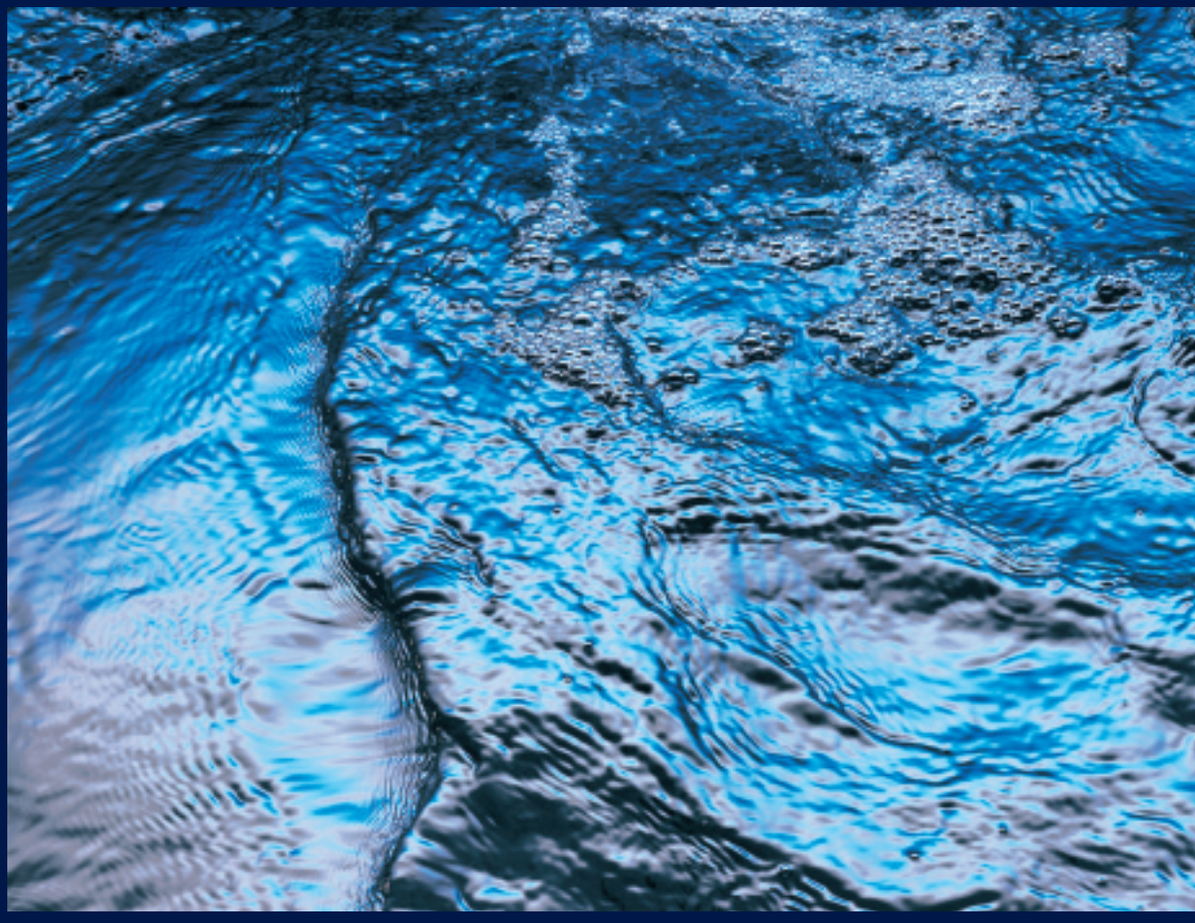
Ministry of Environment, Denmark

Lithuania

Environmental Financing Strategy



DEPA/DANCEE

Danish Environmental Protection Agency
Danish Cooperation for Environment in Eastern Europe

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The work has been coordinated by a DEPA Steering Committee also comprising representatives of the beneficiary ministries in Lithuania.

The opinions expressed in the report are those of the consultant. The Danish Ministry of Environment – Danish Environmental Protection Agency (Danish EPA) and the beneficiary ministries may not agree with these opinions.

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Lithuania. Environmental Financing Strategy

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Table of Contents

Executive Summary

Background

Following the *Environment for Europe* Conference of Environmental Ministers in Lucerne, Switzerland in 1993, many CEE and NIS countries, including Lithuania, formulated environmental strategies or "action plans" at the national, regional or local levels. A major weakness of these action plans has been their failure to assess costs of proposed actions and develop realistic plans for mobilizing and efficiently allocating the financial resources needed to support investments and other activities. Recognizing these shortcomings, the EAP Task Force supported the development of a pilot environmental financing strategy (EFS) in Lithuania in 1997.

An environmental financing strategy is a series of interrelated analyses focused on the costs of environmental actions, the distribution of those costs among stakeholders, and options for financing those costs. Two major goals of an EFS are to determine if funding is adequate to meet anticipated demand and assess the affordability of proposed financing schemes.

In December 1998, the Lithuanian Ministry of Environment indicated its interest in updating the financing strategy and targeting a revised strategy on specific actions needed to meet EU environmental requirements, particularly those for which public financial resources and user fees for water, waste, and energy would be required to cover a significant portion of investment costs. This report, funded by DANCEE, is the outcome of collaboration between the Ministry of Environmental Protection, Milieu Environmental Law Consultancy, Ltd., and the Environmental Policy Center in Vilnius.

Demand for Environmental Financing

In the strategy, expenditures have been assessed, both those that are presently incurred in Lithuania by the private and public sectors, and those that would be required to implement the environmental *acquis*. In terms of total current expenditure for environment as a percentage of GDP, environmental expenditure in Lithuania is quite similar to percentages observed in most CEE and OECD countries. However, in comparison to OECD countries, Lithuania spends only a small fraction of the amounts spent in OECD countries due to the large differences in GDP. Similar patterns are observed for environmental investment expenditures as a percentage of gross fixed capital formation (GFCF).

PAC Expenditures as a Percentage of GDP (selected OECD Countries)

Country	Year	Total Expenditure as % of GDP	Investment Expenditure as % of GDP	Investment Expenditure as % of Gross Fixed Capital Formation
Lithuania	1997	1.13	0.38	2.6
Other CEE countries				
Czech Republic (1)	1994	2.7	-	9.0
Hungary (2)	1995	-	0.6	3.1
Poland (1,2)	1995	1.1	1.0	6.5
Russia (2)	1995	-	0.38	1.6
Slovak Republic (1)	1994	1.3a	-	3.2a
Slovenia (2)	1995	-	0.44	2.1
Selected OECD countries				
Finland (1)	1994	1.1	-	3.0
France (1)	1995	1.4	-	2.0
Germany (1,2)	1994	1.4	0.47	2.8
Netherlands (1,2)	1994	0.6b	0.43	2.2
Portugal (2)	1994	0.7	-	1.7
United States (1)	1994	1.6	-	3.5

Sources: OECD, Pollution Abatement and Control Expenditures in OECD Countries, Summary Table 1, 1998a; OECD, *Environmental Expenditure in Central and Eastern Europe*, Table II.1, 1998b

Notes: [a] Includes only public sector expenditures

[b] 1992 expenditures

The Costs of Approximation

For Lithuania, the body of EU environmental legislation provides the basic set of goals for estimating future demand. Estimates of the demand for environmental financing in Lithuania have been prepared for 19 directives and regulations. All costing studies have been coordinated with the Ministry of Environment to ensure that results can be integrated into the Ministry's approximation strategy as it evolves and is refined to reflect new information.

The table below summarizes cumulative investment costs associated with selected EU directives. By 2015, cumulative investment costs to meet EU requirements for the selected directives would reach almost 1.6 billion Euros. The most costly directives in terms of investment costs will be the urban wastewater directive (91/271/EEC) and the combination of landfill and packaging waste directives (99/31/EEC and 94/62/EEC).

Summary of the Cumulative Investment Costs of Approximation (Year 2000 MEuros)

Directives in which costs primarily are public sector costs		
Directive	**Cumulative investments**	**Main components for which costs were estimated**
91/271/EEC – Urban wastewater	520	wastewater treatment plants and sewerage systems
99/31/EEC – Landfill and 94/62/EEC – Packaging waste	420	new landfill construction, closing of old landfills, collection/sorting systems, incineration plants
80/778/EEC – Drinking water directive	170	construction of iron removal plants, drinking water supply systems
91/689/EEC – Hazardous waste	10	hazardous waste landfill transfer system, incinerator
Administrative costs	4	strengthening of human resources preparation of new legislation etc.
Directives in which costs primarily are private sector costs		
Directive	**Cumulative investments**	**Main components for which costs were estimated**
88/609/EEC – Large combustion plants	34	end of pipe equipment for achievement of necessary emission reduction
98/70/EC- Quality of petrol and diesel	195	technological changes at the Mazeikiai oil refinery.
94/63/EC – VOC directive	25	update of petrol service stations, fuel transfer stations, and Klaipeda port facilities
93/12/EEC – Sulfur content in middle distillates	0	costs are closely tied to predictions of the use of trucks and other vehicles with diesel engines
Chemicals directives and regulations	12	measures for new packaging, labeling, classification, notification obligations, safety data sheets, laboratory updating data bases, updating of vehicles and establishment of new administrative structures, training
91/676/EEC - Nitrates	150	training, construction of manure storage facilities
96/61/EC – IPPC	65	- SO2 reduction facilities
Total	**1600**	

Assuming zero growth of GDP, annualized costs would be approximately 5% of GDP in 2015. These estimates do not consider how these investments and O&M costs would be financed. Thus, actual burdens would be lower to the extent that foreign grant financing reduces domestic costs.

Comparative Analysis of the Costs of Accession

All of the Accession Countries have estimated the costs of approximation with EU environmental legislation. These analyses have been conducted using bottom-up costing methodologies similar to those employed in Lithuania. The table below provides comparisons of cumulative investment costs for the water, waste and air sectors for the ten CEE countries.

Cumulative investment costs for selected sectors in the Accession Countries

	Water Sector		Waste Sector		Air Sector	
Country[a]	mEuros	Euros per capita	mEuros	Euros per capita	mEuros	Euros per capita
Bulgaria (BUL-108)[b]	3,513	413	921	108	3,022	356
Czech Republic[c]	2,500	243	1,152	112	1,535	149
Estonia	595	397	730	487	1,500	1000
Hungary[d]	1,678	166	454	45	1,601	159
Latvia	900	360	330	132	70-215	28-86
Lithuania	690	187	430	160	254	94
Poland (POL –101)	6,524	169	3,695	96	4,317	112
Romania (ROM-101)[e]	3,440	152	2,788	123	402	18
Slovakia (SR-104)	499	94	876	165	939	177
Slovenia (SLO-101)	1,183	623	1,118	588	241	127

Sources: For Estonia and Latvia, estimates were presented during the 5th Baltic Donors meeting in Vilnius, May, 2000; Table 3.4 above for Estonia, Latvia, and Lithuania; Soil and Water Ltd. "Development of Synthesis Reports for Approximation of EU Environmental Legislation" (DISAE, MC-112), November 1999 for remaining countries

Notes: [a] - DISAE Projects in parentheses next to country name

[b] - Bulgaria air sector costs include LCP and IPPC Directives

[c] - Based on estimates by TME (Moses model) and WB

[d] - Based on estimates by TME and EDC

[e] - According to Soil and Water, Ltd, notes "The estimates for Romania in ROM-101 are low and discussed in the report. No explanation is given."

National Affordability Analysis

To examine burdens for the environmental *acquis*, estimates of the costs of approximation are utilized. These burdens are in terms of annualized costs. Because a portion of municipal investments will be financed through grants, annualized investment costs for public investments will overestimate the actual burden.

The ability of the economy and the population to shoulder the burden of approximation with the environmental *acquis* crucially depends on future growth of population, output, household incomes, household expenditures and national budget expenditures. Four household income, output, household expenditure and national budget expenditure growth scenarios are considered in the Strategy (no growth, low growth, medium growth, and high growth). The table below presents national affordability indicators for the medium growth scenario (3.5% annual increase in GDP and other economic indicators during the period 1998 – 2020). The availability of grants from the EU and other donors has a significant dampening effect on the average burden. The burdens relative to incomes and expenditures in 2015 and 2020 for households (in per capita terms) are expected to be quite high under the medium growth scenario.

National Affordability Indicators for the Medium Growth Scenario

Affordability Measure	For the five-year period ending			
	2005	**2010**	**2015**	**2020**
Total Annualized Costs as a Percentage of Current Year GDP	1.05%	1.60%	2.60%	2.45%
Total Annualized Approximation Costs Per Capita (Euros per year)	37.50	68.14	131.71	147.12
Total Annualized Approximation Costs Per Household (Euros per year)	101.26	183.99	355.61	397.23
Primarily Public Sector Annualized Costs Per Household as a Percentage of Average Annual Household Expenditure	0.41%	0.64%	2.07%	1.76%
Primarily Public Sector Annualized Costs Per Household as a Percentage of Average Annual Household Income	0.45%	0.70%	2.09%	1.78%
Total Annualized Costs Per Household as a Percentage of Average Annual Household Expenditure	2.36%	3.61%	5.88%	5.53%
Total Annualized Costs Per Household as a Percentage of Average Annual Household Income	2.38%	3.65%	5.93%	5.58%
Annualized Costs of Directives Mainly Affecting the Public Sector as a Percentage of the Predicted National Budget Expenditures	0.85%	1.34%	3.95%	3.36%

Domestic Sources of Environmental Financing

To meet demand for environmental financing, a combination of domestic and foreign sources has played or will potentially play a role in meeting EU compliance schedules. Domestic sources include State and municipal general revenues, pollution charges and fines, other charges, user fees on municipal services, facility own resources (profits), commercial capital (credits and equity), leasing markets.

State and Municipal General Revenues

The State budget has been the main domestic source of funding for environmental protection needs before 1999. Beginning in 1999, the funds for municipalities to finance environmental activities are allocated out of the Privatization Fund and directly transferred to municipal budgets. State budget expenditures for environmental purposes increased until 1994 and amounted to 3.2% of all budget expenditures that year. Since then, environmental expenditures from the state budget have declined. In 1999, expenditures for environmental purposes were 32 million Lt or 0.5% of the State budget and in 2000, the planned amount is even less than in 1999.

Financing of environmental investments from municipalities' own resources is unusual (excluding revenues from user fees), although some municipalities have recently earmarked municipal budgets for environmental purposes.

Pollution Charges and Fines

Pollution charges and non-compliance fees are the primary sources of revenue for the State Nature Protection Fund and 60 municipal nature protection funds. Annual environmental fund revenues increased to almost 50 million Litas by 1997, but have declined in recent years because of better environmental performance and changes in tariffs according to the new Law on Pollution charges.

User Fees

The major source of revenue for municipal investments is user fees on drinking water, sanitation services, and waste disposal. User fees at their present level cover operation and maintenance costs and VAT of 18%. In 1998, amortization funds amounted to 20% of production costs, but are not large enough to finance new investments. Therefore, the costs of new investments to meet EU requirements would require municipalities to increase the present level of tariffs. At present, tariffs on cold water and sanitation are approximately 1 to 1.5% of household expenditures. Monthly payments for the collection of waste range from 0.5 to 3 Litas per person (or less than 0.5% of household expenditures).

Commercial Capital and Leasing Markets

Since the early '90s, the banking sector has gone through a period of market development and consolidation. The banking sector has experienced steady growth in assets and its loan portfolio, while interest rates have been stable. To date, the banking sector has played a limited role in environmental finance, in part because IFI credit has been more attractive for financing large wastewater treatment construction projects. Lithuanian banks are cooperating with the Lithuania Environmental Investment Fund (LEIF) in providing soft loans with interest rates not greater than 11%. Approximately 100 loan applications have been received by the LEIF since the beginning of its activity. As of July 1, 2000, ten soft loans had been provided to clients.

Beginning in 1995, when the first leasing company in Lithuania was established, private businesses started using this new source of financing. There appear to be approximately 10 leasing companies operating in the market. According to the official data, trucks and trailers account for 40-50% part of the leasing portfolio of the top 5 companies.

Private securities in Lithuania have been traded on the National Stock Exchange of Lithuania (NSEL) since 1993. While the NSE is an important source of equity capital, it contributes to environmental improvement only if the capital is used to renovate existing facilities and upgrade production processes.

Opportunities for Increasing Domestic Sources of Financing

To implement the environmental *acquis*, domestic financing levels will need to be increased. User fees on municipal services provide the greatest prospect for generating additional financing, but mainly for loan repayment. The potential for increasing user charges will depend on a number of factors including the elasticity of demand for the services provided, collection effectiveness, and the acceptability of increased rates, particularly among lower income groups.

The greatest potential for increasing domestic sources of capital is the state budget, although environmental finance from this source has been downward. Whether state support for environmental investment can be increased in the future probably will depend on environmental priorities, availability of alternative financing for environmental investments, etc.

The availability of IFI credits at more favorable terms will probably crowd out domestic capital markets in the near future, except for the leasing of vehicles and equipment. In addition, given the nature of environmental investments, including low financial rates of return and the availability of more attractive domestic investments, the domestic capital market may have limited willingness to supply capital to the environmental sector.

Foreign Sources of Environmental Financing

Bilateral and multilateral grants and credits, IFI loans and windows in local banks and foreign direct investment have already or could potentially be used for environmental financing in Lithuania. The table below summarizes grant and loan financing for environmental purposes in Lithuania provided by donors and IFIs in recent years.

Foreign financing of environmental sector during 1995-1999 (millions of Litas and Euros)

Source of Financing	Grants for technical assistance		Investment credits	
	Litas	Euros[1]	Litas	Euros
The World Bank	-	-	52.8	12.88
EBRD	-	-	59.8	14.59
NEFCO	-	-	12.0	2.93
PHARE	35.7	8.7	59.9[2]	14.6[3]
LSIF	9.02	2.2	50.0	12.2
NIB	-	-	82	20
EIB	-	-	61.5	15
Denmark	113	27.56	123	31
Sweden	…	…	55.2[3]	13.46[3]
Finland	3.28	0.8	18.9[2]	4.6[2]
Norway	…	…	6.0[3]	1.46[3]
Others	…	…	1.6[3]	0.39[3]
Total:	157.72	38.46	357.5	87.2

Source: Ministry of Environment; Draft final report "Development of Programme Approximation and Implementation of EU legislation in water sector in Lithuania", PHARE/DISAE project for Lithuanian Ministry of Environment, May 1999.

[1] The exchange rate between Lt and Euro is 1Euro = 4.1 Lt

[2] Investment grants

[3] Investment grants together with technical assistance

… - Technical assistance is lumped together with investment grants

From ISPA, SAPARD, and PHARE funds, Lithuania is able to receive approximately 100 m Euros each year. At least one quarter of this sum will be devoted to environmental protection investments. Assuming the same proportion is devoted to the environment from structural funds to Lithuania after EU membership, Lithuania would potentially receive 125 million Euros each year for the environment or about five times the amount available between 2000 and 2006.

A number of bilateral donors have actively supported environmental activities in Lithuania. Bilateral donors have provided about 29 million Euros for technical assistance during the period 1995-1999. Denmark is the only country that has provided investment credits to Lithuania during this period. Continued support from bilateral donors will be beneficial to Lithuania, particularly for project preparation and for developing implementation strategies for specific directives.

Foreign direct investment is one of the most important factors guaranteeing the successful development of Lithuania's economy. It is clear that all new investments come with an appropriate environmental approach. Therefore, an increase in new modern investments will translate into additional environmental financing. In 1996 alone, more than 60% of new FDI

came from investors who expanded their operations. Cumulative FDI surpassed 1 billion USD by the end of 1997, and had reached 1.7 billion USD by mid-1999.

Opportunities for Increasing Foreign Sources of Financing

Foreign sources of financing play an important role in supporting investments and technical assistance in Lithuania. It appears that the future level of foreign funding for investment is more than adequate to support the investments that have been identified in the water and waste sectors in Lithuania. However, the important questions concern the nature of special conditions that may be tied to the use of these resources and the capacity of Lithuania to prepare projects and mobilize resources that may be required for co-financing and repayment of loans.

Special conditions have been attached to ISPA projects, allowing these funds to be used for specific types of projects meeting minimum project size requirements. While there are some administrative advantages in establishing minimum project sizes, there are three important limitations. Countries may be encouraged to increase project sizes and/or costs to meet the criteria when in fact the compliance results could be achieved at lower costs. Also, countries may be compelled to adjust their priorities to accommodate financing constraints. Finally, a country may have few projects that are large enough, requiring creative packaging to develop acceptable projects. This can create problems in setting tariffs and servicing loans where several municipalities are implementing the "project."

Lithuania has received considerable bilateral assistance from European countries in developing approximation strategies, for institutional strengthening, and project preparation. Once Lithuania becomes a member of the EU, bilateral assistance from member countries will not be available. Lithuania should explore opportunities to utilize bilateral assistance to the greatest extent possible prior to accession and should give priority to bilateral assistance support that is least likely to be continued by the EU. Second, Lithuania should assess priorities for assistance, and determine the likely amount and uses of technical assistance resources that will be available from the EU after accession. This will enable Lithuania to determine how it will meet the training and capacity needs in the related areas of compliance monitoring, project preparation, and financial management.

Project Cycle Management Capacity

Examples of project cycles in Lithuania include ISPA projects, projects included in the Public Investment Programme (PIP), project applications submitted to the Lithuania Environmental Investment Fund, projects supported by IFI and donor loans, and municipal infrastructure projects. Each project cycle may vary in terms of the level of development and resources devoted to each stage of the project cycle and there may be overlapping responsibilities between implementers and funding institutions. There are eight types of institutions involved in project cycle management in Lithuania. These include the Ministries of Environment, Finance (Central Financing and Contracting Unit), and Economy (Public Investment Programnme), municipalities, Lithuania Environmental Investment Fund, the Housing and Urban Development Foundation, IFIs, and bilateral and multilateral donors.

Critical Constraints on Effective Project Cycle Management Capabilities

There are a number of issues that currently impede effective management of environmental investments in Lithuania. First of all, ineffective use of donor financial and technical assistance is principally a problem of absorptive capacity. The MoE has a very small staff to prioritize, guide and participate in donor-funded technical assistance programs. In addition, Lithuania has been

unable to fully utilize grants and other soft financing provided by donors for investment projects because of limited capacity to identify and prepare projects.

Second, like many countries, Lithuania has responded to each offer of foreign financing by establishing specific rules and procedures for the exclusive use of these funds. Predictably, this results in the creation of special institutions and commissions, with investments being prioritized according to rules tailored mainly to the funding source. As a result, there are overlaps and redundancies in roles and responsibilities and difficulties in co-ordinating between complementary programmes. The creation of the ISPA Implementing Agency could improve coordination among institutions and programmes with similar objectives.

Third, there are substantial unmet training needs required if Lithuania is to rely to a greater extent on local expertise to prepare projects, identify and assess financing, and implement investments. Some of these training activities can only be fruitful if there is an increase in staff levels in national ministries and municipal administrations. The goal should be to develop local experts to carry out future training activities. Also, it will be necessary to assist municipalities in identifying and preparing projects, particularly those projects eligible for grant financing.

Fourth, under the present legal framework Lithuanian municipalities are severely restricted in the ways in which they can raise finances for environmental infrastructure. Until Lithuanian municipalities are given their own powers to tax or charge locally, they will remain dependent on central budget allocations, grants from environmental funds (such as the LEIF and Municipal Nature Protection Funds), international donors, and income from user charges for financing environmental infrastructure and for repaying loans for the same.

An effective process of prioritising environmental investments involves a blend of “top down” and “bottom up” approaches. This financing strategy largely reflects a top down approach, looking at investments needed to meet EU requirements at the national level. However, because municipalities will take most investment decisions, there is a need to strengthen municipal investment planning capabilities, i.e. develop the capacity to prepare municipal investment strategies, reflecting both environmental and other priorities.

The Municipal Environmental Investment Programme

The Municipal Environmental Investment Programme (IP) involves a 4-stage process: (1) development of the project lists; (2) allocation of potential sources of capital to investments and analysis of existing gaps; (3) assessment of cost recovery; (4) the affordability analysis.

The Projects Component

The project team compiled a list of specific projects for the major directives requiring investments by municipalities or municipally owned companies. For each identified project, information was collected and summarized in Excel spreadsheets related to the location and description of the project, estimated investment, O&M and annualized costs, and implementation schedule.

Water Sector The initial water projects database included 204 water and wastewater projects. By bundling of smaller projects and screening of projects on the basis of MoE priorities for the sector, the number of projects was reduced and grouped into four categories according to priority.

Water and Wastewater Projects in the Investment Programme

Priority	Types of Projects	No. of Projects	Investment Costs (m Euros)	Implementation Period
1st	Large UWWT projects (construction and renovation) and UWWT projects in towns w/o WWT	16	170	2001-2005
2nd	UWWT projects (construction and renovation of UWWTplants) grouped with SWR or/and DW projects	8	60	2005-2007
3rd	Large DW projects (usually in municipalities where some investment project was proposed as a first priority project) and small UWWT projects grouped with SW and/or DW projects (UWWTP upgrading projects).	9	50	2008-2011
4th	Regional projects covering DW component and sewerage component.	14	110	2011-2013

Municipal Waste Management Facilities. The development of municipal waste projects was guided in part by the recommendations in the report on the Network of Future Municipal Landfills in Lithuania. The report calls for the construction of 14 regional landfills, contains a time schedule for construction of new landfills based on the status of existing landfills and the need for new waste disposal facilities. As waste cannot be properly managed if disposal facilities are not available, the need for a new landfill was the critical factor in determining time schedule for the implementation of the proposed projects.

Municipal Waste Projects in the Investment Programme

Priority	Types of Projects	No. of Projects	Investment Costs (m Euros)	Implementation Period
1st	Construction of new regional landfills, closure of problematic landfills and introduction of collection and some sorting lines.	12	90	2001-2005
2nd	Closure of old small and medium-sized landfills	11	30	2006-2007
3rd	Closure of the remaining landfills and construction of the first waste incineration and composting facilities.	7	160	2008-2010
4th	Remaining projects in waste sector, including composting systems in certain regions.	7	90	2011-2014

Hazardous Waste Management Facilities. According to the National Hazardous Waste Management Programme adopted by the Government in 1999, a hazardous waste landfill, incineration facility and 5 regional hazardous waste storage facilities are planned. These projects have been included in the list of waste management projects, however, they are not taken into account in the affordability analysis for households in municipalities since O&M costs will be covered by disposal fees paid by private companies.

Allocation and gap analysis

The second stage of the IP includes initialization of the investment capital component and gap analysis. For each project, the available domestic and external sources of financing were allocated to specific projects according to the co-financing rules agreed in discussions with the MoE:

- Scenario I - 50% of project capital costs needs are covered by external grants, 30% from IFI loans, and 20% from domestic sources;
- Scenario II – 50% from external and internal grants and 50% from IFI loans;
- Scenario III – 40% from external and internal grants and 60% from IFI loans.

If the issues related to cost recovery and legal constraints on municipal loans are ignored, none of the three scenarios result in major financing gaps between investment needs and available financing (see table below). The analysis suggests that the major requirements arising from EU accession could be fulfilled by 2015, at least from an investment perspective.

Investment needs for water and waste sector projects in Lithuania for the years 2001-2015 (millions of Euros).

	1st Scenario	2nd Scenario	3rd Scenario
Foreign Grant share	**50%**	**40%**	**30%**
Total Amount Needed	380	304	228
Sources needed on average per year	25	20	15
Available sources per year	~45	~35	~35
IFI Loan	**30%**	**50%**	**60%**
Total Amount Needed	228	380	457
Sources needed on average per year	15	25	33
Available sources per year	As much as needed	As much as needed	As much as needed
Lithuanian share	**20%**	**10%**	**10%**
Total Amount Needed	152	76	76
Sources needed on average per year	10	5	5
Available sources per year	~20	~10	~10

Affordability

The burden of the IP program is analyzed in several ways. For municipalities, the amount of loans and annual costs of servicing the loans is related to municipal income to determine if the IP is feasible in terms of the legal restrictions on municipal borrowing. For households, the costs of debt service and O&M are reflected in water and waste tariffs. "Population" affordability is analyzed in terms of percentage of household income that would be spent on these tariffs. At the national level, IP affordability is examined in terms of the annualized costs of the IP as a percentage of GDP. Three scenarios (denoted A, B, and C) were developed to reflect different assumption about credit terms on loans and O&M costs.

Municipal affordability. The analysis of municipal affordability ignored the possibility that municipalities would be borrowing or servicing debt on non-environmental investments. However, it should be recognized that non-environmental projects might crowd out the projects included in the IP and reduce the willingness of municipalities to undertake environmental projects.

For Scenario A-I with 30% of project costs financed by loans, 50 municipalities would surpass the 10% limit on borrowing for a single loan, while under Scenario C-III, all municipalities would exceed this limit. It is important to note that these results are only for the largest loan each municipality would take in the IP. In fact, each municipality would undertake 3 to 8 loan-financed projects under the IP. However, a waiver to exceed these limits can be obtained if the projects are included in the PIP. Also, municipal budgets can be expected to increase with increasing GDP.

In terms of the other measure of municipal affordability (ratio of loan repayment amount to municipal budget), the 10% limit would not be exceeded for any municipalities under Scenario A-I, with percentages ranging up to 7.2%. For Scenario C-III, the 10% limit would be exceeded by fifteen municipalities. It should be noted that this assumes municipalities are not servicing other loans in the air sector or loans for non-environmental purposes.

Population Affordability. The calculation of population affordability involves determination of the tariffs that would be required to cover loan repayments and O&M costs.[1] In addition, information on current household income and assumptions about rates of growth for household income is needed to assess affordability in the later years of the IP.

For Scenario A-I, the tariffs required in 2015 would be 1.5-1.8 % if incomes rise at 5% per year and 3.4 to 4.1% for zero growth in incomes. For Scenario C-III, the tariffs required in 2015 would be 1.97 to 2.34% if incomes rise at 5% per year and 4.35 to 5.24% for zero growth in incomes.

As long as there is positive income growth, tariffs for water and waste would be below the 5% threshold that is commonly asserted as the maximum acceptable burden. However, these burdens could still be unacceptable to ratepayers in Lithuania. To illustrate the potential gap between acceptable tariff burdens and the implied burdens of meeting the costs of investments and O&M expenditures, the project team conducted a willingness-to-pay survey in the municipality of Ukmerge.

Respondents were asked a series of questions about their willingness to pay higher tariffs to support environmental investments required to comply with selected EU environmental directives. For the various waste and wastewater initiatives presented in the survey, tariffs were estimated that would be acceptable to 50% of respondents. Presumably, at this level, a simple majority of respondents would favor the project if it were presented to them as a referendum.

The willingness to pay results provided an interesting picture of the potential for financing projects out of tariffs. In the case of landfill closures and upgrading of new landfills, the willingness-to-pay responses suggest that there would be adequate support for tariffs needed to cover investment and O&M costs, assuming that Ukmerge can be considered representative of the country as a whole. Extrapolating from the survey results, Lithuanians would be willing to pay up to 103.5 million Litas per year while the estimated costs are only 84 million Litas per year. However, the relationship between willingness to pay and costs for the other projects (recycling of packaging waste, organic waste recovery/recycling and sewerage extensions) is quite different. For these directives, average willingness-to-pay only is 5-10% of estimated costs.

National affordability of the IP. National affordability to accept obligations related to the implementation of EU environmental requirements needs is analyzed for both the water and waste sector costs included in the Municipal Environmental Investment Programme and for the

[1] The main report also examines population affordability in terms of tariffs to cover loan repayment only.

share of annualized costs of covering all expenditures related to the environmental *acquis* (at least those directives covered in the Strategy). Data on the total sums needed and available for the IP have already been presented in the previous section. The state's share in the IP is assumed to be 20% according to Scenario I, and 10% according to Scenarios II and III. The table below indicates the total amount of State financing for the IP for the 20% share and relates these amounts to GDP under two alternative growth assumptions (0% and 3%). The share of state investment needs for the 10% share would be accordingly two times less.

Share of annualised costs of the Investment Programme in GDP

Scenario	**2003**		**2006**		**2009**		**2012**		**2015**	
	0%*	**3%****	**0%**	**3%**	**0%**	**3%**	**0%**	**3%**	**0%**	**3%**
A-I	0.12	0.11	0.29	0.24	0.42	0.32	0.54	0.37	0.64	0.40
C-III	0.13	0.12	0.44	0.36	0.67	0.5	0.87	0.6	1.05	0.66

**- GDP annual growth 0% from 1998 level*

*** - GDP annual growth 3%** from 1999[2] level*

With at least moderate economic growth and expected financial schemes as well as favourable loan conditions, implementation of water and waste sector projects should not be a significant burden for Lithuania although the burden could vary by municipality. Under the worse conditions (scenario C-III), however, the additional burden of 0.66% is already very large, considering that Lithuania presently is spending approximately 1.15% on the environment.

Grouping of municipalities

Municipalities in Lithuania differ in terms of their environmental situation and in terms of their administrative capacities and financial strength to undertake actions that meet the EU obligations by a certain time. To enable the Environmental Ministry to better anticipate the challenges that municipalities will face and to help guide policies and assistance, municipalities can be evaluated in terms of a number of criteria and then placed into one of four clusters to reflect their relative capacities to implement the IP. The criteria included: population, size and strength of the administration of municipality working with environmental issues, number of projects foreseen for a municipality in the IP, municipal budget in per capita terms, municipal affordability to accept loan component in the planned projects capital, municipal affordability to repay loans taken, and affordability of households in a municipality to accept increased tariffs burden.

Conclusions

While the results from the IP, indicating no financing gap and acceptable burdens are very promising, suggesting that Lithuania can make significant progress in complying with EU regulations over the next 15 years, a number of important caveats should be noted:

1. The IP only focuses on two sectors and a few – albeit more costly – directives. The inclusion of investments in air quality will add substantial costs in the public sector.
2. There are a substantial number of directives that will impact the private sector and households. These burdens need to be determined and increased municipal tariffs viewed in this context.
3. The IP has ignored potential competition between non-environment municipal investments and investments in water and waste.
4. The IP has assumed that municipalities will have the capacity (or can access such capacity) to prepare the slate of projects included in the IP. As Chapter 6 suggests, smaller municipalities are somewhat disadvantaged in preparing projects.

[2] See above

It appears that in general terms (ignoring the worst and least expected scenarios), the IP is affordable at the municipal level. There is some flexibility in selecting and prioritizing projects without increasing the burden substantially. However, if the timeframe of the IP were compressed or a larger portion of investment costs were financed by credits, burdens could rise to significantly higher levels. Given that the IP has not exhausted potential grant funding, the latter scenario would likely result only if state support through the PIP and Privatization Fund were reduced.

Also, the legislative limits on municipal borrowing (debt may not exceed 20% of income and loans taken in a given year may not exceed 10% of income) might be one of the major obstacles to implementation of the IP.

Other important factors that will need to be considered in implementing the IP are household and municipal affordability. The known "rule of thumb" of 5% in household budget for water (and waste) allows much larger increases in Lithuanian tariffs than is foreseen to meet EU water and waste requirements. However, such high levels of household expenditures on municipal environmental services may have significant distributional impacts on the elderly and other low-income households. In addition, at least based on the survey results from Ukmerge, it does not appear that households would be willing to pay substantially higher tariffs.

Increasing the loan component of investment costs has a significantly larger adverse effect on burdens than altering the credit terms (at least for the range of credit terms that have been considered). If the loan component were to double from 30% (which accords with MoE policy) to 60% in the worse case scenario, the IP would be extremely difficult to implement in Lithuania.

There are significant differences between municipalities in terms of their ability to finance IP projects. Such differences will need to be recognized and addressed in implementing the IP.

Recommendations

Institutional Capabilities

There are a number of weaknesses in the institutions that play a role in managing projects. Recommendations to address these problems cover three types of needs: improving the performance of institutions, increasing training in project cycle management, and improving the flow of information needed to develop, finance, and implement environmental projects.

Recommendation #1: Lithuania should consolidate many of the project management functions for multi- and bi-laterally funded projects into a single institution.

There has been a tendency in Lithuania and other countries to create institutions or funding facilities to accommodate specific sources of external financing. A proposed investment agency would manage externally-financed projects and would have responsibility for providing or mobilizing project preparation assistance, assisting project implementers in securing financing and preparing financial plans to cover debt service, and monitoring implementation and disbursements. The investment agency would work directly with municipalities, responding to requests for information on financing and coordinating requests for information on compliance responsibilities, environmental technologies, etc. with the MoE. Given the difficulties of creating a new agency and the resource requirements, it may be more practical to consider organizational changes to an existing institution. A practical option would be to consider expanding the functions of the proposed ISPA Implementing Agency over a period of time to enable it to play more of an investment coordination role for the environmental sector.

Recommendation #2: The Investment Agency should develop a sustainable training program to support project cycle management

There is a significant need to expand training in most elements of project cycle management at the local level, including project preparation, familiarization with EU environmental requirements, financial packaging and cost recovery, and preparing applications for financing assistance.

Three issues, in particular, should be addressed. First, as bilateral donor assistance from EU member countries will be terminated upon accession, Lithuania needs to focus some of the currently available assistance resources on developing the capacity to carry out training on a sustained basis. Second, local consultants should be targeted to receive training to build up local capacity in the area of project preparation. Third, as discussed in Chapter 6, a portion of training resources should be focused on building capacity at the municipal level to undertake investment planning.

Recommendation #3: The Investment Agency and Ministry of Environment should co-ordinate the development of information to facilitate project cycle management

There is a considerable body of information that would help municipalities and other institutions more effectively execute their respective roles in project cycle management. This includes: (1) information on legislation and regulations related to investments and financing; (2) lists of institutions that participate in project cycle management and/or can provide project development assistance; (3) EU requirements and technologies/processes that satisfy these requirements; (4) information on financing sources, application forms and instructions, and contact information for obtaining materials and assistance.

Domestic and Foreign Financing

In the next few years, the key challenges will be to utilize foreign grants and long-term credits effectively and mobilize adequate domestic financing to meet co-financing requirements, mainly from the state budget. Also, policymakers need to give attention to municipal borrowing limits, which appear to pose a constraint on municipal investments, except for financing scenarios with the largest foreign grant component. Over a longer time horizon, domestic sources of capital with repayment periods of 10-20 years will need to be developed to enable investment costs to be spread over longer timeframes.

Recommendation #4: Lithuania should implement a consolidated policy for programming public and foreign sources of financing for municipal investment projects in the IP

The government is encouraged to prepare an "implementing" document that incorporates elements of the IP, adopts the allocation rules that have been used in the IP to set priorities for environmental investments, and establishes guidelines for blending public and foreign sources of financing. An appropriate form for this implementing document would be a government decision on the environmental financing strategy.

One weakness in the IP that the government is encouraged to address is the large differences in the financial situation of municipalities and their residents. The use of differential allocation rules (e.g., reducing or increasing the loan component) is recommended to equalize burdens across municipalities with significantly different household incomes and/or municipal service costs.

Components of this consolidated policy for programming public and foreign sources of financing should include the following:

- Establish allocation guidelines for the IP. Three alternative allocation formulas have been analysed for the IP, each with different requirements for domestic and foreign grants, and IFI credits. For most municipal investments, a 50% foreign grant, 30% IFI loan, 20% Lithuanian allocation is recommended.
- Earmark state budget resources to cover IP co-financing requirements. For the recommended scenario (including exceptional investment provisions), approximately 5-10 million Euros are needed on an annual basis. This amount is approximately 0.1% of GDP.
- Provide exemptions from municipal borrowing and refinancing limits for all municipal investments in the IP. As there is already a provision that investments in the PIP do not have to meet the municipal borrowing limits, it is recommended to extend the exemption to all IP projects. Alternatively, the IP could be adopted as the environmental component of the PIP, thereby conveying the same exemption to all IP projects.
- Create an emergency debt repayment mechanism to support municipalities that cannot fulfil their repayment obligations.

Recommendation #5: Lithuania should adopt policy guidelines on the forms and terms of foreign financing best suited to investment needs

Based on the findings and analysis presented in this report, the Ministry is encouraged to develop a policy paper that provides an overview of the funding needs for environmental investments in Lithuania and potential obstacles Lithuania faces in accessing foreign resources. This paper could be provided to donors and IFIs to help them better anticipate the needs of Lithuania (and possibly other accession countries).

Updating The Environmental Financing Strategy

Although the analysis performed is comprehensive and quite detailed for the water and waste sectors, this analysis will become outdated with time.

Recommendation #6: The Ministry of Environment is encouraged to review implementation progress and revise (as needed) the Municipal Environmental Investment Programme

The IP should be viewed as a "living" document that will need to be updated. It is necessary to clarify and update the assumptions that have been made about investment plans for each municipality, determine where environmental investments rank among each municipality's overall investment plans, and identify constraints that may necessitate shifting the proposed year of implementation in the IP. In addition, such a review should examine trends in domestic financial markets to determine if private capital markets could play an expanded role in municipal finance (e.g., financing through municipal bonds).

Recommendation #7: The Ministry of Environment is encouraged to expand and update the IP to include investments in air sector (heating and hot water services).

Recommendation #8: The Ministry of Environment is encouraged to expand the EFS to consider directives that primarily impact the private sector.

Recommendation #9: The Ministry of Environment should consider undertaking an assessment of potential options for reducing costs of approximation.

Potentially, the costs of approximation could also be reduced in a couple of ways. First, this study did not consider the potential role of economic instruments in increasing facility flexibility and lowering compliance costs. There could be some cost savings, but the introduction of economic instruments must be considered in the broader context of EU environmental legislation. Second, the focus of studies that have calculated costs of approximation has been to identify control or end-of-pipe options to satisfy compliance requirements. There may be significant cost savings associated with cleaner production and process changes that have not been fully explored, particularly in the energy sector.

Recommendation #10 The Lithuania Statistical Department is encouraged to expand the set of environmental expenditure and household income indicators to facilitate more detailed and disaggregated trend analysis.

Chapter 1. Introduction

1.1. Development of Environmental Strategies in Lithuania

Following the *Environment for Europe* Conference of Environmental Ministers in Lucerne, Switzerland in 1993, participants agreed to cooperate in executing the Environmental Action Programme (EAP) for Central and Eastern Europe (CEE). With assistance from Western donors and International Financial Institutions (IFIs) such as the World Bank, many CEE and NIS countries formulated environmental strategies or "action plans" at the national, regional or local levels. Ideally, such plans articulate and rank environmental priorities, describe necessary policy reforms and institutional strengthening activities, and consider the investments and other actions required to achieve priority environmental objectives.

To date, a major weakness of these action plans has been their failure to assess costs of proposed actions and develop realistic plans for mobilizing and efficiently allocating the financial resources needed to support required investments and other activities. Recognizing these shortcomings, the EAP Task Force supported the development of a pilot environmental financing strategy in Lithuania in 1997. The goal of this pilot was to demonstrate the potential utility of a strategy narrowly focused on the demand and supply of financing for environmental investments.

Before this pilot was undertaken, the Government of Lithuania had already developed a National Environmental Strategy in 1995, approved by Parliament in 1996. It established 44 goals in 10 environmental and natural resource categories. Like other action plans, it lacked adequate cost details and a financial plan of action. The Lithuanian Ministry of Environmental Protection accepted the EAP Task Force's proposal to prepare an environmental financing strategy (EFS). The strategy was prepared in 1997-1998, in co-operation with EAP Task Force consultants and the Harvard Institute for International Development.

The Strategy focused on only three sectors (stationary sources of air pollution, mobile sources of air pollution, and waste management) because of limited resources to conduct the analysis. These sectors were selected because of the government's interest in emerging sectors that had received less technical and financial support (wastewater treatment in Lithuania has received by far the largest share of government and external support) and interest in exploring the financing issues for a cross-section of "polluters" (i.e., motorists, firms, municipalities, and households).

The Lithuanian EFS identified options for addressing the sources of pollution, included estimates of the investment costs associated with these actions, and provided a useful summary of existing sources of funds for environmental investment, particularly those provided by the public sector and external funding sources. However, the Strategy had some limitations. These included: (1) absence of transparent environmental goals for each sector; (2) inadequate consideration of the environmental management costs to facilitate proposed actions; (3) lack of detailed analysis of the sources of domestic and

external financing; and (4) and a limited number of recommendations for mobilizing additional financial resources.

In the same timeframe of the pilot EFS, Lithuania had begun preparations for EU Accession. As part of these preparations, they had requested assistance from the EU-PHARE Programme in developing an approximation strategy for the environment sector. This study, undertaken by Milieu, Ltd., included comprehensive estimation of the costs of implementing the *environmental acquis.* A number of additional projects have also focused on accession, assessing changes required to implement EU directives and/or analyzing the associated costs of approximation. Table 1.1 provides an overview of the projects undertaken in Lithuania to date. More detailed descriptions of these projects are provided in Annex 2.1.

Table 1.1. Summary of Projects of Relevance to the Lithuanian Environmental Financing Strategy

Sector	Funding Agencies	Number/Type of Projects
Water projects	• EU-PHARE • UK Know How Fund • DEPA • Lithuanian Ministry of Environment	• 4 approximation projects • 6 standard related projects • A number of feasibility studies
Waste projects	• EU-PHARE • Lithuanian Ministry of Economy • DEPA	• 4 approximation sub-projects in one big approximation project • 2 hazardous waste projects • 1 waste strategy outline related project
Air projects	• EU-PHARE • DEPA • DG Environment • Lithuanian Ministry of Environment	• 3 approximation projects • 4 specific technical projects
Other	• EU-PHARE • DEPA	• 4 approximation projects in noise, chemicals, GMOs and IPPC sectors

The Lithuanian Ministry of Environment has expressed interest in revising the financing strategy and targeting it on specific actions needed to meet EU requirements, particularly those for which public financial resources and user fees would be required to cover a significant portion of investment costs. The EU will require accession countries to develop compliance schedules that elaborate specific projects to be undertaken and the proposed strategy for financing these projects. Although Lithuania is not among the earliest CEE candidates for EU membership, it is eligible to participate in EU-funded investment programs that may be utilized to satisfy future EU compliance requirements.

In addition, given the existing level of financial resources for environmental investments relative to the anticipated costs, Lithuania is well-advised to implement a financing strategy now.

1.2 Goals of the study

Environmental financing strategies are intended to address the shortcomings of action plans. Financing strategies should include four key elements:

(1) a review of major environmental policy objectives;
(2) an analysis of the costs of meeting these policy objectives;
(3) a review of current trends in financing environmental investments; and
(4) identification and evaluation of financing, policy reform, and institutional strengthening options needed to implement environmental investment programs.

This report presents the results of the project funded by the Danish Ministry of Energy and Environment and carried out by Milieu, Ltd., during the period 1999-2000. Specific objectives of the project have included the following:

- Refine and/or develop estimates of the costs of complying with selected EU Directives.
- Evaluate the sources of financing needed to meet these requirements.
- Develop recommendations for options to close the financing gaps and for strengthening environmental financing institutions.
- Utilize and build on analyses in the existing Approximation Strategy and associated costing study to determine the environmental management resource requirements and costs to implement the selected EU Directives.
- Develop recommendations for specific compliance projects and identify steps the Lithuanian government needs to take to develop project pipeline to enhance use of EU financing.

This current report addresses most of the weaknesses of the first environmental financing study enumerated in the first section. Specifically, this report has benefited from the development of transparent environmental goals designed to harmonize with the body of EU environmental legislation. These goals have facilitated more refined development of the costs of approximation and the identification of specific investments. This report also includes a more detailed analysis of current and potential sources of domestic and external financing than its predecessor. While it does not provide more detailed information on environmental management costs associated with the EU-driven goals, the report does look more closely at the options for expanding project cycle management capacity, perceived to be an important constraint in implementing investments. In addition, the current report provides detailed analysis of affordability at the national and sub-national levels, and provides a project-specific analysis of municipal environmental financing in the water and waste sectors.

1.3 Outline of the Report

The report is divided into eight chapters, including the present chapter, and several annexes. Generally, the annexes provide detailed descriptions of studies, data, and analyses, while the chapters provide only a synthesis of findings.

Chapter 2 provides an overview of environmental expenditures in Lithuania. The chapter also compares environmental expenditures in Lithuania to those for other CEE countries and selected OECD countries. Chapter 3 presents estimates of the costs of approximation, including the costing methodology used to estimate costs for the major EU directives. Costs of approximation are presented in terms of annualized costs and cumulative investment costs for the major environmental directives. Annex 3.1 provides an overview of the methodology that has been used throughout the study to develop the financing strategy and associated analyses while Annex 3.2 describes the various costing studies that have provided information on the costs of approximation. Chapter 3 also compares costs of approximation for Lithuania to those for other accession countries and assesses national affordability.

Chapter 4 and Chapter 5 describe the current sources of domestic and external financing for environmental investments, respectively. These chapters also provide some conclusions on the prospects for expanding available financing in Lithuania.

Chapter 6 examines the issue of project cycle management capacity in the environmental sector, provides an overview of the institutions that play a role in project cycle management, and identifies capacity needs to implement investments.

Chapter 7 presents the Municipal Environmental Investment Programme. This is a fifteen-year investment program emphasizing the implementation of investments in the water and waste sectors. A number of Annexes provide greater detail of the analyses summarized in this chapter. Finally, Chapter 8 provides a summary of recommendations.

Chapter 2. Domestic Environmental Expenditures

This chapter provides an overview of current expenditures on the environment in Lithuania. The first section defines the measures of costs that are used in the strategy. In this chapter, the measure of costs used throughout is environmental expenditure, while other measures of costs, such as annualised costs are used in the strategy to assess affordability. The second section presents information on environmental expenditures in Lithuania while the final section provides comparisons between expenditures in Lithuania and other CEE countries and selected OECD countries.

2.1 Environmental Expenditure and Costs

Two measures of environmental costs are commonly used to describe the commitment of financial resources to environmental activities. **Expenditures** refer to the sums of money that are actually spent on the purchase of goods and services. In the OECD methodology, expenditures are divided into two categories:

- **Investment costs** are expenditures on equipment, machines, buildings and construction works. Their distinguishing feature is their durability. Typically, investment costs are incurred at the start of a project, requiring substantial cash and/or access to credit or other sources of capital.
- **Current costs** refer to expenditures associated with the operation (such as fuel and labor) and maintenance (repairs, periodic upkeep, replacement of consumables such as filters) of investments to ensure that capital equipment, structures, and facilities function according to design standards. Current costs also include expenditures related to self-monitoring, record keeping, and other expenses that may be required to comply with permits, standards, or other regulations. Generally, current costs are also referred to as operations and maintenance (O&M) costs.

Investment and O&M costs are the measures of cost that are featured in OECD's survey of environmental expenditures for its member countries.

Annualized costs are the costs attributable to a particular year (e.g. year 2005), and are composed of (1) *operations and maintenance costs*; and (2) *annualized investment costs*. Although annualized costs are not observed like their component parts, they better reflect the opportunities foregone in making investments. Annualized costs are used to estimate national burdens associated with paying for the costs of approximation. The ratio of annualized costs to GDP can be used to make inter-country comparisons. Investment costs are annualized using the standard amortization formula cited in Anderson and Peszko (1997).

This formula attributes an equal share of principle and interest costs to each period. The formula for calculating annualized costs (AC) is the following:

$AC = I * r / (1-(1+r)^{-n}) + O + M$

where:

I = investment outlay
r = annual interest rate
n = lifetime of the investment in years
O = operations cost
M = maintenance costs

Annualized investment cost provides a measure of the services provided by the capital asset each year. This asset is "used up" or depreciated over time until its useful life is ended. The lifetime of the investment "n" or the depreciation period is usually assumed to be between 10 and 20 years (or even longer for some infrastructure investments). It is important to recognize that annualized investment cost does not represent an actual outlay or expenditure. If a facility raises the capital for an investment from a loan, annual repayments could approximate annualized investment costs provide the repayment period and interest rate are similar to "n" and "r" in the formula above.

2.2 Environmental Expenditures

Investment in the private sector (including environmental investment) has been rapidly growing in Lithuania in recent years. Overall, private sector investment increased by 3.7 times during the period 1994-1998. In 1998, total investment in the private sector was 3.6 billion Litas, only slightly higher than public sector investment of 3.2 billion Litas. Manufacturing accounted for 25% of investment in the private sector, followed by transport and storage (18%), telecommunications and courier services (15%), and wholesale and retail trade (13%).

Total investment activity in Lithuania for the year 1998 is presented in Table 2.1. This table summarizes investment activity for both the public and private sectors. In 1998, public sector investment accounted for about 47% of total investment in Lithuania. Three sectors – transport and storage, electricity, gas, and water supply, and public administration – accounted for 64.2% of investment in the public sector. In the private sector, manufacturing accounted for one-fourth of investment, followed by transport and storage (18.3%), post and telecommunications (15.5%), and wholesale and retail trade (13.4%). In terms of total investment, transport and storage accounts for nearly one-fourth of all public and private sector investment.

Annual Survey of Environmental Expenditures

Official investment statistics in Lithuania do not present separate information for environmental investments or for O& M expenditures. However, since 1996, Statistics

Lithuania has conducted a survey of public and private enterprises to estimate expenditures on investments in environmental protection and production processes and O&M expenses. The indicators included in the survey have been selected on the basis of concepts expressed by structural business statistics and the SERIEE (System for the collection of economic information on the environment) regulations. The survey has applied standard sampling methods to reduce the costs of the survey by using a smaller random sample of enterprises.

Table 2.1 Investment by activity in 1998 (millions of Litas)

	Total Investment	As a % of total	Public sector investment	As a % of public sector	Private sector investment	As a % of private sector
Total	**6,833.6**	**100.0**	**3,214.9**	**100.0**	**3,618.7**	**100.0**
Agriculture, hunting and forestry, fishing	167.5	2.5	82.1	2.5	85.4	2.4
Mining and quarrying	280.2	0.4	5.2	0.2	22.8	0.6
Manufacturing	1,081.5	15.8	176.2	5.5	905.4	25.0
Electricity, gas and water supply	739.3	10.8	713.4	22.2	26.0	0.7
Construction	186.4	2.7	9.4	0.3	177.1	4.9
Wholesale and retail trade; repair of personal and household goods	501.5	7.3	16.6	0.5	484.9	13.4
Hotels and restaurants	58.4	0.9	11.0	0.3	47.4	1.3
Transport and storage	1,599.1	23.4	937.8	29.2	661.3	18.3
Post and telecommunications	591.2	8.7	31.5	1.0	559.7	15.5
Financial intermediation	234.3	3.4	112.8	3.5	121.5	3.3
Public administration and defense; compulsory social security	411.2	6.0	411.2	12.8	-	-
Education	135.3	2.0	134.6	4.2	0.7	0.0
Health and social work	192.1	2.8	188.2	5.9	3.9	0.1
Sewage and waste disposal, sanitation and similar activities	167.6	2.5	166.3	5.2	1.3	0.0
Recreational, cultural and sporting activities	89.5	1.3	80.4	2.4	9.1	0.2
Other activities	142.9	2.1	52.9	1.6	90.0	2.6
Construction of residential houses	507.5	7.4	85.6	2.7	422.0	11.7

The survey was targeted at enterprises with 5 or more employees engaged in economic activities that potentially could be expected to incur costs to address environmental problems. Some problems in conducting the survey that limit its accuracy and utility in

characterizing environmental expenditures should be noted. Among the problems are the following:

- Some expenditures are difficult to separate into their environmental and economic components. Thus, while it is known that many improvements in production processes also yield environmental benefits, these costs are not separable;
- Definitions of what should be included for some kind of companies' activities and domain is not very clear in the SERIEE manual;
- Enterprises lack experience in completing the new statistical forms;
- There are still problems in the business register;
- There is no clear distinction in reporting between private and public companies;
- The Statistical Department is still in the process of acquiring new knowledge related to the collection, reporting and management of environmental statistics.

It should be especially stressed that bookkeeping practices within companies (non-existence of environmental accounting at the enterprises) limit the accuracy of expenditures, in part because there is not a clear separation of enterprises' own resources devoted to the environmental investments and grants and loans received from other financing donors. Nevertheless, below we present statistics resulting from the joint efforts of the Lithuanian Statistical Department and companies to divide funds for investments according to financial sources.

In the future, the Lithuanian Statistical Department may obtain improved information if their surveys provide examples for investment and environmental expenditures needs to better acquaint staff of companies with the required separation of expenditures.

The survey results for 1997 and 1998 are presented in Table 2.2 on the next page. For the purposes of the Strategy, the project team has separated companies into private and public, even though the survey reports from the Statistical Department are not presented in this way. According to the survey, about 500 million Litas in environmental expenditures were made in 1998, an increase from 1997 of approximately 70 million Litas. Public companies account for the largest portion of investments for environmental measures (about 75% in 1998) while investments in production process changes and operational expenditures are more evenly divided between public and private companies.

It should be stressed that enterprises have been categorized according to their main type of economic activity in accordance with the international NACE classification system. Thus, for water supply companies, all investments (including those for the wastewater) are put under the line Water extraction, improvement and distribution, because the main registered activity of these companies is water supply, but not wastewater treatment. Hence, investments for water extraction are overstated and wastewater investments understated in Table 2.2 because enterprises engage in both types of activities. In fact, investments in the wastewater disposal category are limited to some small private companies.

Table 2.2 Environmental Expenditures of Enterprises by type of Economic Activity in 1997 and 1998 (thousands "t" or millions "M" of Litas)

	Investments				Operational expenditures	
	for environmental measures		for production process changes			
	1997	1998	1997	1998	1997	1998
Total	**144.3 M**	**156.1 M**	**20.7 M**	**8.0 M**	**267.5 M**	**344.5M**
Private Companies	**17.4 M**	**32.4 M**	**10.4 M**	**5.3 M**	**138.2 M**	**172.3 M**
Mining and quarrying	**62.5 t**	**28.5 t**	**-**	**-**	**485.4 t**	**1.1 M**
Manufacturing industry:	**12.2 M**	**23.3 M**	**10.0 M**	**5.2 M**	**100.0 M**	**104.9 M**
Food products and beverages	5.1 M	4.2 M	4.0 M	-	31.4 M	30.9 M
Tobacco products	-	-	-	-	86 t	5 M
Textiles	76.5 t	518.2 t	9.2 t	37.0 t	10.5 M	9.0 M
Clothing apparel, finishing and fur dyeing	0.4 t	93.7 t	-	-	1.2 M	843.1 t
Leather and leather products	2.2 M	80.3 t	-	-	1.4 M	2.4 M
Wood and wood products (furniture excluded)	89.3 t	1.4 M	-	-	3.4 M	3.0 M
Pulp, paper and paper products	79.0 t	2.2 M	25.0 t	-	6.4 M	5.6 M
Publishing, printing and reproduction	-	-	-	-	271 t	206 t
Refined petroleum products	3.4 M	3.2 M	-	-	16.1 M	17.6 M
Chemicals and chemical products	109.4 t	2.9 M	2.7 M	338.0 t	11.7 M	10.7 M
Rubber and plastic products	140 t	160 t	-	-	147 t	173 t
Non-metallic mineral products	179.8 t	311.1 t	2.8 M	2.3 M	3.4 M	4.4 M
Basic metals	232 t	21 t	-	20 t	805 t	721 t
Fabricated metal products	6 t	64 t	-	-	485 t	642 t
Machinery and equipment	64.6 t	36.8 t	3.5 t	4.3 t	1.7 M	3.5 M
Electrical machinery and supplies	81.6 t	150.0 t	-	-	1.7 M	703.7 t
Radio, television and communication equipment and supplies	113.7 t	886.8 t	130.3 t	98.8 t	4.0 M	4.4 M
Motor vehicles, trailers and other transport equipment	149.0 t	154.4 t	18.0 t	-	3.5 M	3.6 M
Medical, precision and optical instruments	-	-	-	-	345 t	32 t
Furniture	151.0 t	22.0 t	200.0 t	2.4 M	1.5 M	1.5 M
Recycling	-	2.3 t	-	-	10.4 t	8 t
Construction	**481.5 t**	**2.1 M**	**171.6 t**	**-**	**6.8 M**	**8.4 M**
Supporting and auxiliary transport activities	**2.0 M**	**5.4 M**	**-**	**-**	**192.0 t**	**435.6 t**
Wastewater disposal, sanitation	**2.7 M**	**8.6 M**	**233 t**	**78.6 t**	**30.7 M**	**57.4 M**
Public companies	**126.9 M**	**123.7 M**	**10.3 M**	**2.7 M**	**129.3 M**	**172.3 M**
Electricity, gas, steam and hot water supply	44.9 M	6.7 M	6.2 M	1.1 M	8.4 M	8.4 M
Water extraction, improvement and distribution	81.9 M	116.9 M	4.1 M	1.6 M	104.5 M	163.8 M
Recycling	-	-	-	-	-	78.9 t

Source: Statistical department and authors' own adjustment according to categories of companies

An alternative way of viewing expenditures by enterprises on environment is to examine the types of environmental problems addressed by investments and operational expenditures. In Table 2.3, the survey data for 1997 and 1998 have been organized according to the type of environmental protection activity undertaken. It should be stressed that current (operational) expenditures in the table below exclude operational expenditures from so-called specialized enterprises. Water supply companies (dealing with water supply and wastewater treatment) are under the category of specialized companies. Thus, the table provides information on the amounts of funds spent for

environmental purposes in different companies for which the primary activity isn't related to the environmental protection.

Table 2.3 Expenditures of enterprises on environmental protection by type of environmental protection activity in 1997 and 1998 (millions of Litas)

	Investments				Operational expenditures	
	for environmental protection measures		for changes in production process			
	1997	1998	1997	1998	1997	1998
Total	144.3	156.1	20.7	7.9	116.5	120.5
Protection of water resources	93.0	130.8	6.9	1.9	84.2	86.4
Waste management	3.6	10.7	1.7	0.4	13.0	16.2
Air protection	4.0	11.9	12.1	5.6	17.4	14.6
Other areas	43.8	2.7	-	-	1.9	3.3

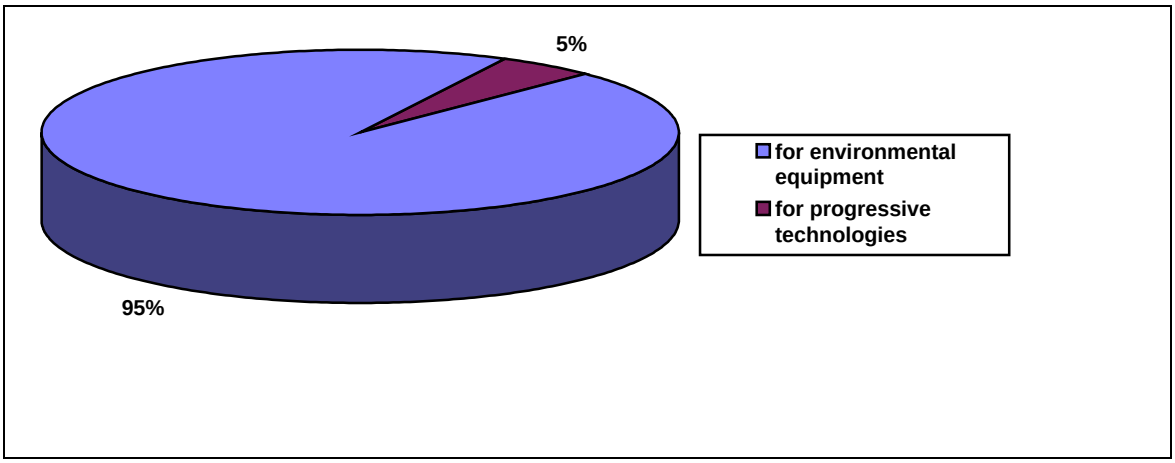
Source: Statistical department

The largest share of investments on environmental protection measures and operational expenditures in non-specialized companies was devoted to wastewater treatment (65 and 77 per cent of all expenditures in 1997 and 1998). Investments in production process changes were dominated by air protection with 58% and 71% of the total for this category in 1997 and 1998. The category "other areas" included environmental protection activities such as noise and vibration and protection of biological and landscape diversity accounted for 30% of investments in environmental protection in 1997, declining to less than 2% in 1998.

Large enterprises (with 100 and over employees) accounted for up to 93 per cent of all environmental investment. Enterprises with over 200 employees in 1996 accounted for 67% of all investment and 81% of operational expenditure, while in 1997 these figures were 91% and 71%, respectively.

As indicated in Figure 2.1, the overwhelming share of environmental investments was direct expenditures on environmental protection equipment rather than on progressive technologies.

Figure 2.1 Investments for environmental protection equipment and introduction of progressive technologies in 1998



It was mentioned above that some preliminary results are started to be collected in the Department of Statistics of Lithuania concerning the investments from different sources. The tables below provide information on the main distribution of sources for environmental investments.

Table 2.4 Investments for air quality by financing sources (thousands of Lt)

	For environmental measures	For production process changes
Total	**11926.0**	**5621.1**
State budget	-	-
Municipal budget	2044.3	46.0
Own sources: • of which received from foreign sources	8841.6 -	1315.0 -
Bank loans: • of which foreign	242.2 -	1910.0 -
Other sources (state funds)	797.9	2350.0

Table 2.5 Investments for water protection by financing sources (thousands of Lt)

	For environmental measures	For production process changes
Total	**130772,4**	**1948.2**
State budget	47324.1	-
Municipal budget	9314.6	16.1
Own sources: • of which received from foreign sources	59495.7 31456.0	1932.1 1049.1
Bank loans: • of which foreign	8037.3 4778.0	- -
Other sources (state funds)	6600.7	-

Table 2.6 Investments for waste management by financing sources (thousands of Lt)

	For environmental measures	For production process changes
Total	**10675.1**	**351.6**
State budget	107.9	-
Municipal budget	4439.0	-
Own sources: • of which received from foreign sources	4871.0 -	351.6 -
Bank loans: • of which foreign	1200.0 -	- -
Other sources (state funds)	57.2	-

The tables above indicate that significantly different investments sources were used for different environmental media. Water traditionally receives the greatest support from the state while air protection is not supported by the state at all. The waste sector is becoming a higher priority in environmental policy and, as municipalities are responsible for this sector, they play the main assisting role in investment area either from their budgets directly or through waste companies that in most cases still belong to municipalities. As the numbers demonstrate, there is likely to diminishing state support (this is relevant to water sector) in the future, so planning of investment sources needs to take this fact into account. Concerning the air sector, after responsibility for the operation of energy plants was transferred to municipalities, they most probably will demand a larger portion of municipal funds for investments.

Even though the survey results are only approximate, they do provide a perspective on the level of environmental expenditure relative to other economic indicators in Lithuania. Table 2.7 relates environmental expenditures to GDP for the years 1997 and 1998.

Table 2.7 Environmental Expenditures as a Share of GDP

	1997		1998	
	Million Lt	% of GDP	Million Lt	% of GDP
GDP	38,201.0		42,767.9	
Environmental expenditure with current expenditure of specialized companies	432.5	1.13%	508.6	1.19%
Environmental expenditure without current expenditure of specialized companies	281.5	0.74%	284.6	0.67%
Environmental investments	165	0.38%	164	0.38%

2.3 Comparisons of Lithuanian Environmental Expenditures with Other Countries

To provide perspective on the level of environmental expenditures in Lithuania, Table 2.5 presents comparable expenditure data for selected CEE and OECD countries. The expenditure data in the table are derived from two sources. Most of the CEE countries listed in the table were included in an analysis of investment expenditures conducted as part of the EAP Task Force work programme. This study did not include analysis of current costs, hence the missing observations for total expenditure as a percentage of GDP. Expenditure information for OECD countries is reported in OECD's survey of its members. This survey was conducted in 1996. Hence, the most recent expenditure data reported is for 1995. All expenditure data reported in both of these studies follows the OECD methodology for pollution abatement and control (PAC) expenditures.

In terms of total expenditure for environment as a percentage of GDP, environmental expenditure in Lithuania is quite similar to percentages observed in most CEE and OECD countries. However, in comparison to OECD countries, Lithuania spends only a small fraction of the amounts spent in OECD countries due to the large differences in GDP. As noted in Table 2.5, environmental expenditure as a percentage of GDP in the Czech Republic are approximately twice levels in most CEE and OECD countries. As the Czech Republic is one of the more advanced CEE countries in its efforts to harmonize with EU environmental legislation, its level of environmental expenditure may be indicative of the level of expenditure that other CEE countries may have to make to catch up with OECD countries.

Table 2.5 - PAC Expenditures as a Percentage of GDP (selected countries)

Country	Year	Total Expenditure as % of GDP	Investment Expenditure as % of GDP	Investment Expenditure as % of Gross Fixed Capital Formation
Lithuania	1997	1.13	0.38	2.6
Other CEE countries[c]				
Czech Republic (1)	1994	2.7	-	9.0
Hungary (2)	1995	-	0.6	3.1
Poland (1,2)	1995	1.1	1.0	6.5
Russia (2)	1995	-	0.38	1.6
Slovak Republic (1)	1994	1.3[a]	-	3.2[a]
Slovenia (2)	1995	-	0.44	2.1
Selected OECD countries				
Finland (1)	1994	1.1	-	3.0
France (1)	1995	1.4	-	2.0
Germany (1,2)	1994	1.4	0.47	2.8
Netherlands (1,2)	1994	0.6[b]	0.43	2.2
Portugal (2)	1994	0.7	-	1.7
United States (1)	1994	1.6	-	3.5

Sources:

(1) OECD, *Pollution Abatement and Control Expenditures in OECD Countries*, Summary Table 1, 1998a

(2) OECD, *Environmental Expenditure in Central and Eastern Europe*, Table II.1, 1998b

Notes:

[a] Includes only public sector expenditures

[b] 1992 expenditures

[c] The Czech Republic, Hungary, and Poland are also OECD countries

Similar patterns are observed for environmental investment expenditures as a percentage of gross fixed capital formation (GFCF). At 2.6% of GFCF, Lithuania is investing in environmental at a level that is comparable to most OECD countries and Slovenia and Hungary among CEE countries. However, investment in the environmental sector in Lithuania significantly lags behind other accession countries such as Poland, the Czech Republic, and Slovak Republic.[3] In the case of the Czech Republic, environmental investment as a percentage of GFCF is more than three times the percentage in Lithuania. Again, this comparison may be suggestive of the acceleration in environmental investment that may be observed in Lithuania and other accession countries in the next decade.

[3] Although the percentage for the Slovak Republic is similar to that for Lithuania, only public sector investment is reflected in the percentage for the Slovak Republic.

Chapter 3. The Demand for Environmental Financing in Lithuania

The demand for environmental financing represents the level of expenditures associated with the implementation of specific actions to meet environmental goals. To determine this level of expenditures requires the specification of well-defined goals, quantifiable targets and associated compliance schedules. These parameters are needed to specify the actions to be taken by facilities and estimate their costs. Once costs have been estimated for individual actions, they can be aggregated to obtain demand by directive or environmental sector.

The purpose of this chapter is to present estimates of the potential magnitude of demand for environmental financing in Lithuania. In order to develop these estimates, several simplifying assumptions have been made to make the analysis more tractable. The focus of the demand analysis is on the body of EU environmental legislation. While Lithuania may choose to deviate from EU legislation by adopting more stringent requirements, the EU legislation provides a reasonable first approximation of the environmental policy program that Lithuania will develop in preparing for membership. The Environmental *Acquis* is made up of over 300 Directives and Council Regulations with which Lithuania will need to approximate. However, the major portion of the costs of approximation is associated with about ten to fifteen costly directives (EDC-EPE, 1997). As a result, given funding and time constraints, the analysis of demand focuses more narrowly on those EU directives and regulations that are expected to engender the most significant expenditures.

The remainder of the chapter is organized into four sections. Section 3.1 provides an overview of the costing methodology that has been used to estimate demand. Additional discussion of this methodology is provided in the EFS Methodology Paper (Annex 3.1). Section 3.2 provides estimates of the potential costs of approximation for selected directives. Section 3.3 presents a sample of costs of approximation developed for other EU accession countries and compares these to estimates developed for Lithuania. Section 3.4 presents analysis of national affordability, based on the cost calculations presented in Section 3.2.

3.1 Costing Methodology

Ideally, demand should cover all of the expenditures incurred to achieve a specific environmental objective. These expenditures include the management costs of environmental authorities to design, implement, monitor, and enforce policies, plus the costs incurred by facilities, households, or individuals to satisfy the requirements of the policies. This latter set of expenditures include both investment costs and related operating and maintenance costs. While some estimates of management costs are provided for the selected directives, the primary focus of the Strategy is on the costs borne by facilities to comply with EU environmental legislation.

The estimation of the costs of approximation reported in this chapter has two "bottom-up" methodological bases. For some of the directives, the basic costing methodology is the MOSES model developed by TME Ltd. in the Netherlands, then adapted for use in Lithuania by Milieu Ltd. (1998). This methodology employs a technology database and associated unit costs of achieving pollution reductions, facility data, and a cost minimization algorithm to match facilities to known technologies. For individual facilities, the cost estimates derived using the MOSES model will be less accurate than costs determined during the process of preparing an actual investment project. However, the MOSES model requires considerably less data and processing time and appears to be adequate for making aggregate cost calculations. Where estimates developed by Milieu Ltd. have been used, the project team has updated these estimates, principally by adjusting costs for inflation, since the previous study used 1996 as a base year and the Strategy uses the year 2000.

The second bottom-up costing approach is based on more detailed and/or updated information on investment projects that has been developed by more recent donor projects in Lithuania. Generally, these projects have had a narrower focus than the previous Milieu project and could incorporate more recent cost and technology information into estimates and even identify specific technologies for existing or proposed facilities.[4] As a result, some of the original cost estimates prepared by Milieu Ltd. have been revised on the basis of more recent studies by Soil and Water (1999), COWI (1999) and Danagro (2000).

In virtually all the costing work, a number of approximation scenarios could be considered for each directive. In some cases, assumptions have been made in the costing work about how a directive would be interpreted, whether it would be strictly applied, and the timing of compliance. All of these issues will be addressed in negotiations between the European Commission and the Government of Lithuania. For example, will Lithuania need to expand its already extensive network of sewers to approximate with 91/271/EEC? Will Lithuania agree to mandatory organic waste recovery? Depending on the answers to these questions, costs can vary by millions of Euros per year.

[4] For example, Milieu Ltd (1998) estimates for 91/271/EEC and Council Directive 99/31/EC on the landfill of waste were refined under two recent projects: (1) *Development of Programme for Approximation and Implementation of EU Water Legislation in Lithuania and* (2) *Strengthening the Framework and Administration of Lithuania's Laws on Waste Management and Environmental Management of Industry* respectively sponsored by PHARE/DISAE and the Danish Government. In addition, as part of the Danish sponsored project mentioned above, a strategy for recycling solid wastes was completed by CowiConsult, with support of the Government of Denmark.

3.2 The Costs of Approximation

3.2.1 Summary of Approximation Studies in Lithuania

As noted above, the costs of approximation reported below have been developed in a number of studies. The most important and comprehensive study was the Milieu, Ltd. Project to develop a Lithuanian strategy for approximation with the environmental *acquis.* This project developed estimates for fourteen of the highest cost directives, including investment, O&M, and management costs. It represented the first comprehensive effort to calculate the costs of approximation in an accession country.

The results in Milieu Ltd. (1998) were presented in five-year blocks from 1996 to 2020. In general, 2015 and 2020 cost results are similar or identical, because of the difficulty of forecasting so far in the future. The first year of the analysis was 1996, which means that costs were expected to begin during that year and it was that year that served as the base year for present value calculations. As of 2000, it is clear that relatively little progress on implementing the *acquis* has occurred in Lithuania. One exception is construction or renovation of wastewater treatment plants. During the last 5 years, construction of a number of such plants was completed. The costs of approximation presented in this chapter have not been adjusted to reflect expenditures that have been incurred between 1996 and 2000. In Chapter 7, where the Municipal Investment Programme is developed, the costs of investments in the water sector are adjusted appropriately to account for the most recent upgrades of wastewater treatment plants. In any case, it makes little sense to continue to view 1996 as the base year, and this reference point is therefore moved to 2000. In cases where cost estimates have not been updated since Milieu Ltd. (1998), the expenditures envisioned in Milieu Ltd. (1998) to occur during the period 1996-2000 were simply shifted to 2001-2005.[5]

Over time, the body of directives studied in Lithuania has expanded. For example, since the Milieu Ltd. study was completed in 1998, the project titled *Development of A Programme for Approximation and Implementation of EU Water Legislation in Lithuania* estimated the costs of 80/778/EEC (the drinking water directive). The costs of approximation with the main directives and regulations on chemicals (DIR 67/548/EEC as amended, DIR 76/769/EEC as amended, DIR 88/379/EEC as amended, DIR 94/55/EC, REG 92/2455/EEC, REG 93/793/EEC, REG 94/1179/EC, REG 94/1488/EC, REG 94/3093/EC, REG 95/2268/EC, REG 97/142/EC, REG 97/143/EC) were also estimated. In addition, very recently (already in 2000) costs for the implementation of Nitrates directive and IPPC directive were made.

The Ministry of Environment of Lithuania has also received the final project report from a multi-country project implemented by Soil and Water Ltd. with PHARE support. *Development of an Approximation Programme for EU Legislation Concerning Emissions*

[5] A problem with this approach is that in the development of the costing scenarios that underlie the estimates in Milieu Ltd. (1998), assumptions were made about the structure and level of the economy. This approach is therefore not ideal, because it in effect assumes that the economy envisioned for each five-year period actually is realised five years later.

From Mobile Sources contains useful amendments to the analysis of Milieu Ltd. (1998). Appropriate refinements from this project were also included in the analysis.

The assessment of compliance costs for the IPPC Directive in Lithuania has been conducted by COWI Consulting Engineers and Planners AS as a component of the DEPA-funded IPPC project in Lithuania. The purpose of this cost assessment was to provide an indication of the order-of-magnitude of the investment needs and other cost-invoking actions that need to be financed in order to achieve IPPC compliance.

It should be mentioned that several of these studies included very detailed calculations and estimates, only summaries of which are presented here. Readers interested in the details of cost estimations that were conducted are urged to consult the documents cited in the bibliography. Including all analyses that contained cost estimates brings the total number of directives to nineteen. Estimates for eight regulations are also included. A summary of the directives is presented in Table 3.1.

Table 3.1 Summary of EU Directives included in Costing Studies

Directive	Description
91/271/EEC	Directive Concerning Urban Wastewater Treatment
80/778/EEC	Directive on Drinking Water Quality
67/548/EEC as amended	Directive on Classification, Packaging and Labeling of Dangerous Substances
76/769/EEC as amended	Directive on Restrictions on marketing and use of dangerous substances and preparations
88/379/EEC as amended	Directive on Classification, packaging and labeling of dangerous preparations
94/55/EC	Transport of dangerous goods
99/31/EC	Directive on the Landfilling of Waste
88/609/EEC	Directive on Limitation of Emissions of Certain Pollutants from Large Combustion Plants
Council Directive 99/32/EC	Directive relating to a reduction in the sulphur content of certain liquid fuels and amending directive 93/12/EC)
94/63/EC	Directive on the Control of Volatile Organic Compound Emissions Resulting from the Storage of Petrol and its Distribution from Terminals to Service Stations
93/12/EEC	Directive Relating to the Sulfur Content of Certain Liquid Fuels
85/210/EEC	Directive on Approximation of the Laws of the Member States Concerning the Lead Content of Petrol
70/220/EEC	Directive on Motor Vehicles
94/62/EEC	Directive on Packaging and Packaging Waste
91/689/EEC	Hazardous Waste Framework Directive
91/676/EEC	Directive on Protection of Waters Against Pollution Caused by Nitrates from Agricultural Sources
96/61/EC	Directive on Integrated Pollution Prevention and Control
96/62/EC	Directive on Ambient Air Quality Assessment and Management
COM (97) 49	Proposed Water Framework Directive

Of these directives, the last two pieces of legislation were covered in Milieu Ltd. (1998) by estimates of the public sector costs to administer the whole *acquis*. There were no other costs associated with these framework directives.

Some of the costing studies cited in this Strategy did not include timing of expenditures in their analysis. In these cases, it is assumed that all investments are completed by 2015. Costs for the periods 2000 – 2005 and 2006 – 2010 are therefore zero.

3.2.2 Cost Estimates for Selected EU Directives

Estimates of the demand for environmental financing in Lithuania have now been prepared for 19 directives and regulations. However, those that are not relevant for Lithuania any more or entail zero costs are not shown in the following tables. The directives which were taken into account while preparing cost estimates, but not included into the tables below are: 99/32/EC – Sulfur content in heavy fuel oil, because it overlaps with the directive on Large combustion plants. The tables below summarize these costs by directive or cost category (combining more than one directive in some cases). These costs have been prepared for the most realistic scenarios. All costing studies have been coordinated with the Ministry of Environment to ensure that results can be integrated into the Ministry's approximation strategy as it evolves and is refined to reflect new information. In Table 3.2, the costs of approximation are broken down into annualized costs (including investments, operational and maintenance costs). The directives have been divided into two groups, depending on whether the costs are incurred primarily by public sector facilities or the private sector and individual consumers (e.g., mobile source directives). In addition, although a portion of the investment costs in the municipal sector are expected to be financed by grants provided by the EU, annualized costs have not been adjusted (see Section 3.4).

Table 3.2 Summary of the Annualized Costs of Approximation with the Environmental Acquis for years 2015 and 2020 (in Year 2000 MEuros)

Directives for which costs are borne primarily on the public sector			
	For Five Year Period Ending		
Directive	2015	2020	Key Notes
91/271/EEC – Urban wastewater	68.5	68.5	All waters sensitive; sewerage extended to all households
99/31/EEC – Landfill and 94/62/EEC – Packaging waste	63.17	65.12	Includes incineration in Vilnius, Kaunas and Klaipeda
80/778/EEC – Drinking water directive	33.0	33.0	Assumes that expenditures are all made by 2015
91/689/EEC – Hazardous waste	2.20	2.20	Assumes that expenditures are all made by 2015
Administrative costs	4.52	4.52	Assumes that all expenditures are made by 2005
Sub-total	171.39	173.34	
Directives for which costs are borne primarily on the public sector			
	For Five Year Period Ending		
Directive	2015	2020	Key Notes
88/609/EEC – Large combustion plants	49.77	52.86	Ignalina NPP closes unit 1 in 2005; orimulsion use is discontinued once the costs of approximation are included into calculations by *Lietuvos Energijia*
98/70/EC- Quality of petrol and diesel	10.24	10.24	
94/63/EC – VOC directive	4.04	4.39	
93/12/EEC – Sulfur content in middle distillates	209.7	261.2	
Chemicals directives and regulations	6.89	6.89	Includes both public and private expenditures
91/676/EEC - Nitrates	17	17	Assumes that all expenditures are made by 2015
96/61/EC - IPPC	37.61	37.61	Only applied to SO_2 reductions in the 48 existing large combustion plants
Sub-total	335.25	390.19	
Totals	**506.64**	**563.53**	

To provide context for these cost estimates, Lithuanian GDP in 1998 was 10.4 billion Euros. Assuming zero growth, annualized costs would be approximately 5% of GDP in 2015. These estimates do not consider how these investments and O&M costs would be financed. Thus, actual burdens would be lower to the extent that foreign grant financing reduces domestic costs. Later, in Chapter 7, costs for selected directives are shifted to earlier time periods in order to utilize EU grants and IFI loans that will be available through ISPA. In addition, affordability analyses are reported applying alternative economic growth assumptions.

Table 3.3 on the next page summarizes cumulative investment costs associated with the EU directives that have been studied. By 2015, cumulative investment costs to meet EU requirements for the selected directives would reach almost 1.6 billion Euros. The most costly directives in terms of investment costs will be the urban wastewater directive (91/271/EEC) and the combination of landfill and packaging waste directives (99/31/EEC and 94/62/EEC).

Annex 3.2 provides a more detailed description of all of the costing studies presented in Table 3.2 and 3.3.

Table 3.3 Summary of the Cumulative Investment Costs of Approximation with the Environmental Acquis (2000 MEuros)

Directives in which costs primarily are public sector costs			
Directive	**Cumulative investments**	**Main components for which costs were estimated**	**Key Notes**
91/271/EEC – Urban wastewater	520	- wastewater treatment plants and - sewerage systems	All waters sensitive; sewerage extended to all households
99/31/EEC – Landfill and 94/62/EEC – Packaging waste	420	- new landfill construction - closing of old landfills - waste collection and sorting systems - waste incineration plants	Background for costs – municipal investment program described in chapter 6 of this report which includes waste collection systems as well as incineration in Vilnius, Kaunas and Klaipeda
80/778/EEC – Drinking water directive	170	- construction of iron removal plants - drinking water supply systems	Assumes that expenditures are all made by 2015
91/689/EEC – Hazardous waste	10	- hazardous waste landfill - transfer system - incinerator	Assumes that all expenditures are made by 2015
Administrative costs	4	- strengthening of human resources - preparation of new legislation etc	Assumes that all expenditures are made by 2005
Sub-total	1124	-	

Directives in which costs primarily are private sector costs			
Directive	**Cumulative investments**	**Main components for which costs were estimated**	**Key Notes**
88/609/EEC – Large combustion plants	34	- end of pipe equipment for achievement of necessary emission reduction	Ignalina NPP closes unit 1 in 2005 and unit 2 in 2008; orimulsion use is discontinued once the costs of approximation are included into calculations by *Lietuvos Energijia*
98/70/EC- Quality of petrol and diesel	195	- technological changes at the Mazeikiai oil refinery.	
94/63/EC – VOC directive	25	- update of petrol service stations - update of fuel transfer stations - update of Klaipeda port facilities	
93/12/EEC – Sulfur content in middle distillates	0	- costs of this directive are closely tied to predictions of the use of trucks and other vehicles with diesel engines	Only operational costs will be needed
Chemicals directives and regulations	12	- measures aimed at achieving new packaging, labeling, classification, notification obligations - safety data sheets - laboratory updating - data bases - measures for updating of vehicles and - establishment of new administrative structures - training	Assumes that expenditures are made in equal shares until 2015; Includes both public and private expenditures
91/676/EEC - Nitrates	150	- training of farmers - construction of manure storage facilities	Assumes that all expenditures are made by 2015
96/61/EC – IPPC	65	- SO2 reduction facilities	Only applied to SO_2 reductions in the 48 existing large combustion plants
Sub-total	481		
Total	**1600**		

3.3 Comparative Analysis of the Costs of Accession

All of the Accession Countries have undertaken exercises to estimate the costs of approximation with EU environmental legislation. These analyses have been conducted using bottom-up costing methodologies similar to those employed in Lithuania. Most of these studies have been prepared with support provided by the EU-financed DISAE Facility. Generally, the cost estimates have been prepared for the major sectors (water, air, and waste), although many of the studies have also estimated costs for specific EU Directives. Because of concerns about the difficulties of raising capital for environmental investments, the major focus of the costing studies has been on estimating the cumulative investment costs that would be required to meet EU requirements.

Costs of accession are presented in two tables below. Table 3.4 provides estimates of cumulative investment costs for the three Baltic countries. These estimates were presented during the 5th Baltic Donors meeting in Vilnius, May, 2000. They reflect the most current analyses of costing, in some cases with updated estimates that are different from those that were previously developed by DISAE and are presented in Table 3.5.

Table 3.4 Comparison of approximation cumulative investments for selected sectors in three Baltic countries, mEuros

Sectors	**Estonia**	**Latvia**	**Lithuania**
Waste (both municipal and hazardous)	730	330	430
Drinking water	270	420	170
Urban wastewater	325	480	520
Air (in all cases include mainly LCP and VOCs directives)	1500	70 – 215	254
IPPC	489	400	65
Total (rounded)	3300	1800	1400

The cost estimates in Table 3.4 show that cumulative investments in all three countries differ in magnitude in all sectors with the exception of urban wastewater. Although Lithuania has the largest population of the three Baltic countries, the total cumulative investment costs for Lithuania are lower than for Estonia and Latvia. The most significant differences in cumulative investment costs are in the air sector and for the IPPC Directive. In the air sector, Estonia faces special problems to address the environmental pollution associated with oil shale. In addition, estimated costs to meet the requirements of IPPC are significantly higher in Estonia and Latvia than in Lithuania.

Table 3.5 presents comparisons of cumulative investment costs for the water, waste and air sectors for the ten CEE countries. To facilitate comparisons between countries of significantly different sizes, cumulative investment costs also are presented in per capita terms. The cumulative investment costs for the three Baltic countries are those presented in Table 3.4 while the cost estimates for the remaining CEE countries are those developed by DISAE or other studies (noted in table notes).

Table 3.5 Comparison of cumulative investment costs for selected sectors in the Accession Countries

	Water Sector		Waste Sector		Air Sector	
Country[a]	mEuros	Euros per capita	mEuros	Euros per capita	mEuros	Euros per capita
Bulgaria (BUL-108)[b]	3,513	413	921	108	3,022	356
Czech Republic[c]	2,500	243	1,152	112	1,535	149
Estonia	595	397	730	487	1,500	1000
Hungary[d]	1,678	166	454	45	1,601	159
Latvia	900	360	330	132	70-215	28-86
Lithuania	690	187	430	160	254	94
Poland (POL –101)	6,524	169	3,695	96	4,317	112
Romania (ROM-101)[e]	3,440	152	2,788	123	402	18
Slovakia (SR-104)	499	94	876	165	939	177
Slovenia (SLO-101)	1,183	623	1,118	588	241	127

Sources: Table 3.4 above for Estonia, Latvia, and Lithuania; Soil and Water Ltd. "Development of Synthesis Reports for Approximation of EU Environmental Legislation" (DISAE, MC-112), November 1999 for remaining countries

Notes:

[a] *- DISAE Projects in parentheses next to country name*

[b] *- Bulgaria air sector costs include LCP and IPPC Directives*

[c] *- Based on estimates by TME (Moses model) and WB*

[d] *- Based on estimates by TME and EDC*

[e] *- According to Soil and Water, Ltd, notes "The estimates for Romania in ROM-101 are low and discussed in the report. No explanation is given."*

In analyzing the differences in cumulative investment costs, it is important to consider a number of caveats. In no particular order, the following caveats should be noted in interpreting the cumulative investment cost estimates:

(1) Costs of accession are viewed as incremental costs. Thus, for a country that had already made significant progress in reducing environmental pollution, cumulative costs may be lower.

(2) Data availability and level of detail (and effort) have a direct effect on cost estimates. In some countries, the goal of the costing exercise was simply to obtain order of magnitude estimates while in other studies, the analysis was very detailed, often focusing on specific investments.

(3) Cost estimates are sensitive to a country's (or those of the consultants) interpretation of the requirements of the EU Directives and/or policies in the Accession Country. For example, investment costs for the urban water and wastewater directive are quite sensitive to sewerage connection costs. The directive affords some flexibility for each country to decide if it is cost-effective to extend sewerage to all urban residents. Thus, if a country sets a goal of 100% sewerage coverage, its investment costs could be substantially higher than in a country which sets a lower goal.

(4) Cost estimates are also sensitive to the methodology utilized. Studies that utilize the MOSES model or similar methodologies may yield estimates that are less precise than studies based on analyses of individual facility investments.

(5) Cost estimates may also be influenced by the assumptions made about the availability of capital. If capital is viewed as a binding constraint in the costing analysis, greater effort may be made to minimize investment costs (relative to O&M costs). On the other hand, if capital availability constraints are not considered, estimates may be higher than the actual costs of investments that would be undertaken in practice.

Referring to Table 3.5, in per capita terms, Lithuania ranks in the middle of the range for cumulative investment costs for each sector. Out of 10 countries, cumulative investment costs per capita for Lithuania are sixth highest for water, fourth highest for waste and eighth highest for air. In terms of total cumulative investment costs per capita for the three sectors, Lithuania is ranked sixth highest out of the ten countries. It is important to note the large variation in cumulative investment costs per capita for the ten accession countries. In the water sector, per capita investment costs are more than six times higher in Slovenia than in Slovakia; in the waste sector, investment costs per capita are more than ten times higher in Slovenia than in Hungary; and in air, Estonia's investment costs are 50 times those for Romania in per capita terms.

3.4 National Affordability Analysis

To examine burdens for the environmental *acquis,* estimates of the costs of approximation presented in Section 3.2 are utilized. These costs are in terms of annualized costs. As was discussed before, annualized costs are the most suitable measure of burden. This means, however, that annualized investment costs are used with O&M costs. As discussed previously, since a portion of municipal investments will be financed through grants, annualized investment costs for public investments will overestimate the actual burden. Thus the analysis is in terms of a maximum estimate of burdens. Actual burdens will be less.

The analysis of national affordability for the environmental *acquis* utilizes eight alternative measures of financial burden. Each of these measures compares the annualized cost of compliance with a measure of an individual's, household's or the economy's ability to pay the costs of approximation. The measures used are the following:

1. Compliance costs as a percentage of projected current year GDP
2. Compliance costs as a percentage of projected current year budget expenditures
3. Compliance costs per capita per year
4. Compliance costs per capita per year as a percentage of projected current year per capita GDP
5. Compliance costs per household per year
6. Compliance costs per household as a percentage of projected current year average annual household income
7. Compliance costs per household as a percentage of projected current year average annual household cash income
8. Compliance costs per household as % of projected current year average annual household consumption expenditures

The 1998 economic indicators used in assessing national affordability are provided in Table 3.6.

Table 3.6 Economic indicators used for assessment of affordability

Measure used	1998 Value
GDP (MEuros)	10,431.20
National Budget Expenditures (MEuros)	2418.44
Per Capita GDP (Euros)	2816.10
Average Household Income in per capita terms (Euros)	1236.59
Average Household Cash Income in per capita terms (Euros)	1025.56
Average Household Consumption Expenditures in per capita terms (Euros)	1249.17
Population (millions)	3.70
Households (millions)	1.37

The ability of the economy and the population to shoulder the burden of approximation with the environmental *acquis* crucially depends on future growth of population, output, household incomes, household expenditures and national budget expenditures.

These parameters are, of course, unknown in 2000, but we can make reasonable assumptions about changes over time and therefore predict future values. It is assumed throughout the analysis that the population of Lithuania remains at the same level as 1998 (3.7013 million persons). Four household income, output, household expenditure and national budget expenditure growth scenarios are considered in the Strategy (no growth, low growth, medium growth, and high growth). The four scenarios considered are the following:

Scenario	Average Annual Rate of Growth of Monetary Measures
No Growth – Monetary measures remain at 1998 levels through 2020	0.0%
Low Growth – Monetary measures grow at an average annual rate of 2.0% per year during the period 1998 - 2020	2.0%
Medium Growth - Monetary measures grow at an average annual rate of 3.5% per year during the period 1998 - 2020	3.5%
High Growth - Monetary measures grow at an average annual rate of 5.0% per year during the period 1998 – 2020	5.0%

Annex 3.3 presents the burdens of each directive considered in this Strategy, for each of the eight measures of ability to pay and for each of the four growth scenarios. In this

section, only selected summary results are presented for each of the affordability indicators.

Eight tables summarize the results. Table 3.7 presents national affordability indicators for the medium growth scenario (3.5% annual increase in GDP and other economic indicators during the period 1998 – 2020). This scenario is considered to be the most reasonable one, because recent growth rates have averaged around 3.5% (except of 1999 which had negative growth). If anything, this rate of growth should be considered a bit conservative, with growth in the 4-5% range perhaps more likely.

Table 3.7 National Affordability Indicators for the Medium Growth Scenario

	For the five-year period ending			
Affordability Measure	**2005**	**2010**	**2015**	**2020**
Total Annualized Costs as a Percentage of Current Year GDP	1.05%	1.60%	2.60%	2.45%
Total Annualized Approximation Costs Per Capita (Euros per year)	37.50	68.14	131.71	147.12
Total Annualized Approximation Costs Per Household (Euros per year)	101.26	183.99	355.61	397.23
Primarily Public Sector Annualized Costs Per Household as a Percentage of Average Annual Household Expenditure	0.41%	0.64%	2.07%	1.76%
Primarily Public Sector Annualized Costs Per Household as a Percentage of Average Annual Household Income	0.45%	0.70%	2.09%	1.78%
Total Annualized Costs Per Household as a Percentage of Average Annual Household Expenditure	2.36%	3.61%	5.87%	5.53%
Total Annualized Costs Per Household as a Percentage of Average Annual Household Income	2.38%	3.65%	5.93%	5.58%
Annualized Costs of Directives Mainly Affecting the Public Sector as a Percentage of the Predicted National Budget Expenditures	0.85%	1.34%	3.95%	3.36%

The first affordability measure indicates that annualized costs are not expected to be out of line with percentages observed in many developed countries (although such statistics relate expenditures to GDP rather than annualized costs). The availability of grants from the EU and other donors has a significant dampening effect on the average burden. The burdens relative to incomes and expenditures in 2015 and 2020 for households (in per capita terms) are expected to be quite high under the medium growth scenario.

Table 3.8 presents annualized costs of approximating with all directives as a percentage of current-year GDP for the four growth scenarios. Costs are expected to be in the 2 to 2.5% of GDP range. These costs are, of course, ambitious given that substantially wealthier OECD countries' commitments to environmental protection are typically 1-2.0% of GDP. The costs are also not *total* expenditures on environmental protection, but are <u>in addition</u> to measures that are already in place or underway.

Table 3.8 Total Annualized Costs as a Percentage of Current Year GDP

	For Five year period ending			
Growth Assumption	**2005**	**2010**	**2015**	**2020**
0%	1.33%	2.42%	4.67%	5.22%
2.00%	1.16%	1.91%	3.34%	3.38%
3.50%	1.05%	1.60%	2.60%	2.45%
5.00%	0.95%	1.35%	2.04%	1.78%

Per capita and per household approximation costs also seem highly significant (see Table 3.9). At least at current levels of income, these costs would involve significant burdens on the Lithuanian population. Of course, with incomes growing at 3.5% per year, these burdens will seem much less onerous in future years. It is also true that at least for the private sector portion of these costs, we can be sure that households will NOT end up paying all these costs (although some of these costs will be reflected in higher prices for Lithuanian goods and services).

Table 3.9 Total Annualized Approximation Costs Per Capita and Per Household (Euros per year)

	For Five year period ending			
	2005	**2010**	**2015**	**2020**
Cost Per Household	101.26	183.99	355.61	397.23
Cost Per Capita	37.50	68.14	131.71	147.12

A better measure of overall burden on households is costs as a percentage of household income and expenditure. Table 3.10 focuses on those costs falling primarily on the public sector in terms of household income.

Table 3.10 Primarily Public Sector Annualized Costs Per Household as a Percentage of Average Annual Household Income

	For Five Year Period Ending			
Growth Assumption	**2005**	**2010**	**2015**	**2020**
0%	0.57%	1.07%	3.74%	3.79%
2.00%	0.50%	0.84%	2.67%	2.45%
3.50%	0.45%	0.70%	2.09%	1.78%
5.00%	0.41%	0.59%	1.63%	1.30%

The directives that are primarily the responsibility of the public sector are often ultimately the responsibility of municipalities and counties. We therefore would expect that increases in user fees would be an important way that households will feel these burdens. From the above table we see that starting in 2011, which is the first year of the five year period ending in 2015, households should begin perceiving significant burdens of approximation. By 2011, if the medium growth scenario comes to pass, households

are expected to on average pay 125 Euros per year for approximation primarily with the Urban Wastewater, Landfill/Packaging Waste and Drinking Water Directives. This burden is very high and strongly suggests the need for measures to reduce costs.

In Table 3.11, we add the costs of the directives that primarily affect the private sector to the primarily public sector costs. In this table we see some rather large burdens placed on households' income streams. For the medium growth scenario, starting in 2011, approximation is expected to cost, on average, 4 or 6% of household expenditures or incomes. It is again emphasized that households will not really carry these whole burdens – some of the costs will be paid by businesses themselves, because they do not want to lose business – but it is clear that businesses will pass on some of the increased costs of approximation. At this stage, we cannot say what portion of this total potential burden households will in effect observe in the form of increased prices.

Table 3.11 Total Annualized Costs Per Household as a Percentage of Average Annual Household Income

	For Five Year Period Ending			
Growth Assumption	**2005**	**2010**	**2015**	**2020**
0%	3.03%	5.51%	10.65%	11.90%
2.00%	2.64%	4.34%	7.61%	7.70%
3.50%	2.39%	3.65%	5.93%	5.58%
5.00%	2.16%	3.07%	4.65%	4.07%

Another likely point of strain generated by the process of financing approximation with the environmental *acquis* is expected to be the public budget. Table 3.12 presents the costs of those directives that will mainly be the responsibility of the public sector as a percentage of the projected current year national budget. This measure therefore provides a sense of how much expenditures will have to be increased to cover approximation, and therefore how much stress will be put on national fiscal policy.

Table 3.12 Annualized Costs of Directives Mainly Affecting the Public Sector as a Percentage of the Predicted National Budget Expenditures

	For Five year period ending			
Growth Assumption	**2005**	**2010**	**2015**	**2020**
0%	1.08%	2.02%	7.09%	7.17%
2.00%	0.94%	1.59%	5.06%	4.64%
3.50%	0.85%	1.34%	3.95%	3.36%
5.00%	0.77%	1.12%	3.09%	2.45%

We see from the table above that approximation will likely have an important effect on the treasury. Municipalities rely on the national budget for significant portions of their capital expenditures. With growth of expenditures of 3.5% per year starting in 1998, it is expected that by 2011 approximation with the environmental *acquis* will make up

approximately 4.0% of the national budget. To the extent that financing of these expenditures actually occurs through the budget, this burden will, of course, largely fall on households in Lithuania through income taxes and other revenue measures.

Chapter 4. Domestic Sources of Environmental Financing

To meet demand for environmental financing, a combination of domestic and foreign sources has played a role or will potentially play a role in meeting EU compliance schedules. Domestic sources include the following:

- State and municipal general revenues
- Pollution charges and fines
- User fees on municipal services
- Facility own resources
- Commercial capital (credits and equity)
- Leasing markets

In this chapter, most of these sources, with the exception of facility financial resources, are discussed. It is acknowledged that the private sector is expected to finance their environmental investments out of existing cash balances, profits, or equity. The availability and utilization of these private sources is strongly linked to overall economic performance and the scope and effectiveness of environmental compliance monitoring activities for regulated facilities. Given the strong emphasis on the municipal sector in the Strategy, however, no additional discussion of these sources will be provided.

4.1 State and municipal general revenues

4.1.1 State Budget

The State budget has been the main domestic source of funding for environmental protection needs until 1999. Every year state budget resources for environmental protection are planned in accordance with and incorporated into the Law on the Approval of Financial Indicators of State and Municipal Budgets. This law also describes planned state budget subsidies for municipalities to finance environmental entities. Beginning in 1999, the funds for municipalities to finance environmental activities are allocated out of the Privatization Fund and directly transferred to municipal budgets.

Following the preparation of the budget pursuant to the Law on the Approval of Financial Indicators of State and Municipal Budgets, the Government of Lithuania approves the 3-year Public Investment Program (PIP), reflecting the planned budget expenditures for the current year and proposed budget for the next two years. The PIP is described in greater detail in Chapter 6.

In absolute terms, general revenues have increased continuously except in 1999, when the economic crisis precipitated a 5-6% decline. Table 4.1 presents information on the state budget, revenues from natural resource taxes and pollution charges, and environmental expenditures financed out of the state budget.

Table 4.1 State Budget revenue and expenditure (Millions of Litas)

	1993	1994	1995	1996	1997	1998	1999
Total revenue	1,907.8	3,002.8	3,927.9	5,555.9	6,130.3	6,312.3	5,944.6
Total expenditure	1,868.3	3,002.8	4,428.8	5,332.8	6,597.8	7,407.0	5,944.6
Income from taxes on the state natural resources and charges on pollution*	12.1	24.2	28.2	46.3	65.9	59.7	57.5
Environmental expenditures for investments	36.41	95.20	98.50	57.10	71.11	77.50	31.88
Environmental expenditure as a percentage of total State budget expenditure	1.9	3.2	2.2	1.06	1.1	1.0	0.5

Source: Ministry of Finance, Ministry of Economy
* - Annual report of the Ministry of Environment;

State budget expenditures for environmental purposes increased until 1994 and amounted to 3.2% of all budget expenditures that year. However, after this peak, environmental expenditures from the state budget have declined. State budget expenditures for environmental investment purposes were reduced substantially in 1999 and only amounted to 32 million Lt together with revenues from the Privatization Fund. The percentage share of environmental investment expenditure in 1999 equal to 0.5% of the State budget and in 2000, the planned amount is even less than in 1999.

In the period, 1993-1999, state budget expenditures for environment have been focused almost exclusively on investments in wastewater systems. 98.6% of state budget expenditures in the environment sector have been earmarked for wastewater with the remaining 1.4% for solid waste. Table 4.2 summarizes environmental expenditures funded by state budget according to environmental sector for the period 1993-1999.

Table 4.2 State Budget Expenditures for Environmental Investments (thousands of Lt)

	1993	1994	1995	1996	1997	1998	1999
Wastewater	36,250	94,600	98,500	56,600	70,211	76,500	30,580
Drinking water							
Waste	159	601		500	900	1,000	1,297
Air							
Soil							
Noise							
Other							
Total	36,409	95,201	98,500	57,100	71,111	77,500	31,877

Sources: Ministry of Environment; Ministry of Economy (PIP)

4.1.2 Municipal Budgets

Municipal budgets are a second government source of funding for environmental investments. There are 56 municipal budgets in Lithuania[6]. Environmental investments from the state budget (and state guaranteed foreign loans and grants) are channelled through municipal budgets. Financing of environmental investments from municipalities' own resources is unusual (excluding revenues from user fees), although some municipalities have recently earmarked municipal budgets for environmental purposes (Table 4.3).

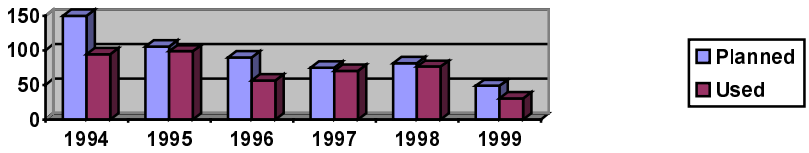
Table 4.3 Expenditure of municipal budgets (millions of Litas)

	1993	1994	1995	1996	1997	1998
Expenditures for environment	..	..	0.7	2.0	3.1	7.1
Other expenditures	1,152.5	1,991.6	2,470.0	2,850.5	2,893.8	3,464.9
Total	1,152.5	1,991.6	2,470.7	2,852.5	2,896.9	3,472.0

Source: Ministry of Finance

Figure 4.1 illustrates how state budget funds have been channelled via municipalities for the period 1994-1999. Planned budget transfers have often exceeded actual amounts by substantial magnitudes. For example, there was over a 25 million Lt gap between planned and actual amounts in both 1994 and 1996.

Figure 4.1 State Budget Subsidies to Municipalities for Environmental Financing (million Lt)



Municipalities are not expected to be given the authority to levy environmental taxes or charges in the foreseeable future. However, municipalities benefit indirectly from environmental taxes and charges that accrue to municipal nature protection funds. In addition, since 1995, some municipalities have begun to allocate small amounts of their municipal budgets (exclusive of State budget subsidies) for environmental purposes (see

[6] In 2000, the structure of municipalities has been changed and more municipalities appeared in the public administration scheme of Lithuania. Since March 19, 2000 (after new elections) there will be 60 municipalities in Lithuania.

Table 4.3). However, in 1998, environmental expenditures only accounted for 0.2% of municipal budget expenditures.

4.2 Pollution Charges and Fines

Pollution charges and non-compliance fees are the primary sources of revenue for the State Nature Protection Fund, 56 municipal nature protection funds, and more recently, the Lithuania Environmental Investment Fund (LEIF). Table 4.4 shows the respective contribution of charges and fines to the working capital of the Nature Protection Funds for the period 1993-1998. In 1999, Parliament adopted the Law on Pollution Charges. This law establishes a revised system of pollution charges that is expected to increase annual revenues on pollution charges to approximately 50 million Litas. The Law on Pollution Charges stipulates that 20% of revenue from pollution charges will be transferred to the LEIF beginning in 2000.

Table 4.4 Overall income to environmental funds (millions of Litas)

	1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Charges on pollution	4.9	13. 7	23.3	37.7	43.4	37.6	33.0
Fines	1.2	3.1	4.4	3.7	5.3	4.8	3.2
Total	6.1	16.8	27.7	41.4	48.7	41.5	36.2

Sources: Annual reports of the Ministry of Environment

4.3 User Fees

A major source of revenue for municipal infrastructure investments is user fees on drinking water, sanitation services, and waste disposal. According to Article 47 of the Company Law on Financial Resources of Municipal Companies, a portion of user fees may be levied to provide service providers with a profit (10% recommended level) and to capitalize an amortization fund to finance depreciated equipment. User fees at their present level are high enough in Lithuania to cover O&M costs, VAT of 18%, depreciation, and profit.

The annual depreciation levy is retained by the utility in an amortization fund and used for maintenance, renovation, and replacement of existing production equipment. In 1998, amortization funds only amounted to approximately 20% of production costs. Since the depreciation levy is set at a level required to maintain the existing infrastructure, amortization funds are not sufficient to finance new investments to meet EU requirements in most cases. In addition, although the gross profit margin in 1996 was 11.2%, the net profit margin[7] was –1.8% (Statistical Year Book). Therefore, the costs of new

[7] Net profit margin is defined as a ratio of a net profit after tax to revenues.

investments to meet EU requirements would require municipalities to increase the present level of tariffs.

In determining the potential role of user fees as a source of financing of environmental investments, three factors come into play: 1) Current levels of user fees; 2) acceptable levels of user fee increases; and 3) potential impacts of higher user rates on demand for municipal services.

At present, tariffs on cold water and sanitation services are approximately 1% of annual household expenditures according to official statistics. For waste collection and disposal, user fee statistics are not separable into component service expenditures. Information on waste collection and disposal costs varies between the different counties in Lithuania. Monthly payments for the collection of waste range from 0.5 to 3 Litas per person (or less than 0.5% of household expenditures). These estimates are not very precise and differ from estimates from other sources. For example, the Lithuanian Water Suppliers Association has estimated per capita fees are 6.5 Lt/month for cold water and sewerage, or approximately 1.5 per cent of household disposable income. In addition, there is considerable variability in user fees across income groups and between small and medium-size towns and large cities and urban areas.

An informal rule-of-thumb that has gained international acceptance is that the maximum affordable level of water-related services to households is 5% of the disposable income, which would mean a ceiling 21 Lt per capita per month (for the income of 1998) in Lithuania and an increase of 14.5 Lt per capita per month over their current level.[8] This implied increase is substantially higher than rates considered in the recent project, completed in the Ministry of Environment, on the preparation of the Water Approximation Strategy. This project proposed to increase water rate by 5 Lt per month per person to meet additional financing requirements.

Alternatively, the 5% cap might be applied to water and waste. Assuming a current combined level of 2% for water and waste, a doubling of user fees could be accommodated without exceeding the cap. Some other issues that will become important are how municipal service costs will change with increasing GDP, what portion of investment costs will be financed from user fees, how soon fees would need to be raised, and what provisions would be made for households for whom the higher fees would be especially burdensome (example, elderly on fixed pensions). In Chapter 7, the issue of household user fees and affordability is revisited.

[8] Since the World Bank and other IFIs often require municipalities to agree to increased user charges to service their loans, we suspect that some rule-of-thumb was developed for this purpose, although this threshold has no conceptual basis. And in fact, it could be argued that the rule-of-thumb cannot be applied independently of incomes. While a 5% rule might be appropriate in an OECD country, it could be a substantial burden for households in developing countries. COWI, with support from DANCEE, has been analysing user charges and will likely propose a rule-of-thumb for water and wastewater services on the order of 4%. Wherever possible, the introduction of higher user charges should consider distributional issues, the costs of the typical household market basket, and willingness to pay by income strata.

The third issue that must be addressed in assessing the financing potential of user fees relates to how households and businesses respond to increases in tariffs. Some anecdotal evidence from Siauliai and Ukmerge suggests that there may be a significant decline in the quantity of water and wastewater services demanded in response to an increase in tariffs. This issue must be taken into account when developing cost recovery plans for servicing loans.

4.4 Commercial capital and leasing markets

Three potential sources of financing for environmental projects are capital that can be mobilized by the banking sector, through the stock market, and by leasing companies. None of these sources is expected to play a major role in the next two decades in environmental financing. In part, this is a reflection of the nature of environmental financing and the attractive options that will be available to Lithuanian facilities through foreign donors and IFIs. However, as these financing sources mature and domestic capital markets become more competitive, there may be some important spillover effects on environmental financing, particularly in the private sector where access to capital for non-environmental investments will allow enterprises to fund environmental investments out of profits and cash balances.

4.4.1 Banking

Since 1993, domestic financial markets in Lithuania have changed enormously. During the last five years the finance sector has been strengthened in line with the emerging Lithuanian economy. Lithuanian's economic development and privatization program increased financing needs for both the private and governmental sectors. By the end of 1998, more than seventy-five percent of the Lithuanian economy was in private hands.

At the beginning of nineties, the debt financing was mainly provided by commercial banks. The banking sector in Lithuania has developed fast. Lithuanian domestic banking sector consolidated considerably over the past couple of years. The commercial banking sector dynamics based on the number of banks and bank branches is indicated in Table 4.6.

Table 4.6 Status of Banks in Lithuania

At the end of year:	Number of Commercial Banks	Number of Branches and Representative Offices
1995	15	250
1996	12	232
1997	11	206
1998	10	176

Since the early '90s, the banking sector has gone through a period of market development and consolidation. The two of the largest private banks -- Vilnius Bankas and Bankas

Hermis (both majority-owned by foreign capital) announced their merger in the Fall of 1999, creating Lithuania's largest private commercial bank. There are two banks in which the State retains a majority ownership share - the Lithuanian Savings Bank (Lietuvos Taupomasis Bankas) and the Lithuanian Agricultural Bank (Lietuvos Zemes Ukio Bankas). Both banks were scheduled to be privatized in 2000.

After a number of changes in the structure of the banking sector that reduced the number of commercial banks and branches, the banking sector in June 1999 consisted of 10 commercial banks, plus the Lithuanian Development bank, and the joint stock company Turto Bankas. Foreign banks may operate in Lithuania via branches, representative offices, subsidiaries or the acquisition of shares in local banks. Acquisition of 10% or more of share capital requires approval by the Bank of Lithuania. Presently, Kredyt Bank PBI S.A. of Poland and Merita Nordbanken of Sweden, Hansabankas of Estonia, and Norddeutsche Landesbank Girozentale of Germany are the only four foreign banks operating in Lithuania. Four foreign banks also have representative offices in Lithuania: Creditanstalt Investment Bank (Austria), Kredyt Bank S.A. (Poland), Bank Polska Kasa Opieki SA (Poland), Kontakt (Russia).

The substantial growth of the banking industry has been supported by the monetary policy of the Central Bank. Since the introduction of the national currency, Litas, in June 1993, the country has implemented a strict monetary policy. In April 1994, a currency board system was established, under which the Lita is pegged to the US dollar at a fixed exchange rate of 4 Litas to USD 1. Having achieved sustained monetary stability, the current Government is committed to a gradual withdrawal from the Currency Board system leading to a transitional peg to a Euro and USD combination in the future and an eventual floating exchange rate. This transitional period is expected to begin not earlier than the end of 2000. It is also noteworthy that Lithuania has had an international credit rating since September 1996. As of May of 2000, Lithuania had the following long-term loan ratings: Moody's – Ba1, Standard&Poor's – BBB-, Fitch IBCA – BB+. The largest and strongest bank in Lithuania, *Vilniaus bankas*, has received credit ratings of IC-A/AB for commitments in the country, LC-1 for short-term commitments, and BB+ for long-term commitments. Other commercial banks have received lower credit ratings of BB-, B, BB, 2T.

Debt market performance has improved substantially and interest rates have declined continuously. The major indices and trends of consolidated commercial banks financials for the period of 1993 through 1st half of 1999 are presented in Table 4.7.

Table 4.7 Banking Sector Indicators (1994-1999)

	1994	1995	1996	1997	1998	July 1, 1999
Total assets (billions of Lt)	5.17	5.29	5.84	8.33	10.55	10.90
Loans (billions of Lt)	3.42	3.49	3.36	3.97	4.74	5.44
Special provisions (millions of Lt)	514.8	549.8	729.6	846.0	359.3	330.4
Provisions for loans (millions of Lt)	514.8	549.8	729.6	753.6	302.2	274.8
Liabilities with banks and credit institutions (millions of Lt)	405.4	254.5	540.9	767.1	1,528.8	1,391.6
Deposits and letters of credit (billions of Lt)	3.52	3.74	4.05	5.88	6.31	6.69
Bank capital (millions of Lt)	343.3	270.7	360.3	499.9	1,281.9	1,389.4
Registered capital (millions of Lt)	250.9	277.0	702.5	826.2	907.3	853.7

Source: Bank of Lithuania

In the period of 1994 through 1999, commercial banks have substantially increased their assets and loan portfolios. Banking service quality has increased together with the variety of the banking products and services offered. The ability of banks to attract foreign funds increased together with the foreign investments in banks' equity. The overall banking sector experienced its highest annual increase in equity in 1998 when the SEB (Swedish bank Skandinavska Enskilda Banken) acquired more than 30 percent of the new share issue of Vilnius Bank. In September 1999 the Central Bank of Lithuania issued the license for Vilnius Bank for the majority stake purchase of Hermis Bank. The consolidation of the two largest commercial banks in Lithuania will open new opportunities for the local debt markets and for the banking service development.

The consolidated bank loan portfolio has exhibited a number of interesting trends. As of July 1, 1999, the total loan portfolio for the banking sector included loans of 5.8 billion Lt. The loan portfolio is heavily skewed toward Lithuanian borrowers, ranging from 96% to 99% of the portfolio since 1994. Between 1994 and 1996, the percentage of the loan portfolio in hard currency was approximately 35%. Since 1996, the share of the loan portfolio in hard currency has increased to 59% by mid-1999. The increase in the hard currency share is attributable to a shift in Central Bank policies and the efforts of banks in managing exchange rate risks.

The loan portfolio has experienced a distinctive shift from short term to long-term loans since 1994 (Table 4.8). In 1994, long-term loans (3+ year repayment period) accounted for only 15.8% of the loan portfolio. By 1999, this share had increased to 57.3%, accounting for all of the growth in the overall loan portfolio. Private businesses are the primary borrowers for both short term and long term loans accounting for about 70% of the total loan amount.

Table 4.8 Trends in the Loan Portfolio by Loan Term

In millions of Litas						
Loan structure by term	**1994**	**1995**	**1996**	**1997**	**1998**	**July 1, 1999**
Short term loans	3,046.5	2,542.9	2,256.3	2,535.7	2,362.6	2,493.1
Government institutions	362.7	143.0	101.9	65.3	318.8	404.7
Private businesses	2,223.4	2,062.4	1,937.6	2,111.4	1,848.3	1,884.7
Private individuals	226.2	125.6	113.4	128.5	113.2	109.0
Others	234.2	212.0	103.4	230.5	82.3	132.3
Long term loans	571.6	1,093.1	1,178.9	1,614.0	2,787.6	3,340.7
Government institutions	35.9	44.2	28.2	84.0	30.6	25.1
Private businesses	417.2	761.4	803.4	1,096.4	1,745.2	2,236.9

Source: Central Bank

Current accounts and term deposits in foreign currency in Lithuania are regulated by the rules of the Bank of Lithuania. Citizens of the Republic of Lithuania and foreign states may have current accounts and term deposits in foreign currencies. The Law on Foreign Exchange limits the use of foreign currencies in the country. Transactions in foreign currencies can be made only by licensed credit institutions registered with the Bank of Lithuania. Lithuanian legal entities seeking to open current accounts with foreign banks must obtain permission from the Bank of Lithuania.

The banking sector has experienced steady growth in assets and its loan portfolio, while interest rates have been stable. Average interest rates for loans in local and foreign currencies, by length of loan, are presented in Table 4.9. As can be seen in the table, the banking sector began to offer loans with repayment periods in 1997.

Table 4.9 Average Interest Rates on Loans in Local and Foreign Currencies

Loans to residents	1994	1995	1996	1997	1998	1999
	Dec	Dec	Dec	Dec	Dec	June
Local currency	29.81	23.88	16.0	11.93	12.57	12.46
Foreign currencies	33.4	20.37	14.73	10.35	10.84	11.46
USD	…	…	…	…	…	11.62
Euro and Euro countries						
Loans in local currency:						
…1 month	33.39	26.80	11.05	12.14	14.89	13.19
1-3 months	32.98	26.15	14.75	12.23	16.69	14.86
3-6 months	28.88	21.75	22.42	12.78	14.46	12.70
6-12 months	29.20	25.98	18.49	12.28	14.18	12.50
1-5 year	22.09	10.43	14.74	11.11	10.10	12.51
More than 5 years	…	…	…	9.93	5.20	7.11
Loans in foreign currencies:						
…1 month	39.14	20.12	18.03	15.66	17.87	13.01
1-3 months	38.12	27.43	16.60	10.61	9.44	12.46
3-6 months	37.79	26.81	19.57	10.48	11.28	11.92
6-12 months	30.12	26.85	13.97	10.61	12.12	11.92
1-5 year	17.56	13.14	12.53	10.19	10.66	10.99
More than 5 years	...	…	…	8.79	9.14	10.09

Source: Central Bank

The banking sector has played a limited role in environmental finance to date, in part because IFI credits have been more attractive for financing large wastewater treatment construction projects. However, Lithuanian banks are cooperating with the Lithuania Environmental Investment Fund (LEIF) in providing soft loans with interest rates not greater than 11%. Approximately 100 applications for getting loans have been received by the LEIF since the beginning of its activity. After the evaluation, as of July 1, 2000, ten soft loans were already provided to clients.

4.4.2 Leasing

Starting from 1995, when the first leasing company in Lithuania was established, private businesses started using this new source of financing. The data available at the moment are limited but there appear to be approximately 10 leasing companies operating in the market.

Presently, the legal basis for leasing is the Civil Code of Lithuania. Lithuanian leasing companies are not viewed as financial institutions and thus do not have to comply with any special financial requirements (capital adequacy, minimum equity requirements). The Central Bank of Lithuania imposes indirect requirements on the leasing companies

owned by the commercial banks: the commercial banks have the right to lend unlimited funds to theirs daughter leasing companies, if the financial reporting of the commercial bank is prepared on consolidated basis. Lease rentals are VAT taxable including the interest portion in the leases thus increasing the interest rates by approximately 18 percent. The majority of the lease contracts are financial lease contracts (99 percent).

Growth in leasing has been brisk in Lithuania, with 75% growth in 1998. The total value of the leasing portfolio at the end of 1998 was approximately 800 million Litas. According to the official data, trucks and trailers account for 40-50% part of the leasing portfolio of the top 5 companies. According to the data from the Center of Economic Research (published in March of 1998), the projected leasing portfolio is expected to grow to 1,400 million Litas in 2000. Table 4.10 provides information on the leasing portfolio of Lithuanian companies for 1997 and 1998.

Table 4.10 Leasing Portfolio for Lithuanian Leasing Companies (millions of Lt)

Leasing company	1997	1st 9 months of 1998	Growth in 9 months	Growth in %
Vilniaus bank leasing	132.9	281.0	148.1	111.4
Hansa leasing	102.5	142.8	40.3	39.3
Hermis leasing	11.7	60.5	48.8	417.1
Litimpex leasing	10.3	16.6	6.3	61.2
Savings bank leasing	4.2	38.0	33.8	805.7
TPLV	7.5	22.0	14.5	193.3
Parex leasing	-	-	-	
Other companies	2.6	28.9	26.3	991.5
TOTAL:	271.7	589.9	318.2	117.1

According to the official data, trucks and trailers accounted for the largest share of leasing at the end of 1998 (46.6%). Leasing of cars ranked second (25.3%), followed by industrial equipment (17.5%). Together, these three categories of leases accounted for 89.4% of the leasing volume, with the remainder distributed between office equipment, agricultural equipment, real estate, and medical equipment.

Leasing companies can be expected to play a greater role in financing environmental investments in the near future, particularly vehicles and heavy equipment used in solid waste collection and disposal. There are a number of issues that will influence growth, including parallel develops in other capital markets, development of cross border controls, currency exchange risks, tax treatment of interest charges, and the level of competition in this burgeoning market.

4.4.3 National stock exchange (NSE)

Private securities in Lithuania are traded on the National Stock Exchange of Lithuania (NSEL), which opened on September 14, 1993. The first trading session was arranged in September 1993 starting with 19 issuers and 22 issues. The Stock Exchange model that

was implemented with the assistance of the SBF-Bourse de Paris and SICOVAM (French depository) and complies with internationally accepted standards. For the recent five years the National Stock Exchange has experienced growth in line with Lithuanian financial and capital markets. During this period the legal framework for a professional securities market was created together with the increased experience of market players. The number of issuers in the trading lists was growing steadily. The Official and Current Lists were created to include the most liquid shares. The turnover of the Stock Exchange was increasing at a rapid pace:

- The total turnover generated during 1993-1996 was LTL 1088 million
- The turnover for 1997 was equal to LTL 1463 million
- Trading volume of 1998 amounted to LTL 1488 million.
- The market capitalization soared from LTL 40 million in 1993 to more than LTL 13 billion in 1998. In 1998, market capitalization figures were - LTL 6,035. mill. (US$ 1,508.8) for Listed Securities, including market value of Listed Shares at LTL 4,199.1 mill. (US$ 1,049.8) and Government Treasury Bills at LTL 1,836.1 mill. (US$ 459) and LTL 7,617.1 mill. (US$ 1,904.3) for Unlisted Securities.
- The total market capitalization of the NSEL amounted to LTL 13.65 billion. (US$ 3.41 billion) in the first half of 1999.

While the NSE is an important source of equity capital, its major contribution to environmental investment in Lithuania is likely to be indirect. As the volume of equity capital increases, capital markets will become more competitive, potentially exerting downward pressure on interest rates (although there are a number of additional factors that will also influence interest rates). To the extent that equity capital is used to renovate existing facilities and upgrade production processes, this source may contribute to environmental improvements.

4.5 Opportunities for Increasing Domestic Sources of Financing

In assessing opportunities for increasing domestic financing for environmental investments, consideration should be given to sources that could play a role in covering the initial or up front costs of investment and to sources that could cover the repayment of credit. In this section, the discussion is divided between capital costs and financing for repayment of investment credits.

4.5.1 Capital Costs

As noted in Chapter 2, environmental investments in 1998 were equal to 156 million Litas, of which 50% came from the State, 5% from state funds and the remainder from other sources (own funds, foreign grants or loans). Thus, at the current time, slightly more than one-half of investments are financed by domestic sources.

State Budget For the two main domestic sources of capital, the prospects for expanding their level are not too promising. The state support for investments in the environment

has been decreasing in comparison to total State investments for all purposes, with substantial decreases in state support for the environment observed in 1999, falling to one-half of the 1998 level as a percentage of total investment. This trend is not necessarily irreversible, but it indicates that there is competition for state support among non-environmental investments. Whether state support for environmental investment will be increased in the future probably will depend on a variety of factors including the priority attached to the environment relative to other sectors, the overall strength of the economy and revenue generated from taxes, and the availability and cost of alternative financing for environmental investments.

State Funds New legislation has been drafted and discussed that would eliminate the State Nature Protection fund and municipal nature protection funds. If this draft legislation is adopted, the environmental charges and fines that are currently earmarked for these funds would revert to the treasury. Such a change does not necessarily mean that these revenues could not be added subsequently to state budget support for environmental investment, but would probably require a significant lobbying effort on the part of municipalities. The State Nature Protection fund has not been used for investments, whereas municipalities have used municipal nature protection fund resources for small investments in the environmental field. In addition, unless further changes are introduced in charge and fines rates, revenues currently designated for the nature protection funds will decrease with improving environmental performance of facilities.

Domestic Capital Markets There are three issues that will determine if domestic capital markets will play a role in financing environmental projects in the future. First, will there be demand for credits among municipalities for domestic credits? This will depend on other options, particularly the availability of IFI credits (see Chapter 5) and the attractiveness of domestic financing relative to foreign financing in terms of interest rates, allowances for grace periods, and repayment period. Given the current situation in the domestic credit market, it may be several years before there is significant narrowing if the differences in credit terms. Second, there is the issue of the domestic sector's willingness to supply capital to the environmental sector. As many compliance investments do not exhibit financial rates of return comparable to non-environmental investments, interest among banks in making loans to the sector may be limited. However, new sources of capital could emerge in the form of municipal bond markets, as has been observed in Poland. The third issue concerns the scope of environmental investments. While there is a growing leasing market in Lithuania, its potential role in environmental financing would be limited primarily to vehicles and certain types of equipment (such as specialized mobile equipment for solid waste disposal facilities

Own Resources In the private sector, own resources would be expected to play a major role, although private firms have received some foreign assistance to adopt clean technologies and access foreign technologies. In the public sector, municipalities have limited capacity to generate surplus revenues (comparable to private sector profits). Municipal revenue raising opportunities are limited, with user fees for municipal services the main source of revenue that can be applied to environmental projects. Generally, unless municipal environmental service providers have been able to build up a significant

amortization fund for rehabilitation and renovation purposes, the magnitude of user fee revenues that could be devoted to capital projects over and above those needs for operations and maintenance is unlikely to support co-financing requirements for major infrastructure projects.

4.5.2 Repayment of Credits

The discussion above suggests that at least some proportion of capital for environmental investments will need to be generated from loans. As discussed in Chapter 6, there are legal limits on municipal borrowing that may have a bearing both on the magnitude and timing of loans. Nevertheless, it appears that municipalities are capable of raising capital for environmental investments through credit.

The burden of servicing these loans will fall largely on municipalities. While it may be possible for municipalities, in an emergency, to utilize municipal budget revenues to service a portion of repayments, revenues from user charges will represent the major source of revenue for debt financing. At the current time, user charges for water, wastewater, and energy are relatively low in Lithuania, suggesting that there is some scope for increasing user charge rates above their current level. In addition, the introduction of user charge increases may be stipulated as a condition to obtain IFI credits. The scope for increasing user charges (and revenues) will depend on a number of factors including the elasticity of demand for the services provided, collection effectiveness, and the acceptability of increased rates, particularly among lower income groups.

Chapter 5. Foreign Sources of Financing

Foreign sources of financing for environmental investments have already played an important role in Lithuania. Three types of foreign sources are considered in this chapter:

- Bilateral and multilateral grants and credits
- IFI loans and windows in local banks
- Foreign direct investment

Table 5.1 summarizes the level of grant and loan financing for environmental purposes in Lithuania that has been provided by donors and IFIs in recent years. As will be apparent in the discussion in the chapter, foreign financing is expected to play an important role as Lithuania prepares for accession and for several years after membership. Over this time period, the relative importance of foreign sources will change, in part because of Lithuania's membership (limiting bilateral support from EU countries). The discussion of each current and potential source will address likely changes in the level of support that can be expected.

Table 5.1 Foreign financing of environmental sector during 1995-1999 (millions of Litas and Euros)

Source of Financing	Grants for technical assistance		Investment credits	
	Litas	Euros[1]	Litas	Euros
The World Bank	-	-	52.8	12.88
EBRD	-	-	59.8	14.59
NEFCO	-	-	12.0	2.93
PHARE	35.7	8.7	59.9[2]	14.6[3]
LSIF	9.02	2.2	50.0	12.2
NIB	-	-	82	20
EIB	-	-	61.5	15
Denmark	113	27.56	123	31
Sweden	…	…	55.2[3]	13.46[3]
Finland	3.28	0.8	18.9[2]	4.6[2]
Norway	…	…	6.0[3]	1.46[3]
Others	…	…	1.6[3]	0.39[3]
Total:	157.72	38.46	357.5	87.2

Source: Ministry of Environment; Draft final report "Development of Programme Approximation and Implementation of EU legislation in water sector in Lithuania", PHARE/DISAE project for Lithuanian Ministry of Environment, May 1999.

1. The exchange rate between Lt and Euro is 1Euro = 4.1 Lt
2. Investment grants
3 - Investment grants together with technical assistance

… - Technical assistance is lumped together with investment grants

5.1 Donor Sources of Financing

5.1.1 The European Union

The EU has reached agreement on a number of financing instruments that will be made available to accession countries in implementation of environmental requirements. These instruments include PHARE, LSIF, ISPA, SAPARD. During the '90s, the PHARE program has been the primary instrument for assisting Lithuania with the development of environmental policies and strengthening its environmental institutions. Table 5.2 summarizes the resources Lithuania has received through PHARE for technical assistance and investment.

Table 5.2 Funds devoted to the national PHARE program in 1993-1999 (thousands of Euros)

Year	Technical assistance	%	Investments	%
1993	945	100	-	0
1994	880	98	17	2
1995	3,700 500	55 100	3,000 -	45 0
1996	~6	0.2	2,500	99.8
1997	~160	4	4,250	96
1998	1,480	31	3,320	69
1999	1,000	0.01	1,500	0.01
Total	8,671	37	14,587	63

Note: Excludes grants from Regional bilateral and CBC PHARE program.

PHARE will gradually be transformed into a pre-structural fund and will be designed to co-operate in regional development projects, to modernize industry and implement the environmental *acquis*. It is planned that 30% of PHARE money will be designated for institutional building projects and 70% for investments.

In 1998 Large Scale Infrastructure Facility (LSIF) was created and Lithuania received from this instrument technical aid in the water sector. This amounted to 14.4 million Euros in 1999 of which 12.2 mEuro went to investment projects (Klaipeda, Panevezys and Jurbarkas water projects) and 2.2 ,mEuro were allocated for technical assistance (for preparation projects for another EU instrument - ISPA).

From ISPA, SAPARD, and PHARE funds, Lithuania is able to receive approximately 100 million Euro each year. It is already known that at least one quarter of this sum will be devoted to environmental protection investments. If Lithuania is accepted for EU membership, it could potentially receive approximately 500 million euros each year from structural funds. Assuming the same proportion is devoted to the environment, Lithuania would potentially receive 125 million Euros each year for the environment or about five times the amount available between 2000 and 2006. IFIs have agreed to provide loans for

30% of project costs on ISPA projects for which projects are valued at 5 million Euros or more, although some exceptions may be allowed for smaller projects to receive ISPA financing.

5.1.2 Bilateral Donors

A number of donors have actively supported environmental activities in Lithuania, as indicated in Table 5.1 above. Bilateral donors have provided about 29 million Euros in technical assistance support during the period 1995-1999.

All countries listed in Table 5.1, as well as the UK and Germany, have provided technical assistance to Lithuania during the last decade. The assistance has been related generally to all sectors important to Lithuania from an environmental point of view. Initially, this assistance focused on support for the preparation of the main environmental strategies and primary legislation but has progressed, for example, to the strengthening of enforcement capacities. It is very important from the perspective of the investment strategy that training of municipal staff on project preparation and management has started as well. With the help of the UK Know How Fund and SIDA, training is organised for employees of local authorities in the identification, preparation and monitoring of the implementation of projects.

Denmark is the only country that has provided investment credits to Lithuania during this period. Between 1995 and 1999, Denmark has provided 31 million Euros in the form of investment credits (including subsidy component where credit terms have been "softened"). Beginning in 1991, Denmark has supported wastewater treatment projects under the *Danish Soft Loans for Infrastructure Projects in the Baltic States Programme*, providing 10-year interest-free loans through the Danish State Export Credit Agency. Seventeen wastewater projects in Lithuania have received 280 DKK in credits, reflecting a subsidy element of 75 million DKK. The Danish Environmental Support Fund is another facility designed to assist Lithuanian facilities in adopting cleaner technologies. In total, Denmark has provided 455 million DKK in assistance to the environmental sector in Lithuania.

Continued support from bilateral donors will be beneficial to Lithuania, particularly in the area of investment project preparation and additional work in developing implementation strategies for specific directives.

5.2 International Financial Institutions (IFIs)

5.2.1 The World Bank

The World Bank has provided loans for environmental projects in Klaipeda (7 million USD) and Siauliai (6.2 million USD). Both loans were used for wastewater projects. In 1999, the World Bank and the European Commission signed a memorandum defining their respective commitments to co-finance the costs of projects for which ISPA assistance is provided.

General credit terms for World Bank loans (currency pool loans and LIBOR-based single currency loans) include the following:

- ✓ Interest rate – 6-7%
- ✓ Grace period – 4-5 years
- ✓ Final maturity – 17 years
- ✓ Minimum size of a loan – there is no formal limitation

Another credit line with a tentative amount of 20 million USD is anticipated from the World Bank. The agreement regarding this new line was signed in 1999. However, the real work with loans is not yet started. The administration of this project called the Municipal Development Program is foreseen to be performed by the Municipal Credit Facility (described further). The main purpose of this project is to develop a system of municipal investments in infrastructure and municipal services. It will assist municipalities in preparing projects and managing credits received. The project also is expected to provide investment support to more than half municipalities of Lithuania. The tentative amount of the loan foreseen is not all directly related to the environmental sector. Some projects presented by the municipalities are connected with the energy efficiency and other fields, which are not directly related to the implementation of the environmental *acquis*.

5.2.2 Nordic Investment Bank

During the last 10 years Lithuanian environmental sector has not received loans from the NIB. However, in 1998 a new credit line of approximately 20 million Euros was opened for earmarked financing of environmental projects, primarily, in water supply and treatment. Initially, 26 possible projects were suggested by Lithuania as the best candidates for the loan. However, there have been some delays in putting this credit line into operation. Presently, the NIB loan is being disbursed through the Municipal Development Programme, described in more detail in Section 6.4.4.

5.2.3 European Bank for Reconstruction and Development (EBRD)

As of the beginning of 1999, the EBRD had signed agreements to fund 20 investment projects in Lithuania. One project is related to the environmental sector. This is Kaunas Environment project, which aims at the improving the quality of water and wastewater services in the city of Kaunas. The loan was made in September of 1995 and its size amounted to 14.95 million USD. EBRD also has plans to finance the rehabilitation of the heating plant and distribution system in Kaunas with a loan amount potentially reaching 42 million USD. This source is very important in meeting the air sector EU directives and could be included in the Investment Programme in the future. The conditions of the EBRD loans are the following:

- ✓ Interest rate – 5-6% for loans with the state guarantee
- ✓ Grace period – 3 years
- ✓ Final maturity – 15 years for public projects
- ✓ Minimum size of a loan – there is no formal limitation

5.2.4 NEFCO

The financing provided by NEFCO for Lithuania amounts to 3 million USD to date. NEFCO provided a loan to co-finance the construction of the Kaunas wastewater treatment plant. It is not clear what role NEFCO will play in financing environmental investments in the near future, except that it will be a minor role compared to the larger IFIs and the European Union.

5.2.5 European Investment Bank

The Lithuanian Government has approved a credit line of 15 million Euros from the European Investment Bank for environmental purposes. The Neringa water project, Panevezys water project, the Vilnius sewerage extension project, as well as the Jurbarkas water project will be financed from this credit line.

It is already agreed that the EIB will provide loans for the implementation of two projects, which are now under preparation for ISPA financing. The first project – Druskininkai wastewater treatment plant construction and development of sewerage network system – will receive 1.65 million Euros from the EIB (overall project size – 5.5 m Euros) and the second project – Development of Siauliai region municipal waste management system – will receive a 3.75 m Euros loan (overall project size is 12.5 m euros). The EIB loan is also part of the Municipal Development Programme.

5.3 Foreign direct investments

Foreign direct investment is one of the most important factors guaranteeing the successful development of Lithuania's economy. It is clearly understood that the country needs additional equity in order to support the economy growth. Thus, attracting investment is one of the key facets of Lithuania's economic strategy. It is clear that all new investments come with an appropriate environmental approach, therefore, an increase in new modern investments will translate into additional environmental financing.

In 1996 alone, more than 60% of new FDI came from investors who expanded their operations. Cumulative FDI reached US$1 billion by end of 1997. After the privatization of Lithuanian Telecom (Lietuvos Telekomas) in July 1998, cumulative FDI increased by US$ 510 million.

As of the end of the first quarter of 1999, Lithuania's foreign direct investment (FDI) stood at $1.7 billion. Up to US$ 2 billion in new FDI is predicted for 1999 as a result of Lithuania's stepped-up infrastructure privatization program. In 1999, sectors that have attracted the largest cumulative amount of FDI are:

- Communication Services - $672.9 million (32.1%)
- Manufacturing - $565.8 million (27.1%)
- Wholesale/Retail - $437.7 million (20.9%)

- Financial Intermediaries - $170.1 million (8.1%)
- Other- $248.4 million (11.9%)

As it was mentioned above, by the end of 1998 more than 75 percent of Lithuania's economy was in private hands. By the end of privatization the country will enter a new phase of competition competing for attracting new investments. One of the competitive trends is the attraction of "green-field" investments. It is expected that the government will review the existing FDI support programs and will prepare a package of investment incentives with the goal of increasing Lithuania's competitive advantage among other Eastern European Countries.

5.4 Opportunities for Increasing Foreign Sources of Financing

Foreign sources of financing play an important role in supporting investments and technical assistance. In assessing the availability of these sources, it is important to consider the function of the specific financial resources that are provided and constraints or additional requirements that Lithuania may need to meet to ensure access. The discussion of foreign sources below is divided into two parts: the first focusing on support for investment (grants, credit, and other capital); and grants for technical assistance.

5.4.1 Financing for Investments

At the present time, Lithuania has access to grants and credits for environmental investments, with the EU providing grants through ISPA and SAPARD. These investment resources support pre-accession activities, with approximately 25 million Euros currently available for the environment sector. Co-financing for ISPA projects of 30% of project costs is available through the World Bank and other IFIs. As discussed in Section 5.1, after accession, Lithuania potentially could have access to grant financing associated with the structural funds of approximately 125 million Euros for the environment.

As will be demonstrated in Chapter 7, this future level of funding is more than adequate to support the investments that have been identified in the water and waste sectors in Lithuania. However, the important questions concern the nature of special conditions that may be tied to the use of these resources and the capacity of Lithuania to prepare projects (see below and Chapter 6) and mobilize resources that may be required for co-financing and repayment of loans (previously addressed in Section 4.5).

As has already been observed, special conditions have been attached to ISPA projects, allowing these funds to be used for specific types of projects meeting minimum project size requirements. While there are some advantages in terms of administration of ISPA resources to establish minimum project sizes, there are three important limitations: (1) it may encourage countries to increase project sizes and/or costs to meet the criteria when in fact the compliance results could be achieved at lower costs; (2) assuming a country has established investment priorities based on environmental risks, availability of prepared projects, and other criteria, countries may be compelled to adjust their priorities

to accommodate financing constraints; and (3) a country may have few projects that are large enough, requiring creative packaging to develop acceptable projects. In this latter case, this can create problems in setting tariffs and servicing loans where several municipalities are implementing the "project." None of these drawbacks are insurmountable, but at a minimum, require Lithuania to anticipate their future financing needs and, if difficulties are anticipated in complying with special conditions, to initiate a dialogue with the EU to identify potential solutions. It is likely that Lithuania will not be uniquely impacted by such requirements and there may be an appropriate forum for accession countries to discuss potential financing problems and options.

5.4.2 Grants for Technical Assistance

Lithuania has received considerable bilateral assistance from European countries in developing approximation strategies, for institutional strengthening, and project preparation. However, once Lithuania becomes a member of the EU, this bilateral assistance will no longer be available, although some technical assistance resources will still be available from the EU. This prospect suggests that Lithuania should consider a number of strategic issues in programming bilateral technical assistance. First, Lithuania should fully explore opportunities to utilize bilateral assistance to the greatest extent possible prior to accession and should give priority to bilateral assistance support that is least likely to be continued by the EU. Second, Lithuania should assess priorities for assistance, and determine the likely amount and uses of technical assistance resources that will be available from the EU after accession. This will enable Lithuania to determine how it will meet the training and capacity needs in the related areas of compliance monitoring, project preparation, and financial management. This exercise could be beneficial in helping Lithuania to propose a balanced bilateral assistance program that addresses both the near term needs in terms of strategy development and project preparation, while also helping Lithuania prepare to sustain these management and project development activities in the future.

Chapter 6. Project Cycle Management Capacity in Lithuania

In the previous two chapters, the focus was on sources of finance and the institutions that supply funds for these purposes. However, even if financial resources are available, compliance goals will not be met unless projects are implemented. Thus, the capacity of enterprises and municipalities to prepare and implement projects is expected to be an important factor in Lithuania's efforts to meet compliance schedules. In addition, a variety of national, local, and international institutions and agencies can be expected to play supporting roles in the implementation of investment projects.

This chapter is divided into five sections. The first section describes the investment project cycle and provides an overview of the institutions that have a role in project cycle management in Lithuania. The next three sections provide detailed discussion of the project cycle roles of national ministries, municipalities, and environmental funds and foundations. The final section summarizes project cycle management capacity needs in Lithuania.

6.1 Overview of Project Management Capacity

6.1.1 The Investment Project Cycle

The investment (or project) cycle describes the step-by-step process by which investments are implemented. In Figure 6.1, the project cycle is depicted as a sequence of six steps.

Figure 6.1 Overview of the Investment Project Cycle

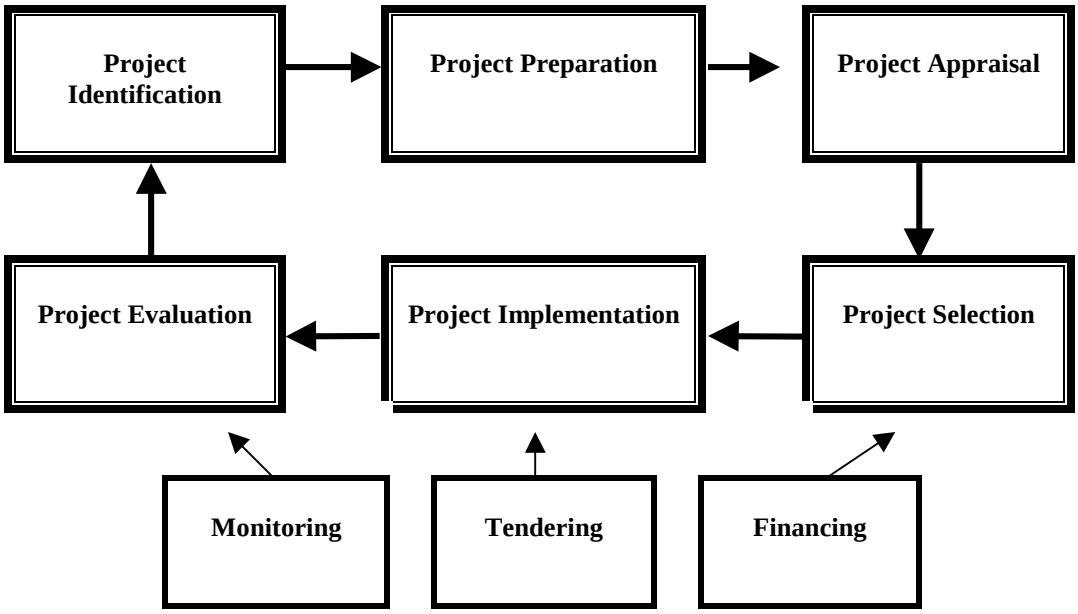


Figure 6.1 presents a stylized project cycle that includes all the steps that are ideally involved in developing and implementing projects. In practical terms, some project cycles, such as those for private sector firms, may involve fewer steps or minimal resources for specific steps. For example, in cases where "soft" financing is disbursed on a competitive basis by an environmental fund, the stages of project appraisal and selection may be formalized to ensure transparency and accountability. On the other hand, if a private sector enterprise or municipality undertakes an investment using own resources, these steps will be limited to an internal (or external) review of the project design and associated financing plan. Similarly, project identification for a fund could involve development of expenditure priorities, coordinated with environmental authorities while project identification by a public or private facility may only involve an analysis of alternative technologies that will meet compliance requirements.

6.1.2 Institutional Roles in the Investment Project Cycle in Lithuania

The project cycle diagram can be used to describe a variety of processes managed by one or more institutions. Examples of project cycles in Lithuania include ISPA projects, projects included in the PIP, project applications submitted to the Lithuania Environmental Investment Fund, projects supported by IFI and donor loans, and municipal infrastructure projects. Each project cycle may vary in the level of development and resources devoted to each stage of the project cycle and there may be overlapping responsibilities between implementers and institutions providing financing.

As an illustration, consider a municipal infrastructure project to upgrade a wastewater treatment plant.

- ***Project Identification:*** The project might be designed to satisfy compliance requirements and identified by the municipality, perhaps with the assistance of donor-funded technical assistance. Or, alternatively, the project might be conceived at the national level in the process of identifying potential projects for ISPA financing.

- ***Project Preparation:*** The preparation of the project would involve development of the project's technical design and costs, financing options, and cost recovery or financing plan if credits will be used in meeting the capital requirements. For several types of co-financing, the municipality would have to prepare and submit an application (e.g., LEIF) or prepare the project in accordance with IFI or donor guidelines.

- ***Project Appraisal:*** The scope of the project evaluation or appraisal would depend on the types of financing sources that would be used. Formal appraisal criteria are used by PIP, ISPA, LEIF, and IFI and donor loan programs. In these cases the appraisal is undertaken by the financing source rather than the project implementer.

- ***Project Selection:*** In some cases, financing is considered on a project-by-project basis, with a project only required to satisfy the criteria established by the funding

institution (e.g., IFI loans). Where financing is limited relative to the number of projects (e.g., PIP, LEIF, and ISPA), the selection process involves comparative analysis of the projects applying *ex ante* criteria.

- ***Project Implementation:*** At the stage of implementation, there may be a number of institutions involved, with the municipality entering into contractual agreements with financing institutions, in some case, conducting tenders for construction and equipment procurement in accordance with the applicable requirements specified by sources of finance. In addition, most funding institutions have requirements for monitoring including reporting on progress, tracking of disbursements, and inspections.

- ***Project Evaluation:*** Once the project is implemented, funding institutions may conduct post-implementation evaluations, particularly if financing has been awarded on a competitive basis (e.g., LEIF) to determine if projects accomplish their proposed objectives.

Table 6.1 provides a summary of the range of roles played by various institutions in project cycle management in Lithuania.

Table 6.1 Project Cycle Management Roles in the Environment Sector

Institution	Project cycle management roles
Ministry of Environment	• Environmental strategy and investments unit together with the PMU assists municipalities in identifying ISPA projects, other projects that meet EU requirements. These units prepare investment projects lists, evaluate them, co-ordinate financing, propose on financing sources, co-ordinate preparation of the ToRs, preparation of ISPA applications, evaluate quality of prepared information, etc. Also they are responsible for the control of the use of the funds that are coming with state guarantee. • Facilitation of project preparation through PHARE and other donor assistance. • For ISPA projects, there is a procedure set by the Ministry of Environment for ISPA project management and generally for the management of projects supported by foreign countries. • Compliance monitoring function to determine if operating facilities meet EU requirements
Ministry of Finance (Central Financing and Contracting Unit)	• CFCU is responsible for PHARE and ISPA tendering, disbursing ISPA funds for investment projects; Auditing of disbursements
Ministry of Economy (Public Investment Programme)	• Provides guidance to the spending agencies on project preparation analysis and selection • Establishes selection criteria and carries out project appraisal and selection, and monitors implementation of PIP projects. • Prepares 3-year PIP annually that indicates approved projects for current budget cycle and proposed allocations for two out-years.
Municipalities	• Full project cycle responsibilities for municipal infrastructure projects, although selection criteria not involved unless financing can be used for alternative projects (e.g., municipal nature protection funds). • Provides financing or co-financing for investments through municipal nature protection funds, user charge revenues
Lithuania Environmental Investment Fund	• Full project cycle management capabilities to appraise, select, implement and evaluate applications received for financing. • Provides guidelines for applicants in preparing project applications • Provides co-financing support to successful applicants
Housing and Urban Development Fund	• Provides training in project identification and preparation, and project and financial management. • Provides assistance in project preparation and financial analysis. • Provides financing through World Bank and other IFI lines of credit. • Provides financing through bilateral grants (Sweden, Finland, and Denmark)
International Financial Institutions	• Full project cycle for most loans with exception of support for local on-lending facilities. • Facilitates identification and preparation by donors
Bilateral and Multilateral Donors	• Support technical assistance projects to identify and/or prepare projects. • Provide grant and/or loan financing, with oversight and monitoring responsibilities

6.2 National Ministries

Three national ministries are involved in project cycle management for environmental investments in Lithuania. The respective roles and programs of the Ministry of Environment and Ministry of Economy are described in more detail below. As noted in the table above, the Ministry of Finance also plays a role in disbursing ISPA and PHARE funds and conducting tenders for the use of these resources. However, as the Finance Ministry's role is limited to these few activities, no further discussion is provided below.

6.2.1 Ministry of Environment

The MoE is the main co-coordinating institution as concerns the management of different environmental projects. These responsibilities have been elaborated in a few ministerial orders and other legal acts. These orders and legal act cover a variety of topics including the management of environmental projects, the use of specific sources of financing such as the State Nature Protection Fund and ISPA, and inter-ministerial cooperation. A number of regulations focus solely on ISPA and cover topics such as specific functions for the Co-coordinating Council for ISPA, rules for the disbursement of ISPA funds, functions of the Project management unit in the Ministry related to ISPA, functions of the Environmental strategy and investments unit of the Ministry related to ISPA, and functions of the Lithuanian Environmental Investments fund related to ISPA. It should be noted that an ISPA Implementing Agency is to be established in the near future, presumably necessitating some adjustments in roles and responsibilities for the ISPA project cycle.

Within the Ministry, the Department of Environmental Strategy is one of five departments that deals daily in its work with management of different projects. The Department consists of several units, including two with project cycle responsibilities: the aforementioned Environmental Strategy and Investments Unit; and the Project Management Unit. The primary functions of the Department include the following:

- Development of a strategy and economic system for rational use of natural resources and management of sustainable development
- Formulation of European integration policy of the Republic of Lithuania in the sector of the use of natural resources and sustainable development
- Co-ordination of issues of approximation of Lithuanian national laws and regulations with EU requirements
- Development of draft laws and other legal acts on economic regulation of environmental protection and use of natural resources as well as methodologies for calculation and application of fines for damage incurred to the environment and natural resources
- Advancement of proposals on issues of development of a national investment programme

- Representation of the Ministry of Environment in the Commission on the National Investment Projects
- Co-ordination of issues related to the establishment and use of environmental funds
- Organization and co-ordination of development of foreign technical assistance programmes and projects as well as co-ordination of programmes and projects developed by foreign banks, PHARE and other bilateral investment and technical assistance programmes
- Co-operation with foreign and international organizations, including preparation and co-ordination of agreements on international co-operation
- Preparation of data and information for international environmental institutions

6.2.2 Public Investment Programme

The state investment policy is realized by the Ministry of Economy through the annual Public Investment Programmes (PIPs). PIPs are developed yearly for 3 years (rolling plan). The first PIP was for 1995-1997, the second for 1996-1998, the third for 1997-1999, the fourth for 1998-2000 and the last one for 1999 - 2001. The PIP describes the investment projects that the Government intends to implement over the three-year period and contains both new and ongoing projects.

The PIP includes a formal project cycle, with most management resources focused on setting investment priorities, appraising and screening investments, and disbursing PIP financing. The Government determines public investment policy, sets limits on financing for public investment and approves the PIP. The Ministry of Economy prepares the PIP. It works with the Ministry of Finance and the spending agencies in compiling the PIP and provides guidance to the spending agencies on project preparation, analysis and selection. After the Government has approved the PIP, the budget is submitted to Parliament for approval.

Project Screening and Prioritization

The PIP includes all priority projects that receive funding directly from central government resources (including projects which also receive some external funding from loans or grants) and/or create a potential liability on the budget (i.e. through the State guaranteeing a loan).

When drafting the PIP, the provisions to include the following projects are usually observed:

- Projects that correspond to the national and sector priorities. The Action Programme of the Government of the Republic of Lithuania for 1997 - 2000 provides that energy,

transport, environmental protection and health care shall be considered priority sectors.
- Projects that provide the greatest social-economic effect;
- Projects that are bound up with commitments of international financial institutions, other foreign partners and Lithuania to implement these projects (with ensuring their partial co-financing of Lithuania from the national budgetary funds).

Projects in the PIP are selected by reference to the following criteria:

- Has the Government already approved implementation of the project;
- Is it appropriate to use public funds to finance the project;
- Does the project address and correspond with priorities in the sector concerned;
- Is the financial rate of return positive;
- Is there a better technical approach to the objective the project is designed to achieve;
- Is the project oriented towards rehabilitation and maintenance of existing infrastructure rather than the construction of new infrastructure;
- Have external loan or grant funds already been secured for the project.

Public investment focuses on areas of the economy that support and promote private sector development, including energy and transport infrastructure. Partial or full cost recovery is desired whenever possible. Investments in environmental protection, the social sectors (education, health care, social welfare, culture, science) are also planned. In general, the Government does not provide budgetary financing for investment in agriculture (except in selected agricultural land improvements) or industry.

There are two Commissions, which play a major role in selection and approval of projects needing the state guarantee to be included into PIP. First one – Commission of the experts of investment projects - is inter institutional body, which considers whether projects proposed to be included into PIP meet requirements set. Those projects, which receive an approval from this Commission, are forwarded to the second Commission to be evaluated. The latter is the State Foreign Loans Commission that makes decisions on the award of State guarantees. In case of a positive decision the Governmental order is prepared and put on the table of the Government that makes a formal decision on the award of the guarantee.

In the environmental sector, wastewater treatment has been the main priority. Most small towns have only mechanical treatment facilities while the majority of rural settlements have no treatment facilities. The wastewater treatment plants for Kaunas, Klaipeda, Siauliai and Panevezys are priorities. The plant for Klaipeda was completed in 1999, and treatment plants for Siauliai and Kaunas will be completed in 2001. The construction of facilities in Panevezys started in 1998. A strategy for hazardous waste management was adopted in 1999 and includes identification of investment priorities. Temporary storage sites will be constructed and, in the longer term, a waste processing plant will be built.

Procedures for project analysis and selection have been strengthened. Some projects are now subject to economic analysis and methodology and procedures to ensure improved

cost estimation are also introduced. Progress in implementation of projects in the PIP is monitored twice a year.

PIP Revision and Updating

The Government is committed to implement projects in the PIP. However, since finance has yet to be secured for some projects in the PIP, this will depend on successful negotiations with funding agencies and actual availability of budgetary finance. Furthermore, while all projects are subject to an initial screening, further scrutiny is required as part of detailed project preparation. This might indicate the need for major changes in project design or, in some cases, that the project should be eliminated from the PIP. The PIP is updated annually to ensure its continuing usefulness. Its time frame is moved forward by one year. The updating process involves:

- Reassessing the resources available for public investment;
- Adjusting annual financing requirements for ongoing projects in relation inter alia to progress in implementation and changes in the inflation rate:
- Reviewing national and sectoral priorities;
- Incorporating new projects and/or dropping others (in response to more detailed project appraisal and changes in priorities and resource availability).

PIP Financing

There are five sources of finance for public investment under the public investment programme: state budget, municipal budgets, loans obtained on behalf of or guaranteed by the State, grants, enterprises' own resources. Budgetary funds for public investment include extraordinary expenditures from State budget available for public investment, earmarked funds in Municipal budgets. The PIP does not include:

- Investments financed from municipalities' budgets (with the exception of earmarked funds);
- Private investments i.e. investments which do not include any public funds and/or which do not create a potential liability on State budget through issue of State guarantee for a loan.

The Ministry of Finance forecasts budgetary resources and limits on foreign borrowing for public investment. Line Ministries and spending agencies submit project proposals to the Ministry of Economy. It is planned to increase investment financing from the national budgetary funds to a level of at least 10 per cent. In conformity with state policy trends of middle-term external borrowing, it is provided that the Government's annual external borrowing limit will not exceed 25 per cent of the national budget revenues of the current year. It is planned to grant foreign loans for investment financing. The share of foreign loans being allocated for this purpose would have to amount to 60-70 per cent in 1998 - 2000. The external state loan (sum of loans) must not exceed 16 per cent of the GDP in any year of the period. State guarantees have been issued to State enterprises and other bodies in recognition of the difficulty of borrowing in commercial money markets.

Depending on the degree of risk associated with the investment, the Government makes a charge of up to 3% of the value of the loan. The money is paid into a fund for use in case of default by a borrower.

In the period between 1998 and 2000, resources reflected in the PIP included the following sources (see Table 6.2).

Table 6.2 Sources of Financing 1998-2000 PIP

Source	Billions of Litas	Percent
National budget (repayment of loans excluded)	2.09	23.0
Municipal budgets (repayment of loans excluded)	0.88	9.7
Foreign loans	4.02	44.2
Non-repayable loans (grants)	0.46	5.0
Own (company) funds	1.51	16.6
Other means (privatisation fund)	0.14	1.5
TOTAL: (repayment of loans excluded)	9.1	100

Funds for public investment (including loans taken on behalf of the State for public investment) will be increased to 5.4% of GDP in the period 1999 - 2001. $1.64 billion will be available over the three-year period (including funds from the national budget, loans taken by the government and loans borrowed under state guarantee). There will be continued inducements to attract private capital (through the issue of shares, i.e. investment funding through the private capital for shares, and bonds). Expenditure will be concentrated on rehabilitation, modernization and maintenance of infrastructure with the objective of providing an efficient infrastructure base for the private sector. Lithuania has well developed infrastructure but financial shortages have resulted in its deterioration. Energy, transport and environmental protection are priority sectors but there will also be public investment in telecommunications, health, social welfare, education, culture and others. Where investments lead to the generation of revenues, they will be financed from enterprises' own resources and borrowing. Budgetary resources will be used primarily where there are no user charges (or they are set below full cost recovery rates) or where they are no other revenues. Most investment in the industrial, agricultural and services sectors will thus be financed from enterprises' own resources and/or private borrowing. Some limited guarantees will be provided for loans to enterprises in the goods and services sectors.

6.3 Municipalities

In Lithuania, power is divided between Central Government, the Counties and the Municipalities (also sometimes referred to as "Local Self - Governments"). The basic law governing the Lithuanian municipalities is found in the *1994 Law on Local Self-government.* This law reformed the decentralized structure of government by introducing a single tier consisting of fifty-six municipalities. The urban or "city" municipalities represented 44 percent of all municipal expenditures in 1996. The level of concentration has not been as pronounced in Lithuania as in other small countries, such as Estonia and Latvia. The two largest municipalities, Vilnius and Kaunas, account for approximately

one-quarter of all municipal expenditures, and the six largest municipalities account for close to 40 percent.

Under the 1994 Law on Local Self-Government, numerous responsibilities were devolved to municipalities from the central government, including the provision of services such as water, sanitation, waste, district heating and hot water. Thus, responsibility for implementing environmental investments to meet EU requirements for water and waste fall on municipalities and municipal companies and service providers. In this section, the discussion of municipal project cycle management capacity is divided into three parts: (1) an overview of municipal investment planning; (2) municipal capabilities to identify, prepare, and implement investment projects; and (3) municipal financing capacity.

6.3.1 Municipal Investment Planning

For Lithuania (as well as other former centrally planned economies), municipal investment planning is a relatively new process. Therefore, the participants of this process do not yet have experience on the most effective way of planning municipal investments. Moreover, municipalities even lack expertise to articulate their needs or utilize services of appropriate consultants. However, both internal and external economic and political conditions necessitate that municipalities develop investment planning capabilities rapidly. Municipal staffs are now being trained on investment project preparation and implementation. With the EU and bilateral donors poised to support municipal investments, there is an urgency to expand municipal capacity both to accelerate project preparation and improve municipal financing capacity.

Generally, municipalities may plan their environmental investments on two levels: first, by submitting projects for consideration in the Public Investment Programme (previously described in Section 6.2.2); and second, in determining how to utilize resources in the Municipal Environmental Protection Fund. The first level of the planning process usually concerns quite large infrastructure projects and the municipality requires approval from appropriate ministries (MoE, MoEconomy, MoF). In fact, the impetus for undertaking these large projects quite often is not borne sorely by the municipality (if at all), but in the responsible state ministry, the institution setting new environmental requirements. The second planning level deals with considerably smaller investment projects, which may be planned and implemented only by the relevant municipal institutions. Here municipalities may utilize their own capacities and draw on local experience in deciding how to allocate these resources to small investment projects. However, planning is not yet efficient on either level. Municipalities are often not able and prepared to prioritise and select those projects for financing which provide the most significant or largest net benefits in terms of public health and welfare.

Another quite controversial aspect is decentralization of revenues received from pollution charges. As described earlier, 70% of pollution charges paid by polluters are allocated to the respective municipalities' nature protection funds. On one hand, this gives to municipalities a little bit more freedom in their investment related decisions. On the other hand, municipalities usually do not have appropriate mechanisms of prioritising and

spending money for the projects with highest benefits. Moreover, heavy political lobbying influences project approval procedures. In addition, financial planning is very difficult in the transitional period because of continuously ongoing structural adjustments.

Seeking to promote investments in municipal infrastructure, the Lithuanian Government approved the Programme of the Development of Municipal Infrastructure in June 2000. The programme has been in development since negotiations were initiated with the institutions providing assistance to CEE countries: the World Bank, Nordic Investment Bank, European Investment Bank, and Danish, Swedish and Finnish institutions. These institutions have committed to provide considerable amounts of funds (described in chapter 5) for the implementation of the Municipal Development Program. On the other side, municipalities are required to be prepared for such assistance and have municipal investment plans. So far only a few municipalities have approved such plans.

Nonetheless, lack of financial resources is a significant factor in the investment process in municipalities. For example, though municipalities exceeded their commitments in 1999 and used approximately 5.4 million Litas or 137 % of their own share foreseen in the PIP for the construction of environmental facilities, these co-financing resources were not a large enough "match" to use available foreign financing. Only 19% of planned loans and six per cent of foreign planned grants were used. On the other hand, it seems municipal nature protection funds are not used sufficiently to leverage available foreign sources. For example, in 1999, only 15.5% of resources accumulated in the municipal nature protection funds were used for the construction of facilities included in the PIP. This suggests that municipalities often have other priorities for using resources from the nature protection funds.

Thus, it is clear that the added experience and development of adequate skills are the main prerequisites for improving municipal investment planning in the environmental sector. Both municipal project cycle management capabilities and financial capabilities are discussed in sections below.

6.3.2 Municipal Project Cycle Management Capabilities

The management of the project cycle for a municipal infrastructure investment requires significant resources, particularly at the stage of preparation. Project preparation requires a range of technical and financial expertise needed to design the investment to ensure it will satisfy compliance requirements, presumably at the lowest cost. The financial plan must utilize financing that represents the best value from the municipality's perspective and, if loans are used, includes a realistic loan repayment schedule with debt servicing matched to revenue projections. Further on in the project cycle, the municipality or other institution must oversee the implementation of the investment, securing financing, carrying out the tendering process, and monitoring construction of the investment.

The capacity of municipalities to undertake these activities in the project cycle depends on two major factors: availability of municipal staff and the appropriate mix of skills and expertise. Municipalities in Lithuania vary considerably in terms of their population and

the sizes of their municipal staffs. Generally, the larger the municipality, the more likely that environmental and economic functions related to project cycle management can be undertaken by municipal staff. Table 6.3 presents information on the number of staff working in environmental units and total administrative staff for the largest municipalities in Lithuania.

Table 6.3. Number of environmental staff in the biggest municipalities of Lithuania

Municipality	Staff in environmental unit	Total administrative staff
Vilnius	11	620
Kaunas	16	451
Klaipeda	4	264
Siauliai	5	272
Panevezys	3	248
Alytus	3	155
Marijampole	3	150

Source: communication with municipalities

Small municipalities very often do not have even one person working on environment and only a small staff dealing with economic/financial issues of the municipality. Many of these small municipalities also do not have staff dealing with investment policy and the identification of financing options. For example, a representative of the municipality of Ukmerge (population 51, 000) indicated that institutional capacity is not sufficient for planning and management of investment projects. At present there is no staff dedicated to investments in Ukmerge municipality and only one part-time staff person working on environmental issues.

Assuming a municipality has staff to carry out the project cycle activities described above, they must also have the requisite mix of skills. Based on the team's discussions with various officials and experts in Lithuania, it appears that many of the needed skills are not well developed even in the largest municipalities. In some cases, however, municipalities can access substantial assistance for project preparation through foreign donors and financing facilities such as the HUDF (see Section 6.4.4). However, in order to utilize this assistance effectively, municipal staff would need to have basic training in project cycle management, including implementation monitoring, in order to cooperate with and guide the work of donor-financed consultants. Alternatively, municipalities could retain the services of consultants to prepare projects for financing and implementation. Presently, in part because municipal project descriptions and applications for financing support must meet donor and/or IFI requirements, there is limited local project preparation capacity. Thus, until such capacity develops, the option of paying foreign consultants out of municipal budgets may be an unattractive option.

6.3.3 Municipal Financing Capabilities

In assessing municipal capabilities to finance environmental investments, it is important to recognize the other expenditures that must be covered by municipalities. Traditionally, the most important component of local expenditures has been social services, which include education, culture and recreation, health, and social assistance. In 1998,

expenditures in social services represented 75% of total municipal expenditures; education accounted for more than half of the total, social assistance for approx. 12% and recreation and culture for almost 5%. Since 1997 finances for health care are managed through a new system, so its share in total municipal expenditure sums up to less than 1%. The other major component of the municipal budget is "housing and municipal economy", which represented 14 and 11 percent of total municipal expenditures in 1997 and 1998, respectively.

The variation of per capita expenditures across municipalities is quite considerable (total expenditures per capita ranged in 1996 from a minimum of Lt 534 to a maximum of Lt 3,869) if special investment programmes are taken into account. Generally, except for a few resort towns, municipal income (and hence expenditures, as municipal budgets should not entail deficits) from funds collected in their territory per capita are quite even and amounted, e.g., to approximately 800-900 Lt per capita in 1999 (*Source: Ministry of Finance*).

The municipalities' competencies are delegated to it by the State[9]. Within the parameters of the competence granted to them by the 1994 Law, municipalities are allowed to act freely, initiate and adopt decisions. The Municipal Council's competencies are listed in Article 15[10], and the relevant competencies are found in the following subsections:

- *Subsection 10* - Confirms the municipal budget
- *Subsection 11* - Adopts the rules and procedure for accumulating and using non-budgetary funds
- *Subsection 12* - Allocates or obliges the mayor (municipal board, if it is formed) to allocate additional municipal budgetary resources
- *Subsection 13* - Confirms the prices and tariffs for services rendered to residents by municipal enterprises; also defines prices for electricity, central heating, cold and hot water, and natural gas.
- *Subsection 14* - Approves the general sum of allocations for institutions and organizations that receive financing from the municipal budget and wage fund.
- *Subsection 15* - Establish local fees according to the procedure established by laws.
- *Subsection 23* - Utilize bank credits, take and lend loans, establish terms for the municipal executive institutions regarding the utilization of bank credits and taking and lending loans.

While at first sight, the municipality's power to gather funds through the charging of "local fees" (subsection 15) appears to be strong, in fact it is quite restricted due to the application of the 1996 Lithuanian Law on Local Charges. This law provides that the local charge is an obligatory payment established by the decision of the municipal council and paid to the municipal budget. It then specifies that local charges can only be collected for four limited purposes: (1) Excavations in municipal public use areas and

[9] Article 14, 1994 Law on Local Self Government
[10] Article 15, as amended

restrictions of traffic; (2) Commercial activities in public areas; (3) Visual advertising on municipal property; and (4) Car parking. Therefore, the power to charge local fees is of limited value to municipalities needing to raise money for environmental infrastructure. Since the scope for using local fees is so restricted, this results in the municipality competence found in Article 15 subsection 11 also being rather limited.

Article 23 of the 1994 Act explains the financial resources of the local authority. The municipality's financial resources are made up of the **municipal budget** and **non-budgetary funds**. In addition, municipal borrowing provides a mechanism for augmenting these sources to cover capital costs of investments, although such borrowing also creates a future liability that must be covered from the municipal budget or non-budgetary funds.

The Municipal Budget[11]

First and most importantly, it has to be stressed that the municipal budget is allocated from the State budget. While the municipality controls the spending of its municipal budget, only the State can control the extent of the budget. This means, for example, that the Municipality cannot decide to increase its budget by raising the taxes paid by enterprises on its territory - this power lies only with central government.

The municipal budget is formed from income from taxes, non-tax income, and transfers from the state. These budget sources are summarized in Table 6.4.

[11] Information taken from the Law on the Methodology for Establishing Municipal Budget Income, 1997 07 02 NoVIII-385

Table 6.4 Sources of Revenue for Municipal Budgets

Source	**Description**
Tax Income	• Part of the State Personal Income Tax • Land tax • Tax for rent of a state land and of water bodies for fishing purposes • Tax on immovable property for enterprises • Stamp duty • Counter (marketplace) tax • Tax on inherited property or property received as a gift • Other income from taxes according to other laws
Non-tax income	• Income from municipal property • Penalties and other income from confiscations • Local fees • Income for services received by municipal organizations • Income for the rent or sale of non-agricultural land • Income for the municipal funds' balance in municipal accounts • Other non-tax income according to other laws.
Transfers from the State	• Equalization grants • Transfers for capital investments in municipalities as provided in the Public Investment Programs • Transfers for compensation for restitution of houses and apartments to former owners • Transfers for the purchase of housing for returning Lithuanian political prisoners and exiles • Transfers for housing.

Missing in the new system of transfers are conditional grants that would allow the central government to pursue or encourage municipal expenditure in areas of national priority or importance or in areas that exhibit significant externalities across municipalities. Perhaps this omission is linked to the lack of tax autonomy at the local level. Local governments, however, have considerable discretion in the spending of shared tax revenues and general transfers, and thus a matching grant program could be effective in the future, even if no revenue autonomy is granted. The reforms of 1997 for equalization transfers put Lithuania ahead of many other countries in transition. Nevertheless, the new system of equalization transfers for Lithuania's municipalities introduced in the Law for establishing Municipal Budget Income of July 1997 is complex.

Non-Budgetary Funds

The principal source of municipal non-budgetary funds are the user charges that residents and businesses pay to the municipal enterprises that provide services such as water supply, wastewater treatment, waste collection and disposal. The municipality has the power to establish the price of these services; and so theoretically has the capability to raise funds by setting the user charge at a rate higher than the actual cost of provision of the service. However, user charges have not been set high enough to fully cover O&M costs and capitalize the amortization funds (used to replace depleted capital and renovate infrastructure).

There are two major issues in assessing the prospects for higher tariffs. First, unless demand is highly inelastic, customers may be able to respond to higher tariffs by reducing consumption. Also, higher tariffs may increase the difficulties of collecting tariffs.. In both of these cases, it will be more difficult to determine, *ex ante*, the level of tariffs required to service debt and meet O&M requirements. Box 6.1 describes the difficulties that Ukmerge has encountered in servicing its debt for a new wastewater treatment plant financed by a Danish loan. Second, there are equity considerations in raising user fees because they have a disproportionately large burden on low-income households. The Energy Pricing Commission, which was established in 1996 and is accountable to the President of Lithuania, coordinates prices for the energy products, drinking water and wastewater. It establishes the main principles for calculating energy prices, and prepares and approves the methodologies for the setting drinking water and wastewater tariffs. It has a supervisory and, at the same time, a consumer "protector" role that may limit the scope for large increases in tariffs.

Municipal Borrowing

The current legal framework for municipal borrowing is ambiguous. The Local Government Law (article 15) regulates the use of bank credits. There are no explicit limits on the level of borrowing, however, nor are there provisions for bankrupt and nonpaying local governments, collateral provisions to permit escrowing of revenue streams, or the pledging of municipal assets to guarantee repayment of loans.

Some observers have argued that municipal borrowing is prohibited by article 27 of the Law on Budget Formation, which states that municipal budgets must be without deficit. Municipalities are not allowed to borrow in order to cover deficits. They need to plan budgets without deficits. However, the new Law for Establishing Municipal Budget Income (article 8) states that municipalities have the right to borrow "according to the procedures and conditions established by the government." In 1998, the Lithuanian Government adopted the Rules on borrowing for municipalities, which is a very important basis for the future investment activities in municipalities. This regulation says that usually a debt (sum of all loans taken plus guarantees provided) cannot exceed 20% of municipal income of a certain year, except of some specific cases (such as if investment projects are included into the PIP etc.). Annual limit for loans taken in that particular year is 10% and for short-term borrowing - 5% of municipal income.

Box 6.1 Debt Financing from User Fees in Ukmerge

The city of Ukmerge completed construction of a new wastewater treatment plant in 1998 at a cost of 22 million Litas, of which 6.4 million Litas was in the form of a loan from the Danish Bank, "Unibank." The treatment plant complies with both Lithuanian and EU standards. The quality of surface water downstream of the wastewater treatment plant in the Sventoji River is good enough to allow swimming. Approximately 21,000 inhabitants of the city or **67.7%** are connected.

The first installment on the Danish loan was due on June 30, 2000, with payments continuing for a period of 8 years. At the time the municipality decided to take the loan, its calculations of cash flow suggested that the loan could be repaid out of revenues from user fees. These calculations were based on high water consumption rates that have since fallen precipitously, especially among industrial customers. In addition, user fees are not levied on about one-third of water use due to an inadequate system of metering. As a result, Ukmerge is unable to repay the loan out of current user fees for water and sewerage of 4.21 litas/m^3.

The municipality asked the Ministries of Economy and Finance for assistance in repaying the loan but these requests were turned down. The water company has decided to tap into its amortization funds to service the loan until and if tariffs can be increased enough to support repayment of the loan. Municipal officials indicated that by drawing down the amortization funds, they will need to borrow additional money in the future to cover the costs of repairs and renovations to the water and wastewater system that would have been financed from amortization funds. More information on Case Study in Municipal Financing: Ukmerge is provided in Annex 6.1.

The new law also stipulates that the central government can issue loans in the event of a temporary shortage in municipal budgets. This practice is already in place: the central government has provided bridge financing at zero interest to municipalities for liquidity management purposes. Other than these short-terms loans, there has been little borrowing. No municipality appears to have issued bonds, and there are no prospects for such activity anytime soon due to absence both of the legal background and a tradition. Borrowing from commercial banks is taking place, but on a small scale. Banks have been less than eager to lend because of the lack of collateral and the inability of most municipalities to pay their arrears to state entities and suppliers. Examples of bank borrowing are provided by the city of Vilnius, which was granted loans by the former State Commercial Bank and the Agricultural Bank (two state-controlled banks) for a total of less than Lt 20 million in 1997. The City of Kaunas also recently borrowed Lt 3 million for parking meters from a commercial bank at 10 percent annual interest; all revenues from parking in the city commercial district were escrowed to the repayment of this loan.

6.4 Environmental Funds

There are at least 24 different categories of funds in Lithuania. Many of these are very specialized, earmarked for specific types of expenditures. Among these funds are a group of environmental funds and one fund in the housing sector that can be used for infrastructure projects. The environmental funds that can be utilized for environmental financing include the state and municipal nature protection funds and the Lithuanian Environmental Investment Fund, the latter established as a non-governmental

organization. Table 6.5 summarizes total income that has accounted for disbursements from these environmental funds. Charges on pollution have accounted for approximately 89 percent of total fund income in the past. However, the Lithuanian Environmental Investment Fund has received a grant from the EU to help capitalize the fund, and a new law on pollution charges will increase the share of revenue from charges, relative to fines.

Table 6.5 Overall revenues received by environmental funds (millions of Litas)

	1993	1994	1995	1996	1997	1998	1999[12]
Charges on pollution	4.9	13.7	23.3	37.7	43.4	36.7	
Fines	1.2	3.1	4.4	3.7	5.3	4.8	
Total	6.1	16.8	27.7	41.4	48.7	41.5	36.2

Sources: Annual reports of the Ministry of Environment

6.4.1 State Nature Protection Fund.

The State Nature Protection Fund was established in 1988 and is subordinate to the Ministry of Environment. The main sources of revenue for the fund include penalties for violation of environmental laws and exceedances of pollution limits. The revenue of the State Nature Protection Fund is used primarily to fund measures to address specific remediation needs, for design, construction, and operation of environmental entities, and for elimination of pollution sources. The State Nature Protection Fund receives approximately 85 applications every year requesting financial support from the Fund. If the council of the fund approves an application, the Ministry of Environment transfers money from the fund's account to the applicant's account.

As illustrated in Table 6.6, the State Nature Protection Fund receives approximately 5 million Lt each year. This level of funding limits the size of projects and/or share of financing that the Fund can provide. Therefore, the Fund supports projects related to environmental management activities such as renovation of buildings, acquisition of monitoring equipment, etc.

Table 6.6 Expenditures of State Nature Protection Fund (thousands of Litas)

	1993	1994	1995	1996	1997	1998	1999[13]
Investments	7	811	1,248	1,719	902	1,525	
Operational costs	1,157	1,628	3,098	2,597	3,868	3,920	
Total	1,164	2,439	4,346	4,316	4,770	5,445	3,160

Source: Ministry of Environment

[12] Only total revenues known.
[13] Only total expenditures known

6.4.2 Municipal Nature Protection Funds

There are 56 Municipal Nature Protection Funds in Lithuania. Seventy to ninety percent of their revenue is derived from pollution charges. These resources are used for compensation for damages to the environment, for financing construction of environmental entities, eliminating pollution sources, and protecting the health of residents. The use of revenue by municipalities is summarized in Table 6.7. Generally, disbursements by the Municipal Nature Protection Funds are about evenly divided between investments and operational costs.

Table 6.7 Expenditures of municipal nature protection funds (millions of Litas)

	1993	1994	1995	1996	1997	1998[14]	1999[15]
Investments	..	6.4	7.2	14 5	22.5		
Operational costs	..	5.9	10.4	16.2	24.5		
Total	..	12.3	17.6	30.7	47.0	40	35

Source: Ministry of Environment

According to the new Law on Pollution Charges adopted in mid-1999 and effective from the beginning of the year 2000, Municipal Nature Protection Funds will receive 70% of revenues collected from pollution charges. With annual revenues from pollution charges projected to be 50 million Litas, these funds will receive about 40 million Litas each year. While this appears to be a substantial amount, it is divided among 56 funds, with many receiving minimal revenue amounts because of limited numbers of polluters in their jurisdictions. Thus, in some municipalities, funds can only support very small investments. To improve administration of these funds and to provide adequate resources for leverage in investments (through co-financing), it might be useful to consider merging municipal funds into 8-10 regional funds. This would necessitate development of procedures for selecting projects to ensure that some municipalities can compete effectively for financing support.

6.4.3 Lithuanian Environmental Investment Fund

The public organization, the Lithuanian Environmental Investment Fund (LEIF) was founded in 1996. This fund was created to provide soft loans and grants to private companies, state enterprises and NGOs in support of environmental investments. The Fund also may acquire shares of enterprises or take an equity position in, for example, a start-up company that provides environmental services or produces environmental control equipment. The main portion of the fund's resources, according to its rules, will be used for providing "soft" loans for which interest rates are offered at rates below those available from commercial lenders (not higher than 11%). Grants may also be provided by the LEIF, provided the grant represents no more than 40% of the total project cost.

[14] Only total expenditures known
[15] Only total expenditures known

The LEIF did not begin operations until 1999, because its potential sources of revenue were linked to passage of the new Law on Pollution Charges. In the law, 20% of revenue from pollution charges is earmarked for the LEIF. Thus, approximately 10 million Litas will be transferred to the LEIF each year. In addition, a grant from EU PHARE in the amount of 2.1 million Euros, was made contingent on the government's ability to provide a sustainable source of revenue for the LEIF. Thus, the passage of the Law on Pollution Charges cleared the way for the LEIF to receive the EU PHARE grant.

The LEIF's financial operations are described in the rules for project cycle management that were designed to conform with international best practices as described in the St. Petersburg Guidelines for Environmental Funds (OECD, 1995). These rules describe project identification, selection, and implementation. A feature of the LEIF is the participation of Lithuanian banks in evaluating financial aspects of proposed projects and managing the repayment of loans.

Approximately 100 applications for loans have been received by the LEIF since the initiation of financial operations. Following evaluation of applications, however, much less projects were assessed as suitable for LEIF support. As of July 1, 2000, approximately ten soft loans were already provided to applicants.

6.4.4 Housing and Urban Development Foundation

There are other funds in Lithuania that could potentially play a role in environmental financing. These include, *inter alia*, the Forestry Fund, Country Support Fund, Energy Saving Fund, Road Fund, Land Reform Fund, and the Municipal Health Fund. In all cases, their primary function is not environmental in scope, but projects could result in environmental benefits. A more direct link to the environment is provided by the Housing and Urban Development Foundation (HUDF), which can support municipal infrastructure development in the water, waste, and air sectors.

HUDF was established in 1996 as a public institution, initially called the Housing Credit Foundation. HUDF is wholly owned by the Ministry of Finance and has the following objectives:

- To function as a source of financing for municipal-level infrastructure until such time as the Lithuanian banking and financial sectors can play more of a role;
- To promote the selection of high quality, high priority projects in infrastructure;
- To encourage the development of effective cost recovery approaches and promotion of financial discipline;
- To encourage best practices in municipal and public service financial and investment planning and management.

The HUDF has set a target of assisting about 40 of the 56 municipalities through training, technical assistance, and investment support by the year 2002. HUDF will administer a World Bank line of credit and other IFI lines of credit. Investment grant support will also be available through the Municipal Grant Capital Facility. HUDF will offer financing for up to 90% of project costs. Loan amounts between $100,000 and $3 million will be available (smaller loans may be available on an exceptional basis). The HUDF will offer variable interest rates, adjusted semi-annually in line with term deposit rates (for loans issued in Litas). A maximum spread of 3 percentage points will be applied to loans to cover overhead costs and administrative margins for HUDF. The maturity on loans can vary from 5 to 17 years, with grace period of up to three years.

An important consideration in examining the potential role of the HUDF loans in the environment sector will be the relative attractiveness of these loans *vis a vis* other sources of financing. Clearly, ISPA is more attractive because of the substantial grant component (coupled to similar lending terms offered by HUDF, but for smaller shares of project costs). However, HUDF offers some flexibility relative to ISPA in that it will support much smaller projects. To the extent that HUDF strives to initiate lending activities in the next few years, there may be limited incentives for municipalities to access the facility, given that environmental compliance schedules will allow several years to bring facilities into accord with EU directives.

6.5 Critical Constraints on Effective Project Cycle Management Capabilities

The previous sections are largely descriptive, providing an overview of the institutions that currently participate in project cycle management of environmental projects in Lithuania. In examining these institutions, the team has noted a number of issues that currently impede effective management of environmental investments in Lithuania. Although the list of issues provided below may not be exhaustive, efforts to address them would greatly enhance project cycle management in Lithuania. These issues are discussed in this section and recommendations for strengthening project cycle management capabilities are provided in Chapter 8.

Ineffective use of donor financial and technical assistance – this is principally a problem of absorptive capacity. MoE staff, at present funding levels, has only two staff in the Project Management unit to prioritize, guide and participate in donor-funded technical assistance programs. In addition, Lithuania has been unable to fully utilize grants and other soft financing provided by donors for investment projects because of limited capacity to identify and prepare projects. Illustratively, less than one-half of all grants from PHARE have been used by Lithuania, although the environmental sector has performed better than other sectors. Also, Lithuania has underutilized export credits and soft financing provided by Denmark.

Poor co-ordination of the various project cycles – Like many countries, Lithuania has responded to each offer of foreign financing by establishing rules and procedures for the exclusive use of these funds. Predictably, this results in the creation of special institutions

and commissions, with investments being prioritized according to rules tailored mainly to the funding source. As a result, there are overlaps and redundancies in roles and responsibilities and difficulties in co-ordinating between complementary programmes. For example, HUDF has a number of activities related to municipal environmental projects, but there has not been much attention focused on how MoE and HUDF could combine strengths, exploit synergies, and avoid duplication. The creation of the ISPA Implementing Agency could improve coordination among institutions and programmes with similar objective.

Project cycle management skills development – There are substantial unmet training needs necessary for Lithuania to rely to a greater extent on local expertise to prepare projects, identify and assess financing, and implement investments. Some of these training activities can only be fruitful if there is an increase in staff levels in national ministries and municipal administrations. In the short run, Lithuania might focus more donor support on project cycle management training, but the goal should be to develop local experts to carry out future training activities. Also, it will probably be necessary for the MoE or other institutions to assist municipalities in identifying and preparing projects, particularly those projects eligible for grant financing.

Constraints on municipal financing - Under the present legal framework Lithuanian municipalities are severely restricted in the ways in which they can raise finances for environmental infrastructure. The primary source of financing for municipal budgets remains the central budget. Until Lithuanian municipalities are given their own powers to tax or charge locally, they will remain dependent on central budget allocations, grants from environmental funds (such as the LEIF and Municipal Nature Protection Funds[16]), international donors, and income from user charges for financing environmental infrastructure and for repaying loans for the same.

Strengthening municipal capacity – An effective process of prioritising environmental investments involves a blend of "top down" and "bottom up" approaches. This financing strategy largely reflects a top down approach, looking at investments needed to meet EU requirements at the national level. However, because municipalities will take most investment decisions, there is a need to develop the capacity to prepare municipal investment strategies, reflecting both environmental and other priorities. Most municipalities lack the capacity to carry out such analyses. Continuous training of municipal staff, combined with technical assistance and effective transmission of information on environmental requirements and negotiated EU compliance schedules will be needed to enable municipalities to participate more actively in the implementation of a national financing strategy. However, in order to increase municipalities' receptivity to additional training, it may be necessary to increase their involvement in and responsibility for investment planning.

[16] It has been proposed to abolish the State and Municipal Nature Protection Funds with these revenues to revert to the State Treasury. Although the State Nature Protection Fund has not been used for investments, municipalities have used the Municipal Nature Protection Funds for investments.

Chapter 7. Municipal Environmental Investment Programme

7.1. Introduction

This chapter provides the analyses of demand and supply of environmental financing in Lithuania. Two types of analytical results are presented. As requested by the Ministry of Environment, the project team has developed a municipal environmental investment programme (IP). This is a detailed, project-level simulation of investment financing, matching available sources of financing to the respective costs of project investments. The IP focuses on municipal investments in the water, wastewater, and waste. The preparation of the IP has involved frequent discussions between the staff in the ministry and the project team. The Ministry has guided the selection of projects, provided advice on their timing, and suggested allocation rules in using available sources of financing.

7.2. Municipal Environmental Investment Programme

The goal of the Municipal Environmental IP is to propose a time-sequenced investment programme with the following features:

- Individual investments should meet the anticipated EU requirements, articulated in Lithuanian environmental laws and regulations
- In aggregate, the proposed investments should satisfy these EU requirements according to a compliance schedule mutually agreed by the GOL and the European Commission
- Financing for these investments should be proposed, relying on existing sources of financing and new sources that can be developed over the timeframe covered by the IP
- Since many of the investments will require municipalities to raise external capital, necessitating repayment of loans (the most common, readily available form of external capital), the investment program should be affordable on a national level (annualised costs relative to GDP) and municipal level (tariffs per capita or per household).

The development of the IP serves the purpose of identifying not only potential gaps in financing, but also other "policy" reforms that may be necessary to meet environmental targets according to proposed compliance schedules. The IP for the municipal sector has been developed using a 4-stage process. The first stage involves initialisation of the projects component; the second includes the investment capital component and the analysis of existing financing gaps. The third one involves the cost recovery component and the fourth component is the affordability analysis. Each of these stages is summarized in Table 7.1.

Table 7.1 Process for Developing the Municipal Investment Programme

Stage 1: Initialisation of Project Component		
Step	**Details**	**Outputs**
1. Initialisation of Projects Component	Development of lists of investment projects based on previous studies and on the latest information available from other sources, including information on project description, current status, costs, and timing	List of projects sorted by starting date and type of project (e.g., water, wastewater, solid waste, hazardous waste)
Stage 2: Programme Investments, Financing and Gap analysis		
Step	**Details**	**Outputs**
2. Initialisation of Investment Capital Component	Description of characteristics of each domestic and external source of financing such as availability, terms and conditions attached to its use, types and sizes of projects eligible for use	Inventory of financing sources and characteristics
3. Identification of existing gaps in financing	Simulate financing of projects on list, drawing financing from available sources, subject to constraints identified in Step 2	Analysis of number and value of projects that cannot be funded
Stage 3: Cost Recovery		
Step	**Details**	**Outputs**
4. Initialisation of Cost Recovery Component	Development of the annual repayment schedule, adjusted for interest rates and repayment period, for the loan component of investments. Tariffs estimated to service repayment as well as additional O&M for investments.	Annual repayment calculator Municipal tariff algorithm
5. Identification of the starting date constraints for projects w/o proposed starting dates	Some municipalities may have reached their cap on loans and will not be able to take new loans until current debt has been reduced enough to accommodate new credit.	For projects without starting dates, establish earliest year these projects could be undertaken and note in project descriptions
6. Development of "acceptable" financing plans for all projects	Determination of the maximum affordable municipal loan, revised allocation of co-financing sources to each investment	Affordable financing plans for each project
7. Development of "preferred" financing plans for all projects	Determination of the most preferred financing plan for each investment, from the municipalities' perspectives	Preferred financing plans for each project
Stage 4: Affordability Analysis		
Step	**Details**	**Outputs**
8. Calculate affordability	Calculate per capita and household affordability ratios	Affordability ratios to be compared to established benchmarks
9. Adjust list of projects to improve affordability	Modification of financing plans of investments to more effectively utilize grants and budgets and/or adjust schedule of investment	Revised time-sequenced list of projects, tables on the allocation of financing sources

A few challenges were encountered in preparing this IP:

- The Financing Strategy is not only a technical but a policy document as well. The team faced major difficulties related to the absence of clear detailed policy goals. This is inevitable, given the dynamic nature of policy development in the environmental sector and economic sectors, as well as the ongoing discussions with the EU on environmental compliance and continual updating of information and analyses in support of these discussions.

- It is stressed in the documents of the EC that each applicant country must present a credible financing strategy as part of its negotiating position. The credible financing strategy should not only describe demand and supply but should also examine the issue of affordability. This suggests a broader dialogue involving the Ministry of Environment, other ministries and local government. For the most part, the project team's discussions have been limited to MoE.

- The projects included in the IP are those that could be undertaken by municipalities, not necessarily those that will be undertaken. In addition, project start dates have been proposed, but these do not necessarily reflect priorities of the specific municipalities. Thus, there will be considerable follow-up activity needed to ground the IP in local realities.

- The potential for implementing the IP is tied to the growth of the country's economy. The capacity of Lithuania to meet the funding commitments assumed in developing the IP are highly sensitive to overall economic performance of the country although this linkage is not very transparent or direct.

7.2.1 The Projects Component

As described in Chapter 3 of this document, several studies have been carried out to identify specific compliance investments required to satisfy EU legislation and to estimate their costs. For some of these investments, the projects have been further prepared and may be included in the ISPA and/or PIP portfolio. The project team compiled a list of specific projects elaborated in these studies for the major directives requiring investments by municipalities or municipally owned companies. For each identified project, the following information was collected and summarized in Excel spreadsheets for (1) water and wastewater and (2) solid and hazardous wastes:

- Municipality
- Project title
- Brief project description
- Total cost of project
- Proposed start date
- Implementation schedule
- Yearly investment costs (if multi-year investment envisioned)
- Estimated O&M costs

- Estimated annualised costs

Generally, it is assumed that all investments will comply with the requirements of the relevant EU directives, although it may be necessary to include some caveats. For example, within the wastewater sector, priority is often given to wastewater treatment plants, relative to expansion of sewerage connections although some municipal projects may include some investment in sewerage connections. The development of project lists has been heavily influenced by recommendations from other studies and guidance from MoE. Specifically, we have followed the recommended mix of treatment plants and sewerage in the action plan prepared by the DISAE/PHARE-funded project (Soil & Water) and recommendations provided by COWI for the structure of waste management systems. Projects to be included in these spreadsheets will generally fall into one of three stages of development:

(1) *Identified projects with proposed start dates.* These projects have been "prioritised" according to some scheduling factor. For example, projects in this second group would include construction of new landfills, necessitated by expected closure of existing landfills that have reached or expect to reach capacity. Thus, if an existing landfill will be exhausted in 2008, a proposed start date would be established to ensure that the new landfill is available by this time.

(2) *Prepared projects*. Some projects have already progressed beyond identification, are already prepared and prioritised for funding under the ISPA Programme and/or the GOL's Public Investment Programme (PIP). For these projects, specific information on start dates and implementation schedule may be available, as well as information on proposed financing.

(3) *Identified projects not currently under preparation by the relevant municipality, with unknown start date.* For these projects, implementation schedules, design and technology specifications, and cost estimates have been developed by consultants and may be less detailed or accurate than for projects in preparation. Over the course of sequencing investments, these are the projects that can be moved between years to utilize available funding. Whether municipalities would elect to follow this sequencing is an issue for later discussion.

The following sections provide more detailed discussion of the development of the projects components for water and waste. Information on the air sector is provided, although this sector was subsequently excluded from the IP.

Water Sector

The EU directives in the water sector relate to towns larger than 2000 p.e. (in case of wastewater and sewerage systems) or settlements having centralized water supply for more than 50 people (in the case of drinking water). Since ISPA will be one of the main financiers of municipal projects, it was agreed with the MoE that for the purposes of preparing the IP, small projects would be "bundled" into larger projects more suitable for ISPA funding (projects of at least 5 million Euros).

The initial water projects database was constructed using the data of LIT-106 project with some amendments (consultation with the Ministry of Environment, data of the PIP 2000-2002, project proposals developed by municipalities for financing from IFIs, ISPA, etc.). There were 204 projects in the initial database. Through bundling of smaller projects and screening of projects on the basis of MoE priorities for the sector, the number of projects was reduced and grouped into four categories according to priority. The following criteria and assumptions were used:

- According to Ministry policy, priority in water sector was given to the construction of wastewater treatment plants, then to extension and renovation of sewerage systems and finally to drinking water improvements and water supply system extensions.
- "Manageable" size of project is 5 – 10 million euro (20.5 – 41 million Lt).
- Combination of several components/projects should be considered (it is not feasible and costly to excavate twice when extending drinking water and sewerage systems). Combination of projects will also expand a list of criteria (e.g. effect on health criteria is met in drinking water projects and improvement is achieved in sewerage and UWWT projects)
- It is preferred to combine projects within one municipality as compared to combination between several municipalities.

Before starting to sort the database projects included in PIP 2000-2002 were identified as financing is already allocated for these projects. There are 18 projects in the water sector in the PIP to be financed in 2000. 15 of them will receive grants from the State budget or the Privatisation Fund. Others will receive only state guarantees for loans. Thus, projects in the PIP 2000 receive the highest priority. Then, the remaining projects in the initial water projects database were grouped in the following way:

Step 1. Identification of large projects (> 20 million litas) that meet "manageable size" criteria. It was agreed that single town projects larger than 40 million Litas should not be split into smaller units.

Step 2. Database was sorted to select all UWWT projects. Investment costs of majority of these projects were smaller than 20 million Litas. Sewerage (SW) or/and drinking water (DW) projects were added to UWWT projects to meet "manageable size" criteria. In all the cases grouping was carried out between the projects within the same municipality.

Step 3. Larger DW projects were separated. If these were not sufficient in size, small UWWT plants and sewerage projects (SW) were added.

Step 4. Grouping of remaining SW and DW projects on regional basis (no UWWT projects, grouping within the same municipality).

The grouped projects were prioritised into four priority groups:

- **1st priority** - this group includes large UWWTP projects (construction and renovation) and UWWT projects in towns without an existing UWWT plant. In addition, according to the proposal from the Ministry of Environment, a few more large projects were included into the first group of priority projects (Vilnius, Siauliai, Panevezys and Alytus projects).

- **2nd priority** – this group includes UWWTP projects (construction and renovation of UWWTP) grouped with SWR or/and DW projects. Grouping was carried out between the projects within the same municipality.

- **3rd priority** – this group includes large DW projects (usually in municipalities where some investment project was proposed as a first priority project) and small UWWT projects grouped with SW and/or DW projects (UWWTP upgrading projects).

- **4th priority** – this group includes regional projects covering DW component and sewerage component.

Also, there are additional 41 small projects (DW or SWR) that are difficult to group on regional basis (there are not enough projects within the same municipality to meet the ISPA criteria). Total investment costs of these projects are approximately 50 million Euros. These projects were not included into the preparation of the IP. However, approximately 4 million Euros each year starting from 2001 and finishing 2015 would be needed over and above the costs of the IP to implement these small projects. The four groupings of water and wastewater projects are presented in the Table 7.2.

Table 7.2 Water and Wastewater Projects in the Investment Programme

Priority	Types of Projects	No. of Projects	Investment Costs (mil. Euros)	Implementation Period
1st	Large UWWWTP projects (construction and renovation) and UWWT projects in towns w/o WWT	16	170	2001-2005
2nd	UWWTP projects (construction and renovation of UWWTP) grouped with SWR or/and DW projects	8	60	2005-2007
3rd	Large DW projects (usually in municipalities where some investment project was proposed as a first priority project) and small UWWT projects grouped with SW and/or DW projects (UWWTP upgrading projects).	9	50	2008-2011
4th	Regional projects covering DW component and sewerage component.	14	110	2011-2013

It should be emphasized that total costs for the water sector are different from those presented in Chapter 3. The IP is a less expensive plan since the construction of a few wastewater treatment plants has been completed since the cost projections were prepared in 1998-1999. Also, the costs do not reflect 18 projects included in the PIP 2000 programme.

The total number of projects for the first three priorities added to the PIP projects is 65. This means that an average of 4 water projects will need to be started each year before 2014 in order to finalize the implementation of water sector related directives before the end of 2015. Of course, the size of the project is important here, therefore, the number of projects started each year will in reality be different. Detailed lists of all priorities projects and investment costs are presented in the Annex 7.1.

According to the EU requirements, investments in waste management sector are required for the development of both municipal and hazardous waste management facilities. The need for investment in the two sub-sectors is discussed further.

Municipal Waste Sector

Attainment of the targets set in the EU directives requires development of integrated and efficient municipal waste management systems including waste collection, sorting, recovery and recycling and final secure disposal. Several strategic documents currently under development in the Ministry of Environment emphasize establishment of regional municipal waste management systems, which are economically more efficient. For this reason, the projects proposed for financing in waste management sector were evaluated on regional basis and grouped around new regional landfills.

The development of municipal waste projects was guided in part by the recommendations contained in the report on the Network of Future Municipal Landfills in Lithuania. The report call for the construction of 14 regional landfills, contains a time schedule for construction of new landfills based on the status of existing landfills and the need for new waste disposal facilities. As waste cannot be properly managed if disposal facilities are not available, the need for a new landfill was the critical factor in determining time schedule for the implementation of the proposed projects.

The construction of new landfills should be followed by closure and reclamation of existing large landfills. Environmental risks associated with the old landfills depend on their size, technical and geological conditions, as they present continuous threat to the environment and human health. Closure of large landfills, especially if they are perceived to present an immediate and serious threat to the environment, were included in the first priority projects scheduled immediately after construction of new landfills, while small landfills could be closed later when funding is available.

Construction of new large municipal landfills and closure of old existing landfills will change the shape of waste management system. As small local landfills will not be available, container sites should be established in small towns and communities, and transfer stations should be built in larger district towns. Waste transportation system should also be changed and accommodated to the needs of new waste management facilities. Planned waste management projects should be based on an integrated approach and it is not possible to plan and implement separate projects for landfill construction without upgrading the whole waste management system.

It was also assumed that establishment of integrated waste collection and management system including new landfill is the highest priority. Construction of waste incineration and composting facilities mainly because of their high costs, was postponed to later stages of implementation, though they are also important.

Upgrading of waste management system in any region should be performed in the following sequence:

1. Construction of new landfill;
2. Closure of major existing landfill presenting serious threat to the environment;
3. Establishment of integrated waste collection and sorting (source separation) system covering the region;
4. Closure of remaining old landfills.

Construction of sorting lines for source-separated secondary products is also included in the proposed projects. The municipal waste projects in the IP were divided into four priority groups (Table 7.4). The overall number of projects in the waste sector in Lithuania is 37. There are also two waste projects in the PIP. Neither will receive funding from the State Budget or Privatisation Fund, but will be financed by loans on behalf of the State.

7.4 Municipal Waste Projects in the Investment Programme

Priority	Types of Projects	No. of Projects	Investment Costs (mil. Euros)	Implementation Period
1st	Construction of new regional landfills, closure of problematic landfills and introduction of collection and some sorting lines.	12	90	2001-2005
2nd	Closure of old small and medium-sized landfills	11	30	2006-2007
3rd	Closure of the remaining landfills and construction of the first waste incineration and composting facilities.	7	160	2008-2010
4th	Remaining projects in waste sector, including establishment of composting systems in certain regions.	7	90	2011-2014

Some deviations from the general approach described above were made in certain regions depending on specific local conditions. Annex 7.2. includes a list of all priority projects and a description of some specific projects or areas.

Hazardous Waste Sector

According to the National Hazardous Waste Management Programme adopted by the Government in 1999, a hazardous waste landfill, incineration facility and 5 regional hazardous waste storage facilities are planned. It is assumed that the incineration plant and landfill will be integrated in the Siauliai regional facility.

Evaluated need for investments for the Siauliai hazardous waste management facility (including first stage of landfill, treatment of contaminated soil, interim storage capacities and 10 stations for hazardous waste collection from households, but excluding incineration plant) is 3 million euros from which 2.22 million Euros is an EU PHARE grant. Remaining amount will be covered from the national budget and privatisation fund (financing included in the PIP).

Evaluated capacity of hazardous waste incineration facility is approximately 0.5 to 1.0 ton per hour. Required investment for construction of the facility is approximately 5 million Euros.

Another EU PHARE grant of 1.08 million Euros is allocated for construction of the Klaipeda hazardous waste storage facility. The total allocation of the PIP for the development of hazardous waste management facilities is 0.375 million Euros.

These projects are included into the list of waste management projects (Table 7.4 and Annex 7.2), however, they are not taken into account while assessing the burden on municipalities, because covering of running costs will be the responsibility of private companies giving their hazardous waste to the special facilities.

Air Quality Sector

Currently there is not enough data to identify and select projects in the air quality sector to be proposed for municipal financing. As mentioned previously, the Lithuanian Energy Strategy, adopted in 1999, is a very general document. Unfortunately, the draft Action Plan cannot provide detailed goals and identify specific measures including investments that will need to be undertaken in Lithuania. This is to a great extent due to the uncertainty related to the restructuring of the energy sector. Furthermore, the Approximation Strategy for the Air Quality Sector has not yet been prepared by the MoE (although work on the strategy has been started with World Bank support).

However, the energy sector has been a subject of many studies so far. Annex 7.3 contains a description of the main studies completed to date, which could provide the basis for defining the project list in the air quality sector.

Preliminarily, based on the discussion in Annex 7.3, the following projects could be proposed in the air quality sector for future development:

1. Installation of desulphurisation equipment in the Lithuanian Power Plant (LPP)
2. Burners replacement (low NO_x burners installed in the LPP)
3. Continuous Emissions Monitoring System installed in the LPP
4. The fourth group would cover all those projects which will need to be implemented in all other power plants depending on the national energy action plan adopted

Therefore, although there are no air projects in the investment programme's project list and hence sums needed are not clear, some investment financing should be reserved for air projects.

Summary List of Projects

Table 7.5 provides a summary of the Projects Component analysis for the municipal sectors. It suggests that municipalities will be required to undertake a substantial number of projects, especially taking account for the bundling of smaller projects to accommodate ISPA criteria. The funding needs are estimated to be 760 million Euros over the entire time period covered by the IP, or about 47 million Euros per year. As noted earlier, the projects component excludes some additional projects in the water sector, with investment costs estimated to be about 4 million Euros per year. Also, within the next year, it should be possible to include air quality sector projects in the IP. However, the remainder of this section focuses on financing the projects included in Table 7.5.

Table 7.5 Project Summary for the Investment Programme: 2000-2015

Total number of projects in the Investment project	106
Total number of detailed municipal projects in the Investment Programme	273
Number of projects in each municipality	3 – 8
Investment funding needs: 2000-2006	350 million Euros
Investment funding needs: 2000-2015	760 million Euros

7.2.2 Allocation and gap analysis

The second stage of preparation of the Municipal Environmental Investment Programme includes initialisation of the investment capital component and gap analysis. For each project, the available domestic and external sources of financing were allocated to specific projects according to the co-financing rules agreed in discussions with the MoE:

- first scenario - 50% of project capital costs needs are covered by external grants, 30% from IFI loans, and 20% from domestic sources;
- second scenario – 50% from external and internal grants and 50% from IFI loans;
- third scenario – 40% from external and internal grants and 60% from IFI loans.

It should be noted that second and third scenarios were chosen in order to explore the possible implications of reduced availability of foreign grants and a concomitant increased requirement for loans as a percentage of project costs.

Annual financing needs are determined by summing across individual projects, then comparing these sums with available supply of financing. Tables 7.6, 7.7, and 7.8 summarize the financing needs and the availability of sources for the three scenarios.

Table 7.6 Investment needs for water and waste sector projects in Lithuania for the years 2001-2015 for the first scenario (millions of Euros).

Year	Amount of investments needed			
	Total amount	**50% share from grants (ISPA, PHARE, bilateral donors)**	**30% share from IFI loans**	**20% share from Lithuanian sources**
2001	62	31	18	12
2002	52	31	15	10
2003	65	33	20	13
2004	46	23	14	9
2005	39	19	12	8
2006	47	24	14	9
2007	39	20	12	8
2008	49	25	15	10
2009	73	37	22	15
2010	76	38	23	15
2011	50	25	15	10
2012	53	27	16	11
2013	37	18	11	7
2014	73	37	22	15
2015	0	0	0	0
Total amount needed	761	380	228	152
Sources needed on average per year	51	25	15	10
Available sources per year as of now	65 + loans	~45 (ISPA plus PHARE, bilateral donors)	As much as needed	~20

Table 7.7 Investment needs for water and waste sector projects in Lithuania for the years 2001-2015 for the second scenario (millions of Euros).

Year	Amount of investments needed		
	Total amount	**50% share from grants (ISPA, PHARE, bilateral donors and Lithuanian sources)**	**50% share from IFI loans**
2001	62	31	31
2002	52	31	31
2003	65	33	33
2004	46	23	23
2005	39	19	19
2006	47	24	24
2007	39	20	20
2008	49	25	25
2009	73	37	37
2010	76	38	38
2011	50	25	25
2012	53	27	27
2013	37	18	18
2014	73	37	37
2015	0	0	0
Total amount needed	761	380	380
Sources needed on average per year	51	25	25
Available sources per year as of now	55 + loans	~55 (ISPA plus PHARE, bilateral donors, plus 10 m euros from Lithuanian sources*)	As much as needed

* - we assume here less input from the Lithuanian sources in comparison with the first scenario (only 10 m euros per year)

Table 7.8 Investment needs for water and waste sector projects in Lithuania for the years 2001-2015 for the third scenario (millions of Euros).

Year	Amount of investments needed		
	Total amount	**40% share from grants (ISPA, PHARE, bilateral donors and Lithuanian sources)**	**60% share from IFI loans**
2001	62	25	37
2002	52	21	31
2003	65	26	39
2004	46	18	28
2005	39	16	23
2006	47	19	28
2007	39	16	23
2008	49	20	29
2009	73	29	44
2010	76	30	46
2011	50	20	30
2012	53	21	32
2013	37	15	22
2014	73	29	44
2015	0	0	0
Total amount needed	761	304	457
Sources needed on average per year	51	20	30
Available sources per year as of now	55 + loans	~55 (ISPA plus PHARE, bilateral donors, plus 10 m euros from Lithuanian sources)	As much as needed

The results in the last two rows of Tables 7.6, 7.7 and 7.8 show that there is no major gap concerning investment needs for municipal waste and water projects included in the IP. Based on the financing needs to implement the preliminary project list and analysis of sources of supply, it appears that the blend of foreign grants and credits plus public sources are adequate to cover the major requirements arising from EU accession by 2015, at least from an investment perspective. However, at least a portion of the financing (IFI loans) will require repayment spread out over several years and presumably financed from user fees on water and waste.

7.2.3 Cost recovery

In order to assess the burden of the IP on municipalities, the tariffs required to service repayment as well as additional O&M for investments need to be estimated. To obtain the tariff requirements, an annual repayment schedule must be developed that reflects the amount of the loan, interest rate applied, and characteristics of the repayment period (including allowance for a grace period). The five steps of the procedure for elaborating the most “preferred” IP, i.e. best cost recovery scenario included the following:

1. *Sorting the project list according to municipalities* – as noted earlier, some projects were bundled or created at the regional level. However, repayment of IFI loans will be made by the respective municipalities according to their share of the total loan amount.

2. *Calculation of annual repayment requirements* – for the IFI loans, two possibilities were assumed: 1) the loan matures in 15 years, a 4-year grace period is allowed, the interest rate is 6%, and construction is completed in two years; 2) the loan matures in 10 years, a 4-year grace period is allowed, the interest rate is 10%, and construction is completed in two years. Repayments were equalized over the repayment period in line with normal financial practices.

3. *Calculation of repayment of loan component aggregated for each municipality* - this step is necessary to determine if a municipality has capacity to service a new loan, based on criteria established in the Lithuanian Government Rules on borrowing for municipalities (1998): all outstanding debt must be less than 20% of income unless the project is included in the PIP, annual debt payments cannot exceed 10% of income or 5% of income for short term borrowing.

4. *Calculation of tariffs to meet cost recovery requirements* – the annual cost of repayment are added to the operational and maintenance costs for each individual project. To make the tariff determination (which is subsequently used in the affordability analysis), three scenarios were modelled:

   Scenario A assumptions: Credit terms the same as presented in the second step (15 year loan maturity, 4 year grace period, 6% interest rate, with a two-year construction period) plus annual O&M costs were set equal to 7% of the investment amount.

   Scenario B assumptions: the same credit terms as Scenario A, but O&M costs for water and waste are 5% and 10% of investment costs, respectively (except for waste incineration and composting projects where O&M costs are 0%).

   Scenario C assumptions: less favourable credit terms were assumed for this scenario. For the IFI loans, it was assumed that the loan matures in 10 years, a 4-year grace period is allowed, the interest rate is 10%, and construction is completed in two years. O&M costs for water and waste are 7% as in the scenario I.

5. *Calculation of cost recovery needs aggregated over all projects in the municipality* - future tariffs (payments for increased water and waste services) for each municipality are summed up to determine overall burdens. Annualised cost burdens for each project are added to determine the total burden per municipality.

These five steps were used to estimate tariff requirements for each municipality. These results were then used in assessing affordability (next section).

Summing up, the following table presents all scenarios that were used in the analysis on the IP implications on municipalities and households.

Table 7.9 Scenarios used for the analysis of the IP implications on households and municipalities

Scenarios according to credit conditions and O&M level	Scenarios according to financing scheme		
	I (50% foreign grants, 20% local grants, 30% loan)	**II** (40% foreign grant, 10% local grant, 50% loan)	**III** (30% foreign grant, 10% local grant, 60% loan)
A (loan: 15yr maturity, 4yr grace, 6% interest; O&M: 7%)	√	√	√
B (loan: 15yr maturity, 4yr grace, 6% interest; O&M: 5%water, 10%waste, 0% incineration and composting)	√		
C (loan: 10yr maturity, 4yr grace, 10% interest; O&M: 7%)	√		√

Scenario A was selected to facilitate assessment of the implications of all financial schemes, Scenario B was considered the most likely financing scheme scenario and Scenario C was used to evaluate both the most likely financing scheme scenario and scenario with the largest share of loans in capital costs. Further in the text, the scenarios will be referred to according to both of their aspects, e.g. Scenario A-I, Scenario C-III etc.

7.2.4 Affordability Analysis

The analysis made in previous parts of the paper indicates that the supply of funds each year is adequate to implement environmental related EU requirements contained in the IP. However, the gap analysis has assumed that the burdens associated with these investments are acceptable. The role of the affordability analysis is to determine if the tariff increases implied by the cost recovery needs described above would be acceptable to municipalities and the population as a whole.

Two types of affordability are analysed for the IP. Municipal affordability relates to the fulfilment of obligations set in Lithuanian legislation regarding municipal debt financing. Thus, this measure of affordability will be related only to the investment component. The second type of affordability relates to the cost burden on the population (termed population affordability). The general results for the affordability analyses are presented below.

Municipal Affordability

As noted in the previous section, Lithuanian legislation sets some limits for municipal borrowing. A debt (sum of all loans taken plus guarantees provided) for a municipality cannot exceed 20% of municipal income in a particular year, except for some specific cases (such as if investment projects are included in the PIP etc.). The annual limit for loans taken in a particular year is 10% and for short-term borrowing, 5% of municipal income. Repayment of loans with interest cannot exceed 10% of total municipal income of that particular year.

It should be noted that it is very difficult to take into account already existing debt in municipalities because terms of all those loans are not known and the calculation of the remaining debt in each municipality for each year until 2015 would require a separate study. In addition, it is not known what types of additional projects may be planned in a given municipality. Non-environmental projects may crowd out the projects included in the IP and the burden would be overstated because municipalities would not elect to undertake some of the IP projects or would be constrained by limits on municipal borrowing. To carry out the analysis, we have ignored this crowding out by other municipal loans. Thus, the 20% limit has not been considered in the analysis and only two of the above mentioned limits (annual limit for loans taken in that particular year cannot exceed 10% and total debt repayments cannot exceed 10% of budget) are taken into consideration.

Table 7.10 provides a summary of the relationship between loan components of proposed IP projects for each municipality and respective municipal budgets. In addition, Annex 7.4. presents a list of all municipalities and data on the shares of loans taken in a certain year from the overall municipal budgets.

Table 7.10 Loan component relative to 1999 budgets for 56 municipalities (Scenario A-I and C-III)

	Scenario A-I	**Scenario C-III**
Number of municipalities, where the largest project size loan component exceed 10%	50	56
Of those number of municipalities, where the biggest project size loan component exceed 20%	28	50
Number of municipalities where the biggest project size loan component is less than 10%	6	0
Average share of loan component in average municipality in Lithuania	20.5%	41.0%

The size of the largest project loan component relative to municipal budgets varies from 5 to 68 per cent, if financing would occur according to the Scenario A-I terms. The largest percentages are observed in resort towns such as Birstonas and Neringa and in the Zarasai municipality. As can be seen in the table, IP project loan components would exceed 20% of the municipal budget for one-half of the municipalities or twice the 10% level for a

single loan. This suggests that many municipalities may experience difficulties borrowing to finance these investments.

Scenario C-III can be interpreted as the case in which no municipality could finance the investment without violating Lithuania's legislation regarding the maximum annual limit for loans taken in a particular year (10%), *unless the projects are included in the PIP and municipal budgets experience some growth in the coming years.* However, such a preliminary analysis provides only some indicative numbers and the interpretation of these numbers should account for the following aspects:

- It should be remembered that if projects are included in the PIP, the 20% and 10% limits could be changed; since many projects would require PIP support, it is very probable that this kind of restriction will not be a problem for municipalities.

- On the other hand, the calculated share is related only to the largest project in a certain municipality. As noted before, each municipality will need to invest in an average of 4 projects. Therefore, in some years, the burden of loans actually will be greater. Moreover, projects started earlier or those that will need to be performed in other sectors (e.g. air protection) will increase the burden.

- It was assumed that municipal revenue/expenditure is not changing over years, i.e. the most pessimistic variant. Most probably, there will be some increase in municipal budgets, lowering the burden relative to the estimates based on 1999 budget data.

Nevertheless, the above mentioned restriction is more of theoretical origin. The real burden that municipalities will face is related to the actual repayments of loans taken. This amount, according to the Lithuanian legislation cannot exceed 10%.

In Annex 7.5 is presented a table on each municipality's "loan burden" according to Scenario **A-I**, i.e. percent of loan taken for waste and water projects repayments from overall municipal budget if the latter was equal to the 1999 level. The table shows that loans to be repaid annually if revenues and expenditures of municipal budgets are the same as in 1999 would vary from 0% to 7.2 % from municipal budget. It means that the allowed limit of 10% will not be exceeded anywhere. Only four municipalities may exceed the 5% share. These are Anyksciai, Birstonas, Neringa, Siauliai.

In Annex 7.6. is presented a table on each municipality's "loan with worse terms burden" (Scenario **C-I** loan conditions), i.e. percent of loan taken for waste and water projects repayment size from overall municipal budget if the latter was at the same 1999 level. The table shows that loans to be repaid annually if revenue/expenditure of municipal budgets was the same as in 1999 would vary from 0% to 12.6 % of the municipal budget. Thus, there would be exceedances of the 10% limit, but in only the two resort areas of Birstonas and Neringa. There would be 13 municipalities where annual loan repayments would exceed 5% of municipal budgets. This shows that Scenarios C-I and A-II are similar in terms of their implications on the loan repayment burden for municipalities.

Scenario **A-II** (Annex 7.7) shows similar results to C-I. Two resort municipalities – Birstonas and Neringa would exceed the 10% limit and 14 municipalities in addition would exceed the 5% limit. These results are still very good expecting some growth in municipal budgets. However, once again aspects mentioned above should be noted, i.e. if a municipality will have more quite expensive projects that are not in the constructed IP, potential problems may be encountered in meeting the repayment requirements without exceeding the 10% limit.

Furthermore, if planned financing schemes do not materialize and less desirable credit terms are applied, much greater burdens would be imposed on municipalities and consequently their residents and businesses. Under Scenario **C-III** (results presented in Annex 7.8) in 2015, 15 municipalities would need to pay back more than 10% from their budget to service their water and waste sector investment loans, assuming their municipal budgets remained at their 1999 level. In addition, the 5% limit would be exceeded in 19 municipalities, with only 22 municipalities servicing loan debt in 2013-2015 that would be less than 5% from their 1999 budgets. And it should be noted once again that this assumes municipalities are not servicing other loans in the air sector or for non-environmental purposes

Population Affordability

Burden from loan component. Since the loan component is not changing in Scenarios A-I and B-I, the burden on households should not vary for the increased tariffs needed to service the loans. Average burdens are presented in Table 7.11 on a per capita basis for Scenarios A-I and B-I.

Table 7.11 Average burden per capita due to implementation of water and waste projects (loan component only)

Scenarios A-I* and B-I**								
	2001	2003	2005	2007	2009	2011	2013	2015
Per year in Litas	0	0.73	6.42	10.4	13.3	16.3	20.2	20.5
Per year in Euros	0	0.18	1.57	2.54	3.24	3.98	4.93	5
Per month in Litas	0	0.06	0.54	0.87	1.11	1.36	1.68	1.71
Per month in Euros	0	0.01	0.13	0.21	0.27	0.33	0.41	0.42

** - 50% foreign grants, 20% local grants, 30% loan (maturity –15 years, grace period – 4 years, interest rate – 6%, O&M costs – 7% from investments)*
*** - 50% foreign grants, 20% local grants, 30% loan (maturity –15 years, grace period – 4 years, interest rate – 6%, O&M costs – 5% water, 10% waste, 0% waste incineration and composting)*

As scenario C-I is related to more costly loan terms than the other scenarios, burdens would be higher, and residents would be worse off than under Scenarios A-I or B-I. The differences between the burden of the IP loan component for Scenarios A-I and B-I and Scenario C-I are illustrated in Table 7.12. By 2015, the burden of the loan component will be 1.6 times the respective burden for Scenarios A-I and B-I.

Table 7.12 Average burden per capita due to implementation of water and waste projects (<u>loan component only</u>) (Litas and euro)

Comparison of Scenarios A-I, B-I and C-I***								
Per month in Lt/Euro	2001	2003	2005	2007	2009	2011	2013	2015
Scenarios A-I and B-I (Litas)	0	0.06	0.54	0.87	1.11	1.36	1.68	1.71
Scenario A-I and B-I (Euros)	0	0.01	0.13	0.21	0.27	0.33	0.41	0.42
Scenario C-I (Litas)	0	0.10	0.83	1.36	1.74	2.13	2.64	2.69
Scenario C-I (Euros)	0	0.02	0.20	0.33	0.42	0.52	0.64	0.66

**** - 50% foreign grants, 20% local grants, 30% loan (maturity –10 years, grace period – 4 years, interest rate – 10%, O&M costs – 7% from investments)*

The tables below present loan component burdens on the population if other financing schemes scenarios were used for the implementation of the EU obligations.

Table 7.13 Average burden per capita due to implementation of water and waste projects (loan component only)

Scenario A-II****								
	2001	2003	2005	2007	2009	2011	2013	2015
Per year in Litas	0	1.21	10.50	17.16	22.01	26.97	33.93	37.05
Per year in Euros	0	0.3	2.56	4.19	5.37	6.58	8.27	9.04
Per month in Litas	0	0.1	0.88	1.43	1.83	2.25	2.83	3.09
Per month in Euros	0	0.02	0.21	0.35	0.45	0.55	0.69	0.75

***** - 40% foreign grants, 10% local grants, 50% loan (maturity –15 years, grace period – 4 years, interest rate – 6%, O&M costs – 7% from investments)*

Scenario A-III would have twice the burden from the loan component as Scenario A-I. The burdens would be considerable:

Table 7.14 Average burden per capita due to implementation of water and waste projects (loan component only) using scenario A-III

Scenario A-III*****								
	2001	2003	2005	2007	2009	2011	2013	2015
Per year in Litas	0	1.46	12.84	20.8	26.6	32.6	40.4	41.0
Per year in Euros	0	0.36	3.14	5.08	6.48	7.96	9.86	10.0
Per month in Litas	0	0.12	1.08	1.74	2.22	2.72	3.36	3.42
Per month in Euros	0	0.02	0.26	0.42	0.54	0.66	0.82	0.84

****** - 30% foreign grants, 10% local grants, 60% loan (maturity –15 years, grace period – 4 years, interest rate – 6%, O&M costs – 7% from investments)*

The greatest burden from only the loan component, however, would be if scenario C-III was used for the implementation of the IP.

Table 7.15 Average burden per capita due to implementation of water and waste projects (loan component only)

Scenario C-III******								
	2001	2003	2005	2007	2009	2011	2013	2015
Per year in Litas	0	2.30	19.91	32.55	41.75	51.15	64.23	68.44
Per year in Euros	0	0.56	4.86	7.94	10.18	12.47	15.67	16.69
Per month in Litas	0	0.19	1.66	2.71	3.48	4.26	5.35	5.70
Per month in Euros	0	0.05	0.40	0.66	0.85	1.04	1.30	1.39

****** - 30% foreign grants, 10% local grants, 50% loan (maturity –10 years, grace period – 4 years, interest rate – 10%, O&M costs – 7% from investments)*

The results above show that under the least desirable scenario, i.e. with the unfavourable loan conditions and the heaviest debt financing scheme (60% loan of total investment package), only the loan component would burden one average inhabitant more than he/she is paying for water and waste services now. That is, one month's payment for the loan in 2015 would amount to 1.35 % from total 1998 household income per capita. Of course, successful economic development, meaning growth of household income as well as growth of municipal budgets would reduce this estimated burden.

Burden from overall investments and O&M costs

Scenario A-I

When O&M costs are included in the calculation of average burdens, Scenarios A-I and B-I differ based on different assumptions that have been made about O&M costs associated with the investments undertaken in the IP. Table 7.16 presents average per capita burdens on a monthly basis. Real annualised costs have not been used, in part because part of annualised investment costs is in the form of foreign grants. State budget contributions could be included in the burden determination (by annualising these contributions and allocating on a per capita basis). However, we have focused instead on the *direct* burdens imposed on residents, presumably through tariffs.

Table 7.16 Average burden per capita per month due to implementation of water and waste projects (loan component plus O&M costs) for Scenario A-I

	2001	2003	2005	2007	2010	2015
Litas	0	1.2	2.4	3.3	4.5	6.2
Euros	0	0.29	0.59	0.80	1.10	1.51

Annex 7.7.1 contains tables with annualised costs, reflecting O&M plus loan component for each municipality and on a per capita basis. Annualised costs are given per year and per month so that existing tariffs and monthly payments can be compared with future burdens per capita. Results in the annex indicate that burdens will not be similar in different municipalities. For example, in 2010, if all costs were covered by user charges, overall additional payment for waste and water (both drinking and sewage) would differ in various municipalities from 0.5 to 40 Lt per month and on average would amount to

4.5 Lt/month. It would mean a per capita increase of 5 to 600 per cent on a monthly basis in comparison to the existing situation, for which average monthly payment for water and waste services equals 8.2 Litas. The average increase in that year would be 55 per cent. Overall average payment for water and waste would equal 12.7 Litas. If we assumed that average disposable income grew by 5 per cent annually, the monthly payment would comprise 1.7 per cent of average total disposable income per capita or 2 per cent of disposable income in cash in 2010. This is not so much more than the current payment (see Chapter 4). If, however, household disposable income were the same in 2010 as in 1998, the increased payment would amount to 3% and to 3.6% of disposable income in cash.

In 2015 the same indicators would be following: Overall average payment for water and waste would equal 14.4 Litas. If we assumed that average disposable income grew 5 per cent annually, the monthly payment would comprise 1.5 per cent of average total disposable income per capita or 1.8 per cent of disposable income in cash in 2015. If, however, household disposable income were the same in 2015 as in 1998, the increased payment would amount to 3.4% and to 4.1% of disposable income in cash.

Thus, even in the case of a very pessimistic scenario (i.e. when household disposable income is not growing) total payment for water and waste will not exceed the 5% threshold.

Scenario B-I

Table 7.17 summarizes burdens for Scenario B-I. Because of the O&M assumptions, the burdens are lower in each year in the table compared to Scenario A-I.

Table 7.17 Average burden per capita per month due to implementation of water and waste projects (loan component plus O&M costs) for Scenario B-I

	2001	2003	2005	2007	2010	2015
Litas	0	0.94	2.13	3.02	4.19	4.98
Euros	0	0.23	0.52	0.74	1.02	1.21

Annex 7.7.2 includes tables with annualised costs (O&M plus loan component) for each municipality and in per capita terms. Annualised costs are provided on both an annual and monthly basis in the tables. Based on conditions described above for Scenario B-I, the burdens per capita exhibit the same general pattern as for Scenario A-I but with lower maximum and average burdens.

In 2010, the additional payment for waste and water (both drinking and sewage) would vary from 0.6 to 30 Lt per month across municipalities, increases on a per capita basis of 7 to 500 percent. The average additional burden would be 4.2 Lt/month. Assuming a current average payment for water and waste services is approximately 8.2 Litas, the average increase in 2010 would be around 50 per cent in comparison to the current situation. Overall average payment for water and waste would equal 12.4 Litas. If we assumed, as in Scenario A-I, that average disposable income grew 5 per cent annually,

the monthly payment would comprise the 1.7 per cent of average total disposable income per capita or 2 per cent of disposable income in cash in 2010. This is essentially the same result as for Scenario A-I.

Scenario C-I

Annex 7.7.3 provides tables with annualised costs (loan component plus O&M) for each municipality and in per capita terms. Annualised costs, as in previous scenarios, are provided in both annual and monthly terms. The average burdens for the loan component and O&M under Scenario C-I are presented in Table 7.18

Table 7.18 Total average burden per capita per month due to implementation of water and waste projects (loan component plus O&M costs) (Litas and euro)

	2001	2003	2005	2007	2010	2015
Scenario A-I (Litas)	0	1.2	2.4	3.3	4.5	6.2
Scenario A-I (Euros)	0	0.29	0.59	0.80	1.10	1.51
Scenario C-I (Litas)	0	1.2	2.7	3.8	5.2	7.1
Scenario C-I (Euros)	0	0.29	/0.66	0.93	1.27	1.73

Results show that the annualised burden for Scenario C-I will be 13% higher than in case of Scenario A-I. In 2010, if all costs were covered by user charges, overall additional payment for the waste and water (both drinking and sewage) would differ across municipalities, ranging from 0.5 to 42 Lt per month and an average of 5.2 Lt/month. Overall average payment for water and waste would equal to 13.4 Litas in 2010. If average disposable income grows at 5 per cent annually, the monthly payment would comprise 1.8 per cent of average total disposable income per capita or 2.2 per cent of disposable income in cash in 2010. In 2015 overall average payment for water and waste would equal to 15.34 Litas. If average disposable income grows at 5 per cent annually, the monthly payment would comprise 1.6 per cent of average total disposable income per capita or 2 per cent of disposable income in cash in 2015. If, however, household disposable income did not change between 1998 and 2015, the increased payment would amount to 3.6% and to 4.4% of disposable income in cash.

Scenario A-II

Annex 7.7.4 provides tables with annualised costs (loan component plus O&M) for each municipality and in per capita terms for this scenario. The average burdens for the loan component and O&M under Scenario A-II are presented in Table 7.19.

Table 7.19 Total average burden per capita per month due to implementation of water and waste projects (loan component plus O&M costs) (Litas and euro)

	2001	2003	2005	2007	2010	2015
Litas	0	1.20	2.72	3.83	5.29	7.54
Euros	0	0.29	0.66	0.93	1.29	1.84

Results show that the annualised burden for Scenario A-II will be 15% higher in 2010 than for Scenario A-I. In 2010, if all costs were covered by user charges, overall additional payment for the waste and water (both drinking and sewage) would vary across municipalities, ranging from 0.86 to 41 Lt per month and an average of 5.3 Lt/month. Overall average payment (including existing payment of 8.2 Lt per month) for water and waste would equal to 13.5 Litas per month in 2010. Again, this means that scenario C-I is similar to scenario A-II in terms of burden on population. Therefore, we are do not discuss results for 2015, given their similarity to those for Scenario C-I.

Scenario A-III

Annex 7.7.5 provides tables with annualised costs (loan component plus O&M) for each municipality and in per capita terms. The average burdens for the loan component and O&M under Scenario A-III are presented in Table 7.20.

Table 7.20 Total average burden per capita per month due to implementation of water and waste projects (loan component plus O&M costs) (Litas and euro)

	2001	2003	2005	2007	2010	2015
Litas	0	1.21	2.90	4.12	5.70	8.16
Euros	0	0.30	0.71	1.00	1.39	1.99

Results show that the annualised burden for Scenario A-III will be higher than for Scenario A-II. In 2010, if all costs were covered by user charges, overall additional payment for the waste and water (both drinking and sewage) would differ across municipalities, ranging from 0.86 to 42 Lt per month and an average of 5.7 Lt/month. Overall average payment for water and waste would equal to 13.9 Litas in 2010. If average disposable income grows at 5 per cent annually, the monthly payment would amount to 1.9 per cent of average total disposable income per capita or 2.3 per cent of disposable income in cash in 2010. In 2015 overall average payment for water and waste would equal to 16.4 Litas. If average disposable income grows at 5 per cent annually, the monthly payment would comprise 1.76 per cent of average total disposable income per capita or 2.1 per cent of disposable income in cash in 2015. If, however, household disposable income did not change between 1998 and 2015, the increased payment would amount to 3.9% and to 4.7% of disposable income in cash.

Scenario C-III

Annex 7.7.6 provides tables with annualised costs (loan component plus O&M) for each municipality and in per capita terms. The average burdens for the loan component and O&M under Scenario C-III are presented in Table 7.21.

Table 7.21 Total average burden per capita per month due to implementation of water and waste projects (loan component plus O&M costs) (Litas and euro)

	2001	2003	2005	2007	2010	2015
Litas	0	1.29	3.51	5.12	7.14	10.16
Euros	0	0.31	0.86	1.25	1.74	2.48

Results show that the annualised burden for Scenario C-III will be highest in comparison with all other scenarios analysed in this document. In 2010, if all costs were covered by user charges, overall additional payment for the waste and water (both drinking and sewage) would differ across municipalities, ranging from 0.8 to 42 Lt per month and an average of 7.14 Lt/month. Overall average payment for water and waste would be equal to 15.34 Litas in 2010 (including existing payment of 8.2 Lt per month). If average disposable income grows at 5 per cent annually, the monthly payment would comprise 2.10 per cent of average total disposable income per capita or 2.5 per cent of disposable income in cash in 2010. In 2015 overall average payment for water and waste would equal to 18.36 Litas. If average disposable income grows at 5 per cent annually, the monthly payment would comprise 1.97 per cent of average total disposable income per capita or 2.34 per cent of disposable income in cash in 2015. If, however, household disposable income did not change between 1998 and 2015, the increased payment would amount to 4.35% and to 5.24% of disposable income in cash.

These results are not as dismal as they might be in the absence of favourable increases in household budgets. With assumed growth in household budgets, the average household would spend 1.97% of its budget on water and waste services, with large burdens limited to the lowest-income households. However, without this growth in household budgets, the payment would be four times larger share of budgets on average and virtually all households would face excessively large burdens.

One aspect needs to be mentioned here. In analysing burdens on population in the case of economy growth, we did not take into account rising operational and maintenance costs because of increasing salaries of workers in water and waste companies, or other components of cost increases (e.g. diminishing subsidization of energy production etc.). This would increase tariffs and therefore the payment would be higher. Consequently, the burden on households would be larger. Taking into consideration this feature would require much more detailed estimation of operational and maintenance costs, namely analysis of the possible changes in each element of operational and maintenance costs. It is recommended that such analysis be undertaken when more detailed investment plans are prepared.

7.2.5 Willingness-to-Pay versus Affordability

While the estimated tariff burdens presented in the previous subsection do not approach the level of 5% of household income that is considered by international experts to be an acceptable upper bound, these burdens could still be unacceptable to ratepayers in Lithuania. To illustrate the potential gap between acceptable tariff burdens and the

implied burdens of meeting the costs of investments and O&M expenditures, the project team conducted a willingness-to-pay survey in the municipality of Ukmerge (see Chapter 6 and Annex 6.1).

As discussed earlier, respondents were asked a series of questions including whether they would be willing to pay higher tariffs to support environmental investments required to comply with selected EU environmental directives. Each respondent was asked two willingness-to-pay questions for each proposed investment: (1) if they would be willing to pay a specific amount (pre-set by the project team and randomly assigned to each survey respondent) and (2) the maximum amount they would be willing to pay.
For the various waste and wastewater initiatives presented in the survey, tariffs were estimated that would be acceptable to 50% of respondents. Presumably, at this level, a simple majority of respondents would favour the project if it were presented to them as a referendum. Table 7.22 presents the estimated tariffs for selected directives and associated compliance investments.

Table 7.22 Estimated Willingness to Pay Higher Tariffs to Finance EU Compliance Investments

Directive	Project	Additional tariff acceptable to 50% of respondents
99/31/EEC	Old landfill closure, new landfill upgrading and collection of wastes	0.39 Litas
94/62/EEC	Recycling of packaging wastes	0.25 Litas
99/31/EEC	Organic waste recovery/recycling	0.02 Litas
91/271/EEC	Sewerage extensions	0.64 Litas

The willingness to pay results provide an interesting picture of the potential for financing projects out of tariffs. In the case of landfill closures and upgrading of new landfills, the willingness-to-pay responses suggest that there would be adequate support for tariffs needed to cover investment and O&M costs, assuming Ukmerge can be considered representative of the country as a whole. Extrapolating from the survey results, Lithuanians would be willing to pay 17.32 million Litas *more* per year to have better landfills. The current average expenditure for waste management is approximately 23.28 Litas per person or 86.16 million litas per year nationwide (assuming all households are paying their current waste management bills). These are costs for collection and landfilling of waste that households are already paying and would presumably continue to be willing to pay if landfills are upgraded. This means that the national willingness to pay for better landfilling and collection is at most 86.16 + 17.32 = 103.50 million litas per year. This figure is a maximum, because it is known that substantial non-payment currently exists. A more reasonable estimate of annual willingness to pay is therefore 60 - 70 million litas per year. The estimated annualised costs of these services are provided in Table 7.23.

Table 7.23 Annualised Costs of Landfill Construction, Operation, Maintenance and Closure as well as New Trucks (used for both landfilling of waste and recovery/ recycling) in millions of Litas per year

	Five Year Period Ending				
	2000	**2005**	**2010**	**2015**	**2020**
Landfill	3.83	49.53	65.76	66.09	66.26
Trucks	2.21	8.16	11.15	16.93	17.55
Total	6.04	57.69	76.91	83.02	83.81

Comparing the costs of landfilling and new trucks with the estimated willingness to pay suggests that households will support most of the costs of such a program. Even in 2020, the estimated cost is only 84million Litas, but the benefit in that year may be as much as 103 million Litas. If Ukmerge is typical of the country, arguments in favour of large subsidies for landfill construction, closure and waste collection are relatively weak. Willingness to pay is estimated to be almost sufficient to cover costs.

However, the relationship between willingness to pay and costs for the other projects in Table 7.22 is quite different. For simplicity, packaging waste and organic waste projects are considered together. Fifty percent of respondents would be willing to pay a total of 3.2 Litas more per person per year for the organic waste recovery and packaging waste recycling services. These services are currently not available in Lithuania, and therefore a portion of the current expenditures by households for waste management should not be attributed to recovery/recycling services. The estimated national willingness to pay for all proposed recovery/recycling services is therefore only about 11.84 million Litas per year. However, by 2005, the annualised costs of organic waste recovery and packaging waste recycling would be three times willingness to pay (35.22 million Litas) and would rise to 110.70 million Litas by 2010, and to 194.50 million Litas by 2020. The implication of these findings is that subsidies will be absolutely essential if these programs are to be put in place. Without external subsidies, political support for the programs can be expected to be minimal at best.

Similarly for sewerage extensions, willingness to pay falls far short of the annualised costs of extending sewerage connections. One-half of respondents indicated a willingness to pay an additional 7.68 Litas per person per year for sewerage services. If 42.6% of the Lithuanian people do not have sewerage services, this translates to a national willingness to pay for sewerage upgrading of approximately 12.1 million Litas. Starting in 2011, it is expected that annual costs will be approximately 187 million Litas. Even with substantial income growth between the year 2000 and 2011, it is unlikely that the annual willingness to pay for sewerage will cover even 10% of the estimated annual costs. This finding suggests that like waste recovery/recycling, sewerage would be an area where subsidies will be necessary if sewerage is to be extended through most of the country as 91/271/EEC requires. However, the annualised costs could be lower because the directive provides some flexibility to consider incremental costs in extending sewers.

7.3. National affordability of the IP

National affordability to accept obligations related to the implementation of EU environmental requirements needs is analysed for both the water and waste sector costs included in the Municipal Environmental Investment Programme and for the share of annualised costs of covering all expenditures related to the environmental *acquis* (at least those directives covered in the Strategy). Data on the total sums needed and available for the IP have already been presented in the previous section. The state's share in the IP is assumed to be 20% according to Scenario I, and 10% according to Scenarios II and III. Table 7.24 indicates the total amount of State financing for the IP for the 20% share and relates these amounts to GDP under two alternative growth assumptions (0% and 3%). The share of state investment needs for the 10% share would be accordingly two times less.

Table 7.24 Share of annual state investment needs for IP in GDP

Year	Investment needs from state (m euro)	Share of needed state investments in GDP (%)	
		If GDP annual growth 0% from 1998 level	If GDP annual growth 3% from 1999[17] level
2001	12	0.11	0.11
2002	10	0.10	0.09
2003	13	0.12	0.11
2004	9	0.09	0.07
2005	8	0.08	0.06
2006	9	0.09	0.07
2007	8	0.08	0.06
2008	10	0.10	0.07
2009	15	0.14	0.11
2010	15	0.14	0.10
2011	10	0.10	0.07
2012	11	0.10	0.07
2013	7	0.07	0.04
2014	15	0.14	0.09
2015	0	0	0

The State co-financing share of the IP represents only a small percentage of GDP. However, as in the case of municipal affordability, annual payments are more important in defining the actual burden. Moreover, it should be noted that not only projects of the two considered sectors, but also all others, need to be taken into account while looking at the national environmental commitments. Thus, two sets of results related to national affordability estimations are presented in this document: (1) share of annualised costs for covering the costs of water and waste sectors projects (fulfilment of the IP) in GDP and (2) share of annualised costs for covering of all needed projects in all environmental *acquis*. The latter was already presented in Chapter 3 of this document.

[17] According to provisional data GDP in 1999 made up 10.6 billion USD and, compared with 1998 fell by 4.1 per cent.

The national affordability calculations for the water and waste sectors (in terms of annualised costs) are presented in Table 7.25 for selected years, financial schemes and two alternative GDP scenarios.

Table 7.25 Share of annualised costs of the Investment Programme in GDP

Scenario	2003		2006		2009		2012		2015	
	0%	3%	0%	3%	0%	3%	0%	3%	0%	3%
A-I	0.12	0.11	0.29	0.24	0.42	0.32	0.54	0.37	0.64	0.40
A-II	0.12	0.11	0.28	0.24	0.50	0.37	0.64	0.44	0.78	0.49
C-III	0.13	0.12	0.44	0.36	0.67	0.5	0.87	0.6	1.05	0.66

**- GDP annual growth 0% from 1998 level*
*** - GDP annual growth 3%** from 1999[18] level*

The table shows that with at least moderate economic growth and expected financial schemes as well as favourable loan conditions, implementation of water and waste sector projects should not be a significant burden for Lithuania although the burden could vary by municipality. Under the worse conditions (scenario C-III), however, the additional burden of 0.66% is already very large, considering that Lithuania presently is spending approximately 1.15% on the environment. Western countries spend approximately 1 to 2.5 per cent of GDP on environment at present.

Nevertheless, the analysis related to the overall environmental acquis implementation burdens for some of the national affordability indicators in Section 3.4 of this document warns that even though Lithuania is reasonably well prepared to support improvements in the water and waste sectors, all other environmental sectors, especially air, will require commitments from the state as well and will increase burdens. It is clear, that the most preferable scheme of financing (50% or even 60% foreign grants, combined with 10-20% State grant and 20-30% loan shares), should be sought by the institutions responsible for the implementation of the investment projects in the environmental field.

7.4. Grouping of municipalities

Municipalities in Lithuania differ in terms of their environmental situation and in terms of their administrative capacities and financial strength to undertake actions that meet the EU obligations by a certain time. As discussed in earlier sections, the implementation of the proposed Municipal Investment Programme would involve 106 projects in the water and waste field. Each average municipality would need to initiate 3 to 8 new projects during the next 10 years in the water and waste management sectors.

In Chapter 6, the lack of project cycle management capacity among municipalities was highlighted as a major constraint to implementation of the EFS in Lithuania. In this section, municipalities are clustered according to their ability to absorb the burden associated with implementation of the IP.

[18] See above

In order for the Environmental Ministry to anticipate the challenges that municipalities will face and to help guide policies and assistance, municipalities can be evaluated in terms of a number of criteria:

- Population
- Size and strength of the administration of municipality working with environmental issues
- Number of projects foreseen for a municipality in the IP
- Municipal budget in per capita terms
- Municipal affordability to accept loan component in the planned projects capital (described in earlier sections)
- Municipal affordability to repay loans taken (described in earlier sections)
- Affordability of households in a municipality to accept increased tariffs burden

The first and second criteria, which are usually directly correlated, were considered in Chapter 6 in assessing municipal project cycle management capacities. Here we will focus on the possible clustering of municipalities according to their burdens under the IP.

Specific attention should be given to resort areas municipalities. Our analysis indicates that the impact on these municipalities from the implementation of EU obligations is quite different from other municipalities of similar population. Usually their population is very small, but their needs in terms of environmental projects are quite high. Therefore, as it can be seen from tables below and in annexes to chapter 7 (in more detail), expected per capita burdens from the implementation of environmental projects is higher. Also, from the point of view of municipal affordability to accept the loan component of the capital requirements of the projects in the IP, these resort towns would be significantly constrained in making such investments.

Tables 7.26 and 7.27 provide lists of municipalities ranked according to the size of an increase in payment of waste and water services in 2015 for selected scenarios developed and analysed above. The names of the resort municipalities appear in **bold** letters.

Table 7.26 Additional monthly payment for water and waste projects in municipalities (scenario A-III)

Municipality	Monthly payment for IP (scenario A-III) (Lt/capita)	Municipality	Monthly payment for IP (scenario A-III) (Lt/capita)
Neringa	**132,9**	Silutes raj.	7,2
Birstonas	**82,3**	Svencioniu raj.	7,0
Anyksciu raj	17,9	Kelmes raj.	6,4
Traku raj.	16,9	Ignalinos raj.	6,0
Akmenes raj.	16,5	Varenos raj.	5,9
MARIJAMPOLE	15,9	Birzu raj	5,3
SIAULIAI	14,9	Vilniaus raj.	5,3
Zarasu raj.	14,7	KLAIPEDA	4,8
Jonavos raj.	14,5	VISAGINAS	4,3
Kaisiadoriu raj.	13,68	Prienu raj.	4,2
Druskininkai	**13,53**	Skuodo raj.	3,6
PANEVEZYS	12,5	Raseiniu raj.	2,8
Jurbarko raj.	11,99	Lazdiju raj.	2,4
Radviliskio raj.	11,49	Alytaus raj	2,4
KAUNAS	11,26	Marijampoles raj.	2,2
Vilkaviskio raj.	11,0	Panevezio raj.	2,1
Siauliu raj.	10,5	Pasvalio raj.	2,1
Joniskio raj.	10,1	Moletu raj.	2,0
Taurages raj.	10,1	Utenos raj.	2,0
Sakiu raj.	9,4	Silales raj.	2,0
Kedainiu raj.	8,8	Kupiskio raj.	1,9
Rokiskio raj.	8,6	Telsiu raj.	1,8
Mazeikiu raj.	8,5	**Palanga**	**1,8**
Plunges raj.	7,9	Klaipedos raj.	1,8
Kretingos raj.	7,9	Sirvintu raj.	1,6
ALYTUS	7,6	Kauno raj.	1,5
Salcininku raj	7,5	Ukmerges raj.	1,2
VILNIUS	7.3	Pakruojo raj.	1.0

Table 7.27 Additional monthly payment for water and waste projects in municipalities (scenario A-I)

Municipality	**Monthly payment for IP (scenario A-I) (Lt/capita)**	**Municipality**	**Monthly payment for IP (scenario A-I) (Lt/capita)**
Neringa	101,7	VILNIUS	5,5
Birstonas	61,8	Silutes raj.	5,4
Zarasu raj.	14,2	Svencioniu raj.	5,4
Anyksciu raj	13,7	Ignalinos raj.	4,3
Traku raj.	13,6	Varenos raj.	4,3
Akmenes raj.	12,6	Birzu raj	4,1
MARIJAMPOLE	12,2	Vilniaus raj.	4,1
Jonavos raj.	11,8	Prienu raj. Is viso	3,9
SIAULIAI	10,9	VISAGINAS	3,9
Jurbarko raj.	10,8	KLAIPEDA	3,6
Druskininkai	10,4	Skuodo raj.	2,2
PANEVEZYS	10,0	Raseiniu raj.	2,1
Radviliskio raj.	9,8	Lazdiju raj.	1,9
Kaisiadoriu raj.	9,3	Alytaus raj	1,9
Vilkaviskio raj.	8,4	Marijampoles raj.	1,7
Siauliu raj.	8,0	Panevezio raj.	1,6
Joniskio raj.	7,7	Pasvalio raj.	1,6
Taurages raj.	7,7	Moletu raj.	1,6
Sakiu raj. Is viso	7,4	Utenos raj.	1,6
KAUNAS	7,3	Silales raj.	1,5
Kedainiu raj.	6,8	Telsiu raj.	1,5
Rokiskio raj.	6,6	Kupiskio raj.	1,4
Mazeikiu raj.	6,5	**Palanga**	1,3
Kelmes raj.	6,1	Klaipedos raj.	1,3
Plunges raj.	6,1	Sirvintu raj.	1,2
Kretingos raj.	6,0	Kauno raj.	1,1
ALYTUS	5,9	Ukmerges raj.	0,8
Salcininku raj	5,8	Pakruojo raj.	0,8

Although Palanga does not have one of the higher burdens under the IP, it may have problems similar to other resort towns, because even of an existing commitment to finance its recently completed wastewater treatment plant.

The following table shows what percentage the biggest planned project loan component, if it equalled to 30% and 60%, amounts to out of the total municipal budget of 1999 in the respective municipality. The font of resort towns is bold.

Table 7.28 The list of municipalities according to the share of the biggest project loan component in the municipal budget of 1999

Municipality	Share of loan component (%)		Municipality	Share of loan component (%)	
	if loan if 30% of capital	if loan is 60% of capital		if loan – 30% of capital	if loan is 60% of capital
Neringa	**68,7**	**137,3**	Rokiskio raj.	39,3	19,6
Birstonas	**68,3**	**136,5**	KAUNAS	39,1	19,6
Zarasu raj.	60,2	120,4	Kauno raj.	38,5	19,2
Jurbarko raj.	47,7	95,5	PANEVEZYS	37,8	18,9
MARIJAMPOLE	39,1	78,3	**Palanga**	**37,5**	**18,8**
Ignalinos raj.	37,4	74,7	Kaisiadoriu raj.	37,3	18,7
KLAIPEDA	33,0	66,0	Mazeikiu raj.	36,3	18,2
Jonavos raj.	32,4	64,8	Raseiniu raj.	36,2	18,1
Kelmes raj.	29,9	59,8	Marijampoles raj.	34,7	17,4
Varenos raj.	29,6	59,3	SIAULIAI	32,8	16,4
Druskininkai	**28,0**	**55,9**	Plunges raj.	32,3	16,2
Taurages raj.	27,9	55,8	ALYTUS	31,4	15,7
Siauliu raj.	27,9	55,8	Prienu raj.	30,2	15,1
Vilkaviskio raj.	27,5	54,9	Pasvalio raj.	29,7	14,8
Ukmerges raj.	27,0	53,9	Vilniaus raj.	29,5	14,8
Klaipedos raj.	26,9	53,7	Silutes raj.	29,0	14,5
Kretingos raj.	26,7	53,4	VILNIUS	28,1	14,1
Lazdiju raj.	25,5	50,9	Traku raj.	27,1	13,6
Anyksciu raj	25,1	50,2	Salcininku raj	24,6	12,3
Radviliskio raj.	23,9	47,8	Silales raj.	23,4	11,7
Joniskio raj.	23,6	47,3	VISAGINAS	20,9	10,5
Akmenes raj.	22,6	45,2	Sirvintu raj.	20,5	10,2
Utenos raj.	22,4	44,8	Birzu raj	19,8	9,9
Svencioniu raj.	22,2	44,5	Skuodo raj.	18,5	9,2
Pakruojo raj.	20,7	41,5	Panevezio raj.	14,1	7,1
Kedainiu raj.	20,7	41,3	Moletu raj.	13,7	6,9
Sakiu raj.	20,5	41,0	Alytaus raj	10,9	5,5
Kupiskio raj.	20,1	40,1	Telsiu raj.	10,2	5,1

The above tables, containing lists of municipalities, made according to different criteria, are actually similar, therefore, except for the largest cities and the four resort towns, the remaining municipalities could be grouped at least into two groups: those where increases in tariffs in 2015 are expected at least to double compared to existing tariffs (the existing average payment for waste and water equals 8.2 Lt/month/capita) and those where this increase would be less than 100%.

It should be noted that the preparation of feasibility studies will, of course, refine investment costs for specific projects, so some shifts in the ranking of municipalities would be expected. However, the clusters of Lithuania municipalities in Table 7.30 reflect our current assessment of IP burdens.

Table 7.30 Grouping of Lithuania Municipalities by IP Burdens

Cluster I : Large Municpalities			
Vilnius	Kaunas	Klaipeda	Siauliai
Panevezys	Alytus	Marijampole	
Cluster II: Resort Towns			
Neringa	Birstonas	Druskininkai	Palanga
Cluster III: Municipalities with burdens increasing by more than 100%			
Anyksciu raj	Jonavos raj.	Vilkaviskio raj.	Sakiu raj.
Traku raj.	Kaisiadoriu raj.	Siauliu raj.	Kedainiu raj.
Akmenes raj.	Jurbarko raj.	Joniskio raj.	Rokiskio raj.
Zarasu raj.	Radviliskio raj.	Taurages raj.	Mazeikiu raj.
Cluster IV: Municipalities with burdens increasing by less than 100%			
Plunges raj.	Kelmes raj.	Visaginas	Alytaus raj
Kretingos raj.	Ignalinos raj.	Prienu raj.	Marijampoles raj.
Salcininku raj	Varenos raj.	Skuodo raj.	Panevezio raj.
Silutes raj.	Birzu raj	Raseiniu raj.	Pasvalio raj.
Svencioniu raj.	Vilniaus raj.	Lazdiju raj.	Moletu raj.
Utenos raj.	Telsiu raj.	Sirvintu raj.	Ukmerges raj.
Silales raj.	Klaipedos raj.	Kauno raj.	Pakruojo raj.
Kupiskio raj.			

In addition to the financial burdens of the IP, it is important to recognize the respective workloads imposed on municipalities to prepare projects. Table 7.31 ranks municipalities according to the number of IP projects. Each municipality's cluster number is provided in parentheses to enable the reader to better see the combined resource and financial burdens implied by the IP.

Table 7.30 Number of IP projects in municipalities

Municipality	Number of projects	Municipality	Number of projects
VILNIUS (I)	8	Klaipedos raj. (IV)	5
Jurbarko raj. (III)	8	Sakiu raj. (III)	5
Kaisiadoriu raj. (III)	8	Salcininku raj (IV)	5
Svencioniu raj. (IV)	8	Vilniaus raj. (IV)	5
BIRSTONAS (II)	7	Kretingos raj. (IV)	4
Joniskio raj. (III)	7	Taurages raj. (III)	4
KAUNAS (I)	7	Lazdiju raj. (IV)	4
Prienu raj. (IV)	7	Siauliu raj. (III)	4
Plunges raj. (IV)	7	Silales raj. (IV)	4
Traku raj (III)	7	Mazeikiu raj. (III)	3
Jonavos raj. (III)	6	Moletu raj. (IV)	4
Alytaus raj. (IV)	6	NERINGA (II)	4
Kauno raj. (IV)	6	Pakruojo raj. (IV)	4
Panevezio raj. (IV)	6	Vilkaviskio raj. (III)	4
Skuodo raj (IV)	6	Pasvalio raj. (IV)	4
SIAULIAI (I)	6	ALYTUS (I)	4
Varenos raj (IV)	6	Anyksciu raj. (III)	4
DRUSKININKAI (II)	5	Kupiskio raj. (IV)	3
Ignalinos raj (IV)	5	Raseiniu raj. (IV)	3
Akmenes raj. (III)	5	Rokiskio raj. (III)	3
MARIJAMPOLE (I)	5	Birzu raj. (IV)	3
Marijampoles raj. (IV)	5	VISAGINAS (IV)	3
PALANGA(II)	5	Zarasu raj. (III)	3
Radviliskio raj. (III)	5	Telsiu raj. (IV)	3
PANEVEZYS (I)	5	Silutes raj (IV)	3
Kedainiu raj. (III)	5	Utenos raj. (IV)	3
Kelmes raj. (IV)	5	Sirvintu raj. (IV)	2
KLAIPEDA (I)	5	Ukmerges raj. (IV)	2

7.5. Summary

While the results from the IP, indicating no financing gap and acceptable burdens are encouraging, suggesting that Lithuania can make significant progress in complying with EU regulations over the next 15 years, a number of important caveats should be noted:

1. The IP only focuses on two sectors and a few – albeit more costly – directives. The inclusion of investments in air quality will add substantial costs in the public sector.
2. There are a substantial number of directives that will impact the private sector and households. These burdens need to be determined and increased municipal tariffs viewed in this context.

3. The IP has ignored potential competition between non-environment municipal investments and investments in water and waste.
4. The IP has assumed that municipalities will have the capacity (or can access such capacity) to prepare the slate of projects included in the IP. As Chapter 6 suggested, smaller municipalities are somewhat disadvantaged in preparing projects.

It appears that in general terms (ignoring the worst and least expected scenarios), the IP is affordable at the municipal level. There is some flexibility in selecting and prioritising projects without increasing the burden substantially. However, if the timeframe of the IP were compressed or a larger portion of investment costs were financed by credits, burdens could rise to significantly higher levels. Given that the IP has not exhausted potential grant funding, the latter scenario would likely result only if state support through the PIP and Privatisation Fund were reduced.

Based on the analysis conducted in this chapter, it appears that the legislative limits on municipal borrowing (debt may not exceed 20% of income and loans taken in a given year may not exceed 10% of income) may be one of the major obstacles to implementation of the IP. Even for the scenarios with a loan component of 30%, many municipalities would be unable to comply with the limits. Obviously, as the loan component of investment costs is increased, more municipalities would be unable to comply with these limits.

Other important factors that will need to be considered in implementing the IP are household and municipal affordability. Acceptable and preferred scenarios are practically the same, as the known “rule of thumb” of 5% in household budget for water (and waste) allows much larger increases in Lithuanian tariffs than is foreseen to meet EU water and waste requirements. However, such high levels of household expenditures on municipal environmental services may have significant distributional impacts on the elderly and other low-income households. In addition, at least based on the survey results from Ukmerge, it does not appear that households would be willing to pay substantially higher tariffs. While such a lack of willingness to pay higher tariffs can be overcome through effective tariff administration (but with higher administrative costs), some reduction in demand and non-payment of tariffs could reduce the capacity of municipalities to repay loans.

As less desirable scenarios are considered, household burdens increase and municipalities face greater challenges in servicing loan repayments. As has been demonstrated in this chapter, increasing the loan component of investment costs has a significantly larger adverse effect on burdens than altering the credit terms (at least for the range of credit terms that have been considered). If the loan component were to double from 30% (which accords with MoE policy) to 60% in the worse case scenario, the IP would be extremely difficult to implement in Lithuania.

As suggested in Section 7.4 above, there are significant differences between municipalities in terms of their ability to finance IP projects. Our analysis has suggested that municipalities will generally fall into one of four categories, based on respective burdens. Such differences will need to be recognized and addressed in implementing the IP.

Chapter 8. Recommendations

In the previous chapters, the demand for and supply of financing for environmental investments has been analyzed. As noted in Chapter 2, current levels of environmental expenditure in Lithuania are similar to those for OECD countries. However, as Lithuania intensifies its efforts to converge to the environmental *acquis*, expenditure as a share of GDP and investment costs as a share of gross fixed capital formation will rise, as illustrated by the environmental statistics presented for the Czech Republic. For a range of EU Directives, the investment costs of approximation have been estimated for Lithuania and compared to those for other accession countries. Lithuania ranks in the mid-range of accession countries in terms of cumulative investment costs per capita for the water, waste, and air sectors. Nevertheless, if per capita income is taken into account, Lithuania's costs of approximation would be more similar to those countries with higher costs per capita.

In Chapters 4 and 5, sources of domestic and foreign financing have been described and analyzed. Overall, there appears to be substantial financing available through the EU and IFIs to support investments in the water and waste sectors. The development of the IP in Chapter 7 demonstrates the prospects for closing the financing gap for investments in the water and waste sectors. Key issues in mobilizing these foreign sources are developing adequate project preparation capacity and, in the case of IFI loans, increasing tariffs to cover both operating costs and debt service.

In terms of affordability, the environmental costs of approximation, both for the range of directives for which costs were assessed in Chapter 3 and for the IP, are not likely to be significantly more burdensome than they are in OECD countries, although low-income households could be heavily impacted by tariff increases. This conclusion is strongly dependent on the availability of EU grant financing and IFI credits and is sensitive to the blend of credits, grants, and own resources used to meet capital requirements. Once the loan component accounts for more than 50% of project costs, the resulting burdens for municipalities and their residents may be unacceptable. In this event, the environmental *acquis* could be made more affordable only by lengthening the compliance period.

In this chapter, we provide a set of recommendations for Lithuanian policymakers to consider in putting this strategy into operation. The recommendations are presented in three sections: Institutional capabilities (Section 8.1); Domestic and foreign sources of financing (Section 8.2); and Updating the Environmental Financing Strategy (Section 8.3).

8.1 Institutional Capabilities

As was stressed in Chapter 6, there are a number of weaknesses in the institutions that play a role in managing projects. Recommendations to address these problems cover three types of needs: improving the performance of institutions, increasing training in project cycle management, and improving the flow of information needed to develop, finance, and implement environmental projects.

Recommendation #1 *Lithuania should consolidate many of the project management functions for multi- and bi-laterally funded projects into a single institution.*

There has been a tendency in Lithuania and other countries to create institutions or funding facilities to accommodate specific sources of external financing. Currently, there is the PIP in the Ministry of Economy, the LEIF, the HUDF, and the proposed ISPA Implementing Agency, plus technical assistance to the Ministry related to project preparation (i.e., new EU-PHARE project). All of these institutions have or would play roles in managing investment projects. This may not be a particularly efficient configuration and most likely will create coordination issues related to implementation of the EFS and more specifically, the IP.

A proposed investment agency would manage externally-financed projects and would have responsibility for providing or mobilizing project preparation assistance, assisting project implementers in securing financing and preparing financial plans to cover debt service, and monitoring implementation and disbursements. The investment agency would work directly with municipalities, responding to requests for information on financing and coordinating requests for information on compliance responsibilities, environmental technologies, etc. with the Ministry of Environment.

The investment agency would not function independently in identifying projects, developing selection criteria, or selecting projects for financing. These functions would be the responsibility of the Ministry of Environment and/or an inter-ministerial steering committee.

Ideally, the investment agency would be "founded" by either the Ministry of Environment or Ministry of Economy, although both ministries, as well as the Ministry of Finance would be involved in the inter-ministerial steering committee. The EFS should guide environmental investment in the municipal sector and all support for these investments (i.e., project preparation, financial support) should be consistent with the EFS and coordinated with the Investment Agency and steering committee. Any new sources of technical or financial assistance for public sector environmental investments would be implemented by the Investment Agency.

Given the difficulties of creating a new agency and the resource requirements, it may be more practical to consider organizational changes to an existing institution. A practical option would be to consider expanding the functions of the proposed ISPA Implementing Agency over a period of time to enable it to play more of an investment coordination role for the environmental sector. ISPA funding is expected to play an important role in financing the IP and is well placed vis a vis other national ministries and municipalities to take on a greater coordination role in the future. Initially, the Ministry of Environment would continue to coordinate the activities of existing institutions that support investments as well as the new ISPA Agency. An organizational plan could be developed

to expand the role of the ISPA Agency and transfer coordination responsibilities from the MoE over a 2-3 year timeframe.

Recommendation #2 *The Investment Agency should develop a sustainable training program to support project cycle management*

As noted in Chapter 6, there is a significant need to expand training in most elements of project cycle management at the local level, including project preparation, familiarization with EU environmental requirements, financial packaging and cost recovery, and preparing applications for financing assistance. Some training programmes are ongoing (e.g., HUDF, project led by the Lithuanian Association of Local Authorities and financed by SIDA, and others (DFID)) are under discussion. If responsibility for project preparation is vested with the Investment Agency, it would be placed to manage a training program and coordinate donor technical assistance. In addition, the agency would cooperate with the Ministry of Environment in determining how best to offer training on compliance requirements and other technical issues.

Three issues, in particular, should be addressed. First, as bilateral donor assistance from EU member countries will be terminated upon accession, Lithuania needs to focus some of the currently available assistance resources on developing the capacity to carry out training on a sustained basis. Second, local consultants should be targeted to receive training to build up local capacity in the area of project preparation. One observation about project preparation expertise is that the necessity of developing projects in time for ISPA leads to assistance to prepare projects rather than create capacity through training. While Lithuania should avail itself of donor assistance for project preparation to ensure that it uses ISPA grants for projects, it also should focus more attention on training so that responsibilities for project preparation can be gradually shifted to local experts. Third, as discussed in Chapter 6, a portion of training resources should be focused on building capacity at the municipal level to undertake investment planning.

Recommendation #3 *The Investment Agency and Ministry of Environment should co-ordinate the development of information to facilitate project cycle management*

There is a considerable body of information that would help municipalities and other institutions more effectively execute their respective roles in project cycle management. This includes: (1) information on legislation and regulations related to investments and financing; (2) lists of institutions that participate in project cycle management and/or can provide project development assistance; (3) EU requirements and technologies/processes that satisfy these requirements; (4) information on financing sources, application forms and instructions, and contact information for obtaining materials and assistance. While an Environmental Projects Development Manual has been prepared for Lithuania by British consultants, the Investment Agency and the Ministry of Environment are encouraged to determine if the current manual adequately provides the information described above and take steps to supply missing information in printed and electronic form. This expanded manual would function as both as a reference guide for project preparation and as an information sourcebook, and should be integrated into ongoing training programs. As the relevant information set is changing frequently, updates would need to be prepared.

8.2 Domestic and Foreign Financing

In order to effectively implement the EFS and the large number of investments identified in the municipal infrastructure sector, domestic and foreign financing for investments must be sustained. In the next few years, the key challenges will be to utilize foreign grants and long-term credits effectively and mobilize adequate domestic financing to meet co-financing requirements, mainly from the state budget. Also, policymakers need to give attention to municipal borrowing limits, which appear to pose a constraint on municipal investments, except for financing scenarios with the largest foreign grant component. Over a longer time horizon, domestic sources of capital with repayment periods of 10-20 years will need to be developed to enable investment costs to be spread over longer timeframes. Specific recommendations are presented below.

Recommendation #4 *Lithuania should implement a consolidated policy for programming public and foreign sources of financing for municipal investment projects in the IP*

There are presently a number of distinct (although not mutually exclusive) processes for allocating or programming financing for environmental investments. The government is encouraged to prepare an "implementing" document that incorporates elements of the IP, adopts the allocation rules that have been used in the IP to set priorities for environmental investments, and establishes guidelines for blending public and foreign sources of financing. An appropriate form for this implementing document would be a government decision on the environmental financing strategy, promoted by the Ministry of Environment but adopted at the level of the Prime Minister, given the important role of state co-financing in the environmental financing strategy.

As appropriate, project selection criteria should be aligned to ensure that projects for PIP, ISPA, and other sources reflect a consistent set of priorities for environmental investments. One weakness in the IP that the government is encouraged to address is the large differences in the financial situation of municipalities and their residents. The use of differential allocation rules (e.g., reducing or increasing the loan component) is recommended to equalize burdens across municipalities with significantly different household incomes and/or municipal service costs.

Components of this consolidated policy for programming public and foreign sources of financing should include the following:

- ***Establish allocation guidelines for the IP***. Three alternative allocation formulas have been analysed for the IP, each with different requirements for domestic and foreign grants, and IFI credits. For most municipal investments, a 50% foreign grant, 30% IFI loan, 20% Lithuanian allocation is recommended. Also, there should be special provisions for exceptional investments that require larger foreign grant and/or Lithuanian contributions because of the limited capacity of municipalities to incur and finance debt.

- ***Earmark state budget resources to cover IP co-financing requirements.*** For the recommended scenario (including exceptional investment provisions), approximately 5-10 million Euros are needed on an annual basis. This amount is approximately 0.1% of GDP.

- ***Provide exemptions from municipal borrowing and refinancing limits for all municipal investments in the IP.*** As there is already a provision that investments in the PIP do not have to meet the municipal borrowing limits, it is recommended to extend the exemption to all IP projects. Alternatively, the IP could be adopted as the environmental component of the PIP, thereby conveying the same exemption to all IP projects.

- ***Create an emergency debt repayment mechanism to support municipalities that cannot fulfill their repayment obligations.*** Even if the allocation formula only requires 30% credit, the analysis in Chapter 7 indicates that some municipalities will be close to or exceed municipal limits for repayment. As a result, there may be exceptional circumstances where a municipality encounters difficulty meeting repayment requirements and cannot make up shortfalls in revenue collections from other municipal sources. Such an emergency debt repayment mechanism would need to be tightly structured to ensure that it is only used for emergencies of limited duration. This mechanism could be in the form of no interest loan to the municipality, a mixture of loan and grant, or a grant. Given the timing of the IP and grace periods attached to loans, the need for such a mechanism is not immediate (although, e.g. the municipality of Ukmerge is already encountering repayment difficulties on a Danish loan), it should be developed over the next 2-3 years.

Recommendation #5 *Lithuania should adopt policy guidelines on the forms and terms of foreign financing best suited to investment needs*

As discussed in Chapters 5 and reflected in the analysis in Chapter 7, foreign donors and IFIs attach a variety of conditionalities that must be met to access financing. These include constraints on project type, size and cost, co-financing requirements, as well as terms related to interest and other charges, grace periods, and repayment of loans. In some cases, these conditionalities necessitate oversizing projects or bundling smaller projects in order to access funding. While there is often a strong rationale for the conditionalities attached to sources by the donor or IFI, in some cases, the conditionalities have been developed according to ex ante analysis of the likely demand for financing.

Based on the findings and analysis presented in the environmental financing strategy, the Ministry is encouraged to develop a policy paper that provides an overview of the funding needs for environmental investments in Lithuania and potential obstacles Lithuania faces in accessing foreign resources. This paper could be provided to donors

and IFIs to help them better anticipate the needs of Lithuania (and possibly other accession countries).

8.3 Updating The Environmental Financing Strategy

The analysis that has been undertaken for the environmental financing strategy has been designed to assist Lithuania in assessing its capacity to implement the environmental *acquis*. Although the analysis is comprehensive and quite detailed for the water and waste sectors, this analysis will become outdated with time. Below, we provide recommendations for improving and updating the EFS analysis that has been undertaken.

Recommendation #6 *The Ministry of Environment is encouraged to review implementation progress and revise (as needed) the Municipal Environmental Investment Programme*

The IP represents an investment strategy for the water and waste sectors that is feasible given the most likely scenarios related to the availability of investment financing. The IP can be used in setting priorities for use of PIP and foreign sources of financing in these sectors and for planning and mobilizing assistance for project preparation. The IP should, however, be viewed as a "living" document that will need to be updated. As noted in Chapter 7, it is necessary to clarify and update the assumptions that have been made about investment plans for each municipality, determine where environmental investments rank among each municipality's overall investment plans, and identify constraints that may necessitate shifting the proposed year of implementation in the IP. In addition, such a review should examine trends in domestic financial markets to determine if private capital markets could play an expanded role in municipal finance (e.g., financing through municipal bonds). The MoE is best positioned to conduct a review of implementation progress as the responsible authority for implementing the environmental *acquis* and, in cooperation with the investment agency and municipalities, to propose modifications.

Recommendation #7 *The Ministry of Environment is encouraged to expand and update the IP to include investments in air sector (heating and hot water services)*

Rehabilitation and upgrading heating and hot water services to improve service quality and address air pollution associated with combustion of fossil fuels will involve significant municipal investments. The Ministry of Environment is encouraged to identify projects in this sector, determine their costs, and incorporate into the IP. These projects will compete with water and waste projects for state budget and foreign sources of finance and will add to household burdens.

Recommendation #8 *The Ministry of Environment is encouraged to expand the EFS to consider directives that primarily impact the private sector.*

Typically, there is a strong presumption that the private sector will be able to absorb the added costs of the environmental *acquis*. The Ministry of Environment is encouraged to

support analysis of the likely financial burdens on the private sector in terms of direct environmental investment and O&M costs as well as higher costs for environmental services provided by municipalities. Importantly, this analysis should determine realistic compliance schedules and identify potential financing gaps for specific economic sectors or for small enterprises within sectors that may necessitate additional financing support.

Recommendation #9 *The Ministry of Environment should consider undertaking an assessment of potential options for reducing costs of approximation*

Potentially, the costs of approximation could also be reduced in a couple of ways. First, this study did not consider the potential role of economic instruments in increasing facility flexibility and lowering compliance costs. There could be some cost savings, but the introduction of economic instruments must be considered in the broader context of EU environmental legislation. Second, the focus of studies that have calculated costs of approximation has been to identify control or end-of-pipe options to satisfy compliance requirements. There may be significant cost savings associated with cleaner production and process changes that have not been fully explored, particularly in the energy sector. Such analysis would be the focus of a separate study and could provide useful background for project preparation in the energy sector as well as economic sectors required to comply with the IPPC.

Recommendation #10 *The Lithuania Statistical Department is encouraged to expand the set of environmental expenditure and household income indicators to facilitate more detailed and disaggregated trend analysis*

As noted in the report, the costs of the environmental acquis will rise over time in Lithuania. It is important to track national environmental expenditure, updating information every two or three years, in order to assess affordability. In addition, more reliable information on household income by municipality would facilitate better analysis of higher household burdens associated with tariff increases.

List of abbreviations

CEE	Central Eastern Europe
CFCU	Central Financing and Contracting Unit
DANCEE	Danish Cooperation for Environment in Eastern Europe
DEPA	Danish Environmental Protection Agency
DISAE	Development of Implementation Strategies for Approximation in Environment
DFID	Department for International Development
DKK	Danish Crowns
DW	Drinking water
EAP	Environmental Action Programme
EBRD	European Bank for Reconstruction and Development
EEC	European Economic Community
EFS	Environmental Financing Strategy
EIB	European Investment Bank
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GMO	Genetically modified organisms
GOL	Government of Lithuania
HUDF	Housing and Urban Development Fund
IBRD	International Bank for Reconstruction and Development
IFI	International Financing Institution
IP	Investment Programme
IPPC	Integrated pollution prevention and control
ISPA	EU pre-accession instrument for supporting of infrastructure projects in the fields of transport and environment
LCP	Large combustion plant
LEIF	Lithuanian Environmental Investment Fund
LPP	Lithuanian Power Plant
LSIF	Large Scale Infrastructure Facility
MoE	Ministry of Environment
MoF	Ministry of Finance
NEFCO	Nordic Environmental Financing Corporation
NIS	Newly Independent States
OECD	Organisation for Economic Co-operation and Development
O&M	Operation and maintenance
p.e.	population equivalent
PHARE	EU pre-accession instrument for institution building, developing community programmes, regional and social development and for industrial restructuring
PIP	Public Investment Programme
PMU	Project Management Unit
SAPARD	EU pre-accession instrument for the modernization of the agriculture and for rural development

SWR	Sewerage
ToR	Terms of reference
UK	United Kingdom
USD	United States Dollar
UWWT	Urban waste water treatment
VOC	Volatile organic compound
WB	World Bank
WTP	Willingness to pay

TABLE OF CONTENTS FOR ANNEXES

Annex 2.1 Summary of Projects related to the Lithuanian Approximation Strategy

This overview includes summaries of studies performed in the water, wastewater, air and waste sectors. The Annex is divided into the following parts:

Annex 2.1.1 Water and Wastewater Sector Studies
Annex 2.1.2 Air Sector Studies
Annex 2.1.3 Waste Sector Studies

Annex 2.1.1 Water and Wastewater Sector Studies

Project 1: Water Approximation Strategy (developed within the framework of the project Technical Assistance to Support the Process of Integration in the Environmental Sector in Lithuania).

Lead consultant: Milieu Ltd. in co-operation with WRc, Water Strategy - Dr. Thomas Zabel.

Funding agency: PHARE

Schedule: April 1997 - Oct 1998

Outputs:
Approximation strategy for water sector including:
1. Overview of Lithuanian legislation; including needs for legal changes;
2. Overview of EU water sector legislation;
3. Implementation scheme including main actions required; monitoring requirements, and reporting requirements;
4. Gap analysis for UWWT, Nitrates and draft Water Framework Directives;
5. Estimation of approximation costs in water sector (UWWTD);
6. Identification of problem areas
7. Priority areas
8. Action plan

Relation to the Financing strategy: In spite of the fact that costs for approximation activities were calculated, the project did not discuss financing issues directly. Financing strategy should take into account the priorities, set in the strategy and timetable for implementation of the requirements.

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Project 2: LIT-106 " Development of Programme for Approximation and Implementation of EU Water Quality Legislation in Lithuania

Lead consultant: Soil & Water Ltd., Team leader Dr. Thomas Zabel WRc plc.

Funding agency: DISAE facility

Schedule: May 1998- July 1999

Outputs:
Main outputs of the project are the Approximation Programme for water sector. The following directives were covered:
1. Urban Waste Water Treatment Directive;
2. Drinking Water Directive;
3. Water Framework Directive;
4. Nitrates Directive;
5. Dangerous Substances Directive;
6. Sewage Sludge Directive;
7. Bathing Water Directive and
8. Freshwater Fish Directive.

Programme discusses legal provisions, standards, monitoring and reporting requirements, timetable of implementation, cost assessment and financing issues, institutional implications and establishes action plan for implementation.

For development of the programme, the following working documents were developed:

1. Legal analysis (detailed gap assessment of the directives mentioned above, timetable for transposition);
2. Evaluation of monitoring and reporting (including assessment of existing monitoring system, overview of EU requirements; recommendations for improvement, cost assessment of implementation of monitoring requirements of the Water Framework Directive);
3. Evaluation of the Implementation of Integrated River Basin Management (discussing EU approaches to river basin management and introduction of river basin management in Lithuania);
4. Identification and assessment of Institutions (Analysis of existing LT institutions involved in water management, institutional arrangements in EU Member states; recommendations for allocation of tasks to existing institutions; Recommendations for institutional rearrangements);
5. Cost assessment (cost assessment for UWWTD and DWD using unit costs function, estimation of costs for implementation of other EU water sector Directives);
6. Financing component (analysis of financial sources, development of alternative financing schemes- basic and growth scenario);
7. Organisation (organisational structure of drinking water supply and wastewater treatment in Lithuania; privatisation issues; possibilities to attract private financing; recommendations for strengthening)

Relation to the Financing strategy: Cost assessment, Financing and Organisation are the main outputs, which should be taken into account when developing Financing Strategy. Priorities set in the Legal analysis section should also be taken into account. Financing plan proposed by LIT-106 suggests implementing DWD and UWWTD during the 20-year period.

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Project 3: Harmonisation of Lithuanian Water Quality Standards- Scoping Study

Lead consultant: Parkman international consultancy

Funding agency: UK Know How Fund

Schedule: June-July 1997

Outputs:
Review of draft Lithuanian Drinking water standards

Other remarks: Outdated, new DW standards are adopted

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Project 4: Development of a Code of Good Agricultural practices for Lithuania.

Lead consultant: Lithuanian Water Management Institute (co-ordinator Dr. Sigitas Sileika) with assistance from Danish Agricultural Advisory Center (Mr. Henning Foged)

Funding agency: DEPA / Ministry of Agriculture and Ministry of Environment of Lithuania

Schedule: March 1999 – December 2000

Outputs:
Code of good agricultural practice, including both mandatory and voluntary measures. The code will regulate application of fertilisers (including manure), fertilisation planning, timing and rates, plant protection and pesticides, pasture management, establishment of manure storage facilities etc.

Relation to the Financing strategy: Implementation of the mandatory measures will entail some costs, which need to be financed. No cost assessment or financing issues are covered by this project.

Other remarks: Project is closely linked with the Nitrates project (Part of implementation of the Nitrates Directive).

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Project 5: Danish Assistance to Lithuania in the Transposition and Implementation of the Nitrates Directive (Nitrates project)

Lead consultant: Danagro a/s Team leader Gunnar Jakobsen

Funding agency: DEPA

Schedule: July 1999 – July 2000

Outputs:
The project is planned to be carried out in several phases. The first phase (1999-2000) includes following subprojects:
1. Development of legislation or governmental/ ministerial orders for transposition of the legal obligations of the Nitrates Directive
2. Development of strategy/scheme for transposition and implementation of the Nitrates Directive in Lithuania;
3. Assistance in designation of vulnerable zones (preliminary suggestions concerning areas that could be designated as vulnerable zones);
4. Draft programme for carrying out ongoing monitoring of nitrates in line with EU requirements
5. Assistance in establishing action programmes for vulnerable zones, including mandatory measures.

Relation to the Financing strategy: The project developed strategy for implementation of the Nitrates directive. Financing strategy should take into account the timetable provided. Issue of vulnerable zones is important, as it is directly related to the costs of implementation.

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Project 6: Feasibility studies for construction of UWWT plans and sewerage systems.

Lead consultant: Various companies

Funding agency: Various Agencies

Schedule: Ongoing

Outputs:
According to the information from the Environmental Ministry's Investments unit, most recently feasibility studies for construction of UWWT plants and sewerage systems were developed for the following towns:

- Trakai
- Ukmerge
- Birstonas+Prienai
- Klaipeda
- Neringa
- Palanga
- Skuodas
- Silute
- Siauliai
- Panevezys
- Birzai
- Alytus
- Varena
- Vilkaviskis
- Utena
- Anyksciai
- Zarasai

Relation to the Financing strategy: These are the most recent feasibility studies and could be used to obtain data for the Financing Strategy.

Other remarks: Selection of towns was made by the Division of Environmental Strategy and Investments of the MoE.

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Project 7: Development of recommendations on management of wastewater in household districts with no sewerage network surrounding big towns of Lithuania

Lead consultant: Center for Environmental Engineering (Team leader K. Andrejevas)

Funding agency: MoE of Lithuania

Schedule: January 1999 – December 1999

Outputs:
The project developed recommendations on management of wastewater treatment in districts, which surround big towns and where is no sewerage network.

Relation to the Financing strategy: Recommendations most probably will have cost implications. There should also be some suggestions on how these costs should be financed.

Other remarks: Relatively small study. Financing: 20,000 Litas

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Project 8: Development of regulations on operation and control of septic tanks and recommendations on management of sewage sludge produced in these septic tanks

Lead consultant: Clean Water Association (Team leader E. Levitas)

Funding agency: MoE of Lithuania

Schedule: January 1999 – December 1999

Outputs:
Recommendations on management of sewage sludge produced in the septic tanks

Relation to the Financing strategy: It is unlikely that recommendations will have big cost and financing implications

Other remarks: Relatively small study. Financing: 15,000 Litas

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Project 9: Development of regulations on operation of small wastewater treatment plant

Lead consultant: Kaunas Technological University (Team leader Matuzevicius)

Funding agency: MoE of Lithuania

Schedule: January 1998 – December 1998

Outputs:
Draft regulations on operation of small waste water treatment facilities (part of UWWT directive - appropriate treatment)

Other remarks: Relatively small study. Financing: 8,000 Litas

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Project 10: Regulation on uniform procedure for monitoring of water use and discharge of pollutants

Lead consultant: Joint Research Center

Funding agency: MoE of Lithuania

Schedule: January 1998 – December 1998

Outputs:
Draft regulations introducing some requirements of UWWTD, namely 24 h sampling of effluents, number of samples to be taken in relation with the size of UWWT plant

Relation to the Financing strategy: UWWT plants will need to purchase samplers for 24 h sampling. Financing of the costs of equipment might need to be included into Financing Strategy

Other remarks: Relatively small study. Financing: 8,000 Litas

Annex 2.1.2 Air Sector Studies

Project 1: Technical Assistance to Support the Process of Integration in the Environmental Sector in Lithuania (the Strategy for Approximation in Air Sector was prepared within the framework of the Strategy for Approximation in the Environment Sector).

Lead consultant: Milieu Ltd. in co-operation with WRc, Yvonne Rees

Funding agency: PHARE

Schedule: April 1997 – October 1998

Outputs:
1. The Strategy for Approximation in the Environment Sector in Lithuania;
2. Sectorial strategies for different sectors including Air Sector in Lithuania (the Strategy for Approximation in Air Sector);
3. Costs of Approximating Lithuanian Environmental Legislation with the European Union;

The Strategy for Approximation in Air Sector includes:
1. Overview of Lithuanian legislation in Air Sector;
2. Overview of EU requirements in Air Sector;
3. Detailed legal gap analysis of all the directives in Air Sector including legal changes required to comply with the EU requirements, responsible institutions and dates for transposition;
4. Implementation scheme, including main actions required, responsible institutions and dates for implementation;
5. Identification of problem areas;
6. Identification of priority areas;
7. Action plan for the required approximation activities;
8. Estimation of costs for approximation in Air Sector, particularly
   - dir. 88/609/EEC Large Combustion Plants
   - Com (97)88 Final (Proposed 1.0% Sulphur Content in Heavy Fuel Oil);
   - dir. 94/63/EC Volatile Organic Compounds
   - dir. 70/220/EEC Type Approval Procedure
   - dir. 93/12/EEC and dir. 85/210/EEC Fuel Quality
   - Air quality monitoring.

Relation to the Financing strategy: The project did not develop financing issues. The Lithuanian Financing Strategy shall take into consideration the priority areas and dates of implementation defined in the Strategy for Approximation in Air Sector.

Other remarks:
The Strategy for Approximation in Air Sector addressed for the first time the implementation of air quality sector directives. This Strategy deals with the legal, administrative and financial requirements to approximate the Lithuanian ambient air related legislation with those of the European Union under the responsibility of the Ministry of Environment. Reference is also made to legislation under the responsibility of other ministries and institutions.

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Project 2: EC project "Preparing Lithuanian Cities for Accession"

Lead consultant: Center for Environmental Policy in co-operation with the London Institute for European Environmental Policy.

Funding agency: General Directorate XI

Schedule: October 1998 – March 1999

Outputs:
To assist Lithuania in development and implementation of cost-effective approximation strategy on local and regional level in order to meet the requirements of EU environmental legislation, including Air Sector legislation, particularly:
- clarify the role of local authorities in the implementation of EU transposed legislation, including Air Sector legislation;
- establish a strategy and action plan for involvement of regional and local authorities;
- prepare guidelines for the design and implementation of a municipal/regional policy in line with EU requirements.

The functions and responsibilities of local authorities will include mainly establishment of local administrative systems and physical infrastructure as well as development of action plans for implementation of specific EU requirements.

The tasks of local authorities in implementation of environmental requirements defined in EU legislation in Air Sector is ensuring observance of required air pollution limits in urban areas.

Relation to the Financing strategy: One of the project outputs expected is cost assessment and an assessment of financing need implementing the EU requirements, including Air Sector requirements, on local and regional level.

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Project 3: Project MC-109 on Development of Approximation Programme for EU Legislation Concerning Emissions from Mobile Sources

Lead consultant: Soil and Water Ltd.

Funding agency: PHARE/DISAE facility

Schedule: June 1998 – December 1999

Outputs:
To develop a manual for the approximation of EU legislation to assist associated countries in efficient transposition, implementation and enforcement of EU legislation concerning emissions from mobile sources. Under the framework of the manual the following outputs were prepared:

- Overview of Lithuanian legislation concerning mobile sources;
- Overview of EU requirements for mobile sources;
- Detailed legal gap analysis of all the directives regarding mobile sources, fuel quality, storage and distribution;

- Background information on analyses, approaches and methodologies relevant to the approximation of EU legislation. It comprises a legislative analysis, practical experiences from selected EU Member States, cost of financing assessments and a review of information services.
- Legal and institutional templates to support the drafting of national legislation and building of competent authorities;
- Generic plan for participation of stakeholders in legislative development and implementation;
- Schedule of pre-accession activities and the approximation checklists have been developed (are to be adapted to specific national conditions);
- Implementation action plan with responsible institutions and dates.

Relation to the Financing strategy: Preliminary cost assessment for the implementation of the directives on mobile sources was carried out. The Financing Strategy need to take into consideration the cost assessment and Implementation action plan, particularly dates.

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Project 4: DEPA Project to Strengthen the Framework and Administration of Lithuania's Laws on Waste Management and Environmental Management of Industry

Lead consultant: COWI

Funding agency: Danish Environment support fund for Central and Eastern Europe, Ministry of Environment and Energy

Schedule: beginning of 1998 - beginning of 2000

Outputs:
Outputs related to air sector cover promotion of the development of a flexible, results-oriented approach towards the permitting and management of industrial pollution in Lithuania. The project analyses existing permitting system in Lithuania, including emission limit values, scope of permitting system, timing and transitional provisions, institutional issues, public participation and co-ordination procedures, cost assessment. One output of this project is a new permitting system, which covers procedures for large combustion plants in Lithuania. In addition a legal framework for implementation of new permitting system is developed.

Other remarks: Overview of relevant economic instruments, facilitating a cost effective operation of a new permitting system and recommendations for application of new economic instruments in this field will be presented.

* * * * *

Project 5: Pollution from Mobile Sources and its Regulation Measures

Lead consultant: The Center for Environmental Policy according to the contract with Harvard Institute for International Development

Funding agency: Harvard Institute for International Development

Schedule: end of 1997 - September 1998

Outputs:
- Causes of pollution from mobile sources and its influence on air quality in Lithuania;

- Current situation regarding road transport;
- Overview of possible and existing pollution regulation (abatement) measures from mobile sources;
- Household Survey on mobile sources in Lithuania.
- Recommendations for pollution regulation measures.

Relation to the Financing strategy: The project describes all possible pollution regulation economic instruments, including existing in Lithuania and in foreign countries; evaluates their effectiveness and possibility to improve or change existing ones.

Other remarks: Only in Lithuanian.

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Project 6: Modernisation of Laboratory Practice and Ambient Air Quality Monitoring System in Lithuania

Lead consultant: PHARE

Funding agency: PHARE

Schedule: February 1999 – December 1999

Outputs:
- improvement of the manual measuring stations;
- to supply equipment (2 set of conventional monitors, portable calibration equipment and 5 sets of automated pm10 analyzers, and 3 DOAS systems), materials, and associated services to enable ambient air quality management, data handling and report generation.

Relation to the Financing strategy: If necessary, prices of certain air monitoring equipment will be available.

Other remarks:
Compliance with EC reference methods is required.

* * * * *

The following projects are not connected with the approximation process, but are related to the air quality issues.

Project 7: Assessment of a Negative Impact of Acid Rains on Ecosystems in the Territory of the Republic of Lithuania.

Lead consultant: Institute of Physics, Institute of Forestry, Institute of Agriculture, Institute of Geography, Geology Service and the Ministry of Environment.

Funding agency: The Ministry of Environment and the Energy Institute

Schedule: 1994 - 1995

Outputs:
- Assessment of a negative impact of acid rains on ecosystems (vegetation, soil, water) in the territory of Lithuania.
- Determination of maximum permissible loads/per year/area unit of acidifying substances (SO2 and NOx).

Other remarks:
These critical loads of SO2 and NOx will serve as a basis in setting targets of SO2 and NOx emissions from stationary sources.

* * * * *

Project 8: Assessment of the Exceedances of S and N Critical Loads in Forest Ecosystems in the Territory of the Republic of Lithuania Due to Impact of Emissions of SO2 and NOx from Stationary Sources.

Lead consultant: Institute of Physics (Dr. Arvydas Juozaitis).

Funding agency: The Ministry of Environment

Schedule: May 1998 – December 1998

Outputs:
- Data on of SO2 and NOx emissions from stationary sources collection; Creation of database;
- Assessment of S and N compounds dispersion in the atmosphere, calculation of exceedances of the actual loads of these compounds.

Other remarks:
Relatively small study. Financing 15 000 Litas.
Database contains data from 1997 on SO2 and NOx emissions from 192 stationary sources, including 137 energy sources.

Annex 2.1.3 Waste Sector Studies

Project 1: Hazardous waste management - Lithuania

Lead consultant: Carl Bro (Denmark)

Funding agency: EU PHARE

Schedule: February 1997 - February 1998

Outputs:
Three options for hazardous waste treatment and disposal have been developed and evaluated. The options differ only in the way in which they treat or otherwise dispose of burnable waste, all other aspects are common to them all. The option foreseeing incineration of burnable waste in a cement kiln has been recommended for implementation.

Relation to the Financing strategy:
Total investment requirements for implementation of proposed hazardous waste management system are evaluated at LTL 34 million, of which 45 % is attributable to six regional transfer stations. The remaining amount is allocated as 16 % to the municipal hazardous waste collection facilities, 19 % to mobile oil-water separator, 13 % to central storage facility and 6 % to biological treatment.

No costs have been attributed to incineration as these are expected to be covered by the cement company. However, the costs of waste transport to the cement works are included in the total transport costs. It has been assumed that all transport requirements will be contracted and no vehicle investment costs will be incurred.

Operating costs were evaluated at LTL 3 million per year, of which operation of the regional transfer stations and transport are the two largest components.

After allowance of additional 10 % for both investment and operating costs for any government duties or taxes which may be payable, it was assumed that the total funding would amount to LTL 38 million for investment and LTL 3.3 million for operation and maintenance (including transport).

Of the total investment costs, approximately LTL 6 million (15 %) after allowances would be a responsibility of municipal authorities and LTL 32 million (85 %) a responsibility of national authorities.

The total annual cost of the proposed system to users will depend on the financing structure, which is finally adopted. An annual cost of LTL 6.1 million would represent a cost of LTL 1.65 per capita per year. Of this, LTL 0.27 (16 %) would be covered by municipal hazardous waste generators and LTL 1.38 (84 %) by other hazardous waste generators.

* * * * *

Project 2: National Hazardous Waste Management Programme

Lead consultant: Ekobaltas

Funding agency: Lithuanian Ministry of Economy

Schedule: 1998

Outputs:
A report containing review of current hazardous waste management system in Lithuania and proposed action plan for 1999-2005.

Relation to the Financing strategy:
Total investment requirements for implementation of proposed hazardous waste management system are evaluated at LTL 78 million, of which LTL 37.1 million is attributable to six regional transfer stations, LTL 12 million for hazardous waste incineration facility, and LTL 8 million for construction of central hazardous waste storage facility. Remaining investment costs include establishment of central tannery waste landfill in Siauliai (LTL 9.8 million), hospital waste management facilities (LTL 4 million), establishment of municipal hazardous waste collection systems (LTL 3 million).

Other remarks:
There is no evaluation of operation or annual costs in the report. Financing of the investments is divided between the state budget (LTL 17.6 million), international funding institutions (LTL 47.25 million), and industries (LTL 6.9 million), however, the background for the division is not explained.

National hazardous waste management programme has been approved by the Government in June 1999.

* * * * *

Project 3: Outline of National Waste Management Strategy

Lead consultant: Ekobaltas

Funding agency: Lithuanian Ministry of Environment

Schedule (start/end): 1998

Outputs:
The outline of the strategy containing basic principles for the development of waste management system in Lithuania and targets in accordance with the EU requirements for expansion and upgrading of the system including "polluter pays" principle.

Relation to the Financing strategy:
There is no evaluation of costs and financing possibilities. The outline foresees that the comprehensive waste management strategy will be developed in 2001.

Other remarks:
The Outline of National Waste Management Strategy has been approved by the Lithuanian Government in May, 1999.

* * * * *

Project 4: Development of waste management regulations (in the framework of the Project to Strengthen the Framework and Administration of Lithuania's Laws on Waste Management and Environmental Management of Industry)

Lead consultant: COWI

Funding agency: Danish EPA

Schedule: 1998-2000

Outputs:
Waste management rules transposing the requirements of waste framework directive (75/442/EEC) and hazardous waste directive (91/689/EEC) have been developed and are expected to be approved by the Ministry of Environment in June 1999.

The development of landfill construction and operation rules, and rules for recording of packaging placed on the Lithuanian market is planned for the second half of 1999.

Relation to the Financing strategy:
The waste management rules set the requirements for establishing and operation of waste management systems in Lithuania including the requirement to draw up national, regional and municipal waste management plans.

* * * * *

Project 5: Alytus county waste management plan (in the framework of the Project to Strengthen the Framework and Administration of Lithuania's Laws on Waste Management and Environmental Management of Industry)

Lead consultant: COWI

Funding agency: Danish EPA

Schedule (start/end): 1998-2000

Outputs:
Draft report outlining the development of waste management system in Alytus county to meet the targets set in the outline of waste management strategy and EU directives. Waste management plans for separate municipalities of the county.

Relation to the Financing strategy:
The project will evaluate investment and operation costs for the development of waste management system over the period of 2000-2016.

* * * * *

Project 6: Landfill strategy for Lithuania (in the framework of the Project to Strengthen the Framework and Administration of Lithuania's Laws on Waste Management and Environmental Management of Industry)

Lead consultant: COWI

Funding agency: Danish EPA

Schedule: 1999-2000

Outputs:
A plan for development of integrated network of landfills in Lithuania.

Relation to financing strategy:
Evaluation of costs for establishment of new landfills, and closure and rehabilitation of old landfills.

Note on nuclear waste
All radioactive waste generated in Lithuania is stored at the Ignalina Nuclear Power Plant. New facilities (dry containers) for storage of high radioactivity nuclear fuel waste have been installed several years ago and will be expanded in the future. It is expected that the facility will serve for 50 years. Final disposal of nuclear waste is still not solved.

There are reports that landfill for low and medium radioactive waste, which was closed in early nineties, is now leaking. Dismantling of the landfill and moving the waste to the Ignalina NPP is being considered as an option.

* * * * *

Project 7: Lithuanian recycling strategy (in the framework of the Project to Strengthen the Framework and Administration of Lithuania's Laws on Waste Management and Environmental Management of Industry)

Lead consultant: COWI

Funding agency: Danish EPA

Schedule (start/end): 1999-2000

Outputs:
A plan for development of recycling capacity to meet the requirements of the EU directives including organic and packaging waste recycling will be developed.

Relation to financing strategy:
Evaluation of costs for recovery and recycling of waste over the period of 2001-2016.

* * * * *

Project 8: Integrated pollution prevention and control (IPPC) (in the framework of the Project to Strengthen the Framework and Administration of Lithuania's Laws on Waste Management and Environmental Management of Industry)

Lead consultant: COWI

Funding agency: Danish EPA

Schedule (start/end): 1999-2000

Outputs:
Regulation on issuing integrated pollution prevention permit and strategy for its implementation.

Relation to the Financing strategy:
Evaluation of costs of reducing pollution and implementation of best available techniques in industries.

Other remarks:
The approach chosen by the project included preparation of 6 discussion papers:

- Emission limit values (Dec. 1998);
- Scope of permitting system (Feb. 1999);
- Transitional provisions and timing (Feb. 1999);
- Institutional issues, appeal system and fining (March 1999);
- Procedures, public participation and co-ordination (April 1999);
- Cost assessment (end of 1999).

Two pilot projects in Alytus textile and Achema (fertilizers) were started in October 1999 for testing application form prepared by the project and planning of the detailed data collection. Experiences from data collection shows that almost all necessary data are available in the companies but the application form is too complicated and should be improved.

Based on the assessment of compatibility with the BAT requirements recommendations for fertiliser and textile industries were issued as an action plan to be implemented in order to meet requirements of the IPPC directive.

The first projects were followed by another 5-7 new pilot projects preparing environmental action plans.

Annex 3.1 Methodology Paper

1. Introduction

This section provides an overview of the motivation for environmental strategies and background to the current DEPA-funded project focused on the preparation of the environmental financing strategy for Lithuania and the refinement of the methodology for environmental financing strategies developed by the Environmental Action Programme Task Force in 1996. The first subsection provides background on the development of environmental strategies in Central and Eastern Europe and the limitations in these documents that provided the impetus for environmental strategies. The second subsection describes the development of a pilot environmental financing strategy in Lithuania. The third section focuses on the process of EU accession and the potential role of strategies in applicant countries' preparations for membership. The last subsection provides an outline of the remaining sections of the paper.

1.1 Environmental Strategies and Action Plans

In 1993, environmental ministers from Central and Eastern Europe (CEE) countries met in Lucerne to launch the Environmental Action Programme (EAP) for Central and Eastern Europe. The EAP was designed to help CEE countries address environmental problems requiring urgent action. The EAP methodology stressed an integrated approach involving the strengthening of environmental policies, institutional capabilities, and the capacity to finance investments and other actions needed to achieve prioritized environmental objectives. In addition, the EAP emphasized development of stronger links between environment and economic development and greater attention to cost-effectiveness criteria in allocating scarce financial resources to environmental initiatives.

A focal point of the EAP process was the preparation of national environmental strategies (NES) and National Environmental Action Plans (NEAPs). These documents would serve the dual purposes of articulating the environmental policy framework and strategy for the CEE countries and helping donors to target their technical and financial assistance resources to environmental priorities of their partners in CEE. Since Lucerne, most CEE countries as well as newly independent states in Eastern Europe and Central Asia have prepare NES and/or NEAPs.

Generally, NES and NEAPs have been effective in synthesizing vast amounts of data on environmental problems and engendering a dialogue on environmental problems and priorities for action. However, they have been limited in providing a framework for implementing a slate of actions to improve environmental quality. Among their limitations are the following:

- *Lack of a strategic vision* – the number of problems and "action" items have been too numerous, in effect, a wish list that cannot realistically be addressed in the context of available resources.

- *Action items poorly described* – in NEAPs, actions are not well-defined, lacking realistic timeframes, and cost estimates.

- *Limited consideration of financing* – even though financing is one of three major components of NEAPs, there has been little discussion of how the costs of actions would be financed.

1.2 Environmental Financing Strategy Pilot in Lithuania

In recognition of these limitations, the EAP Task Force Work Programme, adopted at the 1995 Environment for Europe Ministerial Conference in 1995, included a component to identify essential elements of financing strategies and support preparation of a pilot environmental financing strategy. In September 1996, the EAP Task Force Secretariat at OECD concluded discussions with the Lithuanian Ministry of Environmental Protection to cooperate in the preparation of a pilot environmental financing strategy (EFS) in Lithuania. With support from USAID, the Harvard Institute for International Development collaborated with local consultants in preparing the pilot strategy, based on methodology developed by the EAP Task Force Secretariat.

The pilot Lithuanian EFS provided a general overview of "demand" and "supply" for the range of environmental problems enumerated in the Lithuanian NES. Three pollution sectors – municipal solid waste, stationary sources of air pollution, and transport-related air pollution were examined in greater detail to estimate the costs of actions to address these problems. Sources of financing were identified and described in general terms, but not related to specific investments or associated environmental management costs. The strategy was prepared in draft in 1997, and finalized in 1998.

1.3 EU Accession and the Environmental Acquis

One of the difficulties the project team encountered in preparing the pilot EFS in Lithuania was the lack of clearly-defined goals, targets for each sector, and timeframes for achieving goals and meeting targets. This made it difficult for the project team to identify specific actions and develop cost estimates for each of the three sectors analyzed in detail.

For prospective EU members in CEE countries, the EU environmental legislation will be the focus of efforts to satisfy the environmental requirements for accession. The approximation of laws and regulations to EU legislation requires accession countries to transpose and implement legislation. This latter requirement focuses considerable attention on the development of compliance schedules and the mobilization of financing for compliance investments and development and sustainability of environmental management capacity – in effect, on financing strategies.

As part of the accession process, financing strategies play an important role in negotiations and in the disbursement of pre-accession financing assistance. Accession countries are expected to prepare financing strategies for each of the major environmental directives requiring significant capital investments. In addition, to access the financial resources of ISPA (Instrument for Structural Policies for Pre-Accession), accession countries are required to prepare a national ISPA strategy that describes how ISPA grants are to be used in preparing for accession.

By the second half of 1998, it had become apparent the pilot EFS prepared in Lithuania could be expanded substantially to help guide Lithuania's preparations for accession and particularly in assessing timeframes and the adequacy of financing for environment. Under the EU-PHARE Programme, Milieu had prepared an Approximation Strategy that articulated clear environmental

goals for Lithuania and included initial efforts to estimate compliance costs associated with EU legislation. More recently, additional studies have refined some of the initial cost estimates developed by Milieu and elaborated specific investment projects in solid waste, water and wastewater.

1.4 Outline of the Paper

The purpose of this paper is to describe both the general EFS methodology and the special application of the methodology that has been used for the second EFS in Lithuania to develop the municipal environmental investment programme for the water and waste sectors. The description of the general EFS methodology is not as detailed as other presentations[1] and is provided mainly to illustrate the flexibility of the EFS tool. Section 2 provides an overview of the basic structure of EFS and the potential role of EFS in accession countries. Section 3 and 4 describe the steps involved in elaborating the demand for environmental financing and assessing sources of financing. Section 5 describes the simulation of demand and supply to determine the likelihood of a financing "gap." Section 6 described the affordability analysis and the final section enumerates a range of strategies for closing the financing gap and improving the affordability of measures to achieve compliance with EU legislation.

The general methodology applied to the pilot EFS in Lithuania was also adapted to two action plans in Armenia: the National Environmental Action Plan and the Lake Sevan Environmental Action Plan. These strategies were prepared by COWI in 1998.

2. EFS: Overview

An environmental financing strategy is a series of interrelated analyses focused on the costs of environmental actions, the distribution of those costs among stakeholders, and options for financing those costs. In essence, these analyses would be included in a well-prepared environmental action plan. However, given that NEAPs have not given financing adequate consideration, financing strategies may be viewed as complementary analyses to the NEAP or NES. In this section, an overview of the basic structure of EFS is provided and the potential roles for EFS in environmental policy are described.

2.1 Basic Structure of EFS

The basic structure of EFS involves sequential analyses of the demand and supply of environmental financing. Demand and supply are first analyzed independently, then simultaneously to determine if supply of financing is adequate to meet the funding requirements of proposed actions. A shortfall in funding is referred to as a financing "gap" that may be closed in a variety of ways by reducing demand or expanding the supply of financing. Figure 1 illustrates the three major analytical components that comprise an EFS.

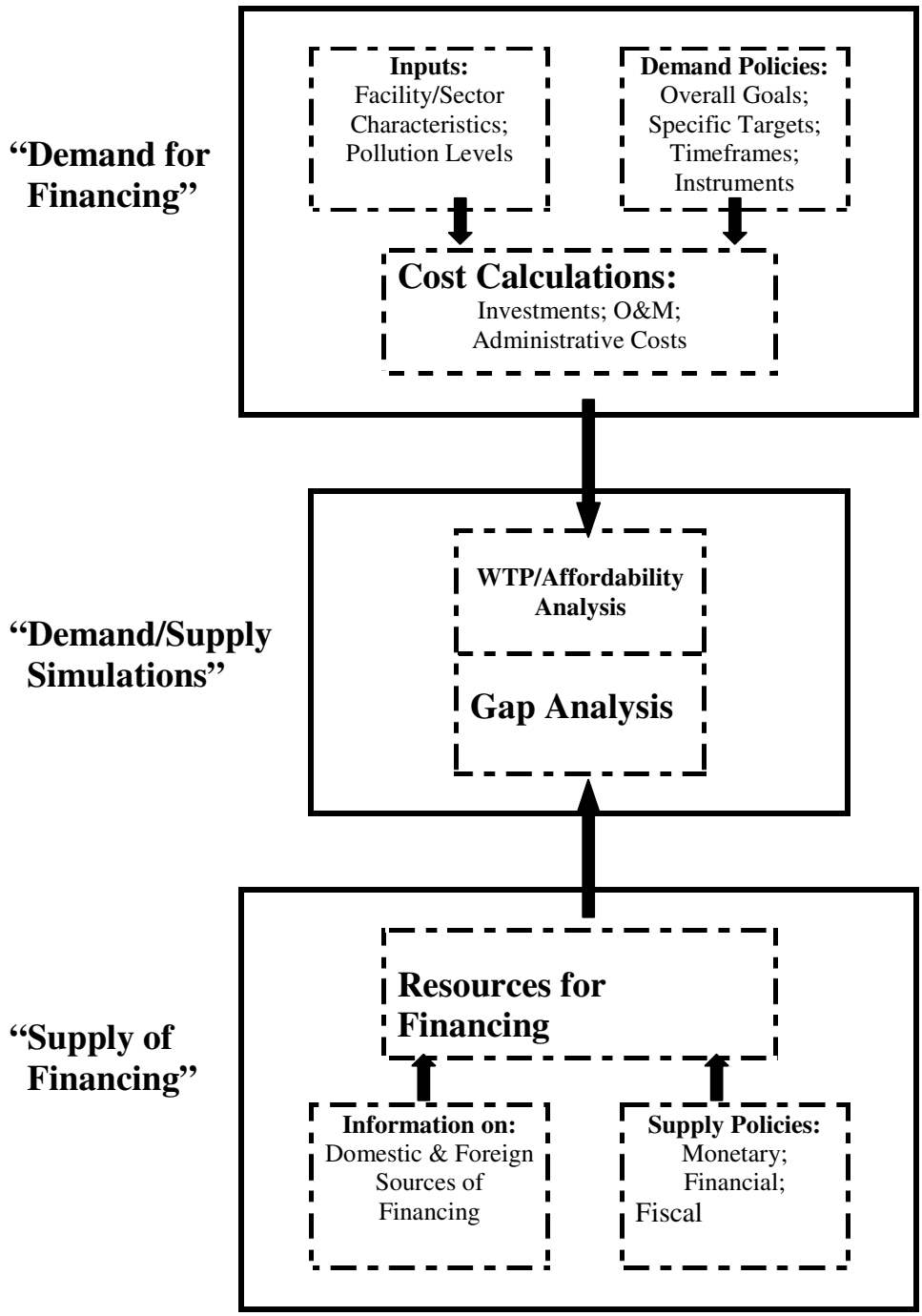
[1] The EFS methodology has been described by COWI (2000) for DANCEE and the OECD EAP Task Force Secretariat. A synthesis of the methodology is provided in "Background Paper on Financing Strategies for the Urban Water Sector in the NIS" prepared by the OECD EAP Task Force Secretariat in September 2000.

The demand for financing describes the costs of all proposed actions required to achieve the goals and targets specified by policymakers over a prescribed timeframe. The cost information that is generated includes estimates of the capital and O&M costs for specific investments, directives, or sectors, as well as costs for environmental management. The supply of financing involves the analysis of potential domestic and foreign sources of financing, determination of the amount available from each source, suitability for environmental actions, and constraints on the use of these resources (source conditionalities).

The central feature of the EFS is the analysis of supply and demand for financing. Basically, this component consists of two types of analysis. The "gap" analysis is a simulation exercise to determine how well potential sources of supply are matched to financing needs or demand. These simulations may only involve comparisons of aggregated costs by directive or sector with available financing or more complicated analysis of detailed investment programmes. Two types of analyses are undertaken in conjunction with the demand/supply simulations. The financing gap is dimensioned in monetary terms, but some ancillary analyses may also be carried out to characterize trends in the gap (for example, to identify the types of projects, directives, sectors where the gap is expected to be larger). The second type of analysis focuses on the affordability of the financing program. This analysis looks at the expected burden of applying sources to proposed actions and determining whether the burden is likely to be acceptable/affordable to stakeholders.

Although Figure 1 suggests that the EFS analysis terminates with the gap and affordability analyses, in fact, the EFS can be viewed as a dynamic process. Assuming there are financing gaps and/or the affordability analysis suggests the financing options are too burdensome, adjustments might be introduced in the form of demand or supply policies designed to reduce the gap and/or improve affordability. The EFS framework is also dynamic in the sense that it can be adjusted or re-analyzed at regular time intervals in order to reflect changes in compliance requirements, introduce new technologies, or changes in the availability of financing.

Figure 1 – Flow Diagram for EFS



The EFS methodology is adaptable to a number of alternative financing issues. EFS can be undertaken at the national, regional, or local level. It can consider broad-based environmental goals such as highly targeted laws, regulations, directives, or sectors. Although it is most desirable to consider environmental expenditure comprehensively, EFS may focus on investments, investments

and O&M costs, or environmental expenditures for management in ministries and regional and local environmental agencies. Finally, EFS may focus on analysis of the financing challenges of individual investments or facilities, or at more aggregated levels.

An important limitation of the EFS should be noted. The bottom-up analysis ignores the potential direct and indirect impacts of environmental demand and supply on prices of goods and services. Illustratively, a major investment in water and wastewater infrastructure will result in higher demand for labor and materials needed in construction, thereby exerting upward pressure on prices of these services and goods. In addition, higher water tariffs needed to finance these investments increase the costs of production for water users, again exerting upward pressure on prices for goods. Ideally, EFS should be carried out in the context of the general economy in order to better evaluate these important price effects. Computable general equilibrium (CGE) models are designed to analyze economy-wide price shifts but are costly to develop and have not yet been effectively linked to EFS.[2]

2.2 Potential Roles of EFS

EFS can play a number of useful roles in the development and implementation of a country's environmental policies. The EFS provides decision makers with a notional idea of the potential demand for environmental financing. It allows decision makers to understand the cost implications of environmental goals and targets and to explore policies that might be implemented to reduce these costs. In addition, the gap and affordability analyses can be helpful in identifying the possible measures that will be necessary to move from current levels of expenditure to the levels required to meet environmental goals and targets. This can be viewed as the policy/implementation gap that must be closed in order to stimulate the levels of demand reflected in the EFS. The EFS does not address these policy questions, but it helps to frame the potential scope of the challenges facing environmental authorities. For example, policies related to increasing awareness among public and private sector facilities of their environmental obligations, creating incentives for accelerated compliance, providing technical assistance to develop investments and find affordable financing, or directly or indirectly affecting the price and availability of financing would all contribute to closing the policy/implementation gap.

EFS also represents a systematic approach for organizing and processing investment cost and financing information, enabling policymakers to better understand the challenges of meeting policy goals. EFS also provides analyses that can better facilitate discussions between environmental authorities and other ministries on the difficult trade-offs and choices that will be required to meet environmental goals. For example, environmental authorities may need funding commitments from the central government to ensure there is adequate co-financing available to obtain grants or loans from foreign donors and IFIs. With respect to donors and IFIs, EFS provides a road map to the financing and related institutional strengthening priorities in the environmental sector that may be addressed through the provision of technical and financial assistance.

In the context of EU accession, the EFS may help CEE countries better engage in discussions with the Commission on the key dimensions of approximation with the environmental acquis. In

[2] A EU-PHARE project in the mid-90s examined costs of approximation for the water and air sectors in Poland and assessed the implied demand increases using a CGE model of the Polish economy.

particular, what goals are to be accomplished? What intermediate targets can be realistically achieved? What are realistic compliance schedules for specific legislation? How will the costs of meeting compliance schedules be financed? And what are the key gaps for which assistance from the EU could be pivotal?

3. Demand for Environmental Financing

The demand for environmental financing represents the level of expenditures associated with the implementation of specific actions to meet environmental goals. To determine this level of expenditures requires the specification of well-defined goals, quantifiable targets and associated compliance schedules. These parameters are needed to specify the actions to be taken by stakeholders and their costs. Once costs have been estimated for individual actions, they can be aggregated to obtain demand.

3.1 Setting Goals, Targets, and Schedules

For Lithuania and other accession countries, the body of EU environmental legislation provides the basic set of goals for estimating demand. Depending on the nature of the specific legislative act or directive, the goals may be elaborated in general terms (e.g., framework directives) or specific emission or discharge standards, input quality (e.g., lead and sulfur limits in fuels), or performance (percentage of customers connected to sewers). The EU legislation also delineates the "regulated" community that is expected to comply with the requirements.

Even for EU Directives that specify quantifiable goals, accession countries may need to set targets that approach but do not meet these goals over a prescribed timeframe. For example, for directives that require significant capital outlays, the accession country may establish intermediate targets in terms of the percentage of facilities meeting the requirements.

Compliance schedules describe the timing of actions and are linked to targets. They are important in determining the number of actions that can be completed by certain dates. Compliance schedules are also a major component of EU membership negotiations since they indicate a country's progress in implementing environmental legislation.

Generally, actions to achieve compliance will result in increased costs for the regulated community. However, there are some responses that require little or no financing and result in net benefits rather than net costs (e.g., win-win measures such as pollution prevention, process changes, waste minimization, etc.). For investments and other actions that increase facility costs, a range of policies and instruments may be required to encourage or compel facilities to undertake compliance actions.

As an illustration of the constellation of goals, targets, and schedules that can be specified in the EFS, Table 1 summarizes the specifications of these demand parameters for the EU Directive Concerning Urban Wastewater Treatment (UWT) (91/271/EEC).

Table 1 – Goals, Targets, and Schedules for Urban Wastewater Treatment

Parameter	As stated in the UWWT Directive	Lithuania Options
Goals	The overarching goal of the UWT Directive is to improve the quality of water bodies by reducing levels of pollutants discharged from wastewater treatment plants. The UWT focuses on two aspects of the problem: (1) use of treatments systems for all conglomerations of 2000 population or more these water bodies and (2) sewerage systems to connect all potential users.	Same as Directive
Targets	The UWT Directive establishes a number of targets: (1) BOD Removal – 90% for cities of more than 100,000; 70% for smaller cities; (2) As an alternative to (1) UWT systems can meet an effluent concentration standard of 25 mg of BOD per liter of effluent; (3) If receiving waters are classified as "sensitive," concentration limits for nitrogen and phosphorus removal are 10 or 15 mg/liter and 1 or 2 mg/liter of effluent, respectively; and (4) all potential users should be connected to sewerage system as long as costs are considered excessive.	Lithuania has some flexibility in setting its specific UWT targets. It can adopt either (1) or (2); it is responsible for establishing the definition of sensitive waters and determining how many systems must meet (1) or (2) as opposed to (3); and it must determine what level of sewerage connection costs are "excessive."
Schedules	The UWT established deadlines for existing members for complying with requirements: (1) cities of 100,000 population by 31 December 2000; (2) smaller cities and towns by the end of 2005; and (3) in areas where eutrophication is a problem, sewerage systems required by the end of 1998. For all accession countries, alternative schedules are required.	In Lithuania, the working assumption for the EFS is to meet the UWT discharge targets by 2015 for all cities and towns of more than 2,000 population equivalent. Sewerage system expansion is integrated into planned investments in wastewater treatment. At this point in time, Lithuania has not committed to a specific schedule or target for sewerage connections.

3.2 Identifying Specific Actions

The next step involves the identification of specific actions required to satisfy the targets. Depending on the directive, the targets may be specified on a facility-by-facility basis or in other terms. For example, directives related to stationary sources of air and water pollutants enable targets to be set for each facility. On the other hand, some directives apply to chemicals and fuels; the required actions must be taken by manufacturers, not the facilities that use these inputs.

Several approaches can be used to specify compliance actions. The most detailed approach is to develop specific compliance action plans for every facility. For some directives, involving a small number of facilities, this may be a practical approach. For example, the Large Combustion Plant Directive (88/609/EEC) will apply to a relatively small number of facilities in Lithuania. A related approach is to develop actual investment projects that would meet the requirements in the directives. For the Lithuanian EFS, this approach has been employed for water and wastewater and for

municipal solid waste. A more expedient and less costly approach is to group facilities according to a set of parameters and identify an appropriate technology that could be adopted to meet the requirements. This approach is less detailed than the previous two approaches but is useful when the number of regulated facilities is large. The drawback of this approach comes in the next stage in developing cost estimates, since a technology may be "assigned" to a facility that is quite different and potentially more costly than an approach the facility would actually consider once it develops its compliance action plan.

For environmental management, specific actions involve staffing, expenditures on related testing equipment, vehicles, laboratories, etc. Typical methodologies to determine staffing requirements involve specification of management activities, estimates of time requirements for each specific activity, and calculation of the number of hours required for activities each year based on frequency of activity and size of the regulated community. Similarly, ancillary costs are developed applying the same unit of effort approach and then aggregating over facilities. For example, determination of the number of inspectors depends on the number of facilities to be inspected, frequency of inspections, duration of inspections (which will vary by facility size), and the number of inspectors required for each inspection.

3.3 Costing of Actions

A variety of cost calculations are required in the EFS. For the demand/supply simulations, expenditures for investment and O&M as well as administration and monitoring (environmental management costs) are required to match with potential sources of financing. In assessing national affordability, estimates of annualized cost are needed to compare with national income.

Each of these types of costs is briefly described below and options for estimating these costs provided. Generally, the Pollution Abatement and Control (PAC) methodology developed by OECD has been employed to identify and calculate environmental expenditure, although we use the more common term – O&M costs – rather than the PAC cost term "current" expenditure.

3.3.1 Investment

Investment costs are those expenditures on equipment, machines, and facilities. They also include costs of design and construction of the investment. Their salient characteristic is that the resulting structures and equipment are durable and may be used for periods of 10 to 25 years before replacement is required. In most cases, investment costs must be financed at the time the investment is made.

One of the major challenges in estimating investment costs relates to projects that involve both process changes and environmental controls. Generally, PAC investment expenditure includes only those costs directly related to the control of pollutants. If investments are undertaken to improve production efficiency – even if they also reduce pollution – they are not considered as PAC investment expenditures. In terms of costing investment actions to meet EU targets, the Lithuania EFS focuses only on PAC investment expenditures. These are relevant for the end-of-pipe control technologies that comprise the specified actions to meet EU requirements.[3]

[3] The so-called win-win measures may have the capacity to address 25-50% of the pollution reductions needed to meet

Investment costs are estimated in two ways. In some cases, a facility investment has already been prepared and costs determined. For many actions, however, the "Moses" Model has been used to estimate investment costs. The Moses Model matches facilities to discrete technological options on the basis of facility parameters. It is involves an algorithm to determine the least cost (in terms of annualized costs, not investment expenditures) technological option.

3.3.2 O&M Costs

O&M costs relate to expenditures associated with the operation (such as fuel and labor) and maintenance (repairs, periodic upkeep, replacement of consumables such as filters) of investments. For investments for which costs have been estimated using the Moses Model, O&M costs are provided for each specific investment. For investments for which the investment costs are based on actual design and project specifications, O&M costs can be estimated or assumed to be a constant percentage of initial capital costs. For the Lithuania EFS, a variety of assumptions for O&M costs are used in the water and municipal waste sectors.

3.3.3 Annualized Costs

Annualized costs represent the sum of annualized investment costs and O&M costs. Investment costs, although incurred at the beginning of the project can be spread out in equal annual amounts over the life of the investment to provide a better sense of the depreciation of the investment. Annualized costs (AC) are calculated using the standard amortization formula:

$$AC = I * r / (1-(1+r)^{-n}) + O\&M \quad \text{where:}$$

I = Investment expenditures
r = Annual interest rate
n = Lifetime of the investment
O&M = Annual O&M costs

The use of annualized costs as opposed to expenditures has two advantages. First, it provides a better reflection of the true opportunity costs of capital expenditures over time; capital costs incurred during one year preclude the use of those funds in future years. This is true whether capital is raised from cash balances or credit. Second, the investment is not used up at the time it is made but depreciates over a period of years. Thus, by annualizing investment costs, there is greater comparability with O&M costs.

3.3.4 Environmental Management Costs

As noted earlier, environmental management costs include the costs of administering regulatory programs, conducting inspections, and taking enforcement actions. These costs are determined by applying unit costs to labor and other expenses identified in specifying the environmental

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environmental requirements, particularly in the private sector. Thus, when only end-of-pipe controls are considered rather than a blend of measures, investment costs may be overstated.

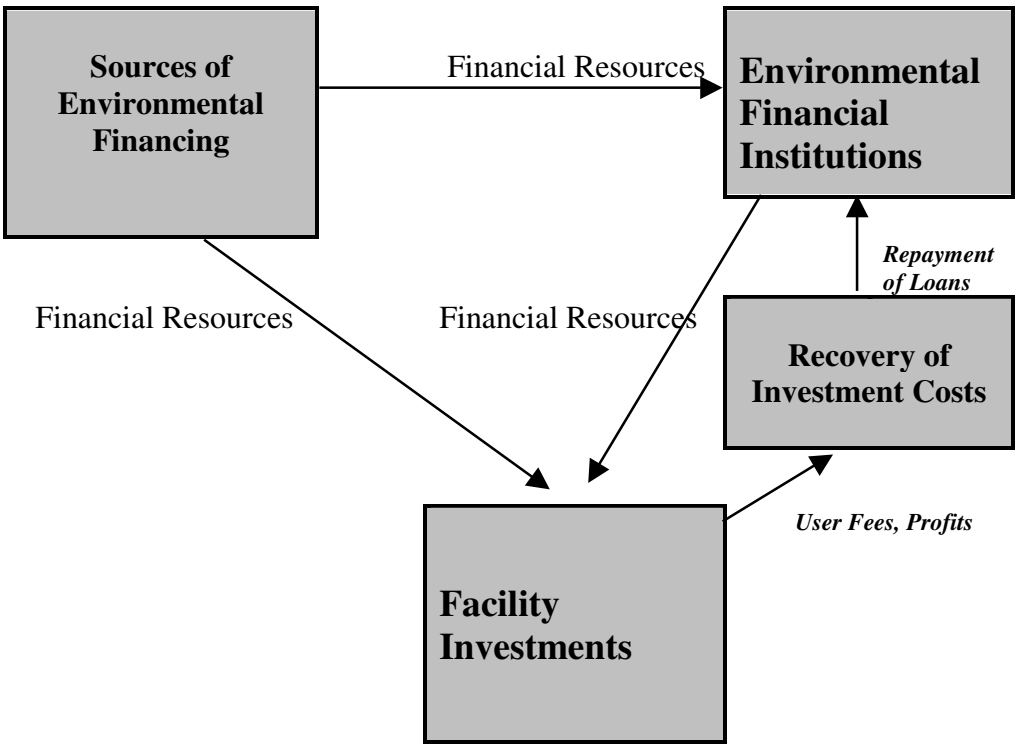
management program. The Lithuania EFS did not generate new estimates of these management costs, relying instead on estimates developed in an earlier study by Milieu (1998).

4. Supply of Environmental Financing

The supply of financing for environmental activities is defined at the sum of financial resources that are available at a given time to support investment, O&M expenditures, and environmental management. This section describes the steps in identifying sources of financing and the conditions that determine their use in the environment sector. Section 4.1 describes the types of sources and scope of analysis of sources while Section 4.2 describes the determination of special conditions that are attached to a facility's access to funding.

A key focus is on the mobilization of capital for environmental investment. The flow of financial resources is described in Figure 2. Sources of environmental financing are entities that provide funds, either directly to investments (e.g., own resources of facilities) or through intermediaries such as environmental funds, IFIs, and commercial lenders. In the case of loans and credits, there is additional movement of financial resources from the facility back to the lender.

Figure 2. The Flow of Financial Resources for Environmental Investments



4.1 Identifying Sources of Financing

As illustrated in Figure 2, there are three types of structures that play a role in the supply of financing: the sources of financing; institutions that manage selected sources; and financing instruments (represented by the flow of financial resources.

Sources of financing can be divided into domestic and foreign sources. Domestic sources of financing include the profits and cash reserves of private facilities, general revenues of national and municipal governments, and earmarked user fees and other special taxes and levies. Some of these earmarked fees, such as water and waste tariffs directly flow to facilities to cover O&M costs and repayment of credits while others are collected by environmental funds and disbursed for funding of environmental projects. In addition, private savings flow to financial intermediaries that may issue loans or provide equity to facilities for investment. On the foreign side, the major sources are grants and soft financing provided by donors, loans provided by IFIs, and private credit and equity provided as foreign direct investment.

The major types of financing institutions that may support environmental expenditures include domestic environmental funds, domestic banks and other types of financial intermediaries, IFI and donor funded "windows" in domestic banks, and IFI and donor credit lines.

Several types of financial instruments may be used to fund environmental expenditures including:

- Grants and direct cash transfers
- Commercial loans
- Soft loans (reduced interest rates, longer grace periods and repayment periods)
- Interest rate subsidies and loan guarantees tied to commercial or IFI loans
- Equity
- Leasing (mainly of equipment such as vehicles and portable machinery)

4.2 Financing Source Conditionalities

Once all potential sources, financial institutions, and instruments have been identified, the next step involves analysis of the conditions that govern their use for environmental expenditures. These attributes are termed financing source conditionalities. Most of these factors are more closely linked to foreign sources, although there are conditionalities that are attached to domestic sources such as loans, disbursements from environmental funds, and public sector investments (e.g., public investment programmes). Among these factors are the following:

- Project type – funding may be for specific environmental or economic sectors, types of technology.

- Project description – access to funding may require an application and comprehensive technical and financial proposal.

- Project location – use of funding may be constrained by geographical location (e.g., local and regional environmental funds, special project areas such as the Black Triangle in the SW Poland, NW Czech Republic, and E Germany).

- Project owner – only private or public owners may be eligible to use certain sources. In addition, there may be requirements that link financing to the performance of the owner (e.g., access to domestic environmental fund limited to facilities that are up-to-date on pollution fee payments).

- Project cost – some sources may fund only small projects, others may establish minimum project sizes to facilitate efficient monitoring.

- Co-financing requirements – some sources may cover only a portion of expenditures, requiring the facility to generate remaining funding requirements from other sources. In some cases, multiple sources may be bundled together (e.g., donor grant and IFI loan) requiring the project use both. In addition, access to interest rate subsidies may depend on pre-approval for commercial loan

- Sovereign guarantees – some sources may require guarantees where loans are considered risky.

In addition to conditionalities related to specific projects or investments, most sources are limited in total supply. Thus, these source budget constraints should also be noted along with the types of constraints enumerated above.

5. Demand/Supply Simulations

The key element in the EFS is the matching of demand and supply and the associated gap and affordability analyses. The exercise of matching demand to supply can be viewed as a simulation, since it is hypothetical; there is no certainty that the sources of financing that are matched to specific projects or expenditures would actually be used. Nevertheless, these simulations can provide results that can enable policymakers to better understand the financing problem and the policy and institutional dimensions of meeting compliance schedules.

Two types of demand/supply simulations are described in this section. These include aggregate demand/supply simulations and project-by-project simulations. These are described in Sections 5.1 and 5.2 below. Section 5.3 provides a detailed description of demand/supply simulations that are presented in the Lithuanian EFS and referred to as the Municipal Environmental Investment Programme or (IP). The IP is a hybrid of both types of simulation, with gaps analyzed at the project level and for the entire municipal sectors (water, wastewater and municipal waste). Finally, the types of affordability analyses that can be undertaken in conjunction with the simulations are presented in Section 5.4.

5.1 Aggregate Demand/Supply Simulations

The first type of demand/supply simulations focuses on comparisons of aggregated costs with the magnitude of available financing. These types of simulations are primarily useful for developing a rough sense of the potential magnitude of the financing gap, in order to inform discussions of demand and supply-side policies. These aggregate demand/supply simulations have been featured in the financing strategies recently prepared by COWI in several NIS countries (Georgia, Moldova, Kazakhstan, Novgorod oblast).

In the most general form, investment and O&M requirements are summed up over directives or sectors on an annual basis and for a prescribed time frame (say 15-20 years). Then, potential annual sources of financing are also summed up for each year of the prescribed time frame. The overall financing gap for each year is equal to the difference between costs and supply of financing. It can also be expressed in proportional terms as the share of costs that can be covered by available sources of financing (i.e., the ratio of supply to costs). The financing gap can also be disaggregated to determine which types of costs (e.g., investment, operations, maintenance) are unlikely to be satisfied by the types of financing that are available.[4]

These aggregate demand/supply simulations consider annual funding source budget constraints at the aggregate level but ignore project-specific conditionalities that may limit the use of sources for certain purposes. For example, loans may only be available for investments and not to meet O&M costs. Also, in the aggregate demand/supply simulations, a simplifying assumption is made that financing sources are fungible across jurisdictions. This may be true for foreign sources and state budget, but user charges are usually earmarked for local services. Thus, the existence of a financing gap is viewed as a general shortage of financing, shared by all facilities when, in fact, some facilities are able to meet their financing requirements, while others are not.

5.2 Project-by-Project Simulations

If environmental expenditures are specified on a project (or facility) level, it is possible to match individual projects to available financing. Presumably, adequate information is provided on the project to determine which sources would be most suitable to finance the project. The simulation proceeds as follows:

1. A project is identified in terms of its costs, characteristics of the project, and any known constraints on the types of financing instruments the owner may utilize. For example, municipalities may be constrained in terms of the amount they may borrow, based on ability to generate revenues, service the loan, and other prior indebtedness.

[4] In the COWI financing strategies, financing gaps for operational and maintenance costs are of interest because the environmental targets, for the most part, have emphasized trying to maintain the current situation rather than considering improved environmental performance or improved services (e.g., water supply and wastewater) because financing is in such short supply. It is assumed that financing is firstly allocated to operational costs and any residual financing goes to maintenance. For accession countries, where the goals are focused on meeting EU requirements, financing is likely to be adequate for O&M, but may be in short supply for investments.

2. Next, the available sources are screened to determine those that may be appropriate for the proposed investment.

3. Finally, a financing package is identified for the project, guided by two criteria: (1) close the financing gap, if possible; and (2) if there appears to be no problem in matching funding to the project, minimize the net cost of funding, thereby improving affordability.

For the project-by-project simulations, there is no accounting for aggregate financing source budget constraints. The simulations simply consider projects one at a time. In some cases, where detailed project information has not been developed, the "projects" that are matched are hypothetical constructs to represent an expected type of project. For example, where compliance expenditures have been estimated at the sector or directive level and not built up on a project-by-project basis, there may still be some value in determining whether a typical project would be able to secure financing. The financing gap may be expressed in several ways: number or percentage of projects for which there is a financing gap, magnitude of the financing gap aggregated over all projects, or the share of costs met by available financing sources. Thus, these latter two measures are identical to the financing gaps described above for the aggregate demand/supply simulations.

The project-by-project matching can serve two purposes. First, it can help to determine what types of projects are likely to engender financing gaps and identify areas where new or additional sources of financing may be needed. For example, there might be a shortage of resources for small investments or projects in a specific environmental or economic sector. Second, project-by-project matching facilitates the development of a financially viable investment programme (described in the next sub-section).

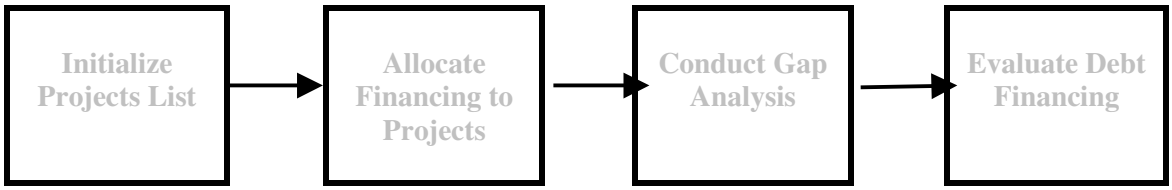
5.3 Investment Programme Simulations

In some cases, there may be adequate information on potential projects to develop a multi-year investment programme for a directive or even an environmental sector. Such a programme can be valuable in demonstrating the potential to meet compliance schedules or illustrating financing difficulties that will be encountered in this effort.

The development of an investment programme for water/wastewater and municipal waste is a central part of the Lithuania EFS. For these sectors, specific projects have been identified (and in some cases prepared) on the municipal level for potential inclusion in the investment programme. These sectors have been targeted for detailed analysis by the government of Lithuania because of concerns that municipalities will encounter difficulty in financing capital investments.

The investment programme (IP) simulations for the Lithuania EFS consist of a four-step process, described in Figure 2 below and briefly described in the remainder of this section.

Figure 2 – Flow Diagram for the IP



Step 1: Initialize Projects List – The first step in the IP simulations involved developing and prioritizing the list of water, wastewater, and municipal waste projects. The projects are designed to comply with two EU water directives (Urban Wastewater Treatment and the Drinking Water Directive) and three EU waste directives (Waste Framework, Packaging and Packaging Waste, Landfill). For each project, the following information was developed:

- Municipality
- Project title
- Brief project description
- Total cost of project
- Proposed start date and implementation schedule
- Yearly investment costs (if multi-year investment envisioned)
- Estimated O&M and annualized costs

The list of projects was then subdivided according to environmental media (water/ wastewater projects; municipal waste projects). Since the IP covers a 15-year period, projects were also divided into three groups according to the extent of development:

- Identified projects with proposed start dates
- Prepared projects
- Identified, but not prepared, projects, with unknown start dates

This subdivision would help to identify projects that could most realistically be programmed for implementation in the next few years, as opposed to projects that should be implemented in the later years of the IP.

To meet grant and credit financing requirements, mainly minimum project cost provisions of ISPA, smaller projects were "bundled" to create larger projects. For example, for the Lithuania EFS, 204 water and wastewater projects were bundled to create 47 larger investment packages. Finally, in collaboration with the Lithuanian Ministry of Environment, the final lists of projects were prioritized and placed into groups with higher priority projects "scheduled" for earlier implementation.

Step 2: Allocate Financing to Projects – The second step of the IP involved determining the formula for allocating financing to individual projects and then simulating the "financing" of projects.

Information on sources of financing was screened to determine those sources that would be most suitable for the types of projects to be included in the investment programme, taking into account characteristics of financing sources such as:

- Amount available for individual investments and in aggregate
- Terms and conditions on use and repayment (if applicable)
- Types and sizes of projects for which financing is available

Next, again in consultation with the Ministry, we set rules for allocating financing to individual projects. In the Lithuanian EFS, three sets of allocation rules were used for simulations to generate three scenarios. Within each scenario, the same allocation rule was applied to all projects. Thus, in the first scenario, 30% of capital costs were assumed to be covered by IFI loans, 20% by budget, and 50% by EU grants (ISPA for the years 2000-2006). The use of uniform allocation rules simplified the simulations, but more complicated rules could have been used. For example, smaller projects might use a different allocation rule or project in water could be financed differently from municipal waste projects.

Finally, the allocation rules were applied to simulate financing of projects. Starting with projects designated for the year 2000, capital costs were "financed" from the major sources according to the allocation rule. Within each year, funds were allocated to projects until a) all projects had been financed or b) the budget constraint for one of the sources had been reached. As reported in Chapter 7 of the Lithuanian EFS, there were adequate resources for investments in the IP. However, had this not been the case, projects would have been delayed until the next year, so that at the end of the IP time frame, there would have been some number of projects that would not have been financed.

Step 3: Conduct Gap Analysis - As indicated above, the financing gap could be analyzed both on a yearly basis and for the 15-year time frame of the IP. Since unfunded projects in a given year were rolled over to the next year, the most useful specification of the financing gap was for the 15-year time frame. At the end of this period, it would be possible to express the gap in terms of the number of projects and associated capital costs for which financing had not been available. However, from a supply-side policy perspective, it would also be informative to know how soon there would be difficulties in financing the year's slate of investments. For example, because of the time and resources involved in preparing projects, the IP could have included fewer projects in the first few years and a large number in later years, with budget constraints not coming into play until the volume of annual projects increased substantially. For the Lithuanian IP, projects were distributed relatively evenly across the 15-year time frame and potential capacity constraints on developing projects were ignored.

Step 4: Evaluate Debt Financing – Since loans were used in the Lithuania EFS, a cost recovery component was developed to determine annual repayment requirements, and combined with O&M requirements to determine tariff requirements. Since debt would be taken on by municipalities, it was necessary in the Lithuanian IP to unbundle larger projects involving more than one municipality and determine each municipality's share of the loan and therefore responsibility for debt financing. Loan terms were considered in determining the timing and amount of annual debt service for each loan taken by a municipality (typically, each municipality was expected to undertake 3 to 8 projects in the IP). Then, with assumptions on associated O&M costs, additional tariff needs were calculated on the municipality level to cover debt service and O&M.[5]

[5] The debt financing stage was also used to determine if municipalities would exceed legal limits for borrowing established for municipalities. These limits are expressed as ratios of debt or debt service to municipal income.

5.4 Affordability Analyses

Affordability criteria are used to assess ability to pay relative to some benchmark at different levels of aggregation. *National affordability* compares the ratio of environmental costs (preferably annualized costs) to GDP or other indicators such as per capita or household incomes. Typically, the ratio of environmental expenditure to GDP in OECD countries is between 1 and 3 percent. As noted in Section 3, the higher this ratio, the greater the opportunity cost of using resources for environmental as opposed to non-environmental purposes. However, if potential benefits of environmental improvements are high, this may provide a rationale for a higher ratio than in OECD countries. If the ratio is significantly lower than in other countries, it will be difficult to justify longer compliance schedules unless financing gaps exist even when expenditure levels are low.

Because of the focus on municipal investments in the Lithuania EFS, a second affordability criterion of interest is *household affordability.* This criterion compares the ratio of tariffs for municipal services (water, sewerage, solid waste, heating) to household income to a benchmark. A common benchmark, apparently popularized by the World Bank, for household affordability is 5%. However, given the large variation in household incomes among transition and OECD countries, a more appropriate way of determining benchmarks for a country would be to determine willingness-to-pay using survey methods.[6]

A third measure of affordability would focus on the private or enterprise sector and the level of expenditure or annualized costs relative to production costs or the value of production. Presumably, the benchmark would be 1-2 % of the value of production. This affordability analysis was not undertaken in the Lithuania EFS.

6. Closing the Financing Gap

Once the demand/supply simulations and gap and affordability analysis have been completed, policymakers may be interested in modifying demand and supply assumptions to reduce the financing gap and/or improve affordability. The options for achieving these objectives include both demand and supply options.

6.1 Demand-side Options

On the demand side, the major options involve changes in targets and the compliance schedule. In the case of targets, making them less stringent would reduce costs on a project-by-project basis or reduce the number of projects to be undertaken. By increasing the timeframe for compliance, less financing is needed on an annual basis.

Another set of options, of potentially smaller impact, relate to policy and capacity building to encourage least cost solutions. These could focus on development and dissemination of improved information on technological options, support for project preparation, better information on sources of financing, and development of domestic consulting services to assist in least cost planning.

[6] Such a survey was undertaken in Lithuania as part of the EFS. Interestingly, the additional predicted tariff increases implied by the IP, far exceeded willingness-to-pay estimates from the survey, with the exception of projects involving closing old landfills and upgrading new landfills.

6.2 Supply-side Options

On the supply side, the major opportunities focus on increasing the availability of foreign and domestic sources of financing. To expand foreign financing, it may be necessary to change policies on guarantees, relax borrowing requirements for municipalities, or make commitments to co-financing requirements of IFIs. In terms of FDI, macroeconomic, privatization, and trade policies may provide the needed stimulus. However, such funding will not benefit municipal investments unless public-private partnerships are encouraged.

On the domestic front, the major challenges focus on greater involvement of the private capital markets in the areas of credit, equity, leasing, and public-private partnerships. Potentially, the availability of substantial grant financing from the European Union will constrain the participation of private capital markets in environmental financing unless accession countries involve local banks and financial intermediaries in co-financing schemes (for example, in helping to finance the residual project costs not covered by ISPA and IFI loans). In addition, accession countries may explore private-public co-financing options for projects that are not suitable for ISPA.

Annex 3.2 Detailed Analyses of the Costs of Approximation with Selected EU Legislation

This annex is divided into the following sections:

Annex 3.2.1 91/271/EEC - Directive Concerning Urban Wastewater Treatment

Annex 3.2.2 99/31/EC - Council Directive on the Landfilling of Waste and 94/62/EEC - Directive on Packaging and Packaging Waste

Annex 3.2.3 88/609/EEC - Directive on Limitation of Emissions of Certain Pollutants from Large Combustion Plants

Annex 3.2.4 Council Directive 99/32/EC relating to a reduction in the sulphur content of certain liquid fuels and amending directive 93/12/EC)

Annex 3.2.5 98/70/EC - Directive on the Quality of Petrol and Diesel

Annex 3.2.6 94/63/EC - Directive on the Control of Volatile Organic Compound Emissions Resulting from the Storage of Petrol and its Distribution from Terminals to Service Stations

Annex 3.2.7 93/12/EEC - Directive Relating to the Sulfur Content of Certain Liquid Fuels

Annex 3.2.8 EU Legislation on Chemicals

Annex 3.2.9 93/12/EEC - Directive Relating to the Sulfur Content of Certain Liquid Fuels

Annex 3.2.10 85/210/EEC – Directive on Approximation of the Laws of the Member States Concerning the Lead Content of Petrol

Annex 3.2.11 70/220/EEC - Directive on Motor Vehicles

Annex 3.2.12 91/689/EEC - Hazardous Waste Framework Directive

Annex 3.2.13 91/676/EEC – Directive on Protection of Waters Against Pollution Caused by Nitrates from Agricultural Sources

Annex 3.2.14 96/61/EC – Directive on Integrated Pollution Prevention and Control

Annex 3.2.15 Administrative Costs, Including those Associated with 96/62/EC – Directive on Ambient Air Quality Assessment and Management and COM (97) 49 – Final – Proposed Water Framework Directive

Annex 3.2.191/271/EEC - Directive Concerning Urban Wastewater Treatment

Brief Description of Directive[7]

The Urban Wastewater Treatment Directive applies to towns with pollution emissions of at least 2000 population equivalents (taking into account both industrial emissions and sewerage). The directive specifies treatment standards and requires that sewerage systems be installed to service these agglomerations as long as the costs are not considered to be excessive. The deadline for larger towns is 31 December 2000, and smaller towns must comply by the end of 2005.

In most cases biological treatment to reduce the BOD load in the effluent must be used. Nitrogen and phosphorus removal are also required for discharges flowing directly or indirectly into water bodies subject to eutrophication. In the directive, such water bodies are called "sensitive," but the definition of water bodies as sensitive or non-sensitive is left to the member states.

As of 2000, Lithuanian waterways had not been classified. Lakes in Lithuania can certainly experience eutrophication, but rivers may be a problem as well. All rivers in Lithuania drain into the Baltic Sea, which is subject to significant eutrophication during warm periods. It is therefore likely that most or even all receiving waters will need to be classified as sensitive.

The directive requires that towns above 100,000 population equivalents remove 90% of the influent BOD during treatment, but for smaller towns the requirement is only 70%. Alternatively, towns can comply with an effluent concentration requirement of 25 mg of BOD per liter of effluent. When receiving waters are sensitive, the limits are 10 or 15 mg/liter of nitrogen and 1 or 2 mg/liter of phosphorus (depending on population level). Alternatively, 80% of nitrogen and 70 – 80% (depending on influent concentration) must be removed from influents.

Discussion

As was already mentioned, since Milieu Ltd. (1998) was finalized, additional estimates were prepared under a PHARE-sponsored project titled *Development of a Programme on Approximation and Implementation of EU Water Legislation in Lithuania*. These estimates are preferred to those of Milieu Ltd. (1998), not only because they are more up-to-date, but also because the analysts examined data at the municipality level rather than averages as was done in Milieu Ltd. (1998). Some differences in the results presentation also existed. Whereas Soil and Water Ltd. (1999a) considered costs as fixed over time, Milieu Ltd. (1998) phases in investments, which includes the inevitability that all needed investments cannot appear in one year.

In Milieu Ltd. (1998), the authors considered the case where only half of Lithuanian's waters were sensitive, as well as where all waters were sensitive. This scenario of course reduced wastewater treatment costs compared with the case where all waters were sensitive, but sewerage costs were the same. Soil and Water Ltd. (1999a) did not consider this partially sensitive case, because it was viewed as implausible.

Soil and Water Ltd. (1999a) furthermore supposed that sewerage would be extended to all households in towns with populations greater than 2000. The rationale for this move was that extension of sewerage is Ministry of Environment policy and therefore should be taken as given. In Milieu Ltd. (1998) the costs of extending the sewer system were estimated to be very high (costs were even higher in Soil and Water Ltd. (1999a)), and therefore was considered an option. The preferred case in the table below is where all waters are sensitive and sewerage is extended to all households in towns with populations greater than 2000. The interested reader can explore the other cases using the Excel model.

[7] In many cases, directive descriptions were adapted or taken from Milieu Ltd. (1998)

Results

Cost of Approximating with 91/271/EEC (Millions of Euros)

	Five Year Period Ending			
	2005	2010	2015	2020
Cumulative Investments				
Wastewater treatment	0	0	137.1	137.1
Sewerage	0	0	385.9	385.9
Total Cost	***0***	***0***	***523.0***	***523.0***
Annual Costs				
Wastewater Treatment	0	0	22.9	22.9
Sewerage	0	0	45.6	45.6
Total Costs	***0***	***0***	***68.5***	***68.5***

Source: Soil and Water Ltd. (1999a)

Annex 3.2.2 99/31/EC - Council Directive on the Landfilling of Waste and 94/62/EEC - Directive on Packaging and Packaging Waste

For purposes of this Strategy, these two directives are treated as one directive with landfilling and packaging waste components. In the Recycling Strategy already discussed, it was determined that waste incineration is necessary to meet the requirements of 94/62/EEC and the biodegradable waste recovery objectives that are an important part of 99/31/EC. Because this technology links these two directives, costs are considered together.

Brief Description of the Directive 99/31/EC

The Directive requires that all landfills meet a series of criteria for construction and operation. New landfills must comply immediately after transposition of the directive to national law and existing landfills need to be upgraded or closed by June 2009. The measures applying to new and upgraded landfills include the following:

- Fencing of the perimeter;
- Leachate collection and bottom sealing;
- Surface sealing;
- Pre-treatment and compacting of wastes;
- Groundwater monitoring and control;
- Gas extraction;
- Ban on the landfilling of certain types of wastes;
- Gradual reduction in the landfilling of biodegradable waste.

Landfills that are closed because it is not economical to upgrade them or for other reasons must also meet certain requirements. These include the following:

- Capping and creation of top cover;
- Reclamation;
- Gas extraction (to be used or flared);
- Leachate control.

According to the draft *Strategic Plan for a Network Future Municipal Landfills in Lithuania* (the "Strategic Plan"), prepared by Cowi for the Ministry of Environment, there are approximately 840 operating landfills and dump sites in Lithuania (Cowi, 1999). None of these sites meet the requirements of the directive and few are even in partial compliance. This observation is not surprising given that there are relatively few requirements on municipalities. As a result, most landfills are completely uncontrolled.

The timing of compliance with the directive is governed by Article 18 (1). Article 18 (1) says that the Member States must bring into force regulations necessary to comply with the Directive not later than two years after its entry into force. 2001 is therefore the date of compliance. An important component of the Directive is a set of targets for diversion of biodegradable waste from landfills. These targets are the following:

(a) In 2006, reduce the total amount of biodegradable municipal waste to 75 % of the amount (by weight) produced in 1995 or the latest year before 1995 for which standardised Eurostat data are available;
(b) In 2009, reduce the total amount of biodegradable municipal waste to 50 % of the amount (by weight) produced in 1995 or the latest year before 1995 for which standardised Eurostat data are available;
(c) In 2016, reduce the total amount of biodegradable municipal waste to 35 % of the amount (by weight) produced in 1995 or the latest year before 1995 for which standardised Eurostat data are available;

However, Article 8 also contains the following statement: "Member States which in 1995 or the latest year before 1995 for which standardised Eurostat data are available put more than 80 % of their collected municipal waste to landfill, may postpone the attainment of the targets set out in paragraphs (a), (b) or (c) by a period not exceeding four years".

Concerning closure, the Directive requires the preparation of closure plans by 2002 and implementation of those plans by 2009.

Discussion of 99/31/EC

The information source for cost estimates pertaining to this directive is Cowi (1999). Cowi (1999) prepared a plan for the future of landfills in Lithuania. The Plan proposes the gradual closure of existing landfills and the construction of fourteen new municipal landfills that comply with the requirements of the Landfill Directive. These modern landfills will replace the several hundred dumps/landfills that are currently in the country. This change in the basic structure of landfilling in Lithuania addresses a critique of the current system that was levied in several documents, including the precursor to this Environmental Finance Strategy.

Basic data on these proposed landfills are given below.

Number and Location of Future Municipal Landfills in Lithuania

County	Location (nearest major city)	Projected year of completion of first section	Total required capacity, m^3
Alytus	**Alytus**	**2002**	**1,200,000**
Kaunas	**Kaunas** **Kedainiai**	**2008** **2002**	**4,200,000** **700,000**
Klaipeda	**Klaipeda** **Silute**	**20022009**	**2,200,000** **500,000**
Marijampole	**Marijampole**	**2002**	**1,100,000**
Panevezys	**Panevezys** **Central for Birzai, Kupiskis and Rokiskis**	**2006** **2007**	**1,250,000** **550,000**
Siauliai	**Siauliai**	**2001**	**2,400,000**
Tauragé	**Taurage**	**2001**	**700,000**
Telsiai	**Telsiai (or Seda)**	**2001**	**1,050,000**
Utena	**Utena**	**2005**	**1,100,000**
Vilnius	**Vilnius** **Ukmerge**	**2004** **2009**	**5,300,000** **400,000**
Total	**14 landfills**		**265,000 inhabitants per landfill**

Source: Cowi (1999)

The requirement that Lithuania ultimately recycle 65% of its biodegradable wastes is expected to impose rather high costs on the system, and it has been argued (e.g. in Milieu Ltd., 1998) that this may be an area for discussion between the Government of Lithuania and the European Commission.

Since the draft of the directive was published in 1997, however, the organic waste recycling component was substantially softened. Of particular importance is the already mentioned provision in Article 8, which states that countries that landfilled more than 80% of their wastes in 1995 can postpone achievement of the targets by a maximum of four years. Indeed, the UK has already filed for such a postponement. In CowiConsult

(1999) it was assumed that Lithuania would take advantage of this provision of the Directive, implying that the years for achieving the various recycling targets will be 2010, 2013 and 2020.

Analysis of the recovery and recycling of biodegradable wastes was handled under the auspices of the Recycling Strategy, which produced the document titled *Draft Strategic Plan for Waste Recycling in Lithuania*. It was determined that incineration was necessary for Lithuania to meet these requirements of 99/31/EC, as well as the packaging waste recycling targets associated with 94/62/EEC. Relatively minor composting is envisioned. It therefore is expected that three incineration facilities will be built, with a total capacity of 200,000 tons of waste per year. These facilities are proposed to be built in each of the following counties: Vilnius in 2009, Kaunas in 2010 and Klaipeda in 2014.

94/62/EEC - Directive on Packaging and Packaging Waste

Brief Overview of the Directive 99/31/EC

The Packaging Waste Directive applies to packaging made of paper, glass, metal and plastic. It specifies that by the year 2001 half of all packaging waste generated must be recovered and between 25% and 45% of the total packaging weight should be recycled. In addition, a minimum of 15% of each material making up the packaging waste stream must be recycled.

Discussion

Packaging waste is part of a class of pollutants that are recoverable and recyclable. They therefore have the potential to raise revenues and even generate profits for municipalities. The key is to keep costs down. Milieu Ltd. (1998) and Cowi (1999b) both supposed that cost containment would be a crucial issue. They therefore only considered a system that relied on voluntary drop-off of recyclable wastes at collection points that are scattered throughout the country and concentrated in towns and cities. More user friendly systems like curbside collection are much more expensive. The system is supported by public information and education programs to encourage participation.

It was assumed that once the system is fully active, Lithuanian waste managers would be able to access the same packaging waste markets that are available to current European Union members. Most materials therefore generate revenues for municipalities.

The difference between the results of Milieu Ltd. (1998) and Cowi (1999) is the use of incineration. Milieu Ltd. (1998) did not include the possibility of incineration, and therefore all biodegradable waste is composted and all packaging waste is recycled. In the following section, to the degree possible, these two approaches are compared and contrasted.

Results

The draft Plan for future municipal landfills presented in Cowi, (1999a) substantially improved on previous analyses because it proposed a more rational distribution of landfills throughout the country. In terms of landfill construction and existing landfill closure, estimates from the draft Plan for future municipal landfills are considered to be substantial improvements on those presented in Milieu Ltd. (1998). Estimates from Cowi (1999a) are therefore used.

As is shown in the tables below and in the summary table to follow, the costs to approximate with 1999/31/EC will be substantial. The largest portion of these costs is for the construction and maintenance of the fourteen landfills that are expected to make up the future Lithuanian waste disposal system. As presented in the table below, total construction costs are expected to be approximately 178 million litas (43.6 million Euros). Annual operating costs will be about 21 million litas (5.1 million Euros).

Construction Costs, Annual Operational Costs and Total Aftercare Expenses

County	Construction costs* Million Litas	Annual operational costs Million Litas	Total aftercare expenses Million Litas
Alytus	**13.00**	**1.275**	**5.60**
Kaunas	**28.0 (Kau.)**	**3.20**	**13.20**
	8.90 (Ked.)	**0.85**	**3.70**
Klaipeda	**18.50 (Kl.)**	**2.00**	**8.50**
	7.50 (Si)	**0.70**	**3.00**
Marijampole	**11.65**	**1.15**	**5.00**
Panevezys	**13.30 (Pa.)**	**1.35**	**5.85**
	7.90 (Ros.)	**0.75**	**3.20**
Siauliai	**19.20**	**2.00**	**8.80**
Tauragé	**8.90**	**0.85**	**3.70**
Telsiai	**11.50**	**1.15**	**5.00**
Utena	**12.00**	**1.15**	**5.25**
Vilnius	**32.85 (Vi.)**	**3.85**	**15.65**
	6.85 (Uk.)	**0.65**	**2.70**
Total	**200.15**	**20.93**	**89.20**

Notes: *Access roads not included; landfill Investments are made in three-year increments after which closure takes place on that landfill cell. There are a total of five landfill cells in each landfill. 25% of landfill investment costs are for landfill infrastructure that is used throughout the fifteen-year lifetime of each landfill.
Source: COWI (1999)

Methods and Costs for Closing Existing Landfills

Landfill type	Closure method (typical)	Costs Litas/ha	Number of landfills	Average size Ha.	Total closure costs Mill. Litas
Small landfills/ dumpsites	Compacting and grading of surface Covering with 0,5 m of soil. Planting	**75,000**	**630**	**0.75**	**35.5**
Middle size landfills/dumpsites	Compacting and grading of surface Covering with 1,0 m of soil. Planting	**150,000**	**120**	**1.5**	**27.0**
Large landfills/dumpsites	Compacting and grading of surface Covering with 0,5 m of clay, 0,3 m gravel layer and 1,0 m of soil. Monitoring programme Planting	**300,000**	**20**	**5.0**	**30.0**
Landfills/dumpsites with complications	Compacting and grading of surface Covering with 0,5 m of clay, 0,3 m gravel and 1,0 m soil. Monitoring programme Gas control and collection, groundwater protection systems, leachate collection systems etc.according to needs Planting	**1,000,000**	**15**	**15.0**	**225.0**
Total			**785**		**317.5**

Source: Cowi (1999a)

It should be stressed here that numbers in the above table reflect the newest (2000) version of draft report of COWI. However, calculations which results are presented in tables below had been made before the mentioned last version was prepared. Timing of the project does not allow correcting all these calculations; therefore those a little bit older numbers are used further for estimation of annualised costs. Moreover, numbers in older COWI version and in newer one do not differ much, so results really reflect the same situation.

Distribution of the Costs of Closing Existing Landfills (2000 MEuros)

	Five Year Period Ending				
	2000	2005	2010	2015	2020
Cumulative Investment	0.78	28.78	58.49	58.49	58.49
Annualized Costs (2000 MEuros)	0.08	2.90	5.90	5.90	5.90

Landfill closures are completed in 2010. Annualized cost calculations assume a 50- year lifetime of closures
Source: Cowi (1999b)

Total Costs of Compliance with the Landfill Construction (including aftercare, operations and maintenance costs) and Existing Landfill Closure Components of the Landfill Directive (2000 MEuros)

	Cumulative Investments	Annualized Investment, Operation and Maintenance Costs
2000	3.71	0.93
Five Year Period Ending		
2005	56.42	12.08
2010	108.07	16.04
2015	118.64	16.12
2020	118.64	16.16

New landfill operation and maintenance expenses based on averages, with first expenditures starting in 2002
Source: Cowi (1999b)

Recovery and recycling of biodegradable and packaging wastes require several different types of investments. The table below summarizes these costs by cost category. As is clear from the table, investments in the three incinerators make up virtually all the non-landfill related investments necessary to comply with these two directives. Indeed, these incinerators cost more than twice as much as the fourteen new landfills combined!

Cumulative Investments for Biodegradable and Other Recyclable Waste Recovery and Recycling (2000 MEuros)

Year	2000	2005	2010	2015	2020
Containers for separate collection	0.96	6.30	13.29	21.57	23.43
Trucks for separate collection	0.98	6.24	9.17	16.20	16.98
Glass sorting	0.00	2.93	3.90	6.83	6.83
Paper and plastic sorting	0.00	1.22	1.22	2.20	2.44
Incineration	0.00	36.59	146.34	219.51	219.51
Composting	0.00	2.20	9.09	23.14	27.82
TOTAL Cumulative Investments	**1.94**	**55.48**	**183.02**	**289.44**	**297.01**

Source: CowiConsult (1999b)

Annualized costs are also significant, and incineration costs are, of course, again expected to make up the vast majority of these costs. Total annualized investment costs in 2010 are expected to be approximately 30 MEuros and by 2020 the total should be over 50 MEuros.

Annualized Investment Costs for Biodegradable and Other Recyclable Waste Recovery and Recycling (2000 MEuros)

	2000	2005	2010	2015	2020
Containers for separate collection	0.22	1.45	3.05	4.95	5.38
Trucks for separate collection	0.16	1.02	1.49	2.64	2.76
Glass sorting	0.00	0.67	0.90	1.57	1.57
Paper and plastic sorting	0.00	0.28	0.28	0.50	0.56
Incineration	0.00	5.95	23.82	35.72	35.72
Composting	0.38	9.87	31.62	50.70	52.38
Total Annualized Investment Cost	**0.38**	**9.87**	**31.62**	**50.70**	**52.38**

The lifetimes of containers, sorting apparatus and composting materials is 6 years. The lifetimes of trucks and incineration equipment is assumed to be 10 years,
Source: CowiConsult (1999b)

To fully consider the costs of the recovery/recycling portion of these directives, it is necessary to consider the operating costs net of any revenues that are expected to be earned from the sale of recyclable materials. The table below shows that on an operating basis the recovery/recycling program ultimately should be in the black. Starting in 2005 profits result from the system and by 2010 over 3 MEuros are generated annually. Considering the annualized investment cost, however, gives quite a different result. We see from the table below that in all years significant costs are imposed on the Lithuanian economy. By 2010, net annual costs of the recovery/recycling program will be about 26 MEuros and in 2020 this cost will rise to 45 MEuros.

Annual Operating and Maintenance Costs Plus Annualized Investment Costs for Biodegradable and Other Recyclable Waste Recovery and Recycling (2000 MEuros)

	2000	**2005**	**2010**	**2015**	**2020**
Containers	0.72	1.89	2.44	2.93	3.04
Trucks	0.38	0.97	1.23	1.49	1.52
Sorting	0.00	1.90	2.55	2.85	2.85
Revenues from sold secondary materials	-0.60	-5.08	-6.34	-7.64	-7.71
Incineration	0.00	0.00	3.73	4.24	4.24
Revenues from sold energy	0.00	0.00	-7.16	-8.15	-8.15
Composting	0.00	0.00	0.28	1.19	1.49
Revenues from sold compost	0.00	0.00	-0.14	-0.57	-0.72
Operating Loss in Meuros	**0.50**	**-0.32**	**-3.40**	**-3.64**	**-3.42**
Total Annualized Investment Cost	**0.38**	**9.87**	**31.62**	**50.70**	**52.38**
Net Annualized Cost	**0.88**	**9.56**	**28.23**	**47.05**	**48.96**

Source: CowiConsult (1999b)

It is interesting to examine the incineration portion of this equation and compare it to other possible options. In the table below are given the estimated annualized costs, net of revenues received from the sales of electricity, associated with incineration. We see that this technology is not expected to be economically efficient on its own; the costs of incineration are significantly larger than the benefits, yielding annual system losses in the 20 - 30 MEuro range.

Net Annualized Costs of Incineration (MEuros)

Year	2000	2005	2010	2015	2020
Annualized investment costs	0.00	5.95	23.82	35.72	35.72
Operating and Maintenance costs	0.00	0.00	3.73	4.24	4.24
Total Annualized Costs	0.00	5.95	27.54	39.97	39.97
Revenues from sold energy	0.00	0.00	-7.16	-8.15	-8.15
Net Annualized Costs of Incineration	**0.00**	**5.95**	**20.39**	**31.82**	**31.82**

But is incineration the most cost-effective way to achieve the biodegradable waste recycling goal in 99/31/EC? To answer this question a counterfactual scenario must be offered for consideration. Milieu Ltd. (1998) provides such a possibility, because instead of incinerating most biodegradable wastes, the authors propose a composting program.

Costs of Organic Waste Recovery and Composting (2000 MEuros)

	Year				
	2000	2005	2010	2015	2020
Cumulative Investment	7.63	72.60	132.4	164.0	164.0
Annualized Costs	3.60	26.8	48.4	60.3	60.3

Source: Milieu Ltd. (1998)

We see from the table above that composting is a more expensive way than incineration to utilize biodegradable wastes. In 2010, for example, a full composting program without curbside pickup would cost about 48.4 MEuros per year. Incineration would cost just under half that amount. On an economic basis, incineration is therefore perhaps superior to a composting-only program.[8] This conclusion is mitigated by three factors that may merit further investigation. First, in developing the composting scenario in Milieu Ltd. (1998), the authors explicitly omitted the potential *revenues* from the sale of compost. However, in the small composting program included in the Recycling Strategy these revenues resulted in the recovery of almost half the costs of the composting program. If revenues from compost sales were indeed so significant, the net costs of the incineration and composting programs would be roughly similar.

Second, it is unclear whether the costs of mitigating air pollution from the three incinerators has been fully included in the calculations. For example, it is crucial that the costs of complying with 88/609/EEC (Large Combustion Plant Directive) be included in the estimated incineration costs. If high-cost, end-of-pipe treatment methods must be utilised to reduce emissions of pollutants such as sulphur-dioxide, nitrogen oxides and particulate matter, the superiority of incineration over composting may be called into question. It is in any case unlikely that the costs of the greenhouse gases emitted by the incinerators have been considered. Lithuania accepted the same greenhouse gas reduction target in Kyoto in 1997 as the European Union (8.0% reduction from 1990 levels) to be achieved during the first commitment period, which runs from 2008 – 2012. This target is probably quite strict, and Lithuania may end up having to buy greenhouse gas permits on the international market in any case. The three waste incinerators represent additions of three large new sources of greenhouse gases. It is therefore possible that Lithuania may end up having to buy greenhouse gas permits at $10 – 20 per ton of carbon dioxide equivalent for these incinerators on the international market. Certainly these simple points should be investigated more fully.

Third, Lithuania currently has excess electricity generating capacity. It can, of course, sell any excess power on the international market, but it also has large formal and informal agricultural sectors that could utilise the compost from the nation's biodegradable wastes. The comparative desirability of these two products therefore should also perhaps be considered, particularly if the cost differences between composting and incineration programs may be minimal.

As a final point on this topic, we would like to raise the same issue noted in Milieu Ltd. (1998). Whether incineration or composting is used to meet the biodegradable waste recovery/recycling requirements in 99/31/EC, the costs are very high. Should a land-rich, sparsely populated country like Lithuania invest a total of 219 MEuros (3.0% of 1998 GDP) or 50 MEuros per year to drastically reduce the landfilling of biodegradable wastes? Perhaps this question could be taken up during accession negotiations between the Government of Lithuania and the European Commission.

In the table below is a summary of cumulative investment and annualized costs for all components of both directives. Annual costs are, of course, net of any revenues earned from the sale of electricity produced by

[8] Incineration is combined with a small composting program in the recommendations of the Recycling Strategy, but the net costs of the composting program are very small and are therefore ignored.

incineration plants, compost and recycled materials. Not surprisingly, the costs to comply with these two directives are very high. By 2010 virtually 3.0% of 1998 GDP will need to be invested to comply with the directives. Slightly over half of cumulative investments and total net annualized costs in 2020 are due to waste incineration costs.

Total Costs of the Landfill and Packaging Waste Directives (MEuros)

	Year				
	2000	2005	2010	2015	2020
Cumulative Investment	5.65	111.90	290.28	408.08	420.79
Total Net Annualized Costs	1.81	21.64	44.27	63.17	65.12

Annex 3.2.3 88/609/EEC - Directive on Limitation of Emissions of Certain Pollutants from Large Combustion Plants

Brief Description of the Directive

The Large Combustion Plant Directive applies to facilities that have energy input greater than 50 MW. The predominant fuel currently used is heavy fuel oil, though some facilities also use some natural gas. The quantitative requirements of the directive are two-fold:

- New sources (those constructed after June 1987) must comply with concentration standards for SO_2, NO_x and particles;
- Aggregate emissions of SO_2 and NO_x from existing sources must be reduced (compared to 1980 levels).

For new sources the following concentration standards per normalized cubic meter (Nm^3) apply. Differences in requirements depend on the thermal input of the plant and the fuel used:

- SO_2 : **liquid fuel**: between 1700 mg/Nm^3 at 100 MWth and 400 mg/Nm^3 at 500 Mwth; **gaseous fuel** 35 mg/Nm^3.
- NO_x : **solid fuel**: 650 mg/Nm^3 , **liquid fuel**: 450 mg/Nm^3 and **gaseous fuels** 350 mg/Nm^3
- Particles: **solid fuel**: 50 mg/Nm^3 if thermal capacity is > 500 MW, 100 mg/Nm^3 if thermal capacity is < 500 MW; **liquid fuel** 50 mg/Nm^3 ; **gaseous fuel** 5 mg/Nm^3

In Lithuania as of 1996 there were 48 facilities that met the thermal input cut-off, but no large combustion plants were considered "new" under the directive, because they were all constructed before July 1987. The only new sources that will be subject to the concentration requirements will therefore be ones that are built in the future.

For each EU member, there was also an aggregate reduction target for nitrogen and sulfur oxide emissions. These requirements apply to existing sources. In the text of the directive there is no guidance regarding how to treat future EU members.

Discussion

Milieu Ltd. (1998) is the only document that presents analysis of the costs of approximating with 88/609/EEC. The results therefore come from that source. There are several controversial elements related to the interpretation of the directive. First, with regard to the No_x and SO_2 reduction requirements on existing sources, Milieu Ltd. (1998) assumed that the large combustion plants in Lithuania as a group will need to meet the average percentage reduction that was applied to the EU-12.[9] This interpretation therefore *excluded* the increases in emissions given to the so-called cohesion countries when the directive was adopted.

Second, there is some uncertainty surrounding the future of the Ignalina Nuclear Power Plant. Milieu Ltd. (1998) therefore used the best forecast of the (then) Ministry of Energy. In its analysis, Milieu Ltd. (1998) assumed that Unit 1 would close in the year 2003 and the plant will close completely in 2008. This loss of capacity will at least partly be replaced by thermal power. Closure delays would, of course, reduce the costs of complying with 88/609/EEC.

Lithuania recently committed to close Unit 1 by 2005, if international financial assistance is received to support that step. This assistance is very likely to be forthcoming, implying that the actual result will be very

[9] These wre mentioned in Annexes 1 and 2 of the Directive.

close to that proposed by the Ministry of Energy. Indeed, because Milieu Ltd. (1998) calculated costs in five year units, the timing of cost estimates should be in line with the actual period in which costs will be incurred.

Another potentially important influence on the time path of emissions is the use of orimulsion as a fuel in two units of the Lithuanian and Vilnius power plants. In 1997, 32.6 kilotons of oil equivalent (approximately 4.0% of the total fossil fuels used by the power sector) were burned in the Lithuanian Power Plant in Elektrenai. This fuel is imported from Venezuela, and has a high sulphur content. In the context of the directive, it is unclear how to treat this fuel. Milieu Ltd. (1998) viewed this change (that occurred after 1988) as significant enough to warrant treatment as a "new source." Of course, this interpretation will be one part of negotiations regarding approximation with the *acquis*. Indeed, one possible solution is that Lithuania will halt the use of orimulsion fuel. Because the approximation cost associate with the use of this fuel is rather high, this case will be treated similarly to the implementation of composting requirements in the Landfill Directive. The use of orimulsion will be one possible scenario, but no orimulsion will also be actively considered.

Results

As can be seen in the following two tables, the approximation costs associated with the use of orimulsion can, depending on the interpretation of the directive, be quite serious. By 2010 almost Euros 40 million will have to be invested in the two plants to allow them to meet the concentration limits. In 2010 approximately Euros 27 million will be spent on annual costs. This figure is almost two-thirds of the amount needed for all existing large combustion plants to substitute low sulphur heavy fuel oil for high-sulphur oil.

Annualized Costs for Orimulsion-Fired Power Plants to Meet the SO_2, NO_x and Particulate Concentration Requirements in the Directive (2000 MEuros)

	Five Year Period Ending			
	2005	**2010**	**2015**	**2020**
SO_2	13.0	19.5	25.9	32.7
NO_x	1.32	1.80	4.07	5.33
Particulates	0.09	0.14	0.19	0.23
TOTALS	**14.41**	**21.44**	**30.16**	**38.26**

Source: Milieu Ltd. (1998)

Cumulative Investments for Orimulsion-Fired Power Plants to Meet the SO_2, NO_x and Particulate Concentration Requirements in the Directive (2000 MEuros)

	Five Year Period Ending			
	2005	**2010**	**2015**	**2020**
SO_2	15.8	23.70	31.60	39.80
NO_x	3.63	4.95	11.21	14.67
Particulates	0.30	0.46	0.61	0.77
TOTALS	**19.73**	**29.11**	**43.42**	**55.24**

Source: Milieu Ltd. (1998)

Total Costs of Approximating with 88/609/EEC, Including the Use of Orimulsion (Millions of Euros)

	Five Year Period Ending			
Year	**2005**	**2010**	**2015**	**2020**
Cumulative Investment	19.73	43.16	72.70	89.38
Annualized Costs	14.40	50.05	79.93	91.12

Annex 3.2.4 Council Directive 99/32/EC Relating to a Reduction in the Sulphur Content of Certain Liquid Fuels and Amending Directive 93/12/EC)

Brief Overview of the Directive

The directive specifies that heavy fuel oil used for combustion purposes should not have more than 1.0% sulfur content as of 1 January 2000. This requirement is significant for Lithuania, because most large combustion plants currently burn heavy fuel oil with sulphur contents of 2.0% - 3.0%.

Discussion

Milieu Ltd. (1998) is to-date the only document to present estimates of the costs of approximating with this directive. It is therefore those results that are presented below. Requirements of the directive overlap the requirements of 88/608/EEC, because Milieu Ltd. (1998) predicted that substitution of low sulphur heavy fuel oil would also allow compliance with the sulphur requirements of 88/609/EEC. Additional costs are therefore only those pertaining to years prior to 2003, when the existing source requirements under 88/609/EEC come into effect.

Results

The annual cost of meeting the requirements of this directive are expected to be 13.66 year 2000 MEuros per year during 2000 - 2003.

Annex 3.2.5 98/70/EC - Directive on the Quality of Petrol and Diesel

Brief Overview of the Directive

This directive requires that the private sector improve the quality of petrol and diesel fuel in order to achieve benzene limits. In Lithuania this will primarily mean changes at the Mazeikiai oil refinery.

Discussion

None

Results

According to the Strategy, prepared by the Ministry of Transport (Transport and Environment: A Comprehensive Strategy, 1998), investments for reaching the goal related to benzene require 800 million Lt or 195.12 million euro. Annualized investment costs equal approximately 42 million Lt or 10.24 million Euros per year. Operational costs in this case are not significant and can be ignored.

Annex 3.2.6 94/63/EC - Directive on the Control of Volatile Organic Compound Emissions Resulting from the Storage of Petrol and its Distribution from Terminals to Service Stations

Brief Overview of the Directive

The directive specifies process quality standards for the major components of the petroleum distribution system. These standards are expressed in terms of VOC emissions per ton of petroleum produced and distributed. The table below taken from Milieu Ltd. (1998) presents the estimated reduction implied for various stages in the refining and distribution system.

Emissions Reductions Based on Estimated Emissions Factors

Emissions Source	Emission Factor (kg of VOC per ton of fuel)	Emission Limit from Directive (kg of VOC per ton of fuel)	Implied Reduction
Refinery Evaporative Emissions	1	None Specified	0.0%
Ports * Marine Terminals * Loading of Vessels	 0.3 0.02	 0.1 0.05	 66.6% 0.0%
Gasoline Distribution (from refinery and depots to service stations) * Tanks * Loading of Containers	 0.396 0.324	 0.1 0.05	 74.7% 84.5%
Service Stations * Loading of Tanks * Fueling of Vehicles	 1.428 1.372	 0.1 None	 93% None

Source of Emissions Factors: TME estimates based on European Commission (1991) and VROM (1986)

The directive comes into force at various times, but it is assumed below that compliance begins in 2005. Of course, using the spreadsheet model compliance in 2010 or 2015 can be chosen.

Discussion

There are two sources of cost information, but neither can be considered superior. In the results section, both are included and then the two sets of estimations are averaged for use in this Strategy. In Milieu Ltd. (1998), costs are divided between the cargo port at Klaipeda and the distribution network (e.g. storage tanks and gas stations) and rely on estimations of VOC emissions in this network.

Soil and Water Ltd. (1999c) started from unit costs of one station or terminal and built up costs from that point. According to data from 1997, Lithuania has 606 stationary and 201 container type petrol stations. Approximately 400 of them have recuperation equipment, because they were constructed after 1995 when this requirement was imposed in Lithuania. There are also approximately 20 terminals in Lithuania. They, however, are constructed mostly before 1995, and therefore lack recuperation installations. The cost of implementing the VOC directive therefore consists mostly of the installing recuperation systems in old petrol stations and terminals. In addition, a VOC vapour regeneration plant should be built to treat collected VOC, but this is not considered a cost related to a direct implementation of the directive.

The modernisation of one petrol station costs approximately 200 000 Lt (48000euro) and retrofitting one terminal costs approximately 1.5 million Lt (360000 Euros). Therefore, the overall investment for modernisation of petrol stations and terminals equals approximately 70 million Lt (41million for 206 petrol stations and 30 million for 20 terminals) or 17 million Euros. The implementation should be completed by 2007, implying that the annual investment cost would equal approximately 9 million Lt (2.1 million Euros).

In addition, VOC analysers should be acquired in order to perform enforcement measures as required by the EU. Assuming that each regional environmental protection department acquires VOC analyser, which costs according to the information from Finland 100000 euro, 3.4 million Lt or 0.8 million euro would be required. With the lifetime of 10 years annual investment cost would sum up to 80000 euro. This would be burden for the public.

Results

Annual Costs and Investments to Comply with the VOC Directive in Lithuania

	Annual Costs 2000 MEuros	**Investment Stock 2000 MEuros**	
Subsector		Equipment	Civil Construction
Cargo handling and storage	2.73	6.87	6.32
Other transport support	1.85	9.37	0.00
TOTAL 2005	4.58	16.13	6.32
Cargo handling and storage	2.83	7.09	6.43
Other transport support	2.07	10.57	0.00
TOTAL 2010	4.91	17.66	6.43
Cargo handling and storage	2.94	7.52	6.54
Other transport support	2.40	12.21	0.00
TOTAL 2015	5.34	19.73	6.54
Cargo handling and storage	3.16	7.96	6.65
Other transport support	2.73	14.17	0.00
TOTAL 2020	5.89	22.13	6.65

Source: Milieu Ltd. (1998)

Summary of Investment Costs to implement 98/70/EC (2000 MEuros)

	Five Year Period Ending			
Year	**2005**	**2010**	**2015**	**2020**
Cumulative Investment	13.37	19.46	20.68	21.90
Annualized Costs	1.76	2.57	2.73	2.89

Assumes 10 year lifetime for VOC analyzers and 15 year lifetimes for all other equipment
Source: Soil and Water Ltd. (1999c)

The results used in this strategy are a simple average of those from the above two sources. These results are given in the table below.

Investment Costs Used in the Strategy (MEuros)

	Five Year Period Ending			
Year	**2005**	**2010**	**2015**	**2020**
Cumulative Investment	17.91	21.78	23.48	25.34
Annualized Costs	3.17	3.74	4.04	4.39

Annex 3.2.7 93/12/EEC - Directive Relating to the Sulfur Content of Certain Liquid Fuels

Brief Overview of the Directive

The Directive 93/12/EEC applies to all middle distillates, including diesel fuel. The directive requires that by 1994 the sulphur content in these fuels should not exceed 0.05 percent by weight. In 2015, the sulphur content will need to be reduced to 0.003%. Currently, a variety of grades of diesel are used. These fuels have sulphur contents ranging from 0.5%, to greater than 1.0%. In the analysis, a 1.0% sulphur content is taken as the base case.

Discussion

The costs of this directive are closely tied to predictions of the use of trucks and other vehicles with diesel engines. Milieu Ltd. (1998) predicted that the baseline sulphur-dioxide emissions from these vehicles would increase five-fold during 2000 - 2020. Their baseline emissions are presented below.

Estimated Sulphur Dioxide Emissions from Diesel Vehicles Without the Directive (Thousands of Tons Per Year)

	1995	2000	2005	2010	2015	2020
1.0% Sulphur Content Fuel Used	0.7	1.2	2.2	3.6	4.7	5.7

Source: Milieu Ltd. (1998)

Results

Costs of Approximation with the Directive (2000 MEuros)

Year	2005	2010	2015	2020
Annual Cost	74.2	133.4	209.7	261.2

Source: Milieu Ltd. (1998)[10]

[10] Because no investments are required, year 2000 expenditures were not labelled year 2005 expenditures as was done for other directives.

Annex 3.2.8 EU Legislation on Chemicals

This sub-section presents a brief description of EU Chemicals Legislation Covered by the DISAE Project LIT-109: "Development of an Action Programme for the Implementation of EU Legislation on Chemicals in Lithuania".

The following directives and regulations were analysed during the project:

Reference	**Subject**
DIR 67 / 548 / EEC as amended	Classification, packaging and labelling of dangerous substances
DIR 76 / 769 / EEC as amended	Restrictions on marketing and use of dangerous substances and preparations
DIR 88 / 379 / EEC as amended[11]	Classification, packaging and labelling of dangerous preparations
DIR 94 / 55 / EC as amended	Transport of dangerous goods
REG / 92 / 2455 / EEC	Import and export of dangerous chemicals
REG / 93 / 793 / EEC	Existing substances
REG / 94 / 1179 / EC	First list of priority substances
REG / 95 / 2268 / EC	Second list of priority substances
REG / 97 / 143 / EC	Third list of priority substances
REG / 97 / 142 / EC	Delivery of information on existing substances
REG / 94 / 1488 / EC	Principles for evaluation of risks
REG / 94 / 3093 / EC	Ozone depleting substances

Directive 67/548/EEC (as amended) regulates the classification, packaging and labelling of chemicals dangerous to man and the environment. It establishes a compulsory prior testing and notification system for any new chemicals placed on the Community market after 1981. The Directive distinguishes between 'new' and 'existing' chemicals. Annex I to Directive 67/548/EEC lists the chemicals, which the Community has classified as dangerous.

Directive 88/379/EEC on classification, labelling and packaging of dangerous preparations (as amended) has been a counterpart to the 1967 Directive on dangerous substances. It adapted and extended the procedures and standards for the classification, packaging and labelling of dangerous substances to dangerous preparations (i.e. mixtures of two or more chemical substances). On 31 May 1999 the EU adopted a new Directive 1999/45/EC on the classification, packaging and labelling of dangerous preparations, which was published in the Official Journal of the European Communities and consequently entered into force on 30 July 1999. The new legislation repeals and replaces the former dangerous preparations Directive 88/379/EEC (as amended).

The new Directive introduces Community provisions on the classification and labelling of substances to take account of their effects on the environment. It also introduces a method for assessing the hazards for the

[11] Directive 88/379/EEC has been replaced by Directive 99/45/EC, which was adopted May 31 1999. The new Directive has been taken into account in the project even though it was published only on July 30 1999.

environment either by a calculation method or by determining the toxicological properties by test methods under certain conditions. In this directive, the obligation to provide professional users with safety data sheets is also broadened.

The Directive provisions must be transposed into the national legal orders of the Member States by 30 July 2002. The requirements shall be applied to pesticides (i.e. plant protection products and biocides) from 30 July 2004 and to other dangerous preparations starting 30 July 2002.

Directive 76/769/EEC (as amended) establishes restrictions on the marketing and use of certain dangerous substances and compounds. It creates a framework and a simplified legislative procedure through which the EU may ban or restrict dangerous chemicals or preparations by adding the substances and controls to an Annex of the Directive.

Directive 94/55/EC on transport of dangerous goods by road (as amended) is based on the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR). The Directive makes the requirements of the Convention applicable not only to international transports within the EU, but to any transport of dangerous goods by road within the EU (also within the territory of one Member State).

Regulations therefore largely fall outside the approximation process and come into force in the Candidate Countries on the date of accession. Nevertheless, environmental regulations require further national measures for implementation and cannot be wholly ignored before accession. Therefore, certain national implementation measures, besides the repeal of contradictory national legislation, are required: The applicability of the Regulation requires that the Member States authorise the competent authorities to apply the provisions of the Regulation.

Regulation EEC/793/93 on the evaluation and control of risks of existing substances applies to the collection, circulation and accessibility of information on existing substances, as well as to the evaluation of the risks of existing substances to people, including workers and consumers, and the environment.

The Regulation establishes the obligation for manufacturers and importers to deliver data on substances produced or imported above certain quantities. Member States must also designate the authorities to which the Commission sends copies of the data it has received. The Member States shall also introduce appropriate legal and administrative sanctions to deal with non-compliance by industries and importers.

There are several EU Regulations related to Regulation EEC/793/93:

- **Regulations EC/1179/94** concerning the first list of priority substances, **EC/2268/95** concerning the second list of priority substances, and **EC/143/97** concerning the third list of priority substances identify the priority substances requiring attention. In addition, they designate and indicate for each substance on the list the Member State, which is responsible for its evaluation.

- **Regulation EC/1488/94** lays down the general principles for the assessment of risks posed by existing substances to people and the environment. These principles have to be followed by the Member States who have the responsibility to carry out risk assessments on existing substances having first, second or third priority.

- **Regulation EC/142/97** concerns the delivery of information about certain existing substances, based on Article 12 of Regulation EEC/793/93. The manufacturers and importers of the substances listed in the Annex to Regulation EC/142/97 are obliged to deliver to the Commission all relevant and available data concerning exposure by people and the environment to these substances.

Regulation EEC/2455/92 concerning the export and import of certain dangerous chemicals sets up a common system of notification and, in particular, of information for imports from and exports to third countries of chemicals which are banned or severely restricted to certain uses owing to their effects on human health and the environment.

Regulation EC/3093/94 on substances that deplete the ozone layer places controls on the production, imports, exports, supply, use and recovery of controlled substances listed in Annex I (CFCs, halons, carbon tetrachloride, 1,1,1-trichloroethane, methyl bromide, hydrobromofluorocarbons and HCFCs). The Regulation also lays down requirements related to the reporting of information on the controlled substances.

Discussion

The chemicals directives do not imply big investments as such, especially not in public sector. Costs for the implementation of the directives and regulations of concern for the project were assessed in 1999 by Soil and Water Ltd. for PHARE/DISAE. Costs in the public sector are mainly related to the development of efficient administrative and technical structures, databases, controls, development of lists of chemicals. The cost figures therefore include administrative costs that are in addition to those included in sub-section II.16 of this chapter, which deals with administrative costs.

For the purposes of the Financing Strategy we assume that investments for approximating are made in equal shares each year before 2015. The Approximation Programme on Chemicals foresees most steps to be taken by 2010, but, as cost estimates include the private sector as well, the final date for implementation of all EU requirements is 2015. This timetable is consistent with the Ministerial plan for adoption of the *acquis*.

Results

Public sector
The investments and annual operational costs, in Lithuanian Litas and EUROs to be made in the public and private sectors are presented in the tables below.

Investments and annual operational costs in the public sector

Public sector		
Investments	**Total costs**	
Measure	**LTL**	**EUR**
Set-up and transposition of institutions and administrative system	240,000	58,536.59
Set-up and transposition of legislation	240,000	58,536.59
Set-up of enforcement system	180,000	43,902.44
Set-up of laboratories	700,000	170,731.71
Knowledge building	180,000	43,902.44
Set-up of of chemicals databases	38,000	9,268.29
Handbook, literature, hardware, software and other resources	240,000	58,536.59
Communication and guidance to the private sector	116,000	28,292.68
TOTAL INVESTMENT COSTS	**1,934,000**	**471,707.32**
Operational costs		
Measure	**LTL**	**EUR**
Inventory of chemicals, product register	450,000	109,756.10
Administration of classification, labelling and packaging dangerous chemicals	72,000	17,560.98
Administration of notification new chemicals	210,000	51,219.51
Administration of existing chemicals	258,000	62,926.83
Administration of restricted or banned chemicals	42,000	10,243.90
Administration of ozone depleting substances	198,000	48,292.68
Administration of export and import of dangerous chemicals	12,000	2,926.83
Administration of transport of dangerous goods	36,000	8,780.49
Enforcement of all Directives and Regulations	1,851,000	451,463.41
Communication and guidance to the private sector	120,000	29,268.29
Policy making	252,000	61,463.41
Continuous training of experts	30,000	7,317.07
TOTAL OPERATIONAL COSTS	**3,531,000**	**861,219.51**

Private sector

Investments and annual operational costs in the private sector

Private sector		
Investments	**Total costs**	
Measure	**LTL**	**EUR**
Set-up of hazard communication unit	13,680,000	3,336,585.37
Set-up and transposition of laboratories	1,200,000	292,682.93
Knowledge building	2,538,750	619,207.32
Set-up and transposition of chemicals databases	1,424,000	347,317.07
Hardware, software and other resources	2,575,000	628,048.78
Handbook, guidance materials, literature	320,000	78,048.78
Classification, labelling and packaging of dangerous chemicals	1,200,000	292,682.93
Development of safety data sheets	10,000,000	2,439,024.39
Investments in production processes and substitution materials (restricted/banned chemicals)	300,000	73,170.73
Investments in production processes and substitution materials (ODP)	0	0
Transport of dangerous goods (danger signs, safety kits)	939,000	229,024
Transport of dangerous goods (minimising risks/maximising safety)	15,000,000	3,658,536
TOTAL INVESTMENT COST	**49,176,750**	**11,994,329**
Operational costs		
Measure	**LTL**	**EUR**
Inventory of chemicals; product register	1,500,000	365,854
Notification new chemicals	2,250,000	548,780
Existing chemicals	7,502,000	1,829,756
Continuous classification, packaging, labelling of dangerous chemicals	1,486,600	362,585
Administration of restricted or banned chemicals	507,000	123,659
Administration of ozone depleting substances	507,000	123,659
Administration of import & export of dangerous chemicals	507,000	123,659
Administration of transport of dangerous goods	507,000	123,659
Communication	410,000	100,000
Extra human resources	640,000	156,098
Continuous training	588,300	143,488
TOTAL OPERATIONAL COSTS	**16,404,900**	**4,001,195**

Annualized Costs of the Chemicals Directives (2000 MEuros)[12]

Year	2005	2010	2015	2020
Public Sector	0.89	0.91	0.94	0.94
Private Sector	4.65	5.30	5.95	5.95
Total	5.54	6.21	6.89	6.89

Cumulative Investment Costs of the Chemicals Directives (2000 MEuros)

Year	2005	2010	2015	2020
Public Sector	0.157	0.315	0.472	0.472
Private Sector	4.0	8.0	11.99	11.99
Total	4.157	8.315	12.46	12.46

[12] A 10-year lifetime on investments is assumed.

Annex 3.2.9 80/778/EEC - Directive on Drinking Water Quality

Brief Overview of the Directive

The directive regulates drinking water quality and sampling/monitoring methods in the countries of the EU. In its annexes, the Directive provides the measurement parameters and their values, as well as the patterns, frequencies and methods of analysis.

Discussion

The analysis of this Directive comes from the project titled "*Development of Programme for Approximation and Implementation of EU water Quality Legislation in Lithuania,*" which was implemented by Soil and Water Ltd. and The Environmental Policy Center. An important goal of this project was to estimate the costs of complying with the Directive.

Construction and renovation of water treatment facilities and distribution systems are the main approximation costs associated with the Directive. The main measures needed are the following:

- Construction and reconstruction of iron removal facilities;
- Reconstruction of parts of the supply network;
- Replacement of 29 km of pipelines that contain lead;

The following assumptions were discussed in Soil and Water Ltd. (1999b), which was the final report of the project:

- The cost of iron removal depends mainly on the capacity of facilities, not on differing concentrations of iron (i.e. if two towns have the same drinking water supply capacities, but iron concentration differs, the cost would be the same);
- One iron removal facility will be constructed in each town;
- The lifetime of an iron removal plant (construction and equipment together) is 20 years;
- 955 km of pipes or 21% of the network need to be replaced;
- Towns with less than 50,000 inhabitants require 122 Euros (500 Lt) per meter for repairing the water distribution network. Larger towns require 195 Euros (800 Lt) per meter;
- The lifetime of pipes is 30 years.

The total amount of required iron removal capacity equals approximately 342000 m^3/day and this sum comprises approximately 54 per cent of all water supplied in 1997.

Results

Investments, Operational Costs and Annualised Costs to Approximate with 80/778/EEC Using the Method of Aeration and Filtration through a Granular Layer

	Investments needed for the construc-tion of the iron removal facilities	Operatio-nal costs needed for the iron removal	Annualized costs of the iron removal	Invest-ments needed for the renovation of the water supply network	Annualized costs of the network renovation	Total invest-ments	Total annualized costs
Million Litas	157.50	33.93	52.43	637.89	67.51	795.40	119.94
M EUROs	*34*	*7*	*11*	*136*	*14*	*169*	*26*

Annualized cost calculations assume an interest rate of 10%.
Source: Soil and Water Ltd. (1999a)

Annex 3.2.10 85/210/EEC – Directive on Approximation of the Laws of the Member States Concerning the Lead Content of Petrol

Brief Overview of the Directive

85/210/EEC requires that by the year 2000, all gasoline should be unleaded. This step is in line with the existing Lithuanian policy program, and indeed the contemporary Lithuanian reality. Milieu Ltd. (1998) therefore did not consider these costs true costs of accession. They therefore estimate the costs of approximation at zero.

Annex 3.2.11 70/220/EEC - Directive on Motor Vehicles

Brief Overview of the Directive

This directive and its subsequent amendments set emission limits for carbon monoxide, hydrocarbons and NO_x. Limits vary by vehicle type and whether diesel fuel or gasoline is used. Reductions are calibrated to the abatement levels that are achieved by using various exhaust catalyst technologies or by making engine modifications. Some of these technologies were available at the time amendments to the original directive were promulgated and others emerged in response to the requirements of amendments.

The directive and its amendments do not require any modifications of the existing vehicle fleet, but only require that a procedure for giving "type approval" be put in place to assure that vehicles entering the fleet are in compliance with the concentration limits for their years of manufacture. Lithuania does not manufacture vehicles and all new additions must therefore be imported. Most of these imports are older cars, yielding a relatively old stock. The directive will not affect this age distribution, because it does not specify any particular age structure.

Discussion

Once Lithuania joins the European Union, all passenger vehicles imported into the country must meet the type approval requirements appropriate for their years of their manufacture. These emissions requirements essentially mean that gasoline engines must be equipped with exhaust catalysts that were state-of-the-art at the time the vehicle was manufactured. Diesel engines will require that combustion modifications be done in order to meet the emissions limits. The costs of these changes will, of course, simply be embedded in the cost of the imported vehicles. It is these costs that are the costs of approximation.

Between the years 2005 and 2020, more than half a million passenger vehicles are expected to be imported into Lithuania (Milieu Ltd. 1998). The base on which approximation costs are levied is therefore extremely large. It is perhaps not surprising, therefore, that the costs to approximate with this directive will probably also be very high. By 2020, for example, additional costs to the market for imported passenger cars will be about 1200 Million Euros. In 2005, this total is expected to be about 200 Million Euros.

It is, however, rather unclear to what degree we should consider those costs as part of the "burden" on the Lithuanian economy. Additional costs are those that would not have occurred in the absence of approximation. Would households really avoid these costs if Lithuania were to decide NOT to join the European Union? Currently, the vast majority of vehicles imported are European vehicles. Having been manufactured in the European Union, these vehicles already meet the type approval requirements of 70/220/EEC and those costs are embedded in the costs of even a five-year old vehicle. Even now, those who buy and sell imported European-made vehicles are paying the costs of approximation with the EU environmental *acquis*; they just don't know it.

It is therefore hard to imagine that prices, quantities of vehicles transacted or costs will change very much as a result of approximation. Perhaps a few additional costs could be envisioned. For example, vehicles imported from Russia, Japan or directly from US manufacturers would be subject to type approval requirements, whereas now they are not. The costs of buying such vehicles that meet the requirements of 780/220/EEC would therefore be additional.

That having been said, even now most non-EU made vehicles imported into Lithuania probably already meet or exceed type approval requirements. Lithuania is a small country in the world car market. New and used Japanese or American cars probably come equipped with the necessary catalysts (for example), because

vehicles that are sold in Lithuania would also be sold in Europe. Furthermore, the same catalysts that have been required in the EU are also required in Japan and the US.

In the main, probably only imports of Russian cars would be subject to real additional costs because of 70/220/EEC. This market segment has declined drastically during the past nine years. Indeed, if there is a story of the vehicle fleet in Lithuania, it is the substitution of European cars (especially German ones) for Russian-made models.

For these reasons, we will ignore the impact of 70/220/EEC on the Lithuanian economy. We are not saying there will be no costs, because the costs probably will be large. It is just that we are not convinced that those costs can reasonably be considered *additional* costs that households would not have borne without approximation.

Annex 3.2.12 91/689/EEC - Hazardous Waste Framework Directive

Brief Overview of the Directive

The Hazardous Waste Directive sets out rules for the classification, isolation, collection and transport of hazardous wastes in the member states. It also requires the development of a hazardous waste management plan. Unlike most of the other directives examined, 91/689/EEC has no quantitative requirements.[13]

Discussion

Paulsson (1998) proposes three options for the treatment and disposal of hazardous wastes. These options are the following:

1. Incinerate hazardous wastes in the cement kiln of the firm Akmenes Cementas located in Naujoji Akmene, with only the residue deposited in a safe landfill.
2. Incineration in a facility designed and built for waste incineration, with only the residue deposited in a safe landfill.
3. All residual hazardous waste after treatment is landfilled; no incineration used.

The first option was the one chosen by Milieu Ltd. (1998) and it is therefore those results which are presented below.

Results

Estimated Annualized Costs and Total Investments for Hazardous Waste Management in Lithuania (2000 MEuros) (Assumes Incineration in Akmenes Cementas)

	Waste (Tons)	Annual Cost (2000 MEuros)	Investments (2000 MEuros)
Incineration of Mixed Waste	4500	0.43	1.31
Treatment of Oily Waste	18,000	0.20	1.85
Contaminated Soil Treatment	6000	0.68	0.00
Landfilling Residual	1500	0.28	1.31
Municipal and Regional Storage Facilities		0.62	5.67
Total		2.20	10.14

Source: Milieu Ltd. (1998) based on Paulsson (1998)

According to the National Hazardous Waste Management Programme adopted by the Government in 1999, hazardous waste landfill, incineration facility and 5 regional hazardous waste storage facilities are planned. It is assumed that incineration plant and landfill will be integrated in the Siauliai regional facility.

Evaluated need for investments for the Siauliai hazardous waste management facility (including landfill, treatment of contaminated soil, interim storage capacities and 10 stations for hazardous waste collection from

[13] The analysis by Milieu Ltd. (1998) relied heavily on Paulsson (1998), which is the output of a project funded by the European Union to develop a hazardous waste strategy and action plan for Lithuania.

households) is 3 million euros from which 2.22 million euros is EU Phare grant. Remaining amount will be covered from the national budget and privatisation fund (financing included in the PIP).

Another EU Phare grant of 1.08 million euros is allocated for construction of Klaipeda hazardous waste storage facility. The total allocation of the PIP for the development of hazardous waste management facilities is 0.375 million euros.

It is assumed that costs in the table above include these described costs.

Annex 3.2.13 91/676/EEC – Directive on Protection of Waters Against Pollution Caused by Nitrates from Agricultural Sources

Brief Overview of the Directive

The Nitrates Directive attempts to reduce the runoff and leaching of nitrogen from agricultural sources into water bodies. The directive specifies that member states must develop regulations for controlling runoff and leaching, and must limit the application of fertilizers (either manure or chemical) on agricultural land.

The directive limits the application of fertilizers to 170 kilograms of nitrogen per hectare, but allows member states to increase that amount if certain conditions are met.

Discussion

The cost estimates in this sub-section are taken from Danagro a/s et al (2000).

The quantity of cattle, cows, pigs and poultry declined by 62%, 36%, 57% and 61 per cent respectively from 1989 to 1999. This likely has resulted in a large (probably even larger) drop in manure generation. Milieu Ltd. (1998) used the *average* fertilizer application to compute costs and found that on average Lithuania was in compliance with the major quantitative requirement of the directive. This, of course, is not all the requirements that must be met, but it was noted that other costs (e.g. for upgrading manure storage where necessary, development of administrative requirements, etc.) would be relatively minor.

Soil and Water Ltd. (1999) challenged this view that these "other" costs will be minor. Using a survey of the twenty largest pig and poultry farms, they found that there is a deficit of liquid manure storage capacity of approximately 168,000 cubic meters and calculated costs for the eliminating this capacity gap.

Danagro a/s et al. (2000), however, looked at the possible costs in more detail. The study estimated not only costs for average farms in Lithuania, but also included the benefits of better manure storage and spreading procedures and increased yields because of reduced nitrogen losses.

Results

Results of Danagro a/s are taken for the analysis here. Calculations based on different scenarios were based. Two main scenarios were related to the usage of less or more modern equipment. Also acquisition of spreaders was treated as not clear measure for the implementation of EU requirements, therefore, two possibilities were evaluated.

Overall estimated costs for the implementation of the Nitrates directive (m euro)

Costs	Investments		Operational costs	Annualised costs	
	Scenario I	Scenario II		Scenario I	Scenario II
Total	415	185	11	57	33
Total without spreaders	274	150	0	31	17

Source: Danagro a/s (2000)

Overall investment costs for the implementation of the Nitrates directive depending on scenarios taken could reach approximately 150 to 415 million euro. Annualised costs sum up respectively 17 to 57 million euro. Having in mind rough estimation of benefits of increased yields and reduced application of artificial nitrogen

because of implementation of some measures, net annualised costs amount to 0.73 to 40 million euro once again depending on the scenario.

Further in section 2.3.3. we will take less modern scenario without spreaders as most relevant.

Annex 3.2.14 96/61/EC – Directive on Integrated Pollution Prevention and Control

Brief Overview of the Directive

The Integrated Pollution Prevention and Control Directive specifies the use of best available technique (BAT) for new plants mentioned in Annex 1 of the directive. BAT will also be applied to existing plants after 2004. Article 2.11 defines BAT and allows a consideration of economic factors in choosing BAT methods. The directive does not restrict the type of technology that can be used, and process changes as well as end-of-pipe measures can be employed.

The requirements of the directive are still being developed, but it is clear that once firms begin to comply, other directives considered in this report will become at least partly redundant. Because the requirements have not yet been worked out, Milieu Ltd. (1998) presented only a very partial and preliminary analysis focusing on SO_2 reductions by facilities covered by 88/609/EEC (Large Combustion Plant Directive).

More thorough, though not yet very precise, cost assessment was made during the above mentioned COWI project. According to the results of this study the total private and public costs for the Lithuanian society, in order to comply with the IPPC Directive, can be estimated to be between 298 million euro and 490 million euro, excluding the landfills. The costs to the landfills are not taken into account as a requirement according to the IPPC Directive. If to exclude in addition energy plants, which costs are given under the LCP, estimates say that industry's costs of IPPC compliance amounts to about 170 million euro.

Discussion

The analysis by Milieu Ltd. (1998) took a very, very preliminary step toward evaluating the costs of the IPPC Directive. Milieu Ltd. (1998) explored the implications of imposing BAT on these sources only for SO_2 reductions. The analysis of COWI was based on the scaling procedure, when data from 27 companies belonging to different IPPC sectors was adjusted to the whole Lithuania. The reliability of the analysis' results is therefore not so high.

Results

Costs of BAT Techniques for Sulphur Dioxide Abatement Applied to the 48 Existing Large Combustion Plants (2000 MEuros)

Source: TME (1997) and Milieu Ltd. (1998), and COWI (2000)

Year	Additional Costs of 96/61/EEC (*TME and Milieu*)		Additional Costs of 96/61/EEC (*COWI*)
	Annualized Costs	Cumulative Investments	Cumulative Investments
2005	12.97	28.34	
2010	28.23	47.74	
2015	37.61	65.40	170
2020	37.61	65.40	170

Further in the section 2.3.3. in the table on annualized costs data from TME and Milieu is taken for operational costs, as COWI calculations cannot be made for running costs because of a variety of technologies to be implied for different companies in different IPPC sectors.

Annex 3.2.15 Administrative Costs, Including those Associated with 96/62/EC – Directive on Ambient Air Quality Assessment and Management and COM (97) 49 – Final – Proposed Water Framework Directive

Brief Overview

The basis of this section is Milieu Ltd. (1998), which discusses the need for a variety of administrative structures to approximate with the environmental *acquis*, including the establishment of new agencies to implement selected parts of the Approximation Strategy. The Approximation Strategy also recommends the development of nine monitoring networks focusing on all environmental media, as well as protected areas management. All these activities will be the responsibility of the Government of Lithuania, largely through the Ministry of Environment.

Discussion

The administrative costs associated with the suite of chemicals directives are included in the section on chemicals.

Results

Summary of Monitoring and Administrative Costs of Approximation (2000 MEuros)

Activity	Annual Costs	Investments
Monitoring	0.96	2.28
Administration	3.56	1.55
Total	4.52	3.83

Annex 3.3 Financial Burdens of Approximation with the Environmental Acquis by Directive for the Four Growth Scenarios Considered

Technical Notes

1. Unless otherwise noted, the lifetime of equipment is 10 years and construction projects last 25 years;
2. The Euro – Litas exchange rate is 4.1 Litas per Euro;

Low Growth Scenario - average annual GDP, income and expenditure growth of 2.0% per year

Summary of the Annualized Costs of Approximation with the Environmental Acquis (2000 MEuros)

	For Five Year Period Ending				
Annual Income, Consumption and GDP Data	**1998**	**2005**	**2010**	**2015**	**2020**
GDP (MEuros)	**10431.20**	**11982.16**	**13229.28**	**14606.19**	**16126.42**
National Budget Expenditures (MEuros)	**2418.44**	**2778.03**	**3067.17**	**3386.40**	**3738.86**
Per Capita GDP (Euros)	**2816.10**	**3234.81**	**3571.49**	**3943.22**	**4353.63**
Average Household Income per Capita (Euros)	**1236.59**	**1420.45**	**1568.29**	**1731.52**	**1911.74**
Average Household Cash Income per Capita (Euros)	**1025.56**	**1178.05**	**1300.66**	**1436.03**	**1585.50**
Average Household Consumption Expenditures per Capita (Euros)	**1249.17**	**1434.90**	**1584.25**	**1749.13**	**1931.19**
Population (millions)	**3.70**	**3.70**	**3.70**	**3.70**	**3.70**
Households (millions)	**1.37**	**1.37**	**1.37**	**1.37**	**1.37**
Average Household Size	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**
Annual Rate of Growth of All Monetary Measures During Period		**2.00%**	**2.00%**	**2.00%**	**2.00%**

Directive				
Directives in which costs primarily are public sector costs				
91/271/EEC – Urban wastewater Annual costs (MEUROS)	0	0	68.5	68.5
*** as a percentage of projected current year GDP	0.00%	0.00%	0.47%	0.42%
****as percentage of projected current year budget expenditures	0.00%	0.00%	2.02%	1.83%
**** per capita per year	0.00	0.00	18.51	18.51
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.47%	0.43%
**** per household per year	0.00	0.00	49.97	49.97
**** per household as % of projected current year average annual household income	0.00%	0.00%	1.07%	0.97%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	1.29%	1.17%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	1.06%	0.96%
99/31/EEC – Landfill and 94/62/EEC – Packaging waste (MEUROS)	21.64	44.27	63.17	65.12
*** as a percentage of projected current year GDP	0.18%	0.33%	0.43%	0.40%
****as percentage of projected current year budget expenditures	0.78%	1.44%	1.87%	1.74%

**** per capita per year	5.85	11.96	17.07	17.59
**** per capita per year as a % of projected current year per capita GDP	0.18%	0.33%	0.43%	0.40%
**** per household per year	15.79	32.29	46.08	47.50
**** per household as % of projected current year average annual household income	0.41%	0.76%	0.99%	0.92%
**** per household as % of projected current year average annual household cash income	0.50%	0.92%	1.19%	1.11%
**** per household as % of projected current year average annual household consumption expenditures	0.41%	0.75%	0.98%	0.91%
80/778/EEC – Drinking water directive annual costs MEUROS	0	0	33	33
*** as a percentage of projected current year GDP	0.00%	0.00%	0.23%	0.20%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.97%	0.88%
**** per capita per year	0.00	0.00	8.92	8.92
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.23%	0.20%
**** per household per year	0.00	0.00	24.07	24.07
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.51%	0.47%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.62%	0.56%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.51%	0.46%
91/689/EEC – Hazardous waste ANNUAL COST MEUROS	0	0	2.2	2.2
*** as a percentage of projected current year GDP	0.00%	0.00%	0.02%	0.01%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.06%	0.06%
**** per capita per year	0.00	0.00	0.59	0.59
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.02%	0.01%
**** per household per year	0.00	0.00	1.60	1.60
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.03%	0.03%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.04%	0.04%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.03%	0.03%
Administrative costs ANNUAL COST MEUROS	4.52	4.52	4.52	4.52
*** as a percentage of projected current year GDP	0.04%	0.03%	0.03%	0.03%
****as percentage of projected current year budget expenditures	0.16%	0.15%	0.13%	0.12%
**** per capita per year	1.22	1.22	1.22	1.22
**** per capita per year as a % of projected current year per capita GDP	0.04%	0.03%	0.03%	0.03%
**** per household per year	3.30	3.30	3.30	3.30
**** per household as % of projected current year average annual household income	0.09%	0.08%	0.07%	0.06%
**** per household as % of projected current year average annual household cash income	0.10%	0.09%	0.09%	0.08%
**** per household as % of projected current year average annual household consumption expenditures	0.09%	0.08%	0.07%	0.06%

Public Sector subtotal ANNUAL COST MEUROS	26.16	48.79	171.39	173.34
*** as a percentage of projected current year GDP	0.22%	0.37%	1.17%	1.07%
****as percentage of projected current year budget expenditures	0.94%	1.59%	5.06%	4.64%
**** per capita per year	7.07	13.18	46.31	46.83
**** per capita per year as a % of projected current year per capita GDP	0.22%	0.37%	1.17%	1.08%
**** per household per year	19.08	35.59	125.02	126.45
**** per household as % of projected current year average annual household income	0.50%	0.84%	2.67%	2.45%
**** per household as % of projected current year average annual household cash income	0.60%	1.01%	3.22%	2.96%
**** per household as % of projected current year average annual household consumption expenditures	0.49%	0.83%	2.65%	2.42%
Directives in which costs primarily are private sector costs				
88/609/EEC – Large combustion plants ANNUAL COST MEUROS	0	28.61	49.77	52.86
*** as a percentage of projected current year GDP	0.00%	0.22%	0.34%	0.33%
****as percentage of projected current year budget expenditures	0.00%	0.93%	1.47%	1.41%
**** per capita per year	0.00	7.73	13.45	14.28
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.22%	0.34%	0.33%
**** per household per year	0.00	20.87	36.31	38.56
**** per household as % of projected current year average annual household income	0.00%	0.49%	0.78%	0.75%
**** per household as % of projected current year average annual household cash income	0.00%	0.59%	0.94%	0.90%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.49%	0.77%	0.74%
99/32/EC – Sulfur content in heavy fuel oil ANNUAL COST MEUROS	13.66	0	0	0
*** as a percentage of projected current year GDP	0.11%	0.00%	0.00%	0.00%
****as percentage of projected current year budget expenditures	0.49%	0.00%	0.00%	0.00%
**** per capita per year	3.69	0.00	0.00	0.00
**** per capita per year as a % of projected current year per capita GDP	0.11%	0.00%	0.00%	0.00%
**** per household per year	9.96	0.00	0.00	0.00
**** per household as % of projected current year average annual household income	0.26%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household cash income	0.31%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household consumption expenditures	0.26%	0.00%	0.00%	0.00%
98/70/EC- Quality of petrol and diesel ANNUAL COST MEUROS	1.76	2.57	2.73	2.89
*** as a percentage of projected current year GDP	0.01%	0.02%	0.02%	0.02%
****as percentage of projected current year budget expenditures	0.06%	0.08%	0.08%	0.08%
**** per capita per year	0.48	0.69	0.74	0.78
**** per capita per year as a % of projected current year per capita GDP	0.01%	0.02%	0.02%	0.02%
**** per household per year	1.29	1.87	1.99	2.11
**** per household as % of projected current year average annual	0.03%	0.04%	0.04%	0.04%

household income				
**** per household as % of projected current year average annual household cash income	0.04%	0.05%	0.05%	0.05%
**** per household as % of projected current year average annual household consumption expenditures	0.03%	0.04%	0.04%	0.04%
94/63/EC – VOC directive ANNUAL COST MEUROS	3.17	3.74	4.04	4.39
*** as a percentage of projected current year GDP	0.03%	0.03%	0.03%	0.03%
****as percentage of projected current year budget expenditures	0.11%	0.12%	0.12%	0.12%
**** per capita per year	0.86	1.01	1.09	1.19
**** per capita per year as a % of projected current year per capita GDP	0.03%	0.03%	0.03%	0.03%
**** per household per year	2.31	2.73	2.95	3.20
**** per household as % of projected current year average annual household income	0.06%	0.06%	0.06%	0.06%
**** per household as % of projected current year average annual household cash income	0.07%	0.08%	0.08%	0.07%
**** per household as % of projected current year average annual household consumption expenditures	0.06%	0.06%	0.06%	0.06%
93/12/EEC – Sulfur content in middle distillates ANNUAL COST MEUROS	74.2	133.4	209.7	261.2
*** as a percentage of projected current year GDP	0.62%	1.01%	1.44%	1.62%
****as percentage of projected current year budget expenditures	2.67%	4.35%	6.19%	6.99%
**** per capita per year	20.05	36.04	56.66	70.57
**** per capita per year as a % of projected current year per capita GDP	0.62%	1.01%	1.44%	1.62%
**** per household per year	54.13	97.31	152.97	190.54
**** per household as % of projected current year average annual household income	1.41%	2.30%	3.27%	3.69%
**** per household as % of projected current year average annual household cash income	1.70%	2.77%	3.94%	4.45%
**** per household as % of projected current year average annual household consumption expenditures	1.40%	2.27%	3.24%	3.65%
Chemicals directives and regulations ANNUAL COST MEUROS	6.89	6.89	6.89	6.89
*** as a percentage of projected current year GDP	0.06%	0.05%	0.05%	0.04%
****as percentage of projected current year budget expenditures	0.25%	0.22%	0.20%	0.18%
**** per capita per year	1.86	1.86	1.86	1.86
**** per capita per year as a % of projected current year per capita GDP	0.06%	0.05%	0.05%	0.04%
**** per household per year	5.03	5.03	5.03	5.03
**** per household as % of projected current year average annual household income	0.13%	0.12%	0.11%	0.10%
**** per household as % of projected current year average annual household cash income	0.16%	0.14%	0.13%	0.12%
**** per household as % of projected current year average annual household consumption expenditures	0.13%	0.12%	0.11%	0.10%
70/220/EEC – Motor Vehicles ANNUAL COST MEUROS	0	0	0	0
*** as a percentage of projected current year GDP	0.00%	0.00%	0.00%	0.00%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.00%	0.00%
**** per capita per year	0.00	0.00	0.00	0.00
**** per capita per year as a % of projected current year per capita	0.00%	0.00%	0.00%	0.00%

GDP				
**** per household per year	0.00	0.00	0.00	0.00
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.00%	0.00%
85/210/EEC – Lead in petrol ANNUAL COST MEUROS	0	0	0	0
*** as a percentage of projected current year GDP	0.00%	0.00%	0.00%	0.00%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.00%	0.00%
**** per capita per year	0.00	0.00	0.00	0.00
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.00%	0.00%
**** per household per year	0.00	0.00	0.00	0.00
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.00%	0.00%
91/676/EEC - Nitrates ANNUAL COST MEUROS	0	0	5.37	5.37
*** as a percentage of projected current year GDP	0.00%	0.00%	0.04%	0.03%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.16%	0.14%
**** per capita per year	0.00	0.00	1.45	1.45
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.04%	0.03%
**** per household per year	0.00	0.00	3.92	3.92
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.09%	0.07%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.10%	0.09%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.08%	0.08%
96/61/EC - IPPC ANNUAL COST MEUROS	12.97	28.23	37.61	37.61
*** as a percentage of projected current year GDP	0.11%	0.21%	0.26%	0.23%
****as percentage of projected current year budget expenditures	0.47%	0.92%	1.11%	1.01%
**** per capita per year	3.50	7.63	10.16	10.16
**** per capita per year as a % of projected current year per capita GDP	0.11%	0.21%	0.26%	0.23%
**** per household per year	9.46	20.59	27.44	27.44
**** per household as % of projected current year average annual household income	0.25%	0.49%	0.59%	0.53%
**** per household as % of projected current year average annual household cash income	0.30%	0.59%	0.71%	0.64%
**** per household as % of projected current year average annual household consumption expenditures	0.24%	0.48%	0.58%	0.53%
Private sector subtotal ANNUAL COST MEUROS	112.65	203.44	316.11	371.21
*** as a percentage of projected current year GDP	0.94%	1.54%	2.16%	2.30%
****as percentage of projected current year budget expenditures	4.06%	6.63%	9.33%	9.93%

**** per capita per year	30.44	54.96	85.40	100.29
**** per capita per year as a % of projected current year per capita GDP	0.94%	1.54%	2.17%	2.30%
**** per household per year	82.18	148.40	230.59	270.78
**** per household as % of projected current year average annual household income	2.14%	3.50%	4.93%	5.24%
**** per household as % of projected current year average annual household cash income	2.59%	4.22%	5.95%	6.33%
**** per household as % of projected current year average annual household consumption expenditures	2.12%	3.47%	4.88%	5.19%
Grand Total ANNUAL COST MEUROS	138.81	252.23	487.50	544.55
*** as a percentage of projected current year GDP	1.16%	1.91%	3.34%	3.38%
****as percentage of projected current year budget expenditures	5.00%	8.22%	14.40%	14.56%
**** per capita per year	37.50	68.14	131.71	147.12
**** per capita per year as a % of projected current year per capita GDP	1.16%	1.91%	3.34%	3.38%
**** per household per year	101.26	183.99	355.61	397.23
**** per household as % of projected current year average annual household income	2.64%	4.34%	7.61%	7.70%
**** per household as % of projected current year average annual household cash income	3.19%	5.24%	9.17%	9.28%
**** per household as % of projected current year average annual household consumption expenditures	2.61%	4.30%	7.53%	7.62%

Medium Growth Scenario - average annual GDP, income and expenditure growth of 3.5% per year

Summary of the Annualized Costs of Approximation with the Environmental Acquis (2000 Euros and MEuros)

		For Five Year Period Ending			
Annual Income, Consumption and GDP Data	**1998**	**2005**	**2010**	**2015**	**2020**
GDP (MEuros)	**10431.20**	**13271.39**	**15762.25**	**18720.61**	**22234.21**
National Budget Expenditures (MEuros)	**2418.44**	**3076.93**	**3654.43**	**4340.31**	**5154.93**
Per Capita GDP (Euros)	**2816.10**	**3582.86**	**4255.32**	**5053.98**	**6002.54**
Average Household Income (Euros)	**1236.59**	**1573.28**	**1868.57**	**2219.27**	**2635.80**
Average Household Cash Income (Euros)	**1025.56**	**1304.80**	**1549.69**	**1840.55**	**2186.00**
Average Household Consumption Expenditures (Euros)	**1249.17**	**1588.02**	**1886.07**	**2240.06**	**2660.49**
Population (millions)	**3.70**	**3.70**	**3.70**	**3.70**	**3.70**
Households (millions)	**1.37**	**1.37**	**1.37**	**1.37**	**1.37**
Annual Rate of Growth of All Monetary Measures During Period	**3.50%**	**3.50%**	**3.50%**	**3.50%**	
Directive					
Directives in which costs primarily are public sector costs					
91/271/EEC – Urban wastewater Annual costs (MEUROS)	0	0	68.5	68.5	
*** as a percentage of projected current year GDP	0.00%	0.00%	0.37%	0.31%	

****as percentage of projected current year budget expenditures	0.00%	0.00%	1.58%	1.33%
**** per capita per year	0.00	0.00	18.51	18.51
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.37%	0.31%
**** per household per year	0.00	0.00	49.97	49.97
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.83%	0.70%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	1.00%	0.85%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.83%	0.70%
99/31/EEC – Landfill and 94/62/EEC – Packaging waste (MEUROS)	21.64	44.27	63.17	65.12
*** as a percentage of projected current year GDP	0.16%	0.28%	0.34%	0.29%
****as percentage of projected current year budget expenditures	0.70%	1.21%	1.46%	1.26%
**** per capita per year	5.85	11.96	17.07	17.59
**** per capita per year as a % of projected current year per capita GDP	0.16%	0.28%	0.34%	0.29%
**** per household per year	15.79	32.29	46.08	47.50
**** per household as % of projected current year average annual household income	0.37%	0.64%	0.77%	0.67%
**** per household as % of projected current year average annual household cash income	0.45%	0.77%	0.93%	0.80%
**** per household as % of projected current year average annual household consumption expenditures	0.37%	0.63%	0.76%	0.66%
80/778/EEC – Drinking water directive annual costs MEUROS	0	0	33	33
*** as a percentage of projected current year GDP	0.00%	0.00%	0.18%	0.15%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.76%	0.64%
**** per capita per year	0.00	0.00	8.92	8.92
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.18%	0.15%
**** per household per year	0.00	0.00	24.07	24.07
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.40%	0.34%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.49%	0.41%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.40%	0.34%
91/689/EEC – Hazardous waste ANNUAL COST MEUROS	0	0	2.2	2.2
*** as a percentage of projected current year GDP	0.00%	0.00%	0.01%	0.01%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.05%	0.04%
**** per capita per year	0.00	0.00	0.59	0.59
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.01%	0.01%
**** per household per year	0.00	0.00	1.60	1.60
**** per household as % of projected current year average annual	0.00%	0.00%	0.03%	0.02%

household income				
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.03%	0.03%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.03%	0.02%
Administrative costs ANNUAL COST MEUROS	4.52	4.52	4.52	4.52
*** as a percentage of projected current year GDP	0.03%	0.03%	0.02%	0.02%
****as percentage of projected current year budget expenditures	0.15%	0.12%	0.10%	0.09%
**** per capita per year	1.22	1.22	1.22	1.22
**** per capita per year as a % of projected current year per capita GDP	0.03%	0.03%	0.02%	0.02%
**** per household per year	3.30	3.30	3.30	3.30
**** per household as % of projected current year average annual household income	0.08%	0.07%	0.06%	0.05%
**** per household as % of projected current year average annual household cash income	0.09%	0.08%	0.07%	0.06%
**** per household as % of projected current year average annual household consumption expenditures	0.08%	0.06%	0.05%	0.05%
Public Sector subtotal ANNUAL COST MEUROS	26.16	48.79	171.39	173.34
*** as a percentage of projected current year GDP	0.20%	0.31%	0.92%	0.78%
****as percentage of projected current year budget expenditures	0.85%	1.34%	3.95%	3.36%
**** per capita per year	7.07	13.18	46.31	46.83
**** per capita per year as a % of projected current year per capita GDP	0.20%	0.31%	0.92%	0.78%
**** per household per year	19.08	35.59	125.02	126.45
**** per household as % of projected current year average annual household income	0.45%	0.70%	2.09%	1.78%
**** per household as % of projected current year average annual household cash income	0.54%	0.85%	2.51%	2.14%
**** per household as % of projected current year average annual household consumption expenditures	0.45%	0.70%	2.07%	1.76%
Directives in which costs primarily are private sector costs				
88/609/EEC – Large combustion plants ANNUAL COST MEUROS	0	28.61	49.77	52.86
*** as a percentage of projected current year GDP	0.00%	0.18%	0.27%	0.24%
****as percentage of projected current year budget expenditures	0.00%	0.78%	1.15%	1.03%
**** per capita per year	0.00	7.73	13.45	14.28
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.18%	0.27%	0.24%
**** per household per year	0.00	20.87	36.31	38.56
**** per household as % of projected current year average annual household income	0.00%	0.41%	0.61%	0.54%
**** per household as % of projected current year average annual household cash income	0.00%	0.50%	0.73%	0.65%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.41%	0.60%	0.54%

99/32/EC – Sulfur content in heavy fuel oil ANNUAL COST MEUROS	13.66	0	0	0
*** as a percentage of projected current year GDP	0.10%	0.00%	0.00%	0.00%
****as percentage of projected current year budget expenditures	0.44%	0.00%	0.00%	0.00%
**** per capita per year	3.69	0.00	0.00	0.00
**** per capita per year as a % of projected current year per capita GDP	0.10%	0.00%	0.00%	0.00%
**** per household per year	9.96	0.00	0.00	0.00
**** per household as % of projected current year average annual household income	0.23%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household cash income	0.28%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household consumption expenditures	0.23%	0.00%	0.00%	0.00%
98/70/EC- Quality of petrol and diesel ANNUAL COST MEUROS	1.76	2.57	2.73	2.89
*** as a percentage of projected current year GDP	0.01%	0.02%	0.01%	0.01%
****as percentage of projected current year budget expenditures	0.06%	0.07%	0.06%	0.06%
**** per capita per year	0.48	0.69	0.74	0.78
**** per capita per year as a % of projected current year per capita GDP	0.01%	0.02%	0.01%	0.01%
**** per household per year	1.29	1.87	1.99	2.11
**** per household as % of projected current year average annual household income	0.03%	0.04%	0.03%	0.03%
**** per household as % of projected current year average annual household cash income	0.04%	0.04%	0.04%	0.04%
**** per household as % of projected current year average annual household consumption expenditures	0.03%	0.04%	0.03%	0.03%
94/63/EC – VOC directive ANNUAL COST MEUROS	3.17	3.74	4.04	4.39
*** as a percentage of projected current year GDP	0.02%	0.02%	0.02%	0.02%
****as percentage of projected current year budget expenditures	0.10%	0.10%	0.09%	0.09%
**** per capita per year	0.86	1.01	1.09	1.19
**** per capita per year as a % of projected current year per capita GDP	0.02%	0.02%	0.02%	0.02%
**** per household per year	2.31	2.73	2.95	3.20
**** per household as % of projected current year average annual household income	0.06%	0.06%	0.05%	0.04%
**** per household as % of projected current year average annual household cash income	0.07%	0.07%	0.06%	0.06%
**** per household as % of projected current year average annual household consumption expenditures	0.05%	0.05%	0.05%	0.04%
93/12/EEC – Sulfur content in middle distillates ANNUAL COST MEUROS	74.2	133.4	209.7	261.2
*** as a percentage of projected current year GDP	0.56%	0.85%	1.12%	1.17%
****as percentage of projected current year budget expenditures	2.41%	3.65%	4.83%	5.07%
**** per capita per year	20.05	36.04	56.66	70.57
**** per capita per year as a % of projected current year per capita GDP	0.56%	0.85%	1.12%	1.18%

**** per household per year	54.13	97.31	152.97	190.54
**** per household as % of projected current year average annual household income	1.27%	1.93%	2.55%	2.68%
**** per household as % of projected current year average annual household cash income	1.54%	2.33%	3.08%	3.23%
**** per household as % of projected current year average annual household consumption expenditures	1.26%	1.91%	2.53%	2.65%
Chemicals directives and regulations ANNUAL COST MEUROS	6.89	6.89	6.89	6.89
*** as a percentage of projected current year GDP	0.05%	0.04%	0.04%	0.03%
****as percentage of projected current year budget expenditures	0.22%	0.19%	0.16%	0.13%
**** per capita per year	1.86	1.86	1.86	1.86
**** per capita per year as a % of projected current year per capita GDP	0.05%	0.04%	0.04%	0.03%
**** per household per year	5.03	5.03	5.03	5.03
**** per household as % of projected current year average annual household income	0.12%	0.10%	0.09%	0.07%
**** per household as % of projected current year average annual household cash income	0.14%	0.12%	0.10%	0.09%
**** per household as % of projected current year average annual household consumption expenditures	0.12%	0.10%	0.08%	0.07%
70/220/EEC – Motor Vehicles ANNUAL COST MEUROS	0	0	0	0
*** as a percentage of projected current year GDP	0.00%	0.00%	0.00%	0.00%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.00%	0.00%
**** per capita per year	0.00	0.00	0.00	0.00
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.00%	0.00%
**** per household per year	0.00	0.00	0.00	0.00
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.00%	0.00%
85/210/EEC – Lead in petrol ANNUAL COST MEUROS	0	0	0	0
*** as a percentage of projected current year GDP	0.00%	0.00%	0.00%	0.00%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.00%	0.00%
**** per capita per year	0.00	0.00	0.00	0.00
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.00%	0.00%
**** per household per year	0.00	0.00	0.00	0.00
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.00%	0.00%

91/676/EEC - Nitrates ANNUAL COST MEUROS	0	0	5.37	5.37
*** as a percentage of projected current year GDP	0.00%	0.00%	0.03%	0.02%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.12%	0.10%
**** per capita per year	0.00	0.00	1.45	1.45
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.03%	0.02%
**** per household per year	0.00	0.00	3.92	3.92
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.07%	0.06%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.08%	0.07%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.06%	0.05%
96/61/EC - IPPC ANNUAL COST MEUROS	12.97	28.23	37.61	37.61
*** as a percentage of projected current year GDP	0.10%	0.18%	0.20%	0.17%
****as percentage of projected current year budget expenditures	0.42%	0.77%	0.87%	0.73%
**** per capita per year	3.50	7.63	10.16	10.16
**** per capita per year as a % of projected current year per capita GDP	0.10%	0.18%	0.20%	0.17%
**** per household per year	9.46	20.59	27.44	27.44
**** per household as % of projected current year average annual household income	0.22%	0.41%	0.46%	0.39%
**** per household as % of projected current year average annual household cash income	0.27%	0.49%	0.55%	0.46%
**** per household as % of projected current year average annual household consumption expenditures	0.22%	0.40%	0.45%	0.38%
Private sector subtotal ANNUAL COST MEUROS	112.65	203.44	316.11	371.21
*** as a percentage of projected current year GDP	0.85%	1.29%	1.69%	1.67%
****as percentage of projected current year budget expenditures	3.66%	5.57%	7.28%	7.20%
**** per capita per year	30.44	54.96	85.40	100.29
**** per capita per year as a % of projected current year per capita GDP	0.85%	1.29%	1.69%	1.67%
**** per household per year	82.18	148.40	230.59	270.78
**** per household as % of projected current year average annual household income	1.93%	2.94%	3.85%	3.80%
**** per household as % of projected current year average annual household cash income	2.33%	3.55%	4.64%	4.59%
**** per household as % of projected current year average annual household consumption expenditures	1.92%	2.91%	3.81%	3.77%
Grand Total ANNUAL COST MEUROS	138.81	252.23	487.50	544.55
*** as a percentage of projected current year GDP	1.05%	1.60%	2.60%	2.45%
****as percentage of projected current year budget expenditures	4.51%	6.90%	11.23%	10.56%
**** per capita per year	37.50	68.14	131.71	147.12
**** per capita per year as a % of projected current year per capita GDP	1.05%	1.60%	2.61%	2.45%
**** per household per year	101.26	183.99	355.61	397.23

**** per household as % of projected current year average annual household income	2.39%	3.65%	5.93%	5.58%
**** per household as % of projected current year average annual household cash income	2.87%	4.40%	7.16%	6.73%
**** per household as % of projected current year average annual household consumption expenditures	2.36%	3.61%	5.88%	5.53%

High Growth Scenario - average annual GDP, income and expenditure growth of 5.0% per year

Summary of the Annualized Costs of Approximation with the Environmental Acquis (2000 Euros and MEuros)

		For Five Year Period Ending			
Annual Income, Consumption and GDP Data	**1998**	**2005**	**2010**	**2015**	**2020**
GDP (MEuros)	**10431.20**	**14677.74**	**18732.93**	**23908.49**	**30513.97**
National Budget Expenditures (MEuros)	**2418.44**	**3402.99**	**4343.17**	**5543.11**	**7074.56**
Per Capita GDP (Euros)	**2816.10**	**3962.53**	**5057.31**	**6454.55**	**8237.82**
Average Household Income (Euros)	**1236.59**	**1740.00**	**2220.73**	**2834.28**	**3617.33**
Average Household Cash Income (Euros)	**1025.56**	**1443.07**	**1841.76**	**2350.60**	**3000.03**
Average Household Consumption Expenditures (Euros)	**1249.17**	**1757.71**	**2243.33**	**2863.12**	**3654.15**
Population (millions)	**3.70**	**3.70**	**3.70**	**3.70**	**3.70**
Households (millions)	**1.37**	**1.37**	**1.37**	**1.37**	**1.37**
Annual Rate of Growth of All Monetary Measures During Period		**5.00%**	**5.00%**	**5.00%**	**5.00%**
Directive					
Directives in which costs primarily are public sector costs					
91/271/EEC – Urban wastewater Annual costs (MEUROS)		0	0	68.5	68.5
*** as a percentage of projected current year GDP		0.00%	0.00%	0.29%	0.22%
****as percentage of projected current year budget expenditures		0.00%	0.00%	1.24%	0.97%
**** per capita per year		0.00	0.00	18.51	18.51
**** per capita per year as a % of projected current year per capita GDP		0.00%	0.00%	0.29%	0.22%
**** per household per year		0.00	0.00	49.97	49.97
**** per household as % of projected current year average annual household income		0.00%	0.00%	0.65%	0.51%
**** per household as % of projected current year average annual household cash income		0.00%	0.00%	0.79%	0.62%
**** per household as % of projected current year average annual household consumption expenditures		0.00%	0.00%	0.65%	0.51%
99/31/EEC – Landfill and 94/62/EEC – Packaging waste (MEUROS)		21.64	44.27	63.17	65.12
*** as a percentage of projected current year GDP		0.15%	0.24%	0.26%	0.21%
****as percentage of projected current year budget expenditures		0.64%	1.02%	1.14%	0.92%
**** per capita per year		5.85	11.96	17.07	17.59
**** per capita per year as a % of projected current year per		0.15%	0.24%	0.26%	0.21%

capita GDP				
**** per household per year	15.79	32.29	46.08	47.50
**** per household as % of projected current year average annual household income	0.34%	0.54%	0.60%	0.49%
**** per household as % of projected current year average annual household cash income	0.40%	0.65%	0.73%	0.59%
**** per household as % of projected current year average annual household consumption expenditures	0.33%	0.53%	0.60%	0.48%
80/778/EEC – Drinking water directive annual costs MEUROS	0	0	33	33
*** as a percentage of projected current year GDP	0.00%	0.00%	0.14%	0.11%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.60%	0.47%
**** per capita per year	0.00	0.00	8.92	8.92
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.14%	0.11%
**** per household per year	0.00	0.00	24.07	24.07
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.31%	0.25%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.38%	0.30%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.31%	0.24%
91/689/EEC – Hazardous waste ANNUAL COST MEUROS	0	0	2.2	2.2
*** as a percentage of projected current year GDP	0.00%	0.00%	0.01%	0.01%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.04%	0.03%
**** per capita per year	0.00	0.00	0.59	0.59
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.01%	0.01%
**** per household per year	0.00	0.00	1.60	1.60
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.02%	0.01%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.03%	0.02%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.02%	0.02%
Administrative costs ANNUAL COST MEUROS	4.52	4.52	4.52	4.52
*** as a percentage of projected current year GDP	0.03%	0.02%	0.02%	0.01%
****as percentage of projected current year budget expenditures	0.13%	0.10%	0.08%	0.06%
**** per capita per year	1.22	1.22	1.22	1.22
**** per capita per year as a % of projected current year per capita GDP	0.03%	0.02%	0.02%	0.01%
**** per household per year	3.30	3.30	3.30	3.30
**** per household as % of projected current year average annual household income	0.07%	0.06%	0.04%	0.03%
**** per household as % of projected current year average annual household cash income	0.09%	0.07%	0.05%	0.04%
**** per household as % of projected current year average annual household consumption expenditures	0.07%	0.05%	0.04%	0.03%
Public Sector subtotal ANNUAL COST MEUROS	26.16	48.79	171.39	173.34
*** as a percentage of projected current year GDP	0.18%	0.26%	0.72%	0.57%

****as percentage of projected current year budget expenditures	0.77%	1.12%	3.09%	2.45%
**** per capita per year	7.07	13.18	46.31	46.83
**** per capita per year as a % of projected current year per capita GDP	0.18%	0.26%	0.72%	0.57%
**** per household per year	19.08	35.59	125.02	126.45
**** per household as % of projected current year average annual household income	0.41%	0.59%	1.63%	1.30%
**** per household as % of projected current year average annual household cash income	0.49%	0.71%	1.97%	1.56%
**** per household as % of projected current year average annual household consumption expenditures	0.40%	0.59%	1.62%	1.28%
Directives in which costs primarily are private sector costs				
88/609/EEC – Large combustion plants ANNUAL COST MEUROS	0	28.61	49.77	52.86
*** as a percentage of projected current year GDP	0.00%	0.15%	0.21%	0.17%
****as percentage of projected current year budget expenditures	0.00%	0.66%	0.90%	0.75%
**** per capita per year	0.00	7.73	13.45	14.28
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.15%	0.21%	0.17%
**** per household per year	0.00	20.87	36.31	38.56
**** per household as % of projected current year average annual household income	0.00%	0.35%	0.47%	0.40%
**** per household as % of projected current year average annual household cash income	0.00%	0.42%	0.57%	0.48%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.34%	0.47%	0.39%
99/32/EC – Sulfur content in heavy fuel oil ANNUAL COST MEUROS	13.66	0	0	0
*** as a percentage of projected current year GDP	0.09%	0.00%	0.00%	0.00%
****as percentage of projected current year budget expenditures	0.40%	0.00%	0.00%	0.00%
**** per capita per year	3.69	0.00	0.00	0.00
**** per capita per year as a % of projected current year per capita GDP	0.09%	0.00%	0.00%	0.00%
**** per household per year	9.96	0.00	0.00	0.00
**** per household as % of projected current year average annual household income	0.21%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household cash income	0.26%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household consumption expenditures	0.21%	0.00%	0.00%	0.00%
98/70/EC- Quality of petrol and diesel ANNUAL COST MEUROS	1.76	2.57	2.73	2.89
*** as a percentage of projected current year GDP	0.01%	0.01%	0.01%	0.01%
****as percentage of projected current year budget expenditures	0.05%	0.06%	0.05%	0.04%
**** per capita per year	0.48	0.69	0.74	0.78
**** per capita per year as a % of projected current year per capita GDP	0.01%	0.01%	0.01%	0.01%
**** per household per year	1.29	1.87	1.99	2.11
**** per household as % of projected current year average annual household income	0.03%	0.03%	0.03%	0.02%
**** per household as % of projected current year average	0.03%	0.04%	0.03%	0.03%

annual household cash income				
**** per household as % of projected current year average annual household consumption expenditures	0.03%	0.03%	0.03%	0.02%
94/63/EC – VOC directive ANNUAL COST MEUROS	3.17	3.74	4.04	4.39
*** as a percentage of projected current year GDP	0.02%	0.02%	0.02%	0.01%
****as percentage of projected current year budget expenditures	0.09%	0.09%	0.07%	0.06%
**** per capita per year	0.86	1.01	1.09	1.19
**** per capita per year as a % of projected current year per capita GDP	0.02%	0.02%	0.02%	0.01%
**** per household per year	2.31	2.73	2.95	3.20
**** per household as % of projected current year average annual household income	0.05%	0.04%	0.04%	0.03%
**** per household as % of projected current year average annual household cash income	0.06%	0.06%	0.05%	0.04%
**** per household as % of projected current year average annual household consumption expenditures	0.05%	0.05%	0.04%	0.03%
93/12/EEC – Sulfur content in middle distillates ANNUAL COST MEUROS	74.2	133.4	209.7	261.2
*** as a percentage of projected current year GDP	0.51%	0.71%	0.88%	0.86%
****as percentage of projected current year budget expenditures	2.18%	3.07%	3.78%	3.69%
**** per capita per year	20.05	36.04	56.66	70.57
**** per capita per year as a % of projected current year per capita GDP	0.51%	0.71%	0.88%	0.86%
**** per household per year	54.13	97.31	152.97	190.54
**** per household as % of projected current year average annual household income	1.15%	1.62%	2.00%	1.95%
**** per household as % of projected current year average annual household cash income	1.39%	1.96%	2.41%	2.35%
**** per household as % of projected current year average annual household consumption expenditures	1.14%	1.61%	1.98%	1.93%
Chemicals directives and regulations ANNUAL COST MEUROS	6.89	6.89	6.89	6.89
*** as a percentage of projected current year GDP	0.05%	0.04%	0.03%	0.02%
****as percentage of projected current year budget expenditures	0.20%	0.16%	0.12%	0.10%
**** per capita per year	1.86	1.86	1.86	1.86
**** per capita per year as a % of projected current year per capita GDP	0.05%	0.04%	0.03%	0.02%
**** per household per year	5.03	5.03	5.03	5.03
**** per household as % of projected current year average annual household income	0.11%	0.09%	0.07%	0.05%
**** per household as % of projected current year average annual household cash income	0.13%	0.10%	0.08%	0.06%
**** per household as % of projected current year average annual household consumption expenditures	0.11%	0.08%	0.06%	0.05%
70/220/EEC – Motor Vehicles ANNUAL COST MEUROS	0	0	0	0
*** as a percentage of projected current year GDP	0.00%	0.00%	0.00%	0.00%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.00%	0.00%
**** per capita per year	0.00	0.00	0.00	0.00
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.00%	0.00%

**** per household per year	0.00	0.00	0.00	0.00
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.00%	0.00%
85/210/EEC – Lead in petrol ANNUAL COST MEUROS	0	0	0	0
*** as a percentage of projected current year GDP	0.00%	0.00%	0.00%	0.00%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.00%	0.00%
**** per capita per year	0.00	0.00	0.00	0.00
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.00%	0.00%
**** per household per year	0.00	0.00	0.00	0.00
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.00%	0.00%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.00%	0.00%
91/676/EEC - Nitrates ANNUAL COST MEUROS	0	0	5.37	5.37
*** as a percentage of projected current year GDP	0.00%	0.00%	0.02%	0.02%
****as percentage of projected current year budget expenditures	0.00%	0.00%	0.10%	0.08%
**** per capita per year	0.00	0.00	1.45	1.45
**** per capita per year as a % of projected current year per capita GDP	0.00%	0.00%	0.02%	0.02%
**** per household per year	0.00	0.00	3.92	3.92
**** per household as % of projected current year average annual household income	0.00%	0.00%	0.05%	0.04%
**** per household as % of projected current year average annual household cash income	0.00%	0.00%	0.06%	0.05%
**** per household as % of projected current year average annual household consumption expenditures	0.00%	0.00%	0.05%	0.04%
96/61/EC - IPPC ANNUAL COST MEUROS	12.97	28.23	37.61	37.61
*** as a percentage of projected current year GDP	0.09%	0.15%	0.16%	0.12%
****as percentage of projected current year budget expenditures	0.38%	0.65%	0.68%	0.53%
**** per capita per year	3.50	7.63	10.16	10.16
**** per capita per year as a % of projected current year per capita GDP	0.09%	0.15%	0.16%	0.12%
**** per household per year	9.46	20.59	27.44	27.44
**** per household as % of projected current year average annual household income	0.20%	0.34%	0.36%	0.28%
**** per household as % of projected current year average annual household cash income	0.24%	0.41%	0.43%	0.34%
**** per household as % of projected current year average annual household consumption expenditures	0.20%	0.34%	0.35%	0.28%
Private sector subtotal ANNUAL COST MEUROS	112.65	203.44	316.11	371.21
*** as a percentage of projected current year GDP	0.77%	1.09%	1.32%	1.22%
****as percentage of projected current year budget expenditures	3.31%	4.68%	5.70%	5.25%
**** per capita per year	30.44	54.96	85.40	100.29

**** per capita per year as a % of projected current year per capita GDP	0.77%	1.09%	1.32%	1.22%
**** per household per year	82.18	148.40	230.59	270.78
**** per household as % of projected current year average annual household income	1.75%	2.47%	3.01%	2.77%
**** per household as % of projected current year average annual household cash income	2.11%	2.99%	3.63%	3.34%
**** per household as % of projected current year average annual household consumption expenditures	1.73%	2.45%	2.98%	2.74%
Grand Total ANNUAL COST MEUROS	138.81	252.23	487.50	544.55
*** as a percentage of projected current year GDP	0.95%	1.35%	2.04%	1.78%
****as percentage of projected current year budget expenditures	4.08%	5.81%	8.79%	7.70%
**** per capita per year	37.50	68.14	131.71	147.12
**** per capita per year as a % of projected current year per capita GDP	0.95%	1.35%	2.04%	1.79%
**** per household per year	101.26	183.99	355.61	397.23
**** per household as % of projected current year average annual household income	2.16%	3.07%	4.65%	4.07%
**** per household as % of projected current year average annual household cash income	2.60%	3.70%	5.60%	4.90%
**** per household as % of projected current year average annual household consumption expenditures	2.13%	3.04%	4.60%	4.03%

No Growth Scenario - All Monetary Measures Remain at 1998 Levels through 2020

Summary of the Annualized Costs of Approximation with the Environmental Acquis (2000 MEuros)

	For Five Year Period Ending			
Directive	**2005**	**2010**	**2015**	**2020**
Directives in which costs primarily are public sector costs				
91/271/EEC – Urban wastewater Annual costs (MEUROS)	0	0	68.5	68.5
****as percentage of 1998 GDP	0.00%	0.00%	0.66%	0.66%
****as percentage of 1998 Budget Expenditures	0.00%	0.00%	2.83%	2.83%
**** per capita per year	0.00	0.00	18.51	18.51
**** per capita per year as a % of 1998 per capita GDP	0.00%	0.00%	0.66%	0.66%
**** per household per year	0.00	0.00	49.97	49.97
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.00%	0.00%	1.50%	1.50%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.00%	0.00%	1.80%	1.80%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.00%	0.00%	1.48%	1.48%
99/31/EEC – Landfill and 94/62/EEC – Packaging waste (MEUROS)	21.64	44.27	63.17	65.12
****as percentage of 1998 GDP	0.21%	0.42%	0.61%	0.62%
****as percentage of 1998 Budget Expenditures	0.89%	1.83%	2.61%	2.69%
**** per capita per year	5.85	11.96	17.07	17.59

**** per capita per year as a % of 1998 per capita GDP	0.21%	0.42%	0.61%	0.62%
**** per household per year	15.79	32.29	46.08	47.50
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.47%	0.97%	1.38%	1.42%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.57%	1.17%	1.66%	1.71%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.47%	0.96%	1.37%	1.41%
80/778/EEC – Drinking water directive annual costs MEUROS	0	0	33	33
****as percentage of 1998 GDP	0.00%	0.00%	0.32%	0.32%
****as percentage of 1998 Budget Expenditures	0.00%	0.00%	1.36%	1.36%
**** per capita per year	0.00	0.00	8.92	8.92
**** per capita per year as a % of 1998 per capita GDP	0.00%	0.00%	0.32%	0.32%
**** per household per year	0.00	0.00	24.07	24.07
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.00%	0.00%	0.72%	0.72%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.00%	0.00%	0.87%	0.87%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.00%	0.00%	0.71%	0.71%
91/689/EEC – Hazardous waste ANNUAL COST MEUROS	0	0	2.2	2.2
****as percentage of 1998 GDP	0.00%	0.00%	0.02%	0.02%
****as percentage of 1998 Budget Expenditures	0.00%	0.00%	0.09%	0.09%
**** per capita per year	0.00	0.00	0.59	0.59
**** per capita per year as a % of 1998 per capita GDP	0.00%	0.00%	0.02%	0.02%
**** per household per year	0.00	0.00	1.60	1.60
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.00%	0.00%	0.05%	0.05%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.00%	0.00%	0.06%	0.06%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.00%	0.00%	0.05%	0.05%
Administrative costs ANNUAL COST MEUROS	4.52	4.52	4.52	4.52
****as percentage of 1998 GDP	0.04%	0.04%	0.04%	0.04%
****as percentage of 1998 Budget Expenditures	0.19%	0.19%	0.19%	0.19%
**** per capita per year	1.22	1.22	1.22	1.22
**** per capita per year as a % of 1998 per capita GDP	0.04%	0.04%	0.04%	0.04%
**** per household per year	3.30	3.30	3.30	3.30
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.10%	0.10%	0.10%	0.10%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.12%	0.12%	0.12%	0.12%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.10%	0.10%	0.10%	0.10%
Public Sector subtotal ANNUAL COST MEUROS	**26.16**	**48.79**	**171.39**	**173.34**
****as percentage of 1998 GDP	0.25%	0.47%	1.64%	1.66%
****as percentage of 1998 Budget Expenditures	1.08%	2.02%	7.09%	7.17%
**** per capita per year	7.07	13.18	46.31	46.83
**** per capita per year as a % of 1998 per capita GDP	0.25%	0.47%	1.64%	1.66%
**** per household per year	19.08	35.59	125.02	126.45
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.57%	1.07%	3.74%	3.79%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.69%	1.29%	4.51%	4.57%

**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.57%	1.06%	3.71%	3.75%
Directives in which costs primarily are private sector costs				
88/609/EEC – Large combustion plants ANNUAL COST MEUROS	0	28.61	49.77	52.86
****as percentage of 1998 GDP	0.00%	0.27%	0.48%	0.51%
****as percentage of 1998 Budget Expenditures	0.00%	1.18%	2.06%	2.19%
**** per capita per year	0.00	7.73	13.45	14.28
**** per capita per year as a % of 1998 per capita GDP	0.00%	0.27%	0.48%	0.51%
**** per household per year	0.00	20.87	36.31	38.56
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.00%	0.63%	1.09%	1.16%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.00%	0.76%	1.31%	1.37%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.00%	0.62%	1.08%	1.14%
99/32/EC – Sulfur content in heavy fuel oil ANNUAL COST MEUROS	13.66	0	0	0
****as percentage of 1998 GDP	0.13%	0.00%	0.00%	0.00%
****as percentage of 1998 Budget Expenditures	0.56%	0.00%	0.00%	0.00%
**** per capita per year	3.69	0.00	0.00	0.00
**** per capita per year as a % of 1998 per capita GDP	0.13%	0.00%	0.00%	0.00%
**** per household per year	9.96	0.00	0.00	0.00
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.30%	0.00%	0.00%	0.00%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.36%	0.00%	0.00%	0.00%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.30%	0.00%	0.00%	0.00%
98/70/EC- Quality of petrol and diesel ANNUAL COST MEUROS	1.76	2.57	2.73	2.89
****as percentage of 1998 GDP	0.02%	0.02%	0.03%	0.03%
****as percentage of 1998 Budget Expenditures	0.07%	0.11%	0.11%	0.12%
**** per capita per year	0.48	0.69	0.74	0.78
**** per capita per year as a % of 1998 per capita GDP	0.02%	0.02%	0.03%	0.03%
**** per household per year	1.29	1.87	1.99	2.11
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.04%	0.06%	0.06%	0.06%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.05%	0.07%	0.07%	0.08%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.03%	0.06%	0.06%	0.06%
94/63/EC – VOC directive ANNUAL COST MEUROS	3.17	3.74	4.04	4.39
****as percentage of 1998 GDP	0.03%	0.04%	0.04%	0.04%
****as percentage of 1998 Budget Expenditures	0.13%	0.15%	0.17%	0.18%
**** per capita per year	0.86	1.01	1.09	1.19
**** per capita per year as a % of 1998 per capita GDP	0.03%	0.04%	0.04%	0.04%
**** per household per year	2.31	2.73	2.95	3.20

**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.07%	0.08%	0.09%	0.10%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.09%	0.10%	0.11%	0.11%
**** per HH/Yr. as % of 1998 Ave. Annual Consumption Expenditures	0.07%	0.08%	0.09%	0.10%
93/12/EEC – Sulfur content in middle distillates ANNUAL COST MEUROS	74.2	133.4	209.7	261.2
****as percentage of 1998 GDP	0.71%	1.28%	2.01%	2.50%
****as percentage of 1998 Budget Expenditures	3.07%	5.52%	8.67%	10.80%
**** per capita per year	20.05	36.04	56.66	70.57
**** per capita per year as a % of 1998 per capita GDP	0.71%	1.28%	2.01%	2.51%
**** per household per year	54.13	97.31	152.97	190.54
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	1.62%	2.91%	4.58%	5.711%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	1.96%	3.51%	5.53%	6.88%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	1.61%	2.89%	4.54%	5.65%
Chemicals directives and regulations ANNUAL COST MEUROS	6.89	6.89	6.89	6.89
****as percentage of 1998 GDP	0.07%	0.07%	0.07%	0.07%
****as percentage of 1998 Budget Expenditures	0.28%	0.28%	0.28%	0.28%
**** per capita per year	1.86	1.86	1.86	1.86
**** per capita per year as a % of 1998 per capita GDP	0.07%	0.07%	0.07%	0.07%
**** per household per year	5.03	5.03	5.03	5.03
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.15%	0.15%	0.15%	0.15%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.18%	0.18%	0.18%	0.18%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.15%	0.15%	0.15%	0.15%
70/220/EEC – Motor Vehicles ANNUAL COST MEUROS	0.00%	0.00%	0.00%	0.00%
****as percentage of 1998 GDP	0.00%	0.00%	0.00%	0.00%
****as percentage of 1998 Budget Expenditures	0.00%	0.00%	0.00%	0.00%
**** per capita per year	0.00	0.00	0.00	0.00
**** per capita per year as a % of 1998 per capita GDP	0.00%	0.00%	0.00%	0.00%
**** per household per year	0.00	0.00	0.00	0.00
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.00%	0.00%	0.00%	0.00%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.00%	0.00%	0.00%	0.00%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.00%	0.00%	0.00%	0.00%
85/210/EEC – Lead in petrol ANNUAL COST MEUROS	0	0	0	0
****as percentage of 1998 GDP	0.00%	0.00%	0.00%	0.00%
****as percentage of 1998 Budget Expenditures	0.00%	0.00%	0.00%	0.00%
**** per capita per year	0.00	0.00	0.00	0.00
**** per capita per year as a % of 1998 per capita GDP	0.00%	0.00%	0.00%	0.00%
**** per household per year	0.00	0.00	0.00	0.00
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.00%	0.00%	0.00%	0.00%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.00%	0.00%	0.00%	0.00%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption	0.00%	0.00%	0.00%	0.00%

Expenditures				
91/676/EEC - Nitrates ANNUAL COST MEUROS	0	0	5.37	5.37
****as percentage of 1998 GDP	0.00%	0.00%	0.05%	0.05%
****as percentage of 1998 Budget Expenditures	0.00%	0.00%	0.22%	0.22%
**** per capita per year	0.00	0.00	1.45	1.45
**** per capita per year as a % of 1998 per capita GDP	0.00%	0.00%	0.05%	0.05%
**** per household per year	0.00	0.00	3.92	3.92
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.00%	0.00%	0.12%	0.12%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.00%	0.00%	0.14%	0.14%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.00%	0.00%	0.12%	0.12%
96/61/EC - IPPC ANNUAL COST MEUROS	12.97	28.23	37.61	37.61
****as percentage of 1998 GDP	0.12%	0.27%	0.36%	0.36%
****as percentage of 1998 Budget Expenditures	0.54%	1.17%	1.56%	1.56%
**** per capita per year	3.50	7.63	10.16	10.16
**** per capita per year as a % of 1998 per capita GDP	0.12%	0.27%	0.36%	0.36%
**** per household per year	9.46	20.59	27.44	27.44
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	0.29%	0.62%	0.82%	0.82%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	0.77%	0.74%	0.99%	0.99%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	0.28%	0.61%	0.81%	0.81%
Private sector subtotal ANNUAL COST MEUROS	**112.6534**	**203.435**	**316.1054**	**371.2057**
****as percentage of 1998 GDP	1.08%	1.95%	3.03%	3.56%
****as percentage of 1998 Budget Expenditures	4.66%	8.41%	13.07%	15.35%
**** per capita per year	30.44	54.96	85.40	100.29
**** per capita per year as a % of 1998 per capita GDP	1.08%	1.95%	3.03%	3.56%
**** per household per year	82.18	148.40	230.59	270.78
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	2.46%	4.44%	6.91%	8.11%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	2.97%	5.36%	8.33%	9.78%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	2.44%	4.40%	6.84%	8.03%
Grand Total ANNUAL COST MEUROS	**138.8134**	**252.225**	**487.4954**	**544.5457**
****as percentage of 1998 GDP	1.33%	2.42%	4.67%	5.22%
****as percentage of 1998 Budget Expenditures	5.74%	10.43%	20.16%	22.52%
**** per capita per year	37.50	68.14	131.71	147.12
**** per capita per year as a % of 1998 per capita GDP	1.33%	2.42%	4.68%	5.22%
**** per household per year	101.26	183.99	355.61	397.23
**** per HH/Yr. as % of 1998 Ave. Annual HH Income	3.03%	5.51%	10.65%	11.90%
**** per HH/Yr. as % of 1998 Ave. Annual HH Cash Income	3.66%	6.64%	12.84%	14.34%
**** per HH/Yr. As % of 1998 Ave. Annual Consumption Expenditures	3.00%	5.45%	10.54%	11.78%

Annex 6.1 Case Study in Municipal Financing: Ukmerge

To illustrate some of the challenges municipalities face in developing and implementing environmental investments, a case study was prepared for the municipality of Ukmerge.[14] The subsections below provide a description of the municipality and municipal services, attitudes of residents concerning environmental improvements and their willingness to support projects through higher tariffs, and municipal capacity to prepare and finance projects.

6.1.1 Description of Ukmerge

The municipality of Ukmerge is comprised of the city of Ukmerge, six small townships, and small rural settlements. The total population of the municipality is 51,000, thirty-one thousand of which reside in the city of Ukmerge. The six small townships have populations ranging from one to two thousand and the remaining population lives in rural settlements with less than one thousand inhabitants.

Ukmerge has suffered economically since independence, with a number of large companies in the municipality closing permanently. Although information on disposable income is not available on the municipality level, information on average monthly per capita gross earnings indicate that levels in Ukmerge are only 78% of the national average:

Table 6.1.1 Average monthly gross earnings per capita

	1996 (in Litas/month)	1997 (in Litas/month)
National average	635	814
Ukmerge district	505	637

According to the most recent household budget survey, average household size in Lithuania equals to 2.69. Average household size in small cities like Ukmerge (i.e. not the largest cities) is 2.67. Discussions with officials in Ukmerge suggested that average household size might be declining in Ukmerge because of youth flight to the larger cities offering better employment opportunities.

6.1.2 Municipal Services in Ukmerge

Management of water and wastewater, solid waste, and energy services in the municipality is the responsibility of the Division of Economics and Local Utilities with 5 employees. Environmental problems are handled by a part-time environmental engineer employed in the Division of Architecture and Construction.

Water and wastewater

Ukmerge town has a distribution/collection network that includes 76 kilometers of water supply pipes and 64 kilometers of wastewater pipes. Drinking water is supplied by 8 drilled wells. Four more wells are at the disposal of water supply company

[14] Ukmerge was selected for the case study from an initial pool of seven municipalities. The other six were Alytus, Utena, Birzai, Jurbarkas, Sirvintos, and Pabrade.

"Ukmerges vandenys", which, if needed, would require re-drilling. At current consumption levels, the eight operational wells are sufficient to meet demands.

"Ukmerges vandenys" does not have exact figures on how many kilometers of the water supply and sewerage network are in need of reconstruction or clearing/cleaning (an assessment is planned in the near future), but their preliminary estimate is that about 30% of both water supply and sewerage pipes should be renovated. Recently 2 kilometers of new sewerage was constructed in one of Ukmerge town districts at a cost of 1.5 million Lt (750 Lt per meter). This cost is similar to estimated unit costs for sewerage construction used in other costing projects in Lithuania. Thus, the cost of renovation of the network would be approximately 30 million Lt (42 kilometers of pipe).

In the city of Ukmerge, 23,100 inhabitants or **74.5%** of the city's population are connected to the water supply system. The water company provided data indicating that approximately 75 accidents occurred in the water supply system in 1998, although most of these did not lead to a disruption in service. The quality of drinking water is good in Ukmerge and conforms to the standards. The water company has installed a facility to remove iron, one of the common contaminants of drinking water in Lithuania.

The city of Ukmerge completed construction of a new wastewater treatment plant in 1998 at a cost of 22 million Litas. The treatment plant complies with both Lithuanian and EU standards. The quality of surface water downstream of the wastewater treatment plant in the Sventoji River is good enough to allow swimming. Approximately 21,000 inhabitants of the city or **67.7%** are connected. The water company reported 348 accidents have occurred in the sewerage system, mostly related to obstructions.

There are 11 wards in Ukmerge district, which run the water supply and sewage systems in 23 small settlements or villages. There are 27 drilled wells, 23 water towers, 9 wastewater treatment plants, 3 pump stations and 2 water collection reservoirs. The length of water supply and sewage systems is not known exactly, but estimates are 80 km and 30 km, respectively. The total number of customers for water supply in the wards is 1,310 (1248 households and 62 other).

Twenty of 27 wells and 20 of 23 water towers are in need of repairs in the water supply system serving the wards. Water supply and sewerage pipes are of poor technical quality. The same is true with sewerage systems also. Nine settlements have wastewater treatment plants. Of these, only one is in a good technical condition, three are satisfactory, four of are in poor condition and one is in urgent need of improvements.

The Municipality has estimated the costs of upgrading the water and wastewater system in the wards to be 5 million Litas. The needed improvements include the following:

- re-drill some wells;
- repair some wells;
- set up the water accounting measures in some wells;

- repair wells' sanitary zones fences;
- repair ten water towers;
- establish automatic water level measurement in 9 towers;
- reconstruct around 25 km of water supply pipes;
- reconstruct around 5 km of sewerage pipes;
- clean (wash up) approximately 80 km of water supply network;
- clean approximately 30 km of sewerage network;
- reconstruct some wastewater treatment plants etc.

Table 6.1.2 summarizes the overall utilization rates for drinking water and wastewater in the municipality:

Table 6.1.2 Water and Wastewater Utilization in Ukmerge

	Water supply (m3/year)	Wastewater (m3/year)
"Ukmerges vandenys"	1058000	101600
Services of wards	144000	47500
Other municipal companies	80400	50200
Private companies	47000	44000
Other institutions		
Total	1329400	1157700

As of October, 2000, Ukmerge municipality has set the following tariffs for water services in Ukmerge town:

Table 6.1.3 Tariffs for water and wastewater in Ukmerge

Service	Unit	Existing tariffs in 1999-2000
Cold water supply	1 m3	1.57
Wastewater and sewage	1 m3	2.64

The first repayment of the Danish loan, which was used for the construction of the wastewater treatment plant, was transferred on June 30, 2000. Water company expects to pay back the loan from the part for amortisation, as this will not be needed for some years because the wastewater treatment plant is new.

Tariff collection rate in Ukmerge is similar to the overall situation in Lithuania, which is that approximately 90% of tariffs is collected.

Solid Waste

Regular waste collection services are provided to the city of Ukmerge (including Pasile settlement adjacent to the town) and Sventupe settlement 12 km northeast from the town. Approximately 19,000, i.e. less than two-thirds of the population is served including 17.5 thousand in multi-apartment blocks and 1,500 in single family houses. Wastes from small townships are collected on a random basis and disposed in small landfills (dumps) close to the townships.

Waste collection services in the city are provided by the *UAB Ukmerges paslauga*, a company 100 % owned by the municipality. The company has 5 old Russian-made waste collection trucks and recently has purchased a Mercedes truck.

Less than half of the population is provided with containers for waste collection. A major portion of waste is collected by "bulk method" - a compression truck comes two to three times per week to indicated place and the population has the possibility to empty their trash bins. The municipality is considering replacement of the bulk method with containers, however, no specific plan has been developed so far. There is no separate collection of secondary materials.

Waste collection in Sventupe is performed by another municipality-owned company. Beside waste collection, the company performs a number of other jobs related to municipal services.

There are more than 15 small landfills in the municipality, some small towns having two or three landfills. The main landfill used by the *UAB Ukmerges paslauga* is situated in an old quarry without any environmental protection measures. The landfill is only half-full and still can be operated for at least several years.

District Heating

Ukmerge municipality has not begun the process of reorganizing and decentralizing the provision of district heating and hot water, as stipulated in the Law on "Lithuanian Energy." This change has not occurred because of financial constraints faced by local authorities and the concern about the increases in heating tariffs that would result from this change (estimated to be between 30 and 80% increase over current tariffs).

There are 6 centralized heat supply companies in Ukmergė and the settlements around it (the heat supply company in Ukmerge is a branch of Vilnius heat company "Vilniaus Šilumos Tinklai"). It is still not decentralized. Two boilers produce 2/3 of heat requirements and 1/3 is purchased from the industrial company "Ukmergės Gelžbetonis." All boilers are fueled by natural gas and prices for industry and household are the same.

6.1.3 Perceptions of the Quality of Municipal Services

The project team designed a survey to gauge perceptions of Ukmerge residents about the quality of their municipal services and willingness-to-pay for system improvements focused principally on meeting EU requirements. The survey was administered by the Sociological Information Center in Vilnius in September 1999. A full description of survey results is provided in Annex 6.2 and the willingness-to-pay results are discussed in Chapter 7.

The survey focused mainly on extension of sewerage lines, improved drinking water quality, and solid waste. As noted above, Ukmerge has a relatively new wastewater treatment facility that already meets the requirements under the UWWT directive. Only sewerage was therefore considered in the survey, and only respondents who indicated that they did not have sewerage services were surveyed. Indeed, 42.6% of respondents said that they did not have these services. Figure 6.1.1 indicates that

slightly more than half of respondents indicated they were willing to pay an additional amount in tariffs to be connected to the sewer system. Respondents who indicated they were unwilling to pay higher tariffs for sewerage services provided reasons for their negative responses (see Figure 6.1.2).

Figure 6.1.1

Would you agree to pay for connection to sewerage?

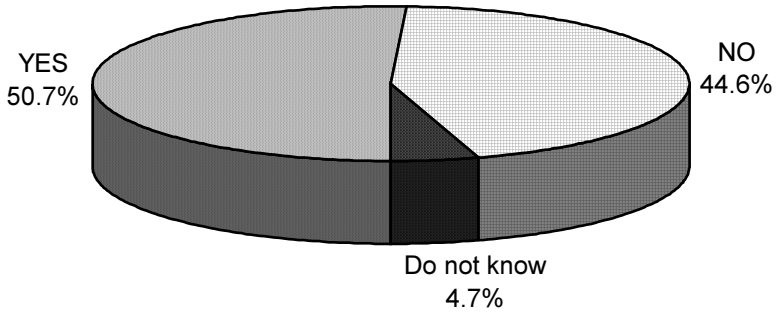
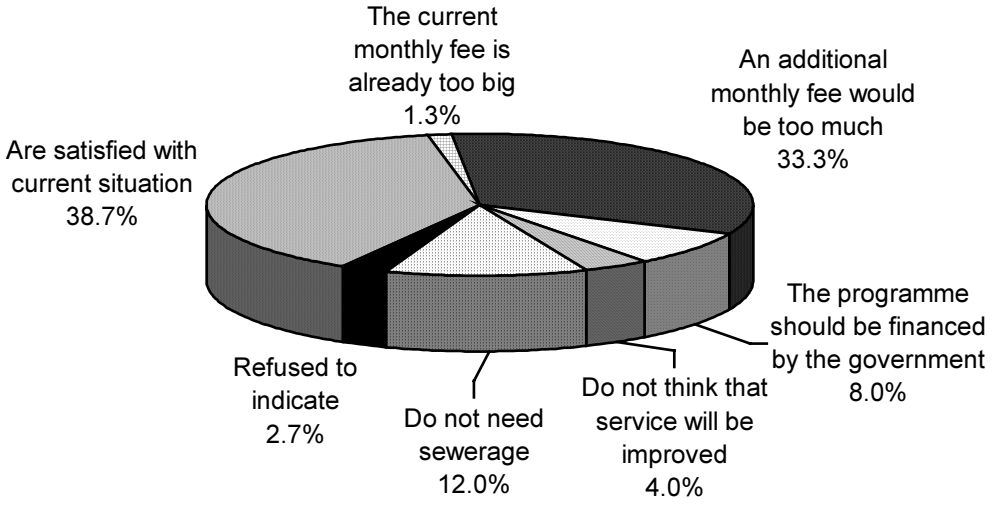


Figure 6.1.2

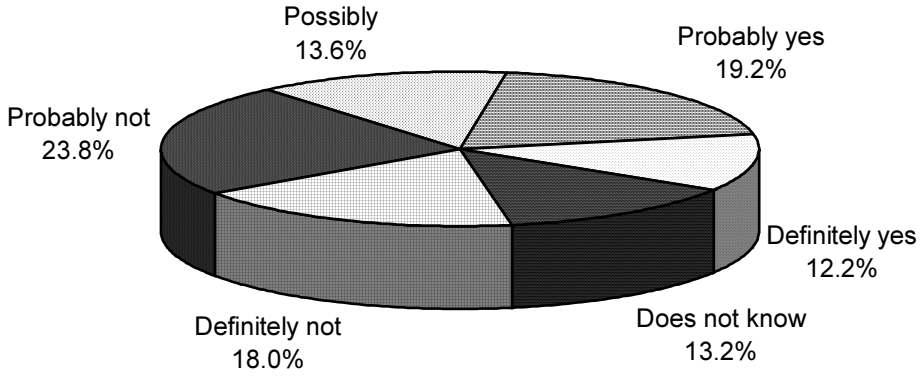
Why Are Your Unwilling to Pay Anything for Sewerage Connection?



Respondents were also asked about the quality of their drinking water. As indicated in Figure 6.1.3, over 41% of respondents stated that their water was probably or definitely healthy to drink while 31% of respondents replied probably yes or definitely yes.

Figure 6.1.3

Is the water healthy to drink?



As shown in Figure 6.1.4, over half of respondents either do not drink tap water or drink it only after treatment. As shown in Figure 6.1.5, about two-thirds of those who treat their tap water treat it by boiling.

Figure 6.1.4

Do you drink water directly from the tap?

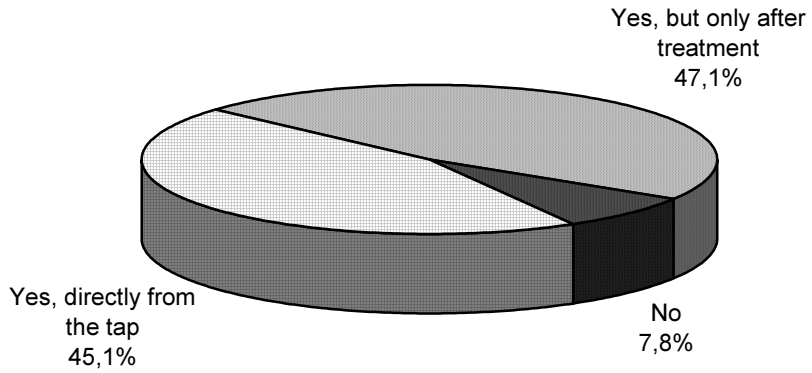
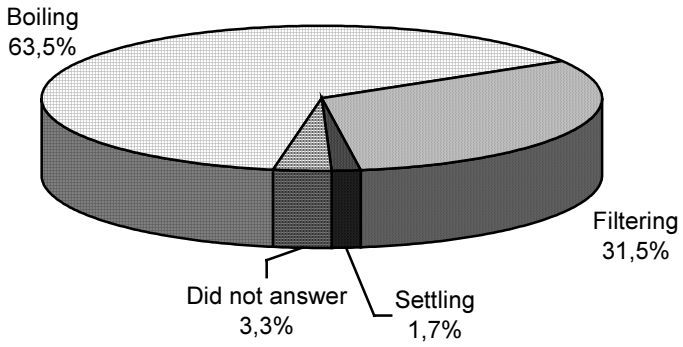


Figure 6.1.5

What is the principal way of tap water treatment ?

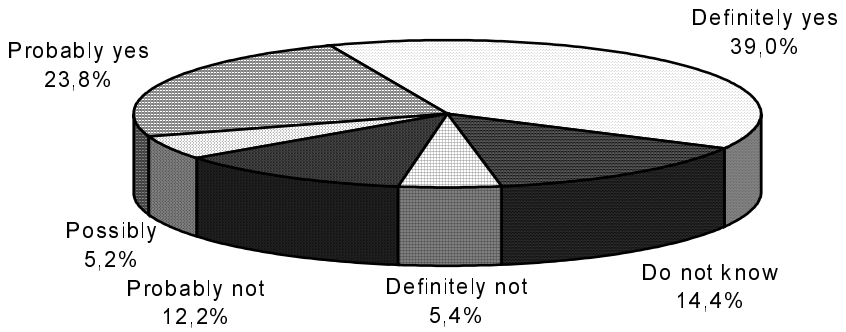


It is interesting to note that, according to municipality officials, drinking water quality meets standards, yet the public perceives that the water is unhealthy. Such perceptions indicate a need to improve public awareness of the quality of services, particularly when municipalities will likely have to increase user fees to fund infrastructure renovations and investments to comply with EU directives.

In the waste sector, the survey asked a variety of questions about landfills, recycling of organic wastes, and packaging. Over half of respondents (53.6%) indicated they did not know where their waste was disposed after it was collected. This is not too surprising given the large number of active landfills in the municipality. However, when asked if garbage dumps pollute groundwater, a large percentage indicated they did (Figure 6.1.6).

Figure 6.1.6

Do dumps pollute groundwater?

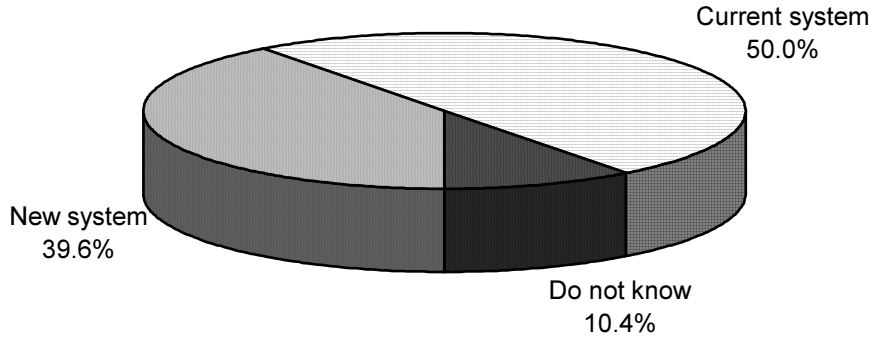


Respondents were asked whether they would favor construction of an environmentally secure landfill and proper closure of old landfills to minimize threats

to groundwater. The description of the services provided by new landfill construction and the closure of old landfills is presented in the Appendix to Annex 6.2 (before Question 19). Each respondent was asked if they would support the program if they had to pay an additional monthly fee (random amounts from 0.10 litas to 3.70 litas per person per month). The distribution of yes and no answers is given in Figure 6.1.7 below. The survey result that 40% of respondents supported the program conforms well to the notion that landfill quality is a concern for Ukmerge residents.

Figure 6.1.7

Which garbage disposal system would you choose?



Respondents were asked similar types of questions about their willingness to pay for packaging waste recycling and organic waste recovery programs. In both cases, respondents preferred the current system by substantial margins over a new system (linked to higher tariffs). Only 33.8 percent of respondents indicated support for the packaging waste recycling program and an even smaller percentage (12.8%) of respondents favored the organic waste recovery program.

What is interesting about the results for waste is that all of the proposed programs would primarily benefit the environment rather than improve the quality of waste services, suggesting a low level of awareness of the waste management problems and their environmental impacts as well as limited interest in supporting programs out of their own household incomes.

6.1.4 Financing Issues in the Municipality

Ukmerge's recent experience in financing the construction of the new wastewater treatment plant is illustrative of the types of problems many of the smaller municipalities may face in Lithuania. As noted earlier, the total cost of the new plant was 22 million Litas, of which 6.4 million Litas was in the form of a loan from the Danish Bank, "Unibank."

The first installment on the Danish loan was due on June 30, 2000, with payments continuing for a period of 8 years. At the time the municipality decided to take the loan, its calculations of cash flow suggested that the loan could be repaid out of revenues from user fees. These calculations were based on high water consumption rates that have since fallen precipitously, especially among industrial customers. In addition, user fees are not levied on about one-third of water due to inadequate system of metering. As a result, Ukmerge is unable to repay the loan out of current user fees

for water and sewerage of 4,21 litas/m^3. The municipality asked the Ministries of Economy and Finance for assistance in repaying the loan but these requests were turned down. The water company has decided to tap into its amortization funds to service the loan until and if tariffs can be increased enough to support repayment of the loan. Municipal officials indicated that by drawing down the amortization funds, they will need to borrow additional money to cover the costs of repairs and renovations to the water and wastewater system that would have been financed from amortization funds.

The municipality has taken steps to increase tariffs for water and wastewater. The Municipal Council adopted the new tariffs (see Table 6.1.3) and the request has been submitted to the Governmental Energy Pricing Commission to approve proposed tariffs. The rates, which were approved by the Energy Pricing Commission, are presented in the far right column.

It should be mentioned here that each municipality (water company) could set different water and wastewater charges for all users. In addition, these charges should be co-ordinated with the State Pricing Commission under the Government of Lithuania. The co-ordination in this case means that this Commission is checking just economical-financial calculations made by water companies. In the future this Commission should take more political role, but legislation on this is not yet ready.

Table 6.1.3 Proposed tariffs for water and wastewater in Ukmerge (Lt/m^3)

Service	Previous rate with VAT in Lt	Proposed by Municipality rate with VAT in Lt	Adopted rate with VAT in Lt
Cold water supply	1.83	1.99	1.85
Wastewater	1.62	3.56	3.12
Total	3.45	5.55	4.97

Ukmerge's experience in undertaking this capital project has a number of important lessons for other municipalities:

(1) Smaller municipalities will often lack the financial expertise to evaluate future revenues, particularly when there are several sources of uncertainty including household income levels, inflation in the utility's costs, the nature and magnitude of customer's responses to higher tariffs (including slower payment as well as reduced use). Representative of the municipality of Ukmerge indicated that institutional capacity is not sufficient for planning and management of investment projects. At present there is no staff dedicated to investments in Ukmerge municipality. Other municipalities (depending on size of municipality) might have one or two persons dealing with investments.

(2) As suggested by the survey results, municipalities will face an uphill battle in attempting to enlist support for tariff increases, particularly in light of their regressive incidence and higher burden on low- income families.

(3) Under the current system of municipal finance in Lithuania (and typically observed in other CEE countries), municipalities have little flexibility and few

options for covering revenue shortfalls. In Ukmerge, the use of the water company's amortization funds sets the company off on a path that will increase its dependence on mechanisms such as loans in the future.

(4) While the availability of soft financing is very attractive, municipalities may be unable to finance a small portion of project costs out of own resources. As noted above, Ukmerge was responsible for repayment of only one-third of project costs and still encountered difficulties.

The municipality faces a number of financing issues in addition to repayment of the Danish loan. Clean Water Association has carried out a study of rural wastewater treatment and is developing recommendations regarding renovation of existing small wastewater treatment plants. Unfortunately municipality has no means to finance the programme.

The municipality also would like to upgrade the solid waste management system but the officials are very cautious about taking a loan, as it would increase tariffs. The officials believe that economic and social situation in Ukmerge is one of the worst in Lithuania and are afraid to put any additional burden on the population. The tariff on waste collection tariff was increased in October 1998 from 1.44 to 1.68 Lt per capita per month for multiapartment blocs and from 2.05 to 2.63 Lt for single family houses. However, these revenues were not adequate to cover operational expenses and investments and 200 thousand Lt were needed from the Municipal Nature Protection Fund. Nevertheless, the waste management enterprise "Ukmerges paslauga" lacks the resources to replace any of the old trucks that collect waste in Ukmerge town. Partly, the enterprise lacks funds because the Municipality owes approximately 700,000 Litas for cleaning of the town. In addition, some problems exist with collection of taxes for waste management. Owners of private houses are not willing to pay for waste collection and often leave their garbage in streets or use waste bins located in blockhouses etc.

Annex 6.2. Willingness to Pay for Upgrading Municipal Environmental Services to European Union Standards in Ukmerge, Lithuania

The Financing Problem and Scope of the Study

The costing analysis revealed that Lithuanian municipalities could expect to be hit with some rather serious approximation costs, particularly starting in 2010 when investments to approximate with 91/271/EEC and 80/778/EEC will be made. Annual costs to comply with 99/31/EEC and 94/62/EEC will also reach their peak during that period.

These directives pose a potentially serious financing problem for municipalities and for the Government of Lithuania. To the extent that these costs cannot be covered by budgetary or other support, it means that tariffs will have to be increased. How much can tariffs increase without generating a subscriber rebellion? The broad answer to this question is "by as much as people actually value the benefits resulting from implementation of the directives." Clearly, if people think they are being asked to pay for something, which has no value for them personally, they will be unhappy with the policy.

But is it likely that the major directives affecting municipalities will have no value to service subscribers? Probably not. 91/271/EEC should improve the quality of surface waters, increasing recreation opportunities, and offer sewerage services to those who currently do not have them. 80/778/EEC will improve the quality of drinking water consumed by residents. These benefits are very real and personal. The only problem is that they are not provided by markets and therefore we do not know their magnitudes.

The two waste directives also provide tangible benefits, but these are rather less "private" and more "public." 99/31/EEC will protect groundwater resources from landfill leaching and will reduce the chance that fires will occur and individuals are hurt on landfill sites. The directive also offers residents the opportunity to re-use organic wastes, either through composting or incineration. 94/62/EEC gives households the chance to recycle their packaging wastes (e.g. plastics, metal, tin, glass, paper), which reduces demands on primary natural resources and also reduces pollution. These benefits are also very real, but they are more in the realm of "public good" benefits rather than private benefits.

Given that households probably value the environmental benefits approximation will generate, they should be willing to pay for them. The purpose of this study is to estimate the magnitudes of the willingnesses to pay for the environmental benefits associated with the following directives in the town of Ukmerge.

- 80/778/EEC (Drinking Water) – upgrading of pipes only
- 91/271/EEC (Urban Wastewater) – extension of sewerage only
- 99/31/EC (Landfilling of Waste)
  - Landfill upgrading
  - Organic waste recovery and reuse components.
- 94/62/EEC (Packaging Waste)

Ukmerge was chosen in consultation with the Ministry of Environment, because it was believed to be typical in important ways. Ukmerge municipality has a population of approximately 51,000, which is close to the mode in Lithuania. Ukmerge town itself has about 31,000 people. It has suffered large declines in industrial production as have many towns in the country. At about 800 litas per month, average monthly household income is probably close to the median nationwide. On the environmental front, it is at least partly typical, because as in the rest of the country solid waste management is very rudimentary. There are many small, uncontrolled landfills in the area and no public recycling services are available. Wastewater treatment has been upgraded, but many households are not connected to the system; this is also typical.

The method used for estimating the willingness to pay is under the general rubric of "non-market valuation." The particular technique is called "contingent valuation," and relies on the use of a highly structured survey to infer willingness to pay. The survey implemented in Ukmerge had three goals:

1. Examine satisfaction with key municipal environmental services related to the directives;
2. Estimate the demand (i.e. the willingness to pay) function associated with the improvements from the directives;
3. Use the demand estimates to calculate the national willingness to pay.

The survey was implemented in Ukmerge municipality in September 1999, by eleven trained interviewers working for the firm SIC of Vilnius. SIC oversaw implementation of the survey and managers checked 10% of the surveys with telephone calls. A random sample of households was chosen and 755 households were visited. Forty potential respondents refused to participate and 215 could not be reached. Five hundred households completed the questionnaire (see Appendix for an unofficial translation of the questionnaire). Respondents were all "decision makers" in their households. Only those with the power to commit financial resources were interviewed.

The table below presents key aspects of the sample. We see that a majority of respondents were women (71%) and most were over fifty years old (55.6%). The sample has a rather average level of education, with a majority of respondents having completed secondary school. Fifty-five percent of households had monthly incomes of 600 litas or less, and 74% earned 900 litas or less per month. Virtually all respondents owned their own homes and had typically lived there more than ten years.

Table 1

	Percentage	Number
Gender		
Male	29.0	145
Female	71.0	355
Age		
18-29	10.4	52
30-39	17.8	89
40-49	16.2	81
50-59	16.0	80
60-69	19.0	95
70 and over	20.6	103
Education		
Primary	20.8	104
Principal	12.0	60
Secondary school	25.8	129
High school	27.4	137
Some university study	2.6	13
University diploma	11.4	57
Households where there are family members who have achieved a higher level of education that respondent has	21.8	109
Family's average monthly income		
0-300 LTL	23.4	117
301-600 LTL	31.6	158
601-900 LTL	18.6	93
901-1200 LTL	11.6	58
1201-1500 LTL	6.2	31
More than 1500 LTL	5.8	29
Did not indicate	2.8	14

Method for Assessing Willingness to Pay in Ukmerge

For each part of each directive, a description was prepared which detailed the benefits respondents would enjoy if the measures stipulated in the directive were implemented. These descriptions are included in the questionnaire that is in the appendix. Respondents were read this description and asked if they understood it and if they had any questions.

Respondents were then asked if they would support the program if their monthly tariff for the relevant service (e.g. water supply or waste management) was increased by an ADDITIONAL fee of X litas per person per month. Respondents were given one of

ten possible prices. For waste management and water supply questions the lowest additional tariff offered was 0.10 litas more per person per month and the highest was 3.7 litas more per person per month. Because of the known high cost of sewerage extension, for the sewerage hookup component of 91/271/EEC, the range of tariff increase was 0.20 litas to 4.90 litas. Respondents then said either yes they would support the program or no they would not. Those who said yes were then asked if they would pay an amount 30% higher than the first number given. Those who said no were given a figure 30% less than the first number given.

These data were then analyzed using logit regression analysis. Using this technique it was possible to infer the demand for the environmental services associated with the four directives considered. Logit actually estimates the probability that a respondent *will agree* to the service upgrade considered. This probability is estimated as a function of several variables derived from a behavioral model that is discussed in the next paragraph. One of the variables in the model was the proposed increase in the monthly tariff per person (one of the ten possible choices).

The model of behavior comes from standard consumer theory in which the demand for a good is a function of prices, incomes, wealth and household characteristics. For the problem of municipal environmental services in Ukmerge, it was hypothesized that the probability of a respondent agreeing to a service upgrade would be a function of the variables in the table below. Of particular note is the hypothesis that if a higher tariff is proposed, respondents will systematically agree to the program less often than those who had low bids. Also of note is the ambiguity associated with the effect of respondent age on the probability of a yes answer. On the one hand, all else equal the very old are perhaps less likely to agree to an upgrade. It is also true, however, that established people in their 50s might be even more open to change than less established individuals in their 30s and 40s.

Table 2. Variables Used in the Logit Model

Dependent Variable is the "yes" (1) or "no" (0) answer to the question of whether the respondent would support the program

Variable	Hypothesized Correlation with Support for the Upgrade	Rationale for Hypothesized Relation
Proposed Cost (Litas more per person per month)	Negative	Respondents are less likely to agree if the cost is higher
Household Income per month (litas per household per month. By category as given in Table 1)	Positive	Valuation of environmental amenities tends to be positively related to incomes. Higher income earners more likely to value all goods by more, including the environment
Household size	Negative	Households with more children will have less money left over to spend on environmental protection
Gender of respondent	Ambiguous	Perhaps males or females systematically have a higher valuation of environmental services, but it is unknown if this is a factor
Age of respondent (years)	Ambiguous	Retirees would tend to say yes less often, but those only 8 - 10 years younger would be in their peak income earning years and therefore perhaps more interested in innovative projects
Wealth (proxy was car ownership. Yes or no variable)	Positive	Wealthier people are willing to spend more on all goods, including environmental improvements
Education of Respondent (by category as given in the table above)	Positive	More educated people may be better able to understand the importance of protecting the environment.
Key knowledge and/or personal interest in the proposed program (variable is based on respondents' opinions and impressions)	Positive	If someone has a personal interest in the proposed program (e.g. they are particularly worried about drinking water quality) or has sought out information to better understand an environmental problem, they would be more likely to say yes than a completely uninformed or disinterested person

The logit regressions are designed to estimate the probability of a yes answer, while dividing up the independent contribution of each of independent variable on this probability. Our main interest is in the effect of rising tariffs on the probability of a yes answer, but we must include all the other variables to avoid biasing our estimates of the importance of changes in tariffs. Logit therefore estimates the INDEPENDENT effects of all the individual variables. When we interpret the effect of prices on the probability of a yes answer, we therefore do it *taking the effects of all other variables as given*. For example, if the proposed additional tariff, age of

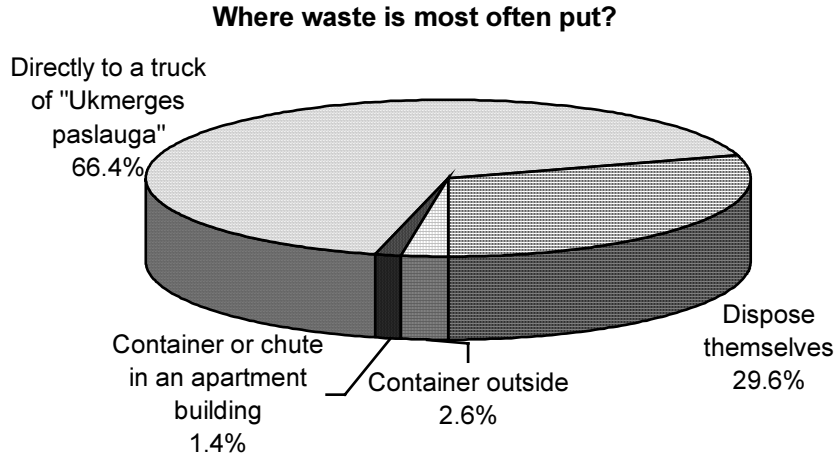
respondent and monthly household income are all in the same equation, the effect of each variable is being independently estimated. It would therefore be inappropriate to interpret any results for the variable age with reference to income, because the *effects of differing incomes (which we might expect indeed are related to the ages of respondents) have been independently taken into account.*

The Waste Management Directives

Overview of Waste Management in Ukmerge

Before going into the results pertaining to each directive, we will report on the knowledge of respondents regarding waste management in Ukmerge and their satisfaction with services. As shown in Figure 1, In the sample of respondents most households put their waste in trucks operated by *Ukmerges Paslauga*. Two-thirds of households dispose of waste in that way.

Figure 1



Most of the remainder dispose waste themselves, which as shown in Table 3 is mostly burning and dumping themselves.

Table 3

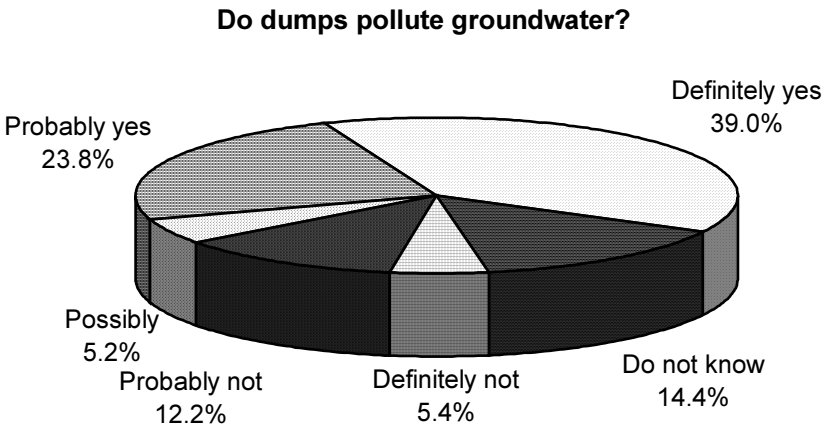
Ways of disposal	Percentage
Burn	11.8
Dumping themselves	8.6
Dig	7.0
Compost	2.2
In total:	**29.6**

It is surprising that almost half of respondents know exactly where their waste is put when *Ukmerges Paslauga* takes it away. This result suggests that a significant portion of respondents have worry about such details. These data are presented in Figure 2.

Figure 2

Perhaps linked with this knowledge of where waste is dumped is substantial concern over pollution of groundwater. As shown in Figure 3, over half of respondents thought that garbage dumps definitely or probably pollute groundwater.

Figure 4



Among respondents who most often put their waste in outdoor or indoor containers, or directly into a truck of "*Ukmergės paslauga*" (70.4 % of respondents), the average monthly fee per capita was 1.94 litas. The average tariff per household was 5.12 litas per month. The full distribution of household payments for waste management are given in Table 4 below.

Table 4

Amount of payment	Percentage
None	2.8
Up to 3.00 LTL	24.7
3.01-6.00 LTL	35.8
6.01-10.00 LTL	15.6
10.01 LTL and more	5.4
Do not know	15.6

The Landfill Directive also includes an organic waste reuse component. One possibility for complying with this part of the Directive is to compost organic waste. This was the option explored by Milieu Ltd. (1998). Since that time it has come to be believed that incineration would be more cost effective, but a policy decision has yet to be taken. At the time the survey was implemented, composting was considered to be the most viable option and it was therefore this method that was explored during the survey. It was found, for example, that approximately half of all respondents compost organic wastes. Almost two-thirds have a place where they would be able to utilize publicly provided compost. These results are given in Figures 5 and 6.

Figure 5

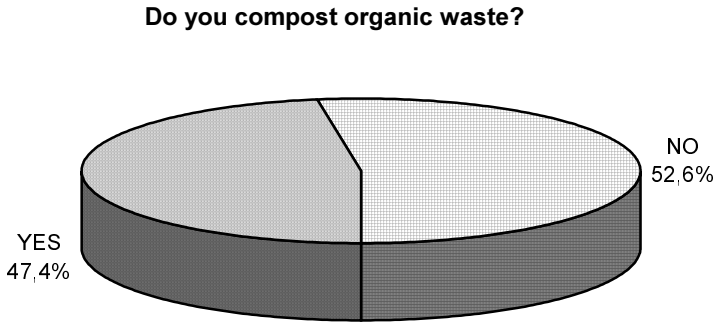
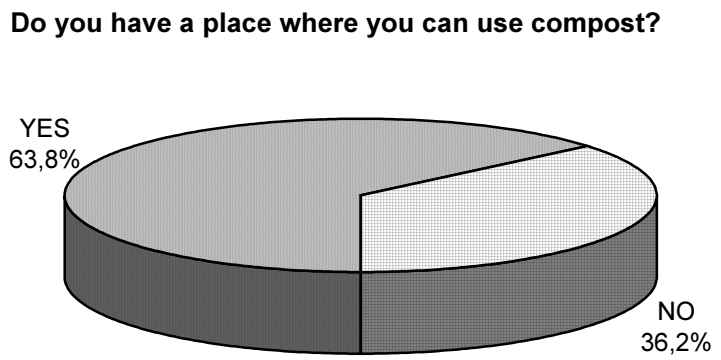


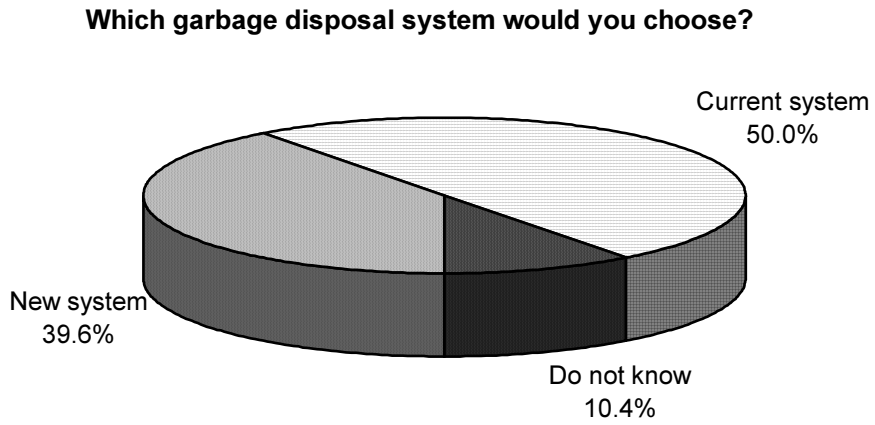
Figure 6



Willingness to Pay for Secure Landfills

The description of the services provided by new landfill construction and the closure of old landfills is presented in the Appendix (before Question 19). Each respondent was then asked if they would support the program if they had to pay an additional monthly fee (on top of the 2.0 litas per person they on average already pay) of from 0.10 litas to 3.70 litas per person per month. The distribution of yes and no answers is given in Figure 7 below. That 40% of respondents supported the program conforms well to the notion that landfill quality is a concern for Ukmerge residents.

Figure 7



The demand for better landfills and safe closure of existing landfills was then estimated using logit. The variables noted in Table 2 were all included in the initial regression equation. Whether respondents knew where their garbage was landfilled was used as a proxy for special knowledge or interest in waste management. Several of the variables were dropped from the equation, because their effects were not statistically significant from zero even at the 80% level and dropping them changed the estimated coefficient on the proposed tariff variable very little.

The regression results, after seemingly irrelevant variables were dropped, are presented below.

Willingness to pay for more secure landfills					
Estimated coefficients					
	Coefficient Estimate	Standard. Error	t-ratio	P-value	Mean Value of Variable
ONE	1.58257	0.702236	2.25361	0.024221	1
Log of the proposed tariff increase	-0.65156	0.110599	-5.89121	3.83E-09	Not applicable
Income category (higher values mean higher incomes)	0.12843	0.064008	2.00646	4.48E-02	2.844
Household size	-0.39849	0.102283	-3.89594	9.78E-05	2.748
Age of Respondent	-0.03512	0.008005	-4.38764	1.15E-05	52.1
Level of Education of Respondent	0.201322	0.081084	2.4829	1.30E-02	3.1272
If Respondent Knows Landfill Where their Waste Goes (yes=1, no=0)	0.530603	0.216837	2.44701	1.44E-02	0.4509

Number of observations	448
Iterations completed	5
Log likelihood function	-257.2909
Restricted log likelihood	-307.5053
Chi-squared	100.4288
Degrees of freedom	8
Significance level	0000000

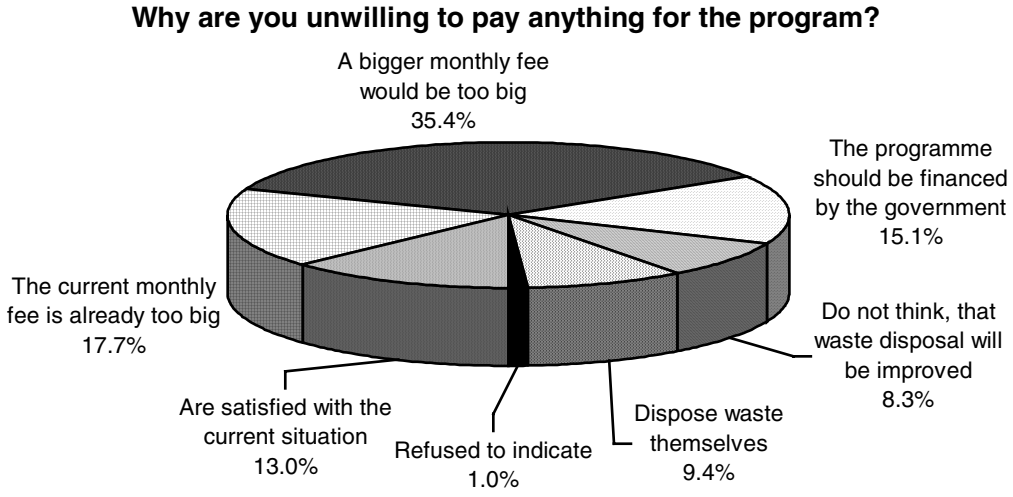
It is notable that the signs of all coefficients are as hypothesized, and that the age of respondents was negatively related to willingness to support landfill upgrading and safe closure. All coefficient estimates of interest are significant at the 1.0% level, allowing us to be rather confident in the results. We can use these coefficient estimates to calculate the tariffs that would cause a given percentage of people in the population to support the program. We present tariffs that are estimated to cause 20%, 50% and 80% of respondents to support the program. Of particular interest is the tariff that would cause half the population to favor the program and half to oppose it. This tariff level is especially interesting, because it might be considered the maximum additional tariff that would make the program politically feasible (i.e. that at least half would "vote" for).

Proposed Additional Tariff per person per month	Estimated Percentage of Population that would Support Upgrading the Landfills
0.62 litas	20%
0.39 litas	50%
0.25 litas	80%

These tariffs are valid *at the mean values of all the other variables in the equation*. For example, if the average age of decision makers in the sample were to decline from 52 years to 39 years (a decline of 25%), it is estimated that 50% of the population would support the program at a tariff of 0.79 litas more per person per month. The equation therefore estimates that a decline in average age of 25% will double willingness to pay!

All respondents were also asked the *maximum* they would be willing to pay to upgrade landfills in Ukmerge. Approximately 38% of respondents indicated that they would be unwilling to pay anything for better landfills. Those respondents who were unwilling to pay anything were then asked why they would not be willing to contribute to the program. The distribution of their answers is given in Figure 8 below.

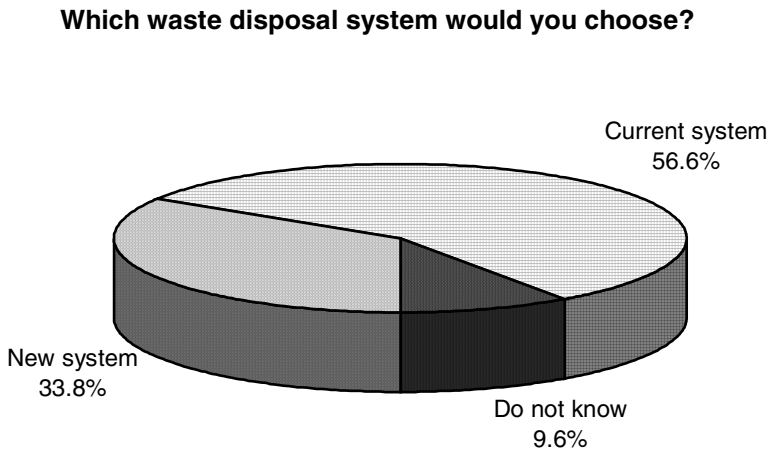
Figure 8



Willingness to Pay for Packaging Waste Recycling

The description of the services that the Packaging Waste Directive would offer households is presented in the Appendix (before Question 24). Each respondent was then asked if they would support the program if they had to pay an additional monthly fee (on top of the 2.0 litas per person they on average already pay) of from 0.10 litas to 3.70 litas per person per month. The distribution of yes and no answers is given in Figure 9. Only one-third of respondents supported a new waste management system which includes packaging waste recycling. This finding suggests that this service is considered less important than landfill upgrading, which was supported by over 40% of respondents.

Figure 9



The demand for packaging waste recycling services was again estimated using logit. All variables in Table 2 were included in the initial version of the model and variables were dropped only if coefficient estimates were not significantly different from zero at least at the 80% level. Variables were also dropped only if estimated coefficients on the proposed tariff variable changed very little as a result of the variables being deleted from the equation. The final regression results are presented below.

Willingness to pay for packaging waste recycling service					
Variable	Coefficient Estimate	Standard.Error	t-ratio	P-value	Mean Values of Variables
ONE	0.045038	0.543102	0.082927	0.933909	1
Log of Proposed Tariff	-0.65082	0.106771	-6.09551	1.09E-09	Not Applicable
Age of Respondent	-0.02198	0.006995	-3.14232	0.001676	52.33407
Education of Respondent	0.159529	0.080518	1.9813	0.047558	3.11062
If Respondent Knows Landfill Where their Waste Goes (yes=1, no=0)	0.427495	0.213443	2.00286	0.045193	0.471239

Number of observations	452
Iterations completed	5
Log likelihood function	-261.1307
Restricted log likelihood	-298.7700
Chi-squared	75.27864
Degrees of freedom	4
Significance level	.0000000

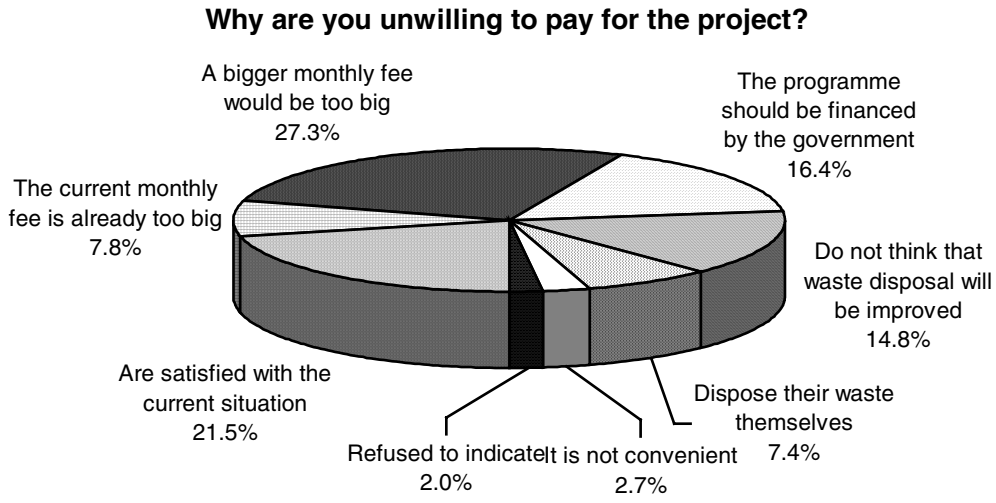
Once again the signs of all coefficients are as hypothesized, and the age of the respondent again seems to again have a negative impact on willingness to support the project. All coefficient estimates of interest are significant at least at the 5.0% level. We again present the tariffs that are estimated to cause 20%, 50% and 80% of respondents to support the program. These figures are given in the table below

Proposed Additional Tariff per person per month	Estimated Percentage of Population that would Support Upgrading the Landfills
0.39 litas	20%
0.25 litas	50%
0.16 litas	80%

The results suggest substantially lower willingness to pay for packaging waste recycling than for landfill upgrading. This result is not necessarily a problem, because (though cost estimates for the two waste directives were done together) packaging waste recycling is expected to be substantially cheaper than landfill upgrading and closure.

Once again, respondents were asked for their maximum willingness to pay. *Slightly over half of respondents said that the maximum they were willing to pay for the program was nothing*. This result perhaps adds more support to the notion that funding the recycling program through tariffs in isolation from other waste management upgrades may be rather difficult. The reasons half of households were unwilling to pay nothing are given in Figure 10 below.

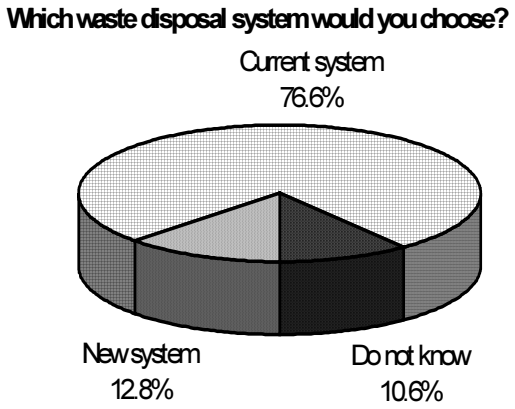
Figure 10



Willingness to Pay for Organic Waste Recovery and Reuse

The description of the services organic waste recovery and recycling would offer is presented in the Appendix (before Question 29). The description emphasizes a public composting program in which organic waste could be dropped off by residents. All residents would then have access to the compost. Each respondent was then asked if they would support the program if they had to pay an additional monthly fee (on top of the 2.0 litas per person they on average already pay) of from 0.10 litas to 3.70 litas per person per month. The distribution of yes and no answers is given in Figure 11 below. *That 70% of respondents were unwilling to support the program at the proposed tariffs suggests that in Ukmerge there is little support for this component of the Landfill Directive*.

Figure 11



The demand for organic waste collection and reuse services was estimated using logit. Once again, all variables in Table 2 were included in the initial version of the model. In addition to the variables already mentioned, whether respondents currently compost and whether they have a place to use compost were also included. Variables were

only dropped from the equation if the coefficient estimates were significant at less than a 80% level, and if the estimated coefficient on the proposed tariff changed very little as a result of variables being deleted from the equation. The final regression results are presented below.

Willingness to pay for organic waste collection and composting service					
Variables	Estimated Coefficient	Standard Error	t-ratio	P-value	Mean Values of Variables
ONE	-1.48736	0.78515	-1.89436	0.058177	1
Log of the proposed tariff	-0.62421	0.124674	-5.0067	5.54E-07	Not Applicable
Age of respondent	-0.03095	0.009462	-3.27095	0.001072	52.16779
If Respondent Knows Landfill Where their Waste Goes (yes=1, no=0)	1.08328	0.309712	3.49769	0.000469	0.451902
If Respondent Currently Composts (yes=1, no = 0)	1.03637	0.350515	2.95671	0.003109	1.532439
Does Respondent have a Place to Use Compost if it were Available for the Municipality (yes=1, no=0)	-0.75032	0.344144	-2.18026	0.029238	1.375839

Number of observations	447
Iterations completed	7
Log likelihood function	-151.0065
Restricted log likelihood	-183.5778
Chi-squared	65.14258
Degrees of freedom	5
Significance level	.0000000

In this case the signs of coefficients are not all as one might expect. It might be supposed, for example, that if households would be able to utilize compost from the public program they would systematically be willing to support the program more often. In this case – for an unknown reason – the opposite relationship was estimated. The effects of other variables are perhaps as expected, with the age of the respondent again having a negative impact on willingness to support the initiative. All coefficient estimates of interest are significant at least at the 5.0% level. We again present the tariffs that are estimated to cause 20%, 50% and 80% of respondents to support the program. These figures are given in the table below

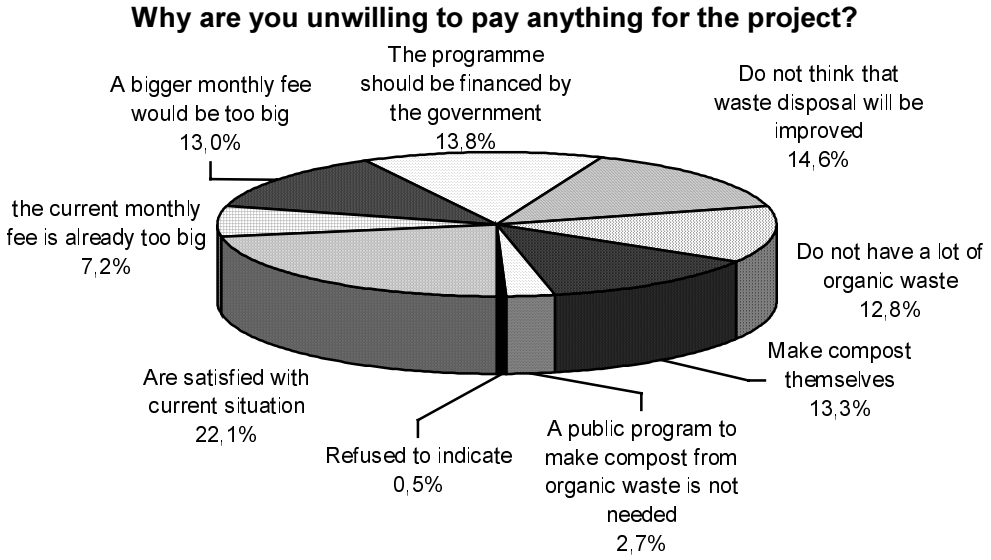
Proposed Additional Tariff per person per month	Estimated Percentage of Population that would Support Upgrading the Landfills
0.027 litas	20%
0.017 litas	50%
0.010 litas	80%

The results suggest that willingness to pay for organic waste recovery and composting is virtually zero. This result is indeed a problem, because we know from Milieu Ltd. (1998) that organic waste recovery and recycling is one of the most expensive components of the Landfill Directive. Incineration of organic waste is perhaps somewhat cheaper than composting, but incineration would also not provide any

direct benefits to residents. One might therefore perhaps reasonably hypothesize that the *willingness to pay for organic waste recovery with composting would be higher than that for incineration of organic wastes*.

Once again, respondents were asked for their maximum willingness to pay. Given the obvious lack of support exhibited so far, it is perhaps not surprising that over 75% of respondents said they were willing to pay nothing for the program. This component of the Landfill Directive therefore appears to be practically without support in Ukmerge. The reported reasons for being willing to pay nothing are given in Figure 12 below. Of special note is a significant portion of residents already have *their own* composting programs.

Figure 12



With our willingness to pay estimates in hand, we can predict the degree to which the Government of Lithuania and municipalities will be able to finance the expenditures for the Landfill and Packaging Waste Directives using tariffs. Again, our cutoff of political acceptability is 50% support, so we use that value for calculations. At that level of support, the sample would be willing to pay 7.88 litas more per person per year for the three new services. This is in addition to the average of 23.28 litas per person per year that is already paid for waste management. The total willingness to pay is therefore approximately 31.16 litas per person per year.

We know there are slightly over 3.70 million people in Lithuania. If the sample from Ukmerge is broadly representative of the country as a whole, we can use this willingness to pay estimate to predict the national willingness to pay for the whole waste management program. If all households are indeed currently paying their waste bills (a rather unlikely case), the national willingness to pay should be approximately 115 million litas per year. Perhaps more likely is that the national willingness to pay with 50% support for the overall program is on the order of 60 - 80 million litas, because we know there now exists widespread non-payment of waste management tariffs. Total estimated annualized costs during the period 2000 - 2005 are approximately 88.7 million litas, which compares rather well with our estimate.

Indeed the willingness to pay may even exceed the anticipated annualized cost; if it is reasonable to combine the willingnesses to pay for all three services, at least in the early years the program as a whole can be funded through tariffs.

In later years, however, when total costs rise due to the construction of more new regional landfills, increased landfill closures, acceleration of organic waste incineration, etc. this amount will no longer be sufficient. During the period 2006 – 2010, for example, 181 million litas will be required on an annual basis, which is at least twice the willingness to pay estimated in 2000. During the decade from 2011 – 2020, approximately 262 million litas will be required on an annual basis, which is three to four times the willingess to pay estimated in Ukmerge.[15]

It has been suggested, however, that summing the willingnesses to pay for the individual waste components into an aggregated willingness to pay is not correct. Concern has been raised particularly because it is possible that such an approach would result in a higher willingness to pay than if respondents were asked to assess the value of all services as a unit. For this reason, it is perhaps useful to compare the estimated cost of providing the individual services with the willingnesses to pay for those services.

It is possible to differentiate between landfill costs and recovery/recycling costs, but not between costs for organic waste and packaging waste recovery. The reason recovery/recycling costs have to be considered together is that costs such as those for containers, trucks and sorting are joint costs. For this reason, we consider recovery/recycling as one unit and all costs associated with landfill construction, operation, maintenance and closure as a separate category.

With regard to landfill valuation, the estimates suggests that 50% of respondents would be willing to pay 4.68 litas more per person per year. This means that on an annual basis, nationally, Lithuanians would be willing to pay 17.32 million litas *more* nationally per year to have the enhanced service. Currently, there are no publicly provided organic waste or packaging waste recovery/recycling services available in Lithuania. The current average expenditure for waste management of 23.28 litas per person or 86.16 million litas nationally (assuming all households are paying their current waste management bills) per year therefore should rightly be attributed to collection and landfilling. This means that the national willingness to pay for better landfilling and collection is at most 103.50 million litas per year, and perhaps more reasonably 60 - 70 million litas per year. The estimated annualized costs of these services are provided in the table below.

Annualized Cost of Landfill Construction, Operation, Maintenance and Closure as well as New Trucks (used for both landfilling of waste and recovery/recycling) in Millions of Litas per Year

		Five Year Period Ending			
	2000	2005	2010	2015	2020
Landfill	3.83	49.53	65.76	66.09	66.26
Trucks	2.21	8.16	11.15	16.93	17.55
Total	6.04	57.69	76.91	83.02	83.81

[15] Of course as discussed elsewhere in this report, incomes are likely to rise over time. Higher incomes should in general increase aggregate willingness to pay.

Comparing the costs of landfilling and new trucks (which are in reality used for both garbage disposal and recovery/recycling) with the estimated willingness to pay suggests that households will support most of the costs of such a program. Even in 2020 the estimated additional cost is only 84million litas, but the benefit in that year may be as much as 103 million litas. If Ukmerge is typical of the country as a whole, and if the only improvements envisioned were landfill related, there would therefore be relatively weak arguments in favor of large subsidies for landfill construction, closure and waste collection. Willingness to pay is estimated to be almost sufficient to cover costs.

The same is certainly not true for recovery/recycling. Fifty percent of respondents would be willing to pay a total of 3.2 litas more per person per year for the organic waste recovery and packaging waste recycling services. As was already noted, those services are currently not available in Lithuania, and therefore a portion of the current expenditures by households for waste management should therefore not be attributed to recovery/recycling services. The estimated national willingness to pay for all proposed recovery/recycling services is therefore only about 11.84 million litas per year.

The table below presents the net annualized costs of those recovery/recycling programs, where costs are net of revenues from sold secondary materials and revenues from energy sold by waste incinerators. The cost estimates from an organic waste management program that relies on incineration are used, because they are likely to be lower than those of a nationwide composting program. While comparing benefits that come from a composting program with costs that include incineration is to some degree incongruous, this comparison also implies a *very conservative* analysis of costs and benefits. After all, we know that the costs of the included incineration program are lower, and if anything the estimated willingness to pay would also be lower. This method therefore includes a strong bias in favor of organic waste recovery/recycling.

Annualized Costs of Organic Waste Recovery and Packaging Waste Recycling (Millions of Litas per Year)

Year				
2000	2005	2010	2015	2020
2.05 Million Litas	35.22 Million Litas	110.70 Million Litas	186.80 Million Litas	194.50 Million Litas

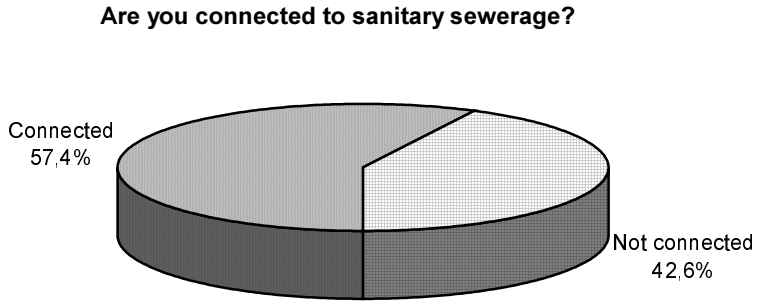
Even including the most recent costs of these recovery/recycling programs, estimated expenses are still very high - indeed much higher than landfill related costs. The willingness to pay is on the other hand very low, and compares particularly badly with the costs of these programs. Indeed, starting even in 2002 it is estimated that willingness to pay will not be sufficient to cover costs. By 2010, if willingness to pay does not change, it will cover about 10% of estimated costs. The implication of these findings is that *subsidies will be absolutely essential if these programs are to be put in place. Without external subsidies, political support for the programs can be expected to be minimal at best*.

The Water Directives

Sewerage Extension Under 91/271/EEC

Ukmerge has a relatively new wastewater treatment facility, which already meets the requirements under the directive. Only sewerage was therefore considered in the survey, and only respondents who indicated that they did not have sewerage services were surveyed. Figure 13 indicates that a substantial portion of the sample are NOT connected to sewerage. Indeed, 42.6% of respondents said that they did not have these services.

Figure 13



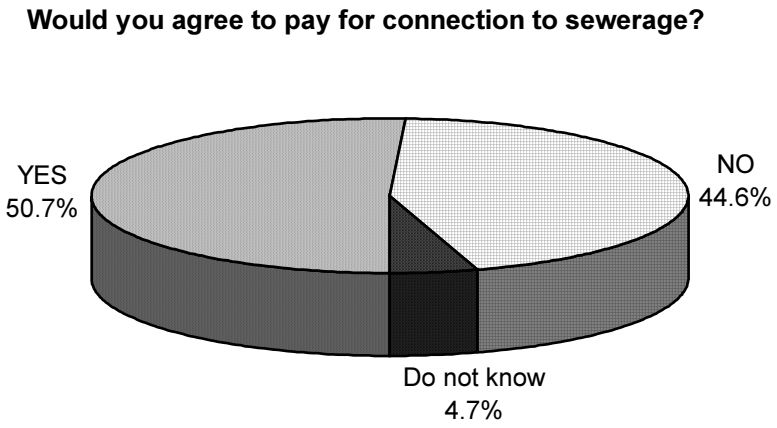
The table below shows the distribution of monthly payments by households connected to the centralized water system. These payments are for both water and sewerage. An average resident pays approximately 6.90 litas per person per month for these services, which is very high by Lithuanian standards. Nationwide, the average per capita tariff is approximately two litas per month.

Amount of payment	Percentage
None	0.3
Up to 3.00 LTL	4.2
3.01-6.00 LTL	11.5
6.01-10.00 LTL	20.8
10.01-20.00 LTL	29.9
20.01-30.00 LTL	13.3
30.01 LTL and more	11.2
Do not know	8.3
Refused to indicate	0.5

The description of the services offered to respondents under the directive is presented in the Appendix (before Question 34). Each respondent was then asked if they would support the program if they had to pay an additional monthly fee (on top of the tariff

they already pay) of from 0.20 litas to 4.90 litas per person per month. The distribution of yes and no answers is given in Figure 14, where we see that over half of those who are currently NOT connected would favor a program to extend sewerage.

Figure 14



The demand for sewerage services was also estimated using logit. All variables in Table 2 were included in the initial version of the model and variables were dropped only if coefficient estimates were not significant at least at the 80% level. Variables were also dropped only if estimated coefficients on the proposed tariff variable changed very little as a result of the variables being deleted from the equation. The final regression results are presented below.

Willingness to pay for *Extension of Sewerage*					
Variable	Coefficient Estimate	Standard.Error	t-ratio	P-value	Mean Values of Variables
ONE	-0.67757	0.376936	-1.79756	0.072246	1
Log of Proposed Tariff	-0.29896	0.174232	-1.71586	8.62E-02	Not Applicable
Household Income	0.134949	0.082435	1.63704	0.101623	2.73399
Household Size	-0.20979	0.109797	-1.91071	0.056041	2.748769
Education Level	0.36242	0.119886	3.02305	0.002502	2.748769
Ownership of an Automobile (yes or no)	0.597133	0.369726	1.61507	0.106296	0.4286

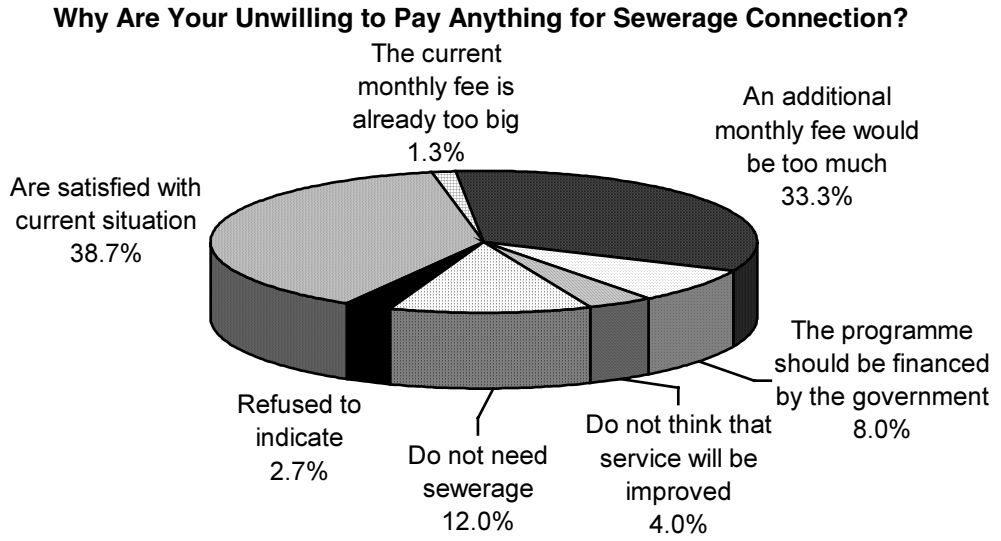
Number of observations	203
Iterations completed	5
Log likelihood function	-125.3765
Restricted log likelihood	-140.2923
Chi-squared	29.83166
Degrees of freedom	5
Significance level	.1591678E-04

Once again the signs of all coefficients are as hypothesized, but in this case the age of the respondent was unrelated to willingness to support the project. We are rather less sure of certain coefficient estimates than in previous regressions, but all coefficient estimates are significantly different from zero at least at the 10.0% level. We again present the tariffs that are estimated to cause 20%, 50% and 80% of respondents to support the program. These figures are given in the table below

Proposed Additional Tariff per person per month	Estimated Percentage of Population that would Support the Sewerage Extension Program
1.75 litas	20%
0.64 litas	50%
0.24 litas	80%

Once again, respondents were asked for their maximum willingness to pay. Slightly over 35% said that the maximum they were willing to pay for the program was nothing. The reasons half of households were unwilling to pay nothing are given in Figure 15 below.

Figure 15



The results suggest substantial willingness to pay for sewerage services (on the order of that for all waste directives combined). Whether this figure is "enough," of course depends on the costs. Half of respondents indicated a willingness to pay an additional 7.68 litas per person per year for sewerage services. If 42.6% of the Lithuanian people do not have sewerage services (a perhaps high figure), this means that the national willingness to pay for sewerage upgrading is approximately 12.1 million litas (calculated as 3.7013*0.426*7.68).

How does this figure compare with the costs? The answer is rather badly. Starting in 2011, when expenses are slated to start being incurred, it is expected that annual costs will be approximately 187 million litas. Even with substantial income growth between the year 2000 and 2011, it is unlikely that the annual willingness to pay for sewerage will even cover 10% of the estimated annual costs. This finding suggests that like waste recovery/recycling, sewerage would be another area where subsidies

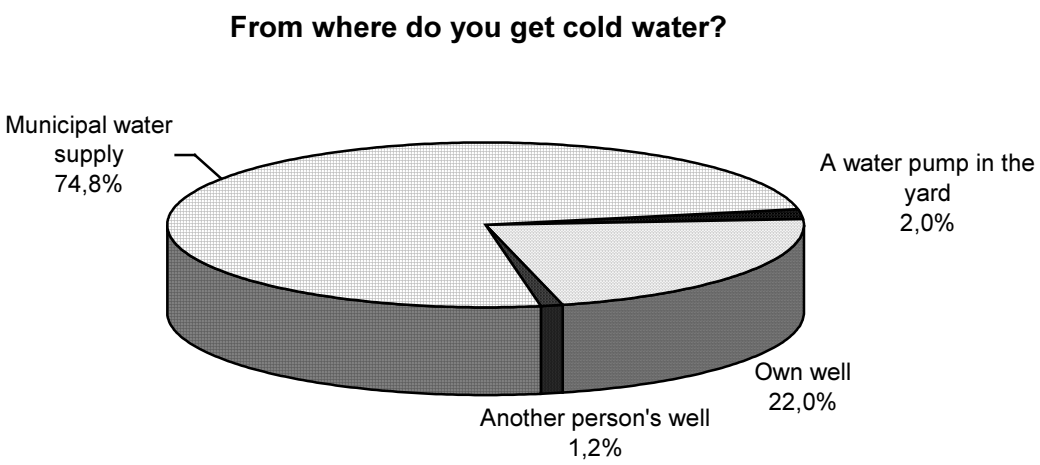
will be necessary if sewerage is to be extended throughout the country, as 921/271/EEC requires.

Drinking Water

Excessive iron and minerals in drinking water are the main areas where drinking water system upgrades are needed nationally. Ukmerge, on the other hand, has a rather advanced water supply system, which includes an iron removal facility. The only equipment that requires upgrading under the directive is approximately 23 kilometers of water supply piping. It was therefore only on this piping that the survey focused, which really cannot be considered representative of the country. Perhaps the main usefulness of the willingness to pay results are therefore for LOCAL financing.

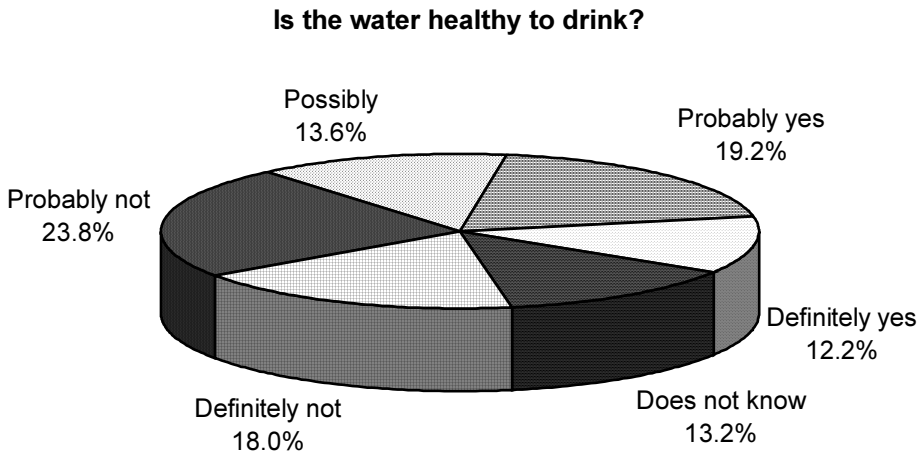
As shown in Figure 16, approximately three-quarters of residents get their water from the municipal supply system.

Figure 16



Also of interest are the perceptions of residents. Despite what is likely to be a relatively high-quality product, among those who get their water from the municipality, many residents are concerned about water quality. This concern is evident in Figure 17, which suggests that over half of respondents either thought their water was not healthy or did not know.

Figure 17



As shown in Figure 18, because of worries over water quality, over half of respondents either do not drink tap water or drink it only after treatment. As shown in Figure 19, about two-thirds of those who treat their tap water treat it by boiling.

Figure 18

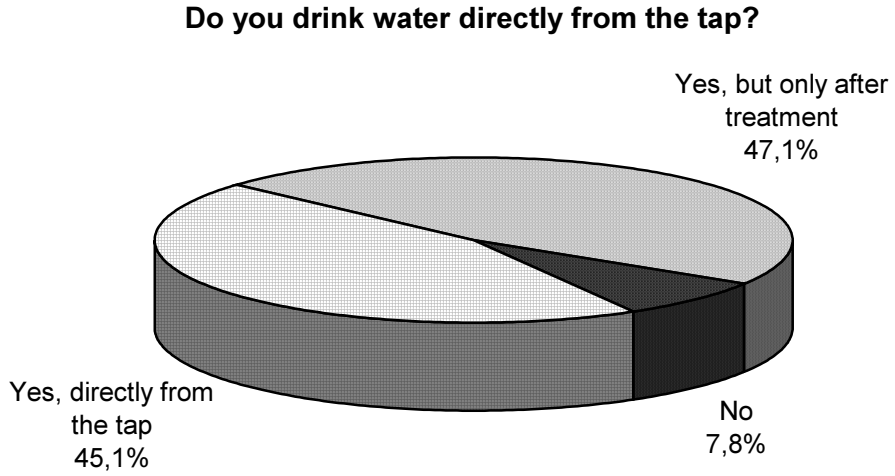
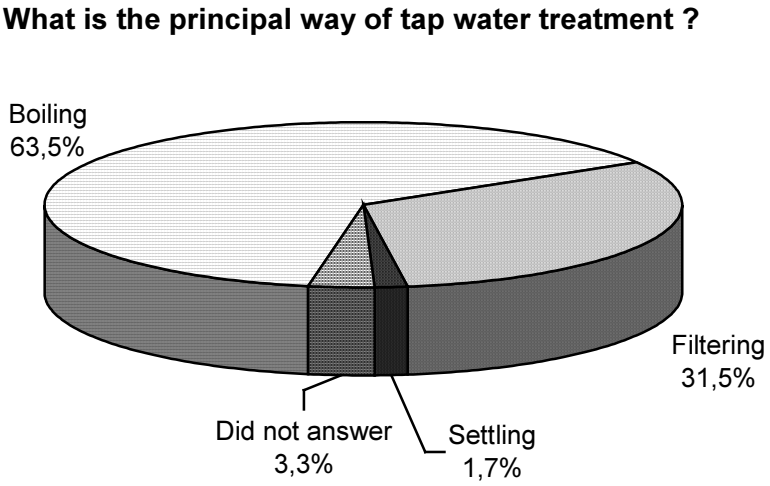


Figure 19



The demand for upgrading of water pipes was also estimated using logit. All variables in Table 2 were included in the initial version of the model and variables were dropped only if coefficient estimates were not significant at least at the 80% level. Variables were also dropped only if estimated coefficients on the proposed tariff variable changed very little as a result of the variables being deleted from the equation. The final regression results are presented below.

Willingness to pay for improved water supply service					
Variable	Coefficient Estimate	Standard Error	t-ratio	P-value	Mean Values of Variables
ONE	1.54278	0.435184	3.54512	0.000392	1
Log of Proposed Tariff	-0.4216	0.113302	-3.72107	1.98E-04	Not Applicable
Age of Respondent	-0.02857	0.007329	-3.89798	9.70E-05	50.59091
Do You Consider the Water to be Healthy to Drink (ordinal measure 5= definitely yes, 1 = definitely not	-0.19372	0.09617	-2.01439	0.043968	2.536364

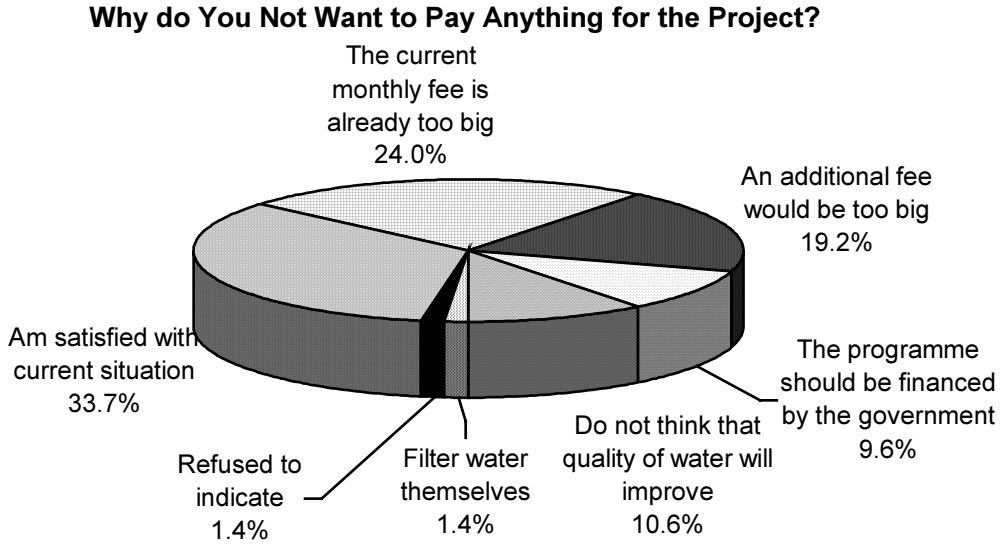
Coefficient signs are all as hypothesized, and the age of the respondent once again was negatively correlated with willingness to support the project. All coefficient estimates are significantly different from zero at least at the 5.0% level. We again present the tariffs that are estimated to cause 20%, 50% and 80% of respondents to support the program. These figures are given in the table below.

Proposed Additional Tariff per person per month	Estimated Percentage of Population that would Support the Sewerage Extension Program
0.24 litas	20%
0.12 litas	50%
0.06litas	80%

Once again, respondents were asked for their maximum willingness to pay. *Slightly over 56% said that the maximum they were willing to pay for the program was*

nothing. The reasons half of households were willing to pay nothing are given in Figure 20 below.

Figure 20



The "product" offered to respondents was relatively modest – water supply pipe upgrading. It is therefore not surprising that willingness to pay was also modest. Half of all respondents are estimated to be willing to pay 1.44 litas more per person per year. The cost of the estimated cost of upgrading the 23 kilometers of water supply pipe in Ukmerge municipality is approximately 10 million Litas and the estimated willingness to pay of the 52,000 residents of Ukmerge Municipality is approximately 74,880 litas per year. On a national level, a similar pipe upgrading program would be valued at approximately 5.3 million litas.

Annex 6.2.1 Questionnaire Used in Ukmerge

Attention Enumerator: Please check that survey is complete and that questions are in the proper order before beginning

Name of Enumerator _____

Enumerator A ☐

Enumerator B ☐

Enumerator C ☐

Enumerator D ☐

Etc.

Assigned Respondent Category (1 - 10) _____

ENUMERATOR: BEFORE BEGINNING THE SURVEY PLEASE WRITE THE CHARGE RATES IN QUESTIONS 19, 20, 21; 24, 25, 26; 29, 30, 31; 34,

35, 36; 39, 40, 41 THAT ARE CONSISTENT WITH THIS ASSIGNED RESPONDENT CATEGORY

WILLINGNESS TO PAY FOR UPGRADING MUNICIPAL ENVIRONMENTAL SERVICES TO EUROPEAN UNION STANDARDS IN THE TOWN OF UKMERGE, LITHUANIA

Survey Instrument
30 August 1999

Introduction

"We are (I am) conducting a survey of household decision makers as part of a major effort to better understand families' demand for improved environmental services. We are sponsored by the Ministry of Environment in Lithuania. Ukmerge municipality has been chosen by the Ministry of Environment as a site for investigating several of the most important municipal environmental issues. The study is being conducted with support and input from the Municipality of Ukmerge. You have been chosen at random as one of 500 households that will participate in the study."

This survey is to be administered to an adult in your household who participates in the household's financial decision-making. Are you someone with this role in your household?

ENUMERATOR: If yes, continue. If no, ask if a decision maker is available. After meeting the decision maker, restate the above paragraph.

"Your answers will potentially help guide decisions on improving environmental services in Ukmerge and Lithuania. Your identity will not be included with your responses to the questions and your responses will also be kept in the strictest confidence. Only summary results will be provided to the Ministry of Environment and the Municipality of Ukmerge."

Would you be willing to participate in this study?

ENUMERATOR: If yes, continue. If no, ask if someone else is available. If nobody is willing or able to participate in the survey conclude the interview and thank the respondent for his/her participation

ENUMERATOR: Is the home an apartment or a house?

Apartment ☐ If apartment, which floor _____

House ☐

What is the sector code of the residence? ____

Date of interview: _____

Time interview started: _____ _

SECTION 1
INFORMATION ON WATER, HEATING AND ELECTRICITY SERVICES

"First I would like to ask you a few questions about your cold water service"

1. From where do you get your cold water?

☐ Centralized water supply in your home
☐ Centralized water supply shared with others
☐ Own well
☐ Another person's well
☐ Other method
☐ Don't know

2. Please state whether you consider the following aspects of your cold water service to be poor, adequate or good.

Service Measure	**Poor**	**Adequate**	**Good**	**Very good**
Water pressure	1	2	3	4
Color of water	1	2	3	4
Smell of water	1	2	3	4
Taste of water	1	2	3	4

3. Do you consider the water to be healthy to drink?

1	2	3	4	5	or 6
Definitely not	Probably not	Possibly	Probably yes	Definitely yes	Don't know

ENUMERATOR: IF THE ANSWER TO QUESTION #1 WAS "CENTRALIZED WATER SUPPLY IN HOME" OR "CENTRALIZED WATER SUPPLY SHARED WITH OTHERS," CONTINUE, OTHERWISE SKIP TO QUESTION 6

4. Do you drink the tap water?

☐ No

☐ Yes, we drink it directly from the tap

☐ Yes, but only after treatment → What is your principal type of treatment?

☐Boiling ☐Filtering ☐Settling ☐Other (specify)_____

5. How is your monthly water bill calculated?

☐ Based on a flat rate per person

☐ Based on the results of reading the water meter in your home

☐ Based on an estimate of your share of water used after reading a bulk water meter located in your apartment building

☐ Other method (specify) _____

☐ Don't know

6. Are you connected to sanitary sewerage? Yes ☐ No ☐ Don't know ☐

7.How much does your household pay each month for cold water service and sewerage?

_____ litas _____ don't know _____ refuses to answer

8. Are you connected to the centralized heating system?

Yes ☐ CONTINUE
No ☐
Don't know ☐ SKIP TO QUESTION #11

9. Do you feel that your family's heating service in 1998-99 was

Poor ☐ Adequate ☐ Good ☐ or Don't know ☐ ?

10. Approximately how much did you pay in total for heating during 1998 - 99?

_____ litas _____ Don't know

11. How much did you pay on average per month for electricity during 1998?

_____ litas _____ don't know

SECTION 2

SOLID WASTE SERVICES

"I would now like to ask you a few questions about the solid waste service that is available to you and your family."

12. Where do you most often put your waste?

☐ Container outside;
☐ Container or chute in an apartment building; } CONTINUE
☐ Directly in a truck operated by *Ukmerges Paslauga*
☐ Other place (specify): _____ } **SKIP** TO QUESTION #14
☐ Refuse to answer

13. Please rate the following features of your solid waste disposal system

Criteria	**Very bad**	**Not bad**	**Not bad**	**Good**	**Very good**
Odors	1	2	3	4	5
Noise	1	2	3	4	5
Frequency with which chute or container is emptied	1	2	3	4	5
Presence of litter around the chute or container	1	2	3	4	5
Neighbors' waste disposal practices	1	2	3	4	5+

14. Do you know the exact location where your waste is dumped after it is collected from your home?

Yes ☐ → If yes, where? _____No ☐

15. Do you think the landfill where your garbage goes is polluting the groundwater or creating other environmental problems?

1	2	3	4	5	or 6
Definitely not	Probably not	Possibly	Probably yes	Definitely yes	Don't know

16. How much did your household pay on average per month for waste collection and disposal services during 1998? _____ litas _____ Don't know

17. Do you currently compost some or all of your organic waste like food, grass clippings, leaves, etc?
Yes ☐ No ☐ Don't know ☐

18. Do you have a yard or garden where you could use compost if it were available from the municipality?
Yes ☐ No ☐ Other ☐

SECTION 3
WILLINGNESS TO PAY FOR IMPROVED WASTE MANAGEMENT, WATER SUPPLY AND WASTEWATER TREATMENT SERVICES

ENUMERATOR: PLEASE READ THE FOLLOWING INTRODUCTORY PARAGRAPHS TO THE RESPONDENT

"Now I would like to ask you how much your household would be willing to pay for better environmental protection services than are currently being offered by the Municipality of Ukmerge. I will describe in detail the improvements in service and then ask whether you would be willing to pay for those improved services at a specific price. Please simply answer YES or NO to those questions. Again, please recall that in giving these answers you are completely anonymous and your answers will be kept confidential."

"Every household has different needs and levels of income and wealth. You and your family also have a variety of goods and services - clothes, gifts, entertainment, transportation, food, drink, etc. - available to you on which you can potentially spend your money. Please listen to the description of the improved services and answer yes or no based on your own situation. There is no right or wrong answer; we really want to know what you think about these services."

"I will now describe the most important benefits you would likely receive if improvements in solid waste services were to be provided in Ukmerge. I will then ask you whether you would be willing to pay a specific amount to get those services. Please simply answer YES or NO."

"DO YOU HAVE ANY QUESTIONS ABOUT WHAT I JUST SAID? WOULD YOU LIKE ME TO REPEAT ANYTHING?"

SECTION 3a
WILLINGNESS TO PAY FOR SECURE LANDFILLS

ENUMERATOR: PLEASE READ THE FOLLOWING PARAGRAPHS

"I would first like to talk about how solid wastes are disposed in Ukmerge. After garbage is collected from homes and enterprises, they are dumped in about 20 sites scattered throughout the county. These are dump sites without any environmental controls The sites are unlikely to be fenced and therefore allow access to intruders, possibly resulting in injuries or fires. There are also no protections against the leaching of potentially toxic liquids that are constantly generated by landfills, into surface and groundwater resources. These liquids are not treated in any way to reduce their toxicity. Because these protections are absent, there is a significant chance that landfill liquids, which may be harmful to public health or the environment, are leaking into underground or surface water resources. It is even possible that now or in the future drinking water may be affected by the leaching from these dump sites.

“Wastes in landfills also degrade and release landfill gases into the atmosphere that can explode and cause landfill fires, potentially causing health hazards for people in the area. One of these gases (methane) is also one of the most important so-called "greenhouse gases" that are believed to contribute to global warming. Finally, after landfills in Ukmerge are filled, the sites are simply left open to the environment. This approach allows water to enter landfills, resulting in leaching over time, and permanently removes the land from productive use.”

"To assure that the environment in Ukmerge is protected, several improvements to landfills could be made. Suppose that the municipality in conjunction with the Government of Lithuania were to undertake a program to upgrade landfill quality. Under this program, landfills would be fenced to keep people and animals out and sealed on the bottom with plastic or clay to prevent liquid generated by landfills from migrating to the groundwater. Sealing the bottom also would keep the liquid from moving into surface water like rivers and lakes. This would prevent landfills from polluting streams and rivers, such as the Sventoji River, and ultimately the Baltic Sea, helping to keep those waterways safe for swimming, fishing and other uses."

"Second, to prevent the bottom-sealed landfills from overflowing, landfill liquids would also periodically be pumped out and treated in a special treatment plant located on landfill sites. Once the liquids from landfills are fully treated and safe, they would be released into waterways. Third, after landfills in Ukmerge have completed their useful lives, they would be permanently closed and sealed on top. The sites would then be planted with grass and other plants so they would look like the surrounding areas. The sites would then be used for parks or other recreational purposes. Sealing the landfills would greatly reduce bad smells from the waste underneath, would avoid the need to pump contaminated liquids out of closed landfills, and would prevent rainwater from washing those liquids into Lithuania's waterways.

" Fourth, the gases from Ukmerge's landfills would either be collected or burned in a controlled fashion. Landfill gas collection systems would be installed and collected

gases used as an energy source or flared, thus reducing the threat of fires, as well as emissions of greenhouses that cause global warming.

"In summary, the steps to improve the landfills and the expected benefits from those measures are the following:

- Fence landfills to keep out intruders and avoid injuries and fires;
- Seal the bottom of landfills to avoid polluting ground and surface waters;
- Pump and treat the liquids that are generated by landfills to keep waterways clean;
- Seal and replant landfill sites after they are closed to avoid future contamination and make closed landfill sites suitable for use as recreational resources;
- Collect or burn off gases generated by landfills to reduce risks of fires and reduce emissions of gases believed to cause global warming.

To make these changes, households in Ukmerge would be required to pay more for their garbage collection and disposal than they pay at present. Currently, everyone pays approximately 2.0 litas per person per month. Suppose making these improvements would increase the price of garbage collection and disposal by **(a)** _____ litas per person per month. Everyone would pay this higher rate. This means that your family, which has **(b)** _____ members would have to pay a total of about **(c)** (a)_____ * ____ or **(d)** ___ more per month for the service.

"DO YOU HAVE ANY QUESTIONS ABOUT THE PROJECT I JUST DESCRIBED? WOULD YOU LIKE ME TO REPEAT ANYTHING?"

19. Which would you and your family prefer: To keep the garbage collection and disposal services as they are now and pay the same amount you are now paying, or to pay _____ litas more each month for your family to have the improved service?

Improved Service ☐ CONTINUE AND SKIP QUESTION 21
Current Service ☐
Don't know ☐ } SKIP TO QUESTION 21

20. Suppose that that the initial cost estimates for this program were too ***low***, and instead of requiring **(a)** _____ litas per person, the program required a charge of **(b)** ___ litas per person to be implemented. This means that your household, which has **(c)** ____ members, would have to pay an increased monthly bill of (b)_____ * **(c)** or **(d)** _____ litas more per month for waste management services that include these landfill improvements. Do you think your family would be willing to pay this additional amount each month.

Yes ☐ No ☐ Don't know ☐ ENUMERATOR: SKIP NEXT QUESTION!!

21. ENUMERATOR: IF THE RESPONDENT ANSWERED QUESTION 20, PLEASE SKIP THIS QUESTION!!!

Suppose that initial cost estimates for this program were too ***high***, and instead of requiring **(a)** _____ litas per person, the program could be implemented for a charge of **(b)** _____ litas per person. This means that your household, which has **(c)** ____ members, would have to pay an additional monthly charge of **(d) = (b)*(c)**_____ for waste management services that include these landfill improvements. Do you think your family would be willing to pay this amount each month?

Yes ☐
No ☐ } CONTINUE
Don't know ☐

22. What is the maximum amount you would be willing to pay per month for your household to have the improved service?
_____ litas per month SKIP TO SECTION 3B
☐ Nothing CONTINUE

23. What is the principal reason you do not want to pay anything to improve the landfills in Ukmerge? ENUMERATOR: DO NOT READ THE ANSWERS LISTED BELOW. }

☐ We are satisfied with the existing service
☐ The current monthly tariff is too expensive already
☐ An additional monthly tariff would be too expensive for me and my family
☐ The government should pay those costs, not residents
☐ I do not believe the service will really improve
☐ Other reason. Specify _____.
☐ Refuses to say.

SECTION 3B
WILLINGNESS TO PAY FOR PACKAGING WASTE RECYCLING SERVICES

ENUMERATOR: PLEASE READ THE FOLLOWING PARAGRAPHS

"At present, all garbage is disposed in landfills. There is no service available from the municipality that allows residents to recycling packaging made of paper, cardboard, plastic or aluminum. Suppose that a recycling project were initiated for residents of the municipality of Ukmerge, which would allow the opportunity to recycle most packaging materials. Under the proposed project, recycling service would be combined with an improved garbage disposal system that would be available to you at or near your home. Containers assigned to different uses - recycleable glass, metals, plastic, paper products and normal garbage—would be placed in convenient locations near your home. The containers would be frequently cleaned and emptied. You would be required to separate your garbage into the appropriate containers. If you currently dispose of your waste directly into garbage trucks at regularly scheduled times, it would no longer be necessary to wait for the garbage truck when it comes to your neighborhood

Recycling packaging materials such as glass jars and bottles, metal cans and paper containers such as cardboard boxes, and juice containers in Ukmerge would mean that less land would be needed for landfills. Less land would therefore be spoiled. Having recycling of packaging waste in Ukmerge would also reduce the use of natural resources that originated from the environment. Recycling or re-using glass and metal, rather than manufacturing those products would reduce the amount of mining activity that is needed. Less land is therefore disturbed. Making glass and metal also uses a lot of energy and creates air pollution that can cause respiratory problems like asthma. Recycling paper packaging also helps conserve the forests of Lithuania and the world, because paper is made from wood products. Recycling also reduces water pollution, because paper manufacturing creates water pollution that can damage fish, interfere with swimming and cause waterways to have a bad smell."

"*Ukmerges Paslauga* would empty all the containers at regular, scheduled times. It would then sell the recyclable materials to companies engaged in such business here in Lithuania and throughout Europe. It is expected that selling the recyclable packaging will partially, but not completely, off-set the costs of the recycling program. The rest of the funding for the program would come from households like yours."

"In summary, this recycling program would offer the following benefits:

- Allow smaller landfills, spoiling less land in Ukmerge;
- Air and water pollution - probably in areas other than Ukmerge - would be reduced;
- Forest resources would be preserved because less paper products would be used;
- For many residents of Ukmerge garbage collection service would improve, because there would no longer be a need to meet garbage trucks at regularly

scheduled times. On the other hand, residents *would* be required to sort garbage by type, which is currently not necessary."

Suppose this new recycling program could be initiated in Ukmerge if each resident paid a waste disposal bill that were _____ higher than the current bill. Currently, everyone pays approximately 2.0 litas per person per month. Suppose making these improvements would increase the price of garbage collection and disposal by **(a)** _____ litas per person per month. Everyone would pay this higher rate. This means that your family, which has **(b)** _____ members would have to pay a total of about **(c)** (a)_____ * ____ or **(d)** ___ more per month for the service.

"DO YOU HAVE ANY QUESTIONS ABOUT THE PROJECT I JUST DESCRIBED? WOULD YOU LIKE ME TO REPEAT ANYTHING?"

24. Which would you and your family prefer: To keep the garbage collection and disposal services as they are now and pay the same amount you are now paying, or pay a total of **(d)** _____ litas more each month for your family to have access to the recycling service I have described?

Improved Service ☐ CONTINUE AND SKIP QUESTION 26
Current Service ☐
Don't know ☐ } SKIP TO QUESTION 26

25. Suppose that that the initial cost estimates for this program were too ***low***, and instead of requiring **(a)** _____ litas per person, the program required a charge of **(b)** ___ litas per person to be implemented. This means that your household, which has **(c)** ____ members, would have to pay an additional monthly bill of (b)_____ * **(c)** or **(d)** _____ litas more per month for the municipal recycling program. Do you think your family would be willing to pay this amount each month?
Yes ☐ No ☐ Don't know ☐ ENUMERATOR: SKIP THE NEXT QUESTION

26. ENUMERATOR: IF THE RESPONDENT ANSWERED QUESTION 25, PLEASE SKIP THIS QUESTION!!!
Suppose that initial cost estimates for this program were too ***high***, and instead of requiring **(a)** _____ litas per person, the program could be implemented for a charge of **(b)** _____ litas per person. This means that your household, which has **(c)** ____ members, would have to pay an additional monthly charge of **(d) = (b)*(c)**_____ for the municipal recycling program. Do you think your family would be willing to pay this amount each month?
Yes ☐
No ☐ } CONTINUE
Don't know ☐

27. What is the maximum you would be willing to pay per month for your household to have the improved service?
_____ litas per month SKIP TO SECTION 3C
☐ Nothing } CONTINUE

28. What is the principal reason you do not want to pay anything so that the type of recycling program described above could be introduced? ENUMERATOR: DO NOT READ THE ANSWERS LISTED BELOW..

- ☐ We are satisfied with the existing service
- ☐ The current monthly tariff is too expensive already
- ☐ An additional monthly tariff would be too expensive for me and my family
- ☐ The government should pay those costs, not residents
- ☐ I do not believe the service will really improve
- ☐ Other reason. (specify _____
- ☐ Refuses to say.

SECTION 3C
WILLINGNESS TO PAY FOR COLLECTION AND COMPOSTING OF ORGANIC WASTES

ENUMERATOR: PLEASE READ THE FOLLOWING PARAGRAPHS

" I would now like to talk with you about one last solid waste management program that might be implemented in Ukmerge. Natural organic materials, such as yard wastes, street sweepings, manure from farms, food wastes from kitchens and wood wastes make up over half of the waste in Ukmerge's landfills. Currently, those wastes - if they are collected at all - are treated the same as all other garbage. There is no separate collection and composting of organic wastes.

Suppose that a program were implemented which would offer collection and composting of organic wastes. Under the proposed program, collection of natural organic wastes would be combined with an improved garbage disposal system that would be available near your home. Special containers for organic waste would be provided at convenient locations and would be frequently cleaned. Your family would be asked to separate the organic waste from the rest of your trash and place it in these special containers. *Ukmerges Paslauga* would collect these wastes and compost them, creating potentially valuable, nutrient-rich organic fertilizer."

This program would have four main benefits. First, you, your neighbors, businesses and farms in Ukmerge could come to an appointed place and take compost for use in yards, gardens and farms. There would be no charge for this fertilizer. Second, because under the program you would be asked to separate wastes into containers, if your household currently disposes waste directly into garbage trucks, there would no longer be a need to be available when the garbage truck comes to your neighborhood. Third, organic wastes make up more than half of all wastes disposed in landfills in Ukmerge. Collecting and composting those wastes rather than landfilling them would mean that less land would be needed for landfills. Finally, the organic materials in landfills are the ones that generate combustible gases which, if ignited, can release toxic gases into the atmosphere and, potentially cause health hazards. These gases are also believed to contribute to global warming. This program would remove most organic materials from Ukmerge's landfills, thus reducing the risk of these types of environmental hazards.

In summary, the proposed program would offer the following benefits:

- Compost would be available to all Ukmerge residents;
- Smaller landfills would be needed, spoiling less land in Ukmerge;
- For many residents of Ukmerge, garbage collection service would improve, because there would no longer be a need to meet garbage trucks at regularly scheduled times. On the other hand, residents would be required to sort garbage by type, which is currently not necessary.
- Less toxic gases would be generated by landfills, reducing the risk of explosions and toxic fires, as well as reducing emissions of greenhouse gases.

Suppose this new organic waste recovery and composting program could be initiated in Ukmerge if each resident paid a waste disposal bill that was _____ higher than the current bill. Currently, everyone pays approximately 2.0 litas per person per month. Suppose making these improvements would increase the price of garbage collection and disposal by **(a)** _____ litas per person per month. Everyone would pay this higher rate. This means that your family, which has **(b)** _____ members would have to pay a total of about **(c)** (a)_____ * ____ or **(d)** ___ more per month for the service.

"DO YOU HAVE ANY QUESTIONS ABOUT THE PROJECT I JUST DESCRIBED? WOULD YOU LIKE ME TO REPEAT ANYTHING?"

29. Which would you and your family prefer: To keep the garbage collection and disposal services as they are now and pay the same amount you are now paying, or pay a total of **(d)** _____ litas more each month for your family to have access to the organic waste recovery and composting service I have described?

Improved Service ☐ CONTINUE AND SKIP QUESTION 31
Current Service ☐
Don't know ☐ } SKIP TO QUESTION 31

30. Suppose that that the initial cost estimates for this program were too ***low***, and instead of requiring **(a)** _____ litas per person, the program required a charge of **(b)** ___ litas per person to be implemented. This means that your household, which has **(c)** ____ members, would have to pay an additional monthly bill of (b)_____ * **(c)** _____ or **(d)** _____ litas more per month to implement the organic waste recovery and composting program. Do you think your family would be willing to pay this amount each month?

Yes ☐ No ☐ Don't know ☐ ENUMERATOR: SKIP THE NEXT QUESTION

31. ENUMERATOR: IF THE RESPONDENT ANSWERED QUESTION 30, PLEASE SKIP THIS QUESTION!!!
Suppose that initial cost estimates for this program were too ***high***, and instead of requiring **(a)** _____ litas per person, the program could be implemented for a charge of **(b)** _____ litas per person. This means that your household, which has **(c)** ____ members, would have to pay an additional monthly charge of **(d) = (b)*(c)**_____ for the organic waste recovery and composting program. Do you think your family would be willing to pay this amount each month?

Yes ☐
No ☐ CONTINUE
Don't know ☐

32. What is the maximum you would be willing to pay per month for your household to have the improved service?

_____ litas per month SKIP TO SECTION 3D
☐ Nothing } CONTINUE

33. What is the principal reason you do not want to pay anything to implement the system of organic waste collection and composting that was described?
ENUMERATOR: DO NOT READ THE ANSWERS LISTED BELOW.

- ☐ We are satisfied with the existing service
- ☐ The current monthly tariff is too expensive already
- ☐ An additional monthly tariff would be too expensive for me and my family
- ☐ The government should pay those costs, not residents
- ☐ I do not believe the service will really improve
- ☐ Other reason. Please specify _____
- ☐ Refuses to say.

SECTION 3D
WILLINGNESS TO PAY FOR CONNECTION TO SEWERAGE SERVICES

ENUMERATOR: IF THE RESPONDENT SAID "NO" TO QUESTION #6 (i.e. RESPONDENT'S HOUSE IS NOT CONNECTED TO THE CENTRALIZEDSEWERAGE SYSTEM), PLEASE CONTINUE, OTHERWISE SKIP TO SECTION 3E

ENUMERATOR: PLEASE READ THE FOLLOWING PARAGRAPH

"You have indicated that you are not connected to the municipal sewerage system. I would like to acquaint you with some of the potential benefits of connecting to the centralized sewer system. If you were connected, you would not need to service your private septic system or pit toilet. This would create a more sanitary environment in your yard. If you currently use a pit toilet, connection would allow you the opportunity to have indoor plumbing. Furthermore, there is little or no smell associated with centralized sewage systems."

"DO YOU HAVE ANY QUESTIONS ABOUT WHAT I JUST SAID? WOULD YOU LIKE ME TO REPEAT ANYTHING?"

34. Suppose your house could be connected to the municipal sewage system for a per person monthly charge of _____ litas. For your family, which has ____ persons, this means you would pay ____ per month for sewerage services. Do you think your household would be willing to pay this additional _____ per month in order to be connected to the Ukmerge sewage system?

Yes ☐ CONTINUE
No ☐
Don't know ☐ } SKIP TO QUESTION 36

35. Suppose that that the initial cost estimates for this program were too ***low***, and instead of requiring **(a)** _____ litas per person, the program required a charge of **(b)** ___ litas per person to be implemented. This means that your household, which has **(c)** ____ members, would have to pay a monthly bill of (b)_____ * **(c)** _____ or **(d)** _____ litas more per month to get sewerage services. Do you think your family would be willing to pay this amount each month?
Yes ☐ No ☐ Don't know ☐ ENUMERATOR: SKIP THE NEXT QUESTION

36. ENUMERATOR: IF THE RESPONDENT ANSWERED QUESTION 35, PLEASE SKIP THIS QUESTION
Suppose that initial cost estimates for this program were too ***high***, and instead of requiring **(a)** _____ litas per person, the program could be implemented for a charge of **(b)** _____ litas per person. This means that your household, which has **(c)** ____ members, would have to pay a monthly charge of **(d) = (b)*(c)**_____ to get sewerage services. Do you think your family would be willing to pay this amount each month?

Yes ☐
No ☐ } CONTINUE
Don't know ☐

37. What is the maximum amount you would be willing to pay per month for your household to have sewerage services?
_____ litas per month SKIP TO SECTION 3E
☐ Nothing } CONTINUE

38. What is the principal reason you do not want to pay anything to be connected to the centralized sewer system? ENUMERATOR: DO NOT READ THE ANSWERS LISTED BELOW.

- ☐ We are satisfied with the existing service
- ☐ The current monthly tariff is too expensive already
- ☐ An additional monthly tariff would be too expensive for me and my family
- ☐ The government should pay those costs, not residents
- ☐ I do not believe the service will really improve
- ☐ Other reason. Please specify _____
- ☐ Refuses to say.

ENUMERATOR: IF THE RESPONDENT'S WATER DOES NOT COME FROM THE CENTRALIZED WATER SUPPLY SYSTEM (AS STATED IN QUESTION #1), PLEASE SKIP TO SECTION 4

SECTION 3E
WILLINGNESS TO PAY FOR IMPROVED DRINKING WATER SERVICES

ENUMERATOR: PLEASE READ THE FOLLOWING PARAGRAPHS

" I would now like to talk with you about the quality of water supply services in Ukmerge. *Ukmerges Vandenys* has installed equipment to assure that the water they supply to residents and firms is completely safe for drinking. The quality of tap water distributed to households is checked regularly, and there is no reason to believe that it is unsafe. Nevertheless, it is well known that because of insufficient water pipe maintenance, many people in Ukmerge from time to time receive water that has an orange/red color or an odor.

Suppose there were a program to complete all upgrades necessary to ensure that the water supply system would be completely safe in the future and no colors or odors would be present. First, some groundwater wells that supply Ukmerge with drinking water would need to be re-drilled and repaired. Approximately 23 kilometers of water supply pipes must be reconstructed or cleaned to reduce leakage of drinking water from the system, and to be sure that the water delivered to your home would be clean and tasty. These measures together would assure that you, your neighbors, and businesses in Ukmerge would have access to drinking water that had no color (e.g. no red or orange), no odor, tasted good and was completely safe to drink."

Suppose these water supply improvements could be initiated in Ukmerge if each resident paid a water bill that was _____ higher than the current bill. Currently, everyone pays approximately 2.0 litas per person per month. Suppose making these improvements would increase the price of water by **(a)** _____ litas per person per month. Everyone would pay this higher rate. This means that your family, which has **(b)** _____ members would have to pay a total of about **(c)** (a)_____ * ____ or **(d)** ___ more per month for the service.

"DO YOU HAVE ANY QUESTIONS ABOUT THE PROJECT I JUST DESCRIBED? WOULD YOU LIKE ME TO REPEAT ANYTHING?"

39. Which would you and your family prefer: To keep water supply services as they are now and pay the same amount you are now paying, or to pay a total of _____ litas more each month for your family to have the improved service I have described?

Improved Service ☐ CONTINUE AND SKIP QUESTION 41

Current Service ☐
Don't know ☐ } SKIP TO QUESTION 41

40. Suppose that the initial cost estimates for upgrading the water supply system turned out to be too ***low***, and instead of requiring **(a)** _____ litas per person, the program required a charge of **(b)** ___ litas per person to be implemented. This means that your household, which has **(c)** ____ members, would have to pay a monthly bill of (b)_____ * **(c)** _____ or **(d)** _____ litas more per month to upgrade the water supply system. Do you think your family would be willing to pay this amount each month?

Yes ☐ No ☐ Don't know ☐ ENUMERATOR: SKIP THE NEXT QUESTION

41. ENUMERATOR: IF THE RESPONDENT ANSWERED QUESTION 40, PLEASE SKIP THIS QUESTION!!!
Suppose that it turns out that initial cost estimates for upgrading the water supply system were too ***high***, and instead of requiring **(a)** _____ litas per person, the program could be implemented for a charge of **(b)** _____ litas per person. This means that your household, which has **(c)** _____ members, would have to pay a monthly charge of **(d) = (b)*(c)**_____ to upgrade the system. Do you think your family would be willing to pay this amount each month?

Yes ☐
No ☐
Don't know ☐
} CONTINUE

42. What is the maximum you would be willing to pay per month for your household to have the improved service?
_____ litas per month SKIP TO SECTION 4
☐ Nothing } CONTINUE

43. What is the principal reason you do not want to pay anything to improve the drinking water system in Ukmerge?
ENUMERATOR: DO NOT READ THE ANSWERS LISTED BELOW.

- ☐ We are satisfied with the existing service
- ☐ The current monthly tariff is too expensive already
- ☐ An additional monthly tariff would be too expensive for me and my family
- ☐ The government should pay those costs, not residents
- ☐ I do not believe the service will really improve
- ☐ Other reason. Please specify _____
- ☐ Refuses to say.

SECTION 4
HOUSEHOLD CHARACTERISTICS

"Now I would like to ask you a few questions about you and your family."

44. ENUMERATOR: WHAT IS THE RESPONDENT'S GENDER?

- ☐ Male
- ☐ Female

45. Do you rent or own your home?

- ☐ Rent
- ☐ Own
- ☐ Refuses to answer

46. How many years have you lived in this home?

_____ years

47. How many rooms do you have in this home?

_____ rooms

48. Of the people who live in your home, how many are:

_____ Under 17 years old

_____ Between 17 and 55 years old

_____ Over 55 years old

49. How many people in the household work full time (i.e. at least 35 hours per week)?

_____ people

50. What is your age?

_____ years

51. What is the highest level of education you have achieved?

- ☐ No education
- ☐ Primary school
- ☐ Secondary school
- ☐ High school
- ☐ Some university study
- ☐ Diploma level
- ☐ Greater than diploma level

52. Is there someone else in your household who has achieved a higher level of education? If yes, please indicate the level of his or her education

- ☐ I am the highest educated person in my household
- ☐ Primary school
- ☐ Secondary school
- ☐ High school
- ☐ Some university study
- ☐ Diploma level
- ☐ Greater than diploma level

53. On average, what is the total monthly income of all members of your household, including salaries, pensions, fees, profits from businesses, free-lance and informal occupations, scholarships, rents, and any other sources?
ENUMERATOR: PLEASE READ CHOICES AND ASK THE REPSONDENT TO TELL YOU WHICH CATEGORY IS MOST APPROPRIATE

- ☐ 0 - 300 litas
- ☐ 301 - 600 litas
- ☐ 601 - 900 litas
- ☐ 901 - 1200 litas
- ☐ 1201 - 1500 litas
- ☐ 1501 - 2000 litas
- ☐ 2001 - 3000 litas
- ☐ 3001 - 4000 litas
- ☐ 4001 - 5000 litas
- ☐ Greater than 5000 litas
- ☐ Refuses to answer or does not know

54. Please tell me which of the following items you own ENUMERATOR PLEASE READ THE CHOICES

- ☐ Automobile
- ☐ Truck
- ☐ Washing machine
- ☐ Vacation/garden house

"THANK YOU VERY MUCH FOR YOUR PARTICIPATION. YOUR COOPERATION WAS GREATLY APPRECIATED BY ME, THE MINISTRY OF ENVIRONMENTAL PROTECTION AND THE MUNICIPALITY OF UKMERGE."

ENUMERATOR PLEASE COMPLETE
Time interview ended: _____

Was the person nervous or irritated during the interview?
Yes ☐ No ☐ Don't know ☐

Do you think the person made an effort to tell the truth regarding his/her willingness to pay for the project you described?
Yes ☐ No ☐ Don't know ☐

Overall, how would you rate the quality of the interview?
Very Good ☐ Good☐ Fair ☐ Poor ☐ Don't know ☐

Annex 7.1. List of Water Projects in the Municipal Investment Programme and investment schedule

Municipality	Project title	Total invest-ment costs, thou. Lt	Total invest ment costs, thou.e uro	Investment shedule (thou euro)															
				2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	PIP projects																		
BIRSTONAS	Reconstruc-tion of wwtp	600	146	146															
DRUSKININK AI	Reconstruc-tion of wwtp	22000	5366	5366															
KAUNAS	Wwtp I stage	22860	5576	5576															
KLAIPEDA	Extension of swr	10708	2612	2612															
NERINGA	Environmen-tal project	32000	7805	7805															
PANEVEZYS	Water project I stage	53600	13073	13073															
SIAULIAI	Environmen-tal project	58000	14146	14146															
VILNIUS	DW and swr extension	104000	25366	25366															
VILNIUS	Wwtp III stage	14023	3420																
VILNIUS	Antaviliai iron removal	28800	7024																
Birzai district	Birzai wwtp	12000	2927	2927															
Ignalina district	Ignalina wwtp	6500	1585	1463															
Jurbarkas district	Jurbarkas wwtp	14400	3512	1463															
Skuodas district	Skuodas wwtp	7700	1878	1183															
Silute district	Silute wwtp			1220															
Trakai district	Trakai-Lentvaris wwtp	12000	2927	1100															
Varena district	Varena wwtp	8000	1951	2000															

I priority projects																			
Municipality	**Project title**	**Total invest-ment costs, thou. Lt**	**Total invest ment costs, thou.e uro**	Investment shedule (thou euro)															
				2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
KAUNAS	Kaunas waste water project	140000	34146		34146														
Salcininkai district	Construction of Salcininkai wwtp	8000	1951		1951														
Svencionys district	Construction of Svencioneliai wwtp	5500	1341		1341														
Jonava district	Jonava ww&swr project	51600	12585		12585														
Mazeikiai district	Mazeikiai regional ww,swr,dw project	39160	9551,2			9551													
Kedainiai district	Kedainiai wastewater project WWT, SWR	38950	9500			9500													
Radviliskis district	Radviliskis town water project (WWT, SWR)	31600	7707,3			7707													
Plunge district	Plunge town water project (WWT, SWR, DW)	27700	6756,1			6756													
Anyksciai district	Anyksciai water project DW, SWR	24432	5959			5959													
PANEVEZYS	PanevezysDW &SWR project	66000	16098				16098												

I priority projects																			
Municipality	**Project title**	**Total invest-ment costs, thou. Lt**	**Total invest ment costs, thou.e uro**	Investment shedule (thou euro)															
				2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
ALYTUS	ALYTUS water project, DW, SW	37105	9050				9050												
Akmene district	N. Akmene water project (WWT, DW, SWR)	28790	7022				7022												
Kaisiadorys district	Kaisiadorys water project (WWT, SWR, DW)	25709	6270				6270												
Siauliai district	Kursenai water project (WWT, SWR, DW)	45173	11018					11018											
SIAULIAI	SIAULIAI swr extention	68800	16780					16780											
MARIJAM-POLE	Marijampole water project (WWT, SWR)	64600	15756						15756										

II priority projects																		
Municipality	**Project title**	**Total invest-ment costs, thou. Lt**	**Total invest ment costs, thou.e uro**	Investment shedule (thou euro)														
				2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Kretinga district	Kretinga regional water project (WWT, SWR, DW)	26100	6366						6366										
Taurage district	Taurage regional water project (WWT, SWR, DW)	46051	11232							11232									
Rokiskis district	Rokiskis regional water project (WWT, SWR, DW)	27919	6810							6810									
Joniskis district	Joniskis regional water project1 (WWT, DW, SWR)	28390	6924							6924									
Anyksciai district	Anyksciai regional water project (WWT, DW)	29910	7295							7295									
KLAIPEDA	KLAIPEDA swr (remaining)	39655	9672								9672								
BIRSTONAS	Birstonas water project (DW, SWR)	26250	6402								6402								
Trakai district	Vievis+Elektr enai water project (WWT, DW,	24950	6085								6085								

II priority projects																			
Municipality	**Project title**	**Total invest-ment costs, thou. Lt**	**Total invest ment costs, thou.e uro**	Investment shedule (thou euro)															
				2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
	SWR)																		

III priority projects																			
Municipality	**Project title**	**Total invest-ment costs, thou. Lt**	**Total invest ment costs, thou.e uro**	Investment shedule (thou euro)															
				2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Akmene district	Akmene regional water project (WWT, SWR, DW)	26219	6395									6395							
Vilkaviskis district	Vilkaviskis regional water project (SWR, DW)	42300	10317									10317							
SIAULIAI	SIAULIAI DW	32000	7805									7805							
Silute district	Silute regional water project (WWT, DW, SWR)	29500	7195									7195							
Sakiai district	Sakiai regional water project (WWT, DW, SWR)	26690	6510									6510							
Trakai district	Trakai regional water project (WWT, SWR, DW)	22800	5561												5561				
Pasvalys district	Pasvalys water project (WWT, SWR, DW)	17454	4257	2129											4257				
VISAGINAS	Visaginas WWT	13300	3244	1622											3244				
Telsiai district	Telsiai water project (WWT, DW)	5650	1378	689											1378				

IV priority projects																		
Municipality	**Project title**	**Total invest-ment costs, thou. Lt**	**Total invest ment costs, thou.e uro**	Investment shedule (thou euro)														
				2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Zarasai district	Zarasai regional water project (SWR, DW)	53240	12985												12985				
Kelme district	Birzai regional water project (SWR, DW)	38700	9439												9439				
Radviliskis district	Radviliskis regional water project (SWR, DW)	38554	9403												9403				
Ukmerge district	Ukmerge water project (SWR, DW)	37900	9244													9244			
Kelme district	Kelme regional water project (SWR, DW)	36700	8951													8951			
Utena district	Utena regional water project (SWR, DW)	35800	8732													8732			
Varena district	Varena water project (SWR, DW)	34325	8372													8372			
Lazdijai district	Lazdijai regional water project (SWR, DW)	27800	6780													6780			
Marijampole district	Marijampole regional water project (SWR, DW)	27060	6600													6600			

IV priority projects																			
Municipality	**Project title**	**Total invest-ment costs, thou. Lt**	**Total invest ment costs, thou.e uro**	Investment shedule (thou euro)															
				2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Svencionys district	Pabrade town water project (SWR, DW)	25250	6159														6159		
Raseiniai district	Raseiniai regional water project (SWR, DW)	24700	6024														6024		
Kaunas district	Kaunas regional water project (SWR, DW)	22750	5549														5549		
Pakruojis district	Pakruojis regional water project (SWR, DW)	20710	5051														5051		
Kupiskis district	Kupiskis regional water project (SWR, DW)	19000	4634														4634		
Alytus district	Simnas swr	5900	1439																
Alytus district	Alytus villages DW	4575	1116																
Alytus district	Daugai DW	900	220																
DRUSKININKAI	DRUSKININKAI swr	4400	1073																
Ignalina district	Ignalina swr	10000	2439																
Ignalina district	Ignalina DW	3772	920																
Joniskis district	Zagare WWTP	700	171																
Joniskis district	Zagare swr	8000	1951																
Joniskis district	Joniskis villages DW	5500	1341																

IV priority projects																			
Municipality	**Project title**	**Total invest-ment costs, thou. Lt**	**Total invest ment costs, thou.e uro**	Investment shedule (thou euro)															
				2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Jurbarkas district	Jurbarkas swr	6600	1610																
Jurbarkas district	Jurbarkas villages DW	8340	2034																
Jurbarkas district	Smalininkai DW	765	187																
Jurbarkas district	Jurbarkas DW	590	144																
Kaisiadorys district	Ziezmariai swr	4800	1171																
Kaisiadorys district	Kaisiadorys villages DW	650	159																
Kedainiai district	Kedainiai DW	10000	2439																
Kedainiai district	Kedainiai villages DW	3097	755																
Klaipeda district	Gargzdai swr	4100	1000																
Moletai district	Klaipeda villages DW	7800	1902																
Moletai district	Moletai swr	6300	1537																
Moletai district	Moletai DW	1850	451																
PALANGA	PALANGA swr	9000	2195																
PALANGA	PALANGA DW	5000	1220																
Panevezys district	Ramygala swr	6000	1463																
Panevezys district	Panevezys villages DW	9420	2298																
Panevezys district	Ramygala DW	275	67																
Plunge district	Rietavas DW	1250	305																
Plunge district	Rietavas swr	9400	2293																
Plunge district	Plateliai DW	3780	922																
Prienai district	Jeznas swr	3700	902																
Prienai district	Prienai DW	3000	732																

IV priority projects																			
Municipality	**Project title**	**Total invest-ment costs, thou. Lt**	**Total invest ment costs, thou.e uro**	Investment shedule (thou euro)															
				2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Sakiai district	Sakiai villages DW	16650	4061																
Silale district	Silale swr	6300	1537																
Sirvintos district	Sirvintos swr	8600	2098																
Skuodas district	Skuodas DW	2680	654																
Skuodas district	Skuodas swr	9400	2293																
Svencionys district	Svencionys DW	1350	329																
Svencionys district	Svencionys swr	14300	3488																
Varena district	Varena villages DW	100	24																
Vilnius district	Nemencine swr	4100	1000																
VILNIUS	Grigiskes swr	4300	1049																
Totally		**1827990**	**445851**		**50024**	**39474**	**38440**	**27798**	**22122**	**32261**	**22160**	**38222**	**0**	**0**	**46268**	**48679**	**27417**	**0**	**0**

Assumptions:

1. Rate between Lt and euro = 4.1
2. Projects which start in 2000 are secured with money and we do not plan needs for them for following years
3. ISPA part for 2000 is different here and in PIP, because PIP foresees the use of money (different for each year) and for our planning we need overall sum (signing of the agreement is for all amount)
4. It is realistic to receive a grant from Finland and Sweden for approx. 7 million euro in 2001, therefore grants part is not 25, but bigger.
5. Inspite of the fact that Siauliai swr extension is treated as priority project, it is put further because of social equity reasons
6. Sum for Kaunas wastewater project is reduced by suggestion from Ministry specialists
7. 2009 and 2010 years are not foreseen for the implementation of water projects, as big waste incineration or composting projects should start.

Annex 7.2. List of Waste Projects in the Municipal Investment Programme and Investment Schedule

Municipality	Project title	Total investment costs, thou Lt	Total investment costs, thou euro	Investment schedule (thou euro)															
				2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	PIP projects																		
Siauliai county	Waste project I	22000	5366	5366															
Telsiai county	New Plunge landfill		1000	1000															
Siauliai county	Hazardous waste management facility	12000	3000	1500	1500														
Klaipeda county	Hazardous waste management facility	5820	1455	728	728														
	I priority projects																		
Panevezys county	Upgrading of existing system	7380	1800	1800															
Taurage county	Constr of regional Taurage landfill, closure of existing, establishment of collection and sorting system in county	19270	4700		4700														
Alytus county	Construction of new regional landfill, closure of existing, establishment of waste collection and sorting system in county, construction of sorting and baling linefor plastics and paper in Alytus	28290	6900		6900														
Klaipeda county	Construction of regional Klaipeda landfill and closure of existing, establishment of collection and sorting system in county (except Silute) and constr of sorting and baling line for paper and plastics in Klaipeda	49610	12100			12100													
Marijampole county	Construction of Marijampole regional landfill, closure of existing, establishment of collection and sorting system in county	27060	6600				6600												

Municipality	Project title	Total investment costs, thou Lt	Total investment costs, thou euro	Investment schedule (thou euro)															
				2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Vilnius county	Construction of regional Vilnius landfill and closure of exist Karijotiskes landfill and establishment of collection and sorting system in county (except Ukmerge and Sirvintos munic) and constr of sorting and baling line for paper and plastics in Vilnius	82820	20200				20200												
Kaunas county	Construction of reg landfill for Kedainiai and Raseiniai municipalities, closure of Kedainiai landfill, establishment of collection and sorting system in mentioned municipalities	22550	5500					5500											
Kaunas county	Establishment of collection and sorting system in Kaunas county (except Kedainiai and Raseiniai munic) and constr of sorting facility for glass	29520	7200					7200											
Utena county	Construction of reg Utena landfill, closure of existing, establishment of collection and sortin system in county	23370	5700					5700											
Siauliai county	Closure of existing landfills including Bubiai, N.Akmene and Kelme	15170	3700						3700										
Panevezys county	Constr of reg Panevezys landfill, closure of existing, establishment of collection and sorting system in county (except Rokiskis, Birzai and Kupiskis), constr of baling line	38540	9400						9400										
Panevezys county	Construction of reg landfill for Rokiskis, Birzai&Kupiskis, closure of existing in Birzai, establishment of collection and sorting system for mentioned municipalities	14760	3600						3600										

II priority projects

Municipality	Project title	Total investment costs, thou Lt	Total investment costs, thou euro	Investment schedule (thou euro)															
				2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Telsiai county	Constr of reg Telsiai landfill, closure of exist Mazeikiai and Telsiai landfills, establishment of collection and sorting system in county	26240	6400							6400									
Klaipeda county	Closure of landfills in county including Kretinga landfill	5740	1400							1400									
Marijampole county	Closure of landfills in county including Kazlu Ruda, Sakiai and Vilkaviskis	13530	3300							3300									
Panevezys county	Closure of small landfills in Rokiskis, Birzai, Kupiskis	4100	1000							1000									
Vilnius county	Closure of landfills in county including Vievis, Salcininkai and Eisiskes	9840	2400							2400									
Panevezys county	Closure of small and average landfills in county (except Rokiskis, Birzai and Kupiskis)	2870	700							700									
Kaunas county	Constr of reg Kaunas landfill and closure of exist Lapes landfill	44690	10900								10900								
Kaunas county	Closure of Kedainiai and Raseiniai landfills including Ciobiskis and Raseiniai	6970	1700								1700								
Taurage county	Closure of exist landfills in county	4100	1000								1000								
Telsiai county	Closure of exist landfills in county	4100	1000								1000								
Kaunas county	Closure of landfills in county (except Kedainiai and Raseiniai) including Jonava, Miskiniai and Prienai	11070	2700								2700								

	III priority projects																		
Municipality	**Project title**	**Total investment costs, thou Lt**	**Total investment costs, thou euro**	**Investment schedule (thou euro)**															
				2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Alytus county	Closure of landfills including Druskininkai and Lazdijai	10660	2600									2600							
Utena county	Closure of landfills in county including Ignalina, zarasai and Moletai	13940	3400									3400							
Vilnius county	Constr of reg Ukmerge landfill, establishment of collection and sorting system in mentioned munic, closure of exist landfills including Ukmerge landfill	10660	2600									2600							
Klaipeda county	Constr of reg Silute landfill, establishment of collection and sorting system in Silute munic, closure of exist landfills including Silute landfill	9430	2300									2300							
Vilnius county	Vilnius incineration plant	300120	73200										73200						
Alytus county	Composting facility in Alytus	9020	2200											2200					
Kaunas county	Kaunas incineration facility	300530	73300											73300					
	IV priority projects																		
Siauliai county	Composting facility in Siauliai	9020	2200												2200				
Vilnius county	Composting facility in Vilnius	19300	4700												4700				
Kaunas county	Composting facility in Kaunas	19300	4700													4700			
Panevezys county	Composting facility in Panevezys	19300	4700														4700		
Taurage county	Composting in Taurage	9020	2200														2200		
Marijampoles raj.	Composting in Marijampole	9020	2200														2200		
Klaipeda county	Incineration facility in Klaipeda	300120	73200															73200	
Total					**13828**	**12100**	**26800**	**18400**	**16700**	**15200**	**17300**	**10900**	**73200**	**75500**	**6900**	**4700**	**9100**	**73200**	**0**

Assumptions:

1. Rate between Lt and euro = 4.1
2. Projects which start in 2000 are secured with money and we do not plan needs for them for following years
3. ISPA part for 2000 is different here and in PIP, because PIP foresees the use of money (different for each year) and for our planning we need overall sum (signing of the agreement is for all amount)
4. It is realistic to receive a grant from Finland and Sweden for approx. 7 million euro in 2001, therefore grants part is not 25, but bigger.
5. Siauliai and Klaipeda hazardous waste treatment facilities are secured with investment financing (PIP and PHARE). In addition, running costs will need to be financed by private companies, therefore their costs are not included further into the burden calculation.

Annex 7.2.1 Specific Description of the Situation Concerning Waste Investment Projects in Each County of Lithuania

As Kaunas municipal landfill corresponds to the basic requirements set in the Landfill Directive, there is no immediate need to establish new regional landfill in Kaunas area. It was assumed that development and upgrading of waste collection and sorting facilities in Kaunas region can be started before construction of new landfill.

Financing for construction of new Plunge landfill in Telsiai County has been already allocated and the landfill should be completed in this year. Construction of new landfill for a single municipality is in conflict with the general strategy for developing regional waste management system adopted by the Ministry of Environment. As the construction of new Plunge landfill cannot be cancelled, it is necessary to start a study for evaluating options how to integrate new landfill into the regional system. Possible options can be establishment of temporary "subregional" system and using new Plunge landfill for both Plunge and Telsiai municipalities, or extending the landfill in the future for use by the whole county.

Investments for landfill construction and closure of existing landfills were taken from the report on the Network of Future Municipal Landfills in Lithuania. Investment figures for Vilnius, Kaunas and Klaipeda landfills were reduced as compared to the report having in mind planned construction of waste incineration facilities, which will reduce the amount of landfilled waste 3 to 4 times.

Investment figures for waste collection and sorting facilities were partly taken from the report on the Recycling Strategy and partly evaluated by this project.

Basic features of certain proposed projects are outlined further:

Alytus County

The development of waste management system in Alytus County is planned in three stages. The first stage will include the main components of the system, while closure of middle-size and small landfills is foreseen for the year 2008. Construction of composting facility is planned in 2010.

Alytus County waste management plan has been developed and approved by both county and municipal authorities. Application for ISPA financing for developing Alytus County waste management system has been made jointly by all municipalities and it is most comprehensive if compared to other applications.

Kaunas County (main part)

Kaunas County is divided in two areas with separate landfills serving each area. The landfill close to Kaunas City should serve the main part of the County except Kedainiai and Raseiniai municipalities where separate regional waste management system is planned.

As existing Kaunas landfill is meeting international standards, development of comprehensive collection system for the whole landfill catchment area is planned

before construction of the new landfill. The project will include also construction of glass sorting line. It is assumed that the investments for the construction of glass sorting plant will be taken by the municipalities, however, the plant can also be established as a private enterprise (e.g. by Aleksotas glass factory).

Investments in new Kaunas landfill are evaluated taking into account waste incineration, which will be started soon after construction of the new landfill.

Separate landfill is planned for Kedainiai and Raseiniai municipalities in the northwestern part of the Kaunas County. Currently, new Kedainiai municipal landfill is under construction. It is suggested that the landfill could be completed in the year 2000 with the assistance of bilateral donors. Expansion of the landfill and establishment of waste collection system covering both municipalities is planned for 2004.

Klaipeda County

The development of Klaipeda County waste management system is divided into two projects. The Klaipeda regional landfill should serve the whole county except Silute municipality for which separate landfill is proposed.

Investment requirements for Klaipeda regional landfill were evaluated having in mind that incineration facility will be established in 2014 which will reduce the amount of waste disposed in the landfill.

Applications for ISPA financing have been received separately from Klaipeda City and from Kretinga and Palanga municipalities. Both applications should be reconsidered and the co-operation between the municipalities should be established.

Establishment of upgraded waste management system, construction of new landfill and closure of all existing landfills in Silute municipality is planned in one single project.

Marijampole County

The first waste management project in Marijampole County includes construction of new regional landfill, establishment of collection system covering the whole County and closure of existing Marijampole City landfill. Closure of remaining landfills in the County is planned for 2006. Construction of composting facility in Marijampole should be started in 2013.

Panevezys County (main part)

Two landfills are planned in the Panevezys County, one close to Panevezys City and another in the Northern part of the County serving three municipalities: Rokiskis, Birzai and Kupiskis.

Panevezys City municipality is going to upgrade waste collection system using the loan from the World Bank (currently estimated at approximately 1.9 MUSD). However, the World Bank project will not cover establishment of the whole-county

collection system, construction of new landfill and closure of existing landfills. Therefore, new project will be needed for establishing integrated waste management system.

Siauliai County

Application for ISPA financing for Siauliai waste management project has been already approved, however, the project planned for the year 2000 will not include the establishment of integrated waste collection and management system covering the whole County. Therefore, another project is planned which, together with the establishment of waste collection system will include closure of remaining landfills in the County.

Siauliai district municipality has made a separate application for ISPA financing for the developing of waste management system. The application is co-ordinated neither with the general waste management strategy nor with the approved Siauliai regional project. The application should be modified and serve as a basis for the second stage regional project.

Taurage County

As new landfill is urgently needed in Taurage, this is a high priority project. The project will include the development of the regional system including new landfill and closure of existing Taurage landfill, while closure of remaining old landfills is planned 6 years later.

Telsiai County

As it was mentioned above, financing for construction of Plunge landfill has been already allocated and it is expected that the landfill will be completed this year. It is not clear how this landfill will be integrated into the regional waste management system. Regional waste management strategy should be developed before starting the project covering the whole county.

Vilnius County

Two landfills are envisaged in Vilnius County: one for southern and central part of the County including Vilnius City and another separate landfill for Ukmerge and Sirvintai municipalities in the northern part of the County.

The development of waste management system in the main part of Vilnius County is split into two projects in accordance with the principles described above. The need for investment in the new landfill was evaluated assuming that incineration plant for municipal waste will be constructed in 2008-2009 and landfill space will be needed only for slag produced during incineration.

Utena County

It is assumed that the whole waste management system including new landfill, closure of existing Utena landfill and waste collection system covering all County area will be

developed in the framework of one project. Closure of remaining landfills is planned 4 years later.

Annex 7.3. Description of Main Studies in Air Sector

Currently there is not enough data to identify and select projects in air quality sector to be proposed for financing. The main reason is that uncertainties related to the detalisation of the recently adopted National Energy Strategy do not allow predicting possible changes in power plants. The policy for future development of plants related to the environmental requirements could be quite different depending on taken policy steps. In addition, external conditions, like changes in heavy fuel oil or gas prices, will impact future decisions as well. Therefore, at the moment studies on costs of modifications of power plants, which have been made so far, could be almost the only one source for deciding about projects necessary.

The following section thus focuses on studies performed so far.

1.

Milieu Ltd. **Report on the Costs of Approximating Lithuanian Environmental Legislation with the European Union (1998)** was the first comprehensive document that presented analysis of the costs of approximating with the Directives in air quality sector.

The Report states that calculating the approximation costs for implementation of the directive 88/609/EEC in Lithuania, several controversial elements need to be considered. Firstly, regarding the reduction requirements for total national emission ceilings, particularly No_x and So_2 for existing large combustion plants, Milieu Ltd. assumed that the large combustion plants in Lithuania as a group will need to meet the average percentage reduction that was applied to the EU-12. Secondly, there is some uncertainty surrounding the future of the Ignalina Nuclear Power Plant. Milieu Ltd. therefore used the best forecast of the (then) Ministry of Energy and assumed that Unit 1 would close in the year 2003 and the plant will close completely in 2008. This loss of capacity will at least partly be replaced by thermal power. Closure delays would, of course, reduce the costs of complying with 88/609/EEC. As a part of this scenario, it is expected that new gas turbine power stations will need to be installed in two units of Lithuanian Power Plant and one in Vilnius CHP-3.

As it is known, Lithuania recently committed to close Ignalina Unit 1 by 2005, if international financial assistance is received to support that step. This assistance is very likely to be forthcoming, implying that the actual result will be very close to that proposed by the Ministry of Energy. Indeed, because Milieu Ltd. (1998) calculated costs in five year units, the timing of cost estimates should be in line with the actual period in which costs will be incurred. As regards all nuclear plant, The National Energy Strategy (adopted by Governmental resolution No VIII-1348, October 5, 1999) foresees that date and conditions for the complete closure of Power Plant (Unit 2 closure) will be set in an updated National Energy Strategy in 2004.

Thirdly, Milieu Ltd. analyses the use of orimulsion as a fuel in two units of the Lithuanian Power Plant and Vilnius CHPP-3 like one of potentially important factor influencing the time path of emissions. This fuel has high sulphur content. In the context of the directive, it is unclear how to treat this fuel. Milieu Ltd. viewed this change (that occurred after 1988) as significant enough to warrant treatment as a "new source." Of course, this interpretation will be one part of negotiations regarding

approximation with the *acquis*. Indeed, one possible solution is that Lithuania will halt the use of orimulsion fuel. As can be seen in the following tables, the approximation costs associated with the use of orimulsion can, depending on the interpretation of the directive, be quite serious. By 2020 almost 55 million Euros will have to be invested in the two plants to allow them to meet the concentration limits. In all cases first investments will have to be made between 2005 and 2010 after the complete (most probably) closure of Ignalina NPP.

Cumulative Investments for Orimulsion-Fired Power Plants to Meet the SO_2, NO_x and Particulate Concentration Requirements in the Directive (2000 MEuros)
Source: Milieu Ltd. (1998)

	Five Year Period Ending			
	2005	**2010**	**2015**	**2020**
SO_2	15.8	23.70	31.60	39.80
NO_x	3.63	4.95	11.21	14.67
Particulates	0.30	0.46	0.61	0.77
TOTALS	**19.73**	**29.11**	**43.42**	**55.24**

Cumulative Investment Costs of Approximation with the 88/609/EEC Directive (2000 MEuros)

Five Year Period Ending				Key notes
2005	**2010**	**2015**	**2020**	
0	14.05	29.28	34.14	Two conditions: Ignalina NPP closure and meeting emission ceilings

Total Costs of Approximating with 88/609/EEC, including the Use of Orimulsion (Millions of Euros)

	Five Year Period Ending			
Year	**2005**	**2010**	**2015**	**2020**
Cumulative Investment	19.73	43.16	72.70	89.38

Directive 96/61/EC on Integrated Pollution Prevention and Control (IPPC)

The analysis made by the same mentioned project took a very, very preliminary step toward evaluating the costs of the IPPC Directive. The team took as the universe of pollution sources only those that were considered large combustion plants. These sources certainly will be subject to the Directive and will likely make up a large percentage of Lithuanian sources subject to IPPC. Milieu Ltd. explored the implications of imposing BAT on these sources ONLY for SO_2 reductions. The scope of the analysis was therefore rather limited. MOSES model, prepared by TME, was used for estimation of those costs.

Cumulative Investments Costs for Approximation with the Directive 96/61/EEC, 2000 MEuros
(for BAT Techniques for Sulphur Dioxide Abatement Applied to the 48 Existing Large Combustion Plants)
Source: TME (1997) and Milieu Ltd. (1998)

	Additional Costs of 96/61/EEC			
Year	**2005**	**2010**	**2015**	**2020**
Cumulative Investments	28.34	47.74	65.40	65.40

Other studies

2.
Within the framework of the co-operation with States of Central and Eastern Europe, the Swiss Government, in 1995, agreed to make a non-reimbursable contribution to finance a limited number of priority projects in the environmental, energy, infra structural and health sector. In order to assess the technical, environmental, economic and financial aspects of the selected projects, Colenco was appointed in 1995 to prepare an appraisal report covering the selected projects: 1) Kaunas Thermal Power Plant, 2) Vilnius Boiler House No.8. and Environmental Audit for both thermal heat and power plants. 4 alternatives were discussed that included measures for installation of certain flue gas measuring and monitoring systems, combustion optimisation and installation of low NOx burners for mentioned plants. The costs of implementation of these alternatives vary from **5 to 8 million Lt**.

It should be mentioned that some Lithuanian plants already have installed monitoring equipment. Namely, during last years Kaunas CHP-2, Vilnius CHP-2, Vilnius CHP-3, Vilnius boiler house-8 and Mazeikiai CHP have performed such kind of activities. This implies that not all power plants should be considered as those needing the mentioned measures.

3.
In the report on Technical Possibilities for Pollution Abatement of Selected Pollutants in Lithuania (1997) certain costs of environmental protection measures were presented too. The cost of installation of control equipment at a medium size (100 MW) district heating plant is approximately $US 280,000. The equipment increases plant efficiency by 2 % resulting in $US 80,000 annual savings. NOx emissions can be reduced up to 40 % by comparatively simple and low-cost combustion process modification measures. Low NOx burners are a second possibility to reduce NOx emissions up to 60%. The cost of installing low NOx burners at major Lithuanian power and CHP plants (Elektrenai(LPP), Vilnius, Kaunas, Klaipeda and Mazeikiai) is estimated at $US 9,500,000.

As it can be seen from above information, studies made dealt only with some energy plants, thus providing just fragmentical information on required costs in combustion plants. Quite an extensive work in power and heating sector was carried out just for Lithuanian Power Plant.

Lithuanian Power Plant

4.

The last few years LPP uses only one unit of 150 MW with a minimal loading. It is planned that after the Ignalina closure, Lithuanian PP will work in a full capacity.

In September 1997 an investigation to deal with increased SO2 emissions in Lithuanian PP in case of Ignalina closure was made. Seven companies (1 Danish-Swedish, 1 Danish, 3 German, 1 Japan) participated in the tender to propose sulphur

removal equipment for Lithuanian PP. The price is varying between 24 million Litas, and 234 million Litas.

After the adoption of the new Lithuanian emission standards (LAND 12-98) additional reconstruction of smoke re-circulation systems and full instalment of it in Unit No.5 appeared to be necessary to reduce NOx emissions.

5.

STONE&WEBSTER company in 1999 developed a study evaluating a state of all equipment in Lithuanian PP; assessed volume and price of necessary renovation works. Total cost of implementation equalled to USD 867 million, from which USD 549 million should be used before 2005 (closure of Ignalina NP Unit 1). Calculated cost only for environmental protection measures is US$ 19'225'300 (see table below). Referring to the study the World Bank provided a loan of USD 10 million to change control and management systems, burners and main regulators in Unit No.6. The works are already started and should be finished before the end of 2001.

Investments to renovate Lithuanian PP (millions of USD)

2000	2001	2002	2003	2004	2005	2006
19	115	130	135	150	159	159

Cost of Environmental Protection Measures (USD)

	Environmental Protection Measures	Total Cost US$
I	**Boiler Projects – Units 1-4**	**6'522'750**
1.	Burner Replacement all Units (total 24 burners)	6'296'000
2.	Fuel Additive system (all units)	226'750
II	**Boiler Projects – Units 5-8**	**11'499'150**
3.	Burner Replacement all Units (total 56 burners)	10'976'000
4.	Fuel Additive system (all units)	332'750
5.	Relief Valve Sound Attenuation (All Units)	190'400
III	**I&C/Elect'I Tasks – Units 1-4**	**571'450**
6.	Continuous Emissions Monitoring System Unit 1 Unit 2 Unit 3 Unit 4	 169'300 134'050 134'050 134'050
IV	**I&C/Elect'I Tasks – Units 5-8**	**608'950**
7.	Continuous Emissions Monitoring System Unit 5 Unit 6 Unit 7 Unit 8	 184'300 141'550 141'550 141'550
V	**Turb/Gen Projects – Units 1-4**	**23'000**
8.	Oil Discharge Abatement System & L.O. CW Pressure	23'000
	Total	**19'225'300**

Fuel Substitution

The substitution of heavy fuel oil (HFO) by natural gas could eliminate sulphur dioxide emissions and reduce nitrogen oxide emissions. The process of HFO substitution with natural gas could be quite slow because natural gas prices are

increasing and will be higher than HFO prices. The national policy is to substitute natural gas first in boilers situated in densely populated areas and having low stacks. However, no investment costs are incurred in this case, because only fuel switching takes place.

It can be seen from the discussion above that there are few categories of measures to be implemented in energy plants. However, as it was mentioned, before the adoption of the National Energy Action Plan, no clear policy is known and thus no concrete projects could be elaborated.
The following table summarises the projects presented above and gives different unit costs for different groups of power plants:

Summary of projects related to power plants

Project	Description	Capacity	Total cost	Unit cost
Milieu (1998)	Instalment of new gas turbine in two units of LPP and one in Vilnius CHPP-3	4118+951= 5069 MW	34.14 meuros = 140 mLt	**27,614** Lt/MW
Milieu (1998)	The same as above including the use of orimulsion	5069 MW	89.38 meuro = 366 mLt	**72,294** Lt/MW
Milieu (1998)	Implementation of IPPC directive regarding sulphur emissions	All large combustion plants – 17695 MW	65.40 meuro = 268 mLt	**15,153** Lt/MW
Colenco (1995)	Instalment of certain flue gas measuring and monitoring systems, combustion optimisation and low Nox burners	Two plants – Kaunas TPP and Vilnius boiler house-8 1544 +494 = 2038	6.5 mLt (average)	**3,189** Lt/MW
IC Consult, ERM Energy, COWIconsult. National Energy Strategy of the Republic of Lithuania, Final report (December 1993)	Cost of installing low Nox burners in major plants	LPP-4118MW, Vilnius-1070+951 =2021MW, Kaunas-1544MW, Klaipeda-559+333= 892MW, Mazeikiai-1420MW 9995 MW	9.5 mUSD = 38 mLt	**3,802** Lt/MW
COWIconsult. Proposals for Rehabilitation Projects for Kaunas	Installation of control equipment at a medium size district heating plant	100MW	USD 280000 = 1.12 mLt	**11,200** Lt/MW
1997 different companies-tender for sulphur removal equipment	LPP	4119 MW	24 mLt to 234 mLt	**5,827** Lt/MW to **56,810** Lt/MW
Stone&Webster (1999)	Environmental measures in LPP	4119 MW	20 mUSD = 80 mLt	**19,422** Lt/MW

The table shows that unit cost for different kind of measures in different power plants according to different projects and thus methodologies used could vary from approximately 3200 Lt per MW of capacity to even 72000Lt per MW. The difference is 22 times.

6. Strengthening of the Framework and Administration of Lithuania's Laws on Waste Management and Environmental Management of Industry

This project calculated limits for costs for LCP as regards the implementation of IPPC. The work was based on the analysis of studies made so far and presented above. The resulting costs amount to 57 million to 500 million Lt or 14 to 122 m euros. The almost ten times difference seems not so frightening having in mind a lot of not clear policy steps.

Annex 7.4. Share of the Biggest Environmental Project Loan Component in Municipal Budget

The Annex is divided into two parts and presents the share of the biggest environmental project in a specific municipality for two scenarios – A-I and C-III.

Annex 7.4.1. Share of the biggest environmental project loan component in municipal budget under the scenario A-I
Annex 7.4.2. Share of the biggest environmental project loan component in municipal budget under the scenario C-III

Annex 7.4.1 Share of the Biggest Environmental Project Loan Component in Municipal Budget, Scenario A-I

Municipality	Municipal income in thou euros (1999)	Percentage of the biggest project in municipal budget (%)
Akmene district	9331,22	22,58
Alytus district	7910,49	5,46
ALYTUS city	17300,73	15,69
Anyksciai district	8712,20	25,12
BIRSTONAS city	2813,66	68,26
Birzai district	8867,07	9,90
DRUSKININKAI city	5755,61	27,97
Ignalina district	7266,10	37,37
Jonava district	11655,37	32,39
Joniskis district	8786,34	23,64
Jurbarkas district	9049,51	47,74
Kaisiadorys district	10078,78	18,66
KAUNAS city	73074,15	19,57
Kaunas district	15147,32	19,25
Kedainiai district	13792,20	20,66
Kelme district	9469,27	29,90
KLAIPEDA city	39021,95	33,02
Klaipeda district	10832,93	26,86
Kretinga district	11202,44	26,69
Kupiskis district	6932,20	20,05
Lazdijai district	7990,73	25,46
MARIJAMPOLE city	12074,39	39,15
Marijampole district	11396,10	17,37
Mazeikiai district	15784,88	18,15
Moletai district	6713,66	6,87
NERINGA city	3410,00	68,66
Pakruojis district	8435,85	20,74
PALANGA city	6633,90	18,77
Panevezys district	9752,44	7,07
PANEVEZYS city	25551,22	18,90
Pasvalys district	8601,95	14,85
Plunge district	12548,78	16,15
Prienai district	8915,12	15,12
Radviliskis district	11798,78	23,91
Raseiniai district	9990,49	18,09
Rokiskis district	10400,24	19,64
Sakiai district	9516,83	20,52
Salcininkai district	8637,32	12,28
SIAULIAI city	30721,71	16,39
Siauliai district	11845,61	27,90
Silale district	9139,02	11,69
Silute district	14911,22	14,48
Sirvintos district	6149,02	10,23
Skuodas district	7445,85	9,24
Svencionys district	8305,85	22,24

Municipality	Municipal income in thou euros (1999)	Percentage of the biggest project in municipal budget (%)
Taurage district	12070,00	27,92
Telsiai district	12606,34	5,11
Trakai district	15734,15	13,55
Ukmerge district	10280,73	26,97
Utena district	11681,46	22,42
Varena district	8473,66	29,64
Vilkaviskis district	11275,12	27,45
Vilnius district	15979,51	14,76
VILNIUS city	109893,66	14,07
VISAGINAS city	9307,80	10,46
Zarasai district	6471,22	60,20

Annex 7.4.2 Share of the Biggest Environmental Project Loan Component in Municipal Budget, Scenario C-III

Municipality	Municipal income in thou euros (1999 planned)	Percentage of the biggest project loan component in municipal budget, %
Akmene district	9331,22	45,2
Alytus district	7910,49	10,9
ALYTUS city	17300,73	31,4
Anyksciai district	8712,20	50,2
BIRSTONAS city	2813,66	136,5
Birzai district	8867,07	19,8
DRUSKININKAI city	5755,61	55,9
Ignalina district	7266,10	74,7
Jonava district	11655,37	64,8
Joniskis district	8786,34	47,3
Jurbarkas district	9049,51	95,5
Kaisiadorys district	10078,78	37,3
KAUNAS city	73074,15	39,1
Kaunas district	15147,32	38,5
Kedainiai district	13792,20	41,3
Kelme district	9469,27	59,8
KLAIPEDA city	39021,95	66,0
Klaipeda district	10832,93	53,7
Kretinga district	11202,44	53,4
Kupiskis district	6932,20	40,1
Lazdijai district	7990,73	50,9
MARIJAMPOLE city	12074,39	78,3
Marijampole district	11396,10	34,7
Mazeikiai district	15784,88	36,3
Moletai district	6713,66	13,7
NERINGA city	3410,00	137,3
Pakruojis district	8435,85	41,5
PALANGA city	6633,90	37,5
Panevezys district	9752,44	14,1
PANEVEZYS city	25551,22	37,8
Pasvalys district	8601,95	29,7
Plunge district	12548,78	32,3
Prienai district	8915,12	30,2
Radviliskis district	11798,78	47,8
Raseiniai district	9990,49	36,2
Rokiskis district	10400,24	39,3
Sakiai district	9516,83	41,0
Salcininkai district	8637,32	24,6
SIAULIAI city	30721,71	32,8
Siauliai district	11845,61	55,8
Silale district	9139,02	23,4
Silute district	14911,22	29,0
Sirvintos district	6149,02	20,5
Skuodas district	7445,85	18,5
Svencionys district	8305,85	44,5

Municipality	Municipal income in thou euros (1999 planned)	Percentage of the biggest project loan component in municipal budget, %
Taurage district	12070,00	55,8
Telsiai district	12606,34	10,2
Trakai district	15734,15	27,1
Ukmerge district	10280,73	53,9
Utena district	11681,46	44,8
Varena district	8473,66	59,3
Vilkaviskis district	11275,12	54,9
Vilnius district	15979,51	29,5
VILNIUS city	109893,66	28,1
VISAGINAS city	9307,80	20,9
Zarasai district	6471,22	120,4
Total	**787444,15**	

Average share of loan component of the biggest project: **41,02%**

Annex 7.5. Repayment of Loans as % from Municipal Revenue/Expenditure

The Annex is divided into four parts, which show percentage of loan component of future environmental projects in the municipal revenue/expenditure of 1999.

Annex 7.5.1. Repayment of loans as % from municipal revenue/expenditure of 1999 under the scenarios A-I and B-I.
Annex 7.5.2. Repayment of loans as % from municipal revenue/expenditure of 1999 under the scenario C-I.
Annex 7.5.3. Repayment of loans as % from municipal revenue/expenditure of 1999 under the scenario A-II.
Annex 7.5.4. Repayment of loans as % from municipal revenue/expenditure of 1999 under the scenario C-III.

Annex 7.5.1. Repayment of Loans as % from Municipal Revenue/Expenditure, Scenarios A-I and B-I

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Akmene district	0,0	0,0	0,0	0,2	0,2	0,2	2,5	2,5	2,6	2,6	2,6	4,7	4,7	4,7	4,7
Alytus district	0,0	0,0	0,0	0,0	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,6	0,6	0,6	0,6
ALYTUS city	0,0	0,0	0,0	0,0	0,5	0,5	2,1	2,1	2,1	2,1	2,1	2,3	2,3	2,3	2,3
Anyksciai district	0,0	0,0	0,0	0,0	0,0	2,1	2,1	2,5	2,5	5,1	5,1	5,3	5,3	5,3	5,3
BIRSTONAS city	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	7,2	7,2	7,1	7,1	7,1
Birzai district	0,0	0,0	0,0	1,0	1,0	1,0	1,0	1,0	1,5	1,6	1,6	1,6	1,6	1,6	1,6
DRUSKININKAI city	0,0	0,0	0,0	2,9	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,4	3,4
Ignalina district	0,0	0,0	0,0	1,2	1,2	1,2	1,2	1,5	1,5	1,5	1,5	1,5	1,5	1,7	1,7
Jonava district	0,0	0,0	0,0	0,0	3,3	3,3	3,3	3,5	3,5	3,5	3,8	3,8	3,8	3,8	3,8
Joniskis district	0,0	0,0	0,0	0,2	0,2	0,2	0,2	0,2	0,3	2,7	2,7	2,7	2,7	2,7	2,7
Jurbarkas district	0,0	0,0	0,0	1,0	1,5	1,5	1,5	1,5	1,5	1,5	1,6	1,6	1,6	1,6	1,6
Kaisiadorys district	0,0	0,0	0,0	0,0	0,0	0,0	1,9	2,1	2,1	2,1	2,3	2,3	2,3	2,3	2,3
KAUNAS city	0,0	0,0	0,0	0,5	1,9	1,9	1,9	2,1	2,1	2,1	2,5	2,5	2,5	2,5	2,5
Kaunas district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,2	0,2	0,2	0,6	0,6	0,6	0,6	0,6
Kedainiai district	0,0	0,0	0,0	0,0	0,0	2,1	2,1	2,9	2,9	2,9	3,1	3,1	3,1	3,1	3,1
Kelme district	0,0	0,0	0,0	0,2	0,2	0,2	0,2	0,2	0,4	0,4	0,4	0,4	0,4	0,4	0,4
KLAIPEDA city	0,0	0,0	0,0	0,4	0,4	1,0	1,0	1,0	1,0	1,0	1,8	1,8	1,8	1,8	1,8
Klaipeda district	0,0	0,0	0,0	0,0	0,0	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Kretinga district	0,0	0,0	0,0	0,0	0,0	0,5	0,5	0,5	2,2	2,3	2,3	2,3	2,3	2,3	2,3
Kupiskis district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,4	0,5	0,5	0,5	0,5	0,5	0,5
Lazdijai district	0,0	0,0	0,0	0,0	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,6	0,6	0,6	0,6
MARIJAMPOLE city	0,0	0,0	0,0	0,0	0,0	0,0	0,4	0,4	4,5	4,7	4,7	4,7	4,7	4,7	4,7
Marijampole district	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,5	0,5	0,7	0,7	0,7	0,7	0,7	0,7
Mazeikiai district	0,0	0,0	0,0	0,0	0,0	1,9	1,9	1,9	1,9	2,3	2,4	2,4	2,4	2,4	2,4
Moletai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,3	0,3	0,3	0,3	0,6	0,6	0,5	0,5
NERINGA city	0,0	0,0	7,1	7,1	7,1	7,2	7,2	7,2	7,2	7,2	7,2	7,2	7,2	7,2	7,2
Pakruojis district	0,0	0,0	0,2	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,3	0,3
PALANGA city	0,0	0,0	0,0	0,0	0,0	0,3	0,3	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,4

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Panevezys district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,6	0,6	0,6	0,6	0,6	0,6	0,6
PANEVEZYS city	0,0	0,0	1,6	2,0	2,0	2,0	4,0	4,0	4,7	4,7	4,7	4,7	4,7	4,7	4,7
Pasvalys district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Plunge district	0,0	0,0	0,0	0,2	0,2	1,9	1,9	1,9	1,9	2,4	2,5	2,5	2,5	2,5	2,5
Prienai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,2	0,2	0,2	0,4	0,4	0,4	0,4	0,4
Radviliskis district	0,0	0,0	0,0	0,2	0,2	2,2	2,2	2,2	2,3	2,3	2,3	2,3	2,3	2,3	2,3
Raseiniai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,7	0,7	0,7	0,9	0,9	0,9	0,9	0,9
Rokiskis district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,4	2,6	2,6	2,6	2,6	2,6	2,6
Sakiai district	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,5	0,5	0,7	0,8	0,8	0,8	3,0	3,0
Salcininkai district	0,0	0,0	0,0	0,0	0,7	0,7	1,0	1,0	1,0	1,1	1,1	1,1	2,4	2,4	2,4
SIAULIAI city	0,0	0,0	0,0	3,0	3,0	3,0	3,0	4,7	4,9	4,9	4,9	5,7	5,7	5,7	5,7
Siauliai district	0,0	0,0	0,0	0,2	0,2	0,2	0,2	3,1	3,2	3,2	3,2	3,2	3,2	3,2	3,2
Silale district	0,0	0,0	0,0	0,0	0,4	0,4	0,4	0,4	0,4	0,4	0,5	0,5	0,5	0,5	0,5
Silute district	0,0	0,0	0,0	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	2,5	2,5	2,5	2,5
Sirvintos district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,4	0,4	0,4	0,4
Skuodas district	0,0	0,0	0,0	1,0	1,0	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4
Svencionys district	0,0	0,0	0,0	0,0	0,5	0,5	0,8	0,8	0,8	0,9	0,9	0,9	0,9	0,9	2,0
Taurage district	0,0	0,0	0,0	0,0	0,5	0,5	0,5	0,5	0,5	3,4	3,5	3,5	3,5	3,5	3,5
Telsiai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,6	0,6	0,6	0,6	0,6
Trakai district	0,0	0,0	0,0	0,4	0,4	0,4	0,8	0,8	0,8	0,9	2,1	2,1	3,5	3,5	3,5
Ukmerge district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,5	0,5	0,5
Utena district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,4	0,4	0,4	0,4	0,6	0,6	0,6	0,6
Varena district	0,0	0,0	0,0	1,5	1,9	1,9	1,9	1,9	1,9	1,9	1,9	2,1	2,1	2,1	2,1
Vilkaviskis district	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,5	0,5	0,7	0,7	3,6	3,6	3,6	3,6
Vilnius district	0,0	0,0	0,0	0,0	0,0	0,0	0,4	0,4	0,4	0,5	0,5	0,5	2,0	2,0	2,0
VILNIUS city	0,0	0,0	0,0	0,7	0,7	0,7	1,1	1,1	1,1	1,2	1,2	1,2	2,6	2,6	2,6
VISAGINAS city	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,3	0,3	0,3	0,3	0,5	0,5	0,5	0,5
Zarasai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,3	0,3	0,3	0,3	0,5	0,5	0,5	0,5

Annex 7.5.2. Repayment of Loans as % from Municipal Revenue/Expenditure, Scenario C-I

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Akmene district		0,0	0,0	0,3	0,3	0,3	4,0	4,0	4,1	4,1	4,1	7,5	7,5	7,5	7,5
Alytus district		0,0	0,0	0,0	0,7	0,7	0,7	0,7	0,7	0,7	0,7	1,0	1,0	1,2	1,2
ALYTUS city		0,0	0,0	0,0	0,7	0,7	3,3	3,3	3,3	3,3	3,3	3,6	3,6	3,6	3,8
Anyksciai district		0,0	0,0	0,0	0,0	3,3	3,3	3,9	3,9	8,0	8,0	8,4	8,4	8,4	8,4
BIRSTONAS city		0,0	0,0	0,5	0,5	0,5	0,5	0,6	0,6	0,6	11,8	11,8	11,8	12,6	12,6
Birzai district		0,0	0,0	1,6	1,6	1,6	1,6	1,6	2,3	2,5	2,5	2,5	2,5	2,5	2,5
DRUSKININKAI city		0,0	0,0	4,6	5,2	5,2	5,2	5,2	5,2	5,2	5,2	5,2	5,2	5,4	5,4
Ignalina district		0,0	0,0	2,0	2,0	2,0	2,0	2,4	2,4	2,4	2,4	2,4	2,4	2,7	2,7
Jonava district		0,0	0,0	0,0	5,3	5,3	5,3	5,5	5,5	5,5	6,0	6,0	6,0	6,0	6,0
Joniskis district		0,0	0,0	0,3	0,3	0,3	0,3	0,3	0,4	4,3	4,3	4,3	4,3	4,3	4,3
Jurbarkas district		0,0	0,0	1,6	2,4	2,4	2,4	2,4	2,4	2,4	2,5	2,5	2,5	2,5	2,5
Kaisiadorys district		0,0	0,0	0,0	0,0	0,0	3,0	3,3	3,3	3,3	3,7	3,7	3,7	3,7	3,7
KAUNAS city		0,0	0,0	0,5	2,8	2,8	2,8	3,1	3,1	3,1	3,7	3,7	3,7	3,7	3,7
Kaunas district		0,0	0,0	0,0	0,0	0,0	0,0	0,3	0,3	0,3	0,9	0,9	0,9	0,9	0,9
Kedainiai district		0,0	0,0	0,0	0,0	3,4	3,4	4,5	4,5	4,5	4,9	4,9	4,9	4,9	4,9
Kelme district		0,0	0,0	0,3	0,3	0,3	0,3	0,3	0,5	0,5	0,5	0,5	0,5	0,5	0,5
KLAIPEDA city		0,0	0,0	0,7	0,7	1,5	1,5	1,5	1,5	1,6	2,9	2,9	2,9	2,9	2,9
Klaipeda district		0,0	0,0	0,0	0,0	0,7	0,7	0,7	0,7	0,8	0,8	0,8	0,8	0,8	0,8
Kretinga district		0,0	0,0	0,0	0,0	0,7	0,7	0,7	3,5	3,6	3,6	3,6	3,6	3,6	3,6
Kupiskis district		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,6	0,8	0,8	0,8	0,8	0,8	0,8
Lazdijai district		0,0	0,0	0,0	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,9	0,9	0,9	0,9
MARIJAMPOLE city		0,0	0,0	0,0	0,0	0,0	0,7	0,7	7,1	7,4	7,4	7,4	7,4	7,4	7,4
Marijampole district		0,0	0,0	0,0	0,0	0,0	0,7	0,7	0,7	1,1	1,1	1,1	1,1	1,1	1,1
Mazeikiai district		0,0	0,0	0,0	0,0	3,0	3,0	3,0	3,0	3,6	3,8	3,8	3,8	3,8	3,8
Moletai district		0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,5	0,5	0,5	0,9	0,9	0,9	0,9
NERINGA city		0,0	11,2	11,2	11,2	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3
Pakruojis district		0,0	0,2	0,2	0,2	0,2	0,2	0,2	0,4	0,4	0,4	0,4	0,4	0,4	0,4
PALANGA city		0,0	0,0	0,0	0,0	0,5	0,5	0,5	0,5	0,6	0,6	0,6	0,6	0,6	0,6

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Panevezys district		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,9	1,0	1,0	1,0	1,0	1,0	1,0
PANEVEZYS city		0,0	2,5	3,2	3,2	3,2	6,3	6,3	7,4	7,5	7,5	7,5	7,5	7,5	7,5
Pasvalys district		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,9	1,0	1,0	1,0	1,0	1,0	1,0
Plunge district		0,0	0,0	0,4	0,4	3,0	3,0	3,0	3,0	3,8	3,9	3,9	3,9	3,9	3,9
Prienai district		0,0	0,0	0,0	0,0	0,0	0,0	0,2	0,2	0,2	0,7	0,7	0,7	0,7	0,7
Radviliskis district		0,0	0,0	0,3	0,3	3,5	3,5	3,5	3,7	3,7	3,7	3,7	3,7	3,7	3,7
Raseiniai district		0,0	0,0	0,0	0,0	0,0	0,0	1,1	1,1	1,1	1,4	1,4	1,4	1,4	1,4
Rokiskis district		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,7	4,1	4,1	4,1	4,1	4,1	4,1
Sakiai district		0,0	0,0	0,0	0,0	0,0	0,7	0,7	0,7	1,1	1,1	1,1	1,1	4,4	4,4
Salcininkai district		0,0	0,0	0,0	1,1	1,1	1,7	1,7	1,7	1,7	1,7	1,7	3,7	3,7	3,7
SIAULIAI city		0,0	0,0	4,8	4,8	4,8	4,8	7,5	7,7	7,7	7,7	8,9	8,9	8,9	8,9
Siauliai district		0,0	0,0	0,3	0,3	0,3	0,3	4,8	5,0	5,0	5,0	5,0	5,0	5,0	5,0
Silale district		0,0	0,0	0,0	0,6	0,6	0,6	0,6	0,6	0,6	0,8	0,8	0,8	0,8	0,8
Silute district		0,0	0,0	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	3,9	3,9	3,9	3,9
Sirvintos district		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,6	0,6	0,6	0,6
Skuodas district		0,0	0,0	1,6	1,6	2,2	2,2	2,2	2,2	2,3	2,3	2,3	2,3	2,3	2,3
Svencionys district		0,0	0,0	0,0	0,8	0,8	1,3	1,3	1,3	1,4	1,4	1,4	1,4	1,4	3,2
Taurage district		0,0	0,0	0,0	0,8	0,8	0,8	0,8	0,8	5,4	5,5	5,5	5,5	5,5	5,5
Telsiai district		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,8	1,0	1,0	1,0	1,0	1,0
Trakai district		0,0	0,0	0,7	0,7	0,7	1,3	1,3	1,3	1,4	3,2	3,2	5,5	5,5	5,5
Ukmerge district		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,9	0,9	0,9	0,9
Utena district		0,0	0,0	0,0	0,0	0,0	0,0	0,6	0,6	0,6	0,6	1,0	1,0	1,0	1,0
Varena district		0,0	0,0	2,3	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,3	3,3	3,3	3,3
Vilkaviskis district		0,0	0,0	0,0	0,0	0,0	0,8	0,8	0,8	1,1	1,1	5,6	5,6	5,6	5,6
Vilnius district		0,0	0,0	0,0	0,0	0,0	0,7	0,7	0,7	0,7	0,7	0,7	3,1	3,1	3,1
VILNIUS city		0,0	0,0	1,1	1,1	1,1	1,8	1,8	1,8	1,8	1,8	1,8	4,1	4,1	4,1
VISAGINAS city		0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,5	0,5	0,5	0,8	0,8	0,8	0,8
Zarasai district		0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,5	0,5	0,5	0,8	0,8	0,8	0,8

Annex 7.5.3. Repayment of Loans as % from Municipal Revenue/Expenditure, Scenario A-II

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Akmenes district	0,0	0,0	0,0	0,3	0,3	0,3	4,2	4,2	4,4	4,4	4,4	7,9	7,9	7,9	7,9
Alytus district	0,0	0,0	0,0	0,0	0,7	0,7	0,7	0,7	0,7	0,7	0,7	1,0	1,0	1,0	1,0
ALYTUS city	0,0	0,0	0,0	0,0	0,8	0,8	3,5	3,5	3,5	3,5	3,5	3,8	3,8	3,8	3,8
Anyksciai district	0,0	0,0	0,0	0,0	0,0	3,5	3,5	4,2	4,2	8,5	8,5	8,8	8,8	8,8	8,8
BIRSTONAS city	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,1	11,9	11,9	11,9	12,7	12,7
Birzai district	0,0	0,0	0,0	1,7	1,7	1,7	1,7	1,7	2,4	2,6	2,6	2,6	2,6	2,6	2,6
DRUSKININKAI city	0,0	0,0	0,0	4,8	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,7	5,7
Ignalina district	0,0	0,0	0,0	2,1	2,1	2,1	2,1	2,6	2,6	2,6	2,6	2,9	2,9	2,9	2,9
Jonava district	0,0	0,0	0,0	0,0	5,6	5,6	5,6	5,8	5,8	5,8	6,4	6,4	6,4	6,4	6,4
Joniskis district	0,0	0,0	0,0	0,3	0,3	0,3	0,3	0,3	0,5	4,5	4,5	4,5	4,5	4,5	4,5
Jurbarkas district	0,0	0,0	0,0	1,7	2,5	2,5	2,5	2,5	2,5	2,5	2,7	2,7	2,7	2,7	2,7
Kaisiadorys district	0,0	0,0	0,0	0,0	0,0	0,0	3,2	3,4	3,4	3,4	3,9	3,9	3,9	6,2	6,2
KAUNAS city	0,0	0,0	0,0	0,8	3,2	3,2	3,2	3,5	3,5	3,5	4,1	4,1	4,1	7,5	7,5
Kaunas district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,3	0,3	0,3	0,9	0,9	0,9	0,9	0,9
Kedainiai district	0,0	0,0	0,0	0,0	0,0	3,5	3,5	4,8	4,8	4,8	5,2	5,2	5,2	5,2	5,2
Kelme district	0,0	0,0	0,0	0,3	0,3	0,3	0,3	0,3	0,5	0,5	0,5	0,5	0,5	0,5	0,6
KLAIPEDA city	0,0	0,0	0,0	0,7	0,7	1,6	1,6	1,6	1,6	1,7	3,0	3,0	3,0	3,0	3,0
Klaipeda district	0,0	0,0	0,0	0,0	0,0	0,8	0,8	0,8	0,8	0,9	0,9	0,9	0,9	0,9	0,9
Kretinga district	0,0	0,0	0,0	0,0	0,0	0,8	0,8	0,8	3,7	3,8	3,8	3,8	3,8	3,8	3,8
Kupiskis district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,6	0,8	0,8	0,8	0,8	0,8	0,8
Lazdijai district	0,0	0,0	0,0	0,0	0,7	0,7	0,7	0,7	0,7	0,7	0,7	1,0	1,0	1,0	1,0
MARIJAMPOLE city	0,0	0,0	0,0	0,0	0,0	0,0	0,7	0,7	7,5	7,8	7,8	7,8	7,8	7,8	7,8
Marijampole district	0,0	0,0	0,0	0,0	0,0	0,0	0,8	0,8	0,8	1,2	1,2	1,2	1,2	1,2	1,2
Mazeikiai district	0,0	0,0	0,0	0,0	0,0	3,1	3,1	3,1	3,1	3,8	4,0	4,0	4,0	4,0	4,0
Moletai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,6	0,6	0,6	0,6	0,9	0,9	0,9	0,9
NERINGA city	0,0	0,0	11,8	11,8	11,8	11,9	11,9	11,9	11,9	11,9	11,9	11,9	11,9	11,9	11,9
Pakruojis district	0,0	0,0	0,3	0,3	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,4	0,4	0,4	0,4
PALANGA city	0,0	0,0	0,0	0,0	0,0	0,5	0,5	0,5	0,5	0,6	0,6	0,6	0,6	0,6	0,6

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Panevezys district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
PANEVEZYS city	0,0	0,0	2,6	2,6	2,6	2,6	5,9	5,9	7,1	7,2	7,2	7,2	7,2	7,2	7,2
Pasvalys district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Plunge district	0,0	0,0	0,0	0,4	0,4	3,2	3,2	3,2	3,2	4,0	4,1	4,1	4,1	4,1	4,1
Prienai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,3	0,3	0,3	0,7	0,7	0,7	0,7	0,7
Radviliskis district	0,0	0,0	0,0	0,3	0,3	3,7	3,7	3,7	3,9	3,9	3,9	3,9	3,9	3,9	3,9
Raseiniai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,1	1,1	1,1	1,5	1,5	1,5	1,5	1,5
Rokiskis district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,7	4,3	4,3	4,3	4,3	4,3	4,3
Sakiai district	0,0	0,0	0,0	0,0	0,0	0,0	0,8	0,8	0,8	1,1	1,1	4,7	4,7	4,7	4,7
Salcininkai district	0,0	0,0	0,0	0,0	1,2	1,2	1,7	1,7	1,7	1,8	1,8	1,8	3,9	3,9	3,9
SIAULIAI city	0,0	0,0	0,0	5,1	5,1	5,1	5,1	7,9	8,1	8,1	8,1	9,4	9,4	9,4	9,4
Siauliai district	0,0	0,0	0,0	0,3	0,3	0,3	0,3	5,1	5,3	5,3	5,3	5,3	5,3	5,3	5,3
Silale district	0,0	0,0	0,0	0,0	0,7	0,7	0,7	0,7	0,7	0,7	0,8	0,8	0,8	0,8	0,8
Silute district	0,0	0,0	0,0	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	4,1	4,1	4,1	4,1
Sirvintos district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,6	0,6	0,6	0,6
Skuodas district	0,0	0,0	0,0	1,6	1,6	2,3	2,3	2,3	2,3	2,4	2,4	2,4	2,4	2,4	2,4
Svencionys district	0,0	0,0	0,0	0,0	0,8	0,8	1,4	1,4	1,4	1,4	1,4	1,4	3,4	3,4	3,4
Taurage district	0,0	0,0	0,0	0,0	0,9	0,9	0,9	0,9	0,9	5,7	5,8	5,8	5,8	5,8	5,8
Telsiai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,9	1,0	1,0	1,0	1,0	1,0
Trakai district	0,0	0,0	0,0	0,7	0,7	0,7	1,4	1,4	1,4	1,4	3,4	3,4	5,8	5,8	5,8
Ukmerge district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,9	0,9	0,9	0,9
Utena district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,7	0,7	0,7	0,7	1,1	1,1	1,1	1,1
Varena district	0,0	0,0	0,0	2,4	3,2	3,2	3,2	3,2	3,2	3,2	3,2	3,5	3,5	3,5	3,5
Vilkaviskis district	0,0	0,0	0,0	0,0	0,0	0,0	0,8	0,8	0,8	1,2	1,2	5,9	5,9	5,9	5,9
Vilnius district	0,0	0,0	0,0	0,0	0,0	0,0	0,7	0,7	0,7	0,8	0,8	0,8	3,3	3,3	3,3
VILNIUS city	0,0	0,0	0,0	1,2	1,2	1,2	1,9	1,9	1,9	1,9	1,9	1,9	4,3	4,3	4,4
VISAGINAS city	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,5	0,5	0,5	0,8	0,8	0,8	0,8
Zarasai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,6	0,6	0,6	0,6	0,9	0,9	0,9	0,9

Annex 7.5.4. Repayment of Loans as % from Municipal Revenue/Expenditure, Scenario C-III

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Akmene district	0,0	0,0	0,0	0,5	0,5	0,5	7,9	7,9	8,3	8,3	8,3	15,0	15,0	15,0	15,0
Alytus district	0,0	0,0	0,0	0,0	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,9	1,9	1,9	1,9
ALYTUS city	0,0	0,0	0,0	0,0	1,5	1,5	6,6	6,6	6,6	6,6	6,6	7,2	7,2	7,2	7,2
Anyksciai district	0,0	0,0	0,0	0,0	0,0	6,7	6,7	7,9	7,9	16,1	16,1	16,8	16,8	16,8	16,8
BIRSTONAS city	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,1	22,6	22,6	22,6	24,1	13,6
Birzai district	0,0	0,0	0,0	3,2	3,2	3,2	3,2	3,2	4,6	5,0	5,0	5,0	5,0	5,0	5,0
DRUSKININKAI city	0,0	0,0	0,0	9,1	10,4	10,4	10,4	10,4	10,4	10,4	10,4	10,4	10,4	10,8	10,8
Ignalina district	0,0	0,0	0,0	3,9	3,9	3,9	3,9	4,9	4,9	4,9	4,9	5,4	5,4	5,4	5,4
Jonava district	0,0	0,0	0,0	0,0	10,5	10,5	10,5	11,1	11,1	11,1	12,1	12,1	12,1	12,1	12,1
Joniskis district	0,0	0,0	0,0	0,5	0,5	0,5	0,5	0,5	0,9	8,6	8,6	8,6	8,6	8,6	8,6
Jurbarkas district	0,0	0,0	0,0	3,2	4,7	4,7	4,7	4,7	4,7	4,7	5,1	5,1	5,1	5,1	5,1
Kaisiadorys district	0,0	0,0	0,0	0,0	0,0	0,0	6,1	6,5	6,5	6,5	7,3	7,3	7,3	11,8	11,8
KAUNAS city	0,0	0,0	0,0	1,5	6,1	6,1	6,1	6,7	6,7	6,7	7,9	7,9	7,9	14,2	14,2
Kaunas district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,6	0,6	0,6	1,8	1,8	1,8	1,8	1,8
Kedainiai district	0,0	0,0	0,0	0,0	0,0	6,7	6,7	9,1	9,1	9,1	9,8	9,8	9,8	9,8	9,8
Kelme district	0,0	0,0	0,0	0,6	0,6	0,6	0,6	0,6	1,0	1,0	1,0	1,0	1,0	1,0	1,1
KLAIPEDA city	0,0	0,0	0,0	1,3	1,3	3,1	3,1	3,1	3,1	3,3	5,7	5,7	5,7	5,7	5,7
Klaipeda district	0,0	0,0	0,0	0,0	0,0	1,4	1,4	1,4	1,4	1,6	1,6	1,6	1,6	1,6	1,6
Kretinga district	0,0	0,0	0,0	0,0	0,0	1,4	1,4	1,4	7,0	7,2	7,2	7,2	7,2	7,2	7,2
Kupiskis district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,2	1,5	1,5	1,5	1,5	1,5	1,5
Lazdijai district	0,0	0,0	0,0	0,0	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,9	1,9	1,9	1,9
MARIJAMPOLE city	0,0	0,0	0,0	0,0	0,0	0,0	1,4	1,4	14,1	14,8	14,8	14,8	14,8	14,8	14,8
Marijampole district	0,0	0,0	0,0	0,0	0,0	0,0	1,5	1,5	1,5	2,2	2,2	2,2	2,2	2,2	2,2
Mazeikiai district	0,0	0,0	0,0	0,0	0,0	5,9	5,9	5,9	5,9	7,3	7,5	7,5	7,5	7,5	7,5
Moletai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,1	1,1	1,1	1,1	1,7	1,7	1,7	1,7
NERINGA city	0,0	0,0	22,3	22,3	22,3	22,6	22,6	22,6	22,6	22,6	22,6	22,6	22,6	22,6	22,6
Pakruojis district	0,0	0,0	0,5	0,5	0,5	0,5	0,5	0,5	0,8	0,8	0,8	0,8	0,8	0,8	0,8
PALANGA city	0,0	0,0	0,0	0,0	0,0	1,0	1,0	1,0	1,0	1,1	1,1	1,1	1,1	1,1	1,1

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Panevezys district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,9	2,0	2,0	2,0	2,0	2,0	2,0
PANEVEZYS city	0,0	0,0	5,0	5,0	5,0	5,0	11,1	11,1	13,4	13,6	13,6	13,6	13,6	13,6	13,6
Pasvalys district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,8	2,0	2,0	2,0	2,0	2,0	2,0
Plunge district	0,0	0,0	0,0	0,8	0,8	6,0	6,0	6,0	6,0	7,6	7,8	7,8	7,8	7,8	7,8
Prienai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,5	0,5	1,4	1,4	1,4	1,4	1,4
Radviliskis district	0,0	0,0	0,0	0,6	0,6	7,0	7,0	7,0	7,4	7,4	7,4	7,4	7,4	7,4	7,4
Raseiniai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	2,1	2,1	2,1	2,8	2,8	2,8	2,8	2,8
Rokiskis district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,4	8,2	8,2	8,2	8,2	8,2	8,2
Sakiai district	0,0	0,0	0,0	0,0	0,0	0,0	1,4	1,4	1,4	2,2	2,2	8,8	8,8	8,8	8,8
Salcininkai district	0,0	0,0	0,0	0,0	2,2	2,2	3,3	3,3	3,3	3,4	3,4	3,4	7,4	7,4	7,4
SIAULIAI city	0,0	0,0	0,0	9,6	9,6	9,6	9,6	14,9	15,4	15,4	15,4	17,9	17,9	17,9	17,9
Siauliai district	0,0	0,0	0,0	0,6	0,6	0,6	0,6	9,7	10,1	10,1	10,1	10,1	10,1	10,1	10,1
Silale district	0,0	0,0	0,0	0,0	1,3	1,3	1,3	1,3	1,3	1,3	1,6	1,6	1,6	1,6	1,6
Silute district	0,0	0,0	0,0	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	7,1	7,1	7,1	7,1
Sirvintos district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,2	1,2	1,2	1,2
Skuodas district	0,0	0,0	0,0	3,1	3,1	4,4	4,4	4,4	4,4	4,5	4,5	4,5	4,5	4,5	4,5
Svencionys district	0,0	0,0	0,0	0,0	1,6	1,6	2,6	2,6	2,6	2,7	2,7	2,7	6,5	6,5	6,5
Taurage district	0,0	0,0	0,0	0,0	1,6	1,6	1,6	1,6	1,6	10,7	11,1	11,1	11,1	11,1	11,1
Telsiai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,7	1,9	1,9	1,9	1,9	1,9
Trakai district	0,0	0,0	0,0	1,4	1,4	1,4	2,6	2,6	2,6	2,7	6,5	6,5	10,9	10,9	10,9
Ukmerge district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,7	1,7	1,7	1,7
Utena district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,3	1,3	1,3	1,3	2,0	2,0	2,0	2,0
Varena district	0,0	0,0	0,0	4,6	6,1	6,1	6,1	6,1	6,1	6,1	6,1	6,6	6,6	6,6	6,6
Vilkaviskis district	0,0	0,0	0,0	0,0	0,0	0,0	1,5	1,5	1,5	2,3	2,3	11,2	11,2	11,2	11,2
Vilnius district	0,0	0,0	0,0	0,0	0,0	0,0	1,3	1,3	1,3	1,5	1,5	1,5	6,3	6,3	6,3
VILNIUS city	0,0	0,0	0,0	2,3	2,3	2,3	3,5	3,5	3,5	3,7	3,7	3,7	8,2	8,2	7,3
VISAGINAS city	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	1,0	1,0	1,0	1,6	1,6	1,6	1,6
Zarasai district	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,1	1,1	1,1	1,1	1,7	1,7	1,7	1,7

Annex 7.6. Annualised Costs for Each Municipality, Scenario A-I

The Annex consists of two parts. First table shows real spending a municipality will need to allocate in order to implement water, wastewater and waste projects from the Municipal Investment Programme. The second table presents burden of these spendings on population in each municipality of Lithuania.

Annex 7.6.1. Annualised costs for implementation of the Municipal Investment Programme for each municipality

Annex 7.6.2. Average burden of Municipal Investment Programme per capita

Annex 7.6.1. Annualised Costs for Implementation of the Municipal Investment Programme for Each Municipality, Scenario A-I

Municipality	Population	Annualised costs for water and waste sectors - Scenario A-I (thou euros)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Akmene district	39097	0	0	37	37	53	544	544	786	786	797	1245	1245	1443	1443	1443	1443
Alytus district	33585	0	0	0	80	80	115	115	116	116	116	146	146	159	159	185	185
ALYTUS city	77338	0	0	0	185	185	900	900	1180	1180	1179	1249	1249	1280	1280	1339	1339
Anyksciai district	37711	0	0	0	0	417	417	676	676	1220	1220	1490	1490	1510	1510	1510	1510
BIRSTONAS city	3800	0	0	0	0	0	0	3	4	4	457	457	657	657	657	687	687
Birzai district	38113	0	0	205	205	295	295	295	382	407	446	457	456	456	456	456	456
DRUSKININKAI city	21652	0	0	376	427	593	616	616	616	616	616	616	616	636	636	661	661
Ignalina district	24872	0	0	111	111	201	201	250	250	272	272	272	272	302	302	315	315
Jonava district	55140	0	0	0	881	881	1270	1314	1313	1332	1415	1415	1451	1451	1451	1896	1896
Joniskis district	34344	0	0	32	32	46	46	46	68	553	563	777	777	777	777	777	777
Jurbarkas district	40570	0	0	1008	1111	1201	1246	1246	1246	1246	1268	1268	1278	1278	1278	1278	1278
Kaisiadorys district	40187	0	0	0	0	0	439	471	665	679	738	738	764	764	765	1089	1089
KAUNAS city	414174	0	0	390	2781	3125	4180	4507	4507	4652	5271	5271	5544	5544	5544	8882	8882
Kaunas district	84414	0	0	0	0	0	0	67	67	96	222	223	279	279	278	278	278
Kedainiai district	70683	0	0	0	0	665	665	1190	1190	1293	1365	1365	1397	1397	1397	1397	1397
Kelme district	43046	0	0	40	40	58	58	58	94	94	110	110	110	110	110	110	771
KLAIPEDA city	202528	0	0	183	183	841	841	1060	1060	1118	1795	1820	2119	2119	2119	2119	2119
Klaipeda district	45732	0	0	0	0	112	112	162	162	175	175	181	181	181	181	181	181
Kretinga district	46991	0	0	0	0	115	115	166	612	625	822	828	828	828	828	828	828
Kupiskis district	26047	0	0	0	0	0	0	0	60	76	102	109	110	110	110	110	110
Lazdijai district	32642	0	0	0	78	78	112	112	112	112	112	142	142	155	155	180	180
MARIJAMPOLE city	52020	0	0	0	0	0	121	121	1277	1338	1825	1852	1852	1852	1852	1852	1852
Marijampole district	51079	0	0	0	0	0	119	119	171	231	231	257	257	257	257	257	257
Mazeikiai district	64175	0	0	0	0	669	669	964	964	1121	1146	1215	1226	1226	1226	1226	1226
Moletai district	26262	0	0	0	0	0	0	52	52	75	75	106	106	120	120	120	120

Municipality	Population	Annualised costs for water and waste sectors - Scenario A-I (thou euros)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
NERINGA city	2676	0	0	546	787	794	794	798	797	797	797	797	797	797	797	797	797
Pakruojis district	30784	0	0	29	42	42	42	42	62	62	71	71	70	70	70	70	70
PALANGA city	19567	0	0	0	0	48	48	69	69	75	75	77	77	77	77	77	77
Panevezys district	41691	0	0	0	0	0	0	0	130	139	196	200	200	201	201	201	201
PANEVEZYS city	133638	0	0	1123	1527	1638	2764	2764	3676	3707	3891	3905	3905	3904	3904	3904	3904
Pasvalys district	36601	0	0	0	0	0	0	0	114	122	172	176	176	176	176	176	176
Plunge district	57310	0	0	70	70	574	574	783	783	923	945	1007	1017	1017	1017	1017	1017
Prienai district	39037	0	0	0	0	0	0	31	31	45	103	103	129	129	129	443	443
Radviliskis district	54595	0	0	51	51	614	614	852	887	887	903	903	903	903	903	903	1561
Raseiniai district	46480	0	0	0	0	0	0	153	153	220	267	267	288	288	288	288	288
Rokiskis district	45570	0	0	0	0	0	0	0	105	611	657	880	880	880	880	880	880
Sakiai district	42316	0	0	0	0	0	99	99	142	191	224	246	260	716	716	917	917
Salcininkai district	39682	0	0	0	137	137	265	265	295	303	303	307	555	555	664	664	672
SIAULIAI city	146800	0	0	1128	1128	2063	2063	3237	3332	3850	3892	4439	4438	4679	4679	4680	4680
Siauliai district	52752	0	0	49	49	71	71	843	877	1217	1232	1232	1232	1232	1232	1232	1242
Silale district	33259	0	0	0	84	84	121	121	121	121	139	139	147	147	147	147	147
Silute district	70582	0	0	85	85	160	160	160	160	160	160	825	825	1118	1118	1118	1118
Sirvintos district	21554	0	0	0	0	0	0	0	0	0	0	54	54	78	78	78	78
Skuodas district	27679	0	0	0	0	141	141	171	171	179	179	182	182	182	182	182	182
Svencionys district	35576	0	0	0	94	94	196	196	224	231	231	234	234	234	456	463	561
Taurage district	61244	0	0	0	142	142	205	205	205	991	1021	1368	1381	1381	1381	1381	1381
Telsiai district	79781	0	0	0	0	0	0	0	0	150	174	240	250	250	250	250	347
Trakai district	55996	0	0	205	205	273	410	410	471	488	913	920	1606	1606	1826	1826	2231
Ukmerge district	51122	0	0	0	0	0	0	0	0	0	0	64	64	120	120	120	120
Utena district	53424	0	0	0	0	0	0	106	106	153	153	217	217	245	245	245	245
Varena district	36961	0	0	137	225	349	388	388	388	388	388	421	421	436	436	464	464
Vilkaviskis district	52999	0	0	0	0	0	123	123	177	239	240	989	989	1308	1308	1308	1308
Vilnius district	88240	0	0	0	0	0	152	152	219	237	237	245	795	795	1038	1056	1056

Municipality	Population	Annualised costs for water and waste sectors - Scenario A-I (thou euros)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
VILNIUS city	578334	0	0	1776	1776	2560	3555	3555	3994	4112	4112	4164	7771	7771	9363	9363	9363
VISAGINAS city	33719	0	0	0	0	0	0	67	67	97	97	137	137	155	155	154	381
Zarasai district	24628	0	0	0	0	0	0	49	49	71	71	100	100	113	113	113	1022
Total	**3700799**	**0**	**0**	**7580**	**12552**	**19397**	**25867**	**30695**	**35435**	**40182**	**44182**	**48517**	**54651**	**56453**	**58839**	**63690**	**66762**
Share of annualised costs in 1998 GDP, %				**0,07**	**0,12**	**0,18**	**0,25**	**0,29**	**0,34**	**0,38**	**0,42**	**0,46**	**0,52**	**0,54**	**0,56**	**0,61**	**0,64**
Share of annualised costs in GDP, if it grows 3% annually, %			**0**	**0,07**	**0,11**	**0,16**	**0,21**	**0,24**	**0,27**	**0,30**	**0,32**	**0,34**	**0,37**	**0,37**	**0,37**	**0,39**	**0,40**
State investment needs, thou euros			**12000**	**10000**	**13000**	**9000**	**8000**	**9000**	**8000**	**10000**	**15000**	**15000**	**10000**	**11000**	**7000**	**15000**	**0**
Share of state investments in GDP, if it grows 0% annually, %			**0,114**	**0,10**	**0,12**	**0,09**	**0,08**	**0,09**	**0,08**	**0,10**	**0,14**	**0,14**	**0,10**	**0,10**	**0,07**	**0,14**	**0,00**
Share of state investments in GDP, if it grows 3% annually, %			**0,109**	**0,09**	**0,11**	**0,07**	**0,06**	**0,07**	**0,06**	**0,07**	**0,11**	**0,10**	**0,07**	**0,07**	**0,04**	**0,09**	**0,00**

Annex 7.6.2. Average burden of Municipal Investment Programme per capita, scenario A-I

	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality
	Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month	
Akmene district	0,00	0,00	0,00	3,83	0,32	12485	57,06	4,75	185893	82,47	6,87	268693	130,56	10,88	425362	151,28	12,61	492896
Alytus district	0,00	0,00	0,00	9,79	0,82	27409	14,07	1,17	39367	14,12	1,18	39505	17,81	1,48	49837	22,56	1,88	63149
ALYTUS city	0,00	0,00	0,00	9,80	0,82	63140	47,73	3,98	307603	62,55	5,21	403108	66,21	5,52	426725	70,97	5,91	457360
Anyksciai district	0,00	0,00	0,00	0,00	0,00	0	45,35	3,78	142520	73,51	6,13	231025	161,97	13,50	509013	164,16	13,68	515873
BIRSTONAS city	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	4,25	0,35	1345	493,14	41,10	156161	741,77	61,81	234893
Birzai district	0,00	0,00	0,00	22,04	1,84	70004	31,72	2,64	100754	41,14	3,43	130650	49,13	4,09	156056	49,07	4,09	155835
DRUSKININKAI city	0,00	0,00	0,00	80,91	6,74	145984	116,70	9,72	210559	116,66	9,72	210499	116,66	9,72	210499	125,10	10,43	225731
Ignalina district	0,00	0,00	0,00	18,29	1,52	37908	33,13	2,76	68658	41,27	3,44	85543	44,87	3,74	93001	51,89	4,32	107543
Jonava district	0,00	0,00	0,00	65,51	5,46	301000	94,43	7,87	433908	97,66	8,14	448746	105,22	8,77	483500	140,97	11,75	647752
Joniskis district	0,00	0,00	0,00	3,84	0,32	11002	5,52	0,46	15785	8,16	0,68	23343	92,76	7,73	265484	92,72	7,73	265370
Jurbarkas district	0,00	0,00	0,00	112,25	9,35	379510	125,90	10,49	425635	125,93	10,49	425760	128,14	10,68	433222	129,12	10,76	436520
Kaisiadorys district	0,00	0,00	0,00	0,00	0,00	0	44,78	3,73	149969	67,82	5,65	227111	75,34	6,28	252320	111,09	9,26	372017
KAUNAS city	0,00	0,00	0,00	27,53	2,29	950026	41,37	3,45	1428018	44,62	3,72	1539955	52,18	4,35	1800947	87,92	7,33	3034604
Kaunas district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	3,24	0,27	22817	10,81	0,90	76036	13,51	1,13	95063
Kedainiai district	0,00	0,00	0,00	0,00	0,00	0	38,57	3,21	227208	69,04	5,75	406672	79,18	6,60	466380	81,02	6,75	477204
Kelme district	0,00	0,00	0,00	3,84	0,32	13776	5,55	0,46	19926	8,98	0,75	32219	10,51	0,88	37686	73,43	6,12	263401
KLAIPEDA city	0,00	0,00	0,00	3,70	0,31	62470	17,02	1,42	287287	21,46	1,79	362112	36,84	3,07	621736	42,89	3,57	723938
Klaipeda district	0,00	0,00	0,00	0,00	0,00	0	10,07	0,84	38362	14,55	1,21	55446	16,21	1,35	61780	16,19	1,35	61687
Kretinga district	0,00	0,00	0,00	0,00	0,00	0	10,07	0,84	39415	53,39	4,45	209090	72,26	6,02	282952	72,22	6,02	282788
Kupiskis district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	9,41	0,78	20425	17,23	1,44	37392	17,34	1,45	37641
Lazdijai district	0,00	0,00	0,00	9,79	0,82	26643	14,07	1,17	38260	14,12	1,18	38400	17,81	1,48	48445	22,57	1,88	61390
MARIJAMPOLE city	0,00	0,00	0,00	0,00	0,00	0	9,54	0,80	41376	100,65	8,39	436318	145,97	12,16	632800	145,93	12,16	632599
Marijampole district	0,00	0,00	0,00	0,00	0,00	0	9,55	0,80	40658	13,73	1,14	58425	20,63	1,72	87802	20,65	1,72	87885

	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality
	Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month	
Mazeikiai district	0,00	0,00	0,00	0,00	0,00	0	42,71	3,56	228433	61,56	5,13	329225	77,60	6,47	414992	78,32	6,53	418845
Moletai district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	8,15	0,68	17842	16,62	1,39	36383	18,77	1,56	41081
NERINGA city	0,00	0,00	0,00	1206,32	100,53	269008	1216,40	101,37	271257	1220,99	101,75	272282	1220,84	101,74	272247	1220,84	101,74	272247
Pakruojis district	0,00	0,00	0,00	5,57	0,46	14295	5,57	0,46	14295	8,22	0,69	21088	9,42	0,78	24163	9,39	0,78	24082
PALANGA city	0,00	0,00	0,00	0,00	0,00	0	10,06	0,84	16407	14,46	1,21	23582	16,09	1,34	26242	16,19	1,35	26397
Panevezys district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	12,74	1,06	44246	19,68	1,64	68388	19,72	1,64	68515
PANEVEZYS city	0,00	0,00	0,00	46,84	3,90	521589	84,81	7,07	944514	112,79	9,40	1256100	119,79	9,98	1334060	119,78	9,98	1333966
Pasvalys district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	12,73	1,06	38841	19,72	1,64	60161	19,71	1,64	60119
Plunge district	0,00	0,00	0,00	5,01	0,42	23917	41,06	3,42	196092	56,01	4,67	267500	72,05	6,00	344111	72,75	6,06	347422
Prienai district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	3,25	0,27	10571	10,81	0,90	35176	46,56	3,88	151457
Radviliskis district	0,00	0,00	0,00	3,84	0,32	17459	46,08	3,84	209651	66,60	5,55	303022	67,81	5,65	308512	117,21	9,77	533255
Raseiniai district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	13,47	1,12	52186	23,58	1,97	91333	25,42	2,12	98451
Rokiskis district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	9,42	0,79	35779	79,13	6,59	300498	79,16	6,60	300616
Sakiai district	0,00	0,00	0,00	0,00	0,00	0	9,55	0,80	33675	13,72	1,14	48366	23,86	1,99	84125	88,87	7,41	313381
Salcininkai district	0,00	0,00	0,00	14,11	1,18	46667	27,37	2,28	90509	30,50	2,54	100852	31,76	2,65	105039	69,40	5,78	229503
SIAULIAI city	0,00	0,00	0,00	31,49	2,62	385250	57,61	4,80	704708	93,06	7,75	1138425	123,97	10,33	1516537	130,70	10,89	1598838
Siauliai district	0,00	0,00	0,00	3,84	0,32	16885	5,55	0,46	24402	68,14	5,68	299535	95,75	7,98	420938	96,54	8,04	424388
Silale district	0,00	0,00	0,00	10,39	0,87	28796	14,95	1,25	41437	14,97	1,25	41503	17,18	1,43	47626	18,16	1,51	50329
Silute district	0,00	0,00	0,00	4,96	0,41	29178	9,32	0,78	54803	9,32	0,78	54803	47,93	3,99	281895	64,96	5,41	382104
Sirvintos district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	10,28	0,86	18464	14,81	1,23	26602
Skuodas district	0,00	0,00	0,00	0,00	0,00	0	20,87	1,74	48141	25,31	2,11	58391	26,92	2,24	62085	26,99	2,25	62244
Svencionys district	0,00	0,00	0,00	10,82	0,90	32083	22,60	1,88	66995	25,76	2,15	76369	26,95	2,25	79887	64,65	5,39	191665
Taurage district	0,00	0,00	0,00	9,50	0,79	48503	13,72	1,14	70028	13,70	1,14	69897	91,58	7,63	467419	92,47	7,71	471951
Telsiai district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	12,32	1,03	81911	17,82	1,49	118495
Trakai district	0,00	0,00	0,00	15,00	1,25	70004	30,04	2,50	140162	34,50	2,88	161004	67,37	5,61	314393	163,33	13,61	762151
Ukmerge district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	5,13	0,43	21860	9,66	0,81	41161

	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality
	Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month	
Utena district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	8,15	0,68	36306	16,62	1,39	73994	18,77	1,56	83549
Varena district	0,00	0,00	0,00	24,95	2,08	76844	43,03	3,59	132536	43,03	3,59	132524	46,72	3,89	143908	51,47	4,29	158539
Vilkaviskis district	0,00	0,00	0,00	0,00	0,00	0	9,54	0,80	42141	13,72	1,14	60591	76,49	6,37	337816	101,16	8,43	446777
Vilnius district	0,00	0,00	0,00	0,00	0,00	0	7,06	0,59	51899	10,17	0,85	74791	11,38	0,95	83699	49,05	4,09	360714
VILNIUS city	0,00	0,00	0,00	12,59	1,05	606667	25,20	2,10	1214581	28,31	2,36	1364572	29,52	2,46	1422827	66,38	5,53	3199004
VISAGINAS city	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	8,15	0,68	22912	16,62	1,39	46703	46,38	3,86	130318
Zarasai district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	8,16	0,68	16742	16,63	1,39	34124	170,10	14,17	349095
Average burden per inhabitant per month, Lt			**0,00**			**1,16**			**2,39**			**3,27**			**4,48**			**6,16**

Annex 7.7. Annualised Costs for Each Municipality, Scenario B-I

The Annex consists of two parts. First table shows real spending a municipality will need to allocate in order to implement water, wastewater and waste projects from the Municipal Investment Programme. The second table presents burden of these spendings on population in each municipality of Lithuania.

Annex 7.7.1. Annualised costs for implementation of the Municipal Investment Programme for each municipality

Annex 7.7.2. Average burden of Municipal Investment Programme per capita

Annex 7.7.1. Annualised Costs for Implementation of the Municipal Investment Programme for Each Municipality

Municipality	Population	Annualised costs for implementation of water and waste projects - Scenario B-I (thou euros)																
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Akmene district	39097	0	0	52	52	68	419	419	672	672	683	1003	1003	1201	1201	1201	1201
Alytus district	33585	0	0	0	115	115	150	150	150	150	150	193	193	206	206	207	207
ALYTUS city	77338	0	0	0	264	264	799	799	1078	1078	1078	1177	1177	1208	1208	1208	1208
Anyksciai district	37711	0	0	0	0	298	298	589	589	987	987	1276	1276	1296	1296	1296	1296
BIRSTONAS city	3800	0	0	0	0	0	0	4	5	5	332	332	532	532	532	532	532
Birzai district	38113	0	0	146	146	236	236	236	361	396	435	446	446	446	446	446	446
DRUSKININKAI city	21652	0	0	268	342	508	531	531	531	531	531	531	531	531	531	540	540
Ignalina district	24872	0	0	79	79	169	169	240	240	262	262	262	262	304	304	317	317
Jonava district	55140	0	0	0	629	629	1018	1081	1080	1099	1217	1217	1253	1253	1254	1254	1254
Joniskis district	34344	0	0	46	46	60	60	60	92	438	448	662	662	661	661	661	661
Jurbarkas district	40570	0	0	720	867	957	1002	1002	1002	1002	1033	1033	1043	1043	1043	1043	1043
Kaisiadorys district	40187	0	0	0	0	0	314	359	553	567	652	652	678	678	679	679	679
KAUNAS city	414174	0	0	279	1986	2330	3385	3854	3853	3998	4883	4883	5156	5156	5156	5156	5156
Kaunas district	84414	0	0	0	0	0	0	95	95	124	305	305	361	361	361	361	361
Kedainiai district	70683	0	0	0	0	475	475	1100	1100	1202	1305	1305	1337	1337	1337	1337	1337
Kelme district	43046	0	0	58	58	76	76	76	127	127	143	143	143	143	143	143	598
KLAIPEDA city	202528	0	0	131	131	1002	1002	1221	1221	1303	1787	1812	2111	2111	2111	2111	2111
Klaipeda district	45732	0	0	0	0	160	160	210	210	229	229	235	235	234	234	234	234
Kretinga district	46991	0	0	0	0	165	165	216	534	553	750	756	756	755	755	755	755
Kupiskis district	26047	0	0	0	0	0	0	0	85	109	135	142	143	143	143	143	143
Lazdijai district	32642	0	0	0	111	111	145	145	146	146	146	188	188	201	201	201	201
MARIJAMPOLE city	52020	0	0	0	0	0	173	173	1014	1100	1588	1615	1615	1614	1614	1614	1614
Marijampole district	51079	0	0	0	0	0	170	170	222	307	307	333	333	334	334	334	334
Mazeikiai district	64175	0	0	0	0	478	478	773	773	997	1033	1102	1113	1113	1113	1113	1113
Moletai district	26262	0	0	0	0	0	0	75	75	98	98	142	142	156	156	156	156
NERINGA city	2676	0	0	390	631	641	641	644	644	644	644	644	644	644	644	644	644

Municipality	Population	Annualised costs for implementation of water and waste projects - Scenario B-I (thou euros)																
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Pakruojis district	30784	0	0	41	54	54	54	54	83	83	92	92	91	91	91	91	91
PALANGA city	19567	0	0	0	0	69	69	90	90	98	98	100	100	100	100	100	100
Panevezys district	41691	0	0	0	0	0	0	0	185	199	256	260	260	260	260	260	260
PANEVEZYS city	133638	0	0	950	1354	1465	2270	2270	3360	3404	3587	3601	3601	3601	3601	3601	3601
Pasvalys district	36601	0	0	0	0	0	0	0	162	174	224	228	229	228	228	228	228
Plunge district	57310	0	0	100	100	469	469	678	678	878	910	972	982	982	981	981	981
Prienai district	39037	0	0	0	0	0	0	44	44	58	142	141	167	167	167	167	167
Radviliskis district	54595	0	0	73	73	481	481	719	770	770	786	786	785	785	785	785	1256
Raseiniai district	46480	0	0	0	0	0	0	218	218	285	353	353	374	374	374	374	374
Rokiskis district	45570	0	0	0	0	0	0	0	150	532	578	801	801	801	801	801	801
Sakiai district	42316	0	0	0	0	0	141	141	184	254	302	324	338	663	663	864	864
Salcininkai district	39682	0	0	0	98	98	255	255	285	297	297	301	655	654	763	763	775
SIAULIAI city	146800	0	0	904	904	1839	1839	2678	2813	3331	3373	3763	3763	4004	4004	4004	4004
Siauliai district	52752	0	0	71	71	93	93	643	692	1032	1047	1047	1047	1047	1047	1047	1047
Silale district	33259	0	0	0	120	120	157	157	158	158	183	183	191	191	191	191	191
Silute district	70582	0	0	61	61	136	136	136	136	136	136	726	726	1019	1019	1019	1019
Sirvintos district	21554	0	0	0	0	0	0	0	0	0	0	77	77	101	101	101	101
Skuodas district	27679	0	0	0	0	170	170	200	200	211	211	214	214	215	215	215	215
Svencionys district	35576	0	0	0	67	67	195	195	223	233	233	236	236	237	237	237	334
Taurage district	61244	0	0	0	203	203	266	266	265	827	870	1217	1230	1230	1230	1230	1230
Telsiai district	79781	0	0	0	0	0	0	0	0	215	248	314	324	324	325	325	394
Trakai district	55996	0	0	146	146	214	411	411	472	495	799	806	1705	1705	1925	1925	2202
Ukmerge district	51122	0	0	0	0	0	0	0	0	0	0	91	91	147	147	148	148
Utena district	53424	0	0	0	0	0	0	152	152	199	199	289	289	317	317	317	317
Varena district	36961	0	0	137	224	348	387	387	387	387	387	434	434	449	449	449	449
Vilkaviskis district	52999	0	0	0	0	0	176	176	230	318	319	862	862	1181	1181	1181	1181
Vilnius district	88240	0	0	0	0	0	217	217	284	310	310	318	318	318	561	561	561
VILNIUS city	578334	0	0	1776	1268	2052	3474	3474	3913	4082	4082	4134	4134	4134	5726	5726	5726
VISAGINAS city	33719	0	0	0	0	0	0	96	96	126	126	183	183	201	201	200	362
Zarasai district	24628	0	0	0	0	0	0	70	70	92	92	133	133	146	146	146	796

Municipality	Population	Annualised costs for implementation of water and waste projects - Scenario B-I (thou euros)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total	**3700799**	**0**	**0**	**6427**	**10200**	**16619**	**23124**	**27948**	**32751**	**37309**	**41398**	**45377**	**47673**	**49339**	**51503**	**51724**	**53916**
													One inhabitant per year				14,57
													One inhabitant per month				1,21
				2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Share of annualised costs in GDP of 1998				**0,06**	**0,10**	**0,16**	**0,22**	**0,27**	**0,31**	**0,36**	**0,39**	**0,43**	**0,45**	**0,47**	**0,49**	**0,49**	**0,51**
Share of annualised costs in GDP, if it grows 3% annually, %				**0,06**	**0,09**	**0,14**	**0,19**	**0,23**	**0,26**	**0,28**	**0,31**	**0,32**	**0,33**	**0,33**	**0,34**	**0,33**	**0,33**
State investment needs, thou euros				**12000**	**10000**	**13000**	**9000**	**8000**	**9000**	**8000**	**10000**	**15000**	**15000**	**10000**	**11000**	**7000**	**15000**
Share of state investments in GDP, if it grows 0% per year, %				**0,11**	**0,10**	**0,12**	**0,09**	**0,08**	**0,09**	**0,08**	**0,10**	**0,14**	**0,14**	**0,10**	**0,10**	**0,07**	**0,14**
Share of state investments in GDP, if it grows 3% annually, %				**0,11**	**0,09**	**0,11**	**0,07**	**0,06**	**0,07**	**0,06**	**0,07**	**0,11**	**0,10**	**0,07**	**0,07**	**0,04**	**0,09**

Annex 7.7.2. Average Burden of Municipal Investment Programme Per Capita, Scenario B-I

Municipality	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality
	per year	per month		per year	per month		per year	per month		per year	per month		per year	per month		per year	per month	
Akmene district	0,00	0,00	0	5,47	0,46	17835	43,97	3,66	143260	70,52	5,88	229751	105,19	8,77	342721	125,92	10,49	410255
Alytus district	0,00	0,00	0	13,99	1,17	39155	18,26	1,52	51113	18,31	1,53	51252	23,59	1,97	66012	25,21	2,10	70570
ALYTUS city	0,00	0,00	0	14,00	1,17	90200	42,33	3,53	272821	57,15	4,76	368326	62,40	5,20	402132	64,02	5,34	412629
Anyksciai district	0,00	0,00	0	0,00	0,00	0	32,39	2,70	101800	64,05	5,34	201293	138,74	11,56	435991	140,92	11,74	442851
BIRSTONAS city	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	5,61	0,47	1775	358,48	29,87	113518	574,02	47,84	181774
Birzai district	0,00	0,00	0	15,74	1,31	50003	25,43	2,12	80753	38,87	3,24	123461	47,99	4,00	152435	47,92	3,99	152213
DRUSKININKAI city	0,00	0,00	0	64,78	5,40	116882	100,57	8,38	181457	100,53	8,38	181397	100,53	8,38	181397	102,16	8,51	184336
Ignalina district	0,00	0,00	0	13,06	1,09	27077	27,90	2,32	57827	39,54	3,29	81949	43,14	3,59	89407	52,24	4,35	108274
Jonava district	0,00	0,00	0	46,79	3,90	215000	75,71	6,31	347908	80,34	6,69	369142	90,53	7,54	415970	93,23	7,77	428399
Joniskis district	0,00	0,00	0	5,49	0,46	15717	7,16	0,60	20500	10,94	0,91	31297	79,01	6,58	226122	78,97	6,58	226007
Jurbarkas district	0,00	0,00	0	87,60	7,30	296157	101,24	8,44	342282	101,28	8,44	342407	104,43	8,70	353067	105,41	8,78	356365
Kaisiadorys district	0,00	0,00	0	0,00	0,00	0	31,99	2,67	107121	56,41	4,70	188916	66,56	5,55	222920	69,27	5,77	231978
KAUNAS city	0,00	0,00	0	19,66	1,64	678590	33,51	2,79	1156582	38,14	3,18	1316530	48,33	4,03	1668193	51,04	4,25	1761552
Kaunas district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	4,63	0,39	32595	14,83	1,24	104305	17,53	1,46	123333
Kedainiai district	0,00	0,00	0	0,00	0,00	0	27,55	2,30	162292	63,79	5,32	375765	75,72	6,31	445990	77,55	6,46	456813
Kelme district	0,00	0,00	0	5,49	0,46	19680	7,20	0,60	25830	12,10	1,01	43392	13,62	1,14	48858	56,92	4,74	204170
KLAIPEDA city	0,00	0,00	0	2,64	0,22	44622	20,28	1,69	342213	24,71	2,06	417038	36,68	3,06	618996	42,73	3,56	721198
Klaipeda district	0,00	0,00	0	0,00	0,00	0	14,38	1,20	54803	18,86	1,57	71887	21,03	1,75	80127	21,00	1,75	80035
Kretinga district	0,00	0,00	0	0,00	0,00	0	14,38	1,20	56307	46,60	3,88	182482	65,96	5,50	258291	65,92	5,49	258128
Kupiskis district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	13,44	1,12	29178	22,38	1,87	48585	22,50	1,87	48834
Lazdijai district	0,00	0,00	0	13,99	1,17	38062	18,26	1,52	49678	18,31	1,53	49819	23,59	1,97	64169	25,22	2,10	68599
MARIJAMPOLE city	0,00	0,00	0	0,00	0,00	0	13,64	1,14	59108	79,90	6,66	346383	127,28	10,61	551742	127,23	10,60	551541
Marijampole district	0,00	0,00	0	0,00	0,00	0	13,65	1,14	58083	17,82	1,48	75850	26,77	2,23	113940	26,79	2,23	114022
Mazeikiai district	0,00	0,00	0	0,00	0,00	0	30,51	2,54	163167	49,36	4,11	263958	70,38	5,86	376376	71,10	5,92	380229
Moletai district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	11,65	0,97	25488	22,21	1,85	48601	24,35	2,03	53299
NERINGA city	0,00	0,00	0	967,15	80,60	215675	981,55	81,80	218887	986,15	82,18	219912	985,99	82,17	219877	985,99	82,17	219877
Pakruojis district	0,00	0,00	0	7,22	0,60	18518	7,22	0,60	18518	11,00	0,92	28222	12,20	1,02	31297	12,17	1,01	31216
PALANGA city	0,00	0,00	0	0,00	0,00	0	14,37	1,20	23438	18,77	1,56	30613	20,91	1,74	34094	21,00	1,75	34248

Municipality	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality
	per year	per month		per year	per month		per year	per month		per year	per month		per year	per month		per year	per month	
Panevezys district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	18,19	1,52	63208	25,55	2,13	88765	25,59	2,13	88892
PANEVEZYS city	0,00	0,00	0	41,54	3,46	462637	69,64	5,80	775562	103,08	8,59	1147910	110,48	9,21	1230400	110,48	9,21	1230306
Pasvalys district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	18,19	1,52	55487	25,59	2,13	78037	25,57	2,13	77995
Plunge district	0,00	0,00	0	7,15	0,60	34167	33,54	2,79	160175	48,49	4,04	231583	69,52	5,79	331995	70,21	5,85	335306
Prienai district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	4,64	0,39	15102	14,83	1,24	48255	17,54	1,46	57054
Radviliskis district	0,00	0,00	0	5,48	0,46	24942	36,15	3,01	164467	57,81	4,82	263003	59,02	4,92	268494	94,29	7,86	428980
Raseiniai district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	19,25	1,60	74552	31,14	2,59	120607	32,98	2,75	127725
Rokiskis district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	13,46	1,12	51113	72,04	6,00	273564	72,07	6,01	273682
Sakiai district	0,00	0,00	0	0,00	0,00	0	13,64	1,14	48107	17,81	1,48	62798	31,36	2,61	110590	83,76	6,98	295363
Salcininkai district	0,00	0,00	0	10,08	0,84	33333	26,36	2,20	87180	29,49	2,46	97523	31,12	2,59	102899	80,07	6,67	264775
SIAULIAI city	0,00	0,00	0	25,23	2,10	308696	51,35	4,28	628154	78,56	6,55	961083	105,11	8,76	1285862	111,84	9,32	1368162
Siauliai district	0,00	0,00	0	5,49	0,46	24122	7,20	0,60	31638	53,79	4,48	236464	81,41	6,78	357868	81,41	6,78	357874
Silale district	0,00	0,00	0	14,84	1,24	41137	19,40	1,62	53778	19,43	1,62	53844	22,58	1,88	62591	23,56	1,96	65294
Silute district	0,00	0,00	0	3,54	0,30	20842	7,90	0,66	46467	7,90	0,66	46467	42,16	3,51	247967	59,20	4,93	348175
Sirvintos district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	14,68	1,22	26377	19,22	1,60	34515
Skuodas district	0,00	0,00	0	0,00	0,00	0	25,18	2,10	58083	29,63	2,47	68333	31,72	2,64	73175	31,79	2,65	73335
Svencionys district	0,00	0,00	0	7,73	0,64	22917	22,53	1,88	66787	25,69	2,14	76161	27,24	2,27	80745	38,54	3,21	114267
Taurage district	0,00	0,00	0	13,58	1,13	69290	17,79	1,48	90815	17,77	1,48	90684	81,49	6,79	415882	82,37	6,86	420414
Telsiai district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	16,15	1,35	107352	20,23	1,69	134519
Trakai district	0,00	0,00	0	10,72	0,89	50003	30,06	2,51	140271	34,53	2,88	161113	59,00	4,92	275317	161,26	13,44	752479
Ukmerge district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	7,33	0,61	31228	11,86	0,99	50530
Utena district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	11,65	0,97	51865	22,20	1,85	98840	24,35	2,03	108395
Varena district	0,00	0,00	0	24,82	2,07	76448	42,90	3,58	132140	42,90	3,57	132127	48,18	4,01	148391	49,81	4,15	153407
Vilkaviskis district	0,00	0,00	0	0,00	0,00	0	13,63	1,14	60202	17,81	1,48	78652	66,66	5,56	294417	91,33	7,61	403378
Vilnius district	0,00	0,00	0	0,00	0,00	0	10,08	0,84	74142	13,20	1,10	97033	14,77	1,23	108586	26,05	2,17	191541
VILNIUS city	0,00	0,00	0	8,99	0,75	433333	24,63	2,05	1186982	27,74	2,31	1336973	29,31	2,44	1412551	40,59	3,38	1956397
VISAGINAS city	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	11,65	0,97	32732	22,20	1,85	62386	44,07	3,67	123834
Zarasai district	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	11,65	0,97	23917	22,21	1,85	45583	132,45	11,04	271822
Average burden for one inhabitant per month			**0,00**			**0,94**			**2,13**			**3,02**			**4,19**			**4,98**

Annex 7.8. Annualised Costs for Each Municipality, Scenario C-I

The Annex consists of two parts. First table shows real spending a municipality will need to allocate in order to implement water, wastewater and waste projects from the Municipal Investment Programme. The second table presents burden of these spendings on population in each municipality of Lithuania.

Annex 7.8.1. Annualised costs for implementation of the Municipal Investment Programme for each municipality

Annex 7.8.2. Average burden of Municipal Investment Programme per capita

Annex 7.8.1. Annualised Costs for Implementation of the Municipal Investment Programme for Each Municipality, Scenario C-I

	Population	Annualised costs for water and waste sectors – Scenario C-I (thou euros)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Akmene district	39097	0	0	37	37	63	554	554	922	922	940	1388	1388	1700	1700	1700	1705
Alytus district	33585	0	0	0	80	80	136	136	136	136	136	166	166	187	187	231	231
ALYTUS city	77338	0	0	0	185	185	947	947	1389	1389	1389	1459	1459	1508	1508	1567	1608
Anyksciai district	37711	0	0	0	0	417	417	783	783	1346	1346	1747	1747	1778	1778	1778	1778
BIRSTONAS city	3800	0	0	0	0	14	14	17	18	19	472	472	789	789	789	840	840
Birzu raj	38113	0	0	205	205	348	348	348	435	460	521	538	538	538	538	538	538
DRUSKININKAI	21652	0	0	376	427	689	725	725	725	725	725	725	725	745	745	775	775
Ignalina district	24872	0	0	111	111	254	254	303	303	338	338	338	338	368	368	389	389
Jonava district	55140	0	0	0	881	881	1495	1539	1539	1569	1651	1651	1708	1708	1708	2152	2152
Joniskis district	34344	0	0	32	32	54	54	54	76	561	576	914	914	914	914	914	914
Jurbarkas district	40570	0	0	1008	1111	1254	1326	1326	1326	1326	1348	1348	1363	1363	1363	1363	1363
Kaisiadorys district	40187	0	0	0	0	0	439	471	777	799	859	859	901	901	901	1225	1225
KAUNAS city	414174	0	0	390	2781	3125	4792	5119	5119	5348	5968	5968	6400	6400	6400	9737	9737
Kaunas district	84414	0	0	0	0	0	0	67	67	114	240	240	328	328	328	328	328
Kedainiai district	70683	0	0	0	0	665	665	1361	1361	1523	1595	1595	1645	1645	1645	1645	1645
Kelme district	43046	0	0	40	40	68	68	68	104	104	127	127	127	127	127	127	788
KLAIPEDA city	202528	0	0	183	183	935	935	1282	1282	1339	2016	2056	2528	2528	2528	2528	2528
Klaipeda district	45732	0	0	0	0	112	112	190	190	203	203	212	212	212	212	212	212
Kretinga district	46991	0	0	0	0	115	115	195	641	654	965	974	974	974	974	974	974
Kupiskis district	26047	0	0	0	0	0	0	0	60	76	118	130	130	130	130	130	130
Lazdijai district	32642	0	0	0	78	78	132	132	132	132	132	161	161	181	181	206	206
MARIJAMPOLE	52020	0	0	0	0	0	121	121	1308	1369	2138	2180	2180	2180	2180	2180	2180
Marijampole distr.	51079	0	0	0	0	0	119	119	202	262	262	303	303	303	303	303	303
Mazeikiai district	64175	0	0	0	0	669	669	1135	1135	1292	1317	1427	1444	1444	1444	1444	1444
Moletai district	26262	0	0	0	0	0	0	52	52	88	88	119	119	141	141	141	141

	Population	Annualised costs for water and waste sectors – Scenario C-I (thou euros)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
NERINGA city	2676	0	0	546	927	934	934	940	939	939	939	940	940	940	940	940	940
Pakruojis district	30784	0	0	29	49	49	49	49	69	69	83	83	83	83	83	83	83
PALANGA city	19567	0	0	0	0	48	48	81	81	87	87	91	91	91	91	91	91
Panevezys district	41691	0	0	0	0	0	0	0	130	139	229	236	236	236	236	236	236
PANEVEZYS city	133638	0	0	1123	1761	1937	3063	3063	4264	4295	4584	4606	4606	4606	4606	4606	4606
Pasvalys district	36601	0	0	0	0	0	0	0	114	122	201	207	207	207	207	207	207
Plunge district	57310	0	0	70	70	592	592	922	922	1062	1084	1182	1197	1197	1197	1197	1197
Prienai district	39037	0	0	0	0	0	0	31	31	53	111	111	152	152	152	467	467
Radviliskis district	54595	0	0	51	51	627	627	1003	1038	1038	1063	1063	1063	1063	1063	1063	1721
Raseiniai district	46480	0	0	0	0	0	0	153	153	260	307	307	340	340	340	340	340
Rokiskis district	45570	0	0	0	0	0	0	0	105	611	684	1036	1036	1036	1036	1036	1036
Sakiai district	42316	0	0	0	0	0	99	99	168	217	250	284	284	739	739	1057	1057
Salcininkai district	39682	0	0	0	137	137	300	300	348	356	356	360	608	607	780	780	788
SIAULIAI city	146800	0	0	1128	1128	2605	2605	3779	3874	4693	4759	5305	5305	5686	5686	5686	5686
Siauliai district	52752	0	0	49	49	83	83	855	889	1427	1451	1451	1451	1451	1451	1451	1461
Silale district	33259	0	0	0	84	84	143	143	143	143	161	161	174	174	174	174	174
Silute district	70582	0	0	85	85	204	204	204	204	204	204	869	869	1332	1332	1332	1332
Sirvintos district	21554	0	0	0	0	0	0	0	0	0	0	54	54	92	92	92	92
Skuodas district	27679	0	0	0	0	184	184	231	231	239	239	244	244	244	244	244	244
Svencionys district	35576	0	0	0	94	94	220	220	263	270	270	275	275	275	497	504	659
Taurage district	61244	0	0	0	142	142	241	241	241	1027	1057	1605	1626	1626	1626	1626	1626
Telsiai district	79781	0	0	0	0	0	0	0	0	150	174	279	295	295	295	295	391
Trakai district	55996	0	0	205	205	312	449	449	545	562	988	999	1793	1793	2140	2140	2545
Ukmerge district	51122	0	0	0	0	0	0	0	0	0	0	64	64	153	153	153	153
Utena district	53424	0	0	0	0	0	0	106	106	180	180	244	244	288	288	288	288
Varena district	36961	0	0	137	225	420	482	482	482	482	482	515	515	538	538	566	566
Vilkaviskis district	52999	0	0	0	0	0	123	123	209	271	271	1036	1036	1540	1540	1540	1540
Vilnius district	88240	0	0	0	0	0	152	152	258	276	276	289	839	839	1223	1241	1241
VILNIUS city	578334	0	0	1776	1776	3014	4009	4009	4703	4821	4821	4903	8510	8510	11026	11026	11026

	Population	Annualised costs for water and waste sectors – Scenario C-I (thou euros)															
		2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
VISAGINAS city	33719	0	0	0	0	0	0	67	67	114	114	154	154	182	182	182	409
Zarasai district	24628	0	0	0	0	0	0	49	49	83	83	112	112	132	132	132	1041
Total	3700799	0	0	7580	12933	21470	29045	34796	40709	46286	50979	56163	62991	65540	69182	74204	77380
													One inhabitant per year				20,91
													One inhabitant per month				1,742
Year		**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	
Share of annualised costs in 1998 GDP			**0,07**	**0,12**	**0,20**	**0,28**	**0,33**	**0,39**	**0,44**	**0,49**	**0,54**	**0,60**	**0,63**	**0,66**	**0,71**	**0,74**	
Share of annualised costs in GDP, if it grows 3% annually			**0,07**	**0,11**	**0,18**	**0,23**	**0,27**	**0,31**	**0,34**	**0,37**	**0,39**	**0,43**	**0,43**	**0,44**	**0,46**	**0,46**	
State investment needs, thou euros		**12000**	**10000**	**13000**	**9000**	**8000**	**9000**	**8000**	**10000**	**15000**	**15000**	**10000**	**11000**	**7000**	**15000**	**0**	
Share of state investments in GDP, if it grows 0% annually		**0,11**	**0,10**	**0,12**	**0,09**	**0,08**	**0,09**	**0,08**	**0,10**	**0,14**	**0,14**	**0,10**	**0,10**	**0,07**	**0,14**	**0,00**	
Share of state investments in GDP, if it grows 3% annually,		**0,11**	**0,09**	**0,11**	**0,07**	**0,06**	**0,07**	**0,06**	**0,07**	**0,11**	**0,10**	**0,07**	**0,07**	**0,04**	**0,09**	**0,00**	

Annex 7.8.2. Average Burden of Municipal Investment Programme Per Capita, Scenario C-I

	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for	Per capita		Per month	Per capita		Per month	Per capita		Per month	Per capita		Per month for	Per capita		Per month for
	Per year	Per month	municipality	Per year	Per month	for municipality	Per year	Per month	for municipality	Per year	Per month	for municipality	Per year	Per month	municipality	Per year	Per month	municipality
Akmene district	0,00	0,00	0,00	3,83	0,32	12485	58,10	4,84	189310	96,72	8,06	315111	145,55	12,13	474205	178,79	14,90	582514
Alytus district	0,00	0,00	0,00	9,79	0,82	27409	16,63	1,39	46541,8	16,63	1,39	46541,8	20,32	1,69	56873,8	28,21	2,35	78952,3
ALYTUS city	0,00	0,00	0,00	9,80	0,82	63140	50,22	4,19	323661	73,65	6,14	474678	77,34	6,45	498451	85,24	7,10	549339
Anyksciai district	0,00	0,00	0,00	0,00	0,00	0	45,35	3,78	142520	85,15	7,10	267584	189,90	15,82	596765	193,27	16,11	607357
BIRSTONAS	0,00	0,00	0,00	0,00	0,00	0	15,11	1,26	4783,33	19,35	1,61	6127,94	508,97	42,41	161175	906,74	75,56	287134
Birzai district	0,00	0,00	0,00	22,04	1,84	70004	37,42	3,12	118862	46,84	3,90	148758	57,85	4,82	183731	57,85	4,82	183731
DRUSKININKAI city	0,00	0,00	0,00	80,91	6,74	145984	137,34	11,44	247801	137,34	11,44	247801	137,34	11,44	247801	146,80	12,23	264877
Ignalina district	0,00	0,00	0,00	18,29	1,52	37908	41,86	3,49	86766,3	50,01	4,17	103651	55,78	4,65	115610	64,11	5,34	132878
Jonava district	0,00	0,00	0,00	65,51	5,46	301000	111,16	9,26	510783	114,41	9,53	525707	122,77	10,23	564131	160,05	13,34	735429
Joniskis district	0,00	0,00	0,00	3,84	0,32	11002	6,47	0,54	18518,3	9,11	0,76	26076	109,12	9,09	312293	109,12	9,09	312293
Jurbarkas district	0,00	0,00	0,00	112,25	9,35	379510	133,98	11,17	452968	133,98	11,17	452968	136,19	11,35	460430	137,70	11,48	465555
Kaisiadorys district	0,00	0,00	0,00	0,00	0,00	0	44,78	3,73	149969	79,24	6,60	265377	87,61	7,30	293415	124,94	10,41	418403
KAUNAS city	0,00	0,00	0,00	27,53	2,29	950026	47,43	3,95	1637118	50,68	4,22	1749143	59,08	4,92	2038952	96,39	8,03	3326851
Kaunas district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	3,24	0,27	22816,5	11,66	0,97	82020,5	15,93	1,33	112087
Kedainiai district	0,00	0,00	0,00	0,00	0,00	0	38,57	3,21	227208	78,96	6,58	465097	92,52	7,71	544986	95,42	7,95	562069
Kelme district	0,00	0,00	0,00	3,84	0,32	13776	6,51	0,54	23342,7	9,93	0,83	35635,8	12,12	1,01	43494,2	75,02	6,25	269122
KLAIPEDA city	0,00	0,00	0,00	3,70	0,31	62470	18,93	1,58	319404	25,95	2,16	437962	41,63	3,47	702609	51,19	4,27	863876
Klaipeda district	0,00	0,00	0,00	0,00	0,00	0	10,07	0,84	38362,3	17,06	1,42	65012,3	19,03	1,59	72535,8	19,03	1,59	72535,8
Kretinga district	0,00	0,00	0,00	0,00	0,00	0	10,07	0,84	39414,7	55,93	4,66	218998	85,01	7,08	332876	85,01	7,08	332876
Kupiskis district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	9,41	0,78	20424,8	20,53	1,71	44567	20,53	1,71	44567
Lazdijai district	0,00	0,00	0,00	9,79	0,82	26643	16,58	1,38	45093,2	16,58	1,38	45093,2	20,27	1,69	55138,2	25,91	2,16	70485,8
MARIJAMPOLE	0,00	0,00	0,00	0,00	0,00	0	9,54	0,80	41375,8	103,09	8,59	446909	171,79	14,32	744713	171,79	14,32	744713

	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for	Per capita		Per month	Per capita		Per month	Per capita		Per month	Per capita		Per month for	Per capita		Per month for
	Per year	Per month	municipality	Per year	Per month	for municipality	Per year	Per month	for municipality	Per year	Per month	for municipality	Per year	Per month	municipality	Per year	Per month	municipality
city																		
Marijampole district	0,00	0,00	0,00	0,00	0,00	0	9,55	0,80	40658,3	16,21	1,35	69016,7	24,28	2,02	103354	24,28	2,02	103354
Mazeikiai district	0,00	0,00	0,00	0,00	0,00	0	42,71	3,56	228433	72,49	6,04	387650	91,14	7,60	487417	92,23	7,69	493225
Moletai district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	8,15	0,68	17841,8	18,65	1,55	40808,7	22,08	1,84	48325,3
NERINGA city	0,00	0,00	0,00	1420,81	118,40	316842	1430,90	119,24	319090	1438,56	119,88	320798	1440,09	120,01	321140	1440,09	120,01	321140
Pakruojis district	0,00	0,00	0,00	6,50	0,54	16687	6,50	0,54	16687	9,15	0,76	23479,3	11,02	0,92	28262,7	11,02	0,92	28262,7
PALANGA city	0,00	0,00	0,00	0,00	0,00	0	10,06	0,84	16406,8	16,98	1,41	27681,8	18,99	1,58	30961,8	18,99	1,58	30961,8
Panevezys district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	12,74	1,06	44245,8	23,22	1,94	80688	23,22	1,94	80688
PANEVEZYS city	0,00	0,00	0,00	54,02	4,50	601539	93,99	7,83	1046672	130,83	10,90	1457000	141,32	11,78	1573830	141,32	11,78	1573830
Pasvalys district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	12,73	1,06	38840,7	23,20	1,93	70752,3	23,20	1,93	70752,3
Plunge district	0,00	0,00	0,00	5,01	0,42	23917	42,35	3,53	202242	65,96	5,50	314992	84,59	7,05	404010	85,67	7,14	409135
Prienai district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	3,25	0,27	10571,2	11,69	0,97	38034,3	49,04	4,09	159524
Radviliskis district	0,00	0,00	0,00	3,84	0,32	17459	47,06	3,92	214093	77,94	6,50	354613	79,82	6,65	363155	129,25	10,77	588053
Raseiniai district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	13,47	1,12	52186,2	27,07	2,26	104864	29,98	2,50	116139
Rokiskis district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	9,42	0,79	35779,3	93,17	7,76	353798	93,17	7,76	353798
Sakiai district	0,00	0,00	0,00	0,00	0,00	0	9,55	0,80	33674,7	16,23	1,35	57249,7	27,49	2,29	96944,5	102,45	8,54	361286
Salcininkai district	0,00	0,00	0,00	14,11	1,18	46667	30,99	2,58	102468	35,95	3,00	118868	37,20	3,10	123009	81,43	6,79	269269
SIAULIAI city	0,00	0,00	0,00	31,49	2,62	385250	72,74	6,06	889891	108,20	9,02	1323608	148,17	12,35	1812650	158,81	13,23	1942825
Siauliai district	0,00	0,00	0,00	3,84	0,32	16885	6,48	0,54	28501,8	69,07	5,76	303635	112,75	9,40	495651	113,53	9,46	499095
Silale district	0,00	0,00	0,00	10,39	0,87	28796	17,66	1,47	48954	17,66	1,47	48954	19,87	1,66	55076,7	21,47	1,79	59518,3
Silute district	0,00	0,00	0,00	4,96	0,41	29178	11,87	0,99	69836,7	11,87	0,99	69836,7	50,48	4,21	296928	77,38	6,45	455120
Sirvintos district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	10,28	0,86	18463,7	17,51	1,46	31447

	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for	Per capita		Per month	Per capita		Per month	Per capita		Per month	Per capita		Per month for	Per capita		Per month for
	Per year	Per month	municipality	Per year	Per month	for municipality	Per year	Per month	for municipality	Per year	Per month	for municipality	Per year	Per month	municipality	Per year	Per month	municipality
Skuodas district	0,00	0,00	0,00	0,00	0,00	0	27,24	2,27	62832,5	34,20	2,85	78890,8	36,10	3,01	83277,8	36,10	3,01	83277,8
Svencionys district	0,00	0,00	0,00	10,82	0,90	32083	25,36	2,11	75194,8	30,32	2,53	89886,5	31,73	2,64	94082,2	75,99	6,33	225296
Taurage district	0,00	0,00	0,00	9,50	0,79	48503	16,13	1,34	82328	16,13	1,34	82328	107,48	8,96	548524	108,88	9,07	555699
Telsiai district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	14,32	1,19	95236,2	20,10	1,68	133661
Trakai district	0,00	0,00	0,00	15,00	1,25	70004	32,89	2,74	153487	39,92	3,33	186287	73,12	6,09	341183	186,37	15,53	869669
Ukmerge district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	5,13	0,43	21859,8	12,27	1,02	52268,2
Utena district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	8,15	0,68	36305,5	18,70	1,56	83257,3	22,08	1,84	98290,7
Varena district	0,00	0,00	0,00	24,95	2,08	76844	53,46	4,45	164653	53,46	4,45	164653	57,15	4,76	176037	62,83	5,24	193510
Vilkaviskis district	0,00	0,00	0,00	0,00	0,00	0	9,54	0,80	42141,2	16,19	1,35	71524,5	80,17	6,68	354061	119,16	9,93	526261
Vilnius district	0,00	0,00	0,00	0,00	0,00	0	7,06	0,59	51899,2	11,98	1,00	88115,8	13,43	1,12	98728	57,66	4,80	423988
VILNIUS city	0,00	0,00	0,00	12,59	1,05	606667	28,42	2,37	1369697	33,34	2,78	1606814	34,76	2,90	1675250	78,17	6,51	3767213
VISAGINAS	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	8,15	0,68	22912,2	18,74	1,56	52650,8	49,75	4,15	139801
Zarasai district	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0	8,16	0,68	16741,7	18,69	1,56	38355,5	173,34	14,45	355756
Average burden for one inhabitant per month, Lt			**0,00**			**1,19**			**2,68**			**3,76**			**5,19**			**7,14**

Annex 7.9. Annualised Costs for Each Municipality, Scenario A-II

The Annex consists of two parts. First table shows real spending a municipality will need to allocate in order to implement water, wastewater and waste projects from the Municipal Investment Programme. The second table presents burden of these spendings on population in each municipality of Lithuania.

Annex 7.9.1. Annualised costs for implementation of the Municipal Investment Programme for each municipality

Annex 7.9.2. Average burden of Municipal Investment Programme per capita

Annex 7.9.1. Annualised Costs for Implementation of the Municipal Investment Programme for Each Municipality, Scenario A-II

	Population	Annualised costs for water and waste sectors – ScenarioA-II (thou EUR)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Akmene district	39097	0	0	37	37	63	555	555	942	942	960	1408	1408	1737	1737	1737	1737
Alytus district	33585	0	0	0	80	80	139	139	139	139	139	169	169	192	192	217	217
ALYTUS city	77338	0	0	0	185	185	954	954	1420	1420	1420	1490	1490	1541	1541	1600	1600
Anyksciai district	37711	0	0	0	0	417	417	799	799	1365	1365	1785	1785	1818	1818	1818	1818
BIRSTONAS	3800	0	0	0	0	0	0	3	4	5	458	458	791	791	791	844	844
Birzai district	38113	0	0	205	205	356	356	356	443	467	532	550	550	550	550	550	550
DRUSKININKAI city	21652	0	0	376	427	704	742	742	742	742	742	742	742	761	761	792	792
Ignalina district	24872	0	0	111	111	262	262	311	311	347	347	347	347	399	399	399	399
Jonava district	55140	0	0	0	881	881	1529	1573	1573	1605	1687	1687	1748	1748	1748	2192	2192
Joniskis district	34344	0	0	32	32	56	56	56	78	563	579	935	935	935	935	935	935
Jurbarkas district	40570	0	0	1008	1111	1261	1337	1337	1337	1337	1359	1359	1375	1375	1375	1375	1375
Kaisiadorys district	40187	0	0	0	0	0	439	471	794	817	877	877	921	921	921	1483	1483
KAUNAS city	414174	0	0	390	2781	3355	5113	5440	5440	5682	6301	6301	6756	6756	6756	12548	12548
Kaunas district	84414	0	0	0	0	0	0	67	67	116	242	242	335	335	335	335	335
Kedainiai district	70683	0	0	0	0	665	665	1386	1386	1557	1629	1629	1682	1682	1682	1682	1682
Kelme district	43046	0	0	40	40	70	70	70	106	106	126	126	126	126	126	126	793
KLAIPEDA city	202528	0	0	183	183	949	949	1314	1314	1372	2049	2091	2589	2589	2589	2589	2589
Klaipeda district	45732	0	0	0	0	112	112	195	195	208	208	217	217	217	217	217	217
Kretinga district	46991	0	0	0	0	115	115	200	646	659	987	997	997	997	997	997	997
Kupiskis district	26047	0	0	0	0	0	0	0	60	76	120	133	133	133	133	133	133
Lazdijai district	32642	0	0	0	78	78	135	135	135	135	135	165	165	186	186	211	211
MARIJAMPOLE	52020	0	0	0	0	0	121	121	1313	1374	2185	2229	2229	2229	2229	2229	2229
Marijampole district	51079	0	0	0	0	0	119	119	206	266	266	310	310	310	310	310	310

	Population	Annualised costs for water and waste sectors – ScenarioA-II (thou EUR)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Mazeikiai district	64175	0	0	0	0	669	669	1160	1160	1318	1342	1458	1476	1476	1476	1476	1476
Moletai district	26262	0	0	0	0	0	0	52	52	91	91	122	122	145	145	145	145
NERINGA city	2676	0	0	546	948	955	955	960	960	960	960	960	960	960	960	960	960
Pakruojis district	30784	0	0	29	50	50	50	50	70	70	85	85	85	85	85	85	85
PALANGA	19567	0	0	0	0	48	48	83	83	89	89	93	93	93	93	93	93
Panevezys district	41691	0	0	0	0	0	0	0	130	139	234	241	241	241	241	241	241
PANEVEZYS	133638	0	0	1123	1796	1796	2922	2922	4166	4197	4502	4525	4525	4525	4525	4525	4525
Pasvalys district	36601	0	0	0	0	0	0	0	114	122	206	212	212	212	212	212	212
Plunge district	57310	0	0	70	70	594	594	942	942	1083	1105	1208	1224	1224	1224	1224	1224
Prienai district	39037	0	0	0	0	0	0	31	31	54	112	112	155	155	155	470	470
Radviliskis district	54595	0	0	51	51	628	628	1025	1060	1060	1086	1086	1086	1086	1086	1086	1744
Raseiniai district	46480	0	0	0	0	0	0	153	153	265	312	312	347	347	347	347	347
Rokiskis district	45570	0	0	0	0	0	0	0	105	611	687	1059	1059	1059	1059	1059	1059
Sakiai district	42316	0	0	0	0	0	99	99	171	220	253	289	289	1080	1080	1080	1080
Salcininkai district	39682	0	0	0	137	137	305	305	356	364	364	370	617	617	799	799	807
SIAULIAI city	146800	0	0	1128	1128	2685	2685	3860	3955	4818	4888	5434	5434	5836	5836	5836	5836
Siauliai district	52752	0	0	49	49	86	86	857	891	1458	1483	1483	1483	1483	1483	1483	1493
Silale district	33259	0	0	0	84	84	146	146	146	146	164	164	177	177	177	177	177
Silute district	70582	0	0	85	85	211	211	211	211	211	211	876	876	1364	1364	1364	1364
Sirvintos district	21554	0	0	0	0	0	0	0	0	0	0	54	54	94	94	94	94
Skuodas district	27679	0	0	0	0	190	190	240	240	247	247	253	253	253	253	253	253
Svencionys district	35576	0	0	0	94	94	224	224	269	276	276	282	282	282	667	674	674
Taurage district	61244	0	0	0	142	142	246	246	246	1033	1063	1641	1663	1663	1663	1663	1663
Telsiai district	79781	0	0	0	0	0	0	0	0	150	174	284	301	301	301	301	398
Trakai district	55996	0	0	205	205	318	455	455	556	573	999	1011	1822	1822	2188	2188	2593
Ukmerge district	51122	0	0	0	0	0	0	0	0	0	0	64	64	158	158	158	158
Utena district	53424	0	0	0	0	0	0	106	106	184	184	248	248	294	294	294	294
Varena district	36961	0	0	137	225	431	496	496	496	496	496	529	529	554	554	582	582

	Population	Annualised costs for water and waste sectors – ScenarioA-II (thou EUR)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Vilkaviskis district	52999	0	0	0	0	0	123	123	214	276	276	1043	1043	1575	1575	1575	1575
Vilnius district	88240	0	0	0	0	0	152	152	264	282	282	295	845	845	1250	1268	1268
VILNIUS city	578334	0	0	1776	1776	3081	4077	4077	4809	4927	4927	5014	8621	8621	11273	11273	11359
VISAGINAS	33719	0	0	0	0	0	0	67	67	116	116	156	156	186	186	186	413
Zarasai district	24628	0	0	0	0	0	0	49	49	85	85	114	114	136	136	136	1045
Total	**3700799**	**0**	**0**	**7580**	**12990**	**21807**	**29546**	**35436**	**41521**	**47220**	**52013**	**57326**	**64259**	**67278**	**71268**	**78628**	**81694**
														One inhabitant per year			22,07
														One inhabitant per month			1,839
Share of annualised costs in 1998 GDP				**0,07**	**0,12**	**0,21**	**0,28**	**0,34**	**0,40**	**0,45**	**0,50**	**0,55**	**0,61**	**0,64**	**0,68**	**0,75**	**0,78**
Share of annualised costs in GDP, if it grows 3% annually, %		**0,00**		**0,07**	**0,11**	**0,18**	**0,24**	**0,28**	**0,32**	**0,35**	**0,37**	**0,40**	**0,43**	**0,44**	**0,45**	**0,49**	**0,49**
State investment needs, thou euros		**12000**		**10000**	**13000**	**9000**	**8000**	**9000**	**8000**	**10000**	**15000**	**15000**	**10000**	**11000**	**7000**	**15000**	**0**
Share of state investments in GDP, if it grows 0% annually, %		**0,11**		**0,10**	**0,12**	**0,09**	**0,08**	**0,09**	**0,08**	**0,10**	**0,14**	**0,14**	**0,10**	**0,10**	**0,07**	**0,14**	**0,00**
Share of state investments in GDP, if it grows 3% annually, %		**0,11**		**0,09**	**0,11**	**0,07**	**0,06**	**0,07**	**0,06**	**0,07**	**0,11**	**0,10**	**0,07**	**0,07**	**0,04**	**0,09**	**0,00**

Annex 7.9.2. Average Burden of Municipal Investment Programme Per Capita, Scenario A-II

Municipality	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality
	Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month	
Akmene district	0	0	0	3,83	0,32	12485	58,2	4,85	189619	98,75	8,23	321741	147,64	12,30	481024	182,16	15,18	593507
Alytus district	0	0	0	9,79	0,82	27409	17	1,42	47569,6	17,00	1,42	47569,6	20,69	1,72	57901,6	26,53	2,21	74252
ALYTUS city	0	0	0	9,80	0,82	63140	50,58	4,22	326012	75,29	6,27	485197	78,97	6,58	508970	84,81	7,07	546601
Anyksciai district	0	0	0	0	0	0	45,35	3,78	142520	86,86	7,24	272975	194,08	16,17	609920	197,66	16,47	621162
BIRSTONAS	0	0	0	0	0	0	0	0	0	4,25	0,35	1344,6	494,1	41,17	156464	910,72	75,89	288393
Birzai district	0	0	0	22,04	1,84	70004	38,25	3,19	121471	47,66	3,97	151367	59,13	4,93	187793	59,13	4,93	187793
DRUSKININKAI city	0	0	0	80,91	6,74	145984	140,4	11,70	253364	140,42	11,70	253364	140,42	11,70	253364	149,95	12,5	270555
Ignalina district	0	0	0	18,29	1,52	37908	43,12	3,59	89374,7	51,27	4,27	106260	57,26	4,77	118690	65,71	5,48	136197
Jonava district	0	0	0	65,51	5,46	301000	113,7	9,47	522370	116,93	9,74	537294	125,45	10,45	576435	163,00	13,58	748973
Joniskis district	0	0	0	3,84	0,32	11002	6,666	0,56	19076,7	9,31	0,78	26634,4	111,67	9,31	319607	111,67	9,31	319607
Jurbarkas district	0	0	0	112,3	9,35	379510	135,1	11,26	456811	135,12	11,26	456811	137,32	11,44	464273	138,95	11,58	469769
Kaisiadorys district	0	0	0	0	0	0	44,78	3,73	149969	80,96	6,75	271122	89,47	7,46	299635	151,31	12,61	506743
KAUNAS city	0	0	0	27,53	2,29	950026	50,61	4,22	1746800	53,86	4,49	1858826	62,37	5,20	2152768	124,22	10,35	4287293
Kaunas district	0	0	0	0	0	0	0	0	0	3,24	0,27	22816,5	11,76	0,98	82751,3	16,27	1,36	114464
Kedainiai district	0	0	0	0	0	0	38,57	3,21	227208	80,42	6,70	473664	94,49	7,87	556566	97,55	8,13	574605
Kelme district	0	0	0	3,84	0,32	13776	6,662	0,56	23897,1	10,09	0,84	36190,3	12,03	1,00	43169,2	75,54	6,30	270994
KLAIPEDA city	0	0	0	3,70	0,31	62470	19,21	1,60	324166	26,61	2,22	449044	42,33	3,53	714473	52,41	4,37	884598
Klaipeda district	0	0	0	0	0	0	10,07	0,84	38362,3	17,47	1,45	66560,5	19,49	1,62	74271,6	19,49	1,62	74271,6
Kretinga district	0	0	0	0	0	0	10,07	0,84	39414,7	56,34	4,69	220639	86,95	7,25	340508	86,95	7,25	340508
Kupiskis district	0	0	0	0	0	0	0	0	0	9,4098	0,78	20424,8	20,88	1,74	45323,3	20,88	1,74	45323,3
Lazdijai district	0	0	0	9,80	0,81	26643	17	1,4165	46238,1	17,00	1,42	46238,1	20,691	1,72	56283,1	26,54	2,21	72181,1
MARIJAMPOLE	0	0	0	0	0	0	9,545	0,7954	41375,8	103,49	8,62	448646	175,71	14,64	761717	175,71	14,64	761717

Municipality	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality
	Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month	
Marijampole district	0	0	0	0	0	0	9,552	0,796	40658,3	16,57	1,38	70544,3	24,859	2,07	105816	24,86	2,07	105816
Mazeikiai district	0	0	0	0	0	0	42,71	3,5595	228433	74,13	6,18	396434	93,149	7,76	498153	94,30	7,86	504331
Moletai district	0	0	0	0	0	0	0	0	0	8,15	0,68	17841,8	19,024	1,58	41633,4	22,60	1,88	49462,2
NERINGA city	0	0	0	145	121,1	323950	1463	121,9	326199	1470,2	122,51	327849	1470,2	122,51	327849	1470,17	122,5	327849
Pakruojis district	0	0	0	6,66	0,55	17092	6,663	0,5552	17091,7	9,31	0,78	23884	11,256	0,94	28875	11,26	0,94	28875
PALANGA	0	0	0	0	0	0	10,06	0,8385	16406,8	17,46	1,45	28471,8	19,491	1,62	31781,1	19,49	1,62	31781,1
Panevezys district	0	0	0	0	0	0	0	0	0	12,74	1,06	44245,8	23,745	1,98	82494,5	23,74	1,98	82494,5
PANEVEZYS	0	0	0	55,09	4,591	613506	89,66	7,4717	998506	127,82	10,65	1423431	138,83	11,57	1546027	138,83	11,57	1546027
Pasvalys district	0	0	0	0	0	0	0	0	0	12,73	1,06	38840,7	23,734	1,98	72392	23,73	1,98	72392
Plunge district	0	0	0	5,008	0,417	23917	42,52	3,5437	203089	67,41	5,62	321926	86,428	7,20	412767	87,58	7,30	418283
Prienai district	0	0	0	0	0	0	0	0	0	3,25	0,27	10571,2	11,768	0,98	38281,8	49,32	4,11	160429
Radviliskis district	0	0	0	3,84	0,32	17459	47,18	3,9313	214629	79,62	6,63	362251	81,568	6,80	371102	131,00	10,92	596000
Raseiniai district	0	0	0	0	0	0	0	0	0	13,47	1,12	52186,2	27,543	2,30	106685	30,61	2,55	118547
Rokiskis district	0	0	0	0	0	0	0	0	0	9,42	0,78	35779,3	95,317	7,94	361967	95,32	7,94	361967
Sakiai district	0	0	0	0	0	0	9,55	0,7958	33674,7	16,57	1,38	58433,4	28,044	2,34	98891	104,67	8,72	369086
Salcininkai district	0	0	0	14,11	1,18	46667	31,55	2,6292	104330	36,74	3,06	121491	38,195	3,18	126304	83,40	6,95	275785
SIAULIAI city	0	0	0	31,49	2,62	385250	74,99	6,2494	917407	110,45	9,20	1351124	151,78	12,65	1856751	163	13,58	1994034
Siauliai district	0	0	0	3,84	0,32	16885	6,66	0,5552	29288,4	69,25	5,77	304421	115,28	9,61	506771	116,06	9,67	510215
Silale district	0	0	0	10,39	0,866	28796	18,03	1,5026	49974,5	18,03	1,50	49974,5	20,24	1,69	56097,1	21,87	1,82	60603,3
Silute district	0	0	0	4,96	0,41	29178	12,26	1,0215	72096,6	12,26	1,02	72096,6	50,867	4,24	299188	79,26	6,60	466202
Sirvintos district	0	0	0	0	0	0	0	0	0	0	0	0	10,279	0,86	18463,7	17,83	1,49	32026,9
Skuodas district	0	0	0	0	0	0	28,1	2,3417	64815,9	35,5	2,96	81882,6	37,517	3,13	86536	37,52	3,13	86536
Svencionys district	0	0	0	10,82	0,90	32083	25,83	2,1526	76582,1	31,02	2,59	91967	32,477	2,71	96282,2	77,68	6,47	230289
Taurage district	0	0	0	9,504	0,79	48503	16,49	1,3742	84160,4	16,49	1,37	84160,4	109,86	9,16	560687	111,35	9,28	568274

Municipality	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality
	Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month	
Telsiai district	0	0	0	0	0	0	0	0	0	0	0	0	14,604	1,22	97091,3	20,45	1,70	135945
Trakai district	0	0	0	15	1,25	70004	33,35	2,7792	155625	40,74	3,40	190127	74,012	6,17	345364	189,84	15,82	885880
Ukmerge district	0	0	0	0	0	0	0	0	0	0	0	0	5,1312	0,43	21859,8	12,68	1,06	54029,2
Utena district	0	0	0	0	0	0	0	0	0	8,15	0,68	36305,5	19,019	1,59	84673,2	22,60	1,88	100599
Varena district	0	0	0	24,95	2,08	76844	55	4,5829	169390	55,00	4,58	169390	58,691	4,89	180774	64,53	5,38	198749
Vilkaviskis district	0	0	0	0	0	0	9,542	0,7951	42141,2	16,56	1,38	73150,5	80,718	6,73	356500	121,81	10,15	537972
Vilnius district	0	0	0	0	0	0	7,058	0,5882	51899,2	12,25	1,02	90058,6	13,703	1,14	100763	58,90	4,91	433104
VILNIUS city	0	0	0	12,59	1,05	606667	28,9	2,4084	1392886	34,09	2,84	1642987	35,546	2,96	1713121	80,52	6,71	3880854
VISAGINAS city	0	0	0	0	0	0	0	0	0	8,15	0,68	22912,2	19,02	1,59	53443,9	50,21	4,18	141079
Zarasai district	0	0	0	0	0	0	0	0	0	8,16	0,68	16741,7	19,026	1,59	39046,9	173,93	14,49	356955
Average burden for one inhabitant per month			**0,00**			**1,20**			**2,73**			**3,83**			**5,29**			**7,54**

Annex 7.10. Annualised Costs for Each Municipality, Scenario A-III

The Annex consists of two parts. First table shows real spending a municipality will need to allocate in order to implement water, wastewater and waste projects from the Municipal Investment Programme. The second table presents burden of these spendings on population in each municipality of Lithuania.

Annex 7.10.1. Annualised costs for implementation of the Municipal Investment Programme for each municipality

Annex 7.10.2. Average burden of Municipal Investment Programme per capita

Annex 7.10.1. Annualised Costs for Implementation of the Municipal Investment Programme for Each Municipality, Scenario A-III

	Population	Annualised costs for water and waste sectors – Scenario A-III (thou euros)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Akmene district	39097	0	0	37	37	69	560	560	1019	1019	1042	1489	1489	1884	1884	1884	1884
Alytus district	33585	0	0	0	80	80	151	151	151	151	151	181	181	208	208	234	234
ALYTUS city	77338	0	0	0	185	185	981	981	1540	1540	1540	1610	1610	1671	1671	1730	1730
Anyksciai district	37711	0	0	0	0	417	417	860	860	1437	1437	1933	1933	1972	1972	1972	1972
BIRSTONAS	3800	0	0	0	0	0	0	3	4	6	458	458	858	858	858	916	916
Birzai district	38113	0	0	205	205	386	386	386	473	498	575	596	596	596	596	596	596
DRUSKININKAI city	21652	0	0	376	427	759	804	804	804	804	804	804	804	824	824	858	858
Ignalina district	24872	0	0	111	111	292	292	341	341	385	385	385	385	440	440	440	440
Jonava district	55140	0	0	0	881	881	1658	1702	1702	1741	1823	1823	1896	1896	1896	2340	2340
Joniskis district	34344	0	0	32	32	61	61	61	83	567	587	1015	1015	1015	1015	1015	1015
Jurbarkas district	40570	0	0	1008	1111	1292	1382	1382	1382	1382	1404	1404	1423	1423	1423	1423	1423
Kaisiadorys district	40187	0	0	0	0	0	439	471	858	886	946	946	999	999	999	1609	1609
KAUNAS city	414174	0	0	390	2781	3470	5579	5907	5907	6196	6815	6815	7362	7362	7362	13645	13645
Kaunas district	84414	0	0	0	0	0	0	67	67	126	252	252	363	363	363	363	363
Kedainiai district	70683	0	0	0	0	665	665	1484	1484	1689	1761	1761	1824	1824	1824	1824	1824
Kelme district	43046	0	0	40	40	76	76	76	112	112	136	136	136	136	136	136	804
KLAIPEDA city	202528	0	0	183	183	1003	1003	1441	1441	1499	2176	2226	2824	2824	2824	2824	2824
Klaipeda district	45732	0	0	0	0	112	112	211	211	224	224	236	236	236	236	236	236
Kretinga district	46991	0	0	0	0	115	115	217	663	676	1069	1081	1081	1081	1081	1081	1081
Kupiskis district	26047	0	0	0	0	0	0	0	60	76	129	144	144	144	144	144	144
Lazdijai district	32642	0	0	0	78	78	147	147	147	147	147	176	176	202	202	227	227
MARIJAMPOLE	52020	0	0	0	0	0	121	121	1331	1392	2365	2418	2418	2418	2418	2418	2418
Marijampole district	51079	0	0	0	0	0	119	119	224	283	283	336	336	336	336	336	336

	Population	Annualised costs for water and waste sectors – Scenario A-III (thou euros)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Mazeikiai district	64175	0	0	0	0	669	669	1259	1259	1416	1441	1579	1601	1601	1601	1601	1601
Moletai district	26262	0	0	0	0	0	0	52	52	98	98	130	130	157	157	157	157
NERINGA city	2676	0	0	546	1029	1035	1035	1042	1041	1041	1041	1041	1041	1041	1041	1041	1041
Pakruojis district	30784	0	0	29	54	54	54	54	74	74	92	92	92	92	92	92	92
PALANGA	19567	0	0	0	0	48	48	90	90	96	96	101	101	101	101	101	101
Panevezys district	41691	0	0	0	0	0	0	0	130	139	253	262	262	262	262	262	262
PANEVEZYS	133638	0	0	1123	1930	1930	3057	3057	4466	4497	4864	4891	4891	4891	4891	4891	4891
Pasvalys district	36601	0	0	0	0	0	0	0	114	122	222	230	230	230	230	230	230
Plunge district	57310	0	0	70	70	605	605	1022	1022	1163	1185	1309	1328	1328	1328	1328	1328
Prienai district	39037	0	0	0	0	0	0	31	31	58	117	117	168	168	168	483	483
Radviliskis district	54595	0	0	51	51	636	636	1112	1147	1147	1178	1178	1178	1178	1178	1178	1836
Raseiniai district	46480	0	0	0	0	0	0	153	153	288	335	335	376	376	376	376	376
Rokiskis district	45570	0	0	0	0	0	0	0	105	611	703	1149	1149	1149	1149	1149	1149
Sakiai district	42316	0	0	0	0	0	99	99	186	235	268	311	311	1169	1169	1169	1169
Salcininkai district	39682	0	0	0	137	137	325	325	386	394	394	401	649	649	867	867	875
SIAULIAI city	146800	0	0	1128	1128	2997	2997	4171	4266	5303	5386	5933	5933	6415	6415	6415	6415
Siauliai district	52752	0	0	49	49	93	93	864	898	1579	1609	1609	1609	1609	1609	1609	1619
Silale district	33259	0	0	0	84	84	159	159	159	159	177	177	192	192	192	192	192
Silute district	70582	0	0	85	85	236	236	236	236	236	236	901	901	1487	1487	1487	1487
Sirvintos district	21554	0	0	0	0	0	0	0	0	0	0	54	54	102	102	102	102
Skuodas district	27679	0	0	0	0	214	214	274	274	282	282	289	289	289	289	289	289
Svencionys district	35576	0	0	0	94	94	238	238	292	299	299	306	306	306	723	731	731
Taurage district	61244	0	0	0	142	142	267	267	267	1053	1084	1778	1804	1804	1804	1804	1804
Telsiai district	79781	0	0	0	0	0	0	0	0	150	174	306	327	327	327	327	423
Trakai district	55996	0	0	205	205	341	478	478	599	616	1042	1056	1930	1930	2369	2369	2774
Ukmerge district	51122	0	0	0	0	0	0	0	0	0	0	64	64	177	177	177	177
Utena district	53424	0	0	0	0	0	0	106	106	200	200	263	263	319	319	319	319
Varena district	36961	0	0	137	225	472	550	550	550	550	550	583	583	613	613	641	641

	Population	Annualised costs for water and waste sectors – Scenario A-III (thou euros)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Vilkaviskis district	52999	0	0	0	0	0	123	123	232	294	294	1071	1071	1708	1708	1708	1708
Vilnius district	88240	0	0	0	0	0	152	152	286	304	304	320	870	870	1356	1374	1374
VILNIUS city	578334	0	0	1776	1776	3343	4338	4338	5216	5335	5335	5439	9046	9046	12229	12229	12331
VISAGINAS city	33719	0	0	0	0	0	0	67	67	126	126	166	166	202	202	202	429
Zarasai district	24628	0	0	0	0	0	0	49	49	92	92	121	121	147	147	147	1056
Total	**3700799**	**0**	**0**	**7580**	**13209**	**23067**	**31441**	**37862**	**44618**	**50794**	**55986**	**61788**	**69127**	**72649**	**77393**	**85298**	**88382**

One inhabitant per year	23,88
One inhabitant per month	1,99

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Share of annualised costs in 1998 GDP	**0,00**	**0,07**	**0,13**	**0,22**	**0,30**	**0,36**	**0,43**	**0,48**	**0,53**	**0,59**	**0,66**	**0,69**	**0,74**	**0,81**	**0,84**
Share of annualised costs in GDP, if it grows 3% annually	**0,00**	**0,07**	**0,11**	**0,19**	**0,25**	**0,30**	**0,34**	**0,37**	**0,40**	**0,43**	**0,47**	**0,48**	**0,49**	**0,53**	**0,53**
State investment needs	**12000**	**10000**	**13000**	**9000**	**8000**	**9000**	**8000**	**10000**	**15000**	**15000**	**10000**	**11000**	**7000**	**15000**	**0**
Share of state investments in GDP, if it grows 0% annually	**0,11**	**0,10**	**0,12**	**0,09**	**0,08**	**0,09**	**0,08**	**0,10**	**0,14**	**0,14**	**0,10**	**0,10**	**0,07**	**0,14**	**0,00**
Share of state investments in GDP, if it grows 3% annually	**0,11**	**0,09**	**0,11**	**0,07**	**0,06**	**0,07**	**0,06**	**0,07**	**0,11**	**0,10**	**0,07**	**0,07**	**0,04**	**0,09**	**0,00**

Annex 7.10.2. Average Burden of Municipal Investment Programme Per Capita, Scenario A-III

Municipality	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for	Per capita		Per month for	Per capita		Per month for	Per capita		Per month for	Per capita		Per month for	Per capita		Per month for
	Per year	Per month	municipality	Per year	Per month	municipality	Per year	Per month	municipality	Per year	Per month	municipality	Per year	Per month	municipality	Per year	Per month	municipality
Akmene district	0	0	0	3,83	0,32	12485	58,76	4,90	191457	106,90	8,91	348282	156,18	13,01	508833	197,60	16,47	643812
Alytus district	0	0	0	9,79	0,82	27409	18,44	1,54	51601,8	18,44	1,54	51601,8	22,13	1,84	61933,8	28,51	2,38	79804
ALYTUS city	0	0	0	9,80	0,82	63140	52,03	4,34	335297	81,67	6,81	526319	85,35	7,11	550092	91,74	7,64	591222
Anyksciai district	0	0	0	0,00	0,00	0	45,35	3,78	142520	93,53	7,79	293938	210,12	17,51	660316	214,41	17,87	673806
BIRSTONAS	0	0	0	0,00	0,00	0	0,00	0,00	0	4,25	0,35	1344,6	494,57	41,21	156615	987,90	82,33	312835
Birzai district	0	0	0	22,04	1,84	70004	41,49	3,46	131764	50,90	4,24	161660	64,14	5,34	203707	64,14	5,34	203707
DRUSKININKAI city	0	0	0	80,91	6,74	145984	152,32	12,69	274840	152,32	12,69	274840	152,32	12,69	274840	162,39	13,53	293010
Ignalina district	0	0	0	18,29	1,52	37908	48,09	4,01	99668,1	56,23	4,69	116553	63,43	5,29	131469	72,59	6,05	150459
Jonava district	0	0	0	65,51	5,46	301000	123,32	10,28	566644	126,57	10,55	581568	135,56	11,30	622902	174,01	14,50	799583
Joniskis district	0	0	0	3,84	0,32	11002	7,23	0,60	20691,7	9,87	0,82	28249,4	121,14	10,09	346695	121,14	10,09	346695
Jurbarkas district	0	0	0	112,25	9,35	379510	139,69	11,64	472271	139,69	11,64	472271	141,90	11,82	479733	143,85	11,99	486329
Kaisiadorys district	0	0	0	0,00	0,00	0	44,78	3,73	149969	87,54	7,30	293181	96,54	8,04	323293	164,14	13,68	549694
KAUNAS city	0	0	0	27,53	2,29	950026	55,23	4,60	1906155	58,47	4,87	2018180	67,47	5,62	2328598	135,07	11,26	5E+06
Kaunas district	0	0	0	0,00	0,00	0	0,00	0,00	0	3,24	0,27	22816,5	12,24	1,02	86109,2	17,65	1,47	124165
Kedainiai district	0	0	0	0,00	0,00	0	38,57	3,21	227208	86,09	7,17	507084	102,14	8,51	601658	105,82	8,82	623306
Kelme district	0	0	0	3,84	0,32	13776	7,23	0,60	25921,3	10,65	0,89	38214,5	12,99	1,08	46589,2	76,61	6,38	274829
KLAIPEDA city	0	0	0	3,70	0,31	62470	20,30	1,69	342544	29,18	2,43	492397	45,07	3,76	760716	57,17	4,76	964866
Klaipeda district	0	0	0	0,00	0,00	0	10,07	0,84	38362,3	18,95	1,58	72200,2	21,14	1,76	80563,8	21,14	1,76	80564
Kretinga district	0	0	0	0,00	0,00	0	10,07	0,84	39414,7	57,82	4,82	226434	94,32	7,86	369368	94,32	7,86	369368
Kupiskis district	0	0	0	0,00	0,00	0	0,00	0,00	0	9,41	0,78	20424,8	22,65	1,89	49164,5	22,65	1,89	49165
Lazdijai district	0	0	0	9,79	0,82	26643	18,44	1,54	50157,1	18,44	1,54	50157,1	22,13	1,84	60202,1	28,52	2,38	77577
MARIJAMPOLE	0	0	0	0,00	0,00	0	9,54	0,80	41375,8	104,90	8,74	454733	190,61	15,88	826276	190,61	15,88	826276

Municipality	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality
	Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month	
Marijampole district	0	0	0	0,00	0,00	0	9,55	0,80	40658,3	17,98	1,50	76521,5	26,97	2,25	114782	26,97	2,25	114782
Mazeikiai district	0	0	0	0,00	0,00	0	42,71	3,56	228433	80,41	6,70	430034	100,91	8,41	539661	102,30	8,52	547074
Moletai district	0	0	0	0,00	0,00	0	0,00	0,00	0	8,15	0,68	17841,8	20,22	1,69	44258,3	24,52	2,04	53653
NERINGA city	0	0	0	1575,82	131,32	351407	1585,90	132,16	353655	1594,78	132,90	355635	1594,78	132,90	355635	1594,78	132,90	355635
Pakruojis district	0	0	0	7,23	0,60	18539	7,23	0,60	18539,3	9,87	0,82	25331,6	12,21	1,02	31320,8	12,21	1,02	31321
PALANGA	0	0	0	0,00	0,00	0	10,06	0,84	16406,8	18,94	1,58	30884,8	21,14	1,76	34473,2	21,14	1,76	34473
Panevezys district	0	0	0	0,00	0,00	0	0,00	0,00	0	12,74	1,06	44245,8	25,76	2,15	89484,1	25,76	2,15	89484
PANEVEZYS	0	0	0	59,22	4,93	659496	93,79	7,82	1044496	137,03	11,42	1526051	150,05	12,50	1671051	150,05	12,50	2E+06
Pasvalys district	0	0	0	0,00	0,00	0	0,00	0,00	0	12,73	1,06	38840,7	25,75	2,15	78528,3	25,75	2,15	78528
Plunge district	0	0	0	5,01	0,42	23917	43,26	3,61	206607	73,12	6,09	349211	93,62	7,80	447113	95,01	7,92	453733
Prienai district	0	0	0	0,00	0,00	0	0,00	0,00	0	3,25	0,27	10571,2	12,25	1,02	39834,6	50,69	4,22	164915
Radviliskis district	0	0	0	3,84	0,32	17459	47,74	3,98	217196	86,15	7,18	391932	88,48	7,37	402553	137,91	11,49	627451
Raseiniai district	0	0	0	0,00	0,00	0	0,00	0,00	0	13,47	1,12	52186,2	29,53	2,46	114361	33,20	2,77	128596
Rokiskis district	0	0	0	0,00	0,00	0	0,00	0,00	0	9,42	0,79	35779,3	103,40	8,62	392643	103,40	8,62	392643
Sakiai district	0	0	0	0,00	0,00	0	9,55	0,80	33674,7	17,97	1,50	63385,2	30,15	2,51	106319	113,27	9,44	399414
Salcininkai district	0	0	0	14,11	1,18	46667	33,63	2,80	111194	39,85	3,32	131787	41,43	3,45	137008	90,40	7,53	298927
SIAULIAI city	0	0	0	31,49	2,62	385250	83,69	6,97	1023839	119,15	9,93	1457555	165,69	13,81	2026974	179,16	14,93	2E+06
Siauliai district	0	0	0	3,84	0,32	16885	7,23	0,60	31769	69,81	5,82	306902	125,05	10,42	549722	125,83	10,49	553166
Silale district	0	0	0	10,39	0,87	28796	19,56	1,63	54210,2	19,56	1,63	54210,2	21,77	1,81	60332,9	23,72	1,98	65740
Silute district	0	0	0	4,96	0,41	29178	13,72	1,14	80680,3	13,72	1,14	80680,3	52,33	4,36	307772	86,40	7,20	508189
Sirvintos district	0	0	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	10,28	0,86	18463,7	19,34	1,61	34740
Skuodas district	0	0	0	0,00	0,00	0	31,71	2,64	73139,2	40,59	3,38	93619,3	42,78	3,56	98667,6	42,78	3,56	98668

Municipality	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for	Per capita		Per month	Per capita		Per month	Per capita		Per month	Per capita		Per month for	Per capita		Per month for
	Per year	Per month	municipality	Per year	Per month	for municipality	Per year	Per month	for municipality	Per year	Per month	for municipality	Per year	Per month	municipality	Per year	Per month	municipality
Svencionys district	0	0	0	10,82	0,90	32083	27,42	2,29	81301,3	33,65	2,80	99763,1	35,23	2,94	104444	84,19	7,02	249601
Taurage district	0	0	0	9,50	0,79	48503	17,89	1,49	91291,8	17,89	1,49	91291,8	119,00	9,92	607332	120,78	10,07	616436
Telsiai district	0	0	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	15,74	1,31	104637	21,76	1,81	144670
Trakai district	0	0	0	15,00	1,25	70004	35,01	2,92	163365	43,88	3,66	204766	77,32	6,44	360824	203,10	16,93	947752
Ukmerge district	0	0	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	5,13	0,43	21859,8	14,19	1,18	60463
Utena district	0	0	0	0,00	0,00	0	0,00	0,00	0	8,15	0,68	36305,5	20,22	1,68	90013,1	24,51	2,04	109124
Varena district	0	0	0	24,95	2,08	76844	61,00	5,08	187899	61,00	5,08	187899	64,70	5,39	199283	71,08	5,92	218930
Vilkaviskis district	0	0	0	0,00	0,00	0	9,54	0,80	42141,2	17,97	1,50	79352,3	82,82	6,90	365802	132,13	11,01	583569
Vilnius district	0	0	0	0,00	0,00	0	7,06	0,59	51899,2	13,29	1,11	97690,5	14,86	1,24	109302	63,82	5,32	469298
VILNIUS city	0	0	0	12,59	1,05	606667	30,75	2,56	1482120	36,98	3,08	1782242	38,56	3,21	1858319	87,42	7,28	4E+06
VISAGINAS city	0	0	0	0,00	0,00	0	0,00	0,00	0	8,15	0,68	22912,2	20,22	1,68	56814,2	52,12	4,34	146460
Zarasai district	0	0	0	0,00	0,00	0	0,00	0,00	0	8,16	0,68	16741,7	20,23	1,69	41508,6	175,84	14,65	360885
Average burden for average inhabitant per month			**0**			**1,22**			**2,90**			**4,12**			**5,70**			**8,16**

Annex 7.11. Annualised Costs for Each Municipality, Scenario C-III

The Annex consists of two parts. First table shows real spending a municipality will need to allocate in order to implement water, wastewater and waste projects from the Municipal Investment Programme. The second table presents burden of these spendings on population in each municipality of Lithuania.

Annex 7.11.1. Annualised costs for implementation of the Municipal Investment Programme for each municipality

Annex 7.11.2. Average burden of Municipal Investment Programme per capita

Annex 7.11.1. Annualised Costs for Implementation of the Municipal Investment Programme for Each Municipality, Scenario C-III

	Population	Annualised costs for water and waste sectors – Scenario C-III (thou euros)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Akmene district	39097	0	0	37	37	88	579	579	1290	1290	1325	1773	1773	2397	2397	2397	2397
Alytus district	33585	0	0	0	80	80	192	192	192	192	192	222	222	265	265	290	290
ALYTUS city	77338	0	0	0	185	185	1076	1076	1960	1960	1960	2029	2029	2126	2126	2185	2185
Anyksciai district	37711	0	0	0	0	417	417	1074	1074	1689	1689	2446	2446	2509	2509	2509	2509
BIRSTONAS	3800	0	0	0	0	0	0	3	4	7	460	460	1091	1091	1091	1165	869
Birzai district	38113	0	0	205	205	491	491	491	578	602	725	758	758	758	758	758	758
DRUSKININKAI	21652	0	0	376	427	951	1023	1023	1023	1023	1023	1023	1023	1043	1043	1087	1087
Ignalina district	24872	0	0	111	111	397	397	446	446	515	515	515	515	586	586	586	586
Jonava district	55140	0	0	0	881	881	2110	2154	2154	2214	2297	2297	2412	2412	2412	2856	2856
Joniskis district	34344	0	0	32	32	77	77	77	99	584	615	1291	1291	1291	1291	1291	1291
Jurbarkas district	40570	0	0	1008	1111	1396	1540	1540	1540	1540	1562	1562	1592	1592	1592	1592	1592
Kaisiadorys district	40187	0	0	0	0	0	439	471	1083	1127	1187	1187	1271	1271	1271	2047	2047
KAUNAS city	414174	0	0	390	2781	3870	7204	7532	7532	7989	8608	8608	9472	9472	9472	17465	17465
Kaunas district	84414	0	0	0	0	0	0	67	67	160	286	286	462	462	462	462	462
Kedainiai district	70683	0	0	0	0	665	665	1825	1825	2149	2221	2221	2321	2321	2321	2321	2321
Kelme district	43046	0	0	40	40	97	97	97	132	132	171	171	171	171	171	171	838
KLAIPEDA city	202528	0	0	183	183	1190	1190	1883	1883	1941	2618	2698	3642	3642	3642	3642	3642
Klaipeda district	45732	0	0	0	0	112	112	269	269	282	282	300	300	300	300	300	300
Kretinga district	46991	0	0	0	0	115	115	276	722	735	1357	1375	1375	1375	1375	1375	1375
Kupiskis district	26047	0	0	0	0	0	0	0	60	76	160	183	183	183	183	183	183
Lazdijai district	32642	0	0	0	78	78	187	187	187	187	187	216	216	257	257	282	282
MARIJAMPOLE	52020	0	0	0	0	0	121	121	1393	1454	2992	3077	3077	3077	3077	3077	3077
Marijampole district	51079	0	0	0	0	0	119	119	285	344	344	427	427	427	427	427	427
Mazeikiai district	64175	0	0	0	0	669	669	1601	1601	1759	1783	2003	2037	2037	2037	2037	2037

	Populatio n	Annualised costs for water and waste sectors – Scenario C-III (thou euros)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Moletai district	26262	0	0	0	0	0	0	52	52	125	125	156	156	200	200	200	200
NERINGA city	2676	0	0	546	1308	1315	1315	1325	1324	1324	1324	1324	1324	1324	1324	1324	1324
Pakruojis district	30784	0	0	29	69	69	69	69	89	89	117	117	117	117	117	117	117
PALANGA	19567	0	0	0	0	48	48	115	115	121	121	128	128	128	128	128	128
Panevezys district	41691	0	0	0	0	0	0	0	130	139	320	333	333	333	333	333	333
PANEVEZYS	133638	0	0	1123	2399	2399	3526	3526	5513	5544	6123	6166	6166	6166	6166	6166	6166
Pasvalys district	36601	0	0	0	0	0	0	0	114	122	281	292	292	292	292	292	292
Plunge district	57310	0	0	70	70	641	641	1300	1300	1441	1463	1659	1689	1689	1689	1689	1689
Prienai district	39037	0	0	0	0	0	0	31	31	74	132	132	214	214	214	528	528
Radviliskis district	54595	0	0	51	51	662	662	1414	1450	1450	1499	1499	1499	1499	1499	1499	2157
Raseiniai district	46480	0	0	0	0	0	0	153	153	366	413	413	479	479	479	479	479
Rokiskis district	45570	0	0	0	0	0	0	0	105	611	756	1462	1462	1462	1462	1462	1462
Sakiai district	42316	0	0	0	0	0	99	99	236	285	318	387	387	1478	1478	1478	1478
Salcininkai district	39682	0	0	0	137	137	395	395	491	499	499	510	758	758	1103	1103	1111
SIAULIAI city	146800	0	0	1128	1128	4082	4082	5256	5351	6990	7122	7668	7668	8430	8430	8430	8430
Siauliai district	52752	0	0	49	49	118	118	890	924	1999	2047	2047	2047	2047	2047	2047	2057
Silale district	33259	0	0	0	84	84	202	202	202	202	220	220	245	245	245	245	245
Silute district	70582	0	0	85	85	324	324	324	324	324	324	988	988	1809	1809	1809	1809
Sirvintos district	21554	0	0	0	0	0	0	0	0	0	0	54	54	129	129	129	129
Skuodas district	27679	0	0	0	0	299	299	394	394	402	402	412	412	412	412	412	412
Svencionys district	35576	0	0	0	94	94	286	286	371	379	379	389	389	389	920	927	927
Taurage district	61244	0	0	0	142	142	340	340	340	1126	1156	2253	2295	2295	2295	2295	2295
Telsiai district	79781	0	0	0	0	0	0	0	0	150	174	383	416	416	416	416	512
Trakai district	55996	0	0	205	205	420	557	557	749	765	1191	1214	2305	2305	3000	3000	3405
Ukmerge district	51122	0	0	0	0	0	0	0	0	0	0	64	64	243	243	243	243
Utena district	53424	0	0	0	0	0	0	106	106	254	254	318	318	406	406	406	406
Varena district	36961	0	0	137	225	615	739	739	739	739	739	772	772	818	818	847	847
Vilkaviskis district	52999	0	0	0	0	0	123	123	295	357	357	1165	1165	2173	2173	2173	2173

	Population	Annualised costs for water and waste sectors – Scenario C-III (thou euros)															
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Vilnius district	88240	0	0	0	0	0	152	152	364	382	382	407	957	957	1725	1743	1743
VILNIUS city	578334	0	0	1776	1776	4253	5248	5248	6636	6755	6755	6919	10526	10526	15558	15558	14472
VISAGINAS city	33719	0	0	0	0	0	0	67	67	161	161	201	201	256	256	256	484
Zarasai district	24628	0	0	0	0	0	0	49	49	117	117	147	147	187	187	187	1096
Total	**3700799**	**0**	**0**	**7580**	**13973**	**27459**	**38043**	**46314**	**55410**	**63243**	**69828**	**77331**	**86085**	**91253**	**98623**	**108430**	**110029**
														One inhabitant per year			29,73
														One inhabitant per month			2,48
Share of annualised costs in 1998 GDP				**0,07**	**0,13**	**0,26**	**0,36**	**0,44**	**0,53**	**0,60**	**0,67**	**0,74**	**0,82**	**0,87**	**0,94**	**1,03**	**1,05**
Share of annualised costs in GDP, if it grows 3% per annum		**0,00**	**0,07**	**0,12**	**0,23**	**0,31**	**0,36**	**0,42**	**0,47**	**0,50**	**0,54**	**0,58**	**0,60**	**0,63**	**0,67**	**0,66**	
State investment needs		**6000**	**5000**	**6500**	**4500**	**4000**	**4500**	**4000**	**5000**	**7500**	**7500**	**5000**	**5500**	**3500**	**7500**	**0**	
Share of state investments in GDP, if it grows 0% per annum		**0,06**	**0,05**	**0,06**	**0,04**	**0,04**	**0,04**	**0,04**	**0,05**	**0,07**	**0,07**	**0,05**	**0,05**	**0,03**	**0,07**	**0,00**	
Share of state investments in GDP, if it grows 3% per annum		**0,05**	**0,04**	**0,06**	**0,04**	**0,03**	**0,04**	**0,03**	**0,04**	**0,05**	**0,05**	**0,03**	**0,04**	**0,02**	**0,05**	**0,00**	

Annex 7.11.2. Average Burden of Municipal Investment Programme Per Capita, Scenario C-III

Municipality	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality	Per capita		Per month for municipality
	Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month		Per year	Per month	
Akmene district	0	0	0	3,83	0,32	12485	60,73	5,06	197862	135,28	11,27	440744	185,91	15,49	605711	251,39	20,95	819062
Alytus district	0	0	0	9,79	0,82	27409	23,46	1,95	65649	23,46	1,95	65649	27,15	2,26	75981	35,42	2,95	99143,9
ALYTUS city	0	0	0	9,80	0,82	63140	57,04	4,75	367644	103,89	8,66	669578	107,58	8,97	693351	115,86	9,65	746670
Anyksciai district	0	0	0	0,00	0,00	0	45,35	3,78	142520	116,77	9,73	366968	265,99	22,17	835883	272,77	22,73	857206
BIRSTONAS	0	0	0	0,00	0,00	0	0,00	0,00	0	4,25	0,35	1344,6	496,24	41,35	157142	937,89	78,16	296997
Birzai district	0	0	0	22,04	1,84	70004	52,78	4,40	167624	62,19	5,18	197519	81,59	6,80	259148	81,59	6,80	259148
DRUSKININKAI city	0	0	0	80,91	6,74	145984	193,79	16,15	349657	193,79	16,15	349657	193,79	16,15	349657	205,75	17,15	371240
Ignalina district	0	0	0	18,29	1,52	37908	65,39	5,45	135527	73,53	6,13	152413	84,91	7,08	175989	96,56	8,05	200145
Jonava district	0	0	0	65,51	5,46	301000	156,88	13,07	720883	160,13	13,34	735807	170,79	14,23	784782	212,38	17,70	975897
Joniskis district	0	0	0	3,84	0,32	11002	9,20	0,77	26318	11,84	0,99	33875,7	154,11	12,84	441062	154,11	12,84	441062
Jurbarkas district	0	0	0	112,25	9,35	379510	155,62	12,97	526130	155,62	12,97	526130	157,83	13,15	533592	160,91	13,41	544018
Kaisiadorys district	0	0	0	0,00	0,00	0	44,78	3,73	149969	110,49	9,21	370028	121,15	10,10	405709	208,82	17,40	699325
KAUNAS city	0	0	0	27,53	2,29	950026	71,31	5,94	2461306	74,56	6,21	2573331	85,21	7,10	2941144	172,89	14,41	5967239
Kaunas district	0	0	0	0,00	0,00	0	0,00	0,00	0	3,24	0,27	22816,5	13,90	1,16	97807	22,45	1,87	157958
Kedainiai district	0	0	0	0,00	0,00	0	38,57	3,21	227208	105,85	8,82	623510	128,81	10,73	758750	134,62	11,22	792966
Kelme district	0	0	0	3,84	0,32	13776	9,19	0,77	32973,2	12,62	1,05	45266,3	16,31	1,36	58503,7	79,82	6,65	286328
KLAIPEDA city	0	0	0	3,70	0,31	62470	24,09	2,01	406566	38,12	3,18	643428	54,62	4,55	921814	73,74	6,14	1244498
Klaipeda district	0	0	0	0,00	0,00	0	10,07	0,84	38362,3	24,10	2,01	91847,2	26,89	2,24	102484	26,89	2,24	102484
Kretinga district	0	0	0	0,00	0,00	0	10,07	0,84	39414,7	62,98	5,25	246622	120,00	10,00	469908	120,00	10,00	469908
Kupiskis district	0	0	0	0,00	0,00	0	0,00	0,00	0	9,41	0,78	20424,8	28,82	2,40	62546,5	28,82	2,40	62546,5
Lazdijai district	0	0	0	9,79	0,82	26643	23,46	1,95	63809,9	23,46	1,95	63809,9	27,15	2,26	73854,9	35,43	2,95	96374,1
MARIJAMPOLE	0	0	0	0,00	0,00	0	9,54	0,80	41375,8	109,79	9,15	475940	242,49	20,21	1051184	242,49	20,21	1051184

Municipality	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for	Per capita		Per month for	Per capita		Per month	Per capita		Per month	Per capita		Per month for	Per capita		Per month for
	Per year	Per month	municipality	Per year	Per month	municipality	Per year	Per month	for municipality	Per year	Per month	for municipality	Per year	Per month	municipality	Per year	Per month	municipality
Marijampole district	0	0	0	0,00	0,00	0	9,55	0,80	40658,3	22,87	1,91	97344,4	34,30	2,86	146017	34,30	2,86	146017
Mazeikiai district	0	0	0	0,00	0,00	0	42,71	3,56	228433	102,30	8,52	547089	127,95	10,66	684262	130,14	10,85	695979
Moletai district	0	0	0	0,00	0,00	0	0,00	0,00	0	8,15	0,68	17841,8	24,40	2,03	53403	31,19	2,60	68252,2
NERINGA city	0	0	0	2004,75	167,06	447059	2014,83	167,90	449307	2028,87	169,07	452437	2028,87	169,07	452437	2028,87	169,07	452437
Pakruojis district	0	0	0	9,19	0,77	23582	9,19	0,77	23582,4	11,84	0,99	30374,7	15,53	1,29	39841,3	15,53	1,29	39841,3
PALANGA	0	0	0	0,00	0,00	0	10,06	0,84	16406,8	24,10	2,01	39291	26,89	2,24	43852,1	26,89	2,24	43852,1
Panevezys district	0	0	0	0,00	0,00	0	0,00	0,00	0	12,74	1,06	44245,8	32,77	2,73	113834	32,77	2,73	113834
PANEVEZYS	0	0	0	73,61	6,13	819713	108,18	9,01	1204713	169,13	14,09	1883551	189,16	15,76	2106604	189,16	15,76	2106604
Pasvalys district	0	0	0	0,00	0,00	0	0,00	0,00	0	12,73	1,06	38840,7	32,76	2,73	99905,5	32,76	2,73	99905,5
Plunge district	0	0	0	5,01	0,42	23917	45,83	3,82	218863	93,02	7,75	444265	118,67	9,89	566767	120,87	10,07	577231
Prienai district	0	0	0	0,00	0,00	0	0,00	0,00	0	3,25	0,27	10571,2	13,91	1,16	45244,2	55,50	4,62	180543
Radviliskis district	0	0	0	3,84	0,32	17459	49,71	4,14	226140	108,87	9,07	495332	112,56	9,38	512121	162,00	13,50	737019
Raseiniai district	0	0	0	0,00	0,00	0	0,00	0,00	0	13,47	1,12	52186,2	36,43	3,04	141101	42,24	3,52	163601
Rokiskis district	0	0	0	0,00	0,00	0	0,00	0,00	0	9,42	0,79	35779,3	131,54	10,96	499508	131,54	10,96	499508
Sakiai district	0	0	0	0,00	0,00	0	9,55	0,80	33674,7	22,87	1,91	80635,8	37,49	3,12	132195	143,23	11,94	505070
Salcininkai district	0	0	0	14,11	1,18	46667	40,86	3,40	135107	50,70	4,23	167657	52,71	4,39	174298	114,78	9,56	379545
SIAULIAI city	0	0	0	31,49	2,62	385250	114,00	9,50	1394618	149,46	12,45	1828335	214,17	17,85	2619989	235,45	19,62	2880382
Siauliai district	0	0	0	3,84	0,32	16885	9,19	0,77	40410,9	71,78	5,98	315544	159,09	13,26	699351	159,87	13,32	702795
Silale district	0	0	0	10,39	0,87	28796	24,88	2,07	68966,5	24,88	2,07	68966,5	27,09	2,26	75089,2	30,18	2,51	83636,2
Silute district	0	0	0	4,96	0,41	29178	18,80	1,57	110584	18,80	1,57	110584	57,41	4,78	337675	105,10	8,76	618180
Sirvintos district	0	0	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	10,28	0,86	18463,7	24,60	2,05	44189,7
Skuodas district	0	0	0	0,00	0,00	0	44,28	3,69	102136	58,31	4,86	134507	61,10	5,09	140931	61,10	5,09	140931
Svencionys	0	0	0	10,82	0,90	32083	32,97	2,75	97741,5	42,81	3,57	126923	44,82	3,74	132877	106,88	8,91	316878

Municipality	2001, Lt			2003, Lt			2005, Lt			2007, Lt			2010, Lt			2015, Lt		
	Per capita		Per month for	Per capita		Per month for	Per capita		Per month	Per capita		Per month	Per capita		Per month for	Per capita		Per month for
	Per year	Per month	municipality	Per year	Per month	municipality	Per year	Per month	for municipality	Per year	Per month	for municipality	Per year	Per month	municipality	Per year	Per month	municipality
district																		
Taurage district	0	0	0	9,50	0,79	48503	22,76	1,90	116136	22,76	1,90	116136	150,84	12,57	769828	153,66	12,80	784218
Telsiai district	0	0	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	19,69	1,64	130926	26,33	2,19	175066
Trakai district	0	0	0	15,00	1,25	70004	40,79	3,40	190327	54,81	4,57	255767	88,87	7,41	414680	249,30	20,77	1163299
Ukmerge district	0	0	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	5,13	0,43	21859,8	19,45	1,62	82877,1
Utena district	0	0	0	0,00	0,00	0	0,00	0,00	0	8,15	0,68	36305,5	24,40	2,03	108616	31,18	2,60	138823
Varena district	0	0	0	24,95	2,08	76844	81,94	6,83	252380	81,94	6,83	252380	85,64	7,14	263764	93,91	7,83	289237
Vilkaviskis district	0	0	0	0,00	0,00	0	9,54	0,80	42141,2	22,86	1,90	100958	90,16	7,51	398211	168,10	14,01	742417
Vilnius district	0	0	0	0,00	0,00	0	7,06	0,59	51899,2	16,90	1,41	124278	18,91	1,58	139048	80,97	6,75	595392
VILNIUS city	0	0	0	12,59	1,05	606667	37,20	3,10	1792990	47,05	3,92	2267369	49,05	4,09	2364150	102,59	8,55	4944508
VISAGINAS	0	0	0	0,00	0,00	0	0,00	0,00	0	8,15	0,68	22912,2	24,40	2,03	68555,4	58,79	4,90	165204
Zarasai district	0	0	0	0,00	0,00	0	0,00	0,00	0	8,16	0,68	16741,7	24,40	2,03	50084,2	182,51	15,21	374576
Average burden for one inhabitant per month			**0**			**1,29**			**3,51**			**5,12**			**7,14**			**10,16**

DATASHEET

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Abstract:
The purpose of the Lithuanian Environmental Financing Strategy is to provide a realistic estimate of environmental expenditure needed in Lithuania in order to comply with environmental EU-legislation and to establish an overview and assessment of financing possibilities for the country in order to meet environmental compliance targets within a 15 year horizon.
The strategy has been developed in an iterative process involving primarily the Lithuanian Ministry of Environment. This report presents the final findings and recommendations made by the consultants.

Terms:
Lithuania, environment, financing, strategy, EU-directives, EU-accession, expenditure, affordability, approximation, cost, waste, water, landfill, packaging waste, drinking, hazardous, large combustion plants, quality of petrol and diesel, sulphur content in middle destilates, chemicals directives and regulations, nitrates, VOC directive, IFIs, bilateral donors, ISPA, public investment programme, DANCEE, municipal environmental investment programme.

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Ministry of Environment

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