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ENGLISH

MEDITERRANEAN ACTION PLAN
MED POL

Meeting to review the long term implementation of National Action Plans
to address pollution from land-based activities

Durrës, (Albania), 1-3 June 2006

ASSESSMENT OF THE COMPLIANCE OF NATIONAL ACTION PLANS WITH SAP TARGETS

PRELIMINARY ANALYSIS

UNEP/MAP
Athens, 2006

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Background

In the framework of the implementation of the Operational strategy of the Strategic Action Programme (SAP), adopted by the 12th Meeting of Contracting Parties to the Barcelona Convention (Monaco, November 2001), the Mediterranean countries prepared Sectoral Plans (SPs) and National Action Plans (NAPs) on the basis of National Diagnostic Analyses (NDAs), and the a Baseline Budgets (BBs) of emissions/releases.

The preparation of NAPs represent the operational long-term objective of the Strategic Action Programme (SAP), as NAPs are expected to describe the pollution reduction process to be achieved by the countries making use of all the results of the individual activities of the SAP. NAPs were prepared by all countries of the region and they wereformally endorsed by the 14th Meeting of the Contracting Parties held in Slovenia in November 2005.

National Action Plans are iterative processes that call for the phased implementation of priorities identified within a cross-sectoral, participatory framework. By enabling long-term prioritisation, a country's national programme of action becomes a cyclical process that enables stakeholders to progressively identify and address threats and impacts to the marine and coastal environments. Within the NAPs, a fundamental goal is to develop concrete projects that:

- mobilise both stakeholders and resources,
- build upon National Diagnostic Analysis (NDA),
- are mainstreamed into relevant institutional, budgetary and policy frameworks and,
- incorporate lessons learnt in the process.

National Action Plans focus on sustainable, pragmatic and integrated environmental management approaches and processes, such as integrated coastal area management, harmonized, as appropriate, with river basin management and land-use plans. Towards this end, work on the development of economic instruments and on their implementation at the national level, to ensure financial sustainability to the implementation of the SAP MED and the NAPs, will also play a significant role.

In order to facilitate the implementation of the NAPs in the framework of MED POL Phase IV, the Secretariat prepared the following:

1- Country by country analysis of NBB Data Base for the most relevant substances.

2- Quantification of the reduction of pollution by the above substances that could occur through the implementation of actions described in the individual NAP .

3- Estimation of the level of compliance with the SAP commitments related to the above substances that would be acheived through the implementation of the individual NAP taking into consideration the NBB values as base levels.

4- A preliminary estimate of the marginal cost of pollution reductions (per Kg or Ton) for each of the above substance on the basis of best available data and information.

The present document outlines the results of the analysis of the above-mentioned 4 tasks. The results should be considered as the basis for the development of the long term strategy for the implementation of NAPs to meet the SAP obligations.

I. COUNTRY BY COUNTRY ANALYSIS OF NBB DATA BASE FOR A SELECTED LIST OF SUBSTANCES

In this section an analysis of the national releases normalized to the industrial GDP for each considered substance is presented, according to data included in the National Action Plan (NBB) Database. In fact the GDP normalized values are, in general, relevant indicator which could to reflect the magnitude and intensity of the releases to the level of industrial development. Tables from page 4 to 33 show the results of the analysis according to data from NBB. The major results are as follows:

- **BOD5**: Bosnia-Herzegovina accounts of 26% of the releases followed by Albania 18%, Lebanon 18%, Egypt 17%, Italy 5%, Syria 4% and Turkey 3%.

- **Cadmium** (water): Italy accounts for 42% of total releases, Albania for 50% and Malta 6% of the releases of cadmium.

- **Hydroncarbons:** Egypt is a major contributor with 48% of the releases followed by Malta 29%, Israel and Libya 16% and Algeria 1%.

- **Lead** (water): Tunisia accounts for 91% of the releases followed by Algeria 4%

- **Nitrogen oxides**: Albania accounts for 40% of total releases, followed by Libya 24%, Italy 19%, Israel 12% and Spain 5%.

- **Oils and greases**: Italy accounts for 87% of total releases followed by Albania 6%, Turkey and Tunisia 2% each and Croatia, Algeria and Malta 1% each.

- **Dioxins and Furans** (air): Croatia accounts for 56% of dioxins followed by Italy 25%, Cyprus 18% and Israel 1%

- **Phenols**: Egypt accounts for 67% of the total releases followed by Tunisia 20%,,Albania 12% and Algeria 1%.

- **Total N**: Italy accounts for 43% of total releases followed by Albania 33%, Lebanon 8%, Syria5%, Bosnia-Herzegovina 4%, Croatia 3% and Malta 2%.

- **Total P**: Tunisia accounts for 38% of total releases, followed by Italy (26%), Albania 15%, Lebanon 8%, Syria 5%, Bosnia –Herzegovina 3%, Croatia 2% and Turkey 1%.

- **VOC**: Italy accounts for 19 %, followed by Egypt 17%, Cyprus 16%, Bosnia – Herzegovina 16%, Albania 13%, Syria 11%, Turkey 2%, Lebanon 2%, Israel 1% and Spain 1%.

- **Mercury** (water): Tunisia accounts for 96% of total releases, followed by Algeria 4%.

- **Zn** (water): Egypt accounts for 51% of total releases, followed by Libya 44%, Malta 3% and Italy 2%.

- **NH3**: Italy accounts for 40% of total releases, followed by Spain 26%, Egypt 24 % Spain 9% and Lebanon 1%.

- **AOX** (water): Italy accounts for 93% of total releases, followed by Spain 7%.

- The analysis of NBB data related to sources of releases is highlighted in (T –data in kg/yr- and Table- 2 – data in %). The summary of the tables indicates the following:

Explanatory notes for Tables from page 4 to 33

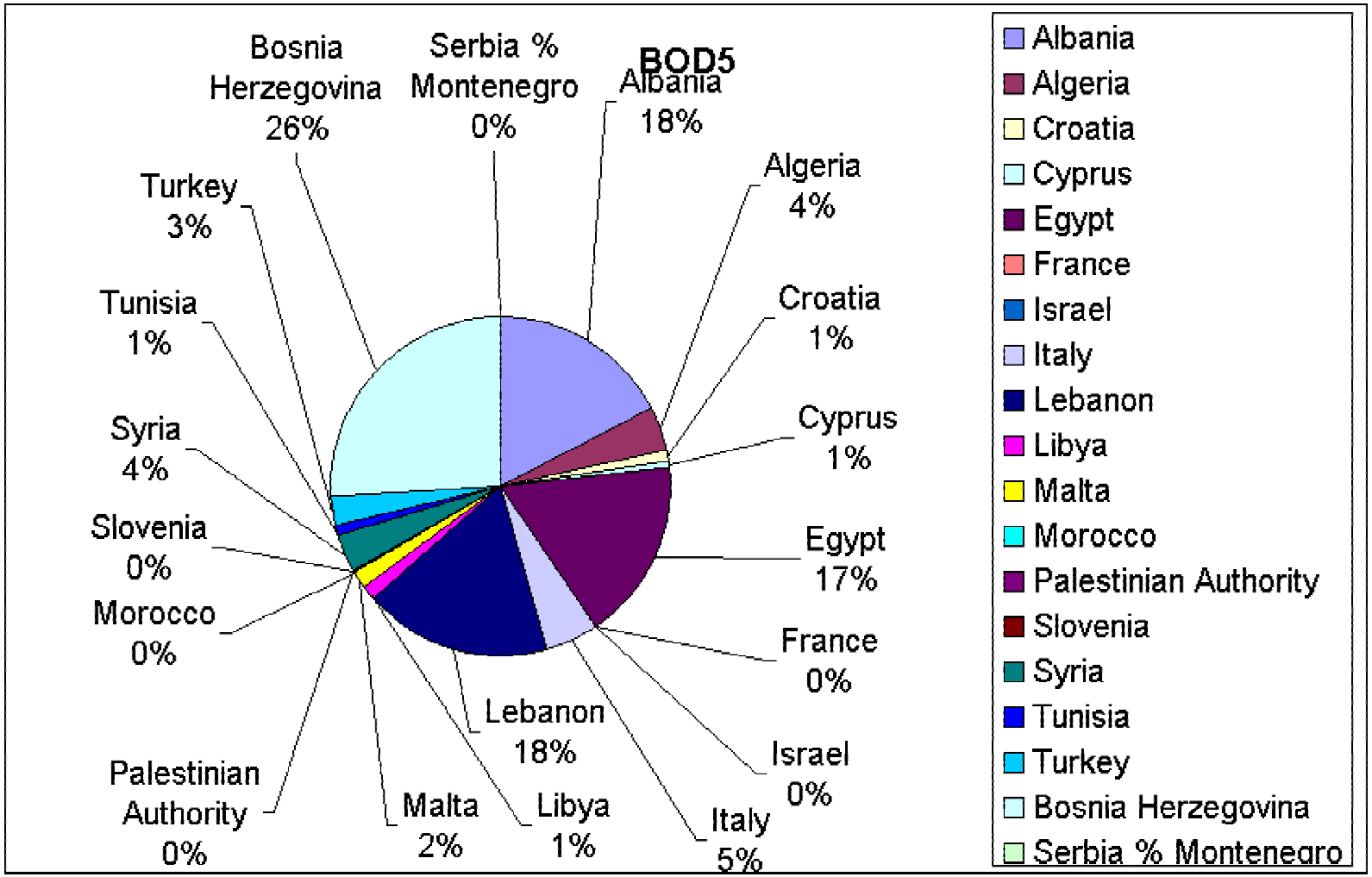
- **"Releases"** represents the releases of specific pollutant expressed in kg/year for the base year of 2003 according to the NBBs

- **"GDP ind."** is the contribution of national industrial activity in to the GDP expressed in Euros according to the World Bank data for 2003.

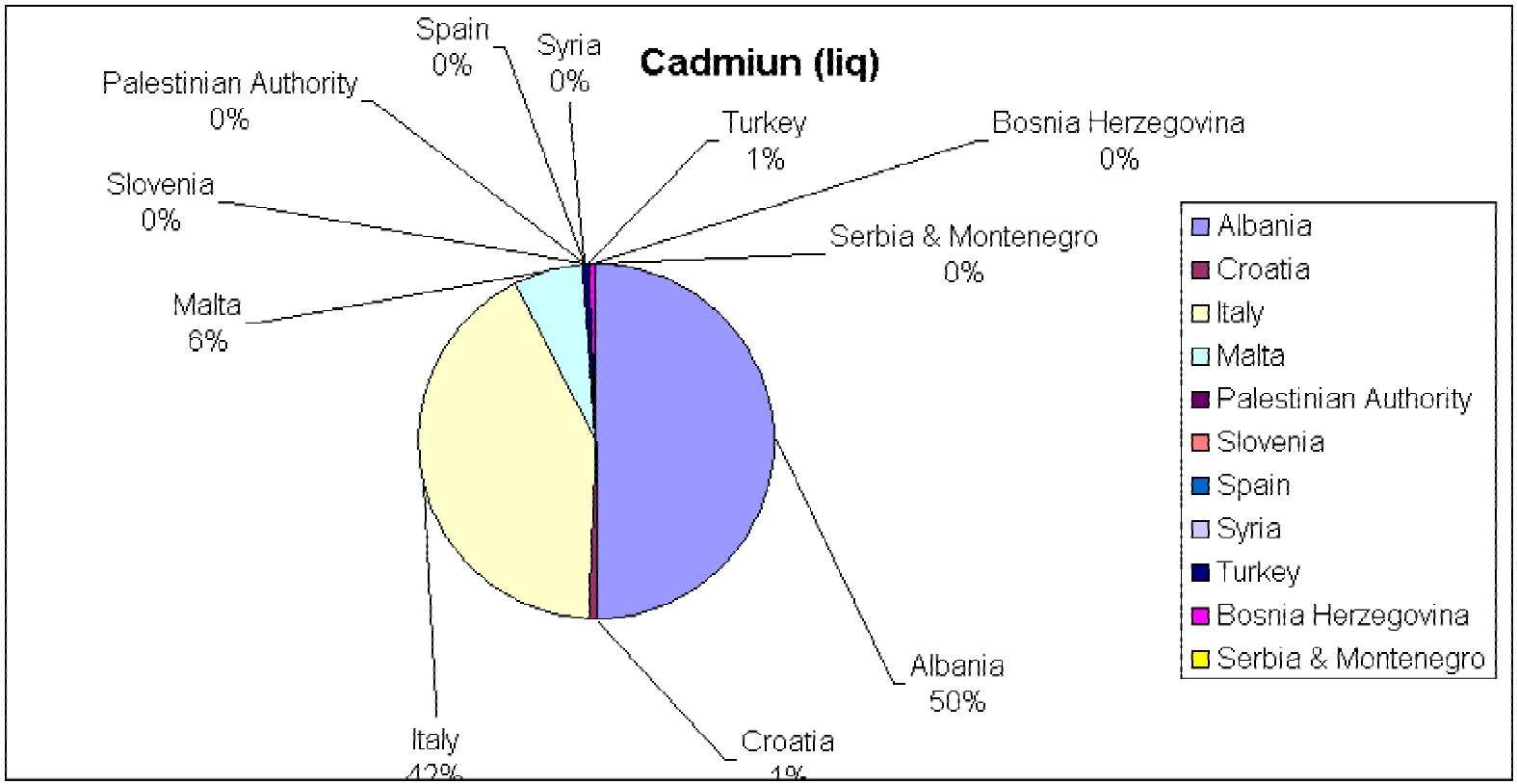
- **"Release Intensity"** expressed as kg/year/euro is the result of the ratio between quantity of pollutant released and GDP. Ind.

- **"Percentage of Total"** is the release intensity expressed in % of the total release intensity for the concerned countries.

Release Intensity "Release/GDP Industry 2003"				
	BOD5			
Year	2003			
Country	**Releases**	**GDP Ind**	**Release Intensity**	**Percentage of Total**
Albania	48125996	1,121,000 €	42.93	17.56%
Algeria	395833804.2	40,116,000 €	9.87	4.03%
Croatia	19383407.18	6,391,000 €	3.03	1.24%
Cyprus	2437988	1,811,000 €	1.35	0.55%
Egypt	1403460234	33,612,000 €	41.75	17.07%
France	54200	337,206,000 €	0.00	0.00%
Israel	5943750	44,030,000 €	0.13	0.06%
Italy	3991972009	315,757,000 €	12.64	5.17%
Lebanon	156081507	3,625,000 €	43.06	17.61%
Libya	64421100	18,800,000 €	3.43	1.40%
Malta	5934879.3	1,517,000 €	3.91	1.60%
Morocco	6869340	10,636,000 €	0.65	0.26%
Palestinian Authority	2270000			0.00%
Slovenia	2396012	6,930,000 €	0.35	0.14%
Syria	46522530.02	5,313,000 €	8.76	3.58%
Tunisia	10900173.4	5,752,000 €	1.90	0.77%
Turkey	266169054.2	39,309,000 €	6.77	2.77%
Bosnia Herzegovina	93500651.86	1,461,000 €	64.00	26.17%
Serbia % Montenegro	8032397.55	275,200,000 €	0.03	0.01%

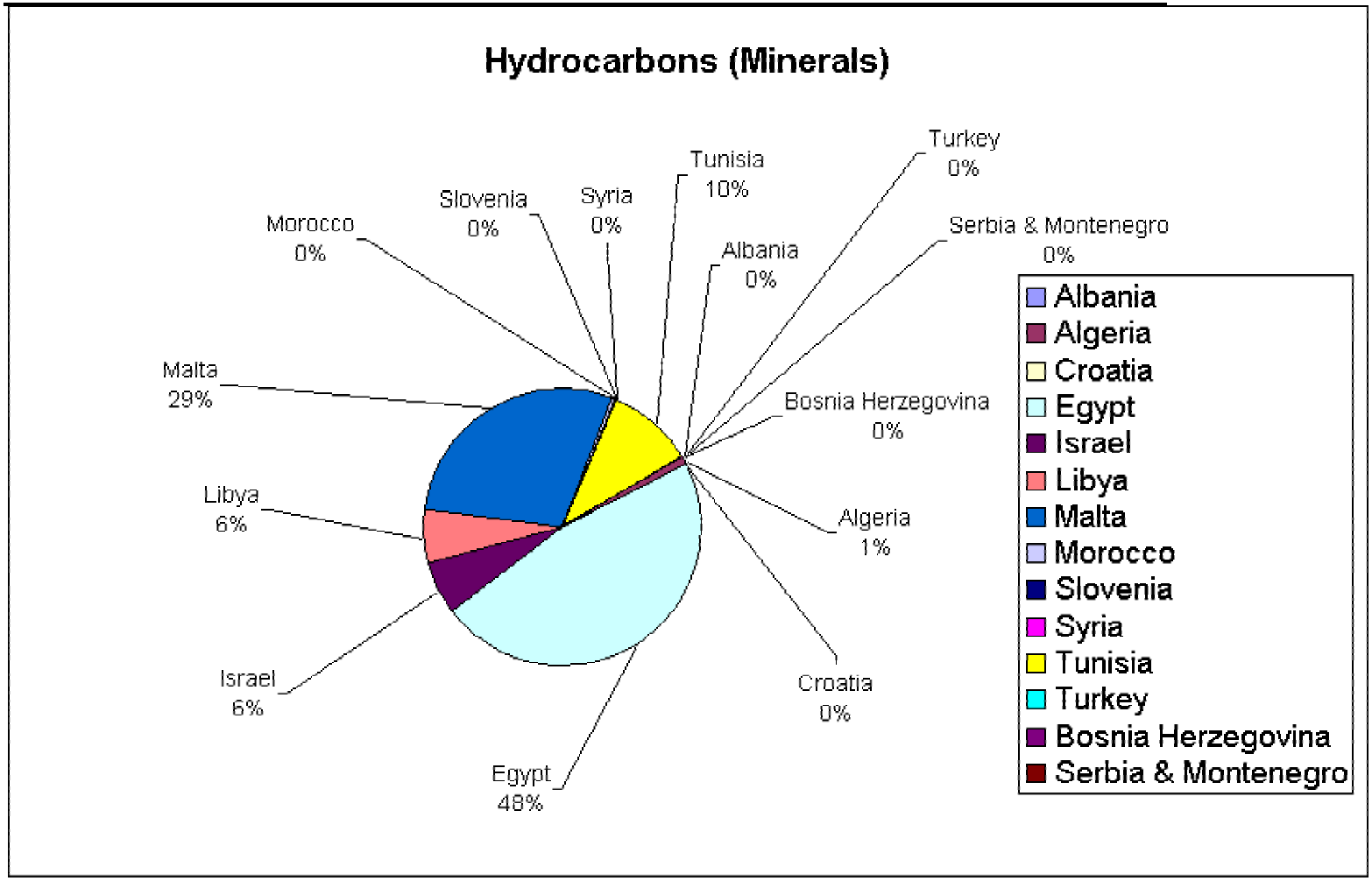

BOD5
Albania 18%
Algeria 4%
Croatia 1%
Cyprus 1%
Egypt 17%
France 0%
Israel 0%
Italy 5%
Libya 1%
Malta 2%
Lebanon 18%
Palestinian Authority 0%
Morocco 0%
Slovenia 0%
Syria 4%
Tunisia 1%
Turkey 3%
Bosnia Herzegovina 26%
Serbia % Montenegro 0%
Albania
Algeria
Croatia
Cyprus
Egypt
France
Israel
Italy
Lebanon
Libya
Malta
Morocco
Palestinian Authority
Slovenia
Syria
Tunisia
Turkey
Bosnia Herzegovina
Serbia % Montenegro

Pollutant	Cadmium (liq)			
Year	2003			
Country	**Releases**	**GDP Ind**	**Release Intensity**	**Percentage of Total**
Albania	1605.98	1,121,000 €	0.00143263	49.85%
Croatia	142.6238	6,391,000 €	0.00002232	0.78%
Italy	380081.16	315,757,000 €	0.00120371	41.89%
Malta	278.1	1,517,000 €	0.00018332	6.38%
Palestinian Authority	329			0.00%
Slovenia	0.082	6,930,000 €	0.00000001	0.00%
Spain	434.95	170,607,000 €	0.00000255	0.09%
Syria	10.2185	55,313,000 €	0.00000018	0.01%
Turkey	650	39,309,000 €	0.00001654	0.58%
Bosnia Herzegovina	18.044	1,461,000 €	0.00001235	0.43%
Serbia & Montenegro	0.12088	275,200,000 €	0.0000000004	0.00%

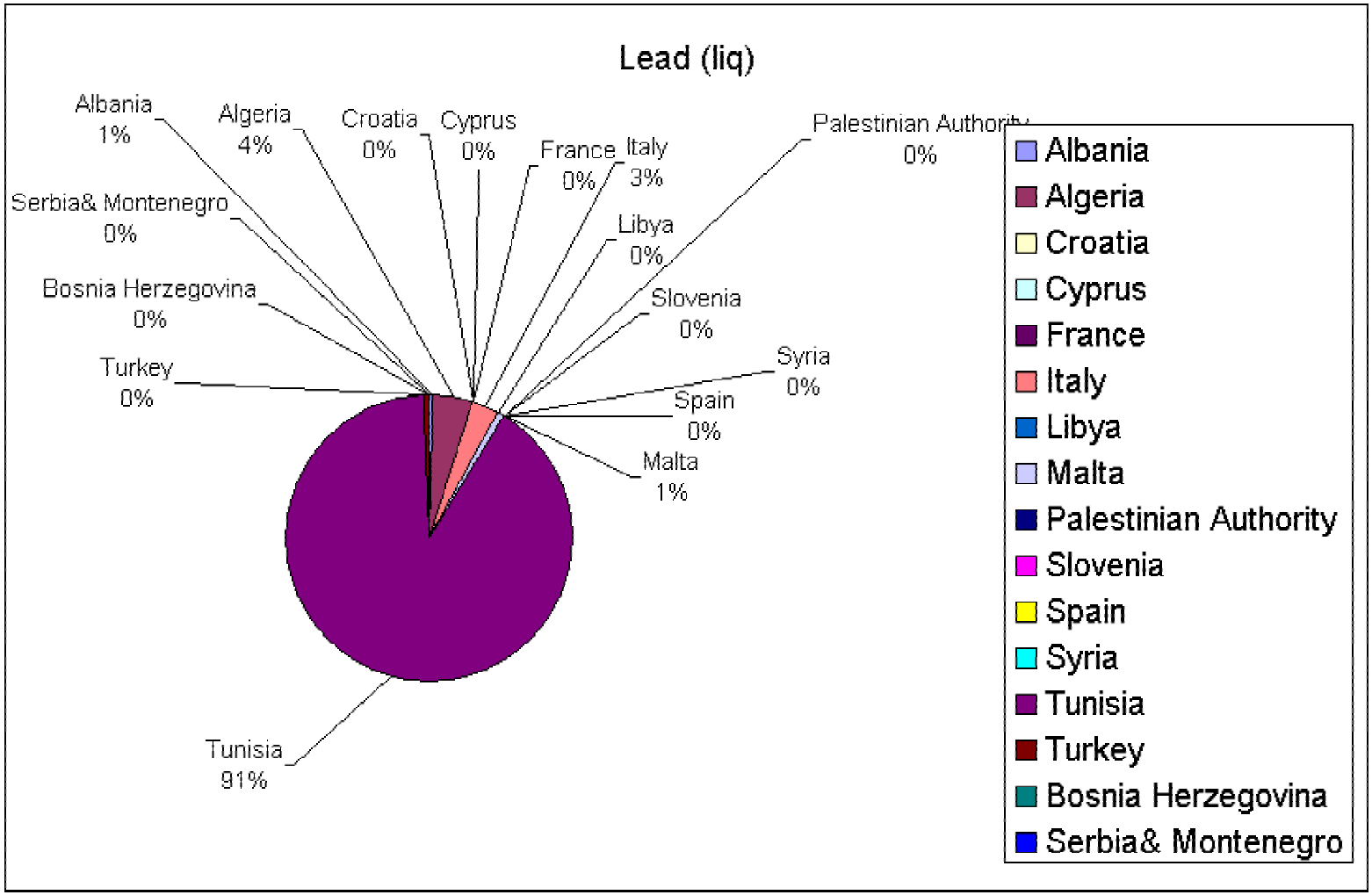

Cadmiun (liq)
Spain 0%
Syria 0%
Palestinian Authority 0%
Turkey 1%
Bosnia Herzegovina 0%
Slovenia 0%
Serbia & Montenegro 0%
Malta 6%
Albania 50%
Italy
Croatia
Albania
Croatia
Italy
Malta
Palestinian Authority
Slovenia
Spain
Syria
Turkey
Bosnia Herzegovina
Serbia & Montenegro

Pollutant	Hydrocarbons (minerals)
Year	2003

Country	Releases	GDP Ind	Release Intensity	Percentage of Total
Albania	22850	1,121,000 €	0.0204	0.02%
Algeria	49491649.1	40,116,000 €	1.2337	1.00%
Croatia	66705.97176	6,391,000 €	0.0104	0.01%
Egypt	1934084778	33,612,000 €	57.5415	46.77%
Israel	333840	44,030 €	7.5821	6.16%
Libya	146966200	18,800,000 €	7.8174	6.35%
Malta	54499.7	1,517 €	35.9260	29.20%
Morocco	1009800	10,636,000 €	0.0949	0.08%
Slovenia	62.5	6,930,000 €	0.000009	0.00%
Syria	2022068.88	5,313,000 €	0.3806	0.31%
Tunisia	70629540	5,752,000 €	12.2791	9.98%
Turkey	5755006	39,309,000 €	0.1464	0.12%
Bosnia Herzegovina	10290.892	1,461,000 €	0.0070	0.01%
Serbia & Montenegro	572444	275,200,000 €	0.002	0.00%

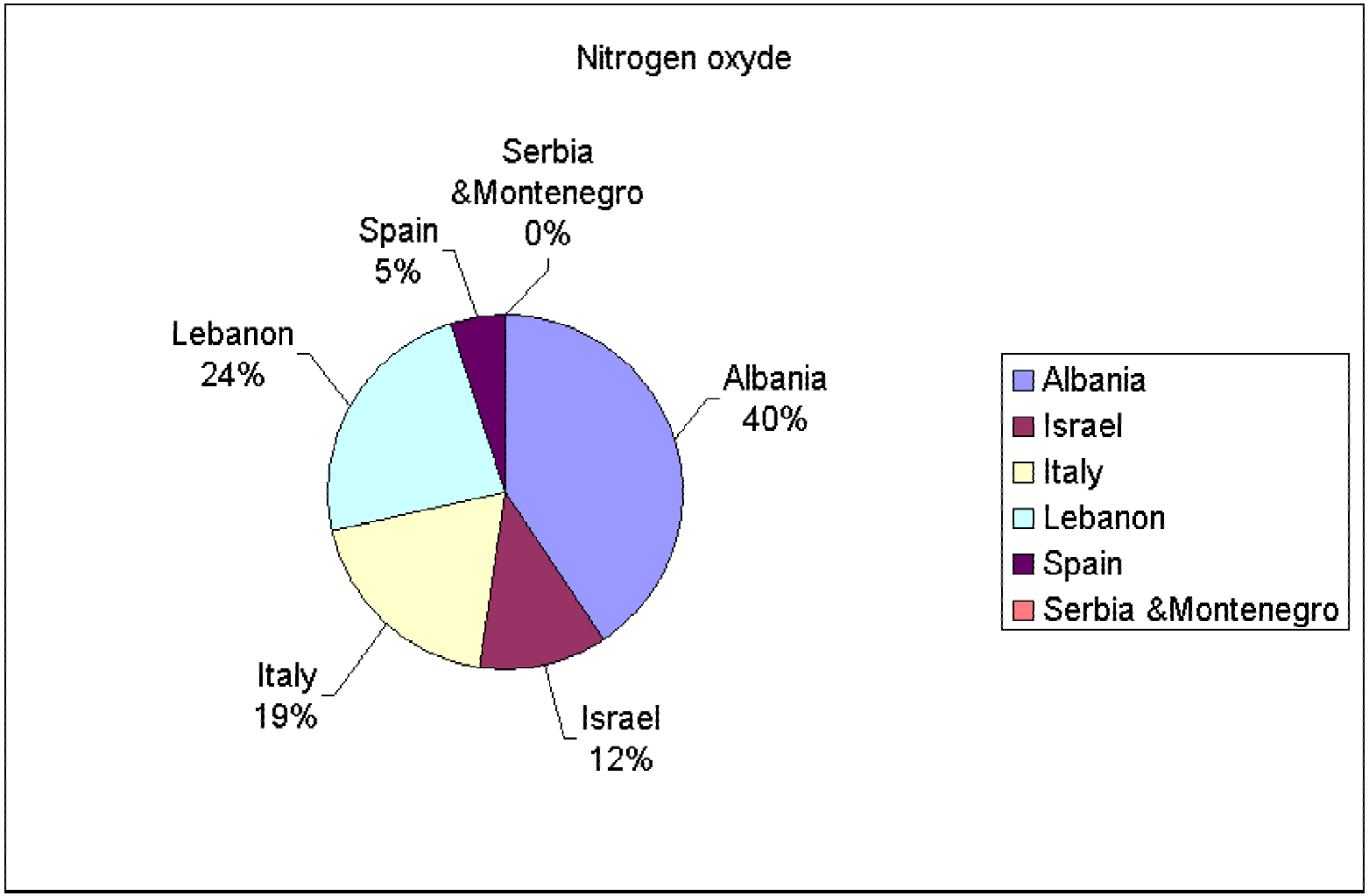

Hydrocarbons (Minerals)
Turkey 0%
Tunisia 10%
Slovenia 0%
Syria 0%
Morocco 0%
Albania 0%
Serbia & Montenegro 0%
Malta 29%
Bosnia Herzegovina 0%
Libya 6%
Algeria 1%
Israel 6%
Croatia 0%
Egypt 48%
Albania
Algeria
Croatia
Egypt
Israel
Libya
Malta
Morocco
Slovenia
Syria
Tunisia
Turkey
Bosnia Herzegovina
Serbia & Montenegro

Pollutant	Lead (liq)			
Year	2003			
Country	**Releases**	**GDP Ind**	**Release Intensity**	**Percentage of Total**
Albania	1021.68	1,121,000 €	0.0009	0.61%
Algeria	256047.44	40,116,000 €	0.0064	4.31%
Croatia	522.2726	6,391,000 €	0.0001	0.06%
Cyprus	49	1,811,000 €	0.000027	0.02%
France	200	337,206,000 €	0.000001	0.00%
Italy	1388316.73	315,757,000 €	0.0044	2.97%
Libya	5	3,625,000 €	0.0000	0.00%
Malta	1936.7	1,517,000 €	0.0013	0.86%
Palestinian Authority	100			0.00%
Slovenia	0.46	6,930,000 €	0.0000001	0.00%
Spain	1372.64	170,607,000 €	0.000008	0.01%
Syria	405.485	5,313,000 €	0.0001	0.05%
Tunisia	772200	5,752,000 €	0.1342	90.58%
Turkey	26310	39,309,000 €	0.0007	0.45%
Bosnia Herzegovina	180.512	1,461,000 €	0.0001	0.08%
Serbia& Montenegro	242.6263	275,200,000 €	0.000001	0.00%


Lead (liq)
Albania 1%
Algeria 4%
Croatia 0%
Cyprus 0%
France 0%
Italy 3%
Palestinian Authority 0%
Serbia& Montenegro 0%
Libya 0%
Bosnia Herzegovina 0%
Slovenia 0%
Turkey 0%
Syria 0%
Spain 0%
Malta 1%
Tunisia 91%
Albania
Algeria
Croatia
Cyprus
France
Italy
Libya
Malta
Palestinian Authority
Slovenia
Spain
Syria
Tunisia
Turkey
Bosnia Herzegovina
Serbia& Montenegro

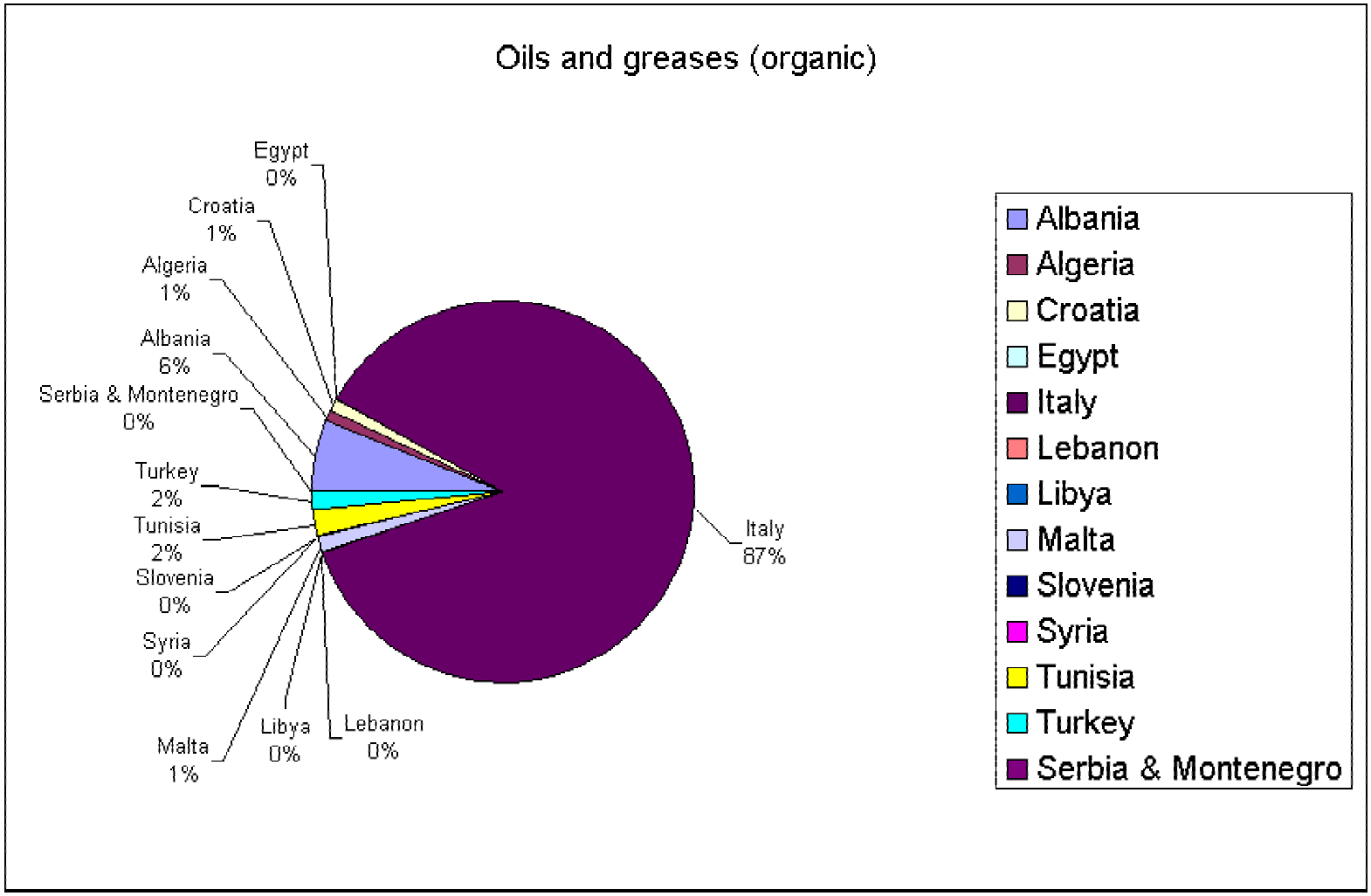
Pollutant	Nitrogen oxyde
Year	2003

Country	Releases	GDP Ind	Release Intensity	Percentage of Total
Albania	9276670	1,121,000 €	8.28	40.55%
Israel	105113700	44,030,000 €	2.39	11.70%
Italy	1238378812	315,757,000 €	3.92	19.22%
Lebanon	17484000	3,625,000 €	4.82	23.63%
Spain	170201649.6	170,607,000 €	1.00	4.89%
Serbia &Montenegro	417758	275,200,000 €	0.0015	0.01%


Nitrogen oxyde
Serbia &Montenegro 0%
Spain 5%
Lebanon 24%
Albania 40%
Italy 19%
Israel 12%
Albania
Israel
Italy
Lebanon
Spain
Serbia &Montenegro

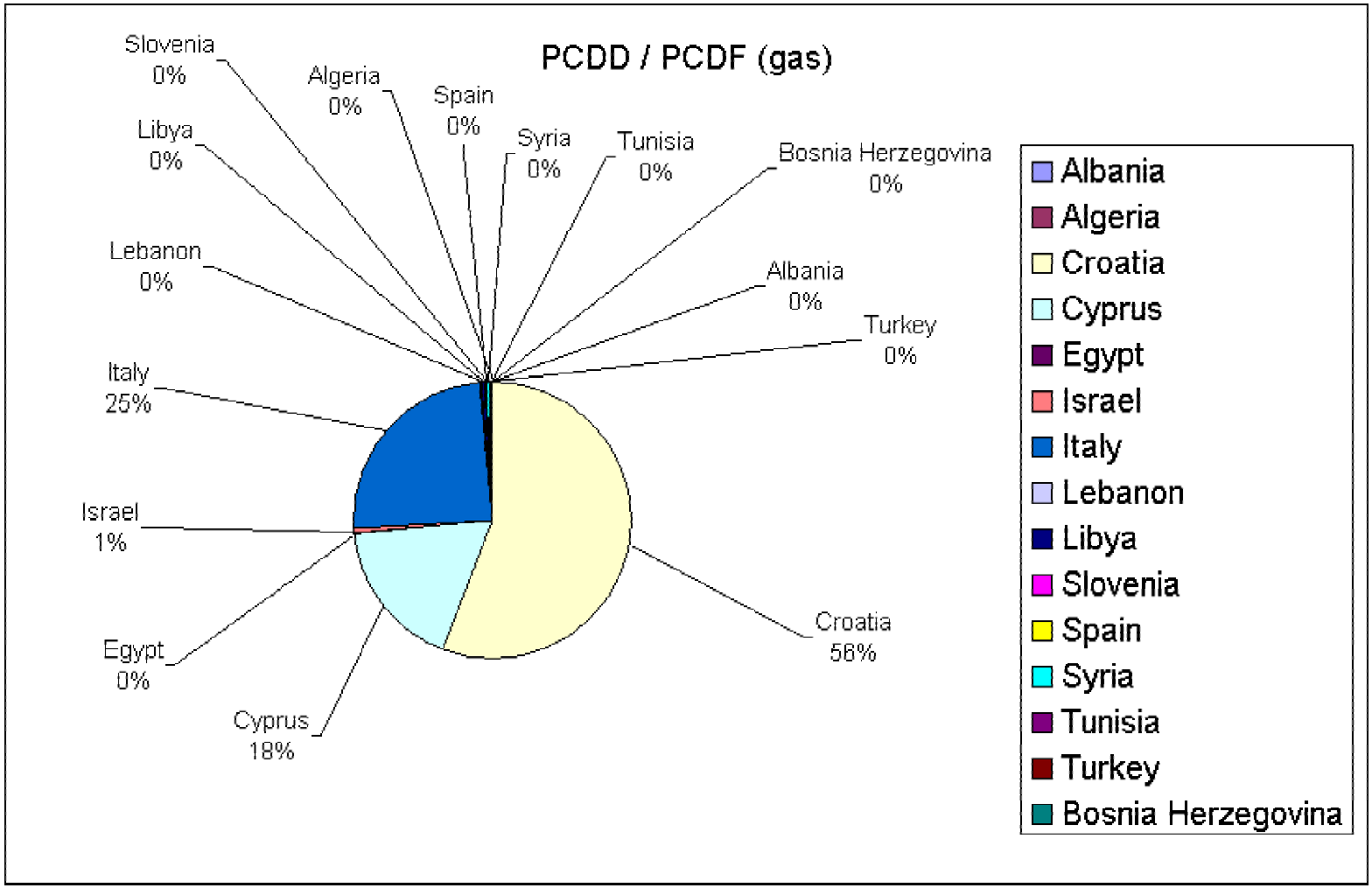
Pollutant	Oils and greases (organic)
Year	2003

Country	Releases	GDP Ind	Release Intensity	Percentage of Total
Albania	2000000	1,121,000 €	1.78	6.09%
Algeria	10532864	40,116,000 €	0.26	0.90%
Croatia	2013186.802	6,391,000 €	0.32	1.08%
Egypt	427076	33,612,000 €	0.01	0.04%
Italy	7999268488	315,757,000 €	25.33	86.54%
Lebanon	12089	3,625,000 €	0.0033	0.01%
Libya	13704	18,800,000 €	0.0007	0.00%
Malta	593961.2	1,517,000 €	0.39	1.34%
Slovenia	39826	6,930,000 €	0.01	0.02%
Syria	8450	5,313,000 €	0.002	0.01%
Tunisia	3962938.4	5,752,000 €	0.69	2.35%
Turkey	18589127	39,309,000 €	0.47	1.62%
Serbia & Montenegro	22752.43	275,200,000 €	0.0001	0.00%


Oils and greases (organic)
Egypt 0%
Croatia 1%
Algeria 1%
Albania 6%
Serbia & Montenegro 0%
Turkey 2%
Tunisia 2%
Slovenia 0%
Syria 0%
Malta 1%
Libya 0%
Lebanon 0%
Italy 87%
Albania
Algeria
Croatia
Egypt
Italy
Lebanon
Libya
Malta
Slovenia
Syria
Tunisia
Turkey
Serbia & Montenegro

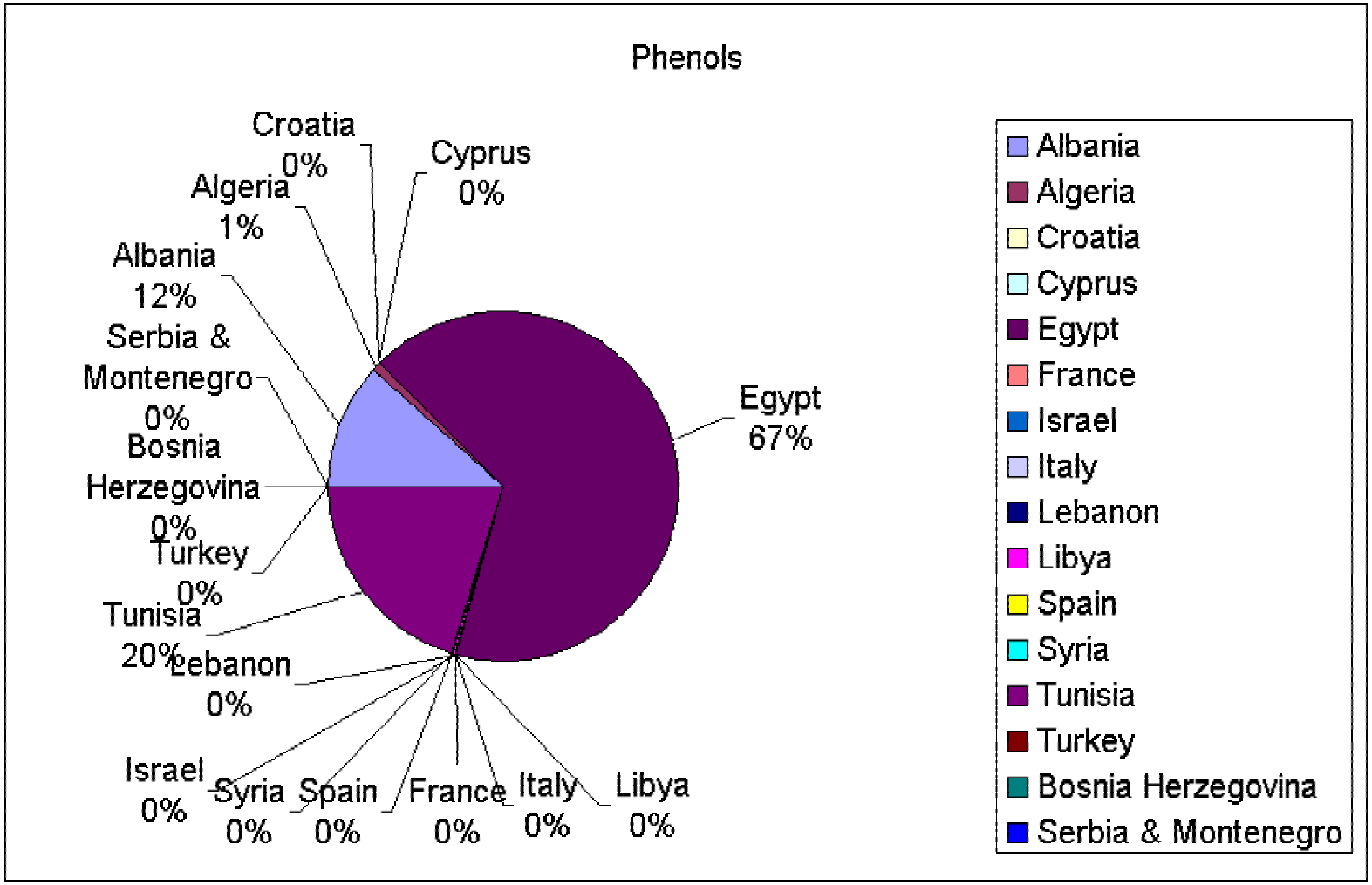
Pollutant	PCDD / PCDF (gas)
Year	2003

Country	Releases	GDP Ind	Release Intensity	Percentage of Total
Albania	0.000002483	1,121,000 €	0.000000000002	0.01%
Algeria	0.000739007	40,116,000 €	0.00000000002	0.05%
Croatia	0.142790269	6,391,000 €	0.00000002234	55.45%
Cyprus	0.013	1,811,000 €	0.00000000718	17.82%
Egypt	0.0000017743	33,612,000 €	0.0000000000001	0.00%
Israel	0.01032227	44,030,000 €	0.00000000023	0.58%
Italy	3.156	315,757,000 €	0.00000001	24.81%
Lebanon	0.000457999	3,625,000 €	0.0000000001	0.31%
Libya	0.0004988	18,800,000 €	0.000000000027	0.07%
Slovenia	0.0006	6,930,000 €	0.000000000087	0.21%
Spain	0.015242	170,607,000 €	0.000000000089	0.22%
Syria	0.000386724	5,313,000 €	0.000000000073	0.18%
Tunisia	0.0006782	5,752,000 €	0.00000000012	0.29%
Turkey	0.000002859	39,309,000 €	0.0000000000001	0.00%
Bosnia Herzegovina	0.000000007	1,461,000 €	0.00000	0.00%


PCDD / PCDF (gas)
Slovenia 0%
Algeria 0%
Spain 0%
Syria 0%
Tunisia 0%
Bosnia Herzegovina 0%
Libya 0%
Lebanon 0%
Albania 0%
Turkey 0%
Italy 25%
Israel 1%
Egypt 0%
Cyprus 18%
Croatia 56%
Albania
Algeria
Croatia
Cyprus
Egypt
Israel
Italy
Lebanon
Libya
Slovenia
Spain
Syria
Tunisia
Turkey
Bosnia Herzegovina

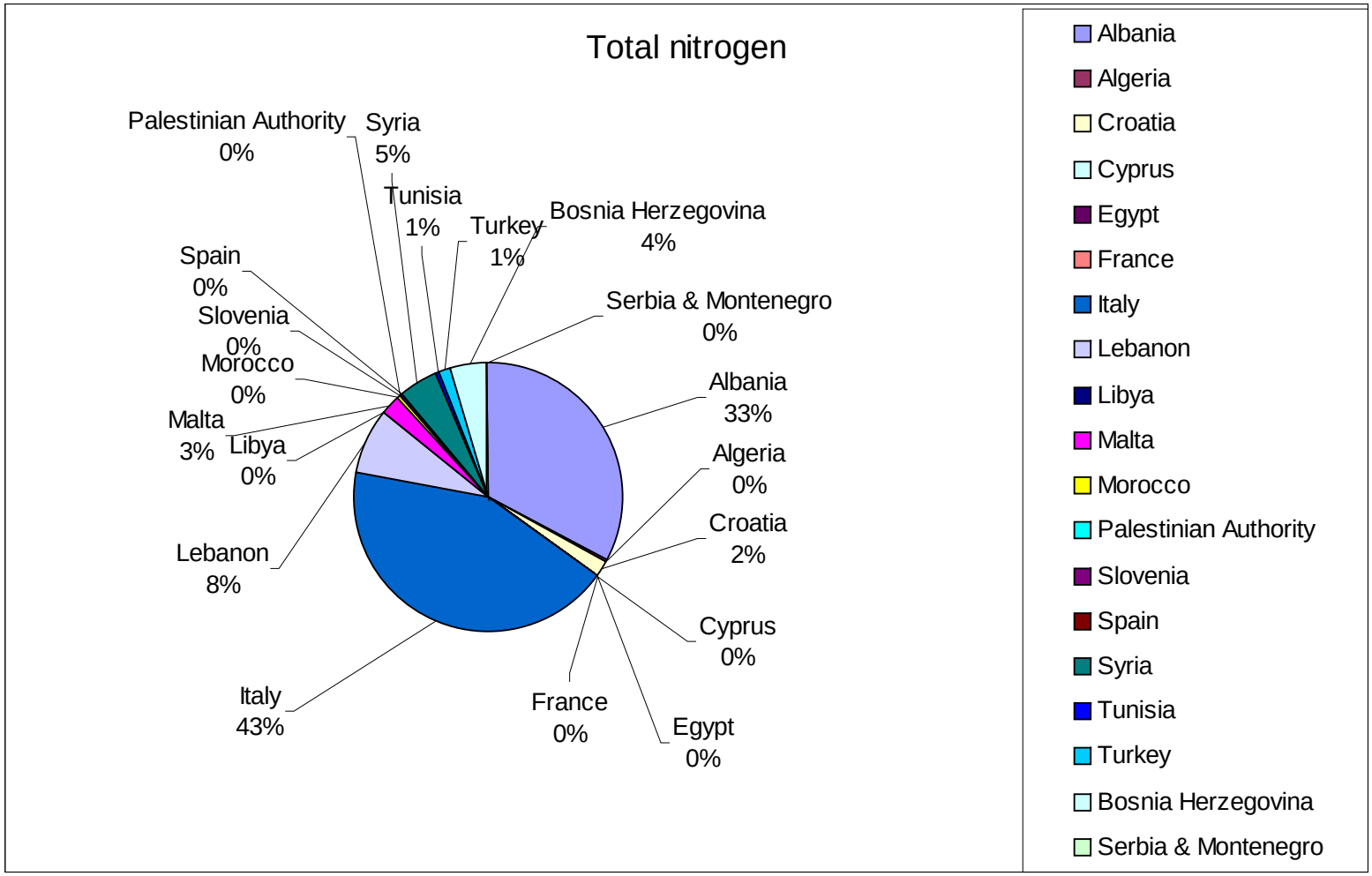
Pollutant	Phenols
Year	2003

Country	Releases	GDP Ind	Release Intensity	Percentage of Total
Albania	1012310	1,121,000 €	0.90	11.67%
Algeria	2433152	40,116,000 €	0.06	0.78%
Croatia	4277.95	6,391,000 €	0.00067	0.01%
Cyprus	40	1,811,000 €	0.00002	0.00%
Egypt	174128224.6	33,612,000 €	5.18	66.94%
France	8900	337,206,000 €	0.00003	0.00%
Israel	43075	44,030,000 €	0.00098	0.01%
Italy	712508.21	315,757,000 €	0.00226	0.03%
Lebanon	184	3,625,000 €	0.00005	0.00%
Libya	588200	18,800,000 €	0.03	0.40%
Spain	6463.07	170,607,000 €	0.00004	0.00%
Syria	1408.616	5,313,000 €	0.00027	0.00%
Tunisia	8964032	5,752,000 €	1.56	20.14%
Turkey	34842.14	39,309,000 €	0.00089	0.01%
Bosnia Herzegovina	52	1,461,000 €	0.00004	0.00%
Serbia & Montenegro	3.16	275,200,000 €	0.00000001	0.00%

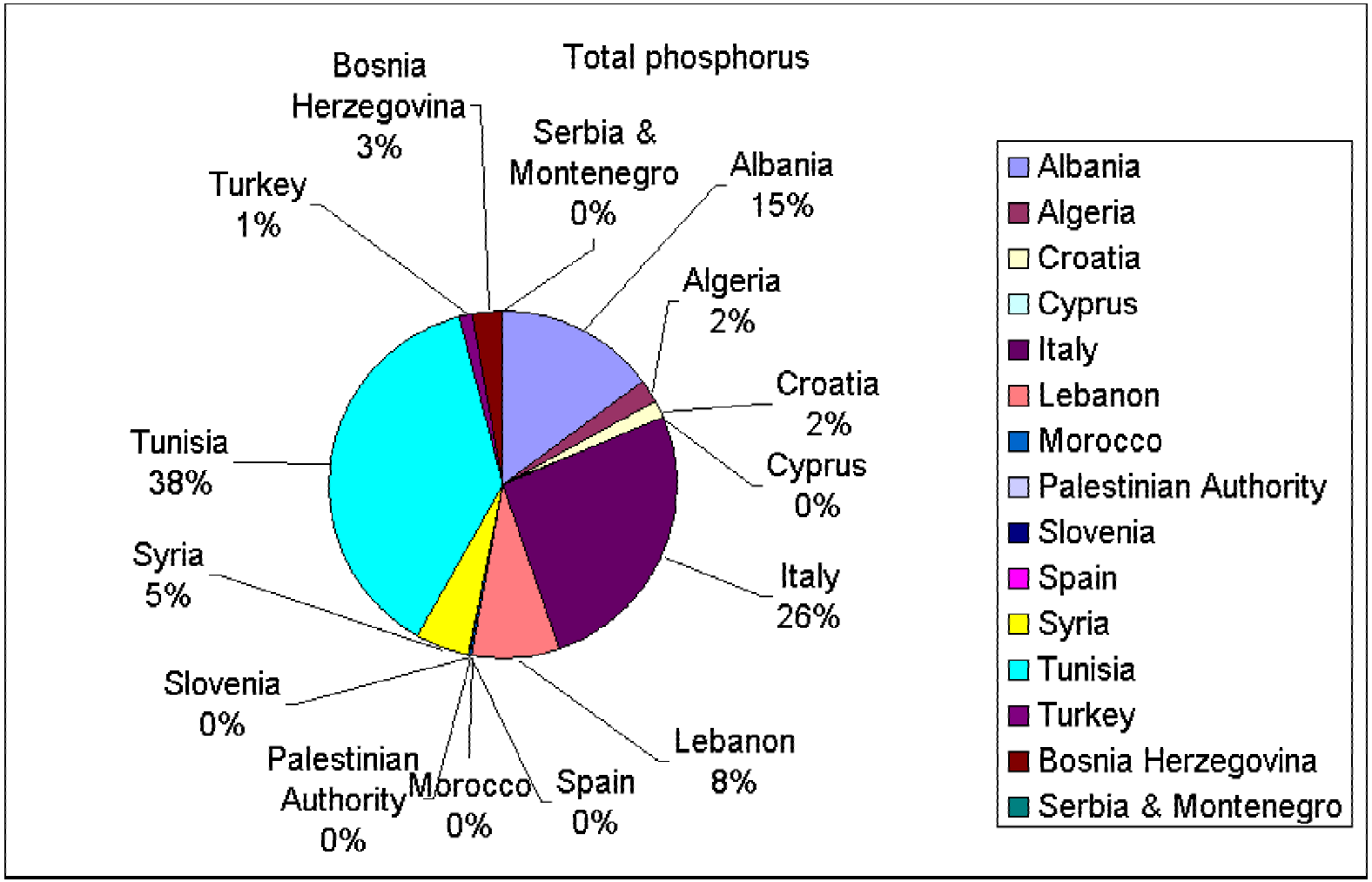

Phenols
Croatia 0%
Cyprus 0%
Algeria 1%
Albania 12%
Serbia & Montenegro 0%
Bosnia Herzegovina 0%
Turkey 0%
Tunisia 20%
Lebanon 0%
Israel 0%
Syria 0%
Spain 0%
France 0%
Italy 0%
Libya 0%
Egypt 67%
Albania
Algeria
Croatia
Cyprus
Egypt
France
Israel
Italy
Lebanon
Libya
Spain
Syria
Tunisia
Turkey
Bosnia Herzegovina
Serbia & Montenegro

Pollutant	Total nitrogen
Year	2003

Country	Releases	GDP Ind	Release Intensity	Percentage of Total
Albania	9312730	1,121,000 €	8.3075	32.67%
Algeria	3415135	40,116,000 €	0.0851	0.33%
Croatia	3045594.3	6,391,000 €	0.4765	1.87%
Cyprus	33805.4	1,811,000 €	0.0187	0.07%
Egypt	38088.99	33,612,000 €	0.0011	0.00%
France	94600	337,206,000 €	0.0003	0.00%
Italy	3443007997	315,757,000 €	10.9040	42.89%
Lebanon	7244056	3,625,000 €	1.9984	7.86%
Libya	2160	18,800,000 €	0.0001	0.00%
Malta	1011705.9	1,517,000 €	0.6669	2.62%
Morocco	854496	10,636,000 €	0.0803	0.32%
Palestinian Authority	1179000			0.00%
Slovenia	336994.42	6,930,000 €	0.0486	0.19%
Spain	7551421.35	170,607,000 €	0.0443	0.17%
Syria	6271892	5,313,000 €	1.1805	4.64%
Tunisia	886520	5,752,000 €	0.1541	0.61%
Turkey	13198205.2	39,309,000 €	0.3358	1.32%
Bosnia Herzegovina	1634696	1,461,000 €	1.1189	4.40%
Serbia & Montenegro	1189691.07	275,200,000 €	0.0043	0.02%

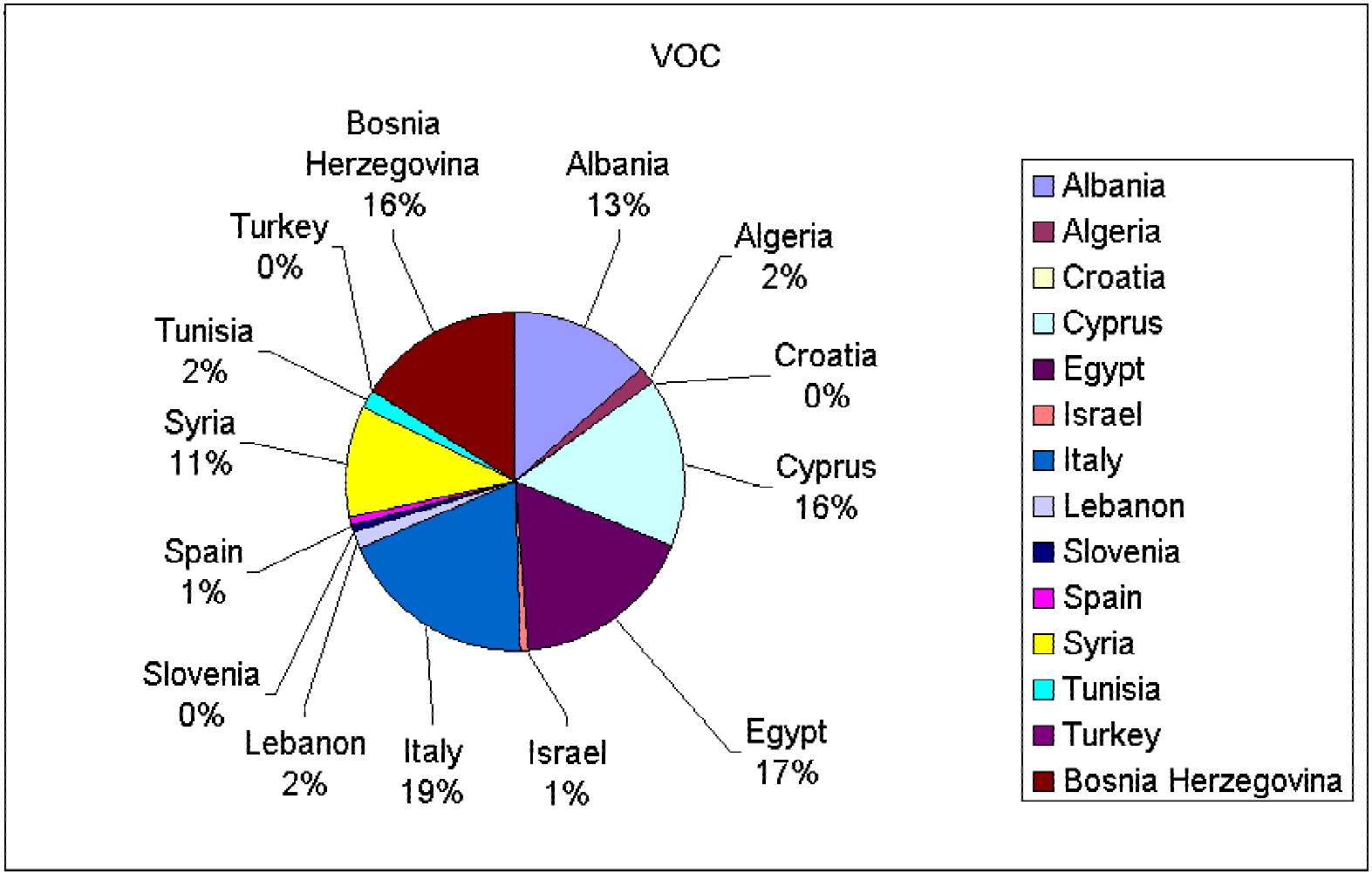

Total nitrogen
Palestinian Authority 0%
Syria 5%
Tunisia 1%
Turkey 1%
Bosnia Herzegovina 4%
Spain 0%
Slovenia 0%
Serbia & Montenegro 0%
Morocco 0%
Albania 33%
Malta 3%
Libya 0%
Algeria 0%
Croatia 2%
Lebanon 8%
Cyprus 0%
Italy 43%
France 0%
Egypt 0%
Albania
Algeria
Croatia
Cyprus
Egypt
France
Italy
Lebanon
Libya
Malta
Morocco
Palestinian Authority
Slovenia
Spain
Syria
Tunisia
Turkey
Bosnia Herzegovina
Serbia & Montenegro

Pollutant	Total phosphorus				
Year	2003				
Country		Releases	GDP Ind	Release Intensity	Percentage of Total
Albania		1414580	1,121,000 €	1.262	15.09%
Algeria		7453822	40,116,000 €	0.186	2.22%
Croatia		844003.75	6,391,000 €	0.132	1.58%
Cyprus		5035	1,811,000 €	0.003	0.03%
Italy		680374383.4	315,757,000 €	2.155	25.77%
Lebanon		2444000	3,625,000 €	0.674	8.06%
Morocco		233664	10,636,000 €	0.022	0.26%
Palestinian Authority		216500			0.00%
Slovenia		55012.37	6,930,000 €	0.008	0.09%
Spain		661650.49	170,607,000 €	0.004	0.05%
Syria		2194892	5,313,000 €	0.413	4.94%
Tunisia		18287182	5,752,000 €	3.179	38.03%
Turkey		3827660	39,309,000 €	0.097	1.16%
Bosnia Herzegovina		328400	1,461,000 €	0.225	2.69%
Serbia & Montenegro		322824	275,200,000 €	0.0012	0.01%

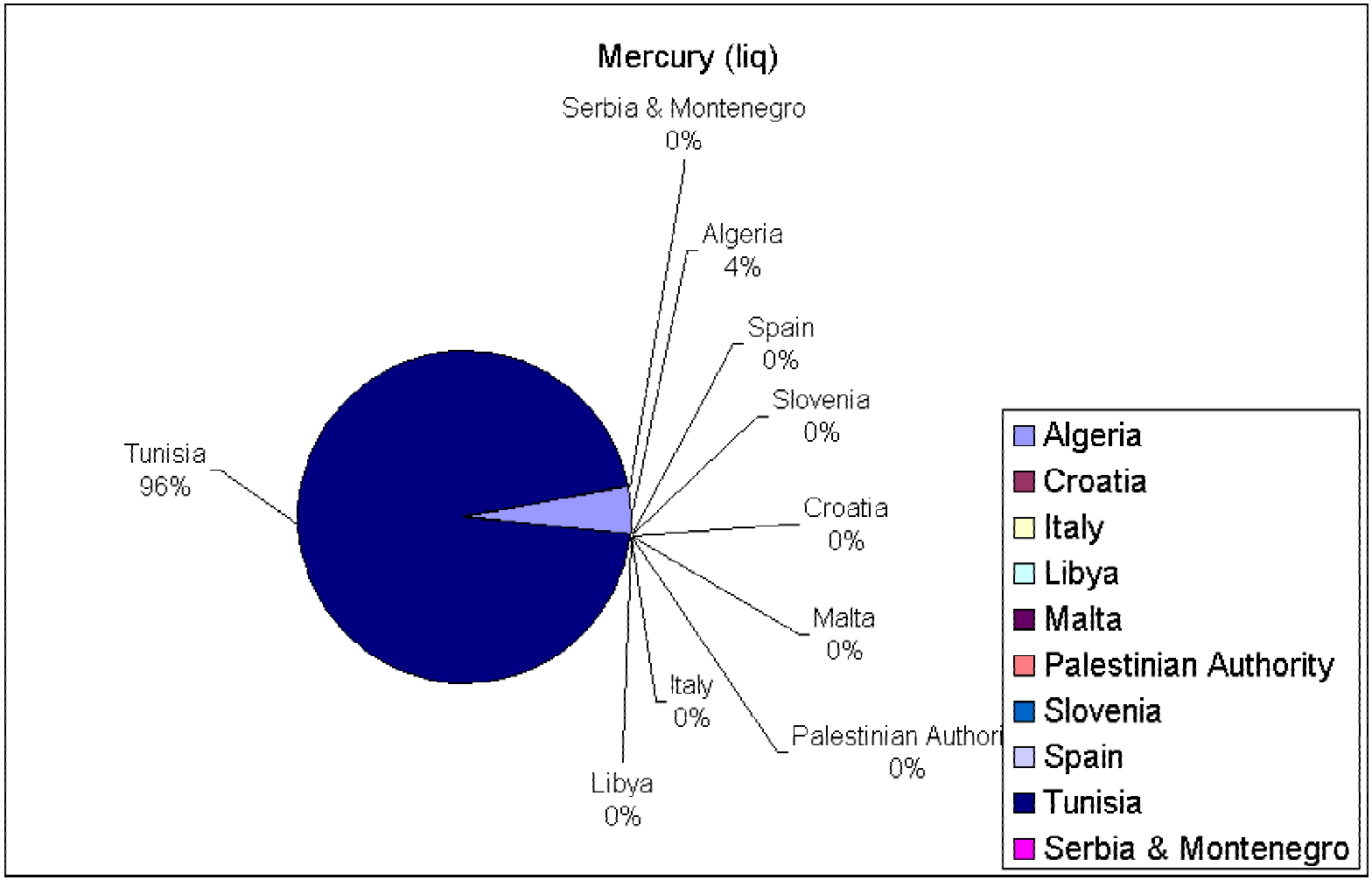

Total phosphorus
Bosnia Herzegovina 3%
Serbia & Montenegro 0%
Albania 15%
Turkey 1%
Algeria 2%
Croatia 2%
Tunisia 38%
Cyprus 0%
Syria 5%
Italy 26%
Slovenia 0%
Lebanon 8%
Palestinian Authority 0%
Morocco 0%
Spain 0%
Albania
Algeria
Croatia
Cyprus
Italy
Lebanon
Morocco
Palestinian Authority
Slovenia
Spain
Syria
Tunisia
Turkey
Bosnia Herzegovina
Serbia & Montenegro

Pollutant	VOC
Year	2003

Country	Releases	GDP Ind	Release Intensity	Percentage of Total
Albania	3230258.74	1,121,000 €	2.88	13.48%
Algeria	15612858	40,116,000 €	0.39	1.82%
Croatia	11961.26	6,391,000 €	0.0019	0.01%
Cyprus	6258000	1,811,000 €	3.46	16.16%
Egypt	123069912.4	33,612,000 €	3.66	17.12%
Israel	7083407.492	44,030,000 €	0.16	0.75%
Italy	1289255783	315,757,000 €	4.08	19.09%
Lebanon	1281600	3,625,000 €	0.35	1.65%
Slovenia	527502	6,930,000 €	0.08	0.36%
Spain	37237804.28	170,607,000 €	0.22	1.02%
Syria	12201111.18	5,313,000 €	2.30	10.74%
Tunisia	2036011	5,752,000 €	0.35	1.66%
Turkey	18300	39,309,000 €	0.0005	0.00%
Bosnia Herzegovina	5041650	1,461,000 €	3.45	16.14%

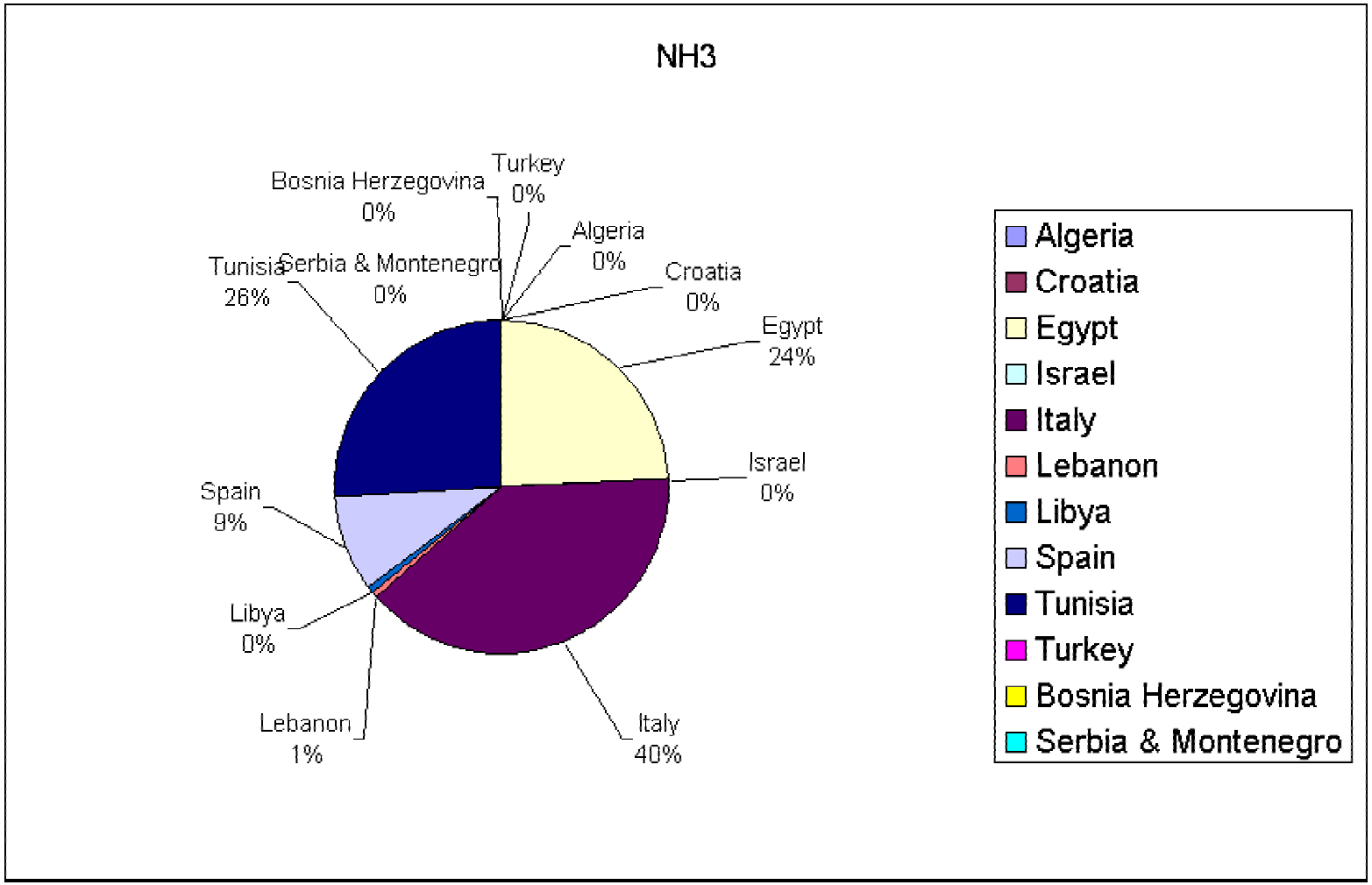

VOC
Bosnia Herzegovina 16%
Albania 13%
Turkey 0%
Algeria 2%
Tunisia 2%
Croatia 0%
Syria 11%
Cyprus 16%
Spain 1%
Slovenia 0%
Lebanon 2%
Italy 19%
Israel 1%
Egypt 17%
Albania
Algeria
Croatia
Cyprus
Egypt
Israel
Italy
Lebanon
Slovenia
Spain
Syria
Tunisia
Turkey
Bosnia Herzegovina

Pollutant	Mercury (liq)				
Year	2003				
Country		Releases	GDP Ind	Release Intensity	Percentage of Total
Algeria		248600	40,116,000 €	0.0061970286	4.41%
Croatia		118.1789	6,391,000 €	0.0000184915	0.01%
Italy		3112.21	315,757,000 €	0.0000098563	0.01%
Libya		1000	18,800,000 €	0.0000531915	0.04%
Malta		199.8	1,517,000 €	0.0001317073	0.09%
Palestinian Authority		0.39			0.00%
Slovenia		0.002	6,930,000 €	0.0000000003	0.00%
Spain		89.47	170,607,000 €	0.0000005244	0.00%
Tunisia		772200	5,752,000 €	0.1342489569	95.44%
Serbia & Montenegro		0.77292	275,200,000 €	0.000000003	0.00%

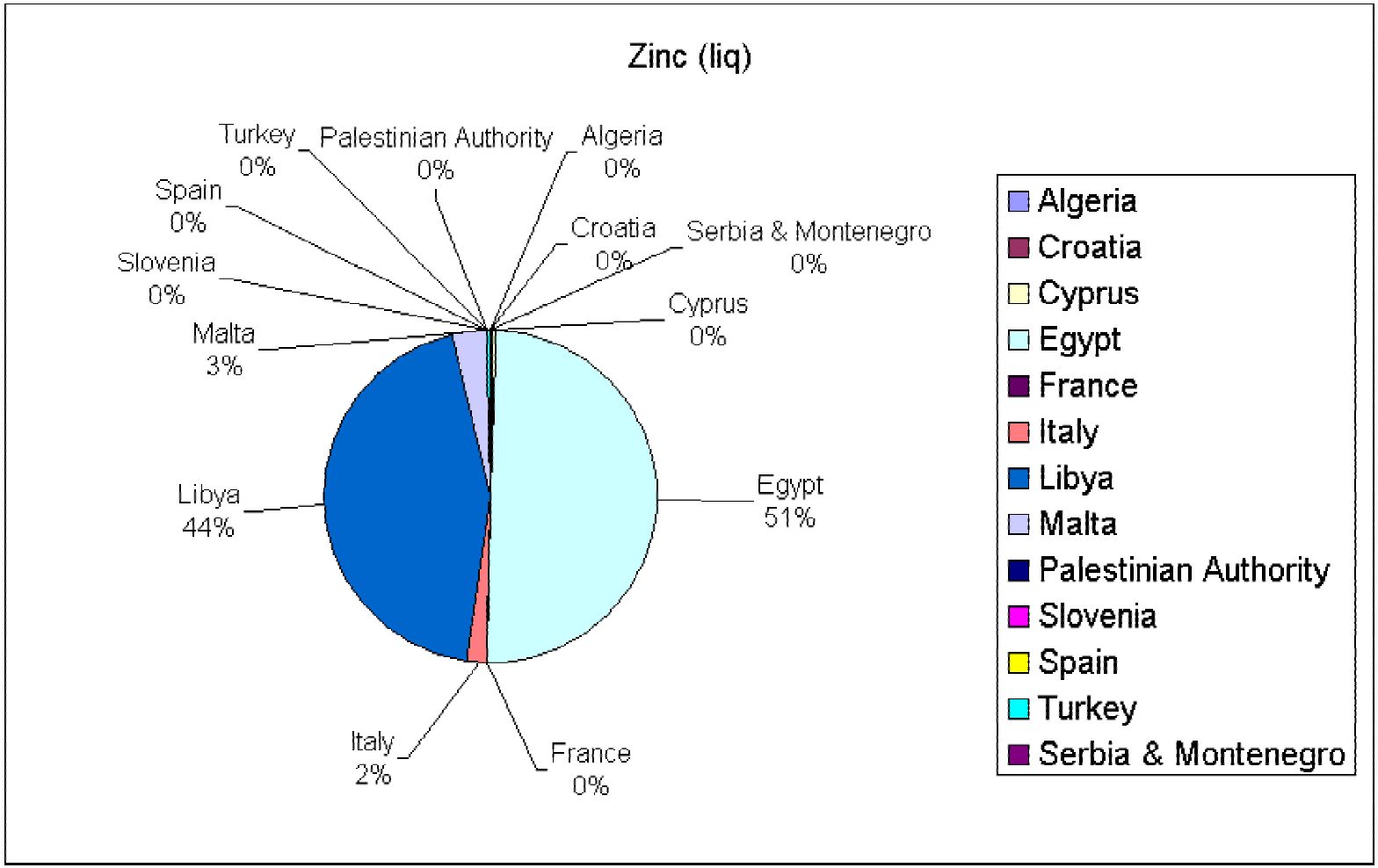

Mercury (liq)
Serbia & Montenegro
0%
Algeria
4%
Spain
0%
Slovenia
0%
Tunisia
96%
Croatia
0%
Malta
0%
Italy
0%
Palestinian Authori
0%
Libya
0%
Algeria
Croatia
Italy
Libya
Malta
Palestinian Authority
Slovenia
Spain
Tunisia
Serbia & Montenegro

Pollutant	NH3
Year	2003

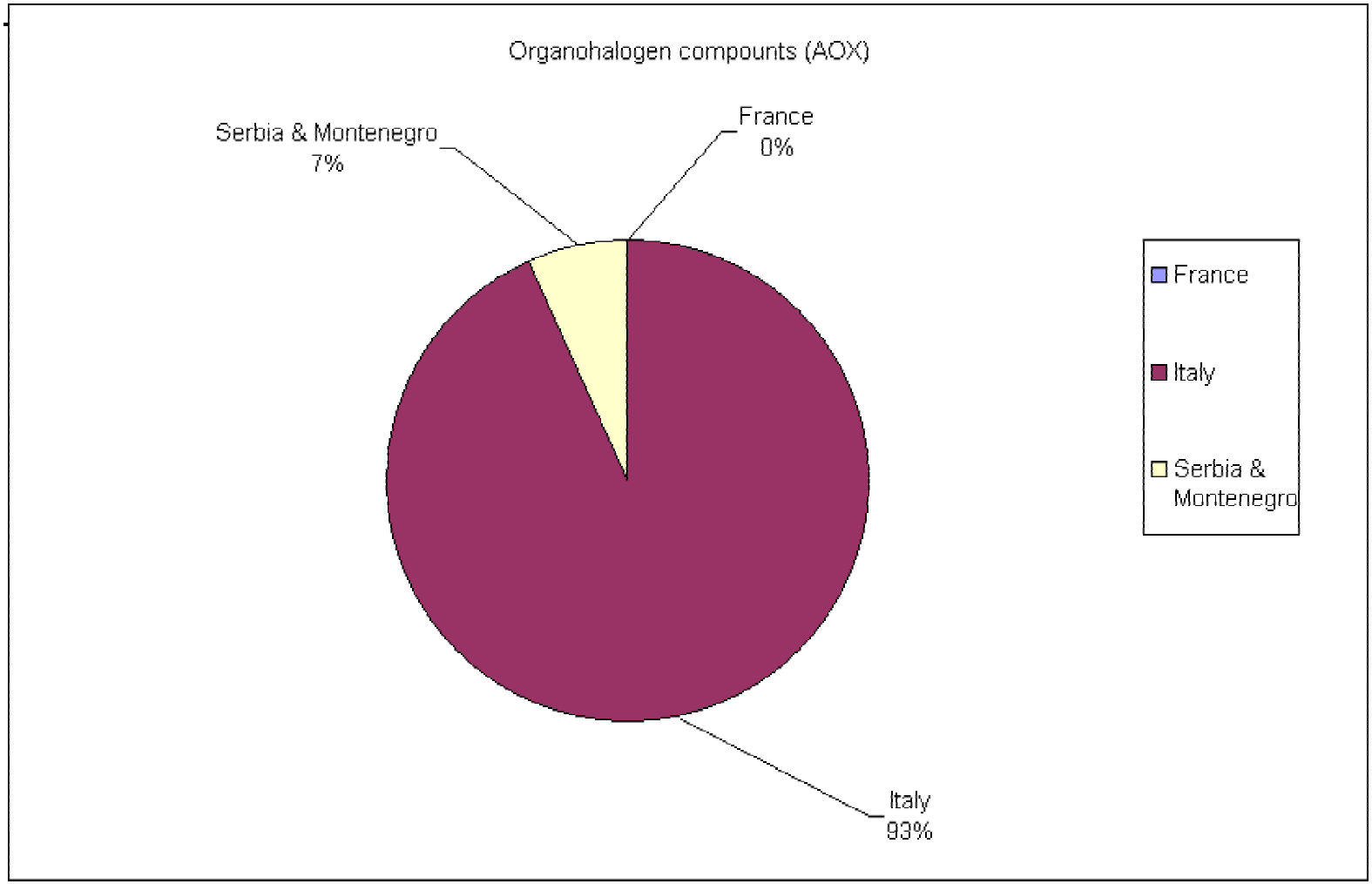
Country	Releases	GDP Ind	Release Intensity	Percentage of Total
Algeria	23471.5566	40,116,000 €	0.0006	0.03%
Croatia	9924.1767	6,391,000 €	0.0016	0.09%
Egypt	14076258.6	33,612,000 €	0.42	24.33%
Israel	8120	44,030,000 €	0.00018	0.01%
Italy	210924496.9	315,757,000 €	0.67	38.80%
Lebanon	38310	3,625,000 €	0.01	0.61%
Libya	147300	18,800,000 €	0.01	0.46%
Spain	27779338.93	170,607,000 €	0.16	9.46%
Tunisia	2593000	5,752,000 €	0.45	26.19%
Turkey	81.6	39,309,000 €	0.0000021	0.00%
Bosnia Herzegovina	0.11016	1,461,000 €	0.0000001	0.00%
Serbia & Montenegro	77472	275,200,000 €	0.0003	0.02%


NH3
Bosnia Herzegovina 0%
Turkey 0%
Algeria 0%
Tunisia 26%
Serbia & Montenegro 0%
Croatia 0%
Egypt 24%
Israel 0%
Spain 9%
Libya 0%
Lebanon 1%
Italy 40%
Algeria
Croatia
Egypt
Israel
Italy
Lebanon
Libya
Spain
Tunisia
Turkey
Bosnia Herzegovina
Serbia & Montenegro

Pollutant	Zinc (liq)			
Year	2003			
Country	**Releases**	**GDP Ind**	**Release Intensity**	**Percentage of Total**
Algeria	500	40,116,000 €	0.000012	0.00%
Croatia	6991.858	6,391,000 €	0.001094	0.38%
Cyprus	1268	1,811,000 €	0.000700	0.24%
Egypt	4762877.535	33,612,000 €	0.14	49.56%
France	11900	337,206,000 €	0.00004	0.01%
Italy	1718445.53	315,757,000 €	0.01	1.90%
Libya	2385800	18,800,000 €	0.13	44.39%
Malta	13411.7	1,517,000 €	0.01	3.09%
Palestinian Authority	1794			0.00%
Slovenia	33.46	6,930,000 €	0.000005	0.00%
Spain	26156.22	170,607,000 €	0.000153	0.05%
Turkey	39040	39,309,000 €	0.000993	0.35%
Serbia & Montenegro	2549.12	275,200,000 €	0.00001	0.00%


Zinc (liq)
Turkey 0%
Palestinian Authority 0%
Algeria 0%
Spain 0%
Croatia 0%
Serbia & Montenegro 0%
Slovenia 0%
Cyprus 0%
Malta 3%
Libya 44%
Egypt 51%
Italy 2%
France 0%
Algeria
Croatia
Cyprus
Egypt
France
Italy
Libya
Malta
Palestinian Authority
Slovenia
Spain
Turkey
Serbia & Montenegro

Pollutant	Organohalogen compounds (AOX)				
Year		2003			
Country		Releases	GDP Ind	Release Intensity	Percentage of Total
France		3100	337206000	0.000009	0.09%
Italy		2866751.48	315757000	0.00907898	93.35%
Serbia & Montenegro		108862.03	170607000	0.000638087	6.56%


Organohalogen compounds (AOX)
Serbia & Montenegro
7%
France
0%
Italy
93%
France
Italy
Serbia & Montenegro

II. ANALYSIS OF SOURCES OF RELEASES BY ACTIVITY

The analysis of NBB data related to sources of releases is highlighted in (Table 1- data in kg/yr and Table- 2 data in %). The summary of the tables indicates the following:

- The main sectors contributing to major releases of selected substances are manufacture of metals, farming of animals, manufacture of refined petroleum products, and manufacture of fertilizers.

- Manufacture of metals is the main source of releases for Zn (liq) and oils and greases.

- Farming of animals is the main source of releases of BOD5 and nutrients (Total Nitrogen, Total Phosphorus, and NH3).

- Manufacture of oil refined petroleum products is responsible for the major releases of hydrocarbons (up to 98,81%) and phenols (99,5%).

- Manufacture of fertilizers also appears to be the major source of releases for Total N, mercury, and lead.

- AOX is basically emitted from the manufacture of paper.

- Air releases are dominated by production of energy (TSP, NOx, SOx), transport (VOC, NOx) and oil refining (VOC, SOx).

In addition Table 3 shows that for most of the priority substances the majority of the releases are produced by one or up to three sectors.

Table- 1- Releases of selected substances, by sector (in kg/yr)

Sector	BOD5	Total N	Total P	Hg (liq)	Cd (liq)	Pb (liq)	Zn (liq)	Hydrocarbons	Oils and greases	AOX	Phenols	TSP	VOC	NOx	NH3	SOx
Not identified	6,671,594.00	8,564,471.35	1,161,730.49	89.47	434.95	1,372.64	26,156.22	333,840.00		108,862.03	49,313.07		42,210,261.77	170,201,649.59	27,787,458.93	
Agriculture	2,641,103.12	119,800.00	19,579.00				42.00	191.00	224,782.00			6,163.88	42,857.47	37,396.26		18,668.06
Aquaculture	4,033,243.63	372,205.90	16,618.60			1.60	22.50	1,111.70	799,839.19		348.50	72.25	11,946.07	8,108.69		1,160.65
Building and repairing of ships and boats	109,622.10	17,478.90	1,560.30	0.77	4.00	242.83	2,748.30	4,489.90	7,557.10			520,160.24	684,214.41	843.18		299.00
Chemistry in general	54,200.00	146,900.00	18,572.30		7.40	336.88	1,110.39	0.00		2,100.00	12,118.38		114,298,500.00			
Factories that cause physical changes to the environment		14,457.60				4.80	2,059.60	0.00								
Farming of animals	3,580,196,292.57	1,388,553,554.05	677,790,112.55					139.80	219,554.39			19,868.46	603,985.93	30,255,995.06	181,429,410.00	233,140.13
Food packing	575,027,721.87	1,347,068.69	1,088,801.06	8.00	80.00	829.00	2,825.02	882.19	11,193,712.84		317.10	4,472,483.63	14,571,752.19	1,629,091.18	77,942.56	8,881,535.73
Hazardous wastes							11,100.00	0.00					3,660.00			
Industry in general	390,575.34	60,800.00	1,500.00	0.01	11.00	24.00	224.50	300.00	27,500.00			113,830.70	224,505.79	93,699.48		142,143.41
Management of urban solid waste	554,278.00	1,566.00		0.00	0.00	0.02	0.22	0.00		1,000.00						
Manufacture and formulation of biocides	538.18							0.00				202.85	340.26	917.40		1,651.30
Manufacture of cement	787,592.32	3,586.80	957.00			206.75		175.31	12,388.01		409.00	84,087,720.43	3,392,479.72	106,493,526.30	104,178.99	58,075,852.72
Manufacture of electronics products	7,288.00	8.90			0.08		27.90	29.60				244.72	109,655.43	3,541.89		461.86
Manufacture of fertilizers	52,279,524.04	1,075,717,565.92	21,048,253.09	1,023,236.08	258.13	1,026,514.66	15,026.44	6,512,000.00	1,180,950,179.11	2,259.00	53.00	476,731.28	6,117,098.02	3,579,325.45	26,172,893.50	3,296,274.50
Manufacture of metals	1,998,631.36	941,631,527.18	41,855.39	1.10	1,808.79	10,674.53	8,849,949.92	12,123,766.09	6,818,355,617.61	15.00	228,646.88	10,958,902.90	9,889,305.95	10,365,758.27	13,490.00	27,162,486.34
Manufacture of other inorganic chemicals	81,203.30	24,151.30	1,954.10		40.00	1,357,310.00	584.20	626.30	516,004.25		24.10	41,035,165.84	1,587,268.05	8,649,301.80		30,030,198.76
Manufacture of other organic chemicals	18,517,183.05	5,541,995.42	367,740.45	1,008.70	173.12	1,695.82	9,153.10	3,277.80	33,967.00	1,800.00	45,654.98	201,814.20	243,389,820.07	125,206.64	36,400.00	1,209,670.29
Manufacture of paper	495,549,867.80	297,860.00	65,079.09	32.69	119.16	1,051.34	4,747.05	9.01	4,092.00	2,861,600.00	1,126.95	229,218.08	25,923,556.04	538,216.05		6,327,865.15
Manufacture of pharmaceuticals	11,870,803.10	272,491.80	62,898.10	6.83	20.00	698.99	3,521.30	10.70	5,622,823.46	1,076.88	873.49	50,288.07	5,653,737.07	68,321.94		134,119.63
Manufacture of refined petroleum products	1,490,369,244.60	818,316.07	36,201.20	8.81	157,856.02	977.48	10,846.13	2,184,782,139.70	2,268,298.90		187,089,618.60	4,894,626.43	207,398,063.67	41,154,482.14	8,000.00	141,458,637.67
Manufacture of textiles	104,841,880.97	816,237.70	404,638.00	2.90	525.30	10,374.92	37,121.17	63.90	16,533,794.90		51,312.90	164,854.57	27,888,776.88	557,073.80		2,532,110.52
Mining and quarrying	44,000.00	2,000.00						0.00	5,000.00			2,816,812.44	164.87	114,665.57		1,159,942.48
Port services	6,834.00		21,032.00					8.00	107.00							
Production of energy	103,056.30	19,199,660.60	4,158,056.00	387.55	685.44	3,978.21	12,897.04	6,626.30	32,864.80	0.60	18,243.52	219,631,530.63	46,567,795.57	408,534,059.71	113,822.00	968,257,493.70
Recycling activities	1,760.40							98.88			5.02	47,917.02	403.38	3,824.80		39,200.00
Tanning and dressing of leather	30,058,488.88	6,738,116.68	6,310.00			14,440.00		6,590,764.00	719,535.29		38,094.61	698.90	26,294,421.54	4,231.90	29,910.00	7,630.44
Tourism	6,353,005.56	762,903.20	191,764.10		0.02	0.31		2,725.27	55,511.01							
Transport	387,845.80	1,000.00	272.00			3,613.83	274.00	573,275.80	35,819.20			3.29	738,186,804.89	858,474,504.74	15,023,844.93	96,163,529.35
Treatment and storage of hazardous wastes						100.00		0.00								
Treatment of urban wastewater	172,640,648.42	49,299,083.35	12,272,087.26	537.92	221,526.86	14,461.94	46,343.95	83,183.80	3,323,127.30		407,284.41		14,491,051.00	9,590,382.00	5,223,423.00	9,061,184.81
Waste management activities	3,194,060.00	538,810.00	159,700.00					0.00								
Total general	6,558,772,086.70	3,500,863,617.41	718,937,272.08	1,025,320.82	383,550.28	2,448,910.55	9,036,780.95	2,211,019,735.06	8,040,942,075.36	2,978,713.51	187,943,444.51	369,729,310.81	1,529,542,426.04	1,650,484,123.84	256,020,773.90	1,354,195,256.50

Table- 2- Releases of selected substances, by sector (in %)

Sector	BOD5	Total N	Total P	Hg (liq)	Cd (liq)	Pb (liq)	Zn (liq)	Hydrocarbons	Oils and greases	AOX	Phenols	TSP	VOC	Nitrogen oxyde	NH3	Sulfur oxyde
Not identified	0.10%	0.24%	0.16%	0.01%	0.11%	0.06%	0.29%	0.02%	0.00%	3.65%	0.03%	0.00%	2.76%	10.31%	10.85%	0.00%
Agriculture	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aquaculture	0.06%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Building and repairing of ships and boats	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	0.00%	0.00%	0.00%	0.00%	0.14%	0.04%	0.00%	0.00%	0.00%
Chemistry in general	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.00%	0.00%	0.07%	0.01%	0.00%	7.47%	0.00%	0.00%	0.00%
Factories that cause physical changes to the environment	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Farming of animals	54.59%	39.66%	94.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.04%	1.83%	70.87%	0.02%
Food packing	8.77%	0.04%	0.15%	0.00%	0.02%	0.03%	0.03%	0.00%	0.14%	0.00%	0.00%	1.21%	0.95%	0.10%	0.03%	0.66%
Hazardous wastes	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Industry in general	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.01%	0.01%	0.00%	0.01%
Management of urban solid waste	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Manufacture and formulation of biocides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Manufacture of cement	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	22.74%	0.22%	6.45%	0.04%	4.29%
Manufacture of electronics products	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
Manufacture of fertilizers	0.80%	30.73%	2.93%	99.80%	0.07%	41.92%	0.17%	0.29%	14.69%	0.08%	0.00%	0.13%	0.40%	0.22%	10.22%	0.24%
Manufacture of metals	0.03%	26.90%	0.01%	0.00%	0.47%	0.44%	97.93%	0.55%	84.80%	0.00%	0.12%	2.96%	0.65%	0.63%	0.01%	2.01%
Manufacture of other inorganic chemicals	0.00%	0.00%	0.00%	0.00%	0.01%	55.43%	0.01%	0.00%	0.01%	0.00%	0.00%	11.10%	0.10%	0.52%	0.00%	2.22%
Manufacture of other organic chemicals	0.28%	0.16%	0.05%	0.10%	0.05%	0.07%	0.10%	0.00%	0.00%	0.06%	0.02%	0.05%	15.91%	0.01%	0.01%	0.09%
Manufacture of paper	7.56%	0.01%	0.01%	0.00%	0.03%	0.04%	0.05%	0.00%	0.00%	96.07%	0.00%	0.06%	1.69%	0.03%	0.00%	0.47%
Manufacture of pharmaceuticals	0.18%	0.01%	0.01%	0.00%	0.01%	0.03%	0.04%	0.00%	0.07%	0.04%	0.00%	0.01%	0.37%	0.00%	0.00%	0.01%
Manufacture of refined petroleum products	22.72%	0.02%	0.01%	0.00%	41.16%	0.04%	0.12%	98.81%	0.03%	0.00%	99.55%	1.32%	13.56%	2.49%	0.00%	10.45%
Manufacture of textiles	1.60%	0.02%	0.06%	0.00%	0.14%	0.42%	0.41%	0.00%	0.21%	0.00%	0.03%	0.04%	1.82%	0.03%	0.00%	0.19%
Mining and quarrying	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.76%	0.00%	0.01%	0.00%	0.09%
Port services	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Production of energy	0.00%	0.55%	0.58%	0.04%	0.18%	0.16%	0.14%	0.00%	0.00%	0.00%	0.01%	59.40%	3.04%	24.75%	0.04%	71.50%
Recycling activities	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
Tanning and dressing of leather	0.46%	0.19%	0.00%	0.00%	0.00%	0.59%	0.00%	0.30%	0.01%	0.00%	0.02%	0.00%	1.72%	0.00%	0.01%	0.00%
Tourism	0.10%	0.02%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Transport	0.01%	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	48.26%	52.01%	5.87%	7.10%
Treatment and storage of hazardous wastes	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Treatment of urban wastewater	2.63%	1.41%	1.71%	0.05%	57.76%	0.59%	0.51%	0.00%	0.04%	0.00%	0.22%	0.00%	0.95%	0.58%	2.04%	0.67%
Waste management activities	0.05%	0.02%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total general	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Table- 3- Sectors contributing for the majority of releases, by substance

Pollutant	Sector(s)	% Of total emission in the Med Region
BOD5	Farming of animals Oil refining Food packing	86.1%
Total N	Farming of animals Manufacture of fertilizers Manufacture of metals	97.3%
Total P	Farming of animals Manufacture of fertilizers	97.2%
Hg (liq)	Manufacture of fertilizers	99.8%
Cd (liq)	Treatment of urban wastewater Oil refining	98.9%
Pb (liq)	Inorganic chemicals Manufacture of fertilizers	97.3%
Zn (liq)	Manufacture of metals	97.9%
Hydrocarbons	Oil refining	98.8%
Oils and greases	Manufacture of metals Manufacture of fertilizers	99.5%
AOX	Manufacture of paper	96.1%
Phenols	Oil refining	99.5%
TSP	Production of energy Manufacture of cement	82.1%
VOC	Transport Oil refining Organic chemicals	77.7%
Nitrogen oxyde	Transport Production of energy	76.8%
NH3	Farming of animals Manufacture of fertilizers	81.1%
Sulfur oxyde	Production of energy Oil refining	89.0%

III ESTIMATION OF THE POSSIBLE REDUCTION OF POLLUTION THROUGH THE IMPLEMENTATION OF ACTIONS INCLUDED IN NAPS

Measures included in NAP synopsis have been selected provided they address a potential reduction of a substance of concern (either liquid or gaseous) within the industrial sector. As a result, actions aimed at solid waste treatment/disposal or to urban wastewater treatment have been excluded and considered out of the scope.

In addition, some actions have not been selected as they do not target direct reduction of pollutant releases/releases, for example, actions aimed at emission monitoring/control.

From those actions which are likely to reduce industrial pollution, different degrees of reduction have been identified: few actions have already been assigned a specific reduction rate by NAP, others have been compared to BAT standards and others are difficult to quantify due to the lack of specific references concerning the expected reduction.

In the following sections, a country by country analysis of selected actions that can lead to a potential reduction of substances of concern is presented, including a preliminary assessment of substances and sources of releases not covered by the identified actions. For the qualitative assessment of substances potentially reduced, the sectors that are being addressed (metal, textile…) by the specific actions (technological upgrading, WWTP…),have been, included in order to identify potential substances affected. The link between sectors and substances emitted has been established on the basis of data included in the NBB Database, resulting in a matrix presented in Table 4.

Table 4 Substances potentially emitted by the different sectors, according to NBB Database.

	Liquid										Gaseous					
Sector	**BOD**	**Total N**	**Total P**	**Hg**	**Cd**	**Pb**	**Zinc**	**Hydrocarbons**	**Oils greases**	**AOX**	**TSP**	**VOC**	**PCDD / PCDF**	**Nitrogen oxydes**	**NH3**	**Sulfur oxyde**
Aquaculture	x	x	X			x	x	x	x		x	x		x		x
Building and repairing of ships and boats	x	x	x	x	x	x	x	x	x		x	x		x		x
Chemistry in general	x	x	x		x	x	x			x		x				
Farming of animals	x	x	x					x	x		x	x		x	x	x
Food packing	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x
Hazardous wastes							x					x				
Management of urban solid waste	x	x		x	x	x	x			x			x			
Manufacture and formulation of biocides	x										x	x		x		x
Manufacture of cement	x	x	x			x		x	x		x	x	x	x	x	x
Manufacture of electronics products	x	x			x		x	x			x	x		x		x
Manufacture of fertilizers	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x
Manufacture of metals	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Manufacture of other inorganic chemicals	x	x	x		x	x	x	x	x		x	x	x	x		x
Manufacture of other organic chemicals	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x
Manufacture of paper	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
Manufacture of pharmaceuticals	x	x	x	x	x	x	x	x	x	x	x	x		x		x
Manufacture of refined petroleum products	x	x	x	x	x	x	x	x	x		x	x		x	x	x
Manufacture of textiles	x	x	x	x	x	x	x	x	x		x	x	x	x		x
Mining and quarrying	x	x							x		x	x		x		x

	Liquid										Gaseous					
Sector	**BOD**	**Total N**	**Total P**	**Hg**	**Cd**	**Pb**	**Zinc**	**Hydrocarbons**	**Oils greases**	**AOX**	**TSP**	**VOC**	**PCDD / PCDF**	**Nitrogen oxydes**	**NH3**	**Sulfur oxyde**
Port services	x		x					x	x							
Production of energy	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Recycling activities	x							x			x	x		x		x
Tanning and dressing of leather	x	x	x			x		x	x		x	x		x	x	x
Tourism	x	x	x		x	x		x	x							
Transport	x	x	x			x	x	x	x		x	x	x	x	x	x
Treatment and storage of hazardous wastes						x										
Treatment of urban wastewater	x	x	x	x	x	x	x	x	x					x	x	
Waste management activities	x	x	x													

a. Albania

Albania has planned actions for each specific industrial sector or facility; most actions involve either a technology up-grade or the construction of a wastewater treatment plant. Apparently, these priority actions address main substance discharges reported by NBB database for Albania except for:

- Dioxins and furans (PCDD/PCDF) releases from transport sector in regions where general actions for industry have not been proposed, e.g. Durres, Elbasan, Fieri and Lushnja.
- Water discharges of hydrocarbons from the manufacture of refined petroleum products in Mallakastra.
- VOC releases from chemical industry in Durres and Mallakastra.
- Releases from industrial facilities (food packing mainly) situated in Kruja, Kurbini, Saranda, Lushnja region.

Expected pollution reduction resulting from reported actions has been compared to standard reductions extracted from the related bibliography, which can be consulted in the next chapter.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Wastewater Treatment Plant	Food industry	Shengjin town (Lehza)	X		Yes
Industrial Wastewater treatment plant	Food industry	Durres	X		Yes
Industrial Wastewater treatment plant	Industry general	Tirana district	X		Yes
Technology up-grade for compliance with the DCM on air emission	Industry general	Vlora		X	Yes
Technological up-grading and waste minimization from tanning industries	Tanning industry	Kavaja district	X	X	Yes
Technological up-grading and waste minimization from tanning industries	Tanning industry	Tirana distruct	X	X	Yes
Implementation of DCM on air emission norms (*BAT)*	Cement factory	Elbasan		X	Yes
Steel production plant. Technology up-grade on air emission	Metal industry	Elbasan		X	Yes
Ferro-chromium plant. Technology up-grade on air emission	Metal industry	Elbasan		X	Yes
Technology up-grade for the TPP on air emission	Production of energy	Mallakastra		X	Yes

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Technology up-grade on air emission	Manufacture of refined petroleum products	Mallakastra		X	Yes
Industrial WWTP and technologiacal upgrading, cleaner technology	Poultry	Durres	X		Yes
Industrial WWTP and technologiacal upgrading, cleaner technology	Manufacture of refined petroleum products	Fieri	X		Yes
Industrial Wastewater treatment plant and technological upgrading, cleaner technology	Food industry	Durres	X		Yes

b. Algeria

Actions described in NAP from Algeria involve general decontamination by voluntary agreements with industrial sectors/installations. As specific actions have not been detailed, quantifying the expected pollutant reduction appears to be a hard task; however, such planned actions are supposed to address both air and water releases.

However, pollutant discharges from chemical, pharmaceutical, manufacture of fertilizers and food packing reported by NBB database for various regions are not addressed by the planned actions, e.g.:

- VOC releases from organic/inorganic chemical industry in Alger, Oran and Chlef regions.
- BOD and oil and grease liquid releases from pharmaceutical industry in Ain Temouchent and Alger.
- Liquid releases of hydrocarbons and BOD in the manufacture of fertilizers in Oran
- BOD releases from food packing in Tipaza, Oran, Mostaganem, Skikda, Tizi Opuzou.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Industrial de-pollution: voluntary agreements	Paper industry	Alger	X		No
Industrial de-pollution: voluntary agreements	Cement industry	Skikda	X		No
Industrial de-pollution: voluntary agreements	Petrochemical	Skikda	X		No
Industrial de-pollution:	Natural gas	Skikda	X		No

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
voluntary agreements	liquefied/production of energy				
Industrial de-pollution: voluntary agreements	Plastics industry	Skikda	X		No
Industrial de-pollution: voluntary agreements	Industrial Zone Management	Skikda	X		No
Industrial de-pollution: voluntary agreements	Paper industry	Annaba	X		No
Industrial de-pollution: voluntary agreements	Manufacture of fertilizers	Annaba	X		No
Industrial de-pollution: voluntary agreements	Siderurgy/ iron and steel industry	Annaba	X		No
Industrial de-pollution: voluntary agreements	Tanning industry	Mostagenem	X		No
Industrial de-pollution: voluntary agreements	Paper industry	Mostagenem	X		No
Industrial de-pollution: voluntary agreements	Food industry	Tiemcen	X		No
Industrial de-pollution: voluntary agreements	Metal industry/ Zinc Electrolysis	Tiemcen	X		No
Industrial de-pollution: voluntary agreements	Tanning industry	Tiemcen	X		No

c. Bosnia & Herzegovina

Bosnia&Herzegovina has planned actions mainly focused on industrial wastewater treatment. Food and textile industry in Neretva and Cetina regions are to reduce BOD from their liquid effluents. Metal industry and a thermal power plant in Trebisnjica river basin are supposed to reduce all pollutants from their liquid effluents. Expected pollutant reductions could be estimated on wastewater treatment plant standards extracted from the bibliography.

However, there are pollutant discharges reported by NBB database, which are not covered by the planned actions, e.g.:

- Gaseous releases from industry in Bosnia&Herzegovina have not been considered, e.g. VOC releases from textile industry in Neretva and Cetina; dioxins and furans releases from transport sector in Cetina and Trebisnjica.

- BOD releases from farming of animals, food packing and textile industry in Trebisnjica region.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Pretreatment/cleaner production of wastewater from industrial plants (BOD5)	Textile industry	Neretva	X		Yes
Pretreatment/cleaner production of wastewater from industrial plants (BOD5)	Textile industry	Cetina	X		Yes
Pretreatment/cleaner production of wastewater from industrial plants (BOD5)	Food industry	Neretva	X		Yes
Pretreatment/cleaner production of wastewater from industrial plants (BOD5)	Farming of animals	Neretva	X		Yes
Pretreatment/cleaner production of wastewater from industrial plants	Metal industries-galvanization	Trebinjetool industry (Trebisnjica river basin)	X		Yes
Pretreatment/cleaner production of wastewater from industrial plants	Metal industries-galvanization	Ckonjic UNIS GAL (Trebisnjica river basin)	X		Yes
Pretreatment/cleaner production of wastewater from industrial plants	Production of energy	Trebisnjica	X		Yes

d. Croatia

Actions described in NAP of Croatia only involve industrial wastewater treatment plants for some specific facilities within the food sector in Rovinj (Istarska), Zadar (Zadarska) and Split (Splitsko-Dalmatinska) regions.

Expected pollutant reductions derived from these actions could be based on wastewater treatment plant standards extracted from the bibliography.

Apparently, these priority actions only address a part of the pollutant discharges reported by NBB database for Croatia, main lacks of action have been identified as follows:

- Gaseous releases in Croatia have not been considered, the most significant are: NH3 (cement industry in Splitsko-Dalmatinska and Istarska); dioxin and furan from transport industry and VOC from manufacture of refined petroleum products in Primorsko-Goranska.

- BOD, hydrocarbons, oils and greases discharges from sectors such as farming of animals, manufacture of organic and inorganic products, cement industry, textile industry, manufacture of refined petroleum products

- Pollutant releases from other industrial sectors in Istarska (production of energy, farming of animals, building and repairing of ships and boats, chemical, cement, paper, aquaculture industry); Splitsko-Dalmatinska (farming of animals, building and repairing of ships and boats, chemical, cement, textile, aquaculture industry); and Zadraska (aquaculture) have not been considered

- Pollutant releases from regions such as Dubrovacko-Neretvanska, Primorsko-Goranska, Sibensko-Kninska have not been considered.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
MIRNA fish processing. Industrial WWTP	Food industry	Rovinj	X		Yes
ADRIA fish processing. Industrial WWTP	Food industry	Zadar	X		Yes
Brewery. Industrial WWTP	Food industry	Split city	X		Yes

e. Cyprus

Actions described in NAP only involve a refinery complete closure, which means a 100% reduction of both gaseous and liquid releases, and a wastewater treatment plant for a brewery installation. Expected pollutant reduction derived from the latest action could be based on wastewater treatment plant standards extracted from the bibliography.

However, there are pollutant discharges reported by NBB database which are not covered by the planned actions, e.g.:

- Total Nitrogen and Phosphorous liquid discharges from Aquaculture.
- VOC releases from paper industry, manufacture of organic chemicals, transport, and industry general.
- Dioxin and furans from production of energy.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Refinery complete closure *(100% reduction)*	Oil refinery	All regions	X	X	Yes (100%)
KEO Brewery wastewater treatment plant	Food industry	All regions	X		Yes

f. Egypt

Egypt has planned actions mainly focused on the application of cleaner technologies and industrial wastewater treatment plants in industrial installations mostly situated in Alexandria, Bahira and Port Said regions. However, as NBB database has only reported pollutant releases from Alexandria region, actions applied within the other regions will not be quantifiable. Expected pollutant reductions for those quantifiable actions could be based on standards extracted from the bibliography.

However, there are pollutant discharges reported by NBB database for Alexandria region which are not covered by the planned actions, e.g.:

- Hydrocarbons, VOC and total Nitrogen from metal industry:
- VOC from organic chemical industry
- BOD, hydrocarbons (liquid discharges) from the manufacture of refined petroleum products:
- Hydrocarbons, VOC and total Nitrogen from tanning industry:

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Air filters	Paper industry	Alexandria Governorate		X	Yes
Application of cleaner technologies and WWTP	Paper industry	Alexandria Governorate	X	X	Yes
Application of cleaner technologies and WWTP	Food industry	Alexandria Governorate	X	X	Yes
Application of cleaner technologies and WWTP	Textile industry	Alexandria Governorate	X	X	Yes
Application of cleaner technologies and WWTP	Fertilizer industry	Alexandria Governorate	X	X	Yes
Application of cleaner technologies and WWTP	Pharmaceutical industry	Alexandria Governorate	X	X	Yes
Air filters	Cement industry	Alexandria Governorate		X	Yes
Air filters	Oil refinery	Alexandria Governorate		X	Yes
Application of cleaner technologies and WWTP in the companies: Ismadye, Misr Rayon, El-Beida Dye	Industry general	Bahira Governorate	X	X	Yes?
Application of cleaner technologies and construction of a WWTP in the industrial zone south of Port Said	Industry general	Port Said Governorate	X	X	Yes?

g. France

Actions described in NAP of France consist of general plans/programmes for all industrial sectors in all regions concerning both liquid and gaseous releases without detailing expected reduction rates. On the other hand, NBB database has not been reported by regions. As a result, quantification of pollutant reduction is not possible except for the action which refers to the application of BATs, in this case, standards have been defined from the bibliography consulted.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Plans for industries relocation from urban centres	Industry general	All regions		X	No
National Programme on prevention and reduction of the water pollution by hazardous substances poured in the aquatic environment	Industry general	All regions	X		No
Measures of pollution reduction on classified industries	Industry general	All regions	X		No
Other specifics measures (voluntary agreements and BATs)	Industry general	All regions	X		Yes?

h. Greece

Actions described in NAP of Greece consist of general plans/programmes for all industrial sectors in all regions concerning both liquid and gaseous releases without detailing expected reduction rates; as a result, quantification of pollutant reduction is not possible.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Development of a program for the control of operation and maintenance of WWTPs	Industry general	All regions	X		No
Programs of measures including management and evaluation of air pollution, regional plans, monitoring, etc.	Industry general	All regions		X	No
Enforcement to control discharges from industrial installations, environmental permits	Industry general	All regions	X	X	No

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Development of support tools for the identification and control of pollution from point sources	Industry general	All regions	X	X	No
Provision of equipment for the effective protection of the environment	Industry general	All regions	X	X	No

i. Israel

Actions described in NAP of Israel are focused on the enforcement of emission standards; in addition, reduction rates have also been estimated. Although NBB database has not been reported by regions, reduction rates will be applied to all sectors or specific sectors when detailed, in order to quantify expected reduction. No gaps between NBB releases and related actions have been identified.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Establishment of proper conditions in business licenses and enforcement of more stringent standards and enforcement in industrial plants	Industry general	All regions	X		No
Signature of a "Covenant on implementing Standards on Air Pollutant Releases" (reduction 40-100% of air pollutants by 2012)	Industry general	All regions		X	Yes (40-100%)
Regulations on pollutants releases standards for power plants. Compliance with the national standards (2010-2014)	Production of energy	All regions		X	Yes
Compliance of all industrial plants/facilities and review of their compliance with air standards.	Industry general	All regions		X	Yes
Emission conditions in business licences	Industry general	All regions		X	No
Control the reduction rate of the metals Hg,	Industry general	All regions	X	X	Yes (<50%)

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Cd and Pb (in air and liquid releases) in comparison to the NBB. If necessary (reduction below 50%) taking enforcement measures including adoption of BAT NEC in order to reach required reduction level by 2010.					

j. Italy

Actions described in NAP of Italy mainly consist of the reduction and establishment of emission limits for TPB (Toxic, Persistant and Bioaccumulative) substances, which include heavy metals, AOX and dioxins and furans; and the promotion and improvement of current industrial wastewater treatment plants regarding nutrients and suspended solid releases (BOD included) for all industrial sectors and all regions. Although priority substances have been included, not all the substances within the scope of SAP commitments have been considered by Italy.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Nutrients and SS: Application of BAT in industry	Industry general	All regions	X		Yes
Complete the implementation of regional plans to control air pollution	Industry general	Southern regions		X	No
TPB: Reduce and phase out inputs	Industry general	All regions	X	X	No
TPB: Introduce Environmental Quality Standards (water) and Effluent Emission Limits	Industry general	All regions	X		No
Nutrients and SS: Implementation of the IPPC Directive	Industry general	All regions	X		No
Nutrients and SS: Promotion of tertiary treatment for industrial wastewater	Industry general	All regions	X		Yes?
Nutrients and SS: Improve industrial WWTP's efficiency	Industry general	All regions	X		No

k. Lebanon

Specific actions described in NAP of Lebanon are mainly focused on the reduction of metals discharges from metal, tanning and fertilizer industry. NBB database has not been reported by regions and amounts of Pb, As, Cr and Hg from fertilizer industry have been reported altogether, therefore, reduction rates will be applied to the whole sector. Main gaps between NBB releases and related actions have been identified as follows:

- Food packing (BOD, VOC), paper industry (DBO), textile industry (DBO)
- Dioxins and furans from the manufacture of cement, metal industry, manufacture of other inorganic chemicals, production of energy and transport

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Reduction of phosphogypsum slurry dumping (Cd)	Fertilizer industry	Selaata	X		No
Reduce Effluent Concentrations & Quantities and Industrial WWTP	Fertilizer industry	All regions	X	X	Yes
WWTP in slaughterhouse	Farming of animals	All regions	X		Yes
Promote cleaner production & chromium recycling	Tanning industry	All regions	X	X	Yes
50% Reduction of metal emission	Metal industry	Industrial area/Mount Lebanon	X		Yes
30-50% Reduction of chromium	Tanning industry	Gazieh and Dora	X		Yes
Upgrade selected industrial zones	Industry general	Mount Lebanon	X	X	No

l. Libya

Actions described in NAP of Libya mainly consist of the establishment of emission standards for all industrial sectors in all regions concerning both liquid and gaseous releases without detailing expected reduction rates; as a result, quantification of pollutant reduction is not possible in these cases. However, a specific and quantifiable action concerning cement plants has been planned so as to reduce air releases.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Control of air releases electrostatic precipitators in 3 of the 6 existing plants (50%)	Cement industry	All regions		X	Yes
Introduction of standard specifications	Industry general	All regions	X	X	No

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Economic instruments program	Industry general	All regions	X	X	No

m. Malta

Actions described in NAP of Malta involve wastewater treatment plants for both industrial and domestic effluents in three regions of Malta and the establishment and enforcement of quality standards for metals and organohalogens. Specifically, a 50% reduction of organohalogen releases from industrial installations has also been reported, however no data on organohalogen releases have been considered in NBB database, thus none of the actions can be quantified.

Priority actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Control releases from power plants	Production of energy	All regions	X	X	No
Organohalogen: reduce by 50% such releases from industrial installations	Industry general	All regions	X		No
WWTP of Cumnija (domestic and industrial)	Industry general	Malta North	X		No
WWTP of Ras il-Hobz (domestic and industrial)	Industry general	Gozo island	X		No
WWTP of Weid Ghammieq (domestic and industrial)	Industry general	Malta	X		No
Extend sewage network to serve all premises	Industry general	All regions	X		No
Elimination of oil discharges from shore installations	Industry general	All regions	X		No
Introduce environmental quality standards for Hg, Cd and Pb for industrial and non-industrial areas (water and sediments)	Industry general	All regions	X		No
Hg, Cd and Pb: Ensure the compliance of all discharges to Emission Limit Values	Industry general	All regions	X		No
Organohalogen compounds: introduce Environmental Quality Standards for non-	Industry general	All regions	X		No

Priority actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
industrial areas					
Organohalogen compounds: ensure the compliance of all discharges to Emission Limit Values	Industry general	All regions	X		No

n. Monaco

Actions described in NAP of Monaco are focused on the enforcement of emission limit values from industrial installations; however, no releases have been reported by Monaco in the NBB database, thus none of the actions can be quantified.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Ensure the compliance of all discharges to Emission Limit Values	Industry general	All regions	X	X	No
Monitor Cd and Hg at exit of wwtp and introduce limit values into legislation	Industry general	All regions	X		No

o. Morocco

Morocco has planned actions involving technology up-grade and enforcement of quality standards at industrial wastewater treatment plants. Apparently, these priority actions address main releases reported by NBB database as only BOD data have been reported.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Upgrading all industrial WWTPs (N.S.)	Industry general	All coastal area	X		Yes?
To achieve environmental quality standards at industrial facilities and treatment of wastewater (for BOD and heavy metals)	Industry general	All regions	X		No

p. Palestinian authority

Actions described in NAP of Palestinian authority consist of the establishment of environmental standards and the implementation of industrial environmental management systems in all regions, none of the actions can be quantified regarding pollutant releases.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Industrial Environmental Management System	Industry general	All regions	X	X	No
Environmental Standards and Guidelines	Industry general	All regions	X	X	No

q. Serbia & Montenegro

Serbia & Montenegro has planned actions focused on the application of best available technologies and industrial wastewater treatment plants for metal industry in Kotor region and shipyard installations in Boka Kotorska bay (Tivat region). NBB database has reported significant lead releases from shipbuilding and repair in Tivat region and lead, cadmium and sulphur oxyde releases from metal industry in Kotor region. Expected pollutant reductions for these quantifiable actions could be based on standards extracted from the bibliography.

Apparently, these priority actions only address a part of the pollutant discharges reported by NBB database for Serbia & Montenegro, main lacks of action have been identified as follows:

- Food packing in Bar region (mainly BOD, oil and greases, Total N and P)
- Waste management activities (BOD)
- Manufacture of petroleum products (mainly sulphur oxide)

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Introduction of BAT and construction of Industrial WWTP	Daido, Metal industry	Kotor	X	X	Yes
Introduction of BAT and construction of Industrial WWTP	Shipyard Bijela	Boka Kotorska bay (Tivat)	X	X	Yes

r. Slovenia

Slovenia has planned actions focused on the application of best available technologies to all industrial sectors for all regions. Moreover, Hg reduction from Idrija mine has been reported although no quantifiable target has been established. Expected pollutant reductions for quantifiable actions could be based on standards extracted from the bibliography consulted.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Implementation of BAT to industrial plants	Industry general	All regions	X	X	Yes

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Reduce Hg emission from Idrija mine	Mining	Idrija mine	X		No

s. Spain

Actions described in NAP of Spain are focused on the following specific pollutants: organohalogen compounds, heavy metals and nutrients and suspended solids. Priority industrial sectors regarding releases of these pollutants have been identified and promotion measures proposed. None of these actions can be quantified regarding pollutant reduction. On the other hand, NBB database for Spain has not been reported by industrial sectors.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Organohalogen compounds: To promote reduction of short-chain chlorinated paraffins, following EU and international initiatives	Priority: Chemical sector	All regions	X		No
Organohalogen compounds: To promote reduction of tri, tetra and pentachlorophenol in wood treatment	Priority: Chemical sector	All regions	X		No
Nutrients and SS: To promote voluntary agreements considering the recommendations in BREFs	Priority: chemical industry, agro-food, textile)	All regions	X		Yes
Heavy metals: To apply measures included by the European Water Framework Directive. To promote additional measures in coastal regions oriented to reduce releases of heavy metals	Industry in general	Coastal regions	X		No
Heavy metals: To restirct the use of Cd, Hg and Pb. To apply the future European strategy on Hg	Industry in general	All regions	X		No

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Organohalogen compounds: To adopt the substitution principle as defined in the EU	Priority: Chemical sector	All regions	X		No
Organohalogen compounds: To set emission limits under the current IPPC regulatory framework	Priority: Chemical sector	All regions	X	X	No
Organohalogen compounds: Production of pesticides: to apply European regulatory framework	Priority: Chemical sector	All regions	X	X	No
Nutrients and SS: To promote and regulate the adoption of tertiary treatments for industrial wastewater	Industry in general	All regions	X		No

t. Syria

Syria has planned actions mainly focused on industrial wastewater treatment and air releases from cement industry. Expected pollutant reductions could be based on wastewater treatment plant standards extracted from the bibliography consulted.

However, there are some pollutant discharges from Tartous regions, reported by NBB database, which are not covered by the planned actions, e.g.:

- BOD releases from farming of animals, food packing, manufacture of organic chemicals and textile industry.
- Cd and Pb releases from the manufacture of organic chemicals
- Total N and P from farming of animals and manufacture of organic chemicals
- Hydrocarbons, VOC releases from manufacture of refined petroleum products
- Hydrocarbons from metal industry

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
The exchange of fuel with natural gas for two power generation units	*Thermal power plant/production of energy*	*Tartous*		X	Yes?
Construction of WWTP and a sewerage network for the industrial area of Al	Industry general	Lattakia	X		Yes

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Fawar Spring					
Rehabilitation of the Banias refinery industrial WWTP	Oil Refinery	Tartous	X		Yes
Installation of fabric filters on the production line for the Tartous cement factory	Cement Industry	Tartous		X	Yes
Pretreatment of wastewater from food manufactures at Fawar Spring area and Ugarit Beverages Company prior to discharge to public sanitary sewers	Food industry	Lattakia	X		Yes

u. Tunisia

Tunisia has planned actions focused on the application of programmes of de-pollution and upgrade/clean technologies for both air and water releases with special attention to heavy metals. Most reported actions do not allow estimating pollutant reductions; however, for those quantifiable actions standards extracted from the bibliography consulted will be taken into account. A priori, no gaps between NBB releases and related actions have been identified.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Heavy metal: Elimination of the phosphogypsum discharges	Ferlizer industry	Gabes	X		Yes
Heavy metal: Control of Discharges from Jradou	Waste treatment	Ben Arous	X		No
Heavy metal: Clean technology programs	Industry general	All regions	X	X	Yes
Up-grading of 4000 industries	Industry general	All regions	X	X	Yes
Industrial de-pollution studies	Industry general	Ariana, Sousse and Mednine	X	X	No
Partnership for the improvement of the air quality	Industry general	All regions		X	No
National strategy for the reduction of the air pollution	Industry general	All regions		X	No
Programmes of de-pollution of the littoral	Industry general	Coastal regions	X		No

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
De-pollution and elimination of the coastal zone	Industry general	Sfax	X		No
Rehabilitation of the Lake Bizerte by the de-pollution of surrounding industries	Industry general	Bizerte	X		No
De-pollution of the public production facilities programs	Cement factory, Chemical industry, 3 Phophate Usines, 2 Power stations	Bizerte Gabes Sfax, Fer/Acier El Fouleth and Menzel Bourguiba Rades and Ghannouch	X		No

v. Turkey

Turkey has planned actions completely focused on industrial wastewater treatment. Expected pollutant reductions could be based on wastewater treatment plant standards extracted from the bibliography. Main gaps between NBB releases and related actions are dioxin releases from pulp and paper industry.

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Furnishing Wastewater Treatment Plants in areas in lack of the latter	Textile industry	All regions	X		Yes
Improvement of current Wastewater Treatment Plants	Textile industry	All regions	X		Yes?
Furnishing Wastewater Treatment Plants in areas in lack of the latter	Food industry	All regions	X		Yes
Improvement of current Wastewater Treatment Plants	Food industry	All regions	X		Yes?
Furnishing Wastewater Treatment Plants in areas in lack of the latter	Pulp and paper sector	All regions	X		Yes
Improvement of current Wastewater Treatment Plants	Pulp and paper sector	All regions	X		Yes

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Furnishing Wastewater Treatment Plants in areas in lack of the latter	Tannery industry	All regions	X		Yes
Improvement of current Wastewater Treatment Plants	Tannery industry	All regions	X		Yes
Furnishing Wastewater Treatment Plants in areas in lack of the latter	Other organic and inorganic industry	All regions	X		Yes
Improvement of current Wastewater Treatment Plants	Other organic and inorganic industry	All regions	X		Yes
Furnishing Wastewater Treatment Plants in areas in lack of the latter	Metal industry	All regions	X		Yes
Improvement of current Wastewater Treatment Plants	Metal industry	All regions	X		Yes
Furnishing Wastewater Treatment Plants in areas in lack of the latter	Oil refining	All regions	X		Yes
Improvement of current Wastewater Treatment Plants	Oil refining	All regions	X		Yes
Furnishing Wastewater Treatment Plants in areas in lack of the latter	Aquaculture	All regions	X		Yes
Improvement of current Wastewater Treatment Plants	Aquaculture	All regions	X		Yes
Furnishing Wastewater Treatment Plants in areas in lack of the latter	Mining	All regions	X		Yes
Improvement of current Wastewater Treatment Plants	Mining	All regions	X		Yes
Furnishing Wastewater Treatment Plants in areas in lack of the latter	Energy production	All regions	X		Yes
Improvement of current Wastewater Treatment Plants	Energy production	All regions	X		Yes

Priority Actions	Sector	Region	Substances potentially reduced		Quantifiable reduction?
			Liquid	Gaseous	
Improving the current wastewater treatment plants	Electronic industry	All regions	X		Yes

Synthesis of qualitative analysis

The synthesis of potential reductions for the selected substances according to actions included in NAPs is presented in Table 5. This qualitative assessment is based on the potentiality for reduction in terms of YES/NO, according to the description of each individual action, which has been presented above for the different countries.

The aim of this assessment is to obtain a preliminary overview of the scope of actions included in NAPs. As it can be observed in the table, the majority of countries have included actions that can potentially reduce most of the selected substances, specially BOD5, nutrients and metals in water. AOX would be the substance emitted to water less covered by NAPs. Air releases are in general less represented in NAP actions, especially dioxins and furans.

Table 5 Potential reductions of selected substances, according to actions included in NAP

	Actions included to reduce water emissions							Actions included to reduce air emissions					
Country	BOD	N / P	Hg, Cd, Pb	Zn	HC	Oils/Greases	AOX	TSP	VOC	PCDD/PCDF	NOx	NH3	SOx
Albania	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Algeria	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bosnia H	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Croatia	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No
Cyprus	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Egypt	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
France	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Greece	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Israel	No	No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Italy	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Lebanon	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Libya	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Malta	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Serbia M	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No
Monaco	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Morocco	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No
Palestine	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Slovenia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Spain	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	No
Syria	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tunisia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Turkey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No

IV. QUANTIFICATION OF THE REDUCTION OF POLLUTION AND LEVEL OF COMPLIANCE WITH SAP TARGETS

In this section, actions that have been identified previously as potentially quantifiable for the different countries are selected, and the related reduction is estimated, in order to compare results with SAP targets. As a significant lack of data and information appears when trying to perform this kind of quantitative estimations, a preliminary **case study for BOD5** has been developed with the aim of setting a methodology that could be applied to other substances. The main steps to obtain estimated reductions are described below. To show how the methodology has been applied, data for Albania is included in Table 6.

a) Actions included in NAP have been selected provided they allow for quantification and they address a potential reduction of BOD5 from industrial sources. These actions are shown in the first column of Table 6. It should be noted that actions are defined for the majority of countries in a very generic way ("wastewater treatment plant"; "technological upgrading", etc.). This is suitable for the aim of the NAP, but put significant limitations on the estimation of reductions, as no information on the specific type of treatment (primary, secondary,…), wastewater flow (m^3), BOD5 concentration of wastewater, etc, is included.

b) Releases related with the sectoral and regional scope that the NAP actions are intended for (e.g., BOD5 releases that a wastewaster treatment plant will receive from the food industry sector in the region of Durres in Albania) are then calculated. This information refers to columns 2, 3 and 4 of Table 6. Emission data are collected from the NBB Database. It should be noted that only releases related to the scope of actions can be selected for the estimation of reductions, and no total country releases.

Table 6 Estimation of potential reductions of BOD5 in Albania

Priority Actions in NAP	Sector	Region	Emission (kg/yr)	Potential Reduction (conventional) (%)	Potential Reduction (BAT) (%)	Potential Reduction (conventional) (kg/yr)	Potential Reduction (BAT) (kg/yr)
Wastewater Treatment Plant	Food industry	Shengjin town (Lehza)	806	50%	98%	403	792
Industrial Wastewater treatment plant and technological upgrading, cleaner technology	Food industry	Durres	2,190	50%	98%	1,095	2,151
Industrial Wastewater treatment plant	Industry general	Tirana district	602,525	50%	79%	301,263	477,199
Technological up-grading and waste minimization from tanning industries	Tanning industry	Kavaja district	116,000	50%	80%	58,000	92,800
Technological up-grading and waste minimization from tanning industries	Tanning industry	Tirana district	207,900	50%	80%	103,950	166,320

Priority Actions in NAP	Sector	Region	Emission (kg/yr)	Potential Reduction (conventional) (%)	Potential Reduction (BAT) (%)	Potential Reduction (conventional) (kg/yr)	Potential Reduction (BAT) (kg/yr)
TOTAL (country)			3,186,243			464,711	739,262
% REDUCTION						**14,58%**	**23,20%**
SAP TARGET						50%	

c) The theoretical potential reduction is then allocated for each of the selected actions. This parameter has been obtained from bibliographic research, and **two scenarios** are considered: a conventional industrial wastewater treatment facility, and the adoption of Best Available Techniques (BAT) to treat wastewater. In the "conventional" scenario, a 50% potential reduction on the BOD5 load has been estimated, on the basis of the research developed for the "Plan on Reduction of input of BOD by 50% by 2010 from industrial sources for the Mediterranean Region" [1]. In the "BAT" scenario, potential reductions that could be addressed by the adoption of BAT to treat wastewater have been collected from BREFs documents (Reference Document on Best Available Techniques) that are produced by the European Commission for the different industrial sectors. In this case, different values of potential reductions are applied depending on the sector being addressed by the selected NAP action. Values of potential reductions are included in columns 5 and 6 of Table 6.

   As BREFs are not available for all sectors, and in some cases NAP actions are not defined for a specific sector, but for "industry in general", an average of values obtained for available sectors is then applied. These values are shown in Table 7.

Table 7 Potential reductions of BOD5 loads by adopting BATs on wastewater treatment.

Sector	% BOD5 reduction
Food Industry	98
Paper Industry	77
Tanning industry	80
Farming of animals	33
Textile industry	93
Oil refining	94
Industry in general	79

d) Calculation of estimated reductions is carried out by multiplying potential reduction values by the emission related for each NAP action. This estimation allows to obtain the total amount of BOD5 potentially reduced for the two scenarios (columns 7 and 8 of Table 6), which can be compared with total country releases, and the resulting percentage can be compared as well with the SAP target (50% reduction of BOD5 loads).

This methodology has been applied to countries, and results are presented in Table 8. It has been not possible to perform estimations for all countries. This is due to the fact that in some

countries NAP actions are defined in such a generic way, that no quantitative assumptions are possible. In other cases, like for Spain, no data on BOD5 releases are included in the NBB, or no specific actions seem to be included addressing BOD5 reduction (Israel).

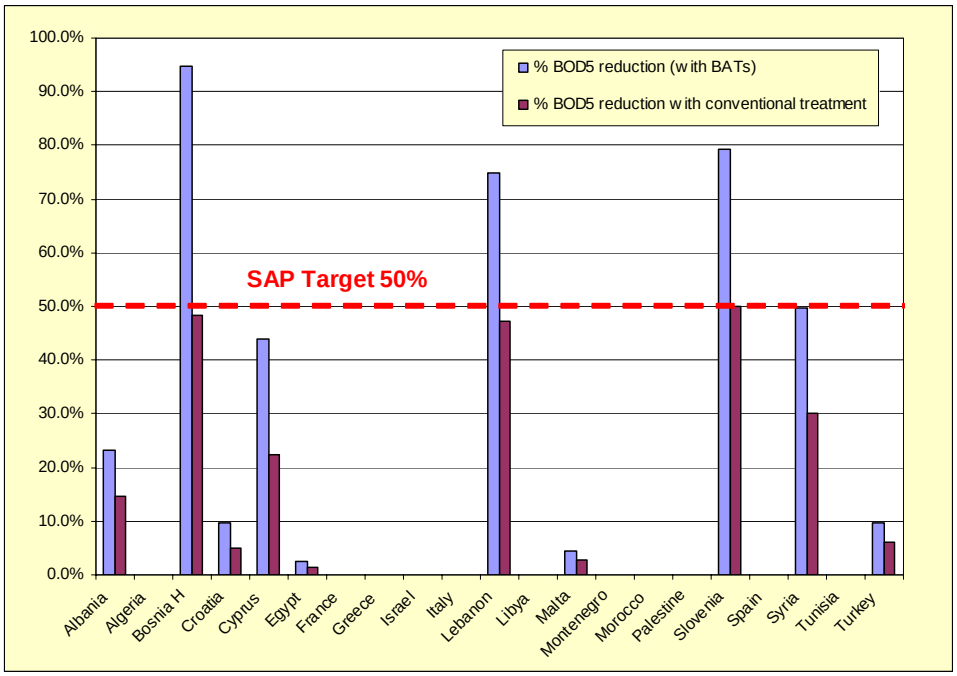
Finally, it should be noted that behind this approach a key assumption which is needed to be considered, is that BOD5 reductions take place in untreated wastewater from industries. This approach is consistent with that included in the "Plan on Reduction of input of BOD by 50% by 2010 from industrial sources for the Mediterranean Region" [1]. However, this makes the approach more suitable for some countries that have reported in NAP that certainly this is the situation for most industrial wastewaters, but would not be the case for some other countries, specially some EU countries like France, Italy or Spain. In fact, these latter countries have not been included in the analysis. To perform calculation, only a correction has been introduced to be consistent with the above approach, dealing with the distinction of BOD5 generic discharges included in the NBB database, from specific discharges of industrial facilities. This has been done by not considering data on discharges from urban wastewater treatment sector, which is included in the NBB.

Table 8 Estimation of potential reduction of BOD5 for MAP countries

Country	BOD5 (kg/yr)	BOD5 (industrial) (kg/yr)	BOD5 (potentially reduced with BATs) (kg/yr)	% BOD5 reduction (with BATs)	BOD5 (potentially reduced with conventional treatment) (kg/yr)	% BOD5 reduction with conventional treatment
Albania	48,125,996	3,186,243	739,262	23.2%	464,711	14.6%
Algeria	395,833,804	NA	NA	NA	NA	NA
Bosnia H	93,500,652	85,571,852	81,195,255	94.9%	41,406,914	48.4%
Croatia	19,383,407	2,796,105	271,405	9.7%	138,190	4.9%
Cyprus	2,437,988	1,337,988	589,200	44.0%	300,000	22.4%
Egypt	1,403,460,234	1,403,460,234	33,652,609	2.4%	20,170,600	1.4%
France	54,200	NA	NA	NA	NA	NA
Greece	28,463,053	NA	NA	NA	NA	NA
Israel	5,943,750	NA	NA	NA	NA	NA
Italy	3,991,972,009	NA	NA	NA	NA	NA
Lebanon	156,081,507	112,081,507	83,834,071	74.8%	52,925,550	47.2%
Libya	64,421,100	NA	NA	NA	NA	NA
Malta	5,934,879	289,676	13,094	4.5%	8,267	2.9%
Montenegro	8,032,398	NA	NA	NA	NA	NA
Morocco	6,869,340	NA	NA	NA	NA	NA
Palestine	2,270,000	NA	NA	NA	NA	NA
Slovenia	2,396,012	468,947	371,406	79.2%	234,474	50.0%
Spain	0	NA	NA	NA	NA	NA
Syria	46,522,530	46,522,530	23,083,647	49.6%	14,009,735	30.1%
Tunisia	10,900,173	NA	NA	NA	NA	NA
Turkey	266,169,054	266,085,054	25,693,442	9.7%	16,065,971	6.0%
Total general	6,558,772,087	1,921,800,135	249,443,391	13.0%	145,724,410	7.6%

NA : available information is not enough to be analysed.

Figure 1 Estimation of potential reduction of BOD5



On the basis of the above estimations, an indicator on the probability to achieve SAP targets on BOD5 reduction by 2010 can be established as follows:

Probability	Criteria (estimated reduction)
Low	<10%
Medium	10 - 30%
High	>30%

According to the above criteria, the current situation for the MAP countries (conventional scenario) is shown in Table 9. As it can be observed, 3 out of 10 analysed countries would have a high probability to achieve targets if actions included in their NAP are implemented, 3 countries would have a medium probability and 4 countries a low probability.

Table 9 Probability to achieve SAP targets on BOD5 reduction by 2010

Country	Probability to achieve targets by 2010
Albania	Medium
Algeria	NA
Bosnia H	High
Croatia	Low
Cyprus	Medium
Egypt	Low
France	NA
Greece	NA
Israel	NA
Italy	NA
Lebanon	High
Libya	NA
Malta	Low
Serbia M	NA
Monaco	NA
Morocco	NA
Palestine	NA
Slovenia	Hlgh
Spain	NA
Syria	Medium
Tunisia	NA
Turkey	Low

V PRELIMINARY ANALYSIS OF COST OF REDUCTIONS

The estimation of costs for reducing pollution by means of technological upgrading of industries, introduction of techniques for pollution prevention, etc., is rather difficult and requires a case-by-case analysis. In order to perform some rough estimation on costs for to the overall set of actions to reduce pollution included in NAP from MAP countries, costs figures for wastewater treatment processes have been used. In fact, most of actions included in NAP refer to the construction of new industrial wastewater treatment plants. In order to link the analysis with the previous section, a **case study for costs to reduce BOD5** is presented in this chapter.

Although some research is still on-going in order to identify the best figures to perform this kind of cost calculations, a preliminary analysis has been carried out on the basis of assumptions and figures included in the "Plan on Reduction of input of BOD by 50% by 2010 from industrial sources for the Mediterranean Region" [1].

Three main factors that affect costs of wastewater treatment plants can be divided into the following:

1. land requirement
2. capital costs
3. operations and maintenance costs

Land requirement is influenced by the volume of waste to be treated and the method of treatment. Cost of treatment is influenced by construction costs (type and size of facility), and method of treatment (BOD removal efficiency). Additional costs are also incurred due to the geographical location of the treatment facility (land cost); labour cost; and related

maintenance and operating costs. In spite of all these variables affecting costs, in the MAP report [1] a rough estimation of capital and operating costs for reducing country industrial BOD discharges by 50%, considering the following assumptions:

a. land costs is ignored
b. activated sludge treatment is implemented by the countries overlooking the southern shores of the Mediterranean
c. stabilization ponds are applied by the countries overlooking the southern shores of the Mediterranean
d. costs of additional treatment to separate algae in stabilization ponds is ignored
e. cost of inflation is ignored
f. it is assumed that no industrial wastewater treatment infrastructure is in place
g. the socio-economic conditions and the variability of cost of labour are ignored
h. cost figures are obtained from case studies in bibliography, which better adapts to BOD reduction scenario expected in Mediterranean countries.

The above assumptions have been applied to our case study, using the following cost figures, which refers to the treatment with activated sludge (50% removal of BOD5) of a wastewater effluent with a BOD load of 3650 tons/year:

Capital costs: 4.8 million USD
Operational costs: 1.49 million USD

Results obtained for a set of MAP countries are shown in Table 10. Once obtained the specific discharges from industrial activities (by removing data from NBB on releases from urban wastewater treatment sector), the figures presented above are applied to estimate costs related with reductions estimated by NAP actions, as well as costs related to achieve the 50% SAP target.

Table 10 Estimated costs to implement NAP BOD5 reduction acions, and costs to reduce 50% of total BOD5 loads in MAP countries, through wastewater treatment processes

Country	BOD5 (kg/yr)	BOD5 (industrial) (kg/yr)	BOD5 potentially reduced NAP (kg/yr)	Cost for NAP actions, operational (€/yr)	Cost for NAP actions, capital cost (€)	Cost to achieve SAP target, operational (€/yr)	Cost to achieve SAP target, capital cost (€)
Albania	48,125,996	3,186,243	464,711	240,924	776,130	1,651,871	5,321,462
Algeria	395,833,804	395,833,804	NA	NA	NA	205,215,427	661,096,677
Bosnia Herzegovi	93,500,652	85,571,852	41,406,914	21,466,932	69,155,218	44,363,730	142,916,715
Croatia	19,383,407	2,796,105	138,190	71,643	230,796	1,449,608	4,669,878
Cyprus	2,437,988	1,337,988	300,000	155,532	501,041	693,664	2,234,623
Egypt	1,403,460,234	1,403,460,234	20,170,600	10,457,213	33,687,665	727,607,616	2,343,970,845
France	54,200	54,200	NA	NA	NA	NA	NA
Greece	28,463,053	28,463,053	NA	NA	NA	NA	NA
Israel	5,943,750	5,943,750	NA	NA	NA	3,081,468	9,926,877
Italy	3,991,972,009	3,948,090,884	NA	NA	NA	NA	NA
Lebanon	156,081,507	112,081,507	52,925,550	27,438,635	88,392,919	58,107,352	187,191,470
Libya	64,421,100	64,421,100	NA	NA	NA	33,398,369	107,592,062
Malta	5,934,879	289,676	8,267	4,286	13,806	150,179	483,799
Montenegro	8,032,398	8,032,398	NA	NA	NA	4,164,303	13,415,204
Morocco	6,869,340	6,869,340	NA	NA	NA	3,561,329	11,472,739
Palestine	2,270,000	75,000	NA	NA	NA	38,883	125,260
Slovenia	2,396,012	468,947	234,474	121,560	391,603	243,120	783,206
Spain	0	NA	NA	NA	NA	NA	NA
Syria	46,522,530	46,522,530	14,009,735	7,263,184	23,398,176	24,119,064	77,698,998
Tunisia	10,900,173	6,547,773	NA	NA	NA	3,394,617	10,935,679
Turkey	266,169,054	266,085,054	16,065,971	8,329,216	26,832,372	137,948,698	444,398,491
Total general	**6,558,772,087**	6,386,131,438	145,724,410	75,549,123.698	243,379,727	1,249,189,299	4,024,233,984

Results indicate that countries which have included actions to address most of its BOD5 loads (e.g. Bosnia, Lebanon), will effectively support significant costs (columns 3 and 4 of Table 10). However, assuming that all countries reached the 50% BOD reduction target, countries with major BOD loads would logically have major costs, like Egypt, Algeria or Lebanon.

The above figures should only be used as indicators, to be reviewed on the basis of additional research and country specific analysis to enable a major detail of available information.

VI REFERENCES

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