



GREEN economy

Scoping Study

Azerbaijan



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List of acronyms

ADB	Asian Development Bank	R&D	Research and development
AZN	Azerbaijani manat	ROA	Republic of Azerbaijan
BAU	Business-as-usual	RPS	Renewable Performance Standards
CDM	Clean Development Mechanism	SCP	Sustainable Consumption and Production
CIA	Central Intelligence Agency	SOCAR	State Oil Company of Azerbaijan Republic
EBRD	European Bank for Reconstruction and Development	SPPRSD	State Program on Poverty Reduction and Economic Development
EIA	Energy Information Administration	SPSED	State Program on Social-Economic Development of Regions
FAO	Food and Agriculture Organization of the United Nations	TCF	Trillion cubic feet
GEF	Global Environment Facility	TRACECA	Transport Corridor Europe Caucasus Asia
GER	Green Economy Report	UNFCCC	United Nations Framework Convention on Climate Change
GHGs	Greenhouse gas emissions	US EPA	United States Environmental Protection Agency
GSI	Global Subsidies Initiative	UNEP	United Nations Environment Programme
IEA	International Energy Agency	UNECE	United Nations Economic Commission for Europe
IISD	International Institute for Sustainable Development	WHO	World Health Organization
ITF	International Transport Forum		
NAMAs	Nationally Appropriate Mitigation Actions		
NEAP	National Environmental Action Plan		
NRDC	Natural Resources Defense Council.		
PRC	People's Republic of China		

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Executive summary

Azerbaijan has made significant strides in improving its economy over the past decade, as it embarked on a market-based economy and recovered from a significant downturn following the breakup of the Soviet Union. As a result, the government is now looking to implement a policy that will bring about the country's transition to a low-carbon, resource efficient and socially inclusive economy. This study presents an assessment of Azerbaijan's economy, looking at ways that will foster its transition to a green economy.

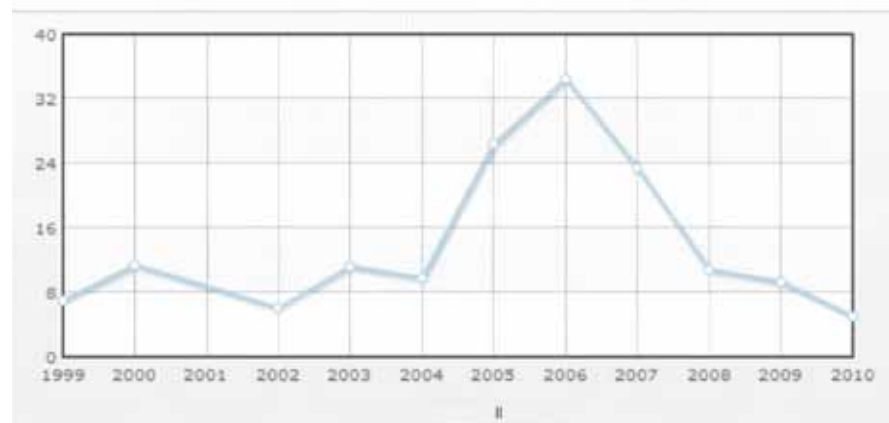
Many of Azerbaijan's current challenges are rooted in the break-up of the former Soviet Union which caused a significant downturn in the early 1990s. With a growing population of 8.78 million, the country faces challenges in terms of its poverty rate, currently at 9.1 per cent. However, it has made great gains in this regard with a strong downward trajectory since 2001 when 49 per cent of the population were considered poor. The rate is expected to continue to fall due to the government's focused action and an improved economy.

This puts Azerbaijan on track to achieve its Millennium Development Goals (MDG) of bringing down poverty rates to 6.7 per cent of the population by 2015.

Unemployment is also an issue, and like poverty a significant improvement has been observed since early 2000. Its rate has been falling from a high of 10.7 per cent in 2003 to its current level of approximately 6 per cent. Nevertheless, regional disparities still exist.

Azerbaijan has one of the fastest growing economies in the world, largely due to its oil production. The country is well endowed with fossil fuel resources, and oil production has expanded dramatically in Azerbaijan's recent history. Between 1997 and 2008, oil production increased almost five-fold – 85 per cent of which was exported, giving the country a favourable current account balance and fiscal position. The expansion of oil production has produced remarkable growth rates in Azerbaijan, averaging 17 per cent between 1999 and 2009 (see Figures

Figure 1. GDP of Azerbaijan – real growth rate 1999-2010 (Source: United States Central Intelligence Agency. The World Factbook: Azerbaijan. CIA, 2011)



1 and 2). Oil revenues have made it possible for the government to embark upon a highly expansionary fiscal policy to combat poverty and support growth while remaining in fiscal surplus. In addition, oil revenues have kept the country's trade balance in significant surplus.

The country faces challenges related to its fossil fuels, which are considered a finite¹ resource and are expected to eventually reach its peak. This, coupled with a legacy of aging Soviet-era infrastructure and a history of environmental degradation associated with fossil fuel development, is a concern. For these reasons, Azerbaijan is seeking to diversify its economy, looking at other economic sectors beyond oil. The combination of these factors is providing the impetus for Azerbaijan to look at ways to diversify its economy through a transition to a green economy that would allow for long-term economic stability and the creation of new economic assets while addressing environmental and social concerns as part of the economic structure.

In the interest of exploring the opportunities that a green economy presents for Azerbaijan, this study examined three key economic sectors – energy, agriculture and transport – and their related challenges in order to offer suggestions on how to ensure such a transition. The analysis revealed a few key priority areas for intervention which are summarised below:

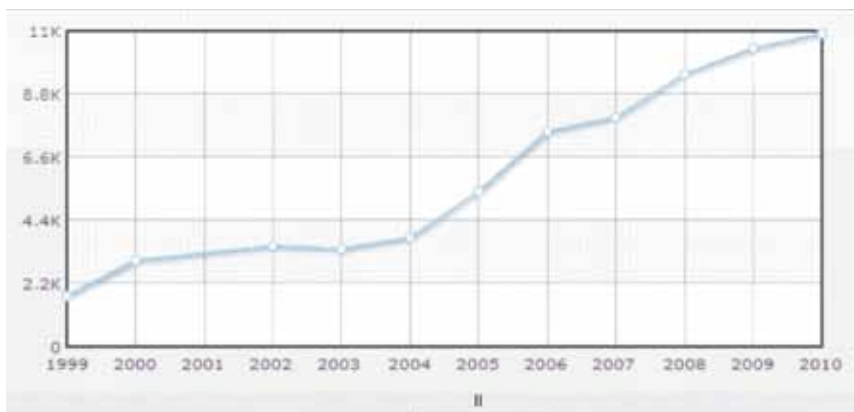
Energy:

- Increase efficiency and renewable energy capacity;
- Provide subsidy and incentive reform in energy production; and
- Facilitate transition away from fossil fuels.
-

Agriculture:

- Promote stronger supply chains;
- Enhance public-private partnerships with agri-business;
- Support education and capacity building; and
- Enforce regulation on agricultural inputs and outputs.

Figure 2. GDP per capita (PPP) 1999-2010 (Source: United States Central Intelligence Agency. The World Factbook: Azerbaijan. CIA, 2011)



Transport:

- Increase investment in public transit options;
- Enhance regulatory oversight; and
- Promote investment in clean vehicle technology.

In order to achieve these actions and enable the transition to a green economy, the Government of Azerbaijan will have to put in place enabling conditions for a more sustainable consumption and production, and encourage green actions and decision-making from both consumers and the private sector alike. Some of the enabling conditions Azerbaijan could consider implementing in the interest of encouraging sustainable development and a shift to a green economy policy framework include:

Public procurement plans across all sectors, all sectors, with the goal of fostering implementation of new technologies, and signalling that the government is leading by example.

For example: Mandating clean technology procurement for government owned vehicles (i.e. plug-in hybrid, very high fuel efficiency models).

Strong regulatory systems designed to mandate change, increase environmental controls and restore market confidence.

For example: Implementing a Renewable Performance Standard for major energy-producers that would require them to certify that a certain percentage of electricity production is derived from clean or renewable sources, and raising this percentage over time.

Subsidy and fiscal instrument reform, which includes eliminating perverse subsidies and reforming inefficient ones. Other fiscal instruments such as carbon taxes, cap-and-trade and loan guarantees should also be considered. Examination of potential investment partnerships with green private

sector-businesses can also support the transition to a low-carbon development.

For example: Subsidies for sustainable farming practices or investments in diffusion of sustainable farming technology and knowledge.

Global financing, using Azerbaijan's experience in accessing international funding sources to fund projects that promote a green economy or some of its aspects. Developing a list of Nationally Appropriate Mitigation Actions (NAMAs) may also be worth considering.

A clear, stable and predictable approach to putting in place enabling conditions or undertaking market interventions by the government is essential to sustain market confidence and minimize unintended side-effects. As a country transitions to a green economy, it is also important to consider potential negative short-term impacts on traditional 'brown' sectors, e.g., decline in production and additional costs related to the internalisation of externalities, as well as possible ways to offset such impacts through the development of and investment in green sectors and long-term economic planning.

Finally, it is important to highlight the potential role of Azerbaijan's oil revenues as a funding source for the transition to a green economy, either directly, or through different market mechanisms, such as the development of cap-and-trade. In this regard, Azerbaijan may have a critical advantage over most other countries. Having such an abundant funding base could offer the country a key opportunity to scale-up investment in new, dynamic, employment-intensive and resource-efficient sectors and activities. These domestic funds can also be used to leverage international funding, private capital and donor financing. Using these fossil fuel revenues to fund a transition to a more sustainable and environment-friendly long-term economic framework is a unique opportunity that must be seized.

Figure 3. Export and import levels (in US\$ millions) (Source: The World Bank. Azerbaijan at a Glance. 2011.)¹⁶

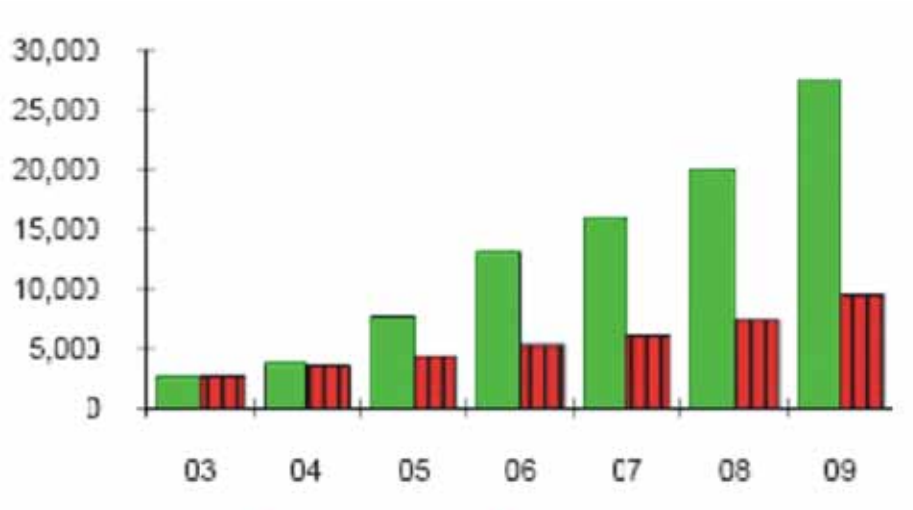
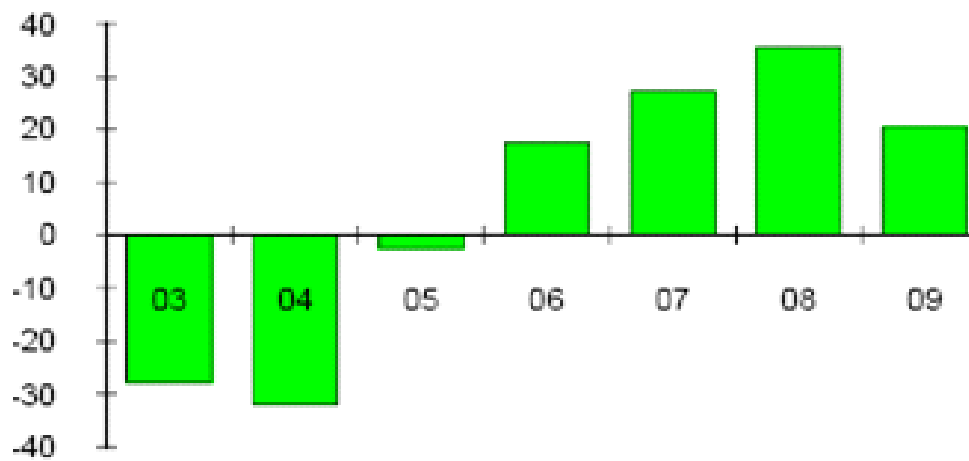


Figure 4. Current account balance to GDP, 2004-2009¹⁶



1 Introduction

The first step in scoping a green economy plan for Azerbaijan is to analyse the concept. The given definition of the green economy from UNEP is based on the idea of decoupling resource use and environmental impacts from economic growth. Policy reforms and investments are made in sectors that promote both economic growth and environmental sustainability. The result of these investments is a transition from traditional brown economic sectors to more environmentally sustainable, resource efficient green practices that offer long-term economic growth, reducing emissions, improving social conditions, creating jobs and reducing waste. Developing new green sectors that are based on these economic principles is also a major focus in addition to transforming existing ones.

There is no generic model for a green economy; each country has unique opportunities, strengths and challenges. Investment in the green economy can occur at the sectoral level where opportunities, or needs, call for green transition. The transition to a green economy requires partnership from both the public and private sectors. The public sector puts enabling conditions and policies in place, and then the green economy emerges from actions of the private sector and consumers to act in a sustainable manner.

The specific case of Azerbaijan is no less unique. The country has seen a great deal of economic development while transitioning to a market-based economy, in large part because of the development of oil and gas reserves. Since the breakup of the Soviet Union, industry, in particular energy, has increased significantly

making up 50 per cent of GDP, while oil production has quadrupled from 1999 to 2009, when it surpassed 1 million bpd.² Despite its economic development, the government realizes that there is a need to plan for a future that will be less reliant on fossil fuel production and ensure that financial flows are directed to other economic sectors. Undertaking a green economy transition now allows the country to take advantage of current growing oil revenues and invest in the development of non-oil sectors, thus facilitating its transition to more efficient economic processes and sustainable consumption and production.

The objective of this study is to provide a scoping exercise for the Republic of Azerbaijan (ROA) on how it can transition its key sectors of energy, agriculture and transportation onto a green economy pathway. These sectors are chosen because of their central importance to the Azerbaijan's economy, their contribution to greenhouse gas emissions and the importance of their long-term viability for the protection of social and environmental needs of the country. The scoping study can be used as a tool by the ROA in formulating policy development in these sectors and in enabling the continued transition of the country's economy.

The basis of this report consists of a study conducted by the National Academy of Sciences and several research contributions by UNEP and other independent research institutions. The International Institute for Sustainable Development (IISD) provided research assistance, relying on UNEP publications, including the Green Economy Report.

*UNEP defines a **green economy** as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.*



2 Macroeconomic profile and overarching challenges to the economy

Azerbaijan has one of the fastest growing economies in the world. Net exports (see Figure 3), fuelled by substantial new oil and gas production, are the major drivers of growth,³ and this growth would not have been possible without the substantial investment that has occurred in the oil and gas sectors in the past two decades. Growth rates, while negative in the turbulent 1990s, averaged 17 per cent between 1999 and 2009. But as a result of the global financial crisis, the country's growth rates have slowed down - from 5 per cent in 2010⁴ to below 1 per cent in 2011.⁵

The production and refining of oil and gas form the bedrock of Azerbaijan's economy.⁶ Extractive industries constituted 80 per cent of Azerbaijan's industrial output in 2008, and earnings from the sale of hydrocarbons made up 90 to 95 per cent of export revenue.⁷ This is helping to create a two-track economy, where a fast-growing international hydrocarbon sector accounts for most of the country's investments and export income, contrasted with a non-oil-related inefficient internal economy sector that cannot compete with imports or generate exports.⁸

Table 1. GDP sectoral breakdown⁹

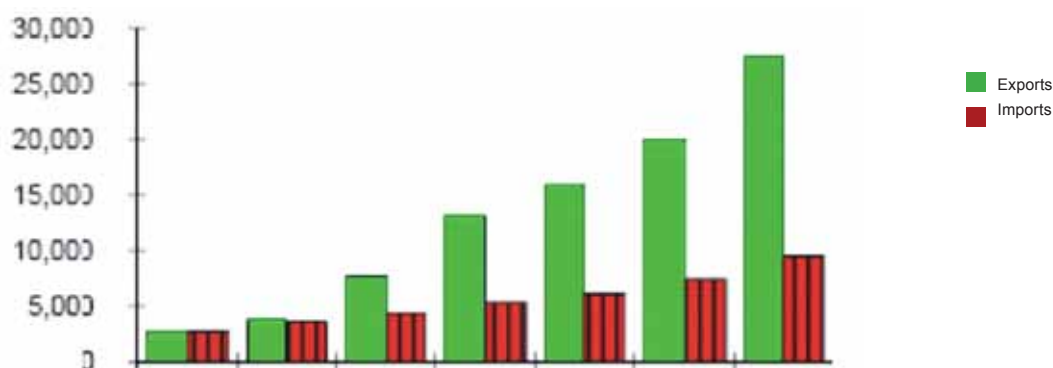
Sectors	%
Industry	50.0
Social and informal services	11.7
Transport and communications	8.6
Trade	8.0
Other	7.6
Construction	7.4
Agriculture	6.7

Table 1 provides a sectoral breakdown of Azerbaijan's economy. It shows that industry, at 50 per cent, makes up a major component of GDP, while agriculture, which is less developed and despite its importance in employment, makes up a relatively small share of GDP at 6.7 per cent.

According to official statistical data provided by the National Academy of Sciences, the agriculture, transport, services and non-oil-related construction sectors are all projected to make up an increasing share of GDP in the near future, with agriculture and construction both rising in the short-term to 13 per cent of GDP, and services to 21.5 per cent. Much of the growth in the service sector comes from tourism. Additionally, strong growth is anticipated in communication and information technology sectors in the short-term. Growth in these sectors is expected to significantly decrease the share of industry in GDP in the future, despite growth in the mining and manufacturing components. It is important to note that the bulk of the growth in these sectors will come from private sector components, even though growing government spending and investment will support growth.¹⁰

Fiscal policy has been highly expansionary in Azerbaijan due to government efforts to support growth and combat poverty.¹¹ Oil revenues have made this possible without the country having to assume a large debt burden. In fact, these revenues, which increased eight-fold between 2001 and 2008, have given Azerbaijan's government budget a significant surplus, allowing the country to enjoy a comfortable net creditor position.¹² Azerbaijan's external debt is low, at 4 per cent of GDP, and only about one-fifth of it is short-term debt.¹³

Figure 3. Export and import levels (in US\$ millions) (Source: The World Bank. Azerbaijan at a Glance. 2011.)

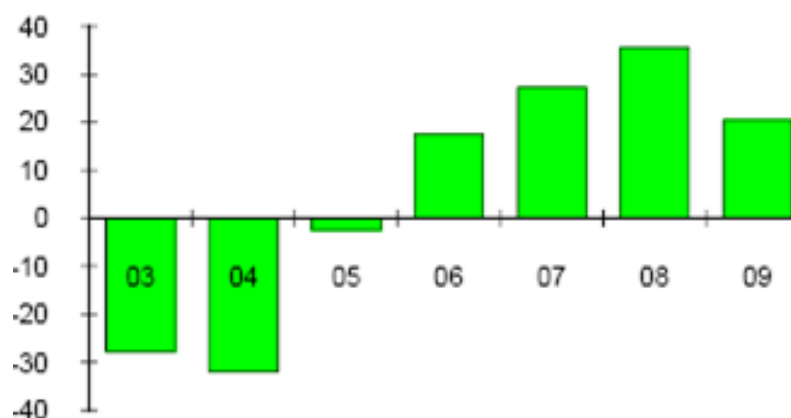


The country's trade balance has been largely in surplus since 2005, which is almost entirely due to oil revenues (see Figure 3). Exports greatly exceed imports by a factor of approximately 3.5.¹⁴ In 2009, these contracted sharply due to the global financial crisis and subsequent recession, but are already showing signs of strong recovery. In 2009, the current account surplus fell to around 24 per cent of GDP before recovering to nearly 31 per cent of GDP in 2010 (see Figure 4).¹⁵ While this strong current account position is an asset to Azerbaijan's economy, the country's high dependence on fossil fuel exports makes it vulnerable to possible market fluctuations.

Azerbaijan has relatively low resource-efficiency. Current modes of capture, distribution and use of natural resources are highly wasteful (e.g., the practice of flaring natural gas) and have led to significant environmental degradation, as outlined in Figure 7. The country needs to address these issues of production efficiency in order to proceed with meaningful green economy reform, and to move toward modes of sustainable consumption and production (SCP) to ensure natural resources efficiency.

SCP entails comprehensive changes in production and consumption patterns that require changes to how products and services are designed, produced, used and disposed of, as well as to the type and nature of products that are produced and consumed. SCP considers the entire lifecycle of a product, rather than merely its production stage. And while the low resource-efficiency in Azerbaijan highlights the need for SCP, addressing resource use in isolation will not be sufficient in the move to a green economy, since it does not include the all-important systems view necessary to overcome environmental challenges. Fortunately, the country is in an economic position to carry out the needed investment. It is projected that the country's sound fiscal position will remain in the foreseeable, and therefore, the country is in an advantageous position because it can use its revenues from fossil fuel resources to shift to a green economy. Furthermore, additional economic benefits are expected as a result of more efficient production, such as the capture and use of flared natural gas¹⁷ for energy and the capture of vented carbon dioxide for use in enhanced oil recovery.

Figure 4. Current account balance to GDP, 2004-2009¹⁶



2.1 Environmental footprint

In terms of resource endowments, Azerbaijan holds substantial offshore hydrocarbon resources (found under the Caspian Sea) that are estimated to constitute 0.6 per cent of world oil reserves and 0.7 per cent of global natural gas reserves.¹⁸ While these resources are an important contributor to economic growth, they generate just a little over 1 per cent of total employment.¹⁹ Azerbaijan is also well-endowed with alternative energy resources, but these remain underdeveloped.²⁰ Like many other resource-exporting former Soviet Union countries, Azerbaijan uses its energy resources by flaring off natural gas, using heavy oil for electricity generation, and general inefficiency of energy-using equipment among the principal factors.²¹

Industrial emissions in Azerbaijan are mostly concentrated in Baku and Sumgayit, and associated with the oil industry. But the most important environmental problems the country faces involve pollution caused in the past. The long history of oil exploitation in the country has left Azerbaijan with a massive legacy of oil and other chemical pollution, both land-based and offshore.²² The Absheron Peninsula (which includes Baku and Sumqayit) and the Caspian Sea are considered to be one of the ecologically most devastated areas in the world because of severe air, soil and water pollution.²³ Air pollution

has to some extent dropped since 1991, but this has been caused by industrial contraction rather than conscious mitigation. The same industrial contraction has reduced the ability of industry to take on some of the burden of past pollution. This, coupled with serious curtailment of investment in public infrastructure, including its environmental components (water, wastewater treatment, and waste management)²⁴ has left a legacy of many environmental problems. However, there is growing recognition of the issue at the state level, and investment in environmental protection has significantly increased in recent years.

2.2 Social and economic profile

Azerbaijan has a population of 9.49 million people, the largest among the countries of the South Caucasus, with significant changes in demographic factors observed in the last ten years. The fertility rate is rising and since 2002 the birth rate has increased by 28 per cent.²⁵ While there is a negative migration rate, the population is growing gradually every year.²⁶ The agricultural sector is one of the biggest employers in Azerbaijan, with over one-third of the labour force working in the sector, despite its relatively low share of GDP. There are significant regional disparities in unemployment rates, and recently many people have migrated

to the Absheron Peninsula in search for jobs and opportunities.²⁷ Unemployment in Azerbaijan has been falling steadily since 2003, from 10.7 per cent, to its current level of approximately 6 per cent.²⁸

Despite impressive economic growth in the past 15 years, poverty has become a significant problem in Azerbaijan. As the Asian Development Bank (ADB) indicates, it says a lot about the difficulties of the transition process that despite its oil wealth, Azerbaijan is plagued by poverty, much of it new poverty.²⁹ However, progress has been made in recent years. The poverty rate has declined dramatically from 50 per cent in 2001³⁰ to approximately 9.1 per cent in 2010,³¹ which means Azerbaijan is on track to meet its Millennium Development Goal of 6.7 per cent poverty by 2015. Similarly, significant regional disparities still exist in unemployment, with rural poverty being particularly pronounced. Azerbaijan is a fairly unequal society in terms of income distribution, with a Gini index of 36.5 per cent.³²

A move to green economy could significantly contribute to poverty reduction. The link between ecological scarcity and poverty is well-established.³³ At the very least, a green economy approach could prevent the further erosion of natural capital stocks as a way of combating poverty. However, the links between green economy and poverty are more beneficial³⁴ than it appears as a number of sectors with green economic potential are particularly important for the poor, such as agriculture, forestry, fishery and water management. In Azerbaijan, in particular, the importance of agriculture is clearly understood, as well as the ways in which the energy sector can negatively impact natural resources. Considering that these two sectors are closely linked, a green economic outlook would recognize the importance of an energy sector protecting soil and water quality

within the energy sector to be beneficial to the agricultural sector. Investing in greening these sectors, including through scaling up microfinance, is likely to benefit the poor in terms of not only jobs but also in their livelihoods that are predominantly based on ecosystem services (i.e. agriculture).³⁵ However, the report also stresses that a shift to green economy does not in itself assure desirable outcomes in poverty reduction,³⁶ and recommends that green economy initiatives be crafted so as to be “pro-poor” themselves, or to complement existing initiatives seeking to address poverty.³⁷

2.3 Policy landscape

Azerbaijan’s National Environmental Action Plan (NEAP) of 1997 identifies issues requiring urgent action, including:

- pollution caused by industries;
- decrease of the sturgeon stock triggered by pollution, over-fishing and a loss of reproductive capacity;
- deteriorating water quality, especially of drinking water, both in rural and in urban areas;
- loss of fertile agricultural land from erosion, salinization, pollution with heavy metals and chemicals, and deteriorating irrigation systems;
- threats to protected areas leading to losses in biodiversity;
- loss of forest cover, mainly in areas affected by the ongoing conflict between Armenia and Azerbaijan;
- damage to the Caspian coastal zone caused by flooding from a rise in sea level and pollution; and
- deterioration of cultural heritage, due to natural causes, aggravated by modern environmental problems such as acid rain and uncontrolled development.³⁸

Table 2. List of state programmes, strategies and action plans

No.	State programme/strategy/action plan	Implementation period (years)	Main implementation agency?	Date/No. of approved document
Economic and regional development				
1	State Program on Socio-Economic Development of the Regions of the Republic of Azerbaijan, 2009-2013	2009-2013	Ministry of Economic Development	Presidential Decree No. 80 14 April 2009
2	State Programme of the Azerbaijan Republic on Poverty Reduction and Sustainable Development, 2008-2015	2008-2015	Ministry of Economic Development	Presidential Decree No. 3043 16 September 2008
Energy supply				
3	State Programme on Alternative and Renewable Energy Resources in Azerbaijan Republic	2004–2013	Ministry of Industry and Energy	Presidential Decree No. 462 21 October 2004
4	Governmental Programme on the Development of the Fuel-Energy Complex in Azerbaijan Republic	2005–2015	Ministry of Industry and Energy	Presidential Decree No. 635 of 14 February
Transport				
5	Amendment to the Action Plan for 2008-2013 on Improving the Transport System in Baku	2008-2013	Ministry of Transport	Presidential Decree No. 2930 8 July 2008
Employment				
6	Employment Strategy of Azerbaijan Republic	2006-2015	Ministry of Labour and Social Protection of Population	Presidential Decree No. 1068 16 October 2005
7	State Programme on Implementing Employment Strategies in Azerbaijan Republic	2007-2010	Ministry of Labour and Social Protection of Population	Presidential Decree No. 2167 15 May 2007
Environmental protection				
8	National Programme on Environmentally Sound Social-Economic Development in the Republic of Azerbaijan	2003–2010	Ministry of Ecology and Natural Resources	Presidential Decree No. 1152 18 February 2003
9	Additional Measures Associated with Implementation of International Conventions in the Field of Environmental Protection and Biodiversity Conservation	2006-2010	Ministry of Ecology and Natural Resources	Presidential Decree No. 1396 30 March 2006
10	Complex Action Plan for the Improvement of the Ecological Situation in the Republic of Azerbaijan	2006-2010	Ministry of Ecology and Natural Resources	Presidential Decree No. 1697 28 September 2006
11	State Programme on the Development and Rational Use of the Natural Gas Fields in the Absheron Peninsula	2003-2006	Ministry of Ecology and Natural Resources	Presidential Decree No. 1242 13 June 2003
12	State Programme on the Rational Use of Summer-Winter Pastures and the Fight against Combating Deforestation	2004-2010	Ministry of Ecology and Natural Resources	Presidential Decree No. 222 22 May 2004
13	National Programme on Restoration and Expansion of Forests in Azerbaijan Republic		Ministry of Ecology and Natural Resources	Presidential Decree No. 1152 18 February 2003
14	National Strategy and Action Plan for Biodiversity Conservation and Sustainable Development in Azerbaijan Republic	2006-2009	Ministry of Ecology and Natural Resources	Presidential Decree No. 1368 24 March 2006
15	Additional Measures Aimed at Fulfilling the Obligations Specified in International Conventions and Agreements to which Azerbaijan is Party		Ministry of Ecology and Natural Resources	Presidential Decree No. 1396 30 March 2006



The 1999 Law on Environmental Protection establishes that environmental protection is based on principles such as:

- Solutions to social, economic, moral and aesthetic problems;
- Effective use and rehabilitation of ecosystems;
- Ensuring protection of biodiversity;
- Legal responsibility (polluter-pays) for damages;
- Prevention of damages;
- Public participation in environmental protection; and
- International co-operation.³⁹

Strategic documents, such as the State Programme on Poverty Reduction and Economic Development (SPPRSD)⁴⁰ and the State Programme on Social-Economic Development of Regions (SPSED),⁴¹ outline environmental priorities and set out policy goals.

The Ministry of Ecology and Natural Resources, established in 2001, is the key state actor in the country's development.⁴² Some primary characteristics of state programmes and policies, such as the SPSED, include the development of the non-oil sector, infrastructure growth, economic development and investment in poverty reduction and employment.⁴³

While most relevant planning documents do not mention green economy, many of their provisions are compatible with green economy principles, and efforts are underway to make the green economy more central to environmental policy planning.

Potential environmental policy interventions have been identified by Bloomington Energy and Environmental Intelligence. In a report to the Ministry of Ecology and Natural Resources, they proposed the following: reforming of environmental, legal and regulatory institutions; strengthening environmental monitoring and its uses; raising public awareness and public participation; engaging in recruiting and training; and addressing the cleanup of oil pollution.⁴⁴ The ADB also proposed a number of specific policy interventions, and asserts that a second NEAP is probably required to address the shortcomings of the first, noting that this task is made more difficult by the paucity of fresh data in some instances.⁴⁵

Table 2 shows a list of state programmes, strategies and actions plans that are determined to have an influence on a green economy transition. Many set out policies and targets for future development of specific sectors, outlining the context under which future transition will occur.

3 Key sectors identified for greening the economy

The sectors of energy production, agriculture and transport have significant potential for greening the economy. In addition, the transition of each sector will have important impacts on the economy as a whole. Each of these three key sectors is discussed in more detail below.

3.1 Energy

The sectors of energy production, agriculture and transport have significant potential for greening the economy. In addition, the transition of each sector will have important impacts on the economy as a whole. Each of these three key sectors is discussed in more detail below.

With its considerable hydrocarbon resources, Azerbaijan has been able to supply its domestic needs while contributing to global energy needs through export. As mentioned in the introduction, oil and gas production are a major component of the Azerbaijani economy. As of January 2010, oil reserves were projected at 7 billion barrels.⁴⁶ Operations are run by the

State Oil Company of Azerbaijan Republic (SOCAR), which is responsible for refining, pipelines, and imports/exports, and the Azerbaijan International Operating Company (AIOC), which is a consortium of 10 companies that have signed extraction contracts with the Republic of Azerbaijan. Exports of oil reached approximately 876 000 bpd in 2009 primarily via pipeline and shipping routes to markets in Europe and elsewhere.

Azerbaijan has proven reserves of roughly 30 trillion cubic feet (Tcf) of natural gas (see Figure 5 in billion cubic feet) as of January 2010.⁴⁷ Natural gas processing, transport, distribution and storage are managed by Azerigaz (a subsidiary of SOCAR) in the domestic market, and Azneft (another subsidiary) is responsible for exploration, development and production. Only recently, since 2007, has the country become an exporter of natural gas, mainly via the South Caucasus Pipeline.

While oil production has increased significantly, consumption has remained relatively constant

Figure 5. Azerbaijan's natural gas production and consumption, 2001-2009⁵²
(Source: U.S. Energy Information Administration)

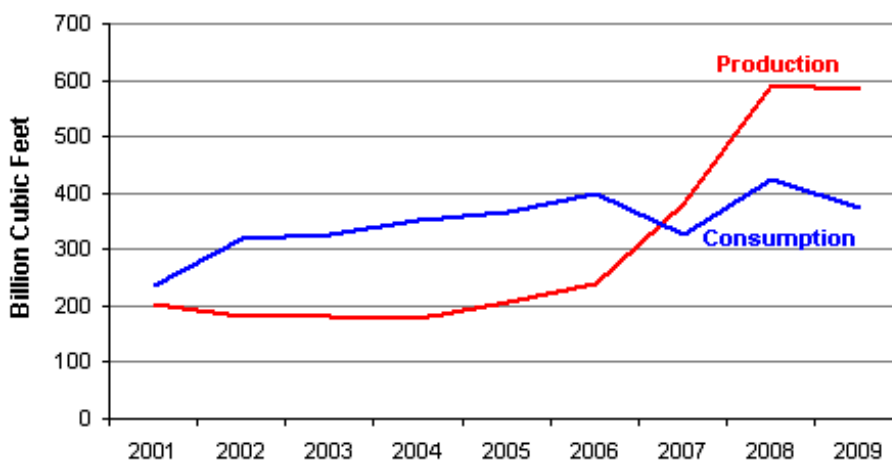
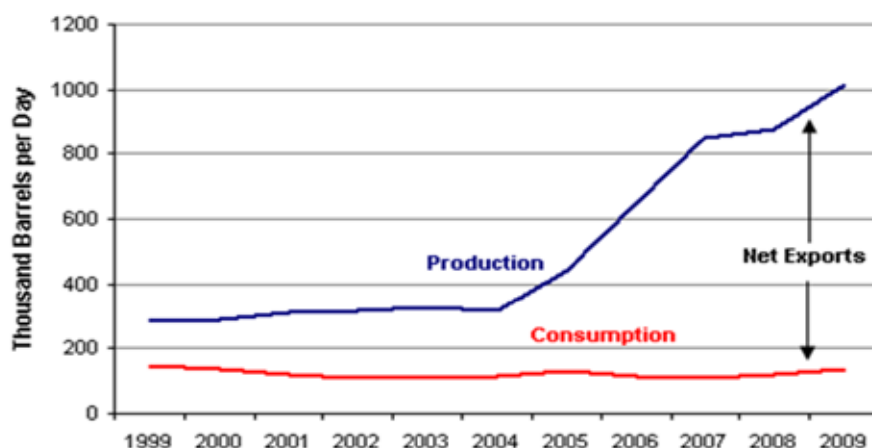


Figure 6. Azerbaijan's oil production and consumption, 1999-2009⁵²



(see Figure 6). This has allowed the vast majority of new production to be used for export, generating a significant revenue stream for the country. Oil and gas resources make up roughly 90 per cent of exports. Largely thanks to its oil and gas exports, Azerbaijan had a positive current account balance of nearly US\$ 2 416 billion in 2011.⁴⁸

Given its large reserves, the country's energy needs are met entirely with the country's gas and oil resources. Moreover, the country also produces hydroelectricity power that accounts for 1.7 per cent of the economy's energy supply.^{49 50} Electricity production totalled 18.96 billion kWh in 2007⁵¹ with nearly all of this being consumed domestically. All generating stations are state-owned, with transmission and distribution managed by state company Azerenergy. The energy supply in Baku is managed by "Bakielectrikshebeke", an open joint stock company. Azerbaijan produces enough electricity to meet domestic needs, but due to transmission and distribution limitations, it has to rely on imports to meet the needs of certain regions.

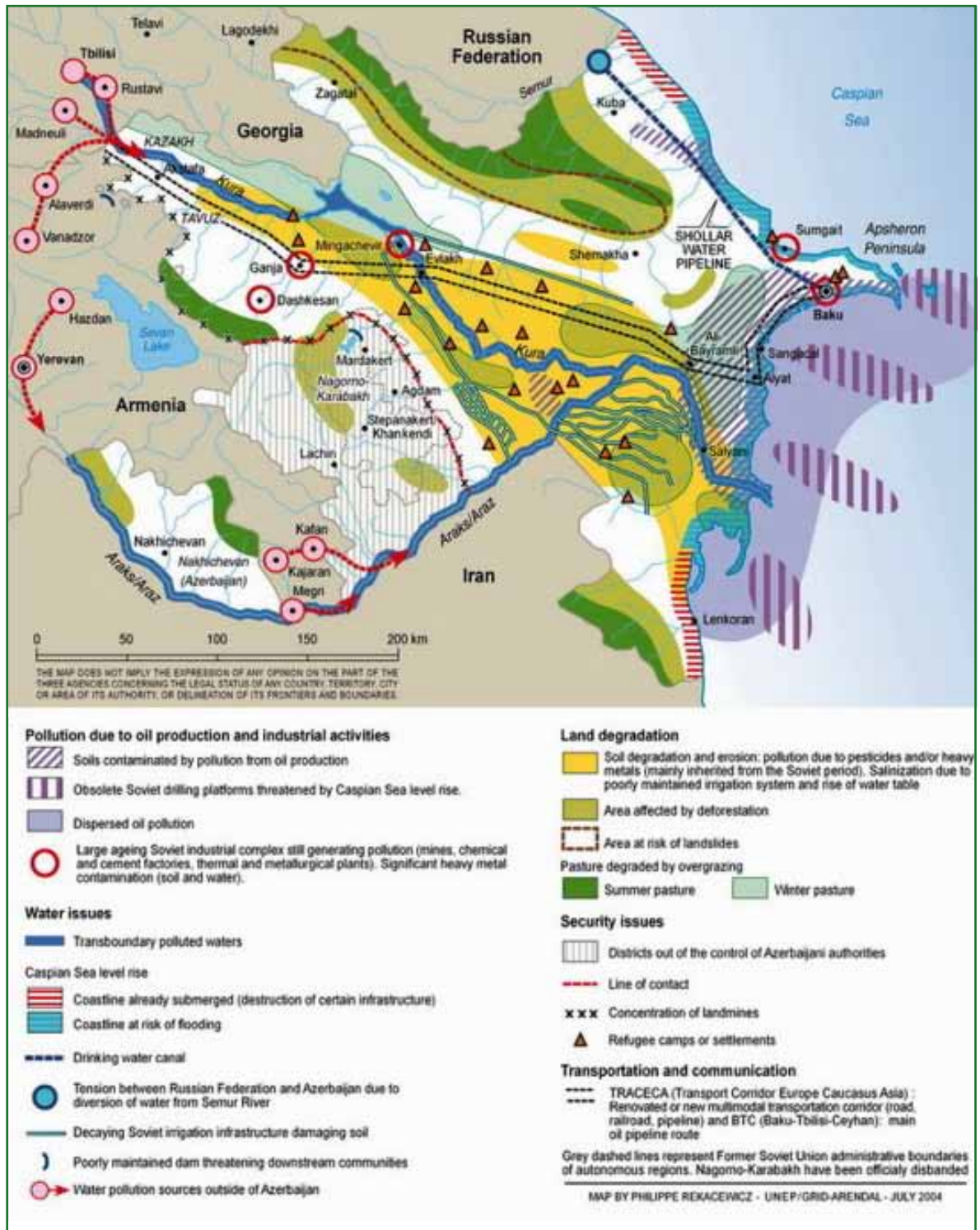
Azerbaijan's history of energy development has left it with a number of challenges, both in terms of infrastructure and environmental. An aging, obsolete infrastructure from the Soviet era has led to rolling blackouts in some areas of the country,⁵³ despite the fact that the country

is producing a surplus of energy to meet its domestic needs. The lack of an effective transmission network is also a major hurdle to energy security and reliability. Finally, the country's abundance of energy resources has also led to relatively high energy intensity, the highest in the Caucasus,⁵⁴ which also means that energy efficiency was formerly considered to be a low priority.

On the environmental side, UNEP research has shown a significant level of pollution caused by fossil fuel development, including significant areas of coastline contaminated by oil, soil and water resource degradation from manufacturing, mining and energy generation. Compounding this problem is the risk of sea level rise, which threatens Soviet-era oil production platforms in the Caspian Sea. Human health impacts from pollution are also a major concern in the country's intensive energy development⁵⁵ and emissions are intensified by inefficient use of energy resources, including the flaring of natural gas (see Figures 7 and 8).⁵⁶

These issues present opportune areas for green economy investment and, to a certain extent, the country is already making some strides. High energy intensity suggests that there is opportunity for efficiency improvements. Azerenergy has noted a small decline in energy consumption in the country in the past year due to efforts it has made to improve efficiency.

Figure 7. Environmental and pollution issues in Azerbaijan⁵⁷



Improvements in natural gas supply and the introduction of electricity meters across the country are prime examples of measures that have improved efficiency, while also addressing access and security. Less energy waste decreases the frequency of blackouts, and has the economic spinoff of potentially freeing up electricity for export.

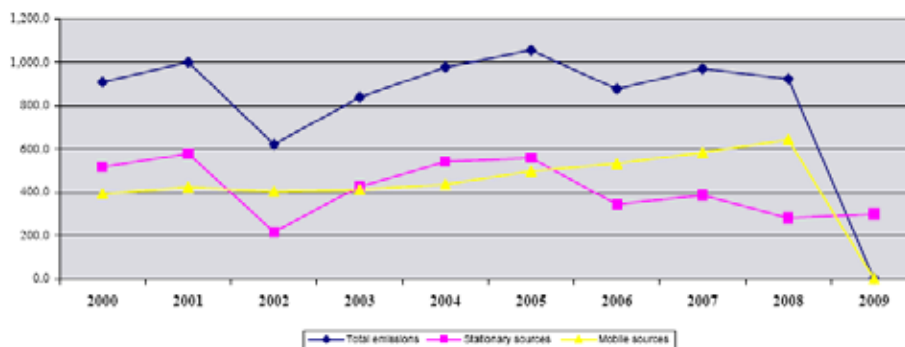
The government has also indicated an interest in energy management through modernizing and improving the production and transmission of energy in the country. An ADB project, the Power Distribution Development Investment programme,⁵⁸ aims to assist the country with its fuel and energy sector development by providing assistance to Azerenergy in improving the reliability of power supply, reducing energy losses, enhancing efficiency and improving financial performance. This project is an effective example of green economic action already underway, as it aims to provide economic benefits while modernizing and greening the electricity sector.

Another issue that should be examined is the extent of subsidies for energy production, in particular fossil fuel production, and how these affect a shift to a green economy. Fossil fuel subsidies artificially lower the price of these fuel

sources, stacking the deck against renewable energy production and lowering demand for sustainable solutions. Subsidies also work against efficiency measures as they keep energy prices low, a situation that can lead to inefficiency and waste. In Azerbaijan, there are subsidies in place for gasoline and diesel that reduce the price of fuels below what the international market would dictate.⁵⁹

Prior to the year 2000, the country had the highest domestic oil subsidies in the world at 16.6 per cent of GDP.⁶⁰ Following a peak of 22 per cent of GDP in 2000, subsidies have gradually declined. The country has shown some progress in addressing this issue,⁶¹ partially at the behest of the International Monetary Fund (IMF).⁶² While subsidies as a share of GDP have fallen significantly,⁶³ the average subsidization rate remains 21.7 per cent of the cost, with natural gas being the highest recipient⁶⁴ at approximately 60 per cent of the reference price.⁶⁵ In addition to its efforts to reduce direct subsidies,⁶⁶ the government has recently also indicated its desire to address indirect subsidies as well. Raising domestic prices through elimination of subsidies can create difficult socio-economic conditions for citizens, so subsidies have to be carefully reallocated to poverty reduction measures or

Figure 8. Air emissions trends – 1000 t/y, 2000-2009 (Source: State Statistical Committee, Statistical Yearbook 2008, Environment in Azerbaijan 2009)



to increased renewable energy sources to offset rising energy prices.

If properly reformed, a subsidy system can retain the social benefits of the current system, while avoiding the promotion of inefficient fossil fuel usage and environmental degradation that fossil fuel subsidy systems can entail. Promoting clean energy development offsets fossil fuel usage, and having market prices prevail in fossil fuels increases natural efficiency measures so that funds that have been previously directed at subsidies for fossil fuel production can be redirected for social benefit (e.g., lower taxes, direct social programmes, income assistance).

The prevalence of state-owned companies in the energy sector has positive and negative effects with respect to investment in a green economy. On the one hand, state-owned industries, beholden to state oversight, can at times have difficulty making quick transitions. On the other hand, state oversight could be a useful tool in developing a vision for green investment and produce a system where the sector and the government can work together on the country's transition to a green economy. Policy enabling conditions for green investment are discussed in detail in Section 4.

With respect to the specific application of green economic transition in the area of energy, there are some easily identifiable opportunities in Azerbaijan that address pressing needs, including:

- **Increased energy capacity.** As the economy grows, so too will the need for energy capacity, which can be met through a combination of efficiency improvements and increased clean energy capacity. Increasing efficiency through initiatives, such as improving efficiency of production, demand side management programmes for industry and consumers and capacity expansion, and through increased investment in renewables and cleaner energy sources will probably

both be necessary. At present, investment in these areas⁶⁷ have been insignificant. A shift to renewable energy sources can also bring significant new employment opportunities, as much as a 15 per cent increase in energy-sector employment globally, compared to BAU.⁶⁸

- **Financing infrastructure improvements.** The energy production and transmission system in Azerbaijan is in serious need of upgrade. With increasing revenues from fossil fuel generation, the country can fund development in renewables either directly, or through actions, such as subsidies or public-private partnerships. Initiatives, such as feed-in-tariffs, subsidies, tax credits, grants and conditional funding structures,⁶⁹ can bolster energy production and supply as well as provide incentive to local/rural power generation, lessening reliance on long transmission networks and antiquated infrastructure. Implementing local renewable power generation can also reduce disruptions and provide a more stable and reliable supply of energy to consumers,⁷⁰ and reduce energy poverty in rural areas of Azerbaijan. Improvements to transmission networks can reduce energy losses and boost reliability and security. Investment in new, more efficient infrastructure also carries economic benefits such as job creation, which can contribute to the significant reduction of emissions, thereby improving air quality.
- **Fossil fuel transition.** One of the most effective ways to ensure a transition from fossil fuels to lower carbon options is to rebalance the foundation in favour of renewables by phasing out any subsidies that may exist in the fossil fuel sector, and redirecting efforts into the development of renewables. Investments in technology, both in terms of implementation and research and development (R&D), can also kick-start a green transition. It is a fact that Azerbaijan

will continue to rely on fossil fuel production and consumption for the immediate future, but an attempt to diversify energy sources can help reduce the fossil fuel-to-clean energy supply ratio, and start the transition to greener energy sources that the country will eventually have to undertake.

- Energy (including electricity) is a key sector that must be addressed in the global response to climate change. The Climate Group has estimated that energy-related carbon emissions will need to be reduced by 48 Gt CO₂ by 2050.⁷¹ Addressing this need in a pro-active green economy shift can help to create the necessary mitigation, while investing at the same time in economic and social improvement.

3.2 Agriculture

While energy production has been the quickest growing sector of the Azerbaijan economy in the last decade, agriculture is also a major economic contributor and continues to be a prominent driver of the labour market in the country. Over 38 per cent of the population employed in the sector^{72, 73} and 48 per cent of the population live in rural areas.⁷⁴ The growth and importance of the sector must be

considered in the context of its near collapse⁷⁵ following the breakup of the Soviet Union. Since then, agriculture has made great strides to recover. Production includes grains and crops such as cotton, grapes and vegetables (see Table 3).

The agriculture sector has seen significant growth in cultivated areas in the past decade as well as an increase in livestock production (recovering steadily since its collapse in 1994).⁷⁶ In addition to increased areas under cultivation, productivity has also increased. These increases have allowed the country to meet its domestic needs and to become an export market.⁷⁷

Several government programmes have been developed in recent years to stimulate the growth of the agricultural sector. The SPPRS⁷⁹ 2008-2015 includes reference to potential measures such as exemption from taxes for agricultural producers, improved access to finance/credit, capacity building for agricultural experts, support for the development of the agro-service sector and improved insurance mechanisms.⁸⁰

The SPSED⁸¹ 2009-2013 also addresses agriculture, providing reference to a series of actions undertaken, with key goals for development of the agriculture sector, including:

Table 3. Development dynamics of agricultural indicators⁷⁸

	Unit of measurement	Year		
		2000	2005	2009
Cultivated area under agricultural crops	thousand hectares	1 041.5	1 327.9	1 705.4
Cultivated area under cereals	thousand hectares	648.2	802.3	1 125.5
Livestock: cattle	thousand heads	2 021.6	2 380.0	2 610.8
Livestock: sheep and goats	thousand heads	6 085.7	7 698.7	8 409.9
Livestock: poultry	million heads	14.7	19.0	22.0
Wheat production	thousand tonnes	1 540.1	2 126.7	2 988.3
Per capita wheat production	kg/person	189.8	248.6	333.2

- improve the legal and regulatory framework, the scientific and methodical basis and the HR preparation system in the agrarian sector;
- connectedly develop the areas of raw material production and processing of raw materials, as well as stimulate competitiveness in the agricultural sector;
- increase the financial support to the agrarian sector;
- strengthen the material and technical basis of the agrarian sector;
- support new structures that will serve the agrarian sector to operate on market principles;
- improve irrigation and amelioration works in agriculture; and
- ensure the efficient use of land and water resources.⁸²

Great amounts of state funding have been invested in the agricultural sector, including offsets of significant amounts of farming costs with public funds.⁸³

Increased use of non-organic fertilizers and pesticides is a means to increase crop productivity but must be considered carefully if the desire is to promote a green economy. Use of such products must be properly regulated and monitored to ensure that any potentially damaging environmental side effects are avoided, such as contamination of drinking water. Toxic pesticides, in particular, can have devastating impacts both on the ecosystem and human health, and consequently present a major risk.⁸⁴ As in other sectors, the benefits of increased economic output in a given green sector must be carefully weighed against the environmental and social costs of a specific strategy or action. Alternatives to such substances can also be found, and should be encouraged in a green economy framework.

Another environmental concern with the growth of the agricultural sector is the growing amounts of land under cultivation and livestock

production that result in increased GHGs, particularly methane, which has a global warming potential 56 times that of CO₂.⁸⁵

The significance of the agricultural sector in the transition to a green economy is also related to its social importance, given the need for strong domestic food security. The importance of this aspect is noted in the SPPRS,⁸⁶ as better domestic production lessens the exposure of Azerbaijan to risks from food price spikes and import restrictions. The chapter on agriculture in the Green Economy Report addresses the issue of poverty directly, highlighting that for every 10 per cent increase in farm yields, there has been a 7 per cent reduction in poverty in Africa; and more than 5 per cent in Asia.⁸⁷ Azerbaijan ranks relatively low in prevalence of undernourishment, but it has also seen its percentage of food consumption expenditure rise as its economy has grown in the past decade, a development that will have to be carefully watched so that rising food prices do not create access problems for residents.⁸⁸

With the goals of the SPSED in mind, there are several ways in which Azerbaijan can attempt to develop a green economy in its agriculture sector, respect domestic needs and create more robust economic performance. UNEP's Green Economy Report points to research that estimates that green farming practices can increase yields between 54 and 179⁸⁹ per cent while simultaneously restoring and maintaining soil fertility, reducing emissions and increasing water use efficiency.

Several opportunities for green economy investment are presented in the Green Economy Report, including investments in R&D, partnerships with leading private agribusinesses, strengthening supply chains for green products and farm inputs, farm mechanization and post-harvest storage, plant and animal health management, and diversification of crops and livestock, and soil and water management.



Measures with regard to food storage and improved resource management help to reduce losses, produce higher returns, and ensure long-term resource sustainability and soil fertility.

Moreover, there are a few some targeted measures and policy enabling actions that Azerbaijan can take at the national level to encourage a green transition in the agricultural sector. These include:

- **Public procurement of sustainably produced food, coupled with stronger supply chains.** As with the energy sector, public procurement is an important tool to encourage demand for sustainable goods and offer fiscal investment in green agricultural production. Public procurement schemes also allow the government to lead by example, assisting directly in achieving its own policy goals. Strengthening supply chains also goes hand-in-hand with getting farm inputs into farmers' getting sustainably produced green products to the consumer market.
- **Public-private partnerships.** The goal of both investment in R&D development and partnerships with leading private

agribusiness is to “develop, deploy and diffuse”⁹⁰ technologies and inputs that are resource efficient, and alternatives to traditional practices, technologies and inputs. Partnering with agri-business and encouraging farm mechanization promotes early adoption of technologies, assists in getting them to farmers and increases farm productivity.⁹¹

- **Education, training and capacity building.** Providing farmers with training and capacity-building in sustainable farm management practices is an essential part of the effort to bring together green and traditional farming practices. Communicating the benefits of sustainable management practices, such as zero-tillage, precision application systems, advanced irrigation and post-harvest crop and resource management, are integral to initiating a shift. Many farmers naturally consider themselves stewards of land and water resources given their livelihood and would gladly take advantage of opportunities to increase productivity, while at the same time ensuring the long-term sustainability of the environment from which they make their living.

- **Fiscal instruments/regulations.** Fiscal instruments can work both ways, including negative measures such as taxes or reduced subsidies on fossil fuel use, toxic pesticides and herbicides, and penalties on emissions and pollution from harmful practices. Positive incentives such as tax exemptions and subsidies for investment in clean technology and organic pest management can also be used as an incentive to a transition.⁹² Strategic targeting of investments and subsidies to specific crops that are important to the social and health pillars of sustainability⁹³ is also worth considering. Effective regulatory systems can also ensure that proper oversight and controls on unsustainable practices are in place and over time helps farmers to shift to more sustainable practices.

With agriculture as the main source of employment in Azerbaijan, its transition to a green economy framework is essential for an economy-wide transition. Any measures that could affect employment should be carefully examined for potential unintended consequences and side effects, with a long-term economic planning outlook.

3.3 Transport

The transport sector has changed dramatically as a result of Azerbaijan's impressive economic growth in the last 15 years. The country has a transport network consisting of 22 000 km of roads, 2 000 km of railroads, 5 international and 2 local airports, as well as the largest Caspian seaport.⁹⁴ In 2010, 120 million tonnes of cargo was moved by pipelines, 100 million by road, 22 million by railway and 11 million by sea.⁹⁵ Air transportation makes up a much smaller share, at 40 000 tonnes. In terms of cargo, the Europe-Caucasus-Asia corridor sees a significant flow of traffic, especially in oil and gas. With regard to all passenger transport, 1.1 billion people were transported by automobile,

206 million by metro and bus, 6.4 million by railway and 941 000 by air.⁹⁶ Azerbaijan has a relatively high vehicle per person ratio, at 0.51 motor vehicles per person, placing it 41st out of 120 countries examined.⁹⁷

Transport forms an important part of Azerbaijan's economy. Along, with communications, it constituted 8.6 per cent of GDP in 2010. In the first two months of 2011 alone, economic entities engaged in transport in Azerbaijan provided AZN 612 million in services, a 14.9 per cent rise compared to the same period in the previous year, while oil shipments accounted for 61.6 per cent of cargo transported in this period. This implies that other goods represent only 38.4 per cent of shipped cargo.⁹⁸

The transportation sector is also a key sector because of the employment it generates in the manufacturing of vehicles, refining of fuels, management of transport services, and the development and maintenance of infrastructure.⁹⁹ In addition, due to its proximity to the Silk Road,¹⁰⁰ Azerbaijan offers the most feasible passage connecting Central Asia and the People's Republic of China (PRC) with Europe.¹⁰¹ The rapid growth of the oil and gas sector has changed the needs of Azerbaijan's transportation network and created increased and different demands.¹⁰² The government sees the development of the sector as an important step in boosting private sector development and in linking rural communities with other centers in an effort to reduce poverty and improve living standards.

Transportation is also a substantial emitter of greenhouse gases: globally, the sector emits one-quarter of global energy-related CO₂.¹⁰³ In Azerbaijan, the transport sector (in terms of fossil fuel combustion) was responsible for 3.6 Mt of CO₂ emissions in 2007, making up 13 per cent of the economy-wide total of 27.6 Mt from fossil fuel combustion.¹⁰⁴ The sector also presents substantial cost to the environment, the

economy and society in the forms of congestion (and associated losses in productivity of urban areas); resource depletion and land grab; degradation of human health (through air pollution, noise or vibration); reduction in human security (through traffic accidents); reduction of accessibility; and loss of biodiversity.¹⁰⁵ A WHO study also highlighted the issue of the increasing number of traffic accident fatalities, where Azerbaijan was among the top 10 countries in the world with the highest ratio of fatal to non-fatal traffic accidents.¹⁰⁶

The current pattern of transportation, primarily based on gasoline and diesel-fuelled vehicles, is highly unsustainable and will generate serious environmental, social and economic damage if its growth is not checked and its nature and patterns not transformed. According to the Green Economy Report, BAU will significantly enlarge vehicle fleets and exacerbate their costs to society.¹⁰⁷ Change in the sector is absolutely vital to the promotion and creation of a green economy.

Moreover, there is a benefit to a green transportation sector beyond cost avoidance. There are significant opportunities in terms of employment, enhanced economic activity and enhanced natural environments. Indeed, the Green Economy Report observes that investment in public transportation and vehicle efficiency improvements generates exceptional economic returns and that several scenarios show that a green, low carbon, transport sector can reduce greenhouse gas emissions by 70 per cent without major additional investment. It also notes that studies suggest a strong link between green jobs and the transport sector.¹⁰⁸

In a green economy, “transport-sector jobs would increasingly be those that are generated through investment in green transport infrastructure and vehicles, alternative fuels and telecommunication and other technologies.”¹⁰⁹

While there is significant room for private sector initiative in transport, there is a great need for the state to play a leading role in determining the future of the sector.

The government of Azerbaijan needs to take the lead in terms of shaping the investment strategy as well as providing the enabling conditions. As UNEP’s maintains, a three-pronged investment strategy is needed to transform the sector: promote access instead of mobility, shift to less harmful modes of transportation, and improve vehicles towards lower carbon intensity and pollution.¹¹⁰

Azerbaijan has undertaken several projects in the transportation sector, including one to develop a 10-year sector strategy^{111, 112} that will cover all forms of transportation. Linking the development of the transportation sector to the country’s poverty strategy includes upgrading of road infrastructure, linking rural populations to larger markets, and improving conditions for private sector investment leading to job opportunities.¹¹³ Significant domestic funding has been directed to the development of the sector, including US\$ 8.5 billion in 2008¹¹⁴ and another US\$ 2 billion in 2010,¹¹⁵ the majority of which went into the development of highway infrastructure.

Azerbaijan has also started to see a rise in fuel prices, bringing these prices more in line with the minimum for a non-subsidized nation,¹¹⁶ as it moves to reducing fossil fuel subsidies. Diesel and gasoline prices that are more in line with international market rates will be a great driver of a green economy transition through vehicle efficiency, reduced greenhouse gas emissions, and perhaps a shift to more public transport use by citizens. On the other hand, rises in fuel prices can affect poverty negatively, and thus, as stated before, subsidies must be offset with programmes directed at assisting residents with low-income levels.



Taking into account both the local needs and the guidance provided by the Green Economy Report, some suggestions for actions and policies that can be adopted in the sector to spur Azerbaijan's transition to a green economy include:

- **Shifting financing priorities towards public transport and non-motorised transport.** Azerbaijan faces the problems of an aging transport infrastructure and an increasing number of vehicles on the road, as the economy continues to grow. Investments in public transportation infrastructure can increase public ridership, reduce vehicles on the road, reduce transportation sector emissions, and assist low income residents in accessing transportation options. This can be coupled with increased charges for private motor vehicle use including disincentives, such as increased penalties for traffic violations (which could also increase safety, another important issue of this sector), charges for use of particular transportation links (toll roads) or increased charges for vehicle registry or fuels.
- **Regulation of fuel and vehicles.** The growing demand on Azerbaijan's transportation network is an on-going concern. Increased use of the transportation network for the shipping of goods, coupled with increased light duty vehicles creates concerns for safety as well as increased emissions. In addition, as of 2009, Azerbaijan does not have vehicle standards in place for fuel consumption or

seat-belt installation.¹¹⁷ Regulation of fuel emissions intensity can reduce emissions, while more stringent regulation of vehicle efficiency and safety can reduce emissions, accidents and fatalities. More stringent enforcement of road transportation rules and regulation goes hand-in-hand with the development of these rules.

- **Development and comprehensive application of a green transport technology.** Similarly to the agriculture and energy sectors, supporting research and development and partnering with the private sector for the development and distribution of green technologies can speed up implementation and reduce emissions. Public procurement can be an important part of this strategy, as can incentives (such as for fuel efficient vehicles) and public-private partnerships. Building the capacity of public institutions to foster and promote green transportation options can also assist in encouraging public adoption.

The government of Azerbaijan is already making an important effort to move the sector forward. It is carrying out substantial efforts to increase the efficiency, organization and safety of cargo and passenger transportation, making significant investment in public transportation, especially in its metro system,¹¹⁸ and conducting an amendment to its Action Plan for 2008-2013 to improve the transport system in Baku. However, there is much more that can be done to ensure its overall policy for the sector is providing a clear articulation of the green economy principles.

4 Enabling conditions

For a green economy framework to succeed anywhere, the framework must be able to successfully transition the jurisdiction in question from traditional economic development to a more sustainable path, and maintain a level of strength within the economy. Negative side-effects from such a transition must be mitigated so that the green economic shift becomes an enduring economic model, rather than gradually sliding back into the traditional economic growth framework of the past. An economic framework that is not resilient to growing pains and other market shocks and stresses in the face of hardships is unsustainable in any framework, whether it is green or not. Market shocks can produce instability in a green economy, in much the same way they can in the traditional economy. In addition, while the majority of investment will have to come from private sources, the public sector will have to make strategic investments to trigger action.¹¹⁹ For these reasons, the enabling conditions that the government puts in place must be carefully considered, with a long-term outlook to maximizing return on actions taken.¹²⁰

The following is an examination of instruments and actions that can be used for any government to enable a green economy transition. The actions per se do not impose a green economy, but rather set out the conditions for the economy to undertake a natural transition led by consumer and private sector actions. The role of regulations and standards, economic and fiscal policy instruments, international financing and institutional and policy processes are examined, as well a description of the Azerbaijan's specific context providing examples for each key sector examined.

4.1 Regulations and standards

Actions, such as regulations and standards, are direct ways for governments to prepare the conditions for a transition to a green economy in targeted sectors. They can serve to encourage a transition through the placement of stringencies on environmental performance (i.e. energy intensity or emissions limitations) and reduction of regulatory and business risk, leading to increased confidence in markets.¹²¹

Standards and regulations, like any other mechanism, are only as effective as their stringency. If set too low, they will be met, but will not encourage a long-term transition to more effective technologies. The goal of the standards and regulations is to mandate a shift to cleaner technologies. For example, a regulation that requires coal generation to meet the same emissions intensity as cleaner fuels could encourage a switch to cleaner fuels, an implementation of carbon capture and storage, or an increased reliance on renewables.

Standards, such as renewable performance standards (RPS),¹²² also encourage a transition from a mandated requirement. An RPS system encourages increased renewable energy development by specifying a minimum amount of energy that an electricity utility must generate from renewable energy sources. This mandated minimum stimulates renewable energy development and technological advancement in renewables. The goal, over time, is to ensure that renewable energies are economically competitive with traditional sources, assisting

in perpetuating a long-term transition to clean energy generation.

These direct instruments do not account for flexibility amongst the entities facing the mandated shift, and care must be taken to ensure that standards do not place unnecessary strain on small and medium-size enterprises. Regulations and standards in their purest form simply require improvements to be made within a certain timeframe. While this is a very direct form of instituting a transition, economic actors might face limited flexibility to transform, and negative economic impacts may occur unless properly taken into account. One flexibility mechanism is time, where a long lead for regulatory compliance can allow the regulated community to align scheduled capital investments with mandated compliance. At the same time, the avoidance of flexibility can make for a much more straightforward system and ensure confidence that the desired effect (for instance, intensity improvements or emissions reductions) will result from the plan.

In the context of Azerbaijan's transport sector, lack of regulation has created safety and efficiency problems. A way for the government to address this is the creation of a regulatory system that mandates changes to these areas, e.g., a mandatory seat-belt use would have significant impacts on safety and address the high rate of traffic fatalities within the country. Similarly, a regulatory system regulating fuel consumption by light-duty vehicles would have significant spinoffs, including reduced fossil fuel emissions, energy efficiency and reduced transportation fuel costs for citizens.

In the energy sector, Azerbaijan may wish to look at the implementation of an RPS system. There has been a minimal trend in increasing hydro-production offsetting thermal capacity,¹²³ but an RPS system would mandate further transition away from fossil fuel to more renewable sources. Currently, hydro-electricity is the only significant non-fossil fuel electricity source, which represents only around 10 per cent of its generation capacity. Clearly, this is an area where progress is needed for a green economy transition. Prior to putting in place a standard and a target, a detailed examination of the country's renewable resources capacity would have to take place to ensure that the implementation of an RPS system would be achievable, and that it could be implemented in a measured transition to prevent undue price shocks to rate-payers. As such, a mandated renewable energy target could signal a desire to transition to renewable energy, and give confidence to private sector interests that may look to invest in renewable energy technologies (essentially by securing a market for their implementation). Regulation could also play an important role in the promoting an energy-efficient sector, particularly with respect to production efficiency, by ensuring that energy producers meet certain performance standards on efficiency and addressing a major concern related to sustainable production.

In the agricultural sector, efficient use of land and water resources and improved irrigation are key stated goals of the SPSED. One way to ensure this is tight regulatory oversight of farm inputs and outputs to ensure that resources are not being depleted (i.e. through regulations

on water use for irrigation) nor contaminated (i.e. regulatory oversight of non-organic fertilizers and pesticides that have potential to contaminate natural resources). In addition, as the sector is the primary labour source of the Azerbaijan economy, it is also essential to ensure that labour standards are in place to prevent mistreatment of workers as the sector moves to a more decentralized private-ownership structure. Ensuring food safety and supply is essential to improve social conditions, as well as ensuring the safety of the workforce

4.2 Fiscal policy instruments

As opposed to regulations and standards which are a very direct method of bringing about transition, using economic and fiscal policy instruments, either in the form of taxation or market mechanisms, can also be used to encourage the transition to a green economy, but with a wider degree of market reliance and flexibility. On the other hand, price distortions can discourage green investments or failure to scale-up investments.¹²⁴

Azerbaijan possesses an advantage with regard to financing the transition to a green economy as a result of its recent strong growth in fossil fuel revenues. These revenues present a readily available funding source for investment in enabling conditions to spur the transition to the green economy. Used directly or indirectly, through methods, such as those described below, these funds can be a significant source for green economy investments in the sectors discussed, and a unique opportunity for Azerbaijan's current economic situation.

Carbon taxes are a relatively straightforward instrument to encourage emission reductions. In this case, compliance costs include payments of the tax on emissions (a rate on absolute emissions or emissions intensity) and payments for mitigation to avoid the tax

on emissions. The funds raised from carbon taxes can then be earmarked for any purpose, but if the goal is the development of a green economy, its most effective use is to fund initiatives that promote this transition, e.g., renewable energy implementation, technology research and development, or investments, in areas such as adaptation to climate change.

A major thrust of a green economy is the removal of perverse subsidies on fossil fuels and other unsustainable practices and resources. Subsidies that enable and promote environmentally damaging practices serve as a disincentive to a green transition and undermine efforts to put the world economy on a path toward sustainable development.¹²⁵ As the Global Subsidies Initiative argues, even where subsidies are in place for legitimate purposes, their efficiency must be demonstrated to ensure that they do not lead to unforeseen or unintended consequences, overwhelming the potential benefits.¹²⁶

Direct financing subsidies, when properly designed, and incentives can serve to promote a green economy transition, and when combined with an initiative, such as a carbon tax, they can provide a funding source readily available and does not draw public funds away from other priorities. These subsidies can take the form of direct financing (or similar measures, such as feed-in-tariffs), loan guarantees or other fiscal incentives.

A market-based mechanism, such as cap-and-trade, can be complex to implement, but can offer a degree of compliance flexibility through trading or investment in offsets in sectors uncovered by the policy. While the cost is uncertain, since abatement costs are not known when the cap on emissions is set, added flexibility in offsets and safety values (price ceiling on allowance process) can mitigate cost concerns. Investment in offsets, or other 'payments' for providing ecosystem services,

also allow other sectors to access revenue streams and encourage sustainable land use decisions and economic outcomes.¹²⁷ However, there is a caveat with respect to dealing with any sort of market mechanism – the government needs to be stable and predictable. Changes to markets must encourage confidence, such as in the phase of feed-in tariffs or a cap-and-trade system. Moreover, there must also be proper review and limitation of market intervention to ensure that the measures are attaining the proper goals without creating unnecessary side effects. Caps and limitations on pollution/emissions must also be stringent enough to provide incentive to change. Otherwise, the intended outcome of improved environmental performance will be lost.

In the case of Azerbaijan, one of the fundamental topics in the energy sector is the role of subsidies in fossil fuel energy production. For the country to shift away from fossil fuel dependence to a more sustainable energy sector, the first measure to be undertaken is the review of existing fossil fuel subsidies. While the government should be praised for the work done to date to reduce subsidies, such as the dramatic decrease in the relation of subsidies to GDP, fossil fuel subsidies are still in place, and as long as they are, they will continue to work as a suppressant to renewable energy development. Once fossil fuel subsidies are identified and measures are undertaken to remove them, the government must take care to offset negative impacts from the potential rise in energy prices, which includes redirection of subsidies to renewable energy development, investment in social programmes to assist low-income residents and energy-efficiency measures.

In the transport sector, fiscal measures to reduce emissions could include the implementation of carbon taxes on fuels, or congestion charges in urban areas, coupled with positive incentives, such as investment in public transit options and

clean transport technology. These measures are taken in the context of Azerbaijan's growing number of vehicles, which lead to increased emissions as well as rising safety concerns (high fatality rate) and infrastructure challenges (the need for road investments). The revenues from fuel taxes and congestion charges could then be invested in much needed infrastructure improvements, as well as in public transport and clean technology development.

Addressing subsidies in energy and transport can have side effects in the area of agriculture, raising input costs for farmers and reducing profits. For this reason, subsidies in the agricultural sector have to be carefully considered and implemented to ensure that they do not promote fossil fuel inefficiencies or the use of harmful farming inputs. Subsidies for sustainable farming practices or investments in clean technology, development and/or sustainable management practices could ensure that this sector, which is a labour force driver, is not unduly harmed by efforts to reduce emissions and inhibit Azerbaijan's move to green economy practices in other sectors. Sustainable subsidies in the areas of technology and management could also address the goal of the SPSED to increase financial assistance to the agriculture sector, while improving its material and technical bases.

4.3 Institutional and policy processes to support reform

One of the most effective and direct ways that a government can support the initial transition to green economics is through its own public procurement. Procurement schemes signal buy-in from the government for a particular technological advance, help encourage early adoption and also serves to help bridge the implementation phase for new technologies as they enter the market.

As a process, stakeholder engagement can also be integral to the success of a policy shift or transition. Involving industry and the public early in such a process can help build a positive public case for change, encourage inclusiveness in the policy process and help smooth the transition in its early stages. Stakeholder engagement could also build support for the implementation of new policies or technological solutions in areas where there is a lack of public knowledge or concerns about potential impacts. Support for an initiative can be raised by bringing stakeholders into the fold, explaining the reasons for and benefits of the shift to a green economy, and taking their concerns and ideas into consideration.

In Azerbaijan, public procurement has been recommended across all sectors, but could also be particularly effective and easily implemented in the transportation sector. For example, the government can easily mandate that all government vehicles purchased be stronger than a fixed efficiency threshold (i.e. g/km CO₂ or litres/km fuel efficiency), or alternatively that they use a clean energy technology, such as electric, hybrid or clean-fuel vehicles. Initial costs may be slightly higher, and certain exceptions may have to be implemented (such as heavy duty construction vehicles), but procurement measures serve as an early signal that the government supports a move to improved fuel efficiency, and in the long run may actually reduce operational costs through less fuel usage. In this manner, public procurement could also serve as a signal of confidence for private sector investment in clean transport technology.

Within the agriculture sector, an important way to support reform is through education of farmers on sustainable land use practices, improving the technical basis of the sector, which is a policy goal included in the SPSED. Government officials, or outside consultants, can conduct studies and international reviews into sustainable farm management practices, the environmental benefits of sustainable farming inputs, and ways to sustainably increase crop and livestock production. The results of these studies can then be passed along to farmers through public education and capacity building campaigns. Farmers may not have the capacity or ability to conduct these studies, but, enabled by the findings of government research, they may be more willing to make the transition to more sustainable practices.

It has been mentioned that efforts on energy efficiency (production and consumption) have been historically low, and only recently have measures been taken to increase efficiency, such as the installation of meters. The first step in a process to transition from reliance on fossil fuels must be a concerted effort in efficiency. One way to achieve this is to encourage efficiency on the demand side.

With a history of low energy prices and only a recent introduction of metering there is a lack of incentive for demand side measures to reduce energy consumption. Government education campaigns about the benefits of fuel efficiency (most notably lower energy bills) and measures that can be undertaken to invest in efficiency (such as support for improved home

insulation) can provide an incentive to reduce energy waste. These education measures can also be paired with fiscal measures, such as low-interest loans, or tax breaks for home efficiency retrofits that reduce the upfront cost of demand side efficiency improvements.

4.4 Financing the transition to a green economy

In addition to the domestic financing methods mentioned above, there are also significant opportunities to access international funding sources for green transition. Azerbaijan has already demonstrated an ability to mobilise international funding sources in the past and the recent growth in domestic revenues through fossil fuel exports can be used to leverage additional international funding sources and donor capital. Projects exist across the sectors of energy, transport and agriculture with organizations like the European Bank for Reconstruction and Development,¹²⁸ the ADB,¹²⁹ the World Bank¹³⁰ and the Global Environment Fund (GEF).¹³¹

Furthermore, Azerbaijan has also developed renewable energy projects through the Clean Development Mechanism (CDM).¹³² Clearly, the country has its practical experience in accessing international funding for development and climate change initiatives, which provides a basis to support economic and social development goals that embrace a green economy approach.

Another option that Azerbaijan has not yet taken advantage of is the development of a list of Nationally Appropriate Mitigation Actions (NAMAs). Originally included as an appendix to the Copenhagen Accord,¹³³ NAMAs have become an effective way for developing countries to express potential mitigation projects undertaken voluntarily with international support. The development of a list of NAMAs with projects focused in areas that would increase renewable energy, encourage sustainable transport or enhance sustainable land management practices would act as an exercise for Azerbaijan to identify other areas of priority to transition to a green economy, as well as highlight projects to the international community where investment would be effective in reducing emissions.

In this regard, applications for international funding could be made for projects in all sectors and Azerbaijan should consider using domestic fossil fuel revenues as leverage in appropriate situations. Some of the considerations to design its proposals for a green economy transition could be how each project contributes to the pillars of a green economy, including their potential social, environmental and economic implications, and how each project proposal fits into Azerbaijan's aspiration to move to a green economy framework. Individual sector profiles of NAMA options would give the government a starting point in developing international project proposals, as well as help visualize an economy-wide transition through a series of actions in each sector.

5 Key findings

The structure of a green economy is based on the pillars of environmental sustainability as well as development, employment and equity. This study has identified some specific enabling conditions for consider in Azerbaijan's transition to a green economy in Azerbaijan. These enabling conditions include:

Public procurement. Across practically every sector, public procurement plans are a quick and relatively easy way for Azerbaijan to show leadership as it shifts to a green economy. It could also serve as an indirect funding source for green and sustainable technology and product development, as well as a means to encourage early adoption. Implementation is often a difficult phase in the transition to a new technology, and a public sector boost during this phase can help overcome hurdles.

Strong regulatory systems. Such regulatory systems reduce risk and uncertainty within sectors, and build confidence in markets. As previously discussed, regulatory systems could assist in this transition by placing stringencies on environmental performance and regulating or curtailing use of unsustainable or unsafe products, practices or inputs. However, the design of regulatory systems must be carefully considered, with a long-term outlook on how they will impact on the economy, ensuring that any potential economic or job losses are either mitigated or offset with economic development and job creation in new green sectors.

Subsidy reform and other fiscal instruments. One of the major first steps that must take place in the transition to a green economy is an examination of current subsidy plans in order to determine whether unsustainable practices are currently being subsidised and whether they contribute to environmental degradation. Perverse subsidies should be eliminated, and inefficient subsidies reformed. In addition,

subsidies should be targeted at developing new green technologies and sectors. Furthermore, consideration of other positive and negative fiscal instruments, such as carbon taxes, cap-and-trade, direct financing, insurance plans, loan guarantees and feed-in tariffs, should be undertaken where appropriate to drive the transition of green economic sectors.

Exploration of global financing. Azerbaijan has already shown its ability to access international financing sources to assist in meeting its development and environmental needs, and to position itself for a transition to a green economy. Several funding sources are mentioned, all of which Azerbaijan has explored and should continue to do, using domestic sources as leverage, where appropriate. The key will be projecting green economy principles in projects proposed for international funding. The government may also choose to look into the development of a set of NAMAs as a way to combine action on mitigation towards a green economy transition (i.e. renewable energy development), while presenting a list of preferred funding initiatives to international funders

One of the most important caveats related to enabling conditions, including market interventions, is that government action must be stable and predictable for the market to retain confidence. This includes regular review of government intervention to ensure that desired goals are being achieved and that negative side effects are mitigated. Any targets set must also be measurable and transparent, and accompanied by regular reporting to ensure accountability and credibility. Measuring progress against targets over time also enables the government to identify early successes and enact corrections to policies in sectors that are lagging behind in their transition, or facing unexpected consequences.



6 Conclusions

Azerbaijan has shown remarkable progress in transitioning to a market economy, and rebounding from a major economic downturn since the collapse of the Soviet Union. In the early 1990s, the country was facing an aging infrastructure, inefficiencies in energy generation and supply, as well as downturns in agricultural exports. It was also left with a legacy of fossil fuel energy production that has been a double-edged sword. On the one hand, fossil-fuel energy production has enabled the economy to rebound quite well from a fiscal standpoint, but on the other it has led to degradation of some of its natural resources.

Today, Azerbaijan realizes the importance of low-carbon development and is now looking to foster the development of a green economy and shift away from its reliance on fossil fuels. To this end, the government has used domestic and international funding to develop projects and enact policies in several key sectors, including energy, agriculture and transportation. These actions have already achieved some positive results. With that in mind, this study is intended to offer suggestions on general and sector-specific actions to continue to foster a transition that has already begun.

Within the sectors of energy, agriculture and transport, specific actions are proposed that would assist in the transition to a green economy model, including:

- **Energy:** Increased energy efficiency measures (production and consumption) and renewable energy capacity; subsidy and incentive reform in energy production; shift away from fossil fuels.
- **Agriculture:** Stricter supply chains; public-private partnerships with agri-business for technology development/implementation; education and capacity building; stronger regulation on agricultural inputs and outputs.
- **Transport:** Investment in public transit options; stronger regulatory oversight; investment in clean vehicle technology, public procurement of zero/low carbon transportation technologies and fuels.

In order to ensure that these actions are successful, the government will have to put in place several green economy enabling conditions, including:

- **Public procurement plans** across all sectors, with the goal of fostering implementation of new technologies and signalling that the government is leading by example.
- **Strong regulatory systems** designed to mandate change, increase environmental stringencies, and remove uncertainty to provide confidence for the market.

- **Subsidy and fiscal instrument reform**, including eliminating perverse subsidies and reforming inefficient ones. Other fiscal instruments, such as carbon taxes, cap-and-trade and loan guarantees, should also be considered. Examination of potential investment partnerships with green private sector-businesses can also support transition to low carbon development.
- **Global financing.** Using Azerbaijan's experience in accessing international funding sources to target funds to projects with green economy aspects; developing a list of NAMAs may also be worth considering.

While several ideas have been expressed, it is important that care and consideration goes into all green economy transition planning, and thus the implementation of these expressed ideas should proceed with caution. Some traditional sectors could face negative economic impacts and potential job reductions as a result of a green transition. The Government of Azerbaijan must therefore advance in a way that is stable and

predictable, inspiring confidence and buy-in for the transition to a green economy. Measures must be taken to offset economic slowdowns in 'brown' sectors with the development of new green sectors, and to ensure that employment challenges are addressed for transitioning workers. Some degree of difficulty could be expected as the country shifts to a green economy, but maintaining a long-term outlook for the development of a robust economy that takes environmental, social and economic sustainability into account will be in the best interest of Azerbaijan and its citizens.

Finally, Azerbaijan's oil revenue can serve as a vital funding source for the development of a green economy within the country. These funds, used directly or indirectly through measures, such as cap-and-trade, can be a way to kick-start the transition and serve as a leverage mechanism for more international funding support. Using current strong financial flows from fossil fuel development to fund a transition to a more sustainable and environmental friendly, long-term economic framework, and one that Azerbaijan's that seized.

Annex 1. Total emission of pollutants into the air, 2000-2009

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total emissions	908.1	1 000.0	620.7	837.9	975.3	1 054.3	875.1	969.9	922.7	-
Stationary sources	515.4	577.0	217.4	425.9	539.8	557.9	544.2	385.9	280.7	300.0
Percentage in total	57.0	58.0	35.0	51.0	55	53.0	39.0	40.0	30.0	-
Mobile sources	392.7	423.0	403.2	412.0	435.5	496.4	530.9	584.0	642.0	-
Percentage in Total	43.0	42.0	65.0	49.0	45.0	47.0	61.0	60.0	70.0	-
GDP per capita (US\$)	665.0	714.0	774.0	897.0	1 060.0	1 600.0	2 509.0	3 906.0	5 404.0	4 874.0

Annex 2. Emissions of individually-listed pollutants from stationary sources, 2000-2009

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Dust	19.2	28.3	29.4	34.1	43.5	28.2	23.7	28.4	31.3	19.8
SO ₂	35.1	14.7	13.6	15.5	13.2	13.8	12.4	9.2	8.0	4.3
NO _x	24.2	27.1	26.3	24.2	25.2	25.8	29.3	23.1	36.3	24.2
CO	26.3	27.9	18.2	25.4	42.5	26.1	16.0	25.3	37.4	27.6
Others	410.6	479.1	129.9	326.7	415.4	464.0	262.8	299.9	181.8	224.1

Annex 3. Rate abated emissions, 2000-2009

Year	2000	2002	2003	2004	2005	2006	2007	2008	2009
Pollutants generated	627.0	459.0	713.0	829.0	1,781.0	715.0	765.0	646.0	-
Pollutants emitted	515.4	217.4	425.9	539.8	557.9	344.2	385.9	280.7	300.0
Percentage abated	16.0	53.0	40.0	35.0	69.0	52.0	50.0	57.0	-

Annex 4. Selected economic and environmental indicators (Source: Ministry of Environment and Natural Resources)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Indicator										
Air pollution										
Emissions of SO ₂										
- Total (t)	35 100.0	2 600.0	13 600.0	15 500.0	13 200.0	13 800.0	12 400.0	9 200.0	7 200.0	
- by sector (t)										
Energy					10 302.0	11 600.0	9 600.0	6 500.0	3 484.0	1 705.0
Industry					1 704.0	1 900.0	2 560.0	2 400.0	3 500.0	2 381.2
Transport					269.8	101.3	53.6	49.4	51.4	53.4
Other					924.2	198.7	186.4	250.6	164.6	-4139.6
- per capita (kg/capita)	4.0	2.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0	1.0
- per unit of GDP (kg/ 1 000 National currency units)										
Emissions of NO _x (converted to NO ₂)										
- Total (t)	24 200.0	27 100.0	26 300.0	24 200.0	25 200.0	25 800.0	29 300.0	23 100.0	28 700.0	24 184.0
- by sector (t)										
Energy						19 800.0	22 800.0	17 400.0	15 100.0	13 267.0
Industry						5 500.0	6 000.0	5 300.0	13 100.0	10 510.0
Transport						130.0	150.0	200.0		182.8
Other						370.0	350.0	200.0	500.0	224.2
- per capita (kg/capita)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
- per unit of GDP (kg/ 1 000 National currency units)										
Emissions of Ammonia NH ₃										
- Total (t)	15.8	8.0	10.4	6.2	6.3	4.5	7.4	7.5	8.3	7.0
- by sector (t)	24 200.0	24 000.0	26 300.0	24 200.0	25 200.0	25 800.0	29 300.0	23 100.0	28 700.0	
Energy										
Industry									7.8	
Transport										
Other										
Emissions of total suspended particles (TSP)										
- Total (t)	19 200.0	25 000.0	29 400.0	34 100.0	43 500.0	28 200.0	23 700.0	28 400.0	31 300.0	
- by sector (t)								19 802.0		
Energy					660.5	706.0	600.0	500.0	300.0	225.5
Industry					39 787.0	25 700.0	21 600.0	26 800.0	30 200.0	19 128.0
Transport					51.0	36.1	23.8	23.1	27.4	24.3
Other					3 001.5	1 757.9	1 476.2	1 0769.9	772.6	424.2

Annex 4 (continued)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Air pollution (continued)										
Emissions of non-methane volatile organic compounds (NMVOC)										
- Total (t)	185.0	194.0	143.0	139.0	172.0	130.0	130.0	127.0	127.0	
- by sector (t)										
Energy	32.0	41.0	24.0	29.0	29.0	45.0	45.0	43.0	43.0	
Industry	153.0	153.0	119.0	110.0	143.0	85.0	84.0	84.0		
Transport					125.0	138.3	106.0	152.0	131.0	62.8
Other					-125.0	-138.3	-105.0	-152.0	-47.0	-62.8
Emissions of persistent organic pollutants (PCBs, dioxin/furan and PAH)										
- Total (t)				56.4	56.4	57.0	57.0	57.0	57.0	
- by sector (t)										
Energy				45.2	45.2	45.2	46.0	46.0	46.0	
Industry				11.2	11.2	11.4	11.0	11.0	11.0	
Transport										
Other										
Emissions of heavy metals										
- Total cadmium (t)										
- Total lead (t)										
- Total mercury (t)										
Greenhouse gas emission (total of CO ₂ , CH ₄ , N ₂ , CFC, etc.) expressed in CO ₂										
- Total (t)	40 987 000.0	41 710 000.0	41 584 000.0	44 297 000.0	46 524 000.0	50 635 000.0	4 933 100.0	45 014 000.0	45 014 000.0	
- by sector (t)										
Energy	33 734 000.0	34 002 000.0	33 513 000.0	36 147 000.0	38 063 000.0	41 003 000.0	41 030 000.0	36 714 000.0	36 714 000.0	
Industry	143 000.0	247 000.0	366 000.0	403 000.0	468 000.0	839 000.0	1 187 000.0	1 187 000.0	1 187 000.0	
Transport	2 279 000.0	2 472 000.0	2 562 000.0	2 921 000.0	3 432 000.0	3 632 000.0	3 978 000.0	1 187 000.0	1 187 000.0	
Agriculture	311 000.0	261 000.0	204 000.0	191 000.0	270 000.0	330 000.0	5 187 000.0	5 187 000.0	5 187 000.0	
Waste	2 641 000.0	2 788 000.0	2 809 000.0	2 704 000.0	2 914 000.0	3 607 000.0	1 596 000.0	1 906 000.0	1 906 000.0	
Other										

Annex 4 (continued)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Air pollution (continued)										
Emissions of CO ₂										
- Total (t)	29 274 000.0	28 842 000.0	28 703 000.0	31 347 000.0	33 280 000.0	35 845 000.0	35 006 000.0	31 957 000.0	31 957 000.0	
- by sector (t)										
Energy	29 132 000.0	28 596 000.0	28 338 000.0	3 094 500.0	32 813 000.0	35 007 000.0	30 771 000.0	30 771 000.0	30 771 000.0	
Industry	142 000.0	246 000.0	365 000.0	402 000.0	467 000.0	838 000.0	1 187 000.0	187 000.0	1 187 000.0	
Transport					506.1	401.0	489.0	400.0	700.0	720.0
Agriculture					73.5	47.3	24.3	16.0	10.0	9.2
Waste										
Other	3.0	3.0	2.0	3.0	5.0	3.0	2.0	3.0	4.0	3.0
- per capita (kg/capita)										
- per unit of GDP (kg/1 000 national currency units)										
Urban population exposed to air quality exceedances										
- Number of exceedances of maximum allowable concentration										
(MAC) (times/year)										
- Air pollution index (% of population affected)										
- Consumption of ozone- depleting substances (ODS) (t)	37.3	36.5	87.2	76.4	109.2	64.4	50.0	2.7	2.5	
Water										
Accessible freshwater resources										
Total (million m ³)										
- Surface water (million m ³)	28 019.7	27 622.1	35 241.1	38 209.7	35 803.8	29 390.6	35 864.6	33 430.3	30 011.6	32 000.0
- Groundwater (million m ³)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Water abstraction										
Total abstraction (million m ³ /year)	11 110.0	10 012.0	10 075.0	10 772.0	11 440.0	12 050.0	12 360.0	12 270.0	11 735.0	11 425.0
Intensity of water usage (Water abstraction/ accessible resources)										

Annex 4 (continued)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Water (continued)										
Total water consumption by sectors (million m ³)	6 588.0	6 414.0	6 754.0	7 370.0	8 019.0	8 607.0	8 865.0	8 371.0	7 886.0	7 639.0
- Households	449.0	408.0	503.0	512.0	498.0	521.0	523.0	360.0	348.0	383.0
- Industry	2 316.0	2 273.0	1 977.0	2 264.0	2 264.0	2 360.0	2 508.0	2 157.0	2 042.0	1 638.0
of which water used for cooling	1 875.0	1 863.0	1 704.0	2 236.0	2 173.0	2 284.0	2 198.0	2 078.0	2 485.0	1 991.0
- Agriculture	3 819.0	3 709.0	4 248.0	4 579.0	5 240.0	5 710.0	5 817.0	5 837.0	5 474.0	5 577.0
Household water consumption index (l/ capita/day)	183.0	175.0	175.0	181.0	179.0	166.0	160.0	105.0	100.0	
Nutrient and organic water pollution discharged into rivers (thousand t)										
- Suspended solids										
- Biological oxygen demand (BOD)										
- Ammonium										
- Nitrates										
- Phosphates										
Wastewater treatment (average removal rate in %)										
- Suspended solids	96.5	96.0	97.1	97.1	96.8	95.2	97.2	95.2	94.1	93.2
- Biological oxygen demand (BOD)	97.2	97.1	97.2	96.7	97.1	97.1	96.7	95.7	93.2	94.5
- Ammonium	66.7	67.8	65.8	66.2	66.5	67.1	69.3	67.4	66.1	66.0
- Nitrates	39.1	35.2	35.2	34.3	34.2	33.8	32.9	33.8	34.0	35.9
- Phosphates	70.1	70.0	69.2	69.5	69.7	69.9	70.0	68.9	68.9	67.7
Accidental and illegal discharges of oil at sea (t)										
Biodiversity and living resources										
Protected areas										
- Total Area (km ²)										
- Total Area (% of national territory)										
Protected Area IUCN Categories (% of national territory)										
Ia Strict Nature Reserve										
Ib Wilderness Area										
II National Park										
III Natural Monument										
IV Habitat/ Species Management Area										
V Protected Landscape / Seascape										

Annex 4 (continued)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Biodiversity and living resources (continued)										
VI Managed Resource Protected Area										
- Total area (km ²)										
- Naturalness										
Undisturbed by man (1 000 ha)										
Semi-natural (1 000 ha)										
Plantation (1 000 ha)										
- volume of the wood (thousand m ³)										
- harvesting intensity (harvest/growth)										
Number of endangered species (IUCN categories)										
- Critically endangered										
- Endangered										
- Vulnerable										
Industrial fish catch (t)										
- From fish farming (t)										
- From natural water bodies (t)										
Land resources and soil										
Arable land (thousand ha)	1 825.6	1 835.7	1 837.2	1 838.5	1 840.7	1 843.2	1 841.3	1 854.0	1 860.2	
Cultivated land (thousand ha)	1 041.5	1 162.3	1 222.9	1 219.5	1 293.8	1 327.9	1 326.3	1 323.9	1 499.9	
Soil erosion										
- % of total land	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8
- % of agricultural land	43.7	43.6	43.6	43.6	43.6	43.6	43.6	43.6	43.6	43.6
Fertiliser use per ha of cultivated land										
- Mineral fertilizers (kg/ha)										
- Organic fertilizers (t/ha)										
Pesticide use (kg/ha)										
Energy										
Total primary energy supply (TPES) (Mtoe)								13.5	15.1	13.4
Total final energy consumption (TFC) (Mtoe)								7.6	8.8	7.3
- By fuel										
Coal								0.0	0.0	0.0
Petroleum products								2.8	3.2	2.9
Gas								3.0	3.7	2.8
Electricity								1.4	1.4	1.1
Heat								0.4	0.4	0.3

Annex 4 (continued)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Energy (continued)										
Other									0.1	0.2
- By sector										
Industry								1.7	2.0	1.7
Transport								1.9	2.2	1.8
Agriculture								0.2	0.3	0.2
Other								3.8	4.3	3.6
Energy intensity TPES/ GDP (PPP) (toe/ thousand US\$ (2000) PPP)										
Energy productivity GDP (PPP)/TPES (thousand US\$ (2000) PPP/toe)										
TPES/Population (toe per capita)								1.57	1.74	1.52
Transportation										
Number of transport accidents (land, air and maritime)	1 987.0	1 985.0	2 196.0	2 311.0	2 388.0	3 179.0	3 197.0	3 104.0	2 970.0	2 792.0
In which										
- Died	596.0	559.0	642.0	724.0	811.0	1 065.0	1 027.0	1 107.0	1 052.0	930.0
- Injured	2 199.0	2 228.0	2 486.0	2 691.0	2 766.0	3 668.0	3 606.0	3 432.0	3 232.0	3 044
Size and composition of motor vehicle fleet (1 000)	440 626.0	451 642.0	457 442.0	511 460.0	554 031.0	612 069.0	690 012.0	773 318.0	860 047.0	925 866.0
Freight vehicle fleet										
- Trucks	78 566.0	77 142.0	76 928.0	79 019.0	80 918.0	90 852.0	97 395.0	110 391.0	113 088.0	117 378.0
Passenger vehicle fleet										
- Buses (including passenger vans)	16 756.0	17 275.0	17 422.0	18 781.0	20 991.0	26 735.0	27 474.0	28 092.0	29 340.0	29 985.0
- Cars	332 026.0	342 958.0	350 559.0	400 439.0	438 964.0	479 447.0	548 979.0	616 853.0	700 080.0	759 203.0
Passenger transportation (million passenger kilometres)	11 367.0	11 741.0	11 968.0	12 588.0	13 814.0	14 746.0	15 956.0	17 657.0	18 981.0	19 745.0
Freight transportation (million ton kilometres)	15 948.0	18 447.0	20 277.0	22 291.0	23 283.0	26 534.0	43 294.0	78 007.0	88 607.0	97 704.0
Waste										
Generation of waste										
- Total waste generation (t)										
- Hazardous waste (if available, by class of hazard) (t)	26 556.0	16 437.0	9 777.0	26 861.0	11 183.0	12 831.0	29 518.0	10 381.0	24 255.0	
- Industrial waste (t)		23 922.6	44 243.9	60 452.5	63 031.9	64 139.5	61 999.6	31 688.5	48 469.8	
- Municipal waste (t)		5 300 000.0	7 724 200.0	7 868 800.0	7 431 700.0	7 321 500.0	6 600 000.0	6 797 700.0	6 160 000.0	

Annex 4 (continued)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Waste (continued)										
- Radioactive (nuclear) waste (t)										
Transboundary movements of hazardous waste (t)	189 950.0	31 680.0	15 320.0	18 350.0	14 630.0	9 753.0	2 220.9	2 901.0	8 080.0	
Waste intensity (total waste generated per unit of GDP)										
(t/ 1 000 National currency units)	26 600.0	16 400.0	9 800.0	26 800.0	11 200.0	12 800.0	29 500.0	10 400.0	24 200.0	
Waste recycling and reuse (t)	2 210.0	6 900.0	4 300.0	3 700.0	10 420.0	15 500.0	14 860.0	16 400.0	4 800.0	
Health and democracy										
Drinking water quality										
- Samples failing the standards on sanitary-chemical indicators (%)	20.0	20.0	15.0	28.0	22.0	16.0	19.0	18.0	18.0	15.0
- Samples failing the standards on microbiological indicators (%)	13.0	12.0	9.0	20.0	11.0	10.0	8.0	9.0	11.0	10.0
Population with access to safe drinking water (%)							78% according to research data			
Population with access to improved sanitation (%)							80% according to research data		(2006)	
Incidence of typhoid, paratyphoid infection										
(per 100 000 population)	0.2	0.3	0.1	0.2	0.1	0.1	0.1	0.1	0.4	0.0
Salmonella infections (per 100 000 population)	6.9	8.2	7.2	5.3	6.6	6.9	6.0	5.0	4.8	4.0
Active tuberculosis incidence rate (per 100 000 population)	64.5	61.0	54.5	48.3	44.9	44.3	43.6	43.9	49.7	49.9
Viral hepatitis incidence rate, including vaccination cases										
(per 100 000 population)	30.0	25.2	21.7	16.6	14.5	20.4	33.2	26.3	27.6	21.1
Health expenditure (% of GDP)	0.9	0.8	0.7	0.8	0.9	0.9	0.9	0.9	0.9	1.2
Birth rate (per 1 000)	14.8	13.8	13.8	14.0	16.1	17.2	17.8	18.0	17.8	17.2
Total fertility rate	2.0	1.8	1.8	1.9	2.1	2.3	2.3	2.3	2.3	
Mortality rate (per 1 000)	5.9	5.7	5.8	6.0	6.1	6.3	6.2	6.3	6.2	5.9
Infant mortality rate (deaths/1000 live births)	16.4	16.6	16.7	15.5	14.4	12.7	11.9	12.1	11.4	11.3
Female life expectancy at birth (years)	75.1	75.2	75.0	75.1	75.2	75.1	75.1	75.8	76.1	76.1

Annex 4 (continued)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Health and democracy (continued)										
Male life expectancy at birth (years)	68.6	68.6	69.4	69.5	69.6	69.6	69.6	70.1	70.8	70.9
Life expectancy at birth (years)	71.8	71.9	72.2	72.3	72.4	72.4	72.4	73.0	73.4	73.5
Population aged 0-14 years (%)	29.8	28.6	27.5	26.4	25.4	24.5	23.8	23.2	22.6	22.6
Population aged 65 or over (%)	5.1	5.3	5.5	5.8	6.1	6.3	6.6	6.7	6.8	6.8
Ageing index										
(Number of persons 65 years or over per hundred persons under age of 15)	17.3	18.6	20.2	21.9	24.0	25.9	27.6	28.9	30.1	29.8
Total population (million inhabitants)	8 114.3	8 191.3	8 269.1	8 349	8 447	8 553	8 665.9	8 779.8	8 896.9	8 997.4
- % change (annual)	0.8	0.8	0.8	0.8	1.0	1.1	1.1	1.1	1.2	1.1
- Population density (inhabitants/km ²)	94.0	95.0	95.0	96.0	98.0	99.0	100.0	101.0	103.0	104.0
Social and economic issues										
GDP										
- change (2000=100)	100.0	109.9	121.5	135.2	149.0	188.3	253.3	316.6	350.8	383.4
- change over previous years (%)	111.1	109.9	110.6	111.2	110.2	126.4	134.5	125.0	110.8	109.3
- in current prices (million National currency)	4 718.1	5 315.6	6 062.5	7 146.5	8 530.2	12 522.4	18 764.2	28 360.5	40 137.2	34 578.7
- in current prices (million US\$)	5 272.8	5 707.7	6 235.9	7 276.0	8 680.4	13 238.7	20 983.0	33 050.3	48 852.5	43 024.4
- per capita (US\$)	662.9	710.5	768.9	888.5	1 048.5	1 579.8	2 471.6	3 841.7	5 603.3	4 874.1
- per capita (US\$ PPP per capita)										
Industrial output (annual 2000=100)	100.0	105.1	108.9	115.5	122.1	163.1	62.3	62.9	63.0	63.3
Industrial output (% change over previous year)	106.9	105.1	103.6	106.1	105.7	133.5	136.6	124.0	106.0	108.6
Agricultural output (% change over previous year)	112.1	111.1	106.4	105.6	104.6	107.5	100.9	104.0	106.1	103.5
Share of agriculture in GDP (%)	15.9	14.7	13.8	12.3	10.8	8.6	6.7	6.4	5.3	6.4
Labour productivity in industry (% change over previous year)										
Consumer price index (CPI)										
(% Change over preceding year, annual average)	101.8	101.5	102.8	102.2	106.7	109.6	108.3	116.7	120.8	101.5

Annex 4 (continued)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Social and economic issues (continued)										
Producer price index (PPI)										
(% Change over the preceding year, annual average)	127.4	101.8	97.7	116.1	112.9	118.9	117.7	108.0	111.6	80.8
Registered unemployment (% of labour force, end of period)										
Labour force participation rate (% of 15-64 year old)										
Employment in agriculture (%)										
Current account balance										
- Total (million US\$)	-167.8	-51.7	768.4	-2 020.5	-2 589.3	167.3	3 707.6	9 018.9	16 453.5	10 172.8
- (As % of GDP)	3.2	0.9	12.3	27.8	29.8	1.2	17.6	27.2	33.7	23.6
Balance of trade in goods and services (million US\$)	94.7	238.8	-454.0	-1516.4	-2077.2	1 329.1	5 821.9	13 093.2	20 669.1	12 970.3
Net foreign direct investment (FDI) (million US\$)	29.2	220.1	1 066.9	2 293.1	2 329.7	458.2	-1306.4	-5102.7	-545.0	146.2
Net foreign direct investment (FDI) (as % of GDP)	0.6	3.8	17.1	31.5	26.8	3.4	6.2	15.4	1.1	0.3
Cumulative FDI (million US\$)				3 948.7	4 697.5	4 475.3	4 468.9	4 291.1	3 982.4	2 899
Foreign exchange reserves										
- Total reserves (million US\$)										
- Total reserves as months of imports										
Export of goods (million US\$)	1 858.3	2 078.9	2 304.8	2 624.5	3 742.9	7 648.9	13 014.6	21 269.3	30 586.4	21 096.8
Imports of goods (million US\$)	1 539.0	1 465.0	1 823.3	2 722.7	3 581.6	4 349.8	5 269.4	6 045.0	7 574.6	6 513.8
Net external debt (million US\$)	1 158.0	1 162.0	1 385.0	1 575.0	1 588.0	1 650.0	1 972.0	2 441.9	3 001.1	3 421.8
Ratio of net debt to exports (%)	62.3	55.9	60.1	60.0	42.4	21.6	15.2	11.5	9.8	16.2
Ratio of net debt to GDP (%)	22.0	20.4	22.2	21.6	18.3	12.5	9.4	7.4	6.1	8.0
Exchange rate, annual averages (National currency unit/US\$)	0.895	0.931	0.972	0.982	0.983	0.946	0.893	0.858	0.822	0.804
Income and poverty										
GDP per capita (1 000 US\$/capita)	0.7	0.7	0.8	0.9	1.0	1.6	2.5	3.8	5.6	4.9

Annex 4 (continued)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Social and economic issues (continued)										
Poverty		49.0	46.7	44.7	40.2	29.3	20.8	15.8	13.2	10.9
- Population living below 50% of median income (%)										
Income inequality (Gini coefficient)										
Minimum to median wages (minimum wage as a percentage of median wage)										
Communications										
Telephone lines per 100 population	10.0	10.7	11.4	11.5	12.2	13.0	14.0	14.5	15.1	15.9
Cellular subscribers per 100 population	5.3	7.9	9.7	12.8	17.4	26.8	39.0	52.4	69.9	87.8
Personal computer in use per 100 population						2.3	3.1	3.7	4.4	
Internet users per 100 population						8.0	10.0	11.0	17.0	
Education										
Literacy rate (%)	98.9	99.0	99.0	99.1	99.2	99.3	99.4	99.5	99.6	99.6
Education expenditure (% of the GDP)	3.9	3.5	3.1	3.3	3.4	3.0	2.5	2.5	2.4	3.3

Notes

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