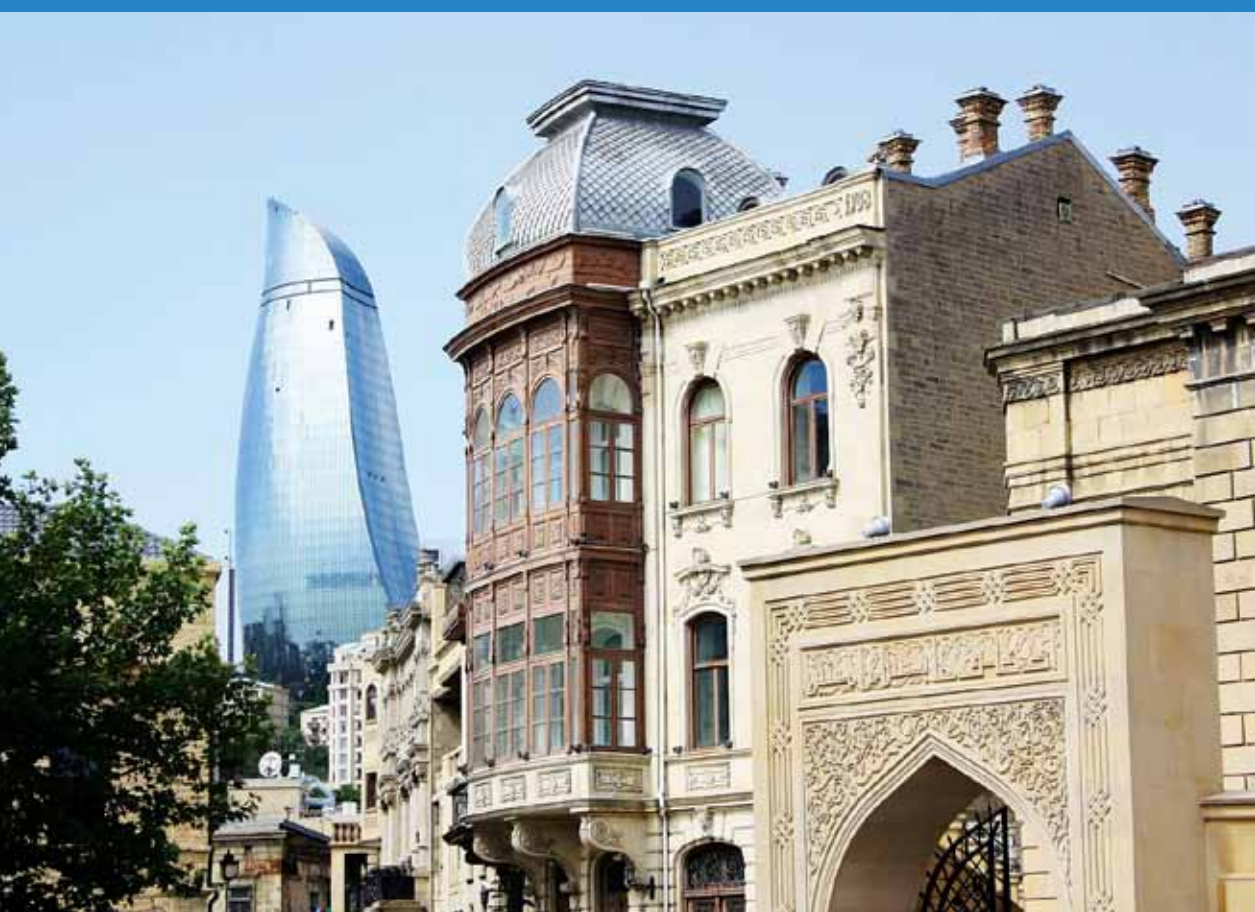


# In-Depth Review of the Energy Efficiency Policy of AZERBAIJAN



**ENERGY CHARTER SECRETARIAT**  
2013



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**Boulevard de la Woluwe, 56**  
**B-1200 Brussels, Belgium**

**ISBN 978-905948-126-8** (English PDF)

**ISBN 978-905948-125-1** (English Paperback)  
**Dépôt D/2013/7850/3**

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*Photo on the cover:* **Old city of Baku, Republic of Azerbaijan**

The Old City of Baku or Inner City (İçəri Şəhər) is the historical centre of Baku. This small town has managed to preserve its ancient architectural and cultural heritage throughout the centuries. It has been classified in 2000 as a World Heritage Site by Unesco and in 2005 as Historical-Architectural Reserve under the Ministry of Culture and Tourism of the the Republic of Azerbaijan. Today, with the increasing construction of skyscrapers and other modern structures, the Old Town has become a tiny part of the capital. At the rear of the photograph is one of the three Flame Towers skyscrapers, which became one of the symbols of "modern" Baku.

*Source:* <http://www.leilabellz.com/2012/08/old-city-baku-icri-shr.html>

## INTRODUCTION

Azerbaijan ratified the Energy Charter Treaty (ECT) and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) on 2 December 1997. By ratifying PEEREA, countries commit themselves to formulating and implementing policies for improving energy efficiency (EE) and reducing the negative environmental impacts of the energy cycle (Art.5). The guiding principle of PEEREA is that contracting parties shall co-operate and, as appropriate, assist each other in developing and implementing EE policies, laws and regulations (Art.3).

The country review process is a core activity in monitoring and facilitating the implementation of PEEREA. The in-depth EE reviews, implemented under PEEREA, have proven to be an important tool in assessing the progress of member countries in fulfilling their commitments under the protocol. They also provide peer guidance to governments in developing and implementing EE policies.

At the Energy Charter Conference in 2009 in Rome, member states discussed the fact that, to effectively monitor the progress made by the contracting parties in implementing the PEEREA obligations, in-depth reviews should be carried out every five years and regular reviews should be completed in between. The conference also adopted an indicative schedule of reviews for 2010–2012, focusing on countries that are not covered by other international organisations. Fully respecting the criteria discussed by the conference an in-depth review of the EE policy of Azerbaijan was carried out in 2012.

The review team comprised the following officials: Mr Christopher Walden from the Swedish Energy Agency, Sweden, Mr Artan Leskoviku from the National Agency of Natural Resources, Albania, and Ms Edyta Nowak from the EC Delegation in Azerbaijan, together with Ms Gabriela Prata Dias and Ms Bilyana Chobanova from the Energy Charter Secretariat. The team was also supported by Ms Rukiye Yayla and Mr Wietze Lise from AF-Mercados EMI. The team visited Baku between 18 and 22 June 2012 and discussed a range of issues with government agencies and other stakeholders (listed in Annex IV).

The key sources of information for this report include the previous in-depth review of the investment climate and market structure in the energy sector of Azerbaijan of 2011, national policies and relevant laws as posted on ministry websites, other relevant publications by the Government of Azerbaijan and the reports of international financial institutions such as the European Bank for Reconstruction and Development (EBRD), International Monetary Fund (IMF), World Bank (WB), International Finance Corporation (IFC), International Energy Agency (IEA), Transparency International and the institutions of the EU.



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# EXECUTIVE SUMMARY

## **Executive Summary**

Azerbaijan ratified both the Energy Charter Treaty and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) in 1997. By ratifying PEEREA, countries commit to implementing policies to improve energy efficiency (EE) and reduce the environmental impacts of the energy cycle (Art.5).

An international team visited Baku from 18 to 22 of June in 2012 and discussed a range of issues with governmental agencies and industry and other stakeholders for the purpose of completing this in-depth review.

## **Background**

The economic development of the country in the last decade was strong with an average growth rate of GDP of around 10% for the period 2000–2005; in 2005–2007 it increased almost threefold, reaching 28% on average and falling down to 10% annually in 2008–2009. Oil and gas development and export have been central to Azerbaijan's economic growth. The volume of production has increased due to visible progress in almost all the fields of industry as well in oil and gas, chemistry and oil chemistry, machinery, metal processing, building materials and industry.

As a result of the 'open door' policy of the country, the number of foreign and joint ventures has increased from 1995 until today. At the moment 192 foreign-invested enterprises representing 63 states function in the industrial field. Foreign investments remain an important factor in the continuation of stable social and economic development in the country. The average net inflows of foreign direct investment into the country reached 10% of GDP for the period 2000–2010.

## **Energy and Energy Efficiency Policy**

At present, Azerbaijan provides 100% of its gross energy consumption through domestic production, which is currently largely reliant on the exploitation of the country's hydrocarbon reserves, namely oil and natural gas. Azerbaijan is, at the present time, a net exporter of oil and natural gas. The total crude oil production in Azerbaijan was 50.6 Mtoe while natural gas production totalled 13.6 Mtoe (15 billion m<sup>3</sup>) in 2009. There are a number of perspective fields in Azerbaijan that are under development and it is expected that new exploration fields will positively contribute to an increase in the country's oil production.

Securing long-term energy independence is a stated policy goal for fostering economic growth. However, as the country is already energy independent and is a net energy exporter, the momentum towards harnessing a renewable energy sources (RES) potential appears to be linked to recent high international oil and gas prices.

The Azerbaijani Government has adopted the State Programme for the Development of the Fuel and Energy Sector (2005–2015), which identifies and sets development targets for the various sub-sectors within the energy sector along with a package of specifically defined measures aimed at achieving the aforementioned targets and goals within the prescribed period over the next 10 years. The overall goal of the state programme is to meet the electric power, gas and other energy demands of both the population and economy fully through the continued development of the fuel and energy sector. There is limited competition due to existing monopolies in the gas and electricity sectors.

The Azeri electricity market has not opened yet and no formal opening timeframe has been envisaged. Legislation neither requires transmission and distribution to be separated from generation nor envisages the presence of a separate transmission system operator and distribution system operator. Accounting, functional and/or managerial disaggregation has not been accomplished or envisaged by legislation. Nonetheless, partial disaggregation has occurred: some mini-power plants have been privatised and one independent regional distribution company has been created.

The State Programme for the Development of the Fuel and Energy Sector (2005–2015) targets the reduction of losses and prevention of theft and the inefficient use of energy in order to cover the electric power and natural gas demands. It is stated that full payment of the cost of the electricity and natural gas consumed is one of the factors that would ensure the efficient use of these resources. The State Programme on the Use of Alternative and Renewable Sources (2004) also envisages more efficient utilisation of hydrocarbon energy sources as one of the objectives. Although the government sets the targets for an energy efficient economy, there is no law or secondary legislation specific to EE activities.

### **Renewable Energy Policy**

Since 2009, Azerbaijan has been signatory to the International Renewable Energy Agency (IRENA) and has created the State Agency on Alternative and Renewable Energy Sources (SAARES). A national strategy on the use of alternative sources of energy and RES for the period 2012–2020 is being prepared by SAARES and by the Ministry of Industry and Energy (MIE), including an RES Law, which is expected to be published by the end of 2012. As of June 2012, SAARES has become the State Company on Alternative and Renewable Energy Sources. This will provide a mandate to develop RES projects. A state budget of \$60 million has been committed to the development of RES.

Hydropower is for now the most important renewable energy (RE) resource in Azerbaijan and in 2010 hydropower satisfied about 18% of the need for electricity generation. Azerbaijan has about 1000 MW of operating hydropower capacity and an additional 62 MW of planned hydropower capacity. Although there has been little implementation of wind energy in Azerbaijan until the present day, interest has been growing. Its use has huge prospects in some regions of Azerbaijan. Calculations suggest that the Republic of Azerbaijan has the economically feasible potential to produce about 800 MW of wind power. The main potential is in the south-east around the Caspian coast. There is also competition with tourism development. The estimates of the solar, biomass and geothermal potential are more uncertain. Even though there is sufficient space to install solar panels, the estimated potential of 5000 MW can only be a long-term goal due to the relatively high upfront investment cost. Biomass utilisation is equally unlikely without an incentive system in place. There exists only the potential of geothermal energy for heat supply, due to the relatively low temperatures of the wells.

The main barrier to RES development is the low tariffs that were set in 2007 and are still valid for 2012, with 3.2 US¢/kWh for small hydropower plants (HPPs) and 5.7 US¢/kWh for wind. Another barrier is the lack of a legal basis for connection rules. In order to overcome the barriers to developing RES in Azerbaijan two projects are relevant.

- The preparation and implementation of an action plan for RE and EE. This project will be undertaken by the Khazar Consulting Agency.

- The improvement of legislation in the field of RE and EE, and compliance with the law of the European Union. This project is ongoing on the part of SAARES in co-operation with the International Academy of Ecoenergy.

Azerbaijan is interested in finding solutions to the problems regarding environmental protection and the rational utilisation of natural resources. In support of Azerbaijan's environmental protection goals, a number of important laws, legal documents and state programmes have been developed and approved in order to improve the ecological situation in the country.

### **Overall Assessment of Progress**

There are two gross indicators of progress. First, the reliability of power supplies has improved, leading to a flow of funds to the power sector in Azerbaijan. Second, a 90% collection rate of the electricity bills has been achieved. This happened after many years of significant problems, when transmission and distribution companies were unable to collect bills and consequently had insufficient funds to pay for the generated electricity.

The three priority areas for development in the energy sector of Azerbaijan are identified as follows: '(i) rehabilitation of power grid for improvement of power supply quality and loss reduction; (ii) development of renewable energy; and (iii) improvement of demand-side EE and energy conservation'.

The main objective of the Azerbaijani Government in the field of energy has been to become self-sufficient in terms of meeting the energy demand. This objective has been achieved for oil since 1998 and for gas since 2007. Moreover, in addition to committed exports, there is currently an overcapacity of 2 billion m<sup>3</sup> of gas that could be exported to Europe and this is expected to increase to 10 billion m<sup>3</sup> by 2017.

Under the 'European Union – Azerbaijan Action Plan', which was concluded as part of the European Neighbourhood Policy, Azerbaijan is to continue co-operation on Caspian and Black Sea regional energy issues and enabling the infrastructure to facilitate the transit and development of Caspian energy resources.

Within the energy and transport priority area of the action plan there are specific commitments to energy policy convergence towards EU energy policy objectives, which are expressed as i) a gradual convergence towards the principles of the EU internal electricity and gas markets and ii) progress regarding energy networks. Of particular relevance to this review is the commitment to progress on EE and the use of RES.

According to Action Plan 2011–2015 approved by the president for the implementation of the State Programme on Poverty Reduction and Sustainable Development 2008–2015 (adopted by Decree #3043 from 15 September 2008) the country will begin privatisation of enterprises in the fuel and energy sector. However, no noticeable activities have taken place so far with the exception of two small privatised HPPs. Meetings with government agencies and companies have confirmed that there are no immediate plans to proceed with the privatisation and opening up of the state companies in the oil, gas and electricity sectors.

EE in Azerbaijan still needs further developments in terms of strategy, action plans and legislation. Moreover, the few EE measures that exist are the ones that are financed by the EU or other donor projects.

The institutional arrangements for EE are at a very early stage of development in Azerbaijan. Institutional development should be informed by an understanding of the short-, medium- and long-term tasks to be accomplished and to which the Azeri authorities need to give early and high-level consideration.

The European Bank for Reconstruction and Development (EBRD) has supported the preparation of a €165 million investment programme to modernise and upgrade AzDRES TPP (the country's largest thermal power plant (TPP)). This project has also applied for carbon credits under the clean development mechanism (CDM) and is expected to reduce CO<sub>2</sub> emissions by 3 million tons CO<sub>2</sub> eq. annually.

The electricity (and gas) market in Azerbaijan is still a vertically integrated monopoly, where the Tariff Council can set the wholesale and retail power prices. As of January 2007 the retail prices have been increased from a subsidised level of 2.4 US\$/kWh to a cost reflective level of 7.5 US\$/kWh and it is still at this level as of 2012 (again no longer cost reflective).

An assessment of the RES potential in Azerbaijan showed a potential of over 8 GW, which is more than the currently installed capacity. However, this may not be enough to fully meet the electricity demand, because of the intermittent character of solar energy and especially wind, but also due to lower availability when compared with conventional TPPs and HPPs. Nevertheless, the output of gas fired power plants could be considerably reduced, by developing this RES potential, which could make the GDP growth, which is currently mainly driven by oil and gas exports, more sustainable and long lasting.

International donors, the EU and the Energy Charter are strongly supportive of Azerbaijan in terms of its EE efforts; with a view to complying with concluded agreements the administration should take a more explicit and structured approach to capturing the benefits of EE for all.

## **Recommendations**

### ***General Recommendations***

- The government's energy policy should reflect the potential contribution of EE to increasing fuel exports and supporting economic growth and the environment.
- EE and RE should be given high priority by the government and future energy policies should be supported by detailed analysis of economic EE potentials in all sectors of the economy and the barriers impeding the realisation of these potentials.
- The MIE should improve its capacity to analyse and assess EE as a basis for future policy development, including decisions on financing.
- The rehabilitation of the generation, transmission and distribution assets in the power sectors need to continue. This will maximise the fuel burning efficiency and minimise the technical transmission and distribution losses.

Future energy strategies and policies should be transparent and consistent with long-term goals and should consider initiating programmes for EE and setting objectives for key sectors.

### ***Institutional Framework***

- There is a need for developing laws and secondary legislation on EE and RE.



- The government should create an EE unit within the MIE to lead the development of legislation, promote sustainable energy within the government and monitor the implementation of the overall EE policy. Appropriate resources (human and financial) should be allocated by the government for the activities of the unit.
- Specific programmes for improving EE in the various sectors of the economy should be developed and should include specific targets and monitoring systems so that their implementation can be continuously monitored.
- Inter-administration co-operation between energy and other public policy makers should be enhanced, in particular for those concerned with the environment, transport, housing and industry.
- The efforts of various stakeholders, including local authorities, universities, research centres and NGOs, need to be supported by the government and further scaled up to promote EE in Azerbaijan.

### ***Energy Market and Pricing***

- It is recommended that the government should consider the introduction of market oriented principles in the energy sector and an appropriate regulatory framework based on international experience.
- To facilitate the implementation of EE measures the existing electricity, heat and gas tariffs should be reviewed. The differentiation of tariffs for different types of consumers and the introduction of block tariffs as well as the affordability issues of the population should also be taken into account.

### ***EE Financing***

- The government should allocate sufficient financial resources for increasing EE in public and state-owned buildings and public lighting and at the same time introduce an incentive system for private and residential sector initiatives in EE and RES.
- Continued dialogue with IFIs and the donor community should be ensured in order to strengthen the focus on EE and RE.

### ***Specific EE Programmes and Measures***

- High efficiency standards should be adopted for newly constructed buildings, as well as EE labelling and minimum energy performance (MEP) standards for electrical equipment and it should be ensured that compliance and enforcement procedures are in place.
- Energy auditing and energy management systems should be introduced for large industry consumers.
- EE must feature in any integrated approach to transport planning and provision.
- The implementation of the district heating rehabilitation programme should be continued in order to reduce losses and attract new consumers; the introduction of individual metering should be encouraged where possible.
- The government should promote and raise awareness of EE in local communities and with citizens and SMEs.



- The country's participation in various international initiatives, for example the Green Building Council and International Renewable Energy Agency (IRENA) in Abudabi, should be continued to ensure the exchange of information and best practices for successful EE and RES projects in other countries.

### ***Renewable Energy Sources***

- RES development should continue to be a priority for Azerbaijan. A timetable with objectives, goals and targets for RES should be included in the RE strategy.
- The focus should continue to be on the utilisation of the existing solar and wind potential, but also the waste-to-energy use possibilities need to be assessed.
- Part of the oil and gas revenues should be dedicated to RES development and RES fund should be created.
- Grid connection rules, tariff methodology and incentives should be developed in order to attract investments in the RES sector.
- The role of SAARES should be strengthened to enable them to have a leading role in developing RES in Azerbaijan.

### ***Data Collection and Monitoring***

- To support the monitoring of the results achieved, a project database needs to be set up for all activities related to EE in Azerbaijan.
- The existing statistics on building stock should be used to support the policy making process and estimate the energy saving potential for the building sector.
- To monitor the energy saving potential, energy audits have to be made compulsory, starting with the largest buildings. This should lead to an action plan on tapping the energy saving potential.





BACKGROUND

## **Brief Overview of the Country**

### ***Geographical***

The Republic of Azerbaijan is in the South Caucasus region. It borders with Iran (765 km) and Turkey (15 km) in the south, Russia (390 km) in the north, Georgia (480 km) in the north-west and Armenia (1007 km) in the west, and covers a territory of 86,600 km<sup>2</sup>. Azerbaijan is on the western coast of the Caspian Sea; it has a coastline of 713 km and has been an important trade and transport point since the beginning of commerce along the Great Silk Road.

Azerbaijan's population is approximately 9.1 million (1 January 2011) and this has been increasing regularly each year. The territory of Azerbaijan consists of 66 districts, 11 provinces and the Nakhchevan Autonomous Republic. The main cities are Baku, Ganja, Sumgayit, Shemakhy, Sheky, Khankendy and Shusha. Baku, the capital, is situated on the shore of the Caspian Sea in the south of the Absheron peninsula. It covers an area of 2,200 km<sup>2</sup> and has a population of around 2 million inhabitants.

Azerbaijan is characterised by a diverse landscape. Mountains cover 60% of the total area of the Republic of Azerbaijan, including the Major Caucasus, Minor Caucasus (with the Garabagh plateau) and the Talysh Mountains surrounding the Kur-Araz lowland in the north, west and south-east. The average altitude of the territory of the republic is up to 400 m. The lowland of the Caspian Sea shore is below sea level (currently -26.5 m), while the highest peak Bazarduzu is 4466 m high.

The climate in Azerbaijan is majorly influenced by its geographical position and landscape and the Caspian Sea. It has been determined that Azerbaijan accounts for eight out of eleven climate zones existing in the world. The average annual temperature is 15°C on the plains while in high mountain regions they even fall below zero. Temperatures reach 25–27°C in the Aran regions and 5°C in the mountain regions in July. The absolute maximum is 43°C, while the minimum is lower than -30°C. Precipitation is also not equal across the territory of the country. The Absheron peninsula and Nakhchevan Autonomous Republic account for a lower level of precipitation per year (200 mm). Precipitation is the highest (1200–1700 mm) in the south of the Lenkeran lowland and foothills of the Talysh Mountains. Predominant winds blow to the north (the Absheron peninsula), south-west (Kur-Araz lowland) and west (Lenkeran lowland).

Azerbaijan is an important supplier of both oil and natural gas. Besides the major oil and gas deposits of Azerbaijan, there are numerous mining sites for ferrous and nonferrous metals and construction materials. An area that must be specifically mentioned is the north-west of the country (Dashkesan, in particular). Major deposits of aluminium ore, iron ore and nonferrous metals and construction materials including gypsum, limestone and trim stone are scattered all over the country and are of particular interest. Deposits of iodine, gold and other precious metals, mineral spring water, etc. also form part of the geology of Azerbaijan.

### ***Human***

Azerbaijan has a very homogenous population. Ethnic Azeris form the majority (90.6%) of Azerbaijan's population of about 9.1 million (2011). Other ethnic groups include Dagestanis (2.2%), Russians (1.8%), Armenians (1.5%) and other 3.9%. The key demographic indicators are set out in Table 1 below.

*Table 1: Key demographic indicators*

|  |     |
|--|-----|
| Population, total (millions)             | 9.1 |
| Population growth (annual %)             | 1.1 |
| Life expectancy at birth, female (years) | 73  |
| Life expectancy at birth, male (years)   | 67  |

*Source: WB, 2011*

93.4% of the population are Islamic. Other religious groups are those who follow the Russian orthodox and Georgian orthodox churches and Judaism. The literacy rate is close to 98%.

The country has a labour force of 6.2 million as of 2011. The service sector employs 49.6% of the whole labour force, followed by agriculture and industry with 38.3% and 12.1% respectively. 11% of the population lives in poverty as of 2009.

### **Climate Change**

Climate change scenarios for Azerbaijan suggest an increase in the average temperature and rainfall. The average annual temperature increase between 2021 and 2050 is expected to amount to 1.5°C–1.6°C. In the coastal zone and the western part of Nakhchivan, the increase would be 1.7°C. The temperature increase in the first half of the century might be about 0.3°C per decade. Since the actual temperature rise in Azerbaijan between 1990 and 2000 was about 0.4°C, the data provided by the model are consistent with observed reality. The rainfall from 2021–2050 is expected to increase by 10–20% compared to in the period 1961–1990. This includes increases of 0–10% in Nakhchivan and 20% in the eastern part of the country.

The sectors most exposed to climate change are water resources, tourism, agriculture and energy and Azerbaijan needs to find ways to mitigate and adapt to climate change.

Azerbaijan joined the United Nations Framework Convention on Climate Change (UNFCCC) in the category of a non-Annex I country in 1995, and is also a signatory to other international agreements on climate change, such as the Kyoto Protocol. Its Climate Change Programme (CCP) focuses on three main areas: the greenhouse gas (GHG) inventory, vulnerability and adaptation and GHG mitigation and carbon financing. The second national communication on climate changes was submitted to the UNFCCC in 2010.

### **Political**

The structural formation of Azerbaijan's political system was completed by way of the acceptance of the new Constitution of Azerbaijan on 12 November 1995. The constitution established Azerbaijan as a democratic, constitutional, secular and unitary republic. The power in Azerbaijan is divided into legislative, executive and judicial powers. Each of them acts in accordance with the constitution and legislative acts. The government of the Republic of Azerbaijan is organised on the basis of the principle of separation of power. According to the traditional concept of the separation of power, the constitution determines that the executive power is held by the president of the Republic of Azerbaijan, the legislative power is exercised by the Parliament of the Republic of Azerbaijan — Milli Majlis — and the judicial power is held by the independent courts, which has 125 deputies.

The deputies of the Milli Majlis of the Republic of Azerbaijan are elected on the basis of a majority system, and general, equal and direct elections are by free, private and secret ballots. The Milli Majlis develops constitutional laws, acts and orders on issues within its power. It approves the appointment of the prime minister and gives the vote of confidence to the Cabinet of Ministers. Under the Constitution of the Republic of Azerbaijan, the Milli Majlis can dismiss the president by means of impeachment.

The government (Cabinet of Ministers) is subordinate to the president, who appoints the prime minister and cabinet subject to approval by the Milli Majlis. The Cabinet of Ministers oversees the implementation of the state budget and financial, credit and monetary policies, as well as state social programmes.

Like all contemporary political systems, the political system of Azerbaijan is characterised by pluralism — the existence of more than one political party. The political parties participate in political life through representatives in the legislative and local self-governing bodies.

Azerbaijan is a member of the United Nations, the Organization for Security and Cooperation in Europe (OSCE), NATO's Partnership for Peace, the Euro-Atlantic Partnership, the World Health Organization, the GUAM (Georgia, Ukraine, Azerbaijan, and Moldova) Organization for Democracy and Economic Development, the EBRD, the Council of Europe, the International Monetary Fund (IMF), the Organization of the Islamic Conference, the Nonaligned Movement and the World Bank (WB). Azerbaijan is an observer at the Community of Democracies. In 2011, Azerbaijan was elected to the UN Security Council as a non-permanent member, representing the East Europe Group for the 2012–2013 term.

### **Economic**

The economic development of the country during the period from independence until the present can be divided into two main stages. The first period from 1991–1995 was determined by economic chaos. The situation during the first period was strongly aggravated by the political, military and economic problems faced by the Republic of Azerbaijan. The second period of macroeconomic stability and dynamic economic development has been ongoing since 1996.

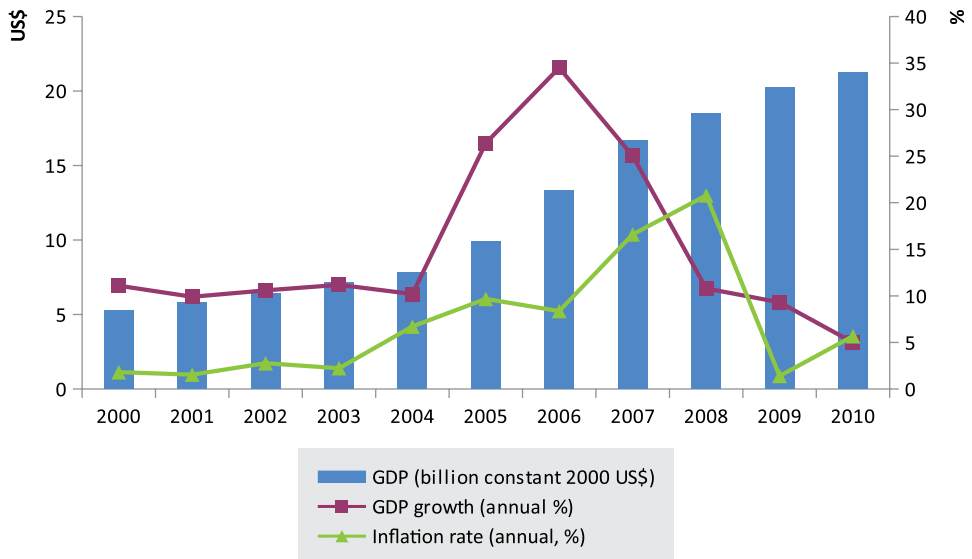
Due to large-scale and basic reforms carried out on the economy of the country, significant results have been gained from 1996 onwards. Oil and gas development and export have been central to Azerbaijan's economic growth. Contracts signed on 20 September 1994 with big companies representing the most developed countries of the world on joint activity in the oil and gas production industry stimulated the rapid development of the oil and gas industry. The volume of production increased due to visible progress in almost all the fields of industry as well in oil and gas, chemistry and oil chemistry, machinery, metal processing, building materials and industry.

Over the past few years, the Azerbaijani Government has worked to integrate the country into the global economic marketplace, attract increased foreign investment, diversify its economy and maintain positive growth during the global financial crisis. Wide-ranging economic reforms implemented by Azerbaijan during the past five years have resulted in notable progress in terms of improving regulatory efficiency and encouraging domestic economic diversification, especially in the areas of agriculture, tourism and information and communications technology. In particular, the substantial economic reforms implemented in

2007 and 2008 led the WB to name Azerbaijan as one of the top 10 global reformers for 2009 in its annual Doing Business report. Azerbaijan has enjoyed measurable success in terms of diversifying its economy outside of the energy sector, with the non-oil portion of the economy growing by almost 10% in 2011, while the growth in the energy sector has been flat.

The average growth rate of GDP for the period 2000–2005 was around 10%; in 2005–2007 it increased almost threefold, reaching 28% on average and falling down to 10% annually from 2008–2009. The next graph shows the historical GDP values and growth rates for Azerbaijan for the period 2000–2010.

Figure 1: GDP development of Azerbaijan



Source: WB, 2011

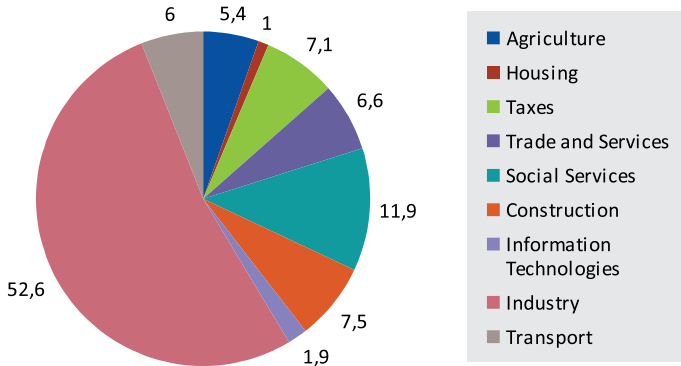
Azerbaijan's high economic growth during 2006–08 was attributable to large and growing oil exports, but some non-export sectors also featured double-digit growth, spurred by growth in the construction, banking and real estate sectors, although most of this increase was still tied to the expansion in the hydrocarbon sector. After 2008, the demand for oil began to reduce due to the global economic and financial crisis. This has resulted in a slowdown in GDP growth over the last three years. In 2010, economic growth slowed to 5.0%, although the impact of the global financial crisis was less severe than in many other countries in the region. Real GDP growth in 2011 was low (0.1%) and per capita GDP is estimated at \$13,044 (PPP) as of 2011.

The inflation rate in the country follows a similar trend to that of GDP, as it increases in times of high economic growth. The economy suffered from high inflation rates of about 20% during 2007–2008 but it was brought under control in 2009 with the slowdown in GDP growth but increased to 8.1% again in 2011.

The components of GDP by sector in 2009 are illustrated below. The GDP of the country is dominated and driven by the industrial sector, which accounts for 52.6% of all GDP. The industry is one of the most developed sectors in Azerbaijan. It covers fuel and energy, chemistry, mechanical engineering, metallurgy, the food industry, light industry and other areas. The main

objective of the state policy in the field of industry for the medium future is to ensure steady and rapid production growth, structural improvement and increasing efficiency. The main activities include the modernisation and reconstruction of equipment facilities, increasing the competitiveness of national products and the flow and efficiency of investments, the intensified development of the non-oil sector and encouraging the development processes in the processing industry. The agricultural sector consists mostly of wheat, cotton, wine, fruit, tobacco, tea, vegetables and cattle breeding.

Figure 2: Components of GDP %, 2010

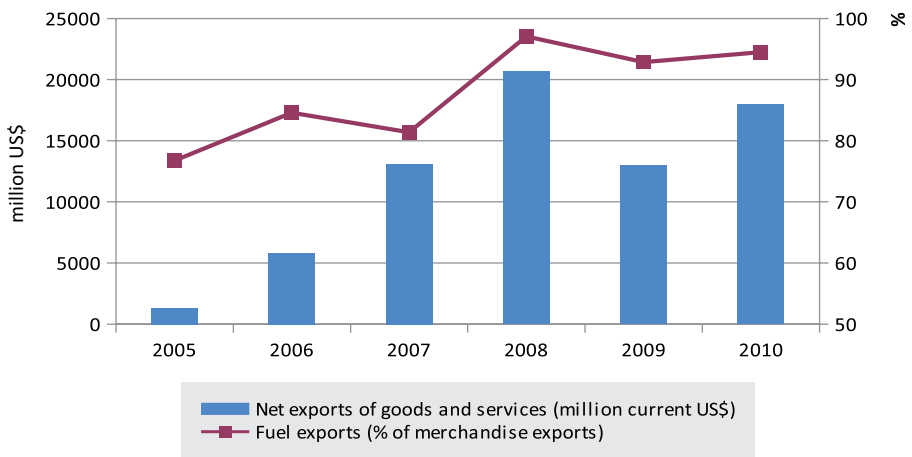


Source: Ministry of Economic Development of Azerbaijan, 2010

Import and export activities have been increasing over the last few years and there has been a tremendous increase in the net exports of goods and services in the last five years. There was a significant decrease in the volume of net exports in 2009 as a result of the global economic crisis but the increasing trend reversed in 2010. The share of fuel exports in total merchandise exports has been above 90% for the last few years. Exports reached \$26.57 billion in 2011 and crude oil, oil products, natural gas, ferrous metals, fruits and vegetables are the main export items. Imports, \$9.76 billion as of 2011, consist of vehicles, machinery and parts, consumer durables, foodstuffs and textiles. The EU has remained the major destination for the export of Azerbaijani goods; Italy, France, Russia, Israel, the USA and Ukraine are the major trade partners of Azerbaijan. While many of the reforms adopted were designed to facilitate Azerbaijan's accession to the World Trade Organization (WTO), as of March 2012, Azerbaijan is still not a WTO member.



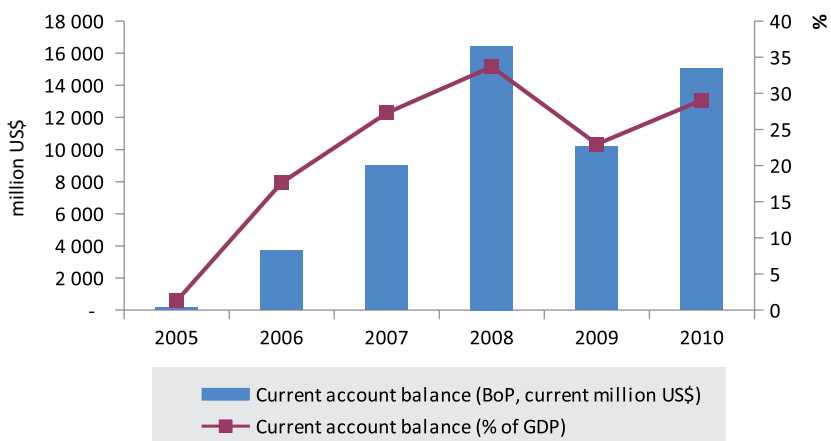
Figure 3: Net exports of Azerbaijan



Source: WB, 2011

The current account balance of the country follows the same trend as net exports does, as usual. Resting mainly on the strength of oil pricing, the current account surplus was boosted to \$16.5 billion in 2008, about 34% of GDP, from 1% in 2005.

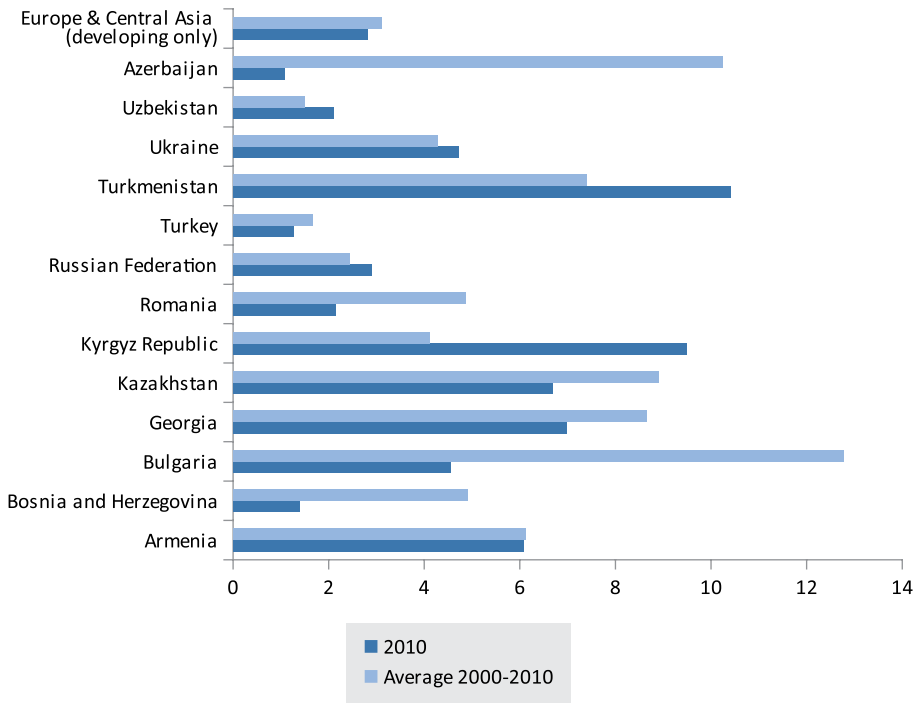
Figure 4: Current account balance of Azerbaijan



Source: WB, 2011

As a result of the 'open door' policy of the country, the number of foreign and joint ventures has increased from 1995 until the present time. At the moment 192 foreign-invested enterprises representing 63 states function in the industrial field. Foreign investments remain an important factor for the continuation of stable social and economic development in the country. The average net inflows of foreign direct investment into the country reached 10% of GDP for the period 2000–2010.

Figure 5: Azerbaijan and comparative countries: foreign direct investment, net inflows (% of GDP)



Source: WB, 2011

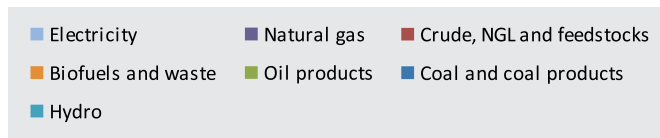
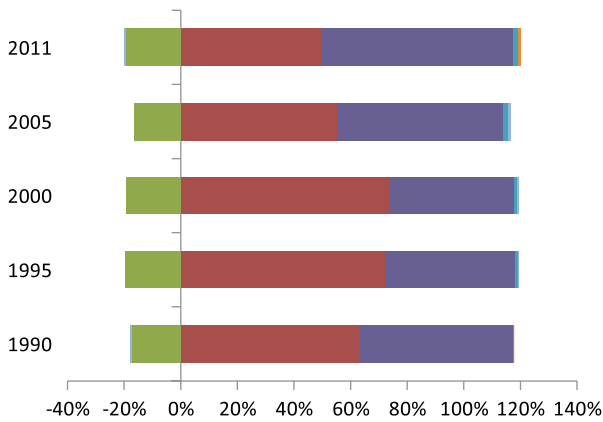
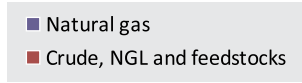
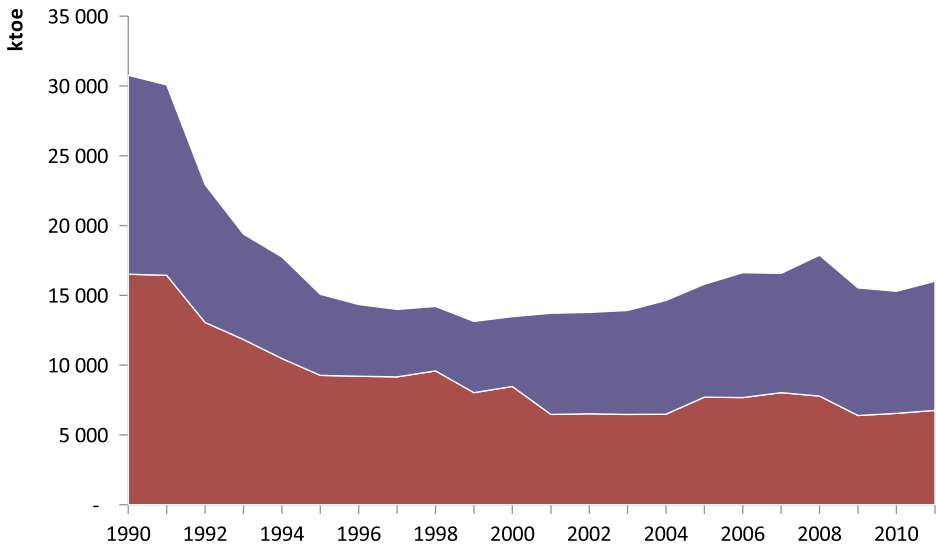
## Energy Supply and Demand

### Energy Balance

At present, Azerbaijan provides 100% of its gross energy consumption through domestic production, which is currently largely reliant on the exploitation of the country’s hydrocarbon reserves, namely oil and natural gas. The country does not depend on foreign resources in the energy sector. Azerbaijan exports oil, natural gas and electricity.

From the early 1990s through to 1997 primary energy demand was in free fall. This is illustrated in the next graph, where the average growth rate between 1990 and 1997 can be seen to be –11%. The primary energy demand only resumed growth in 2001 but the average growth rate between 2001 and 2009 remained low; the effect of the global crisis can be seen in the graph for 2009.

Figure 6: Total primary energy supply



Source: IEA statistics, 2011 and MIE, 2012

Table 2: Energy balance 2007 – 2011

|                              | 2007          | 2008          | 2009          | 2010          | 2011          |
|------------------------------|---------------|---------------|---------------|---------------|---------------|
| <b>Primary production</b>    | 54,198        | 61,274        | 67,332        | 68,255        | 62,542        |
| <b>Import</b>                | 132           | 103           | 58            | 44            | 45            |
| <b>Export</b>                | -40,751       | -46,037       | -53,526       | -54,344       | -48,784       |
| <b>International bunkers</b> | -449          | -502          | -383          | -479          | -517          |
| <b>Stock changes</b>         | 24            | -342          | -469          | -909          | 309           |
| Total energy supply          | <b>13,155</b> | <b>14,495</b> | <b>13,012</b> | <b>12,703</b> | <b>13,595</b> |
| Final consumption            | <b>6,992</b>  | <b>8,282</b>  | <b>7,044</b>  | <b>7,248</b>  | <b>7,909</b>  |
| Industry and construction    | 1,274         | 1,493         | 954           | 798           | 949           |
| Transport                    | 1,323         | 1,642         | 1,472         | 1,704         | 1,985         |
| Other fields of economy      | 3,938         | 4,516         | 4,099         | 4,209         | 4,357         |
| Non energy use               | 458           | 630           | 520           | 537           | 618           |

Source: Ministry of industry and energy, 2011

## Oil and Gas

Azerbaijan is currently a net exporter of oil and natural gas. The total crude oil production in Azerbaijan in 2011 was 45.6 mln ton, while natural gas production totalled 16.4 billion m<sup>3</sup>. There are a number of perspective fields in Azerbaijan that are under development and it is expected that new exploration fields will positively contribute to an increase in the oil production of the country. Furthermore, the State Oil Company of the Azerbaijan Republic (SOCAR) announced the discovery of the second largest gas field, Umid, in 2010. Data from the well shows that the Umid deposit contains 200–250 billion m<sup>3</sup> of natural gas at the lowest estimation. Reserves of this size could push Azerbaijan's proven gas reserves up to around 2,550 billion m<sup>3</sup>.

The Caspian Sea is considered one of the most important spots in the world for oil exploration and development. Proven oil reserves in the Caspian Basin, which Azerbaijan shares with Russia, Kazakhstan, Turkmenistan and Iran, are comparable in size to the North Sea reserves of several decades ago. One of the priorities of the economic policy of the Republic of Azerbaijan was the preparation of an oil strategy for an independent state. The implementation of this strategy started in September of 1994 with the signing of the 30-year contract between SOCAR and 12 international oil companies (Amoco, BP, McDermott, Unocal, LUKoil, Statoil, Exxon, Turkiye Petrolleri, Pennzoil, Itochu, Ramco and Delta) on the joint exploitation of the 'Azeri' and 'Chirag' wells and the deep part of the 'Guneshli' well in the Azerbaijan sector of the Caspian Sea and a share division of oil production.

The Baku-Tbilisi-Ceyhan (BTC) pipeline, which opened in May 2005, has a maximum capacity of 1 million barrels per day (bbl/d). While oil and gas production in Azerbaijan has been steady for the past few years, imminent large-scale investments in the oil and gas sector (most notably, a \$20 billion investment for the second stage of the Shah Deniz gas project) are likely to cause energy production to rise in the next decades.

SOCAR was founded in 1992 following the merger of two state oil companies: Azneft and Azneftkimiya. It is responsible for all aspects of the offshore and onshore exploration of oil and gas fields in the country, the pipeline system, oil and gas imports and exports and the processing, refining and sale of oil and gas products. Azerigaz, a SOCAR subsidiary, is responsible for natural gas processing, transport, distribution and storage, mainly in the domestic market. Azneft, another SOCAR subsidiary, is responsible for the exploration, development and production from the older onshore and offshore natural gas fields owned directly by SOCAR. The Azerbaijan International Operating Company (AIOC) is the largest foreign joint venture in association with SOCAR, and is involved in the development of the Azeri Chirag Guneshli (ACG) oil and gas fields and the Shah Deniz gas field. On its own, SOCAR produces less than 20% of Azerbaijan's total output, with the remaining 80% being produced by the BP-operated AIOC.

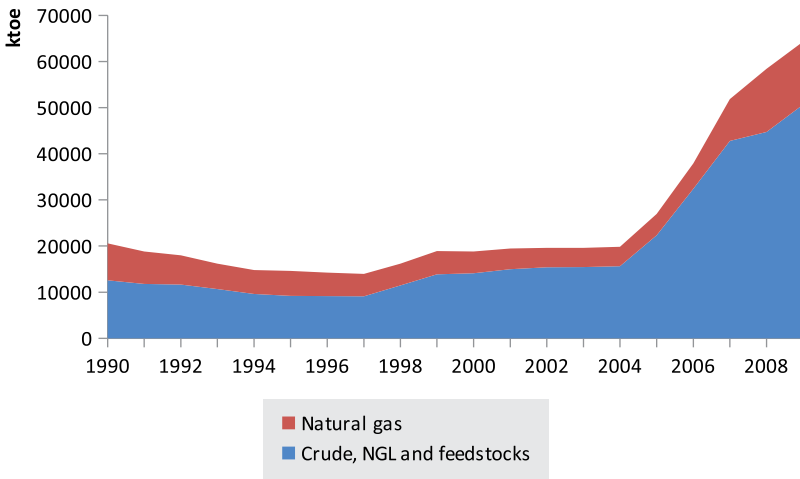
Azerbaijan's proven crude oil reserves were estimated to be 7 billion barrels in January 2012, according to the Oil and Gas Journal (OGJ). The country's largest hydrocarbon basins are located offshore in the Caspian Sea, particularly the ACG field, which accounted for nearly 80% of Azerbaijan's total oil output in 2010. The graph below shows oil production from 1990 up to 2009. Crude oil production increased sharply after 2004 with an average growth rate of 28% in the period 2004–2009. Oil production in Azerbaijan increased from 288,000 bbl/d in 2000 to 1.1 million bbl/d in 2010. The Azeri government and BP expect that Azerbaijan's total oil production will peak by 2012.

Azerbaijan has a crude oil refining capacity of 399,000 bbl/d as of January 2012, according to the OGJ. Azeri crude oil is refined domestically at two refineries: the Baku refinery, with a capacity of 239,000 bbl/d, and the New Baku refinery, with a capacity of 160,000 bbl/d. Both refineries need modernisation, which the Azeri Government estimated would cost between \$600 million and \$700 million.

The gas sector plays a key role in the economy of Azerbaijan. According to MIE proven natural gas reserves of Azerbaijan are approximately 2,550 billion m<sup>3</sup>. The next graph shows that natural gas production in Azerbaijan started to increase sharply from 2004–2009, from 4189 ktOE (4.5 billion m<sup>3</sup>) to 13660 ktOE (15 billion m<sup>3</sup>). In 2010, the natural gas production in Azerbaijan increased further to 17 billion m<sup>3</sup>. Almost all of Azerbaijan's natural gas is produced in two offshore fields: the ACG complex and Shah Deniz. The Shah Deniz natural gas and condensate field started producing in late 2006, tripling the total production and making Azerbaijan a net gas exporter. The ACG field provides associated gas to the Azerigaz system for domestic use via an undersea gas pipeline to the Sangachal Terminal at Baku. The Sangachal Terminal, located south of Baku, is one of the world's largest integrated oil and gas processing terminals. It receives, stores and processes both crude oil and natural gas from the ACG fields and from Shah Deniz, and then ships these hydrocarbons through the South Caucasus pipeline for export.

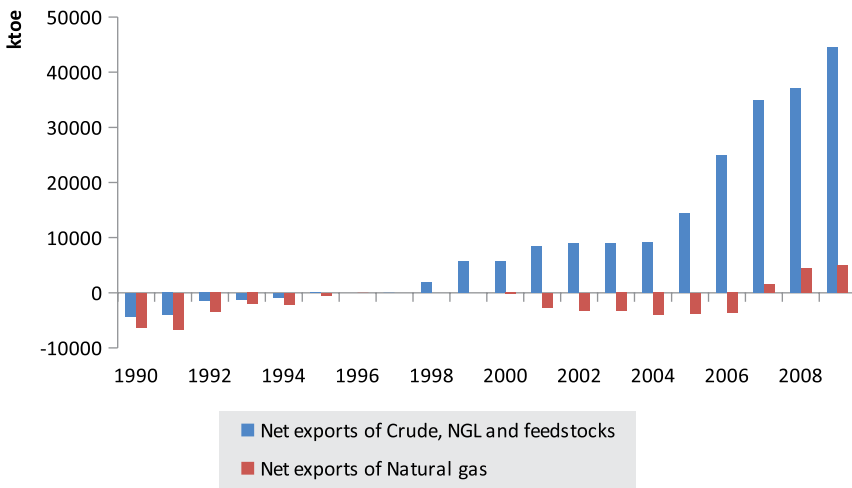
Azerbaijan exported an estimated 777,000 bbl/d in 2010, which was a drop of about 8% compared with that in 2009. Although Azerbaijan has three export pipelines, most (about 80%) of its oil is exported via the BTC pipeline. Azerbaijan became a net exporter of natural gas in 2007 with the start-up of the Shah Deniz field; in prior years it imported natural gas from Russia. In 2010, Azerbaijan exported around 6.4 billion m<sup>3</sup> to Turkey, 0.3 billion m<sup>3</sup> to Georgia, 1 billion m<sup>3</sup> to Russia and 0.1 billion m<sup>3</sup> to Iran.

Figure 7: Oil and natural gas production of Azerbaijan



Source: IEA statistics, 2011

Figure 8: Net exports of oil and natural gas from Azerbaijan



Source: IEA statistics, 2011

### Renewable Energy

Azerbaijan has vast resources of almost all types of RE: solar, wind, geothermal, hydro and biomass. There are significant agricultural operations in the country that could provide residues for biomass combustion or gasification. High average annual wind velocities create the potential for the efficient utilisation of wind power and there also exists solar energy potential due to favourable climatic conditions. The country is also rich in geothermal power. The development of small HPPs is the most promising component in the RES sector. Although

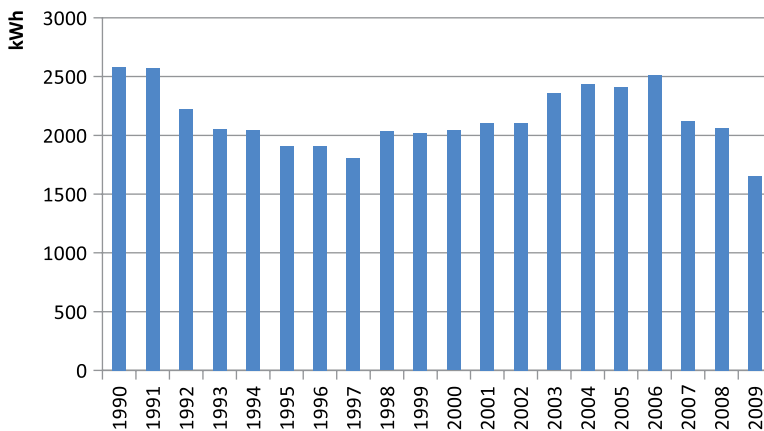
the country currently does not utilise all of its RES, the development of RES is also one of the government's strategic priorities (see the section on RES policy for more details).

### **Electricity**

The power sector is important to the development of Azerbaijan's economy. Azerbaijan is fully electrified, and electrical power is the third most utilised energy source (first is natural gas and second is oil) for domestic and industrial use. It has an installed generating capacity of about 6,500 MW, of which thermal power stations contribute 5,500 MW and hydropower stations make up most of the balance. Until the recent past a significant portion of the installed capacity was not available; however, since the year 2000, investment efforts in generation and transmission have improved conditions in the electricity power system. Converting power plants to natural gas has also provided an important leap forward in terms of improving power plant efficiencies and their environmental impacts.

The development of electricity consumption per capita shows an increasing trend from 1997–2006. The increasing trend was reversed in 2007 and continued to decline until 2009. The main reason for the fall in demand was substantial rises in tariffs in January 2007, coupled with the implementation of the government's policy to install meters and increased bill collection. The electricity tariff was increased in January 2007 from 24 \$/MWh to 75 \$/MWh for the first time since 1997. A further factor is the gasification programme, which allows the switching from electricity to natural gas for heating. Electricity consumption per capita was 1651 kWh in 2009, which is well below the average per capita consumptions of developed economies; for example, about 6000 kWh is consumed per capita in the EU-27 per year.

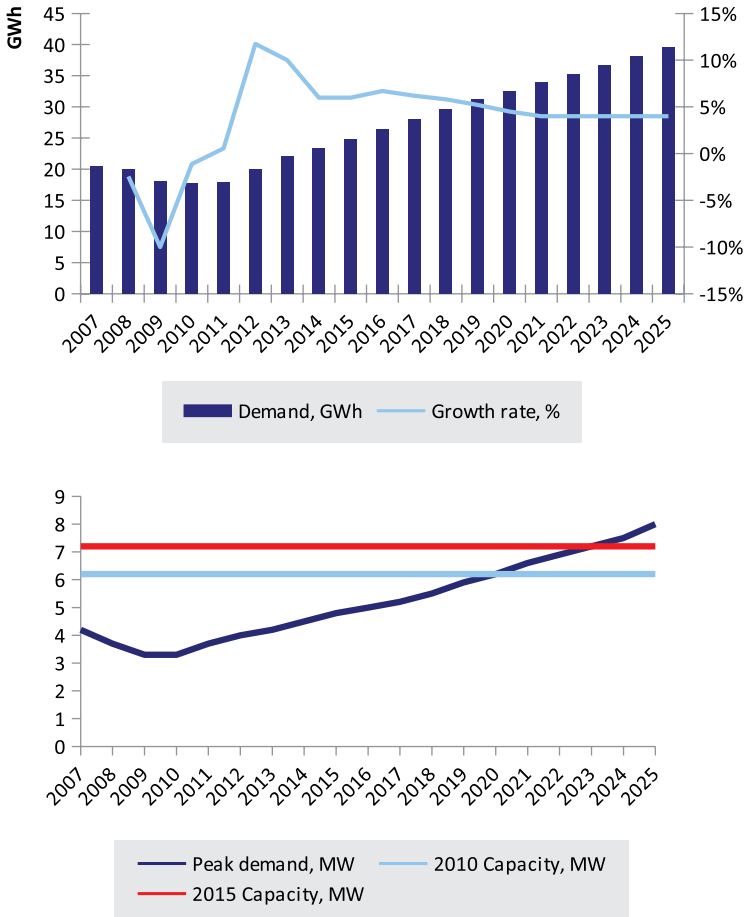
**Figure 9: Electricity consumption per capita**



Source: IEA statistics, 2011

According to Azerenerji the demand for electricity is expected to double between 2012 and 2022, and to increase by almost 140% by 2025. The peak demand is also expected to double by 2022–2023.

Figure 10: Demand and peak load power projection for Azerbaijan



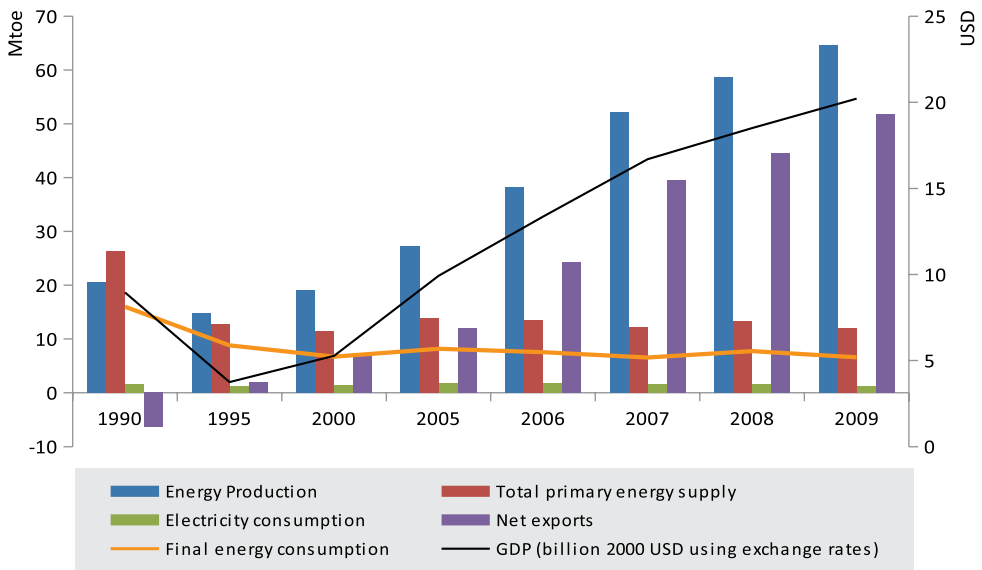
Source: Azerenerji JSC, Presentation to Fitch, March 2012

**Evolution of Energy Production, Exports and Consumption**

The evolution of energy production, exports, primary energy supply, electricity and energy consumption values in the period 1990–2009 is illustrated below. The GDP indicator is also given in the graph to represent the relation between economic growth and energy developments.



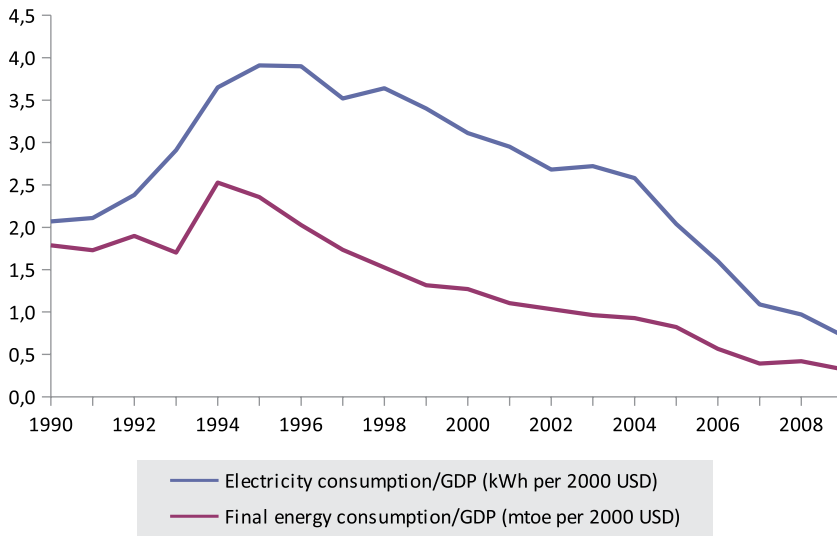
Figure 11: Energy production, net exports and total primary energy supply



Source: IEA statistics, 2011

Energy production and energy consumption reached their lowest values in 1995, dragging GDP level to its lowest point after the country became independent. The recovery of the economy can be seen clearly from the GDP trend, which had an average growth rate of 13% between 1995 and 2009. Energy consumption and electricity consumption has not followed the same path with GDP and they have remained fairly stable after 1995. Hence, GDP and energy consumption are not correlated in Azerbaijan, since GDP is growing, while the energy consumption is nearly constant. Alternatively, we can establish a correlation between economic growth and the export volume. This relation is evident from the graph. The net energy exports of Azerbaijan have had an average 32% yearly growth after 1995, increasing from 1.9 Mtoe in 1995 to 51.8 Mtoe in 2009. This significant increase in exports has come from the increased energy production of the country that came with the exploration of oil and gas reserves. Energy production had an average growth rate of 12% for the period 1995–2009. Electricity consumption values are decoupled from GDP and energy production and electricity consumption are mainly influenced by tariffs, which caused a significant decrease in electricity consumption after 2007. Because of the dependence of economic growth on energy exports, the energy intensity of GDP dropped after 1995, which can be clearly seen below.

Figure 12: Energy intensity of GDP



Source: IEA statistics, 2011

### Electricity and Heat Production

The state-owned company Azerenerji is responsible for the operation of the generation and transmission infrastructure and the import and export of electricity. The company has a monopoly position in the market and produces, transports, distributes and sells electricity throughout the whole country, except for the distribution business in the capital, Baku. Azerenerji manages electricity generation across the country and operates eight TPPs, six HPPs and seven module-type power plants (MPPs). All cities and villages are electrified and are connected to the electricity grid and almost all customers are metered in Azerbaijan.

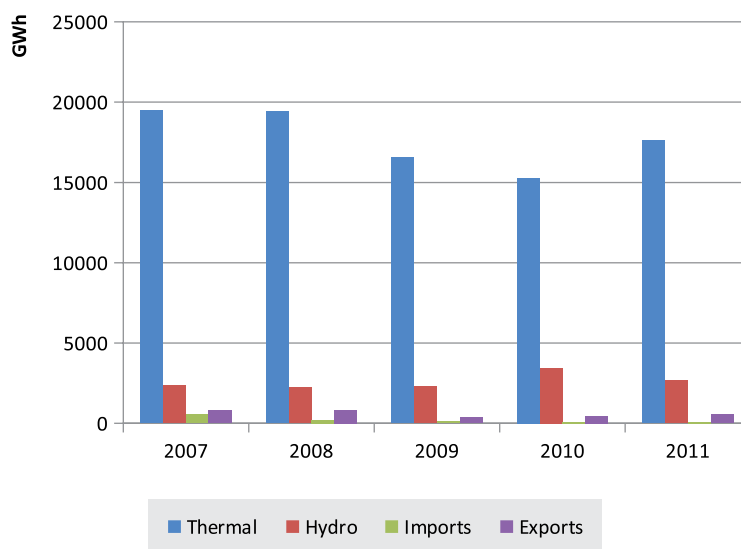
The electricity generation and total final consumption of the country increased gradually from 1997 till 2007. The total generation increased from 16.8 TWh in 1997 to 21.8 TWh in 2007 with an average yearly growth rate of 4%. Similarly, the total final electricity consumption increased in the same period with an average growth rate of 7%. During this period, the country was the net importer of electricity to meet the increased demand. Together with an increase in electricity tariffs in 2007, both generation and consumption fell significantly, with an average 7% and 14% yearly decrease in generation and consumption respectively. With the fall in demand, the country became the net exporter of electricity from 2007 onwards.

Table 3: Electricity statistics for 2007–2011 (GWh)

|                                     | 2007   | 2008   | 2009   | 2010   | 2011   |
|-------------------------------------|--------|--------|--------|--------|--------|
| Total generation                    | 21,847 | 21,643 | 18,867 | 18,709 | 20,294 |
| Oil products and natural gas        | 19,483 | 19,410 | 16,559 | 15,263 | 17,618 |
| Hydro                               | 2,364  | 2,232  | 2,308  | 3,446  | 2,676  |
| Electricity imports                 | 548    | 216    | 110    | 100    | 90     |
| Electricity exports                 | 786    | 812    | 380    | 462    | 550    |
| Total final electricity consumption | 15,953 | 15,650 | 12,393 | 12,326 | 13,369 |

Source: MIE, 2012

Figure 13: Electricity balance 2007–2011



Source: MIE, 2012

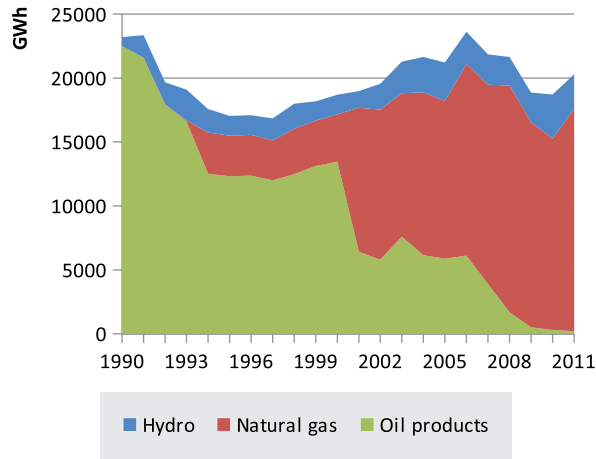
Table 4: Azerenerji's generation facilities

| Generation Facility | Current Installed Capacity (MW) | Projected YE 2012 Installed Capacity (MW) | Projected YE 2015 Installed Capacity (MW) |
|---------------------|---------------------------------|---|---|
| TPP                 |                                 |   |   |
| Azerbaijan TPP      | 2,400                           | 2,600                                     | 2,600                                     |
| Janub               |                                 | 780                                       | 780                                       |
| Shirvan TPP         | 900                             |   |   |
| Baki TPP            | 106                             | 106                                       | 106                                       |
| Sumqait CCPP        | 525                             | 525                                       | 525                                       |
| Shimal CCPP         | 400                             | 400                                       | 400                                       |
| Shimal II CCPP      |                                 |   | 400                                       |
| Boyukshor           |                                 |   | 385                                       |
| Baki MPP            | 104                             | 104                                       | 104                                       |
| Astara MPP          | 87                              | 87  | 87  |
| Sheki MPP           | 87                              | 87  | 87  |
| Khachmaz MPP        | 87                              | 87  | 87  |
| Sangachal MPP       | 301                             | 301                                       | 301                                       |
| Shahdagh MPP        | 104                             | 104                                       | 104                                       |
| Total               | 5,101                           | 5,181                                     | 5,966                                     |
| HPP                 |                                 |   |   |
| Mingechevir HPP     | 416                             | 416                                       | 416                                       |
| Shemkir HPP         | 380                             | 380                                       | 380                                       |
| Yenikend HPP        | 150                             | 150                                       | 150                                       |
| Varvara HPP         | 17                              | 17  | 17  |
| 25 small HPP        |                                 |   | 50  |
| Total               | 963                             | 963                                       | 1,013                                     |

Source: Azerenerji JSC, Presentation to Fitch, March 2012

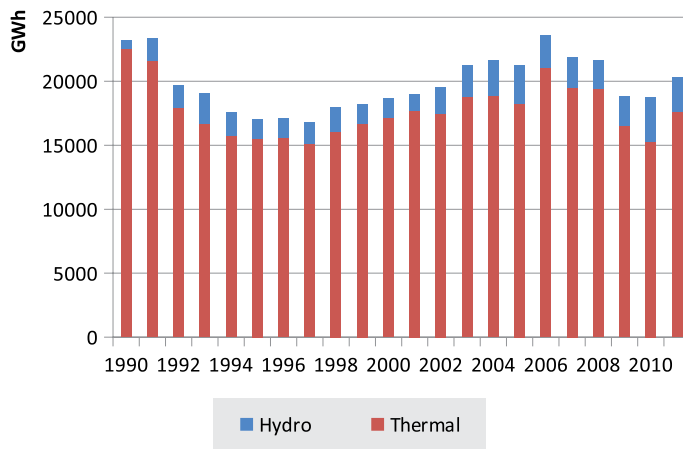
Electricity generation is entirely based on natural gas (combined cycle gas turbines), heavy oil (only on peak demand) and hydropower. About 90% of the capacity is based on fossil fuels. Firewood is used mainly for domestic consumption. The country is using its natural gas sources increasingly for generation; the share of oil products in the generation decreased from 70% in the 1990s to about 3% in 2009 and was replaced by natural gas.

Figure 14: Electricity generation by fuel



Source: IEA statistics, 2011 and MIE, 2012

Figure 15: Electricity generation by power plant type



Source: IEA statistics, 2011 and MIE, 2012

According to the latest energy balances of the State Statistical Committee of the Republic of Azerbaijan (2011), as of 2010, losses in the transmission system are 3.8%, whereas losses in the distribution system are 16.6%, where both loss ratios are calculated as the loss over total generation. This is close to the estimates of MIE, namely 4–5% transmission losses and 15–16% distribution losses.

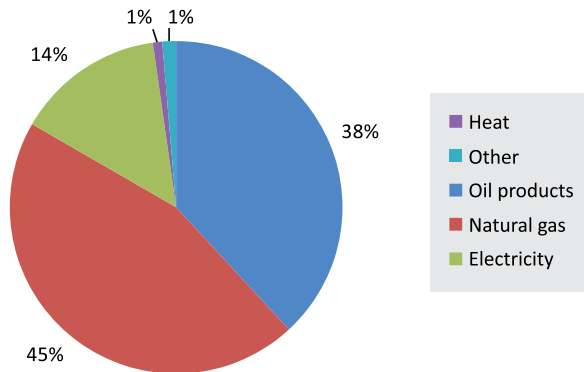
‘Azeristiliktejhizat’ OJSC or the state district heating company supplies Baku, but also other regions in Azerbaijan. They are also responsible for the future development of the heat production units and the heat distribution network. All district heating development is state financed whereas the Tariff Council regulates the tariffs. The existing district heating system is dysfunctional. Instead, electricity is used for heating. The gas price is low at 0.100 €/m<sup>3</sup>. The Tariff Council also approved a threefold price increase for district heating, namely from 5 Kapeke/m<sup>2</sup>/month to 15 Kapeke/m<sup>2</sup>/month<sup>1</sup>, which is 15 €/month for a medium-sized apartment, which is charged in the winter season only. When the consumed heat amount is measured, the tariff is 25 Kapeke/m<sup>3</sup>.

**Energy Consumption Trends by Sectors**

**Total Final Energy Consumption**

The total final energy consumption (TFEC) by energy source is illustrated in the chart below. Oil and gas have a dominant share of 83%. The remaining part consists mainly of electricity (15%), but also heat (1%) and other (1%).

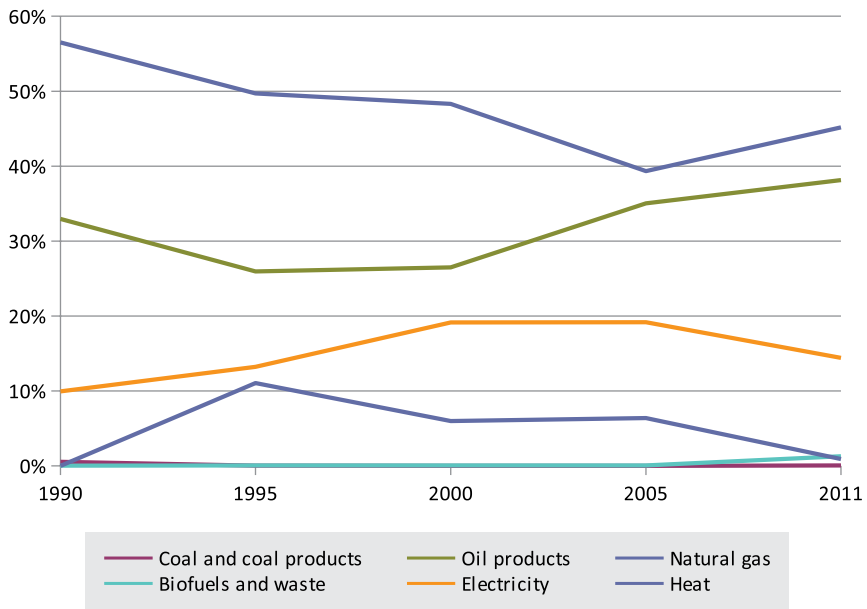
Figure 16: Final energy consumption in 2011



Source: MIE, 2012

The following figure shows the shares of various energy sources in the final energy consumption over the years. The share of natural gas decreased gradually from 57% in 1990 to 45% in 2011. The share of oil products decreased from 33% to 26% between 1990 and 1995, but it resumed growth after 1995 and its share climbed to 37% in 2011. Electricity consumption accounted for an increasing proportion of the final consumption until 2000–2005 and its share reached 19% but then electricity consumption started to fall due to a substantial increase in tariffs and its share in 2011 became 14%.

<sup>1</sup> 1 Manat = 100 Kapeke, whereas 1 Manat is approximately equal to 1 Euro.

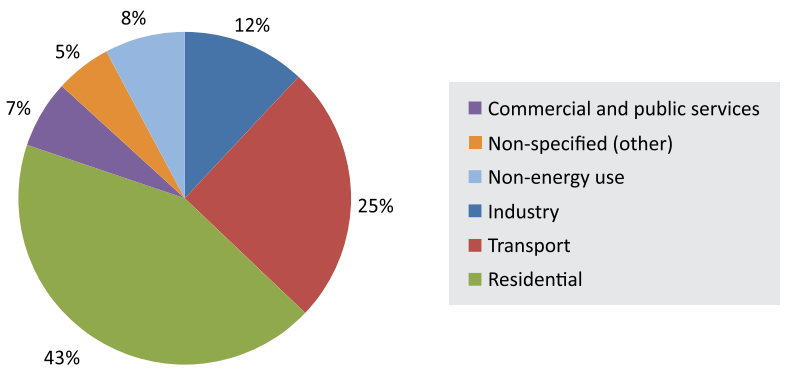
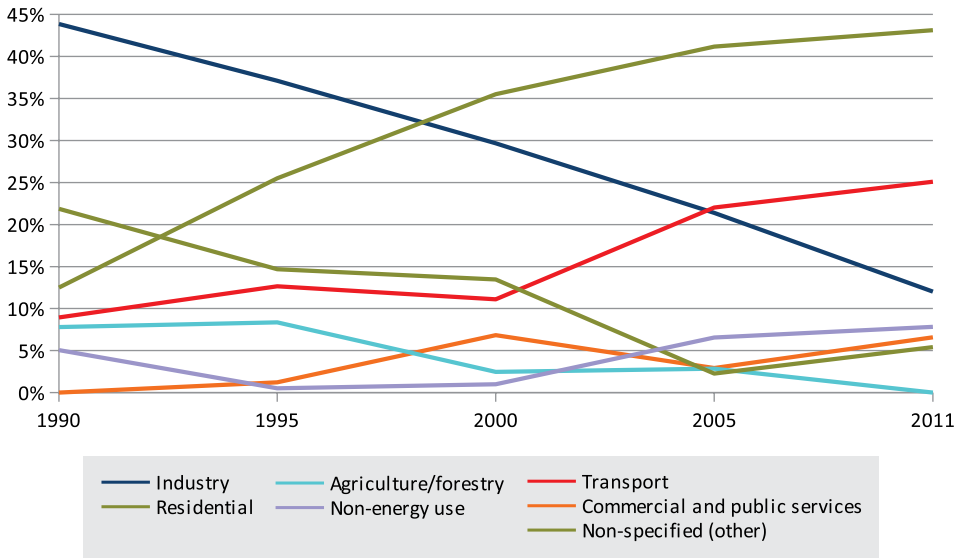
**Figure 17: Trends in final energy consumption**

Source: IEA statistics, 2011 and MIE, 2012

### **Final Energy Consumption by Sector**

Residential consumption accounted for 43% of the total final consumption in 2011 and this was followed by transport (25%) and industry (12%). Non-energy use and commercial consumption each has about a 7% share in the final consumption. The following figure shows the share of each sector over the years. It is clear that industrial consumption has decreased significantly and its share is replaced by residential consumption. The share of transport activities is also increasing while the commercial and agricultural consumption shares remain relatively stable.

Figure 18: Final consumption by sectors, 2011



Source: IEA statistics, 2011 and MIE, 2012

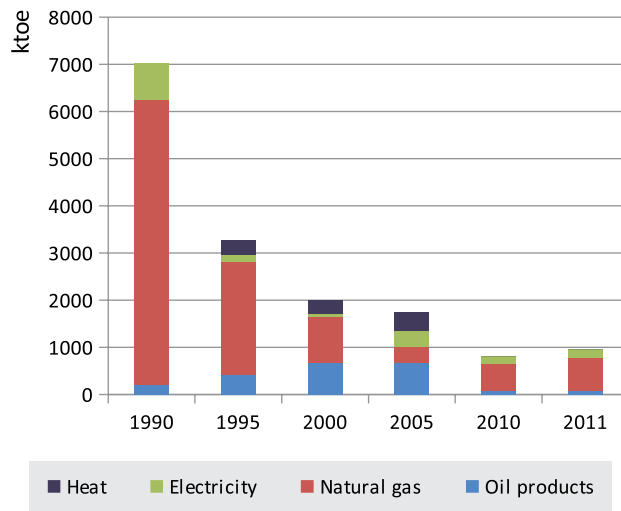
### Industry

The figure below shows the final energy consumption trend in the industry sector by fuel over the past years. Industrial consumption has decreased substantially from 1990 till today, from 7 Mtoe in 1990 to 1 Mtoe in 2011.

Gas is the preferred fuel and it contributes to the bulk of energy used in industry, with a share of 73% in 2011. The share of oil products in industrial use is only 9%. The electricity used in industrial consumption constituted about 18% of the total consumption in the sector in 2011.



Figure 19: Final energy consumption of the industrial sector



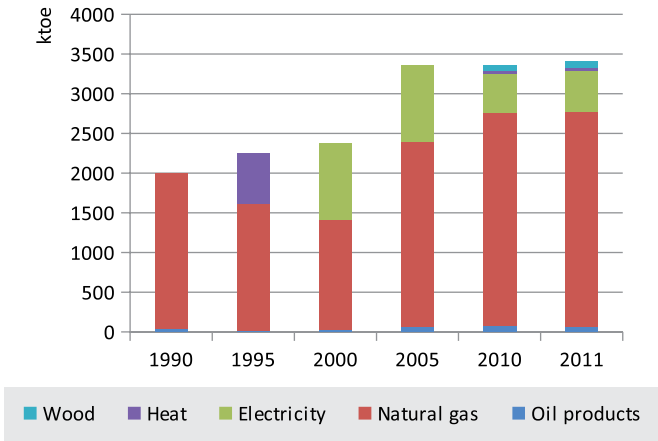
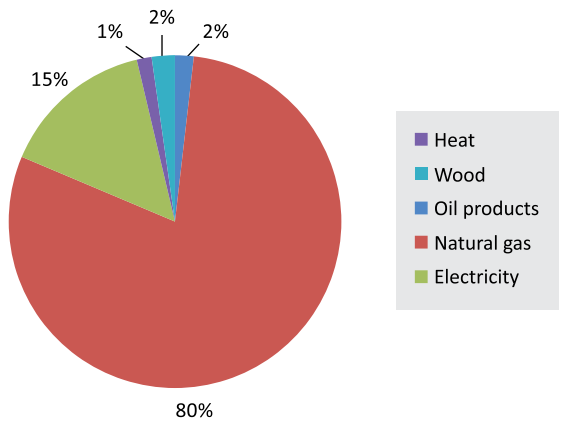
Source: IEA statistics, 2011 and MIE, 2012

### Residential

Residential energy consumption increased gradually from 2,001 ktoe in 1990 to 3,618 ktoe in 2006 with a yearly average growth of 3.8%. It started to decrease in 2007, mainly due to the fall in electricity consumption resulting from the increase in tariffs.

Natural gas is the main fuel used in residential consumption. About 80% of the total residential energy consumption is met by natural gas. There is no diversity in the energy sources used for residential consumption and electricity represents only 15% of the total consumption. The shares of heat, wood and oil products constitute the remaining 5%.

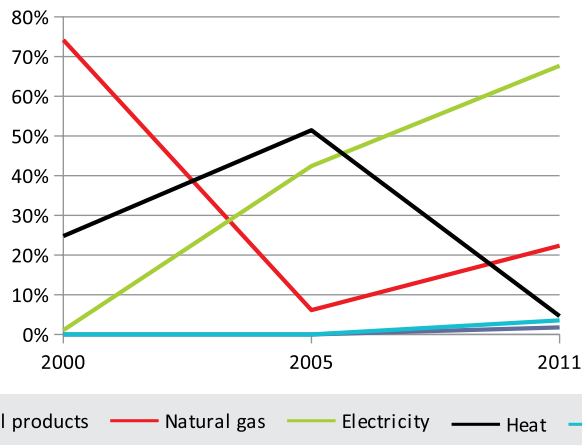
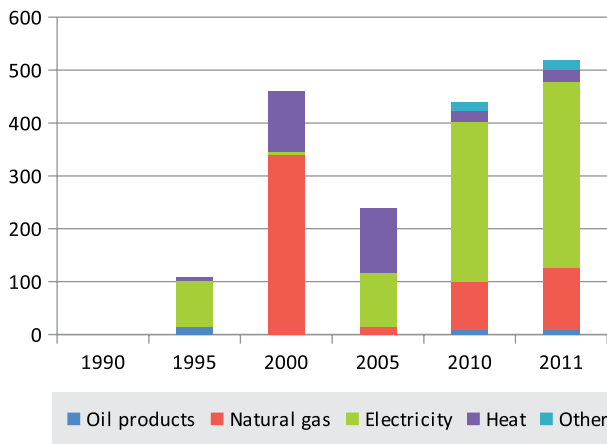
Figure 20: Final energy consumption of the residential sector in 2011



Source: IEA statistics, 2011 and MIE, 2012

### Services

Services comprise the commercial and public sectors. The total energy consumption in the sector increased during the period 1995–2000 and then started to fall during the following five years but reassumed growth again after 2005. The average yearly growth of the final energy consumption of the commercial sector was 1.1% in the period 2000–2011.

**Figure 21: Final energy consumption of the services sector**

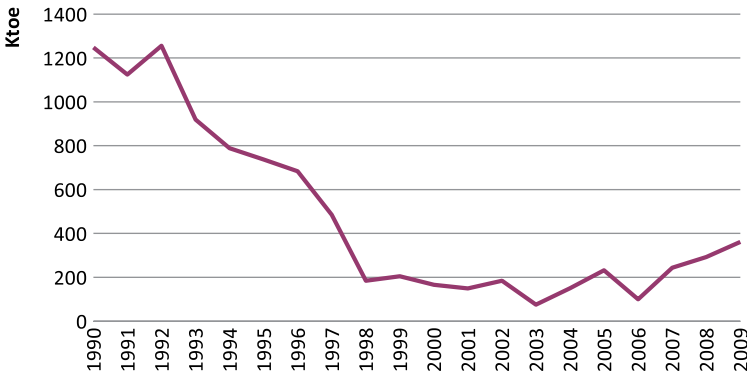
Source: IEA statistics, 2011 and MIE, 2012

The energy consumption of the sector changes dramatically as can be seen from the figure above, which shows the shares of energy sources in the final energy consumption. The share of natural gas decreased from 74% in 2000 to 22% in 2011 and this has mainly been replaced by electricity, indicating an electrification of the services sector. Heat consumption shows great volatility, with an increase during 2000–2005 and a steep decrease after 2005. Electricity consumption has grown gradually and its share in the final energy consumption was 68% in 2011.

### **Agriculture and Forestry**

The final energy consumption of the agriculture and forestry sector decreased gradually during 1990–2006 from 1,248 ktoe to 99 ktoe and started to increase after 2006, reaching 361 ktoe in 2009. Oil products have an 83% share in the TFEFC of the sector and the remaining balance is met by electricity; the share of natural gas remains insignificant.

Figure 22: Final energy consumption of the agricultural sector

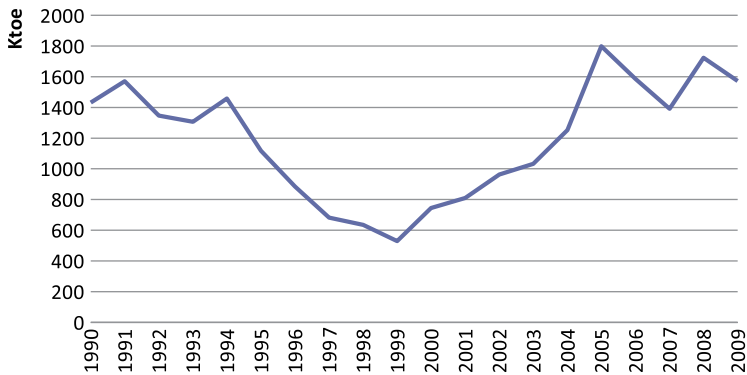


Source: IEA statistics, 2011

### Transport

Energy use in transport decreased during 1990–1999 but then it gained a significant increase and exceeded its value of 1990 after 2004, corresponding to the opening up of the economy to foreign countries and also to the increase in the quality of life. Almost all of the final energy consumption in the transport sector is met by oil products, and the share of electricity is only 2%.

Figure 23: Final energy consumption of the transport sector



Source: IEA statistics, 2011



ENERGY POLICY

## **Background**

Azerbaijan has a strong moral, cultural, scientific and economic potential and a favourable geographical-political position and is particularly famous for its rich natural resources. Oil occupies an important place among these reserves. Within the first years of independence the increase in gas and oil production was regarded as one of the major means by which to eliminate the economic and social troubles. Under the conditions of limited financial funds the participation of foreign companies and investors was required. The oil contract signed with the oil companies of the West in Baku on 20 September 1994 opened a new page in the history of the country and it has been called the 'contract of the century'. 21 oil contracts were signed with the foreign oil companies in Baku as well as in Washington, Moscow, London and Paris with the direct participation of Heydar Aliyev. To date nearly 30 companies in 14 countries of the world participate in the implementation of the said contracts.

The transportation of Azeri oil to the world markets has been one of the major targets of the country. The development of wide international economic co-operation and the increase in the oil production in the region has done much for the implementation of the project involving the BTC oil pipeline. Negotiations have been conducted and successfully completed over the transportation of oil to global markets. On 18 November 1999, the president of the Republic of Azerbaijan, Heydar Aliyev, the president of Georgia, Edward Shevarnadze, and the president of Turkey, Suleyman Demirel, signed a contract on the transportation of crude oil by the BTC pipeline via the Republic of Azerbaijan and Turkey at the Istanbul OSCE summit. The country celebrated the first oil produced by the BTC pipeline in May 2005, and the official completion ceremony of this pipeline was held in Turkey in July 2006. Since then the BTC pipeline has been operational, with a maximum capacity of 1 million bbl/d. Furthermore, in parallel with the BTC the Baku-Tbilisi-Erzurum gas export pipeline was commissioned in September 2006. In October 2008, the first tanker carrying oil from Kazakhstan's Tengiz field departed for Azerbaijan.

Securing long-term energy independence is a stated policy goal for fostering economic growth. However, as the country is already energy independent and is a net energy exporter, the momentum towards harnessing RES potential appears to be linked to recent high international oil and gas prices.

## **Energy Policy Goals**

The Azerbaijani Government has adopted the State Programme for the Development of the Fuel and Energy Sector (2005–2015), which identifies and sets development targets for the various sub-sectors within the energy sector along with a package of specifically defined measures aimed at achieving the aforementioned targets and goals within the prescribed period over the next 10 years. The overall goal of the state programme is to meet the electric power, gas and other energy demand of both the population and the economy fully through the continued development of the fuel and energy sector. The principal specific objectives of the state programme are as follows:

- to determine the priority development targets for Azerbaijan's fuel and energy sector in compliance with the best practices and standards of the modern world;
- to implement appropriate scientific and institutional actions aimed at enhancing the operating effectiveness of the various industries within the fuel and energy sector;
- to ensure the implementation of appropriate technology measures for the improved

production, processing, transportation, storage, accounting and consumption of energy resources;

- to help include the environment for sound competition in the fuel and energy sector;
- to increase the volume of investments for the development of the fuel and energy sector;
- to ensure environmental safety in the fuel and energy sector; and
- to ensure more complete collections of fuel and energy (electricity and natural gas) bills.

The following activities are envisaged for the upcoming years for oil and gas production with the purpose of further developing the country's fuel and energy sector:

- finding and exploring new fields;
- launching a full-scale operation on discovered fields;
- drilling new wells and rehabilitating idle wells in the operated fields;
- introducing new machinery and technologies in the operated fields to increase the oil recovery factor; and
- constructing, reconstructing and modernising the oil and gas production, transportation and refinery/processing systems, and broadly applying science and technology breakthroughs and advanced expertise.

### **Legal Basis**

The following laws governing the energy sector have been adopted by the parliament.

- The Law on Energy (Baku, 24 November 1998, No. 541-IQ)
- The Law on Electricity (Baku, 13 June 1998, No. 723)
- The Law on Subsoil (Baku, 13 February 1998, No. 439-IG)
- The Law on the Use of Energy Resources (Baku, 30 May 1996)
- The Law on Power Plants and Heat Generation Plants (Baku, 28 December 1999, No. 84-IG)
- The Law on Gas Supply (Baku, 30 June 1998, No. 513-IG)
- The Law on Environmental Security (Baku, 4 August 1999, No. 172)
- The Law on Environment Protection (Baku, 4 August 1999, No. 173).

The Law on the Use of Energy Resources, passed on 30 May 1996, defines the legal, economic and social fundamentals for state policy on the use of energy resources as well as the main directions for policy implementation.

The Law on Energy covers the regulation of the exploration, exploitation, production, processing, storage, transportation, distribution and use of all 'energy materials and products', including gas. Essentially, the Law on Energy is an 'umbrella' law for power regulations. Each person intending to engage in activities related to energy must obtain, prior to commencing such an activity, special authorisation from the MIE on the basis of an energy contract or application to such a ministry.

The legal framework for the regulation of oil and gas in Azerbaijan was established with the

adoption of the Law on Subsoil. The Law on Subsoil governs the exploration, use, protection, safety and supervision of the use of subsoil reserves including, but not limited to, oil located both within Azerbaijan and in the Azerbaijani sector of the continental shelf of the Caspian Sea. Under the Law on Subsoil, no person or legal entity may engage in oil or gas exploration and production without a licence.

The Law on Gas Supply regulates the process of the production, processing, transportation, storage, distribution, sale and use of all types of gas (including natural gas). No grid code has been adopted in Azerbaijan. There is no third-party access to the pipeline network and access to the grid must be negotiated with Azerigaz.

The main legislative acts regulating the power sector are the Law on the Use of Energy Resources, the Law on Electricity and the Law on Power Plants and Heat Generation Plants. The Law on Electricity requires that individuals and legal entities obtain special permission to conduct activities concerning the generation, transportation and distribution of electricity if not otherwise determined by law.

### **Energy Market Liberalisation**

According to the action plan for 2011–2015, approved by the president for the implementation of the State Programme on Poverty Reduction and Sustainable Development 2008–2015 (adopted by Decree #3043 from 15 September 2008), the country will begin the privatisation of enterprises in the fuel and energy sector. The action plan prescribes that the State Committee for Property Affairs and the MIE should be approached for consultations during 2011–2015 on the privatisation of enterprises in the electric power, oil and gas industries, based on the sales of oil and petroleum products. In accordance with the State Privatisation Programme, the president of Azerbaijan, on the advice of the State Committee for Property, decides on the admission of foreign investors to participate in privatisation, which includes facilities and enterprises in the energy sector. However, no noticeable activities have taken place so far with the exception of two small privatised HPPs. Meetings with government agencies and companies have confirmed that there are no immediate plans to proceed with the privatisation and opening up of the state companies in the oil, gas and electricity sectors.

There is limited competition due to the existing monopolies in the gas and electricity sectors. The Azeri electricity market has not opened yet and no formal opening timeframe has been envisaged. Legislation neither requires transmission and distribution to be separated from generation nor envisages the presence of a separate transmission system operator and distribution system operator. Accounting, functional and/or managerial disaggregation has not been accomplished or envisaged by legislation. Nonetheless, partial disaggregation has occurred: some mini-power plants have been privatised and one independent regional distribution company has been created. The principles of non-discriminatory access to the network infrastructure are provided by legislation, though this has not been implemented in practice due to the current market structure.

All gas institutions remain in state hands and there are no plans to change this in the near future. The president of Azerbaijan issued Decree No. 310 on Measures to Improve the Issuance of Special Permits (licences) for Certain Types of Business Activities in Azerbaijan on 28 March 2000, which has been subsequently amended. Under the decree the production and processing of oil can only be conducted by state enterprises or joint stock companies (JSCs) in which the controlling stake belongs to the state. Under the Law on Subsoil, the right to engage



in subsoil exploration and extraction activities may be granted pursuant to a special permit (licence) to Azerbaijani citizens and entities as well as to foreign individuals and legal entities. Consumers cannot purchase natural gas directly from producers such as the AIOC. Azerenerji procures natural gas for electric plants under a contract agreement with SOCAR. There is no third-party access; access to the grid must be negotiated with Azerigaz.

### **Institutional Framework**

The Ministry of Fuel and Energy of the Republic of Azerbaijan was established by Order 458 of the president of the Republic of Azerbaijan on 18 April 2001. The duties, functions and rights of the ministry were defined in the statute of the ministry ratified by Order 575 of the president of the Republic of Azerbaijan on 6 September 2001. The ministry was eliminated and its functions were transferred to the MIE by order of the president (No: 150, 6 December 2004). The MIE functions as the central executive body responsible for the formulation of national policy relating to the industry and energy sectors. The MIE is also responsible for the following:

- supervision, regulation and control of the efficient use of the Fuel and Energy Complex;
- issuance of special permissions (licences) in cases provided for by the legislation;
- preparation of the annual fuel and energy balance;
- preparation and implementation of state programmes on the development of the industry and energy sectors; and
- development of renewable resources.

Since the first days of its establishment the MIE has established close relations with all international organisations operating in the sphere of fuel and energy and has carried out due measures for the expansion of these contacts. The MIE works very closely with the Ministry of Economic Development of the Republic of Azerbaijan, SOCAR, Azerenerji JSC (the state-owned electricity company) and other related organisations. In accordance with Presidential Decree No. 404 on 15 May 2006, the MIE participates in the preparation and implementation of state policy in the areas of the production, transportation and processing of oil. The ministry in co-operation with SOCAR has the mandate to prepare, negotiate, execute and oversee the implementation of the PSA or other agreements on behalf of the state with respect to the development of hydrocarbon reserves in Azerbaijan.

The Ministry of Economic Development was established instead on 30 April 2001 and has the following duties:

- to determine the strategy for the socioeconomic development and main directions of the Republic of Azerbaijan, to prepare economic programmes and to ensure their implementation;
- to determine how to regulate the socioeconomic activity through analysing the economic situation in the Republic of Azerbaijan;
- to co-ordinate the activity of central and local executive bodies in the implementation of structural reforms;
- to undertake measures for conducting state policy in economic co-operation with foreign countries and international and regional financial organisations, and to increase the efficiency of foreign economic relations;

- to carry out structural and investment policy in the country;
- to define the major directions of regional economic policy and to implement them;
- to undertake due measures aiming to support the development of entrepreneurship and to encourage it;
- to carry out the state policy on state property privatisation and management and to give instructions regarding the state property;
- to undertake measures, stipulated by the law, aimed at the prevention, restriction and liquidation of monopolies and unjust competition between the economic individuals and the protection of the interests of entrepreneurs; and
- to fulfil other duties stipulated by the law of the Republic of Azerbaijan.

On 13 September 1992, according to a decree by the president of the Republic of Azerbaijan, SOCAR was established on the basis of the Azerneft State Concern and Azerneftkimya Production Association in order to use oil resources in accordance with a consistent national policy, improve the management structure of the oil industry and develop the energy industry. SOCAR is involved in exploring oil and gas fields, producing, processing and transporting oil, gas, and gas condensate, marketing petroleum and petrochemical products in domestic and international markets and supplying natural gas to industries and the public in Azerbaijan. Three production divisions, two oil refineries and one gas processing plant, an oil tanker fleet, a deep water platform fabrication yard, two trusts, one institution and 22 subdivisions are operating as corporate entities under SOCAR. Joint ventures (including ventures in Georgia and Turkey), consortia and operating companies established with SOCAR's participation are conducting business in different parts of the petroleum industry.

SOCAR's 'Azerigaz' Production Union was established using the facilities and equipment of the Azerigaz Closed Joint Stock Company (CJSC) in accordance with Decree No. 366 of the president of the Republic of Azerbaijan on 1 July 2009 'Concerning Improvements in Petroleum Industry Management Systems'. The 'Azerigaz' Production Union transmits, distributes and markets natural gas in the Republic of Azerbaijan. The syndicate also transports SOCAR gas to the Islamic Republic of Iran, Georgia and the Russian Federation. The total volume of gas transported annually by the syndicate inside and outside the country is 12.6 billion m<sup>3</sup>. By supplying natural gas to all of the fossil fuel power plants in the country, Azerigaz is playing a significant role in the development of the country's electrical power industry. The production divisions and organisations are consolidated in the 'Azerigaz' Production Union.

Azerenerji JSC, which is a 100% state-owned enterprise, was established by Executive Order No. 423 of the president on 17 June 1996. The main function of the JSC is the management of the Republic of Azerbaijan's electric power production and transmission. Besides, the JSC is carrying out electric power distribution in the country except in Baku, Baku's surroundings and the Nakhchivan Autonomous Republic. The main aim of Azerenerji JSC is to supply the Republic of Azerbaijan with electric power, to make sure the supply system works regularly and to continuously improve it, to totally satisfy consumers' demands and strengthen its position as a reliable supporter in the foreign market. Azerenerji is entitled to submit proposals on tariff increases and to take part in the tariff regulation process, but the final authority with regard to tariff determination in the electricity sector lies with the Tariff Council.

The State Oil Fund of the Republic of Azerbaijan was established by Decree No. 240 of Heydar

Aliyev, dated 29 December 1999. The cornerstone of the philosophy behind the State Oil Fund of the Republic of Azerbaijan is to ensure intergenerational equality with regard to the country's oil wealth and to accumulate and efficiently manage oil revenues. The State Oil Fund was established as a legal entity with a separate management structure and it did not have a special account in the central bank. This is one of the features that distinguish the State Oil Fund. The connection between the State Oil Fund's revenues and expenditures and the state budget is built only within the bounds of a summary of the revenues and expenditures of the public administration sector and it pursues the goal of following a single macroeconomic policy. The assets of the fund could not be used for lending to state authorities and state and non-state organisations and as a guarantee for the liabilities of any subject. The fund's activity is directed at the achievement of the following objectives:

- to preserve macroeconomic stability, ensure fiscal-tax discipline, decrease the dependence on oil revenues and stimulate the development of the non-oil sector;
- to ensure intergenerational equality with regard to the country's oil wealth and accumulate and preserve oil revenues for future generations; and
- to finance major national projects to support socio-economic progress.

The regulations on the Tariff Council of the Republic of Azerbaijan was certified on the basis of Decree No. 341 of the president of the Republic of Azerbaijan dated 26 December 2005 and it was determined that the Tariff Council would be the collegial executive power organ implementing the state regulation of the prices (tariffs), service fees and collections where the state regulation is applied. It was also determined that the minister of economic development of the Azerbaijan Republic would occupy the chair of the council. The council implements its activities on the basis of the Constitution of the Republic of Azerbaijan, the laws of the Republic of Azerbaijan, decrees and orders of the president of the Republic of Azerbaijan, decisions and orders of the Cabinet of Ministers of the Republic of Azerbaijan, the international contracts supported by the Republic of Azerbaijan and the present regulations.

### **Energy Pricing**

The government has established a medium-term tariff policy that incorporates a transition to full cost recovery for utility service providers with a 10% return to equity. This will enable utilities to become financially self-sustainable. The Tariff Council determines the retail and wholesale tariffs as well as the gas and fuel supply prices. The regulated entities are required to provide economic substantiation of the expenses that are part of the prices (tariffs). The calculated tariffs are reviewed by the Tariff Council and published upon approval. There are no access tariffs for generation/retailing and transmission/distribution. Access to, and proper investments in, the network are guaranteed by the Law on Electricity.

A uniform tariff for the population and other tariffs for commercial and industrial enterprises are in force. The following types of tariffs exist in the electricity sector:

- tariffs for the purchase of electricity from producers
- wholesale electricity sale tariffs
- retail electricity sale tariffs
- export and import electricity tariffs.

As with electricity, the gas tariffs are approved by the Tariff Council and are mandatory for all entities in Azerbaijan. The Tariff Council regulates gas tariffs in accordance with its internal rules. There are no access tariffs though separate tariffs exist for the following:

- the wholesale purchase of natural gas
- the retail sale of natural gas to end consumers and
- the transportation of natural gas.

Depending on the specification of the services, tariffs are determined on the basis of the expenses necessary to obtain profits, considering cost price, production force, technology parameters, etc. Tariffs are calculated on the cost-benefit basis using reports for previous years and actual data, as well as forecasted data, taking account of an entity's offer. A tariff rate incorporates the subsidy amounts, which are determined by the government and outside of the control of the Tariff Council.

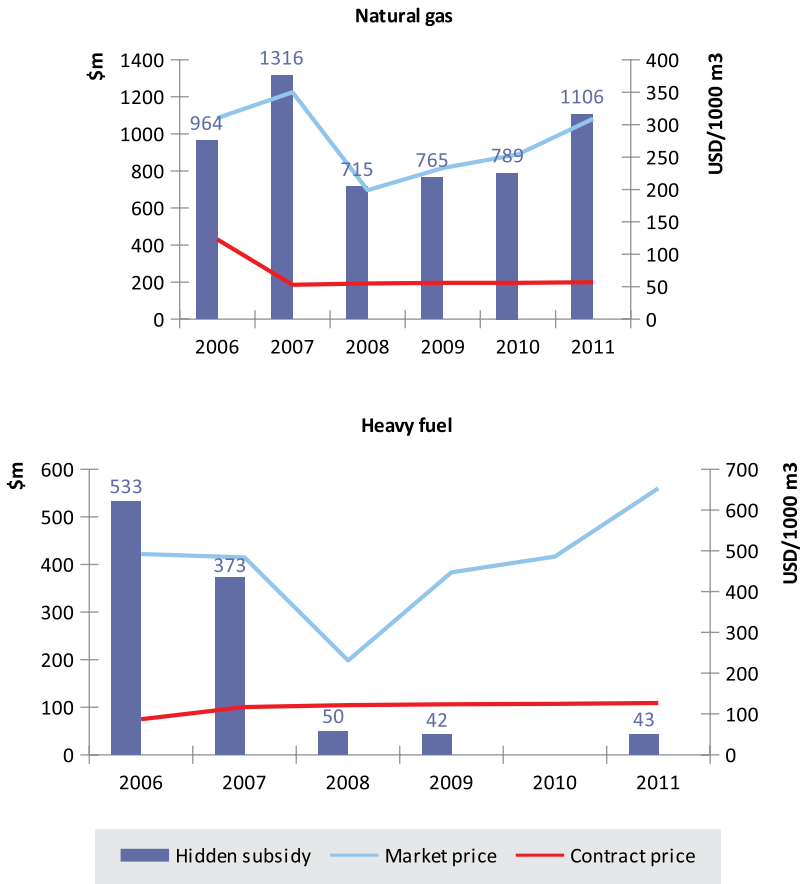
The Tariff Council has powers to set tariffs for any kind of RE, but only wind energy and mini hydropower tariffs have been set. There is no difference between the tariffs for co-generation and traditional power systems. At present, a uniform tariff is applied.

Governmental bodies may cancel or change decisions made by the Tariff Council, where such a right is granted to them by legislation. Regulatory decisions may also be cancelled by court rulings. Energy companies may appeal against a decision made by the Tariff Council, either directly to the council itself or through a court action. An appeal does not automatically terminate a decision, but, if the appeal is deemed to have merit, the applicable Tariff Council decision may be amended or a new one may be defined.

Due to government support there is cheap fuel in Azerbaijan.

- Azerenerji benefits from huge implicit subsidies on the pricing of its fuel:
  - o prices are set by the Tariff Council, chaired by the minister of economic development and including other ministers;
  - o the fuel prices set are renewed automatically every year unless an application is made by SOCAR to raise them;
  - o any rise in the prices of fuel provided by SOCAR would be accompanied by a rise in electricity tariffs.
- The prices Azerenerji has paid for gas and heavy fuel have been well below the prices SOCAR has received on the open market.
- This has resulted in huge implicit subsidies, particularly during periods of surging oil prices.
- The stability of fuel prices is also a major benefit, removing volatile market moves from the equation.

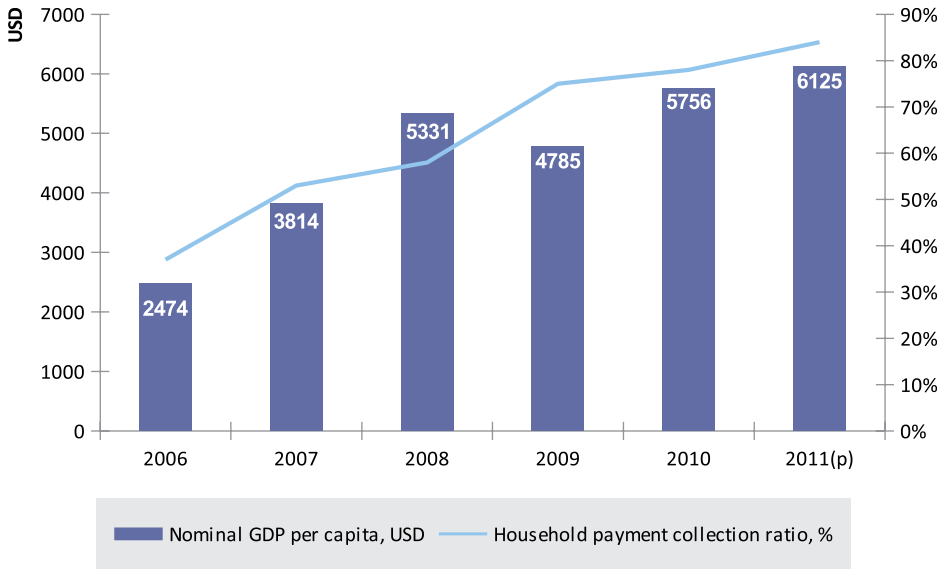
Figure 24: Natural gas and heavy fuel hidden price subsidy



Source: Azerenerji JSC, Presentation to Fitch, March 2012

In addition, payment collection ratios have improved hugely over the past five years, as shown in the next graph.

Figure 25: Household payment collection ratio



Source: Azerenerji JSC, Presentation to Fitch, March 2012



# ENERGY EFFICIENCY POLICY

### **Strategic and Legal Basis**

Among the three main priorities of Azerbaijan's environmental policies set by the Ministry of Ecology and Natural Resources (MENR), one is the 'Efficient Use of Natural Resources for Meeting the Needs of Existing and Future Generations, Benefiting from Renewable Energy Sources through Non-traditional Methods and Achieving Energy Efficiency'. The Azerbaijani Government puts special emphasis on EE and relevant targets are set through various state programmes.

'The National Programme on Environmentally Sustainable Social and Economic Development' for the period 2003–2010 recognises the rationalisation of the use of non-renewable sources of energy as an important factor in the implementation of environmental and sustainable development. The programme proposes the following actions in relation to this purpose:

- introducing highly efficient technologies in heat power plants and optimising the structure of the energy system;
- promoting modern energy saving technologies in both production and non-production sectors; and
- developing and implementing national and regional programmes aimed at better use of energy saving means in households.

The State Programme for the Development of the Fuel and Energy Sector (2005–2015) targets the reduction of losses and prevention of the theft and inefficient use of energy in order to cover the electric power and natural gas demands. It is stated that full payment of the cost of electricity and natural gas consumed is one of the factors that would ensure efficient use of these resources. The State Programme on the Use of Alternative and Renewable Sources (2004) also envisages more efficient utilisation of hydrocarbon energy sources as one of the objectives.

Although the government sets the targets for an energy efficient economy, there is no law or secondary legislation specific to EE activities. The basic elements for the promotion of EE are captured in the Law on the Use of Energy Resources, which took effect in 1996. The law envisages a number of administrative and financial measures promoting EE in the country. These include the following.

- There is mandatory state certification of energy-intensive equipment, both new and already in operation.
- Mandatory energy audits exist for enterprises with annual energy consumption above 8,141 MWh.
- Subsidies for the implementation of EE measures are provided from the State Fund for Rational Use of Energy Resources, as well as for research and development in this field.
- Foreign investment aimed at the efficient utilisation of Azerbaijani energy resources is reimbursed from the cost savings that these measures generate.
- There are state standards of energy usage for different technologies and resources. Compliance with these standard levels is monitored in accordance with the Law on Standardization of Azerbaijan.
- Through inspections, state authorities check on the energy-consumption levels of industrial enterprises to make sure that the energy consumption of both energy and manufacturing



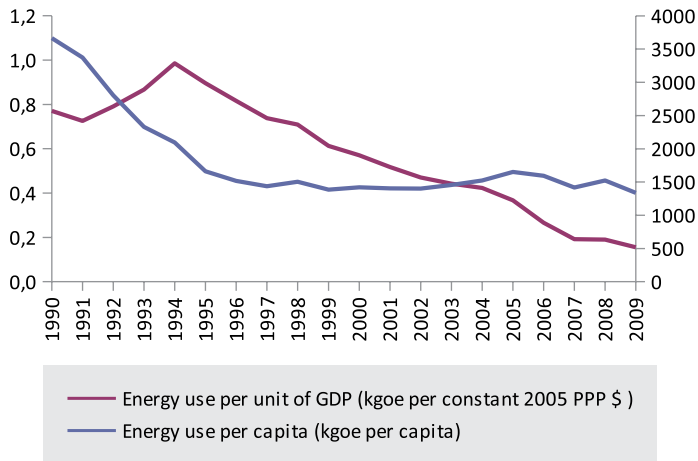
equipment remains within the accepted limits. In the case of non-compliance, a fine is levied on the company.

Azerbaijan has drafted the 'State Programme of Development, Technical Regulation & Standardization of Energy Efficiency'. The State Committee on Standardization, Metrology & Patents of Azerbaijan informs that the programme was designed to increase economic efficiency and accelerate the introduction of European experience in the energy system. The programme has been co-ordinated with relevant government structures and was submitted for consideration by the Azerbaijani Cabinet Ministers in 2011.

### **Energy Intensity**

Energy intensity in Azerbaijan has decreased rapidly since 1994. Energy use per unit of GDP was 0.99 in 1994 and it decreased to 0.16 in 2009. This is the result of the country's impressive GDP growth, which increased the capacity use of the economy as a whole. Although energy intensity has decreased significantly, energy use per capita has remained almost the same since 1994, showing the increase in per capita GDP in the country.

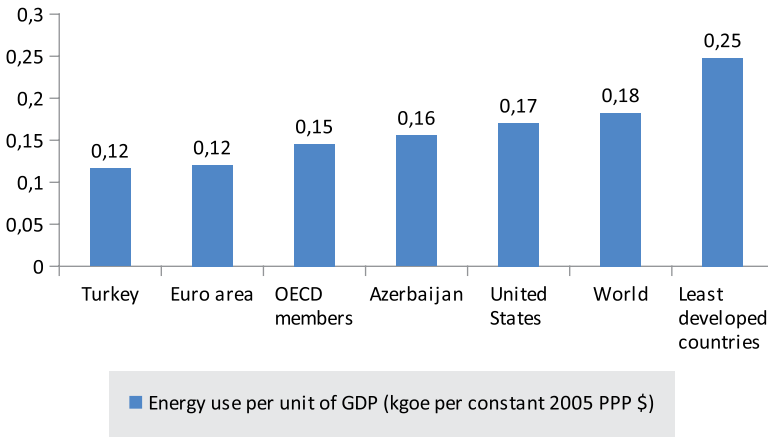
**Figure 26: Energy intensity indicators for Azerbaijan**



Source: WB statistics, 2011

When compared with the world average of 0.18, the energy intensity of Azerbaijan is little bit lower than this and it is close to the energy intensity of OECD members.

Figure 27: Comparison of energy intensity indicators, 2009



Source: WB statistics

Even though EE issues are known by constructors in Azerbaijan, they are generally not applied as they make the projects more expensive. Here a behavioural change is needed. Furthermore, the creation of an EE institute is desired to promote this, but there are no concrete plans for this as yet. A rough estimate shows that an energy consumption reduction of 40–50% would be possible.

A budget of €90 million has been allocated to improve the power distribution network of Baku. As part of this investment SCADA systems are being constructed too. It is further estimated that a reduction of 30–35% in power consumption (below the ‘baseline’) is possible until 2020. In addition, on the supply side a reduction of 25% in fuel consumption by generation plants has already been achieved.

There is no practice involving energy audits, not even for large consumers. In addition, there is no demand-side management for large consumers as yet. Balancing supply and demand is purely achieved by varying the amount of generation.

## **Implementing Energy Efficiency**

### ***Power and district heating sector***

In the power engineering sector, energy saving can be achieved by decommissioning obsolete equipment, replacing it with new high-efficient equipment, constructing and commissioning high- and small-capacity power plants, constructing new substations and power transmission lines and upgrading this sector’s efficiency. The energy saving potential is estimated at 20-25%. To achieve this, Azerenerji has undertaken various activities and invested 250 mln Euro in order to:

- Fuel oil has been fully replaced by natural gas power generation from 2010 onwards.
- The fuel consumption in conditional units has fallen from 411 gr/kWh in 2000 to 314 gr/kWh in 2011. The target is to decrease this further to 260 g/kWh in 2015.

- The transmission grid has been strengthened:
  - 220 kV Mingachevir-Absheron Transmission Enhancement Project, financed by the Asian Development Bank (\$160m).
  - 330 kV AzTPP-Imishli Transmission project, financed by KfW (€30m).
- Transmission losses are around 20-25%, further improvements in the network are ongoing with the aim to reach 10% losses.
- The Ganja smart card pilot project is a success and will be rolled out across the country.

The EBRD has supported the preparation of a \$232 million (€165 million) investment programme to modernise and upgrade AzDRES TPP (the country's largest thermal power station), for which the bank has provided a loan of \$207 million (€147 million) (signed in November 2006). The project, which is currently being implemented, consists of the following: (i) the rehabilitation of all turbines and boilers, and modernisation of the command and control system, to be financed by the EBRD; (ii) the repair of one of the chimneys and the repair of the water cooling system; and (iii) the implementation of environmental and health and safety measures. The total carbon dioxide emissions reductions from the project, including from fuel switching, are estimated to be 2.2 million t a year, which creates an opportunity for the company to generate additional revenue from the sale of carbon credits.

A presentation by BP highlights the unusual situation in the power sector where demand has fallen in the past three to four years, whereas GDP has grown at rates of around 25%. This is far below the trend that can be observed in other eastern European countries. This negative growth in electricity consumption is mainly driven by a price hike in 2007 and a better coverage of billing, reducing the losses.

Efforts will be taken to reduce the fuel used to generate 1 kWh of electric power from 314 grams of conventional fuel (in 2011) to 260 grams (by 2015) at TPPs by introducing new generating capacities and improving the characteristics of the old generating units. At the same time, efforts will be made to expand and reconstruct the electric power and gas transmission lines and rural and urban distribution networks, improve the accounting system, reduce losses and prevent theft and inefficient use of energy in order to cover the electric power and natural gas demands. Full payment of the cost of the electricity and natural gas consumed is one of the factors that would ensure the efficient use of these resources.

In order to bring the losses down in the heat distribution network, which have been as high as 50%, an USAID funded project has developed a district heating strategy for Azerbaijan. The main improvement to the system has been to construct more heating boilers and to minimise the transmission of heat over long distances, as they used to be transported over 100 km. This can bring down the heat distribution losses to 0.2–0.5%, which is a huge improvement in efficiency.

The plan of the district heating company in Baku is to cover all of Baku with the heat distribution network. Both commercial/public as well as residential consumers are targeted. The previous district heating situation (back in the 1990s) was very bad. From 2013 onwards there is an expansion plan to cover the whole country. As of 2012, 140,000 flats are connected to the heat distribution network. The plan is to connect 250–300,000 flats by 2015. This number is quickly increasing by modernising the old (Soviet) heat distribution network. This coincides with an increase from 2,500 to 4,500 buildings.

### **Built Environment**

The EU funds an Energy Reform Support Programme (ERSP), which will assist Azerbaijan in implementing agreed priorities. Building on the State Programme for the Development of the Fuel and Energy Sector in Azerbaijan (2005–2015), the Azerbaijani Government under the ERSP will review the national energy strategy in order to develop an overall, coherent, integrated and transparent energy strategy that covers the supply, transportation, transit and use of all the energy resources and the further reforms to be undertaken; it will identify the infrastructure rehabilitation requirements and the new infrastructure needs, while specifying in more detail the policies and legislative and institutional reforms to promote EE, energy savings and the greater use of RE.

A workshop on Energy Efficiency and Renewables in Azerbaijan, co-organised by Azerbaijan's MIE, the INOGATE programme and the Energy Community, was held in Baku in 2011. Participants expressed their support for a strategy that would benefit Azerbaijan, with a special focus on developing policies and actions to increase EE and the use of RE. Recent INOGATE support for Azerbaijan was also highlighted, namely the technical assistance for energy regulatory practices and energy saving in the building sector, and support for the introduction of technical standards and practices in the energy sector.

The 'Umid' Support to Social Development Public Union (NGO) conducted 'Support to Environmental and Energy Initiatives' project in 2006–2007 with the support of BP Exploration (Caspian Sea) Ltd. and its partners. In 43 communities awareness-raising activities were carried out related to more sustainable and safer management/utilisation of their environmental and energy issues, through demonstrations held in a mobile energy bus. A similar programme was conducted by the same NGO in the period 2003–2006 again with the support of BP Exploration (Caspian Sea) Ltd., namely 'Effective Usage of Energy Resources by Communities and Improvement of Access to Energy Sources'. 49 entrepreneurs were provided with consultations on the installation of micro HPPs, biogas units, solar panels and sawdust heaters; the instructions were provided and insulation works were realised in 23 public objects — twelve schools, three hospitals, two municipality rooms, one shop, three kindergartens, three rooms belonging to the local executive committee and one belonging to the chemist.

The 'Energy Saving Initiative in the Building Sector in the Eastern European and Central Asian Countries (ESIB)' is an INOGATE project with a budget of € 4.4 million to be applied in the following beneficiary countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. The project's implementation period is 1 January 2010–31 December 2013. It has the following objectives:

- to support the development and enforcement of EE-related legislation in the building sector; and
- to support an enabling investment climate for energy conservation projects (including identification and assistance in the preparation of EE investments in the building sector for submission to international financial institutions).

The 'Sustainable Buildings in Azerbaijan; Technical Assistance and Capacity Building' project has been started in a partnership between the State Agency on Alternative and Renewable Energy Sources of Azerbaijan (SAARES) and Norsk Energi (Norway) for the period 05/2011–04/2014. This is a technical assistance and capacity building programme on the energy auditing, certification and management of buildings, utilisation of RE in buildings and support

for the development of new regulations and norms for EE and RES in buildings.

The 'Umid' Support to Social Development Public Union (NGO) conducted the 'Initiative to Increase Energy Efficiency in Communities' project in July–December 2011. The project was implemented within the framework of a Civic Action for Security and Environment (CASE) programme administered by the OSCE office in Baku and financed by Statoil and the governments of Austria, Canada and the United States. In the context of the project, the energy audits of 19 entrepreneurship objects, 12 public buildings and 136 individual farms was conducted in four communities and training programmes were organised. Based on the results of the final audit, the energy expenses of the objects were found to have decreased by 15%.

### **Industry**

IFC conducted a survey across five sectors of Azerbaijan's industry (food, chemicals, building materials, metal processing and machine building) in 2008 to obtain a picture of how industrial enterprises in Azerbaijan manage and finance EE improvements. According to the findings of the survey, Azerbaijan's industrial sector could be saving up to 9% of its energy costs by further improving EE. Azerbaijani companies have an understanding of the potential of energy savings and a track record of energy auditing and energy efficient lighting projects represent the most widespread projects across all five industries. The 100 companies surveyed indicated plans to invest more than \$60 million in EE in the short term; this represents a market potential of more than \$200 million in Azerbaijan. In order to encourage complex and profitable EE measures, Azerbaijani authorities may want to consider streamlining administrative procedures and creating incentives to further encourage companies to implement EE projects. Tax benefits and public funding for EE projects are the top two measures for improving EE according to the surveyed companies (International Finance Corporation, 2008-2010).

### **Services**

In July 2010, AZERMS (a local private consultancy firm) under the Enterprise Development and Training Program (EDTP) conducted an EE survey in Azerbaijan. This survey built upon previous work carried out by the IFC and EBRD and included in-depth interviews with over 100 people, representing approximately 60 companies. The companies ranged from service providers such as translation, training and engineering firms to industrial firms in metal fabrication, construction, industrial gas production, food/beverage processing, catering and waste management. Based on the findings, the BP Sustainable Development Program funded a one-year project, with extension opportunities, that will focus on developing local EE consulting capacity, awareness building and providing targeted support to key companies and sectors (industrial gas production, metal fabrication, construction and waste management).

### **Transport**

The energy, residential and transport sectors were the largest sources of CO<sub>2</sub> emissions in Azerbaijan in 2009, according to IEA statistics. However, there are no EE or emission standards in relation to transport vehicles at present.





ORGANISATION OF  
ENERGY EFFICIENCY ACTIVITIES

## **Ministry of Industry and Energy (MIE)**

The MIE<sup>2</sup> of Azerbaijan functions as the central executive body responsible for the formulation of national policy related to the industry and energy sectors. The MIE is also responsible for the supervision, regulation and control of the efficient use of the fuel and energy complex.

SAARES is a governmental agency under the MIE mandated by the Cabinet of Ministers. It serves as the principal regulatory institution in the sphere of alternative energy and RE and it is tasked with assessing the sustainable energy potential, shaping relevant policies, including tariff policy, and elaborating on and enforcing relevant procedures, such as issuing special permission to the public and private entities to construct power generation facilities in the Republic of Azerbaijan. As of June 2012, SAARES has become the State Company on Alternative and Renewable Energy Sources. This will provide a mandate to develop RES projects.

## **Tariff Council**

The Tariff Council<sup>3</sup> of the Republic of Azerbaijan is regarded as the collegial executive power organ for implementing the state regulation of prices (tariffs), service fees and collections where state regulation is applied. The Tariff Council is responsible for tariff policy that affects EE. It has powers to set tariffs for any kind of RE, but only wind energy and mini hydropower tariffs have been set. There is no difference between the tariffs for co-generation and traditional power systems. At present, a uniform tariff is applied.

## **Non-governmental Agencies and Resources**

In the absence of direct government promotion and implementation of EE measures, non-government organisations play an important role.

## **'Umid' Support to Social Development Public Union**

The 'Umid' Support to Social Development Public Union is an independent national NGO of Azerbaijan that is working to help the marginalised segment of the population, by resolving their basic needs and social problems, improving the state of education, developing communities, creating economic opportunities for the people, etc. Its projects focus on the development of community based organizations (CBOs), limited liability companies, school-teacher associations, community development councils (CDCs) and newly operating local NGOs. The EE projects conducted by this NGO are 'Initiative to Increase Energy Efficiency in Communities', 'Support to Environmental and Energy Initiatives' and 'Effective Usage of Energy Resources by Communities and Improvement of Access to Energy Sources'.

## **International Eco-Energy Academy**

The International Eco-energy Academy is an independent scientific-technical and public organisation and has existed for over 20 years. It is supported by national and regional scientific centres throughout the world on the basis of voluntary collective and individual membership. The main objective of the organisation is to conduct research into fundamental and applied problems associated with energy development and the functioning of energy systems, together with the environmental problems with regard to the utilisation of natural resources and economic issues concerning the rational use of the natural and manpower resources. The

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<sup>2</sup> More information on this institution can be found in the energy policy section of this report.

<sup>3</sup> *Idem.*



main scientific and technical activities identified by the International Eco-energy Academy in the mentioned areas are feasibility studies on the use of RES and environmental research. EE-RES conferences are organised on a bi-annual basis. They are currently involved in the development of the RES/EE Law together with the MIE.

### **Other NGOs**

Azerbaijan joined the SPARE (School Program for Application of Resources and Energy) in 2002. The programme is co-ordinated by the Azerbaijan Youth Union (AYU). The AYU is a non-governmental organisation, founded in September 1991 and officially registered by the Azerbaijan Ministry of Justice in December 1994. Among the activities of the programme that are related to EE, there are various types of training on EE in schools.





# RENEWABLE ENERGY POLICY

## **Renewable Energy Sources Potential**

The energy sector plays a central role in the economy of Azerbaijan. Energy production, however, is largely reliant on the exploitation of the country's hydrocarbon reserves. Since 2004, Azerbaijan's leadership has taken steps to change the status quo and the government has recently started paying greater attention to developing RE. This is reflected by Azerbaijan's accession to IRENA in June 2009, the presidential decree on the creation of SAARES in July 2009 and the adoption of the State Programme on the Use of Alternative and Renewable Energy Sources for 2004–2013.

Recently, in 29 December 2011, the president of the Republic of Azerbaijan ordered the preparation of a national strategy on the use of alternative energy sources and RES for the years 2012–2020 by SAARES and the MIE over a six-month period and a budget of 1 million Manats was allocated for this project. In addition, a RES Law is under development, which is due by the end of 2012. As of June 2012, SAARES has become the State Company on Alternative and Renewable Energy Sources. The number of personnel will increase from the current 25 to approximately 75. This will provide a mandate to develop RES projects.

In the meeting of the intergovernmental working commission between the United States and Azerbaijan held on April 2012, the director of SAARES, Dr Akim Badalov, stated that Azerbaijan has set the following targets for the development of RE by 2020:

- 20% share of RE in electricity
- 9.7% share of RE in all energy consumption
- 2,000 MW of installed RES capacity by 2020.

In 2011, the share of RE in electricity production was 10%, 9.8% of which was from hydropower, and the share of RE in all energy consumption was only 2.3%. The realisation of the 2020 targets requires the regulatory framework to be strengthened by enacting and enforcing laws that promote RES projects. The utilisation of the country's RES has remained limited to hydropower till today although it also has vast potential in terms of solar, wind, biomass and geothermal energy.

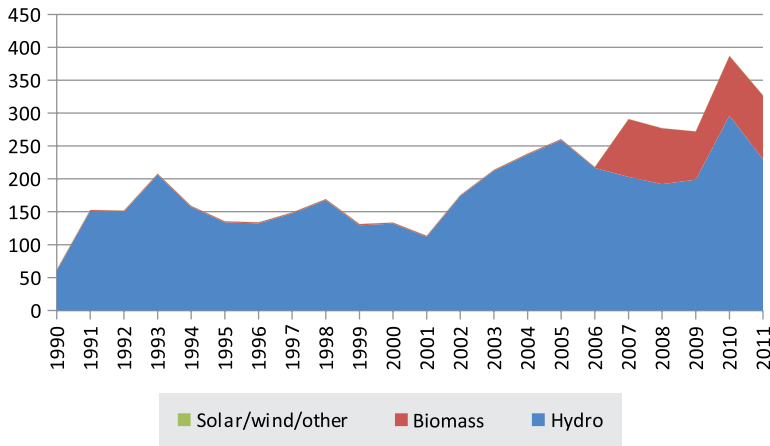
A budget of \$60 million has been committed to developing RES in Azerbaijan. The first part of this is being spent on developing a so-called hybrid RES facility where solar, wind and biomass are simultaneously developed with an aggregated installed capacity of 5.5 MW. Here the private sector is also involved.

The Azerbaijan Technical University has offered a course on RES since 1993. About 15–20 students are expected to graduate yearly. Wind and solar technologies are the main focus of the course.

The following two main RES barriers can be identified in Azerbaijan.

- There are insufficient incentives and the current tariff methodology is not suitable (RES tariffs are too low).
- There is an insufficient legal basis and there is a lack of connection rules.

The following figure presents the total generation of RES expressed in ktoe.

**Figure 28: Renewable sources in primary energy supply**

Source: IEA statistics, 2011 and MIE, 2012

A set of estimates of the achievable potential is set out below.

**Table 5: Renewable energy potential in Azerbaijan**

| Source                    | Achievable Potential in MW |
|---------------------------|----------------------------|
| Small hydropower stations | >400                       |
| Wind energy               | >800                       |
| Solar energy              | >5000                      |
| Bioenergy                 | >1500                      |
| Geothermal (thermal only) | >800                       |

Source: SAARES, 2012

### Hydropower

Hydro is the main renewable resource contributing to the energy supply in Azerbaijan and this accounted for 18% of electricity generation in 2010. Azerbaijan has about 1000 MW of operating hydropower capacity and an additional 62 MW of planned hydropower capacity. The largest hydroelectric power plant is Mingachevir; it has an installed capacity of 402 MW and is situated on the Kura River. Furthermore, there are presently three more hydroelectric power plants with an installed capacity of more than 100 MW in Azerbaijan, all of which are situated on the Kura River. The water resources of Azerbaijan are located in the following areas:

- the lower reaches of the Kura River with its multiple tributaries;
- the Aras River (the Kura tributary), which is on the border; and
- a group of creeks flowing into the Caspian Sea.

There is still some degree of hydropower potential in the country that is as yet undeveloped. Research in this area indicates that the overall technical potential for hydropower generation

for the rivers in Azerbaijan can go up to 40 TWh. Based on the June 2012 mission, the economically feasible potential amounts to less than 1 TWh, all of which is related to small HPPs of the river runoff type. This is equivalent to an installed capacity of about 400 MW, according to Azerenerji. Hence, the hydroelectric potential is rather limited.

The construction of HPPs plays an important role in solving issues of national importance, such as flood control, the clean production of electricity and the creation of new irrigation systems. In the near future, the construction of 61 small HPPs is planned. Small HPPs are often located in settlements that are located far from the power lines and substations of the unified energy system. However, it may meet the local power needs, which may also help to solve other social problems.

By the end of 2013, the plan is that 20 government-financed small HPPs will be completed with a total installed capacity of 86 MW.

Azerenerji has prepared a programme of new HPPs, amounting to an installed capacity of 1.3 GW, including small HPPs, although funding has not been identified yet, and nor has the site feasibility been investigated. Two projects have been started to date, namely the Sheki and Mughan HPPs. There are also projects on the Yukhari Shirvan and Bash Mil irrigation canals.<sup>4</sup>

The United Nations Development Programme (UNDP) promoted small hydro development in Azerbaijan in the form of a project that ran from 2007-2010, which had a budget of around \$1.5 million, provided by Norway.

### **Wind Power**

Although there has been little implementation of wind energy in Azerbaijan until present, interest has been growing. Its use has great prospects in some regions of Azerbaijan. Calculations from governmental institutions suggest that the Republic of Azerbaijan has the economically feasible potential of about 800 MW of wind power, which is approximately equivalent to 2.4 TWh of electricity (implying a capacity factor of 34%). This would allow for a yearly saving of about 0.8 million tons of standard fuel. Estimates for the technical capacity for wind power are 1,500 MW or higher according to different sources. The wind potential is the highest in the south-east close to the Caspian Sea, but this competes with tourism.

The windiest areas of Azerbaijan are the Absheron peninsula, Caspian Sea coastal areas, west of Azerbaijan (the Ganja-Dashkasan region) and Nakhchivan, Sharur-Julfa regions. The Absheron peninsula is located on the north-western part of the Caspian Sea and the average annual wind speed in the Absheron peninsula is 5–8 m/s. The number of windy days on the peninsula varies between 245 and 280.

The wind farms currently operating or under construction are as follows:

- Pilot Project – 2x850 kW Vestas v52/850 turbines installed in 2010 and owned by Caspian Technologies+500 kW Training Center;
- Alten Group Project – 4x2 MW Gamesa turbines installed in 2011 and owned by Alten Group Hotel Coordina;

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<sup>4</sup> *Note that these plans are not very advanced, as Azerenerji does not plan to have any new hydros on-line by 2015. Their main focus is currently on upgrading thermal power plants and the addition of around 800 MW new thermal power plants.*

- Shurabad Project – 16x3 MW Vestas turbines (under construction) owned by Caspian Technologies;
- Mitaki Project– 20x2.5 MW Fuhrlander turbines (under construction) owned by Caspian Management; and
- Sitalcaj Project – 4x900kW powerwind turbines (under construction) and owned by Trans T S.

In 2009, the USAID Trade and Investment Reforms Support Programme aided the Tariff Council in developing a wind tariff model to incentivise wind development. The Tariff Council may apply different tariffs to different projects depending on negotiations.

### **Solar Energy**

The climatic conditions of Azerbaijan provide numerous opportunities for increasing the production of electricity and heat using solar energy. For example, the amount of sunlight energy available per year is estimated to be 1300 kWh/m<sup>2</sup> in Azerbaijan. The development of solar energy can partially solve the problems with electricity shortages in remote regions of the country. Although the solar energy potential across the entire country is very high, no large-scale solar power installation exists. The MIE envisions commissioning solar stations in the Absheron peninsular, as well as in Nakhchivan and the Mil-Mughan region.

A domestic industry with its own production of solar collectors for water heating already exists in Azerbaijan, as these are the solar collectors mostly used in remote military installations.

### **Biomass**

The rapid development of industry, agriculture and social services in Azerbaijan has opened up new possibilities for energy production from biomass. The country has combustible industrial waste, forestry and waste from wood processing, agricultural product and organic waste, domestic and municipal waste and waste from areas polluted by oil and petroleum products, which can be used in energy production. Each year 2 million tons of solid municipal and industrial waste are produced in Azerbaijan. The recycling of municipal solid and industrial waste would partially solve the problem of heating public buildings in the capital and other large industrial cities.

At present, there are more than 200 landfills with a total area of 900 hectares in Azerbaijan. The amount of methane emitted into the atmosphere from landfills in big cities is estimated as follows:

- Baku – 30.4 thousand tons (42.8 mln m<sup>3</sup>)
- Gence – 5.1 thousand tons (7.2 mln m<sup>3</sup>)
- Sumqayit – 4.9 thousand tons (6.9 mln m<sup>3</sup>)
- Mingachevir – 1.6 thousand tons (2.3 mln m<sup>3</sup>)
- Nakhchivan – 1,2 thousand tons (1.7 mln m<sup>3</sup>)
- Shirvan – 1.2 thousand tons (1.7 mln m<sup>3</sup>).

By setting up small heating plants in these landfills electricity can be produced. Although the biomass energy potential across the entire country is very high, only a few small pilot projects using biomass have been developed in Azerbaijan. However, a large project of €346

million is noteworthy in terms of waste processing. The construction of a waste-to-energy plant was decided within the framework of the 'Comprehensive Action Plan on Improvement of the Ecological Situation in the Republic of Azerbaijan for 2006–2010' and the agreement on designing, building, operating and providing technical services for the 'Waste-to-Energy Plant in the City of Baku' was signed with the winner, a French company 'Constructions Industrielles de la Mediterranee S.A.' ('CNIM' S.A.) on 15 December 2008. The Balakhani waste-to-energy plant consists of two incineration lines, each line having a capacity of 250,000 tons, and a turbine producing electricity with an installed capacity of 35 MW. The amount of electricity obtained as a result of burning of waste will be equal to 231.5 GWh/year. It is considered to be the biggest waste-to-energy plant in Eastern Europe and CIS countries. The facility will create employment for 400 employees once it starts operating and it is still under construction as of June 2012.

Biogas is not considered an interesting option according to the MENR; it is argued that natural gas is abundantly available and there is no energy shortage driving such a need. However, for environmental reasons, a careful analysis of the situation should be considered.

### **Geothermal Power**

The territory of Azerbaijan is rich in thermal waters. They cover large areas, such as the Greater and Lesser Caucasus, the Absheron peninsula, the area of the Talysh mountain slope, the territory of the valley of the Kura River and the Caspian-Guba region. The production capacity of the Lenkoran, Massaly and Astara regions has been estimated to be about 25,000 m<sup>3</sup> per day. Wells have produced waters with wellhead temperatures of about 40°C and rates of 40 l/s. With the use of thermal waters in these areas the need for thermal energy in everyday life and in other areas can be met. The current use of geothermal energy in Azerbaijan is entirely thermal, and there are no geothermal power plants for electricity production. The usage of thermal waters for greenhouse heating can be found in the Lenkoran region, Kuraside zone (Djarly, Muradkhanly and Sor-Sor) and Gandja and Yalama-Khudat regions. Moreover, these geothermal waters have a high mineral content (more than 15 g/l).

### **Renewable Energy Projects**

Since 2004, very few activities involving RES have been implemented in Azerbaijan but there are some important projects in the pipeline for the 2012–2013 period.

*Table 6: Planned renewable energy projects in Azerbaijan for 2012–2013*

| Project Name and Location       | Capacity (MW) | Cost      | Potential investors                         |
|---------------------------------|---------------|-----------|---|
| Pirshakul wind farm             | 110           | €165 mln  | Government of Azerbaijan (10-25%)+ KfW      |
| Hovsan Sewage-Gas Station       | 50            | €75 mln   | Government of Azerbaijan (10-25%)+POSCO     |
| Absheron Solar PV Park          | 25            | €87.5 mln | Government of Azerbaijan (10-25%)+JICA      |
| Offshore Wind Farm              | 100           | €250 mln  | Government of Azerbaijan (10-25%)+Private   |
| 1000 House /1000 Power Stations | 50            | €80 mln   | Government of Azerbaijan + Private Investor |

Source: SAARES, 2012



SAARES launched a project in January 2011, which will continue until 2013, with the UNDP to promote RE in Azerbaijan. This project has become possible with the financial support of €500,000 provided by the European Union and \$790,000 contributed by the Norwegian Government. The specific objectives of the project are as follows:

- to support the building of a small HPP as a demonstration of its feasibility in Azerbaijan;
- to provide training and education to target groups and beneficiaries on sustainable energy;
- to assess the potential for renewable power, particularly in remote and rural areas;
- to identify which types of renewable power are economic or economic with minimal subsidy in each economic zone within the country; and
- to identify in a broad sense the geographic areas that offer good potential for the placement of sustainable power generation.

While the development of RE is one of the government's strategic priorities, the legal and institutional environment are not yet attractive for potential investors. However, studies to reform the energy sector of Azerbaijan have been ongoing with the government playing a leading role. The first tenders for the 'Programme of European Commission to Support Reforms in the Energy Sector of Azerbaijan' started in March 2010. Until now, six tenders have been held. In three of them the winners have been already declared. They are as follows:

- preparation and implementation of an action plan for RE and EE (the winner of the tender was the Khazar Consulting Agency);
- improvement of legislation in the field of RE and EE, and compliance with the law of the European Union (the winner of the tender was the International Academy of Ecoenergy); and
- preparation of a strategy for the integrated and versatile development of the energy sector (the winner of the tender was Mercury Consulting).

Documents on the other three tenders were submitted for consideration to the Ministry of Finance, the Ministry of Economic Development and the State Agency on Procurement.

### **Policy Framework and Regulations**

The current economic conditions are not favourable for generators or consumers of alternative energy. RES technology projects remain more expensive to install and operate than conventional TPPs. Financing for RES projects from funding institutions tends to be limited to just large-scale projects. Private financing is seen as crucial for the funding of smaller, more diverse and more economically efficient projects but the financing terms tend to be unfavourable. 'Feed-in' tariffs for wind and small hydro generation exists but are thought to be too low to attract investment into the sector. Furthermore, this mechanism is not extended to other RES technologies.

There are no specific laws relating to RES but some provisions are contained in the existing energy laws.

Law on Utilization of Energy Resources from 30 May 1996

- Portions of the Fund of Rational Power Utilization shall be spent among other purposes and also for the 'utilization of the Renewable Energy sources' (Article 15)

- Subsidies from the fund may be granted to enterprises for the 'examination of the Renewable Energy sources' (Article 16) and
- State power standards shall determine the '[...] proper demands for the energy resources and the renewable power sources' (Article 19).

Law on Energy from 24 November 1998

- One of the objectives of state policy with regard to power is the 'use of renewable power sources' (Article 3).

Law on Electrical and Heating Power Stations from 28 December 1999

- 'Construction of power plants which run with Renewable Energy sources can be subsidized by the State' and
- At the same time the 'unlimited purchase of energy produced at these (small) plants is guaranteed' (Article 3).

In accordance with Article 3 mentioned above, the following plants are deemed to be small.

- Solar power plants which produce electrical and heating energy
- Wind power plants with a capacity from 10–100 kW, which generate electrical energy and are located at a distance from immovable property of any third person in accordance with relevant norms and standards
- HPPs with capacities of 50–10,000 kW, which are located at stable water streams (steady stream) and immediately return used water to their beds and
- Power plants, which produce electrical and heating energy by means of gas or other fuel, about 80% of which is extracted from biomass, excluding natural firewood.

The State Programme on the Use of Alternative and Renewable Sources was prepared based on these laws and approved by Presidential Decree No. 462, dated 21 October 2004. This programme involves the execution of RES feasibility studies and the development of small hydro and wind projects. The objective of the state programme is stated as being to promote power generation from renewable and environmentally sound sources and to utilise hydrocarbon energy sources more efficiently. The major tasks of the state programme include the following:

- to define the potential of alternative (renewable) energy sources for electric power generation;
- to raise the efficiency of the utilisation of the country's energy sources by developing RES;
- to ensure the opening up of additional jobs with the creation of new energy production sites; and
- given the existing total capacity of traditional energy sources in Azerbaijan, to increase the energy capacities at the expense of alternative energy sources and, therefore, achieve the country's energy security.

The delivery of the programme has been delayed because of lack of funding. In order to progress further, studies for the preparation of a 'National Strategy on the use of alternative and renewable energy sources in the Republic of Azerbaijan for 2012–2020' were started on the

order of the president of Azerbaijan on 29 December 2011. SAARES and the MIE were assigned to prepare the project for the national strategy in six months together with the relevant central and local executive bodies and with the involvement of local and international companies with extensive experience in this field. The targets of this project are set out below:

- to identify key areas for the production of electricity and thermal energy in the country by using alternative and RES for the years 2012–2020;
- to create the legal framework in the area of alternative energy sources and RES;
- to take measures to encourage the use of alternative energy sources and RES; and
- to provision the use alternative and RES in all sectors of the economy, relying on the internal and international scientific and technical potential.

A budget of 1 million AZN (approximately the same value as a Euro) was allocated for this project. Current deficiencies within the existing regulatory structure that prevent the exploitation of alternative energy sources and RES may be removed with the proposed legal framework in the national strategy. The consolidation of existing laws that affect RES may be required.





ENVIRONMENTAL POLICY RELATED TO ENERGY

## **Background**

The rapid development of all spheres of economics and human activity has had an increasingly negative impact on the environment, including the inefficient usage of natural resources. Azerbaijan is interested in finding solutions to the problems regarding environmental protection and the rational use of natural resources. In support of Azerbaijan's environmental protection goals, a number of important laws, legal documents and state programmes have been developed and approved in order to improve the ecological situation in the country.

The country's main environmental problems are wastewater pollution, including trans-boundary pollution, the emission of harmful substances and GHGs from industrial plants and vehicles, improper disposal of solid municipal and industrial wastes, including hazardous wastes, the depletion of biodiversity and a decline in forest resources and fauna. As Azerbaijan improves its economic performance, integrating environmental concerns into sector policies remains a key challenge for the future in terms of mitigating negative environmental impacts from high-impact economic sectors, including the oil and gas extracting industries. As most energy in Azerbaijan is generated by burning hydrocarbons, a reduction in emissions might be possible through gains in efficiency, energy saving and the use of alternative energy sources, whereas the transfer from liquid fuel to gas has already been completed in the power sector.

The Azerbaijani Government pursues a policy aimed at mitigating the consequences of climate change. These efforts include the adoption of the State Programme on the Use of Renewable and Alternative Energy Sources in the Azerbaijan Republic as well as the establishment of a designated national authority (DNA) under the CDM within the framework of the Kyoto Protocol linked to the UNFCCC, which was ratified in 2000.

Environmental protection has improved in recent years. First of all, the amount of forested land increased from 11.4% to 11.8% from 2004 to 2012. In addition, 5.5% of the forests were protected in 2004 and this share went up to 10.2% in 2012.

## **Environmental Policy, Legislation and Implementation**

Considering the ecological situation that has evolved in the contemporary period and social-economic conditions, the MENR sets out the three main priorities of Azerbaijan's environmental policies as follows.

- In considering that environmental security must be ensured, the application of modern methods based on 'Sustainable Development' principles in order to regulate the protection of the environment and minimise pollution;
- Efficient use of natural resources for meeting the needs of existing and future generations, benefiting from RES through non-traditional methods and achieving EE; and
- Assessment of national requirements with regards to global environmental problems, identification of ways to resolve such problems and broadening of co-operation with international organisations, as well as ensuring the implementation of environmental policies through the utilisation of the national capacity.

Azerbaijan's National Environmental Action Plan (NEAP) for 1998–2003 marked the nation's first major strategic effort to promote environmental protection in the post-Soviet era. The NEAP identified key environmental threats, including severe pollution from industrial sources, oil exploration and production, overfishing, deteriorating water quality, agricultural lands

damaged by pollution, salinisation, desertification, erosion and deteriorating irrigation systems, loss of biodiversity, loss of forest cover and poor coastal zone management. As a direct result of the NEAP, local environmental action plans (LEAPs) were introduced in the country, involving public participation and stakeholder dialogue and assistance for local and regional authorities with policy formulation and priority setting.

Following the completion of the first NEAP for the period 1998–2003, a second NEAP was not adopted, although one was developed. This happened despite the fact that the first NEAP can be credited with major successes, including a contribution to the establishment of the MENR and strengthening the development of LEAPs. In the absence of a second NEAP, the main environmental policy document has been 'The National Programme on Environmentally Sustainable Social and Economic Development' for the period 2003–2010, which was endorsed by the 2003 Presidential Decree No. 1152. The national programme covers the environmental aspects of the country's overall development strategy and is accompanied by an action plan covering the years 2003–2010 for its implementation. The action plan focuses on five major areas, namely environmental protection and the use of natural resources, global environmental problems, industrial complexes, agriculture and tourism and education, science and culture. The MENR is to provide all the necessary guidelines, application software and scientific data for its full implementation.

The national programme and its action plan were further complemented by a 'Comprehensive Action Plan on Improvement of the Environmental Situation for the Period 2006–2010', which dealt with improving the environmental situation in various areas (Baku Bay, the Bebiheybat area, the areas adjacent to Heydar Aliyev international airport, Absheron peninsula and other parts of Azerbaijan). The comprehensive action plan also aimed to address general ecological problems and improve legislation.

Although the government of Azerbaijan has adopted comprehensive policies for environmental protection and sustainable development, there have been considerable challenges in terms of their implementation. This has been partly due to the fact that the national programme and the action plan lacked a clear identification of priority areas for funding purposes and did not include cost estimates.

The basis for environmental legislation is provided by the constitution, which defines living in a healthy and clean environment as the right of the country's citizens. The two main environment-related laws safeguarding this right are the Law on Environmental Protection and the Law on Environmental Safety, both adopted in 1999.

The Law on Environmental Protection (1999) describes, in general terms, the rights and duties of the state, local authorities, individuals and public organisations, acceptable uses of nature and natural resources, the development of cadastres (inventories) and the monitoring of environmental and natural resources. The legal foundations for the use of economic instruments for environmental protection and the main principles guiding environmental expenditure can be found in the Law on Environmental Protection. Article 22 establishes the legal basis for the introduction of a number of financial mechanisms to protect the environment, including payments for the use of natural resources, payments and charges for environmental pollution, economic incentives, funds for environmental protection, grants and the use of international funds allocated for environmental protection. Resources from fines are earmarked for the financing of environmental protection measures.

The Law on Environmental Safety (1999) similarly provides broad guidance related to the protection of the public from 'hazards arising as a result of anthropogenic and natural impacts' on the environment. Like the Law on Environmental Protection, this act specifies the rights and duties of the state, local authorities, individuals and public organisations, the generation and dissemination of information and requirements for the maintenance of ecological safety.

The Law on Protection of Atmospheric Air (2001), the Law on Water Supply and Wastewater (1999) and similar laws provide more focused but still general guidance on specific environmental media and problems. Taken as a whole the laws recognise a number of important legal and regulatory principles, including the 'polluter pays' principle, the advantages of using economic incentives and market-oriented policy tools to regulate the environmental activities of enterprises and the need for more specific laws to implement the goals of environmental policies.

One of the first actions taken by Azerbaijani environmental authorities was to develop a system of charges on air pollutants emitted by enterprises. Resolution No. 122, issued on 3 March 1992, approved the procedure for the 'Collection of a pay for natural resources, payments for pollutant emissions into environment, and for the use of receipts from these payments as well as payment rates for pollutant emissions into the atmosphere'. The MENR is the controlling authority and sets limits for specific users of admissible pollutant emission volumes. Pollutant emissions above the set limits are paid at a rate five times higher than normal. The payment for environmental pollution takes into account the environmental situation and the environmental significance of territories. The introduction of payment for pollutant emissions does not relieve users of the obligation to implement measures of environmental protection and the observation of nature preservation laws. Revenues from these charges have shown a positive trend in recent years. Average annual payments in the period 2008–2009 were more than three times larger than those in the period 2003–2005 (MENR). This is a remarkable growth, taking into account that rates have remained unchanged and that there has not been a comparable increase in emissions. However, the system of pollution charges remains unreformed and largely ineffective as a policy instrument.

The legislative framework continues to require further development, especially with regard to secondary legislation and implementing legislation. Continued attention is required in order to implement existing strategies and plans to further enhance monitoring and enforcement. Azerbaijan faces difficulties with the implementation and enforcement of legislation due to limited financial resources, especially at the regional and local levels.

### **Administrative Structure**

MENR was established on 23 May 2001 according to Decree #485 of the president of the Republic of Azerbaijan. The ministry is the central executive body with the responsibility of formulating and implementing environment policy, developing environmental protection measures, screening projects for potential adverse environmental impacts, monitoring the implementation of environmental legislation and imposing sanctions and administering a pollution permit system. Climate change-related functions have subsequently been added in recent years. The MENR is the DNA responsible for participation in the CDM. The Hydrometeorology Department within the ministry deals with climate change related international obligations, including a GHG inventory and preparing national communications for the UNFCCC. In terms of their legal and political mandate and their capacity, environmental



institutions in Azerbaijan have become stronger than they were a decade ago with the establishment of the MENR.

Other government bodies play an important but indirect role, including the Ministry of Agriculture, the Ministry of Economic Development, the Ministry of Education, the MIE, the Ministry of Health, the Ministry of the Interior, the Ministry of Justice and the Ministry of Transport. As a rule, ministries also have a Department of Environment co-ordinating activities with the MENR.

### **International and Regional Agreements and Protocols**

The MENR puts special emphasis on broadening ties with international organisations and donor countries in order to tackle environmental challenges. Hence, co-operation with the UNDP, IAED, UNEP, NATO, OSCE, GEF, OECD, Economic Cooperation Organization, WB, Asian Bank and World Wildlife Foundation and other organisations are continuing. Further bilateral ties are being made with developed countries based on relevant agreements. The bilateral co-operation of Azerbaijan with other countries in the field of environmental protection can be found in the appendix.

Joining international conventions in the area of the protection of the environment is also an important priority for Azerbaijan. To this end, the Republic of Azerbaijan has joined 20 conventions up until now, such as the Convention on Biodiversity, the Convention on the Protection and Use of Borderline Waters and International Lakes, the Convention on the Prevention of Animate Nature and the Natural Environment of Europe, the Basel Convention on Control over Inter-boundary Transportation and Neutralization of Dangerous Waste and the Convention on the Evaluation of Environmental Influence in an Inter-boundary Context.

### ***Kyoto Protocol***

Azerbaijan ratified the UNFCCC in 1995 and joined the Kyoto Protocol in 2000 as a non-Annex 1 country. The second communication to the UNFCCC secretariat was prepared by the National Hydrometeorological Department under the MENR with the backing of the UNDP/GEF. It includes a GHG inventory for the years 1990–2005, climate change scenarios and adaptation measures.

Since the Kyoto Protocol took effect in 2005, interest in CDM projects has risen in Azerbaijan. A number of GHG reduction projects have been prepared in various sectors, but only four projects have reached the validation stage and no CDM project has been registered at the UN level so far. In 2009, Azerenerji signed an Emission Reduction Purchase Agreement to sell carbon credits generated by the rehabilitation of the AzDRES TPP, which has been financed by the EBRD. The project, which is expected to reduce CO<sub>2</sub> emissions by about 2 million tons annually, has involved the development of a pioneering CDM methodology for power plant rehabilitation projects with the support of the EBRD.

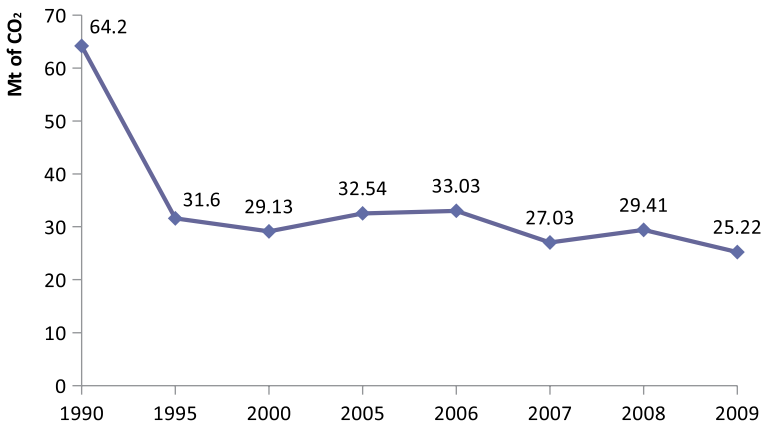
Table 7: Registered CDM project proposals

| Sector                        | Number of Project Proposals | GHG reduction rate, thousand tons/year CO <sub>2</sub> eq. |
|-------------------------------|-----------------------------|--|
| Energy                        | 17                          | 13675.4  |
| Alternative energy            | 9                           | 1775.0   |
| Agriculture                   | 2                           | 3331.0   |
| Wastes                        | 3                           | 287.1  |
| Forestation and afforestation | 3                           | 62.7   |
| <b>Total</b>                  | <b>34</b>                   | <b>19131.2</b>   |

Source: SAARES, 2012

GHG reduction has already taken place in the country. Due to the decline in industrial activities since 1990, the level of GHGs released into the atmosphere from stationary and mobile sources has reduced. While the level of pollution equated to 64.2 million tons of CO<sub>2</sub> in 1990, in 2009 this figure accounted for 25.22 million tons of CO<sub>2</sub>.

Figure 29: CO<sub>2</sub> emissions in Azerbaijan



Source: IEA, 2011, based on the sectoral approach

The main sources of CO<sub>2</sub> emissions in Azerbaijan are the energy and industrial sectors. CO<sub>2</sub> emissions in the energy sector come from the burning of fuel, including in the production of energy, oil and gas extraction, transport and human settlements. In the sector for industrial operations and the use of materials, the biggest sources of CO<sub>2</sub> emissions have been mineral materials production and metallurgy. In general, there is potential for greater GHG reduction in Azerbaijan. The replacement of electric energy by other sources, particularly alternative energy sources, could lead to a considerable reduction in emissions.

The potential sources of GHG in the oil and gas sector in Azerbaijan are Azneft Production Unity, the Heydar Aliyev Oil Refinery in Baku and the Azerneft Yag Oil and Gas Refinery, all belonging to the state oil company (SOCAR). Every year, 3 million tons of GHG in CO<sub>2</sub> eq. are emitted by SOCAR, by operating companies and joint ventures in Azerbaijan. Of this amount,

about 1.3 million tons are associated gas. Starting from the end of 2009, as a result of actions by SOCAR, 600 thousand tons of emissions will be utilised. A major part of associated gas emissions come from BP facilities. During oil extraction about 500 thousand tons in CO<sub>2</sub> eq. of associated gas is released per year, but by taking appropriate actions the GHG emission that result from the release of associated gas can be reduced by 1.2 million tons (Second National Communication to the UNFCCC, MENR, 2010).

SOCAR has been taking regular actions to deal with climate change. It has established the Ecological Park in order to meet the demand for trees and shrubs, and to inform the population about environmental issues. In order to meet part of the peak demand for electricity from alternative energy sources and RES, four wind generators with 10 kW each and solar panels with a total capacity of 20 kW have been installed as a pilot project.

With the purpose of implementing the utilisation of low-pressure associated gases at the Oil Rocks project within the CDM, a project documentation developed jointly with the Gazprom Germany Consulting Company has been filed with the Executive Council of the Kyoto Protocol on CDM for registration, and is now in the process of verification. After the completion of technical and installation works, 200 million m<sup>3</sup> of associated gases will be prevented from being emitted into the atmosphere.

The plan to reduce the amount of associated gases emitted by SOCAR and by the projects SOCAR takes part in has been developed by SOCAR jointly with the Partnership for Reduction of Global Gas Burning organisation of the WB.





# ASSESSMENT OF PROGRESS

## **Overall Assessment**

The three priority areas for development in the energy sector of Azerbaijan have been identified as follows: '(i) rehabilitation of power grid for improvement of power supply quality and loss reduction; (ii) development of renewable energy; and (iii) improvement of demand-side EE and energy conservation'.

The main objective of the Azerbaijani Government in the field of energy has been to become self-sufficient in terms of meeting the energy demand. This objective has been achieved for oil since 1998 and for gas since 2007. Moreover, in addition to committed exports, there is currently an overcapacity of 2 billion m<sup>3</sup> gas that could be exported to Europe and this is expected to increase to 10 billion m<sup>3</sup> by 2017. Various routes for export to Europe are currently under consideration, for example the Nabucco gas pipeline through Turkey or the South Stream through the Black Sea or via an LNG facility (in Georgia).

Activities are under way to rehabilitate the installed capacity. This will substantially increase the efficiency of fuel consumption for power generation. This rehabilitation of power plants could be considered the main progress in EE in Azerbaijan.

While this is an important step, the issue of EE could be put much higher on the political agenda in Azerbaijan.

The introduction of EE may pose challenges, but it will be worthwhile due to the expected benefits and mitigated risks. The in-depth review PEEREA process is designed to assist this outcome.

It is encouraging to see that Azerbaijan has reached energy independence. This creates opportunities to channel the revenues into investments in RES and EE. For this it is necessary to minimise local demand and to keep the oil and gas resources in reserve for future exports or to further increase the current levels of exports. This could be stimulated with a positive commitment to an EE policy. This policy is best delivered through well-crafted EE programmes and measures that meet the priority needs of Azerbaijan.

## **Legislative Framework, Policy and Measures to Promote Energy Efficiency**

Under the 'European Union — Azerbaijan Action Plan', which was concluded as part of the European Neighbourhood Policy, Azerbaijan is to continue co-operation on Caspian and Black Sea regional energy issues and enable the infrastructure to facilitate the transit and development of Caspian energy resources.

Within the energy and transport priority area of the action plan there are specific commitments to energy policy convergence towards EU energy policy objectives expressed as i) a gradual convergence towards the principles of the EU internal electricity and gas markets and ii) progress regarding energy networks. Of particular relevance to this review is the commitment to progress on EE and the use of RES.

According to Action Plan 2011-15, approved by the president for the implementation of the State Programme of Poverty Reduction and Sustainable Development 2008–15 (adopted by Decree #3043 from 15 September 2008), the country will begin the privatisation of enterprises in the fuel and energy sector. However, no noticeable activities have taken place so far with the exception of two small privatised HPPs. Meetings with government agencies and companies have confirmed that there are no immediate plans to proceed with the privatisation and opening up of state companies in the oil, gas and electricity sectors.

EE in Azerbaijan still needs further developments in terms of strategy, action plans and legislation. Moreover, the few EE measures that exist are the ones that are financed by the EU or other donor projects being implemented by NGOs.

### **Financing Energy Efficiency**

RES is being developed in Azerbaijan with the creation of SAARES. A public budget of \$60 million has been committed to the development of RES. This is being used for developing small HPPs, the capacity building at SAARES and the demonstration project of 5.5 MW of a hybrid RES installation combining solar, wind and biomass. However, no state budget financing has been allocated to develop EE.

The EBRD has supported the preparation of a €165 million investment programme to modernise and upgrade AzDRES TPP (the country's largest thermal power station), for which the bank has provided a loan of €147 million (signed in November 2006). This project has also applied for carbon credits under the CDM and is expected to reduce CO<sub>2</sub> emissions by three million tons annually.

The 'Energy Saving Initiative in the Building Sector in the Eastern European and Central Asian Countries (ESIB)' is an INOGATE project with a budget of € 4.4 million to be applied in the following beneficiary countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

In December 2011 the president of the Republic of Azerbaijan gave an order for the preparation of a national strategy on the use of alternative energy sources and RES for the years 2012–2020 by SAARES and the MIE in a six-month period and a budget of about €1 million was allocated for this project.

However, the efforts so far insufficiently reflect the EE action lines agreed in Priority 4.6.2 in Energy of the EU–Azerbaijan Action Plan. This has called for the development of an action plan, including a financial plan for improving EE and enhancing the use of RE.

In spite of the current lack of dedicated resources, the MIE is in a position to insist other executive bodies with discretionary resources or revenue raising powers to follow the policy direction of the parliament and legislature. An EE fund with appropriate guidelines and governance is a prerequisite.

### **Institutional Arrangements**

The institutional arrangements for EE are at a very early stage of development in Azerbaijan. Institutional development should be informed by an understanding of the short-, medium- and long-term tasks to be accomplished and to which the Azeri authorities need to give early and high-level consideration.

### **Energy Pricing and Taxation**

The electricity (and gas) market in Azerbaijan is still a vertically integrated monopoly, where the Tariff Council can set the wholesale and retail power prices. As of January 2007 the retail prices were increased from a subsidised level of 24 \$/MWh to a cost reflective level of 75 \$/MWh and it is still at that level as of 2012; again it is no longer cost reflective.<sup>5</sup> This price increase was

<sup>5</sup> <http://www.tariffcouncil.gov.az/?/az/content/70/>

sufficient for the state company Azerenerji to obtain loans for implementing the rehabilitation of the power system with regards to modernising generation, transmission and distribution. The main objective is to achieve lower fuel consumption, namely 260 gr/kWh by 2015.

Concerning RES, the tariffs that have been set since 2007 (and are also valid for 2012) are 32 \$/MWh for small HPPs and 57 \$/MWh for wind. These low tariffs are clearly a major blockage to developing RES in Azerbaijan. It is difficult, however, for the Tariff Council to generate the motivation for higher tariffs. Separate and additional funds will be needed in order to provide incentives to achieve RES beyond the cost of cheap fossil fuel generation.

### **Energy Efficiency and the Environment**

Even though GHG emissions have come down from a level of 64 (1990) to 25 (2009) Mton of CO<sub>2</sub> eq., an additional effort is desired to limit GHG emissions.

While Azerbaijan has an NEAP, only a small part of the first NEAP recommendations are implemented, mainly due to a shortage of resources. LEAPS have been elaborated in selected municipalities.

### **Renewable Energy**

The assessment of the RES potential in Azerbaijan has shown a potential for over 8 GW, which is more than the currently installed capacity. However, this may not be enough to fully meet the electricity demand, because of the intermittent character of solar and especially wind power, but also due to lower availability when compared to that of conventional TPPs and HPPs. Nevertheless, the output of gas fired power plants could be considerably reduced, by developing this RES potential, which could make the GDP growth, which is currently mainly driven by oil and gas exports, more sustainable and long lasting.





RECOMMENDATIONS

### **General Recommendations**

- The government's energy policy should reflect the potential contribution of EE to increasing fuel exports and supporting economic growth and the environment.
- EE and RE should be given high priority by the government and future energy policies should be supported by a detailed analysis of economic EE potentials in all sectors of the economy and the barriers impeding the realisation of these potentials.
- The MIE should improve its capacity to analyse and assess EE as a basis for future policy development, including decisions on financing.
- The rehabilitation of the generation, transmission and distribution assets in the power sectors need to continue. This will maximise the fuel burning efficiency and minimise the technical transmission and distribution losses.
- Future energy strategies and policies should be transparent and consistent with long-term goals and should consider initiating programmes for EE and set objectives for key sectors.

### **Institutional Framework**

- There is a need for developing laws and secondary legislation on EE and renewable energy.
- The government should create an EE unit within the MIE to lead the development of legislation, to promote sustainable energy within the government and monitor the implementation of the overall EE policy. Appropriate resources (human and financial) should be allocated by the government for the activities of the unit.
- Specific programmes for improving EE in the various sectors of the economy should be developed, which should include specific targets and monitoring systems for continuous evaluation of their implementation.
- Enhance inter-administration co-operation between energy and other public policy makers, in particular the environment, transport, housing and industry.
- The efforts of various stakeholders including local authorities, universities, research centres and NGOs need to be supported by the government and further scaled up to promote EE in Azerbaijan.

### **Energy Market and Pricing**

- It is recommended that the government consider the introduction of market-oriented principles in the energy sector and an appropriate regulatory framework based on international experience
- To facilitate the implementation of EE measures the existing electricity, heat and gas tariffs should be reviewed. Differentiation of the tariffs for different types of consumers and the introduction of block tariffs as well as the affordability issues of the population should also be taken into account.

### **Energy Efficiency Financing**

- The government should allocate sufficient financial resources for increasing EE in public and state-owned buildings and public lighting and at the same time introduce an incentive system for private and residential sector initiatives in EE and RES.

- Continued dialogue with IFIs and the donor community should be ensured in order to strengthen the focus on EE and RE.

### ***Specific Energy Efficiency Programmes and Measures***

- High efficiency standards should be adopted for newly constructed buildings, EE labelling and MEP standards for electrical equipment and it should be ensured that compliance and enforcement procedures are in place.
- Energy auditing and energy management systems need to be introduced for large industry consumers.
- EE must feature in any integrated approach to transport planning and provision.
- The implementation of the district heating rehabilitation programme must be continued in order to reduce losses and attract new consumers and the introduction of individual metering should be encouraged where possible.
- The government should promote and raise awareness of EE in local communities, with citizens and in SMEs.
- The country's participation in various international initiatives, for example the Green Building Council, an IRENA, should be continued to ensure the exchange of information and best practices in successful EE and RES projects in other countries.

### ***Renewable Energy Sources***

- RES development should continue to be a priority for Azerbaijan. A timetable with objectives, goals and targets for RES should be included in the Renewable Energy Strategy.
- The focus must continue to be put on the utilisation of the existing solar and wind potential, but also the possibilities of waste-to-energy use should be assessed.
- Part of the oil and gas revenues should be dedicated to RES development and an RES fund should be created.
- Grid connection rules, tariff methodology and incentives should be developed in order to attract investments into the RES sector.
- The role of SAARES should be strengthened to enable them to have a leading role in developing RES in Azerbaijan.

### ***Data Collection and Monitoring***

- The monitoring of achieved results needs to be monitored and a project database needs to be set up for all activities related to EE in Azerbaijan.
- The existing statistics on building stock should be used to support the policy making process and to produce an estimate of the energy saving potential for the building sector.
- The energy saving potential should be monitored and energy audits have to be made compulsory, starting with the largest buildings. This should lead to an action plan on tapping the energy saving potential.





# ANNEX I: BASIC ECONOMIC AND PRIMARY ENERGY DATA

Basic economic and primary energy data <sup>6</sup>

Table 8: Energy balance, ktoe

| Indicators                         | 1990   | 1995   | 2000   | 2002   | 2004   | 2006   | 2007   | 2008   | 2009   | 2010   | 2011   |
|------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Total Primary Energy Production    | 20,641 | 14,725 | 18,962 | 19,752 | 20,053 | 38,127 | 54,198 | 61,274 | 67,332 | 68,255 | 62,542 |
| Net Imports                        | 15,228 | 629    | 396    | 3,430  | 4,421  | 4,017  | 132    | 103    | 58     | 44     | 45     |
| Exports                            | 8,875  | 2,501  | 7,841  | 11,572 | 11,456 | 28,220 | 41,250 | 46,539 | 53,909 | 54,823 | 49,301 |
| Total Primary Energy Supply (TPES) | 26,236 | 12,764 | 11,435 | 11,459 | 12,645 | 13,515 | 13,104 | 14,495 | 13,012 | 12,567 | 13,632 |
| Total Final Consumption (TFC)      | 16,007 | 8,828  | 6,704  | 6,631  | 7,288  | 7,559  | 6,992  | 8,282  | 7,044  | 7,248  | 7,909  |

Table 9: Total primary energy supply structure, ktoe

| Products                         | 1990   | 1995   | 2000   | 2002   | 2004   | 2006   | 2007   | 2008   | 2009   | 2010   | 2011   |
|----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Coal and coal products           | 89     | 3      | 0      | 0      | 0      | 0      | 5      | 4      | 4      | 6      | 5      |
| Crude, NGL and feedstocks        | 16,515 | 9,268  | 8,470  | 6,516  | 6,492  | 7,684  | 8,034  | 7,788  | 6,393  | 6,552  | 6,765  |
| Petroleum products               | -4,543 | -2,492 | -2,215 | -2,621 | -2,341 | -3,407 | -3,763 | -3,618 | -2,779 | -3,085 | -2,661 |
| Natural gas                      | 14,249 | 5,813  | 5,000  | 7,261  | 8,136  | 8,941  | 8,550  | 10,090 | 9,141  | 8,735  | 9,250  |
| Nuclear                          |        |        |        |        |        |        | -      | -      | -      | -      | -      |
| Hydro                            | 60     | 134    | 132    | 174    | 237    | 217    | 203    | 192    | 199    | 296    | 230    |
| Geothermal                       |        |        |        |        |        |        | -      | -      | -      | -      | -      |
| Solar/wind/other                 | 0      | 0      | 0      | 0      | 0      | 0      | -      | -      | 0      | 0      | -      |
| Combustible renewables and waste | 4      | 4      | 4      | 4      | 4      | 4      | 88     | 85     | 73     | 91     | 97     |
| Electricity                      | -138   | 34     | 42     | 125    | 117    | 76     | -20    | -51    | -23    | -31    | -58    |
| Other fuel products              |        |        |        |        |        |        | 7      | 5      | 4      | 3      | 4      |
| TPES                             | 26,236 | 12,764 | 11,435 | 11,459 | 12,645 | 13,515 | 13,104 | 14,495 | 13,012 | 12,567 | 13,632 |

<sup>6</sup> Ministry Statistics used when available and IEA statistics, electronic version, 2011 for missing data.



Table 10: Final energy consumption, ktoe

| Products                         | 1990   | 1995  | 2000  | 2002  | 2004  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  |
|----------------------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Coal and coal products           | 89     | 3     | 0     | 0     | 0     | 0     | 5     | 4     | 4     | 4     | 4     |
| Petroleum products               | 5,275  | 2,292 | 1,777 | 1,574 | 2,045 | 2,289 | 2,206 | 2,724 | 2,440 | 2,639 | 3,016 |
| Natural gas                      | 9,047  | 4,387 | 3,240 | 3,220 | 3,121 | 3,115 | 3,255 | 4,043 | 3,401 | 3,403 | 3,574 |
| Combustible renewables and waste | 4      | 4     | 4     | 4     | 4     | 4     | 88    | 85    | 73    | 91    | 97    |
| Electricity                      | 1,591  | 1,166 | 1,282 | 1,320 | 1,576 | 1,716 | 1,363 | 1,339 | 1,054 | 1,052 | 1,141 |
| Heat                             | 0      | 976   | 401   | 511   | 542   | 434   | 71    | 86    | 68    | 56    | 73    |
| Other                            |        |       |       |       |       |       | 4     | 1     | 4     | 3     | 4     |
| TFC                              | 16,007 | 8,828 | 6,704 | 6,631 | 7,288 | 7,559 | 6,992 | 8,282 | 7,044 | 7,248 | 7,909 |

Table 11: Basic energy-related indicators

| Indicators   | 1990  | 1995  | 2000  | 2002  | 2004  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Population (million)   | 7.2   | 7.7   | 8     | 8.1   | 8.3   | 8.5   | 8.6   | 8.7   | 8.8   | 8.9   | 9.1   |
| GDP (billion 2000 US\$)  | -     | -     | 5.3   | 5.9   | 7.2   | 13.4  | 17.4  | 20.1  | 22.5  | 23.7  | 24.1  |
| GDP (billion 2000 US\$ PPP)  | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     |
| Primary Energy Intensity (TPES/GDP) (toe per thousand 2000 US\$)         | -     | -     | 2.3   | 2.1   | 1.9   | 1.1   | 0.8   | 0.7   | 0.6   | 0.5   | 0.6   |
| Primary Energy Intensity (TPES/GDP PPP) (toe per thousand 2000 US\$ PPP) | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     |
| TPES/Population (toe per capita)   | -     | -     | 1.5   | 1.5   | 1.6   | 1.7   | 1.5   | 1.7   | 1.5   | 1.4   | 1.5   |
| Electricity Consumption/GDP (kWh per 2000 US\$)                          | -     | -     | 0.268 | 0.238 | 0.228 | 0.139 | 0.090 | 0.076 | 0.055 | 0.053 | 0.056 |
| Electricity Consumption/Population (kWh per capita)                      | 2,570 | 1,952 | 2,065 | 2,012 | 2,290 | 2,551 | 2,113 | 2,051 | 1,643 | 1,625 | 1,728 |
| Energy-related CO <sub>2</sub> Emissions (Mt)                            | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     |

Table 12: Electricity generation, GWh

| Products                           | 1990   | 1995   | 2000   | 2002   | 2004   | 2006   | 2007   | 2008   | 2009   | 2010   | 2011   |
|------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Coal and coal products             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| Petroleum products and natural gas | 22,500 | 15,488 | 17,165 | 16,681 | 18,989 | 22,025 | 19,483 | 19,410 | 16,559 | 15,263 | 17,618 |
| Hydro                              | 700    | 1,556  | 1,534  | 2,020  | 2,755  | 2,518  | 2,364  | 2,232  | 2,308  | 3,446  | 2,676  |
| Solar/wind/other                   | -      | -      | -      | -      | -      | -      | -      | -      | 2      | 1      | -      |
| Combustible renewables and waste   | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| Total electricity generation       | 23,200 | 17,044 | 18,699 | 18,701 | 21,744 | 24,543 | 21,847 | 21,643 | 18,869 | 18,710 | 20,294 |

Table 13: Heat production, TJ

| Products                           | 1990   | 1995   | 2000   | 2002   | 2004   | 2006   | 2007   | 2008   | 2009   | 2010   | 2011   |
|------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Coal and coal products             | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Petroleum products and natural gas | 89,598 | 36,419 | 16,974 | 21,952 | 23,309 | 23,657 | 20,935 | 24,413 | 15,798 | 16,347 | 19,571 |
| Hydro                              | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Solar/wind/other                   | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Combustible renewables and waste   | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Total heat production              | 89,598 | 36,419 | 16,974 | 21,952 | 23,309 | 23,657 | 20,935 | 24,413 | 15,798 | 16,347 | 19,571 |





ANNEX II:  
ENERGY END USE

*Table 14: Final energy consumption by sector, ktoe*

| Sectors                        | 1990   | 1995  | 2000  | 2002  | 2004  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  |
|--------------------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Residential                    | 2,001  | 2,250 | 2,379 | 2,817 | 3,357 | 3,618 | 3,237 | 3,723 | 3,272 | 3,362 | 3,409 |
| Industry sector                | 7,018  | 3,274 | 1,989 | 1,845 | 1,571 | 1,896 | 1,274 | 1,493 | 953   | 798   | 949   |
| Commercial and public services | 0      | 109   | 459   | 389   | 198   | 159   | 441   | 481   | 436   | 440   | 520   |
| Transport sector               | 1,432  | 1,116 | 744   | 963   | 1,253 | 1,586 | 1,323 | 1,642 | 1,472 | 1,704 | 1,985 |
| Others                         | 4,747  | 2,033 | 1,067 | 544   | 402   | 129   | 260   | 313   | 391   | 407   | 428   |
| Non-energy use                 | 809    | 45    | 66    | 74    | 508   | 171   | 457   | 630   | 520   | 537   | 618   |
| TFC                            | 16,007 | 8,828 | 6,704 | 6,631 | 7,288 | 7,559 | 6,992 | 8,282 | 7,044 | 7,248 | 7,909 |

*Table 15: Final energy consumption of the residential sector, ktoe*

|                                  | 1990  | 1995  | 2000  | 2002  | 2004  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  |
|----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Coal and coal products           |       |       |       |       |       |       |       |       |       |       |       |
| Electricity                      | 0     | 0     | 970   | 895   | 1,024 | 1,186 | 717   | 640   | 503   | 495   | 509   |
| Natural gas                      | 1,958 | 1,605 | 1,382 | 1,889 | 2,256 | 2,338 | 2,308 | 2,868 | 2,603 | 2,685 | 2,712 |
| Heat                             | 0     | 634   | 0     | 0     | 0     | 27    | 26    | 29    | 31    | 33    | 49    |
| Petroleum products               | 43    | 11    | 27    | 33    | 78    | 67    | 116   | 120   | 82    | 76    | 62    |
| Combustible renewables and waste |       |       |       |       |       |       | 70    | 66    | 53    | 73    | 77    |
| Other                            |       |       |       |       |       |       |       |       |       |       |       |
| Total residential sector         | 2,001 | 2,250 | 2,379 | 2,817 | 3,357 | 3,618 | 3,237 | 3,723 | 3,272 | 3,362 | 3,409 |

*Table 16: Final energy consumption of the service sector, ktoe*

|                                  | 1990  | 1995  | 2000  | 2002  | 2004  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  |
|----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Coal and coal products           | 0     | 3     | 0     | 0     | 0     | 0     | 5     | 4     | 4     | 4     | 4     |
| Electricity                      | 112   | 129   | 46    | 41    | 124   | 151   | 336   | 365   | 333   | 349   | 399   |
| Natural gas                      | 174   | 40    | 369   | 338   | 127   | 36    | 84    | 104   | 94    | 91    | 116   |
| Heat                             | 0     | 7     | 114   | 154   | 105   | 11    | 14    | 18    | 21    | 22    | 24    |
| Oil products                     | 1,146 | 1,047 | 674   | 818   | 1,095 | 1,548 | 1,307 | 1,613 | 1,438 | 1,662 | 1,943 |
| Combustible renewables and waste | 0     | 0     | 0     | 0     | 0     | 0     | 18    | 19    | 18    | 16    | 19    |
| Other                            | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Total services sector            | 1,432 | 1,226 | 1,203 | 1,351 | 1,450 | 1,745 | 1,764 | 2,123 | 1,908 | 2,144 | 2,505 |

*Table 17: Final energy consumption of the industry sector, ktoe*

|                                  | 1990  | 1995  | 2000  | 2002  | 2004  | 2006  | 2007  | 2008  | 2009 | 2010 | 2011 |
|----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|
| Coal and coal products           |       |       |       |       |       |       |       |       |      |      |      |
| Electricity                      | 783   | 137   | 64    | 179   | 339   | 334   | 258   | 279   | 164  | 151  | 170  |
| Natural gas                      | 6,027 | 2,406 | 972   | 933   | 324   | 705   | 799   | 994   | 654  | 569  | 691  |
| Heat                             | 0     | 316   | 284   | 352   | 434   | 377   | 31    | 38    | 15   | 0    | 0    |
| Petroleum products               | 208   | 415   | 669   | 381   | 474   | 480   | 182   | 182   | 120  | 77   | 87   |
| Combustible renewables and waste |       |       |       |       |       |       | 0     | 0     | 0    | 0    | 0    |
| Other fuel products              |       |       |       |       |       |       | 4     | 0     | -    | -    | -    |
| Total industrial sector          | 7,018 | 3,274 | 1,989 | 1,845 | 1,571 | 1,896 | 1,274 | 1,493 | 953  | 798  | 949  |

*Table 18: Energy consumption of the industry sector by subsector, ktoe*

| Subsectors                 | 1990  | 1995  | 2000  | 2002  | 2004 | 2006  | 2007 | 2008 | 2009 | 2010 | 2011 |
|----------------------------|-------|-------|-------|-------|------|-------|------|------|------|------|------|
| Iron and Steel             | 205   | 3     | 2     | 11    | 18   | 34    | 52   | 54   | 44   | 52   | 65   |
| Chemical and Petrochemical | 713   | 304   | 699   | 600   | 564  | 1,113 | 218  | 323  | 203  | 209  | 236  |
| Non-Metallic Minerals      | 0     | 7     | 0     | 8     | 12   | 15    | 193  | 193  | 173  | 123  | 195  |
| Non-Ferrous Metals         | 0     | 22    | 17    | 14    | 65   | 237   | 449  | 426  | 61   | 8    | 4    |
| Food and Tobacco           | 0     | 11    | 5     | 12    | 22   | 39    | 169  | 279  | 280  | 230  | 237  |
| Mining and Quarrying       | 0     | 1     | 2     | 105   | 49   | 115   | 14   | 15   | 14   | 18   | 20   |
| Machinery                  | 137   | 20    | 9     | 3     | 3    | 3     | 42   | 42   | 32   | 29   | 33   |
| Construction               | 85    | 4     | 15    | 13    | 12   | 37    | 106  | 127  | 114  | 102  | 128  |
| Textile and Leather        | 55    | 23    | 1     | 1     | 2    | 5     | 6    | 9    | 8    | 8    | 8    |
| Paper, Pulp and Printing   | 0     | 1     | 10    | 0     | 0    | 1     | 1    | 2    | 1    | 2    | 1    |
| Non-specified/Other        | 5,824 | 2,879 | 1,229 | 1,078 | 824  | 297   | 24   | 23   | 23   | 17   | 22   |



ANNEX III:  
BILATERAL CO-OPERATION IN THE FIELD  
OF ENVIRONMENTAL PROTECTION

1. Agreement between the government of the Republic of Azerbaijan and the government of the Republic of Georgia on co-operation in the field of environmental protection (18 February 1997)
2. Memorandum of understanding between the MENR of the Republic of Azerbaijan and the State Management Institute of Canada on a training programme for mitigating green gas pollution for 2002–2005 (4 April 2003)
3. Agreement between the MENR of the Republic of Azerbaijan and Baku Office of the OSCE on co-operation (establishment of a public information centre in the field of environmental protection) (4 September 2003)
4. Memorandum of understanding between the government of the Republic of Azerbaijan and the government of the Kingdom of Denmark on the implementation of the Kyoto Protocol of the UNFCCC (8 December 2004)
5. Agreement between the government of the Republic of Azerbaijan and the government of the Republic of Turkey on co-operation in the field of environmental protection (9 July 2004)
6. Agreement between the MENR of the Republic of Azerbaijan and the principal department for hydrometeorology within the Cabinet of Ministers of the Republic of Uzbekistan on scientific-technical co-operation (19 July 2004)
7. Agreement between the MENR of the Republic of Azerbaijan and environmental department of Iran's Islamic republic on co-operation (5 August 2004)
8. Memorandum of understanding between the MENR of the Republic of Azerbaijan and the International Union for Nature Conservation (IUCN) on co-operation in the field of environmental protection (13 October 2004)
9. Memorandum of understanding between the MENR of the Republic of Azerbaijan and KfW on co-operation in the framework of ecoregional environmental protection for South Caucasus (25 October 2004)
10. Memorandum of understanding between the MENR of the Republic of Azerbaijan and World Wide Foundation (WWF) on co-operation in the field of environmental protection (13 November 2004)
11. Agreement between the government of the Republic of Azerbaijan and the government of the Republic of Moldova on co-operation in the field of environmental protection (22 February 2007)
12. Memorandum of understanding between the MENR of the Republic of Azerbaijan and the Korea Reserve Corporation and Geoscientific Institute for Mineral Resources on co-operation in the field of the exploitation of mineral resources (24 April 2007)
13. Protocol between the MENR of the Republic of Azerbaijan and Mineral Resources Department of Egypt's Arab republic on technical co-operation (7 May 2007)
14. Agreement between the government of the Republic of Azerbaijan and the government of the Republic of Ukraine on co-operation in the field of environmental protection (5 September 2007)



15. Memorandum of understanding between the MENR of the Republic of Azerbaijan and the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety on co-operation in the field of the implementation of clean mechanism projects (4 October 2007)
16. Agreement between the MENR of the Republic of Azerbaijan and the State Committee on Protection of the Environment of the Republic of Uzbekistan in the field of environmental protection (11 September 2008)
17. Memorandum of understanding between the Republic of Azerbaijan and UNDP in the field of carbon foundation for millennium development (7 April 2009)
18. Agreement between the government of the Republic of Azerbaijan and the government of the Republic of Latvia on co-operation in the field of environmental protection (25 June 2007)
19. Agreement between the MENR of the Republic of Azerbaijan and Technical Cooperation Organization of the Federal Republic of Germany in the field of the sustainable use of natural resources (17 July 2009)
20. Memorandum of understanding between the MENR of the Republic of Azerbaijan and Environment Industry and Technologies Institute of Korea on co-operation in the field of the preparation of a general plan for the management of natural resources (16 September 2009)
21. Agreement between the MENR of the Republic of Azerbaijan and the Environment Ministry of Romania in the field of environmental protection (28 September 2009)







ANNEX IV:  
ORGANISATIONS VISITED BY THE REVIEW TEAM

Ministry of Industry and Energy

State Agency on Alternative and Renewable Energy

Ministry of Economic Development

Azerenerji JSC

Tariff (Price) Council

Bakuelektrikshebeke (Baku electric network) Electricity Distribution Company

State Statistics Committee

Ministry of Ecology and Natural Resources

State Building and Architecture Committee

Azeristiliktejhizat (district heating company)

Azerbaijan Technical University

Meeting with NGO representative: Ecoenergy International



ANNEX V:  
LIST OF ABBREVIATIONS

| <b>ABBREVIATION</b>   | <b>FULL NAME</b>   |
|-----------------------|--|
| <b>ACG</b>            | Azeri-Chirag-Gunashli Oilfield   |
| <b>AIOC</b>           | Azerbaijan International Operating Company   |
| <b>Azerienergy</b>    | The state-owned electricity company  |
| <b>Azerigaz</b>       | The state-owned gas company (subsidiary of SOCAR)  |
| <b>BTC</b>            | Baku-Tbilisi-Ceyhan Pipeline   |
| <b>CBO</b>            | Community based organisation   |
| <b>CCP</b>            | Climate change programme   |
| <b>CDC</b>            | Community development council  |
| <b>CDM</b>            | Clean development mechanism of the Kyoto Protocol  |
| <b>CJSC</b>           | Closed joint stock company   |
| <b>CO<sub>2</sub></b> | Carbon dioxide   |
| <b>DNA</b>            | Designated national authority  |
| <b>EBRD</b>           | European Bank for Reconstruction and Development   |
| <b>ECT</b>            | Energy Charter Treaty  |
| <b>EE</b>             | Energy efficiency  |
| <b>EU</b>             | European Union   |
| <b>GDP</b>            | Gross domestic product   |
| <b>GEF</b>            | Global environment facility  |
| <b>GHG</b>            | Greenhouse gas   |
| <b>GUAM</b>           | Georgia, Ukraine, Azerbaijan and Moldova   |
| <b>GWh</b>            | Giga watt hour   |
| <b>HPP</b>            | Hydropower plant   |
| <b>IAED</b>           | International Agency for Economic Development  |
| <b>IEA</b>            | International Energy Agency  |
| <b>IFC</b>            | International Financing Corporation  |
| <b>IFI</b>            | International financial institution  |
| <b>INOATE</b>         | International energy co-operation programme between the European Union and the Partner Countries of Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Ukraine and Uzbekistan |
| <b>IRENA</b>          | International Renewable Energy Agency  |
| <b>JSC</b>            | Joint stock company  |
| <b>km</b>             | Kilometre  |
| <b>kWh</b>            | Kilowatt hour  |
| <b>ktoe</b>           | Kilo tonne of oil equivalent   |

|               |   |
|---------------|---|
| <b>MENR</b>   | Ministry of Ecology and Natural Resources                       |
| <b>MES</b>    | Ministry of Emergency Situations                                |
| <b>MIE</b>    | Ministry of Industry and Energy                                 |
| <b>mm</b>     | Millimetre  |
| <b>Mtoe</b>   | Million tonnes of oil equivalent                                |
| <b>MW</b>     | Megawatt  |
| <b>NATO</b>   | North Atlantic Treaty Organization                              |
| <b>NEAP</b>   | National environmental action plan                              |
| <b>NGO</b>    | Non-government organisation                                     |
| <b>OECD</b>   | Organisation for Economic Co-operation and Development          |
| <b>OJSC</b>   | Open joint stock company  |
| <b>OGJ</b>    | Oil and Gas Journal   |
| <b>OSCE</b>   | Organization for Security and Co-operation in Europe            |
| <b>PEEREA</b> | Protocol on Energy Efficiency and Related Environmental Aspects |
| <b>PPP</b>    | Purchasing power parity   |
| <b>PSA</b>    | Production sharing agreement                                    |
| <b>RES</b>    | Renewable energy sources  |
| <b>SAARES</b> | State Agency on Alternative and Renewable Energy Sources        |
| <b>SME</b>    | Small and medium-sized enterprise                               |
| <b>SOCAR</b>  | State Oil Company of the Azerbaijan Republic                    |
| <b>SSC</b>    | State Statistical Committee of the Republic of Azerbaijan       |
| <b>TFEC</b>   | Total final energy consumption                                  |
| <b>TPP</b>    | Thermal power plant   |
| <b>TWh</b>    | Terawatt hour   |
| <b>UNDP</b>   | United Nations Development Programme                            |
| <b>UNFCCC</b> | United Nations Framework Convention on Climate Change           |
| <b>USAID</b>  | United States Agency for International Development              |
| <b>VAT</b>    | Value added tax   |
| <b>WB</b>     | World Bank  |
| <b>WTO</b>    | World Trade Organisation  |







ANNEX VI:  
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In-Depth Review  
of the Energy Efficiency Policy  
of **AZERBAIJAN**

Azerbaijan ratified the Energy Charter Treaty (ECT) and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) on 2 December 1997. By ratifying PEEREA, countries commit themselves to formulate and implement policies for improving energy efficiency and reducing the negative environmental impacts of the energy cycle. The guiding principle of PEEREA is that contracting parties shall co-operate and, as appropriate, assist each other in developing and implementing EE policies, laws and regulations.

An In-depth review of energy efficiency policies of Azerbaijan was carried out in 2012. This In-depth review report was discussed by the PEEREA Working Group and the recommendations were endorsed by the Energy Charter Conference at its meeting in Warsaw in November 2012.

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**ISBN 978-905948-126-8** (English PDF)

**ISBN 978-905948-125-1** (English Paperback)

**Dépôt D/2013/7850/3**



**ENERGY CHARTER SECRETARIAT**  
**2013**