Energy Efficiency Finance

Task 1 Energy Efficiency Potential

Country Report: AZERBAIJAN

Prepared for OeEB by Allplan GmbH
in cooperation with Frankfurt School and Local Partners
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Abbreviations

ABEMDA -	State Agency on Alternative and Renewable Energy Source of Azerbaijan Republic (abbreviation from Azeri language)
ADB -	Asian Development Bank
AE -	Alternative Energy
BAT -	Best Available Technologies
BP -	BP plc, multinational oil and gas company
BTC -	Baku Tbilisi Jeyhan pipeline project
CP -	Cleaner Production
EBRD -	European Bank for Reconstruction and Development
EC -	European Commission
EDTP -	Enterprise Development and Training Program
EE -	Energy Efficiency
ESCO	Energy Service Company
GIZ -	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
HH -	Household
HPP -	Hydro power plant
IFC -	International Finance Corporation
IFI -	International Financial Institution
kWh -	kilo Watt hour
MENR -	Ministry of Ecology and Natural Resources of Azerbaijan Republic
MIE-	Ministry of Industry and Energy of Azerbaijan Republic
OSCE -	Organization for Security and Cooperation in Europe
RE -	Renewable Energy
SAARES -	State Agency on Alternative and Renewable Energy Source of Azerbaijan Republic (English version)
SME -	Small and Medium Enterprise
SOCAR -	State Oil Company of Azerbaijan Republic
TJ -	Terajoule

1 Executive Summary

In contrast to many other countries Azerbaijan - with 520 PJ primary energy use - is almost fully supplied from locally available energy sources with strong emphasis on hydrocarbons. In the field of petroleum it is an important net exporter. Natural gas plays the major role not only for supplying energy and heat producers, but also for supplying energy needs in the residential and industrial sector. The local energy demand is expected to grow both in the residential and industrial sectors and it can be expected that the energy production will be extended accordingly. This will lead to investments in new, more efficient plants and equipment. Still, there is also further need to retrofit distribution lines and grids.

The residential sector is the major consumer of electricity and, since 2009, also for heat. The high energy efficiency potential (not quantified) in the residential sector is mainly due to the bad thermal condition of buildings and windows. Currently there are no energy efficiency standards for buildings in Azerbaijan. After the collapse of the district heating systems, most of the apartments use decentralized heating solutions based on natural gas and in rural areas also on wood, kerosene and electricity are increasingly used for heating. Illegal cutting of forests is an acute problem for Azerbaijan.

In 2011, the biggest electricity consumers in industry were construction, metallurgy (iron and steel, while the non-ferrous metal sector significantly dropped), machinery, chemical and petrochemical, food and tobacco. From this point of view, these industries may be a potential area for EE investments.

Currently, there is no specific national law relevant for energy efficiency, but relevant regulations can be found in other legal documents. To date, there are no support schemes or obligations to use or purchase renewable energy/electricity. The major legislative document related to EE is "The law on Use of Natural Resources" (1996). The law envisages the development of norms of energy usage, responsibility for wastes in energy use, creation of supportive mechanisms to promote EE as well as the creation of a respective EE Fund. However, up to date neither the operation of the EE Fund, nor actual activities of state energy inspections could be verified.

Concerning the technical framework, change of (obsolete) equipment is a standard solution on the local market and can be easily purchased in Azerbaijan. Among these solutions are e.g. compressors, motors, pumps, transformers, electrical controllers, SCADA systems, various metering devices, insulation material, electrical cables, wiring and industrial boilers. On the other hand there are more complex measures, which do not only require the exchange of single machines or equipment but project management and considerable time for the preparation of technical task, agreements with foreign suppliers, logistics, commissioning and testing. Among these measures are heat recovery units, heat recuperators, cogeneration units, waste water recovery, pre-heaters and combustion controls or turn-key production solutions. Awareness of EE technologies and experience, also concerning required repair and maintenance among industrial representatives, is limited, which leads to reluctance to implement such measures.

Despite the currently comparatively low tariffs (around 30% of the comparable EU value), which lead to longer payback periods of potential EE investments and thus reduce their attractiveness, the burden of energy costs (which is presumably mainly due to the low energy efficiency) for both the industrial and household sector is considerable. In the regional comparison done by IFC (2010) among industrial enterprises, Azerbaijan ranks second for average energy cost as a proportion of total operating costs which increases the attractiveness of investments in energy efficiency.

2   Aim and Scope of this Report

The Development Bank of Austria (OeEB) AG aims at increasing its activities in the field of energy efficiency in selected countries via dedicated credit lines, but also via supportive programs for selected financial institutions and project developers. The present study is part of the overall study, which analyzes the status of energy efficiency in the countries Turkey, Ukraine, Armenia and Azerbaijan.

The Study is carried out in cooperation of ALLPLAN GmbH and Frankfurt School and is based on the latest available information collected directly in the country by local experts in June 2013.

This report focuses on Task 1, "Potential of the Energy Efficiency Market" in Azerbaijan and analyzes the following questions:

- How is the Status of Energy Efficiency in different economic sectors?
- In which sectors is the efficiency potential considered to be highest?
- How can local framework for energy efficiency be characterized in terms of legal, economic and technical aspects?

3   Studies Available

3.1   Overview

Energy efficiency potentials have been analyzed in several studies, mainly from international organizations, such as IFC or EBRD, and have been used as basis for offering loans and advisory services. According to latest news, both IFC and EBRD endorsed the first loans in 2013 in the energy efficiency area[1]. Although the report from Hunt (2006) is directly related to the energy efficiency topic, it is not analyzed in detail, because it is outdated and has very limited applicability for public buildings efficiency. Not all presented reports are publicly available, particularly the *Feasibility study report on energy efficiency trends among SME'S in Azerbaijan* (2010) and the *Analysis of problems in Energy Efficiency and Energy Savings (2011)*.

A summary of the reports relevant for the field of energy efficiency are presented in Table 1.

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[1] EBRD approves first energy efficiency loan in Azerbaijan, AzerNews article, February 2013
IFC approves first loan on Azerbaijan's energy efficiency, News.az article, May 2013

Table 1: Overview of available reports

Report Name/Author/Date/Link	Scope	Brief description
Energy Efficiency: a new resource for sustainable development **IFC (2010)** **link**	Desk research and face-to-face interviews with the management of the enterprises of Armenia, Azerbaijan, Belarus, Georgia and Ukraine (2008) and in Russia in 2006 intending to help governments, financial institutions, companies, donors and private investors identify opportunities to provide goods and services that improve energy efficiency.	The report includes an assessment of how industrial enterprises in each of the survey countries prioritize, understand, plan, finance and implement energy efficiency investments. It provides comparison of companies among the studied countries regarding parameters as energy consumption, energy intensities of economies, energy costs as a proportion of total costs of companies and energy prices. The major part of the report is devoted to the feedback from company representatives on awareness and understanding of the EE concept. Previous and planned EE projects, types of EE measures and investment costs are analyzed. The report further describes whether companies have implemented some EE plans, internal incentives programs and conducted energy audits and which governmental incentives and requirements are available in this field. The report concludes with the discussion on financial barriers and why companies do not invest in EE and apply for external funding.
Energy Efficiency: a new resource for sustainable development. Learning experience in energy efficiency by Azerbaijan companies **IFC (2009)** **link**	Conducted in 2008-2009 via face-to-face meetings and interviews with the management of 100 companies in Azerbaijan (mainly with small (58%) and medium (27%) enterprises). Part of the regional overview of the energy efficiency situation and objectives coincide with the regional comparative 2010 report.	Focus of the study is the economic situation of Azerbaijan, the awareness level on EE, potential areas of efficiency improvement as perceived by companies and description of implemented measures to reduce the energy consumption. In contrast to the regional report, it provides more details in what types of EE measures by equipment actions were taken. The report also provides financing options considered by respondents and obstacles in obtaining relevant funding.
Assessment of Sustainable Energy Investment Potential in Azerbaijan, Final Report, EBRD **EBRD, Norsk Energi, APESA (Association of Power Engineers and Scientist of Azerbaijan), ECON Pöyry** **(2008)**	Prepared with funds donated by UK's Department for International Development. An extensive desk research was implemented, and a survey of a list of companies suggested by the Ministry of Economic Development of Azerbaijan, the EBRD office in Baku and by the APESA (Association of Power Engineers of Azerbaijan) was conducted. The report covers an estimation of investing potential.	In comparison with the IFC report, this one provides more substantial desk research on the energy balance of Azerbaijan including energy production, consumption by industries and sources, energy tariffs, energy intensity comparison with CIS, US and European countries. The report provides a brief overview of various sectors of economy such as industry, residential, construction and real estate, including an analysis of the legal framework and assessment of the market potential and market barriers. Examples of potential users as large industrial companies are listed. The report concludes with a discussion of the readiness of the market and the need for technical assistance.
Feasibility study report on energy efficiency trends among SMEs in Azerbaijan. **Dr. Nazir K. Ramazanov** **"Dirchelish" Economic Research Society** **(2010)**	The report includes in-depth interviews among 2-3 representatives from 57 companies located mainly in the Baku area to recommend activities that could be undertaken by the EDTP (Enterprise Development and Training Program) to support improvement of energy efficiency within the BP local supply chain.	In comparison to the reports of international financial organizations, the aim of this report was not to identify investment opportunities, but rather to analyze the current state of energy efficiency awareness; to determine if companies and sectors could benefit from energy efficiency; to define companies' current understanding of how energy efficiency can be applied to reduce costs and improve the environment. The report provides a brief overview of the energy market and continues with the experience of local SMEs. Based on survey results, the report discusses whether EE is an important issue for the companies, the energy share in the overall production costs, perceived areas for efficiency improvement and barriers for implementation of EE measures.
Analysis of problems in Energy Efficiency and Energy Savings. **Vilayat Valiyev, Scientific-Research**	Objective is to provide a scope of the development in the EE area of Azerbaijan.	This report provides recommendations on 14 priority actions for development of EE, such as development of standards, cooperation between states and private entities, relationship of EE and environmental protection policies, development of technologies, promoting EE in power production, distribution and consumption and

Institute of Economic Reforms (2011) **link**		creating market mechanisms.
Azerbaijan Alternative Energy and Energy Efficiency Project Development Support **Steven Hunt, Practical Action Consulting (2006)** **link**	The objective of this report is to support the development of Alternative Energy and Energy Efficiency Projects in Azerbaijan under the BTC funded Environmental Awareness and Improvement Programme (EAIP). Data is collected based on surveys, discussions and interviews undertaken in collaboration with Hayat NGO. The report was submitted to LEAD International and Hayat NGO.	The main topic of this report is the EE in buildings. The report provides 6 project ideas for potential implementation in Azerbaijan including Public Building Heating and Insulation, Public Lighting, Biomass Residue Greenhouse Heating, Stimulating Supply of Improved Stoves, Domestic Lighting and Electrical Appliance Provision, Energy Management Toolkit. Proposals were developed at specific locations in collaboration with communities and Hayat field staff, building primarily on the first two project ideas that Qara Jali Community Medical Centre, Ujar Region and Tovuz City Pedestrian Railway Underpass, Tovuz Region. Furthermore, building inspections were conducted and EE measures suggested.
Resource Efficiency Gains and Green Growth Perspectives in Azerbaijan **Naila Aliyeva (2012)** **link**	A study under Friedrich Ebert Stiftung Organization.	The study uses references to IFC reports, IEA, national statistics and provides a brief overview of the energy production and macroeconomic indicators. It mentions the expected development in state EE policy. Though, while discussing perspectives for Green Growth/Resource Efficiency, the focus is given to AE/RE, ecological issues, water supply and how green economy can create jobs and the state's role in this.
Study of Small and Medium Enterprises in Azerbaijan **IFC (2009)** **link**	The objective of this survey was to assess the existing conditions for doing business in Azerbaijan in 2008 and to develop recommendations for improving them. This report is based on the results of a survey of managers of more than 1,800 small and medium enterprises (SMEs), conducted in late 2007/early 2008, representing all its regions and key sectors of the economy. The survey also included the subpopulations of individual entrepreneurs.	The report provides a brief overview of SMEs' activity in Azerbaijan, covers business registration, licensing and experiences with taxation and inspections. The report provides good insight about how SME are investing, their access to finance and relationship with banks.
A Roadmap for Renewable Energy in Azerbaijan **ADB (2009)** **link**	The report is conducted in a regional attempt to ameliorate the effects of climate change, describes the status of the RE sector of Azerbaijan, point at gaps and provides recommendations.	The roadmap provides an overview of legislative and institutional changes in the energy sector of Azerbaijan, advises policy framework, describes potential of RE sources, discussed tariffs, costs and benefits of RE projects, case studies and provides recommendations.
Doing business in Azerbaijan Azpromo **The World Bank** **UHY (2011-2013)**	Various reports are available providing overview of the business environment in Azerbaijan for potential investors.	UHY is an international network of legally independent accounting and consultancy firms, Azpromo is Azerbaijan Export & Investment Promotion organization. Reports provide overview of how easy it is to register businesses, pay taxes, employ people, get credits, etc.

3.2   Main results of existing studies

The main reports of IFC (2010), IFC (2009) and EBRD (2008) regarding EE potential in Azerbaijan have similar structures and applied survey methodology including market analysis and face-to-face interviews. IFC reports are more targeted at the industry sector, practice of companies and energy saving potential, while EBRD provides a wider look on specific EE measures, savings potential and required investments both in the industrial and residential sectors.

Both IFC reports provide benchmarking against best practices for savings (for gas, heating, electricity and compressed air), but do not provide references to the sources of such practices. IFC (2010) also provides additional benchmarking among the studied countries. The reports do not discuss target industries and EE measures most attractive for investments, so it can rather be used as a policy making tool for promoting activity in this sector. EBRD (2008) from this point is more comprehensive and specific. Though, no analysis of SME and large corporations is provided separately. It evaluates EE measures and savings potential for various economic sectors. EBRD's (2008) scope did not include comparison of specific energy consumption against "international benchmarks", as this was considered to be a more accurate approach as explained in the report:

- Measures of specific energy consumption are rarely directly comparable between industries in the same sector, as few industries produce exactly the same range of products;
- Few relevant "international benchmarks" were available for energy consumption in industry at the time of conducting the study;
- The companies do not disclose accurate production and energy use related information, due to confidentiality reasons.

Though, previous work done provides a good overview of the market background, awareness and experiences of companies and barriers for investing in EE measures, it mainly covers one part of market players: the industry.

4 Status of Energy Efficiency

4.1 Energy supply

Azerbaijan is rich in own resources with negligible import dependencies. The following chart provides a good overview of the energy flow in Azerbaijan. Despite the fact that it depicts the situation in 2007 it is still considered a valuable document as it highlights the main factors of energy supply and use at one glance. It has to be noted that according to 2011 figures gas production and exports have increased considerably. In general, energy consumption in all sectors increased and heat delivered to the industrial sector decreased in comparison to the flow chart.
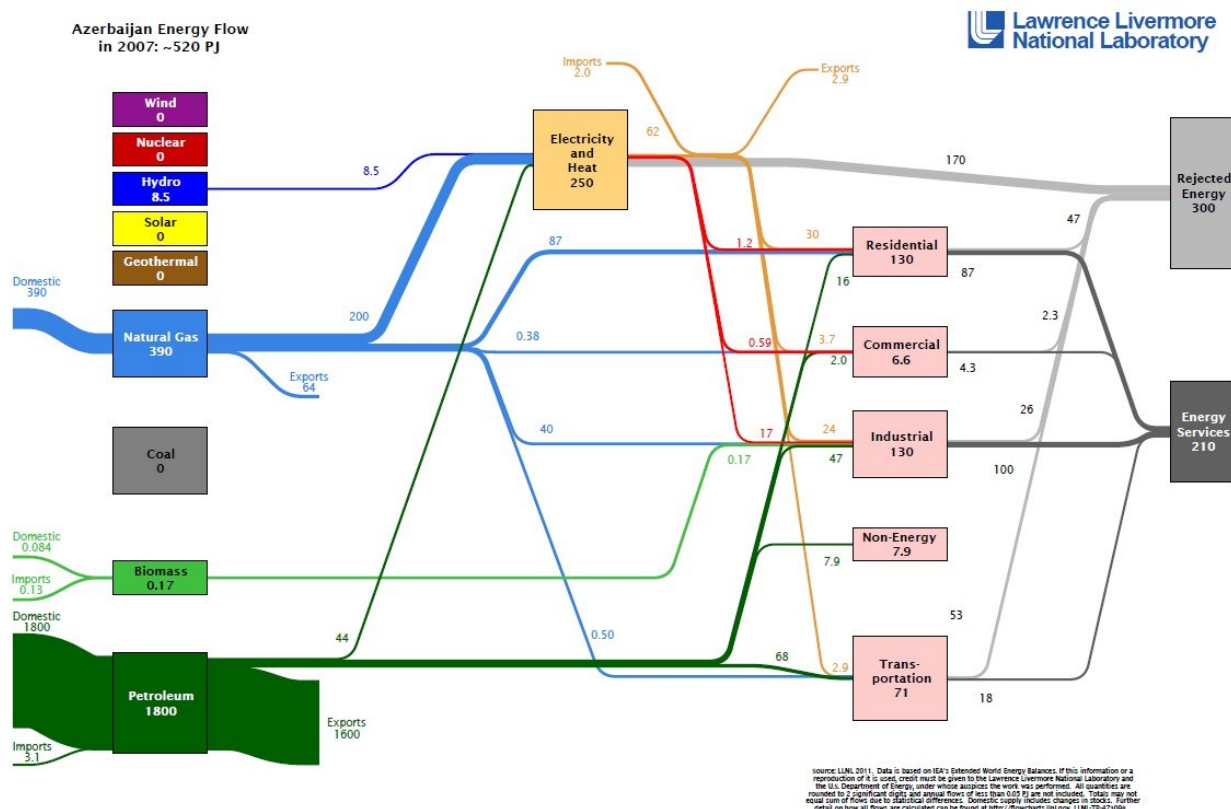
Figure 1: Energy flow Azerbaijan 2007
Source: Lawrence Livermore Laboratories, 2011

From the chart above, which shows about 520 PJ of primary energy supply the following conclusions can be derived:

- In contrast to many other countries Azerbaijan is almost fully supplied by local available energy sources with strong emphasis on hydrocarbons.
- In the field of petroleum it is an important net exporter.
- Natural gas plays the major role not only for supplying energy and heat producers, but also for supplying energy needs in the residential and industrial sector.
- The rejected energy as depicted in the grey row amounting to 300 PJ is to a great extent due to losses in electricity and heat generation. Losses attributable to electricity and heat generation amount to 170 PJ, which is 68% of the delivered energy. In comparison to this figure the Austrian value (2007) amounts to 36%.
- There is a strong energy demand from the residential sector, whereas lower energy demand from the industry in comparison to countries like e.g. Austria.
- Currently, the role of renewable energy has to be considered negligible apart from the contribution of hydro power plants.

Currently, the energy production in Azerbaijan is managed by "Azerenergy" JSC, the biggest power producer. According to the information provided by this entity, the current energy production system of Azerbaijan includes 13 thermal and 8 hydropower electric plants. Thermal plants accounted for 85.3% of the

total electricity production in the country in 2011, while hydropower provided 13.2%[2]. The major fuel for the thermal energy and electricity production is gas. As heat energy was neither exported nor imported it fully covered the local market including consumption for own needs of the energy, industry and residential sector. According to official statistics, heat losses comprised 10% of the total heat production during 2007-2011.

Electric energy production experienced a decrease after stable growth until 2010 and is expected to continue its path towards increase. Electricity loss data is available from 2007 onwards. These losses (on average 18%) take place in network transmission and network distribution, the latter being the major place (81% of all losses).

4.2   Energy demand

The following figures show the total energy consumption and the electricity and heat demand development per sector in 2011.
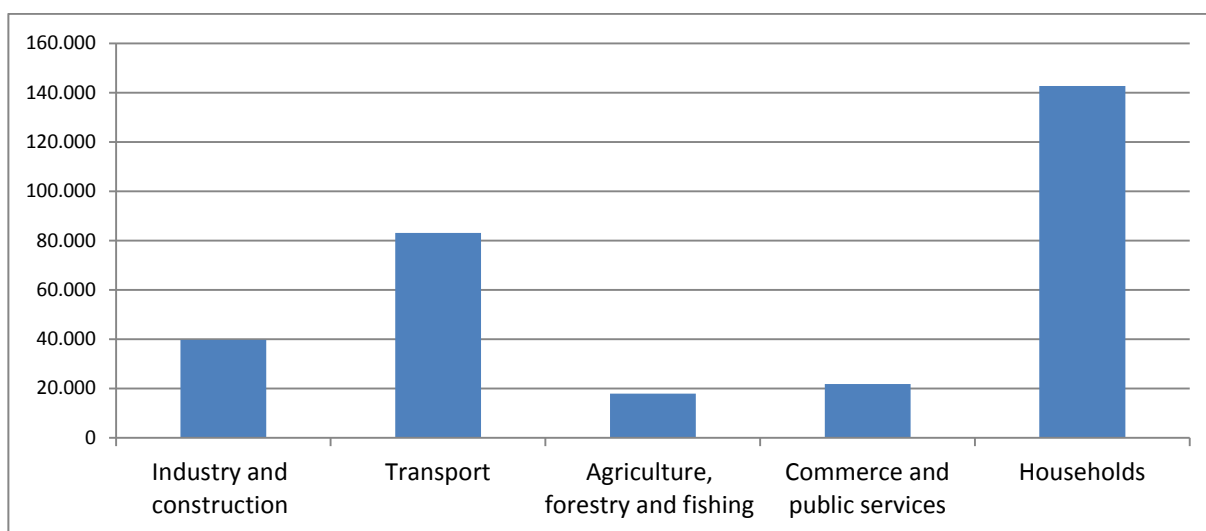
Figure 2: Total energy consumption (petroleum products + gas + electricity + heat) in TJ
Source: State Statistical Committee of Azerbaijan, Energy balance 2011
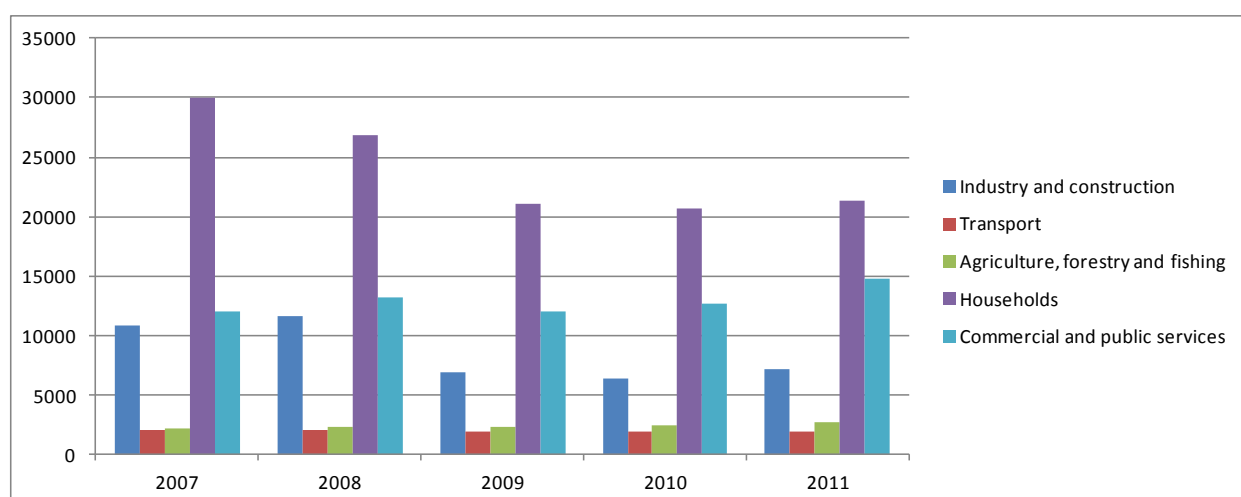
Figure 3: Electricity consumption by sectors in TJ
Source: State Statistical Committee of Azerbaijan Republic

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[2] According to the latest statistics in 2011, Azerbaijan produced 20,294 GWh of electricity. The remaining minor sources of produced electricity are non-energy companies, generators and wind turbines. In 2011 non-energy companies produced 1.5% (301 GWh) of the total. No wind energy or generator produced energy was registered in 2011.
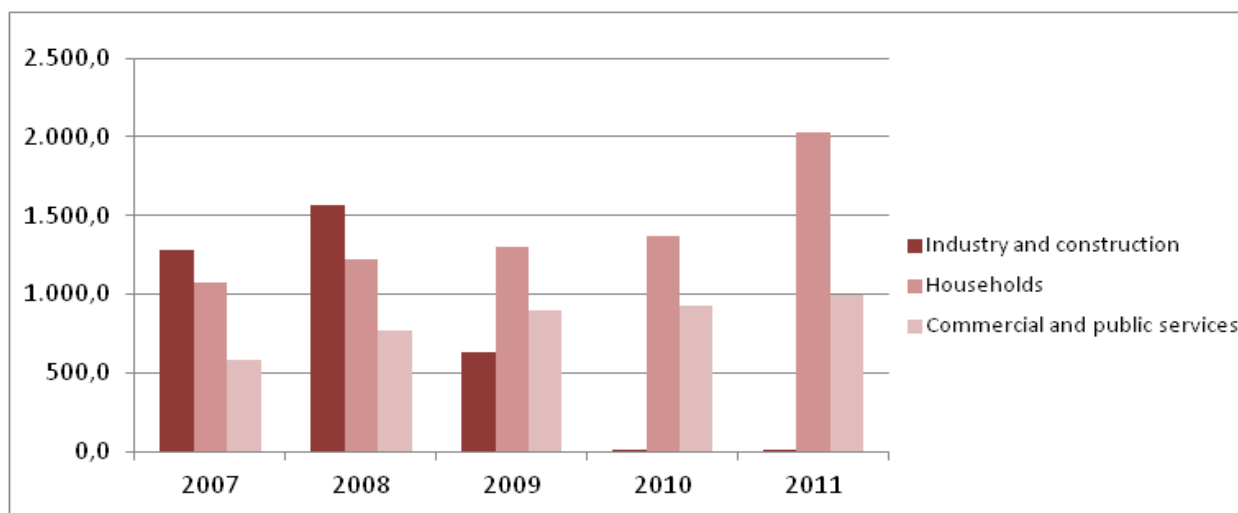
Figure 4: Development of the (centrally supplied) heat demand in TJ
Source: State Statistical Committee of Azerbaijan Republic

The residential sector is the major consumer of electricity and, since 2009, also for heat. When analyzing statistical data an abrupt decrease in (centrally supplied) heat demand for industrial consumers can be observed in the years 2009 and 2010. According to local experts' view this is mainly due to a technological change when more companies started producing their own heat.

Electricity demanded by industry also dropped in 2009, but gradually began to increase in 2011 (13% growth compared to the previous year). The biggest electricity consumers in industry for 2011 were construction, metallurgy (iron and steel, while the non-ferrous metal sphere significantly dropped), machinery, chemical and petrochemical, food and tobacco. From this point of view, these industries may be a potential area for EE investments targeted at a reduction of electricity consumption.

Taking away the unpredictable impact of the crisis in 2009-2010, it can be observed that the energy consumption returns to its path of gradual growth. Households are expected to play a major role in the increase of the local energy demand. The State is expected to provide necessary investments in local power generation facilities to meet that demand as it did before.

Concerning direct fuel consumption also hydrocarbons play a major role. Natural gas is used for boilers and other heating applications. Diesel is a major petroleum product and is consumed in construction. Second largest consumer of petroleum products is the food and tobacco industry. The largest consumers of natural gas are chemical and petrochemical, non-metallic minerals and again food and tobacco. As some EE measures can optimize fuel consumption (e.g. adjusting combustion efficiency) the fuel demand can also point at energy intensive industries.

4.3   Greenhouse gas emissions

GHG emissions are mainly due to the combustion of fuel, technological processes in industry, farming and cattle-breeding. Reduction of GHG emissions in the 1990ies as well after 2008 have been due to economic crises and reached 13.8 Million $tCO_{2-equivalent}$ in 2011 (stationary sources only) after the peak in 2008, where they amounted to 16 Million $tCO_{2-equivalent}$.

Following the Second National Communication to the United Framework convention on climate change, the main contribution of CO_2 is attributable to the energy and industrial sector (AFOLU = agriculture, forestry and land use). The following chart shows the overall emissions by sector. However, latest available figures cited there are from the year 2005 and, in contrast to values above, also comprise non-stationary sources.
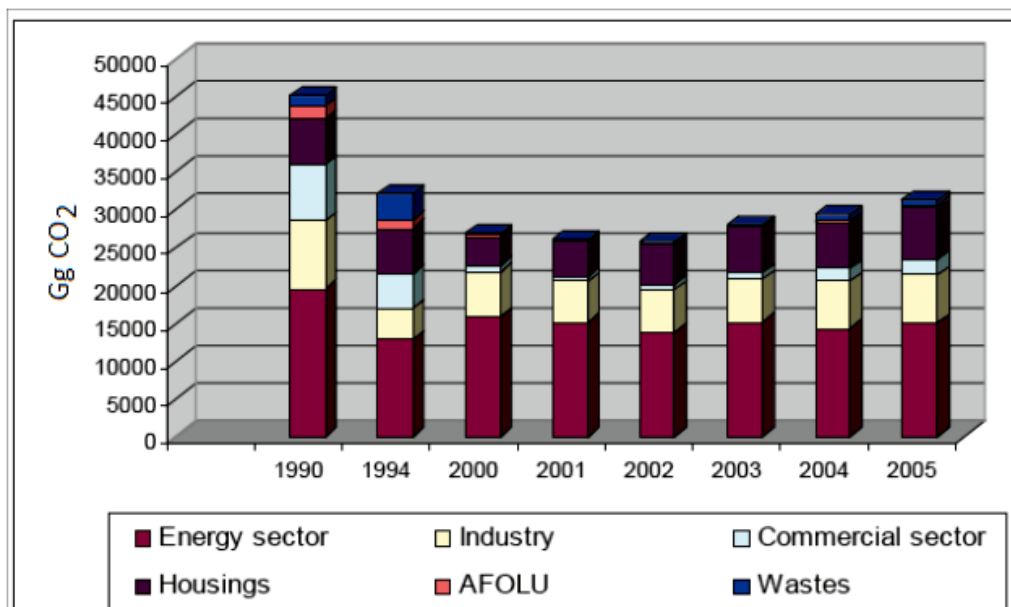
Figure 5: CO₂ emissions per sector
Source: MENR, 2010, Second National Communication to the United Nations Framework Convention on Climate Change. It is assumed that the original chart by error uses "Gt (Giga tons)" as unit, which was changed to "Gg" (Giga grams).

4.4   Energy efficiency overview

Existing studies on energy efficiency mainly focus on the situation in the industrial sector. Despite the pressing problems in the residential sector and its major share in overall energy consumption (see Figure 2) data availability for this sector is limited. The agriculture sector so far is not the main target for energy efficiency measures, mainly due to its relatively low share in the overall energy consumption.

4.5   Energy efficiency in the industrial sector

The industrial sector is responsible for 63.8% of the GDP (CIA, 2012). Previous studies (e.g. EBRD 2008) pointed at the following sectors for the largest energy saving potentials: petro-chemical, metallurgical, food industry, construction materials and minerals as well as light und textile industry. MENR (2010) mentioned the cement sector, stating that large volumes of cement are being produced in Azerbaijan and it is possible to reduce emissions from these plants by optimization of the clinker production and burning processes. The following table summarizes the estimated saving potential per sector. For all figures the current total energy consumption of the relevant industrial sector is taken as the reference value (100 %).

Table 2: Estimated saving potential per sector

UN (2010), Global			EBRD (2008), Azerbaijan		
Report's Sector definition	Industrialized countries	Developing countries	Report's Sector definition	Gas/Fuel	Electricity
Chemical and petro-chemical[3] **- Steam cracking (excl. feedstock)**	20-25%	25-30%	**Petrochemical and metallurgy**	34%	38%
Iron and steel	10-30%	10-30%			
Non-metallic minerals			**Construction materials**	25%	36%
- Cement	20%	25%			
- Lime	30-35%	40%			
Food and beverages	25%	40%	**Food and beverages**	29%	34%
Pulp and paper	25%	20%	**Pulp and paper**	26%	31%
Textile	10%	20%	**Textile**	-	-

Sources: UN, 2010 and EBRD, 2008

From the estimates available the largest potential is cited for the chemical and petrochemical, metallurgy and construction materials sectors. Although the food and beverage industry already uses more new equipment and shows higher expenditures for EE measures than other sectors, the remaining potential can still be considered high. Savings estimations are also available by energy resources. The saving potentials in the following refer to the current total industrial consumption of a particular energy source:

Table 3: Benchmarks of savings potential by energy source

	International best-practice technologies as in IFC (2010)	EBRD (2008)'s expert estimation and regional experience for total industry
Gas	13%	29%
Heating	16%	-
Electricity	20%	36%
Compressed air	25%	-

Sources: IFC, 2010 and EBRD, 2008

It is important to recall that according to IFC (2009), the most modern equipment is present in food production industry (only 5% possess equipment older than 15 years), metallurgy has a higher rate, and the most outdated equipment can be found in the chemistry and petrochemical industry (34%). The sectors mentioned in the table below are the largest electrical energy consumers, as it has been discussed previously. Ratios of EE expenditures to total energy costs supplemented with the latest available domestic capital investments within the sector are provided:

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[3] This sector has a different definition in the *UN (2010)* report that includes high value chemicals, ammonia and methanol. Products reported to be produced under this sector in Azerbaijan can vary from this description.

Table 4: Ratio of EE expenditures to energy costs / comparison with domestic capital investments

	Ratio (EE measure expenditures to energy cost)	Domestic capital investments in 2011 (MIO EUR)
Machinery	1:2.3	280
Metallurgy	1:6.3	95
Building materials	1:3.0	133
Chemistry and petro chemistry[4]	1:1.4	48
Food production	1:1.1	44

Source: IFC, 2009

4.6　Energy efficiency of SMEs

As there is no official definition of midsize legal entities in Azerbaijan, all registered businesses, except of large companies, fall within the category of SMEs.

According to the Azerbaijan Statistical Yearbook 2012, the number of registered enterprises was 75632, among which 60223 were small enterprises.

In Azerbaijan small businesses are defined according to the respective sector as follows (decree No. 57 of the Cabinet of Ministries of the Republic of Azerbaijan on Identification of the Small Entrepreneurship Subjects by Types of Economic Activity dated December 18, 2009).

Table 5: Definition of small enterprises

Entrepreneurship Category	Number of employees	Annual Turnover (VAT and other taxes excluded)
Industry and Construction	< 50	≤ 500,000 manat (454,500 €)
Agriculture	< 25	≤ 250,000 manat (227,300 €)
Wholesale Trade	< 15	≤ 1,000,000 manat (900,900 €)
Retail trade, transportation, service and other economic activities	< 10	≤ 250,000 manat (227,300 €)

Source: CESD, 2012

The share of small enterprises within sectors and the distribution of small enterprises upon sectors are provided in the list below. The share of small enterprises is the highest in the sectors agriculture, forestry and fishing (97%), trade, repair of transport means (96%) and manufacturing, construction, administrative and support service activities (each 93%).

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[4] As described in *MENR (2010),* the main products of the chemical industry are sulphuric acids, superphosphate fertilizers, sodium hydroxide, chlorine, aluminium chloride, sulafanol, synthetic detergents, and bromide. The major of the petrochemical industry are ethanol, synthetic resin, technical rubber products, tires, plastic, glass fibres and polyethylene.

Table 6: Number and share of small enterprises

Sector	Total number of all enterprises	Number of small enterprises	Share of small enterprises within sectors	Distribution of small enterprises upon sectors
Agriculture, forestry and fishing	9,436	9,177	97%	15.2%
Mining	714	639	89%	1.1%
Manufacturing	5,116	4,765	93%	7.9%
Electricity, gas and steam production, distribution and supply	267	119	45%	0.2%
Water supply; waste treatment and disposal	398	308	77%	0.5%
Construction	8,407	7,853	93%	13.0%
Trade, repair of transport means	20,370	19,588	96%	32.5%
Transportation and storage	1,541	1,170	76%	1.9%
Accommodation of tourists and catering	963	834	87%	1.4%
Information and communication	1,486	1,305	88%	2.2%
Financial and insurance activities	1,259	934	74%	1.6%
Real estate activities	742	628	85%	1.0%
Professional, scientific and technical activities	4,194	3,635	87%	6.0%
Administrative and support service activities	2,985	2,768	93%	4.6%
Public administration and defence; social security	4,857	N/A		
Education	1,105	583	53%	1.0%
Human health and social work activities	1,281	794	62%	1.3%
Arts, entertainment and recreation	N/A	962		1.6%
Other service activities	N/A	4,161		6.9%

Source: Azerbaijan statistical yearbook 2012, 2012

There is no separate study of EE potential among SMEs. Still, it turns out that the information obtained from general reports mainly covers SMEs. As EBRD's report (2008) says, most of the companies surveyed are small and medium size companies representing the most essential sectors of Azerbaijan´s industry.

4.7   Energy efficiency in the residential sector

According to the census of 2009, there are 1,895,941 households in Azerbaijan, among which 55% (1,041,173) are in urban and 45% (854,768) in rural regions.

The high energy efficiency potential in the residential sector is mainly due to the bad thermal condition of buildings. According to Aliyeva (2012) there are currently no energy efficiency standards for buildings in Azerbaijan. As mentioned by EBRD (2008), Azerbaijan still uses the Soviet standard SNIP II-3-79 "Civil Heating Engineering" that provides heat resistance values for buildings, but does not classify buildings by efficiency levels as done in European and Russian standards.

District heating experienced a crisis after the collapse of the Soviet Union, and recently renovation work has been done to restore this system. According to Azeristiliktechizat, the state heat supplier, in 2005-2012 large modernization and construction works were realized, including construction of 33 new boiler houses in Baku and regions that are said to meet European standards in energy efficiency and environmental protection and likely applies to district heating. Figures from the State Statistical Committee of Azerbaijan refer to 22.5% of the urban households are supplied with "central heating". It could not be

clarified whether this figure relates to central solutions within one building or to district heating. Residents of such centralized heating supply pay 0.14 EURO monthly per m² without consideration of efficiency or losses. Following EBRD (2008) the total energy use (gas plus electricity) amounted to 329 kWh/m² and year, yet this factor cannot directly be taken to conclude the heat energy demand per square meter due to different or undisclosed methodologies in different studies and not considered habits (e.g. different comfort level, more cooking at home). Existing statistics (e.g. from the Statistical Yearbook) could be used to derive the appliances for which the energy is used (electric appliances, heating, cooking), but following local experts' analysis this leads to contradicting and sometimes unrealistic figures.

Most of the apartments and houses (almost 90% of households in rural areas are separate houses) have decentralized heating systems, which mainly use gas due to its cheap price. EBRD (2008) describes that gas fired mini-boilers called "combi-systems" are popular in Baku and typically mounted at the balconies. They heat water both for apartment heating and for hot water supply. In some of the newly constructed buildings, building level boilers are installed (EBRD experts estimation 5% for the building stock of Baku and under 1% for the building stock of other large cities). Electrical powered heating units typically include infra-red radiators (called "reflectors"), oil filled ribbed radiators and air conditioners (41.1 % urban households and 12.6 % rural households possess air conditioners).

Due to the lack of gas supply and central heating in rural areas wood, kerosene and electricity are increasingly used for heating. According to the EBRD (2008) report, the consumption of kerosene is 17 times and the consumption of wood is 4 times higher than in 1990 and illegal cutting of forests is an acute problem for Azerbaijan. There are no statistics neither about the share of energy sources used for space heating nor about the application of combi-systems in urban areas. High spread of gas supply in urban areas suggests that gas plays a considerable role in space heating, otherwise electricity is used. In rural areas more electricity and wood are assumed. The efficiency rate of heating equipment has not been studied. Using insulation materials and energy efficient windows in the construction of buildings is rare.

The Demographic and Health Survey done by State Statistical Committee of Azerbaijan Republic in 2006 provides shares of cooking fuel:

Table 7: Share of fuel types used in urban and rural households for cooking

Year 2006	Urban HH (%)	Rural HH (%)
Electricity	14.9	28.2
Natural gas/ compressed gas	84.0	48.5
Wood/straw	0.8	20.1
No food cooked in HH	0.0	0.1
Other/ missing	0.2	3.2

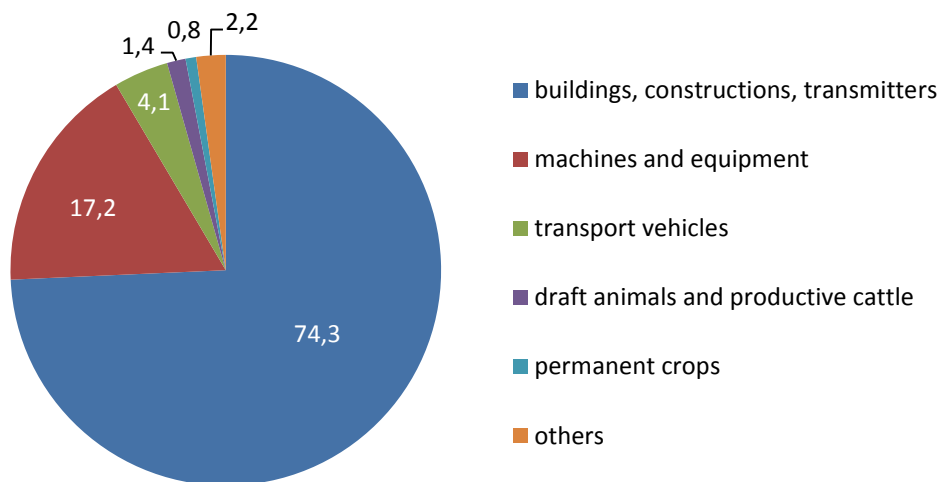Source: State Statistical Committee of Azerbaijan Republic, 2006

Despite the increase of gasification level there is still a considerable share of wood/straw used for cooking, as mentioned in EBRD's (2008) description of rural energy practices.

4.8   Energy efficiency in the agricultural sector

According to the Azerbaijan Statistical Yearbook 2012 there are 9436 enterprises within the agriculture, forestry and fishing sector of which 9177 are small enterprises. The sector is responsible for 6% of the GDP (CIA, 2012).

Due to its comparably low energy consumption share (see Figure 2) the agricultural sector is currently not the main target for investments by public reports, while the major focus is paid to the industrial and residential sector. In 2011 agriculture accounted for 6% of all electricity consumed (740 GWh) and 14% of all petroleum products (mainly diesel). Evaluation of EE potential in agriculture is not available from the existing studies.

The structure of main productive funds may serve as an indicator where the most savings can be obtained (see Figure 6). Potentials are assumed in insulation, building rehabilitation, better control, metering and renewal regarding machines and equipment.

Figure 6 pie chart data:
- 74,3 buildings, constructions, transmitters
- 17,2 machines and equipment
- 4,1 transport vehicles
- 1,4 draft animals and productive cattle
- 0,8 permanent crops
- 2,2 others

Figure 6: Structure of main productive funds (agricultural enterprises and other organizations), %
Source: State Statistical Committee of Azerbaijan Republic, 2011

5   Framework for Energy Efficiency

This section of the report analysis the framework conditions for carrying out energy efficiency. The main questions to be asked are:

- Is energy efficiency, its actors, targets or specific measures mandated or supported in any legal or policy related document?
- Are the technical capacities in place in Azerbaijan in order to realistically realize specific measures?
- Does it make sense to invest in energy efficiency in the country in economic terms?

5.1   Legal and policy framework

The legal and policy framework was analyzed in previously cited studies. Currently, there is **no specific national law relevant for energy efficiency**, but relevant regulations can be found in other legal documents. To date, there are **no support** schemes or obligation to use or purchase renewable energy/electricity.

The major legislative document related to EE is *"The law on Use of Natural Resources"* (1996). The definition of energy efficiency is provided as: "Usage of energy sources under the condition of reduction of anthropogenic environmental impact and acquisition of higher economic benefit at the stage of modern development of technology". Paragraph 6 of this law states that countrywide, local and other programs, which should promote the efficient use of energy resources, shall be prepared. It addresses the direction of state regulations, which include management of the energy conservation and creation of norms, standards, certification, metrology and statistics in the area of use of energy resources. It envisages the development of norms of energy usage, responsibility for wastes in energy use, creation of supportive mechanisms to promote EE as well as the creation of a respective EE Fund. The fund by design is to be financed by non-budget sources and is spent on research, creation of technologies and implementation of programs in EE. The Law also provides the framework for creating norms and standards and defines the roles, responsibilities and scope of state energy inspections for big energy consumers.

However, up to date neither the operation of the EE Fund, nor the real activities of state energy inspections could be verified.

According to the "***Public bar coalition***"[5] report from 2010, a project targeted at legislation development in RE and EE sectors of Azerbaijan, production of heat and electrical energy from solar, wind and biogas sources and bringing environmentally clean technologies into Azerbaijan is a strategic direction in the national policy regarding Climate Change. The Ministry of Industry and Energy plans, as stated, to increase the share of RE in energy production from 1% to 15% until 2015. In 2009 a *State Agency for Alternative and Renewable Energy source (ABEMDA)* within the Azerbaijan Republic Industry and Energy Ministry was created to implement this program. RE issues are mentioned in a row of state laws such as the **State program for 2008-2012 on improvement of official statistics** (Creation of RE statistics) and the **State Program for 2009-2013 for social-economic development of regions** (RE to be one of the main directions of state policy).

The ***Law on electric-power industry*** (1998) mentions norms for efficient energy usage as one criterion for the selection of development projects in the power industry, but provides no reference on specific norms. EBRD Azerbaijan country profile (2010) provides statement that state bodies (MIE, MENR) have developed energy efficiency standards, and have organized a system of environmental and energy management among their initiatives. Aliyeva (2012)[6] stated that Azerbaijan drafted a ***State Programme of Development, Technical Regulation and Standardization of Energy Efficiency***, which was designed

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[5] Implemented by social union "EkoLeks Ecological Law Center" and International EcoEnergy Academy and sponsored by US Counterpart organization
[6] Resource Efficiency Gains and Green Growth Perspectives in Azerbaijan, Friedrich Ebert Stiftung article

to solve problems concerning saving energy, resources and raising EE and considered approval of 69 pertinent national standards. In spite of this news about expected important legislative developments, no additional information about details or progress status could be identified during the desk research. Local construction expert Nurmammad Mammadov claimed at his interview in 2013 for the INOGATE project that the "Law on Energy Efficiency" is in progress, which will imply energy audits of buildings and prohibition of inefficient construction.

The *Law on Environmental Protection (1999)* defines the legal, economic and social framework for the environmental protection. It also stipulates efficient usage of natural resources as one of the main principles of environmental protection and requires that efficient usage of resources should be considered in construction projects.

The *Decree of the Cabinet of Ministers about Rules of Electric Energy Usage (2005)* defines regimes and conditions of the agreement between electricity supplier and consumers, who should not give a way to inefficient usage and wastage of electric energy. The role of state monitoring over the activities of energy supplier and consumers, also as EE in usage, is assigned to the "State Energy Control" department of the Ministry of Industry and Energy.

The Action Plan for usage of a 13 Mio. EUR grant provided by the EC to Azerbaijan within the **Support Program to Reforms in Energy Sector (2009)** actually provided actions to develop RE and EE legislation within 2010-2011 and assigned it to the Ministry of Industry and Energy (MIE). 1 Mio. EUR were planned for awareness campaigns, preparation of a program for spreading the technology, providing technical and economic justification of RE/AE and EE projects within the same period of time. Unfortunately, no public reports or specific data on the results of such action plan were available.

The *State Program on usage of alternative and renewable energy sources of Azerbaijan Republic (2004)* decree assigns the Ministry of Fuel and Energy (later the Ministry of Industry and Energy) with tasks and specific actions to develop the use of renewable resources until 2013. It provides policy measures including improvement of the legislation in RE/AE, stimulation of development, capacity building (awareness building, learning international expertise, conduction of research work) and measures regarding particular energy sources (wind, geothermal, small hydro power, etc.) including repair, installation and study of technology.

5.2 Technical framework

There is no comprehensive information on applicable EE measures in existing studies. According to the country experience there are specific measures, mainly implying the **change of (obsolete) equipment,** which is a standard solution on the local market and can be easily purchased in Azerbaijan. Among these solutions are e.g. compressors, motors, pumps, transformers, electrical controllers, SCADA systems, various metering devices, insulation material, electrical cables, wiring and industrial boilers.

Azerbaijan has representative offices and distributors of the major equipment solution providers as ABB, Schneider Electric, Atlas Corp Co, 3M, Caterpillar and others, also various logistics and multi-brand technology resellers are able to find and organize delivery of particular equipment. The following EE improvements can be characterized as easily available in Azerbaijan (following EBRD report 2008):

- Good housekeeping, operation and maintenance, change of production behavior
- Improved logistics of production distribution
- Energy efficient lighting
- Downsized and energy efficient motors and pumps
- Automated regulation of equipment
- Metering equipment
- Improvement of thermal insulation and reduction of losses in buildings and ovens

A detailed analysis of equipment solution suppliers will be provided in a separate report.

Since the so-called "belief in new equipment" is quite common, such energy efficiency measures are rather easy to be implemented and will lead to improvements, assumed that proper management and maintenance exists.

On the other hand there are **more complex measures,** which do not only require the exchange of single machines or equipment but project management and considerable time for the preparation of technical task, agreements with foreign suppliers, logistics, commissioning and testing. Due to the very specific nature of such equipment, big investments need to be accompanied with a changing demand, since neither the equipment is produced locally, nor is it currently available by distributors. Among these measures are heat recovery units, heat recuperators, cogeneration units, waste water recovery, pre-heaters and combustion controls or turn-key production solutions. Awareness of EE technologies and experience, also concerning required repair and maintenance among industrial representatives, is limited, which leads to reluctance to implement such measures.

5.3 Economic framework

The economy is mainly driven by oil and gas production, chemicals and petrochemicals, metallurgy, mechanical engineering, textiles and the food industry. At present, more than half of the national revenue is due to the oil industry. The BTC pipeline to Europe plays an important role, with the capacity to transport 40-50 million tons of oil annually. GDP stably grew during the last decade and in 2012 reached appr. 51,390 Mio. EUR, which is an increase of 4% compared to 2011 and more than 4 times the value from 2005.

Tariffs for electricity, gas and heat are regulated by the State. Despite considerable tariff increases in 2007, the current values are still very low in comparison to EU member states. The following table summarizes the applicable tariffs. It is worth mentioning that the price for the usage of water as a raw material is very high and amounts to 11.4 EUR/m³. For comparison the rate for households only amounts to 0.3 EUR/m³ and e.g. in the city of Vienna the comparable tariff amounts to 1.73 EUR/m³ (www.wien.gv.at/amtshelfer/bauen-wohnen/wasserwerk/wasseranschluss/wassergebuehr.html).

Table 8: Tariff scheme in Azerbaijan

Tariff Scheme in Azerbaijan	Equivalent values in EUR (1 EUR = 1.0507 AZN)	EU 27[7]
Electricity	**EUR/kWh incl. VAT**	**EUR/kWh incl. VAT**
Retail price all consumers	0.057	Residential: 0.197
Industry (35-110 kV) (day/night)	0.019 – 0.040	Industry: 0.118
Gas	**EUR/m³ incl. VAT**	**EUR/m³ incl. VAT[8]**
Residential	0.0952	Residential: 0.68
others	0.0952	Industry: 0.38
Water	**EUR/m³ incl. VAT**	**EUR/m³ incl. VAT**
Residential	0.3	1.91[9]
Producers (water as raw material)	11.4	

Source: Tariff Council, 2013

Despite the currently comparatively low tariffs, which lead to longer payback periods of potential EE investments and thus reduce their attractiveness, the **burden of energy costs** (which is presumably mainly due to the low energy efficiency) for both the industrial and household sector is considerable. In the regional comparison done by IFC (2010) among industrial enterprises, Azerbaijan ranks second for average energy cost as a proportion of total operating costs and in the ranking of industries with high energy

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[7] Date: Second half of 2012; Source:
http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Energy_price_statistics
[8] Conversion: e.g. residential 0.072 EUR/kWh (Source eurostat) * NCV (=48 TJ/Gg, source:
www.ipcc.ch/meetings/session25/doc4a4b/vol2.pdf, Table 1.2) * Density (=0.712 kg/m³, source:
www.unitrove.com/engineering/tools/gas/natural-gas-density)
[9] Source: www.publicpolicy.ie/domestic-water-charges-in-europe/

costs. In the residential sector, the expenditures for water, electricity and other fuels rank third in the shares of the sectors expenditures, after expenditures for food (47.6%) and expenditures for accommodation, restaurants and cafes (8.1%) and amounted to 7.2% according to the State Statistical Committee. Comparing these figures with the relevant shares in the EU in 2011 (EUROSTAT 2011), with 4.5% expenditures for fuel and 13% for food and beverages, also the limited availability for funds to invest in EE measures can be deducted, which is also aggravated by the recent financial crisis. Further impact of the crisis is a restricted crediting policy of banks that results in difficulties (or even impossibility) for enterprises to obtain a loan. In the field of electricity and gas payment based on actual metering has been established in the last years (Aliyeva, 2012) and will be further improved. In the field of central heat supply, however, payment is in many cases based on rates per m² without taking the actual consumption due to missing meters into consideration.

There are no statistics or studies available about actually realized pay back periods. The only report providing ex-ante estimation for payback periods is EBRD (2008). On the basis of calculations of the Cleaner Production Centre and the expert's experience from Georgia, Armenia and other countries of the former Soviet Union the following estimates on the typical opportunities were derived:

Table 9: EE measures and payback periods

Typical EE measures	Average investments per company, in EUR	Gas/Fuel saving potential	Electricity saving potential	Approximate payback, years
Reduction of energy generation losses and introduction of new energy units to replace old ones	20,000 – 70,000	15%	-	3-5
Combined heat and power	350,000 – 1,350,000	2%	2%	5
Energy efficiency lighting	700	-	5%	1
Downsized and energy efficient motors and pumps	3,500	-	10%	3-5
Improvement of thermal insulation and reduction of losses in building and ovens	13,500–35,000	10%	5%	5
Better efficiency of energy distribution systems, including air compressors	13,500	-	10%	3
Reduced losses in power supply systems	7,000–13,500	-	10%	2-7
Automated regulation and metering equipment	1,350–3,500	10%	10%	2
Use of secondary fuel energy resources (waste heat)	7,000– 20,000	10%	-	5
Use of renewable energy resources	7,000-20,000	10%	-	5
Improved logistics of production distribution	70,000	10%	-	5
Good housekeeping, operation and maintenance, change of production	1,350	10-20%	10-20%	1

Source: EBRD, 2008

Estimations are considered rough and the pay-back periods are sensitive to current levels of energy consumption of a particular company. There is neither such sensitivity analysis nor a study on whether these pay-back periods are realistic. For example if calculating backwards, taking investments of 20,000 EUR

with 3 simple pay back years for the first EE measure and with 15% savings, means that a company would have to consume about 40,000 m^3 of gas per month at current gas prices to make this pay back realistic. Similarly, in case of higher efficiency of energy distribution systems, including air compressors with investments of 13,500 EUR, 10% savings in electricity and 3 simple pay back years implies electricity consumption of about 65,000 kWh per month calculated at a price of 0.057 EUR/kWh.

In the local expert's opinion the derived PB periods are optimistic, as SMEs may have lower total energy consumption costs leading to smaller savings and less attractive pay back figures.

5.4   Awareness and information level

In the residential sector (EBRD, 2008) – apart from financing aspects – the main barriers for the implementation of EE measures are the lack of information, the low awareness and tradition in energy savings as well as legal difficulties for retrofitting houses. Since the residents only own the flat (and pay the energy bills) and the building itself is in the ownership of the state or municipalities, there is little motivation to realize improvements. Currently, external insulation is sometimes also questioned due to esthetical reasons. Also the general attitude and cheap energy prices are no drivers for EE activities.

In the industrial sector there is some awareness on EE issues on the management level, but this is rather based on self-estimation of knowledge about general facts and not backed by e.g. experience in energy audits or management. Concerning data availability, IFC (2009) observes that medium enterprises have more exact energy consumption data than large ones.

6   Conclusions

Based on pertinent studies and local experts' experience, there is large untapped potential for energy efficiency measures in Azerbaijan.

The **local energy demand** is expected to grow both in the residential and industrial sectors and it can be expected that the energy production (which is fully supplied by locally available hydrocarbons) will be extended accordingly both in the heat and electricity sector leading to investments in new, more efficient plants and equipment. Still, there is also further need to retrofit distribution lines and grids.

The **legislation** provides framework for developing EE, though there is no consolidated Action Plan or separate Law on EE. The focus is rather put on renewable energy. Though, legal modifications, acceptance of standards or even a specific law regarding EE are expected to be introduced very soon.

Energy rates were stable in recent years and are much lower in comparison to EU countries. With a view to the growing energy demand an increase in energy prices is likely. Regional and local experience shows that such a change can dramatically increase the interest for energy conservation. Already now, expenditures related to energy put a considerable burden on the residential and industrial sector.

No functional **ESCO** market currently exists in Azerbaijan. Though, technical specialists and energy engineers who potentially can support banks and conduct energy audits are present in Azerbaijan. They are more science and project design oriented, so they should be provided with some additional EE related training concerning BAT and energy audit methodology according to international practice.

Energy efficiency opportunities should not only be limited to simple measures like lighting retrofit, electricity and heat demand reduction, but also include complex measures such as the reduction of specific energy consumption by an increase of productivity, better energy management, recycling of process wastes, water and fuel consumption optimization to increase the total amount of savings. Better level of energy management as proper metering and understanding energy costs can help companies estimate better potential savings and increase their interest in investing in more complex EE measures. This should include the definition of certain performance indicators that can be tracked before and after the

implementation of a particular EE investment project such as specific energy consumption, life cycle estimations, changes in required maintenance cost and frequency and manpower requirements.

The **Target group for EE** investments shall include energy intensive industries with large capital investment requirements for machinery and change of outdated equipment, like chemistry, petro chemistry and other energy intensive industries (e.g. metallurgy or building materials production). The EE financing strategy should also consider state investing policies. For example the petrochemical industry is already a target for renovation by SOCAR. Such intensive industries may be represented by large companies, so at the same time more modern industries like food production and SMEs from other sectors should not be overlooked.

The residential sector accounts for the largest share of energy consumption in Azerbaijan. Taking further into consideration the current construction boom in Baku, the lack of EE standards and the absence of EE consideration during the design stage there is large room for energy efficiency improvements. The most important EE measure would be retrofitting building envelope as insulation of walls, better windows and doors and modernization of heating and cooling systems. Nevertheless, cheap energy prices lead to long pay-back periods and also the ownership situation of apartment buildings can limit the viability of EE crediting in this area.

7 Relevant Institutions

The following table provides an overview of institutions relevant for EE in Azerbaijan. Currently, there are no ESCOs operating in the country and technical expertise in the field of EE is limited to some companies.

Table 10: Relevant institutions

State bodies	
Ministry of Industry and Energy **www.mie.gov.az**	The central executive authority implementing state policy and regulation for the energy sector. Functions of the MIE include: licensing, consumer complaints and sanctions against energy companies for non-compliance with energy legislation.
State Energy Control department of the Ministry of Industry and Energy	Formed in 2002 basing on the decision of the Cabinet of Ministers, provides state monitoring of state power energy companies, energy supply companies and independent energy producers, consumers, production, transfer and distribution of electric energy and energy efficiency.
Ministry of Ecology and Natural Resources **www.eco.gov.az**	The central state body engaged in environmental protection, monitoring and separate aspects of use of natural resources.
ABEMDA **www.abemda.az**	The Agency for Renewable and Alternative Energy Sources under the MIE that runs a dedicated department for alternative energy and the environment.
AzerEnerji JSC **www.azerenerji.gov.az**	A state owned company engaged in the production, transmission, distribution, purchase and sale of electricity in Azerbaijan. Azerenergy is entitled to submit proposals on tariff increases and to take part in the tariff-regulation process.
BakuElektrikShebeke ("*BakuElectricNetwork*") OSJC **www.bes.az**	A state company working in the area of distribution and metering of the electrical energy.
AzeriGas Production Union **www.socar.az/azerigas**	The state-owned gas supplier under the control of SOCAR. It is engaged in gas transportation, distribution, purchase and supply and manages access to transportation and distribution networks.
AzerIstiliktechizat ("*AzerHeatSupply*") JSC **www.azeristilik.gov.az**	The main heat supplier of Azerbaijan formed in 2005 and assigned to implement production, supply and sales of heat to residential buildings and other objects. In 2012-2013 possessed 287 boiler houses in Baku and 138 in regions servicing 3716 building objects in total.
Tariff Council **www.tariffcouncil.gov.az**	The Tariff Council establishes the tariff methodology, approves the tariff level proposed by regulated companies (including but not limited to energy), proposes changes to the legal framework as it relates to pricing; and settles disputes regarding price regulation and tariff application. The Tariff Council has a Chairman and 12 additional Council members who serve in a Council not a staff capacity. The Chairperson is the Minister of Economic Development and the 12 Council members are Deputy Ministers (Finance; Taxes; Justice; Transportation; Industry and Energy; Communication and Information Technology; Agriculture; Education; Health; and Labour) and deputy heads of Committees (Customs and Construction).
State Committee for Standardization, Metrology and Patent of the Republic of Azerbaijan **www.azstand.gov.az**	The central executive power authority realizing the state policy and regulation in the fields of technical regulations, standardization, metrology, conformity assessment, accreditation, quality management as well as in the field of the protection of industrial property objects.

NGOs, scientific organizations, service providers	
International EcoEnergy Academy www.ieacademy.org	Unites researchers in the area of renewable energy, working on the grant basis. Mentions EE and CP areas within the area of their interest, points out at specialists from Clean Energy Institute (USA), Energy & Resource Technology (ERT) Ltd. (Scotland) and other institutions participated in their activities.
Azerbaijan Scientific Research Institute of Energy and Power Design www.pei.az	Azerbaijan Scientific-Research and Design-Prospecting Power Engineering Institute ("AzSR&DPPEI" Ltd) has been created by association of three institutes working in structure of OJSC "Azerenerji". The association's purpose consisted in optimization of structure of management, approach of the scientific and design works which are carried out by institute, to problems of development and functioning of system of electric power industry of the Azerbaijan Republic.
State Committee of City Planning and Architecture www.arxkom.gov.az	Regulates and monitors the construction activity in Azerbaijan, reviews the project designs, defines norms and provides licenses.
APESA www.azerenergy.com	Association of engineers and power engineering specialists of Azerbaijan, specializing in small hydropower station and local thermal power plants. Mentions about its capacity to assess EE projects and provide consultancy services.
Azerms LLC www.azerms.com	Implementer of the BP and its co-ventures sponsored Enterprise Development and Training Program, targeting at market studies and providing consultancy services to local companies in terms of quality, safety and management. Conducted a special EE project for local capacity and awareness building.
Baku Cleaner Production and Energy Efficiency Center www.cpee.az	Created with the support The Norwegian Society of Graduate Technical and Scientific Professionals (TEKNA) and Energy Saving International AS (ENSI) have for several years been organizing trainings on Cleaner Production and Energy Efficiency in Azerbaijan.
Caspian Technology Center www.ctc.az	This company is active in the RE sector, wind and solar areas, implemented greenhouse and drinking water projects. Has training activities.
UMID www.umid-hsdm.com	Social Union sponsored by various donors that is working with the low-income population to support finding solution for socio-economic problems, education, conducting micro financing and repair projects, as well as targeted at environmental improvement and residential EE.
SPARE www.spareworld.org/eng/azerbaijan	School Program for Application of Resources and Energy, Azerbaijan joined the SPARE in 2002. The program is coordinated by Azerbaijan Youth Union (AYU). Promoting environmental education within the country is one of the main tasks of AYU.
SAM www.sam.az	Formed in 2007 as a Strategic Research Center by the President of Azerbaijan Republic for coordination of strategic studies and supply of state bodies with scientific-analytical data. Topics include policy, international relations, economy. Had experience in organizing seminars related to EE.
DAWF, German-Azerbaijan Business Association www.dawf.com	Works closely with GIZ, one of the activities is to investigate opportunities of application of German EE technologies in Azerbaijan, currently organizes a row of seminars regarding EE in buildings and industry with the cooperation with RENAC Renewable Academy.
Caspian Center for Energy and Environment (CCEE) www.adafund.org	A joint venture between Azerbaijan Diplomatic Academy and State Oil Company of the Azerbaijani Republic (SOCAR). The Center focuses on teaching, research and outreach activities, such as conferences, workshops and round-table discussions.
INOGATE www.inogate.org	INOGATE is the energy technical cooperation program between the European Union (EU), Eastern Europe, the Caucasus and Central Asia. Current and recent INOGATE support to the Republic of Azerbaijan includes support for the introduction of technical standards and practices in the oil, gas and electricity sectors; technical support to energy regulatory practices; technical assistance to energy saving.

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