Approved by Decree of the President
of the Republic of Azerbaijan
dated December 6, 2016

Strategic Roadmap for Development of Utilities Services (electric energy, heating, water and gas) in the Republic of Azerbaijan

Contents

1. EXECUTIVE SUMMARY

The main directions of the strategic roadmap for national economy and key sectors of economy were approved by Decree of the President of the Republic of Azerbaijan No. 1897 dated March 16 2016 and strategic roadmaps suitable for the Republic of Azerbaijan were developed by involving local and foreign experts to address the issues arising there from.

“Strategic Roadmap for Development of Utilities (electricity, heating, water and gas) in the Republic of Azerbaijan” (hereinafter referred to as Strategic Roadmap) covers the strategic vision for 2020, long-term vision for 2025 and aspirational vision for post 2025. This document includes proposals on the implementation of broad-scale measures to achieve operational efficiency and high service level in the sector. The roadmap also envisions the development of “public – private partnership” mechanisms against the measures to be implemented.

However, in order to reach strategic targets, responsible government entities will conduct feasibility studies and discuss them with relevant authorities before each project is approved.

To develop the Strategic Roadmap in Utilities sector, analyses were conducted with regard to the current situation in the sector including secure and well-diversified sustainable supply, greater efficiency and quality levels across the value chain, regulatory mechanisms, applied managerial principles, established tariff policy and other directions, drawing upon international best practices and based upon statistical data, and, in order to ensure the country’s sustainable development, strategic objectives were determined by using similar practices of benchmark countries around the world.

Ensuring the generation of fully diversified, uninterrupted and environmentally friendly electricity, creating efficiency and quality standards in line with best international indicators, triggering key drivers to realize the objectives of the electricity generation sector, creating efficient and effective gas distribution infrastructure, including the establishment of high-level water management structure, ensuring efficiency in water consumption, eliminating the existing problems in heat supply system and ensuring operational efficiency of the system were identified as strategic objectives. Priorities were outlined against each strategic target, relevant analyses were conducted, the measures to be implemented for these priorities were specified, and the results to be obtained due to their implementation were forecast.

As a result of the measures to be implemented within the Strategic Roadmap, opportunities will arise to enhance operational efficiency and service level in the utilities sector, increase the exporting potential of the country’s energy resources, expand efficient use of such resources, and create a large number of new jobs in most of the country’s regions alongside the minimization of discharging harmful substances into environment.

In this light, in order to extend the use of high technologies in this sector in the Republic of Azerbaijan, it becomes necessary to implement comprehensive measures in legal, economic, organizational and technical fields, which have successfully tested in benchmark countries around the world.

The implementation of these actions is estimated to bring AZN 832 million GDP increase for Azerbaijan in real terms by 2020 and is expected to create 6,645 new jobs in total. Realization of this impact will potentially require a total of AZN 8,150 million investment, which will be met by public and private resources.

Investments required for the actions to be implemented within the Strategic Roadmap and expected outcomes

No	Priority	GDP impact (2020), AZN mln	Employment, FTE	Investment, AZN mln
2.1.	Increase reserve margin of the national generation portfolio	215	5085	1950
2.2.	Diversify national generation portfolio	70	270	1040
2.3.	Consider the opportunity of increasing net electricity export in the short run with excess supply	115	–	–
3.1.	Improve generation plant efficiency and efficiently utilize the existing potential	75	–	1075
3.2.	Decrease electricity losses and improve quality of transmission and distribution	25	–	400
3.3.	Use optimal tools to promote efficiency in consumption	170	–	–
4.1.	Minimize all kinds of losses in natural gas distribution	90	340	1515
5.1.	Increase infrastructure penetration for clean and waste water	40	–	1135
6.1.	Minimize losses, optimize water tariffs for end-users and enhance efficiency of water utilization through required infrastructure investments	20	–	845
7.1.	Expand optimal heating energy and hot water supply system in the country by considering its geographical, social, and economic peculiarities	12	950	190

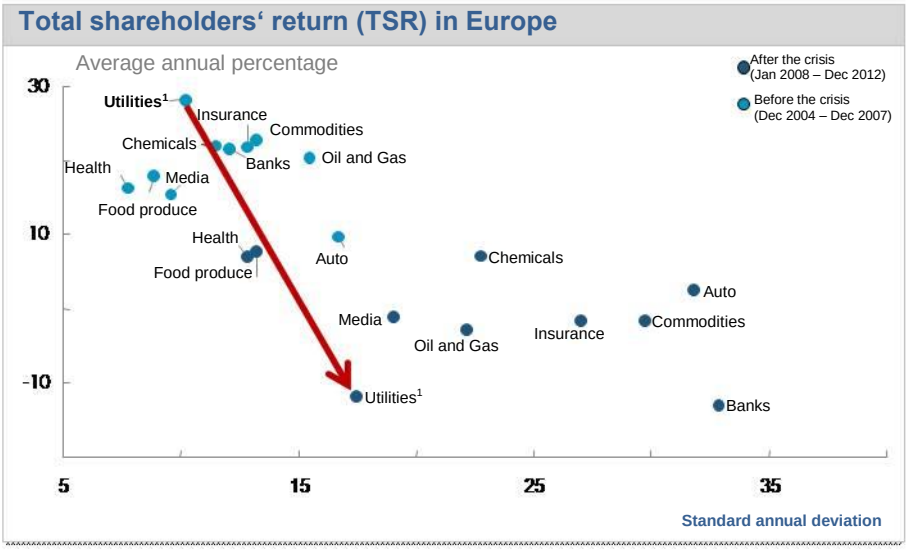
Note1. Only priorities that enable GDP impact over AZN 10 million and employment more than 100 workplaces are shown in this table. Other priorities are critical as enablers in order to ensure that the envisioned impact is achieved.

Note 2: These figures have been provided to give an understanding of the impact. During implementation, each s priority will need a detailed feasibility study and clarification of figures.

2. GLOBAL TRENDS

Covering electricity, gas distribution and water, utilities industry has been among the drivers of industrial growth and social welfare. Other sectors are heavily dependent on quality access of consumers to utilities to effectively operate. The industry, however, went through a significant challenge with the global crisis and got a considerable hit on the revenues compared to other sectors (Exhibit 1).

Exhibit 1: Effect of the global crisis on sectors



1. Including also the plants that operate in this sector
Source: DataStream

The above financial losses in the utility sector impacted other sectors directly relating to this sector, including also provision of households with high-quality utility services, and expansion of service network.

Over-capacity emerged, as a result of decreased demand in electricity supply, have complicated return on investments made by enterprises operating in this sector to get fixed assets. Regulatory uncertainties have also affected the formation of optimum consumption markets.

In this view, four key trends relating to the electricity sector are observable in order to meet the challenges of post-crisis period:

1. Cost optimization has become a key factor to ensure efficient use of investments in order to derive maximum revenues after their reduction in the electricity sector. In this direction, liberalization of the energy market and unbundling of different components across sectors for enhanced economic efficiency and increased transparency are of particular importance. So, most countries have been able to shift from state monopoly in this sector to fully competitive value chain covering various components from electricity generation to retail sale. Governments have achieved set targets by leveraging such different tools as enhancing operational efficiency in the sector, diversification of the type of properties, investor attraction, intensified creation of

competitive environment, introduction of competences, and penetration of advanced technologies.

2. Diversification in generation portfolio including the transition to renewable energy sources and supply of generated electrical energy is one of the directions that are observed. Over the previous period; improper planning of production assets and disregard of an increase in demand for electricity caused certain challenges in most countries by elevating energy security risks. When forecasting the volume of electricity generation, growth potential in GDP and number of the population are taken into consideration. Accordingly, governments develop and implement national electricity generation plans with the aim of diversifying energy production portfolios and decreasing dependency on other countries.

   Incremental shift from traditional generation to renewable and new downstream is part of the electricity generation diversification plan. Use of renewable energy sources enables to eliminate energy dependence, protect environment, and maintain stable input prices alongside profitable operation. Therefore it is expected that the volume of investments aiming to promote use of solar, wind, and thermal energy will surpass volume of capital investments in the traditional energy sources by 2016. Use of solar energy will bring about reduction in energy generation costs compared to traditional sources. Shift to solar energy generation requires higher costs at the initial phase since there arises a necessity to modernize technologies. Additionally, electricity costs are expected to fall 15-25 percent1by 2025 due to the use of wind energy. Due to longer lifetime, higher availability and efficiency and shorter commissioning timing than most other types of power plants, hydro power plants reduce production costs per MWh.

3. In international experience, investments needed for the diversification of generation portfolio and renewable energy sources are financed based on state financing model or independent power producer (IPP) model. Greater involvement of the private sector is needed as long as building power stations requires huge capital investments. Governments balance out investment risks with revenues in order to avoid additional stakeholder burden through diversification of the investment portfolio.

4. Introduction of technical solutions into the electricity sector, especially use of smart meters and grids and energy storage, is considered one of the major global trends. Distributors are planning their investments for smart grids towards achieving operational efficiency and demand management. Smart grids transform the energy distribution from unidirectional to bidirectional, and decrease meter reading and operational costs. Further more, the use of smart grids impacts increases overall efficiency in the sector by minimizing the operational expenses on automation and fault detection as well as optimizing capital expenses. This way it will be possible to derive greater revenues from the electricity sector after introducing such changes. [1]

Provision of primary and ancillary services, increase in energy-producers at household level with their own solar photovoltaic, and improvements in peak load management are expected to be observed in the future.

[1] Source:“İEAWindGroup”,“Blackand Veatch”,“Oxera”,“Bloomberg”

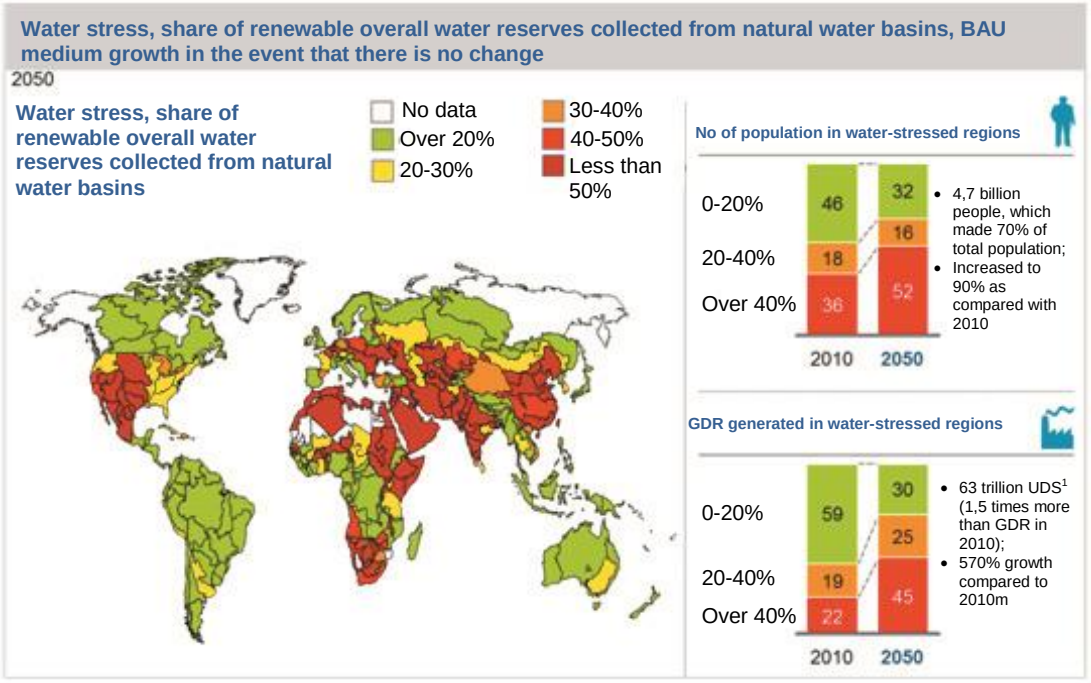
In gas industry, similar trends are observed with the electricity industry. The overarching trend is to move towards increased operational efficiency levels, and different countries are exploring different methodologies in doing that. Unbundling between distribution and retail at different levels and liberalization in gas distribution, particularly on a regional level, are observed. Especially in the markets with extensively developed gas infrastructure, decoupling assets (natural monopoly) from services tend to promote increased competition.

Also, utilities industry has also a social purpose to provide increased quality and coverage of utilities. In this sense, particular countries exercise a reverse trend for the gas distribution industry: re-municipalization. Especially in European countries, municipalities benefit from the financial terms offered by banks closely participating in owning shares in the local gas distribution companies and this way, they overlook the quality of utilities services.

Currently sized more than 600 USD billion, the global water market is exerting 3-5% annual growth. The water scarcity is growing (by 2030, 40 percent of needs expected not to be covered by accessible resources). This is driven by increased economic growth in emerging markets such as expected growth of more than 4 percent per annum for Chinese, Indian, and Vietnamese GDP over the next 5 years as well as fast population growth that is expected to reach around 9 billion in 2040 will increase demand for water consumption[2] . From this perspective, a number of countries have already started taking measures to protect water sources. Both developed and emerging countries have started taking appropriate actions towards toughening pollution and reuse regulations and increasing corporate awareness. Current projections estimate water stress especially in Middle East, North Africa, South Asia, Eastern Asia and west coasts of North America in the long term (Exhibit 2).

[2] Source:"GlobalWaterIntelligence","Ekonomist"journal, analytics department

Exhibit 2. Regions with global water scarcity



1. base prices in 2000
Source: IFPRI

In this direction, the priority trend for governments is effective and balanced use of water resources, ensuring efficient operations, and water supply security. However, although the world faces a global shortage, the nature of the challenge is very local. Countries face specific challenges in managing their water scarcity issues, depending on their hydrological and economic profile.

There are still particular global practices in water management, namely through desalination, tariff management, and industry-specific water consumption reduction levers. Especially in the Middle East, desalination is a growing alternative sourcing model. Out of 70 million m3 increased desalination capacity during 2016-2020, around 25 million (~36%) is estimated to come from the Middle East region[3]. However, due to the expensiveness of water desalination, this mechanism is used to a limited extent.

Other than desalination technologies, tariff structures around the world are being adopted for increased efficiency on the consumption side. This way the government reduces per user consumption levels. Lastly, particular sectors launch water-saving plans to increase their efficiency and reduce their water use (for example, use of modern and saving technologies in construction works and regularly operated machinery and equipment).

According to the International Energy Agency, housing energy demand for household heating and cooling, supplying hot water, lighting, and cooking constitutes approx. 40 percent of the global energy demand. And according to UN Environment Program (UNEP), penetration of more advanced systems to supply heat to buildings may reduce energy consumption twice in

[3] Source:“Global Water Intelligence”, “Ekonomist” journal, analytics department

this sector until 2050.It is possible to provide cheap and high-quality heat supply services for consumers through modern regional (district) heating systems by leveraging local resources (wind, solar, household waste and etc.) in many cities of the world. This way, the volume of atmospheric emissions is minimized. For example, 275 ton coal or 12 million USD is saved per annum using waste wood in heating system of the municipality in Minnesota State, USA. Further, municipalities ensure development of other infrastructure facilities in cities through the funds derived from privatization of the part of heating systems in a number of cities (for example, 89 million USD revenue was gained through privatization of 43 percent of the heating system in Toronto city, Canada)..

Another approach in the world practice is to increase efficiency of the fuel sources used (for example, thermoelectric power plants in Helsinki operate with a very high coefficient of productivity by converting 93% of primary power into thermal and electricity energies).

3. ANALYSIS OF THE CURRENT SITUATION

3.1. Current situation in the utilities sector

Electrical energy sector

Utilities sector of Azerbaijan's economy covering electrical and thermal energies, water and gas supply is extremely vital. Broad-scale reforms have been carried out and major investment projects have been implemented in the country to improve the current infrastructure and provide end-users with uninterrupted electrical and thermal energies. Thanks to these efforts, end-users have been fully supplied with electrical energy and remarkable achievements have been made owing to the capital investments in natural gas, water, and heat supply.

Electrical energy consumption has a special weight in the domestic market and industry in particular. Besides, electrical energy accounts for a certain share in the country's foreign trade balance. Several energy sources (primarily natural gas, water, solar, wind, biomass, and etc.) are currently used to meet end user demand for electrical energy.

The current demand for electricity in the country is met by the power plants operated under "Azerenergy" OJSC, 13 of which are thermal power plants with an installed capacity of 5132 MW and 16 hydro power plants with an installed capacity of 1101,20 MW (exhibit 1)

Table 1.Installed capacities of thermal and hydro power plants in Azerbaijan

No	*Hydro power plants*	*Installed capacity (MW)*	*No*	*Hydro power plants*	*Installed capacity (MW)*
1	Azerbaijan PP	2400,0	1	Mingachevir HPP	402,0
2	Canub PP	780,0	2	ShamkirHPP	380,0
3	SumgaitPP	525,0	3	YenikandHPP	150,0
4	ShimalPP	400,0	4	FuzuliHPP	25,0
5	SangachalmodularPP	300,0	5	TakhtakorpuHPP	25,0
6	BakıTPP	107,0	6	ShamkirchayHPP	25,0
7	BakuPP	104,0	7	ArazHPP	22,0
8	ShahdaghmodularPP	104,0	8	BilavHPP	22,0
9	AstaramodularPP	87,0	9	Arpachay1HPP	20,5
10	ShakimodularPP	87,0	10	Varvara HPP	16,0
11	KhachmazmodularPP	87,0	11	Vaykhir HPP	5,0
12	NakhchivanmodularPP	87,0	12	Arpachay2HPP	1,4
13	NakhchivanGTPP	64,0	13	GoychaySHPP	3,1
			14	İsmayıllı1 SHPP	1,6
			15	İsmayıllı2 SHPP	1,6
			16	Gusar 1SHPP	1,0

Source: "Azerenerjy"OJSC

Further, several small-size power plants, which operate by utilizing water, wind, solar energies and household wastes, have been built by other companies in order to efficiently leverage the natural resources available in the country (table 2).

Table 2.Other power plants

No	*Power stations*	*Installed capacity (MWt)*
1	BP company and its project stakeholders	556,1
2	Yeni Yashma WPP	50,0
3	Oil rocksPP	48,0
4	BalakhanyBMTEZ	37,0
5	Ganja gil - torpag plant PP	25,0
6	Imishly sugar plant	24,0
7	Nakhchivan AR SPP	20,0
8	"Azerrkimya"SCPP	12,5
9	Hokmaly WPP	8,0
10	Mughan SHPP	4,05
11	Sitalchay WPP	3,6
12	Gobustan (HPP) WPP	2,7
13	ShakiSHPP	1,88
14	Yeni Yashma WPP	1,7
15	Gobustan (HPP) WPP	1,2
16	Gobustan (HPP) BİO	0,7
17	Samukh (design capacity2,8MW) SPP	2,8
18	Sumgait (design capacity2,8MW) SPP	2,2
19	Surakhany (design capacity2,8MW) GES	1,6
20	Garadagh (design capacity4MW) SPP	1,2
21	Pirallahy (design capacity2,8MW) SPP	1,1
22	Sangachal (design capacity9MW) SPP	0,0

Source: Ministry of Energy of the Republic of Azerbaijan

The transmission of generated power is carried out via transmission lines500kV,330kV,220 kV,110kV and distribution via 110 kV and lower voltage lines. Till present, power transmission lines with a total length more than 30, 000 km and more than 500 new transformers with a total capacity of around 2000 MW have been commissioned.[4]

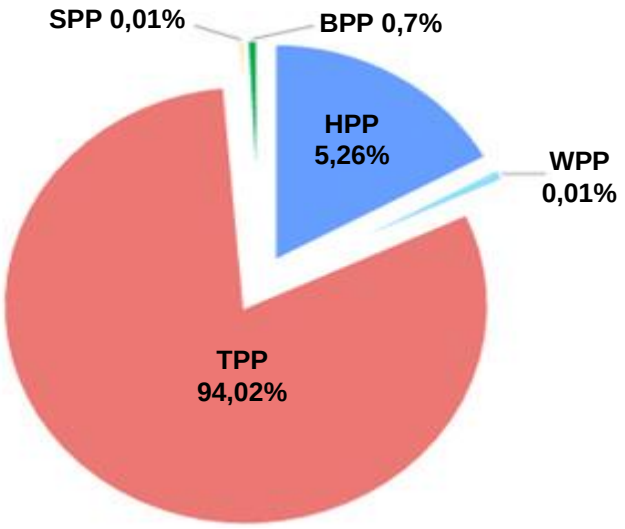
In recent years, the quality indicators of electrical power have markedly improved, loss levels minimized, and collection levels increased thanks to investments made in the energy system. At the same time, this tendency is also reflected in the distribution. This way, 16,6 percent loss in 2010 decreased down to10,7 percent in 2014.[5]

[4] Source:“Azerenergy ”OJSC

[5] Source: State Statistical Committee of Azerbaijan Republic

Given that a large portion of electrical energy in the country, approximately 94 percent, is generated at thermal power plants, it should be noted that the cost-efficient and effective use of natural gas as a primary source of energy is of vital importance (Diagram 1).

Diagram 1.Distribution of electrical energy generation in Azerbaijan*(2014)*



Source: State Statistical Committee of the Republic of Azerbaijan

Gas supply sector

From 2004 onwards, a new era started in the development of gas sector alongside other sectors. Within the framework of "the State Program for Socio-economic Development of the Regions of the Republic of Azerbaijan (2004-2008) and "the State Program for Development of Fuel and Energy Sector in Azerbaijan (2005-2015)" as approved by Decrees of the President of the Republic of Azerbaijan No 24 dated February 11, 2014 and No 635 dated February 14, 2005, the actions aimed at supplying natural gas for the economy and population and rebuilding the gas industry were accelerated. These efforts included upgrading and expanding the existing gas transition system and, when necessary, reconstructing its different sections, improving natural gas supply capabilities, technological and technical measures aimed at maintaining the operability of the system, constructing main and network gas pipelines and installing necessary equipment on them in line with the increased volumes of produced and supplied natural gas, and realizing works to supply gas for the residential areas which had not yet been provided with natural gas. According to "Azerigaz" PU under the State Oil Company of the Republic of Azerbaijan, new gas pipes with a total length of 1926 km were laid and 314 residences were supplied with natural gas over 2004-2008. During that period, natural gas supply to Imishly, Lerik, Yardimly, Fuzuli, Aghjabady and Aghdam regions was restored. "Culfa – Nakhchivan" main gas pipeline with a length of 40,3 km and diameter of 530 mm,

Astara gas compressor station with a capacity 12 MW, modern automated cross-border gas-measuring stations in Astara and Culfa at Iran- Azerbaijan border, and new gas transportation lines in Nakhchivan Autonomous Republic were constructed. From 2005 onwards, the gas supply to Nakhchivan Autonomous Republic was resumed as a result of actions taken. Shimal power plant, a compressor station with a capacity of 21 MW in Garadagh for natural gas supply to users in Absheron peninsular and main gas pipeline with a length of 87,1 km and dia. 1020/720mmwere constructed and put into operation. The number of subscribers among the population, who consumed natural gas in the Republic, reached 697 thousand persons by the

end of 2008. While meter penetration levels by the end of 2003 were 5 percent, this figure reached 99,2 percent by the end of 2008.

As a logical continuation of the efforts taken, reforms in the gas sector have been initiated and serious structural reforms have been implemented since that time based on Decree of the President of the Republic of Azerbaijan “On improvement of management mechanisms in the oil and gas industry” No 366 dated July 01, 2009.Currently, these reforms are still underway. Based on Decree of the President of the Republic of Azerbaijan “On the measures to write off the debts of the population accumulated for gas consumption” No 207 dated December 29, 2009, the remission of debit debts of subscribers among the population, which accumulated until October 01, 2009, was ensured. Within the framework of “The State Program for Development of Fuel and Energy Complex in Azerbaijan (2005-2015)”, “ The State Program for Socio-economic Development of the regions of the Republic of Azerbaijan in 2009-2013”, “The State Program for Socio-economic Development of Baku city and its settlements in 2011-2013” and “The State Program for Socio-economic Development of Baku city and its settlements in 2011-2013” as approved by Decrees of the President of the Republic of Azerbaijan No 635 dated February 14, 2005, No 80 dated August 14, 2009, No 1490 dated May 04, 2011, No 232 dated January 17, 2014, and No 118 dated February 27, 2014, the works to improve the installation of gas service and gas supply system rapidly continued. Gas service was installed in 1309 residential settlements during 2009-2016. To install gas service in residential settlements and improve natural gas supply in the Republic, new gas pipelines with a total length of46082 km were constructed and gas pipelines with a length of 8827 km were overhauled. While the number of subscribers among the population by January 01 2009 was 697000, this indicator by October 01, 2016reached 1929716. To keep an accurate recording of natural gas consumption and increase collection levels, meter penetration reached 100 percent. Overall gas service penetration level in the country made up 87,8 percent by October, 01 2016 and this figure was scheduled to reach 90 percent by the end of 2016. The implementation of the gas service installation program is underway. As a result of implementing this program, gas service penetration level in 6 cities (Sumgait, Mingachevir, Ganja, Naphthalan, and Shirvan) and 6 regions (Absheron, Bilasuvar, Hajigabul, Fuzuli, Balakan and Gazakh) reached 100 percent. Due to the efforts taken to improve natural gas supply across the regions, gas supply network in 3 regional centers (Neftchala, Hajigabul, and Shabran) were fully reconstructed. “Azerigaz” PU organized appropriate services at “Asanxidmat” centers from January 01, 2016 onwards. Advanced technologies, Automated Gas Information System, metering instruments and payment terminals have been applied in consumed gas payment system.[6]

Water supply and wastewater sector

“Azersu”OJSC uses underground and surface water sources to supply drinkable water for the population of the Republic. According to the Company’s data, Baku city and Absheron peninsular are supplied with water taken from 5 sources (Shollar water pipeline, second Baku water pipeline, Jeyranbatan water treatment plants complex (Kur STQK) and Oguz-Gabala-Baku main water pipeline), two of which (Shollar water pipeline, second Baku water pipeline) are underground water

.sources in Khachmaz region and one of which(Oguz – Gabala-Baku main waste pipeline) is an underground water source in Oguz region. Furthermore, the Company also uses the

[6] The statistical data given in this paragraph are based SOCAR “Azerigaz” PU data

resources of Jeyranbatan water storage reservoir fed from the Samur river and waters of the Kur river (Kur water pipelines).

The expansion and development of residential settlements in the Absheron peninsular has necessitated reconstructing and upgrading the existing water supply and sewerage systems. Thus, the exhaustion of the capacity of the existing water supply network and plants as well as their moral and physical obsolescence negatively impacts the quality of services provided for end-users, making the operation of these plants economically inefficient and leading to increased water losses when operating in non-stop water supply mode.

The construction of the sewerage system of Baku city, which is currently in need of substantial capital investments for its reconstruction, was started in 1924 and implemented within the framework of "The Grand Sewerage System of Baku city" project in 1980-1983. Such installations as "Sahil", "Senaye zonasi" sewer headers as well as" Shahar kanari", and "Zykh" sewerage pump stations, which were constructed within this project, were designed to dispose of the wastewaters generated by the population that resided in the center of Baku city.

Along with the waste waters generated by the population that resides in the center of the city, whose number has doubled, the wastewaters from households in Khyrdalan, Bilajary and Binagady districts including the waste waters of industrial enterprises are transmitted mainly through headers comprised of reinforced concrete pipes and components and built within the framework of "The Grand Sewerage System of Baku city" project, which causes an extreme overloading of the headers and increased number of accidents.

Furthermore, the non-productivity of underground and surface water systems has slowed down the development and expansion of these networks. Also, studies show that the creation of surface water management systems is vital in all countries of the world in order to prevent water accumulation in the areas of cites during atmospheric precipitations, soil erosion and landslides, and potential damages to different buildings and infrastructure as a result of these natural processes.

At the same time, necessary measures have been taken to provide end users with water and sewerage services within the framework of the state programs for socio-economic development in the regions and reconstruct water and sewerage economies as approved by relevant decrees of the President of the Republic of Azerbaijan. Thus, drinkable water pipelines with a length of 8590 km and sewerage pipelines with a length of 3870 km, 253 water reservoirs were constructed or reconstructed, 73 water pump stations were built and other measures were taken over2004–2015.

As a result of the efforts taken, the number of the population provided with an uninterrupted supply of drinkable water in the Republic increased from 25 to 65 percent in 2015 as compared to 2004.[7]

Heat supply sector

"Azeristiliktejhizat" OJSC was founded based on Decree of the President of the Republic of Azerbaijan "On the improvement of heat supply management in the Republic of Azerbaijan" No 847 dated June 08, 2005. The Company supplies heating to households and residential buildings in Baku city and regions of the Republic, educational, healthcare institutions and

[7] Source:"Azersu "OJSC

other social facilities by carrying out the functions of generating, transmitting, selling, and servicing of heat energy through its structural units.

Since the establishment of "Azeristiliktejhizat" OJSC, as a result of the public investments in the restoration and refurbishment of heat supply systems,166 new heat supply sources were created, 108 obsolete boilers were upgraded by installing modern equipment, 57 heating stations fed from district boiler houses were refurbished and transformed into modern boiler houses, 271 gas service installation projects were implemented, and heating systems of more than 350 educational and healthcare institutions were refurbished and restored in Baku city and regions of the Republic.[8]

Modern boiler and heating network equipment, manufactured in European countries and fully meeting energy-saving and environmental requirements, were installed in newly built and modernized boiler houses. These boiler houses substantially surpass their predecessors in terms of reliability and safety requirements, and they are fully automated.

The measures implemented have enabled increasing the quality metrics of heat supply and substantial improvement of its technical – economic indicators. As compared to 2011, heat energy generation increased by 1,9 times making 1235,0 Gcal, heat losses decreased by 4,5 percent, specific gas consumption for the generation of 1 Gcal heat energy fell by 5,9m^3/Gcal, which made it possible to save 7,4millionm^3 natural gas volume in nominal terms.[9]

Company experts conducted a feasibility study relating to the application of "Module" type portable boiler house, Portable Cascade Type Boiler House (PCBH), and "Kombi" type heating systems and, after obtaining all approvals in compliance with the legislation, launched its application based on a certificate of conformity issued by the State Committee of Standardization, Metrology, and Patents of the Republic of Azerbaijan. These boiler houses also play a crucial role in solving heat supply problem of the medium and small size residential buildings, healthcare and education institutions.

By July 01, 2016, the Company's structure comprised a central administration unit, 12 service facilities, 2 limited liability companies, 22 heating system operation centers in Baku, 51 unified regional heating system operation centers, 5 regional boiler houses with a capacity of 807 Gcal / h, 530 district boiler houses with a capacity 1501,2 Gcal/h, 94 heating centers, main and district heating lines with a total length of up to 870 km, 2 boost pump stations, motor vehicle park and other engineering heating communications.

3.2. SWOT analysis of the utilities sector

As a strategic planning method, SWOT analysis has been developed in a generic manner in order to ensure short-, medium-, and long-term development of the utilities sector, bring the service levels in line with international quality standards, strengthen supply system, establish management systems, increase supply efficiency and for other purposes.

The key objective of this analysis is to identify impacts from internal and external factors and streamline them along four directions (internal factors – strengths and weaknesses, external factors – opportunities and threats). Such a strategic planning method is crucial in terms of

[8] Source: "Azeristiliktechizat " OJSC
[9] Source: "Azeristiliktechizat" OJSC

preliminary assessment of the sector for current period and identifying its position on the development plane.

Strengths	Weaknesses
• availability of natural resources; • expanding the application of cost-saving methods in using primary resources; • relatively low operational costs; • partial formation of domestic market; • availability of experienced personnel potential	• inefficient distribution of consumer groups; • necessity to improve tariff system and current standards; • lack of incentivizing tools; • gaps in record system; • partial penetration of advanced technologies; • low productivity; • potential for future debt liabilities.
Opportunities	**Threats**
• consistent rise in demand and establishment of new domestic production enterprises; • formation of new markets; • Mastering of modern technologies through integration with foreign markets; • investments attraction; • increased levels of budget receivables.	• availability of foreign business risks; • emergence of technological problems; • higher interest rates in the financial markets; • increased feedstock prices; • more rigorous international environmental requirements; • negative impact on demand by world economic crisis • High prices of energy resources

4. STRATEGIC VISION

For 2025 and beyond, several complex reforms are needed to be carried out in order to meet the consumer demand for such areas as electrical energy, natural gas, water and heating supply, which are included in the utilities sector, with high-quality, efficiently, and in line with requirements of modern times. In the above-mentioned period, it is crucial to form a diversified generation and distribution network and build an efficient management system in order to ensure sustainable development, expand and ensure the cost-effectiveness of infrastructure in this sector. Complex reforms in the sectors will be carried out incrementally in short-, mid-and long-term perspectives.

4.1. Strategic vision for 2020

Strategic vision for 2020 aims to improve the regulatory – legal framework in the utilities sector, enhance the functional efficiency of regulatory authorities, operational efficiency and service quality of service enterprises, improve investment environment, apply international regulations and standards, strengthen personnel base, optimize tariffs, and develop incentivizing tools.

4.2. Long-term vision for 2025

Long-term vision for 2025 aims to form an improved institutional environment and progressive management systems, use of advanced technologies and qualified personnel, ensure generation and diversification of distribution across each area in utilities sector.

Long-term vision

Several achievements will be made thanks to long-term targets relating to the utilities sector and major reconstruction works will be carried out in electrical energy generation in the Republic of Azerbaijan by 2025. The country has set the goal of achieving the efficiency of the electric energy sector by creating an investment environment with the involvement of retail markets and private sector entities, and mainly by using renewable energy and applying micro-electricity generation. Furthermore, gas and water distribution systems with larger geographical coverage will be applied by ensuring efficient and high-quality service levels.

In order to enhance efficiency in the energy sector, unbundling of all the links in the value chain from electrical energy generation to retail (generation, transmission, distribution and sales) from a managerial perspective will be considered as a priority issue. After effective supply and demand market is established to conduct operations in this area, the wholesale market of the electrical energy sector will be attractive for foreign investments. Minimum capital investments will be required from the government as a result of incentivizing the investments in new power stations basing on public-private partnership mechanisms (such as “build - operate-transfer” model, incentivizing tariff or auction tools).

In addition to the investments in new generation capacities, as a result of investing in thermal power plants that operate by using natural gas and hydro power plants, private sector participation into the existing electricity generation facilities will be expanded. Azerbaijan will reserve some of its generation assets as strategic assets depending on their size, location, age, and efficiency (such as 2.400 MW Azerbaijan thermal power plant due to

its large scale). Apart from selected strategic assets, the enhancement of overall generation portfolio efficiency will be envisaged by focusing on the privatization of thermal power plants operating with natural gas and hydro power plants that have optimum cost/benefit structure.

In the electricity sector, foreign direct investment and private sector participation will play a crucial role in building the targeted renewable energy ecosystem (mainly composed of wind and solar photovoltaic) beyond 2025. Azerbaijan is already taking certain actions to create an attractive investment environment through required regulatory amendments and provision of funds in the medium term. This way, it targets to initiate a boost in its renewable energy generation capacity going forward, less depending on fossil energy sources. End-users in the Republic of Azerbaijan will start micro-generation in this era for self-sufficiency purposes. Photovoltaic roof-top applications will become more widespread because especially in rural regions, stand-alone micro-generation points will cost less than electricity distribution. This will be also preferable for industrial sites that use different types of energy in their production (electricity and steam), such as paper & pulp or mining industry

In natural gas distribution, commercial and technical loss levels in Baku region will decrease more after the modernization project in Baku. Plans are in place to increase meter penetration level in the Republic of Azerbaijan until that time as the natural gas supply level of population is regularly on rise.

Until 2025, for waste & clean water management and gas distribution systems, the Republic of Azerbaijan will continue its investments into infrastructure improvements. Besides, measures will be taken to upgrade old infrastructure to ensure the use of meters by all end-users and to enhance efficiency (to be fully completed in a short time especially by considering that meters for commercial users are installed at customer expense), including also newly established households and commercial entities. All these efforts serve for operational efficiency goals in the sectors that are envisioned for the period beyond 2025.

4.3. Aspirational vision of Azerbaijan in utilities for post 2025

Azerbaijan strives for operational excellence and high service levels in electricity, water and sewerage, heating and natural gas supply sectors of its utilities industry in post 2025.

Highlights on aspirational vision

By identifying its inefficient operations across the whole chain from generation to distribution in the electricity sector, the Republic of Azerbaijan will make efforts for their elimination. To achieve these objectives, it will take actions towards the establishment of a fully unbundled and liberalized environment where generation, transmission, distribution and retail services are separated from one another from a managerial perspective in post 2025. Distinct efforts in optimizing each of these pillars will enable Azerbaijan to capture the most benefit out of the value chain. This effort would go in hand with more foreign direct investment (FDI) attracted to the sector and increased know-how for each of the four components forming the sector.

The Republic of Azerbaijan will take measures to increase the attractiveness of the electricity sector as well as ensure efficiency across the electricity value-chain, environmental sustainability, rational competition and cost-effective tariffs in post 2025. The actions to be taken will ensure quality and uninterrupted access to electricity across the country for the households, commercial and industrial end-users.

In order to increase reserve margin, Azerbaijan will both invest in natural gas, hydro and renewable energy resources (such as solar and wind). Although natural gas stations will have the main share in the generation portfolio, their share in the overall portfolio will decrease in post 2025. In this perspective, Azerbaijan will pursue a more sustainable energy generation strategy towards renewable sources in the mid and long term. Azerbaijan targets to base some portion of its installed generation capacity on renewable energy sources in post 2025 and aims to intensify the construction of those power plants. In addition to wind and solar investments, potential opportunities in other renewable resources such as geothermal and biomass will also be evaluated to achieve this goal. Liberalization of the sector will also play a crucial lever in achieving this goal. It will directly incentivize private sector participation in renewable energy-based generation plants by mechanisms like build-operate-transfer, feed-in-tariff and auctions.

Azerbaijan aspires to increase penetration of micro-generation panels (not only solar roof-tops but also heating and power plants that operate based on natural gas and small scale wind turbines) for both industrial sectors and specific groups of the population. There are opportunities for improvement in applying solar roof-top panels especially in regions outside Baku where electricity infrastructure has further potential for improvement. Solar roof-top applications are targeted to be widespread due to their low-cost installation and ease in construction. Electrical energy will also be used to enhance overall efficiency of generation in natural gas industries.

Azerbaijan aspires to reach top-notch electricity generation efficiency levels in its national portfolio in post 2025. This aspiration has two components:

- All existing natural gas and hydro production facilities Azerbaijan will fully modernized;
- New generation facilities with top-notch efficiency (units that produce electricity by using natural gas, hydro, wind and solar sources) will be applied.

In transmission and distribution, the Republic of Azerbaijan has two major aspirations in the long term:

1. Decrease commercial and technical losses in transmission and distribution to the European benchmark levels in post 2025;
2. Eliminate the existing deficiencies in the electric energy sector by using the best international practices.

This aspiration will be achieved by fully modernizing the infrastructure, and replacing outdated and malfunctioning equipment and facilities with the most modern ones (such as increasing the share of underground high-voltage cables in total network). Then, Azerbaijan will introduce SCADA system (supervisory control and data acquisition operated with coded signals over communication channels) for remote monitoring and control of distribution and transmission lines. With the help of the SCADA system, possible interruptions and / or losses will be observed at full and this will increase overall quality and efficiency of the network.

At the same time, two objectives related to retail sales segment in the electric energy sector have been prioritized:

- Reach European energy-efficiency benchmark levels - in both of the sectors, various energy-efficiency methodologies (such as energy-efficient buildings, promotion of energy efficient products) will be incentivized by the government;
- build the infrastructure necessary for using electric motor vehicles in Azerbaijan– plans are in place to use electric vehicles in the Republic in post 2020.The Republic of Azerbaijan will consider a well-designed electricity infrastructure as the prerequisite for this purpose.

In gas supply, Azerbaijan aspires to reach European benchmark gas distribution loss levels by decreasing losses in the Baku region. Apart from gas distribution losses, Efficient operation in the gas distribution system will be ensured by applying digital meters across all end-users in this period. This would allow to effectively track the network based on more detailed data as well as directly impact collections upwards.

For the clean and waste water management, Azerbaijan targets to accomplish country-wide coverage of infrastructure and quality services. Digital meters will be spread to all households and commercial entities connected to the grid to efficiently track and monetize water consumption.

5. TARGET INDICATORS

The implementation of the priorities envisaged for the utilities sector is estimated to:

- Increase GDP by AZN 832 million in 2020, in real terms;
- Add 6645 new employments along the whole value chain in the utilities sector.

This will enable the Republic of Azerbaijan to strengthen its economic pillars and the utilities sector in post 2020.

Electrical energy generation and supply:

- Diversify the generation capacity with wind energy being 350 MW, solar 50 MW, and biomass 20 MW (on top of already planned 900 MW), along with increasing the generation capacity by 1,000 MW;
- Increase net fuel efficiency level for selected combined-cycle gas turbine plants to 50 percent;
- Decrease electricity loss level of Baku from 8.5 percent to 7.0 percent and from 12 percent to 8 percent in the regions;
- Capture 50 percent share from Georgia's electricity imports and 20 percent from Turkey's electricity imports;
- export to Europe the saved natural gas volumes(from natural gas plants) owing to efficiency enhancements through TAP/TANAP projects.

Natural gas supply:

- Decrease gas distribution – related technical loss level for all regions to 8.0 percent(if the loss level of a region is below 8.0 percent, it is assumed to remain the same);
- export to Europe the saved natural gas volumes (from natural gas plants) owing to efficiency enhancements through TAP/TANAP projects.

Water and sewerage services:

- Decrease commercial loss ratio from 20 percent to at least 14 percent(out of 670 millionm3 annual water supply from Azersu OJSC);
- Decrease distribution losses from 31percent to 25 percent;
- Decrease the share of registered users without meters installed from 26 percent to 5 percent (total number of households 2 million 20 thousand);
- increase wastewater collection level from 46 percent to 65 percent (out of 314 million m3annual water supply from Azersu OJSC).

Heating supply:

- Increase the volume of produced heating energy from 427 thousand Gcal[10] to 1767 Gcal as compared to 2015 by considering efficiency factor;
- Increase the number of heat supplied residential buildings by 50,4 percent, to 5689 during 2017-2020 by expanding the coverage of heat supply;
- Generally increase the incomes of heat economies by 5,1 million AZN;
- Improve heating supply through capital repair of the technically faulty heating supply system at around550residential buildings.

[10] Source:"Azeristiliktejhizat"OJSC

6. STRATEGIC OBJECTIVES

To achieve the establishment of a regulatory body, which has been accepted as a strategic target, and to ensure efficiency across the lines of activity in the utilities sector, improvement of legislative and regulatory-legal documents in short – (2016-2020) and mid-term (2020-2025), enhancement of the operational efficiency of the enterprises engaged in this service sector, development of new standards by considering international standards and local specifics, and improvement of the investment environment to attract investors have been defined as strategic objectives.

7. STRATEGIC TARGETS

7.1. Strategic target1.Ensure sustainability and efficiency in regulating the utilities sector

7.1.1. Priority1.1.Establish an independent regulatory body and dedicated fund, develop effective service, collection mechanisms and human resourcing

Rationale

Creation of an independent regulatory body is seen as a critical step in a number of countries towards liberalizing and attracting investments into the utilities sector and offering quick solutions. Besides, creation of a dedicated fund to reduce budgetary burden and ensure timely execution of capital investments needed for the sector may have positive impact on the development of utilities sector.

The provision of utilities services with better quality, convenience, and by applying innovations will ensure end-user satisfaction and will lead to increased consumer responsibility when collecting service charges. Also, appropriate measures taken towards the collection of service charges and increased end-user responsibility will have a positive impact on the financial and business activities of the enterprises engaged in these sectors.

Moreover, the development of highly-qualified staff specialized in this sector and use of their knowledge and skills will help to enhance operational efficiency and service quality in the sector.

Action items

Action 1.1.1. Consider the establishment of a single regulatory body in the utilities sector

A systemic approach towards triggering the enablers to enhance operational efficiency in the utilities sector as well as the establishment of a single regulatory body, which will spur the use of effective mechanisms to attract investors into this sector, will be considered. In this case, the following 3 key factors will be taken into account:

- Organizational and legal form and lines of activity of the independent regulatory body;
- clear assignment of roles and authorities with respect to relevant bodies;
- development of human resources.

The assignment of several strategic roles to that body will be considered, such as regulating the relationship between producers, suppliers, and end-users, analyzing the line of business of relevant sectors and ensuring sectorial efficiency, complying with technical requirements, implementing restructuring measures, and developing incentivizing mechanisms based on purchase agreements in order to attract investments.

Besides, the decoupling of electricity transmission and generation in the utilities sector from one another, creation of wholesale markets for sales purposes, establishment of tariffs based on the projects that are offered for alternative and renewable energy sources, improvement of current tariffs (tariffs for electrical energy generated by wind and mini hydropower plants), formation of tariffs for other sources, prioritization of generation assets for selective privatization (specifically focusing on private enterprises to raise efficiency of some generation

assets), unbundling of distribution and retail, and liberalization of the retail sector will be considered and relevant reforms will be implemented.

In this direction, defining long-term price warranties and competitive bid proposals may help to conclude agreements, attract investors, and cover the demand in the long-term.

Action1.1.2.Consider the establishment of a dedicated fund in the utilities sector

Additionally, in order to improve infrastructure in the utilities sector and consistently raise service levels, allocating a certain amount of funds from the tariffs that are charged for those services and accumulating them in the Dedicated Fund will be taken into consideration.

Action1.1.3.Continue actions towards enhancing the utilities service level

With the aim of optimizing the governance in utilities services for population and enhance transparency, the scope of “ASAN kommunal” centers will be expanded in order to apply their experience across other service areas.

Action 1.1.4.Improve the collection of utilities service charges

Determining the collection tools for utilities services (electricity, natural gas, water, and sewerage) and, particularly, for the types of services (centralized heating, residential area maintenance bill, household waste collection), which are not prepaid services and cannot be suspended individually, will be taken into consideration. Also, according to the management methods established for collections under the Housing Code of the Republic of Azerbaijan, the opportunities for wider use of managerial (house owners’ joint ventures and etc.) activities will be analyzed and appropriate proposals will be made.

Action1.1.5.Improve human resourcing in the sector of utilities services

In order to strengthen the personnel potential, defining relevant specialties and up skilling courses at educational institutions and scientific-research centers, as well as taking necessary measures to prepare learning aids and methodology guidelines will be taken into consideration.

Action1.1.6.Establish an improved regulatory legal framework in the utilities sector

By considering international practices and specifics of national economy, the development of a single regulatory – legal document (such as a law that will regulate the utilities sectors and etc.),which will establish legal bases for efficient and effective activities in the utilities sector, precisely determine the rights and responsibilities of suppliers and consumers, envision mechanisms enabling responsive and consistent governance of the sector and ensure a systemic approach thereto, will be taken into account.

Expected results and indicators

Establishing a regulatory body and dedicated fund, raising collection levels and enhanced human resourcing are all vital factors to develop the utilities sector, minimize the burden on state budget, and liberalize the sector. No GDP and employment impact is expected to result from the actions taken against this priority.

Required investments

No additional investments are required to implement this priority.

Expected risks

No risks are expected in connection with the implementation of this priority.

8. ELECTRIC ENERGY

The Republic of Azerbaijan has wide opportunities to export its electrical energy and has been able to gradually build up its generation capacity over the last 15 years. Natural gas accounts for approx. 94 percent[11] of the electricity produced in the country, with the rest produced at hydro and other power plants. "Azerenergy" OJSC and relevant entities of the State Agency on Alternative and Renewable Energy Sources under the Ministry of Energy of the Republic of Azerbaijan are major companies that are engaged in producing electrical energy.

8.1. Strategic target 2. Ensure the generation of fully – diversified and environmentally friendly electrical energy

The available potential for generating a sufficient amount of electricity in the Republic of Azerbaijan has enabled to supply production and service sectors, including the population, with reliable and affordable electricity. Given the increased demand and planned decommissioning of the existing power plants, the availability of other energy sources (water, wind, solar, bioenergy, and etc.) apart from natural gas allows to further diversify the electricity supply and ensure uninterrupted supply. The below priorities reflect a comprehensive, strategic, and sustainable approach to the country's electricity sector over the next few years.

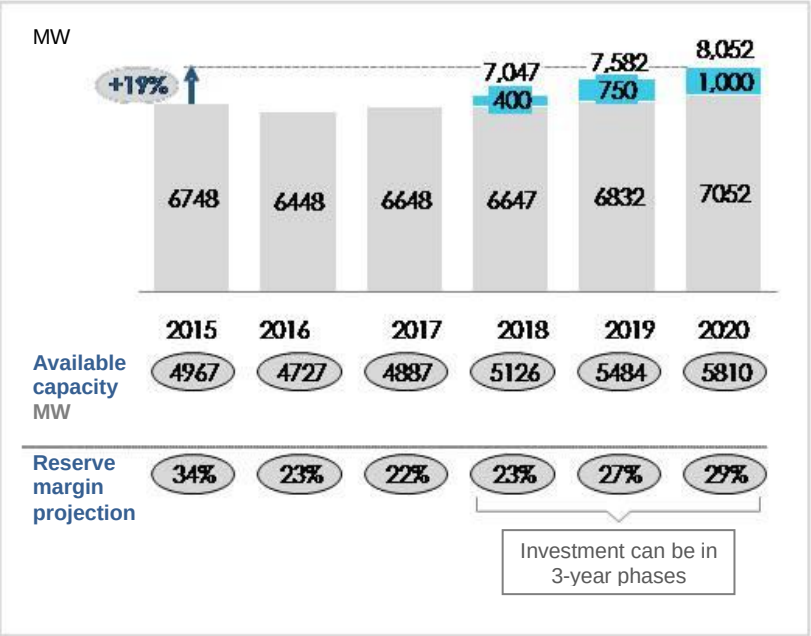
8.1.1. Priority 2.1. Increase reserve margin for national generation portfolio

Rationale

In 2015, the installed capacity of power plants constituted approx. 6748MW,and reserve margin was 34 percent12[12] (diagram2).Alongside the planned investments to implement sufficient electric energy supply over the next 5-10 years, investments will be made to increase the generation capacity by 1000 MW. Thanks to these investments, the current generation capacity is expected to rise by 19 percent over2015–2020, which is a sufficient level to ensure secure reserve margin[13] (providing that the sustainable consumption growth remains stable).

[11] Source: State Statistics Committee of the Republic of Azerbaijan
[12] Source:"Azerenergy "OJSC
[13] Source:"Azerenergy" OJSC

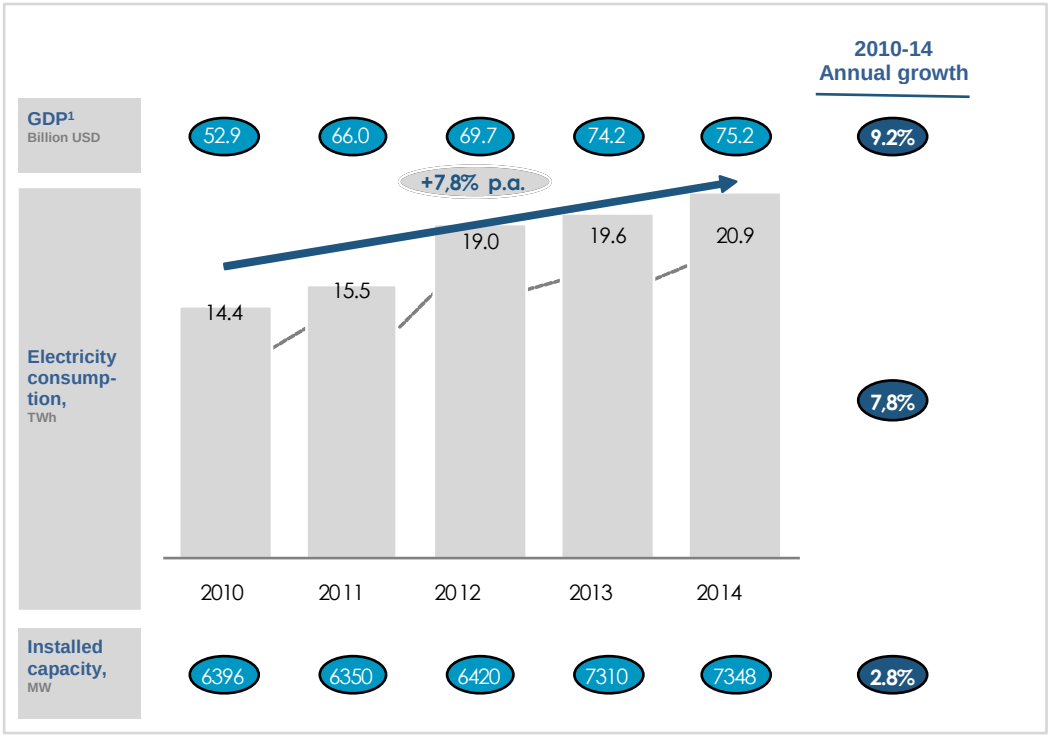
Diagram 2. Attraction of new investments to create additional 1000MW generation capacity



Source:“Azerenergy” OJSC

The country’s recent economic growth and volume of electricity consumption have outpaced the growth in the electricity production. In 2010–2014, country’s GDP amounted to 75.2 billion USD by 9,2 percent annual growth (diagram 3).While electricity consumption rose by 7,8 percent within this period, the increase rate of the generation capacity was lower than 2,8 percent. Growth level in electricity consumption in other emerging countries has primarily outpaced GDP growth and corresponds to the growth in generated volume.

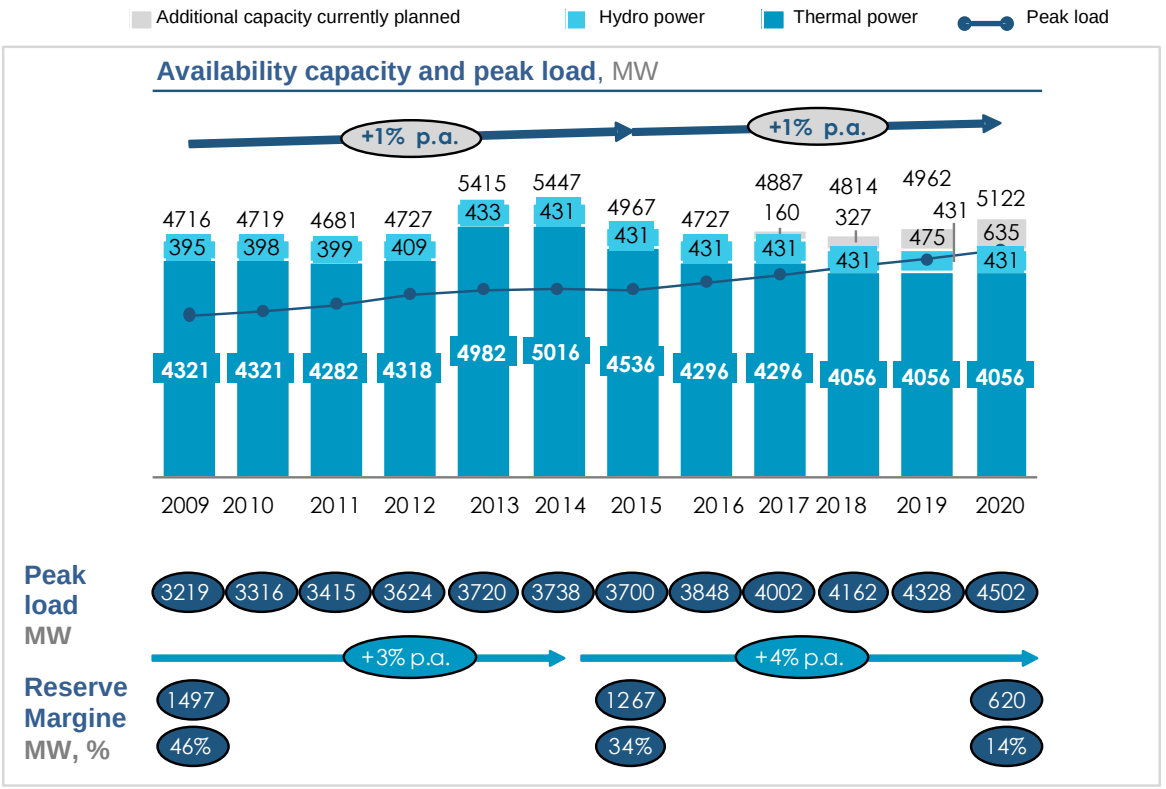
Diagram 3: Electricity consumption has been growing parallel to GDP



1. Current prices in USD
Source: State Statistics Committee of the Republic of Azerbaijan, “Azerenergy” OJSC, World Bank

The current reserve margin of the overall electricity generation capacity in the Republic of Azerbaijan is quite substantial as compared to other countries. The current volume has increased by 1 percent[14] annually and this growth is expected to continue until 2020, i.e., the time when the electricity generation capacity of the country reaches 5122MW [15] (diagram4).However, electricity consumption is expected to grow at a higher pace over the subsequent years by considering the high increase rate of peak load times since 2009. Consequently, in view of up to 34 percent drop in reserve margin in 2015,which was 46 in 2009, it is forecasted to decline to 14 percent until 2020, which is much lower than the 25 percent security level that has been accepted globally.

Diagram 4. Potential drop of reserve margin of the Republic of Azerbaijan below security level until 2020



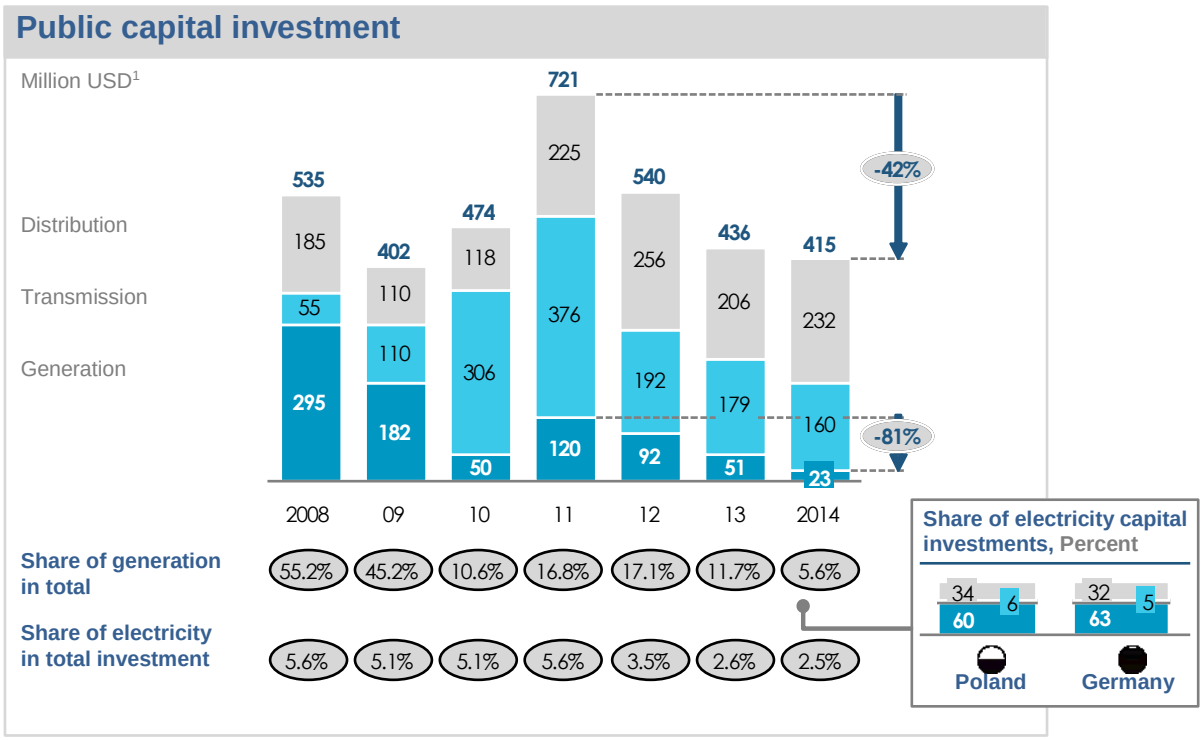
1. *Current potential defined as installed capacity which is increased by specific load factors*
Source: State Statistics Committee of the Republic of Azerbaijan, "Azerenergy" OJSC

The trend lines for generation capacity and peak load usage have been converging due to a shortfall in investment. In 2014 as compared with 2011, annual public investment in electricity (generation, transmission, and distribution) decreased by 42 percent (diagram5). Investment in the generation category, which requires significant capital investment, declined the most during this period, to just 5.6 percent of total investment. Investment levels have declined, particularly in the past two years.

[14] Source: State Statistics Committee of the Republic of Azerbaijan

[15] Source:"Azerenergy "OJSC

Diagram 5. Volume of public capital investments in electric energy sector

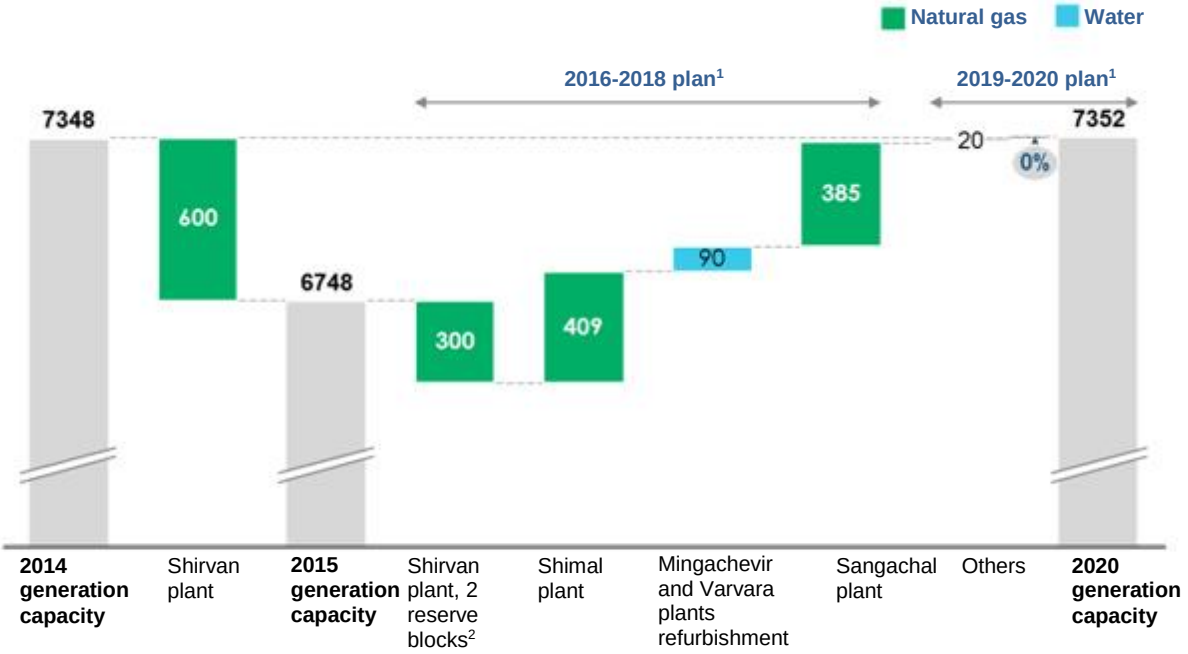


1. *Considering the annual average exchange rate of AZN relative to USD*

Source: State Statistics Committee of the Republic of Azerbaijan, "Azerenergy "OJSC, Poland and Germany' energy agencies

Although Azerbaijan had 7,348 MW of generation capacity in 2014, the Shirvan plant was partially closed the following year, reducing installed capacity by 600 MW. (diagram6).

Diagram6.New capital investment plans

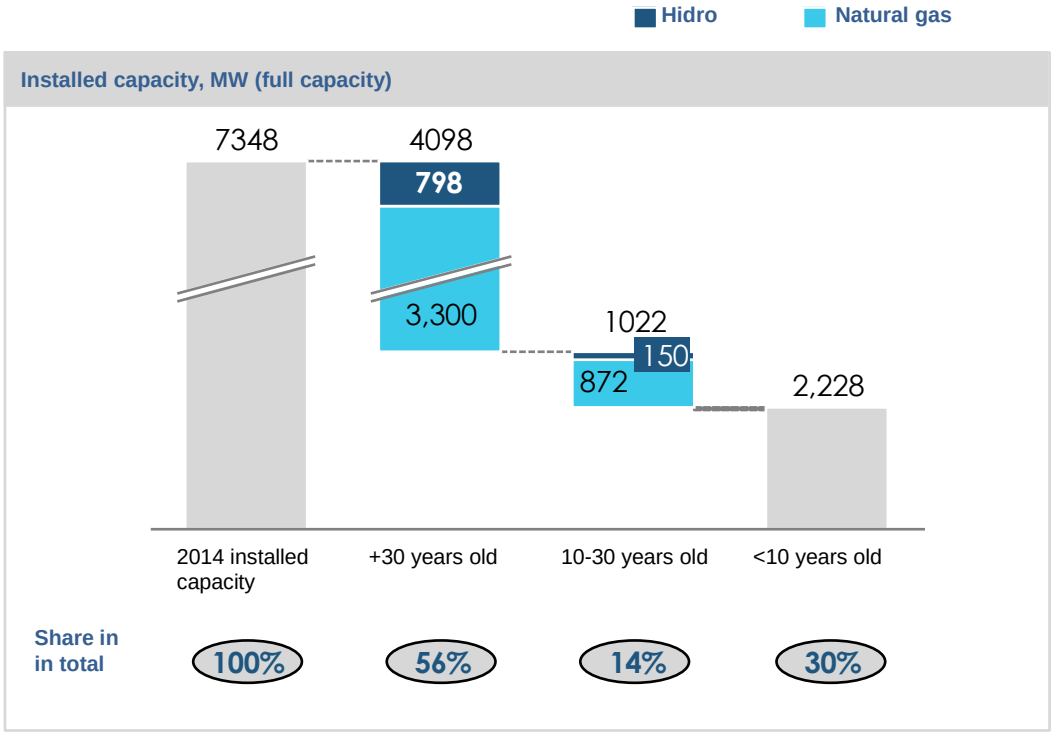


1. *"Azerenergy" OJSC current growth plan*
2. *Only 2 blocks are kept in reserve (each with installed capacity of 150MW)*

Source: "Azerenergy "OJSC

The existing plants and infrastructure are aging, increasing the need for refurbishment and new plants. The average life span of a natural gas plant is 25 years, but 56 percent of Azerbaijan's 2014 installed capacity was generated by plants that have been in operation for more than 30 years (diagram 7). An additional 14 percent of installed capacity is generated by plants 10 to 30 years old, meaning that some of those facilities could require investment in the near future. Renovations and upgrades can extend the operating life of plants. Thus, the Azerbaijan power plant, which accounts for 2,400 MW, or approximately one-third of installed capacity, was recently modernized. However, it will likely require additional upgrades in the next five years.

Diagram 7. Aging of plants and infrastructure



Source:"Azerenergy "OJSC

Action items

Action 2.1.1. Forecast the domestic need for electric energy

"Azerenergy" OJSC and Ministry of Energy of the Republic of Azerbaijan will, in partnership with relevant authorities, perform a comprehensive analysis on domestic electricity consumption levels to accurately identify electricity needs for the period until 2020 and beyond.

Action 2.1.2. Prepare feasibility studies to identify priorities for energy sources

"Azerenergy" OJSC and the State Agency on Alternative and Renewable Energy Sources under the Ministry of Energy of the Republic of Azerbaijan will conduct researches and prepare feasibility studies for the below purposes:

- define priorities on different energy sources including renewable energy and natural within the framework of actions to be taken within the 2nd phase of the priority;

- define the number, installed capacity and types of the power stations to be constructed and the amount of required capital investments by considering the available natural resources, forecasted opportunities to use electrical energy and its future exporting potential;
- Determine the locations for electricity stations that will best serve the biggest sources of electricity demand and fit the existing electricity infrastructure (considering renewable potential map)

Action 2.1.3. Define financing sources for capital investments

Related parties will decide on the form of financing for the investments. Particularly, this will include making decisions on whether it is expedient that the stations should be built and operated by government entities or by private investors as well as holding discussions with the relevant regulatory bodies to determine the volume of financial resources in the state budget in the event that these works are carried out by government entities. Additionally, if it is decided that the new electricity stations are to be built and operated by government, tenders will be announced for investments in these projects by considering vendor selection criteria. If it is decided in favor of private investment, the related bodies will consult with other regulatory bodies and perform analysis to determine which areas would be open to private investment considering the country's strategic security position. They will amend existing legislation and regulations in a manner that would provide private investors incentives to invest into electricity sector in the Republic of Azerbaijan (such as "build-operate-transfer" model, feed-in-tariff, auctions, etc.). Last, they will make a decision and publicly announce the investor or vendor responsible for the construction of electricity stations.

Action 2.1.4. Create additional generation capacities

Experts estimate that the necessity will arise for further investments to create additional 1000 MW generation capacity to provide secure energy supply over the next 5 to 10 years. And to strike a balance between supply and demand various levers will be used that are likely to minimize consumption through different market tools in Azerbaijan. The type of investment to be made in the generation capacity will depend on priorities. If the new stations are to be built by a public company, after commencing the construction of electrical stations, Azerbaijan will determine the KPIs against which the construction progress will be controlled and continuously monitored.

Expected results and indicators

By increasing installed capacity as a result of implementing this priority, AAZN 130 million direct and AZN 85 million indirect GDP impact in real terms will be generated by 2020, summing up to AZN 215 million. It expects an employment impact of 5,085.

Key performance indicators:

- additional capital investments to increase generation capacityby1000MW(on top of currently planned 900 MW16);
- diversify capital investments across new generation capacities(such as natural gas, wind, hydro and solar energies).

Required investments

To create 1500 MW additional generation capacity within 1900 MW increase of generation capacity under this priority (including also planned 900 MW generation capacity), an estimated

AZN 1,950 million investment will be needed for this priority. This investment amount covers investments financed from both public and private sources.

Expected risks

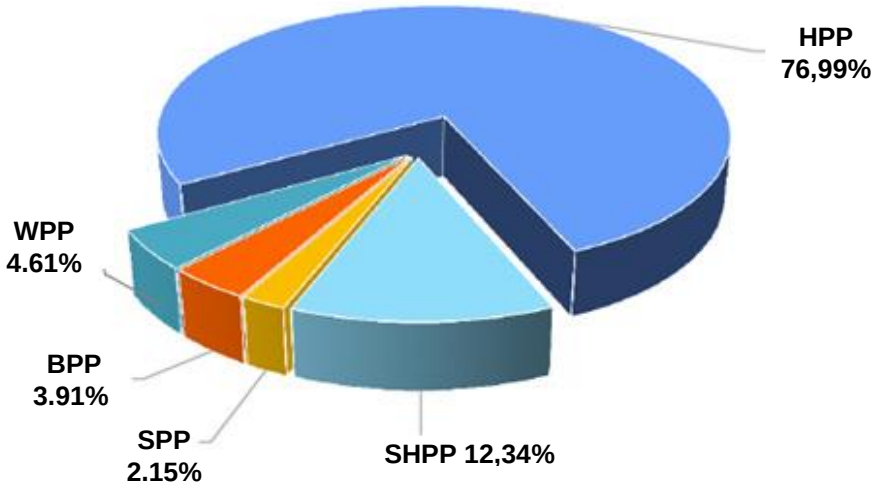
- substantial change in the consumption volume;
- financial shortfall on investments likely to be required for construction-installation works due to the crisis in the global economy.

8.1.2. Priority2.2. Diversify the national generation portfolio

Rationale

Renewable energy sources enable improved electric supply security, reduced overall generation costs, saving of natural resources, creation of new jobs, and environmental protection. Mainly water, wind, and solar technologies are used among the renewables at the moment (see diagram 8). Renewable energy use levels are very low relative to the country's existing potential (except large HPPs). Therefore, in order to diversify generation, high potential energy sources and, particularly, the capabilities of wind and solar energies must be broadly used in the Republic of Azerbaijan.[16]

Diagram 8. Resource-based distribution of generation capacities created due to renewable (2014)



Source: State Agency on Alternative and Renewable Energy Sources under the Ministry of Energy of the Republic of Azerbaijan

Two types of energy sources prevail in the electric energy generation portfolio of the Republic of Azerbaijan. Currently, natural gas account for 94 percent of overall energy generation (the remaining 6 percent is accounted for by hydro and other power stations).17At the same time, three largest natural gas power stations supply 55 percent of the power in the country.[17]

If any of the above stations is decommissioned due to capital repairs, risks may arise for the electricity supply of the country due to this centralized manner of generation. From this viewpoint, further diversifying the portfolio will help to minimize the risk for secure supply.

Besides, the average cost of electricity generation may be brought down by leveraging the opportunities of low-cost sources, including renewables. While natural gas fuel costs USD 30-

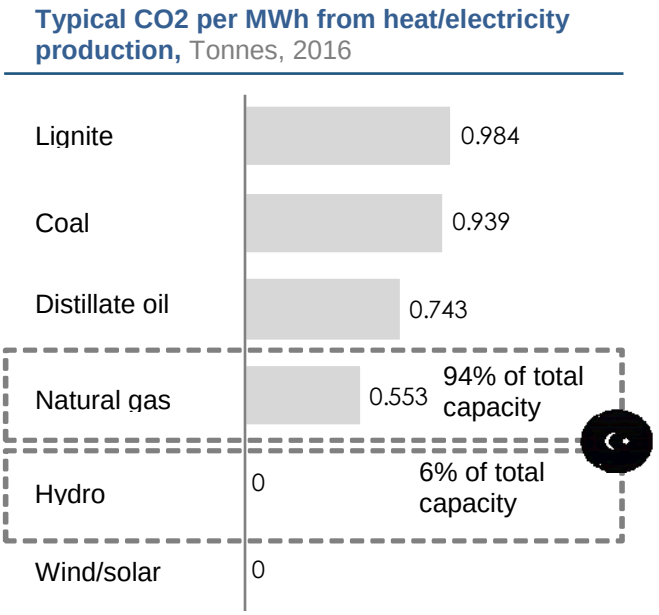
[16] Source:"Azerenergy "OJSC
[17] Source:"Azerenergy "OJSC

40 per MW hour, putting it among the least expensive generation options, wind and solar are comparable. Continued technological advancements lowers generation costs for wind and solar further. For example, in April 2016, electricity generated from solar was auctioning as low as USD 29.90 per MW hour in various parts of the world.[18]

Since Azerbaijan currently has two primary sources for electricity, greater diversification through wind and solar can bring the average cost down.[19]

The increased use of renewable will also have a positive impact on the environment. As compared with natural gas and hydro generation sources, the reduction of emission levels (carbon dioxide - CO_2) during electricity generation due to wind and solar energies will increase the advantage of the country's energy portfolio from an environmental perspective (diagram 9).[20]

Diagram 9. Impact of renewables on energy portfolio sustainability



Source: International Energy Agency

Azerbaijan's potential in renewables is very high. Today wind contributes 66 MW of the country's overall installed capacity – just 0,4 percent of the potential 15,000 MW.[21] Absheron peninsular, dry areas along the Caspian shore, as well as Caspian basin, Nakhchivan Autonomous Republic, and several other territories are considered attractive for wind energy investments. Baku region has favorable geography in terms of onshore investments in wind energy.

Solar energy has approximately 30 MW of installed capacity – just 0,4 percent of the potential capacity of 8000 MW.[22]Currently, construction of solar power stations is underway in Baku and its surroundings, including also several regions of the country. Baku region averages 2,000 to 2,800 hours of sunshine per year, a sufficient level to support solar generation. Kur-Aras,

[18] Source: State Statistics Committee of the Republic of Azerbaijan
[19] Source: "Azerenergy "OJSC
[20] Source: International Energy Agency(IEA)
[21] Source: State Agency on Alternative and Renewable Energy Sources under the Ministry of Energy fo the Republic of Azerbaijan
[22] Source: State Agency on Alternative and Renewable Energy Sources under the Ministry of Energy fo the Republic of Azerbaijan

Absheron, and Nakchivan Autonomous Republic, with the average solar energy of1400 to1800kWh, are also effective places for further solar investment[22] (exhibit 3).

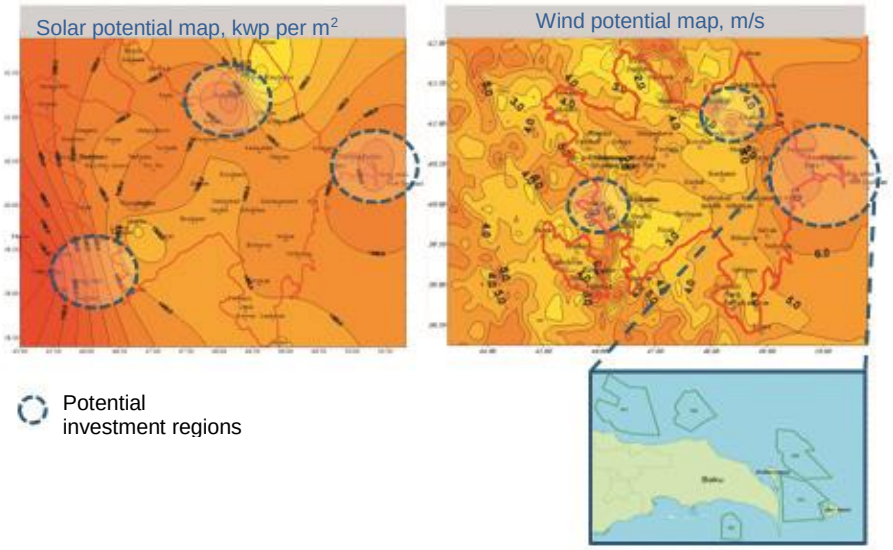
Furthermore, Azerbaijan has 46 MW of installed bioenergy capacity, which makes 5,1 percent of economically efficient potential capacity of 900 MW.

The country's agricultural development, particularly cotton and wheat – growing, provides suitable conditions for investments in energy generation which utilizes biomass. Increasing the amount of cotton from current 100 thousand tons, which is supplied from 52 thousand hectare area in our country, to 250-300 thousand tons next year, release of new wheat growing fields into turnover will lead to manifold increase of the inputs for bioenergy generation.

The preparation works are already underway to reach cotton production to 300,000 tons in 2017, which shows that around 700 thousand ton input suitable for of energy generation will be available only in cotton-growing. The current efforts taken to develop cotton – growing and other agricultural sectors in 24 regions enables us to say there is a broad bioenergy potential and opportunities for its use in Samukh, Aghjabady, Oghuz, and etc. regions.

Studies show that industrial wastes in all industrial sites are predominantly composed of biomass, which is efficient to produce biogas, as well as fluid and hard biomasses that can be used in electricity generation.

Exhibit3. Potential areas for capital investments in solar and wind energies in Azerbaijan



Source: State Agency on Alternative and Renewable Energy Sources under the Ministry of Energy of the Republic of Azerbaijan

The availability of natural gas stations in most of these areas allows for uninterrupted wind and solar energy generation, which ensures constant electricity supply due to such sources and eliminates the likelihood of complete dependence on one or several of sources.

Action items

Action 2.2.1. Assess alternative and renewable energy potential

State Agency on Alternative and Renewable Energy Sources under the Ministry of Energy of the Republic of Azerbaijan will assess Azerbaijan's alternative and renewable energy

potential first by leveraging existing studies or involving experts for new studies and determine the regions with the biggest potential for investment. Then, they will perform financial feasibility and profit-loss studies to determine the most suitable forms and locations for renewable energy stations and prepare list of prerequisites for grid connection (such as power quality, admissible maximum share of renewables in a transformer station). Last, this will include establishing a timeline and plan for renewable energy investments by prioritizing biggest capacity investments and investments close to the areas with the biggest demand. Additionally, by considering the performance indicators of private players that are engaged in this sector, their preferences will be included in the timelines.

Action 2.2.2. Select operational and financing forms for power stations that require investment

State Agency on Alternative and Renewable Energy Sources under the Ministry of Energy of the Republic of Azerbaijan, together with relevant governmental bodies, will decide on the operational and financing forms for the power stations that are in need of investments. Particularly, they will decide whether it is expedient that the stations should be built and operated by government entities or by private investors.

Action 2.2.3.Public communications regarding the actions to be taken

State Agency on Alternative and Renewable Energy Sources under the Ministry of Energy of the Republic of Azerbaijan will prepare public communications plan with regard to the utilization of the country's alternative energy potential and carbon-free electricity generation.

Expected results and indicators

As a result of implementing the priority for renewable energy generation in the national generation portfolio, AZN 50 million direct and AZN 20 million indirect GDP impact by 2020 in real terms, summing up to AZN 70 million, will be generated. It expects an employment impact of 270 in this direction.

Key performance indicators are:

- diversify energy portfolio through capital investments to produce 350 MW wind, 50 MW solar, and 20 MW bioenergy;
- export the saved natural gas (from natural gas plants) to Europe through Trans-Adriatic and Trans-Anatolian gas pipelines (TAP/TANAP), as a results of the efforts taken.

Required investments

An estimated AZN 1,040 million investment will be needed for the construction of new electricity plants (wind, solar, and bioenergy) under this priority.

Expected risks

- adverse climatic condition;
- financing problems relating to investments required for construction works.

8.1.3. Priority 2.3.Consider the opportunity of increasing net electricity export in the short run with excess supply

Rationale

Currently, Azerbaijan exports electricity mainly to Georgia and Turkey. Several countries in the region such as Greece and Iraq are also net electricity importers. Iran and Russia are net exporters, but their limited infrastructure and proximity to Azerbaijan nonetheless present an additional opportunity for electricity exports to those countries. Azerbaijan will consider utilizing excess supply in the near term by increasing electricity exports to other countries in the region, a potential opportunity of untapped income.

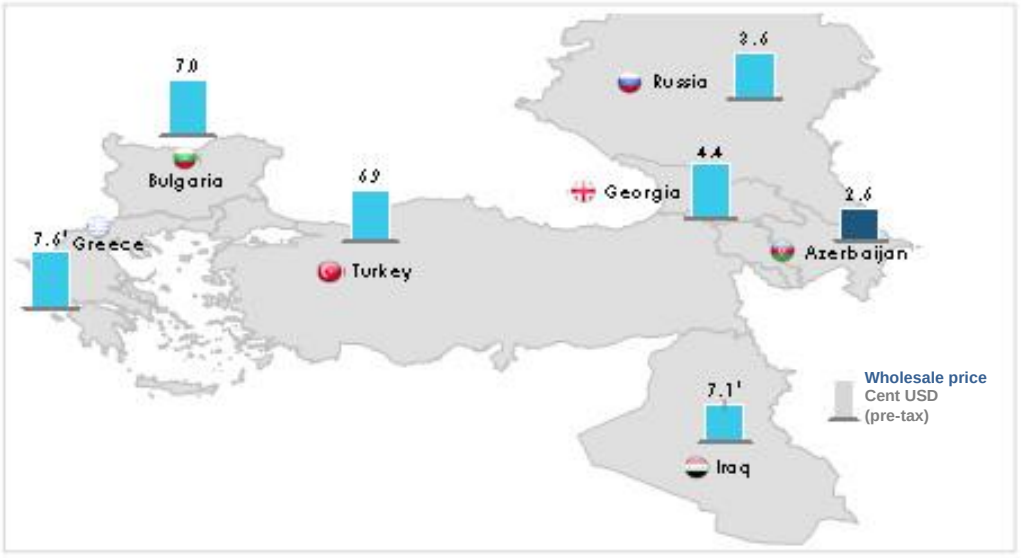
To this effect, the condition of the existing transmission lines and infrastructure that are able to accommodate an increase in electricity exports must be checked first. Currently, there are five high voltage electricity supply lines in the Republic of Azerbaijan that carry electricity to surrounding countries (see exhibit 4)

Exhibit 4. Electric grids to export electricity

Note: Analysis about Iran is based on only publicly available data and Azerbaijan government-owned data.
Source:«Azerenergy» OJSC, Teias

Since the share of natural gas in electric energy generation is higher versus other energy sources, the Republic of Azerbaijan is able to produce electricity relatively inexpensively compared with its neighbors (see exhibit 5). This price advantage has made Georgia and Turkey the primary customers for electricity exports. As the country still has available capacity to generate more energy than it consumes, it will consider increasing exports to countries with higher wholesale prices. In addition to energy exports, Azerbaijan could also leverage its geographic location and position itself as a transit country for electricity sales between its neighbors.

Exhibit 5. Comparable price advantage of Azerbaijan relative to several benchmark countries



1. Based on prices, which were valid until December 01 2016

Source: Erranet, Eurostat

Action items

Action 2.3.1.Investigate export opportunities

Relevant public entity will conduct a comparative analysis between electrical energy and natural gas export by considering the net value of electricity generation, domestic market demand for natural gas, electricity and natural gas prices in export markets, and exporting costs. If exporting electricity proves to be economically feasible, other works will be given a start in this direction.

“Azerenergy” OJSC will hold preliminary discussions with nearby countries (Iran, Russia, Turkey, and Georgia) in need of electricity and explore opportunities for electricity exports by assessing effectiveness of direct natural gas export. Also, “Azerenergy” OJSC will assess electricity trade opportunities with Georgia, Greece, Iran, Iraq, Russia, and Turkey leveraging the existing electric transmission lines.

Action2.3.2. Prepare a feasibility study to realize the export potential

“Azerenergy” OJSC will implement different projects by conducting feasibility studies to realize Azerbaijan’s electricity export potential. It will first utilize projections for future investments into electricity generation and electricity usage to understand available capacity for exports. Second, it will run analysis to determine electricity need of regional countries and required investment for infrastructure and also run profit and loss analysis for export to various countries (both immediate neighbors and opportunities beyond existing markets, such as Greece or Iraq) by taking into account a wide range of variables such as electricity generation costs, transit and custom fees, and potential capacity investments. Third, it will perform studies to determine the suitability of the electricity infrastructure in Azerbaijan and in neighboring countries to support a higher amount of exports, particularly, by paying attention to the mutual fit of the networks located in different countries and transmission capacity of transmission lines. Last, it will be ensured that any additional investment into transmission capacity is incorporated into profit and lost analysis.

Action 2.3.3.Establish a working group for actions to be implemented with regard to exports

"Azerenergy" OJSC will establish a working group responsible for identifying new potential sales opportunities, price negotiations with potential customers, creating key performance indicators to align the defined incentives with electricity export targets, and accurately reflecting such indicators in export profit and loss analysis.

Expected results and indicators

As a result of implementing this priority, AZN 70 million direct and AZN 45 million indirect GDP impact by 2020 in real terms, summing up to AZN 115 million, is expected due to increased generation capacity. This priority is not expected to bring any direct employment impact since employment impact was covered in the previous initiative.

Key *performance* indicators:

- Capture 50 percent share from Georgia's electricity imports and 20% from Turkey's electricity imports.

The required investment

No investment is needed since investment need of this priority was covered in the previous priorities and the existing transmission capacity is assumed to be sufficient to transmit excess capacity.

Expected risks

- sharp increase in domestic demand for electricity due to diversified and developed economy;
- cheaper electricity import offers made to the countries where electricity is forecasted to be exported;
- shortage of generation input to export competitive electricity.

8.2. Strategic target 3. Apply the average global efficiency and quality standards and trigger mechanisms to achieve set goals

Generation capacity is just one part of the equation in ensuring abundant, affordable energy for all consumer groups in Azerbaijan (industrial, commercial, and residential customers). From this perspective, such as factors as investment opportunities, efficiency and responsible usage should be taken into consideration. Due to some inefficiency in transmission and distribution system, actions to decrease energy losses in this sector in the Republic of Azerbaijan will be taken, the existing power plants will be upgraded and brought up to modern requirements. By taking into account the efficiency indicators of economic entities, the government will also consider adjusting tariffs so they reflect costs.

7.3.1. Priority3.1. Increase the efficiency of power stations and use the existing potential efficiently

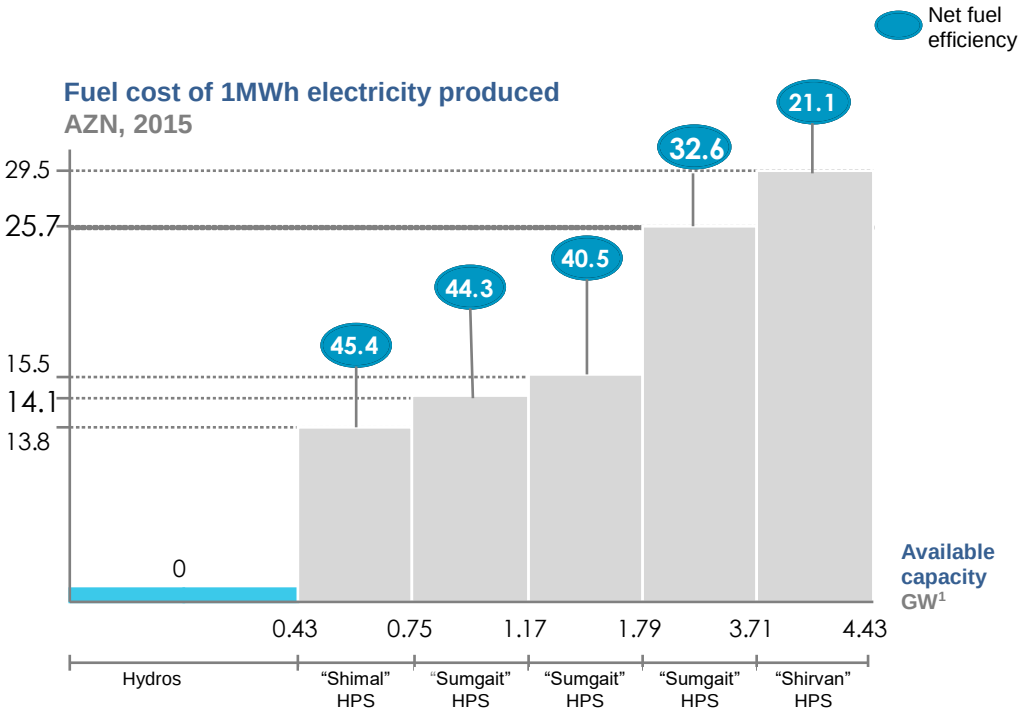
Rationale

The efficiency of Azerbaijan's generation plants has room for improvement.

To determine the efficiency of electricity generation facilities, Azerbaijan could use three factors: net fuel efficiency (amount of energy required to generate each kWh of electricity), internal consumption, and operational and maintenance costs.

Net fuel efficiency provides an overview of Azerbaijan's existing power plants and how they compare with industry benchmarks, helping to determine where opportunities exist for efficiency improvements. Net fuel efficiency also offers a lens through which to assess power plant generation programs and set priorities to lower the average fuel costs for the country's electricity generation portfolio. For example, in 2015, electricity produced by Şimal power station cost AZN 13.8 per megawatt hour compared with Şirvan's cost of AZN 29.5 per megawatt hour(diagram10).Net fuel efficiency may be used to establish improvement potential in the indicators of other fuel sources.

Diagram 10. Net fuel efficiency of power stations

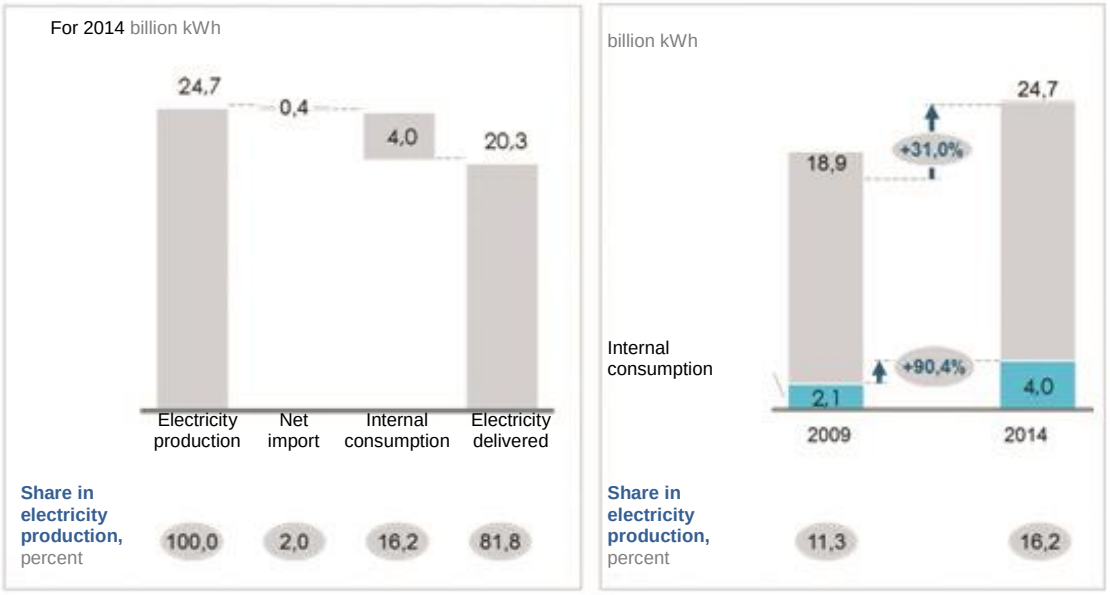


1. Existing potential defines generation capacity based on load factors.
Source: "Azerenergy" OJSC

One of the important causes of energy loss is internal consumption (the amount of energy that power plants use in the production of electricity). Analysis indicates that the amount of energy consumed internally at Azerbaijan's power plants is on rise and growing at a faster rate than total energy production.

From 2009 to 2014, total energy production increased by 32 percent, but internal consumption rose by 90,4 percent (diagram 11). As a result, internal consumption accounted for 16.2 percent of the total amount of energy produced in 2014, which is a rise of 4,9 percent from 2009.

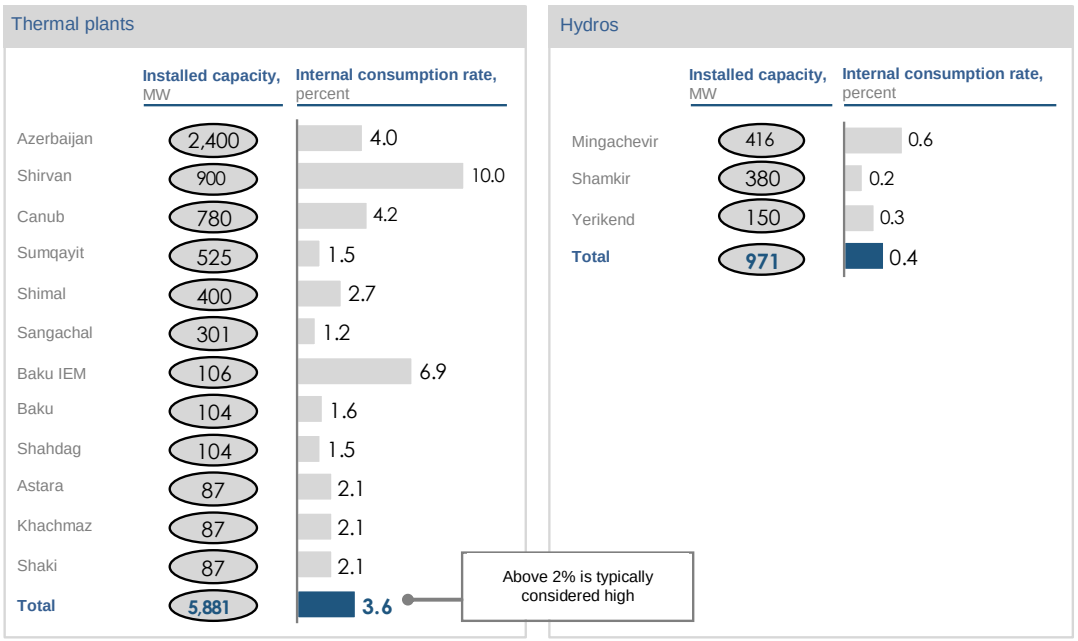
Diagram11.Internal use of electricity at power stations



Source: State Statistics Committee of the Republic of Azerbaijan

Internal consumption rates at Azerbaijan's gas-fired plants are high compared with benchmarks (table3).While the average of internal consumption for all plants in the country was 3.6 percent, well beyond the generally accepted target of 2 percent. This indicator is notably high even in Shirvan thermal power station and Baku combined heat and power plant[23]. In comparison, hydro power plants have much lower consumption rates of less than 1 percent of installed capacity.[24]

Table 3.Internal consumption level at thermal and hydro power plants

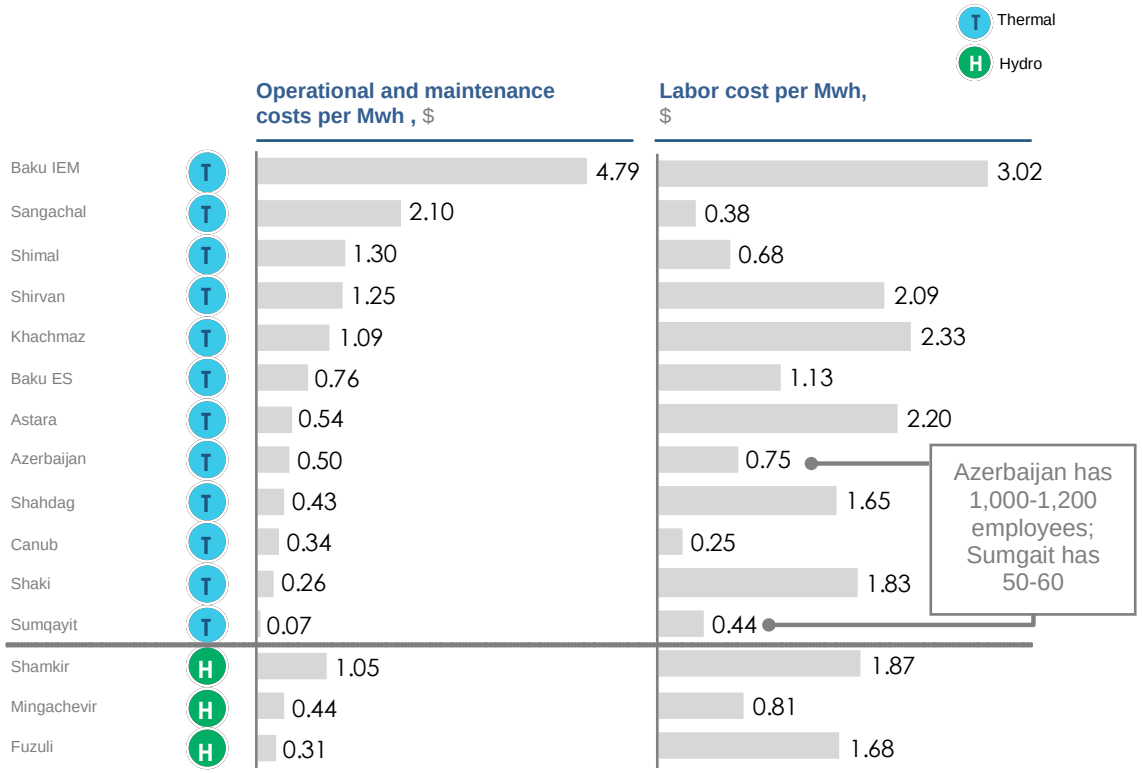


Source: "Azerenergy" OJSC

[23] Source:"Azerenergy"OJSC
[24] Source:"Azerenergy" OJSC

Similarly, operations and maintenance (O&M) and labor costs per megawatt hour differ markedly by facility (diagram 12). O&M costs include all expenditures required to keep a power plant functioning, so the size, age, and type of power plant are factors that contribute to these costs. Collectively, these costs affect the overall productivity and return on investment of power plants. The variance observed among Azerbaijan's plants demonstrates that there is significant improvement potential among plants.

.Diagram 12. Comparison of costs per MWh electricity production



Source: “Azerenergy” OJSC

Action items

Action3.1.1.Ensure the efficient utilization of power stations’ potential

Azerenergy OJSC will perform feasibility studies and analyses to identify the stations that would benefit the most from efficiency improvements by inviting experts and comparing to benchmarks, and will find out efficiency improvement levers applicable to these plants. At the same time, the Company will also consider shutting down the most inefficient plants while maintaining supply security with new higher efficiency plants. In order to minimize the potential negative impact of efficiency upgrade processes on the electricity generation capacity of the country, it will determine the periods most suitable for improvement works in accordance with a phasing schedule of when new electricity stations start operations.

Action3.1.2.Consider the privatization potential of power stations

“Azerenergy” OJSC, Energy Ministry of the Republic of Azerbaijan and other relevant bodies will consider the options to privatize the optimal set of electricity plants with efficiency investment requirements being a part of privatization terms. If opted for the privatization route, it will consult with relevant governmental bodies and determine strategically important assets that will not be subject to privatization.

Action 3.1.3.Announce tender to select investors

"Azerenergy" OJSC and the Ministry of Energy of the Republic of Azerbaijan will announce a tender for modernization with clear set out criteria based on which the vendor or investor will be chosen. They will also establish relevant KPIs (key performance indicators) and monitor the management (implementation of performance-based regulation for private sector participants). Then, they will commence the upgrade works with the supplier chosen from the tender or the private party and leverage performance management tools to monitor work progress.

Expected results and indicators

As a result of implementing this priority, AZN 70 million direct and AZN 5 million indirect GDP impact by 2020 in real terms through improving natural gas plant efficiency of the existing portfolio, summing up to AZN 75 million, will be generated. This priority expects no direct employment.

Key performance indicators:

- Increase net fuel efficiency level (electricity produced divided by fuel consumed) level for selected combined-cycle gas turbine plants to 50% (currently for selected typical gas turbine plants it is 47%);
- Invest maximum USD 300 thousand modernization cost for modernizing 1 MW of natural gas plant;
- Export the saved gas (from natural gas plants) to Europe via TAP/TANAP due to efficiency increase.

The required investment

An estimated AZN 1,075 million investment would be needed for this strategic priority to modernize the current stations. Following the results of the analysis given in Action 3.2.8 of Priority 3.2, a portion of the investments assigned to this priority may be directed to Priority 3.2.

Expected risks

Financial shortage is the key risk factor on investments needed for construction – installation works.

7.3.2. Priority3.2. Minimize electricity losses, raise the quality of electricity transmission and distribution

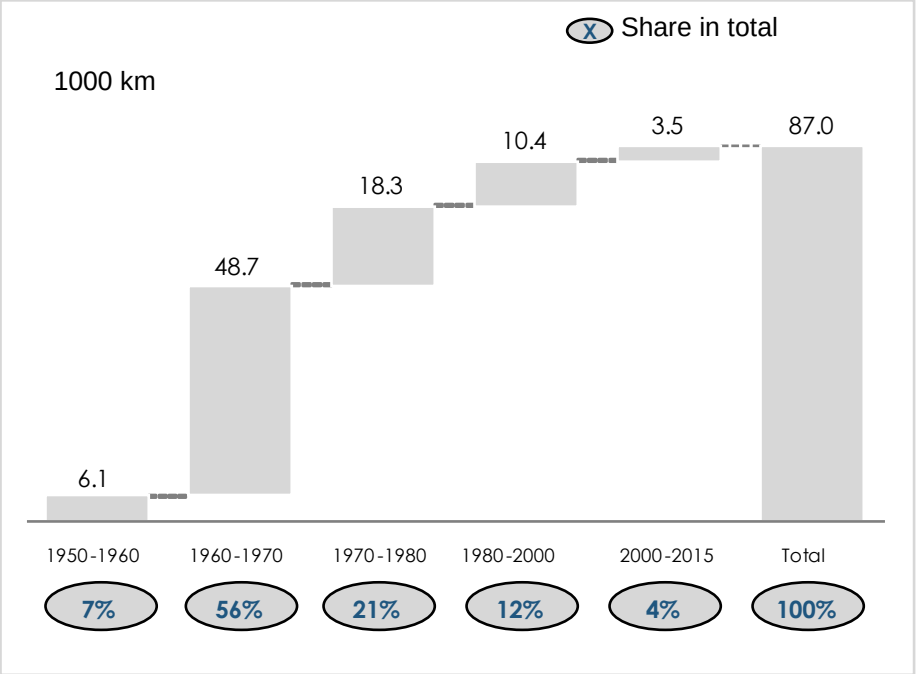
Rationale

In 2014, 13.6 percent of energy generated was lost, about 80 percent of which was lost during distribution and the rest during transmission.[25] In order to improve energy transmission quality and efficiency, it is necessary to prepare a master plan to refurbish these lines, starting with the most inefficient ones.

More than half of the electricity distribution lines in Azerbaijan are more than 45 years old (diagram 13). Outdated transmission and distribution infrastructure is less efficient in delivering electricity from the generation facility to end users.

[25] Source: State Statistics Committee of the Republic of Azerbaijan

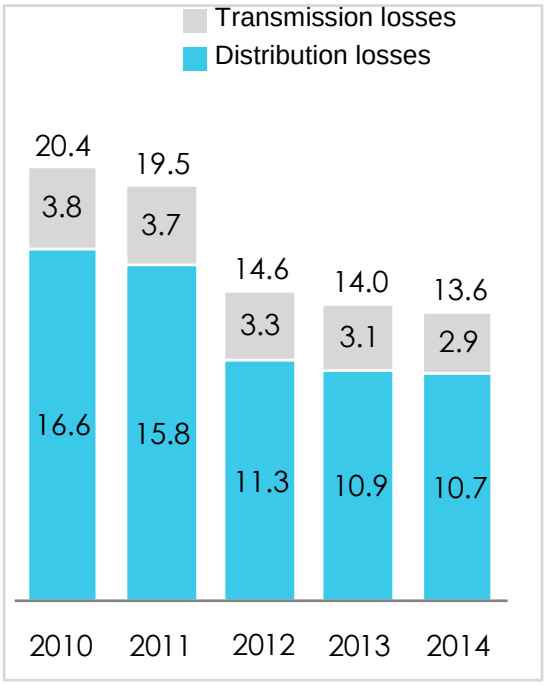
Diagram 13. Lifespan of the existing electricity transmission lines



Source: "Azerishig" OJSC

Despite the aging of its overall infrastructure network, Azerbaijan has made progress in reducing electricity transmission and distribution losses. From 2010 to 2014, these losses declined from 20.4 percent to 13.6 percent of total energy generated (diagram 14).

Diagram 14. Losses in electricity transmission and distribution (percent)



Note: Commercial and technical losses are included
Source: State Statistics Committee of the Republic of Azerbaijan; World Bank

Technical loss level in electricity transmission grids fell by 9,9 percent in January-September 2016 as a result of performing the works related to the first stage of the programs implemented by “Azerishig” OJSC.[26]

Nevertheless, there is a need for the reconstruction and upgrade of outdated 110 kW and 35 kW substations, electricity transmission lines, including also 110 kW and 35-20 kW elevated and cable lines around the Republic starting with the most inefficient ones.[27] Therefore, plans are in place to set up Smart Grid to fully transmit and efficiently distribute generated electricity to end-users by using advanced information and communication technologies.

It is also considered necessary to perform works in the electricity networks to meet potential demand for electricity resulting from the construction of the new Metro stations, the site around Fizuli square, new residential complexes, “White City” project in Baku city, and social buildings in the Republic (with total capacity approx. 3590 MW).[28]

“Azerishig” OJSC will consider building a Network Automated Management System (NAMS) on the electronic map in order to create a single information bank on transmission and distribution networks, analyze material – technical balance in this information bank, hold different surveys, compile a prospective plan, draft annual schedules, and select equipment suitable for the climatic map of the newly run or upgraded lines.

As a result of these efforts, end-users will be supplied with uninterrupted and high-quality electrical energy, the electricity losses in the network will be minimized, networks will be effectively operated, and controlled. In this direction, “Azerishig” OJSC will identify financing sources to continue incremental refurbishment and upgrades on distribution networks in the mid -term and complete the actions.

Action items

Action3.2.1.Define implementation mechanisms to increase efficiency

“Azerenergy” OJSC and “Azerishig” OJSC will conduct a comparative analysis of efficiency and quality levels across the regions, identify the areas causing most losses, investigate electricity transmission and distribution networks, study international practices as well as establish a working group of experts and relevant regulatory bodies at the initial phase to define implementation mechanisms in these directions and take appropriate action steps to determine efficiency enhancement opportunities.

Action 3.2.2.Prepare a master plan for upgrade works

Azerenergy OJSC and Azerishiq OJSC will prepare a master plan for the upgrade works with clearly defined intervals of which areas are upgraded in a particular year by leveraging existing upgrade and expansion plans of Azerisiq OJSC and Azerenergy OJSC (such as Yashma-Darband 330kV, Shimal-Zabrat 220 kV, upgrading or construction of various 110 kV substations). Then, based on the public-private partnership model, they will determine the parties responsible for upgrade works by prioritizing the areas with the biggest losses and setting clear KPIs and targets. Last, they will announce tender and commence upgrade works and constantly monitor the progress of the upgrade against the master plan

[26] Source: “Azerishig” OJSC
[27] Source: “Azerishig” OJSC
[28] Source: “Azerishig” OJSC

Action 3.2.3. Apply key performance indicators (KPI) that monitor the quality of electricity transmission

Azerenergy OJSC and Azerishiq OJSC will introduce power quality tracking KPIs for consumers, especially for industrial facilities having load fluctuations such as steel producers (where necessary, for both transmission and distribution lines). Through these KPIs, they will monitor for loss management and apply the monitoring system.

Action 3.2.4. Meter installation to minimize losses

Azerishiq OJSC will increase the meter installation works to minimize commercial losses. When necessary, the Company will organize monitoring to identify the biggest of losses and reconcile the data from meters.

Action 3.2.5. Perform works in electricity networks to meet the demand for electric energy

“Azerishig” OJSC will continue necessary expansion and refurbishment works in electricity networks in order to meet the demand for electricity due to the efforts in construction works and agricultural development in the Republic (with installed capacity 3590 MW).

Action 3.2.6. Improve the electricity transmission and distribution system

Round charts with minimum voltage level 220 kW will be considered for carrying the available electricity from one source to another and network 110 kW will be used for transmission in Baku city.

If additional investments are required for electricity transmission lines, “Azerishig” OJSC and “Azerishig” OJSC will perform analyses to identify the areas with the largest number of deficiencies observed, carry out modernization works by prioritizing these areas with deficiencies, and draft a comprehensive master plan. If the areas with deficiencies are located outside the country’s boundaries (such as Georgia), decisions will be made jointly with relevant government entities regarding the works to be performed in such areas and financing sources for them. “Azerenergy” OJSC and “Azerishig” OJSC will announce open tenders, select a contractor, and start modernization works.

“Azerishig” OJSC will continue works on reconstructing and upgrading the outdated substations and electricity transmission lines, starting with the most inefficient ones in the Republic.

Action3.2.7. Create a data bank for transmission and distribution network

“Azerishig” OJSC will consider a Network Automated Management System based on an electronic map to enhance operational efficiency of the networks.

Action 3.2.8.Public communication on losses

“Azerenergy” OJSC and “Azerishig” OJSC will communicate to public the targets and results of loss minimization efforts. They will also decide on the form and content of such public communication.

Priority 3.2.9.Prioritize loss minimization projects

Limited budget capabilities of relevant bodies may create restricted choice in implementing electricity generation, transmission, and distribution projects. In this case, dividing the works on energy loss minimization efforts (including also priorities 3.1 and 3.2) across different projects,

including also separate analysis and feasibility study of each component, will be considered. Furthermore, investment requirements for each of these projects will be studied and a profit & loss analysis will be conducted. The projects with the highest indicators will be prioritized.

Expected results and indicators

As a result of this priority, it is estimated that AZN 24 million direct and AZN 1 million AZN indirect GDP impact in real terms in 2020, summing up to total AZN 25 million growth, will be generated by minimizing technical and commercial losses in the electricity transmission lines of the Republic of Azerbaijan. This priority does not have any direct impact on new job opportunities.

Key performance indicators:

- Reduce technical loss levels in Baku from 8,5 to 7 percent[29] (close to the European benchmarks);
- Reduce technical loss levels by 8 percent in the regions.

Required investment

It is forecasted that approx. AZN 400 million capital investment is needed to run or upgrade electricity transmission and distribution lines directly to achieve the above results. Based on the analysis results shown in action 3.2.9 of this priority, part of the investments assigned under this priority may be directed to Priority 3.1.

"Azerishig" OJSC and "Azerenergy" OJSC have also developed another independent investment program that will help to further minimize electricity losses.

Expected risks

Financing bottlenecks are primary risk factors with regard to the capital investments needed for construction – installation works.

7.3.3. Priority3.3. Use optimal mechanisms to raise efficiency in consumption

Rationale

Low electricity prices act as one of the factors slowing down the stimulation of responsible consumption and efficiency. Tariff regulation matters may be addressed in order to enhance efficiency in electricity generation. In general, when tariffs are regulated, it is necessary to apply optimal prices not only by taking into account the costs associated with income generation but also considering such factors as matching consumer and generator interests, providing favorable conditions for dynamic and intensive economic development, utilizing resources purposefully and efficiently, increasing budgetary revenues, lifting subsidies and subventions incrementally, purchasing power of the population, supply and demand levels, domestic production terms and conditions of goods (works, services), world market prices etc.

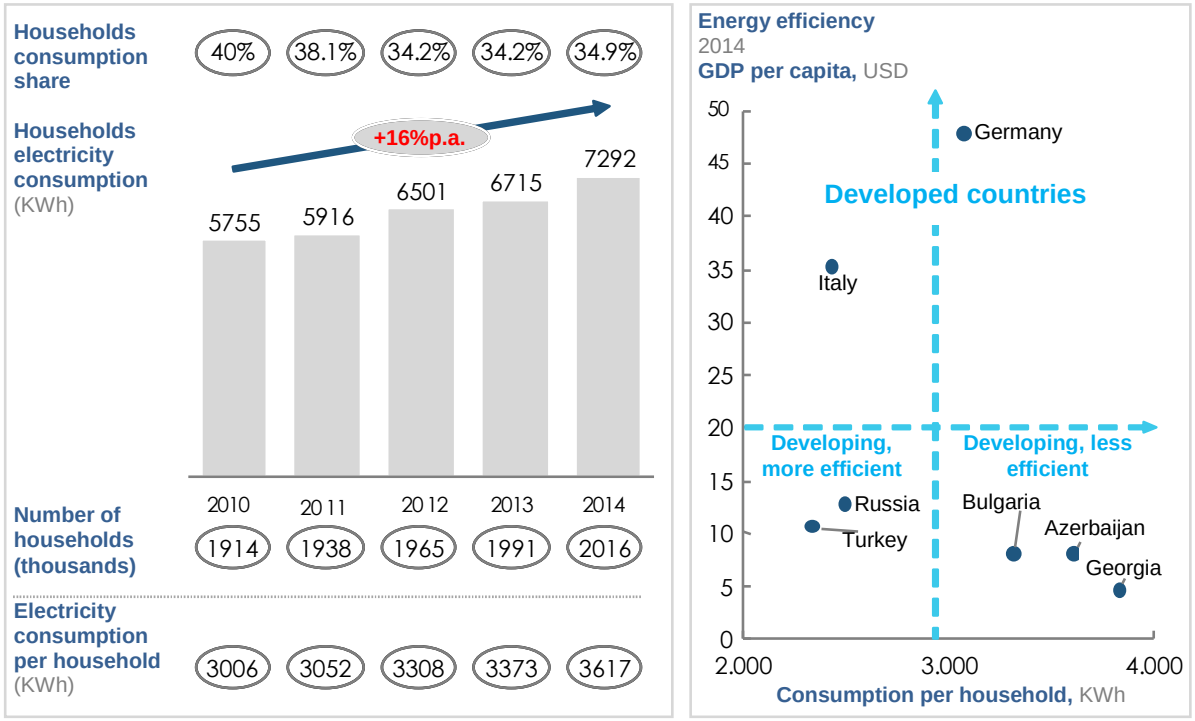
Due attention to the below-stated items relating to addressing such limitations as lower consumer prices impacting energy consumption, granting privileges for some industrial sectors, lack of tariff differentiation depending on the time of the day and volume, including the failure to enforce certification requirements at buildings, transport and household

[29] Source:"Azerenergy" OJSC

equipment in the Republic of Azerbaijan may create conditions for using electricity more efficiently.

1. End – user prices. While the energy consumption of households in the Republic of Azerbaijan was 5755 million kW in 2010, this figure rose to 7292 million kW in 2014 (up to 7938 million kW in 2015), which means 6 percent increase per annum over that period. Meanwhile, the total number of household increased very slightly (diagram 15). The volume of electricity consumed by population in the Republic of Azerbaijan is higher relative to both emerging and developed countries.

Diagram 15. Energy consumption level of population

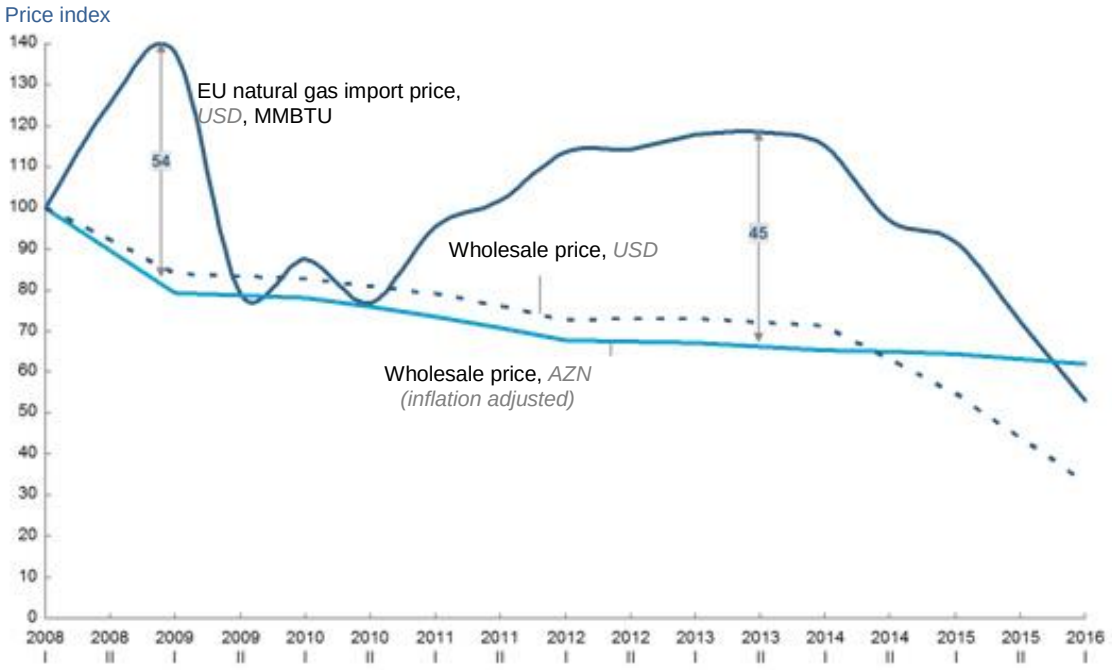


Source: State Statistics Committee of the Republic of Azerbaijan, World Bank, World Energy Agency

Lower consumer prices in Azerbaijan relative to benchmark countries are one of the reasons for increase in consumption. In particular, this price has sharply dropped after devaluation of AZN exchange rate.

2. Pricing levers not reflecting expenses. Government subsidies are needed as long as the energy prices in the Republic of Azerbaijan do not reflect generation, transmission, and distribution costs (Graph 2).

Graph 2. Impact of natural gas price change in the world's market on Azerbaijan's wholesale prices



Source: "Azerenergy" OJSC

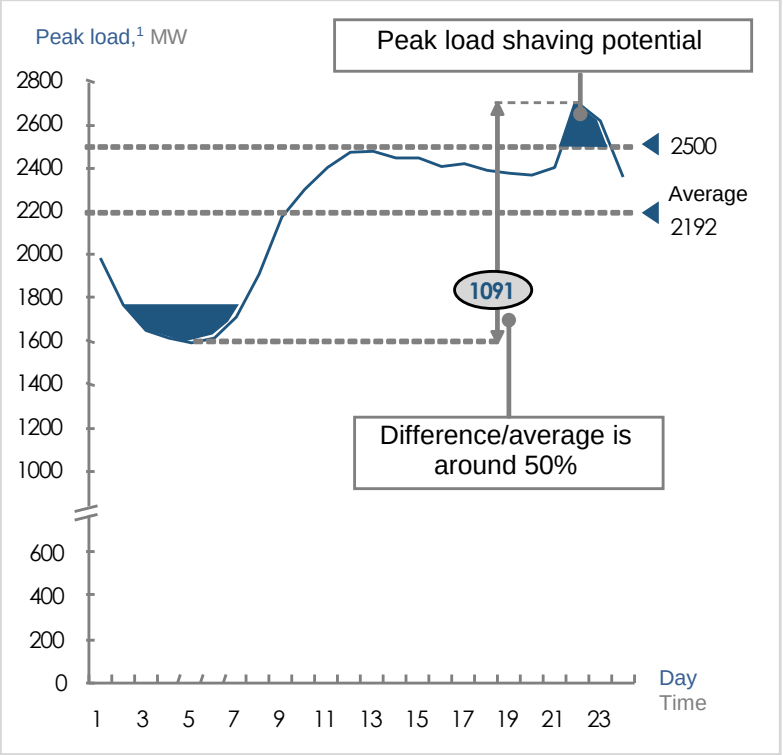
Azerbaijan's transmission and distribution margins do not reflect actual production costs. Compared with Russia and Turkey, Azerbaijan's levies for transmission and distribution are smaller as a percentage of generation costs. This level of subsidies isn't sustainable over the long term, as it doesn't provide enough of a margin for further infrastructure upgrades.

3. High discounts for some industrial sectors. As with household electricity prices, the price of electricity for industry is lower for a number of industrial enterprises (steel and aluminum production) than that of benchmark countries. The price that industry in Azerbaijan pays for electricity is 73 percent lower than the price in Turkey and less than half the price in Russia (here the electricity prices in force by December 01 2016 were assumed for Azerbaijan).[30] On the other hand, keeping strategic discounts for certain industries (for examples, those industries with supply security risk or that are particularly large employers) is critical to ensure Azerbaijan's competitiveness with lower energy prices.

4. Lack of tariff differentiation by time of day. In countries around the world, it is standard practice for utilities to alter the price of electricity based on demand. Azerbaijan does not differentiate its prices throughout the day, resulting in an inefficient demand – supply balance (Diagram3). Adjusting prices for these times would smooth the daily load curve and decrease peak load by creating an incentive to use electricity when it is less expensive, thus lessening the need for added capacity investments.

[30] Source: Enerdata and "Azerenergy" OJSC

Graph3. Impact of day/night tariff on daily load



1. Peak load in June17,2015
Source: "Azerenergy "OJSC

Turkey has implemented a tariff that adjusts prices throughout the day. Electricity prices are lowest in the middle of the night and highest during "peak load" time (approximately 17:00 to 22:00).

5. Lack of tariff based on infrastructure building costs. In addition to a lack of price differentiation by time of day, the Republic of Azerbaijan does not currently use prices that are based on infrastructure building costs, leading to hidden subsidies for some users. Prices that are based on infrastructure building costs are used to avoid a mismatch between costs of infrastructure building and consumption prices

Action items

Action3.3.1. Consider fixing optimal prices to match consumer and producer interests

Related bodies will determine the average cost for creating the national energy portfolio and set a price that is favorable both to consumers and producers by considering the following sub-actions:

- Consider introducing a cost – effective tariff (no subsidization on electricity prices);
- Form a team of experts and consultants to perform international benchmarking of end-user tariffs considering purchasing parity indices;
- Introduce a two-level tariff system for households, fix consumption limits to which tariffs will apply and proper tariffs on these scales;
- Keep end-user prices unchanged for low-income user categories when considering the reduction of discounts for certain industries, price differentiation by time of day, and application of prices basing on infrastructure building costs;
- Introduce electricity tariffs for different times of day (day – night) to decrease peak load;

- Determine additional charges to electricity to avoid mismatch between allocated capacity and consumption;
- Develop proposals to increase the efficiency of reactive energy use.

Action 3.3.2.Discuss electricity use models

Related bodies will hold discussions with the representatives of key industry players to understand their electricity usage patterns and demands. Additionally, through discussions with other government bodies, they will identify strategically important industries that may suffer from higher electricity costs and consider incentive measures to protect these industries (such as additional discounts on strategic industries having high electricity consumption).

Action 3.3.3. Consider user consumption forecasts

Related bodies will analyze changes in electricity consumption patterns due to tariff changes and re-consider future electricity consumption forecasts to better determine domestic demand increase. If changes in the pricing schemes lead to significant excess capacity due to decrease in domestic consumption, they will consider opportunities for additional electricity exports.

Expected results and indicators

As a result of implementing this priority, it is estimated that the Republic of Azerbaijan will generate AZN 125 million direct and AZN 45 million indirect GDP impact in real terms by 2020 through enhancing efficiency in consumption, summing up to AZN 170 million. The implementation of this priority has no direct employment impact.

Key performance indicators are:

- Export the saved gas due to Europe via TAP/TANAP due to efficiency increase in electricity consumption.

The required investment

No investment is needed for this priority

Expected risks

- increased cases of user evasion from payments as a result of increased end-user tariffs;
- sharp reduction in the exporting price of natural gas which is saved due to efficiency increase in electricity consumption.

7.3.4. Priority 3.4. Create effective regulation and auction mechanisms

Rationale

Improvement in the current legislative base is considered one of the major steps taken to develop electricity sector in many countries. In this respect, given that all the links in the value chain from production to consumption in electricity sector is owned and regulated by the government, a number of necessary steps to privatize the energy sector and attract additional investments may largely benefit the country.

Action items

Action 3.4.1. Improve the main regulatory law and other related documentation in electric energy sector

The Republic of Azerbaijan will revise major laws in the sector by defining the legal bases of generation, transmission, distribution, purchase – sale in the electric energy sector, including also rights and duties of producers, suppliers, consumers, and envisioning a systemic approach towards launching the enablers of operative and sustainable development of the sector, by considering international practices and specifics of the national economy. In this case, the financial sources for additional costs (free of charge meter installation and etc.) borne by distributors will be clarified.

Action 3.4.2.Create a wholesale market

By creating a wholesale electricity market, even larger investments will be attracted to this sector.

Action3.4.3.Prioritize generation assets to realize privatization

Generation assets will be prioritized for selective privatization. First, a substantiated analysis of selected facilities with the involvement of experts will be conducted and efficiency improvement potential will be simulated in order to determine prices that reflect costs. During privatization, the strategic importance of potential assets (for example, retaining state ownership of Azerbaijan thermal power plant with a capacity of 2,400 MW for energy security purposes) will be taken into consideration.

Action 3.4.4. Prepare public – private partnership mechanisms

New mechanisms with public – private – partnership (PPP) agreements to attract new investment in energy generation will be developed. First, “built-operate-transfer” model will be leveraged; second, new mechanisms such as feed-in-tariffs, auctions (especially in the financing of renewable energy sectors) will be used.

Expected results and indicators

Establishing a new improved legal framework, implementing liberalization in the sector and preparing mechanisms for sectorial public-private partnership are key enablers for the development of the electric energy sector. The implementation of this priority has no direct GDP and employment impact.

The requirement investment

There is no required investment to achieve this priority.

Expected risks

The increase of end – user tariffs may lead to increased end-user evasions from payments and generally, reduced collection levels.

GAS SUPPLY

The Republic of Azerbaijan is one of the major natural gas producing countries. This resource is a key asset for economic development (in the form of exports), business activity and residential use. By pursuing targeted priorities, maintaining a plentiful reserve margin will be ensured alongside uninterrupted and safe natural gas supply to the population.

7.4. Strategic target 4. Create an efficient and effective gas distribution infrastructure

The Republic of Azerbaijan is a natural gas producing country. This asset is of crucial importance in terms of economic development, employment and residential use. By

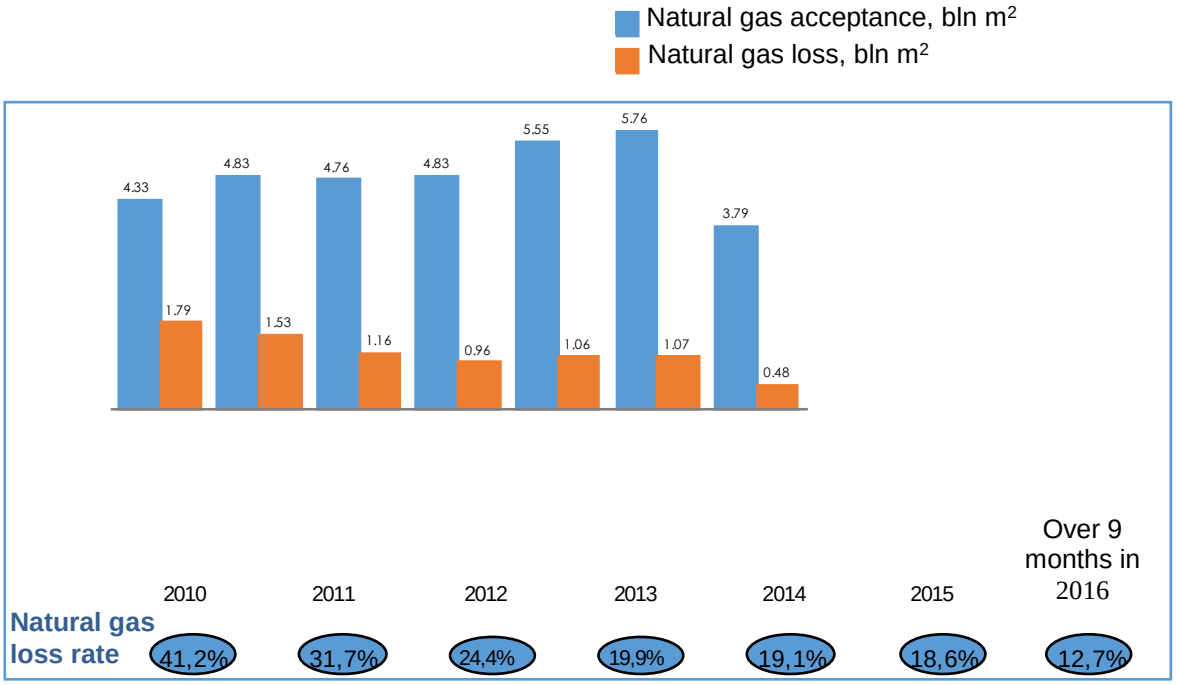
implementing priorities that build on the advantages of natural gas availability, Azerbaijan will ensure that this asset is durable and gas supply to commercial users, industry and households is sustainable.

7.4.1. Priority 4.1. Minimize all types of losses related to natural gas distribution

Rationale

Considerable part of the existing gas supply system in Azerbaijan comprises the network built in 1960-1980 based on the standards available in the former Soviet Union and therefore volume of annual natural gas losses is large. Dynamic growth in natural gas demand of households and industry have speeded up gas service installation recently, mismatch between the existing capacity and growing demand have led to much difficulty in regulating natural gas supply regimes, breakdown of utilities and ultimately, considerable increase in natural gas losses. In 2015, the amount of overall natural gas distribution losses was 1,07bln m3. Although this loss level was lower than respective indicator five years before, it made 18,6 percent of natural gas volumes bought by “Azerigaz” PU in 2015 (exhibit 16). Also, loss level as a result of January-September 2016 amounted to 12,7 percent.

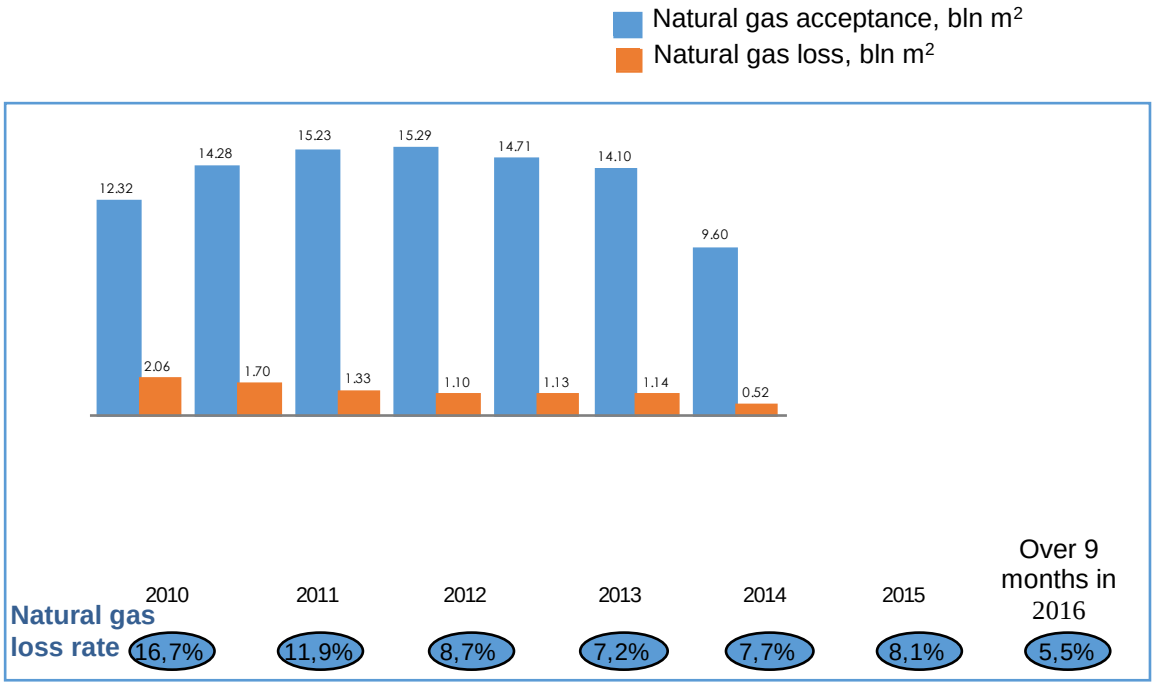
Diagram 16. Natural gas acceptance and loss in domestic gas distribution network



Source:“Azerigaz”PU

The natural gas loss in the main and distribution networksof the State Oil Company of Azerbaijan Republic (SOCAR) in 2010 was 16,7%, 8,1% in 2015, and 5,5% in January – September 2016 (exhibit17).

Exhibit 17. Natural gas intake and loss in domestic main and distribution gas networks

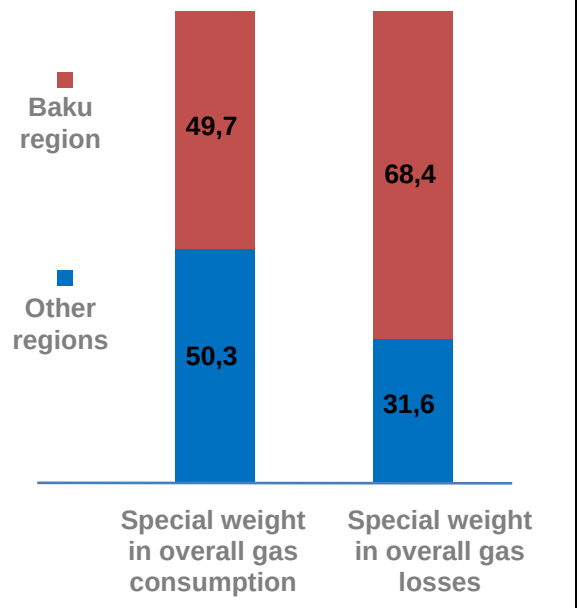


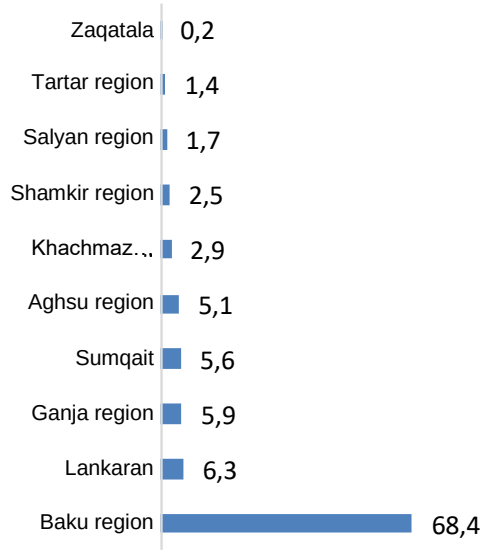
Source:«Azerigaz»PU

In general, the vast majority of the gas loss occurs in the Baku region. Thus, 49,7 percent of the country's overall natural gas consumption in January to August 2016, including also 68,4 percent of the losses in gas supply were accounted for by the Baku region (table 4).

Table 4.The main regions where technical losses occur *(January – August 2016, percent)*

January-august2016





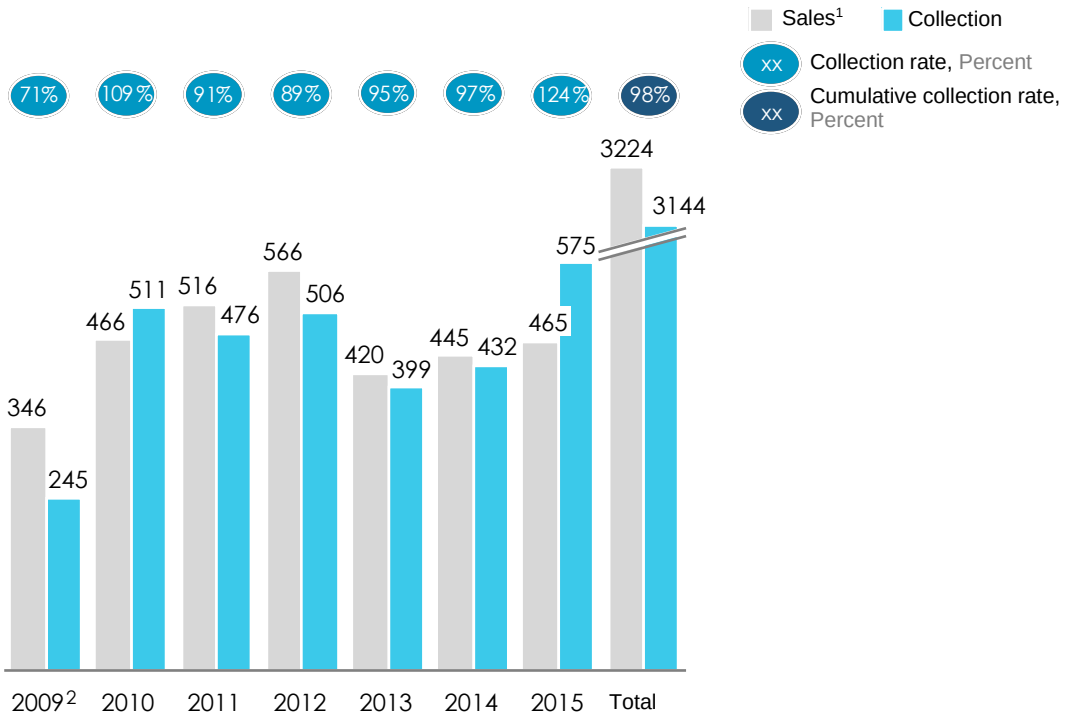
Source:"Azerigaz" PU

Natural gas losses in the Republic of Azerbaijan are classified under two groups: technical losses and commercial losses.

Natural gas losses in the country are due to technical problems and, particularly, outdated infrastructure. Natural gas supply in Baku and Absheron regions has been carried out through gas pipelines with more than 40 years of service life, which lead to gas losses, including leakages, more than 1,1 bln m3 in this region in 2015. To reduce technical losses particularly in Baku region, capital investments will be made to upgrade outdated and complex infrastructure and eliminate inefficiencies in pressure levels. Besides, outdated network and its technical condition cause the violation of safety requirements and negative impacts on environment. It is impossible to supply natural gas demand only by expanding the network. In this direction, implementing program on upgrading and refurbishment of country's natural gas distribution network to international standards will help to meet the dynamically growing demand for natural gas in the country, ensure that end-users are supplied with natural gas in an uninterrupted and reliable manner, decrease losses to the level of technical requirements, increase service level, minimize maintenance costs and lay the foundation for reducing negative environmental impacts.

Collection levels have increased as compared to previous years in the Republic. Thus, although the collection rate on the value of sold natural gas was substantially low in 2009, this gap in collection levels was largely closed in the subsequent years (diagram 18). Thanks to the collection of consumers debts accumulated in previous years and penetration of "smart" gas meters, the collection rate in 2015 outpaced the sales value due to prepayments for the gas volumes to be consumed.

Diagram 18. Tendency of collection rates in2009-2015
(mln AZN)



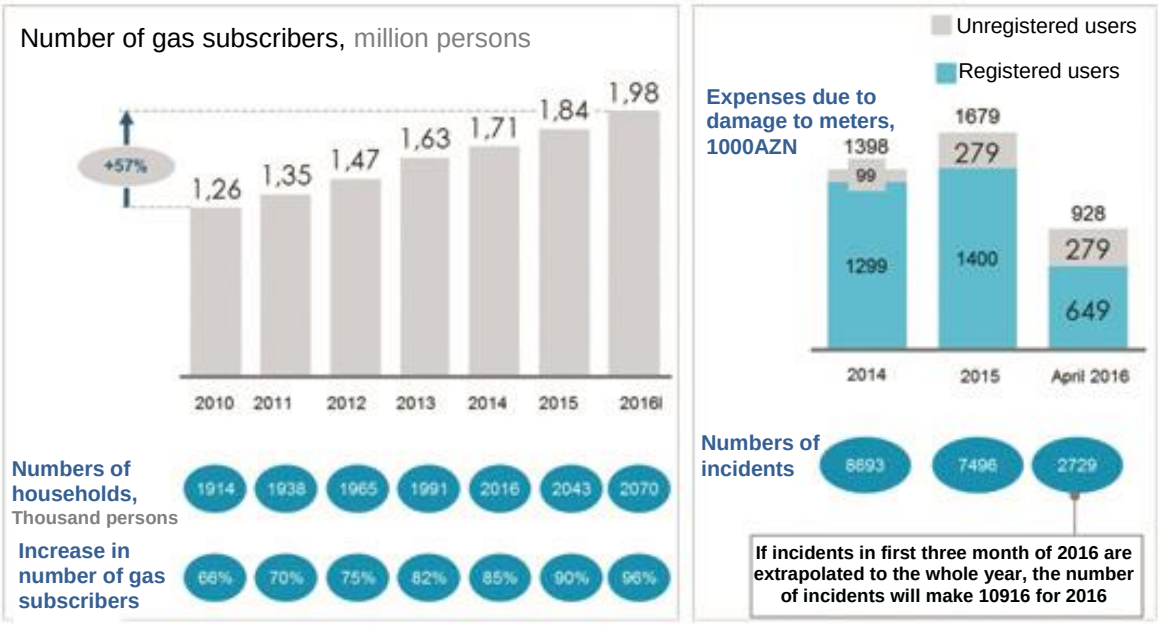
1 Both sales and collection rates include VAT.
2 Debt liabilities totaling AZN *436mln has been written off twice.*

Source:"Azerigaz"PU

As compared to 2010, increase in the volumes of natural gas sales markedly increased due to 57 percent growth in forecasted user levels registered by the end of 2016 (exhibit 19).

Nevertheless, there is still problem relating to meter penetration. It is therefore necessary to apply additional mechanisms to protect gas meters and mitigate commercial losses (applying new penalties for illegal use of gas and etc.).

Diagram 19. Costs incurred due to damage to gas meters



Source:“Azerigaz” PU, SOCAR annual report2014

Action items

Action 4.1.1. Detailed assessment and preparation development plan for the existing network

SOCAR “Azerigaz” PU will first perform a detailed assessment of the existing gas distribution channels to determine the regions with the highest amount of leakages / losses. Based on the results of this assessment, Azerigaz will develop a matrix and group regions by two criteria – cost of modernization and the level of losses as well as prepare a development plan for the enterprise. Then it will build a master plan for the expansion of gas distribution network to underpenetrated areas and modernization. It is also critical to prioritize the matrix of Baku and the regions by high level of loss or low cost groups. Make major investments in the Baku region to prevent technical losses and fix penalties for illegal gas usages to raise collection rates will be considered.

Furthermore, proper measures need to be taken to purify the natural gas transmitted to the network in order to fully align the quality indicators of the natural gas, which is fed into the country’s gas distribution system, with international benchmarks, minimize negative influences on the system’s technical condition, and build up user satisfaction.

Action 4.1.2. Announce tenders for the construction of gas distribution lines

After the financing sources are determined, SOCAR “Azerigaz” PU will announce tenders covering metrics that enable to select a supplier for the construction of gas pipelines and monitor construction works. State Committee on Property Issues, in partnership with SOCAR, will consider the involvement of foreign investors as one of the possible options of financing in order to privatize gas distribution work in several regions.

Action 4.1.3. Determine key performance indicators (KPI) relating to construction activity

SOCAR “Azerigaz” PU will incorporate compliance with KPI relating to construction work into the master plan. Also, SOCAR “Azerigaz” PU will continuously control the progress of the construction works according to defined targets.

Action4.1.4.Consider maximizing collection rates and enforcing penalties against illegal gas usage

International experience of benchmark countries will be studied and proper legislative amendments will be considered to enforce penalties against illegal gas usage aiming to maximize collection rate. Furthermore, The Republic of Azerbaijan will attract finances by taking efforts that aim to ensure long-term success in natural gas supply sector and generate more value add from it.

Action4.1.5.Implementalternative supply sources to remote residential settlements where gas service installation is inefficient from a feasibility point of view

Studies will be performed and specific draft proposals will be made on the efficiency of gas supply to remote residences, international experience in this area and problem solution ways will be analyzed, including also alternative energy supply to residences which gas service installation is inefficient from a feasibility point of view.

Expected results and indicators

As part of this priority, it is estimated that the Republic of Azerbaijan will generate AZN 85 million direct and AZN 5 million indirect GDP impact in real terms by 2020, summing up to AZN 90 million thanks to the reduction of natural gas distribution losses and will create 340 new jobs.

Key performance indicators:

- Reduce the technical loss level in natural gas distribution across all regions to 8 percent (if the loss level in any region is below 8 percent, it is assumed that this will remain on the same level);
- Improve the natural gas supply system by upgrading it to the requirements of international standards;
- Ensure a reliable supply to meet a dynamically growing user demand for natural gas;
- Ease the forecasting of natural gas consumption and identify the assumed loss in the network as soon as possible;
- Eliminate any serious technical problems in natural gas supply;
- Export natural gas to Europe via TAP/TANAP projects, the natural gas saved due to increased efficiency in consumption (from natural gas plants).

Required investment

As part of this priority, it is forecasted that AZN 1,515 million investment will be needed to upgrade outdated pipelines or build new ones. A new investment project has also been developed to help SOCAR “Azerigaz” PU to achieve additional results in natural gas distribution. This program will have a separate feasibility analysis.

Expected risks

- financing problems in investments needed for construction-installation works;
- technical difficulties that are likely to emerge when actions are implemented;

- sharp decrease in the export price of natural gas saved due to increased efficiency in consumption

WATER SUPPLY AND WASTE WATERS

Given that more than 70 percent of surface waters originate from trans-boundary water flows, efficient utilization and protection of unequally distributed limited water reserves in internal water basins is one of the key tasks ahead.[31]

Necessary actions will be taken by improving the record-keeping and utilization of water reserves, responsible management of this valuable natural wealth, supplying uninterrupted and high-quality water to end-users and generally, creating updated regulatory – legal framework towards increased efficiency in the management of water economy.

As a result of the efforts made, the Republic of Azerbaijan will create an effective water supply system through clean and waste water infrastructure expansion as well as increased efficiency of supply and consumption.

7.5. Strategic target5. Create a top-notch water management infrastructure

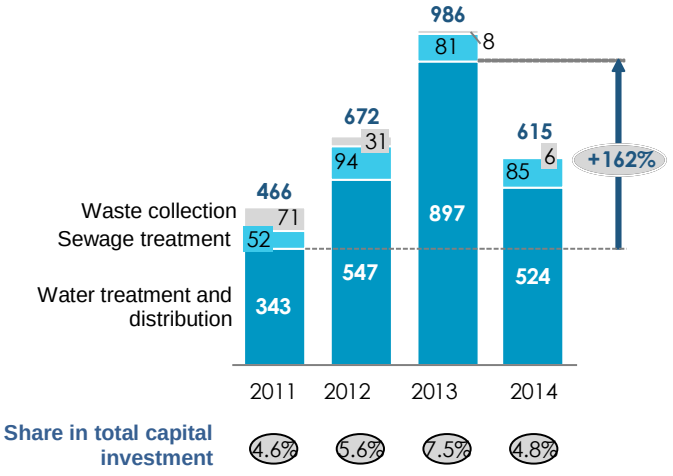
7.5.1. Priority 5.1. Expand clean and waste water infrastructure penetration

Rationale

From 2011 to 2014, the government made significant investments in upgrading the facilities and management of water and sewerage services. A total of AZN 2,7 billion was allocated to water treatment and distribution alone during this period[32] (diagram20).In 2013, the amount of investments from state funds to clean and waste water network made 9,8 percent of its total capital investment.[33]

In 2013, investments in clean and waste water network from state funds accounted for 99,8 percent of the domestic funds allocated to this area.[34]

Diagram 20. Investments to water infrastructure in 2011 to 2014*(AZN million)*



Source: State Statistics Committee of the Republic of Azerbaijan

[31] Source: "Azersu" OJSC
[32] Source: State Statistics Committee of the Republic of Azerbaijan
[33] Source: State Statistics Committee of the Republic of Azerbaijan
[34] Source: State Statistics Committee of the Republic of Azerbaijan

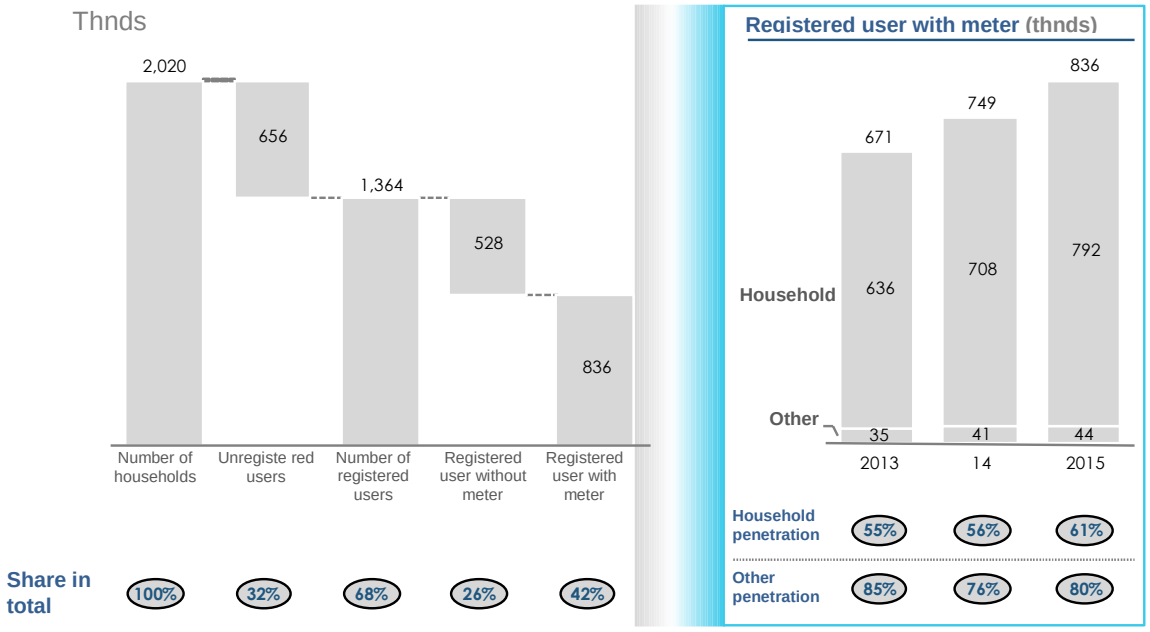
It is necessary for Azerbaijan to continue its efforts towards creation of efficient and effective water and sewerage system.

Water sector is a complex ecosystem comprising several phases and multiple stakeholders. To supply water to commercial and residential customers, it must first be extracted from sources, stored in reservoirs and then delivered to end-users through an infrastructure consisting of pipelines and other appropriate equipment. Last, the collection and treatment of waste water completes the ecosystem and also, after being cleaned, water waters are returned to the system in a safe manner.

In this direction, efficient utilization of water reserves, penetration of economical technologies in water utilization, reduced water losses, price of utilized water and other matters are very important in terms of country's sustainable water supply.

The number of users with meters and registration has increased recently thanks to the government investments in clean and waste water sector in the Republic of Azerbaijan. Thus, meter penetration level reached 61 percent in 2015 (Diagram 21). This level is 80 percent among commercial and industrial users. It has to be mentioned that the area needs improvements given that only 792,000 out of 2 million households are registered for water meters (number of households served by "Azersu" OJSC by 01.10.2016 was 1, 350 million) and that the meters for non-residential groups are installed at the expense of customers as specified by the existing law.

Diagram 21. Availability of potential for efficient water utilization



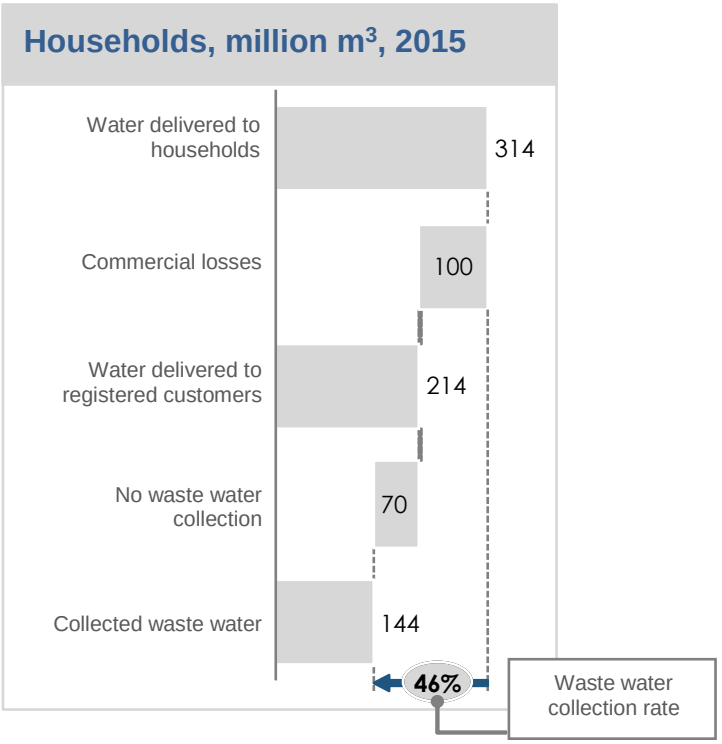
Source:"Azersu"OJSC

Despite certain upgrades in sewerage systems, these services are still below the optimal level. While 314 mln m3 waterwas sold to households in Azerbaijan in 2015, total waste water collected was only 144 mln m3, which accounts for 46 percent of the fed water (diagram 22). The remaining 54 percent is due to commercial losses and lack of the waste water collection system.[35]

[35] Soure:"Azersu" OJSC

In this regard, waste water collection levels may be upgraded. Thus, the respective indicator in Russia is 74 percent, Turkey 73 percent, Bulgaria 73 percent, and the Ukraine 65 percent.[36]

Diagram22. Waste water collection level



Source: "Azersu" OJSC, Global Water Intelligence

Action items

Action5.1.1.Assess areas without infrastructure

"Azersu" OJSC will prepare an assessment of the areas with no clean or waste water infrastructure and prepare an infrastructure master plan. "Azersu" OJSC will prioritize regions with the least cost per household and areas with the biggest need and will also involve experts to perform benchmarking studies to identify the possible costs of infrastructure investment, and add compliance with these costs into management KPIs.

Action5.1.2.Increase meter penetration and complete it for commercial groups

Azersu OJSC will organize monitoring and increase the penetration of meters among clean water users and organize monitoring (considering that the meter installation in commercial groups is installed at the expense of customers, meter installation will be fully completed for these groups of customers). The monitoring will be aimed at identifying registered water users without meters, setting concrete targets for increasing meter penetration and introducing management KPIs, deciding on the timeline and procedures for the installation of water meters and deciding on the workforce required to meet water meter penetration targets.

Action5.1.3.Announce tenders for infrastructure investment

Azersu OJSC will announce tenders for infrastructure investments and choose winners based on selection criteria, which will allow controlling the work progress, commenceto improve the

[36] Source: Global Water Intelligence

infrastructure after determining the financing sources, and constantly monitor progress against the master-plan.

Expected results and indicators

As part of this priority, it is estimated that AZN 25 million direct and AZN 15 million indirect GDP impact in real terms by 2020, summing up to AZN 40 million, will be generated. It expects no direct employment impact in this direction.

Key performance indicators:

- reduce commercial losses from 20 to 14 percent (from 670 million m^3 annual water supply of Azersu OJSC);
- increase collection rates from 46 to 65 percent (from "Azersu" OJSC3 14 million m^3 annual water supply for households);
- Reduce registered users without meters from 26 to 5 percent (with total household number 2,020 thousand).

Required investment

As part of this priority, AZN 1, 135 million investment will be needed to upgrade or build new water pipes (it is vital to conduct additional feasibility study on investment).

"Azersu" OJSC has also developed an investment program to achieve results in addition to the above-mentioned. This program includes topics such as development of the sewerage system, waste water treatment, water management, and management of underground and surface waters. The feasibility study of the program will be submitted to the government separately.

Expected risks

Shortfall in finances for the required investments for construction works is the key risk factor.

7.6. Strategic target6. Decrease losses and ensure efficiency of water supply

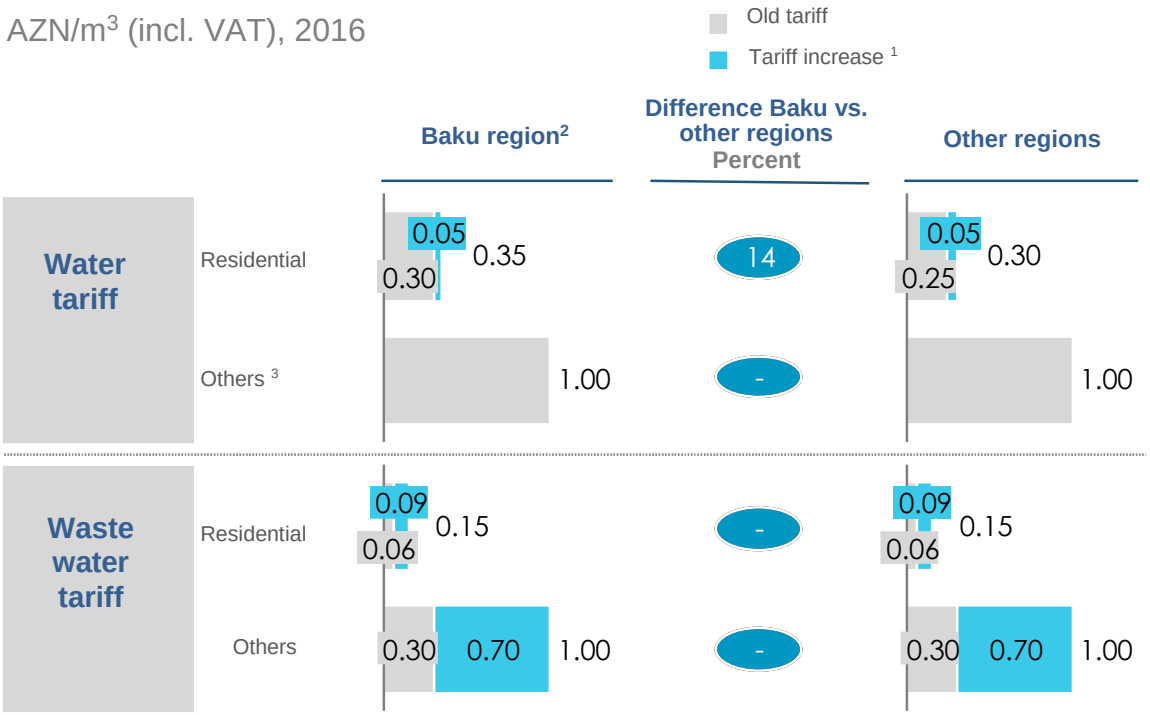
7.6.1. Priority 6.1. Promote water consumption efficiency by attracting investments in order to minimize losses, optimize water usage tariff and required infrastructure

Rationale

As with electricity and gas, the efficiency of water consumption should be improved for all consumer groups including households and industrial sectors in the Republic of Azerbaijan. To achieve this, optimal end-user pricing and targeted investments should be taken into consideration.

The Republic of Azerbaijan differentiates prices by consumer groups and regions (see table 5). Consumers in Baku and several administrative regions (Sumgait, Ganja, Mingachevir, Shirvan, Khyrdalan, and Absheron regions) pay a higher price for water—about AZN .05 per cubic meter more than their consumers in other regions. Waste water prices are consistent throughout the country, as the costs aren't driven by consumption but by the fixed costs for maintaining collection systems and infrastructure.

Table 5. Differentiation considering consumer groups and regions

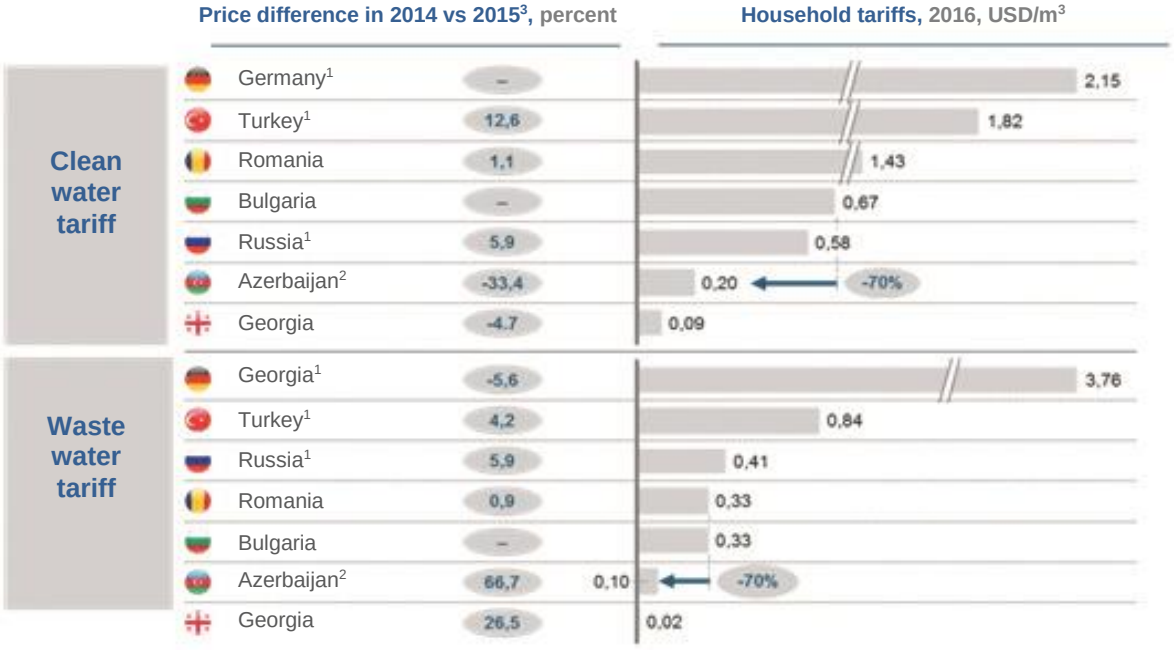


1. Based on the new tariff which has been applicable since May 13 2016
2. Baku region means Baku, Sumgait, Khyrdalan cities, and Abheron region.
3. Consumers using water as a resource (such as beer producers) pay AZN 12.0 perm3.

Source: Tariff Council of the Republic of Azerbaijan

Given particularly AZN devaluation against USD in the country, clean and waste water prices in Azerbaijan are lower than in benchmark countries (table 6).

Table 6.Comparison of clean and waste water tariffs with benchmark countries



1. Tariffs for Istanbul in Turkey, Moscow in Russia, and Berlin in Germany have bennassumed.
2. Tariffs for Baku city in Azerbaijan have been assumed (USD exchange rate of AZN is assumed as AZN 0,67 in 2014 to 2016).
3. Volatility between local currencies of the above countries and USD has been considered.

Source: Global Water Intelligence, Tariff (price) Council of the Republic of Azerbaijan

The upgrading of the existing infrastructure to supply uninterrupted and high-quality water for end – users enables preventing losses during transmission. Thus, while the level of losses in water collected from the source and delivered to end users in 2015 fell and made 52 percent as compared to 2011[37], there is a need to further improve this indicator.

Losses in water distribution to households makes up approx..30 to 32, which is higher relative to the respective indicators of benchmark countries (Turkey – 12 percent, Poland – 10 percent, Greece – 8 percent, Germany – 4 percent). The remaining losses are attributable to commercial losses, around 20 percent.[38]

Action items

Action6.1.1.Minimize losses through detailed evaluation of the network

Azersu OJSC will involve experts and perform detailed evaluation of the network to determine the reasons for technical losses and the areas with the biggest amount of losses and will take appropriate actions. It will also prepare a master plan which details the timeline and budget for the required upgrade works based on the results of the study and will involve experts to perform benchmarking studies to identify the possible costs of infrastructure upgrades, and add compliance with these costs into management KPIs.

Action6.1.2.Take actions to efficiently utilize water reserves

In order to improve the record – keeping of water reserves and their utilization in the country, determine the designation of paid water usage, implement a unified tariff policy in this sector, utilize water resources efficiently, and generally, increase the effectiveness of water management, actions will be taken to develop the country's water balance and to regulate water usage tariffs cost-efficiently along all the phases from collection of water from the source to final usage.

Action 6.1.3.Consider optimal tariff level for clean and waste water services

Relevant government body will analyze and understand consumption patterns and potential impact of the changes in tariffs, perform benchmarking studies based on the GINI index / purchasing power parity to determine the socially optimal level of prices and consider aligning the existing prices for water and sewerage with an optimal tariff level to be determined as a result of the studies. Also, it will consider introducing a two – level tariff system which will envisage that tariffs are fixed to a minimum value by consumer categories and higher tariffs (up to the level fixed by the government) are applied to the extra consumption that surpasses the threshold level. This system will envision incremental increase of the price by ensuring minimum price - setting and basing on consumption.

Action6.1.4. Prepare social programs for special user groups utilizing clean and waste water services

To determine low – income population and other strategically important consumer groups to be covered by social programs, actions will be taken towards the coordination of works with relevant government bodies. The relevant government body will pursue a tariff policy by applying discounts for user categories defined under social programs. To supply uninterrupted and quality water in long-term perspective after application of tariffs defined under above

[37] Source: "Azersu" OJSC

[38] Source: "Azersu" OJSC, Global Water Intelligence

metrics, “Azersu” OJSC will determine forecast indicators of future water utilization by considering changes in water consumption level.

Expected results and indicators

As part of this priority, it is forecasted to generate AZN 12 million direct and AZN 8 million indirect GDP impact in real terms by 2020, summing up to total of AZN 20 million due to efficiency increase in water consumption. It expects no impact on employment.

Key performance indicators:

Decrease the distribution losses of “Azersu” OJSC from 31 to 25 percent[39] (while this target is approx. 211million m^3,it is still high compared to 10 percent which is considered a benchmark[40]).

Required investment

As part of this priority, it is forecasted that AZN 845 million investment will be needed for upgrading water infrastructure.

Expected risks

Increased end – user tariffs may lead to user evasion from payment and generally, decreased collection rate.

HEAT SUPPLY

Provision of energy carriers and heat supply services on a satisfactory level as one of the key components of infrastructure demand related to rapid development of towns and regions, expansion of infrastructure network, construction and commissioning of new residences, educational and healthcare facilities, public and other social buildings in the Republic of Azerbaijan is of special importance.

Implementation of the strategic priorities defined in this direction will enable to create sustainable and reliable heat supply in the country, meet consumers' heat demand uninterruptedly and with high quality, reduce natural gas and electricity consumption used for heating purposes, efficiently utilize energy resources, and ensure fire and environmental safety.

7.7. Strategic target 7. Create a sustainable and reliable heating infrastructure

7.7.1. Priority7.1. Expand optimal heat energy and hot water supply system in the country by considering geographical, social, and economic features

Rationale

Since 2005, significant efforts have been taken to refurbish and develop heat supply system in the Republic of Azerbaijan.

Thus, the works performed within the framework of actions towards the restoration and improvement of the heat supply system have led to considerable changes in its development dynamics and a year-on-year increase in the number of residential buildings, educational, healthcare, and other facilities supplied with heat.

[39] Source:“Azersu” OJSC

Currently, due to operating 531 boiler houses in heating enterprises, 3568 residential buildings, 276 schools, 154 kindergartens, 151 healthcare institutions, and 603 other social facilities are supplied with heat, which has enabled to increase the number of heating sources by 365 pcs or 3,2 times, heat supplied residential buildings by 2580 pcs or 3,6 times, schools by 130 pcs or 1,9 times, kindergartens by 70 pcs or 1,8 times, healthcare institutions by 90 pcs or 2,4 times, other facilities by 512 pcs or 6,6 times as compared to 2004 – 2005 (table 7).

Table 7.Development dynamics of centralized heat supply system

Indicators	**Season**	Boiler houses	Residential buildings	Schools	Kinder-gartens	Healthcare institutions	Other facilities
Number of consumers supplied with heat, pcs	2004-2005	166	988	146	84	61	91
	2005-2006	202	1519	176	111	70	112
	2006-2007	234	1750	218	124	97	131
	2007-2008	312	1933	277	123	127	203
	2008-2009	310	2072	242	141	126	225
	2009-2010	329	2187	244	153	133	265
	2010-2011	352	2305	262	164	142	270
	2011-2012	362	2561	266	158	131	310
	2012-2013	436	2819	268	145	135	363
	2013-2014	508	3142	275	156	147	421
	2014-2015	525	3450	286	160	157	553
	2015-2016	531	3568	276	154	151	603
Difference from 2004-2005		3,2 times	3,6 times	1,9 times	1,8 times	2,4 times	6,6 times

Source:“Azeristiliktejhizat”OJSC

Continued efforts towards improving welfare of population every year presupposes the creation of utilities service complexes meeting modern standards in the Republic of Azerbaijan, including also continued refurbishment of the infrastructure networks to ensure the quality supply of heat supply services to consumers.

Expanding the coverage of centralized heat supply systems will enable to utilize natural gas and electricity (which are used directly for heating purpose) more efficiently and for intended purpose protect environment and ecological cleanliness by minimizing the use of heating oil, diesel fuel, wood, and other fuels.

Action items

Action 7.1.1. Create, restore and refurbish heating sources

Given inefficiencies in centralized heat supply systems from existing regional boiler houses in Azerbaijan and particularly, the experience of developed countries in this area, it is necessary to make adjustments in the heat supply strategy by gradually abolishing the currently operating regional boiler houses and replacing with modern district heating systems based on new technologies (renewable energy technologies, heat pumps and etc.). However, the abolishment of regional boiler houses in favor of new district systems is not deemed expedient from a practical and economic point of view. Plans are in place to perform the following works incrementally:

- Assess the current technical state of regional boiler houses as the main component of centralized heat supply systems; take actions towards economic effectiveness, prospective development and expediency of further operation in terms of security and environment; refurbish them depending on outcomes; carry out appropriate works to limit their coverage by creating district heat sources or to abolish them;
- Determine actions with regard to conducting the economic feasibility study of the projects and respective implementation levers for transforming the central heating stations, which perform the function of distributing the heat energy produced by regional boiler houses, into district boiler houses through their gradual reconstruction;
- define options for heat supply to areas, districts, buildings not supplied with heat, and build new systems respectively.

Action 7.1.2. Use alternative and renewable energy sources

Works are scheduled to be carried out in the following directions to assess the use of alternative and renewable energy for heating purposes and, particularly, the energy potential of solar, wind, geothermal and biomass energy to ensure their massive use:

- Conduct monitoring of the potential alternative and renewable energy usage across the regions of the Republic of Azerbaijan and explore its usage advantage;
- incentivize their penetration by considering the advantages of their use in new residential and non-residential buildings in terms of the capital intensity of installing primary plants for using alternative and renewable energy sources;
- assess the potential of using energy sources in areas which are considered inefficient in terms of technical and economic feasibility or are not planned to be connected to the Republican gas network, particularly, such heavy users as administrative buildings and facilities (schools, polyclinics, hospitals, new municipal buildings, and etc.).

Action 7.1.3. Improve energy efficiency and energy saving

The following works are expected to be carried out for this purpose:

- Conduct monitoring of the efficient utilization of energy carriers to supply heat energy to residential and non – residential buildings and develop measures that will help to prevent ineffective usage in the Republic of Azerbaijan;
- increase efficiency of fuel (natural gas) in heat energy generation;
- implement incentivizing measures to expand the penetration of technologies helping to save on energy and increase energy efficiency in heat supply system;

- implement measures helping to mitigate heat loss in heat supply system in residential and non-residential areas;
- analyze the possibilities for heat meter penetration and make relevant proposals.

Action 7.1.4. Implement actions to protect environment when utilizing heat energy

The followings are expected to be implemented for this purpose:

- conduct monitoring to study the conformity of equipment in heating supply systems to environmental requirements and relevant standards, assess the actions to decommission and renovate technologies that are harmful for environment and assess measures on their replacement;
- provisions shall be made to develop measures towards the prevention of inefficient utilization of natural resources and to avoid environmental damage as a result of heating.

Action 7.1.5. Determine the potential of energy sources for heat supply

It is important to promote efficiency across the key directions of investments in order to develop the heat supply infrastructure; conduct scientific research and design-survey works to identify the potential of energy sources utilized in the country for heat supply in terms of environmental protection; ensure the coverage of heat supply, and optimize the structure of utilizing energy sources for heat supply. To do this:

- assess heat demand by considering the country's administrative territorial division, climatic and topographic features;
- assess the current status of types and quantity of heat sources which are used to supply heat according to heat demand;
- define the priority energy sources for heat supply by considering the country's regional, climatic and topographic features, availability of energy resources and level of supply by using traditional energy sources;
- incentivize the utilization of priority energy sources selected for heat supply and conduct scientific researches on increasing efficiency, develop proposals and recommendations, standards, and regulations;
- envisage the conduct of design and survey works and develop preliminary potential design proposals by considering technical, environmental and other regulations on selected heat sources.

Expected results and indicators

As a result of executing this priority, a total of 2915 projects relating to the restoration and refurbishment of centralized heat supply systems will be implemented in Baku city and regions of the republic in 2017- 2020.

2545 out of the above projects relate to the refurbishment of lower distribution and district heat systems in residential buildings and social facilities, 55 projects to transformation of central heating stations, which perform the function of heat energy distribution, into district boiler houses by means of gradual refurbishment, 84 projects to upgrading the existing boiler houses, 55 projects to creating new heat sources, and 176 projects to gas service installation in boiler houses. Also, by implementing this priority, AZN 12 million GDP in real terms and 950 new jobs are expected to be created by 2020.

Key performance indicators:

- Taking into account efficiency, the volume of heat energy generation as compared to 2015 will increase by 427 thousand Gcal making up 1767 thousand Gcal;
- The coverage of heat supply will expand and the number of residential buildings with heat supply will increase by 50,4 percent in 2017-2020 reaching 5689, which makes up 87 percent of the buildings scheduled to be provided with heat supply. In addition, plans are in place to improve heat supply through the refurbishment of the heat supply systems that are technically faulty in about 550 residential buildings during the above period.

Required investments

It is forecasted that AZN 190 million will be needed for capital investments for the implementation of projects under this priority. Separate feasibility studies will be conducted for the above measures and implemented as part of the budget and operation processes of the companies engaged in the utilities sector.

Expected risks

Shortfall in finances that are needed for investments in construction works is a key risk factor.

7.7.2. Priority 7.2. Improve the regulatory legal framework, implement institutional measures and optimize heat tariffs

Rationale

The development of heat supply system is necessary against the background of new market economy ties to meet heat demand by considering population growth, economic development level, and associated expansion of residential and non-residential building stock in the Republic.

Prospective development requires improving the regulatory legal framework and developing various regulation options by placing special focus on institutional changes that enable commercial development directed to capital investments and attraction of private sector to this area.

Action items

Action 7.2.1. Improve the regulatory legal framework in heat supply sector

Regulations and standards related to heat energy usage rules including the construction and operation of heat supply systems will be developed in order to determine the principles of organizing and regulating the generation, transmission, distribution and consumption of heat energy as well as forming user and producer relationship.

Action7.2.2. Implement institutional actions in heat supply sector

Consistent actions towards establishing and developing a heat supply market based on market economy and commercialization principles, development and creation of private and commercial heat supply systems will be evaluated.

To attract investments to heat supply systems, potential enterprises will be identified and draft proposals will be made to transfer their assets in trust and conduct analyses on their privatization.

Action 7.2.3. Consider tariff optimization for heat supply

- -Develop methodology to estimate economically viable tariffs for combined heat and power plants and centralized heat sources;
- -develop a general estimation methodology to estimate the net value of heat energy supplied to users from other sources, including alternative renewable energy sources;
- -consider fixing heating tariffs on households for total flooring space (actually heated space) rather than residential space;
- -Ensure the shift of public heat supply enterprises to self-financing principles in the short term, develop tariff mechanisms by considering an efficiency factor in the operation of such enterprises.

Expected results and indicators

Determining the principle of organizing and regulating the generation, transmission, distribution and consumption of heat energy, compliance with technical and environmental requirements in the construction and operation of heat supply systems, optimization of the tariff system are key factors to ensure a reliable and sustainable heat supply infrastructure. Furthermore, the creation of favorable conditions for capital investments in the sector, development of market economy and commerce principles play a key role in increased efficiency of the sector.

Required investments

No investments are needed for this priority.

Expected risks

No serious risks are anticipated for the implementation of this priority.

7.7.3. Priority7.3. Assess and eliminate current problems existing in the centralized heat supply system and ensure the efficiency of the system

Rationale

The current network is considered economically inefficient as most of the boiler houses and equipment in the heating network have become outdated and not suitable for operation and generation, and technical production parameters of some others fall short of modern requirements. The existence of tariffs not reflecting due costs and low collection rates have led to situations when heat stations operated for a loss, and substantial losses were incurred in heat energy usage.

Furthermore, in the last years, a complex actions plan has been developed towards the restoration and development of the country's heat supply systems, substantial works have been accomplished in this area, the works to refurbish heat systems in residential buildings and social facilities have been given a start and currently these works are underway.

Nevertheless, the existence of some problems in this area has a negative impact on the efficiency of heat supply systems.

Action items

Action 7.3.1.Ensure efficiency in heat supply system

"Azeristiliktejhizat" OJSC will conduct a detailed assessment of the existing network and take necessary actions based on the results of this assessment in order to build operational efficiency and raise net fuel efficiency in boiler houses, define the causes of the losses that take place in the generation and transmission of heat energy, and identify the areas where such losses occur most often. Furthermore, the Company will perform benchmarking studies, develop a timetable and a master plan for necessary actions to be taken, which will reflect the financing sources, determine the potential costs of infrastructure upgrades and add cost compliance management to KPIs.

Action7.3.2.Optimize the limits intended for budget organizations dealing with heating services

Fixing and implementing precise limits according to the needs of budget organizations will be considered in order to pay heat charges.

Action 7.3.3. Liberalize hot water tariffs

Given the limited scope of hot water services and inefficiency of centralized supply of hot water in countries with mild climate zone (Turkey, Georgia, and etc.) as the Republic of Azerbaijan, actions will be taken towards the liberalization of hot water services in order to introduce the principles of market economy in hot water sector, raise service levels and improve the business activities of enterprises

Action 7.3.4. Review the price of natural gas consumed for the generation of heat energy

Considering certain discounts on natural gas sales that are applicable to the enterprises consuming natural gas for production purposes by connecting to main gas pipelines under current law provided that their monthly consumption rate is not less than 10 mln m^3), the opportunities for "Azeristiliktejhizat" (with annual consumption above 14,5 mln m^3) to benefit from this discount will be taken into account[40].

Expected results and indicators

It is forecasted that heat enterprises will generate AZN 5,1 million more income resulting from the priorities that are defined in connection with the solution of the current problems in heat supply systems.

Key performance indicators:

- Re-adjust the limits fixed for budget organizations to pay heat prices to actual demand required – AZN 3,4 million;
- fix heat tariffs for households for the total space of heated floor space rather than living space –AZN 1,7million.

Required investment

No investment is needed for this priority.

[40] Source:"Azeristiliktejhizat" OJSC

Expected risks

No serious risks are expected for this priority.

8. FINANCING MECHANISMS

It is forecasted that the achievement of the specified strategic targets will require AZN 8150 million investment until 2020. The implementation of the actions envisaged in the Strategic Roadmap will be financed from the following sources:

- government budget;
- off-budget funds;
- National Fund for Entrepreneurship Support and funds from other governmental credit and investment organizations;
- local budgets;
- Funds of local institutions, enterprises and organizations irrespective of their type of ownership;
- Foreign direct investments;
- loans from the country's banking system;
- securities;
- loans, grants and technical aid from international organizations and foreign countries;
- other sources not prohibited by law.

In order to ensure the effective spending of funds on priority targets, the budgets will be prepared within the framework of performance-based budgeting process. A larger portion of the required funds will be provided at the expense of the restructuration of the existing budgets, joint financing initiatives of private sector and various investors.

9. IMPLEMENTATION, MONITORINGAND EVALUATION

Implementation of Strategic Roadmap:

Oversight and governance: Accelerated decision making, clear accountability, and additional execution capacity will ensure appropriate coordination and governance.

- A mechanism for accelerated decision making at the highest political level will be set up for the Strategic Roadmap. This mechanism will enable appropriate leadership from key stakeholders for other decision makers for the implementation of the program. Decisions about implementation priorities and concrete targets will be made using this mechanism.
- The main executive organization will appoint responsible persons for each relevant priority and action in order to implement them in a timely and proper manner. With the involvement of other organizations specified in the action plan, working groups will also be formed for each priority under the leadership of responsible organizations. Reporting meetings of the work groups will be conducted under the leadership of the main executive organization on a quarterly basis. Quarterly work progress and activities to be performed during the next quarter will be discussed in the meetings. The work groups will carry out their activities based on annual work programs. Daily work schedules and task allocation will be determined by the responsible person. Typically, current work group meetings will be held in the offices of the main executive organization as requested by the responsible person. The main executive organization will ensure that appropriate conditions are created for unimpeded activity of the work group and, when necessary, it will involve external experts to make best use of their technical support.
- An appropriate coordination group (delivery unit) will be established to monitor the implementation of the Strategic Roadmap and provide central execution support in areas such as in problem solving or coordination across institutions. The unit's major work will serve to create organization across the institutions, processes, and technology required for implementation. This coordination unit will oversee teamwork across work groups in line with the action plan, summarizing of quarterly reports and preparation of annual reports. Furthermore, it will be responsible for ensuring that the involved institutions arrange for the required financial and human resources, and empowered to inject additional resources when needed.

Strategic alignment and financing: To allow for an efficient implementation process that avoids wasted resources and conflicting objectives, the Strategic Roadmap will be fully integrated into other sectorial plans and existing budgets.

- All related strategic documents proposed by relevant governmental institutions will be harmonized with the Strategic Roadmap and the mandates of existing state agencies will be realigned to the objectives wherever necessary. This alignment work will include developing transparent, measurable implementation targets, which will be communicated publicly and used to track progress.
- Detailed implementation plans will be developed for all strategic priorities as governance for their execution, based on provided actions, to provide transparency regarding the resources required and expected impact. While the assigned leading group will bear overall responsibility for fulfilling the implementation plan, it will involve all key institutions and private sector organizations in its application.

Stakeholder mobilization: Both domestic and international partners from both public and private sectors will be mobilized to join in the execution of the Strategic Roadmap.

- Appropriate actions will be taken to identify and involve key strategic partners. The involvement of multiple organizations and stakeholders is required for the successful implementation of each strategic priority. To ensure alignment of objectives and proper coordination, advisory councils and working committees will be formed to work with the private sector and state owned enterprises as well as with critical international partners, such as international financial institutions.
- Civil society will be mobilized and engaged to generate broad support for the Strategic Roadmap. Furthermore, active communication, transparency and inclusiveness will help to mobilize the public and private sectors, society as a whole, and other relevant stakeholders.

Monitoring and evaluation of the Strategic Roadmap

The Strategic Roadmap will be monitored and evaluated to ensure successful implementation through required tools, processes and other resources. During monitoring and evaluation, focus will be placed on the implementation of core actions, expected results and indicators versus priorities, and also compliance with the completion schedule will be checked. The monitoring and evaluation will be carried out in accordance with procedures based on international methodologies.

The annual activity programs of the work groups will be agreed with the coordination unit and approved by the main executive organization. Representatives of the coordination entity will participate in the quarterly meetings of the work groups.

The main executive organization will submit quarterly work progress reports to the coordination unit at least 10 days prior to the work group's quarterly meeting. By taking into account extensive analysis and evaluation of quarterly reports including discussions held in the quarterly meeting of the working group, the coordination unit will submit quarterly monitoring results and its recommendations for the next period to the main executive organization within 10 days following the meeting date. The coordination unit and the main executive organization will take actions to ensure that the monitoring results and recommendations are taken into consideration by the working group in its daily activities.

10. ACTIONS PLAN

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
Strategic priority 1.Ensure sustainability and efficiency in regulating the utilities sector					
1.1.Establish an independent regulatory body and dedicated fund, develop effective service, collection mechanisms and human resourcing					
1.1.1.	Consider the establishment of a single regulatory body in the utilities sector	Administration of the President of the Republic of Azerbaijan	Ministry of Energy, Ministry of Economy	• Develop the sector of utilities services; • minimize burden on state budget; • Implement sectorial liberalization.	2018
1.1.2.	Consider the establishment of a dedicated fund in the utilities sector	Administration of the President of the Republic of Azerbaijan	Finance Ministry, Ministry of Economy		2017
1.1.3.	Continue actions towards enhancing the utilities service level	State Agency for Public Service and Social Innovations	“Azerenergy”OJSC, “Azerishig” OJSC, “Azersu”OJSC, State Oil Company of Azerbaijan Republic, “Azeristiliktejhizat” OJSC, “Azalternativenerji” LLC		2017-2020
1.1.4.	Improve the collection of utilities service charges	Ministry of Economy	Regulatory body		2017-2018
1.1.5.	Improve human resourcing in the sector of utilities services	Ministry of Labor and Social Protection of Population	Ministry of Education		2017-2020
1.1.6.	Establish unimproved regulatory legal framework in the utilities sector	Ministry of Economy	Regulatory Body, Justice Ministry		2017

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
Strategic target 2. Ensure the generation of fully diversified and environmentally friendly electric energy					
2.1. Increase reserve margin for national generation portfolio					
2.1.1.	Forecast the domestic demand for electricity	Ministry of Energy	Ministry of Economy, State Agency for Alternative and Renewable Energy under the Ministry of Energy, "Azerenergy" OJSC "Azerishig" OJSC	• AZN 130 million direct and AZN 85 million indirect GDP increase in real terms in 2020, summing up to AZN 215 million; • creation of 5085new jobs; • additional capital investment to increase generation capacity by 1000 MW (on top of currently planned 900 MW); • diversify capital investments across new capacities to be built.	2017
2.1.2.	Prepare feasibility studies to identify priorities for energy sources	Ministry of Energy	Regulatory body, Ministry of Economy, State Agency for Alternative and Renewable Energy under the Ministry of Energy, "Azerenergy" OJSC State Oil Company of Azerbaijan Republic		2017
2.1.3.	Define financing sources for capital investments	Ministry of Energy	Regulatory body, Ministry of Economy, State Agency for Alternative and Renewable Energy under the Ministry of Energy, "Azerenergy" OJSC		2017-2018
2.1.4.	Create additional generation capacities	Ministry of Energy	Regulatory body, Ministry of Economy, State Agency for Alternative and Renewable Energy under the Ministry of Energy, "Azerenergy" OJSC		2017-2020

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
2.2. Diversify the national generation portfolio					
2.2.1.	Assess alternative and renewable energy potential	Ministry of Energy	Ministry of Economy, National Academy of Sciences of Azerbaijan State Agency for Alternative and Renewable Energy under the Ministry of Energy, “Azerenergy” OJSC	• AZN 50 million direct and AZN 20 million indirect GDP impact in real terms in 2020 summing up to AZN 70million; creation of 270new jobs; • capital investments to produce 350 MW wind energy, 50 MW solar energy and 20 MW bioenergy to diversify energy portfolio • export of saved natural gas (from natural gas power plants) to Europe via Trans Adriatic gas pipeline and Trans Anatolian gas pipelines (TAP/TANAP)	2017
2.2.2.	Select operational and financing forms for power stations that require investment	Ministry of Energy	Ministry of Economy, Finance Ministry, Regulatory body, Ministry of Economy, State Agency for Alternative and Renewable Energy under the Ministry of Energy		2017-2018
2.2.3.	Public communications regarding the actions to be taken	Ministry of Energy	State Agency for Alternative and Renewable Energy under the Ministry of Energy, “Azerenergy” OJSC		2017-2020

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
2.3. Consider the opportunity of increasing net electricity export in the short run with excess supply					
2.3.1.	Investigate export opportunities	Ministry of Energy	Regulatory body, Ministry of Economy, “Azerenergy” OJSC	• AZN 70 million direct and AZN 45 million indirect GDP growth in real terms in 2020,summing up to AZN 115 million; • Capture 50 percent of Georgia’s electricity import and 20 percent of Turkey’s electricity import.	2017-2018
2.3.2.	Conduct feasibility studies to realize export capacity	Ministry of Energy	Regulatory body, Ministry of Economy, State Agency for Alternative and Renewable Energy under the Ministry of Energy, “Azerenergy” OJSC		2017-2018
2.3.3.	Establish a working group for actions to be implemented with regard to exports	Ministry of Energy	Ministry of Economy, State Agency for Alternative and Renewable Energy under the Ministry of Energy, “Azerenergy” OJSC		2017
Strategic target 3. Apply the average global efficiency and quality standards and trigger mechanisms to achieve set goals					
3.1.Increase the efficiency of power stations and use the existing potential efficiently					
3.1.1.	Ensure the efficient utilization of power stations’ potential	“Azerenergy” OJSC	Regulatory body, Ministry of Energy, Ministry of Economy, Tariff(price) Council	• AZN 70 million direct and AZN 5 million indirect GDP growth in real terms in 2020,summing up to AZN 75million	2017-2020

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
3.1.2.	Consider the privatization potential of power stations	State Committee on Property Issues	Regulatory Body, Ministry of Energy, Ministry of Economy, “Azerenergy” OJSC	• Increase net fuel efficiency (relation of generated electricity to the amount of consumed fuel) up to 50 percent for selected combined cycle gas turbine stations • ● maximum capital investment of USD 300thousand to upgrade 1MWnatural gas power station; • ● export of saved natural gas (from natural gas power plants)to Europe via TAP/TANAP projects thanks to efficiency increase	2017-2020
3.1.3.	Announce tenders to select investors	Ministry of Energy	State Committee on Property Issues, Regulatory body, Ministry of Economy, “Azerenergy” OJSC		2017-2020
3.2. Minimize electricity losses, raise the quality of electricity transmission and distribution					
3.2.1.	Define implementation mechanisms to increase efficiency	Ministry of Energy	Regulatory body, “Azerenergy” OJSC, “Azerishig” OJSC	• AZN 24 million direct and AZN 1 million indirect GDP growth in real terms in 2020, summing up to AZN 25 million; • decrease electricity loss level in Baku from 8,5 percent to 7 percent, and in regions from 12	2017
3.2.2.	Prepare a master plan for Upgrade works	“Azerenergy” OJSC, “Azerishig” ASC	Ministry Of Energy, Ministry of Economy, Regulatory body		2017
3.2.3.	Apply key performance indicators(KPIs) that monitor the quality of electricity transmission	Ministry of energy	Regulatory body, “Azerenergy”OJSC, “Azerishig” OJSC		2017

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
3.2.4.	Meter installation to minimize losses	“Azerishig” OJSC, “Azerenergy” OJSC	Regulatory body, Ministry of Energy, Ministry of Economy	percent to 8 percent.	2017-2018
3.2.5.	Perform works in electricity networks to meet the demand for electric energy	“Azerishig” OJSC, “Azerenergy” OJSC	Regulatory body, Ministry of Energy, Ministry of Economy		2017-2020
3.2.6.	Improve the electricity transmission and distribution system	“Azerishig” OJSC, “Azerenergy” OJSC	Regulatory body, Ministry of Energy, Ministry of Economy		2017-2020
3.2.7.	Create a data bank for transmission and distribution network	“Azerishig” OJSC, “Azerenergy” OJSC	Regulatory body, Ministry of Energy, Ministry of Economy		2017-2020
3.2.8.	Public communication on losses	“Azerishig” OJSC, “Azerenergy” OJSC	Regulatory body, Ministry of Energy, Ministry of Economy		2017-2020
3.2.9.	Prioritize loss minimization projects	“Azerishig” OJSC, “Azerenergy” OJSC	Regulatory body, Ministry of Energy, Ministry of Economy		2017-2020
3.3. Use optimal mechanisms to raise efficiency in consumption					
3.3.1.	Consider fixing optimal prices to match consumer and producer interests	Tariff (price) Council	Regulatory body, Ministry of Economy	• AZN 120 million direct and AZN 45 million indirect GDP increase in real terms in 2020, summing up to AZN 170 million; • export of saved natural gas to Europe	2017-2020
3.3.2.	Discuss electricity use models	Tariff (price) Council	Regulatory body, Ministry of Energy, Ministry of Economy		2017

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
3.3.3	Consider user consumption forecasts	Tariff (price) Council	Regulatory body, Ministry of Energy, Ministry of Economy	through TAP/TANAP projects thanks to efficiency increase in energy consumption	2017
3.4. Create effective regulation and auction mechanisms					
3.4.1.	Improve the main regulatory law and other related documentation in electric energy sector	Ministry of Energy	Justice Ministry, Ministry of Economy, Regulatory body	• create a new legal framework; • implement sectorial liberalization; • develop public – private partnership mechanisms	2017
3.4.2.	Create a wholesale market	Regulatory body	Ministry of Energy, Ministry of Economy		2017-2020
3.4.3.	Prioritize generation assets to realize privatization	Regulatory body	State Committee on Property Issues, Ministry of Energy, Ministry of Economy		2017-2020
3.4.4.	Prepare public – private partnership mechanisms	Regulatory body	State Committee on Property Issues, Ministry of Energy, Ministry of Economy		2017-2020
Strategic target 4.Create an efficient and effective gas distribution infrastructure					
4.1.Minimize all types of losses related to natural gas distribution					
4.1.1.	Detailed assessment and preparation of a development plan for the existing network	State Oil Company of Azerbaijan Republic	Ministry of Energy, Ministry of Economy, Regulatory body	• AZN 85 million direct and AZN 5 million indirect GDP impact in real terms in 2020, summing up to AZN 90 million; • Creation of 340 new	2017

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
4.1.2.	Announce tenders for the construction of gas distribution lines	State Oil Company of Azerbaijan Republic	Ministry of Energy, Ministry of Economy, Regulatory body	jobs; • decrease natural gas distribution loss level in all regions down to 8 percent (if such a loss level is less than 8 percent in any region, then it is assumed to remain on the same level; • Upgrade natural gas supply system according to international standards; • Meet dynamically growing user demand for natural gas in a reliable way; • Facilitate natural gas consumption forecasts and detect the assumed loss from network as soon as possible; • Eliminate technical problems in natural gas supply; • export of saved natural gas to Europe via TAP / TANAP projects due to efficiency increase in consumption(from natural gas plants)	2017-2020
4.1.3.	Determine key performance indicators (KPI) relating to construction activity	State Oil Company of Azerbaijan Republic	Ministry of Energy, Ministry of Economy, Regulatory body		2017
4.1.4.	Consider maximizing collection rates and enforcing penalties against illegal gas usage	Ministry of Energy	State Oil company of Azerbaijan Republic		2017-2018
4.1.5.	Implement alternative supply sources to remote residential settlements where gas service installation is inefficient from a feasibility point of view	Ministry of Energy	Ministry of Economy, State Oil company of Azerbaijan Republic		2017-2018

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
Strategic target 5.Create a top – notch water management structure					
5.1.Expand clean and waste water treatment infrastructure penetration					
5.1.1.	Assess areas without infrastructure	“Azersu” OJSC	Ministry of Economy, Regulatory body	• AZN 25 million direct and AZN 15 million indirect GDP impact in real terms in 2020, summing up to AZN 40 million; • decrease commercial loss level from 20 to 14 percent; • increase waste water collection level from 46 to 65 percent; • decrease the share of registered users without meters from 26 percent to 5 percent	2017
5.1.2.	Increase meter penetration and complete it for commercial groups	“Azersu” OJSC	Ministry of Economy, Regulatory Body		2017-2018
5.1.3.	Announce tenders for infrastructure investment	“Azersu” OJSC	Ministry of Economy, Regulatory Body		2017-2020
Strategic target 6.Decrease losses and ensure efficiency of water supply					
6.1. Mitigate losses, optimize water utilization tariffs and increase water consumption efficiency by attracting investment for required infrastructure					
6.1.1.	Minimize losses through detailed evaluation of the network	“Azersu” OJSC	Ministry of Economy, Regulatory Body	• AZN 12 million direct and AZN 8 million indirect GDP impact in	2017-2020

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
6.1.2.	Take actions to efficiently utilize water reserves	Cabinet of Ministers	Ministry of Economy, Tariff(price) Council, Ministry of Ecology and Natural Resources, Ministry of Emergency Situations "Melioration and Water Resources" OJSC, "Azersu" OJSC, Regulatory body	real terms in 2020, summing up to AZN 20 million impact; • Reduce "Azersu" OJSC distribution losses from 31 percent to 25 percent.	2017
6.1.3.	Consider optimal tariff level for clean and waste water services	Tariff(price) Council	Ministry of Economy, "Azersu" OJSC		2017-2020
6.1.4.	Prepare social programs for special user groups utilizing clean and waste water services	Ministry of Economy	Ministry of Labor and Social Protection of Population, Tariff(price) Council, Regulatory body		2017-2020
Strategic target 7.Createa sustainable and reliable heat supply infrastructure					
7.1. Expand optimal heat energy and hot water supply system in the country by considering geographical, social, and economic features					
7.1.1.	Create, restore and refurbish heating sources	"Azeristiliktejhizat" OJSC	Ministry of Energy, Ministry of Economy, MIDA, Regulatory body	• AZN 12 million increase in GDP in real terms in 2020; • 950new employment	2017-2020

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
7.1.2.	Use alternative and renewable energy sources	Ministry of Energy	Ministry of Economy, State Agency for Alternative and Renewable Energy under the Ministry of Energy, “Azeristiliktejhizat” OJSC	impact; • increase heat energy generation capacity by 427,000 Gcal up to 1767, 000 Gcal as compared 2015, by considering efficiency • Increase the number of households with heat supply by 50,4 percent to reach5689; • improve heat supply through capital repair of technically faulty heat supply systems in approx.550 residential buildings.	2017-2020
7.1.3.	Improve energy efficiency and energy saving	“Azeristiliktəchizat” OJSC	Ministry of Energy, Ministry of Economy, Regulatory body, State Agency for Alternative and Renewable Energy under the Ministry of Energy		2017-2018
7.1.4.	Implement actions to protect environment when utilizing heating energy	“Azeristiliktejhizat” OJSC	Ministry of Ecology and Natural Resources, Ministry of Energy		2017-2020
7.1.5.	Determine the potential of energy sources for heat supply	Ministry of Energy	Ministry of Economy, “Azeristiliktejhizat” OJSC, Regulatory body, State Agency for Alternative and Renewable Energy under the Ministry of Energy		2017-2018
7.2. Improve the regulatory legal framework, implement institutional measures and optimize heat tariffs					
7.2.1.	Improve the regulatory legal framework in heat supply sector	Ministry of Energy	Ministry of Economy, Regulatory body, “Azeristiliktejhizat” OJSC	• Ensure reliable and sustainable heat supply infrastructure.	2017

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
7.2.2.	Implement institutional actions in heat supply sector	Ministry of Energy	Ministry of Economy, Regulatory body, "Azeristiliktejhizat" OJSC		2017-2020
7.2.3.	Consider tariff optimization for heat supply	Tariff (price) Council	Ministry of Economy, Regulatory body, "Azeristiliktejhizat" OJSC		2017-2020
7.3. Assess and eliminate current problems existing in the centralized heat supply system and ensure the efficiency of the system					
7.3.1.	Ensure efficiency in heat supply system	"Azeristiliktejhizat" OJSC	Ministry of Energy, Ministry of Economy, Regulatory body, State Agency for Alternative and Renewable Energy under the Ministry of Energy	• capture AZN 5,1 million increase in revenues from heat industry	2017-2020
7.3.2.	Optimize the limits intended for budget organizations dealing with heating services	Finance Ministry	Ministry of Energy Energy, Ministry of Economy, Regulatory body, "Azeristiliktejhizat" OJSC		2017-2020
7.3.3.	Liberalize hot water tariffs	Cabinet of Ministers	Ministry of Economy, Tariff (price) Council, "Azeristiliktejhizat" OJSC		2016

Item no	Action	Main responsible entity	Other entities	Indicators	Execution period
7.3.4.	Review the price of natural gas consumed for the generation of heat energy	Cabinet of Ministers	Ministry of Economy, Tariff (price) Council, “Azeristiliktejhizat” OJSC, State Oil Company of Azerbaijan Republic		2017