

ADB TA 8727 REG

*CAREC: Study
for Power Sector
Financing Road
Map*

**Mobilizing
Financing for
Priority Projects**

Azerbaijan

September 2016

pwc

This consultant's report does not necessarily reflect the views of ADB or the Government concerned, and ADB and the Government cannot be held liable for its contents.



List of Abbreviations

ADB	Asian Development Bank
ADO	Asian Development Outlook
AT&C	Aggregate Technical & Commercial Losses
AZN	Azerbaijani Manat
BOP	Balance of Payment
CAGR	Compound Annual Growth Rate
CAPS	Central Asian Power System
CAR	Capital Adequacy Ratio
CAREC	Central Asia Regional Economic Cooperation
CASA	Central Asia South Asia Electricity Transmission and Trade Project
CBA	Central Bank of the Republic of Azerbaijan
CCGT	Combined Cycle Gas Turbine
CIS	Commonwealth of Independent States
EAP	Energy Action Plan
EBRD	European Bank for Reconstruction and Development
ECA	Europe and Central Asia
ESCC	Energy Sector Coordinating Committee
FDI	Foreign Direct Investment
FSU	Former Soviet Union
FY	Financial Year
GDP	Gross domestic product
GENCO	Generation Company
G-T-D	Generation-Transmission-Distribution
HPP	Hydro Power Plant
IPP	Independent Power Plant
IPPs	Independent Power Producer
IRENA	International Renewable Energy Agency
Km	Kilometer
KV	Kilovolt
kWh	Kilowatt -hour
LPG	Liquefied Petroleum Gas
MDGs	Millennium Development Goals
MoE	Ministry of Energy
MTPP	Medium Term Priority Project

MW	Megawatt
PLF	Plant Load Factor
PPIB	Private Power & Infrastructure Board
PPP	Public Private Partnership
PSDP	Public Sector Development Program
R&M	Repair and Maintenance
RDC	Regional Dispatch Centre
RDTA	Research and Development Technical Assistance
RE policy	Renewable Energy policy
REC	Regional Electric Grid Companies
RES	Renewable energy sources
RPMP	Regional Power Sector Master Plan
SAARES	State Agency on Alternative and Renewable Energy Sources
SOCAR	State Oil Company of the Azerbaijan Republic
SOFAZ	State Oil Fund of Azerbaijan
T & D	Transmission & Distribution
TA	Technical Assistance
TPP	Thermal Power Plant
UNDP	United Nations Development Programme
US	United States
USAID	United States Agency for International Development
USD	United States Dollar
YoY	Year Over Year

Table of contents

1. National power sector overview	5
1.1. Industry structure and institutional arrangements	5
1.2. Power supply and demand	6
1.2.1. Power supply	6
1.2.2. Power demand	9
1.3. Sector regulation	11
2. Power sector development and investment plan	13
2.1. Objectives driving sector development	13
2.2. Projected supply and demand	16
2.3. Approach and key considerations for project prioritization	18
2.4. List of priority projects and investment requirements	20
3. Options for funding and financing power sector investment plan	25
3.1. National government	25
3.2. Assistance from development partners	28
3.3. Other governments	31
3.4. Envisaged funding probability of priority projects	31
3.5. Private sector participation	33
4. Barriers to investments in power sector	36
5. Reform action plan for facilitating investments	39
Appendix A: List of power plants	44
Appendix B: Macroeconomic overview	45
Appendix C: Bibliography	47

1. National power sector overview

Azerbaijan's power sector has made giant strides in the last ten years with the power generation capacity increasing by almost 40% and exceeding capacity 7,100 MW. This is primarily because of increased focus on addition of new energy generating capacity of approx. ~2.3 GW between the years 2006 and 2015. Azerbaijan has drastically reduced imports and has turned into a net exporter since 2008.

In this section, we have provided a brief description of the companies/ agencies involved in the sector, including their roles and ownership structure. Further, we have discussed the historical electricity supply and demand situation in the country along with a description of the regulatory landscape and institutions involved in regulating the sector.

1.1. Industry structure and institutional arrangements

Azerbaijan's electricity sector is dominated by vertically integrated company 'Azerenerji OJSC', a 100% state owned entity.

Azerenerji owns and operates over 90% of Azerbaijan's power generation capacity. Private sector investments in the power generation sector account for a small portion of the total installed capacity and their presence is limited to small hydro based power plants and few renewable energy based projects. Azerenerji also operates the transmission system network of the country. Azerenerji's subsidiary grid companies - Sumgayit, Ganja, Mingachevir, Shirvan, Imishli, Shaki and Khachmaz Regional Electricity Networks (REN) were responsible for electricity distribution & sales in the whole country except for the Baku region & Nakhchivan Autonomous region. Till January 2015, the Baku Electric Grid JSC was in charge of distribution and retail sale. The Baku Electricity Grid JSC procured energy from Azerenerji. The State Energy Agency of the Nakhchivan Autonomous Republic generates, transmits, distributes and supplies electricity to consumers of Nakhichevan Autonomous Republic.

Bakielektrikshebeke OJSC/ Baku Electric Grid JSC was subsequently renamed Azerishiq OJSC in February, 2015 by the government. Azerishiq is envisaged to handle the task of buying electricity in Azerbaijan and supplying it to consumers with the use of new technologies. Azerishiq has obtained the electricity distribution responsibilities in all districts of the country and aims to implement key sector reforms.

At the time of independence, Azerbaijan inherited a power system which was capable of meeting its demand and providing reliable and quality power to all. The electrical network of the country was integrated with the neighboring countries that were part of the Soviet Union as well as with Iran, providing opportunities for regional synergies. However, during the last few decades, the electrical network has suffered due to lack of investments and limited maintenance activities.

The power sector in Azerbaijan was being managed by a single vertically integrated company "Azerenergy" which is an open joint stock company. 'Azerishiq OJSC', which was established in February, 2015 by the Government, is envisaged to handle the task of buying electricity in Azerbaijan and supplying it to consumers with the use of new technologies.

At present, the ownership of the company is entirely with the Government. However of late, private participation has started in a limited manner for some of the functions. At present, some small power generation plants and two independent regional power distribution companies are under private ownership and control. The private participation in the selected projects have been made through concession arrangement.

Reversal of Privatization in Power Distribution

An attempt at re-organization of power sector was made during early 2000, when privatization took place in the distribution space in the Baku distribution network. The distribution sector was separated from Azerenerji JSC and four companies were established, including Baku Electric Grid JSC, Ganja Electric Grid JSC, Alibayramli Electric Grid JSC, and Sumgayit Electric Grid JSC. Subsequently, management rights of Baku and Sumgayit distribution JSCs were transferred to Barmek, a Turkish company, under a long-term management contract. For the rest of the two distribution JSCs, management rights of Ganja and Ali-Bayramli were transferred to Bayva, an Azerbaijan company, under a long-term management contract in 2002. This was allowed for a short while and then the changes were reversed.

With the performance of private distribution companies being unsatisfactory, the distribution business was transferred to Baku Electric Grid JSC in Baku city and the surrounding area, and to seven of Azerenerji JSC's subsidiary companies.

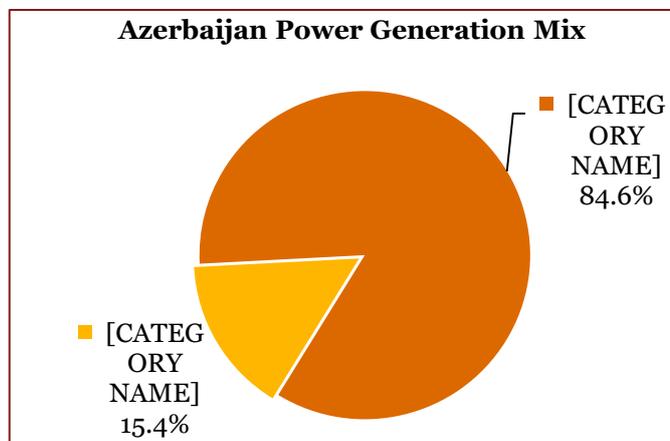
1.2. Power supply and demand

Large quantum of government investments in the power sector since 2006 in the generation, transmission, and distribution sectors have resulted in significant improvements to the overall power sector. Azerbaijan's power system is currently capable of supplying power to almost the entire population. Power demand across Azerbaijan had dropped considerably following a significant increase in tariffs in 2007. However, it has been growing since 2010. Subsequent to substantial investments targeted towards power generation in recent years, the Government of Azerbaijan now plans to prioritize the rehabilitation and modernization of the distribution networks in the different regions given the focus on power exports.

1.2.1. Power supply

Azerbaijan's energy mix like some of the other CAREC member countries is heavily skewed. It is dominated by natural gas and heavy oil which account for more than 8/10th of the energy mix. Azerbaijan's current energy policy is based on securing long-term energy independence and like Kazakhstan also aims to diversify its power generation mix, increase focus on energy efficiency initiatives and support GHG mitigation processes.

Azerbaijan has an installed capacity of 7125.9 MW¹ as of 2014. The share of thermal power stations in electricity generation is 84.6% (6028.4 MW), while hydropower stations contribute 15.4%



Source: Azerbaijan's State Statistical Committee, 2014

(1097.5 MW) to the country's electricity generation, with the largest hydro power plant Mingachevirit having an installed capacity of 402 MW, situated on the Kura River. Azerbaijan hydro energy resources are mostly concentrated on the north-western part of the country with the presence of Mingechaur, Shamkir, Yenikendand Varvara hydro power plants. These three HPP's with an installed capacity of more than 100 MW in Azerbaijan, and are all situated on the Kura River. The water resources of Azerbaijan are located in the following areas: the lower reaches of the Kura River with its multiple tributaries; the Aras River (the Kura tributary) and a group of creeks flowing into the Caspian Sea.

¹ according to Azerbaijan's State Statistical Committee, 2014

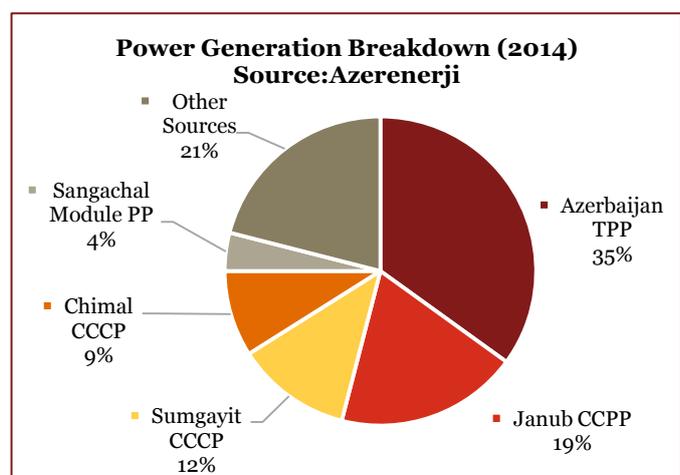
Electricity generation over the years

Electricity generation is primarily based on natural gas (combined cycle gas turbines), heavy oil and hydropower. Over 80% of the capacity is based on fossil fuels. Azerbaijan is using its natural gas sources increasingly for generation. The share of oil products in the generation decreased from 70% in the 1990's to about 3% in 2009 and was replaced by natural gas.

Power Supply over the years (in GWh)								
Year	2007	2008	2009	2010	2011	2012	2013	2014
Oil & Natural Gas	19,483	19,410	16,558	15,259	17,618	21,167	21,863	21,401
Hydro	2,364	2,232	2,308	3,446	2,675	1,821	1,489	1,300
Wind	-	-	2.1	0.5	-	-	0.8	2
Solar	-	-	-	-	-	-	0.8	3
Total (W/O Export & Import)	21,847	21,643	18,879	18,709	20,294	22,988	23,354	22,706
Imports	548	216	110	100	128	140	127	124.1
Exports	786	812	380	462	804	680	495	489.3
Total (with Export & Import)	22,085	22,238	19,138	19,068	20,969	23,528	23,722	23,071

Azerbaijan's power generation relies to a great extent on its domestic oil & gas resources. A portion of the more recently installed thermal power plants are modular gas engines. While there are no major hydropower resources in the country, there is still reasonable potential for small to mid-sized hydro power plants. Modular power plants were mainly used since 2006, when Azerenerji faced serious problems with meeting the demand for peak power. The part load behavior and for its ability to support peak electricity demands during the winter seasons were the key reasons why the modular power plants were preferred. Since 2006-07, ten modular power plants with a capacity of almost 750 MW were deployed across Azerbaijan. The fuel for power generation is purchased from the state-owned State Oil Company of the Azerbaijan Republic (SOCAR). The wholesale prices are determined by the Tariff Council keeping in mind that thermal based power generation is profitable.

The total domestic power generation during year 2014 was approximately 24.7 TWh. The oldest power plant, Azerbaijan TPP is also one of the largest plants in the South Caucasus region and forms the mainstay of Azerbaijan's power generation. Janub power station is critical for meeting power demand in the Absheron peninsula and in southern Azerbaijan. It is the key to ensuring stable operation of the power transmission and distributing system. The chart alongside captures the power generation breakdown by the various key power plants across Azerbaijan. A list of major power plants in

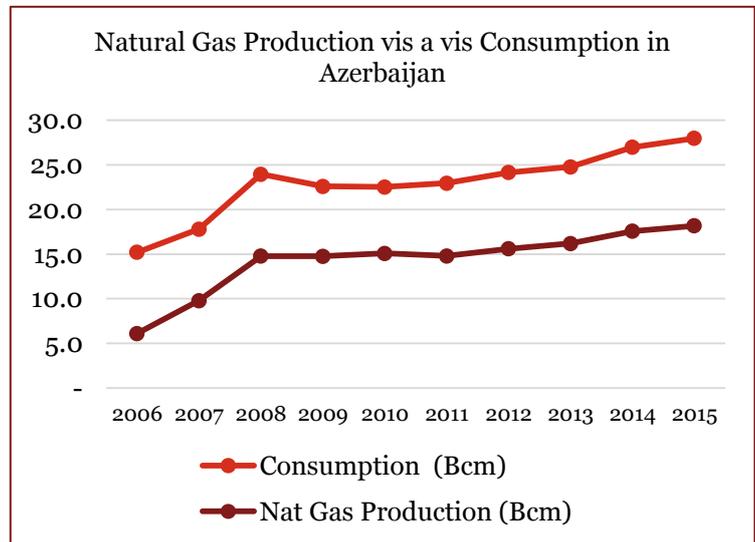


Azerbaijan is captured in Appendix A of this report.

Apart from Azerenerji, Azerbaijan's power sector also includes Independent Power Producers (IPPs). Generation by IPPs was about 1,800 GWh in 2013, which is about 8-9% of the total power generated. Most of these plants are not connected to the national grid and supply power to the customers independently. Private sector investments in the power generation sector account for a small portion of the total installed capacity and their presence is limited to small hydro based power plants and few renewable energy based projects. The table below captures the power generated from IPPs vis a vis those from Azerenerji.

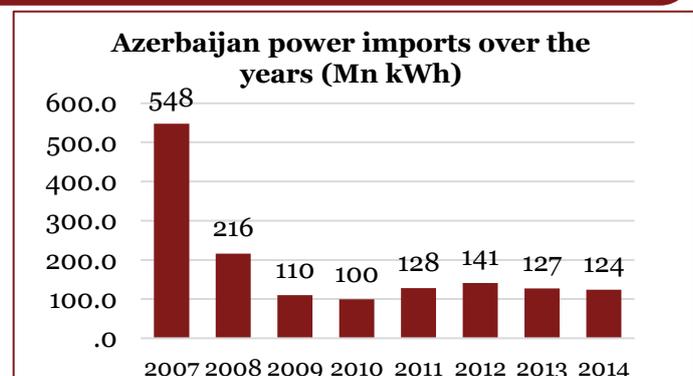
Power Generated Azerenerji vis a vis others (Mn kWh)								
	2007	2008	2009	2010	2011	2012	2013	2014
Power Generated from Public power stations	21,415	21,323	18,600	18,450	19,993	21,358	21,556	22,706
IPPs	432	320	269	260	301	1,630	1,798	2,022

Production of natural gas has increased since the year 2007 due to large-scale capital investments. Azerbaijan started exporting gas to Georgia and Turkey from the Shah Deniz gas field in the Caspian Sea. The State Development Program for the Fuel and Energy Sector (2005-2015) outlined that primary fuel for electric power plants identified under the program would be natural gas. The program also mentioned that mazut (fuel oil) was planned to consume about 15-20% of the fuel supply for electricity generation, but its usage would be limited only for the use of regulating generation and emergency backup in case of outages of the gas system. Natural gas can be viewed as the main fuel for power generation in Azerbaijan.



- The share of oil products in the generation decreased from 70% in the 1990's to about 3% in 2009 and was replaced by natural gas.
- Conversion of power plants to natural gas was a significant development in terms of improving power plant efficiencies and subsequently the overall environmental impact.

Till 2007, peak demand was not entirely met by domestic generation and power had to be imported, mainly from Russia. Azerbaijan imported power from Russia to address the peak demand as well to cover shortages during the winter season with higher demand. Till 2006, power imports by Azerenerji JSC exceeded exports. Azerenerji's focus since then had been on curtailing power imports with a view on energy security. Subsequently the import/export balance changed to an export

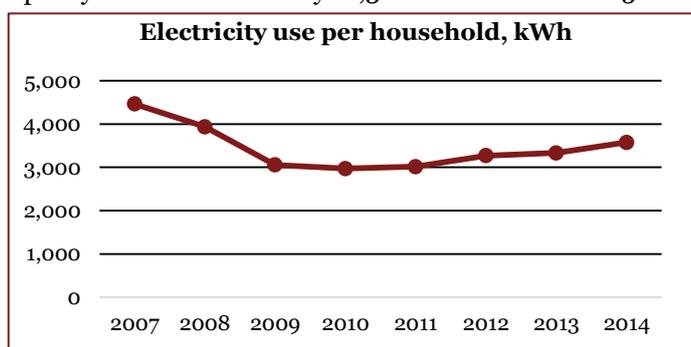


surplus from the year 2007 onwards. Over the years, power imports have come down significantly due to investments and rehabilitation activities undertaken by Azerenerji and Baku Electric Grid and the increased focus on new generation capacity addition. Although the power trade with Russia has come down, the interconnection with Russia has led to improved system stability of Azerbaijan grid. An inter-connection in the power trade to Turkey via Georgia was made from 2010 and currently Turkey is the largest power importer from Azerbaijan.

1.2.2. Power demand

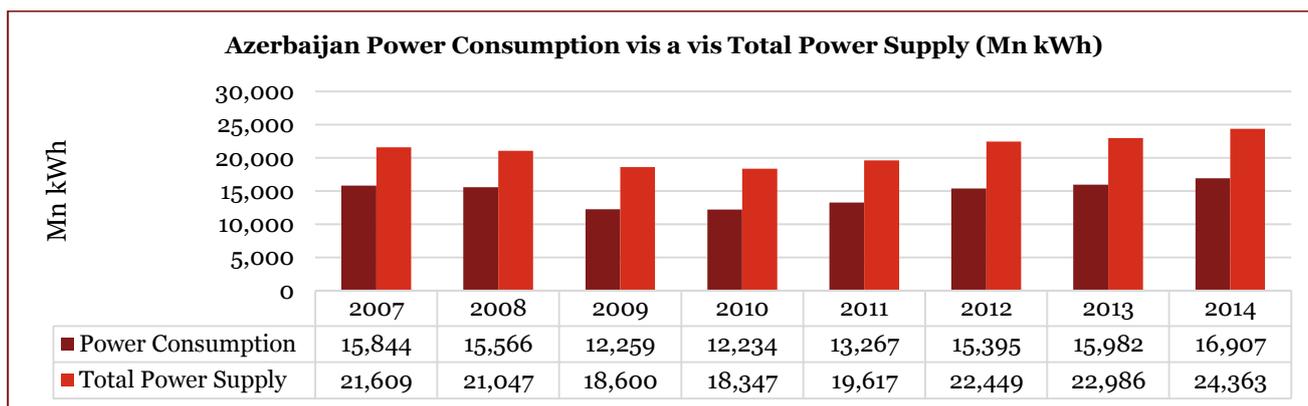
A key development in the power sector took place during the first decade of the twenty-first century with the shift from oil to gas in thermal generation. At the same time, domestic energy consumption dropped below production rates. Moreover, since 2006-07 the power generation capacity of the country increased by 40% exceeding 7,100 megawatts, which allows not only to cover domestic needs, but also allows for exporting power to the neighboring countries. Azerbaijan has not been procuring power from abroad, given that it has been a net exporter since 2008. The country's power capacity has increased by 2,300 MW since 2005 after commissioning new energy generating facilities.

The development of electricity consumption per household showed an increasing trend from the year 1997– 2006. The trend was reversed in 2007 and continued to decline until 2009. This was primarily due to the rise in tariffs in January 2007, coupled with the implementation of the government's policy to install meters and increased bill collection. Since then, the overall power consumption as well as the electricity use per household has been increasing steadily, however it is still below the 2007 consumption levels.

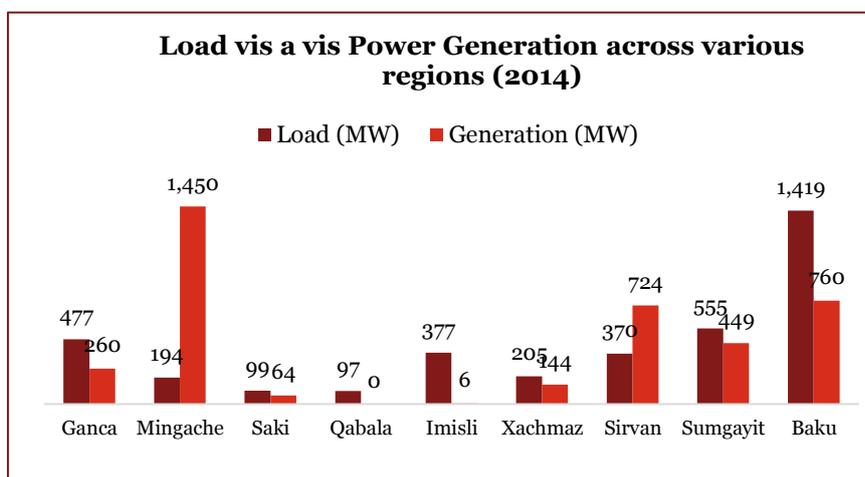


A key aspect of the improving power demand-supply situation was the improvement in average thermal efficiency of the plants in the last 10 years. There was a relative improvement of 30% between 2003 and 2013 given the increasing focus on rehabilitation & modernization of power plants and with the introduction of high efficiency plants such as CCPP and Diesel/Gas Engines.

Another key development was the significant lowering of fuel consumption per kWh over the last 11 years. The average fuel consumption per kWh decreased from ~400 gr/kWh in 2004 to ~310 gr/kWh during 2014, driven by increasing plant efficiency. The chart below captures the overall power consumption in Azerbaijan versus the total power available since 2007.

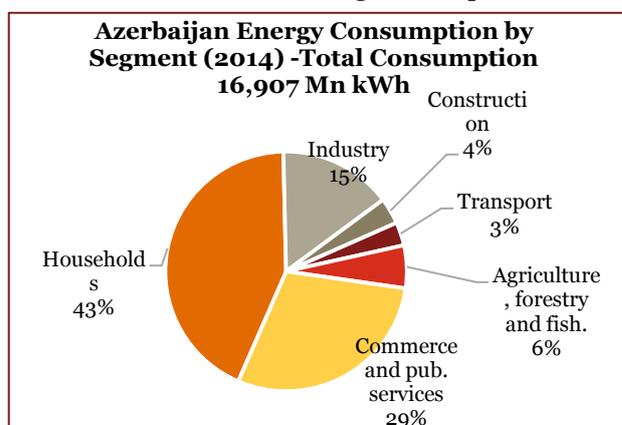


While Azerbaijan does not currently have any major demand-supply mismatch a significant portion of the power generation, transmission & distribution infrastructure needs to be rehabilitated to improve the overall power supply. A major portion of the power sector infrastructure is from the Soviet era and requires modernization & rehabilitation. Over 20% of all power plant equipment are beyond their useful life. The majority of power transmission and distribution facilities in districts are old, having been in operation for 30 years and more. The equipment’s have reached the end of their operating life and have become less reliable, with more frequent outages and increasing losses. The overall distribution system losses at voltage levels below 35 kilovolts (kV) are about 15%. A significant portion of the total installed capacity is not available throughout the year. The assets have non-operating hours due to repairs and maintenance activities, while older units do not function at the full capacity since they were newly commissioned due to deterioration.



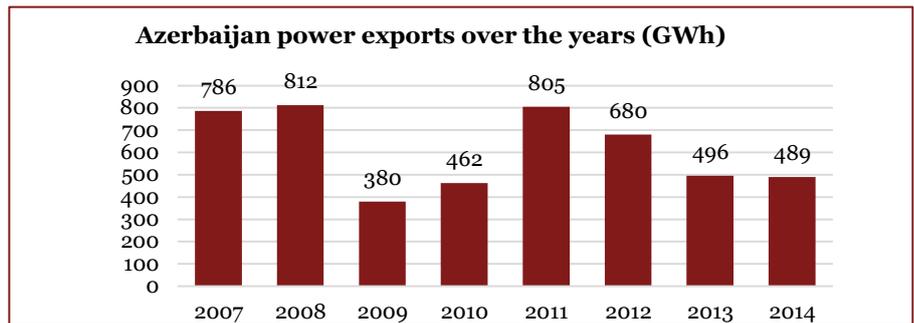
Azerbaijan is divided into nine areas, from west to east namely: Ganja, Mingache, Saki, Qabala, Imisli, Xachmaz, Sirvan, Sumgayit and Baku. A distribution chart of power load and generation for the aforementioned nine areas is shown alongside. The breakdown of the total load of 3,794 MW against a generation of 3,857 MW during winter peak is shown alongside. The region of Baku consumes large parts of the electricity provided compared to the country of Azerbaijan and is the main load center, accounting for over 40% of national demand.

In 2014 approx. 62% of the electricity generated in Azerbaijan was consumed by the industrial, construction and domestic consumers. The mining & minerals along with refining & petrochemicals business account for a major portion of the industrial power consumption. The Absheron peninsula which includes Baku and the industrially zones of Sumgayit, are among the main load centers in Azerbaijan accounting for almost half of the total energy demand in the country.



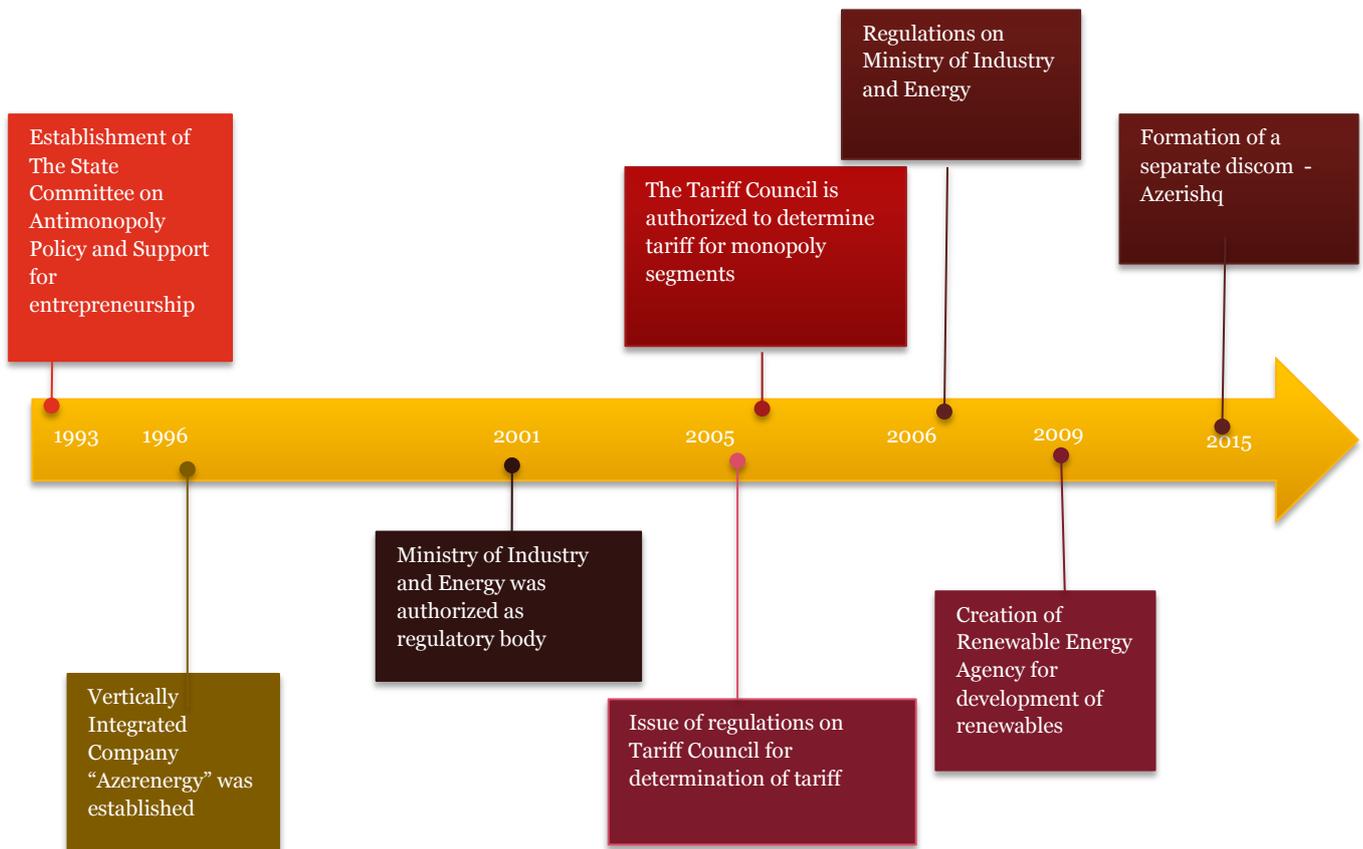
Power Exports

In 2014, Azerbaijan produced around 24.7 TWh of electricity, while the country's electricity consumption amounted to 19.7 TWh. The country has managed to export electricity to many neighboring countries and the export volumes over the last few years are indicated in the chart alongside.



1.3. Sector regulation

In Azerbaijan, the key reforms have been around establishment of regulatory bodies, regulations for determination of tariff and promotion of renewables. The key regulatory milestones in the power sector, is represented in the schematic diagram below:



As can be seen from the above schematic, the major restructuring of the power sector was started in the year 1996 when the single vertically integrated company "Azerenergy" was formed and functions of power generation, transmission and distribution were allocated to this company. In 2001, the Ministry of Energy (MoE) was established to act as the regulatory body and for the protection of consumer interests. The MoE

functions as per the regulations on the Ministry of Energy issued by Republic of Azerbaijan in 2006. Meanwhile, in 2005, the Tariff (Pricing) Council was established to determine the tariff for monopoly segments including power. The regulations for determination of tariff were also issued in 2005.

The development of renewable energy in Azerbaijan is entrusted to the Renewable Energy Agency, which was established in 2009. Since then, there has been various regulations for development and promotion of renewable and alternative sources of energy.

2. Power sector development and investment plan

2.1. Objectives driving sector development

Power sector development in Azerbaijan was steered by the Government’s State Program for Development of the Fuel and Energy Sector in Azerbaijan for the period from 2005–2015. The program outlined the priority development targets for Azerbaijan’s fuel and energy sector and established institutional actions for enhancing its operational effectiveness. It is planned to increase the generating capacity of renewable energy sources to 7702 MW including electric solar energy 2065 MW, thermal solar energy 4500 MW, biomass 515 MW, wind power 562 MW, small hydro power plants of 60 MW until 2020.

Key thrust areas for the power sector in Azerbaijan

Increasing share of RE in power generation

Focus on rehabilitation and further expand power distribution network across Azerbaijan

Leverage export potential which includes plans of exporting power to Afghanistan among CAREC countries

Reduce losses in transmission and distribution of electricity

Focus on Energy Efficiency initiatives in the power sector

Increasing participation of private /other foreign players in the power sector

Key Power Sector Targets

Focus on issues of renovation and replacement of the outdated generating capacities of the power transmission system.

The technical loss level in Azerbaijan’s electricity distribution networks is planned to be reduced from 16.5% to 6.5% by 2020.

The level of losses of energy transmission lines is planned to be reduced from 4.3% to 2.8% by 2020

The Energy Ministry plans to commission new facilities with a capacity of 2.3-2.8 GW by 2020.

Government focus on Alternative Energy sources

Given Azerbaijan’s reliance on internal production for its entire total energy consumption, power generated to a great extent relies on the exploitation of its available oil and natural gas reserves. The government has been focusing on initiatives towards creation of Renewable Energy specific policies and regulatory frameworks. Specifically, the formulation of a national strategy pertaining to the use of alternative/clean energy based sources and RES for 2012–2020 was initiated in December 2011.

There has been an increasing focus on leveraging potential of renewable energy sources (RES) in Azerbaijan driven by enactment of the State Program on the Use of Alternative and Renewable Energy Sources in 2004.

State Agency on Alternative and Renewable Energy Sources (SAARES) in Azerbaijani is responsible for the development and implementation of RE projects.

A National Strategy on the use of alternative and renewable energy sources for the period 2012-2020 is being prepared by SAARES and by the Ministry of Energy (MoE).

A major policy document "Renewable energy strategy" was adopted in 2004 and the State Strategy on Use of Alternative and Renewable Energy Sources (2012-2020) was prepared by the Decree of the President of Azerbaijan Republic dated 29 December 2011.

State Strategy on Use of Alternative and Renewable Energy Sources (2012-20) – key areas



Azerbaijan 2020

In December 2012, the President of the Republic of Azerbaijan, Ilham Aliyev signed a decree that approved the “Development Concept. Azerbaijan – 2020: Outlook for the future”. The development strategy of is based on the forecast that by 2020 Azerbaijan will be a fully competitive and developed State. The decree fixes the principal guidelines for sustainable growth as: the improvement of social welfare, the efficient management of the State, the supremacy of law, human rights and freedoms and the involvement of civil society in public life. Key focus areas for the sector by 2020 are:

- Implementation of stimulating measures in order to accelerate the use of renewable energy sources
- Scientific and technical capacity building
- Continue training of specialists
- Awareness raising for energy consumers
- Promoting the active participation of the private sector
- Flexible regulation of energy tariffs
- Enforcement of legislative framework

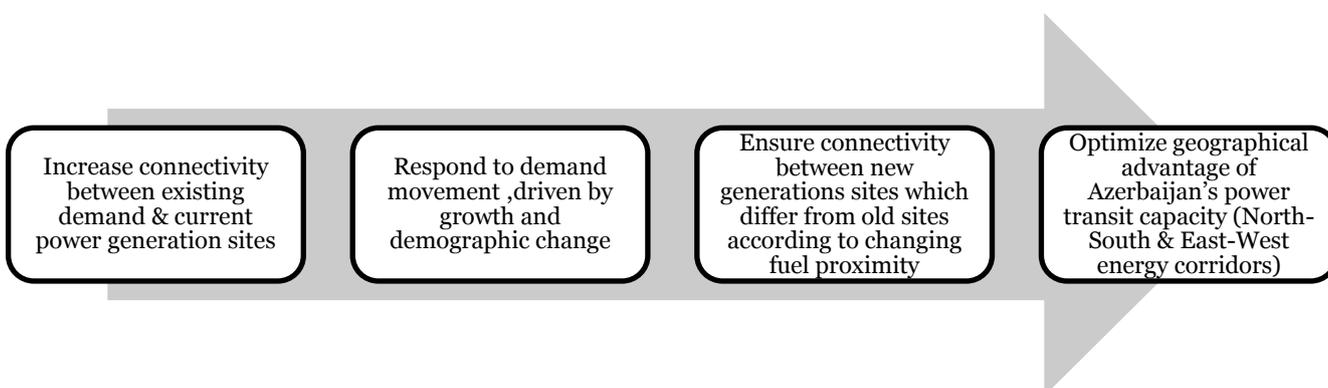
Azerbaijan in the coming years will focus on the development of renewable energy, Azerbaijan currently aims to significantly increase its renewable energy capacity to almost 2.5 GW by 2020. Azerbaijan also aims to increase wind energy capacity to 800 MW and solar PV to 600 MW by 2020. Given the added potential of solar thermal systems, solar energy seems to be the most promising form of alternative energy and is expected to account for almost 950 MW of power generation capacity by 2020. Biogas is expected to grow to 125 MW, geothermal to 150

RE development will reduce the use of gas in the domestic market and increase export volumes

By 2020, the country plans to increase this figure up to 20 percent.

MW, and small hydropower between 80 MW to 150 MW.

Azerenerji principal focus areas for power generation & transmission



State program for socio-economic development of the Baku city and its settlements (2014-2016)

The Presidential decree of the “State program for socio-economic development of the Baku city and its settlements in 2014-2016 year” was approved in January, 2014. This is primarily aimed at improving the demand-supply situation as well as improving the quality of power supply in the capital city of Baku and its vicinity. Key envisaged objectives of the program are:

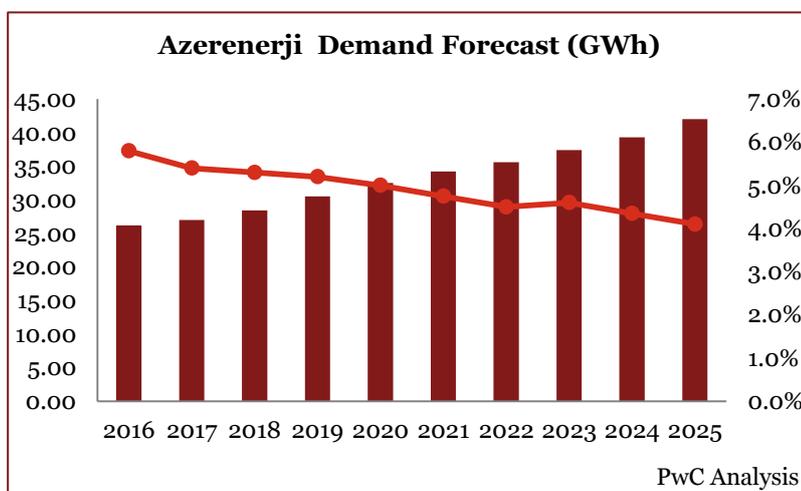
Improvement of electricity supply, based on the results of successful implementation in 2011-2013, is one of the objects that will be achieved.	The rehabilitation / modernization of existing thermal power plants and the construction of new plants.	Azerenerji JSC and Baku Electric Distribution Company are nominated as entrusted with further improving the electric power supply.
---	---	--

2.2. Projected supply and demand

Due to its large hydrocarbon reserves, Azerbaijan will continue to rely mainly on thermal power plants for power supply. Besides oil-fired steam turbines, which are used in the oldest power plants and relatively more modern combined cycle gas turbines, Azerenerji has a high number of modular gas engine power plants. They were mainly ordered during the mid-2000’s when peak demand could not be satisfied domestically. In these years the power exchange balance was negative. Currently with Azerbaijan turning a net power exporter issues with peak power production are no longer faced. The table above captures the overall peak demand vis a vis demand supply balance between 2016 to 2020.

	2016	2017	2018	2019	2020
Peak Demand (MW)	4,350	4,600	4,850	5,100	5,360
Demand / Supply Balance (MW)	1,598	1,348	1,378	1,738	1,208

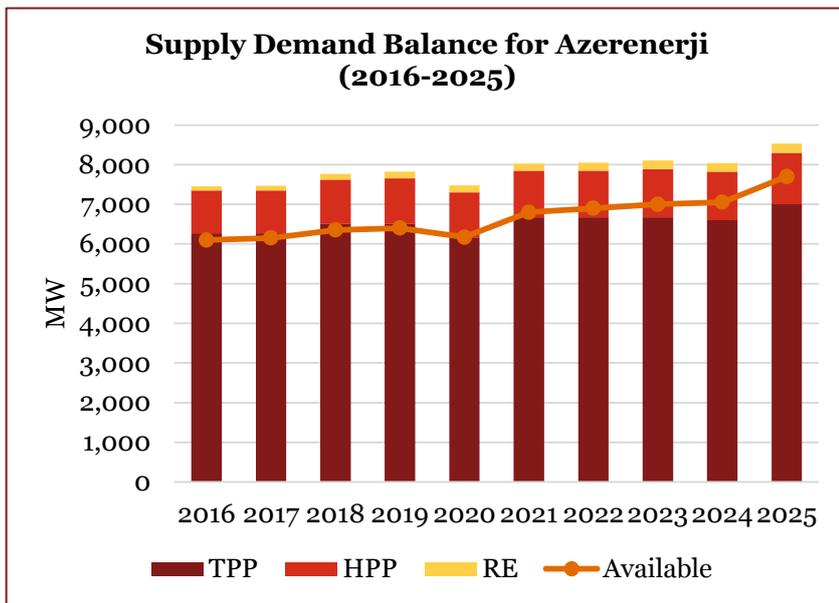
It is envisaged that Azerbaijan’s large hydrocarbon reserves will continue to form the mainstay of the power generation to ensure energy security in the long run and to boost electricity trade with the neighboring countries. This is expected to be complemented by renewable energy sources in the near future.



With industry segment expected to drive future power demand, the growing industry demand will be concentrated in the Baku and Absheron area. The level of energy consumption in this key region, and also the importance of the grid stability will further grow in the future. Besides, given the efforts of diversifying the economy, the oil and gas industry is expected to see rapid growth linked to oil & gas prices in the future. With the exploration of new gas and oil fields this sector will probably expand in the future and continue delivering substantial

contribution to the Azerbaijani economy.

A significant part of power sector spending could be focused towards upgrading of the distribution network with increased focus on reducing losses and improving collection rates. With sizeable investments focusing on power generation in the last decade, the government's current priority is renovation and expansion of the distribution networks. Key issues in the sector are due to the obsolete power infrastructure in the districts coupled with electricity losses in transmission and distribution.



Substantial additions are then planned through 920 MW Yashma TPP and the 300 MW Agh Sheher CHP plant's. Yashma TPP with 920 MW, Agh Sheher CHP with 300 MW and additional 2,000 MW of CCGT over the period 2021-2025 are seen as important investments in the generation sector required to avoid a supply deficit in the medium term. Given the planned retirement & R&M activity of existing power plant a key aspect is the fluctuating available power capacity of power plants. Supply Demand Balance of Azerbaijan's Power System Plan envisages retiring almost 1200 MW of

power generation capacity by 2022.

With planned capacity additions and retirements of plants, Azerbaijan's power sectors looks to have adequate capacity to meet the projected peak demand, export power to neighboring countries and still leave a reserve for emergencies. However, the key concern is the falling reserve margin, which is expected to fall from current levels of 23% to 14.8% by 2025. To circumvent the fall in reserve margins, Azerenerji has a target reserve margin rate of 25% for the years of 2018-2023 and 20% for the years from 2024².

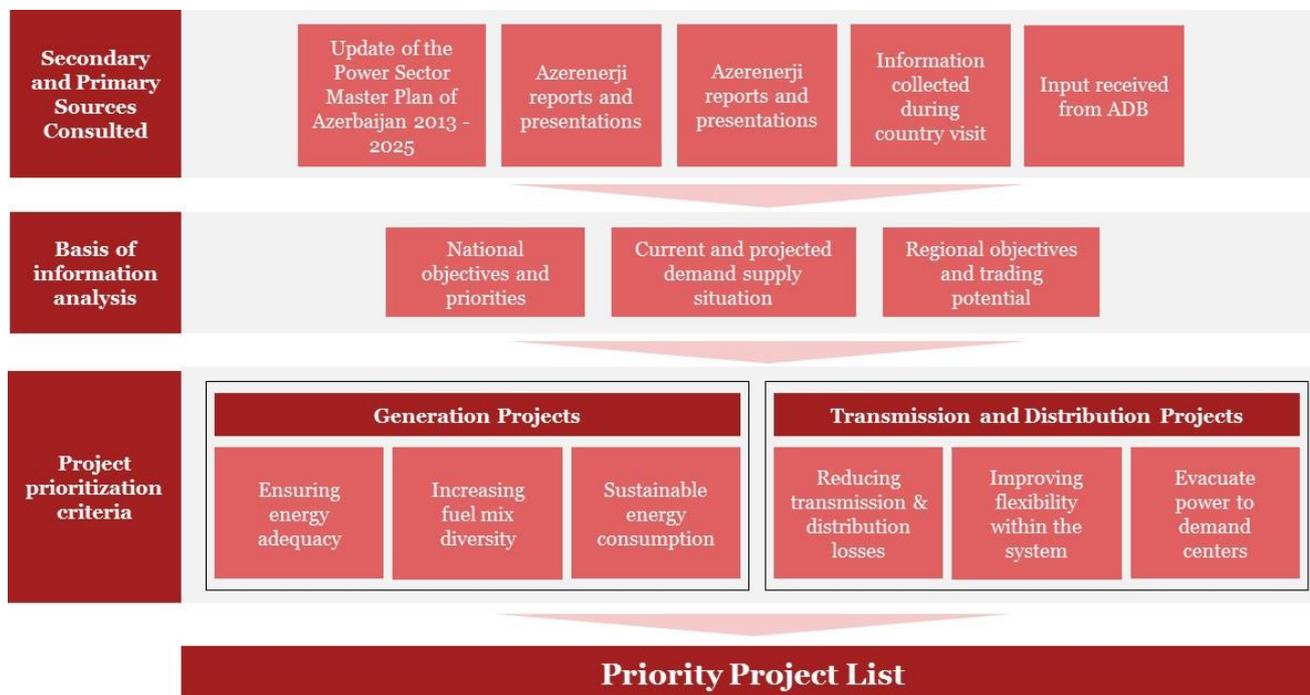
Trading potential

With its present volumes of electricity exports and oil & gas reserves, Azerbaijan does not have demand energy concerns, although the demand is slated to increase significantly in the years to come. However, according to Azerenerji estimates, demand for electricity is expected to increase by almost 140% by 2025. The peak demand is also expected to double the demand³ by 2022–2023. A key development in the power sector took place in the 2000's with the shift from oil to gas in thermal generation. Azerbaijan is a net energy exporter and its exports power to Russia, Iran, Georgia and Turkey. In the future, Azerbaijan intends to expand its electricity network by exporting electricity to Afghanistan and Iraq through Iran. Azerbaijan has also agreed terms with Russia and Iran towards synchronizing its energy network with their respective network systems.

- The present power demand in Azerbaijan is being met satisfactorily by domestic generation assets of Azerenerji generation capacities.
- Among the expansion plans for Azerenerji include retiring of some of the old soviet era power plants. The focus of expansion and improving transmission facilities has primarily been in the eastern part of the country.
- Demand for electricity is expected to increase by almost 140% by 2025. The peak demand is also expected to double by 2022–2023.
- Azerbaijan plans to export electricity through Iran to Afghanistan and Iraq.
- Current Export Potential of approximately 4.5 Bn kWh with the potential to increase up to 6 Bn kWh.

2.3. Approach and key considerations for project prioritization

Based on the assessment of the current and targeted macroeconomic and sector status, we have framed our approach to prioritize projects as shown below:



An initial list of projects were identified from the Update of Power Sector Master Plan for Azerbaijan (2013), Azerenerji reports & presentations, and in consultation with ADB. This was further discussed, during the country visit which took place between 23rd and 26th October 2015, with the CAREC energy focal points, ministries and various development partners. A holistic view of the power sector was obtained to understand the key government priorities, thrust areas and taking into consideration the existing and forecasted demand supply situation vis a vis the regional objectives. This provided us with an understanding of the priorities for the power sector based on which we worked out the different categories of the projects to be considered and also the key considerations/ criteria for project prioritization. A consultative methodology for prioritizing the projects was adopted, which included secondary research followed by interactions during country visit, inputs from our national consultants on a regular basis and subsequent analysis and review, and the list of priority projects was arrived at.

Project selection criteria – Generation Projects

The schematic alongside represents the key criteria for selection of generation projects from the initial list developed. These criteria, along with rationale for selection, are further discussed in brief below.

Criteria	Overview
Ensuring energy adequacy in the long term	<ul style="list-style-type: none"> • Demand for electricity is expected to increase by almost 140% by 2025. The peak demand is also expected to double by 2022–2023. • Capacity additions are required in order to keep pace with growing demand and considering Azerbaijan’s export plans.
Increasing fuel mix diversity	<ul style="list-style-type: none"> • A heavily skewed energy with the share of natural gas and heavy oil being ~90%, necessitates diversification of fuel mix. • Key focus areas for diversification are leveraging the potential for hydro and increasing the share of RE in the energy mix. • Govt. focus areas for RES include hybrid (solar, wind and biomass) facilities, with envisaged involvement of the private sector.
Sustainable Energy Consumption	<ul style="list-style-type: none"> • Azerbaijan being one of the most energy intensive countries among CAREC members with energy intensity levels pegged at 0.16 (energy user per unit of GDP). • The improvement of Azerbaijan’s energy intensity and energy efficiency are essential steps towards more sustainable energy consumption.

Project selection criteria – Transmission Projects

The schematic alongside represents the key criteria for selection of transmission projects from the initial list developed. These criteria, along with rationale for selection, are further discussed in brief below.

Criteria	Overview
Reducing losses & rehabilitation of existing infrastructure	<ul style="list-style-type: none"> • Majority of the T&D facilities have been in operation for 30 years and require urgent rehabilitation & modernization. • Losses during transmission are estimated to be between 4-5%, while distribution losses are estimated to be between 15-16%. • Currently approx. 75% of 6-10 kV distribution lines and 65% of 35 kV distribution lines and substations need to be reconstructed in the Azerenerji Distribution network.
Improving flexibility within the system	<ul style="list-style-type: none"> • Transmission capacity expansion is required in line with the increasing generation capacities and growing demand. • The focus of expansion and improving T&D facilities primarily needs to be in the eastern part of the country.
Evacuate power to demand centers	<ul style="list-style-type: none"> • New power lines needed to address future demand in Absheron peninsula with the capital Baku and the Sumgayit area due to growing industrial activity. • While critical renovation works were undertaken in 2006, a major portion of the low voltage network still needs to be rehabilitated.

2.4. List of priority projects and investment requirements

The list of generation, transmission and other key energy projects are presented in the tables below. It may be noted that the proposed time frame for commissioning of these projects is between the years 2017 and 2023:

List of Power Generation Projects

No.	Projects	Investment Type	Brief Description	Investment Requirement (USD Mn)	Project Selection Criteria		
					Ensuring energy adequacy	Increasing fuel mix diversity	Sustainable energy consumption
1.	Yashma 920 MW, CCGT	New	Proposed 920 MW CCGT power plant to be constructed within the Yashma locality. Yashma seen as a priority investment in the generation sector required to avoid a supply deficit in the medium term.	959	✓	-	-
2.	Hovsan 600 MW CCGT	New	Proposed 600 MW CCGT power plant will provide Baku White City. Almost half of the electricity produced by Hovsan power plant will be directed for the energy supply of the White City.	625	✓	-	-
3.	Wind Farm Project In Caspian Sea, 200 MW	New	Proposed 200 MW wind farm will be built on the platforms in the Caspian Sea between the islands of Pirallahi and Chilov. This project will help diversify the power generation	330	✓	✓	-

No.	Projects	Investment Type	Brief Description	Investment Requirement (USD Mn)	Project Selection Criteria		
					Ensuring energy adequacy	Increasing fuel mix diversity	Sustainable energy consumption
			mix.				
Total				1914			
Investment requirement for Project No. 4 & 2 are as per updated estimates from the “Update of the Power Sector Master Plan of Azerbaijan 2013 – 2025”							
Project 4 is based on feedback obtained from country visit :Azerbaijan’s RE agency (SAARES) which indicated it as priority ,Investment requirement were estimated based on information available from secondary sources - http://renewables.seenews.com/news/plans-for-200-mw-caspian-sea-wind-park-filed-with-azerbaijan-govt-report-499346)							

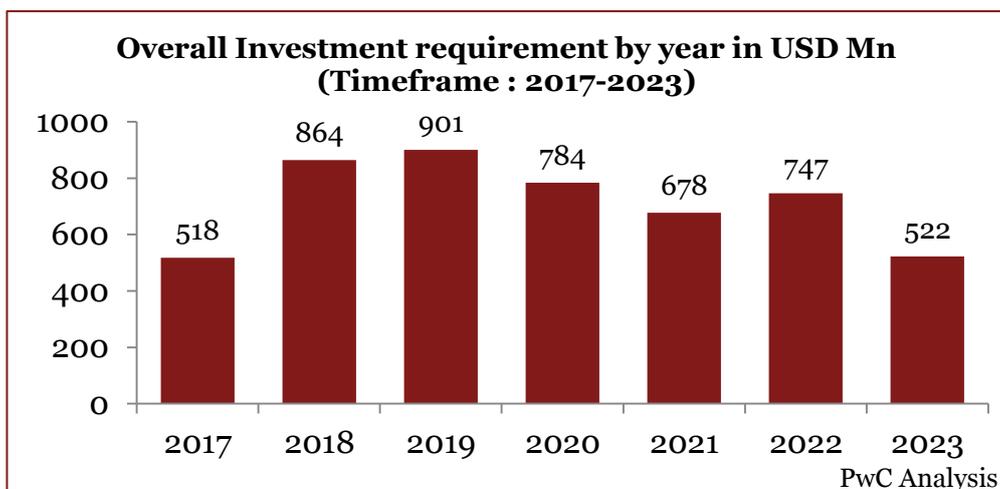
List of Power Transmission Projects

No.	List of Power Transmission Projects	Brief Description and Key Benefits	Investment requirement (USD Mn)	Project Selection Criteria		
				Reducing losses & Rehabilitation existing infrastructure	Improving flexibility within the system	Improving flexibility within the system
1.	330 kV Yashma Plant - Yashma Substation	Proposed 8.4 km long 330 kV OHTL and substation aimed at evacuating power from Yashma power plant.	32	-	✓	✓
2.	330 kV Yashma Plant - Sulu Tepe Substation	Proposed 37.4 km long 330 kV OHTL and substation aimed at evacuating power from Yashma power plant and a substation at Sulu Tepe.	35	-	✓	✓
3.	220 kV Yashma Plant - Yashma Substation & Sanaya Qovsagi Substation	Proposed double circuit 4.6 km long 220 kV OHTL and substation aimed at evacuating power from Yashma power plant and a substation at Sanaya Qovsagi.	38	-	✓	✓
4.	220 kV Yashma Plant - Absheron Substation & Boyuk Sor Substation S	Proposed double circuit, 23.5 km long 220 kV OHTL and substation at ABsheron. Absheron peninsula with the capital Baku and the industrially developed Sumgayit, is the main load center in Azerbaijan.	70	-	✓	✓
5.	Putu - Sirvan 330 kV DC OHL	330 kV transmission line from Putu to Sirvan will help improve overall flexibility in the system in the region.	25	-	✓	✓
6.	Azerbaijan TPP - Mingachevir HPP - Salutapa 330 kV DC OHL	Reinforce existing network by a new 330 kV OHL Azerbaijan TPP - Mingachevir HPP - Salutapa to reduce overloading of existing lines.	110	-	✓	✓

No.	List of Power Transmission Projects	Brief Description and Key Benefits	Investment requirement (USD Mn)	Project Selection Criteria		
				Reducing losses & Rehabilitation existing infrastructure	Improving flexibility within the system	Improving flexibility within the system
7.	Renovation & expansion of Baku Electric Grid	Baku Electric Grid requires immediate investment in renovation and expansion of its network structure. It may be noted that 40% of the 35 kV and 20 kV substation & 10/6 kV transformers needed to be renewed and 20 % of the 20 kV and 35 kV distribution lines , 6 kV and 10 kV distribution lines,0.4 kV distribution lines need to be renewed. These projects will ensure improved reliability of the power supply.	500	✓	✓	✓
8.	Rehabilitation & expansion of existing distribution infrastructure (previously under Azerenerji,now overseen by Azerishiq)	In case of Azerbaijan's distribution network, 40% of 10-6/0.4 kV substations, 80% of 0.4 kV distribution lines, 50% of 6-10 kV distribution lines and 90% of 35 kV distribution lines and substations need to be reconstructed. R&M will help contain distribution losses across Azerbaijan, which was a key focus area.	2600	✓	✓	✓
Total			3410			
Investment requirement for each of the T&D projects is as per estimates from the "Update of the Power Sector Master Plan of Azerbaijan 2013 – 2025"						

Project implementation and year-wise investment requirement for the power generation & transmission projects

The proposed investment plan comprises of the generation and transmission projects with an estimated investment requirement of USD 5,324 Mn of which 94% or 5,014 Mn is required between 2017 and 2023. We assume a project start-up year of 2017 and completion period of 7 years with a major portion of the investment envisaged between the years 2018-2020. The chart



alongside captures the estimated yearly investment requirement till 2023 for the priority projects assuming project start-up from 2017 onwards. Based on the priority projects list, the estimated investment requirement is USD 5,324 million. Investment requirement between 2017 and 2023 is estimated at USD 5,104 million or 94 % of the total estimated investment plan for Azerbaijan.

Assumptions:

- TPPs to commence construction in 2017 with a completion period of 7 years;
- HPPs & RE projects to commence construction in 2018 with completion period of 4 years.
- Construction of new transmission to commence construction in 2019 with a completion period of 4 years.
- Rehabilitation & expansion of Baku Power Grid and other Azerenerji infrastructure projects to commence in 2017 with a completion period of 8 years.

Investment phasing

Year	2017	2018	2019	2020	2021	2022	2023	2024
% of project (RE projects)	15%	25%	30%	30%				
% of project cost (Transmission Projects (OHLs))			15%	25%	30%	30%		
% of project (TPPs)	10%	20%	20%	16%	14%	10%	10%	
% of project (R&M of Distribution)	10%	15%	15%	12%	12%	16%	10%	10%

3. Options for funding and financing power sector investment plan

The updated Azerbaijan Power Sector Master Plan proposed a cumulative investment of approximately USD 10.7 Billion in the power generation sector and approx. USD 4.5 Billion towards power transmission.

It is proposed that the Azerbaijan TPP be replaced by more efficient CCGT units instead of oil-fired steam turbines, be it on the same location or preferably around the Absheron region. It proposed that major portion of the new power projects be based on CCGT technology instead of gas-turbines. The update of the Azerbaijan Power sector Master plan suggests the construction of a new power plant based on Combined Cycle Gas Turbine technology to be commissioned by 2020, on the same lines of the Yashma project. Furthermore the Agh Sheher 300 MW combined heat and power plant (CHP) is proposed within the White City project in Baku, providing district heating and thus increasing the efficiency by using also thermal energy. The table below captures the investment requirement in the generation sector for TPPs:

Tentative Cost Estimate of Capacity Additions Year	Plant	Type	Capacity additions (MW)	Investment requirement (USD Million)
2018	Yashma	CCGT	920	855
2020	Agh Sheher	CHP	300	1,188
2021	Azerbaijan	CCGT	600	1,743
2023	Samur	HPP	100	1,886
2024	Azerbaijan	CCGT	600	2,442
2025	Other CCGT Plant	CCGT	185	2,613
Total			2,705	10,727

Source: Program for social-economic development of the regions of the Republic of Azerbaijan (2014-2018) for Yashma CCGT, Agh Sheher CHP and Samur HPP

According to Azerbaijan's update of the Power sector master plan, investment requirements in the transmission network of Azerbaijan amount to USD 3.5 -4.2 Bn for expansion and reinforcement for investments related to new transmission lines and related investments.

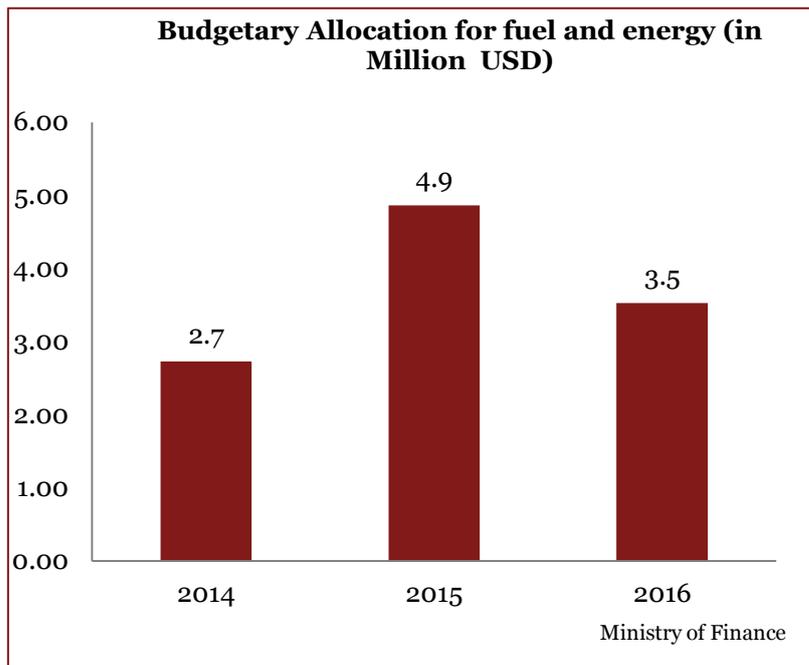
In line with the investment plan for Azerbaijan from 2017-23, proposed funding from National Government budget, other governments, assistance from development partners (ADB and World Bank) has been estimated and the funding gap has been determined which needs to be filled up from other sources such as private investors, PPP etc. The following section describes the proposed funding from each source in details.

3.1. National government

The main objective of state budget of Azerbaijan Republic is to solve the economic, social, and other strategic programs and problems of the country, to ensure the collection and effective use of financial funds for the exercise of state functions as defined by legislation.

Since 2009, Azerbaijan has been signatory to the International Renewable Energy Agency (IRENA) and has created the State Agency on Alternative and Renewable Energy Sources (SAARES). A national strategy on the use of alternative sources of energy and RES for the period 2012–2020 is being prepared by SAARES and by the Ministry of Energy (MoE).

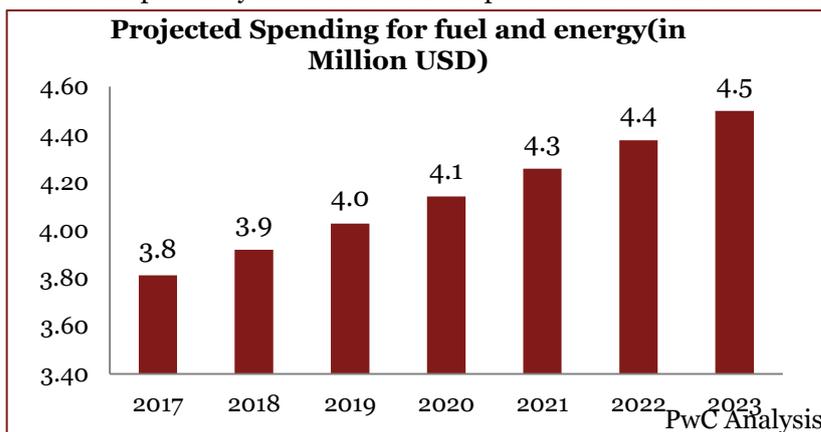
Further **Azerbaijan 2020: Vision of the Future development** concept includes provisions on the alternative and renewable energy sector. Azerbaijan is planning to generate 20 per cent of its electricity from renewable sources by 2020. Loans and investments are being made from the state budget in order to ensure development.



So it can envisaged that budget allocation would be primarily towards the development of alternate sources of energy/ renewable energy.

Government budgetary support over 2017-2023 is estimated at over USD **29 Mn** based on the following assumptions:

- Average GDP growth of 2.4% till 2023 (as per IMF projections till 2020).
- The budgetary support was assumed to be 0.006% of GDP based on trend between 2014 to 2016

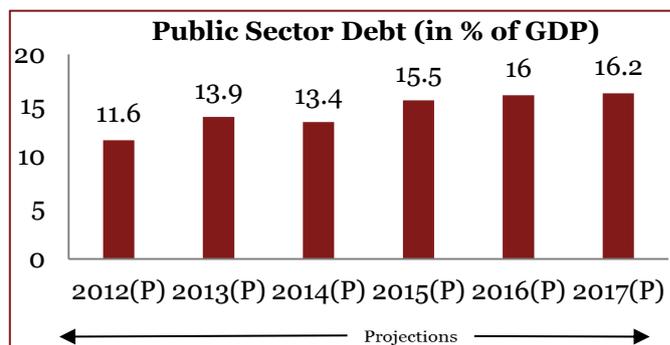
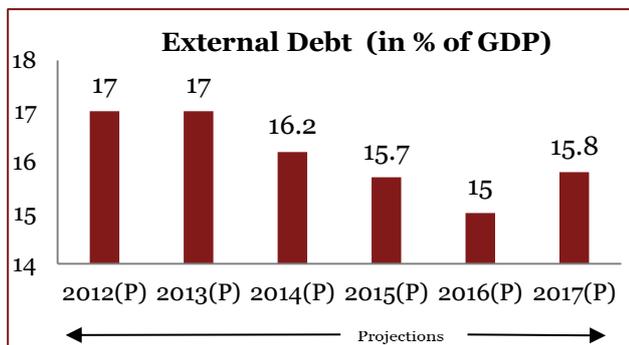


The government's medium-term fiscal framework envisages an investment-led expansion addressing critical investment needs in energy and transport.

Government's ability to borrow

The government's ability to borrow is broadly based on the current level of debt and the projected level of debt in the near future. The following section provides a broad overview on the overall ability of the Government of Azerbaijan to borrow from various sources based on the debt sustainability.

Debt Sustainability Analysis



Azerbaijan's total external debt is low and it is predominantly long term and from multi-lateral agencies. The debt service ratio had shown an increase from 2010 to 2014. Interest rate is mostly concessional and the grant element is also high. Thus, it can be envisaged that that external debt is sustainable and the country will not face any problem to finance external debt in the near and medium term.

The key facts relating to the debt situation in Azerbaijan are as follows:

- In 2014, Azerbaijan's public debt amounted to **15%** of GDP, of which foreign debt was **8.6 %** of GDP
- Recently the government increased the upper limit of domestic state debt limits from Manat 1.5 Bn to 4.5 Bn.
- According to data published by the Ministry of Finance in February 2016, Azerbaijan's public external debt stood at Manat 10.75 Bn (US\$6.9bn) as at January 2016.
- Public debt is expected to rise further due to lower oil prices and the impact of the December 2015 currency devaluation.

Based on such assumptions, the average net borrowing by the Government of Azerbaijan Republic is estimated to be limited to around **USD 650 Mn** per year.

Impact of Decline in Oil Prices

The rapid decrease of oil revenues—the country's main economic driver for the past 10 years—poses real threats to macroeconomic and financial stability in Azerbaijan. The country faces a huge current account deficit on account of lower oil prices, weak regional growth, currency devaluations in its main trading partners, and a decline in hydrocarbon production in 2016. Thus, the Azerbaijan government plans to use about USD 500 Million in SOFAZ assets in 2016 to reduce the balance of payments deficit.

On account of continuous fall in the oil prices and public investments, economic growth in Azerbaijan slowed down resulting in lowering of construction activity in the country. The economic growth rate is forecast to decrease by 1.9% in 2016 from 1.1% in 2015 due to low oil prices, tight monetary conditions, and deterioration of real income due to inflation. Decreased oil prices in international markets had an immediate negative impact on budget implementation, budget revenues for end of 2015 fell by 12% and state expenditures dropped by 16% compared to figures in 2014. Higher social spending (about 4% of GDP) and larger public investment, including construction of the Southern Gas Corridor pipeline (4.25% of GDP) is expected to increase the consolidated

fiscal deficit to 14% of GDP in 2016. This may impact the budgetary allocations to the power sector in the medium term.

3.2. Assistance from development partners

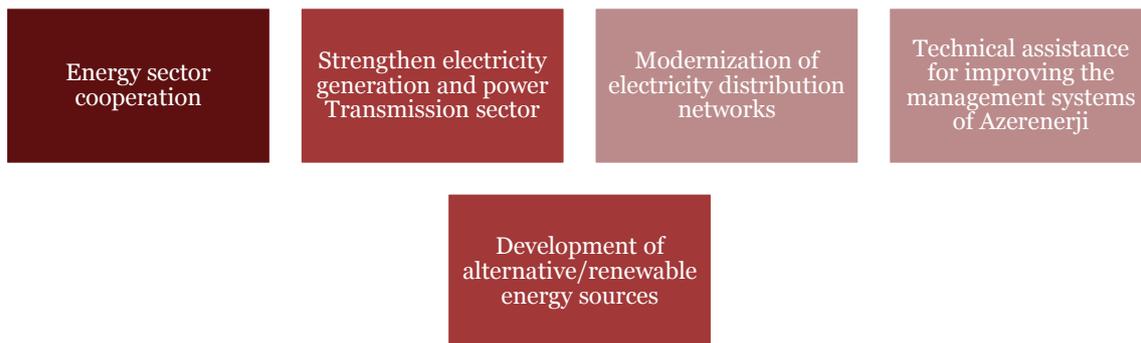
Asian Development Bank (ADB): ADB's engagement in Azerbaijan's energy sector started in 2006 with support to renewable energy development. ADB assistance for Azerbaijan prioritizes infrastructure projects that address gaps and limitations in the burdened power systems, and projects that rehabilitate and modernize the power infrastructure.



EBRD: EBRD has been involved in Azerbaijan's power sector since 1995 through the financing of two hydropower plants. As of end-November 2013, the Bank has signed a total of 138 projects with cumulative investment value of EUR 1,577 Million since initiating its operations in Azerbaijan in 1991. The total value of these projects was EUR 6.6 Billion. 35 per cent of the Bank's cumulative investments were made in the energy sector, 33 % in the financial institutions sector, 21 % in the infrastructure sector and 11% in the corporate sector. EBRD's key focus areas in Azerbaijan include the following:



World Bank: The Country Partnership Framework (CPF) for Azerbaijan covering the period FY16 - FY20, sets out the World Bank Group (WBG) support to the country on its path toward a sustainable, inclusive and private sector-led growth underpinned by a diversified asset base. World Bank's key focus areas in Azerbaijan include the following:



KfW (KfW Development Bank/ Kreditanstalt für Wiederaufbau): KfW Development Bank made significant contributions towards alleviating major power supply concerns in Azerbaijan . KfW Development Bank works closely with the Azeri government on projects in the renewable energy sector. KfW’s key focus areas include:



Apart from above agencies, there are other major development partners in the region like Islamic Development Bank ,EU, OSCE , UNDP. The table below lists some of the engagements of the development agencies in power sector of Azerbaijan

Development Partner	Areas of involvement
EU	Sustainable energy planning and energy saving
IDB	Construction of power plants (Janub power plant together with OFID and the Abu Dhabi Fund for Development)
OSCE	Energy efficiency in buildings
UNDP	Promoting sustainable energy

Assistance from multilateral financing institutions will play a pivotal role in Azerbaijan’s power sector. The support from multilateral funding institutions is primarily required in the power transmission, distribution and to a certain extent in the renewable energy space. The table below provides an analysis of the trends in development partner support to power sector in Azerbaijan:

No	Sector	Current Degree of Multilateral Support	Expected Trend	Comments
1	Power Generation	Medium	↓	Currently there have been funding assistance from the development partners in case of some of the power generation projects. However the trend is expected to decrease in future.
2	Power Transmission and Distribution	Medium	↑	The funding assistance from the development partners in transmission projects is expected to increase in future based on the investment requirements.
3	Renewable Energy	Medium	↑	Azerbaijan's power sector needs continued funding from the development partners towards the renewable energy sector to help leverage Azerbaijan's existing potential for solar, wind, and small hydropower as it looks forward to diversify its energy mix which is heavily dependent on Natural gas and oil.

Assistance from the development partners – Future trends

It is envisaged that ADB and World Bank would continue to invest in Azerbaijan's power sector.

WB estimates

Year	Amount (in USD mn)	Remarks
2016	5	Based on historical trends
2017	5	
2018	5	
2019	5	
2020	5	
2021	10	Increase in lending by 100% for the next CPS
2022	10	
2023	10	
Total	50	

ADB estimates

Year	Amount (in USD mn)	Remarks
2016	250	Based on COBP
2017	250	
2018	250	
2019	200	Based on the average proposed lending for 2014-2018
2020	200	
2021	200	Increase in lending by 10% based on past trends
2022	220	
2023	220	
Total	1,540	

Thus, based on Country Partnership Strategies/ Country Operations Business Plan, funding from key development partners for power sector projects is estimated to be **USD 1590 Mn** over 2017-2023.

3.3. Other governments

Countries like UK, Japan, and Norway have invested in Azerbaijan's energy sector in the past and it can be envisaged that they would continue to invest in the power sector even in future.

United Kingdom: UK is one of the top investors in Azerbaijan with enormous presence in the oil and gas sector. Many multi-million dollar projects include privately built power generation capacities which are being planned in Azerbaijan and these might present huge opportunity for UK companies.

Japan: Tomen Company (Japan) and Azerbaijan Scientific-Research Energy and Power Design Institute have installed two wind towers in Absheron. The company had also prepared a feasibility study for the installation of a 30 MW wind power plant in the Gorbustan region

Norway: In November 2014, the second unit of the Sheki Hydropower Station was launched with funding from EU and government of Norway and equipment from the Chinese company 'Hunan Allonward'.

3.4. Envisaged funding probability of priority projects

Overview of the investment plan and financing sources for 2017-2023



It is envisaged that from 2017 to 2023 the estimated requirement for development of the power sector is USD 4,203 Mn. Further it is estimated that the power sector is likely to receive USD 29 Mn as Government budgetary support and USD 1,590 Mn as assistance from development partners (from sources such as World Bank, ADB) over 2017-2023. The remaining is likely to be sourced from private sector and assistance from other countries. The envisaged funding probabilities from various sources are provided below.

Envisaged funding probability of priority generation projects

Projects	National Government	Other Governments	Assistance from Development Partners	Private Investment
Yashma 920 MW CCGT	Medium	Low	Medium	Low
Hovsan 600 MW CCGT	Medium	Low	Medium	Low
Wind Farm Project In Caspian Sea, 200 MW	Low	Low	High	Medium

Envisaged funding probability of priority transmission project

Projects	National Government	Other Governments	Assistance from Development Partners	Private Investment
330 kV Yashma Power Plant - Yashma S/S	High	Low	Medium	Low

Projects	National Government	Other Governments	Assistance from Development Partners	Private Investment
330 kV Yashma PLANT- Sulu Tepe S/S	High	Low	Medium	Low
220 kV Yashma Plant- Yashma S/S & Sanaya Qovsagi S/S	High	Low	Medium	Low
220 kV Yashma Plant- Absheron S/S & Boyuk Sor S/S	High	Low	Medium	Low
Putu - Sirvan 330 kV DC OHL	High	Low	High	Low
Azerbaijan TPP - Mingachevir HPP - Salutapa 330 kV DC OHL	High	Low	Medium	Low
Baku Electric Grid (renovation & expansion)	Medium	Low	High	Low
Azerenerji (rehabilitation & expansion)	Medium	Low	High	Low

3.5. Private sector participation

PPP in Azerbaijan

Azerbaijan lacks a dedicated Law dealing with PPPs or concessions. Azerbaijan's Civil Code and the Law on Protection of Foreign Investments do acknowledge concessions, yet, neither of them allude to a proper PPP/Concession. A single reference to concession is contained in the Law on Protection of Foreign Investments and is limited to concessions in the 51 natural resources sector and is restricted in its application to foreign investors. There are some sector-specific laws and other acts that cover privatization but do not regulate concessions either. The 2001 Law on State Purchase sets the basis for public procurement, organization and rules for public procurement procedures as well as selection of the contractor and complaints procedures. However this law is silent on PPP.

The economic development policy of the Republic supports private sector development. The Ministry of Economic Development is empowered to play a key role in public-private dialogue serving as a bridge between investors, local producers and the government

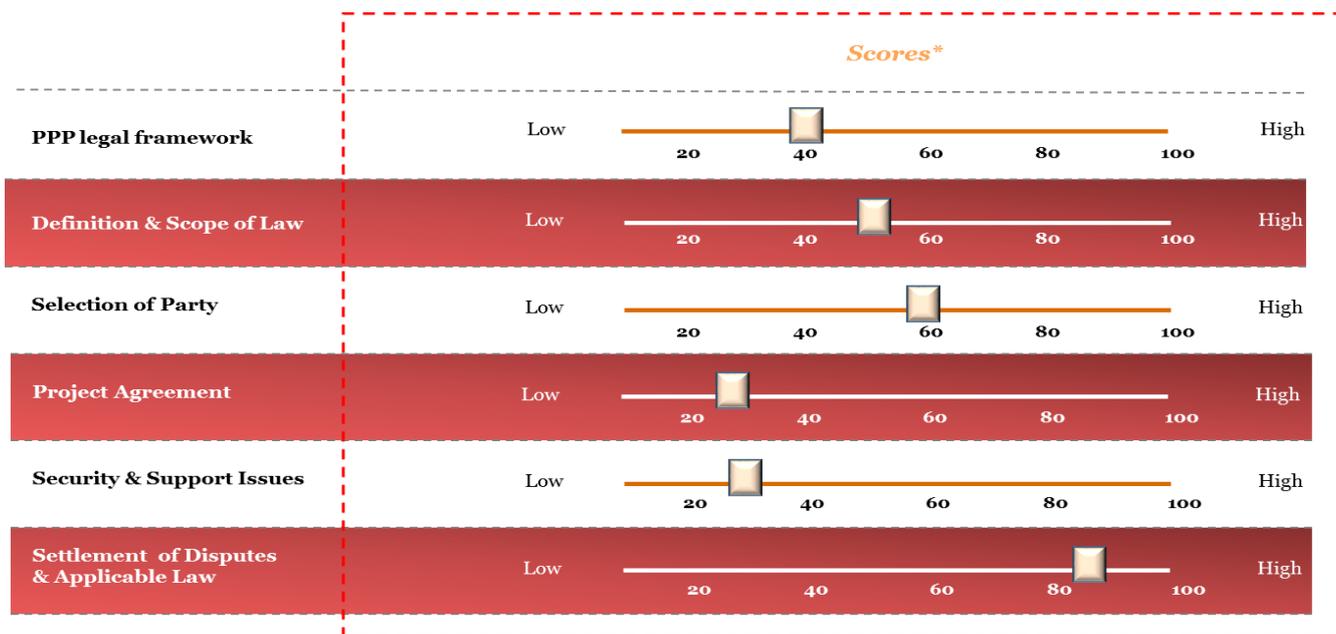
Azerbaijan is among those CAREC countries which has a very limited legal framework for PPPs that refer to modern day concession.

Economic Development Policy

The economic development policy of the Republic supports private sector development. The Ministry of Economic Development is empowered to play a key role in public-private dialogue serving as a bridge between investors, local producers and the government. The existing laws regulate Public Private Partnership on the following issues:



Quality of the PPP legislative framework in Azerbaijan



According to the EBRD “while the laws of Azerbaijan govern either privatization as the outright sale of assets to private sector or public procurement, they are largely silent on public works and services concessions as a way of structuring public-private partnership relations that lie in between these two extreme ends of possible relations of public and private sectors.”

Key focus areas for improving PPP in Azerbaijan

The concern areas in the existing PPP legal framework in Azerbaijan that need to be addressed to improve the overall PPP process are as follows:

Key Issues/ Areas of Intervention
<ul style="list-style-type: none"> Azerbaijan does not have a general concession Law. The Civil Code and the Law on Protection of Foreign Investments recognize concessions, but not quite explicit on the overall PPP process. (E.g. The Law on Protection of Foreign Investments contains only one article with relation to the concessions and it limits the concessions to natural resources and the concessionaires to be a foreign investors.
<ul style="list-style-type: none"> The existing regulation doesn't specify if a Private Party can create security interests over the project assets, rights or other valuable guarantees related to the project.
<ul style="list-style-type: none"> Standard project agreements contain clauses on government support/guarantee, but usually in the form of technical support. The law is silent on the provisions of providing financial or economic support to the contracting agency.
<ul style="list-style-type: none"> The Law doesn't mention about the step-in right of the lenders in case of default by the private party.
<ul style="list-style-type: none"> There is no provision to establish a centralized institutions to promote and institutionalize the PPP process.

4. Barriers to investments in power sector

In this section we have discussed some of the key issues related to investment climate and regulatory landscape which is resulting in inadequate investments in the sector.

Accountability and clarity in regulatory functions

In Azerbaijan, the Ministry of Energy (MoE) was set up in 2005 as the regulatory body for the industries, fuel and energy sector. The responsibilities of MoE are multi-functional and multi-dimensional which includes manufacturing of competitive industrial goods, the efficient use of energy resources, providing the protection of the interests of state in this area, preparing forecasts of energy demand and production, co-coordinating the activities of the state owned enterprises in the relevant field and promoting international co-operation of the area. The key functions of MoE in regulatory domain of power sector involves licensing, resolving consumer complaints and disputes and taking action against energy companies for non-compliance with legislation.

It may be observed that the MoE does various regulatory activities but is not authorized for tariff determination. The responsibility of tariff fixation is entrusted to a separate agency i.e. the Tariff Council. The Tariff Council establishes the tariff methodology, approves the tariff level proposed by regulated companies (including but not limited to energy), proposes changes to the legal framework as it relates to pricing; and settles disputes regarding price regulation and tariff application.

As such, it is observed that the regulatory roles have been distributed to different agencies which leads to issues in accountability and transparency. The absence of clear responsibility and accountability leads to regulatory ambiguity which discourages the development of a robust framework for economic regulation.

Government control over tariff and regulatory function

As mentioned above, the key regulatory activity of tariff determination is done by the Tariff Council. The Tariff Council acts pursuant to authority granted to it by Presidential Decree dated 26 December 2005, the Regulations on the Tariff (Pricing) Council, and the Resolution by the Cabinet of Ministers dated 9 March 2006. It is an executive authority, guided by the Constitution, laws, the President's decrees and executive orders, the Cabinet of Ministers' enactments and resolutions, and existing international agreements.

The Tariff Council has a Chairman and 12 additional Council members. The Chairperson is the Minister of Economic Development and the 12 Council members are Deputy Ministers (Finance; Taxes; Justice; Transportation; Industry and Power Engineering; Communication and Information Technology; Agriculture; Education; Health; and Labor) and deputy heads of Committees (Customs and Construction). There are no fixed terms, with the Chairman and members serving for the duration of their appointment by the President. The entire budget of the Tariff Council comes directly from the State budget.

As such, it can be observed that the Government has direct control in constitution as well as operation of the Tariff Council. In fact, the Chairperson and members of Tariff Council are Ministers and Deputy Ministers of the Government. Further, the MIE which is entrusted with other regulatory activities, also is a department of the Government. An independent regulator is key to ensuring transparency in the sector and increasing the confidence of stakeholders including investors.

Lack of regulatory control and enforcement

Although the Government has entrusted regulatory responsibilities to specific bodies, but these bodies do not have the desired power and autonomy to enforce the regulations and service standards. For example, the legislation allows the Governmental bodies to cancel or change decisions made by the Tariff Council. Regulatory decisions may also be cancelled by court rulings. Energy companies may appeal against a decision of the Tariff Council, either directly to the Council itself or through court action. Also, the Tariff Council has no power to impose fines or interfere if service standards are not met. As such, the mechanism for enforcement of regulatory norms and directions is not strong to ensure the efficient implementation of the prescribed regulations and directions.

Issues in capacity of regulator

The Tariff Council is responsible for determining tariff for diversified industries like the transport, telecom, industry, agricultural and natural resources, education, and health and energy sector including electricity. Further, MoE as the other regulatory body, is also entrusted to regulate various diversified sectors like industries, fuel and energy. Such diverse set of functions and industries require the regulatory bodies to have technical and regulatory experience in different industries and functions for discharging their responsibilities efficiently, which is a challenge for a single body looking after different industries, as in the case of Azerbaijan.

Unbundling and promotion of competition

Azerbaijan's legislation neither requires nor mandates separation and unbundling of functions like generation, transmission, retail supply and trading. Further, accounting, functional and/or managerial disaggregation has also not been accomplished or envisaged by legislation. In most of the countries where reforms have taken place, these activities have been segregated and unbundled companies have been formed to bring about accountability and efficiency in the sector. Also, one of the objectives for unbundling transmission and distribution from generation and retail supply is to segregate the natural monopolies of wires from competitive areas like generation and retail supply. The next phase of reforms where unbundling has taken place, is to introduce competition and promote private participation in competitive segments.

Moreover, the legislation also does not envisage the presence of a separate transmission system operator and a distribution system operator. As such, involvement of private enterprises in the electricity sector is limited.

Development of power market

In Azerbaijan, the power market has not been opened up for private participation or competition. Further, no time bound policy has been framed to open up the power market. Although, the legislation provides for principles of non-discriminatory access to network infrastructure, this has not been implemented in practice due to the market structure.

Issues in tariff determination process and methodology

As per the legislation, regulated entities must present their reports to the Tariff Council by 1 March of each year. If there is a need for tariff adjustment, a draft decision is considered for one month. The Council adopts decisions according to an agreed schedule. Once adopted, the resolution is distributed through media and posted on the website. As such, no consultation with public or other stakeholders is done while determining the tariff. The public consultation and discussion with stakeholders is an important element of tariff determination which ensures transparency and also helps in balancing the needs of all stakeholders.

The tariff is determined on cost plus basis after analysis of economic justification of the costs involved in tariff computation. However, the regulator has not specified any norms or benchmarks for these cost elements which may be used for analysis of the actual costs. For clarity in tariff determination, it is required that the principles of tariff determination along with the norms and regulatory targets be specified in advance to ensure that the regulated entities are aware of the tariff principles and can accordingly plan. Further, clear tariff policy is also required from the State Government which provides a roadmap for subsidies, enabling full cost recovery and also promoting efficiency.

Promotion of renewables

Azerbaijan has a big potential of alternative and renewable energy due to its favorable environmental conditions. However, this potential is not fully used and therefore the "State program of the use of alternative and renewable energy sources in Azerbaijan Republic" was adopted with a view to ensure the creation of new generating capacity on the basis of the country's alternative and renewable energy sources using the world experience according to the Presidential Decree from the 21st October 2004 under number 462. According to the Decree of the President of Azerbaijan Republic dated November 25th, 2013 under number 124, the program of implementation and coordination of the activities envisaged in the state program were assigned to the State Agency for Alternative and Renewable Energy of the Azerbaijan Republic (AREA), which is a public authority and a legal status of which is equated to the status of a central authority. Also, the State Agency AREA was instructed to take the necessary measures to ensure the execution of the state program.

State Agency for Alternative and Renewable Energy of the Azerbaijan Republic (AREA) was created by Presidential Decree on February 1st, 2013 under number 810 "On additional measures in the field of renewable energy and use of renewable energy sources", and the "Regulations of the State Agency of Azerbaijan Republic on alternative and renewable energy" which were approved by the same Decree. In accordance with the Regulations, AREA implements the state policy and regulation, effective organization of activities, state control and coordinates activities in this area. «OOO Azalternativenergy» LLC was approved by AREA, which aims to design, produce, build, operate and provide the infrastructure for exploration and development of alternative and renewable energy sources, energy production, transport and distribution of alternative energy, purchase of equipment, installations and facilities.

Recently, significant work has been done in terms of the efficient use of alternative and renewable energy, creation of modern infrastructure in the industry. All this work has allowed to expand the use of alternative and renewable energy in the economy and the social sphere and has created conditions for the implementation of measures associated with the generation, consumption and efficiency of such energy.

Azerbaijan is a country with a rich potential of alternative and renewable energy. The country's goal is to increase the share of alternative and renewable energy sources in the total energy production to 20 percent by 2020. A map of the development of alternative and renewable energy sources in Azerbaijan until 2020 is created. The goal is to create a hybrid power plant in every town and region of Azerbaijan by 2020. Currently, studies are conducted to determine a number of stations to be built in every particular region. The creation of such stations close to residential areas will above all prevent losses of electricity supply and will allow to sell it to consumers at a lower price. Studies show that investments in the field of alternative and renewable energy sources will pay off within 7-8 years.

5. Reform action plan for facilitating investments

In this section we have discussed some indicative reform measures that the Government may consider for facilitating investments and making the sector more attractive for private investors.

Independence of regulatory function

An Independent and strong regulator can provide assurance to investors that prices, outputs and inputs will not come under the pressure of ‘regulatory capture’ and pressures from economic and political interest groups. It has been observed worldwide that any bureaucratic and political intervention in the working of sector regulator has always resulted in discharge of ineffective regulatory functions by the body. Recently, The Ministry of Energy in Azerbaijan has approved a set of strategic tasks in July 2015 and one of those tasks is *development of the draft law “On Independent Energy Regulator” governing the internal energy (electricity and gas) markets.*

In general, regulators can be independent in two ways: a) from the regulated stakeholders and b) from the political authorities. The first type of independence means that the regulator should not be under the influence of the private interests of the regulated industry. The second type of independence refers to the fact that the regulator should maintain an arm’s length relationship with the government. The regulator shall be protected from short term political influence.

Current Scenario in Azerbaijan

By assigning the regulatory responsibilities to the Ministry of Energy (MoE), the policy makers have allocated the regulatory functions directly to the government. Similarly, the Tariff Council, comprises of members from various ministries which again tends to compromise the principle of protection from short term political interests. Thus, there is a need to establish an independent sector regulator as envisaged by the government

Roadmap

A brief snapshot of the various options for ensuring independence of sector regulator can be illustrated below:

Possible options	Task Details
Formation of committee within purview of MoE	Ministry of Energy (MoE)) can make a committee to formulate a design framework for future reforms, legal and regulatory framework, and change in institutional structure. This committee can take care of the regulatory issues in the power sector
Independent Agency within the (MoE) as an advisor	The committee can be assigned the role of an advisor to the decision makers of MIE initially. In this phase, the committee can be set up as an agency within the ministry without need of any change in the existing legislation
Independent Agency outside ministry	Agency may be eventually instituted as an independent agency outside Ministry. The independent agency will play an advisory role in a wide variety of regulatory issues to(MoE) , but will have no decision making powers on regulatory matters. This option will require amendments in existing legislation. The agency shall be responsible for only sector regulation while

Possible options	Task Details
	the policy decisions would continue to be taken by the(MoE) . The agency shall have financial autonomy (regular revenue stream from license fees or appropriations of general treasury (See case study) as well as operational autonomy (authority to hire resources and experts etc.) to operate effectively

Case Study 1 : Effective Regulatory Governance

In order to study the effectiveness of regulatory performance, the approach used by Stern and Holder has been presented in this case study.

Stern and Holder (1997) identify six inter related aspects of regulatory framework and provide results from a survey of regulatory practice for infrastructure industries in Asian countries.



The six pillars, as defined by Stern and Holder are mentioned below.

Characteristics	Definitions
Clarity of Roles	The regulatory function is well established in the legislation and regulatory functions are clearly delineated from policy making and commercial functions
Autonomy	The regulatory body needs to be financially as well as administratively autonomous
Public Consultation	A formal consultation with public / public bodies is done before decision making
Accountability	The regulatory body shall be made accountable by giving the stakeholders right to appeal (including legal right of redressal) against the decisions
Transparency	The decisions as well as the rationale for arriving at decisions is published regularly. The transparency shall also be ensured in matters related to appointment of members, expenses of the regulator and other such matters
Predictability	The decision making process shall be credible and key regulatory instruments or documents shall not be changed without change in the law governing them

Cost reflective tariffs

The Tariff Council is entrusted with determination of tariffs of natural monopolies of the state viz. utilities, energy, transport, education, telecommunication, public health etc.). As per the tariff regulations, the goal of the tariff regulations are:

- Ensuring balance between interests of natural monopoly entities and consumers;
- Ensuring effective activity of natural monopoly entities;
- Arrangement of necessary conditions for attraction of investments in development of strategic areas;
- Formation of prices and tariffs and ensuring state control over their application.

Some of the reform measures that can be considered in this respect are discussed below:

Segment of Electricity Value Chain	Existing methodology	Reform Action Plan
Generation	<ul style="list-style-type: none"> • Cost of wholesale tariff is determined which includes transmission charges too • Cost plus based with only energy charge • Feed in tariff for pilot renewable projects 	<ul style="list-style-type: none"> • Introduction of two part tariff (capacity and energy charge) to enable recovery of fixed costs • The operating costs may be benchmarked with similar system in other similar countries, for determining tariff norms • Functional Unbundling of Generation and Transmission for tariff purpose • Performance based tariff regulations may be established in the longer run
Transmission	<ul style="list-style-type: none"> • Wholesale tariff determined includes transmission tariff • Third party use of transmission network entails a transit transmission tariff (EUR 2/Mwh) 	<ul style="list-style-type: none"> • Functional unbundling of transmission and determination of separate transmission tariff • The operating costs may be benchmarked with similar system in other similar countries, for determining tariff norms
Distribution and Supply	<ul style="list-style-type: none"> • Cost plus methodology for tariff determination • End user tariffs are almost same for all consumer categories and voltage levels (except energy intensive industries with more than 5 Gwh yearly consumption) 	<ul style="list-style-type: none"> • Roadmap and policies may be adopted for retail supply tariff to move towards Cost of Supply⁴ • In the longer term, retail supply tariffs may be deregulated and competition might be brought in to enable market determined tariffs

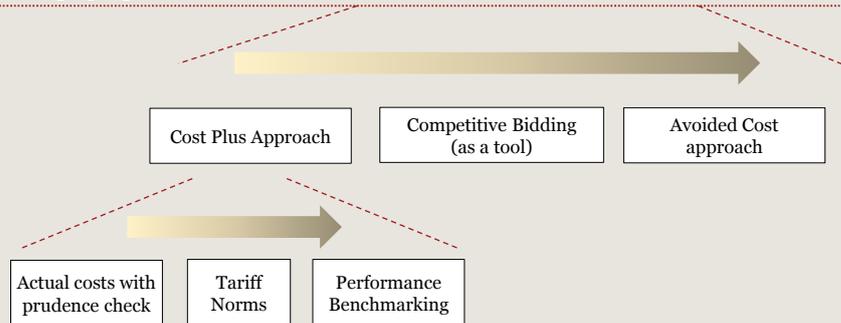
⁴ Cost of Supply is the judicious segregation of total cost incurred by the utility into various consumer categories. Thus CoS allocation system distributes the total costs to different category of consumers based on the cost causation by the particular category. Broad guidelines for calculation of Cost of Supply:

- Identify and assign historical or accounting costs that determine utility’s revenue requirement
- Allocate costs to consumer category based on allocation factors such as contribution of consumer category to system peak; energy sold to each category as % of total sales; no. of consumers in each category, etc.

Case Study III: Tariff setting mechanisms

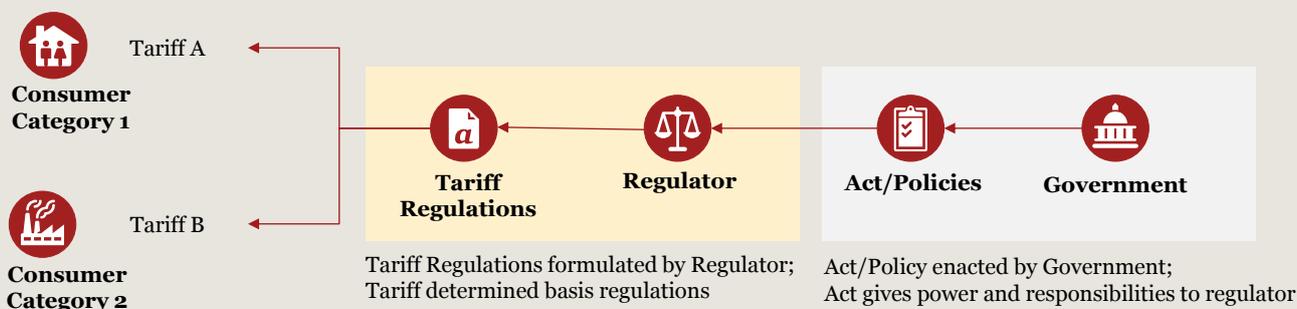
It can be observed across developing and developed countries that historically as the energy sector of a country progresses, the tariff setting regime has moved from Historical tariff setting (based on historical and socio-political trends) to a regulated regime (with independent and transparent tariff determination) and finally to a competitive bidding based market with multiple buyers and sellers. The below diagram lists down the salient features of each of these tariff regimes.

	Historical Regime	Regulatory Regime	Competitive Regime (Retail Competition)
Description	Tariff set based on historical & socio-political trends	Tariff set based on Tariff Regulations & policies by independent regulator	Tariff set based on competing market forces
Sector Scenario	Small Industry with low private participation	Medium sized developing Industry with increasing private participation	Large sized developed Industry with majority private participation
Tariff determination Agency	Government	Independent Regulator	Multiple buyers and sellers monitored by Regulator
Pros	Protection of Consumer interests	Transparency and Standardisation	Efficiency and increased private investments
Cons	Financial burden on state, Opaque process	Susceptible to political motivations	Requires multiple players with economies of scale



Based on the current scenario in Azerbaijan, the end user tariff by supply companies are operating under regulatory regime with limited competitiveness. There is a need for transformation to a full competitive regime where multiple buyers and sellers can compete under regulatory supervision. However, in order to ensure a smooth transition from one tariff regime to another, the Government and the envisaged Independent Regulator need to formulate certain laws, policies and regulations to ensure a standard, non-arbitrary and transparent method of tariff determination.

The flow of tariff reforms shall follow the following sequential steps for seamless transition from one regime to the other:



Promotion of renewables

As outlined in the previous section, reforms needs to be brought in to promote development of renewable projects and ensure financial sustainability of the projects. The measures are given below:

Indicative Measures for promoting renewables

- To promote renewables and provide a clear vision, clear and tangible targets for RE Generation may be fixed along with associated plan to meet the targets
- Frame clear policies for providing incentives to renewable projects which ensure that the projects have affordable tariff
- Framework should be developed to ensure off-take of power from renewable sources (mandatory procurement of power from renewables).

Appendix A: List of power plants

No	Power Plant	Type	Installed Capacity (MW) as of 2013
1	Azerbaijan Oil-fired, steam	TPP	2400
2	Ali-Bayramli	HPP	–
3	Shirvan Gas-fired, turbine	TPP	900
4	Janub	PP	780
5	Sumgayit Oil-fired, steam	TPP	525
6	Mingachevir	HPP	402
7	Shimal Combined heat and power	TPP	400
8	Shamkir	HPP	380
9	Sangachal	Gas fired PP	300
10	Yenikand	HPP	150
11	Fuzuli	HPP	150
12	Baki	Gas fired TPC	107
13	Baki	Gas fired PP	104
14	Shahdagh	Milti fuel PP	104
15	Astara	Gas fired PP	87
16	Shaki	Gas fired, combined cycle PP	87
17	Xachmaz	Gas fired, combined cycle- GTES 64	87
18	Nakhichevan	HPP	87
19	Nakhichevan	Gas fired, combined cycle- GTES 64	64
20	Tartar Gas fired, combined cycle	PP	–
21	Takhtakorpu	HPP	25
22	Bilav	HPP	22
23	Araz	HPP	22
24	Arpachay-1	HPP	20.5
25	Varvara	HPP	16
26	Vaykhir	HPP	5
27	Goychay-1	HPP	2.3
28	Ismayilli-1	HPP	1.6
29	Arpachay-2	HPP	1.4
30	Gusar-1	HPP	1
Total			7230.8
Source: AzerEnerji; Energy Information Agency;			

Appendix B: Macroeconomic overview

Azerbaijan's economy has grown rapidly in the past decade with the GDP increasing 16-fold and GDP per capita many folds.

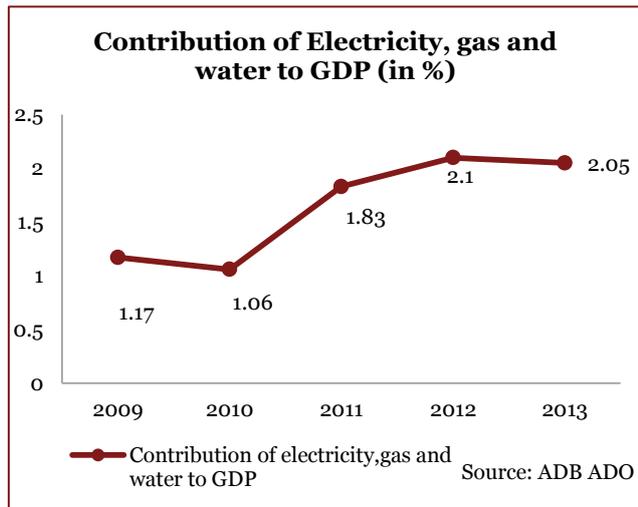
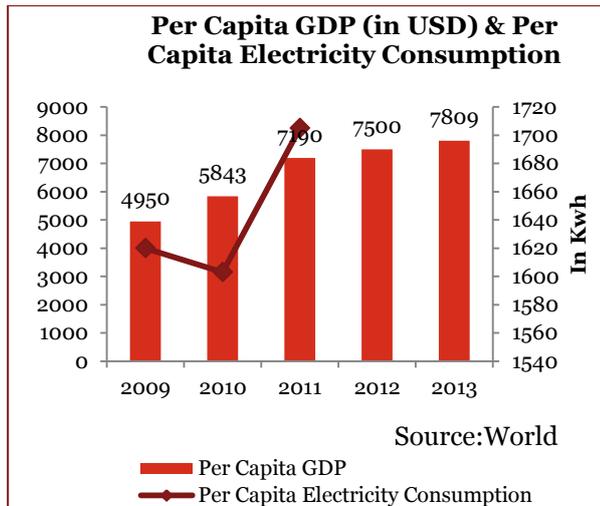
The main challenge for Azerbaijan is to reduce their dependence on oil and gas sectors by diversifying into other industries and strengthening the private sector.

The current account surpluses has reduced from about ~36% in 2011 to about 0.4% in 2015 on account of lower oil exports.

Declining energy prices and the drop in export earnings forced the central bank to devalue the manat and abandon the peg to the US dollar.

Fiscal policy in Azerbaijan is driven largely by oil income, which accumulates in the State Oil Fund of Azerbaijan (SOFAZ). Transfers from SOFAZ have provided about 50% - 58% of total government revenues in the last 5 years

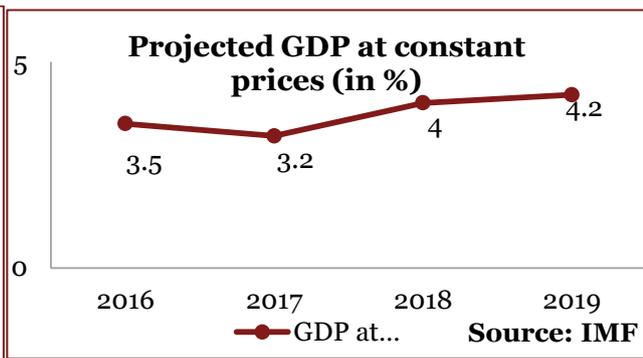
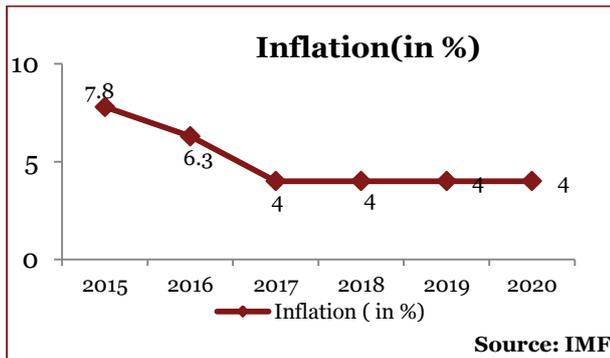
Year	Overall GDP growth	Agriculture	Industry	Services
2008	10.8	6.1	9.7	14
2009	9.3	3.5	10.6	9.1
2010	5	-2.2	4.4	7.2
2011	0.1	-8.0	3.4	-2.1
2012	2.2	5.8	-0.6	6.9
2013	5.8	4.9	4.9	7.2
2014	2.8	-2.6	0.5	7.4
2015	1.1	6.6	-1.9	4.5



The steady economic growth has paved the way for a steady and rapid development of the country's population, and Azerbaijan has been ranked 4th in per capita GDP among CIS states. Poverty declined from 49% of the population in 2001 to 6.0% in 2002.

Per capita consumption which reduced after an increase in tariff in 2007, has shown an increase after 2010.

At present, approximately 60% of the electricity generated in Azerbaijan is consumed by the industrial and commercial consumers.



Oil production will continue to decline, and the Government's capital expenditures will be constrained by lower oil revenues leading to lower economic growth in the medium term.

Construction sector a key economic driver of Azerbaijan is expected to contract in the medium term as oil-funded public investment declines due to crash of oil prices.

Stronger fiscal policy and soft food prices will result into low single digit levels of inflation over the medium term.

FDI, focused on the energy sector, will remain strong due to development of new gas projects.

Azerbaijan has adopted a long term development concept "**Azerbaijan 2020: Vision of the Future**" with the aim of increasing the non-oil sector exports and reduce poverty.

Appendix C: Bibliography

- *Update of the Power Sector Master Plan of Azerbaijan 2013 – 2025*
- *In-Depth Review of the Energy Efficiency Policy of Azerbaijan*
- *EBRD- Strategy For Azerbaijan,2014*
- *Strategy for Regional Cooperation in the Energy Sector of CAREC Countries*
- *ADB: Country Partnership Strategy: Azerbaijan, 2014–2018*
- *Azerbaijan national case study for promoting energy efficiency investment*
- *An analysis of the Policy Reform Impact on Sustainable Energy Use in Buildings*
- *Azerbaijan Private Sector Financing*
- *And The Role Of Risk-bearing Instruments*
- *Electricity Sector Privatization In Azerbaijan-Prepared by Mr. Onur Kerem Günel*
- *Commercial laws of Azerbaijan-An assessment by the EBRD*
- *Asian Development Outlook 2015 , Asian Development Bank*
- *Asian Development Outlook 2014 , Asian Development Bank*
- *Republic of Azerbaijan 2014 Article IV Consultation , IMF*
- *Republic of Azerbaijan: 2013 Article IV Consultation, IMF*
- *Azerbaijan Partnership Program Snapshot, World Bank Group*
- *Assessment of Economic & Export diversification Azerbaijan by Kanan Aslanli , Zohrab Ismayil ,Roushan Aghayev*
- *www.azernews.az > Azerbaijan*
- *<http://www.maliyye.gov.az/en/node/1593>*
- *Azerbaijan State Budget for 2014: Brief Description , Center for Economic and Social Development (CESD)*

Important Notice

Our assessment is based on information provided by the government agencies (as applicable) and research from sources in public domain held to be reliable. If any of these are not entirely complete or accurate, the conclusions drawn therein could undergo material change. PwC will not be responsible to rework any such assertion or conclusion if new or updated information is made available. We have not carried out anything in the nature of an audit nor, except where otherwise stated, have we subjected the financial or other information contained in this report to checking or verification procedures. Accordingly, we assume no responsibility and make no representations with respect to the accuracy or completeness of the information in our report, except where otherwise stated.

No representation or warranty, express or implied, is given by the Company or PwC or any of their respective directors, partners, officers, affiliates, employees, advisers, or agents (any warranty expressed or implied by statute is hereby excluded) as to the accuracy or completeness of the contents of this report or any other document or information supplied, or which may be supplied at any time or any options or projections expressed herein or therein, nor is any such party under any obligation to update the report or correct any inaccuracies or omissions in it which may exist or become apparent. In particular, for reasons of commercial sensitivity, information on certain matters has not been included in the report which may be made available at a later stage.

No responsibility or liability is accepted for any loss or damage howsoever arising that you may suffer as a result of this report and any and all responsibility and liability is expressly disclaimed by PwC and the Company or any of them or any of their respective directors, partners, officers, affiliates, employees, advisers or agents PwC disclaims all liability to any third party who may place reliance on this report and therefore does not assume responsibility for any loss or damage suffered by any such third party in reliance thereon.