ENERGY SECTOR PROGRAM ASSESSMENT

A. Introduction

1. Purpose of the Sector Program Assessment

1. This sector assessment forms part of the Independent Evaluation Department (IED) country assistance program evaluation (CAPE) for Azerbaijan. The CAPE provides the Asian Development Bank (ADB) Board of Directors and Management with an independent assessment of ADB's past operational performance in Azerbaijan. The CAPE findings and recommendations will be an input into the preparation and design of the new country partnership strategy (CPS) that will guide ADB operations in Azerbaijan from 2019 to 2023. Specifically, the CAPE (i) provides an independent assessment of the performance of ADB's country programs and identifies factors affecting performance, and (ii) draws forward-looking lessons and makes recommendations for the next CPS.

2. Time Period

2. **The 2012 country partnership strategy final review validation (CPSFRV) was the first independent country-level assessment of Azerbaijan.**[1] The assessment covered ADB support during 2000–2011 and described the country's need for a diversified economy, increased competitiveness, and strengthened social services.

3. **The current CAPE is the second independent evaluation of ADB's country strategy in Azerbaijan.** It assesses the outcome of ADB support over the 7 years from January 2011 to December 2017. The start of this period was chosen to overlap with the last year of the CPSFRV's coverage to ensure that no operations would be missed.

3. Methodology

4. In line with evolving CPS strategic priorities during the evaluation period, the lending portfolio continued to focus on the energy sector, with the TA portfolio closely aligned with the lending portfolio.

5. ADB's sovereign energy program in Azerbaijan is largely ongoing and there have been very few self-assessed (unvalidated) project completion reports (PCRs) or technical assistance completion reports (TCRs). Hence most information has been taken from TA reports, reports and recommendations of the president (RRPs), stakeholder interviews, and discussions with other development partners in Azerbaijan. Site visits were conducted in Baku and Ganja cities and information was obtained from interviews with executing agencies, implementing agencies and other local stakeholders. The projects that were not visited were evaluated on the basis of available project documents.

6. The evaluation covered all energy sovereign loans, nonsovereign loans, and technical assistance (TA) approved during 2011–2017, and all loans and TA approved prior to the period, but which were implemented during the period, whether operations were active or closed. The evaluation also assessed knowledge products and services produced during the period.

7. **Crosscutting themes.** Crosscutting themes were assessed for relevance and development impacts with reference to the three strategic agendas of Strategy 2020: inclusive economic growth, environmentally sustainable growth (focusing on climate change), and regional cooperation and integration. The special priorities identified as constants in the country strategies are economic diversification (in part through private sector development) and capacity development.

[1] IED. 2012. *Azerbaijan: Validation of the Final Review of Country Operations: 2000–2011*. Manila: ADB.

B. Sector Context

1. Background

8. Azerbaijan is one of the oldest oil-producing countries in the world and is rich in oil and gas resources. The overall volume of the country's hydrocarbon reserves is an estimated 7 trillion barrels of oil equivalent.[2] Oil and gas are the primary sources of energy in Azerbaijan and the main export products. The energy sector (power, oil, and gas), plays a central role in the economy, typically contributing about 40%[3] of the country's GDP, making it the largest economic segment.

2. Gas Sector

9. Economic growth rests in large part on the successful development of oil resources and effective management of the resulting revenue stream. In order to ensure macroeconomic stability, transparency in the management of oil revenue, and safeguarding of resources for future generations, the government established the State Oil Fund of Azerbaijan (SOFAZ) as an extrabudgetary fund. About 43 million tons of oil is produced annually; the bulk of production coming from the ACG consortium.[4] Depletion is limited to 2% per annum, ensuring long-term supplies.[5]

10. Azerbaijan has natural gas reserves of 41 trillion cubic feet and an extensive gas network. Gas supplies come from the gas production by the State Oil Company of Azerbaijan Republic (SOCAR); associated gas produced under the ACG production sharing agreement (PSA); and imports from the Russian Federation. Higher economic growth and efforts to improve energy efficiency by converting oil-fired power plants to gas-fired plants mean that demand for domestic natural gas is growing. The annual gas production in Azerbaijan was about 28.6 billion cubic meters in 2017, with SOCAR producing 6.1 billion cubic meters. Domestic gas consumption was about 9 billion cubic meters (bcm) in 2016, while gas exports constituted 1.5 billion cubic meters from SOCAR's own production (i.e., apart from the gas jointly produced under PSAs)[6]. SOCAR owns and manages all gas transmission, storage and distribution infrastructure in the country, except for the international gas transportation infrastructure associated with the Baku–Tbilisi–Erzurum and South Caucasus pipelines.

11. Azerbaijan's rapid transition to an upper middle-income country has been made possible by the exploitation of its hydrocarbon resources, high levels of public expenditure, and market-based economic reforms. The high economic growth rates since 2001 have resulted in a significant drop in the percentage of the population living below the national poverty line: from 49% in 2001 to 5% in 2013. The oil and gas industry has played an important role in poverty reduction, with hydrocarbons contributing approximately 31% of the country's gross domestic product and approximately 87% of the country's total gross exports in 2015.

12. Azerbaijan has an extensive gas network, and is a net exporter of oil, gas, and electricity. Through the State Program on Socioeconomic Development of Baku City and its Settlements, Azerbaijan's gasification rate increased from 78.5% in 2013 to 86.7% in 2015; the government plans to reach 90% national gasification by 2018. The power sector is the largest gas consumer. Over 90% of power is generated using gas, and power generation consumes about half of the 9.8 bcm of gas consumed annually. Gas is currently exported to Georgia, Iran, and Turkey. Diversification of the export base by accessing larger markets is needed to secure stable revenues from gas production. Economic diversification to reduce reliance on the hydrocarbon sector has been a significant challenge.

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[2] BP Statistical Review of World Energy 2017.
[3] State Statistical Committee of Azerbaijan Republic.
[4] In September 1994, a 30-year contract for the development of ACG (Azeri-Cirag-Gunashli) was signed between the State Oil Company of Azerbaijan Republic (SOCAR) and 13 oil companies, which was extended in 2017 until 2050.
[5] Mission interview with SOCAR, May 2018.
[6] www.socar.az

13. Despite its coverage of 90% of the country's territory, the gas retail industry infrastructure still suffers from a lack of investment and limited maintenance. Annual losses from the main gas pipelines have been 10% for the last 5 years, while the losses in the retail gas distribution networks have averaged 23%. These losses are being addressed by SOCAR and Azergaz, with losses in the main pipelines reduced to 1%, and Azergaz adopting ISO 50001 (energy efficiency), installing smart metering and rehabilitating the transmission system.

3. Electricity Sector

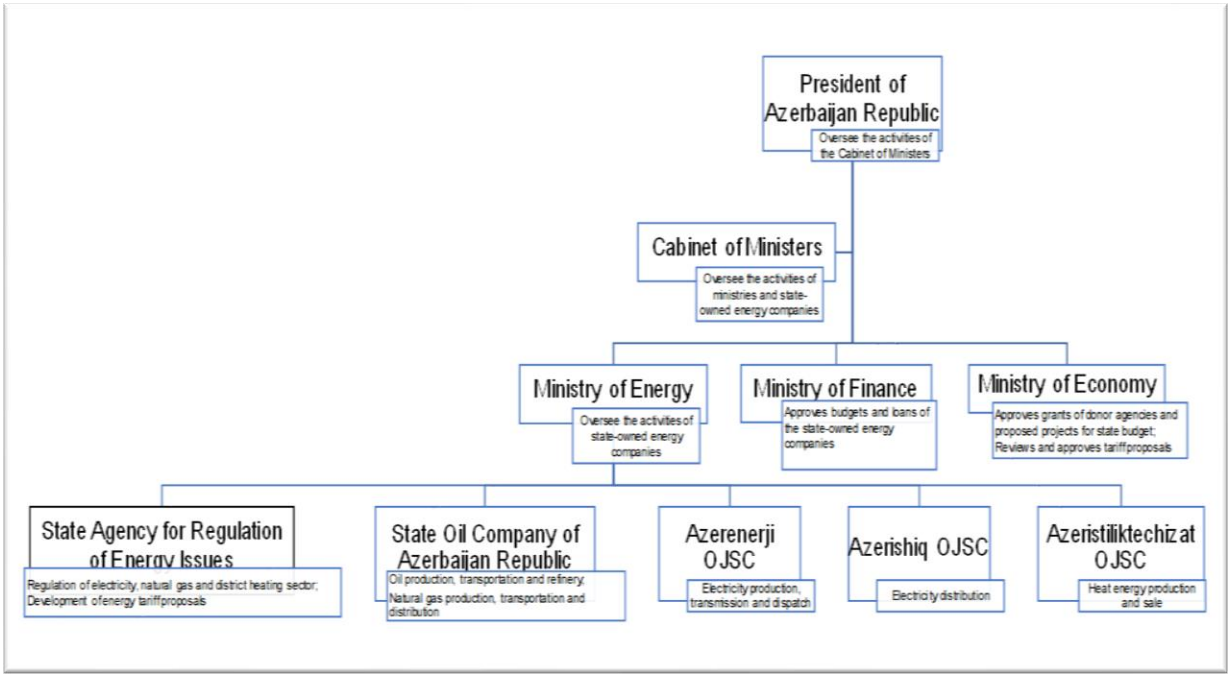
14. Since 2009, large investments in power generation and in transmission and distribution networks have resulted in significant improvements in the quality of power supply. The current total installed generation capacity is 7.87 gigawatts (GW), including gas-fired thermal power plant capacity of 6.76 GW (86%) and hydropower plant capacity of 1.11 GW (14%) as of 2017. In 2016, the available total generation capacity was about 6 GW while the peak demand was 3.7 GW. The total electricity generation in 2016 reached about 25 billion kilowatts-hours (kWh), of which 83% was generated from thermal power plants and 7.9% from the hydropower plants of Azerenerji OJSC, 9% from generation by other public and private companies,[7] and 0.1% from the renewable energy facilities of the State Agency on Alternative and Renewable Energy Resources (SAARES). Private sector investments in generation facilities account for about 1% of total installed capacity.[8] At present, electricity production is sufficient to cover domestic demand with the surplus exported to neighbouring countries, including Georgia, the Russian Federation, and Turkey.

15. The government owns and manages the electricity sector in Azerbaijan. Azerenerji OJSC is the vertically integrated state-owned generation, transmission and dispatch company. It oversees power generation, transmission and dispatch functions across the country, with the exception of Nakhchivan Autonomous Republic (NAR). The generation portfolio of Azerenerji includes 12 thermal power plants and 7 hydropower plants. The company also owns and maintains 500, 330, 220 and 110 kV transmission grid, and National and Regional Dispatch Centres.

16. Before February 2015, Azerenerji OJSC owned all distribution networks in Azerbaijan, except in Baku and NAR. In February 2015, the government further unbundled the energy sector. All power distribution assets and functions were separated from Azerenerji OJSC and transferred to Azerishiq OJSC,[9] formerly Baku Electric Company (Bakielektrikshebeke OJSC), which operates under the supervision of, and is regulated by, the Cabinet of Ministers. The institutional structure shown in Figure 1 is as of 2017. Since 2018, the energy regulator is in the process of taking over some tariff-related and other functions.

[7] Government of Azerbaijan, Ministry of Energy: IPP generation.
[8] There are three small hydro-power plants with a total capacity of 8.8 MWs. They are owned and operated by private companies.
[9] Azerishiq OJSC is a 100% state-owned enterprise responsible for electricity distribution, supply, and other customer services (connection, metering, and billing) in Azerbaijan. However, functions in the NAR are directly administered by the state energy agency of the NAR. The national distribution networks administrated by Azerishiq comprise seven regional networks: Aran, Baku, Canub, Garb, Markazi Aran, Shimal, and Shimal Garb.

Figure 1: Institutional Structure of the Energy Sector[a]



[a] As per its charter, the State Agency for Regulation of Energy Issues has responsibility for developing energy tariff proposals. The responsibility for approving tariff proposals resides with the Tariff Council under the Ministry of Economy (which has been the only authority for reviewing and adopting tariff methodology proposals).

4. Energy Sector Constraints and Challenges

17. Reliable power supply throughout the country and sustainable use of energy are critical for inclusive economic growth. Key efforts to be pursued in the energy sector are summarized below.

18. **Improving power generation efficiency.** Installed and operational generation plant capacity is currently 6018 MW,[10] whereas the system peak demand is only 3750 MW,[11] a reserve margin of 60% which is a significant oversupply of capacity. In addition, over 50% of all power plants are more than 30 years old,[12] with some operating at very low efficiency and with significant numbers of forced outages. As a result, generation costs are too high, and unreliable. Plans by Azerbaijan to construct 1.9 GW of new thermal generation units by 2025 and to complete the overdue decommissioning of the 900 MW Shirvan TPP and the 2400 MW Azerbaijan TPP plant will see the overall reserve margin reduced to less than 25%.

19. **Rehabilitating transmission and distribution networks.** The long distance between Azerbaijan's generation and load centres requires a backbone of large transmission lines. The majority of power transmission and distribution facilities in districts are old, and they have become unreliable, with frequent outages and increasing losses. Remedial work has reduced network losses in Azerbaijan from 29% in 2011 to 13% in 2016.

20. **Improving collection**. Azerishiq supplies electricity to 2.5 million customers, 60% of whom are residential. The collection rate has been improving since 2015, after an initial decline when Azershiq absorbed the county customers from Azerenergy (Table 1). Since 2015, Azerishiq has been improving the distribution infrastructure (rehabilitating distribution substation and lines), metering (installing modern

[10] This assumes the 900 MW Shirvan plant is closed.
[11] Corporate Solution. 2018. *Preparing a Power Sector Financial Recovery Plan*. Baku. The peaks were 3,750 in 2015 and 3,681 MW in 2016.
[12] Industry standards indicate that the useful planning life for thermal power plants is 25 years.

digital meters) and improving billing systems outside Baku to reduce technical and commercial losses and achieve higher collection rates. This has also raised public awareness of electricity consumption and broadened perceptions of the need for energy savings.

Table 1: Electricity Sales and Collection Rates, 2013–2017

	Unit	2013	2014	2015	2016	2017[a]
Residential Consumers	AZN million	167	179.7	377.4	409.5	451.7
Collection %		95.4	95.7	78.1	80.3	82.0
Of which: Internally Displaced Persons	AZN million	21.3	20.6	60.5	64.5	29.0
Collection %		68.6	67.6	71.9	79.8	82.0
Non-Residential Consumers	AZN million	293.6	309.5	547.6	596.8	867.4
Collection %		99.3	99.3	94.6	97.0	99.1
Total Collection	AZN mMillion	460.6	489.2	925	1,006.3	1,319.1
Collection %		97.9	98.0	88.1	89.4	92.8

[a] Preliminary data.
Source: Azerishiq.

21. SOCAR's subsidiary, Azerigaz Production Unit, oversees gas transportation, storage and distribution. With about 2 million customers, Azeriqaz has improved both main and distribution pipelines across the country since 2009 and installed prepaid meters with the aim of reducing technical and commercial losses and achieving consumption efficiency. However, the company needs significant investment to complete these rehabilitation activities. Since gas production, transportation, storage and distribution are concentrated in one company, Azeriqaz's business processes need to be optimized to achieve operation efficiency and reduce gas losses.

22. **Improving financial performance**. The financial performance of energy utilities is weak. Each year the power utilities receive government budget support to implement part of their capital expenditure program. Historic costs and revenues show the financial condition of the sector deteriorated between 2011 and 2017. This was due to rising operating costs rising by 75%, especially fuel. The increase in sales volumes was only 25%, with a corresponding increase in revenues of 64%, growing from AZN759 million in 2011 to an estimated AZN1,246 million in 2017.

5. Tariffs

23. The impact of the changes in sales revenues and costs over the period 2012 to 2015 has caused annual profits to fall from a high of AZN98 million to a loss of AZN82 million. The 2016 tariff increases have returned the sector to a position where tariffs should recover operating costs and return a small operating profit (with an anticipated profit in 2017 of AZN55 million). Production of electricity stagnated following tariff increases in 2016 as a result of both the devaluation and the need to reduce the deficit in the power sector.[13]

[13] Audited Accounts to 2015, 2016, and 2017 are estimates by Corporate Solutions (a consulting firm).

Table 2: Electricity Production and Consumption, 2012 – 2016 (GWh)

	2012	2013	2014	2015	2016
Production	22,988	23,354	24,728	24,688	24,953
Imports	141	127	124	108	114
Exports	-680	-496	-489	-265	-1,096
Total supply	22,449	22,986	24,363	24,531	23,972
Energy Industries' Own Use	3,606	3,641	4,004	3,936	3,960
Losses, Including:	3,368	3,281	3,363	2,869	2,350
Losses in Transmission	763	726	710	514	390
Losses in Distribution	2,605	2,555	2,652	2,355	1,960
Final Consumption	***15,395***	***15,982***	***16,907***	***17,619***	***17,618***
Industry and Construction	3,027	2,996	3,161	3,163	3,517
Transport	523	531	536	482	429
Agriculture, Forestry and Fish	888	910	976	903	979
Commerce and Public Services	4,455	4,829	4,942	5,133	4,622
Households	6,501	6,716	7,292	7,938	8,072

Source: Azerishiq and State Customs Committee.

Table 3: Forecast Sales (GWh)

	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total Sales (Domestic)		17,497	17,804	18,308	18,759	19,266	19,785	20,311	20,845
Exports	981	981	981	981	981	981	981	981	981
Total Sales	18,729	18,478	18,785	19,289	19,740	20,247	20,766	21,293	21,826

Source: Azerishiq.

24. From 2007 to 2016, electricity tariffs in Azerbaijan were unchanged. In 2016, tariffs were increased twice. According to the Tariff Council, the decision was made in July 2016 at the request of Azerenerji and Azerishiq: "considering the raise of productivity within the recent 10 years, extension of distribution networks, decrease of losses, large amount of investments put for provision of durability in supply of electricity, significant increase in the quality of services, as well as the increase in storage and maintenance costs. The December 2016 increase in tariffs was accepted upon request of SOCAR due to rise of the natural gas base costs, as well as considering corresponding applications of Azerenerji JSC and Azerishiq JSC on increase of tariffs."[14]

25. The level of government support dramatically increased in 2015, following the devaluation of the Azerbaijan manat. Financial statements indicate that, at 31 December 2014, Azerenerji had AZN1,103 million of borrowing denominated in foreign currency. This equated to some $1,400 million but, following the devaluation of the AZN, at 31 December 2015, the loans were valued at AZN2,171 million, equivalent to an accounting loss of AZN1,068 million Subsequently, annual loan repayments have doubled in manat terms, exacerbating the inability to generate sufficient cash to meet loan repayments and asset purchases.

26. Although the Tariff Council in 2016 set prices for electricity at a break-even level (without any return on equity), the severe shock of the exchange rate devaluation, together with an ambitious capital investment program, meant the sector could not earn enough cash to finance ongoing operations. This situation has been aggravated by the low collection rate.

27. Current tariffs are sufficient to cover accounting costs but they cannot cover the cash outflows of the sector, which necessitates continuing government support. A comprehensive institutional, financial, legal and regulatory framework needs to be built to enable the establishment of a full-fledged electricity market. Given the forecast growth in sales to 2025, the government urgently needs to close the gap between production costs and revenues if it is to supply a stable source of energy.

[14] Tariff Council Letter No. 03/03-T/50/2017 of 11 May 2017.

28. Within existing legislation in Azerbaijan, there are currently no approved and published tariff methodologies, specific tariff setting principles, or calculation algorithms for electricity. Despite recent changes, the overall tariff structure remains basic and has the following features:

- **Lack of unbundled tariffs**. There are no unbundled tariffs for wholesale power (energy), transmission (apart from transit), ancillary services, system services, dispatch services, use of the system for distribution, or for connections.
- **Limited differentiation of end customers**. There are only three classes of customers: households, very large customers on a day/night tariff, and other non-household customers.

6. Private Sector Participation

29. Attempts to involve the private sector in large generation projects have not been successful due to the lack of a supporting policy, legal, and regulatory framework. Private sector participation also depends on long-term sustainable tariffs, as discussed above.

30. When the distribution companies were privatized under ineffective management contracts in 2002, the expected performance improvements in power supply were not achieved. When the responsibilities of the distribution sector were returned to state-owned companies in 2006, the grid was found to be in a very poor condition. There were excessively high losses, and power outages were frequent. As a result, the government has been reluctant to reengage with the private sector. Clear and structured benefits from private sector participation will need to be demonstrated to encourage broad stakeholder acceptance.

31. The utilities' access to funds other than those supported by the government is also limited.[15] The government's budget cannot support the AZN8.5 billion of priority investments outlined in the update to the master plan. The limited state budget will likely defer the pace of power sector development and will hamper economic growth. To meet investment requirements, the government will need to mobilize alternative financing resources, including increasing electricity tariffs and encouraging private sector participation.

7. Azerbaijan Government's Strategy and Plans

32. The overall vision of the government's energy sector strategy is to utilize domestic energy resources efficiently, protect the country's energy security, and ensure the delivery of reliable and adequate energy services throughout the country for sustainable economic growth. The energy sector policy framework features the following:

- promoting efficient use of energy resources and increasing sector operation efficiency,
- establishing a sound regulatory environment to promote competition,
- improving the sector structure to attract more investments,
- promoting sustainable development to ensure environmental protection,
- strengthening financial discipline in the sector and ensuring full payment for energy consumption, and
- increasing the share of renewable energy (solar, wind, and biogas) in power generation.

33. To enhance operational and financial performance, the government has committed itself to achieving full-cost recovery of the electricity sector by 2022, by pursuing financial and tariff reform and gradually adjusting the tariff level and structure taking into account cost reduction, efficiency improvement, and targeted financial support from the government to protect vulnerable groups of

[15] Standard & Poor's Financial Services. 2013. *Azerbaijan-Based Electric Utility Azerenerji Assigned 'BBB-/A-3' Ratings; Outlook Stable*.

customers. Furthermore, the government plans to return both the electricity and gas sectors to full profitability by 2025.

34. The energy sector is a vital area of focus in the Strategic Road Map for the Development of Utility Services (Electricity, Heat Energy, Gas and Water) in Azerbaijan Republic which was adopted in 6 December 2016.[16] Aligned with the policy framework, the document highlighted resource efficiency, better regulation, generation diversification, wider renewable energy use, electricity market development, and export expansion as key priorities for the power sector. The government has also identified the development of an efficient and effective gas distribution network as the priority for the natural gas sector.

35. Azerbaijan has committed itself to adopting the European 3 Market model, through a phased approach, and is in the process of hiring consultants to implement the first regulatory changes.

36. Azerbaijan has great potential for renewable energy, primarily solar, wind, and small hydropower. The sector's potential is being utilized and significant activities are being implemented. Obstacles include lack of: (i) a strong institutional and regulatory framework to support renewable energy, (ii) a renewable feed-in tariff mechanism and a fund to support up-front investment, and (iii) technical capability. Nevertheless, with support from the government and international development partners, renewable energy development in Azerbaijan is progressing.

8. Programs of Other Development Partners

37. In addition to ADB, other multilateral and bilateral development partner agencies also support the Azerbaijan power sector, including the European Bank for Reconstruction and Development (EBRD), Islamic Development Bank (IsDB), World Bank, KfW, Japan International Cooperation Agency (JICA), and the United States Agency for International Development (USAID). The majority of the funding provided by the other agencies has been for the gas sector. These agencies also support sector reform, improvements to the transmission and distribution networks, rural electrification, clean energy development, and energy efficiency among other forms of support.

38. There is evidence of very good, if informal, coordination between ADB and other development agencies. There are no overlapping or conflicting programs being supported by Azerbaijan's development partners. As many of the partner agencies are located within the ADB mission's complex, there is regular communication between them. In particular, the TA projects supporting much-needed energy sector reforms are shared among the donors and are highly complementary and are timed to have maximum impact on the sector's governance.

[16] Government of Azerbaijan. 2016. The Strategic Road Map for Development of Utility Services (Electricity, Heat Energy, Gas and Water) in Azerbaijan Republic, Baku.

Table 4: Programs of Other Development Partners in the Energy Sector
($ million)

European Bank for Reconstruction and Development		
Wingchair Power Project (cofinanced with Azerenerji, IsDB, and EC TASIS). Total project cost $44.62 million)	1997	$21.65
Lukoil Overseas: Shah Deniz Gas Condensate Field Development	2005	€97.6
Lukoil Overseas: South Caucasus Gas Pipeline	2005	€36.0
AZDRES: Power Plant Rehabilitation	2006	€183.7
CEEP: AccessBank Azerbaijan Energy Efficiency Loan	2013	$4.2
Lukoil Overseas: Shah Deniz Gas Condensate Field Develop II	2014	€177.5
Lukoil Overseas: Shah Deniz Stage II	2015	€221.9
Trans-Anatolian Natural Gas Pipeline (TANAP)	2017	$500.00
Supporting Energy Regulatory Agency	2018	$1.00
World Bank		
Issues and Options Associated with Energy Sector Reform	2004	TA
Power Transmission Project (+ establishment of the SCADA system)	2006	$48.00
Challenges Facing the Gas Sector	2006	TA
Global Gas Flaring Reduction, Phase I-IV	2008	TA
Regional Power Trade in the Southern Caucasus	2011	TA
Extractive Industries Transparency Initiative (EITI) Civil Society Support	2015	TA
Trans-Anatolian Natural Gas Pipeline Project (TANAP)	2017	$1000.00
Black Sea Trade and Development Bank		
Shah Deniz Stage II Gas Field Expansion Project (Lukoil)	2015	$60.00
European Investment Bank		
Trans Adriatic Pipeline (TAP)	2018	$1500.00
Japan International Cooperation Agency		
Severnaya 1 Gas Combined Cycle Power Plant Project (I) and (II)	1998	$346.00
Construction of 400 MW Steam Gas Plant at Shimal-2 Power Plant	2005	¥29,280.00
Islamic Development Bank		
Mingechevir hydropower plant (HPP) 1st and 2nd units Varvara HPP	2008	$80.00
Khachmaz Substation	2005	$13.50
Construction of Janub power plants (with OFID and the Abu Dhabi Fund for Development)	2009	€163.00
KfW		
Rehabilitation of electric transmission sector II (initial phase of SCADA system)	2003	€15.34
Azerbaijan TPP-Imishli 330 kV electric power line	2007	€30.00
Others: EU, UNDP, Norway, USAID		
Energy Efficiency in architectural standards (EU)	2014	$0.03
Promoting development of sustainable energy (UNDP)	2011	$1.00
Energy auditing for buildings (NOR)	2011	$0.95
Electricity Market Law (USAID)	2017	

SCADA = supervisory control and data acquisition, UNDP = United Nations Development Programme, USAID = United States Agency for International Development.
Source: Independent Evaluation Department.

C. ADB Energy Sector Program Strategies and Portfolio

1. ADB Experience in the Sector

39. **ADB operations.** The energy sector has been a priority area for Asian Development Bank (ADB) operations since 2005 when it supported renewable energy development. ADB provided technical assistance to develop an action plan to boost renewable energy development and design small hydropower pilot projects.[17] The first ADB loan of $160 million to the energy sector was in 2008 for the Power Transmission Enhancement Project.[18] In 2010, a partial credit guarantee (PCG) was approved for

[17] ADB. 2005. *Technical Assistance for Preparing the Rural Renewable Energy Development Project*. Manila.
[18] ADB. 2008. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to Azerbaijan for the Power Transmission Enhancement Project.* Manila.

the construction of the Janub Power Plant.[19] In 2016, ADB provided a $250 million loan to Azerishiq OJSC as tranche 1 of the multitranche financing facility (MFF) for the Power Distribution Enhancement Investment Program[20] to support Azerishiq's efforts to improve the efficiency and reliability of power distribution networks and enhance its institutional capacity. Tranche 1, which focuses on the vulnerable distribution infrastructure, will be completed in mid-2018.

40. In 2013, ADB provided a TA to prepare for a pilot renewable energy project (biomass cogeneration),[21] which was completed in late 2016. The ongoing institutional support interventions include TA projects to encourage private sector participation in the energy sector[22] and to prepare a power sector financial recovery plan to support government efforts to develop and implement a power sector financial recovery plan.[23] The major lessons from previous ADB interventions in the energy sector include the need for (i) continuous dialogue with the government on tariff issues and to promote energy sector reform, (ii) capacity building for power utilities, and (iii) good governance and commercialization.

41. In 2017, ADB provided a $500 million loan to Southern Gas Corridor (SGC) Closed Joint Stock Company to finance works related to the development of the Shah Deniz Stage II natural gas extraction consisting of: (i) construction of two new bridge-linked oil platforms, (ii) drilling of 26 new subsea wells, and (iii) construction of new 500-km subsea pipelines.[24] ADB's Midterm Review of Strategy 2020 identified infrastructure development as a core area of operation. In the energy sector, emphasis is being placed on (i) expanding the supply of clean energy, (ii) promoting energy efficiency, and (iii) removing policy, institutional, and regulatory barriers to efficient energy use.

42. ADB support for Azerbaijan prioritizes infrastructure projects that address critical gaps in and constraints on the overstressed power systems, and that rehabilitate and modernize the power infrastructure. Priority areas included the following:

(i) **Rehabilitating power transmission and distribution networks.** ADB supports distribution enhancement investment programs to improve power supply reliability and efficiency.
(ii) **Facilitating regional power and gas trade and cooperation.** ADB continues to support cross-border gas and power transmission connectivity and trade with neighbouring countries through the Central Asia Regional Economic Cooperation (CAREC) and other regional forums. ADB has also supported the SGC Project initiated by the Government of Azerbaijan with the aim of delivering Azerbaijani gas to European markets.
(iii) **Policy and institutional reform.** ADB collaborates with other development partners and supports policy and institutional reforms with the aim of establishing a tariff regime and creating a sound regulatory environment to promote competition and attract private sector investment.

[19] ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to Azerbaijan for the Janub Gas-Fired Power Plant*. Manila.
[20] ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility. Azerishiq Open Joint Stock Company. Power Distribution Enhancement Investment Program.* Manila.
[21] ADB. 2013. *Technical Assistance for Renewable Energy Development (Biomass Cogeneration) Project*. Manila.
[22] ADB. 2014. *Technical Assistance Report. Republic of Azerbaijan: Preparing an Enabling Environment for Private Sector Participation in the Power Sector*. Manila.
[23] ADB. 2016. *Technical Assistance Report. Azerbaijan: Preparing a Power Sector Financial Recovery Plan.* Manila.
[24] ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Partial Guarantee. Shah Deniz Gas Field Expansion Project (Azerbaijan).* Manila.

D. Evaluation of the ADB Energy Sector Program in Azerbaijan

43. The assessment evaluates performance against five criteria: relevance, efficiency, effectiveness, sustainability, and development impact.[25] The ADB projects are assessed collectively against each criterion and an explanation of the rating is given.

44. This assessment of ADB sovereign support to the energy sector was based on four sovereign loans, two of which have closed. One has a PCR whose successful rating has been validated.

Relevance

45. ADB's sovereign support for Azerbaijan's energy electricity program was relevant to Azerbaijan's development priorities, as well as to ADB's Strategy 2020 and to country and sector strategies. Energy plays a prominent role in the government's Azerbaijan 2020 Vision[26] and in the Strategic Road Map for Development of Utility Services (Electricity, Heat Energy, Gas and Water) in Azerbaijan Republic adopted in 2016. The Azerbaijan strategy highlights resource efficiency, better regulation, generation diversification, wider renewable energy use, electricity market development, and export expansion as key priorities for the sector. The government has also identified the development of an efficient and effective gas distribution network as the priority for the natural gas sector.

46. The relevance of ADB's assistance to the energy sector was assessed in terms of its alignment with national priorities, consistency with ADB's sector and country strategies, and development partner and government coordination. The relevance of the design and modality as well as support for capacity development were also considered. At the strategic level, ADB's Strategy 2020 sought to help developing member countries meet their growing energy demands in a sustainable manner by supporting (i) an expansion of energy supply through rehabilitated and expanded transmission and distribution facilities to increase energy utilization; (ii) promoting energy efficiency through supply-side and demand-side measures; (iii) supporting clean energy; and (iv) facilitating the removal of policy, institutional, regulatory, technological, and legal constraints to promoting efficient energy use and promoting regional co-operation.[27]

47. At the country level, ADB's COPB, 2011-2013 and CPS, 2014-2017 state that these strategic goals support the government's development strategy for the energy sector, which seeks to increase generation capacity; develop a strong national grid to ensure a reliable supply of power to all; reduce aggregate technical and commercial losses; create and strengthen institutions which support the energy sector; and carry out and promote energy efficiency and energy conservation.

1. Loan Relevance

48. The Power Transmission Enhancement Project, completed in June 2014, was assessed relevant.[28] The Power Distribution Enhancement Investment Program, expected completion July 2018, is fully aligned with the Azerbaijan and ADB strategies. Both of these projects address the main issue of severely deteriorated strategic transmission and distribution lines and the need to prioritize their rehabilitation. As a result, they are evaluated as relevant.

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[25] IED. 2015. *Guidelines for the Preparation of Country Assistance Program Evaluations and Country Partnership Strategy Final Review Validations.* Manila: ADB.
[26] Government of Azerbaijan. 2016. *Azerbaijan 2020: Look into the Future.* Baku.
[27] ADB. 2015. *2015 Guidelines for the Preparation of Country Assistance Program Evaluations and Country Partnership Strategy Final Review Validations.* Manila.
[28] IED. 2016. *Validation Report: Azerbaijan: Power Transmission Enhancement Project.* Manila: ADB.

49. Although the partial credit guarantee (PCG) for the Janub Power Plant was aligned with the government's needs to relieve the country of supply shortfalls and ADB's 2006 operational strategy[29] and therefore relevant, it was never issued owing to procurement-related integrity concerns. It eventually lapsed.

50. The PCG for Shah Deniz Stage II aligns with the commitment by ADB to provide catalytic solutions for upper middle-income countries such as Azerbaijan under the Midterm Review of Strategy 2020. It supports two Strategy 2020 core operation areas (infrastructure and regional cooperation and integration) and one strategic driver of change (catalyzing investments through private sector participation). The PCG for Shah Deniz Stage II has been used for almost the entire amount.[30]

51. The secondary impact of ADB assistance to SGC so it can meet financial commitments to Shah Deniz will allow SOFAZ and the government to use oil and gas revenues for social expenditures and to continue their efforts to diversify the economy away from the oil and gas sector.[31] The government has identified priority sectors to help achieve such diversification as specified in a 2016 Presidential Order, which provides basic directions to develop a new comprehensive national economic vision.[32] These sectors are relatively labor-intensive and their further development is expected to have a positive impact on employment, and particularly demand for skilled jobs. The government's focus on vocational training is also expected to accommodate increases in the demand for skilled jobs. This project is highly relevant.

2. Technical Assistance Relevance

52. Of the six TA programs in Azerbaijan, four were project preparatory TA (PPTA). Of these, two were for the Power Distribution Development Investment Program, and one was for the Shah Deniz project. As these two projects are rated relevant, the TA projects are also rated relevant.

53. The TA Renewable Energy Development (Biomass Cogeneration) Project was a feasibility study for a biomass cogeneration plant and was completed in May 2017. The TCR was completed in August 2017. The TA supported the promotion of renewable energy to provide sustainable development in the energy sector as part of the government's State Program on the Use of Alternative and Renewable Energy Resources, and ADB's Midterm Review of Strategy 2020 to expand the supply of clean energy. The TA project is thus rated relevant.

54. The TA for Preparing an Enabling Environment for Private Sector Participation in the Power Sector is still active. After lengthy delays, two projects have been chosen for feasibility studies. The TA aims to bring about private investment in partnership with the government and supports both economic diversification and climate change through solar energy and increased efficiency through heat recovery. It is rated relevant.

55. The TA Preparing a Power Sector Financial Recovery Plan is still active. To date, stakeholders of the plan have acknowledged the need for tariff increases and have approved a tentative set of tariffs for different consumer groups. The road map for their implementation has yet to be decided. The TA is highly relevant as it meets the government's strategy to bring the sector to profitability by 2025 and ADB's strategy to establish a tariff regime and create a sound regulatory environment to promote competition and attract private sector investment.

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[29] ADB. 2006. *Country Strategy and Program Update: Azerbaijan.* Manila.

[30] The PCG and the underlying commercial loan were signed in December 2017, and financial closing occurred in April 2018. As of October 2018, the borrower had issued seven utilization requests for a total of approximately $480 million, and the commercial loan is expected to be fully drawn down in 2018.

[31] ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Partial Guarantee. Shah Deniz Gas Field Expansion Project in Azerbaijan.* Manila.

[32] Government of Azerbaijan. 2016. *Presidential Order of 16 March 2016. Basic Directions of the Strategic Roadmap on the National Economy and Main Economic Sector.* Baku.

3. Financing Modality

The two PCGs, for the Shah Deniz Gas Field and for the Janub Power Plant, constituted 64% of all energy sector lending to Azerbaijan. The first loan to the energy sector in 2008 was for a single project, the Power Transmission Enhancement Project, which had no planned follow up action and accounted for 14% of total lending. The MFF for the Power Distribution Enhancement Investment Program, 22% of the total portfolio, was approved to assist with a multitranche portfolio of expansion projects.

56. TA projects were all grant-financed, and totalled $5,900,000, comprising 0.5% of the value of combined loans and TA. Three out of four project preparatory TA projects were converted into loans and the other TA projects are providing assistance to restructure the financial management of the energy sector and to strengthen the enabling environment for private sector participation in the sector. They have supported previous and ongoing loans in the energy sector and increase the likelihood of their successful outcomes, with the timing of the recent TA projects strongly supporting ADB's COBP, 2015-17 to increase sector governance and private sector participation.

4. Knowledge Solutions and Innovation

57. In addition to the capacity development provided by most of the loans and TA projects, knowledge solutions were provided by the TA projects Technical Assistance for Renewable Energy Development (Biomass Cogeneration) Project and Preparing an Enabling Environment for Private Sector Participation in the Power Sector.

58. The Power Distribution Enhancement Investment Program is also providing innovative technology through the inclusion of smart metering supply and installation.

5. Overall Rating of Relevance

59. Overall the energy sector portfolio is rated as relevant.

Effectiveness

1. Loan Effectiveness

60. At completion, the Power Transmission Enhancement Project yielded better-than-expected results for two out of four outcome indicators with (i) the distribution capacity of 220 kV substations increased by 1,010 MVA by 2014 as compared with the 2012 target of 650 MVA, and (ii) transmission line losses reduced by 95 GWh per year from 6% in 2007 to 2.7% in 2014 against the original target of 25 GWh per year from 6% in 2007 to 3% in 2012. It was therefore rated effective.

61. The Power Distribution Enhancement Investment Program Loan is expected to be completed in July 2018. More than 95% of all subprojects had been completed by the end of March 2018, and all subprojects were completed by June 2018. The project is expected to deliver all the expected outcomes for the projects assigned to tranche 1. The CAPE mission conducted construction site visits[33] and held discussions with random beneficiaries. It was ascertained that at two subprojects with new 110/35/10/6 kV substations the number of forced outages decreased from 20 and 150 per month to zero. Losses in the 10 kV and 6 kV lines were reduced from 20% to 4% in both project areas. The beneficiaries interviewed in one area included domestic consumers, small business owners, a municipal chairwoman, and the principal of a local high school. All reported very high satisfaction with the outcomes of the upgraded facilities; whereas previous power availability was

[33] Mashingayirma substation in Ganja city, and Dalimammadli substation in Goranboy Rayon.

4–6 hours daily with very low voltage levels, customers now had a reliable 24-hour supply. The mission concluded that the project was effective in delivering intended outputs.

62. The Shah Deniz PCG is an ongoing project and is currently meeting all its construction schedules. The first phase was completed by the end of June 2018, with 14 out of the planned wells drilled and the bridge-connected platforms and expanded pipelines to bring the gas onshore completed. The Trans Anatolian Pipeline (TANAP) was commissioned and production commenced on 1 July 2018, exporting approximately 6 bcm annually to Turkey and a further 10 bcm to Europe by 2020. The Trans Adriatic Pipeline (TAP) was 70.8% complete at 31 March 2018. At peak construction, the project employed over 24,000 people, of whom more than 80% were Azerbaijan nationals.[34] The project has reached its milestone targets and can be assessed likely to be effective.

63. As the PCG for the Janub Power Plant was never issued and eventually lapsed, it is rated ineffective.

2. Technical Assistance Effectiveness

64. The PPTA projects for the Power Distribution Development Investment Plan and the Shah Deniz Stage II Investment Plan are rated the same as the loans they prepared: likely to be effective.

65. The TCR for the PPTA for Renewable Energy Development (Biomass Cogeneration) Project states that outputs were achieved as envisaged, including (i) biomass resources assessment and technology selection, (ii) a detailed feasibility study, (iii) economic and financial analysis, (iv) safeguard assessment, (v) a policy and regulatory framework assessment, and (vi) procurement documents. Capacity building for renewable energy covered (i) biomass technology, (ii) policy and regulation for RE development, (iii) due diligence on social and environmental impact assessment, (iv) greenhouse gas accounting and carbon project development, and (v) project management and implementation. The TA is thus assessed effective.

66. The PPTA projects Preparing an Enabling Environment for Private Sector Participation in the Power Sector and Preparing a Power Sector Financial Recovery Plan are incomplete and therefore cannot be assessed.

3. Overall Rating of Effectiveness

67. ADB's portfolio in the energy sector is rated effective.

Efficiency

1. Loan Efficiency

68. The efficiency of a project is largely based on the calculation of an economic internal rate of return (EIRR) when benefits are well defined.[35] Process efficiency is also assessed, particularly in cases of policy-based assistance and TA projects.

69. The PCG for the Janub Power Plant was not utilized, and, although the plant was built without ADB funding assistance, the objectives of the dismantling of the Shirvan plant, resettling the redundant staff, and reducing energy use were not met and thus the PCG is classified inefficient. However, AzerEnergy began dismantling the Shirvan plant in 2018 and it is expected to be decommissioned by mid-2019.

[34] Mission meeting with SCG, May 2018.
[35] ADB. 1997. *Guidelines for the Economic Analysis of Projects*. Manila.

70. The PCR and the validation report for the Power Transmission Enhancement Project reported that loan savings were detected early and were used to finance additional components that increased the scope of the project without significantly changing its outputs, outcome, or impact. However, the project was delayed by 2 years due to (i) added civil work resulting from the scope changes, (ii) material and skilled labour shortages, and (iii) weather conditions. The PCR noted that the delays were relatively minor and unavoidable from an implementation perspective. The PCR and the validation report assess the EIRR differently as the assumptions used in the reports differ, and the effect of the additional hydropower did not materialize. The validation report also identified additional impacts, However, the conclusion drawn in both the PCR and validation report is that the threshold was exceeded by the project. Both reports rated the project efficient.

71. The Power Distribution Enhancement Investment Program was more than 95% complete by the end of March 2018 and had suffered no major delays despite a change in scope. The loan was initially classified as C for social resettlement purposes, but due to unanticipated land acquisition and affected person compensation requirements was reclassified as B without the project implementation being held up. The project's outputs and impacts are already visible, and the impacts on the communities which benefit from the rehabilitation of the distribution system are positive but not quantifiable as no baseline indicators were established. With the exception of Clause 12(b)[36] of the loan covenants, all other covenants are either being complied with or have been complied with.[37] The loan is therefore rated likely efficient.

72. The Shah Deniz Stage II Gas Project began production on 1 July 2018, having suffered no delays in any of the building activities of the wells, platforms and pipelines, although another 12 wells need to be drilled, and the final 30% of the TAP pipeline to be constructed by 2020. The demonstrated experience of the contractors, the lack of political risks associated with TANAP and TAP, and the availability of funding for the final works suggest that all components of Stage II will be completed on schedule and all outputs anticipated in the RRP will be realized within the specified timeframe. However, management of the project has indicated that the reporting requirements are arduous, requiring bi-monthly reporting of the project that involves updating very large quantities of financial data which they indicate are not indicative of real project progress. Nonetheless, as SGC is contractually obliged to report these as per its PCG and underlying loan covenants, it has agreed to continue doing so.

73. The loan is therefore rated likely to be efficient.

2. Technical Assistance Efficiency

74. The two TA projects for the Power Distribution Development Investment Program (although still active with the capacity building component yet to completed) have led to the approval of the MFF for the program. They are therefore rated the same as the loan: likely to be efficient.

75. The PPTA for the Renewable Energy Development (Biomass Cogeneration) Project for two biomass plants did not lead to a loan for the expected projects but did deliver all the outputs set out the TA. The TCR indicated that, through capacity building activities, the EA's knowledge of bioenergy technologies and renewable energy policies had been improved. The TA also identified barriers in renewable energy development and provided policy recommendations. The completed feasibility study and due diligence conducted for the projects and the capacity developed will be useful for project implementation once feed-in tariffs are developed. The timing of this project was inappropriate, as the tariffs to support this renewable energy project were not in place, and the

[36] The free cash flows of the borrower for the current financial year shall be at least 1.2 times the debt service requirements for the same period on all debt based on its audited consolidated annual financial statements prepared in accordance with IFRS.
[37] Implementation consultants' quarterly report, January to March 2018, as submitted by the executing agency to ADB.

project should have been concluded without the objective of setting up a plant. Although the project PCR rated it less than successful, its outputs will continue to be highly relevant past the TA completion date and therefore it is rated efficient.

76. The TA Preparing an Enabling Environment for Private Sector Participation in the Power Sector is incomplete and has suffered significant delays. The expected finalization of project choices for the TA Preparing an Enabling Environment for Private Sector Participation in the Power Sector and enabling legislation has been delayed by more than 2 years. The implementation of pilot projects with private sector involvement requires both enabling legislation and tariffs that will make the projects viable. As for the PPTA for the biomass projects, the timing of the project was very premature, and it is classified as inefficient.

77. TA project Preparing a Power Sector Financial Recovery Plan is incomplete and therefore cannot be assessed, although considerable progress has been made.

78. The PPTA for the Shah Deniz Stage II Investment Project, although still active and scheduled to be completed by November 2019,[38] led to the approval of the PCG for the project. Through this TA, ADB is supporting the strengthening of country systems for extractive industry transparency, in particular with respect to the implementation of the Roadmap for Beneficial Ownership Disclosure. The TA is therefore rated efficient.

3. Overall Rating of Efficiency

79. ADB's portfolio in the energy sector is rated likely to be efficient.

Sustainability

1. Loan Sustainability

80. The verified PCR for the Power Transmission Enhancement Project indicated it was likely to be unsustainable given the financial situation of the sector. Azerenergy's failure to meet ADB's debt service recovery ratio (DSCR) covenant of ADB in 2012–2014 necessitated requests to waive this requirement. There were differences in the PCR and validation report with respect to the financial internal rate of return (FIRR),[39] based on the reports' different assumptions. Whereas both reports concluded that the FIRR threshold had been exceeded, the PCR noted that Azerenergy's profitability had deteriorated substantially in 2014 as a result of higher fuel prices, a major cost component in the generation of electricity.

81. The project strengthened Azerenergy staff capacity by providing on-the-job training on transmission and substation operations and maintenance (O&M), environmental management, and social safeguard implementation. The PCR also indicated that procurement and financial management training was also provided to Azerenergy staff. The validation considered these to be adequate to enable the Azerenergy staff to operate and maintain the facilities.

[38] $0.6 million in unused funds were reallocated to include the implementation of the Roadmap for Beneficial Ownership Disclosure for Azerbaijan's extractive industries in December 2017.

[39] At completion, the estimated FIRR of 2.6% in real terms did not compare favorably with the FIRR of 11.7% at appraisal and the re-estimated weighted average cost of capital of 4.3%, hence, the project was not deemed financially viable. The difference in the estimation of the FIRR lies in the (i) estimated life of the project (40 years at appraisal against 50 years at completion); (ii) O&M costs (zero incremental additional costs at appraisal against incremental fixed cost of $10,000 per year and maintenance cost of $0.1 per kWh at completion; (iii) corporate income tax rate (22% at appraisal against 20% at completion); and (iv) financial benefits (decreased import electricity and annual incremental benefit from maintenance savings at appraisal against reduced electricity imports, system loss reduction in terms of avoided fuel expenditures, and increased hydropower output at completion).

82. Given the government's strong commitment to resolving the sector's financial crisis, the strong support given to the proposed tariff structure from the ongoing TA Preparing a Power Sector Financial Recovery Plan, and the appointment of an independent regulator, the sector is now poised to turn around its financial performance. Therefore, the project is likely to be moderately sustainable.

83. The Power Distribution Enhancement Investment Program is nearly complete, but it has also been unable to meet its DSCR. The project outputs are of a high standard, and the executing agency commends the transfer of capacity to the project management unit (PMU) and technical staff. Azershiq has enough qualified staff to perform O&M and to operate the assets in a reliable manner, hence the achievements of the program components are likely to be sustainable. Like the Power Transmission Enhancement Project, with the proposed change outlined above, the project is likely to be moderately sustainable.

84. The Shah Deniz Stage II Gas Project is governed by commercial operating criteria, and has long-term operational and off-take agreements, and sufficient funding to complete the remainder of the project. It is therefore rated most likely sustainable.

2. Technical Assistance Sustainability

85. The Technical Assistance for Renewable Energy Development (Biomass Cogeneration) Project was assessed less than successful as it did not lead to the development of a biomass project. However, considerable capacity building was achieved, and the expertise in renewable energy is likely to be sustainable, given that full feasibility studies were outputs of the TA. Tentatively, the TA is rated moderately sustainable.

86. The TA Preparing an Enabling Environment for Private Sector Participation in the Power Sector and the TA Preparing a Power Sector Financial Recovery Plan are active and incomplete. No rating is possible at this stage.

87. The PPTA projects for the Power Distribution Enhancement Investment Program and the Shah Deniz Stage II Gas Project are rated the same as the loans they prepared: likely sustainable and most likely sustainable, respectively. The capacity building component of the TA Preparing the MFF Power Distribution Investment Program is ongoing and should be re-evaluated at a future date.

3. Overall Rating: Sustainability

88. ADB's portfolio in the energy sector is rated likely to be sustainable.

Development Impact

89. **Design and monitoring frameworks.** The design and monitoring frameworks for energy sector projects can be improved. Impact indicators are at times too broad or not measurable and are thus difficult to evaluate. For instance, for the Power Transmission Enhancement Project, the validation report noted that some of the targets were not readily measurable, such as carbon dioxide reductions. The validation also disputed the methodology used in the PCR to evaluate the FIRR. For energy projects that are being financed using an MFF, similar problems will arise from the reduction expected from carbon dioxide emission reductions, as they are applied to the entire project. The development impacts of the Loan Power Transmission Enhancement Project were rated by the validation report to be less than satisfactory given the limited impacts achieved against those included in the monitoring framework and the lack of available baseline data.

90. Anecdotal reports rate the Power Distribution Enhancement Investment Program impacts satisfactory, but as the loan is incomplete, only tentative conclusions can be drawn. However, as with the Power Transmission Enhancement Project, the DSCR is not achievable.

91. The Shah Deniz Stage II Gas Project has clearly defined impact and outcomes that are measurable.

92. The development impacts of other ongoing projects were not available at the time of writing because implementation was not complete. TA completion reports did not assess or rate the development of TA projects. Therefore, it is not possible to assess the development impact of ADB's overall program of assistance over 2011–2017.

93. The assumptions and methodology to assess impacts and outcomes need to be more clearly defined in the frameworks.

E. Thematic Issues

1. Support for Inclusive Economic Growth

94. The ADB CPS is selective in its sector choices and promotes inclusive growth through a diversified, knowledge-based economy; employment creation from a more balanced (i.e., non-oil) economy; and greater access to economic opportunities for women and the poor in secondary towns and rural areas. It prioritizes transport, urban infrastructure and services, and energy as part of a holistic approach, recognizing that each is a necessary factor for growth. Infrastructure is an important contributor to inclusive growth and diversification as it creates and expands economic opportunities and improves access to economic opportunities. Reliable electricity enables working hours and productivity to increase and create jobs, while urban infrastructure and services provide access to basic services such as water and sanitation, education, and health by reducing the time and costs of reaching services. The design and implementation of modern infrastructure embeds technical knowledge, expertise, and managerial and implementation-related practices, which developing countries can use for replication and innovation.

95. ADB's support to expand and improve generation, transmission and distribution systems has the direct benefit of expanding electricity supply and access, including rural areas. This in turn has the potential to expand economic opportunities for rural communities, including women. With support from ADB, the rehabilitation of rural networks has enabled them to provide continuous supply to rural customers, expanding economic opportunities.

96. To help address women's low level of participation and technical skills in the energy sector, the Power Distribution Enhancement Investment Program includes a target of a minimum of 50 women to participate in training on distribution network management.

2. Support for Environmentally Sustainable Growth

97. Regarding the energy efficiency of ADB's assistance to the energy sector, both the Power Transmission Enhancement Project and the Power Distribution Enhancement Investment Program targeted measurable decreases in line losses and corresponding carbon dioxide reductions. The current ADB TA[40] to support PPP has targeted two projects, one utilizing waste heat from generation, thereby increasing the energy produced from existing supplies, and a solar project. It demonstrates an ongoing commitment to mitigating climate change.

[40] ADB. 2014. *Preparing an Enabling Environment for Private Sector Participation in the Power Sector.* Manila.

98. The Ministry of Energy, the Ministry of Finance, and the newly appointed Energy Regulator strongly support the tariff reform being undertaken through ADB TA Preparing a Power Sector Financial Recovery Plan. All acknowledge the need for tariff reform, improvements to system operations, and legislation to support an increase in renewable energy.

99. The Janup combined cycle gas turbine (CCGT) project was supported by a PCG and included a requirement to decommission the Shirvan plant, which had a very low efficiency operating system, and to resettle all affected staff. The PCG was never issued and subsequently lapsed, and the plant has still not been decommissioned. While this could be considered to be a failure, the ongoing TA Preparing a Power Sector Financial Recovery Plan has recognized the need to decommission the plant. Stakeholders have strongly supported this and the creation of a market where the most efficient plant is dispatched first. Furthermore, the Ministry of Energy has also recognised the need to replace the Azerbaijan TPP, citing high operating costs, low plant availability, and the higher energy efficiency of CCGT plants.

3. Support for Regional Cooperation and Integration

100. **Facilitating regional power and gas trade and cooperation**. ADB continues to support cross-border gas and power transmission connectivity and trade with neighbouring countries through the Central Asia Regional Economic Cooperation (CAREC) and other regional forums. ADB has also supported the Southern Gas Corridor (SGC) Project initiated by the Government of Azerbaijan with the aim of delivering Azerbaijani gas to European markets. ADB support for the development of the Shah Deniz Stage II Gas Project, which began production on 1 July 2018, will nearly double the 9.6 bcm existing production, and in 2020 will add a further 7 bcm for exports. The project will provide Azerbaijan with additional funds to expand its economic diversification program and to further support inclusive growth strategies. Both ADB ordinary capital resources and Private Sector Operations Department funds have been injected into the project.

4. Support for Economic Diversification

101. **Policy and institutional reform**. ADB collaborates with other development partners and supports policy and institutional reforms with the aim of establishing a tariff regime for the energy sector and to create an enabling regulatory environment to promote competition and attract private sector investment.

102. The PPTA Technical Assistance for Renewable Energy Development (Biomass Cogeneration) Project is an ADB-funded pilot program to develop two joint government and private sector renewable energy projects. However, lack of capacity and changes in the government have held up this project by more than 2 years.

5. Support for Governance and Capacity Development

103. Loans and TA projects have actively supported capacity development in the energy sector (Table 5). Both Azeneregy and Azershiq have commended the quality of the capacity building during project implementation and acknowledged the usefulness of the knowledge transfer for better operations, maintenance and operational and financial management.

Table 5: Capacity Development, 2011-2017

Capacity Building	Instances
Procurement	4
Project Management	3
Technical Monitoring	2
Resource Assessment	2
Safeguard Assessment and Monitoring	3
Policy Assessment	3
Tariff Evaluation	2
Greenhouse Monitoring	1
Financial Management	1

Source: Independent Evaluation Department.

6. Overall Evaluation

104. The overall rating of the assessment of ADB's sovereign energy program in Azerbaijan is successful (Table 6). ADB assistance was relevant, effective, efficient, likely sustainable and satisfactory (in terms of development impact).

Table 6: Overall Assessment

Rating Criteria	Criteria Weight	Assessment	Score	Weighted Average Score
Relevance	0.2	Relevant	2	0.4
Effectiveness	0.2	Effective	2	0.4
Efficiency	0.2	Efficient	2	0.4
Sustainability	0.2	Likely sustainable	2	0.4
Development impacts	0.2	Satisfactory	2	0.4
Overall assessment	1.0	Successful		2.0

Source: Independent Evaluation Department.

F. Other Evaluations

1. ADB Performance

105. ADB's performance in the energy sector in Azerbaijan is assessed satisfactory, based on the adequacy and quality of the strategy, the program, responsiveness to client needs, and adherence to ADB policies and procedures.

106. **Adequacy and quality of country partnership strategies (CPSs) and country operations business plans (COBPs)**. The energy sector assessments, strategies and business plans in ADB's CPSs and COBPs during the CAPE period were aligned well with the government's goals for the energy sector. They focused on expanding the availability of and access to energy by reducing losses, strengthening infrastructure, promoting clean energy, and increasing energy efficiency.

107. **Responsiveness to client needs**. Stakeholders met during the CAPE mission considered that ADB staff were helpful and responsive to the needs of project beneficiaries. Particular praise was given to the country director who was seen as very client-focused and a problem solver. ADB was generally acknowledged to have been responsive in following up on issues raised in project reviews and monitoring visits.

108. **Adherence to ADB policies and procedures**. ADB has provided project preparatory TA to assist clients to design subprojects that comply with ADB procedures and safeguard requirements, and to prepare funding requests. ADB has also supported capacity development for project management units (PMUs) so they can comply with ADB environmental and social safeguards and monitoring and reporting requirements. This support helped clients adhere to ABB policies and was well regarded by project beneficiaries.

2. Borrower, Executing and Implementing Agencies Performance

109. **Ownership and commitment**. The borrower, executing and implementing agencies, including other stakeholders in the financial recovery plan (Ministry of Energy, Ministry of Finance, and the Regulator) were all highly committed to the projects funded by ADB, as these supported the country's needs and goals for the energy sector. They also recognized the need to comply with ADB policies and procedures.

110. **Involvement during implementation**. While executing and implementing agencies were engaged and involved during project implementation, their capacity varied widely. The participants in the TA for Renewable Energy Development (Biomass Cogeneration) Project have widely ranging amounts of experience, with some having difficulty understanding the technological and financial implications. Undoubtedly this has impacted on the project and caused the major delays experienced by the project. Implementing agencies in the visited projects all appear to have PMUs with adequate staff.

111. The capacity of state entities to manage and implement loan projects is good. Azenergy and Azeshiq have established PMUs that became familiar with ADB guidelines and procedures.

3. Findings and Lessons

112. ADB's due diligence of subprojects has generally been stringent and followed ADB procedures and guidelines. However, the Power Distribution Enhancement Investment Program was originally classified C for social resettlement purposes, and later changed to B following complaints from affected persons. The mission notes that in the loan there is a distribution line rehabilitation component, and if efficient line surveys had been done as part of the due diligence, these issues would have been highlighted as it is extremely rare for such projects not to involve some encroachment on land. Hence engineering, procurement, and construction (EPC) contractors should have prepared both environmental management plans (EMPs) and social management plans (SMPs) before commencing work.

113. For the same project, procurement was mostly completed prior to the implementation consultants being engaged. EPC contractors began work without clear reporting directions and without clear instructions with respect to grievance complaint procedures. The PMU has recognized these issues.

114. Azershiq noted that it had learned from experience during the implementation of the Power Distribution Enhancement Investment Program that the greatest potential for service improvement came from the 0.4 kV bundled lines.

115. The TA Preparing a Power Sector Financial Recovery Plan has gained very significant ownership from all the stakeholders in the energy sector, not just the executing agency (Ministry of Finance) but also the Ministry of Economy, the Ministry of Energy, the Regulator and the utilities. The consultant has continuously engaged with all the stakeholders and has responded positively to their concerns at each stage of the formulation of the recovery plan. The consultant continuously modified approaches to tariff setting and gained consensus at each stage of what could have been a very contentious process. This slow, iterative and interpersonal approach, even if it causes delays, can produce very large strides toward accomplishing a difficult task.

116. The strong complementary links between donors' actions in restructuring the energy sector, including the USAID support for the energy law, EBRD's support for the establishment of the regulator, and ADB's financial recovery support has generated additional momentum which would have been unlikely with stand-alone unsynchronized projects.

117. The TA Technical Assistance for Renewable Energy Development (Biomass Cogeneration) Project was unsuccessful and the TA Preparing an Enabling Environment for Private Sector Participation in the Power Sector has been delayed by more than 2 years. Both projects expected outcomes that depend on a satisfactory financial return to the projects in order to succeed. However, at conception (May 2013 and September 2014), tariffs, enabling legal, and technical requirements were not seen as pre-conditions for these projects. While the capacity building components of the projects will have very good outcomes, the mission suggests that the expectations of the agencies involved could have been better managed and the overambitious infrastructure targets could have been avoided if better due diligence had been performed.

118. The TA Preparing an Enabling Environment for Private Sector Participation in the Power Sector includes support for project structuring and development planning for demonstrating private sector participation in power projects, which could have benefited from the regular presence of PSOD, as it will involve private sector finance to bring the projects to financial close. Similarly, the absence of PSOD personnel affects the implementation of the nonsovereign loans to SGC.

119. As women are the primary users of energy at home, they have a significant stake in all energy decisions.

4. Recommendations

120. The implementation consultants for the Power Distribution Enhancement Investment Program have recommended design improvements that will improve safety and system operations.[41] It is recommended that these designs be reviewed before any further procurement, and that standards in Azerbaijan be amended to conform to these changes. This should be verified before beginning tranche 2.

121. Where EPC construction work is carried out, detailed instructions with respect to materials, standards, reporting, EMP and SMP should be prepared as an implementation manual and agreed with the contractors before sites are handed over them.

122. Azerbaijan has achieved a 100% electrification rate. However much of the rural system, in particular the 0.4 kV lines, which are the last links to households, are severely degraded. It is recommended that ADB prioritizes the need for this in tranche 2 of the MMF project with government support.

123. It is noted that the TA Preparing a Power Sector Financial Recovery Plan has the potential to transform the financial management of the energy sector. Given that ADB has initiated this process it should be morally bound to take any additional support to bring the project to fruition.

124. It is further noted that the gas distribution sector has nearly identical financial issues to those that face the electricity sector, and ADB should take the opportunity to repeat the TA Preparing a Power Sector Financial Recovery Plan for gas, attached as part of a system rehabilitation project.

[41] First, the current substation design being utilized does not provide adequate protection for personnel in the event of an internal arcing fault. Such a fault would not be contained in one location but will result in significant internal damage and a trip of the complete switchboard. This could result in an extended outage of a complete substation with loss of supply to all customers connected to that substation. Metalclad, air-insulated switchgear in international use, manufactured in accordance with IEC 60298 and IEC 62271, is recommended. Second, earthing connectors are missing at substations. This means they do not provide a connection to earth with sufficiently low impedance to allow phase-to-earth faults to be detected and cleared. Single phase to earth faults are common on distribution systems especially overhead line systems. This means that the first line to earth fault will not be detected and cleared until there is a fault on another phase in the network.

125. Feasibility studies for all energy projects should include consultations with women and analysis of their needs as energy consumers so that appropriate gender actions are integrated into project design.