Technical Assistance Consultant's Report (Final)

Project Number: 44183
March 2013

Republic of Georgia: Energy Sector Assessment, Strategy and Road Map

(Financed by ADB's Technical Assistance Special Fund)

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For the Government of Georgia

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 31 March 2013)

Currency unit	–	lari (GEL)
GEL1.00	=	$0.6035
$1.00	=	GEL1.6570

ABBREVIATIONS

BSTN	–	black sea transmission network project
DPL	–	development policy loan
EBRD	–	European Bank for Reconstruction and Development
EE	–	energy efficiency
EEC	–	energy efficiency center
EIB	–	European investment bank
ENTSOE	–	European network of transmission system operators for electricity
ESCO	–	electricity system commercial operator
GNERC	–	Georgia national energy regulatory commission
GNEWRC	–	Georgian national energy and water supply regulatory commission
GOGC	–	Georgian Oil and Gas corporation
GSE	–	Georgian State Electrosystem
GTV	–	Georgian transportation company
GWh	–	gigawatt hour
HPP	–	hydropower plant
HVDC	–	high voltage direct current
IFC	–	International Financing Corporation
KfW	–	kreditanstalt Für Wiederaufbau (German Development Bank)
kV	–	kilovolt
kWh	–	kilowatt-hour
MOENR	–	ministry of energy and natural resources
MOU	–	memorandum of understanding
MW	–	megawatt
NIF	–	neighborhood investment facility
O&M	–	operation and maintenance
PAM	–	project administration manual
PPA	–	power purchase agreement
PPP	–	public private partnership
PSP	–	private sector participation
PSOD	–	private sector operations department
RE	–	renewable energy
SCADA	–	supervisory control and data acquisition system
SDR	–	special drawing rights
SOCAR	–	state oil company of Azerbaijan republic
TSKB	–	Turkish commercial bank
TPP	–	thermal power plant
TWh	–	terawatt-hour
USAID	–	United States Agency for International Development
VAT	–	value added tax

NOTES

(i) The fiscal year of the government and its agencies ends on 31 December

(ii) In this report, "$" refers to US dollars.

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Executive Summary

A. Sector Performance, Problems, and Opportunities

1. **Two Decades of Sector Reforms.** The Georgian energy sector has undergone tremendous change over the last two decades. Extensive regulatory and market reforms, focused on deregulation and privatization, have helped improve service quality in the energy sector and the financial viability of sector organizations. Specific reforms included the establishment of the independent energy sector regulator, the Georgia National Energy Regulatory Commission (GNERC) and the unbundling and privatization of many power generation, and power and natural gas transmission and distribution functions.[1] Most of the sector entities are now privately-owned, with the exception of the transmission and dispatch company Georgian State Electrosystem (GSE), the Enguri, Vardnili and Khrami hydropower plants (HPP), the electricity market operator called the Electricity System Commercial Operator (ESCO), and one regional electricity distribution company. Legal and regulatory reforms accompanying privatization in the oil and gas sector have helped establish Georgia as a regional oil and gas transit services supplier.

2. **Outcomes of Past Reforms.** As a result of past reforms, the energy sector has gone from near complete operational and financial collapse and import dependency to making Georgia a net electricity exporter that provides affordable, reliable energy services to Georgian customers. Most regions have continuous 24-hour service, up from 2-6 hours of service in the early 2000s. During the same period, collection of billed electricity increased from 20 percent to more than 75 percent, and transmission system losses decreased from 16 percent to less than 2 percent. In 2007, the country became a net exporter of electricity, after more than a decade of dependence on imports from Russia and Armenia (although in 2012 Georgia was again a net importer for the first time in 5 years). The condition of the gas distribution network has also greatly improved. Losses have declined to 12-15 percent from 50 percent in 2002 and collections have increased to 85 percent. The number of customers with natural gas has also increased.

3. **Insufficient Legal, Regulatory and Institutional Framework to Achieve Energy Sector Goals.** Now that Georgia's energy sector has achieved relative financial and physical stability, the Government seeks to increase private sector participation in power generation, increase Georgia's role in regional electricity trade and improve the efficiency of energy production and use. The development of regional trade and private sector participation in the energy sector contribute to the Government's economic growth agenda, and energy efficiency improvements can help Georgia increase energy security. However, Georgia lacks a strong legal, regulatory and institutional framework to support each of these goals.

4. **Barriers to Private Sector Investment.** Construction has not begun and financing has not been secured for many potential hydropower projects that are

[1] Upon inclusion of water in GNERC's responsibilities, the organization was renamed the Georgian National Energy and Water Supply Regulatory Commission (GNEWRC)

expected to be privately developed because investors and lenders perceive significant risk in the sector. Lack of clear environmental regulations, insufficient public-private partnership (PPP) framework, unclear off-take agreements for hydropower projects and the lack of a framework for transmission capacity allocation hinder private sector involvement in hydropower development in Georgia. Every new power plant transaction has risks, but the existing legal, regulatory and institutional framework in Georgia has increased these risks and slowed private investment in hydropower plants.

5. **Barriers to Regional Electricity Trade.** Legal, regulatory and institutional bottlenecks have not allowed Georgia to take full advantage of its potential for regional electricity trade. These include: (i) inadequate market rules to allow for balancing and settlement across borders, which will make participation in Turkey's electricity market difficult (ii) an institutional framework that may create conflicts of interest for existing state-owned entities as regional trade develops, and (iii) insufficient transmission physical infrastructure between Georgia and Turkey, which could cause grid instability once the Black Sea Transmission line comes online. A robust legal, regulatory and institutional framework for regional electricity trade can facilitate Georgia's electricity exports and ensure the country can import electricity from its neighbors when necessary.

6. **Barriers to Energy Efficiency.** Georgia has the potential for drastic improvements in the efficiency of energy production, distribution and end-use. However, the Ministry of Energy and Natural Resources (MENR) lacks the institutional capacity to develop and implement energy efficiency policy. Georgia also lacks a construction code, which means little consideration is given to energy efficient design in new construction. The country also does not have energy efficiency standards and labeling regulations for appliances and the end-use electricity tariff is not designed to encourage energy efficiency. Furthermore, much of Georgia's generation, transmission and distribution infrastructure is very old, which contributes to power system inefficiency and unreliability.

B. Government's Sector Strategy

7. The energy sector plays an important role in the Government's "Strategic '10-Point Plan' for Modernization and Employment," issued in October 2011. The Government's strategic objectives for the energy sector are (i) to improve energy security by increasing reliance on domestic energy resources, (ii) to improve the efficiency of energy production and consumption, (iii) to harmonize the technical and legal aspects of the Georgian power system with those of neighboring countries in order to facilitate energy trade and promote supply security, (iv) to continue deregulation of the power sector and increase private sector participation in the sector, (v) to amend electricity tariffs to support the financial and technical sustainability of the sector and (vi) to create jobs by deploying infrastructure projects that facilitate the development of export industries and provide direct employment opportunities.

8. The Government has begun pursuing its goal of becoming an important electricity exporter within the region by building the Black Sea Transmission Network Line with donor support. The Government has also streamlined licensing

requirements and deregulated generation tariffs for new HPPs under 13 MW in order to encourage private sector participation in hydropower development. However, further legal and regulatory changes are necessary to facilitate private sector participation in power generation, foster regional trade, and improve energy efficiency and reliability.

C. Asian Development Bank Sector Experience and Assistance Program

9. The Asian Development Bank's (ADB) Strategy 2020 has identified infrastructure development as a core area of future operation and regional integration as one of its three development agendas. In the energy sector, Strategy 2020 focuses on: (i) expanding the supply of clean energy; (ii) promoting energy efficiency through supply side and demand side measures; and (iii) removal of policy, institutional and regulatory barriers for efficient energy use. In particular, ADB will support developing member countries to move their economies onto low-carbon growth paths by improving energy efficiency, expanding the use of clean energy sources, and reducing fugitive greenhouse gas emission. ADB's Energy Policy 2009 prioritized promoting energy efficiency and renewable energy as one of the three pillars of ADB assistance in the energy sector.

10. ADB has been involved in Georgia since 2007, but has had limited involvement in the energy sector. ADB is currently providing technical and financial assistance to the Government for the proposed Regional Power Transmission Enhancement Project, but there are significant opportunities for ADB to further increase its strategic involvement. ADB can help the Government achieve its objectives of energy independence and economic development through (i) improvements to the efficiency of energy production and use, (ii) development of regional trade and (iii) enablement of financially and environmentally sustainable private sector participation in hydropower development.

11. **Improvements to the efficiency of energy production and use.** ADB can help Georgia develop the laws, regulations and institutions necessary to improve energy efficiency. ADB can also assist with the rehabilitation of power transmission and distribution equipment to strengthen Georgia's power infrastructure and promote energy efficiency. ADB can provide technical assistance to MENR to restart the process of drafting comprehensive energy efficiency legislation. ADB can also assist the Government with the development of a national construction code that incorporates energy efficiency standards, and the development of national appliance energy efficiency standards and labeling systems. By building on EBRD's experience with its sustainable energy financing facility in Georgia, ADB can provide financing for energy efficiency upgrades.

12. ADB's public sector lending can support rehabilitation of GSE's high-voltage transmission network. A number of substations in the domestic transmission network rely on outdated, Soviet-era control and protection equipment. Modernization of this equipment is required to improve grid stability and power system efficiency. Without this new equipment, Georgia could suffer widespread blackouts if the instability of voltage fluctuations between the Georgian and Turkish grids forces the back-to-back substation to shut down. Additionally, ADB can support the construction of new high voltage substations that will provide additional capacity

needed to provide reliable, adequate power supply to the new manufacturing and industrial hubs in the Black Sea region.

13. A project to improve end-user electricity tariffs is currently underway in Georgia, but no such project has been initiated to improve gas tariffs to support energy efficiency. ADB could provide TA to GNERC to conduct a natural gas end-user tariff study with the goal of revising the natural gas tariff structure to promote energy efficiency. This study could also have the goal of reducing poverty by developing well-targeted cross-subsidies.

14. **Development of regional trade**. Some donors have expressed concern that congestion in the Turkish grid could nullify GSE's plans to increase Georgia's interconnection capacity with Turkey. ADB could support GSE by providing technical assistance for a system planning study to identify the best location for a second line and concessional financing to the Government for construction of the line.

15. ADB can also provide technical assistance to help Georgia develop its regulatory framework for electricity imports and exports, and improve the institutions involved in energy trade. This could include working with the donor community. For instance, ADB could support parts of the Georgia Energy Market Model and Electricity Trading Mechanism projects, which are large, multi-year efforts. ADB's involvement in this area could include assistance to the Government to facilitate the following: (i) the creation of clear rules for capacity allocation to generators over the Black Sea Transmission Line, (ii) amendment of Georgia's energy market rules to harmonize Georgia's grid with Turkey's and (iii) the resolution of the conflict of interest inherent in ESCO's role as a market operator and also a trade consolidator, as well as GSE's roles as transmission system owner and operator.

16. **Enable financially and environmentally sustainable private sector participation in hydropower development.** The Government plans to tender out several large hydropower plants on a Build-Own-Operate basis. Potential strategic investors in these projects are currently negotiating with ADB's Private Sector Operations Department (PSOD) and other multi-lateral development banks (e.g. EBRD, IFC) to raise debt financing for these projects. ADB can provide knowledge products and policy advisory support to facilitate the legal and institutional reforms needed to ensure hydropower projects are developed in an environmentally sustainable manner, reduce investor risk and enable additional investment in the sector. Specific areas for support might include: (i) helping the Government develop standards and procedures for environmental protection when licensing hydropower projects and (ii) developing a clearer framework for tendering and implementing public private partnerships (PPPs) in the power sector. Policy and knowledge support would be closely coordinated with other development partners who have been heavily involved in working with the Government to implement sector reforms.

1 Introduction

1. This report outlines the Georgian energy sector assessment, strategy and road map as the basis for a future partnership between the Government of Georgia and ADB. The paper starts by assessing the energy sector in Georgia and the needs and challenges the Government faces in the sector. It then describes the sector strategy and priorities of the Government, followed by an analysis of the major sector challenges. Drawing on the sector assessment and the Government's sector strategy, the paper presents a road map for possible ADB support over the medium term (2013-2017). Three core areas for ADB support include: improving the efficiency of energy infrastructure, developing regional trade and encouraging private sector participation, specifically in the sustainable development of Georgia's hydropower resources. Besides providing sector-level input into ADB's country partnership strategy for Georgia, this document serves as a basis for further dialogue and cooperative action by ADB and the Government to tackle the complex challenge of managing Georgia's energy sector development in the coming years.

2 Sector Assessment

2. The effects of the global financial crisis still linger in the Georgian economy. The Government has reduced its deficit and the economy is growing as a whole, but Georgia still has a large current account deficit and unemployment and poverty rates remain above pre-crisis levels.[2] The Government hopes to reduce the current account deficit and create jobs by developing new industries and expanding existing enterprises. The Government believes that a reliable, diverse and financially sustainable energy sector is essential to facilitate industrial growth. The following subsections contain (i) a description of the socioeconomic context in Georgia and the role of the energy sector in helping Government achieve its larger strategic objectives, (ii) a brief history of the Georgian energy sector and its modern day context (iii) an assessment of energy subsectors including electricity generation, transmission, and distribution and iv) a summary of Government's strategy for the energy sector.

2.1 Socioeconomic Context

3. Georgia's economy has come far since the 1990s, when the fall of the Soviet Union caused widespread hardship throughout the country. Georgia has experienced impressive economic growth over the past decade, with real GDP growth of more than 50 percent since 2004, despite a 3.8 percent drop in 2009 caused by the global financial crisis.[3]

4. Georgia still faces a growing current account deficit and high unemployment and poverty rates. Poverty rates are particularly high in rural areas, where the fall of

[2] International Monetary Fund, "Program Note: Georgia," October 2nd, 2012, http://www.imf.org/external/np/country/notes/georgia.htm

[3] IMF World Economic Outlook, April 2012. http://www.imf.org/external/pubs/ft/weo/2012/01/weodata/download.aspx (accessed September 20, 2012).

the Soviet Union led to a collapse in demand for Georgia's agricultural products and the privatization of farms led most farmers to revert to subsistence agriculture. In 2009, 31 percent of the rural population lived in poverty compared to 18 percent of the urban population. Georgia had a GINI index of 41.3 and the lowest 20 percent of the population earn a mere 5.32 percent of national income.[4]

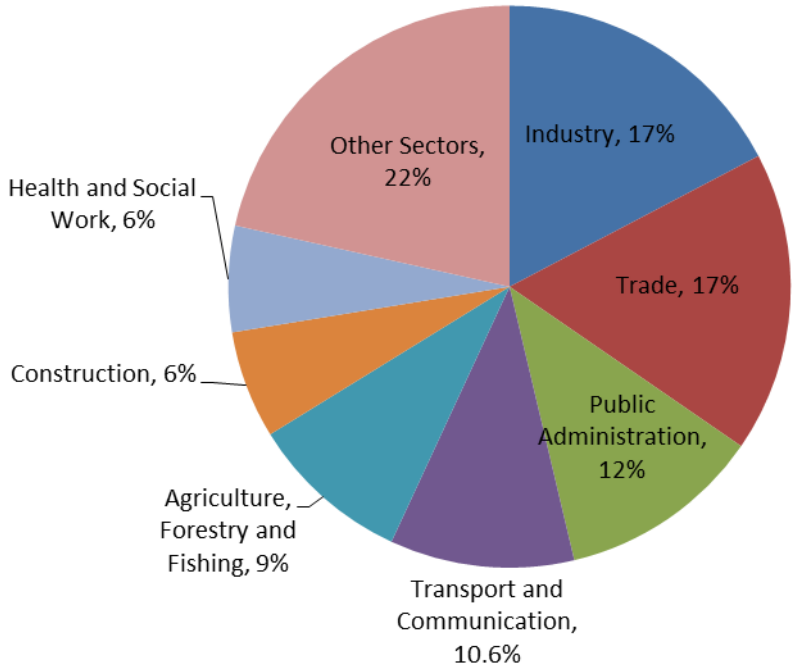
5. Government plans to develop the country's industrial base in order to take advantage of export opportunities for goods with the expectation that this will reduce the current account balance and also create jobs. The provision of affordable and reliable energy supply, along with the improvement of road, rail and marine and air transport infrastructure, is essential for building this industrial base. Government also seeks to develop its energy generation and transmission system to increase electricity trade with neighboring countries.

6. Currently, the main drivers of economic growth in Georgia are industry, trade, transport and communications. In 2011, industry and trade both represented 17 percent of GDP, and transport and communication represented 11 percent. The financial intermediation and manufacturing sectors experienced the largest growth, from 2010 to 2011, with 24 percent and 14 percent real growth, respectively. The utilities (electricity, gas and water supply), hotels and restaurants, communication, trade and construction sectors also saw significant growth in 2011.[5] Figure 2.1 shows the contribution to GDP of each sector in 2011.

[4] The World Bank, "World Development Indicators Databank: Georgia," Accessed Sept 28, 2012.

[5] GeoStat: National Statistics Office of Georgia. "Gross Domestic Product of Georgia in 2011." http://geostat.ge/cms/site_images/_files/english/nad/GDP_2011__press-release__Eng1.pdfgeo (accessed September 20, 2012)

Figure 2.1: GDP Structure in 2011



Source: GeoStat: National Statistics Office of Georgia. "Gross Domestic Product of Georgia in 2011." http://geostat.ge/cms/site_images/_files/english/nad/GDP_2011__press-release__Eng1.pdfgeo (accessed September 20, 2012)

2.2 Energy Sector Context

This section describes the recent history of the energy sector in Georgia, providing a contextual framework for the current issues facing the sector.

2.2.1 Power

7. The collapse of the Soviet Union contributed to the Georgian power sector's decline into poor physical and financial condition. Years of underinvestment before the collapse of the Soviet Union led to dilapidated power generation, transmission and distribution infrastructure. After Georgia achieved independence in 1991, the country lacked the ability to pay for maintenance of the complex energy distribution networks built during the Soviet era and, as a result, these systems fell into disrepair. Georgia also no longer had access to favorably-priced natural gas from the Soviet Union, which had supplied its district heating, power generation and industrial plants and provided fuel for residential customers for heating and cooking. Civil strife in the early 1990s resulted in the closure of gas transport routes from Russia. The 1992-1993 War in Abkhazia between the Georgian government forces and the Abkhaz separatists supporting the Abkhazia's independence from Georgia destroyed the Tkvarcheli thermal power plant (TPP) and made it difficult to operate the Enguri hydropower plant (HPP). By 1994 most areas in Georgia received electricity service for only 2-4 hours a day because of dilapidated and damaged infrastructure and the unavailability of fuel.

8. In the early 1990s all of the Georgian state power sector institutions were insolvent, due to poor collections from customers, corruption, and tariffs below the cost of supply. In 1995, Sakenergo, the vertically-integrated utility was collecting, on average, only 4 percent of power it billed. Tariffs, which were typically below-cost before independence were kept low for political reasons and to ease the burden of macroeconomic reforms. Total quasi-fiscal debt attributable to the sector was equal to roughly 5-6 percent of Georgia's GDP. Operating arrears for gas and power imports stood at roughly US$ 1.1 billion.

9. Georgia has significantly improved power supply reliability and the financial position of power sector companies over the past fifteen years. Two phases of power sector reforms have focused on deregulation and privatization. The first phase of reforms, from 1996 to 2004, established a legal framework for deregulation with laws on energy, electricity, restructuring and privatization. These reforms established the Georgia National Energy Regulatory Commission (GNERC) as the independent power sector regulator. They also implemented the wholesale electricity market. Generation, transmission and distribution functions were unbundled and some generation assets and distribution companies were privatized.

10. The second phase of reforms began in 2006 when the Government published a new energy strategy. The new strategy had the following objectives: (i) the privatization of the electricity and gas sector in order to improve its economic viability and performance, (ii) the reduction of bureaucratic hurdles to private sector participation in the energy sector, (iii) providing private companies access to the transmission and distribution network, and encouraging consumer choice in energy suppliers, and (iv) increasing energy trade with other countries.

11. Georgia's reform efforts have resulted in increased power sector reliability and lower losses. Since 2004, all of Georgia's TPPs, many of its smaller HPPs, and the distribution system have been privatized. The Government has also reformed the wholesale electricity market, moving to a "net pool" model, with a monthly balancing market. Parts of Georgia's transmission and distribution systems and some hydropower plants have undergone rehabilitation. Most regions of Georgia now enjoy 24-hour power supply, although outages still occur and the state-controlled electricity system operator Georgian State Electricity System (GSE) admits the transmission network is "fragile." Georgia's electricity exports grew from 2006 to 2011, as Georgia has taken advantage of its abundant low-cost hydropower resources and proximity to growing electricity markets in neighboring Turkey and Russia.

12. Reforms have improved the financial performance of power sector companies. Collections have increased from 20-40 percent in 1999 to more than 75 percent as of 2007 and transmission system losses decreased from 16 percent in 2002 to 1.9 percent in 2011. The Government now seeks to shift the focus of its reforms from improving the reliability and financial performance of its power sector to ensuring energy security and using the power sector as a driver of economic development in the country.

13. The Government is actively supporting private development of its hydropower resources by streamlining the licensing process and encouraging

electricity exports to lucrative foreign markets. Rehabilitation of existing hydropower projects continues, as does the rehabilitation and further development of the transmission system. Georgia is in the process of developing transmission capacity to special industrial zones within Georgia, as well as new transmission interconnections with its neighbors.

2.2.2 Natural Gas and Oil

14. Much like the power sector, Georgia's natural gas and oil sectors have experienced a strong turnaround since the collapse of the Soviet Union. Georgia had a highly reticulated gas distribution network immediately following independence, but without sufficient gas supply the network was unused and fell into disrepair. Retail gas distribution ceased almost entirely after independence because of insufficient gas supply, and gas imports were used to serve thermal generators and a few large industries only. Households received very little service. Collections were a substantial problem: gas suppliers collected only 2-8 percent of revenues on the amounts they billed. Billing for gas, moreover, was based on the number of registered residents in a household rather than metered consumption, making commercial distribution of gas difficult. By the late 1990s the natural gas distribution network had fallen into disrepair. In 2002 gas supply to Tbilisi was intermittent. Combined technical and commercial losses for the gas distribution system were as high as 50 percent and nonpayment was rampant.

15. Oil production from domestic fields in Georgia decreased during the 1980s and after independence Georgia had to rely on oil imports from Azerbaijan and Russia. This led to energy security problems. The Nagorno-Karabakh War in 1991 between Azerbaijan and Armenia reduced Georgia's ability to import oil from Azerbaijan, which caused supply scarcity and prevented Georgian industry from operating at full capacity. In the early 1990s the domestic oil industry lacked capital to self-finance new investments and domestic oil production did not increase until the late 1990s, when domestic companies were able to form joint ventures with foreign companies to increase domestic production.

16. Since independence, Georgia's oil and natural gas sectors have undergone significant reforms. These reforms have sought to capitalize on the country's geographic location and political disposition to boost revenues and improve energy security. As in the electricity sector, Government reform of gas distribution has focused on privatization. The Government initially passed management, but not ownership, of gas distribution to municipal governments in 1996. Sakgazi, a joint-venture between local Georgian partners and Russian Itera bought the gas distribution companies outside of Tbilisi as in 1998. Georgia also instituted a number of other legal and regulatory reforms in the oil and gas sectors in the late 1990s, including the adoption of legislation on eminent domain, adopting operational standards for pipeline safety, and ratifying international conventions on marine oil pollution damage. In 1998, GNERC's responsibilities for regulation were extended to gas transmission and distribution.

17. Itera invested heavily in rehabilitation of pipelines, compressors and metering at the household and condominium levels in order to improve natural gas distribution system performance. Now, natural gas distribution outside of Tbilisi is

provided by small companies owned by Itera and the State Oil Company of Azerbaijan Republic (SOCAR). KazTransGaz Tbilisi, a Kazakhstani company, provides natural gas distribution services in Tbilisi.

18. Georgia imports almost all of its natural gas from Azerbaijan and Russia. Half of Georgia's natural gas is imported by The Georgian Oil and Gas Corporation (GOGC) and sold to a gas wholesaler, SOCAR Gas Export Import. The rest is purchased by commercial users directly from suppliers of their choice, typically SOCAR.

19. Although Georgia relies heavily on natural gas imports, it is an important transit route for natural gas from Azerbaijan to Turkey and from Russia to Armenia, and Georgia's position as a transit route contributes to supply security. Whereas Russia's Gazprom was once Georgia's only gas supplier, the country now has access to gas from three different pipelines. Security of natural gas supply is especially important for Georgia because natural gas consumption is growing. It is expected to grow at a rate of 4 percent annually until 2017, primarily driven by demand in the commercial and residential sectors. Natural gas consumption in industry is also expected to grow as the Government develops energy-intensive industry in the planned "manufacturing-industrial" zones.[6]

20. Georgia's role as a regional player in oil and gas transit has bolstered Government revenues, in addition to contributing to energy security. Georgia's oil pipelines earn the country millions of dollars a year in transit fees. Gas supply and the condition of the gas distribution network were also much improved by 2007. Itera's gas losses have decreased to 12-15 percent, and average collections were at 85 percent (as high as 90-95 percent in some regions and as low as 60-65 percent in other regions).

21. Similar to the country's position in regional natural gas trade, Georgia is an important transit country in regional oil trade. Georgia's pipelines play a key role in transferring Caspian oil to Europe and the Mediterranean.[7] GOGC is the owner of the Western Route Export Pipeline (WREP), which transports oil from Azerbaijan to Supsa on the Black Sea. GOGC receives a tariff for transporting oil along this pipeline.[8] Georgia imports all of its oil for consumption, though it produces a small amount domestically. Domestically produced oil is exported because Georgia does not have a refinery.[9]

2.3 Subsector Assessment

This subsector assessment describes the institutional arrangements in Georgia's power sector and the physical condition of power sector infrastructure.

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[6] Bank of Georgia, "Georgian Oil and Gas Corporation: Getting more Georgia," 2012, http://bankofgeorgia.ge/reports/getting_more_Georgia.pdf

[7] International Energy Agency, "Beyond the OECD – Georgia," 2012, https://www.iea.org/country/n_country.asp?COUNTRY_CODE=GE

[8] Bank of Georgia, "Georgian Oil and Gas Corporation: Getting more Georgia," 2012, http://bankofgeorgia.ge/reports/getting_more_Georgia.pdf

[9] Nino Patsuria, "Georgia craves for oil refinery," *Weekly Georgian Journal*, 16 February 2011, http://www.georgianjournal.ge/index.php/economy/3685-georgia-craves-for-oil-refinery

2.3.1 Power Generation

22. Georgia's electricity system has installed capacity of 3,320 MW. Of this, 2,610 MW is hydropower, and 710 MW is gas- and oil-fired generation. Hydropower generates approximately 80 percent of Georgia's electricity, and three thermal plants generate the remaining 20 percent. Georgia's single largest generator is the 1,300 MW Enguri hydropower plant, which generates approximately one third of the country's electricity.[10]

23. Half of power generating capacity in Georgia is privately owned, as many generation plants have been transferred from state ownership to private ownership in recent years. The Tbilsresi TPP was the most recent plant to be privatized. Tbilsresi was sold in 2010 to the Georgian Industrial Group.[11] The only Government-owned power generating plants are the Enguri, Vardnili and Khrami HPPs, which together supply over 40 percent of Georgia's electricity.[12]

24. Georgia's power plants are relatively old: the generation fleet's weighted-average age is 37, and the oldest hydropower plants are more than 75 years old. As a result of their age, the two oldest thermal plants, the Tbilsresi TPP and the Mtkvari TPP suffer from low thermal efficiencies. Georgia's third TPP, the Garabani TPP, was completed in 2006 and is Georgia's newest and most efficient generating plant. Because of their age and dilapidated state, many of the hydropower facilities that are critical to Georgia's power sector are undergoing rehabilitation.[13] The Enguri hydropower plant has undergone rehabilitation since the 1990s. The last two units of this plant are currently being rehabilitated.[14]

25. In 2007 Georgia became a net exporter of electricity and the country's annual electricity exports grew 140 percent by 2011. However, in 2012 electricity exports fell and Georgia once again was a net electricity importer. Georgia exports electricity during the summer months when hydropower generation is at its peak, and imports primarily during the winter months, when there is not sufficient hydropower generation to meet domestic demand. Georgia exports excess power from its hydropower plants during the summer months, but a lack of reservoir storage capacity on the system and insufficient transmission export capacity means that most of the excess power generated during this part of the year cannot be utilized.

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[10] Economic Consulting Associates, "Georgia: Regional Power Transmission Enhancement Project, Power Sector Overview (Revised)," Asian Development Bank, 2010.

[11] Bank of Georgia, "Georgia's Hydropower Potential: Giving water the green light," 2012, http://bankofgeorgia.ge/reports/give_green_light_to_water.pdf

[12] Pöyry AS, "The Electricity Sector in Georgia – An Overview," Ministry of Energy of Georgia, 2010, http://www.greengeorgia.ge/sites/default/files/The%20Electricity%20Sector%20in%20Georgia%20Overview.pdf

[13] Ministry of Energy and Natural Resources of Georgia; Pöyry AS, "The Electricity Sector in Georgia – An Overview," Ministry of Energy of Georgia, 2010, http://www.greengeorgia.ge/sites/default/files/The%20Electricity%20Sector%20in%20Georgia%20Overview.pdf

[14] Pöyry AS, "The Electricity Sector in Georgia – An Overview," Ministry of Energy of Georgia, 2010, http://www.greengeorgia.ge/sites/default/files/The%20Electricity%20Sector%20in%20Georgia%20Overview.pdf

As a result, water must be spilled over the dams during the spring and summer months. In 2009, 510 GWh of energy was exported in the summer months, but 1,400 GWh worth of water was spilled over the dams because the energy could not be used.[15]

26. Georgia's government seeks to rapidly develop new hydropower plants, with the expectation that these plants will sell power to the domestic market in the winter and export power to Turkey in summer over a new transmission line that is currently under development. A number of memoranda of understanding (MoUs) have been signed between the MENR and private investors for hydropower project development. Pre-feasibility studies have also been conducted for some potential projects. However, problems with Georgia's laws, regulations and institutions surrounding hydropower development, transmission capacity allocation and energy trade present risks that deter investors from proceeding with projects. These problems are discussed in depth in Section 2.4.1. Development of new hydropower plants in Georgia will likely be delayed until these problems are resolved.[16]

27. The Government recognizes the potential for wind and geothermal resources in Georgia, but it is difficult for these resources to compete with Georgia's low-cost hydropower. Nonetheless, a 24 MW wind project is under development near the Tbilisi Sea, and a number of other areas where high-quality wind energy generating potential might exist have been identified.[17] Hot springs exist near Tbilisi and, although they are inadequate for power production, might be appropriate for domestic heat and hot water production.[18]

2.3.2 Power Transmission

28. Georgia has 3,911 km of transmission lines, which consist of 500 kV, 330 kV, 220 kV, 110 kV and 35 kV lines. A backbone 500 kV line runs from the Tbilsresi TPP in Tbilisi to the Enguri HPP and the Russian border. A 330 kV and a 500 kV line connect Georgia to Azerbaijan, and a 220 kV line connects to Turkey.[19] The Black Sea Transmission Line will add significant transmission capacity between Georgia and Turkey. Construction has been completed and the line is currently in the testing stages, expected to come online by the end of 2013.[20]

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[15] Ministry of Energy and Natural Resources of Georgia; Pöyry AS, "The Electricity Sector in Georgia – An Overview," Ministry of Energy of Georgia, 2010, http://www.greengeorgia.ge/sites/default/files/The%20Electricity%20Sector%20in%20Georgia%20Overview.pdf

[16] Pöyry AS, "The Electricity Sector in Georgia – An Overview," Ministry of Energy of Georgia, 2010, http://www.greengeorgia.ge/sites/default/files/The%20Electricity%20Sector%20in%20Georgia%20Overview.pdf

[17] Ministry of Energy and Natural Resources of Georgia, "Wind Energy,"2011, http://www.menr.gov.ge/en/4502

[18] Transparency International Georgia, "National Policy of Georgia on Developing Renewable Energy Sources," May 2008, http://www.investmentguide.ge/files/160_158_588479_Report7PotentialforRenewablesENG.pdf

[19] Economic Consulting Associates, "Georgia: Regional Power Transmission Enhancement Project, Power Sector Overview (Revised)," Asian Development Bank, 2010.

[20] Bank of Georgia, "Georgia's Hydropower Potential: Giving water the green light," 2012, http://bankofgeorgia.ge/reports/give_green_light_to_water.pdf

29. There are three transmission companies in Georgia: The Georgian State Electricity system (GSE), EnergoTrans and Sakrusenergo. GSE is government-owned and manages the centralized dispatch center, as well as most 220 kV, 110 kV lines and some 35 kV lines. It also owns the portion of the 500 kV transmission line that runs to Azerbaijan. Energotrans is a subsidiary of GSE and owns the 500 kV "Vardzia" and "Zekari" lines. Energotrans is developing the Black Sea Transmission Network Project, which includes a 400 kV transmission line from Akhaltsikhe to the Turkish border. Sakrusenergo is 50 percent owned by Government and 50 percent owned by the Russian transmission company Inter-Rao. Sakrusenergo owns the 500 kV line to the Russian border, as well as the 330 kV line to Azerbaijan and the 220 kV line to Turkey.[21]

30. Because of sustained operating losses and liquidity problems, GSE declared insolvency in 2004, and was granted a postponement of bankruptcy through rehabilitation in 2006. GSE presented a rehabilitation plan to the court which set strategic targets as well as operational and financial objectives for the company for the next 15 years. GSE's financial situation has been improving since the beginning of rehabilitation: the company has been operating at a profit since 2008 and its debt to equity ratio has decreased from 1,000 percent in 2008 to 110 percent, where it has remained since 2009.[22]

31. Transmission system losses in Georgia are around 1.7 percent, which is on par with the level of losses on the transmission systems of other developed European transmission grids.[23] This low level of losses was achieved through aggressive rehabilitation and investment efforts that occurred over the past decade, after years of mismanagement and lack of investment had driven transmission losses as high as 16 percent.[24] Figure 2.2 shows the decline in transmission system losses in Georgia from 2004 to 2011.

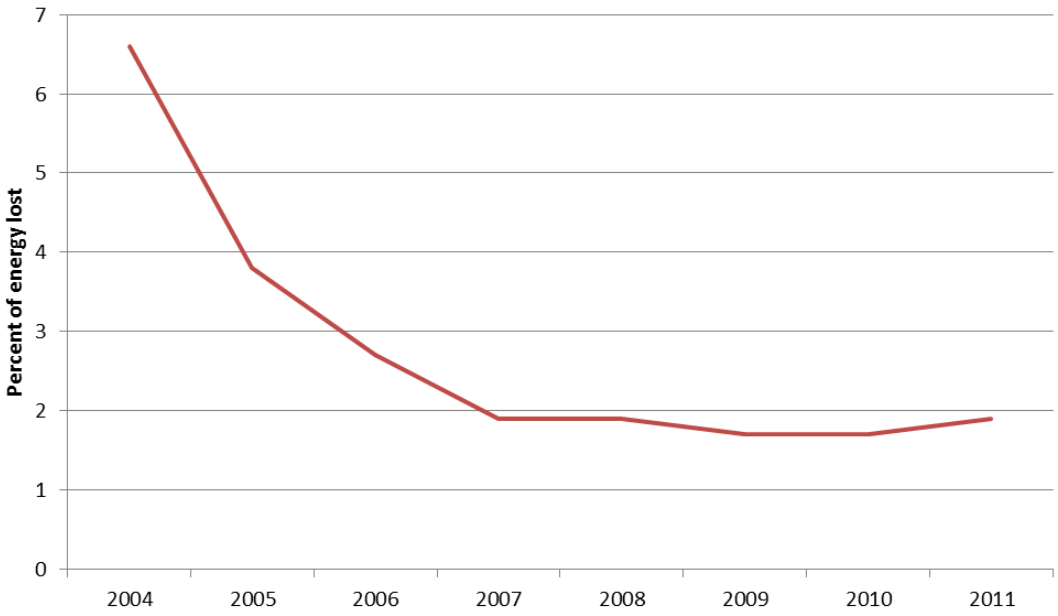
[21] Economic Consulting Associates, "Georgia: Regional Power Transmission Enhancement Project, Power Sector Overview (Revised)," Asian Development Bank, 2010.

[22] Georgian State Electrosystem (GSE), "2010 Annual Report," 2010.

[23] Georgian State Electrosystem (GSE), "2010 Annual Report," 2010.

[24] Pöyry AS, "The Electricity Sector in Georgia – An Overview," Ministry of Energy of Georgia, 2010, http://www.greengeorgia.ge/sites/default/files/The%20Electricity%20Sector%20in%20Georgia%20Overview.pdf

Figure 2.2: Transmission System Losses in Georgia 2004-2011



Source: Georgian State Electrosystem (GSE), "2011 Annual Report," 2011.

32. Reliability and stability problems persist on Georgia's transmission grid. In recent years GSE has made important steps to improve the reliability of the power system in Georgia, and the company's 2011 Annual Report revealed that total and partial blackouts had decreased from the previous year.[25] However, much of GSE's equipment is still in need of rehabilitation to ensure grid stability and reliability. USAID has initiated a project to rehabilitate the 220 kV Senaki 1 and 2 high voltage transmission line and the Menji and Tskaltubo substations to address this problem and to prepare Georgia's grid for increased hydropower exports. GSE has identified a number of other potential future investments in its transmission system to support this goal, including the rehabilitation of all substations by 2015.

2.3.3 Power Distribution and Demand

33. The four distribution companies in Georgia provide approximately 80 percent of the electricity sold. The other 20 percent of electricity sold is provided directly to large industrial consumers. The distribution companies are Telasi (serving Tblisi), Energo-Pro (serving western Georgia), Kakheti Energy Company (serving eastern Georgia) and the Abkhazia Energy Company (serving the Abkhazi region). Energo-Pro is the largest by sales volume, and has the most extensive distribution network, followed by Kakheti, Telasi and Abkhazia.[26]

34. Technical and commercial losses in the distribution system are high compared with the loss levels allowed by the Georgian National Energy and Water Supply Regulatory Commission (GNERC) because of the poor condition of assets.

[25] Georgian State Electrosystem (GSE), "2011 Annual Report," 2011.

[26] Economic Consulting Associates, "Georgia: Regional Power Transmission Enhancement Project, Power Sector Overview (Revised)," Asian Development Bank, 2010.

GNERC allows distribution system losses of 2.8 percent in the 35-110 kV network and 6 percent in the 0.4-10 kV network, or total distribution system losses of 8.8 percent. Each of Georgia's distribution companies has significantly improved losses over the past decade, but current losses are still high: distribution losses were 16 and 17 percent for Energo-Pro and Telasi, respectively, and 27 percent for Kakheti (up from 17 percent in 2008) in 2009. Losses figures for Abkhazia are not available.[27]

35. Distribution system reliability is consistently poor in Georgia, because of the age and condition of system assets, but distribution companies have begun making investments to rehabilitate and improve their systems. Since 2006, Telasi has invested in the rehabilitation of high and low-voltage substations at the 100 kV, 35 kV and 0.4 kV levels. The lines at these levels are now considered to be in good condition. However, medium-voltage transmissions lines at the 6 kV and 10 kV levels are in very poor condition, especially the underground transmission lines.[28] From 2007 to 2009, Energo-Pro Georgia spent US$150 million on metering and grid rehabilitation, which included the provision of new meters for 260,000 of its 870,000 customers.[29] Starting in 2009, when it was bought by Achema Grupa, Kakheti Energy Company also made an effort to replace old, communal meters with individual meters. The company planned to replace meters for all subscribers in the region; however as of 2011, only 20,393 customers had individual meters, leaving the remaining 96,665 subscribers to pay bills according to communal meters.[30]

36. Telasi plans to invest in its distribution system in the coming years. The company expects to invest over US$54 million to improve distribution through 2015, including US$24 million for the technical modernization and reconstruction of its existing assets. [31]

37. Domestic demand for electricity has been rapidly increasing in recent years in Georgia. It increased nearly 10 percent each year from 2009 to 2011, reaching over 9,200 GWh in 2011. This rapid growth followed a period of negative demand growth in 2008 and 2009, which resulted from the economic recession in Georgia caused by the global financial crisis. The MENR forecasts that over the next eight to nine years electricity demand will grow by seven percent annually, reaching approximately 17,000-18,000 GWh per year by 2020.[32] Figure 2.3 below shows generation, consumption and exports in Georgia from 2007 to 2011.

[27] Economic Consulting Associates, "Georgia: Regional Power Transmission Enhancement Project, Power Sector Overview (Revised)," Asian Development Bank, 2010.

[28] JSC Telasi, "Annual Report on Performance Results in 2010," May 2011.

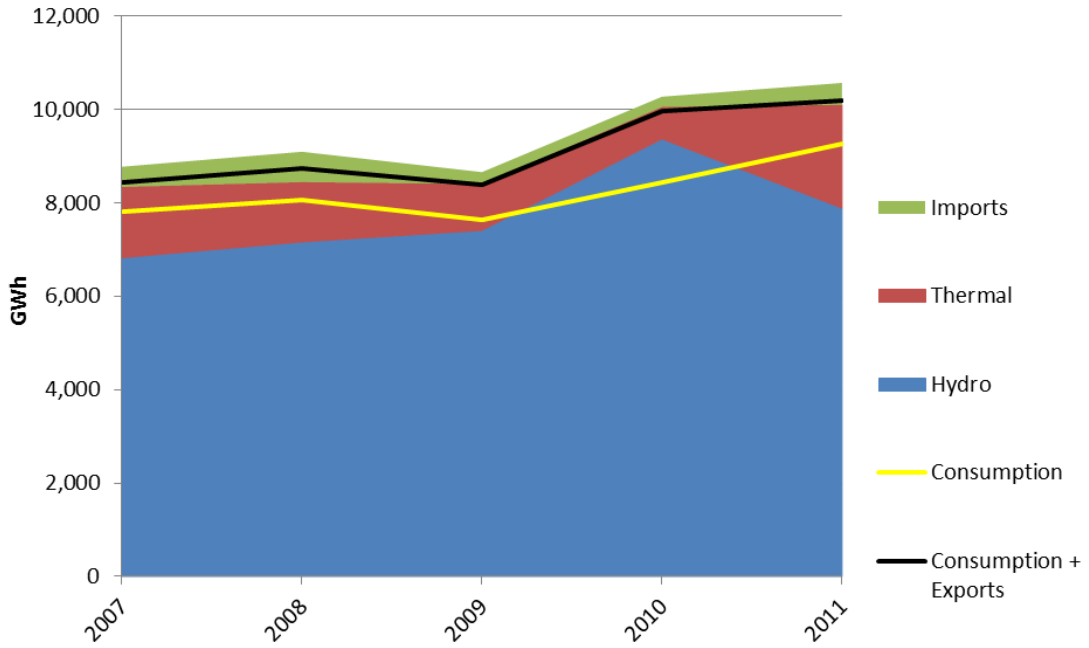
[29] Metering.com, "ENERGO-PRO Georgia Has Invested US$150 Million in Metering and Grid Rehabilitation," 6 Jan. 2009,http://www.metering.com/ENERGO-PRO/Georgia/invested/US150million/dollars/metering/grid/rehabilitation

[30] Mtivlishvili, Gela. "EnergoReket." Humanrights.ge. Information Center of Kakheti (ICK), 1 Sept. 2011. Web. http://www.humanrights.ge/index.php?a=main&pid=13800&lang=eng.

[31] JSC Telasi, "Annual Report on Performance Results in 2010," May 2011.

[32] Ministry of Energy and Natural Resources of Georgia

Figure 2.3: Generation, Consumption and Exports in Georgia 2007-2011

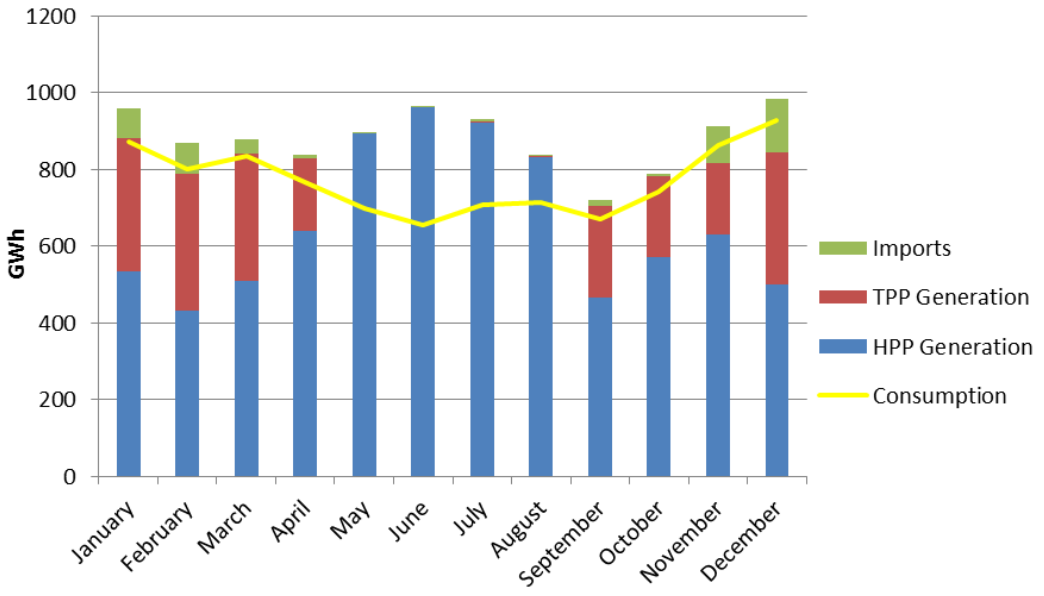


Source: Electricity System Commercial Operator (ESCO), "Electric Energy (Power) Annual Expected Balance," accessed September 25, 2012. <http://esco.ge/index.php?article_id=8&clang=1>

38. Electricity demand is highly seasonal in Georgia, with peak demand in the winter and lower demand in the summer. This is the inverse of the seasonal hydropower generation pattern: hydropower generators tend to produce at their peak in the summer and at their lowest levels in the winter. As mentioned above, this enables Georgia to export energy during the summer, but also requires hydropower generators to spill large amounts of water. Due to low hydropower output in winter, Georgia must rely on thermal generation, which makes up 28 percent of total electricity generation during the winter, but less than 1 percent in summer.[33] Figure 2.4 shows the average monthly electricity generation and consumption level in Georgia.

[33] Ministry of Energy and Natural Resources of Georgia

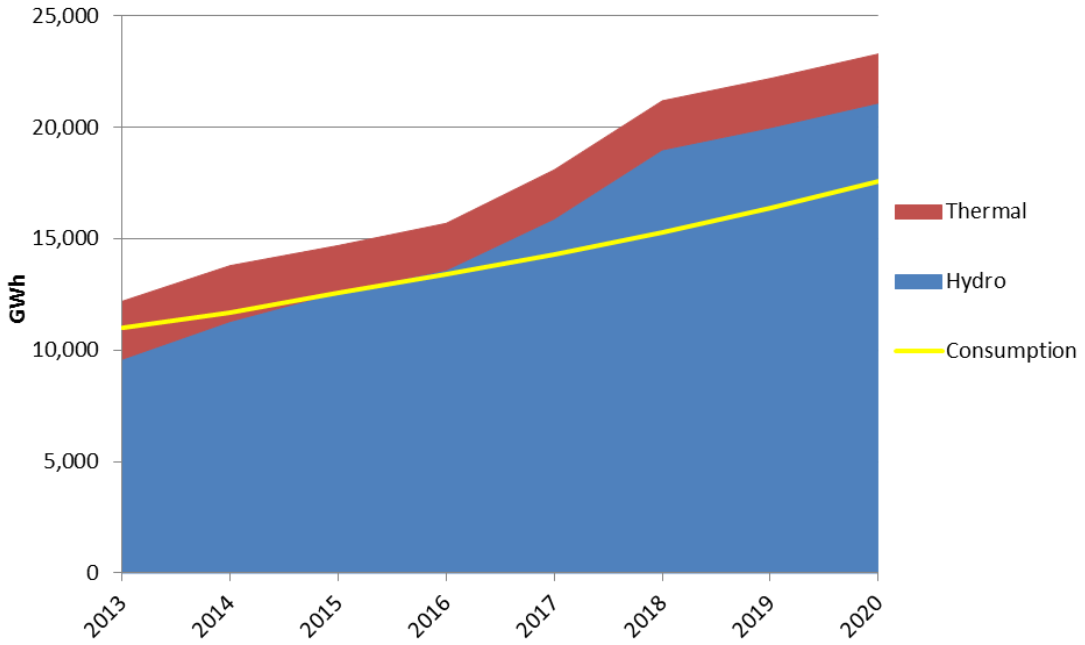
Figure 2.4: Average Monthly Generation and Consumption, 2011



Source: Electricity System Commercial Operator (ESCO), "2011 Energy Balance of Georgia," accessed September 25, 2012.http://esco.ge/index.php?article_id=94&clang=1

39. Georgian electricity demand is forecast to grow as GDP grows in the coming years. However, the relationship between electricity demand growth and GDP growth will depend on the energy intensity of Georgia's economy in the future. Increased industrial production could increase the energy intensity of the country's economy, and thus energy demand could grow faster than GDP. GSE forecasts that demand for electricity in Georgia will reach 12.6 TWh by 2015 and grow to 17.6 TWh by 2020. Figure 2.5 shows GSE's forecast of electricity consumption growth as well as forecast electricity generation from thermal and hydropower resources. The difference between the amount of energy consumed and energy generated is large and it is clear that GSE expects significant growth in energy exports in the second half of this decade.

Figure 2.5: Forecast Electricity Demand Growth 2013-2020



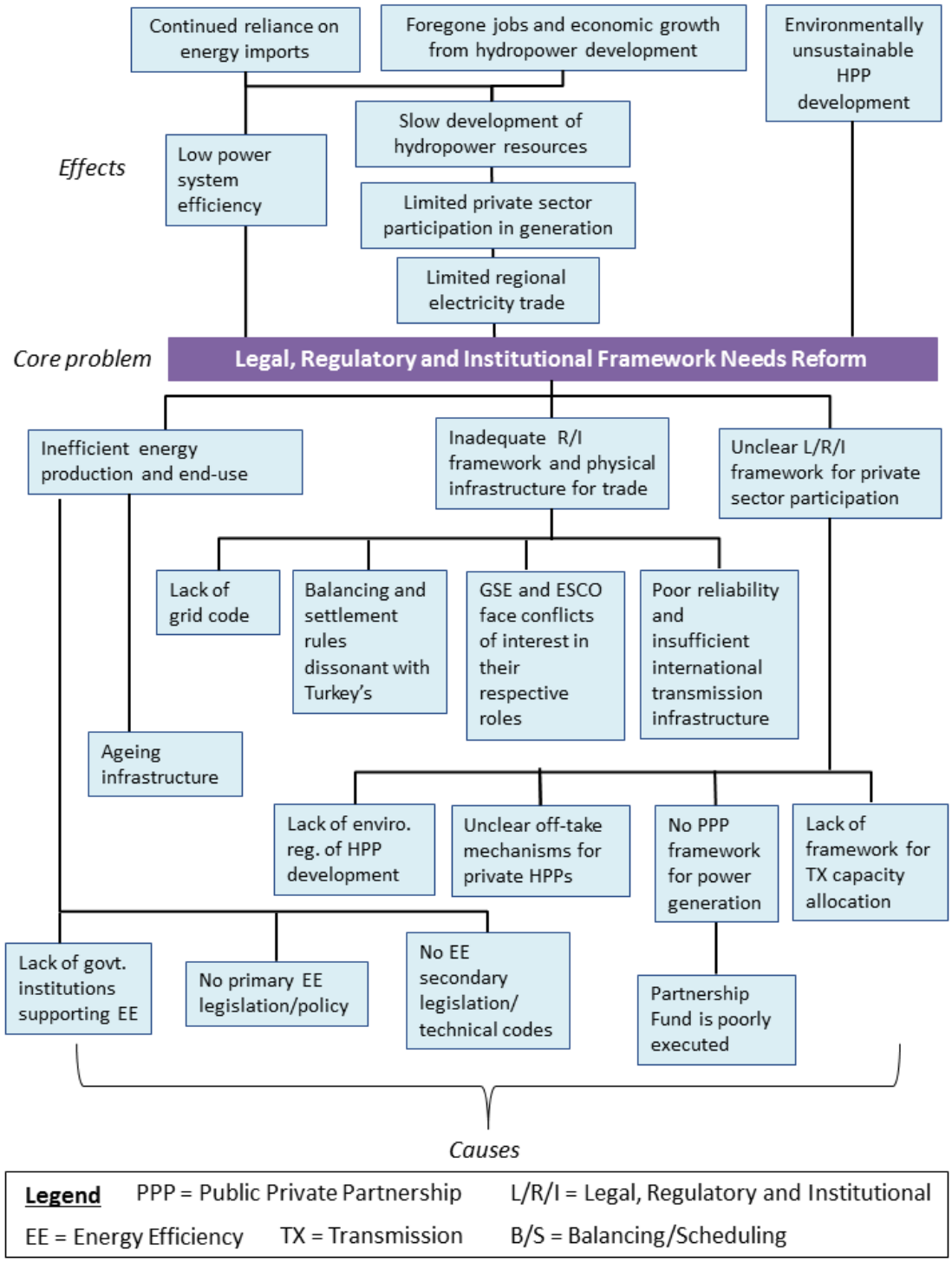
Source: Georgian State Electrosystem (GSE), "2011 Annual Report," 2011.

2.4 Core Sector Problems

40. Increased private sector participation in the energy sector, increased regional trade and improved energy efficiency are all central goals of the Government's energy sector strategy. The development of regional trade and private sector participation in the energy sector contribute to the Government's economic growth agenda, and energy efficiency improvements can help improve energy security in Georgia. However, Georgia lacks a strong legal, regulatory and institutional framework to support each of these goals.

41. Three core sub-problems have thus far prevented Georgia from reaching its goals. First, the problems with the Government's current legal, regulatory and institutional framework fail to encourage private sector investment in hydropower, and this framework does not ensure the environmental sustainability of hydropower projects. Second, increasing regional trade is critical to hydropower development and important for energy security, but a number of physical, regulatory and institutional barriers limit Georgia's ability to integrate with the power grids of its neighbors. Third, lack of Government support for energy efficiency leads to low power system efficiency and forces Georgia to continue to rely excessively on imported fuel and electricity. Figure 2.6 shows a problem tree analysis indicating how each of these core problems contributes to Georgia's core development problem, which in turn has consequences for economic growth.

Figure 2.6: Problem Tree Analysis of Georgia's Power Sector



2.4.1 Unclear Legal, Regulatory and Institutional Framework for Private Sector Participation

42. The Government wants to attract private sector investment to develop Georgia's hydropower resources but construction has not begun and financing has not been secured for many potential projects. Many foreign and domestic investors have expressed interest in the sector and have signed memoranda of understanding

with the Government indicating plans to build HPPs on specific sites. However, investors and lenders perceive significant risk in the sector that limits their willingness to enter into firm contractual arrangements.

43. The Government is aware of the risks facing private sector development of HPPs in Georgia, and has taken a number of steps to reduce investor risk. Many government processes have been streamlined to reduce regulatory bottlenecks. However, despite these recent efforts, additional risk mitigation measures are needed to attract private investment. Lack of clear environmental regulations, insufficient public-private partnership (PPP) framework, unclear off-take agreements for hydropower projects and the lack of a framework for transmission capacity allocation hinder private sector involvement in hydropower development in Georgia. Every new power plant transaction has risks, but the existing legal, regulatory and institutional framework in Georgia has increased these risks, contributing to the slow development of hydropower plants.

44. **No clear PPP Framework in the Power Sector**. The Government has encouraged partnerships between the private sector and Government entities to develop hydropower projects, but a clear framework has not yet been established for doing so. A Partnership Fund, set up under the previous government to fund the initial stages of HPP development resulted in some ad-hoc, direct negotiations on HPP development, but some of these negotiations have arguably deterred private investors from participating in projects. The Partnership Fund that was created under the previous Government funded the preparation of design documents for some large HPPs, and, in some cases, funded early construction. Design documents may help demonstrate a project's bankability, but investors are often better equipped than the Government to develop design documents and supervise construction, and will prefer to do so in order to manage these risks. As a result, the Partnership Fund's efforts may have reduced investor interest in projects where construction had already begun.

45. **Lack of Clear Environmental Regulations for HPP Development.** The Government has taken steps to streamline the processes for acquiring land and obtaining permits necessary to build new HPPs. However, this streamlining process has eroded environmental safeguards surrounding hydropower development. A law adopted by Georgia's Parliament in March 2012 made it possible for a hydropower developer to be exempt from liability for some environmental violations.[34] It is unclear to what extent the new Government will pursue the same path as the old with respect to managing the environmental impact of hydropower development: Georgia's new Government has suggested that it will strengthen Environmental Impact Assessment (EIA) regulations, but detailed plans for environmental legislation and regulation are not yet available.[35] Clear government environmental regulations for HPP development would help ensure that projects are developed in an

[34] Merab Barbakadze, "Agreement against the Environment: Review of the Law of Georgia of March 20, 2012 on Making Amendments to Some Legislative Acts of Georgia," April 2012, http://www.greenalt.org/webmill/data/file/publications/policy_breif_agreement_against_environment_ENG.pdf

[35] Ramaz Gokhelashvili, "Georgia: Country Environment Note," January 2012, Asian Development Bank

environmentally sustainable manner, mitigate the risk of protest, and, most importantly, mitigate the risk of severe damage to Georgia's environment.

46. **Unclear Off-Take Agreements for Hydropower Projects.** At the core of investor reluctance to invest in a hydropower is the lack of certainty surrounding energy off-take arrangements. In order to invest, developers must be confident that they will be able to recoup their investment through energy sales from that project. Investors will therefore require an off-take agreement for the energy generated from the project before construction begins. The Georgian domestic electricity market is expected to be able to consume power produced from new plants during the winter months, and, therefore, some plants were granted off-take guarantees during December, January and February. This guarantee was sufficient to assure investors in some of the smaller hydropower sites that there will be a market for their energy, but for larger sites this off-take arrangement does not adequately reduce demand risk for potential investors. Foreign investors interested in some of the larger hydropower sites, such as Nenskra and Namakhvani, have indicated that they would need to have a long-term off-take agreement guaranteed by the Government before they would invest.

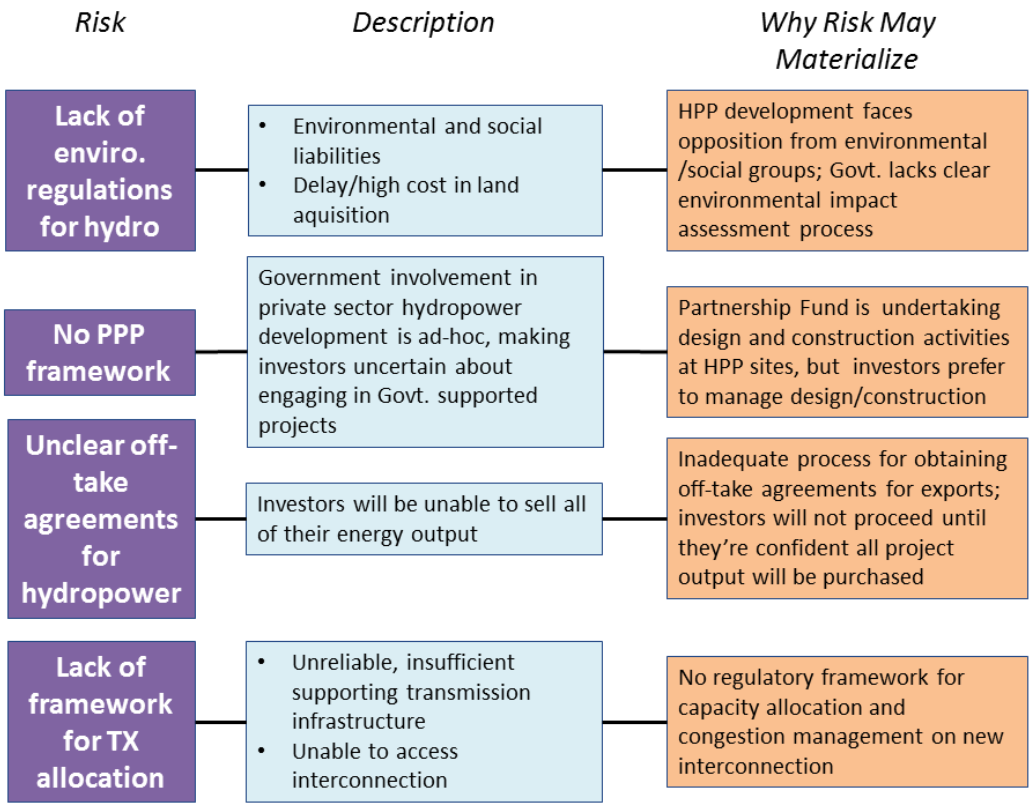
47. Some investors have explored other options for securing long-term off-take arrangements. For example, some Turkish investors have been able to negotiate long-term contracts directly with Turkish counterparts. Investors in small- to medium-sized HPPs (under 100 MW) have considered forming a consortium for aggregating power that could be sold through bilateral contracts with large Turkish marketers. However, establishing an aggregator would require amendments to Georgia's electricity market rules.

48. **Lack of Regulatory Framework for Transmission Capacity Allocation.** The Government has invested in improving domestic transmission reliability and new interconnection capacity (the Black Sea Transmission Network line to Turkey), which provides transmission access to export markets for new hydropower projects developed in Georgia. However, there is little clarity on whether and how investors can secure firm capacity on the line. The Government's "first come, first served" principle for capacity allocation of the interconnection capacity to new HPPs does not make it clear how congestion will be managed if multiple new HPPs require more capacity than is available.

49. Although many investors have signed Memoranda of Understanding (MoUs) with the Government to develop hydropower capacity, the total of the generating capacity listed in MoUs is more than could be transmitted on the new line. Without firm commitments to transmission rights (or at least clear regulations on how to acquire such rights), projects will have difficulty securing financing. The Partnership Fund owns GSE and therefore could conceivably guarantee transmission access, but the terms for acquiring such guarantees are unclear. Moreover, generation from two to three large HPPs that are currently under development would utilize all of the full capacity of the Black Sea line. Developing a transparent, market-based framework for allocating capacity (such as a capacity auction) is one way that Georgia can provide investors with a way to secure transmission capacity. A market-based framework will also allow GSE to respond to market prices for transmission capacity,

which will improve its investment planning related to new interconnections. Figure 2.7 summarizes the risks preventing private sector involvement in HPP development.

Figure 2.7: Risks Preventing Private Sector HPP Development



2.4.2 Inadequate Regulations, Institutions and Physical Infrastructure for Large-Scale Electricity Trade

50. Georgia has the opportunity to increase electricity trade with its neighbors. High electricity prices and a forecast energy deficit in Turkey make it a prime market for electricity exports from Georgia. Export opportunities also exist in southern Russia. Better opportunities for regional electricity trade can promote economic growth and job creation by encouraging the development of domestic hydropower resources. Regional trade also improves energy security by ensuring that Georgia can import electricity from its neighbors when necessary.

51. Regional trade is currently limited, however, by the following barriers: (i) inadequate market rules to allow for balancing and settlement across borders (ii) an institutional framework that may create conflicts of interest for existing state-owned entities as regional trade develops, and (iii) insufficient transmission physical infrastructure between Georgia and its potential trading partners. Each of these barriers is described in greater depth below.

52. In the medium- to long-term, Georgia will need to amend its market rules to allow for balancing and settlement on a more short-term basis. Turkey currently trades capacity and energy on a day-ahead market, but will eventually move to an

hour-ahead market. Currently, ESCO handles system balancing on a monthly basis. Harmonization with the Turkish market is needed to ensure that payments and receipts and the volume of sales and purchases accurately reflect trades. Georgia will need to develop a market mechanism that allows for trading on an hourly basis in order to allow generators in Georgia to compete in the Turkish market.

53. Development of regional trade presents a conflict of interest for two of Georgia's state-owned companies. GSE is both the owner of the majority of the transmission network and the system operator. GSE's incentive as an owner to increase profit for the transmission company could conflict with its mandate as a system operator to dispatch electricity according to the market rules and the transmission grid code. Similarly, ESCO's role as commercial operator, which involves managing balancing and settlement on a monthly basis, conflicts with its new responsibility to sign PPAs with new HPP developers. ESCO has a financial incentive to favor parties with which it has signed a PPA when developing monthly balancing schedules. In the short-term, these issues can be addressed with amendments to the market rules. However, Georgia may benefit from separating these functions as the volume and variety of trades increases with additional market participants.

54. Separating ESCO's roles as market operator and trade consolidator and GSE's role as owner and system operator will require significant institutional capacity building. New institutional operational structures and rules will need to be developed and staff will need to be trained to perform their new functions.

55. In addition to regulatory and institutional problems, limited existing interconnection capacity and the fact that Georgia and Turkey's grids are asynchronously connected limits trade between the two countries. Georgia has one 220kV connection with Turkey that provides a total export capacity of 80 MW. Because of the asynchronous connection, these lines must operate in "island mode", in which a portion of the Georgian or Turkish grid is isolated from the rest of the domestic grid in order to allow for cross-border power flows.

56. Georgia will not be able to continue exporting in "island mode" once Turkey becomes a full member of ENTSO-E.[36] The Black Sea Transmission Network line between Georgia and Turkey, which includes a 500 kV interconnection and a high voltage DC (HVDC) or "back-to-back" substation, addresses this issue in the short-term. The new interconnection comes online in 2013 and, because of the back-to-back substation, will allow Georgia and Turkey to trade without isolating a portion of the grid. It will have an expected total transmission capacity of 350 MW in Phase 1 and 700 MW in Phase 2.

57. However, poor reliability in the domestic transmission network is a major concern once the new Black Sea Transmission Network line comes online. Large voltage fluctuations between the Georgian and Turkish grids could force emergency shutdown of the back-to-back substation. This could, in turn, cause major voltage stability problems and potentially cause blackouts across the Georgian grid.

[36] ENTSO-E, the European Network of Transmission System Operators for Electricity, does not allow member countries to trade electricity between asynchronous grids in island mode.

Upgrades to safety and protection equipment at 220 kV substations in the Georgian domestic grid will be needed to ensure that problems along the interconnection do not have a widespread impact on the Georgian grid.

58. In the medium-term, GSE will need to make additional investments to (i) continue strengthening the Georgian domestic network to meet N-1 criteria and (ii) build additional interconnection capacity to Turkey. In the domestic grid, GSE has plans to rehabilitate and expand the 220 kV network and build a second 500 kV east-west backbone by 2020. In 2016, GSE also plans to begin construction of a new 400kV interconnection line (Akhaltsikhe-Tortum) with Turkey and, in 2020 GSE will begin construction of a 500kV interconnection line with Russia from the 500kV substation Ksani. These investments will be critical to providing adequate, reliable transmission capacity to meet domestic and export demand.

59. GSE's investment plan for 2012-2020 is expected to cost $450 million. Financing this plan may prove difficult as GSE seeks to meet its covenants to creditors under the Rehabilitation Plan.[37] The company exceeded the expectation of its covenants in 2011, but liquidity risk may increase as debt service payments begin for the Black Sea Transmission Network project in 2013. This could limit the GSE's ability to take on additional debt to finance future investments.

2.4.3 Ageing Infrastructure and an Insufficient Legal, Regulatory and Institutional Framework Contribute to Inefficient Energy Production and Use

60. Inefficient energy generation, distribution and end-use contribute to Georgia's continued reliance on imported fuels. Additionally, poor system reliability caused by old infrastructure may deter foreign investors who wish to invest in industry in Georgia. Low-cost, efficient and reliable power supply is therefore important to help meet the Government's goals of energy independence and the development of domestic industry. Electricity system inefficiencies are caused by two major factors: ageing infrastructure and a weak legal, regulatory and institutional framework for promoting energy efficiency.

Generation and distribution infrastructure in need of replacement

61. Georgia's generation, transmission and distribution infrastructure are inefficient because of their old age and poor condition. The average age of existing HPPs is 37 years and the oldest plants have operated for 75 years. The Tbilresi and Mktvari TPPs are roughly 45 years old, and the efficiency at these plants is poor (29 percent) because they rely on old, outdated Soviet technology. Much of the equipment at these plants is fully depreciated, and as a result, tariffs for individual plants – especially some of the large HPPs, which remain fully regulated – are very low.

[37] On July 6, 2004, GSE management declared bankruptcy and applied for "rehabilitation" under the Georgian Law on Bankruptcy Proceedings, allowing the company to postpone bankruptcy for 18 months. In 2006, GSE prepared a financial Rehabilitation Plan, agreed with more than 50 percent of its creditors. The court approved the plan on January 30, 2006, terminating bankruptcy proceedings and granting the Company a period of 15 years to achieve rehabilitation.

62. Technical losses on the distribution network are high because of the poor condition of distribution assets. Despite ongoing efforts to rehabilitate the distribution network, losses were 16 percent for Energo-Pro, 17 percent for Telasi and 27 percent for Kakheti in 2009. Each company's losses are much higher than the level of technical losses allowed by GNERC. End-use electricity and gas consumption is also inefficient because consumer equipment and appliances are, on average, older than what is currently available.

Weak legal, regulatory and institutional framework for end-use energy efficiency

63. Georgia lacks a strong, coherent legal, regulatory and institutional framework for end-use energy efficiency. In 2006 the Parliament of Georgia approved "The Main Directions of State Policy in the Power Sector of Georgia," which lays out a broad energy policy that contains energy efficiency provisions. However, legislation to act on the energy efficiency aspects of this policy direction has not yet been passed. In 2007 the MENR began drafting an energy efficiency law with the support of Winrock International and World Experience for Georgia, but the law was abandoned in 2008 before being presented to Parliament. Both Georgia's GNERC and the Energy Charter Secretariat state that the lack of legislation mandating energy efficiency improvements is one of the most important barriers to improving energy efficiency in the country.[38,39]

64. Georgia also lacks secondary legislation and technical codes to support energy efficiency. For example, Georgia does not have a construction code, which could be an important vehicle for enforcing minimum energy efficiency standards in new building construction. Georgia also does not have energy efficiency standards or an obligatory energy efficiency labeling scheme for new appliances. Appliance energy efficiency standards and labeling requirements could improve the efficiency of energy use and educate consumers.

65. The institutional framework for supporting end-use energy efficiency also needs strengthening. Government currently does not have the institutional capacity to develop and carry out energy efficiency policy. Energy efficiency policy is MENR's responsibility, but the ministry has no formal body in charge of it. Georgia's Energy Efficiency Center (EEC) has operated since 1998, but has no legal standing within the Government and its recommendations to the MENR have little influence on legal and policy decision making. The majority of energy efficiency activities in Georgia are carried out by non-profit organizations or donors. USAID-sponsored firms Winrock International and Advanced Engineering Associates International run the majority of energy efficiency programs in the country.[40]

66. End-use electricity tariffs also do not support improvements in end-use energy efficiency. End-use tariffs are single-part and do not incorporate daily or

[38] Energy Charter Secretariat, "In-Depth Review of Energy Efficiency Policies and Programmes: Georgia," 2012, http://www.encharter.org/fileadmin/user_upload/Publications/Georgia_EE_2012_ENG.pdf

[39] Beridze, Nugzar, "Energy Efficiency (EE) Incentives and Support Schemes Available and Potential Barriers in ERRA Member Countries," GNERC, October 2011, http://bit.ly/13Dp5CL

[40] Energy Charter Secretariat, "In-Depth Review of Energy Efficiency Policies and Programmes: Georgia," 2012, http://www.encharter.org/fileadmin/user_upload/Publications/Georgia_EE_2012_ENG.pdf

seasonal price variation. Furthermore, electricity tariffs have not changed since 2006. GNERC has recently proposed a new tariff-setting methodology, and suggested that the new tariff methodology will incorporate seasonal and daily peak pricing.[41] EBRD is reviewing this new methodology. However, the new Government has stated that it will reduce end-use electricity tariffs, which might confound efforts to revise tariffs to promote energy efficiency as well as power system financial sustainability.

3 Sector Strategy and Road Map

67. The Georgian Government's strategy in the energy sector aims to continue the rehabilitation and expansion of power generation, transmission and distribution, with the dual objectives of ensuring energy security and boosting economic development. Opportunities exist for ADB to finance rehabilitation of existing infrastructure, help foster regional trade and private sector investment through technical assistance, and strengthen the Government's energy efficiency policies and institutions. This section describes the Government's energy sector strategy, discusses the activities of other development partners in the sector and then identifies opportunities for ADB involvement to help Government achieve its strategic objectives.

3.1 Government's Energy Sector Strategy

68. The energy sector plays an important role in the Government's Strategic "10-Point Plan" for Modernization and Employment, issued in October 2011. The Government also lays out its policy directions for the power sector in the Resolution of the Parliament of Georgia titled "Main Directions of State Policy in the Power Sector of Georgia," approved in June 2006. The Government's strategic objectives for the energy sector are (i) improve energy security by increasing reliance on domestic energy resources, (ii) improve the efficiency of energy production and consumption, (iii) harmonize the technical and legal aspects of the Georgian power system with those of neighboring countries in order to facilitate energy trade and promote supply security, (iii) continue deregulation of the power sector and increase private sector participation in the sector, (iv) amend electricity tariffs to support the financial and technical sustainability of the sector and (v) create jobs by deploying large infrastructure projects that facilitate the development of export industries and provide direct employment opportunities.[42]

3.1.1 Improve Energy Security

69. The Government has set a goal of providing 100 percent of the country's electricity from domestic hydropower resources. The Government also has a goal of achieving a 15 percent power system reserve margin using only domestic resources between 2016 and 2019, with an interim goal of achieving a reserve capacity of 10 percent between 2013 and 2015. An important focus of the Government's power

[41] Nugzar Beridze, "The Current Status and Innovations in the Regulation of Electricity in Georgia," December 2012, The Georgia National Energy and Water Supply Regulatory Commission

[42] Government of Georgia, "Strategic '10-Point Plan' of the Government of Georgia for Modernization and Employment 2011-2015," October, 2011

infrastructure improvement strategy is the rehabilitation and development of new hydropower and thermal plants, and the rehabilitation of transmission and distribution infrastructure. The Government also seeks to develop stronger electrical interconnections with its neighbors to support supply security.

3.1.2 Become an Important Regional Energy Exporter

70. The Government hopes to use Georgia's extensive hydropower resources to increase the country's role as an energy exporter within the region. With donor support, Georgia has already begun to do this: the Black Sea Transmission Network line, which is being developed by Energotrans (a GSE subsidiary), is expected to create a total of 700 MW of additional transmission capacity between Georgia and Turkey.

3.1.3 Deregulate and Increase Private Sector Participation in the Power Sector

71. The Government seeks to deregulate the power sector and create an enabling environment supportive of direct foreign investment and private ownership of assets. The Government views private sector participation as important for improving performance in the sector, and for financing new infrastructure. Electricity distribution and most of the generation plants (except for the Inguri and Vardnili HPPs) have been successfully privatized, and licensing requirements have been removed and generation tariffs deregulated for new HPPs under 13 MW. The Government has a goal of eventually deregulating all power plants put into operation after Jan 1 2007.[43]

3.1.4 Improve the Efficiency of Energy Resource Production and Consumption

72. The Government seeks to help Georgia more efficiently utilize its power resources by improving energy efficiency in the industrial and residential sectors. Improved energy efficiency can slow energy demand growth, which will help Georgia pursue its goal of increasing the country's reliance on domestic resources. In addition to improving end-use energy efficiency, the Government seeks to improve the efficiency of energy production by utilizing cogeneration and renewable energy resources.[44]

3.1.5 Job Creation

73. Job creation is a central tenet of the Government's 10-Point Plan, and the energy sector is expected to contribute to job creation and economic growth under that plan. Investments in large-scale infrastructure projects, including energy projects, are intended to increase Georgia's exports and also create employment opportunities. Georgia's relatively low-cost power generation resources could facilitate the development of energy-intensive industries that could reduce of unemployment. The development of hydropower projects through the Partnership Fund or private sector investment could also have some effect on job creation—the

[43] Resolution of the Parliament of Georgia, "On 'Main Directions of State Policy in the Power Sector of Georgia," June 7, 2006

[44] Resolution of the Parliament of Georgia, "On 'Main Directions of State Policy in the Power Sector of Georgia," June 7, 2006

Government expects that additional hydropower development will create 13,000 jobs in the coming years.[45]

74. Power projects can create many jobs beyond the jobs directly created by the project itself. These additional jobs are created in several ways. First, increased demand for materials or services to build a new power plant increases employment in the supply chain needed to supply these materials and services. Second, increased demand caused by new labor income generated by new employment at the plant and in the supply chain further induces job creation. Third, power projects can create jobs by improving electricity service in the country. These jobs are created because improved service provision relieves a supply constraint, thus enabling other industries to produce more and employ more people.

75. It is important to note that while power sector development can indeed create both direct and indirect employment opportunities, the magnitude of jobs created is highly project, and country, specific. For example, indirect employment created by a hydropower project in a country with domestic producers of hydropower plant equipment would be higher than indirect employment created by the same project in a country without these industries. Furthermore the number of jobs created by increasing power supply reliability depends on the prior state of the power sector in the country where the reliability increase occurs.[46]

3.2 Development Partner Support to the Energy Sector

76. Multilateral and bilateral donors are actively involved in Georgia's energy sector. Key areas of focus for donors include: (i) promotion of regional trade through transmission infrastructure development and regional system planning, and (ii) facilitating private sector investment in hydropower through loans to private investors, support for legal and regulatory reform, and institutional capacity building. The following subsections describe these donors, their areas of involvement and how they relate to the Government's strategic objectives for the energy sector. Table 3.1 summarizes how donor involvement in the sector maps to the Government's objectives.

[45] Government of Georgia, "Strategic '10-Point Plan' of the Government of Georgia for Modernization and Employment 2011-2015," October, 2011

[46] International Finance Corporation, "IFC Jobs Study: Assessing Private Sector Contributions to Job Creation and Poverty Reduction," January 2013

Table 3.1. Development Partner Activity in Georgia

Government Objective	Development Partner	Activity to Help Achieve Objective	Funding (mln)
Improve energy security	USAID	HIPP to support addition of 400 MW of new HPPs	US$ 8.9
	EIB/EBRD/NIF	Rehab of Enguri HPP	€ 25
Become an important regional exporter	USAID	Regional system planning; GEMM under HIPP	
	EBRD/KfW	Black Sea Transmission Project	€ 260
	World Bank	Support for sector reform to facilitate exports in DPL	US$ 60*
Deregulate and increase private sector participation in the energy sector	EBRD	Financing for Rustmetali HPP	US$ 7
	EBRD/IFC	Financing for Paravani HPP	US$ 85.5
	EBRD/IFC	Financing for Adjaristkali	US$ 314.3
	EBRD	Financing for small HPPs (<10 MW)	
Improve the efficiency of energy resource production and consumption	USAID	Capacity building for EE; Municipal EE promotion	
	EBRD	Sustainable Energy Financing Facility for EE	US$20
Job creation	USAID	Senaki power transmission line and substations to support the Poti industrial zone	US$17.6

* General Budget Support

Government objective 1: Improve Energy Security

77. Donors currently support this objective through encouragement of investment in hydropower, rehabilitation of existing HPPs and the construction of new HPPs. USAID has invested US$8.9 million in the Hydropower Investment Promotion Program (HIPP), which seeks to stimulate foreign and domestic investment in hydropower. Other large projects promoting additional hydropower capacity are the £24 million rehabilitation of Enguri HPP, which was jointly funded by EIB, EBRD and the NIF and the construction of an 87 MW HPP on the Paravani River which is co-financed by and EBRD, IFC, and TSKB, a Turkish commercial bank.

Government objective 2: Become an important regional energy exporter

78. There are currently a number of donor projects aimed at developing Georgia's regional power export capacity, the largest of which is the Black Sea Transmission Network project. The €260 million project is co-funded by KfW, EBRD, the European Investment Bank (EIB), the Government of Georgia and the Neighborhood Investment Facility (NIF). It will expand the Georgian power transmission network by constructing a 260 km 500 KV line with a back-to-back

substation from the Alkhatsikhe substation in Georgia to the newly constructed Borcka substation in Turkey. Testing on the line is expected to begin in late 2012.[47]

79. The World Bank has also supported regional exports by committing US$60 million under a Development Policy Loan (DPL) aimed to promote electricity export and further investment in the power sector through support for sector reform and infrastructure improvement. [48]

Government objective 3: Deregulate and attract private sector investment

80. Loans to private investors are one mechanism by which donors have facilitated increased private investment in the energy sector. EBRD is currently considering investing US$7 million in the 17 MW Lukhuni HPP, which would have a total cost of US$18 million.[49] The project is being constructed by Rustmetali Ltd, a Georgian metallurgical production company.

Government objective 5: Improve the efficiency of energy resource production and consumption

81. Donors are promoting energy efficiency measures, small-scale renewable energy and rehabilitation of transmission assets in order to decrease demand for imported electricity. EBRD has created a US$20 million Sustainable Energy Financing Facility (SEFF) to make energy efficiency loans to Georgian businesses for energy efficiency upgrades called Energocredit.[50]

82. USAID has provided capacity building for EE and small-scale RE in Georgia through various technical and educational activities and is in the process of negotiating a US$4-10 million contract with the municipal government in Tbilisi to encourage energy efficiency measures in the capital.

Government objectives 6: Create jobs

83. USAID is contributing to the Government's objective of creating industrial jobs by providing important transmission infrastructure investments to support the Poti manufacturing-industrial zone in Western Georgia. USAID is providing $17.6 million to reconstruct the 220 kV Senaki power lines and rebuild the Menji and Tskaltubo substations. This project will provide reliable power to the Poti manufacturing-industrial zone, increase energy security in Western Georgia and support domestic grid stability.

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[47] "Project - Transmission Network." *Kfw-entwicklungsbank.de*. KfW Entwicklungsbank, June 2012. Web. <http://www.kfw-entwicklungsbank.de/ebank/EN_Home/Countries_and_Programmes/Europe/Georgia/Project_-_Black_Sea_Transmission_Network/index.jsp>.

[48] "First Competitiveness and Growth Development Policy Operation." *The World Bank*. 19 July 2012. Web. <http://www.worldbank.org/projects/P129597/first-competitiveness-growth-development-policy-operation?lang=en>.

[49] "MCFF- Bank Republic - Rusmetali." *Project Summary Documents*. European Bank for Reconstruction and Development, 30 Mar. 2012. Web. <http://www.ebrd.com/english/pages/project/psd/2012/42801.shtml>.

[50] EBRD, "Sustainable Energy Financing Facilities (SEFF)," May 2010, http://www.ebrd.com/pages/sector/energyefficiency/sei/financing.shtml

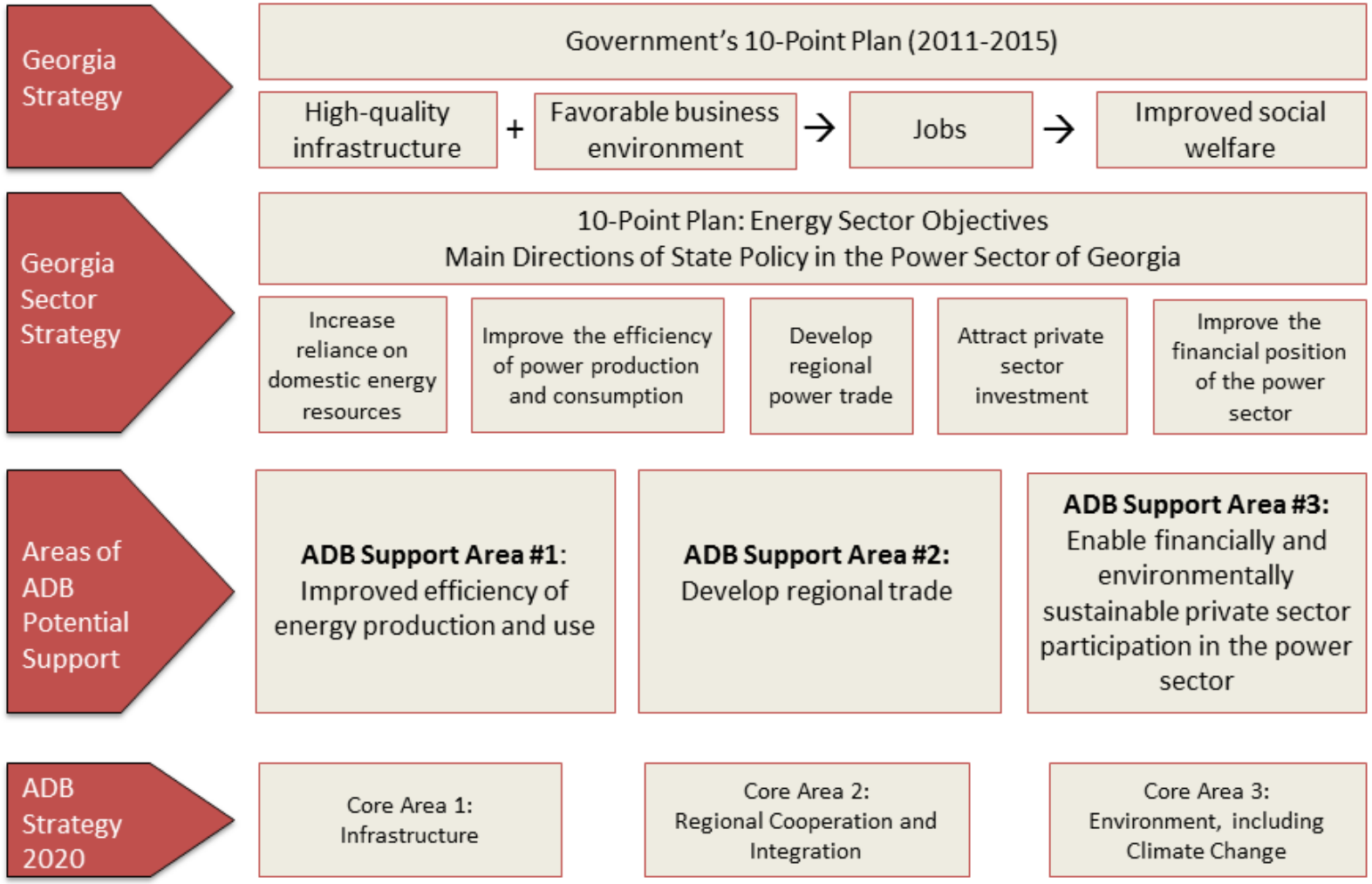
3.3 ADB Support

84. ADB has been involved in Georgia since 2007, but has had limited involvement in the energy sector. ADB is currently providing technical and financial assistance to the Government for the proposed Regional Power Transmission Enhancement Project, but there are significant opportunities for ADB to increase its strategic involvement in Georgia.

85. ADB plans to launch a new Country Partnership Strategy for Georgia in 2013, but until then its Interim Operational Strategy 2008-2009 serves as a guide for ADB's investments in the country. This strategy supports the strategic goals of the Government, and is consistent with ADB's focus areas and agenda outlined in ADB's Strategy 2020. The priority focus areas under this strategy are: (i) improving service delivery in municipal infrastructure within the evolving decentralization process, (ii) reducing road transportation constraints on economic activity and (iii) upgrading and developing energy infrastructure.

86. The Government's objectives for the energy sector are also consistent with ADB's 2009 Energy Policy, which supports the development of renewable energy and energy efficiency projects, the strengthening of energy security through regional cooperation and enhancing energy sector efficiency through private sector participation. These align well with the Government's goals to satisfy 100 percent of Georgia's electricity demand from domestic hydropower resources, increase the energy efficiency of Georgia's economy, become a regional energy generation and transportation hub and improve the efficiency of Georgia's energy sector by increasing private sector participation. Figure 3.1 outlines ADB's development strategy in Georgia and how it compares to the Government's overall strategy, sector strategy, and ADB Strategy 2020.

Figure 3.1: ADB's Development Strategy in Georgia as Compared to Other Strategies



87. ADB can provide a mix of technical assistance, investment, and policy and knowledge advisory support to help the Government achieve its power sector objectives. Key areas of potential ADB involvement are as follows:

3.3.1 Sector Support Area #1: Improved efficiency of energy production and use

88. **Rationale:** Improving the efficiency of energy production and consumption can provide many benefits to Georgia. Rehabilitation and modernization of existing generation, transmission and distribution infrastructure can help improve sector reliability and financial sustainability. The improvement of end-use energy efficiency can reduce demand for and consumer expenditure on electricity. Mitigating demand growth can help Georgia reach its goal of complete reliance on domestic hydropower resources for its electricity needs, and reduce demand for imported oil and natural gas.

89. **Specific Measures:** ADB can help Georgia develop the laws, regulations and institutions necessary to improve energy efficiency across the energy supply chain. ADB can also assist with the rehabilitation of power transmission and distribution equipment to strengthen Georgia's power infrastructure and promote energy efficiency. ADB can provide technical assistance to MENR to restart the process of drafting comprehensive energy efficiency legislation. ADB can also assist with the development of a national construction code that incorporates energy efficiency standards and the development of national appliance energy efficiency standards and labeling systems. By building on EBRD's experience with its sustainable energy financing facility in Georgia, ADB can provide financing for energy efficiency upgrades.

90. ADB's public sector lending can support the rehabilitation of GSE's high-voltage transmission network. A number of substations in the domestic transmission network rely on outdated, Soviet-era control and protection equipment. Modernization of this equipment is required to improve grid stability and power system efficiency. Without this new equipment, Georgia could suffer widespread blackouts if the instability of voltage fluctuations between the Georgian and Turkish grids forces the back-to-back substation to shut down. Additionally, ADB can support the construction of new high voltage substations that will provide additional capacity needed to provide reliable, adequate power supply to the new manufacturing and industrial hubs in the Black Sea region.

91. A project to improve end-user electricity tariffs is currently underway in Georgia, but no such project has been initiated to improve gas tariffs to support energy efficiency. ADB could provide TA to GNERC to conduct a natural gas end-user tariff study with the goal of revising the natural gas tariff structure to promote energy efficiency. This study could also have the goal of reducing poverty by developing well-targeted cross-subsidies.

3.3.2 Sector Support Area #2: Develop regional trade

92. **Rationale:** Regional integration can help Georgia use its cheap domestic hydropower resources to create jobs through the development of an export-oriented energy supply industry and support domestic energy security. Improved interconnections with Georgia's neighbors can ensure that Georgia will be able to import electricity when necessary, which is especially important given the imbalance between Georgia's peak electrical load and its seasonal hydropower generation profile. Development of regional electricity trade is also essential for enabling private sector investment in the power sector.

93. **Specific Measures:** The Government has indicated that it will build a new transmission interconnection with Turkey once the Akhaltsikhe-Borcka line approaches full utilization. Currently, GSE plans indicate that a second interconnection with a back-to-back substation would link the Akhaltsikhe substation in Georgia to the Tortum substation in Turkey. However, some donors suggest the location of the second line may need to be reevaluated, expressing concern about congestion on the Turkish grid in the Tortum area. ADB could support GSE by providing technical assistance for a system planning study to identify the best location for a second line and providing concessional financing to the Government for construction of the line.

94. ADB, in coordination with other donors, could provide technical assistance to help Georgia develop its regulatory framework for electricity imports and exports, and improve the institutions involved in energy trade. USAID has laid out a vision and road map for the creation and implementation of the Georgia Electricity Market Model (GEMM) and Electricity Trading Mechanism (ETM). These initiatives would modify the Georgian power market to enable hydropower generators to sell their energy in Turkey. The creation of the GEMM and ETM will be a large, multi-year effort, and ADB could provide technical assistance to the MENR and other Georgian energy sector participants to implement aspects of the GEMM and ETM.

95. ADB's role might include helping GSE create clear rules for capacity allocation to generators over the Black Sea Transmission Line. ADB could also assist Georgia with the amendment of its energy market rules to allow for short-term balancing and settlement so that Georgia can harmonize its energy market with Turkey's. ADB could also advise the Government on how to resolve the conflict of interest inherent in ESCO's role as a market operator and also a trade consolidator, as well as GSE's roles as transmission system owner and operator. This would likely include the development of new rules and also the retraining of market operators. ADB would work closely with the donor community to ensure consistency with the assistance being provided by other multilateral and bilateral donors on regional trade.

3.3.3 Sector Support Area #3: Enable financially and environmentally sustainable private sector participation in hydropower development

96. **Rationale:** As discussed in Section 2.4.1, private investors are hesitant to invest in hydropower plants because of a number of risks caused by the insufficient legal, regulatory and institutional framework in the power sector. Furthermore, environmental groups have voiced concern over the environmental damage that would be caused by the development of certain proposed hydropower projects. Clearer rules for transmission access and power off-take from privately-owned power projects can help mitigate the risks preventing private developers from moving forward with hydropower projects. The creation of environmental and social impact assessment processes and regulations for hydropower projects would help ensure that these projects are developed in a way that balances the goals of energy development and environmental sustainability.

97. **Specific Measures:** The Government plans to tender out several large hydropower plants on a Build-Own-Operate basis. Potential strategic investors in these projects are currently negotiating with ADB's Private Sector Operations Department (PSOD) and other multi-lateral development banks (e.g. EBRD, IFC) to raise debt financing for these projects. ADB can provide knowledge products and policy advisory support to facilitate the legal and

institutional reforms needed to reduce investor risk and enable additional investment in the sector. Areas for specific support might include: (i) strengthening the rules and procedures for preparing social and environmental management frameworks and (ii) developing a clearer framework for tendering and implementing public private partnerships (PPPs) in the power sector. Policy and knowledge support would be closely coordinated with other development partners who have been heavily involved in working with the Government to implement sector reforms.

98. To strengthen the legal framework for environmental protection with respect to hydropower development ADB could assist the Government with the development of a Strategic Environmental Assessment (SEA) for hydropower development in Georgia. This could be done for the entire country or specific hydropower projects. ADB could also assist Georgia with the revision of its legislation and regulations for EIAs for hydropower development, in order to ensure Georgia's regulations for EIAs meet international standards. ADB could also provide technical support and capacity building to newly-created environmental institutions within the Georgia's new Government.

99. A better framework for PPPs would help ensure that Government and electricity customers get the best possible deal from private investors. A PPP framework would provide clear, formal rules for competitive tender of the rights to develop new power plants, rules for evaluating bids on the basis of technical and financial criteria, and a clear structure and set of terms for BOT/BOO contracts. ADB support could focus specifically on the power sector or more broadly on the creation of a legal and regulatory framework for PPPs in a wide range of sectors. If focused specifically on the power sector, ADB could, for example, assist in the development of model tender documents and contracts, and capacity building to the Ministry of Energy on how to best structure and procure power plants through a PPP modality. PSOD could also conceivably provide transaction advisory support throughout the first tenders. If focused on PPPs in a wider range of sectors, ADB support could include assistance in the development of enabling legislation (a "PPP Law" or "Concessions Law" as they are sometimes called in other countries), support to government institutions responsible for coordinating PPP policies and tenders (called a "PPP Unit" in some other countries, often located in a Ministry of Finance or Economy), or support to line ministries in how to identify and prepare PPP transactions.

4 Energy Sector Road Map and Results Framework

Country Sector Outcomes		Country Sector Outputs		ADB Sector Inputs	
Outcomes with ADB Contribution	Targets with Indicators and Baselines	Outputs with ADB Contributions	Indicators with Incremental Targets	Ongoing and Planned ADB Operations	Main Outputs Expected from ADB Interventions
Enhanced regional integration Increased reliance on domestic HPPs Improved power system efficiency Increased private sector participation	▪ Exports to Turkey increase to 4,000 GWh in 2020 ▪ Share of electricity consumption from HPPs increases from 85% in 2011 to 100% in 2020 ▪ Privately owned HPP capacity increases from 41% in 2011 to 75% in 2017	▪ Improved domestic power system reliability ▪ Development of environmentally sustainable hydropower projects ▪ Increased generation from HPPs during winter ▪ Passage and enforcement of laws and regulations for energy efficiency ▪ Increased investment in HPPs	▪ 100% rehabilitation of 220kV primary equipment (2011 baseline: 79%) ▪ 100% rehabilitation of 220kV secondary equipment (2011 baseline: 71%) ▪ Generation from HPPs in winter increases from 60% of total electricity consumed in 2011 to 80% in 2016 to 100% in 2020 ▪ 20 percent improvement in industrial process EE by 2020 ▪ New HPP projects are privately developed	**Planned Key Activity Areas** ▪ Energy efficiency ▪ Private sector development ▪ Regional trade development **Proposed Loans** ▪ EE financing facility ▪ HPP Development (PSOD) **Proposed TA** ▪ Structuring large HPP project tenders ▪ Developing rules for auctioning transmission rights ▪ Strengthening soc/ environ frameworks ▪ PPA structures ▪ PPP structures ▪ EE standards/code ▪ Revise tariff methodology	▪ Rehabilitate 11 existing substations ▪ Construct Khorga substation ▪ Develop and implement power sector PPP framework ▪ Identify location for second TX line to Turkey ▪ Develop construction code and appliance energy standards ▪ Support update of EIA related legislation for HPPs and Develop Strategic Environmental Assessment (SEA) for HPPs ▪ EE financing facility