

SECTOR ASSESSMENT (SUMMARY): ENERGY¹

A. Sector Performance, Problems, and Opportunities

1. Georgia possesses tremendous hydropower resources. Among the total installed generation capacity of 3,320 megawatts, hydropower generation currently accounts for 85% of yearly energy output and the remaining 15% is from gas and oil-fired generation. The country's hydropower potential is estimated at up to 80 terawatt-hours (TWh) per year, of which 60 TWh is economically feasible. The current generation system comprises 60 hydropower plants with maximum output capacity of 8.0–9.5 TWh per year (i.e., 15% of the economically feasible potential). Georgia has limited oil reserves, and almost all of its oil and natural gas are imported from Azerbaijan and the Russian Federation.

2. Due to its geographic location, Georgia acts as a transit country for the import–export and transit operations of energy carriers in the Caucasus region. Georgia provides an important part of the land corridor along which major volumes of Caspian oil and gas are transported to Armenia, Turkey, and European and Mediterranean markets. Currently, it conducts power trade with Armenia, Azerbaijan, the Russian Federation, and Turkey. In 2011, Georgia exported 0.93 TWh of electricity, accounting for 10% of the country's total electricity generation. The government has entered into agreements with neighboring countries for further enhancement and development of transmission infrastructure and interconnection facilities to expand energy trade. New cross-border interconnection lines with adjacent countries, which will significantly expand the regional energy trade, are scheduled to be commissioned in 2013–2017.²

3. The energy sector plays a critical role in the economy. Affordable and reliable energy supply is essential for building a competitive and productive economy. Georgia also seeks to develop its energy generation and transmission system to increase electricity trade with neighboring countries to take advantage of its abundant and low-cost hydropower resources.

4. Significant progress has been achieved in energy sector reforms over the past 10 years, resulting in increased energy supply reliability and lower losses. Regulatory and market reforms, focused on deregulation and privatization, have helped improve service quality in the energy sector and the financial viability of most sector organizations. Reforms include the establishment of the independent energy sector regulator, the Georgia National Energy and Water Supply Regulatory Commission, and the unbundling and privatization of power generation and distribution assets. Most of the sector entities are now privately owned, with the exception of the transmission and dispatch company, Georgian State Electrosystem; the Enguri and Vardnili hydropower plants; and the electricity market operator, the Electricity System Commercial Operator. 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.

5. The government has also reformed the wholesale electricity market, moving to a “net pool” model, with a monthly balancing market. The net pool model refers to an open and competitive power trade market with balancing and settlements one day ahead, in compliance with the relevant the European Union energy directives. This model will enable project

¹ This summary is based on ADB. 2013. *Georgia: Energy Sector Assessment*. Manila; and Government of Georgia. 2014. *Socio-economic Development Strategy of Georgia (Georgia 2020)*. Tbilisi.

² The Black Sea Transmission Network Project, a 500/400 kilovolt interconnection line between Georgia and Turkey that will add 1,050 megawatts of interconnector capacity with Turkey, is scheduled to be completed by 2017 in three phases. The new interconnection lines between Azerbaijan and Georgia, and Armenia and Georgia are expected to be completed by 2015.

developers to sell their produced electricity at local power exchanges markets. Parts of Georgia's transmission and distribution systems and some hydropower plants have also been rehabilitated. Most regions of Georgia now enjoy 24-hour power supply, although outages still occur and the transmission network is fragile. Large segments of the network require replacement investment.

6. Financial viability of the energy sector institutions has been strengthened with tariff reforms, improved revenue collection, and reduced quasi-fiscal deficits in the sector. Retail tariffs for residential customers are set close to full cost recovery, but cross-subsidization persists. Collection rates increased from 20%–40% in 1999 to 95% in 2011. The transmission system losses also decreased from 16% in 2002 to about 2% in 2012.

7. A reliable, diverse, and financially sustainable energy sector is essential to facilitate inclusive economic growth. The current situation, however, requires continuing efforts to ensure energy security and harness hydropower resources as a driver of economic development. The key development challenges are to attract more private sector participation in power generation, increase Georgia's role in regional electricity trade, and improve the efficiency of energy production and use.

8. **Improving business environment for hydropower development.** The current legal, regulatory, and institutional framework needs to be further improved to encourage private sector investment in hydropower. The government recognizes the risks facing private sector involvement in hydropower projects and has streamlined business processes to reduce regulatory bottlenecks. However, a lack of clear environmental regulations, an insufficient public–private partnership framework, unclear off-take agreements for hydropower projects, and the lack of a framework for transmission capacity allocation significantly hinder private sector involvement in hydropower development. Construction has not begun and financing has not been secured for many potential hydropower projects that are expected to be privately developed due to the perceived risks by investors and lenders. While some commendable measures have been taken, further progress is needed on securing long-term off-take arrangements and sharing risks among investors and the government before major investments are likely to materialize.

9. **Rehabilitating inefficient generation assets.** The generation assets are inefficient because of their old age and poor condition. The average age of existing hydropower plants is 37 years and the oldest plants have operated for 75 years. The Tbilisresli and Mtkvari thermal power plants are roughly 45 years old, and the efficiency at these plants is only 29% because they rely on old, outdated Soviet technology. Much of the equipment at these plants is fully depreciated. As a result, tariffs for individual plants—especially some of the large hydropower plants, which remain fully regulated—are very low. There is significant potential for greater efficiencies and reduced fuel consumption through rehabilitation of aging generation assets.

10. **Strengthening domestic transmission networks.** The fragile domestic transmission networks and poor reliability of the domestic grid will be major concerns as the new Black Sea Transmission Network line comes fully 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. Upgrading of safety and protection equipment at 220 kilovolt substations in the Georgian domestic grid will be needed to ensure that problems along the interconnection do not have a widespread adverse impact on the Georgian grid. In the medium term, investments will be required to continue strengthening the domestic network and building additional

interconnection capacity to Turkey. These investments will be critical to providing adequate, reliable transmission capacity to meet domestic and export demand.

11. **Reducing distribution losses.** 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% for Energo-Pro, 17% for Telasi, and 27% for Kakheti in 2009. Each company's losses are much higher than the level of technical losses allowed by the Georgia National Energy and Water Supply Regulatory Commission. End-use electricity and gas consumption is also inefficient because consumer equipment and appliances are, on average, older than what is currently available. Continued investments in the distribution networks will be required in the short- to medium-term if losses are to be reduced.

12. **Expanding regional cooperation through power trade.** Legal, regulatory and institutional bottlenecks have prevented Georgia from taking full advantage of its potential for regional power trade. These bottlenecks 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 infrastructure between Georgia and Turkey, which could cause grid instability once the Black Sea Transmission Network line comes online. A robust legal, regulatory, and institutional framework for regional electricity trade is needed to facilitate Georgia's electricity exports and ensure the country can import electricity from its neighbors when necessary.

13. **Enhancing energy efficiency.** Georgia has the potential to significantly improve the efficiency of energy production, distribution, and end-use. However, the government needs to strengthen the institutional capacity to develop and implement an energy efficiency policy. Georgia also lacks a construction code, which limits consideration of energy-efficient design in new construction. Georgia needs to develop energy efficiency standards and labeling regulations for appliances. The end-use electricity tariff structure needs revision to encourage energy efficiency. The combination of these efforts will lead to more sustainable energy use.

B. Government's Sector Strategy

14. The government's strategic objectives for the energy sector are to (i) improve energy security by increasing reliance on domestic energy resources, (ii) increase the efficiency of energy production and consumption, (iii) harmonize the technical and legal aspects of the Georgian power system with those of neighboring countries to facilitate energy trade and promote supply security, (iv) continue deregulation of the power sector and increase private sector investment, (v) amend electricity tariffs to support the financial and technical sustainability of the sector, and (vi) create jobs by deploying large infrastructure projects that facilitate the development of export industries and provide direct employment opportunities.

15. The government has set a goal of providing 100% of the country's electricity from domestic hydropower resources. The government also has a goal of achieving a 15% power system reserve margin using only domestic resources between 2016 and 2019. An important focus of the government's power 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.

16. The government seeks to deregulate the power sector and create an enabling environment conducive to direct foreign investment and private ownership of assets. The government views private sector participation as important for improving performance in the sector and financing new infrastructure.

C. ADB Sector Experience and Assistance Program

17. **ADB operations.** ADB engagement in Georgia's energy sector began in 2007 to support the government's initiative of promoting regional energy trade between Georgia and neighboring countries in the Caucasus region. ADB provided technical assistance to prepare an investment project to boost the power system's operational reliability and power exports. The first ADB loan of \$48 million to the power sector was approved in December 2012 for a regional power transmission enhancement project.

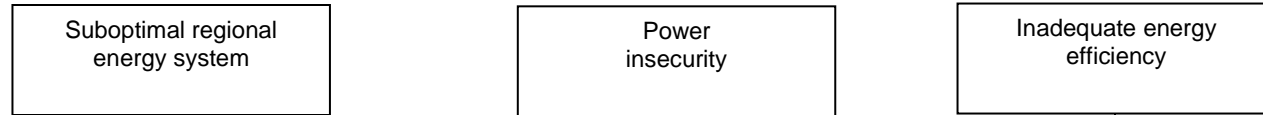
18. **ADB sector strategy.** The areas of ADB assistance have been selected based on the government energy sector priorities and the priorities set forth in ADB's *Midterm Review of Strategy 2020* and *Energy Policy 2009*. In particular, ADB will support Georgia in moving its economy onto a low-carbon growth path by expanding the use of clean energy sources such as hydropower, improving energy efficiency through the rehabilitation of aging assets, and strengthening regional cooperation and integration. The priority areas include:

- (i) **Renewable energy development.** ADB will support government efforts in renewable energy development and will explore opportunities to finance hydropower and energy efficiency projects. Innovative financing tools, such as credit-risk sharing and partnerships with commercial financiers to help mobilize the financing required for long-term investments in power generation, will be considered. ADB public sector interventions will be closely coordinated with those supported by ADB private sector operations.
- (ii) **Rehabilitation of power transmission and distribution networks.** In addition to the ongoing Regional Power Transmission Enhancement Project, ADB proposes continued support for transmission and distribution rehabilitation and enhancement investment programs. Particular attention will be given to rural areas and other underdeveloped regions with poor services.
- (iii) **Facilitating regional energy trade and cooperation.** ADB will continue to explore opportunities to finance cross-border transmission connectivity and energy trade with neighboring countries.
- (iv) **Policy and institutional reform.** ADB will collaborate with other development partners and through policy dialogue and regional assistance to provide support for policy and institutional reforms aimed at creating a sound regulatory environment to promote private sector investment and foster sustainable energy development and cross-border power trade.
- (v) **Knowledge sharing and capacity development.** ADB will continue to provide knowledge relating to innovative financing tools, good governance, and adoption of better sector policy. Areas identified for capacity development include long-term corporate planning; project appraisal; project management and supervision; financial management; human resources management; and environmental and social safeguards, including disaster risk management.

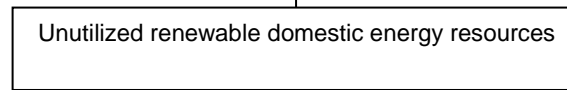
19. ADB will specify publicly advertised, merit-based recruitment for all new jobs or positions created as a result of ADB-supported projects, and encourage qualified women to apply for all posts in order to send an inclusive gender message.

Problem Tree for Energy Sector in Georgia

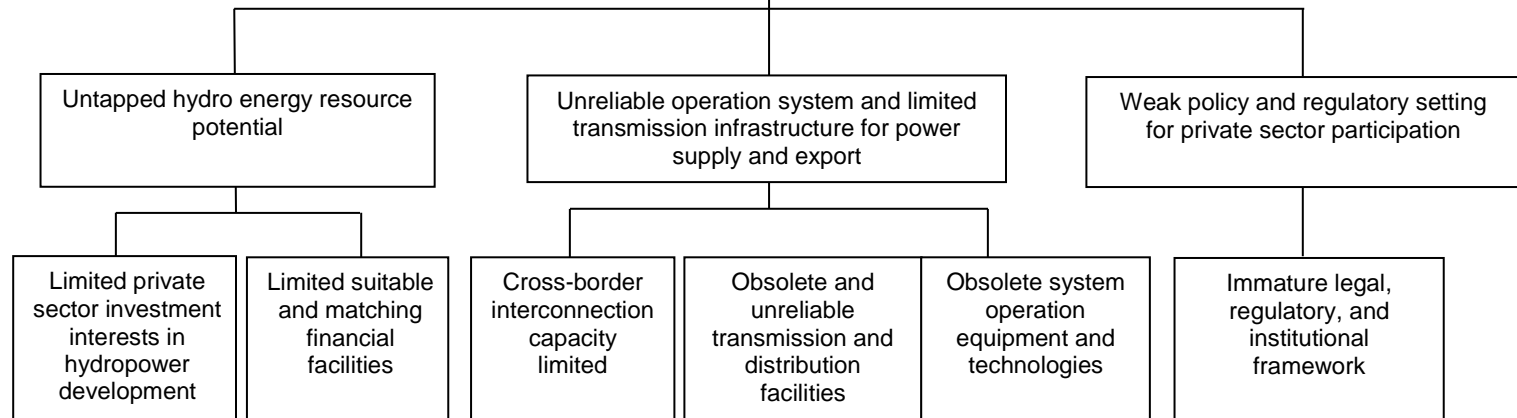
Effects



Core Problem



Causes



Sector Results Framework (Energy, 2014–2018)

Country Sector Outcomes		Country Sector Outputs		ADB Sector Operations	
Outcomes with ADB Contribution	Indicators with Targets and Baselines	Outputs with ADB Contribution	Indicators with Incremental Targets	Planned and Ongoing ADB Interventions	Main Outputs Expected from ADB Interventions
<p>More people use improved domestic energy supply</p> <p>Increased energy trade with neighboring countries</p>	<p>Electric power consumption per capita increases to 2.690 GWh by 2018 (2013 baseline: 2.158 GWh)</p> <p>Export of electricity increases to at least 17% of domestic generation by 2018 (2013 baseline: 4%)</p> <p>Annual carbon dioxide emissions decrease by at least 20 kilotons by 2018 (2010 baseline: 6,241 kilotons)</p>	<p>Power transmission system expanded, improved, and well-managed</p>	<p>Power generation capacity increases to at least 12,000 GWh by 2018 (2013 baseline: 10,059 GWh)</p> <p>Domestic hydropower accounts for 84% and thermal power for 15% of total electricity by 2018, variable by hydrology (2013 baseline: 82% for hydropower and 18% for thermal power)</p> <p>Undelivered electricity to consumers reduces to 800 MWh by 2018 (2013 baseline: 932 MWh)</p> <p>Substation capacity increases by 1,300 MVA by 2018 (2013 baseline for 500/400/330/220 kV substations: 7,000 MVA and for 110 kV substation: 7,367 MVA)</p>	<p>Planned key activity areas</p> <p>Power generation, electricity transmission, renewable energy, and energy efficiency (95% of funds)</p> <p>Capacity development, policy and reforms (5% of funds)</p> <p>Pipeline projects with estimated amounts</p> <p>Power Transmission Network Rehabilitation (\$50 million)</p> <p>Promoting Innovative Financing for Hydropower Development (PATA, \$1.0 million)</p> <p>Power Transmission Network Rehabilitation (PPTA, \$1.0 million)</p> <p>Ongoing projects with approved amounts</p> <p>Regional Power Transmission Enhancement Project (\$48 million)</p>	<p>Pipeline projects</p> <p>Power substations rehabilitated and/or constructed</p> <p>Ongoing projects</p> <p>220/110 kV substation Khorga constructed</p> <p>Two substations: 500/220/110 kV substation Ksani rehabilitated and 220/110 kV substation Marneuli expanded</p> <p>Substation transformer installed in 220/110 kV substation Menji</p> <p>Study of potential hydropower investment project completed</p>

ADB = Asian Development Bank, GWh = gigawatt-hour, kV = kilovolt, MVA = megavolt ampere, MWh = megawatt-hour, PATA = policy and advisory technical assistance, PPTA = project preparatory technical assistance, TA = technical assistance.

Sources: ADB and Georgian State Electrosystem.