GALT & TAGGART
RESEARCH

Georgia's Electricity Sector
Changes and Challenges Ahead

Georgia | Energy
Industry Update
May 16, 2016

Georgia's transmission capacity is set to improve significantly over the next decade. Total investment is estimated at EUR 809mn, according to the 10-year network development plan set out by GSE, and will accommodate an additional 4,000MW of installed capacity. Hydro development remains strong: 27 HPPs with an estimated investment value of US$ 3.2bn are currently at the licensing or construction stages. Domestic consumption growth has decelerated on the back of a slowdown in industrial consumption. The electricity trade deficit decreased 84.2% y/y in 2015, with Turkey the main contributor to export growth despite the significant decline in Turkish electricity prices. The design of a competitive electricity market and power exchange is underway, with active involvement from all stakeholders.

Domestic consumption growth decelerated to 2.1% y/y in 2015, while generation increased 4.5% y/y. A slowdown in industrial consumption was the main drag on consumption growth, while the key contributor to the increased generation was the Gardabani combined-cycle power plant, which commenced operations in September 2015. 11 HPPs with a combined installed capacity of 161MW have been launched in the past three years and an additional 286MW is expected to come online by the start of 2017. 27 HPPs and one wind plant, with a total installed capacity of 1,873MW and estimated investment value of US$ 3.2bn, are at the licensing or construction stages.

Georgia's transmission capacity is set to improve significantly, with planned investment of EUR 809mn. GSE has put forward a 10-year network development plan, communicating a clear vision of how domestic and trans-border transmission capacity will be enhanced to accommodate an additional 4,000MW of installed capacity. The main bottlenecks in the internal transmission system are the east-to-west 500kV lines. To address these limitations, several lines and corresponding substations are to be constructed. Sizable investment will be made in new cross-border transmission lines and back-to-back stations to increase electricity export and transit potential with an additional 2,400MW of cross-border transmission capacity.

Electricity trade deficit decreased 84.2% y/y in 2015. Turkey was the main contributor to export growth (+77.4% y/y), despite the significant decline in Turkish electricity prices. Turkish market prices were lower than Georgian wholesale electricity prices for most of the year. While Georgian export prices remained competitive in 2015, Turkey's transmission system operator capped the transmission capacity to be used for electricity imports from Georgia in 2016. The cap is not yet a limiting constraint, as Georgian demand for export capacity is below the limit set by TEIAS. We look to the enhancement of east-to-west transmission capacity within Turkey and a rebound in Turkish electricity prices to prompt Turkey to remove the cap in the future.

Georgia aims to create a power exchange and an open electricity market. At the current pace and with strong stakeholder involvement, we expect the power exchange to be operational by 2020. A trading model has yet to be developed and a legislative and contractual framework established. The model will likely leverage the experience of Turkey and the Balkan nations, which recently underwent the same process. We expect approximately 10-15% of annual electricity trade to be conducted on the power exchange in its initial years.

Nino Papava
Head of Investment Research | n.papava@gt.ge | +995 32 2401 111 ext. 4693

Tamara Kurdadze
Analyst | tamarkurdadze@gt.ge | +995 32 2401 111 ext. 4298

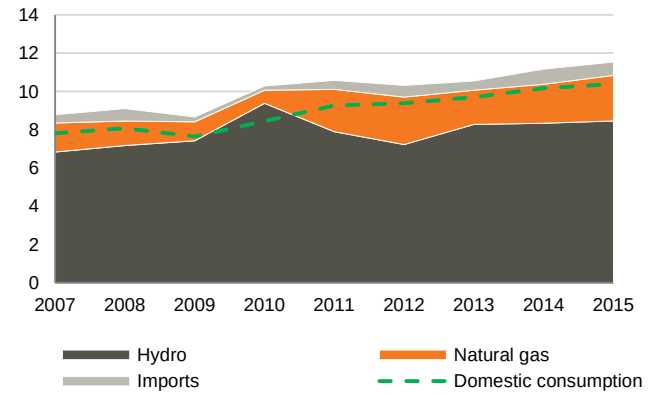
Contents

Power Generation – Development and Incentives

Hydropower dominates the Georgian energy supply mix. Georgia's installed capacity totaled 3,727MW at the end of 2015, of which 2,802MW was hydro and the rest natural gas *(complete list in Appendix 1)*. Hydropower provided for 70.4% of domestic demand, while TPPs supplied 22.9%, with the remaining 6.7% met by imports. The Ministry of Energy forecasts that generation capacity will increase to 6,558MW by 2021 and 8,018MW by 2026. However, hydro projects tend to remain at the development and construction stages longer than the ministry forecasts.

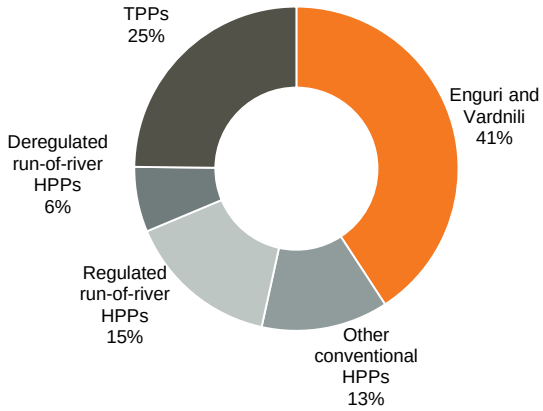
A degree of diversification in the generation mix is underway. A 230MW combined-cycle power plant was commissioned in Gardabani in 2015 and a 13MW coal plant is operating in test mode in Tkibuli. A 20MW wind farm in Gori is expected to be completed in September 2016. Electricity generated by the Tkibuli TPP (September through April) and Qartli WPP (year-round) will be sold exclusively on the domestic market for 10 years after operations commence. Feasibility studies are underway for solar and biomass, albeit on a smaller scale.

Figure 1: Net generation by type and imports, tWh



Source: ESCO

Figure 2: Installed capacity by type in 2015, MW



Source: GSE

11 HPPs with combined installed capacity of 161MW commenced operations in the past three years. The total cost of these projects was estimated at US$ 279.2mn by the ministry. The 87MW Paravani HPP was the largest, with a total investment value of US$ 196.0mn, financed in part by EBRD. It was constructed and is operated by Georgian Urban Energy, owned by Turkey's Anadolu Endustri Holding, and most of its production is exported to Turkey. Another medium-sized (19MW) project was the US$ 17.5mn Larsi HPP, built and operated by Energy LLC, a JV between a Georgian company, Peri LTD (30%), and a private investor from Russia (70%). The Larsi HPP has a 10-year off-take agreement with ESCO, the market operator, to sell all of its electricity on the local market. The remaining projects were small HPPs, with installed capacities of 10MW or less, which sell electricity mainly on the domestic market, either through bilateral agreements or ESCO.

Table 1: New HPPs, Jan-2013 – Jan-2016

Project name	Installed capacity	Investment cost	Investor
Paravani HPP	87.0MW	US$ 196.0mn	Anadolu Endustri Holding (TUR), EBRD
Larsi HPP	19.0MW	US$ 17.5mn	Energy LLC (GEO, RUS)
Bakhvi-3 HPP	10.0MW	US$ 14.1mn	Silk Road Group (GEO)
Akhmeta HPP	9.5MW	US$ 9.8mn	Hydrolea (GEO, BGR)
Aragvi HPP	8.5MW	US$ 13.5mn	Energo-Aragvi (GEO, AUT)
Kazbegi HPP	6.0MW	US$ 3.0mn	Private investors (GEO)
Alazani-2 HPP	6.0MW	US$ 7.6mn	GIG (GEO)
Khadori-2 HPP	5.4MW	US$ 4.9mn	Peri LTD (GEO)
Shilda HPP	5.0MW	US$ 6.3mn	Energy LLC (GEO, RUS)
Debeda HPP	3.0MW	US$ 4.2mn	Hydrolea (GEO, BGR)
Pshavela HPP	2.0MW	US$ 2.3mn	Stori Power (GEO)
Total	**161.4MW**	**US$ 279.2mn**	

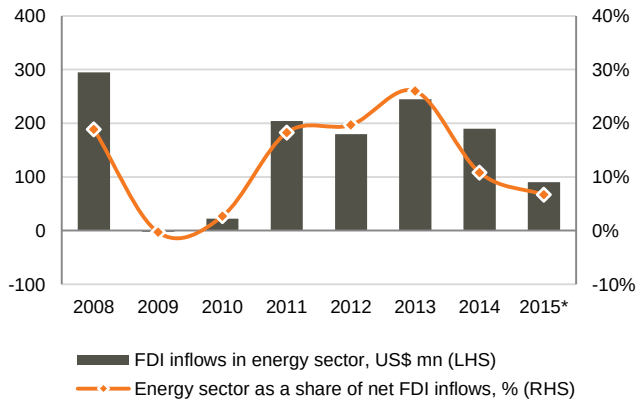
Source: Ministry of Energy, Galt & Taggart Research

Domestic generation increased 4.5% y/y to 10.8tWh in 2015. Hydro generation was up a mere 1.4% y/y in 2015, while TPP output increased 16.8% y/y. The weak growth in hydro generation, despite the newly commissioned HPPs, was due to unfavorable climatic conditions that mainly affected the two largest state-owned plants, Enguri and Vardnili (46.2% of total hydro generation). TPP generation expanded on the back of the commissioning of the Gardabani TPP, owned and operated by the state-owned Georgian Oil and Gas Corporation (GOGC). Georgian gas-powered TPPs have an agreement with SOCAR, whereby they receive natural gas at a reduced price of US$ 143/mcm, keeping gas-powered electricity price-competitive with imported electricity. The price of natural gas for generators could fall further as a result of the agreement between SOCAR and the Georgian government signed in March 2016.

Hydro resource development pipeline remains strong. An additional 286MW of installed hydro capacity is expected to come online by the start of 2017 as the 108MW Dariali and 178MW Shuakhevi HPPs are completed. A total of 27 HPPs and one WPP, with cumulative installed capacity of 1,873MW and an estimated investment value of US$ 3.2bn, are at the licensing or construction stages. Large multinationals, such as Tata Power and Calik Enerji, are represented in the investor mix. Tata Power holds a 40% stake in the US$ 396mn Shuakhevi HPP, partnering with Norwegian Clean Energy (40%) and IFC (20%). South Korea's K-Water, together with the Partnership Fund, is soon to launch construction of the 280MW Nenskra HPP, with an estimated investment value of US$ 1bn. The above pipeline includes the 702MW Khudoni HPP project. Construction of Khudoni is to involve village resettlement and carry certain ecological costs, which has led various NGOs and the local population to vocally oppose the US$ 0.8bn project. Transelectrica, the Indian company that owns the project, has yet to obtain a construction permit. In addition to major projects run by foreign investors, there are others with minority stakes held by investors from Switzerland, the Netherlands, Austria, Ukraine, Azerbaijan, Kazakhstan, China, Vietnam, and Singapore *(complete list in Appendix 2).*

Energy sector FDI dropped 52.7% y/y to US$ 89.9mn, though investor interest in hydropower remains high. Net FDI in the energy sector in 2015 constituted 6.7% of net FDI inflows. Some of the largest recipients were projects in the Adjara region, particularly the Shuakhevi HPP. In addition to the 27 HPP projects at the construction and licensing stages, an additional 26 (1,115MW) are undergoing feasibility studies and carry construction liabilities. The drop in FDI in US$ terms can also be partially attributed to the GEL depreciation in 2015. The HPP construction stage is quite labor-intensive and the GEL's 30% decline versus the US$ may have served to reduce the investment volume in US$ terms. Notably, the 2015 FDI figures are preliminary and often differ substantially from the final figures.

Figure 3: FDI in Georgia's energy sector



Source: GeoStat
** 2015 figure is preliminary*

Government PPA Policy

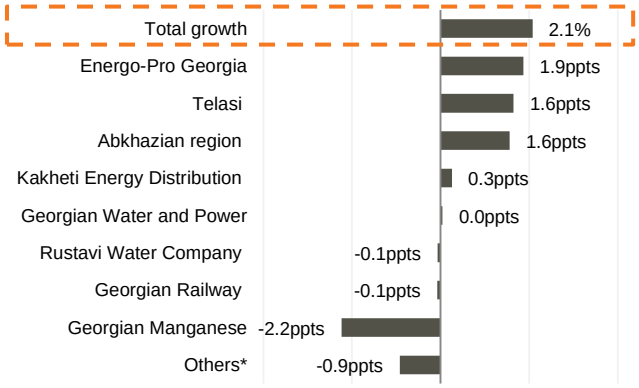
Government offers longer off-take tariffs for new HPPs to stimulate sector development. MoUs signed after April 2015 include 15-year off-take tariffs for eight months (September to April). Previously, 10-year tariffs for 20% of annual generation were the norm. The government has also granted year-round take-or-pay PPAs recently at above-market prices for projects with larger installed capacities and high generation potential. As the Abkhazian region's consumption of conventional dam electricity increases, projects such as the 280MW Nenskra HPP are considered strategically important, bolstering regulated hydro capacity.

Government guaranteed PPAs can be a double-edged sword. On one hand, they incentivize investment by ensuring a steady revenue stream for investors and making it easier for them to secure financing. On the other hand, there is potential downside for the generators, as they are locked in at a certain price for the duration of the contract and are unable to benefit from any future increases in market prices. Furthermore, such agreements are, in effect, government liabilities, and as the IMF mission noted in December 2015, the fiscal risks should be managed carefully to safeguard Georgia's hard-earned fiscal sustainability. The Ministry of Energy has acknowledged the importance of such measures and declared its intent to review the PPA tariff policy. In our view, government-guaranteed PPAs are a necessary mechanism for the development of the Georgian electricity sector, but their impact on fiscal sustainability must be taken into account. For example, 12-month PPAs (as opposed to 8-month) might be excessive and create an unnecessary burden. Furthermore, the government should strike a balance between incentivizing investment and safeguarding fiscal sustainability in setting the investment payback period, as implied by the per kWh tariff.

Domestic Electricity Consumption

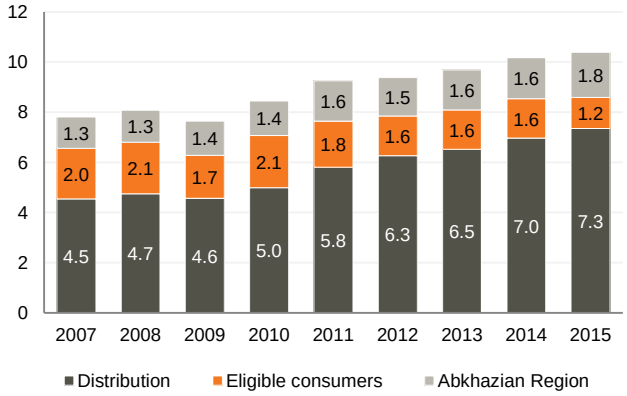
Domestic electricity consumption continues to rise, reaching 10.4tWh in 2015. The growth rate decelerated from 5.0% y/y in 2014 to 2.1% y/y in 2015, largely on the back of the slowdown in direct industrial consumption (-13.9% y/y), which made up 11.2% of total consumption. Electricity consumption growth was concentrated mainly in the greater Tbilisi area, serviced by Telasi, where consumption was up 7.5% y/y. Telasi provided 23.3% of total electricity consumed domestically. Meanwhile, consumption in other regions (serviced by Energo-Pro Georgia and Kakheti Energo Distribution) was up 4.6% y/y, constituting 47.5% of the total. The drop in industrial consumption was mainly due to usage decreasing at Georgian Manganese (GM), a subsidiary of Georgian-American Alloys. A decline in the global price of silicon manganese (-15.5% y/y in December 2015), which accounts for the lion's share of GM's revenues, pressured the company into reducing production and eventually closing the mining part of its business for four months until late spring 2016. Excluding direct industrial consumption, domestic consumption was up 6.3% y/y in 2015.

Figure 4: Contribution to growth of domestic consumption, 2015



Source: ESCO
**Includes previously eligible consumers now serviced by DNOs*

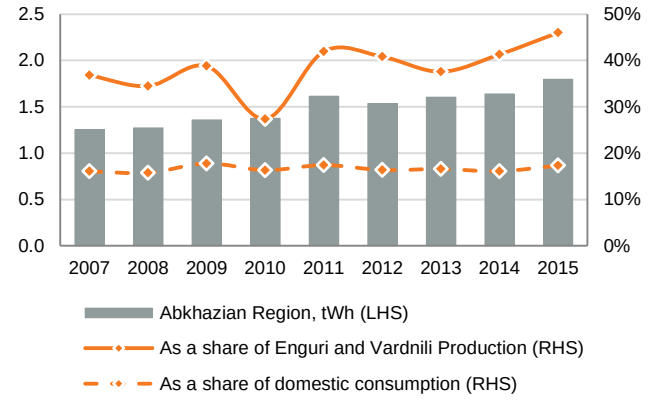
Figure 5: Domestic electricity consumption, tWh



Source: ESCO

The Abkhazian region was an important driver of Georgian electricity consumption growth. The region's consumption increased 9.7% y/y in 2015 and constituted 17.3% of total consumption, while its population is only 6.0% of Georgia's total. The region has priority claim to the cheap electricity (US$ 0.0047/kWh) generated by the Enguri and Vardnili HPPs. The region's consumption is ultimately subsidized by the Georgian government, with the amount payable by the region written off at the end of every year. The region faced a significant electricity deficit in early 2016 due to increased demand, low water levels in the Enguri and Vardnili dams, and poor transmission and distribution infrastructure. The Ministry of Energy negotiated the import of additional electricity from Russia at a reduced price to fill the deficit. A more sustainable solution will need to be devised for the long term.

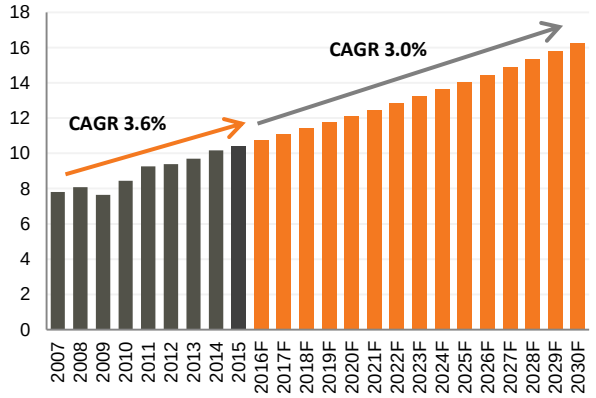
Figure 6: Abkhazian Region electricity consumption



Source: Ministry of Energy

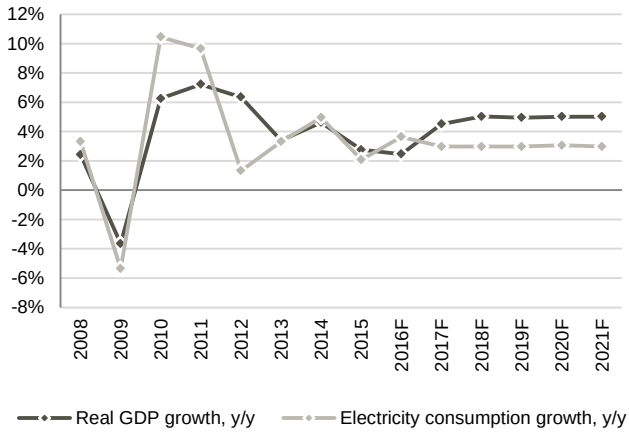
Domestic electricity consumption is expected to increase at a 3.0% CAGR over the next 15 years, according to the Ministry of Energy's base case scenario. At that rate, Georgia's domestic consumption would exceed 16tWh by 2030. This outlook is in line with Georgia's electricity demand trend and projected GDP growth and reinforced by the fact that domestic demand grew 2.1% y/y in 2015, despite a drastic fall in industrial consumption**.** At a 3% CAGR, the gap between generation and consumption would reach 5.4tWh in 2030 (keeping current generation capacity constant). This underlines the importance of developing domestic generation assets to avoid import dependence in the future.

Figure 7: Domestic electricity consumption, tWh



Source: Ministry of Energy

Figure 8: Domestic electricity consumption and GDP growth

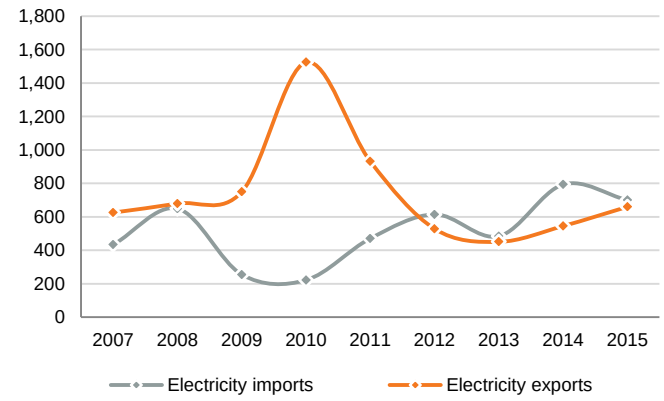


Source: ESCO, IMF

Electricity Trade and Tariffs

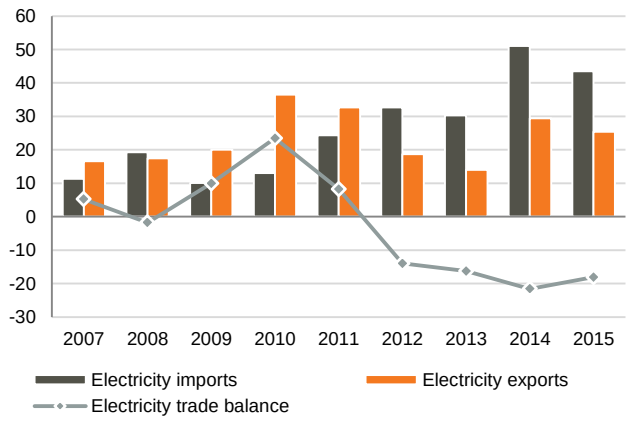
The electricity trade deficit decreased 84.2% y/y in 2015, with imports declining 11.9% y/y and exports rising 21.1%. Turkey was the main contributor to export growth (+77.4% y/y), despite a significant decline in Turkish electricity prices. The key contributor to the decline in imports was the Gardabani TPP, which displaced relatively expensive electricity imports in 2H15. The share of imports in total electricity consumption decreased from 7.7% in 2014 to 6.7% in 2015. Georgia has been a net importer of electricity since 2013, but is expected to become a net exporter in 2016 per the Ministry of Energy's forecast. In our view, net exporter status is more likely to be achieved in 2017 as new HPPs hit the grid.

Figure 9: Electricity imports and exports, gWh



Source: ESCO

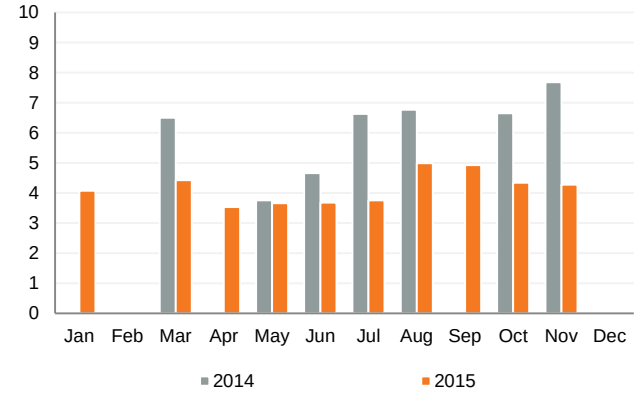
Figure 10: Electricity imports and exports, US$ mn



Source: GeoStat

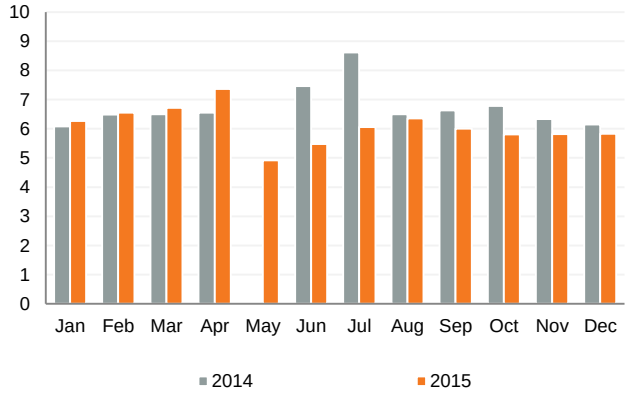
Russia remains the key source of Georgia's electricity imports. Of the electricity imported in 2015, 73.1% came from Russia, with the rest coming in almost equal proportions from Armenia and Azerbaijan. Most of Georgia's electricity imports have historically come from Russia, which has been the cheapest option, with Azerbaijan being the second largest supplier (up to 15% on average). However, as Turkish electricity prices have been falling, Turkey has also become a feasible import partner for Georgia. Prices on Turkey's day-ahead electricity market were lower throughout most of 2015 than the average import price paid for Russian electricity.

Figure 11: Average export prices, Georgia (USc/kWh)



Source: GeoStat, ESCO

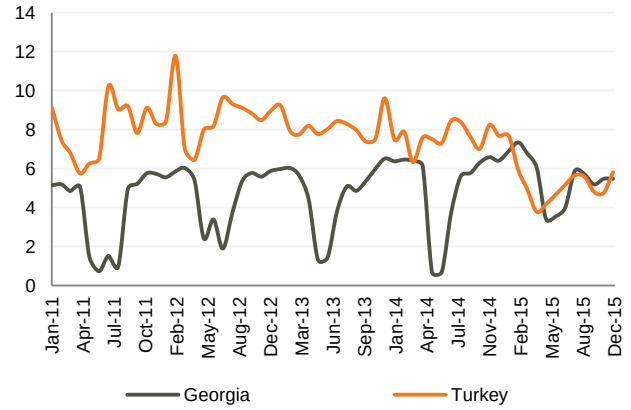
Figure 12: Average import prices, Georgia (USc/kWh)



Source: GeoStat, ESCO

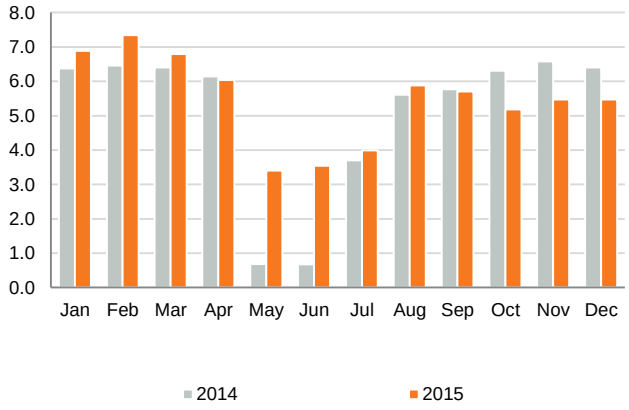
Low oil prices, regional economic turbulence, and devaluation of the Turkish lira lead to lower electricity prices on the Turkish market. Turkish prices were lower than the Georgian balancing electricity price (spot price) for most of 2015, though Georgian export prices remained competitive and exports to Turkey increased 77.4% y/y. Turkish market prices can be seen as a proxy for average export prices, as Turkey is the key export destination for excess Georgian electricity. Price trends on the Turkish market are, therefore, an important consideration for investors in the Georgian energy sector.

Figure 13: Electricity prices in Georgia and Turkey, USc/kWh



Source: Ministry of Energy

Figure 14: Balancing electricity prices in Georgia, USc/kWh

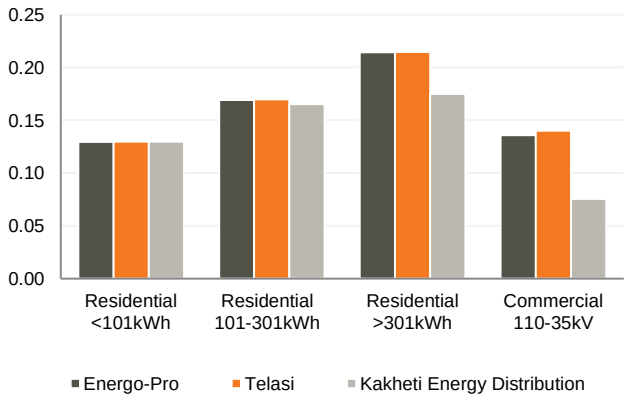


Source: Ministry of Energy

Electricity Tariffs

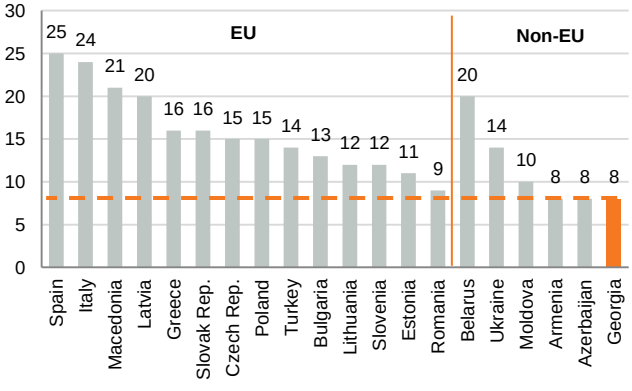
The regulator granted increases in consumption tariffs requested by distributors. Consumption tariffs for non-industrial commercial and residential consumers increased 30% on average. Applications to the regulator by Energo-Pro Georgia and Telasi to increase consumer tariffs were motivated by higher prices for electricity purchased from the generation entities and ESCO. The input price for TPPs has increased (28% on average in 2015) in line with the GEL depreciation, as prices of natural gas fueling the TPPs are fixed in US$. We view GNERC approving the tariff increase as a positive signal, underlining the regulator's commitment to setting cost-reflective, methodology-backed tariffs transparently. Electricity tariffs in Georgia remain below most non-EU tariffs and well below EU ones.

Figure 15: End-consumer electricity tariffs in Georgia, GEL/kWh



Source: GNERC

Figure 16: Electricity prices, USc/kWh (2015)

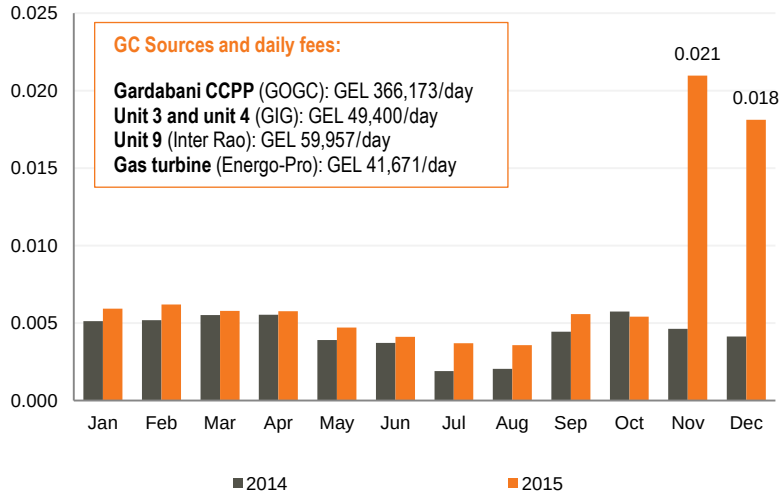


Source: World Bank

** As per WB, the prices are calculated as a monthly consumption of 26,880kWh for business customers*

The guaranteed capacity fee spiked as Gardabani CCPP was granted the status of a guaranteed capacity source in November 2015. Gardabani CCPP is one of four guaranteed capacity sources that receive 1) guaranteed payments for operating in stand-by mode and 2) a per kWh tariff for actual electricity supplied to the grid. Guaranteed capacity (GC) fees are determined by GNERC so as to provide the TPPs a return on their upfront investment and compensate them for the fixed costs of keeping the plants on standby. Unless there is a proportional increase in consumption, higher guaranteed capacity fees translate into higher per kWh prices on electricity for DNOs, direct consumers, and export license holders. Gardabani CCPP's GC fee was set at GEL 366,173/day, compared to an average of GEL 50,343/day for the other three GC sources. Consequently, the GC tariff increased four-fold from 0.5 tetri/kWh in October 2015 to 2.1 tetri/kWh in November 2015.

Figure 17: Guaranteed capacity fee, GEL/kWh



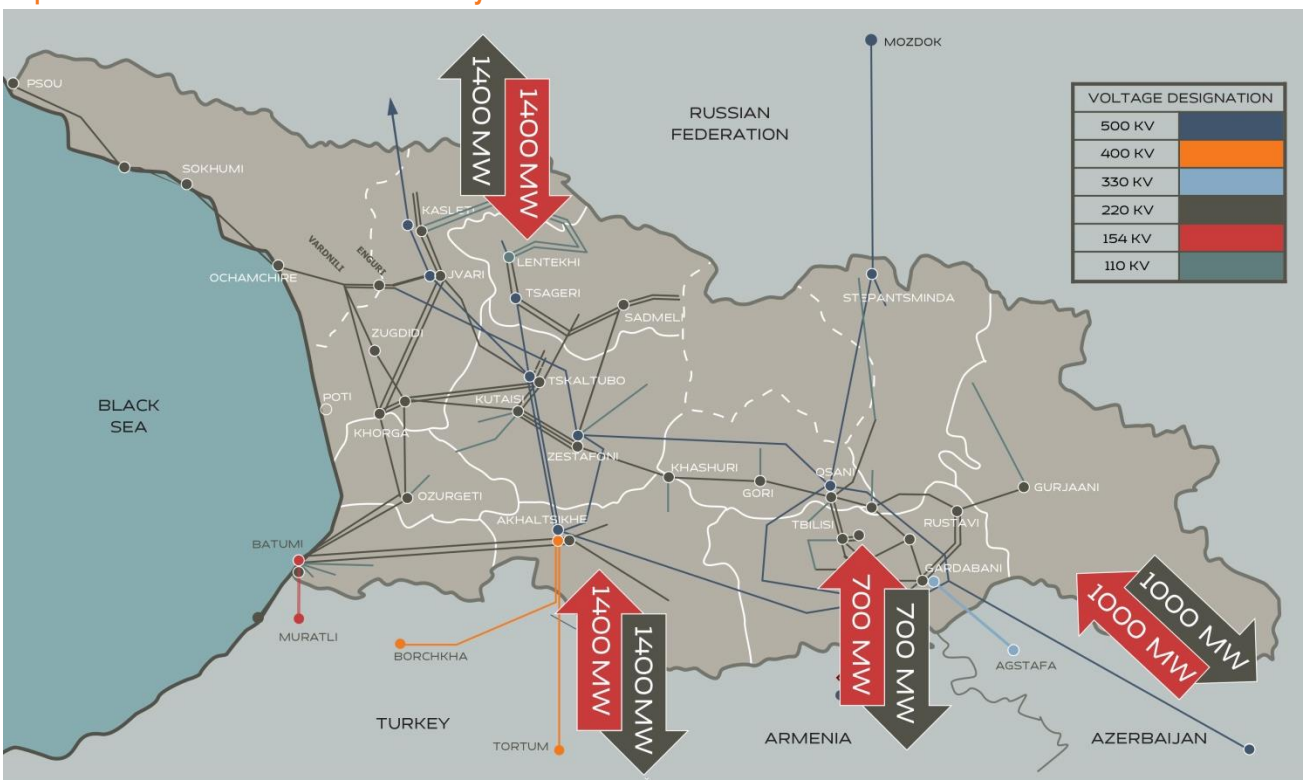
Source: ESCO

Electricity Transmission

Ten-Year Network Development Plan 2016-26

Georgia's transmission capacity is set to improve significantly over the next decade, with EUR 809mn investment planned. Georgian State Electrosystem has put forward a comprehensive 10-year network development plan (TYNDP), detailing the projects to be undertaken in 2016-26. The TYNDP offers a well-structured vision of how domestic and trans-border transmission capacity will be enhanced to accommodate the integration of an additional 4,000MW of installed capacity. For most of the projects included in the short-term planning period (2016-18), feasibility studies have been completed and/or construction work has commenced. GSE estimates the total cost of these projects at EUR 333mn.

Map 1: Planned transmission infrastructure by 2026



Source: GSE

The main bottlenecks in Georgia's internal transmission system are the 500kV lines connecting east and west. The bulk of electricity generation (55.8% of installed capacity) takes place in the West, while consumption is concentrated in the East (Tbilisi-Rustavi area). Most of the load falls on the 500kV Imereti line, which transmits the excess electricity generated in the West for consumption in the East and for export to Turkey via Akhaltsikhe. To remedy the capacity limitations of the Imereti line, several new 500/220kV lines will be constructed. The 500kV Jvari-Tskaltubo-Akhaltsikhe line will be the most expansive of these, entailing the construction of 260km of overhead lines by 2019 at an estimated cost of EUR 195mn.

Transmission capacity to Turkey is expected to double to 1,400MW by 2020. The planned construction of a 400kV overhead line connecting Akhaltsikhe to Tortum and a 350MW high-voltage direct current (HVDC) back-to-back link in Akhaltsikhe, to be completed in 2019, will increase transmission capacity to 1,050MW. Furthermore, the construction of a back-to-back link in Batumi and a new line from Batumi to Muratli will add another 350MW to the cross-border transmission capacity between Georgia and Turkey. Georgian electricity is currently exported to Turkey through the 400kV Meskheti line, with a transmission capacity of 700MW. However, that capacity is

heavily underutilized. The key constraint is the Turkish domestic transmission capacity from the Eastern part of the country, adjacent to Georgia, to the Western part, where most of the consumption takes place. To that end, TEIAS has announced plans to construct several 400kV lines in 2016-20. In our view, the development of the Turkish internal transmission grid in that direction is a necessary precursor to Georgia realizing its full export potential to Turkey.

Project Marneuli will provide a significant boost for electricity exchange potential between Georgia and Armenia. Georgia's electricity transmission capacity to Armenia is currently quite limited, comprising only a single functional 220kV line with a transmission capacity of 150MW. The Marneuli project entails the construction of a 500kV transmission line from Marneuli to Ayrum and a 700MW back-to-back station in Ayrum. Georgia and Armenia will receive affordable financing and grants from IFIs involved in regional transmission development. Each country will be responsible for construction works on its own territory. Armenia also plans to enhance its transmission capacity by building a 400kV line from Noravan in the country's southern region to Iran by 2019. The Marneuli project, coupled with Armenia's development goals, will not only enhance the transmission capacity and network reliability between Georgia and Armenia, but also create a significant transit link connecting Russia, Georgia, Armenia, and Iran.

A new 500kV line connecting Georgia and Russia will further enhance Georgia's role as an electricity transit country. The project entails Georgia constructing a 123km overhead line from Ksani to Stepantsminda and on to the Russian border. Russia will construct a 500kV substation in Mozdok and a line to the Georgian border. This expansive project is slated for completion in 2021. Russia is also planning to further develop the north Caucasus network by constructing several high-voltage substations and overhead lines by 2020. These developments will significantly bolster Russian electricity transit capacity through Georgia to Armenia and Iran and enhance the reliability of the Georgian system.

Current transmission capacity between Georgia and Azerbaijan far exceeds demand. The functional link is the 330kV Gardabani line, with 320MW transmission capacity. The 500kV Mukhranis Veli line has not commenced operations, as technical studies and testing are still in process. Once operational, the line will increase cross-border transmission capacity by 700MW. This increase will be beneficial if electricity trade volumes between Azerbaijan and Turkey via Georgia increase significantly. A recent agreement between the three countries saw Azerbaijan starting to supply electricity to Turkey through Georgia in February 2016. Georgia also imports electricity from Azerbaijan, albeit quite rarely and in small volumes due to the high price.

Table 2: Cross-border transmission capacity

	Transmission line	Nominal voltage, kV	TTC, MW	Mode
Armenia	Alaverdi AC-300	220	150/100	Parallel Synchronous Operation/Island regime
	Marneuli AC-3x300 2018	400	700	Back-to-Back
Azerbaijan	Mukhranis Veli AC-3 x 300	500	700	Parallel Synchronous Operation
	Gardabani AC-480	330	320	
Russia	Kavkasioni AC-3 x 300	500	700	Parallel Synchronous Operation
	Salkhino AC-400	220	50	Island regime
	Stepantsminda AC-3x300 2021	500	1000	Parallel Synchronous Operation
Turkey	Meskheti AC-3 x 300	400	700	Back-to-back
	Adjara AC-400	220	150	Island regime
	Tao AC-3x300 2020	400	700	Back-to-back

Source: GSE

**Shaded lines indicate transmission lines that are planned and not yet in existence; superscript indicates the estimated year of completion.*

Access to Transmission Grid

Priority access to cross-border transmission lines is granted to renewable energy sources built after 2010. 'Leftover' capacity that has not been allocated to priority access groups is granted to registered exporters via open auction (based on the amount that they are willing to pay the TSO per mWh). The winning bid determines the price paid for the right to access the transmission line. 24 exporting entities are currently registered with ESCO. The available transfer capacity is agreed in advance with the importing country. Turkey allocates its capacity in November for the following calendar year.

TEIAS has capped the transmission capacity to be utilized for Georgian electricity exports to Turkey. The restriction was motivated by lower prices on the Turkish electricity market. The cap applies to exports that take place March through June, the period when Georgia produces excess electricity. Looking at 2016 auction data, the cap is not a limiting constraint: demand for export capacity among Georgian exporters was below the level set by TEIAS. However, as new HPPs with priority access to the cross-border transmission lines commence operations in the coming years, the cap will probably become a limiting factor. Enhancement of east-to-west transmission capacity within Turkey and a rebound in Turkish electricity prices are thus the two key positive developments which we expect to lead to Turkey removing the cap.

Georgian Energy Market – Next Steps

Energy Community

Georgia's accession to the European Energy Community is expected by end-2016. Georgia has been an observing member of the Energy Community since 2007. By signing the Association Agreement with the EU in June 2014, the country undertook an obligation to become a member of the energy union by way of continuous reforms and legal approximation with the Third Energy Package adopted by the EU member states. Concerns on the Georgian side include the difficulty of diversifying energy supply due to geographic constraints, the social challenge of introducing market prices for energy, and the lack of legislation on energy efficiency and renewable energy. These concerns are currently being addressed through numerous government and international organization initiatives.

Key areas of the energy market that various stakeholders are working on include:

- Aligning the tariff methodology with the EU's definition of transparent and cost-reflective tariffs
- Standardizing accounts for energy statistics
- Changing how new generation facilities are contracted to align with the EU practice of a competitive generation market without off-take tariffs negotiated with the government
- Unbundling generation and distribution
- Creating a competitive market
- Third-party access to transmission and distribution lines
- Reliability of the electricity system as a whole
- Incentives to increase the share of renewable energy in the energy mix
- Energy efficiency

Competitive Electricity Market

The design of a competitive electricity market and a power exchange is progressing slowly but surely. One of the key directives of the Third Energy Package dictates that Georgia must open up its electricity market and make the trade competitive. An open-market simulation is being conducted through the USAID-financed Governance for Growth (G4G) initiative to see what can be expected once the market is opened. As they prepare for the transition, GNERC, ESCO, and GSE are actively involved in the process and have enlisted the help of US and EU experts. GSE started gathering hourly load and generation data in April 2015 in order to ascertain how the market operates on an hourly basis.

Establishment of the legislative and contractual framework for open-market operations is essential. Electricity trading is currently regulated by the Capacity Market Rules tailored to the current market model. Based on the current model, distribution companies are vertically integrated into generation, ESCO trades balancing electricity, and more than 85% of electricity is traded through bilateral contracts. GNERC is aiming to reduce the minimum consumption threshold for direct consumers to 1kWh pa, making virtually any consumer eligible to trade on the open market. However, until the trading mechanisms are in place, this will be only a de jure change. At the current pace, we expect the market to be operational by 2020, as the government and the private sector are committed to the transition.

We expect 10-15% of annual electricity trade to be conducted on the power exchange in its initial years. The rest will still be traded through bilateral contracts, as was the case with Turkey and certain Balkan countries when they opened up their markets. Over time, the market will become more competitive, electricity trading houses will form, and long-term bilateral contracts will expire, leading to an increase in the volume of electricity traded on the open market. The unbundling of generation and distribution assets will also contribute to the increase.

Appendix 1: Existing Generation Assets

HPP/TPP	Installed capacity, MW	Generation in 2015, gWh	Ownership	Year commissioned
Conventional HPPs				
Enguri	1,300.0	3,313.0	State	1978
Vardnili	220.0	592.0	State	1971
Zhinvali	130.0	410.5	GWP	1984
Khrami-1	113.5	228.3	Inter Rao	1947
Khrami-2	110.0	346.0	Inter Rao	1963
Dzevrula	80.0	120.6	Energo-Pro Georgia	1956
Shaori	38.4	107.1	Energo-Pro Georgia	1955
Total conventional HPPs	**1,991.9**	**5,117.5**		
Run-of-river HPPs				
Vartsikhe	184.0	774.9	Georgian-American Alloys	1977
Lajanuri	111.8	382.4	Energo-Pro Georgia	1960
Paravani	87.0	410.8	Anadolu Endustri Holding (90%), EBRD (10%)	2014
Gumati	66.7	288.8	Energo-Pro Georgia	1958
Rioni	48.0	311.6	Energo-Pro Georgia	1933
Zahesi	36.8	188.0	Energo-Pro Georgia	1927
Khadori	26.0	139.3	Sichuan Electric Power Import & Export Corp.	2004
Chitakhevi	21.0	96.2	Energo-Pro Georgia	1949
Larsi	19.5	68.9	Energy LLC	2014
Ortachala	18.0	79.2	Energo-Pro Georgia	1954
Atsi	16.0	58.9	Energo-Pro Georgia	1937
Satskhene	14.0	18.43	Energo-Pro Georgia	1992
Tetrikhevi	13.6	8.0	GWP	1952
Others (45 HPPs with installed capacities below 13MW)	147.7	452.9	Various private investors	Various
Total run-of-river HPPs	**810.1**	**3,335.3**		
TPPs				
Gardabani Unit 9	300.0	1,212.0	Inter Rao*	1991
Gardabani Units 3 and 4	272.0	760.8	GIG	1963
Gardabani CCPP	230.0	380.7	GOGC	2015
Gas turbine	110.0	24.9	Energo-Pro Georgia	2006
Tkibuli coal	13.0	0.35	GIG	2011
Total TPPs	**925.0**	**2,378.8**		
System installed capacity	**3,726.9**	**10,831.6**		

Source: GSE

** Inter Rao is currently negotiating the sale of Gardabani Unit 9.*

Appendix 2: Projects at Construction and Licensing Stages 2016-25

Project	Project company	Investor	Country	Estimated investment cost (US$)	Estimated installed capacity (MW)	Estimated annual generation (gWh)	Estimated year of operation commencement
Kartli Wind Power Plant	LLC Kartli Wind Power Plant	GEDF, GOGC	Georgia	34,000,000	20.7	88.0	2016
Kintrisha HPP	LLC Hydro Development Company	Skinest Hydro	Estonia	8,000,000	6.0	30.0	2016
Nabeghlavi HPP	AE-SGI Energy	Alliance Energy	Georgia	2,800,000	1.9	13.0	2016
Shuakhevi HPP	LLC Adjaristsqali Georgia	Clean Energy, Tata Power, IFC	Norway, India, IFC	396,000,000	178.0	436.5	2017
Dariali HPP	JSC Dariali Energy	Peri LLC, Energy LLC, Robbins Company, GEDF	Georgia, USA	105,000,000	108.0	521.0	2017
Kirnati HPP	LLC Achar Energy-2007	Eksim Yatirim Holding, İncesu Gayrimenkul	Turkey	90,658,359	51.3	219.0	2017
Khelvachauri-1 HPP	LLC Achar Energy-2007	Eksim Yatirim Holding, İncesu Gayrimenkul	Turkey	69,572,205	47.5	229.8	2017
Abuli HPP	Optimum Enerji Uretim A.S.	Agaoglu Enerji Grubu	Turkey	42,070,000	22.2	116.2	2017
Lukhuni-2 HPP	LLC Rustavi Group	Rusmetali LLC	Georgia	23,000,000	12.0	73.6	2017
Rachkha HPP	LLC GN Electric	LLC GN Electric	Georgia	13,612,290	10.3	31.5	2017
Arakali HPP	Optimum Enerji Uretim A.S.	Agaoglu Enerji Grubu	Turkey	18,150,000	8.8	48.1	2017
Kasleti-2 HPP	LLC Kasleti-2	Hydrolea LLC	Georgia, Bulgaria	10,500,000	8.1	45.8	2017
Saguramo HPP	LLC Saguramo Energy	GGU	British Virgin Islands	3,032,025	4.2	36.4	2017
Shilda-1 HPP	LLC Hydroenergy	LLC Hydroenergy	Georgia	2,500,000	1.9	11.4	2017
Oqropilauri HPP	LLC ALTER ENERGY	LLC ALTER ENERGY	Georgia	1,300,000	1.8	9.4	2017
Goginauri HPP	LLC ALTER ENERGY	LLC ALTER ENERGY	Georgia	1,300,000	1.8	9.3	2017
Skurdidi HPP	LLC Pshavi Hydro	LLC Pshavi Hydro	Georgia, Russia	1,846,000	1.3	6.9	2017
Jonouli-1 HPP	LLC Khvamli	LLC Khvamli	Georgia	2,640,000	1.1	5.1	2017
Khobi-1 HPP	LLC Georgian Investmnent Group - Energy	LLC Georgian Investmnent Group – Energy	Georgia, British Virgin Islands, Switzerland	95,000,000	60.0	320.0	2018
Mtkvari HPP	LLC Mtkvari Hesi	GCF Hydro Development	Luxembourg	115,000,000	53.0	230.0	2019
Khobi-2 HPP	LLC Georgian Investmnent Group - Energy	LLC Georgian Investmnent Group - Energy	Georgia, British Virgin Islands, Switzerland	63,100,000	41.6	191.4	2018
Kasleti-1 HPP	LLC Kasleti 1	Hydrolea LLC	Georgia, Bulgaria	9,060,000	8.1	46.4	2018
Darchi HPP	LLC Darchi	Hydrolea LLC	Bulgaria	19,800,000	16.9	93.6	2020
Skhalta HPP	LLC Adjaristsqali Georgia	Clean Energy, Tata Power, IFC	Norway, India, IFC	20,000,000	9.0	27.1	2020
Nenskra HPP	JSC Nenskra Hydro	Korea Water Corporation, Partnership Fund	Georgia, Korea	1,000,000,000	280.0	1,200.0	2021
Koromkheti HPP	LLC Adjaristsqali Georgia	Clean Energy	Norway	250,000,000	150.0	463.0	2021
Khudoni HPP	LLC Trans Electrica Georgia	Trans Electrica Limited	India, British Virgin Islands	776,701,890	702.0	1,500.0	2022
Khertvisi HPP	LLC Adjaristsqali Georgia	Clean Energy	Norway	65,000,000	65.0	239.0	2022
Total				**3,239,642,769**	**1,872.5**	**6,241.5**	

Source: Ministry of Energy, Galt & Taggart Research

Appendix 3: Selected Stakeholders

Name of the stakeholder	Designation	Sector affiliation	URL
Government and affiliated entities			
Ministry of Energy of Georgia	Ministry	Develops national energy policy.	www.energy.gov.ge
Electricity System Commercial Operator (ESCO)	Market Operator (MO)	Purchases and sells balancing capacity; trades guaranteed capacity; imports and exports electricity; functions as an off-taker for newly built generators.	www.esco.ge
Georgian State Electrosystem (GSE)	Transmission System Operator (TSO)	Owns and operates high-voltage transmission lines; conducts auctions for transmission capacity allocation for exports.	www.gse.com.ge gcat.com.ge
Energotrans Georgia	Transmission licensee	Wholly-owned subsidiary of GSE; administers trans-border overhead lines to Turkey and supporting substations.	www.energotrans.com.ge
SakRusEnergo	Transmission licensee	JV of the Georgian and Russian governments; owns and operates trans-border overhead lines to Russia.	www.sakrusenergo.ge
Georgian National Energy and Water Supply Regulatory Commission (GNERC)	Regulator	Regulates tariffs on generation, transmission, dispatch, distribution, and consumption; sets fees for guaranteed capacity, ESCO, and GSE; mediates disputes; imposes sanctions; issues, modifies, and revokes licenses.	www.gnerc.org
Georgian Energy Development Fund (GEDF)	State investment fund	Conducts preliminary research, feasibility, and environmental impact assessments; promotes opportunities in Georgia's renewables sector to potential investors.	www.gedf.com.ge
Partnership Fund (PF)	State investment fund	Ownership stakes in GSE (100%), ESCO (100%), Telasi (24.5%), GOGC (100%); invests in energy projects including the 230MW Gardabani CCPP plant and the Nenskra HPP; rated BB- by Fitch.	www.fund.ge
GOGC	State-owned corporation	Represents the state's interests in upstream crude oil and natural gas projects in Georgia; owns the Main Gas Pipeline System; owns and operates the 230MW Gardabani CCPP.	www.gogc.ge
IFIs and international donors			
World Bank	IFI	Administers Transmission Grid Strengthening Project, with a cumulative disbursement of US$ 60mn (2014-19) - US$ 53mn for strengthening the grid and US$ 6mn in the form of technical assistance to develop a wholesale power-exchange platform.	www.worldbank.org/projects
ADB	IFI	Administers Regional Power Transmission Enhancement Project, with a cumulative loan disbursement of US$ 48mn aimed at enhancing the country's cross-border transmission capacity; co-finances the 220kV substation Khorga.	www.adb.org/projects
KfW	IFI	Active in Georgia's energy sector since 1993, providing support in the form of initial emergency supply measures, investments in efficient electricity generation, transmission and distribution, and promoting renewable energy; aiding Georgia in expanding its power network and modernizing its infrastructure through the Black Sea Transmission Network (BSTN) project.	www.kfw-entwicklungsbank.de/International-financing/KfW-Entwicklungsbank
EBRD	IFI	50% of its EUR 618mn portfolio in Georgia dedicated to the energy sector through projects including the Qartli Wind Plant; Paravani, Dariali, and Shuakhevi HPPs; the Black Sea Energy Transmission System; and the Telasi rehabilitation project.	www.ebrd.com/work-with-us/project-finance/project-summary-documents.html
IFC	IFI	JV partner of Clean Energy Group and Tata Power in Adjaristqali Georgia LLC, which is currently building the 178MW Shuakhevi HPP and 9MW Skhalta HPP; provided US$ 104mn in debt and equity financing.	
Financial institutions			
Georgian Co-Investment Fund (GCF)	Private equity fund	Mandate includes attracting investments in electricity generation assets; currently preparing to invest in large-scale projects – Tskhenistskhali cascade, Mtkvari HPP and Oni cascade with an estimated total investment of over US$ 1bn.	www.gcfund.ge

Private investors			
Inter Rao	Private company	A Russian diversified energy holding company; owns generation and distribution assets in Georgia - Mtkvari TPP's (blocks 9 and 10), Khrami-1 and Krami-2 HPPs, and Telasi, the distributor servicing the greater Tbilisi area.	www.interrao.ru www.telasi.ge
Energo-Pro Georgia	Distribution Network Operator (DNO)	Operates the largest distribution grid in the country, covering 70% of its total area; manages and maintains 15 small and medium-sized HPPs with a cumulative capacity of 469MW; manages the 110MW Gardabani TPP (GE Power).	www.energo-pro.ge
Kakheti Energy Distribution	Distribution Network Operator (DNO)	Services customers in the Kakheti region, accounting for up to 10% of total DNO consumption.	www.ked.ge
Clean Energy Group	Private company	A Norway-based company with offices in Georgia and the Netherlands; JV partner of Tata Power and IFC in Adjaristqali Georgia LLC, which is currently building the 178MW Shuakhevi HPP and the 9MW Skhalta HPP and has an agreement to build the 150MW Koromkheti HPP and the 65MW Khertvisi HPP.	www.cleanenergygroup.no www.agl.com.ge
Tata Power	Private company	India's largest power company; JV partner of Clean Energy Group and IFC in Adjaristqali Georgia LLC, which is currently building the 178MW Shuakhevi HPP and 9MW Skhalta HPP and has an agreement to build the 150MW Koromkheti HPP and the 65MW Khertvisi HPP.	www.tatapower.com www.agl.com.ge
Transelectrica	Private company	A project company currently working on the 702MW Khudoni HPP project, 34km upstream the Enguri River from the Enguri Arch Dam.	www.transelectrica.com
Anadolu Grubu	Private company	One of Turkey's largest holding companies; owns 90% of the 87MW Paravani HPP (the remaining 10% owned by EBRD) through a project company, Georgia-Urban Enerji LLC.	www.anadolugrubu.com.tr
Korea Water Corporation	Private company	A Korean governmental agency specializing in comprehensive water resource development; partnering with the Partnership Fund on the construction of the 280MW Nenskra HPP with an estimated investment value of US$ 1.0bn.	www.kwater.or.kr
Calik Enerji	Private company	A Turkish holding company with operations in EPC, power generation, distribution, upstream oil and gas, refineries, and pipelines; constructed the 230MW Gardabani TPP; currently assessing the potential for WPPs in Georgia's Shida Kartli and Imereti regions; expressed interest in building another TPP in Georgia; has an MoU for Alpana and Sadmeli HPPs with a total installed capacity of 224MW.	www.calikenerji.com
Georgian Water and Power	Private company	The leading water and sewage services provider on the Georgian market; owns and operates Zhinvali and Tetrikhevi HPPs, with a total installed capacity of 144MW; plans to construct the 4MW Saguramo HPP.	www.gwp.ge
Georgian Industrial Group	Private company	Owns power generation and coal mining operations; 362MW of installed capacity under ownership; plans to construct a 150MW coal-powered TPP.	www.gig.ge
Hydrolea	Private company	A Georgian-Bulgarian company; owns and operates the 9MW Akhmeta, and 3MW Debeda HPPs, with plans to build three more small HPPs with a total installed capacity of 33MW.	N/A
Peri Ltd.	Private company	Georgian company with stakes in several existing and potential HPP projects. Commissioned projects include 19MW Larsi HPP and 5MW Khadori-2 HPP. Projects in development stage include 108MW Dariali HPP to be commissioned in 2016 and 177MW Oni cascade to be commissioned in 2023. Estimated investment for Oni cascade and Dariali HPP totals US$ 435mn.	www.peri.ge
Georgian Renewable Power Company	Private company	Owns 65% stake in two project companies – Svaneti Hydro and Zoti Hydro; involved in three HPP projects – Mestiachala-1, Mestiachala-2, and Zoti – with a total installed capacity of 107MW and an estimated investment of US$ 145mn; 35% of both project companies owned by an Austrian independent power producer, RP Global.	N/A
RP Global	Private company	An Austrian independent power producer with extensive experience globally in the renewable sector; involved in three HPP projects in Georgia – Mestiachala-1, Mestiachala-2, and Zoti – with a total installed capacity 107MW and an estimated investment of US$ 145mn.	www.rp-global.com

Source: Galt & Taggart Research

Disclaimer

This document is strictly confidential and has been prepared by JSC Galt & Taggart ("Galt & Taggart"), a member of JSC Bank of Georgia group ('Group") solely for informational purposes and independently of the respective companies mentioned herein. This document does not constitute or form part of, and should not be construed as, an offer or solicitation or invitation of an offer to buy, sell or subscribe for any securities or assets and nothing contained herein shall form the basis of any contract or commitment whatsoever or shall be considered as a recommendation to take any such actions.

Galt & Taggart is authorized to perform professional activities on the Georgian market. The distribution of this document in certain jurisdictions may be restricted by law. Persons into whose possession this document comes are required by Galt & Taggart to inform themselves about and to observe any and all restrictions applicable to them. This document is not directed to, or intended for distribution, directly or indirectly, to, or use by, any person or entity that is a citizen or resident located in any locality, state, country or other jurisdiction where such distribution, publication, availability or use would be contrary to law or regulation or which would require any registration or licensing within such jurisdiction.

Investments (or any short-term transactions) in emerging markets involve significant risk and volatility and may not be suitable for everyone. The recipients of this document must make their own investment decisions as they believe appropriate based on their specific objectives and financial situation. When doing so, such recipients should be sure to make their own assessment of the risks inherent in emerging market investments, including potential political and economic instability, other political risks including without limitation changes to laws and tariffs, and nationalization of assets, and currency exchange risk.

No representation, warranty or undertaking, express or implied, is or will be made by Galt & Taggart or any other member of the Group or their respective directors, employees, affiliates, advisers or agents or any other person as to, and no reliance should be placed on, the fairness, accuracy, completeness or correctness of this document and the information contained herein (and whether any information has been omitted from this document) and no reliance should be placed on it. This document should not be considered as a complete description of the markets, industries and/or companies referred to herein. Nothing contained in this document is, is to be construed as, or shall be relied on as legal, investment, business or tax advice, whether relating to the past or the future, by Galt & Taggart any other member of the Group or any of their respective directors, employees, affiliates, advisers or agents in any respect. Recipients are required to make their own independent investigation and appraisal of the matters discussed herein. Any investment decision should be made at the investor's sole discretion. To the extent permitted by law, Galt & Taggart, any other member of the Group and their respective directors, employees, affiliates, advisers and agents disclaim all liability whatsoever (in negligence or otherwise) for any loss or damages however arising, directly or indirectly, from any use of this document or its contents or otherwise arising in connection with this document, or for any act, or failure to act, by any party, on the basis of this document.

The information in this document is subject to verification, completion and change without notice and Galt & Taggart is not under any obligation to update or keep current the information contained herein. The delivery of this document shall not, under any circumstances, create any implication that there has been no change in the information since the date hereof or the date upon which this document has been most recently updated, or that the information contained in this document is correct as at any time subsequent to the date on which it is supplied or, if different, the date indicated in the document containing the same. No representation or warranty, expressed or implied, is made by Galt & Taggart or any other member of the Group, or any of their respective directors, employees, affiliates, advisers or agents with respect to the accuracy or completeness of such information.

The information provided and opinions expressed in this document are based on the information available as of the issue date and are solely those of Galt & Taggart as part of its internal research coverage. Opinions, forecasts and estimates contained herein are based on information obtained from third party sources believed to be reliable and in good faith, and may change without notice. Third party publications, studies and surveys generally state that the data contained therein have been obtained from sources believed to be reliable, but that there is no guarantee of the accuracy or completeness of such data. Accordingly, undue reliance should not be placed on any such data contained in this document. Neither Galt & Taggart, any other member of the Group, nor their respective directors, employees, affiliates, advisors or agents make any representation or warranty, express or implied, of this document's usefulness in predicting the future performance, or in estimating the current or future value, of any security or asset.

Galt & Taggart does, and seeks to do, and any other member of the Group may or seek to do business with companies covered in its research. As a result, investors should be aware of a potential conflict of interest that may affect the objectivity of the information contained in this document.

This document is confidential to clients of Galt & Taggart. Unauthorized copying, distribution, publication or retransmission of all or any part of this document by any medium or in any form for any purpose is strictly prohibited.

The recipients of this document are responsible for protecting against viruses and other destructive items. Receipt of the electronic transmission is at risk of the recipient and it is his/her responsibility to take precautions to ensure that it is free from viruses and other items of a destructive nature.

Head of Investment Research
Nino Papava | n.papava@gt.ge

Economist
Eva Bochorishvili | evabochorishvili@gt.ge

Economist
Alim Hasanov | ahasanov@gt.ge

Senior Associate
Giorgi Iremashvili | giremashvili@gt.ge

Senior Analyst
David Ninikelashvili | dninikelashvili@gt.ge

Analyst
David Kutidze | dkutidze@gt.ge

Analyst
Tamara Kurdadze | tamarkurdadze@gt.ge

Address: 79 D. Agmashenebeli Avenue, Tbilisi 0102, Georgia
Tel: + (995) 32 2401 111
Email: research@gt.ge