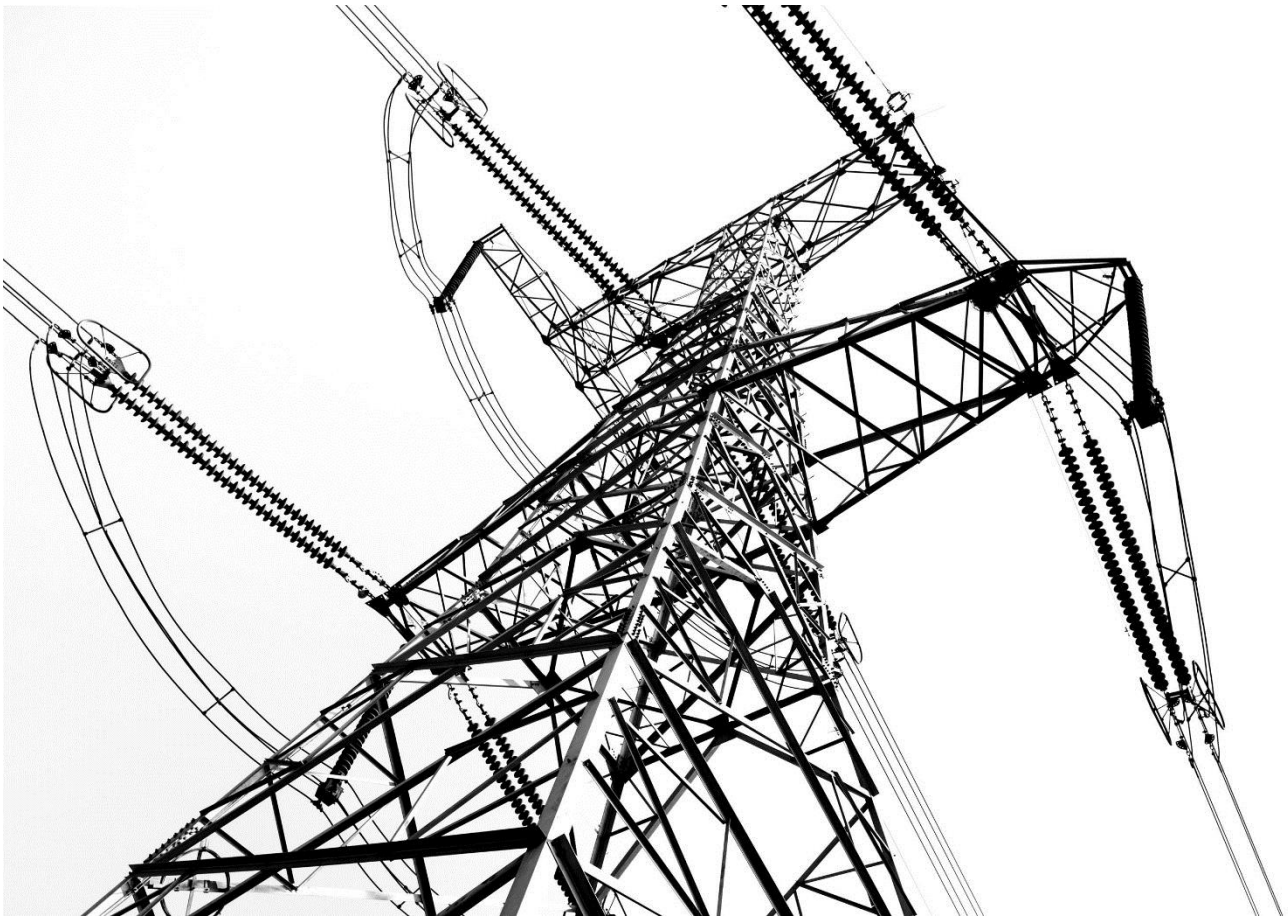
TBC CAPITAL

Electricity Sector Overview

A Growth & Opportunity Play



Georgia | Electricity Sector Overview
9 October 2015

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Executive Summary

Georgia's energy sector is one of the country's most attractive investment opportunities. Hydropower is the cheapest source of renewable power for Georgia and we strongly believe the sector will continue to be attractive for investors over the mid-term. The investment story is rooted in Georgia's massive untapped hydropower potential: current electricity production represents just 40% of Georgia's estimated annual hydropower output potential of 15 TWh.

In addition to 22 hydro plants currently under construction or in the licensing stage and MOUs signed for the construction of 72 small and medium hydro plants, the Ministry of Energy has an additional 80 HPP projects available for investment.

Generation capacities are falling short of growing consumption. Georgia's electricity generation has not kept up with growing consumption since 2012. Over the last 5 years output increased 23% to 10.4TWh as of 2014, while consumption grew 27**%** to 10.2TWh, largely in-line with GDP growth. We expect consumption growth will continue to track GDP trends.

Wholesale electricity prices are on the rise. In 1H 2015 the average electricity price surged 55% y/y, driven by increasing consumption on the back of insufficient growth in generation capacity, with the shortfall being bridged by more expensive sources like imports, thermal power, or newly built hydropower plants. Newly built HPPs are still by far the cheapest source of electricity.

Georgia's neighbor and key trading partner Turkey is an attractive market for exports due to growing consumption, geographical proximity, and an inverse consumption pattern (shortages in the summer when Georgia has a surplus). A new 700MW capacity transmission line now connects the two countries, which will allow for rapid growth in exports.

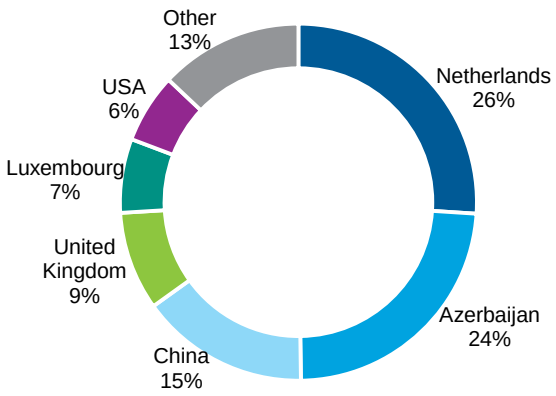
Georgia is on its way to establishing a fully competitive electricity market, which will enable producers to sell electricity at competitive prices. The Georgian government aims to develop a true competitive market and harmonize regulation with Turkish and EU standards. The reforms are aimed at establishing a trading mechanism to help create a competitive market with transparent pricing and a stable environment.

Georgia's goal is to become a regional hub for electricity transit and increase cross-border transmission capacity with its neighbours. In addition to exporting its own electricity to Turkey, Georgia can also transmit Russian and Azeri electricity to Turkey and Russian electricity to Iran through Armenia. Georgian State Electrosystem (GSE) plans to increase transmission capacity to Armenia, Russia, and Turkey by 4.5x, 1.8x and 2.1x, respectively

Georgian Hydropower: A Story of Growth and Opportunity

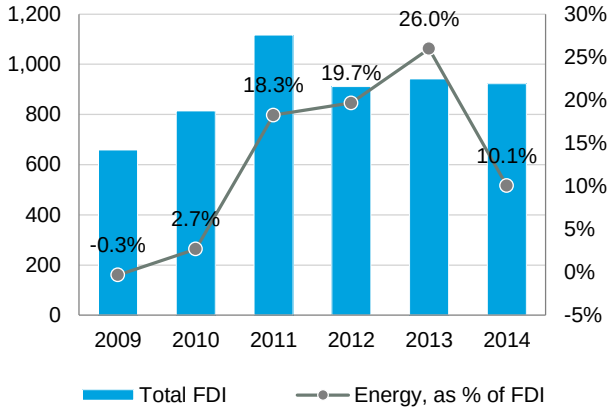
The energy sector is a key driver of the Georgian economy: over the last 5 years the sector was the 2nd largest contributor to total foreign direct investment (FDI) with US$ 750mn (15% of total FDI). Georgia's potential in the energy sphere is rooted in two strengths: as an energy transit corridor for Caspian oil to European markets and in the country's ample hydropower resources.

Foreign Direct Investment by source country, 2014



Source: Geostat

Energy sector's share of FDI, US$ mn



Source: Geostat

Over the last decade Georgia's hydropower sector has attracted numerous strategic investors. Currently, 22 hydropower plants with planned total capacity of 1,500MW (around 50% of the existing total installed capacity) and investment value of US$ 2.6bn are either under construction or in the licensing stage. Over the last 5 years, 8 small and medium HPPs with total installed capacity of 146MW have been built. Both local and international investors participated in these projects, including:

- **Anadolu Group** (Turkey), which completed the 87MW capacity Paravani HPP in 2014 at a total project cost of US$ 157mn.
- **Peri Ltd.** (Georgia) together with **The Robinson Group** (USA) and the **Georgian Energy Development Fund** are overseeing the 108MW Dariali HPP. Production is expected to start in early 2016. The project is expected to cost US$ 123mn, with debt financing provided by the EBRD.
- **Clean Energy Invest** (Norway), **Tata Power** (India), and **International Finance Corporation (IFC)** are implementing the Adjaristsqali HPP Cascade project with total projected installed

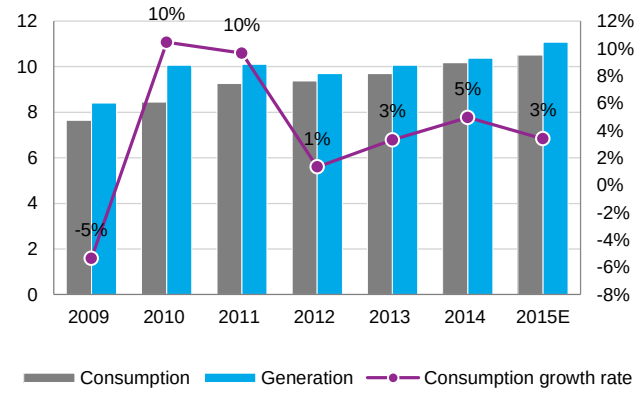
capacity of up to 400MW. The first phase of the project, the 182MW Shuakhevi HPP, is already under construction and expected to be operational by 2017. The total project cost is US$ 700mn.

- Georgia's state-owned **Partnership Fund** has finalized the construction of the 230MW gas-fired combined-cycle TPP, which is expected to be operational by the end of 2015. The total project cost was around US$ 230mn.
- **Georgian Co-Investment Fund** (the largest private equity fund in Georgia) is building the 53MW Mtkvari HPP. The project is expected to be operational by 2018, at a total projected cost of up to US$ 113mn.
- **Calik Enerji** (owned by Calik Group, one of Turkey's largest investment groups) is developing the Alpana and Sademli HPPs with combined installed capacity of 226MW. The total cost of both HPPs is around US$ 460mn. The projects are currently undergoing feasibility assessments and construction is expected to start in 3Q17.

Growing Electricity Consumption

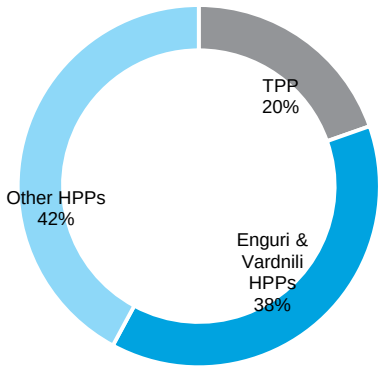
Hydropower dominates electricity generation in Georgia. In 2014 HPPs accounted for 80% (8.3TWh) of total electricity produced, with TPPs accounting for the remaining 20%. The state-owned Enguri and Vardnili HPPs, which are partially located on territory occupied by Russia, are the largest HPPs in the country[1]. They account for 38% of total electricity generation.

Electricity consumption/generation, TWh



Source: ESCO

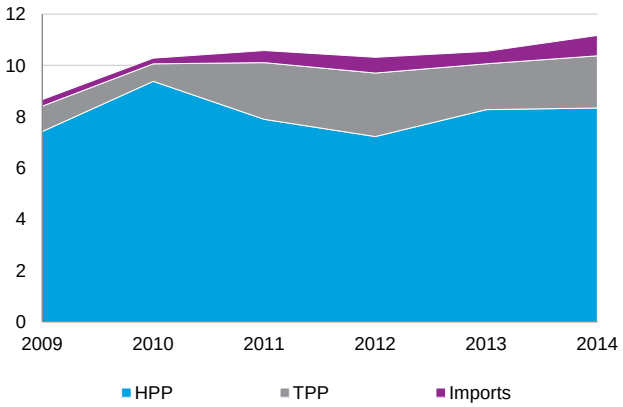
Electricity generation structure, 2014



Source: ESCO

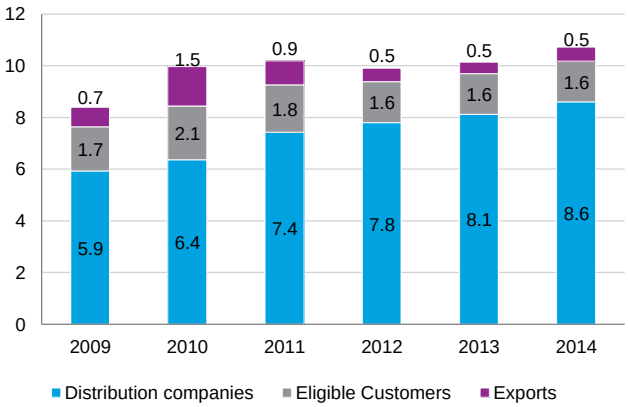
The growth rate of generation has lagged increases in consumption since 2012. Over the last 5 years electricity generation has grown 23% to 10.4TWh in 2014, while consumption increased 27**%** to 10.2TWh. Consumption has moved largely in-line with GDP growth and we expect this to continue.

Electricity supply structure, TWh



Source: ESCO

Electricity consumption structure, TWh



Source: ESCO

[1] According to an agreement between the Government of Georgia and the *de facto* government of Abkhazia, ~60% of the electricity generated by the Enguri and Vardnili HPPs is supplied to Georgia; the remaining 40% goes to Abkhazia

The construction of HPPs is behind schedule, primarily due to a lack of funding. Over the last 5 years, 8 small and medium-sized HPPs were completed with a total installed capacity of 146MW (potential annual output of 0.7TWh). According to the original memorandums of understanding signed between the Georgian government and private investors between 2009 and 2014, newly built HPPs should have added more than 2.5x this amount – around 360MW of installed capacity (~1.9TWh annual electricity generation potential) by 2015. The MOUs have since been revised and construction deadlines extended by request of the investors.

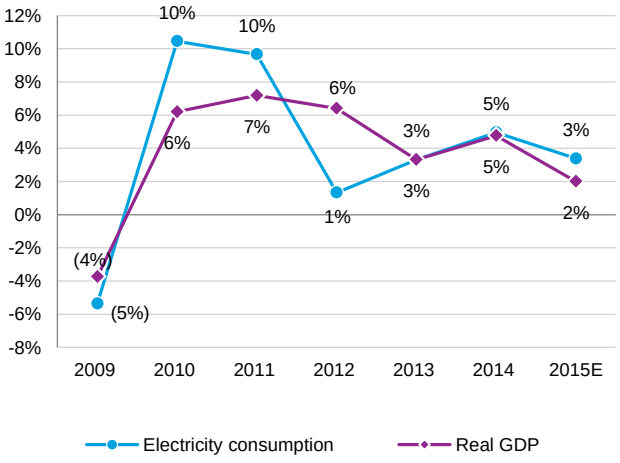
HPPs completed in 2009-2015

Name	Completion date	Installed capacity, MW	Potential annual output, GWh	Total cost, US$, mn	Construction cost per MW, US$, mn
Paravani HPP	2015	86.5	410	157	1.8
Larsi HPP	2014	19.0	100	20	1.1
Bakvi 3 HPP	2013	9.8	38	13.5	1.4
Akhmeta HPP	2014	9.1	50	9.8	1.1
Aragvi HPP	2014	8.5	50	13.0	1.5
Kazbegi HPP	2014	6.0	30	3	0.5
Shilda HPP	2014	5.0	30	5.5	1.1
Nabeghlavi HPP	2014	1.9	12	2.8	1.5
Total		**146**	**720**	**225**	**1.5**

Source: Ministry of Energy, ESCO

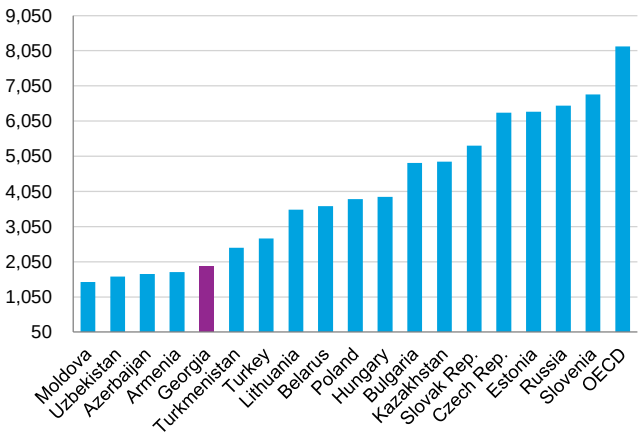
Georgia's electricity consumption is poised to grow alongside its economic growth. Growth in electricity consumption is largely driven by economic growth. In general, a 3% increase in GDP translates into a 1% rise in electricity consumption. Annual per-capita electricity consumption in Georgia (2,260KWh in 2014) is currently well below OECD levels (around 8,000KWh).

Electricity consumption vs. real GDP growth



Source: ESCO

Electricity consumption per capita, 2011, KWh



Source: World Bank

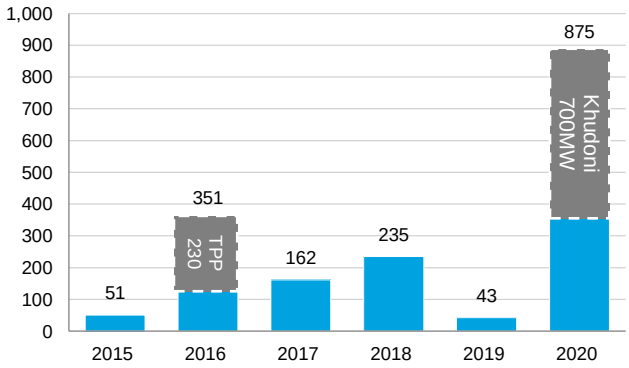
Additional generation assets will be needed to meet growing electricity consumption. We see Georgia's electricity consumption reaching 12-14TWh by 2020 (implied CAGR of 2-5%) and hydro generation reaching 11TWh (implied CAGR of 5%). The deficit will be covered by more expensive TPPs and imports.

We modeled two consumption scenarios: low growth (2% average growth) high growth (5%). In both scenarios Georgia's existing hydro generation capacities will not meet demand.

According to the Ministry of Energy, 22 HPPs with total installed capacity of 1,550MW are at either construction or licensing stage and are expected to launch operations by 2020. This includes the 702MW Khudoni HPP project which we excluded from our calculations as the project is unlikely to be completed by 2020, in our view. Although Khudoni is a high-value investment project supported by the government, it is saddled with financing issues as well as sensitive social and environmental concerns.

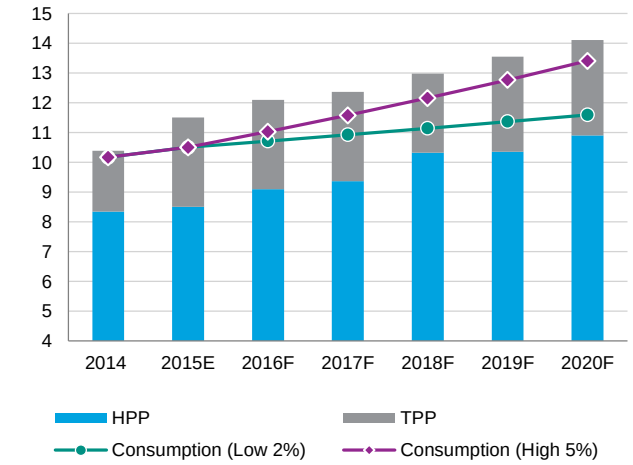
We estimate Georgia's hydro generation will increase 28% by 2020 to 11TWh. If all the HPPs in the pipeline aside from Khudoni are completed, generation capacity will increase by 848MW from the current 3,000MW.

Planned generation capacity, MW



Source: Ministry of Energy, TBC Capital

Electricity consumption/generation forecast



Source: Ministry of Energy, GSE, TBC Capital

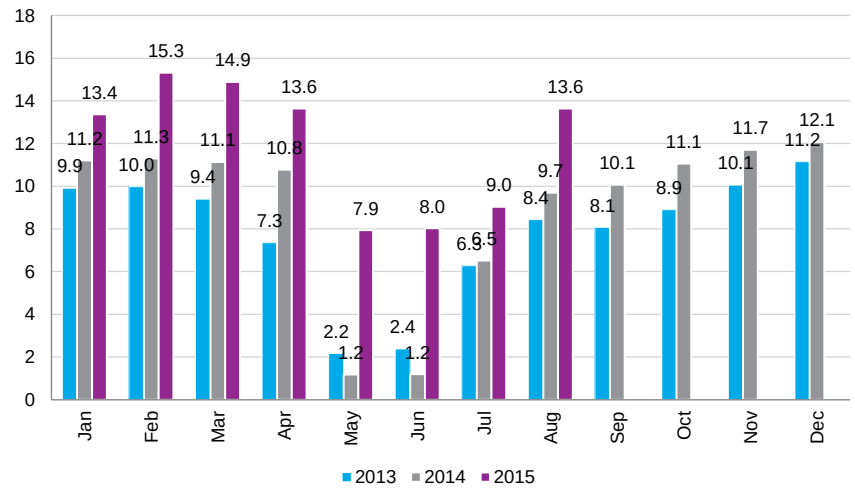
Georgia can more than double hydropower generation if all economically viable HPPs in the pipeline are completed. Aside from the above-mentioned 22 HPPs, the Ministry of Energy has signed 72 MoUs with private investors for the construction of HPPs with total installed capacity of 2,600MW. These 94 projects have the potential to add 4,150MW in installed capacity.

Wholesale Prices on the Rise

Wholesale electricity prices are increasing in Georgia. In 1H 2015 the weighted average balancing electricity price at which ESCO (the market operator) sells electricity reached GEL 0.135/KWh, up 55% y/y. Balancing electricity is traded by ESCO and it is the best reference for deregulated prices.

In the existing market structure, electricity trades are largely conducted via direct contracts. In 2014 direct contracts accounted for 90% of all electricity trade. In direct contract trading electricity producers sign bilateral contracts with large electricity consumers or distribution companies. Balancing electricity, which is traded via ESCO, accounted for only 10% of total electricity trading.

ESCO monthly weighted average balancing electricity price, Tetri/KWh



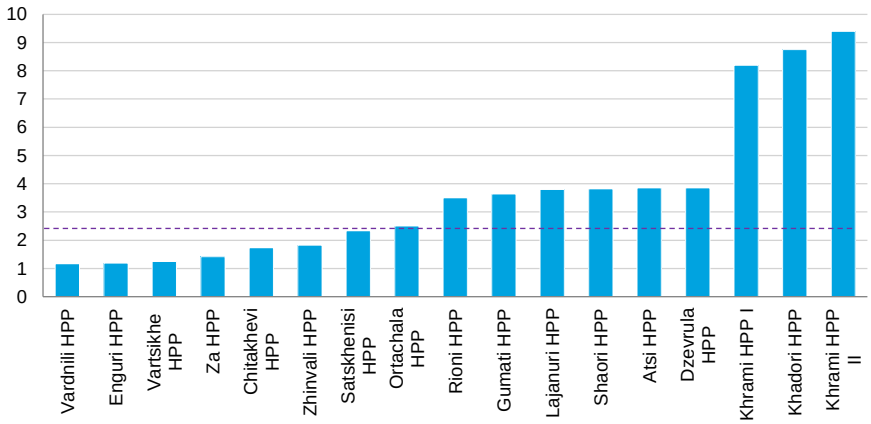
Source: ESCO

We believe electricity prices will continue to rise as existing HPPs, which generate the cheapest electricity (weighted average tariff of GEL 0.024/KWh), are unable to meet increased consumption. Increased consumption will therefore need to be covered by imports (GEL 0.15-0.20/KWh), thermal power plants (GEL 0.10-0.12/KWh), or newly built hydropower plants (GEL 0.10-0.15/KWh). Although the newly built HPPs are the cheapest source of electricity, their prices are still significantly higher than at old HPPs. The newly built HPPs are the cheapest and most competitive electricity source.

More than 75% of Georgia's HPPs were built in the Soviet period and their depreciation expense, which accounts for around 80% of total HPP costs, is significantly lower than for other generation types. Electricity tariffs for these HPPs (built before August 2008 and with installed capacity of over

13MW) are regulated. The electricity generated by these HPPs fully satisfies summertime consumption. In the winter, Georgia's electricity generation shortfall is bridged by TPPs and imports.

Regulated generation tariffs, Tetri/KWh



Source: GNERC

Electricity prices for newly built HPPs (built after 2008) and all HPPs with installed capacity below 13MW are fully deregulated. Over the first 10 years of their life, all newly built HPPs are required to sell 20% of their annual output during the winter to ESCO at a pre-agreed price. The remaining 80% can be exported or sold domestically. The table below illustrates the prices at which ESCO will purchase electricity during winter.

ESCO winter electricity purchase price from new HPPs

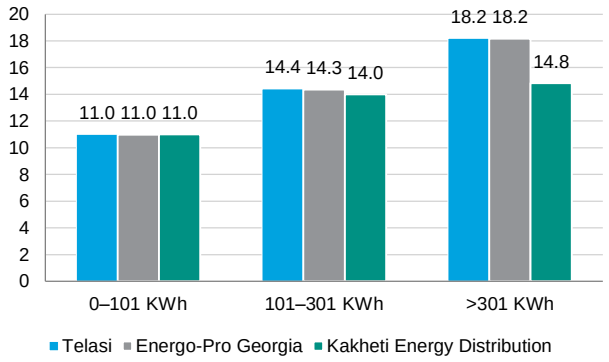
Name	Price US$ cents per KWh	Installed capacity
Aragvi HPP	4.5	9
Bakhvi HPP	6.0	10
Dariali HPP	6.5	108
Kazbegi HPP	6.5	5
Larsi HPP	6.5	19
Nabeghlavi HPP	4.1	2
Paravani HPP	4.7	87
Shilda HPP	6.5	5

Source: Ministry of Energy, ESCO

Higher End Consumer Tariffs on Increased Generation Costs

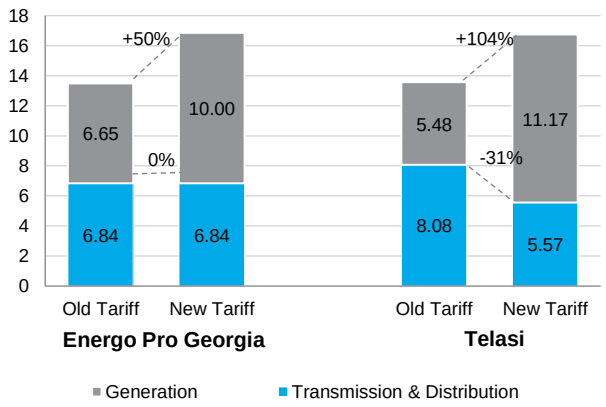
Increased generation costs are translating into higher end consumer tariffs. GNERC has increased the end consumer tariff for both Energo-Pro Georgia and Telasi by around 24.8% (GEL 0.0335/KWh) and 23.5% (GEL 0.0318/KWh), respectively. The increased tariff applies to all consumer groups[2]. Energo-Pro Georgia is the country's largest distribution company, it supplies electricity to all of Georgia apart from Tbilisi and the Kakheti region, while Telasi distributes electricity in Tbilisi

End consumer tariffs by consumer groups and distribution companies per KWh, Tetri



Source: GNERC

End consumer tariff for Energo-Pro Georgia's and Telasi's commercial customers per KWh, Tetri



Source: GNERC

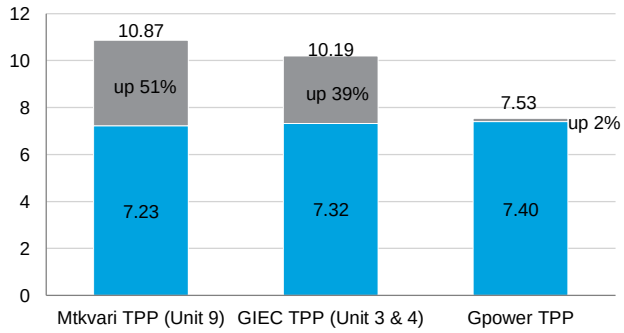
The Georgian Lari's (GEL) depreciation against the US$ had an immediate effect on electricity generation prices, as both imported electricity and natural gas prices are fixed in US$. Since 4Q14, the GEL is down 30% against the US$, which increased thermal generation and imported electricity costs by nearly the same amount. Electricity prices will be subject to further upward pressure as more expensive electricity sources cover increased consumption as existing HPPs, which generate the cheapest electricity (weighted average tariff GEL 0.024/KWh), are maxed out.

For gas-fired thermal power plants (TPPs), natural gas prices are fixed in US$ and account for ~70% of total operating costs, while electricity sales are conducted in GEL. On July 22, 2015 the regulator raised production-based electricity tariffs for all three TPPs (see chart below). TPPs are sources of guaranteed electricity supply; they operate in standby mode, ready to supply the system in the event of a shortage, which often occurs

[2] For socio-political reasons the final tariff is different for three consumer groups: households with monthly consumption of 0-101KWh, 101-301KWh, and more than 301KWh

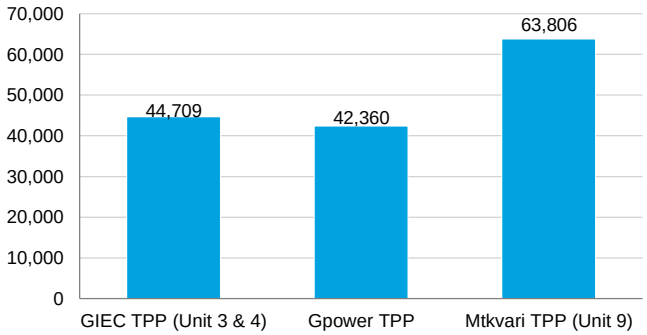
in winter. TPPs, therefore, ensure electricity system stability. TPPs receive regular daily payments that cover fixed costs as well as production-based payments in case the back-up supply is tapped.

Production-based generation tariffs, Tetri/KWh



Source: GNERC

Daily fixed daily payments for guaranteed capacity, GEL

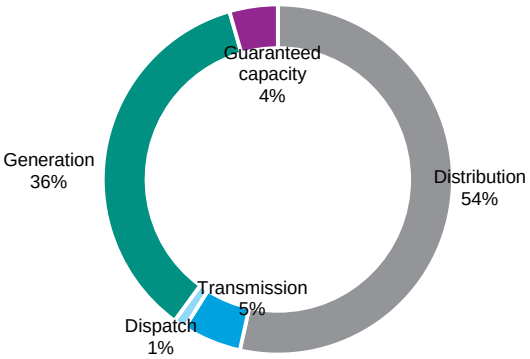


Source: GNERC

A new 230MW TPP will also put upward pressure on the weighted average electricity generation price. The new 230MW Gardabani TPP is expected to be operational by the end of this year. It is poised to get guaranteed capacity status, which means it will receive fixed daily payments for operating in standby mode, ready to supply the system with electricity.

We believe the generation portion of end consumer tariffs will increase and will come to account for the largest portion of the tariff. In 2014, according to GNERC, distribution accounted for 54% of the end consumer tariff, followed by generation (including guaranteed capacity fixed payments) at 40%, and transmission and dispatch at a combined 6%. Distribution holds the largest share of the tariff because of the extensive capex needed to upgrade the existing distribution network.

Composition of the end consumer tariff, 2014



Source: GNERC, TBC Capital

We don't expect significant changes in transmission and dispatch tariffs. There are three transmission companies in Georgia: Georgian State Electrosystem (GSE), its 100% subsidiary Energotrans, and Sakrusenergo. GSE also holds a dispatch license. Dispatch and transmission tariffs are set by an independent regulator (see below table of transmission and dispatch tariffs).

Transmission tariffs per KWh, Tetri

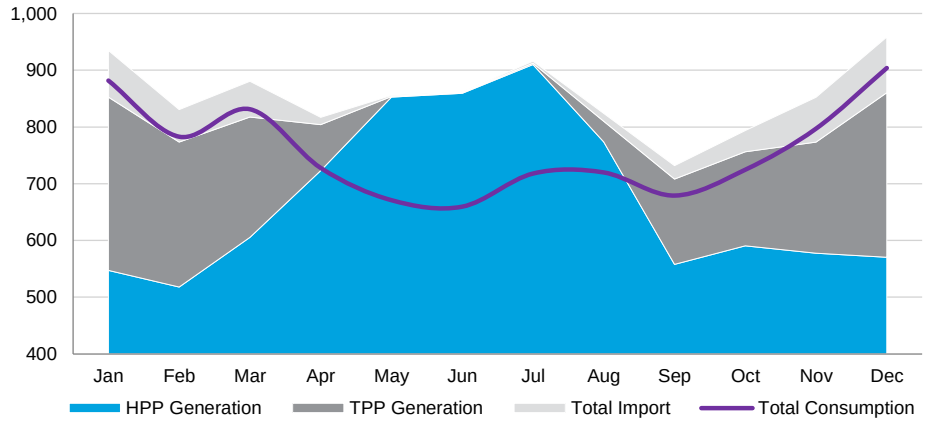
	Dispatch	500kv	400kv	330kv	220kv	110-35kv	10-6kv	0.4kv
Energo-Pro						1.542	2.064	6.837
Telasi						1.800	7.138	8.080
Kakheti Energo Distribution						0.932	2.046	5.638
Georgian State Electrosystem					0.758	0.758	0.758	
Sakrusenergo		0.180		0.180	0.180			
Energotrans		0.270	0.350					
Georgian State Electrosystem	0.102							

Source: GNERC

Summertime Export Opportunities

Output at HPPs is seasonal – output peaks in the summer and falls in the winter. Conversely, consumption peaks in the winter and troughs in the summer. In the winter, Georgia depends on thermal power plants and imports to balance its deficit. Georgia runs a surplus from April to August. The seasonal consumption pattern is flattening out, however, as households and companies have started to adopt air conditioners on a wide scale.

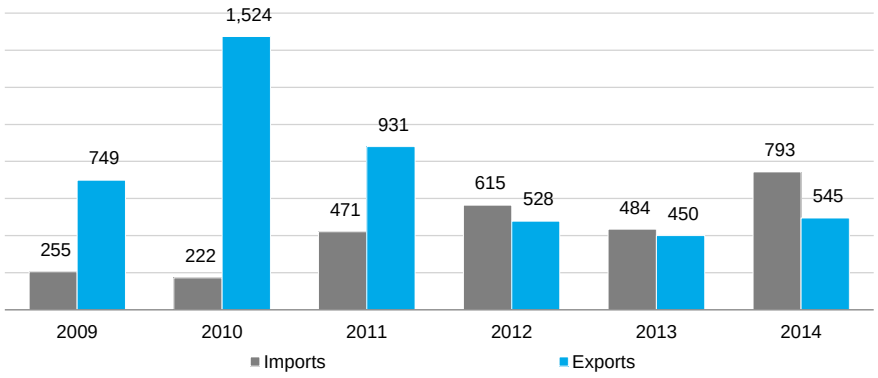
Monthly average electricity generation/consumption, 2009-2014, GWh



Source: ESCO

Georgia has become a net electricity importer since 2012 after being a net exporter over 2006-2012. The trend reversed due to increased consumption and insufficient generation. In 2014, Georgia imported 793GWh, nearly 2x higher y/y, while exports increased 21% to 545GWh. As new generation assets come on stream in the medium term and in spite of the flattening seasonal consumption we believe Georgia will have an opportunity to boost exports during the summer months.

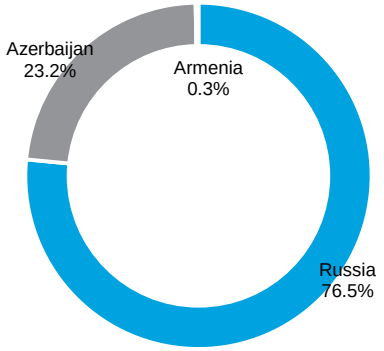
Electricity imports/exports, GWh



Source: ESCO

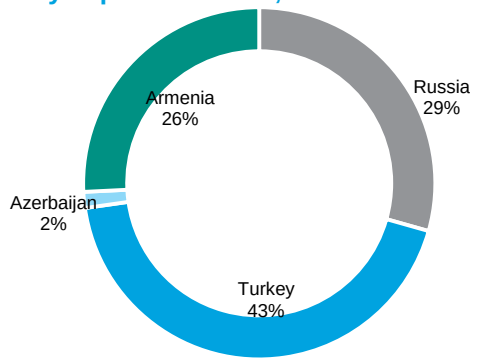
Russian imports bridge Georgia's electricity deficit in the winter, while Turkey dominates summertime exports. In 2014, Russia accounted for 77% of electricity imports followed by Azerbaijan at 23%. Turkey accounted for 43% of exports, followed by Russia at 29%, and Armenia at 26%. We believe the new 400/500kv transmission line with HVDC back-to-back link connecting Turkey and Georgia will further support electricity exports to Turkey. The line was commissioned in 2013 and has increased cross-border transmission capacity by 700MW from 150MW.

Electricity import structure, 2014



Source: ESCO

Electricity export structure, 2014



Source: ESCO

Increased Transmission Capacity with Turkey

A new 700MW capacity transmission line will facilitate an increase in exports to Turkey and further to Eastern Europe. Under the framework of the Black Sea Transmission Network (BSTN), two 350MW HVDC back-to-back links, 500/400/220kv substations, and the new Meskheti line connecting Georgia and Turkey were completed in 2013. Georgia is the first country in the Caucasus Region to install HVDC back-to-back links, which guarantees a stable exchange of electricity without disturbances to or contingencies within the Turkish high voltage power system. They also improve the stability of the national electricity network and strengthen Georgia's potential to be a hub to transit electricity from Russia and Azerbaijan to Turkey.

Over the last 5 years, Georgia and Turkey established a legal framework to govern electricity trading. Capacity allocation rules have been put in place for accessing the new 400kv line connecting Georgia with Turkey. In April 2015 the Turkish and Georgian governments signed an agreement on cooperation in the energy sector, specifically in the use of green energy resources, increasing sector efficiency, and cross-border electricity trading. The agreement also covers the further development of the cross-border transmission infrastructure and cooperation in the process of becoming members of ENTSO-e (European Network of Transmission System Operators for Electricity).

Newly built HPPs are granted priority access to the new cross-border 400kv line connecting Georgia and Turkey. According to the Electricity (Capacity) Market Rules, transmission capacity on the 400kv line is allocated based on the following priority chain:

a. Emergency situations

b. Renewable power plants built since 2010

c. Other power plants and electricity transit/re-export.

In the event bids from priority groups exceed the 400kv line's transmission capacity, capacity is allocated through special auctions arranged by the dispatcher (GSE).

The aggregate transmission tariff to export electricity to Turkey is GEL 0.025/KWh, which includes all the costs associated with exporting electricity from Georgia to Turkey. This tariff is poised to rise, in our view, as the new Gardabani TPP (due to be operational by the end of 2015) will receive the status of guaranteed electricity supplier, which means the guaranteed capacity payment portion is due to rise.

Total transmission cost for exporting electricity to Turkey, Tetri/KWh

GSE - Dispatch	0.10
GSE - 500/220kv	0.76
Sakrusenergo - 500/330/220kv	0.18
Energotrans 500kv	0.27
Energotrans 400kv	0.35
Guaranteed Capacity Payment	0.59
Total	**2.25**

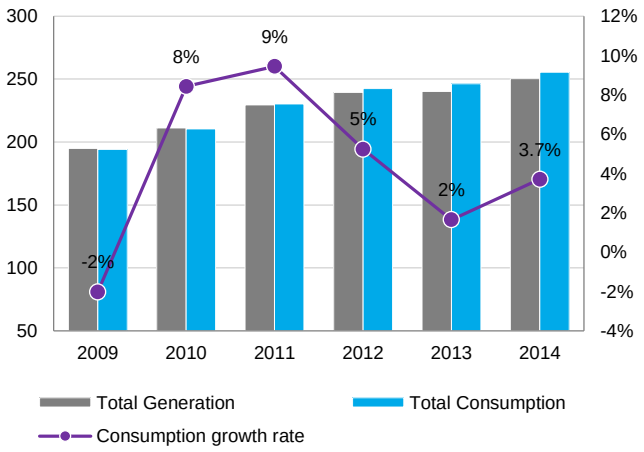
Source: GSE, GNERC

Turkey – a Key Export Market

Turkey is an attractive export destination for Georgian hydropower thanks to its sizable market, growing electricity consumption, geographical proximity, and an inverse seasonality of consumption to Georgia. Turkey experiences a deficit of electricity in the summer, while Georgia has a surplus. The new HVDC back-to-back link connecting Georgia with Turkey offers additional capacity for an increase in exports to Turkey.

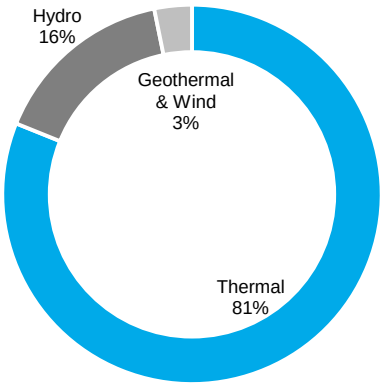
Turkey's electricity market is one of the fastest growing markets in the world. Over the last decade, electricity consumption increased 6% annually on average. In 2014, consumption and generation both rose 4% to 255TWh and 250TWh, respectively. The Turkish Electricity Transmission Company (TEIAS) sees consumption growing around 5% on average annually, reaching 400TWh in 2023. If Turkey is to be self-sufficient it would need to nearly double its current generation to meet the growing demand.

Turkey: Electricity generation/consumption, TWh



Source: TEIAS

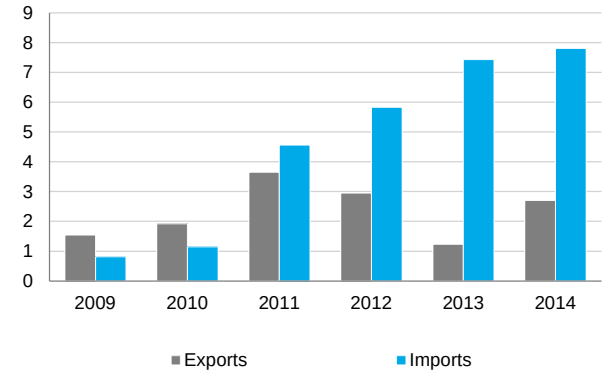
Electricity generation structure, 2014



Source: TEIAS

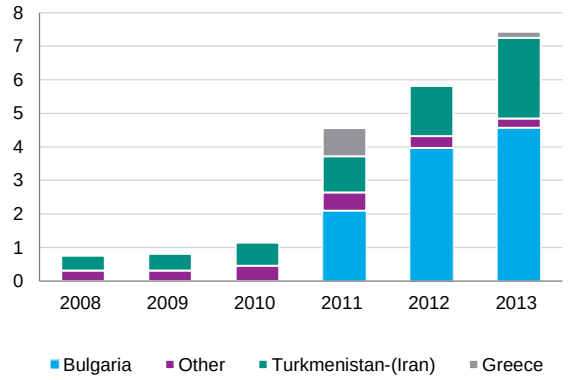
Turkey has been a net electricity importer since 2012**.** In 2014 electricity imports grew 5% y/y to 7.8TWh, while exports increased 2.2x to just 2.7TWh.

Turkey: Electricity import/export, TWh



Source: TEIAS

Turkey: Electricity imports, TWh

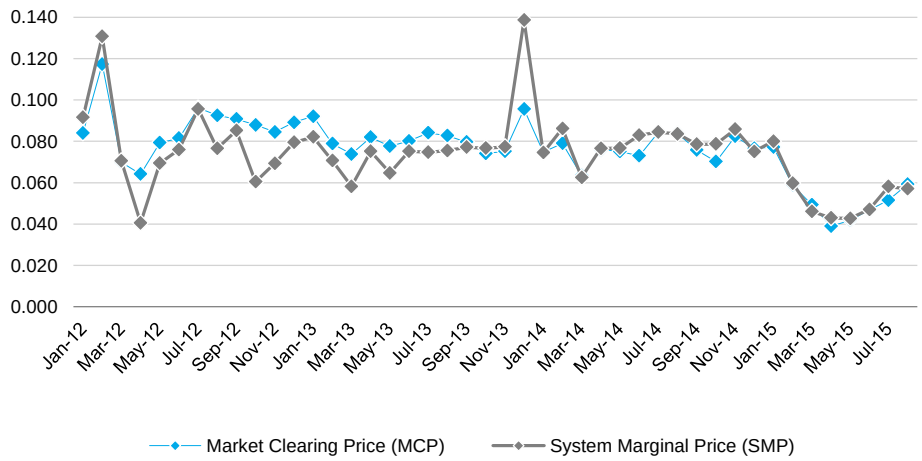


Source: TEIAS

Wholesale electricity prices in Turkey recovered to US¢ 6/KWh in August 2015, after falling to US¢ 4/KWh in May 2015. We believe electricity prices will remain in the range of US¢ 6-7/KWh. The May decline in prices was driven by:

- **Increased generation of cheaper hydro due to better hydrological conditions.** In 1Q15 HPPs accounted for 23% (14TWh) of all electricity generation, up from 17% (11TWh) in 1Q14.
- **A slowdown in consumption on the back of an economic slowdown.** In 4Q14 Turkey's economic growth slowed as exports – a key economic driver – were negatively affected by weakness in key export markets (the euro-zone, Iraq, and Russia).
- **Decreasing energy prices.** A decrease in the natural gas price also reduced the electricity price, driving TPP electricity prices lower.

Turkey: Monthly weighted average electricity prices (DAM), US$/KWh

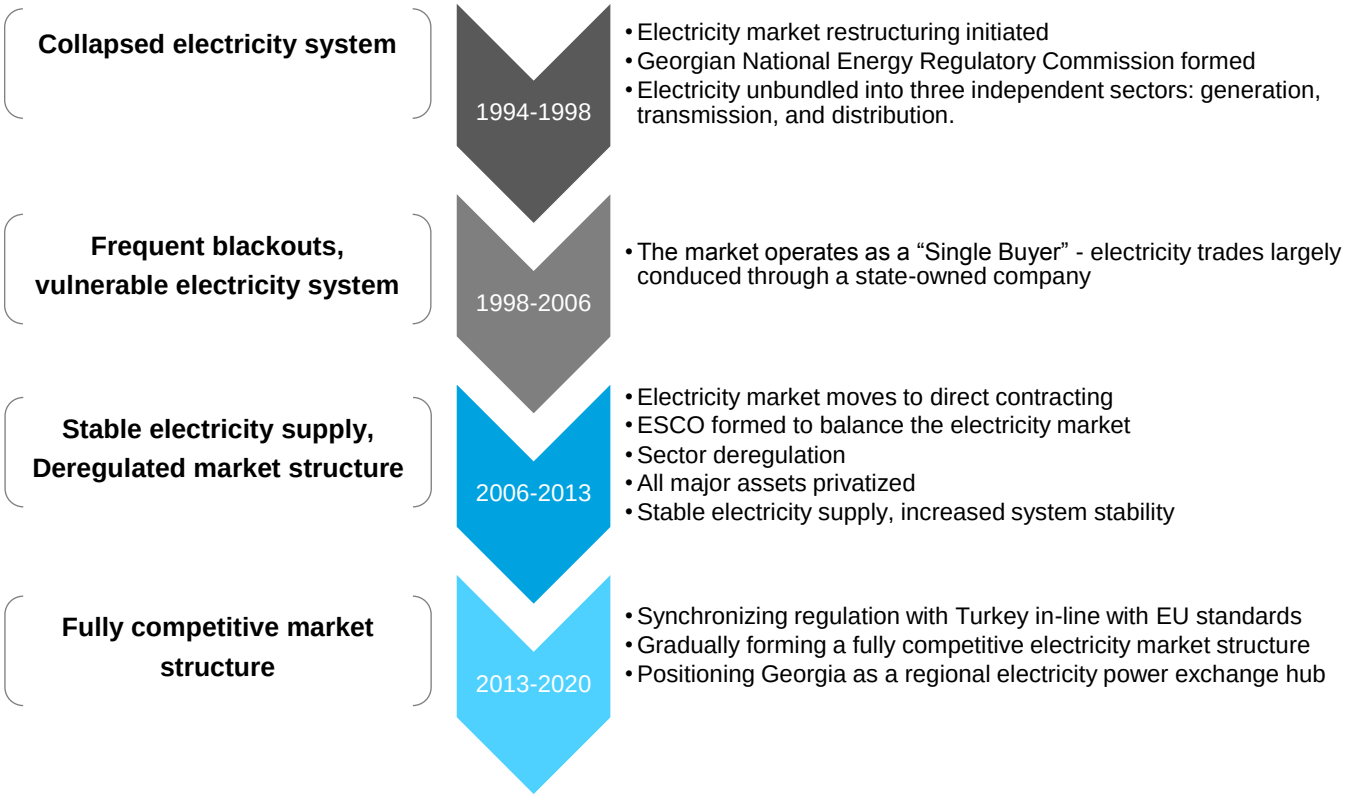


Source: PMUM

Forming a Fully Competitive Market

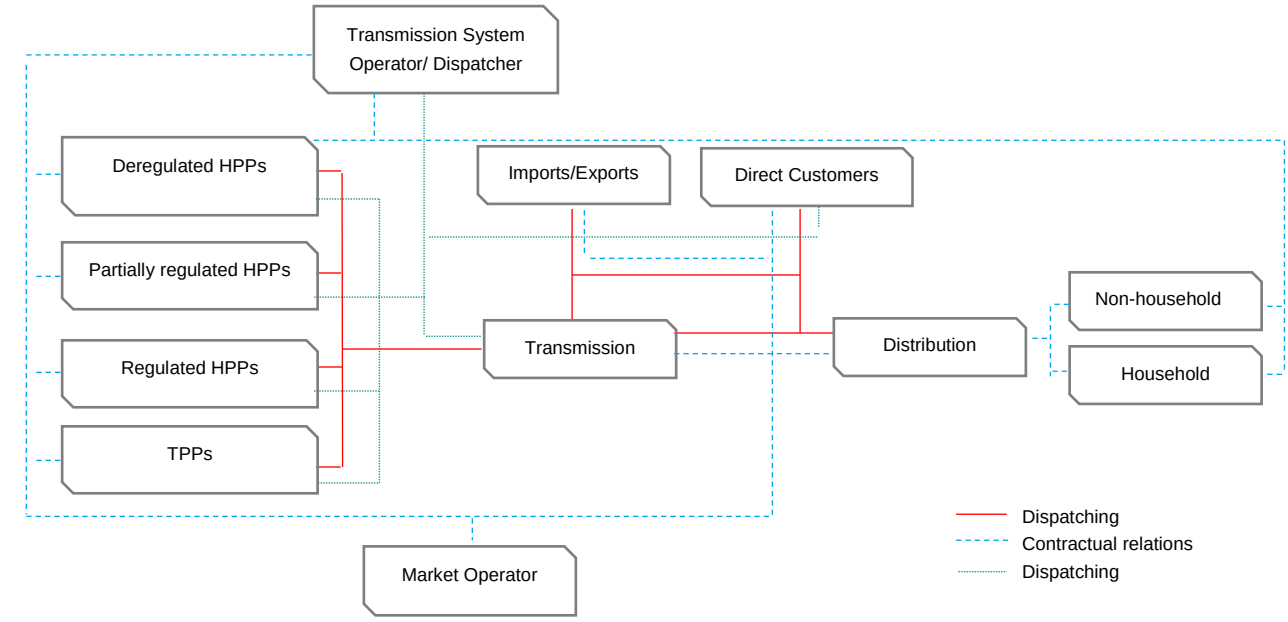
Over the last decade Georgia's electricity sector has undergone significant reforms. It has been transformed from a dysfunctional vertically integrated system operated by state-owned SakRusEnergo into a well-functioning, largely liberal market structure. In 2013 the government started a new stage of development that aims to develop a fully competitive market structure and synchronize regulation with EU standards.

Electricity market development stages



Source: GNERC

Existing Electricity Market Structure



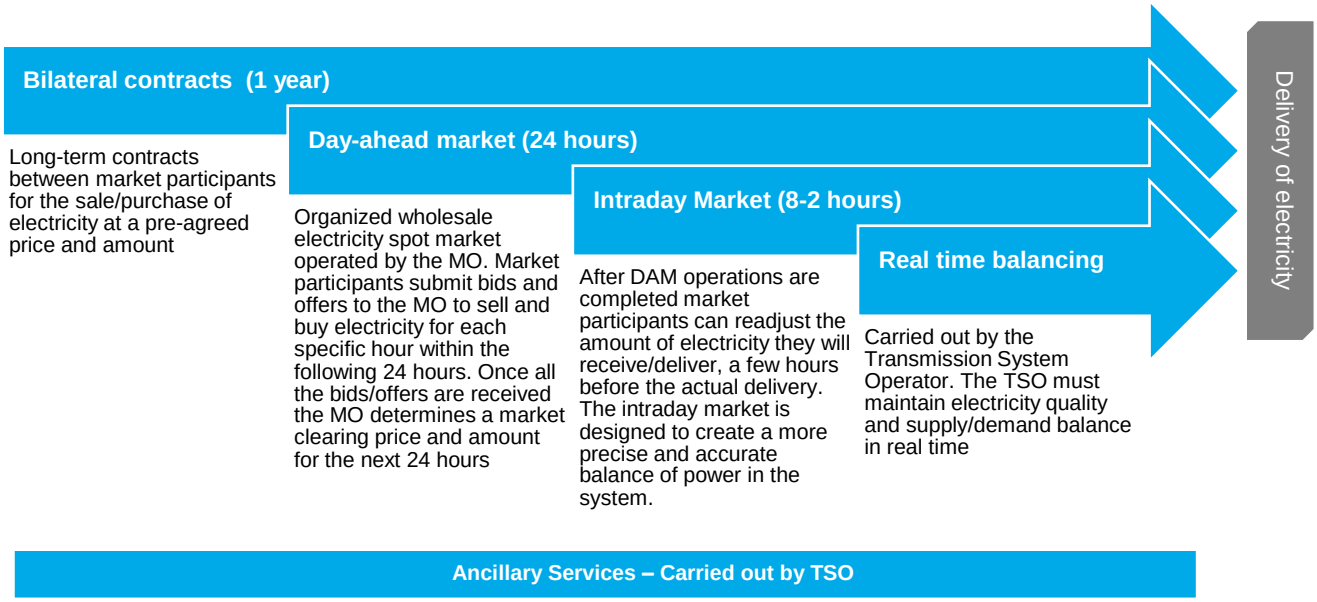
Source: GNERC

Transmission System Operator (TSO) functions are carried out by Georgian State Electrosystem, which also holds a central dispatcher license and owns all the major transmission network infrastructure. According to new amendments adopted in 2014 GSE will operate the entire electricity transmission network and will be responsible for network development planning. GSE is also responsible for day ahead and real-time balancing functions, as well as technical stability and system security.

ESCO (the market operator – MO) is chiefly responsible for trading balancing electricity and guaranteed capacity. The MO has signed medium and long terms contracts for electricity import/export to ensure long-term system balance. The MO is responsible for the system's financial stability.

The Government of Georgia has initiated a set of structural electricity market reforms to further develop a competitive electricity market and synchronize Georgian regulation with the EU standards. The reform aims to establish a fully functioning electricity trading mechanism (see graph on the following page), which will support the formation of a competitive market with clear prices and a predictable environment and enable producers to freely sell electricity to Turkey at competitive prices.

Electricity Trading Mechanisms



**Electricity Trading Mechanism is a process within the electricity market that manages hourly trading, balancing, and settlement of bi-lateral electricity purchase and sale contracts harmonized with Turkey's hourly electricity trading market.*

Source: USAID, Deloitte Consulting, GSE

To establish a functioning electricity trading mechanism and synchronize regulation with Turkey, the Government of Georgia has already implemented several regulatory / legislative amendments, but reforms are still underway. These include the introduction of capacity allocation rules for the new 400kv line connecting Georgia with Turkey, the development by the TSO of a 10-year Transmission Network Development Plan, the development of a Transmission Grid Code, the adoption by the Parliament of Georgia of a new Energy Policy, which outlines the process of synchronizing Georgian energy sector regulation with EU standards and the creation of a competitive energy market and electricity trading mechanism. USAID is supporting the Government of Georgia in developing the new market model. Energy sector reform is ongoing and further steps needs to be taken to form a competitive electricity market.

Georgia as a Regional Electricity Transit Hub

Georgia's aim is to become a regional electricity transit hub thanks to its natural competitive advantage due to the country's location. Georgian State Electrosystem (GSE) plans to invest up to US$ 1bn in projects to increase the country's cross-border transmission capacity and strengthen internal network stability. Georgia can export its own electricity, but it can also act as a transit corridor redirecting Russian and Azeri electricity to Turkey, as well as Russian electricity to Iran via Armenia. At the moment, the Iranian opportunity is limited by the capacity of the 220KV capacity Alavardi line.

Cross-border transmission capacity

Country	Name	Voltage, KV	Transmission capacity, MW	Type
Russia-Georgia	Kavkasioni	500	700	Synchronous
	Salkhino	220	100	Island
	Java*	110	60	Island
	Dariali	110	60	Island
		Total	**920**	
Azerbaijan-Georgia	Mukhranis Veli	500	700	Synchronous
	Gardabani	330	320	Synchronous
		Total	**1,020**	
Turkey-Georgia	Meskheti	400	700	Back-to-back
	Adjara	220	150	Island
		Total	**850**	
Armenia-Georgia	Alaverdi	220	150	Island
	Lalvari	110	30	Island
	Ninotsminda	110	20	Island
		Total	**200**	

**Power transmission line is utilized for import of electricity for the occupied territory of Georgia Source: GSE*

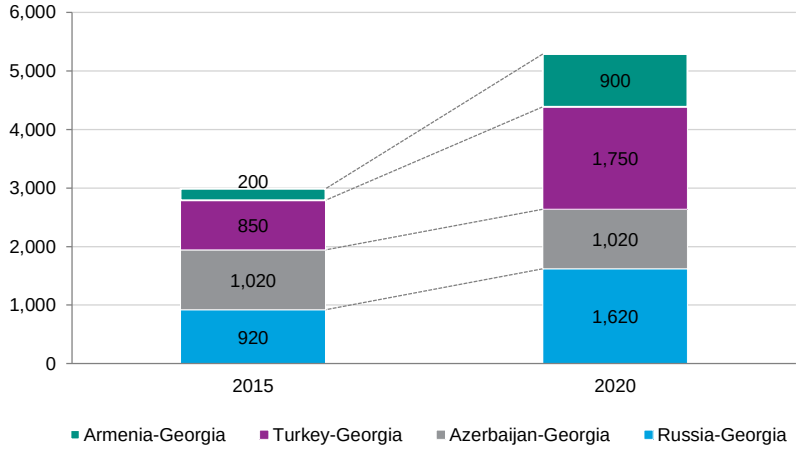
GSE plans to improve cross-border transmission capacity with neighbouring countries. According to its 2015-2025 Network Development Plan, GSE plans to increase the reliability of electricity flows to neighbouring electricity systems by implementing the following projects:

- **Turkey-Georgia:** The construction of two new HVDC back-to-back links, the 500/400kv Akhaltsikhe-Tortum line, and the 220/154kv Batumi-Muratli line. Both projects are expected to be completed by the end of 2020. The two new lines are projected to increase transmission capacity between the countries by 1,050MW.
- **Russia-Georgia:** The 500kV Ksani-Kazbegi-Mozdok line will increase transmission capacity by 700MW, which will nearly double capacity between Georgia and Russia. The line could also

serve as a transit route for Russian electricity through Georgia and Armenia to Iran. The project is expected to be completed by 2020.

- **Armenia-Georgia:** The 500kV Marneuli-Airum line will increase transmission capacity between the countries by 700MW to 900MW. The line will connect with the 700MW 500/400kV HVDC convertor on the Armenian side which will further connect with Iran's electricity system. Armenia has already secured financing for the project and construction is underway. The project is slated to be completed by 2018.

Cross-border transmission capacity development plan, MW



Source: GSE

Electricity Infrastructure in Georgia

Generation

Hydropower dominates electricity generation in Georgia. The Enguri complex (the 1,300MW Enguri HPP and 220MW Vardnili HPP) accounts for 38% of Georgia's total electricity output. The complex is owned by the state, but it is partially located on the Russian-occupied territory of Abkhazia. Apart from the Enguri HPP there are 18 medium and 50 small (below 13MW) HPPs in Georgia with total installed capacity of around 1,500MW. Georgia also has three TPPs located in the southeastern part of the country with total installed capacity of 670MW.

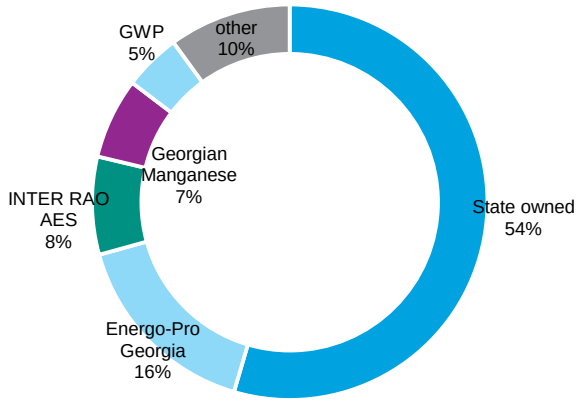
Existing generation assets, 2014

	Installed capacity, MW	Output, 2014, GWh	Date of construction	Ownership
Thermal Power Plants				
Mtkvari TPP (Unit 9)	300	1,210	1990	INTER RAO AES
Gpower TPP	110	45	2006	Energo-Pro Georgia
Tbilsresi TPP (Unit 3 & 4)	260	781	1963-1972	GIEC
Total TPPs	**670**	**2,036**		
Hydro Power Plants				
Regulated HPPs				
Engur HPP	1,300	3,332	1978	State owned
Vardnil HPP	220	634	1971	State owned
Khrami 1 HPP	113	205	1947-1963	INTER RAO AES
Khrami 2 HPP	110	317	1947-1963	INTER RAO AES
Shaor HPP	38	147	1955	Energo-Pro Georgia
Dzevrul HPP	80	145	1956	Energo-Pro Georgia
Zhinval HPP	130	378	1985	GWP
Seasonal HPPs				
Vartsikhe HPP	184	887	1976-1987	Georgian Manganese
Rion HPP	48	318	1933	Energo-Pro Georgia
Gumat HPP	67	340	1956-1958	Energo-Pro Georgia
Lajanur HPP	113	408	1960	Energo-Pro Georgia
Atshesi HPP	16	80	1941	Energo-Pro Georgia
Chitakhevi HPP	21	101	1949-1950	Energo-Pro Georgia
Zahesi HPP	36	190	1927-43	Energo-Pro Georgia
Ortachala HPP	18	86	1954	Energo-Pro Georgia
Satskhen HPP	14	16	1952	Energo-Pro Georgia
Khador HPP	24	130	2004	Eastern Energy Corp.
Larsi HPP	19	42	2014	Energy
Faravan HPP	87	86	2014	Georgia-Urban Enerji
Deregulated HPPs (<13MW)	**149**	**494**		**Private ownership**
Total HPPs	**2,786**	**8,335**		

Source: ESCO

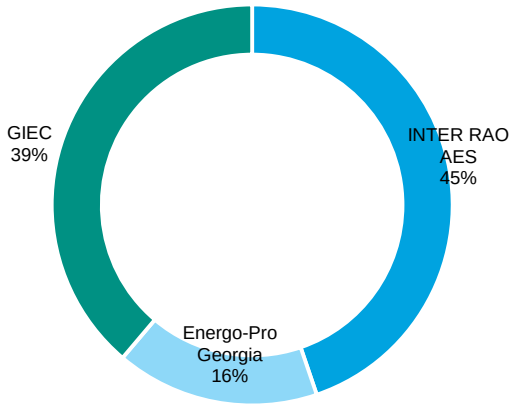
The largest private investor in Georgia's electricity sector is Czech Energo-Pro Georgia, which owns 17% of the country's generation capacity, followed by Russia's INTER RAO UES with 15%, and Georgian International Energy Corporation at 9%. The state owns 45% of total electricity generation capacity through the Enguri complex.

HPP ownership structure, 2014



Source: ESCO

TPP ownership structure, 2014



Source: ESCO

- **Energo-Pro Georgia:** owned by Czech-based energy holding Energo-Pro a.s. The company entered the Georgian market in 2007 and acquired 6 medium-sized HPPs through privatization. The company currently owns 15 medium and small HPPs with total installed capacity of 470MW, as well as a 110MW gas turbine power plant and the largest distribution company in Georgia, which covers the entire country except Tbilisi and the Kakheti region.
- **Inter RAO UES:** a Russian-based energy holding, majority owned by the Russian state. The holding entered Georgia in 2002 with the acquisition of a controlling stake in AES-Telasi, the distribution company that covers Tbilisi**.** It also owns the 223MW capacity Khrami HPP cascade and a 300MW TPP.
- **Georgian International Energy Corporation:** owned by Georgian Industrial Group. The company owns 8 small HPPs (below 49MW) and a 260MW capacity TPP.

Another 22 HPPs with total planned installed capacity of 1,552MW are under construction or in the licensing stage and are scheduled to be completed by 2020. The Ministry of Energy has signed an additional 72 MoUs with private investors for the construction of small and medium HPPs with total installed capacity of 2,600MW. Additionally, the Ministry of Energy has around 80 HPP projects available for investment.

HPPs currently under construction or in the licensing stage

Project	Company	Estimated Installed Capacity, MW	Estimated Annual Generation, GW/h	Commencement of Operation
Lukhuni HPP 2	Rusmetali Ltd	12	74	2015
Pshavela HPP	Hydrolea Ltd	2	10	2015
Abuli HPP	Optimum Energy Üretim A.Ş.	22	116	2015
Arakali HPP	Optimum Energy Üretim A.Ş.	9	48	2015
Okropilauri HPP	Alter Energy	2	9	2015
Goginauri HPP	Alter Energy	2	9	2015
Debeda HPP	Hydrolea Ltd	3	13	2015
Kintrisha HPP	Hydro Development Company	5	30	2016
Kasleti HPP 2	Hydrolea Ltd	8	46	2016
Dariali HPP	Dariali Energy JSC	108	521	2016
Kirnati HPP	Achar Energy 2007 Ltd.	51	219	2017
Khelvachauri HPP 1	Achar Energy 2007 Ltd.	48	230	2017
Khobi HPP 2	Georgian Investment Group Energy	55	260	2017
Kasleti HPP 1	Hydrolea Ltd	8	46	2017
Shuakhevi HPP	Clean Energy	175	437	2018
Khobi HPP 1	Georgian Investment Group Energy	60	320	2018
Mtkvari HPP	Mtkvari HPP Ltd.	53	200	2018
Khudoni HPP	Trans Electrica Ltd.	702	1,500	2020
Skhalta HPP	Clean Energy	6	27	2020
Koromkheti HPP	Clean Energy	150	463	2020
Darchi HPP	Hydrolea Ltd	17	94	2020
Khertvisi HPP	Clean Energy	65	239	2020
Total		**1,552**	**4,910**	

Source: Ministry of Energy

Transmission

The backbone of Georgia's transmission network is a 500kv line. The line connects western Georgia, home to the country's largest generation assets, with eastern Georgia. The country has a relatively well developed network of 220kv lines, but the western part of the network has weak points that need development.

Three transmission companies operate in Georgia:

- **SakRusEnergo –** The Russian-Georgian joint venture owns the 500kv transmission line that crosses the entire country and connects Georgia with Russia.
- **Georgian State Electrosystem (GSE),** owned by Georgia's Sovereign Wealth Fund (Partnership Fund), has the largest transmission network, including all the major 220/110/35kv overhead lines and strategically important 500kv substations. GSE also holds a dispatch license and acts as the Transmission System Operator (TSO).
- **Energotrans,** a 100% subsidiary of GSE, owns the 400kv OHL Meskheti line with HVDC back-to-back substations, which connects Georgia with Turkey. The project was completed in 2013 under the framework of the Black Sea Transmission Network ("BSTN") project.

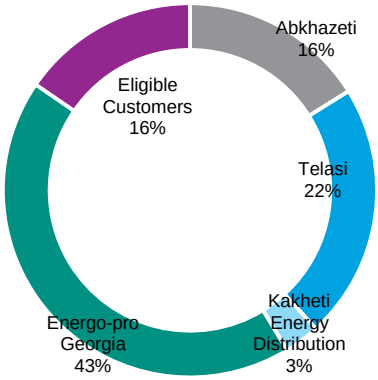
GSE plans to further develop Georgia's internal transmission network. According to its 10-year transmission network development plan GSE aims to connect electricity transmission network nodes and increase power transmission capacity between Georgia's regions.

Distribution

There are two main consumption groups in Georgia: direct customers (large enterprises that consume more than 3GWh annually) and distribution companies.

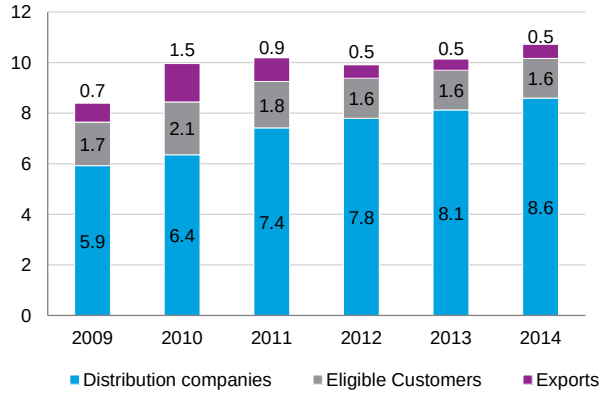
Growth in electricity consumption is driven by distribution companies. Since 2009 consumption by distribution companies increased 45% to 8.6TWh in 2014, while total consumption by direct customers decreased 8% to 1.6TWh. The decrease was driven by several direct customers switching to buying electricity from distribution companies, rather buying directly from electricity generating companies.

Consumption structure, 2014



Source: ESCO

Consumption structure dynamics



Source: ESCO

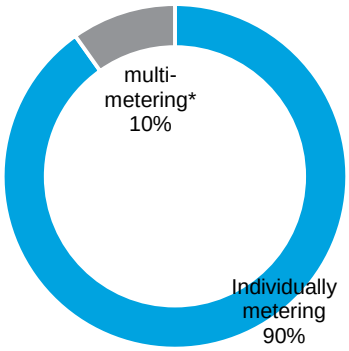
Distribution companies account for 84% (8.6TWh) of total electricity consumption, in 2014. The distribution sector is fully privatized. Three distribution companies operate in Georgia:

- **Telasi** covers Tbilisi. In 2014 Telasi accounted for 22% (2.3TWh) of total consumption. It supplies electricity to 542,164 customers, of which 52% are households, 38% are companies, and 10% are public sector and other organizations. The company is 75% owned by the Russian state through INTER RAO UES, with 24.5% owned by the Partnership Fund (100% Georgian state ownership).
- **Energo-Pro Georgia** covers all of Georgia outside Tbilisi and the Kakheti region. In 2014 it accounted for the largest portion of total electricity consumption at 43% (4.4TWh). Energo-Pro has the largest client base, providing 911,017 clients with electricity.
- **Kakheti Energy Distribution** covers the Kakheti region. It serves 176,531 customers and accounts for only 3% (0.3TWh) of total consumption. The company is owned by Lithuania's Ahema Group.

- **Abkhazia (occupied region)** - Georgian jurisdiction doesn't extend to the currently occupied Abkhazia region. Under the agreement between the Government of Georgia and the *de facto* government of Abkhazia, 40% of electricity generated by Enguri HPP is delivered to the occupied region. In 2014 Abkhazia accounted for 16% (1.6TWh) of total consumption.

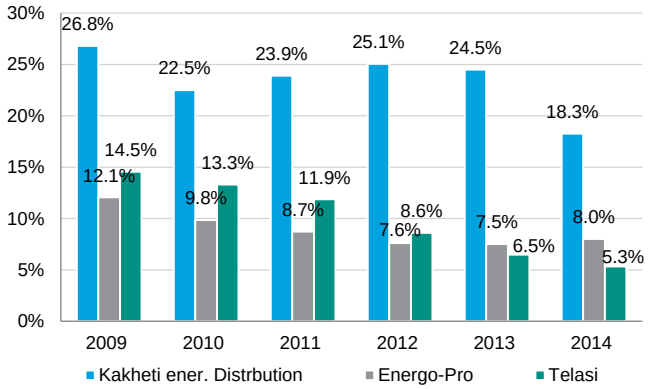
Over the last decade the distribution sector has been the recipient of significant investments, which were designed to decrease losses in the distribution grid. The grid rehabilitation projects and individual re-metering, implemented over the last decade, decreased distribution network losses by 1.7x to 5.2% in 2014. Individual meters still need to be installed in another 160,000 households around 10% of total households.

Customer breakdown by metering



**when several housholdes use single metering machine*
Source: GNERC

Technical losses in distribution



Source: GNERC

In 2014, direct customers accounted for only 16% (1.6TWh) of total consumption. There are only 5 large companies classified as direct customers (consume more than 3 GWh annually), out of which 2 companies have their own generation assets. Even though there are other large companies that satisfy the minimum consumption requirement they prefer to buy electricity from distribution companies. The government plans to gradually lower the direct customer threshold from 3GWh to 1KWh, which should support market openness.

Direct customers

Name	Consumption, GWh, 2014	Description	Ownership
Georgian Manganese	1,121	Manganese production	Private
Georgian Water & Power	267	Water Utility Company	Private
Rustavi Water	47	Water Utility Company	Private
Georgian Railway	19	Railway	State
Geoferrometal	0	Manufacturing	State
Total	**1,554**		

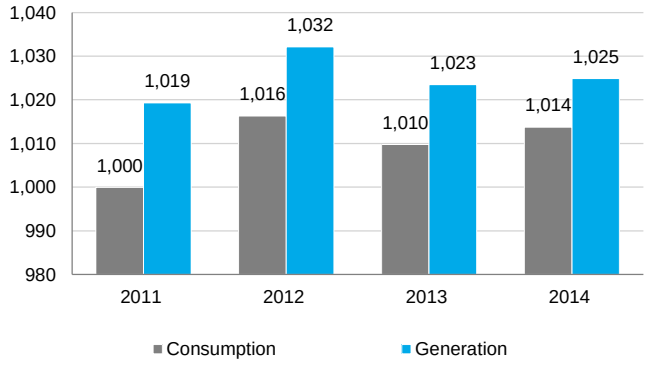
Source: ESCO

Other Regional Electricity Markets

Russia

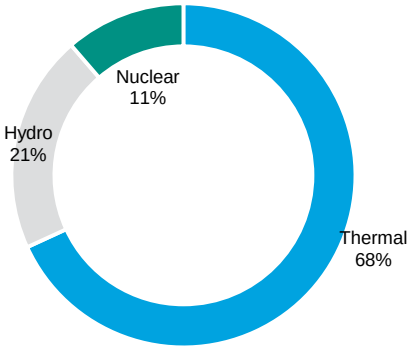
Russia's electricity market is one of the largest markets in the world. In 2014 electricity consumption increased 0.4% y/y to 1,014TWh, while generation added 0.2% y/y to 1,025TWh. Russia has vast energy resources and is self-sufficient in electricity.

Russia's electricity generation/consumption, TWh



Source: System Operator of United Energy System

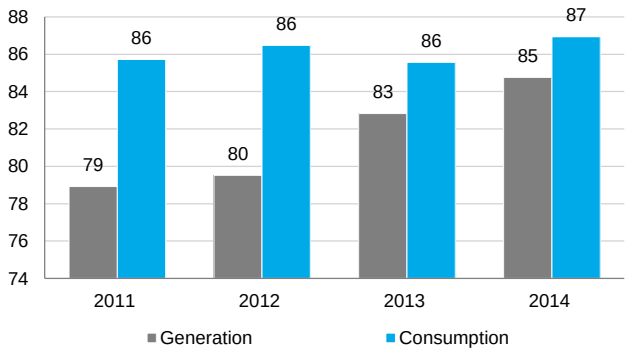
Russia's installed capacity structure, 2014



Source: System Operator of United Energy System

Russia's electricity market is divided into 7 Independent Power Systems (IPS). An electricity deficit in one is balanced by imports from neighboring IPSs. Southern IPS, which borders Georgia, has a consistent electricity deficit. In 2014, consumption increased 1.2% y/y to 87TWh, while generation lagged at 85TWh. Southern IPS is a potential export market for Georgian electricity, but the fact that Inter RAO UES has a monopoly on electricity imports/exports in Russia makes it difficult for Georgian producers to enter the market.

Southern IPS: Electricity generation/consumption, TWh



Source: System Operator of United Energy System

Azerbaijan

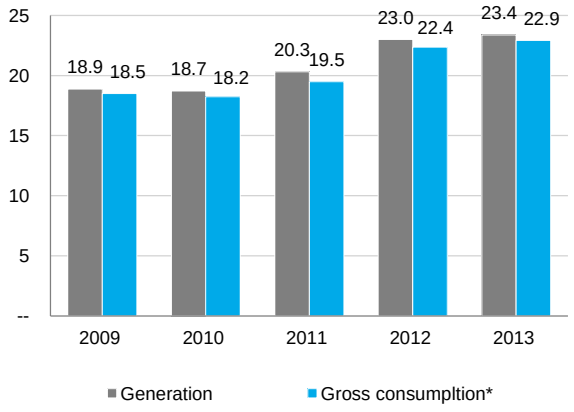
Azerbaijan is self-sufficient in electricity, which makes it an unlikely export market for Georgian electricity in the medium term. Over the last 5 years

Azerbaijan's annual electricity generation and gross consumption (including technical losses and consumption by the energy industry) increased 24% to 23.4TWh and 22.9TWh, respectively, in 2013

The Azeri electricity market is also unattractive for Georgian producers because it is fully controlled by the state monopoly Azerenerji, which is responsible for generation, transmission, distribution, and import/export. There is no competition and electricity prices are regulated.

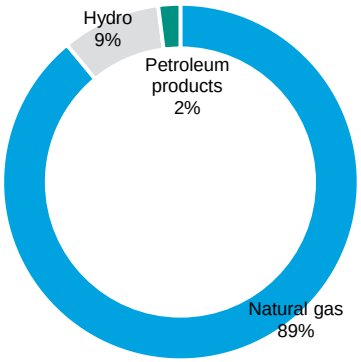
Oil-rich Azerbaijan's electricity generation is dominated by fossil fuel-powered plants. In 2012 TPPs accounted for 91% of total generation, while HPPs accounted for only 9%.

Azerbaijan electricity generation/consumption



*inculdes technical losses and energy industry own consumption
Source: The State Statistical Committee of the Republic of Azerbaijan

Azerbaijan electricity generation by fuel types, 2012



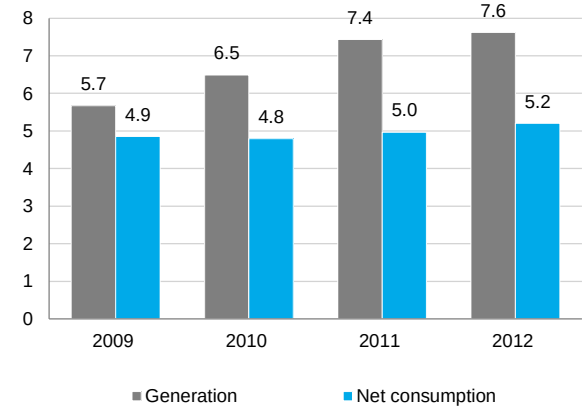
Source: US EIA

Armenia

The Armenian electricity sector is self-sufficient and we don't see Armenia as a potential export market for Georgian electricity producers. The

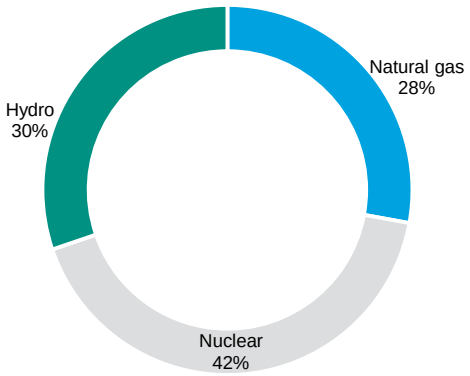
Metsamor nuclear power plant accounts for the largest portion of Armenia's annual generation. In 2012 it accounted for 42% of total generation, followed by hydro at 30% and thermal generation at 28%.

Armenia electricity generation/consumption



Source: World Bank, US EIA

Armenia electricity generation by fuel types, 2012



Source: World Bank, US EIA

The Metsamor plant is expected to be decommissioned by 2026. The Armenian government plans to construct a new, larger NPP by the time Metsamor is decommissioned. The construction of the new plant is projected to cost US$ 4bn and the government has not yet secured financing. If the government doesn't manage to construct a new plant by 2021, Armenia may experience an electricity shortage and could be viewed as a potential export market.

Annex 1: Hydropower Sector SWOT Analysis

Strength

- Liberal electricity market structure
- Deregulated tariffs for newly built HPPs
- Rising local consumption
- Rising electricity prices locally
- Investor-friendly regulation – *Ranked 15th in the World Bank's Ease of Doing Business ranking*
- Liberal tax regime

Weakness

- Transmission network needs further development
- Electricity market reform is still underway and needs to be finalized

Opportunities

- Significant untapped hydropower resources
- Export opportunities to Turkey
- Export opportunity to Iran through Armenia

Threats

- Decrease of electricity consumption
- Decrease of electricity prices
- Over-supply of Turkish electricity market
- Decrease of electricity prices in Turkey
- High Geopolitical risks - conflict with Russia

Annex 2: Georgian Electricity Map

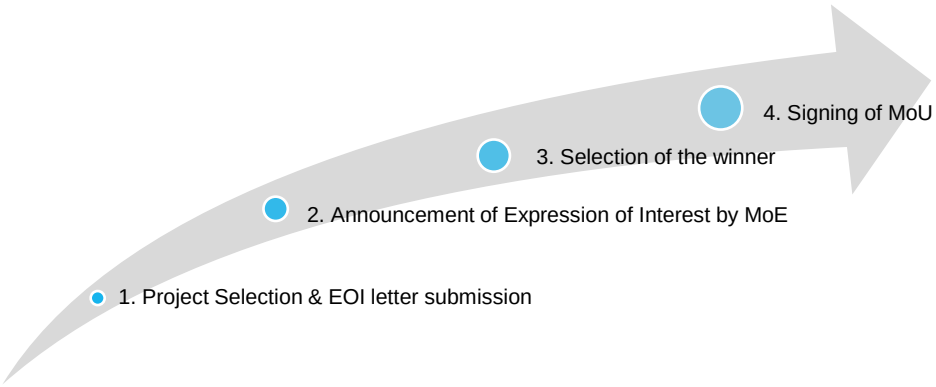
Source: Ministry of Energy , TBC Capital

Annex 3: Project Implementation Procedures

In 2013, the government simplified implementation procedures for projects. According to the new regulations, investors have two options:

1. **Submit an Expression of Interest (EoI) to the Ministry of Energy.** There are currently up to 80 HPP projects available for investment.
2. **Direct Negotiation.** Investors interested in projects beyond the open list can directly engage the Government of Georgia and sign a MoU.

Project Selection and Approval Procedures



Source: Ministry of Energy

1. **Project Selection & Submission of EOI letter:** Interested investors submit an official letter to the MoE that contains:
   a. Project name and location
   b. Preliminary project plan
   c. Estimated capacity and output
   d. Estimated date of completion

2. **Announcement of Expression of Interest by the MoE:** The MoE publishes information about the EOI on its official website and other interested parties have the opportunity to submit offers. The tender period lasts two months.

3. **Selection:** Participants who successfully pass the qualification process will receive a confirmation letter from the MoE. The investor must then submit a pre-construction bank guarantee (US$ 5,000 per MW) within 15 days issued by a bank licensed in an OECD member state. In the event of two or more applications, priority will be given to the party that bids the lowest price for electricity sold to ESCO. If two or more parties submit the same price, the participants are granted an extension to review their offers.

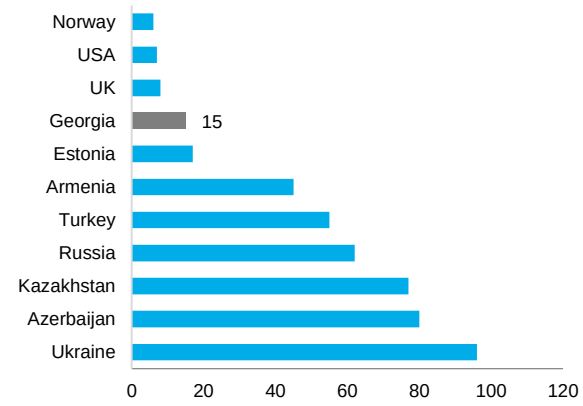
4. **Signing the MoU with the Government of Georgia and ESCO:** Under the terms of the MoU, the implementation of the project is divided into two stages:
    a. **Pre-construction stage** – preparation of a feasibility study and environmental impact assessment report.
    b. **Construction stage** – obtaining the right to use the land and all necessary permits to implement the project, starting and finishing the construction of the project.

    Before launching construction, the investor must submit a bank guarantee issued by a bank licensed in an OECD member state:
        a. US$ 100,000 – for HPPs below 100MW
        b. US$ 50,000 – HPPs above 100MW

    Failure to meet the terms and conditions of the MoU terms will result in a penalty of 0.5% of the total bank guarantee. An investor can gradually reduce the amount of the bank guarantee in line with the amount of capital investments.

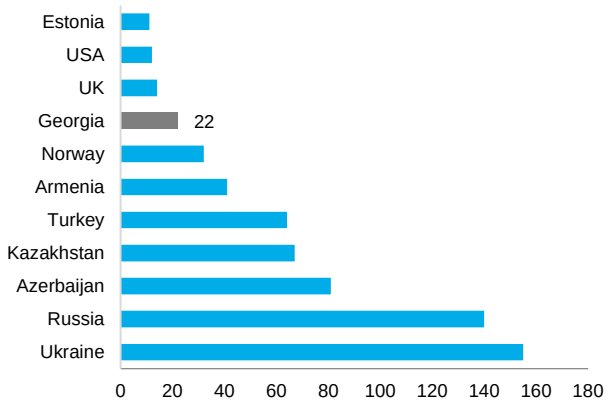
Annex 4: Georgia in the Global Rankings

World Bank's Ease of Doing Business, 2014



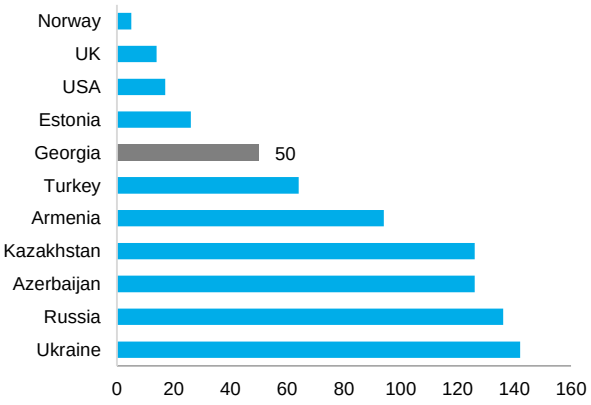
Source: World Bank

Economic Freedom Index, 2014



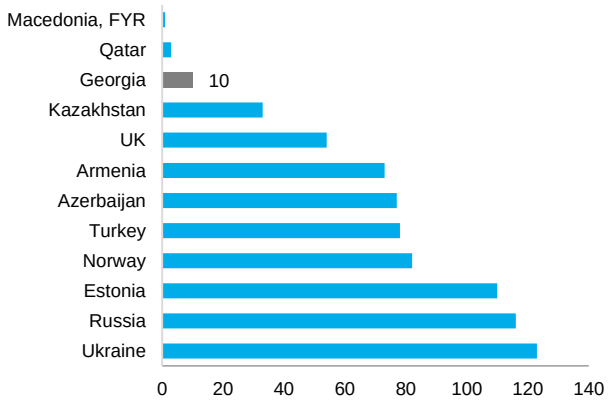
Source: The Heritage Foundation

Corruption Perceptions Index, 2014



Source: Transparency International

WEF's total tax rate ranking, 2014-2015



Source: WEF's Global Competitiveness Report

Georgia's Sovereign Credit Ratings

BB- positive

Fitch Ratings

BB- stable

STANDARD &POOR'S

Ba3 positive

MOODY'S INVESTORS SERVICE

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