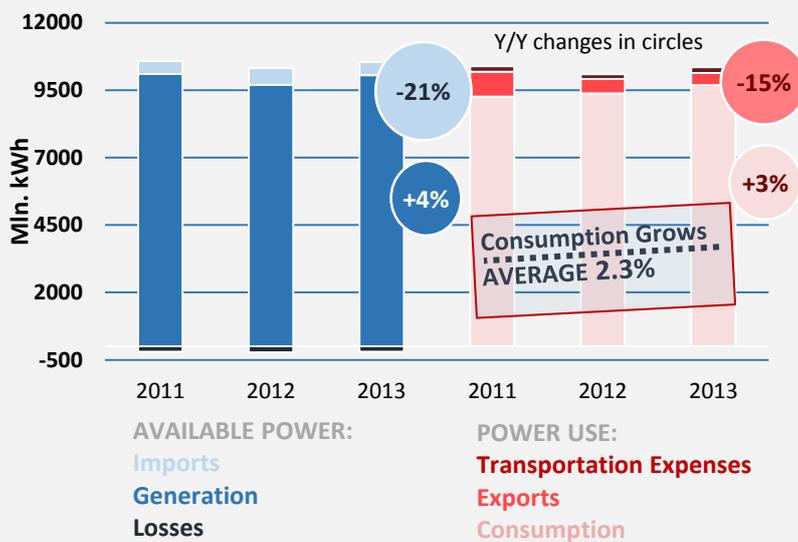


ENERGY SECTOR REVIEW GEORGIA 2013

In this report we will review and analyse the main trends and developments characterizing the electricity sector of Georgia in 2013. In particular, we will discuss the patterns of electricity generation and use, look at the potential contribution of the Georgian energy sector to the competitiveness of Georgian companies according to a number of global indexes, and present the main events that had been taking place during 2013, which we believe will affect the evolution of the energy sector.

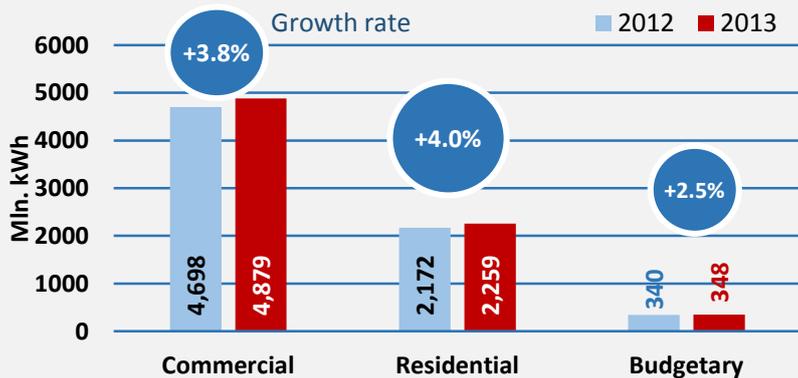
How did the slowdown in economic activity affected Georgia's electricity sector?



While demand for electricity is quite susceptible to economic performance, **2013 was very much a business-as-usual year as far as electricity consumption is concerned.** Compared to 2012, consumption grew by 3%, above the trend we have been observing in recent years (See Figure 1). Generation followed suit, reaching 10.1mln kWh (an addition of 4%).

One possible explanation for this puzzle is that the one-time drop in the level of GDP at the end of 2012 was caused by a permanent reduction in government spending (e.g. on pre-election construction projects). It was not caused by a slowdown of business activities and had no lasting impact on private sector performance, as reflected in respectable month-to-month GDP growth figures throughout 2013.

Electricity consumption data for 2013 are consistent with a steady expansion of the private sector and slow government spending



Data about electricity consumption by different types of users corroborate the above hypothesis. As shown in Figure 2, in 2013, overall demand by commercial clients grew by 3.8% (growth in private sector demand for electricity is even more impressive – 6.5%, if we exclude large direct consumers such as Tbilisi Metro and Georgian Manganese, whose consumption changes very little from year to year). Consumption by residential consumers (households) increased by 4%; budgetary organizations, which were directly affected by slow government spending, lagged far behind with growth of only 2.5%.

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Is Georgia on track towards self-sufficiency in power generation?

In summer, Georgia was able to export surplus hydropower; in winter, there was a need for imports and TPP generation

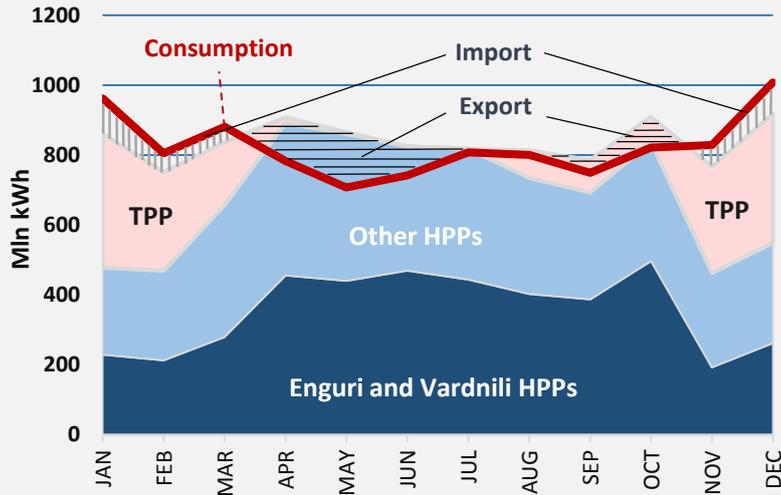
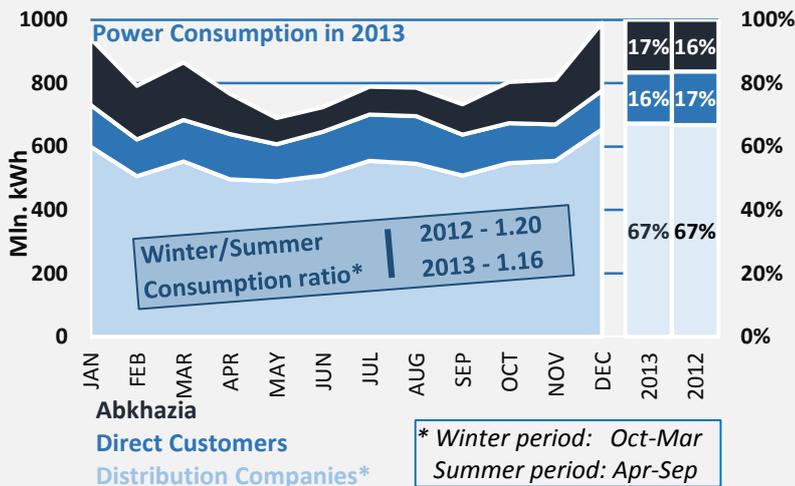
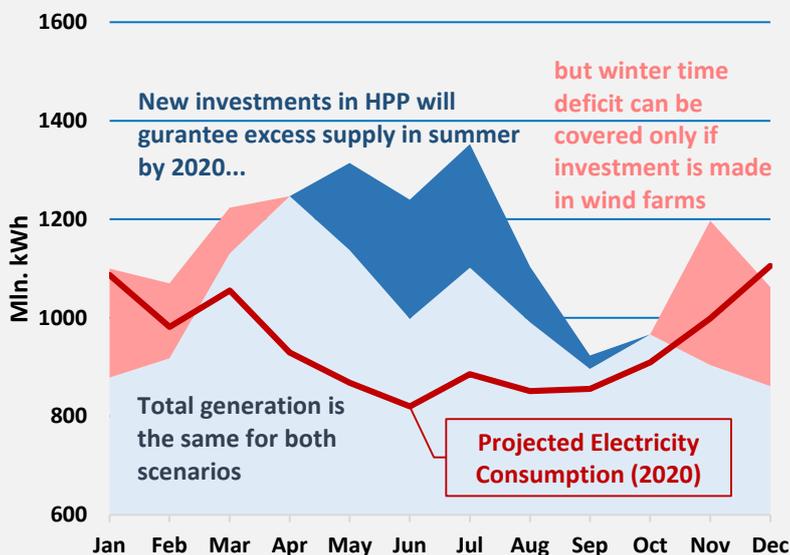


Table 1: Non-hydro sources of power in 2010-2013

Mln. kWh	2010	2011	2012	2013
TPP Generation	683	2,212	2,472	1,788
Imports	222	471	615	484
Total non-hydro	905	2,683	3,087	2,272



Wind farms can help Georgia attain the goal of self-sufficiency



The short answer is yes, Georgia is getting closer to being self-sufficient in electricity supply, but for the time being the country will have to rely on “emergency” imports by ESCO – the national market operator – to balance the system during 5-6 winter months.

The general pattern of electricity generation did not change in 2013. The largest two HPPs, Enguri and Vardnili (both in state ownership), provided a very substantial part of total hydro power generation, peaking in the April-October period. Thermal Power Plants (TPP) helped close the winter gap in electricity supply, accounting for 18% (1,788 kWh) of total electricity generation in 2013 (Figure 3 and Table 1).

Georgia’s power consumption remained higher in winter months (See Figure 4), but the winter/summer consumption ratio decreased from 1.2 in 2012 to 1.16 in 2013, reducing seasonal supply-demand disbalances. As a result, seasonal (winter) imports and (summer) exports of electricity declined by 21% and 15%, respectively (See Figure 1). **On the one hand, Georgia became less dependent on expensive imports (mainly from Russia). On the other, it had less surplus electricity to share with other countries.**

Given the strong seasonal pattern of hydropower generation, HPPs will not be able to fully supply Georgia’s needs. To achieve self-sufficiency in electricity generation while at the same time increasing the share of renewable energy, Georgia may have to develop alternative energy sources that can act in a countercyclical fashion with respect to HPP generation (i.e. produce mainly in the winter).

As argued by Pignatti and Kelbakiani (*), one possibility to consider is **wind farms**. Wind farms should be located in areas where winds are particularly strong in winter months (ideally, next to HPP water reservoirs which could store water pumped back using excess wind power, e.g. during the night).

Figure 5 compares two scenarios to supply Georgia’s needs in 2020: i) adding optimally planned wind farms to existing hydro generation capacity; ii) investing additional resources in HPPs. As can be seen, hydro power generation alone will not be able to meet growing power needs in the cold winter months. On the other hand, wind generation has the potential to eliminate the gap between electricity generation and consumption.

(*). Pignatti, Kelbakiani, Introducing Wind Generation as a Way to Reduce Seasonal Volatility of Electricity Generation in Georgia, IAEE Energy Forum, Q4 2013

A SECTOR ON THE MOVE



GEORGIAN ELECTRICITY SECTOR IN DIFFERENT INTERNATIONAL RANKINGS

A well-functioning energy sector can contribute substantially to the economic development of a country. Enterprises operating in the country get access to cheap and reliable energy. Even foreign investors are likely to take into account energy costs in their investment decisions. This explains why, at the international level, several indexes have now a component recording the state of the electricity sector. Energy issues are included also in business surveys aiming at “capturing” the factors that are mostly critical for firms’ success.

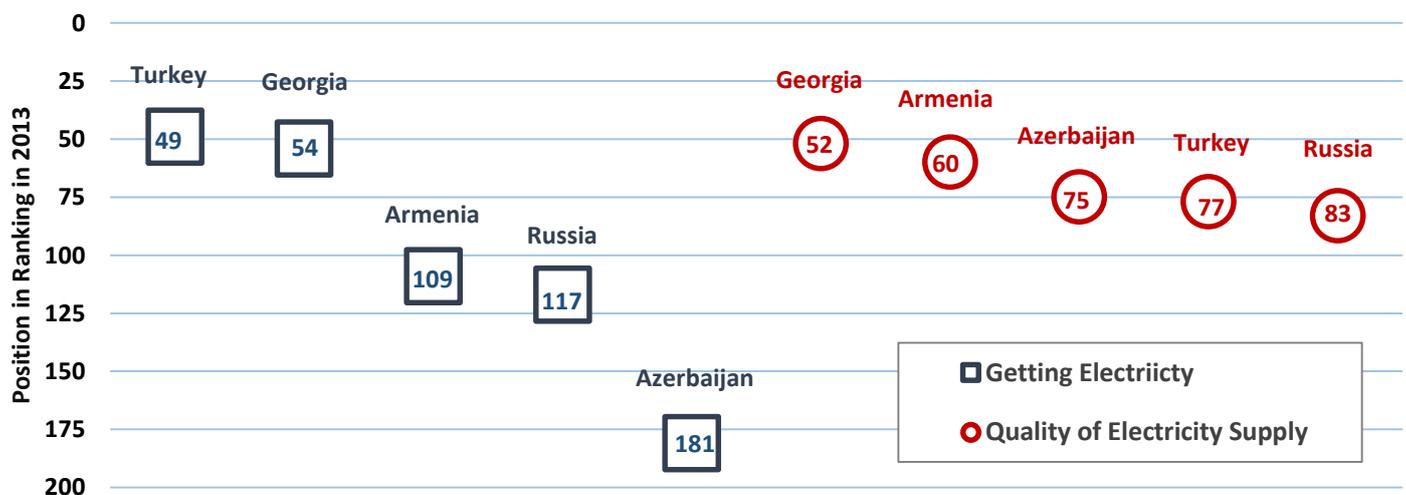
While still far from EU level, the Georgian energy sector seems to have been going in the right direction in the last few years, according to a number of studies:

- According to the Enterprise Survey by the World Bank and IFC, from 2008 to 2013, **percent of firms identifying electricity as the main problem they face went down from 16.4% to 2.1%** (well below the average for the Eastern Europe and Central Asian countries – 4.8%).
- According to the World Bank’s Ease of Doing Business 2014 survey, **Georgia ranked 54th out of 185 countries in terms of ease of getting electricity in 2013** (See figure 6B).
- Finally, looking at the energy component of the Global Competitiveness Index 2013/14 (GCI) by the World Economic Forum, we can see that in terms of **quality of electricity supply** in 2013 Georgia has reached the 52nd position (out of 148 countries), up from the 58th position in 2010, but 6 positions below 2012 (See Figure 6A).

Figure 6A below shows Georgia’s rank in quality of electricity supply (left) and ease of getting electricity (right).



As seen from the figure 6(B), while access to electricity and quality of electricity supply remain problematic issues for businesses, Georgia energy sector does relatively well compared to neighbouring countries. The country has the highest rank in the GCI indicator 2013, with Azerbaijan appearing as negative outlier according to the World Bank’s Ease of Doing Business Survey (See Figure 7).



Strategy/Action Plan/Legislation

- The Ministry of Energy of Georgia started working on the establishment of a Georgian Electricity Market Model 2015 (GEMM 2015) which is expected to facilitate private sector-led development of Georgia's hydropower resources.
- Government of Georgia has declared its intent to join the EU Energy Community.
- Changes were introduced in the Georgian government decree about the "approval of the rule of expressing interest in technical and economic study of the construction, construction, ownership and operation of the power plants in Georgia". The pre-construction guarantee amount has been reduced. Additionally, during 10 years from the moment of putting the power plan into service, tender winners are expected to sell 20% of the total annual generation in Georgia.

Markets

- In January 2013, the price of electricity was lowered by about 20% for residential consumers (consuming up to 301 kWh of electricity per month). As a result, a household consuming 300 kWh electricity per month, will save 9 GEL.
- Natural gas tariffs were lowered as well by 10% in March 2013.
- 28.5% of total FDI inflows to Georgia targeting the Georgian energy sector in 2013. FDI in the energy sector increased by 7% compared to 2012.

Power Generation & Transmission

- Construction of the first wind farm in Georgia, with installed capacity of 20MW (at peak able to meet power demand of 20,000 households) was initiated by the Ministry of Energy of Georgia in cooperation with the Georgian Energy Development Fund.
- Memoranda of understanding for the construction of HPPs with a total installed capacity of 545MW and investment costs of GEL 850mln were signed.
- Partnership Fund and Georgian Oil and Gas Corporation will jointly finance the construction of a combined cycle thermal power plant in Gardabani, Georgia. The project will cost GEL 220mln and by the end of 2015 will add 230MW installed capacity to the Georgian power sector.
- Khudoni, Georgia's largest hydropower investment project, made headlines again. A fierce debate took place between the supporters of the project, emphasizing potential financial gains, and its opponents, stressing the project's potential environmental and social costs.
- Black Sea 500/400 KV Transmission Line became operational and is standing by to transfer power to Turkey. 500/400/220KV substation with HVDC plant in Akhaltsikhe was also built.
- Russia remains the key export market (82.3%) and source of imported electricity (95.1%). Other buyers of Georgian electricity are Armenia (16.5%) and Azerbaijan (1.5%).

FOCUS: ENERGY EDUCATION AT ISET

The International School of Economics offers its master students the possibility to pursue a specialization in Energy and Natural Resources Management. The program is currently sponsored by the Norwegian Ministry of Foreign Affairs. Thanks to Norway's generous ISET has been able to put in place a number of initiatives, offering dedicated courses such as Economics of Energy Markets (Prof. Norberto Pignatti, ISET), Environmental Economics and Policy (Prof. Hans Wiesmeth, Technical University, Dresden), Natural Resources Management (Rögnvaldur Hannesson, Norwegian School of Economics (NHH)). The concentration also offers ISET students and graduates the possibility to attend the Seminar Series in Energy Economics and Natural Resources Management, conducts site visits to HPP plants, oil and gas pipeline infrastructure projects, and national parks.

ISET seeks to increase cooperation and establish stronger linkages with NHH and other academic institutions based in Norway.