



German Economic Team Georgia

Policy Paper Series [PP/01/2014]

Energy Security of Georgia

Georg Zachmann

Berlin/Tbilisi, October 2014

About the German Economic Team Georgia

The German Economic Team Georgia (GET Georgia) advises the Georgian government and other Georgian state authorities such as the National Bank on a wide range of economic policy issues. Our analytical work is presented and discussed during regular meetings with high-level decision makers. GET Georgia is financed by the German Federal Ministry for Economic Affairs and Energy under the TRANSFORM programme and its successor. Our publications are publicly available at our website (www.get-georgia.de).

German Economic Team Georgia

c/o Berlin Economics

Schillerstr. 59

D-10627 Berlin

Tel: +49 30 / 20 61 34 64 0

Fax: +49 30 / 20 61 34 64 9

E-Mail: info@get-georgia.de

<http://www.get-georgia.de>

Energy Security of Georgia

Executive Summary

Georgia enjoys on aggregate a rather resilient energy supply. In terms of oil, coal and electricity supply, we cannot identify major risks. But the increasing gas demand, the disproportionate gas consumption in winter and the reliance on one single gas pipeline from Azerbaijan constitute a low-probability high-impact risk that Georgia shall address in the medium term.

In the short term, Georgia will have to transpose the Energy Community obligations on security of supply. Those will mainly consist of adapting legislation and preparing necessary documentation – but not impose a major shift in energy policy or require specific investments in the near-term.

Author

Georg Zachmann zachmann@berlin-economics.com +49 30 20 61 34 64 52

Acknowledgements

I would like to thank Woldemar Walter for editorial assistance and Ricardo Giucci for valuable comments on the paper.

Contents

- 1. Introduction 1
- 2. General picture..... 1
- 3. Challenges related to a rise in natural gas consumption 3
- 4. Critical infrastructure for gas supply 5
- 5. Energy community obligations on supply security..... 7
- References10

1. Introduction

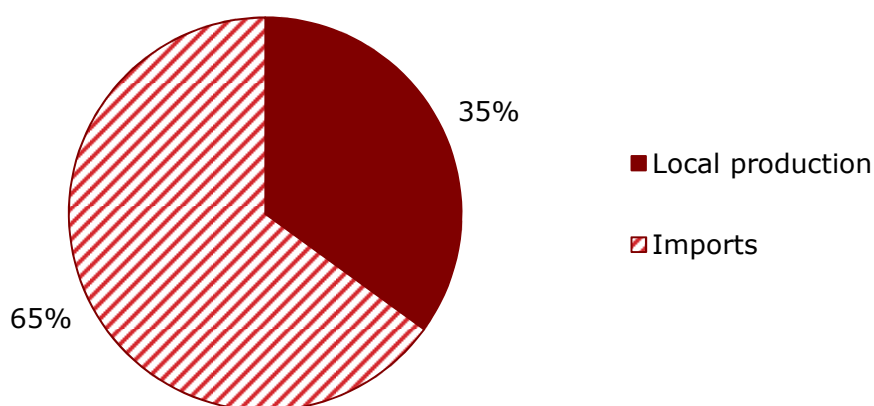
Secure energy supplies are essential for many aspects of public and private life. Energy is an indispensable production factor in all economic sectors, it is crucial for heating, lighting, cooking, transportation and many other basic needs. So, already short-term interruptions can have huge direct and indirect cost to people, industry and entire countries. Consequently, supply security is one essential energy policy objective.

Energy security is a particularly important issue for Georgia. In the geopolitically sensitive region the country is situated in, foreign energy supplies cannot easily be taken for granted. The unsolved explosion of the Russian gas pipeline and the Russian electricity transmission line to Georgia in January 2006 were a stunning reminder of this risk¹. And this does not only relate to the potential economic cost of a one-off supply disruption, but also to the political cost of continuously being susceptible to corresponding threats. Hence, limiting the vulnerability to supply disruptions from individual suppliers is essential to maintain political room for manoeuvre which is important given the potential dynamic of the region's political situation.

2. General picture

We have first to acknowledge that on aggregate Georgia maintains a rather resilient fuel mix. Overall energy consumption is relatively low (790 ktoe² per capita compared to 2615 ktoe in Bulgaria) and about 35% of the energy is generated domestically (mainly hydropower and biomass).

Figure 1: Georgia`s energy balance in 2012

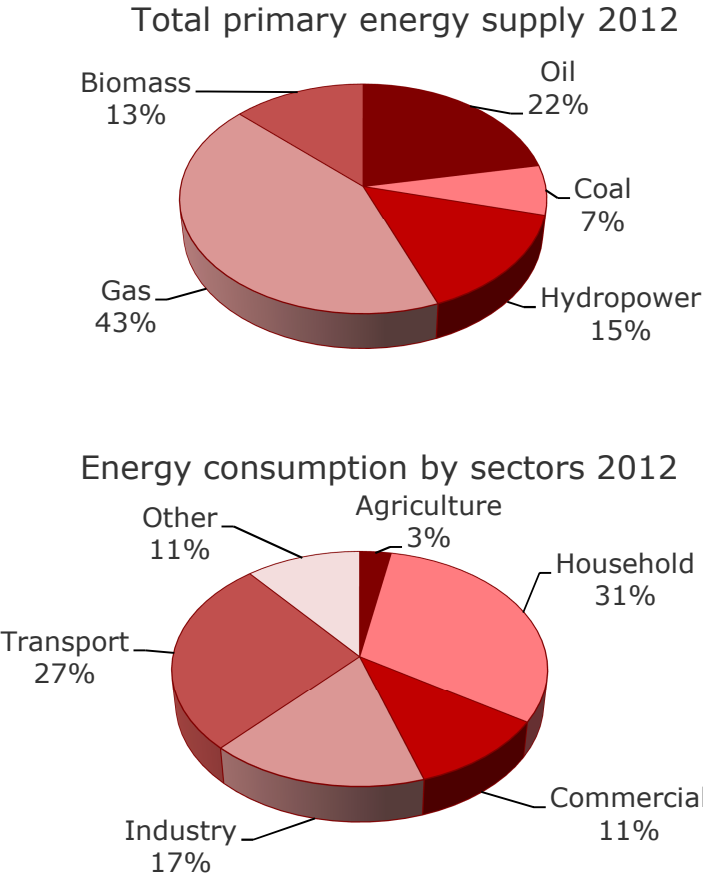


Source: USAID (2014)

¹ <http://www.nytimes.com/2006/01/23/international/europe/23georgia.html>

² Kilotons of oil equivalent.

Figure 2: Energy supply and consumption in 2012



Source: USAID (2014)

Access to oil and coal is no major concern given the importing infrastructure at the Black Sea Ports. In terms of electricity, Georgia is a net exporter. Due to its significant interconnections with all neighbouring countries it should be able to compensate the failure of major domestic generation assets³. And even the high share of imported gas in the energy mix (43% in 2013) is somewhat mitigated by the rather stable supply situation from Azerbaijan⁴. And also in the foreseeable future, Azerbaijan will find it difficult to stop supplying Georgia, given that Georgia is a major export route for Azeri gas - and if anything this role as a gas transit country is set to increase. And even in the currently unlikely scenario of a politically motivated supply disruption from Azerbaijan, Russia (that relies on Georgia for bringing gas to Armenia) and potentially even Turkey are technically capable of bringing gas to Georgia. So we conclude that on aggregate, Georgia enjoys a rather resilient energy supply situation.

³ For example, Georgia managed its electricity system during the rehabilitation of its largest hydropower plant Enguri which is typically responsible for 30-40% of Georgian electricity supplies. Deutsche Wirtschaftsvereinigung (2014).

⁴ The ten-year contract with Azerbaijan national gas and oil company SOCAR concluded in 2010 on bulk supply of gas, secures due volumes of strategic gas till 2020.

Security of supply is, however, not a well-defined concept. The share of imports from a certain country in the total consumption of a certain fuel is only a first approximation. Given that most fuels and suppliers are partially exchangeable, the current import shares might provide an over-pessimistic picture. On the other hand, abstracting from important details such as seasonal patterns might result in an overly optimistic picture of a country’s security of energy supply.

So, the devil for supply security is in the detail. In the following three sections we identify and discuss three potential reasons for concern: the projected fast growth of natural gas in the fuel mix (Chapter 3), the vulnerability of critical infrastructure for gas (Chapter 4) and compliance with European regulations (Chapter 5).

3. Challenges related to a rise in natural gas consumption

Given the favourable characteristics of natural gas as an energy carrier (clean, versatile and available), the general trend of increasing energy consumption, as well as the favourable supply situation from Azerbaijan, Georgia is expected to rely more heavily on natural gas. Demand is expected to more than double until 2030. This additional demand could in principle be easily met by additional imports from Azerbaijan given that the South Caucasus Pipeline can transport up to 8.8 bn cubic meters (bcm) per year and is planned to be extended up to 25 bcm (and later possibly to 60 bcm).

Table 1: Balance in million cubic meters (mcm)

	Today	2020	Potential
Consumption	2,200	2,900	
Domestic production	0	0	0
Total Import	2,200	2,900	
- AZE	2,200	2,900	20,000
- ARM (IRN)	0	0	2,500 ⁵
- RU	0	0	8,500 ⁶
- TUR	0	0	Potential reverse flows
Storage	0	0	300-700

Source: Own assessments based on USAID (2014) and other sources

This will, however, have a measurable impact on the diversification of suppliers, routes and fuels for Georgia. Everything else being equal this will increase import dependency

⁵ Depending on pipeline. Currently unused Armenian import capacity from Iran.
⁶ Northern Caucasus – Trans Caucasus pipeline: full volume transportation is 12 mcm/d. The pipeline continues to Yerevan (Armenia). Second pipeline: Vladikavkaz – Tbilisi pipeline (to Yerevan): 12 mcm/d.

from 65% to 77%. The share of energy imports from Azerbaijan in total energy imports would increase from 43% to 62%. So, it will be more difficult to ensure enough back-up in terms of alternative supplies to be able to cope with a disruption of this single most important supplier.

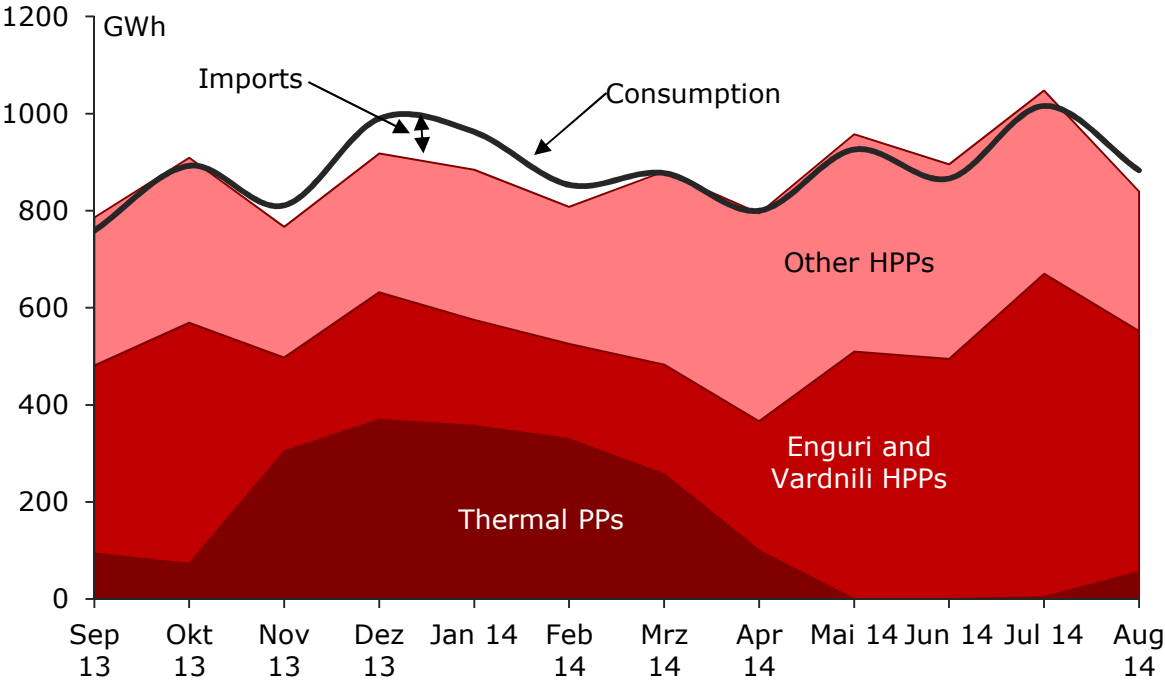
Table 2: Gas consumption forecast (in ktoe)

	2014	2015	2020	2025	2030
Natural Gas	1,806	1,896	2,420	3,089	3,942

Source: USAID

The second issue is that reliance on gas is unevenly distributed over the year. While hydropower significantly contributes to the fuel mix during summer, gas is almost not consumed in this period. On the other hand, in the heating period, especially when some of the hydro reservoirs are frozen gas is the pivotal fuel. In the four-month heating period gas-fired power plants account for almost half of entire gas consumption of Georgia.

Figure 3: Electricity Balance by supply sources (Sep 2012-Aug 2013)



Source: ESCO

So in this period a cut of the continuous gas supplies from Azerbaijan that are limited at 12.5 mcm/d⁷, might be very difficult to compensate. From a pure infrastructure perspective, the existing 1200 mm and 700 mm pipelines from Russia might supply

⁷ The pipeline would allow 24 mcm/d, but the contract only foresees 12.5 mcm/d, which might be driven by the available withdrawal capacity of the Azeri gas fields (and the Azeri gas consumption peak).

Armenia and Georgia during peak demand as they should be able to transport some 50 mcm/d⁸. But at which price Russia would be willing to support Georgia and whether it has sufficient available gas to be delivered on short notice is an open question.

Consequently, Georgia should further explore diversification options. There are numerous alternatives (and combinations thereof, see Table 2). Short-term gas supply risk can be, for example, mitigated by strategic gas storages, demand curtailment ability and dual fuel ability for thermal power plants as well as district heating systems. At growing demand, longer-term gas supply disruptions could only be weathered by establishing sufficient alternative supply routes (e.g., from Russia and Iran). In addition, increasing the efficiency of energy use (e.g., through better insulation) might mitigate the growth in gas demand.

4. Critical Infrastructure for gas supply

Security of supply not only comprises the risk arising from commercial or political disputes with pivotal suppliers but also the risk of technical faults of major infrastructure. For example, the fire at Rough storage facility in February 2006 deprived the UK for almost four month of 80 % of its gas storage capacity.

Georgia is supplied from three pipelines at the moment: two connecting with Azerbaijan [including Shah-Deniz pipe] and the third one running from Russia to Armenia. The pipeline from Azerbaijan indeed arrives at two different locations in Georgia, but it runs for almost three-hundred kilometres as one single line through Azerbaijan. So a single incident can possibly affect the entire supply to Georgia. And indeed, on 12 August 2008, the pipeline operator BP closed the pipeline for the safety reasons because of the South Ossetia conflict and gas supplies were resumed on 14 August 2008.

⁸ See Table 1.7 in USAID (2006, p.51). That states that the North-South Caucasus Pipeline has a capacity of 45.8 mcm/d and the Vladikavkaz-Tbilisi Pipeline a capacity of 8.2 mcm/d.

Figure 4: Route of the main gas import pipeline system from Azerbaijan



Source: EIA

Consequently, the reliance on one single supply route is posing a low-probability high-impact risk on the Georgian energy supply. In the medium term, especially given the expected increase in gas demand, this calls for investing into viable back-up options such as fuel-switching capability, gas storage, reverse-flows from Turkey, or option contracts with Armenia or Russia.

Table 2: Measures to mitigate gas supply risks

Short term disruptions	Long term disruptions
Additional gas supply routes - Infrastructure - Delivery contracts ⁹ - Option contracts ¹⁰	Additional gas supply routes - Infrastructure - Delivery contracts - Option contracts
Mitigate gas consumption increase - Energy efficiency - Use alternative energy sources	Mitigate gas consumption increase - Energy efficiency - Use alternative energy sources
Consumption curtailment emergency plans	
Fuel switching capability at power plants (and for heating)	
Gas storage	

Note: major options in bold

Source: Own assessment

5. Energy Community Obligations on Supply Security

Georgia envisages to become a full member of the Energy Community. Members of the Energy Community have to comply with most EU rules on Energy Security. In particular, three legal acts lay down the legal framework:

Directive 2005/89/ EC concerning measures to safeguard security of electricity supply and infrastructure investment

- This directive, inter alia requires the definition of emergency measures (e.g., definition of the consumers that are subject to sub-frequency unloading to prevent a black-out)

Directive 2004/67/EC concerning measures to safeguard security of natural gas supply

The key elements and obligations are¹¹:

- definition of roles and responsibilities of different gas market players;
- definition of minimum security of supply standards (partial national - wide gas supply disruption, extremely cold temperatures, 1 - in - 20 peak demand);
- definition of protected customers;
- reporting (additional to the reporting obligation of Directive 2003/55/EC);
- up - to - date national emergency measures;
- list of instruments for security of gas supply;

⁹ Contracts for the *ex-ante* scheduled deliveries, typically structured as take-or-pay with a competitive price.

¹⁰ Contracts that allow to draw a certain amount of gas in certain circumstances, typically at a upfront fee for the availability and a high price for the actually drawn volumes.

¹¹ See Energy Institute Hrvoje Požar (2014).

- community mechanisms in case of major disruption which surpasses national level;
- establishment of the Gas Coordination Group.

Directive 2009/119/EC Stocks of crude oil and petroleum products

- maintain minimum stocks of crude oil and/or petroleum products no later than 1 Jan 2023.
- 90 days of net imports or 61 days of consumption, whichever is the higher of crude oil and all products, except naphtha
- Based on year before (only in Jan-Mar on year before last year)
- Stocks outside the Energy Community (e.g., in Azerbaijan) do not count
- Different regimes allowed: Government Stocks, Stockholding organizations, Industry Stocks (and mix thereof)
- Reporting obligations
- Given the comparatively low oil consumption in Georgia (2012: 14,000 barrel per day¹²) the cost of a 90 days stock obligation are in the order of USD 100-200 m.

For the near future, the Energy Community is discussing whether and how to incorporate the main elements of the *EU Regulation 994/2010 concerning measures to safeguard security of gas supply* in the Energy Community framework¹³. But a decision on a mandatory implementation of EU 994/2010 is not foreseen in 2014.

Beyond transposing the EU acquis, the Energy Community Treaty comprises three distinct measures to advance security of supply in the Energy Community:

1. Security of Supply Statements (SoSS) (Articles 29 - 30) that introduce obligation of the Contracting Parties to adopt the Security of Supply Statements starting one year after the Treaty comes into force. The SoSS have to be communicated and updated every two years. The deadlines for Moldova and Ukraine are 1 May 2011 and 1 February 2012 respectively. The level of detail of these Statements varies widely and some parties have not submitted statements for several years (Albania since 2009). Some parties submit 29 pages (Albania in 2009) others 75 pages (Moldova in 2013).
2. Safeguard Measures (Articles 36 - 39) that regulate possibility of a Contracting Party to take temporary necessary safeguard measures in a sudden crisis that shall cause the least possible disturbance to the market function including obligation of the Contracting Parties to notify the Energy Community Secretariat of these measures
3. Mutual Assistance in the Event of Disruption (Articles 44 - 46) stipulates that Energy Community Ministerial Council meeting will take place, if requested by

¹² ENI (2013) World Oil and Gas Review 2013.

¹³ As a result, the Energy Community Secretariat was requested to draft a proposal for the Regulation's adaptation and present it for further discussions.

the Party affected in the event of a disruption. The Ministerial Council may take necessary measures in response to the disruption.

So to comply with the Energy Community provisions, Georgia will have to prepare a number of documents. But it will not be legally required to undertake specific investments or a paradigm-shift in its energy legislation (the third package is much more 'intrusive' in this respect). Nevertheless, the proper implementation of the emergency planning provisions, is not only a legal obligation, but also in the interest of Georgia.

References

- Deutsche Wirtschaftsvereinigung (2014). georgien und armenien kompakt Erneuerbare Energien.
- Energy Institute Hrvoje Požar (2014) Study on the implementation of the new regulation (EU) 994/2010 concerning measures to safeguard security of gas supply in the Energy Community.
- European Union. Directive 2005/89/ EC concerning measures to safeguard security of electricity supply and infrastructure investment.
- European Union. Directive 2004/67/EC concerning measures to safeguard security of natural gas supply.
- USAID (2006) A Natural Gas Strategy for Georgia
www.unece.org/fileadmin/DAM/env/epr/experts/Georgia/Latest/energy/For_USAID_Gas_Strategy_Part_2%5B1%5D.pdf
- USAID (2014) Whitepaper energy strategy of Georgia (2015-2030) 3 year action plan (2015-2018).