



ISSUE BRIEF

BY NINO GHVINADZE AND LAURA LINDERMAN

Cross-border Electricity Exchanges: Bolstering Economic Growth in the South Caucasus and Turkey

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Some fifteen years ago, the United States outlined a strategic vision of the South Caucasus¹ as a vital energy transit corridor from the Caspian basin to Europe that would carry Azerbaijani oil and gas through pipeline routes independent of Russia and Iran. Although South Caucasian energy sectors are already closely interconnected through pipeline networks stretching from Azerbaijan to Turkey and from Russia to Armenia, electricity trade across borders is limited. As regional demand for electric power continues to grow, it is important to tap Georgia's vast hydro and Azerbaijan's cheap natural gas resources and invest in large-scale electricity production. The expansion of cross-border electricity trade will significantly contribute to Georgia's economic growth, help Turkey meet its rapidly increasing electricity needs, and assist European Union (EU) member states in meeting European Commission-mandated renewable energy quotas. To realize these ambitious goals, Ankara, Tbilisi, and Baku will have to ease technical and legislative trade barriers and attract investors. Consistent technical and financial support from the transatlantic community is essential for the successful implementation of these projects.

Benefits of Regional Integration

Large infrastructure projects that traverse several countries have been proven to help accelerate regional integration and promote peace. Land or sea transport networks, synergized customs regimes, unified energy

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infrastructure and markets, and international pipelines drive diversified growth and improve political ties. The South Caucasus energy transit corridor was meant to ease Europe's dependence on Russian gas and minimize Russia's influence in the South Caucasus and Central Asia (CCA), but has had broader strategic implications. The corridor has become part of a grand strategy for the region to push economic reforms, encourage spillover effects in other sectors, such as simplification of customs regimes, joint defense projects, and promoting pro-Euro-Atlantic policies. Turkey and Azerbaijan are Georgia's leading foreign investors and trade partners. If and when political disagreements are overcome, Armenia has the potential to join and benefit from this trans-Caucasian partnership.

¹ Georgia, Azerbaijan, and Armenia.

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The United States has been a main sponsor of the South Caucasus Corridor initiative, which is seen as part of the New Silk Road of transport and energy links between Europe and the CCA region. An economically sound and stable South Caucasus will be a reliable partner for ensuring the security of Europe's eastern border and provide a lucrative market for both American and European businesses. According to an International Monetary Fund (IMF) assessment of CCA markets,² there is room to deepen intraregional trade. Georgia leads the region with 20 percent of its total trade occurring with its neighbors. By contrast, less than 5 percent of Azerbaijan's and Armenia's total trade is with their immediate neighbors.

Projects included as part of the Southern Corridor vision include the Baku-Tbilisi-Ceyhan (BTC) and Baku-Tbilisi-Erzurum (South Caucasus Pipeline) oil and gas pipelines and the Baku-Tbilisi-Kars (BTK) railway. BTK is a new 105-kilometer branch of a railway, slated to open in 2014, that will serve as one of the exit routes for the International Security Assistance Force (ISAF) from Afghanistan.³ Through a new Marmaray tunnel under the Bosphorus, scheduled to open in the fall 2013, BTK will be directly linked to the European railway network.

Connecting the Georgian and Azerbaijani energy grids to Turkey and later to the European system is another element of the corridor that was initiated in the late 2000s. The projects, which have received support from the US government and the EU⁴ and are co-financed by international agencies and regional governments, aim to renovate and build new transmission lines to interconnect Georgian, Azerbaijani, and Turkish power grids. Foreign investors are also helping to develop hydropower generation in Georgia and Turkey. These relatively new components of the corridor are even more important now, when shale gas has the

potential to diminish dependence on Russian gas and the Nabucco project has been delayed for an indefinite period.

Clean Energy for Regional and European Markets

The share of hydropower in the world energy mix is growing steadily, which makes increasing interest in largely untapped hydro potential of Georgia and Turkey very timely. The International Energy Agency (IEA) projects that over the period of 2012 to 2035, almost 60 percent of investments in energy generation will be allocated toward renewable energy sources.⁵ Hydropower constituted almost 78 percent of all renewable energy generated in 2012.⁶ Hydropower expansion will be in non-Organization for Economic Co-operation and Development (OECD) countries, as many OECD economies are already widely utilizing their hydro resources. Norway is almost 100 percent powered by hydroelectricity, while Austria generates almost 60 percent, and Sweden and Switzerland about 40 percent of their total electricity consumption. Compared to other OECD countries, Turkey's hydro sector is significantly underdeveloped. Turkey's 2009 Electricity Market and Security of Supply Strategy sets the goal of increasing the share of renewable energy in electricity generation up to 30 percent by 2023 by utilizing all the technically and economically viable hydro and geothermal potential in the country.⁷ EU 20/20/20 targets call for an increase to 20 percent of total consumption from renewables.

Developing vast hydro resources and strengthening connection of the South Caucasus energy grid with the Turkish and European electricity systems would supply Georgia's economy with cheap renewable energy for the decades to come and help other countries in the region meet their energy needs. With Turkey's full membership in the European Network of Transmission System Operators for Electricity

2 Juha Kahkonen, "The Caucasus and Central Asia: From Transition to Emerging Markets," IMF, May 2013, <http://www.imf.org/external/np/seminars/eng/2013/cca/pdf/jk.pdf>.

3 Georgia's Prime Minister Bidzina Ivanishvili announced the decision to use BTK as an alternative exit route for ISAF after meeting with the NATO Secretary General Anders Rasmussen in June 2013.

4 The major donor organizations are the US Agency for International Development (USAID), EU's Neighborhood Investment Facility (NIF), European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), and German Development Bank (KfW).

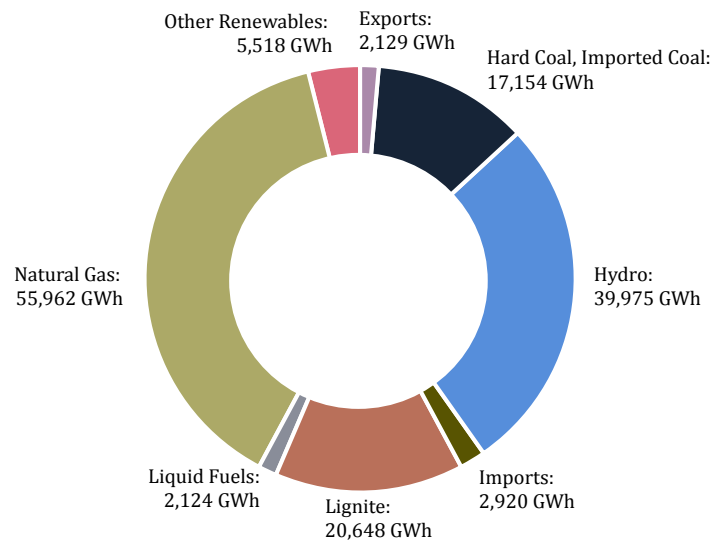
5 International Energy Agency, "World Energy Outlook 2012 Factsheet: How Will Global Energy Markets Evolve to 2035?," <http://www.worldenergyoutlook.org/media/weo/website/2012/factsheets.pdf>.

6 British Petroleum, *BP Statistical Review of World Energy June 2013*, http://www.bp.com/content/dam/bp/pdf/statistical-review/statistical_review_of_world_energy_2013.pdf.

7 Undersecretariat of State Planning Organization, Prime Minister's Office of the Republic of Turkey, "Electricity Energy Market and Supply Security Strategy Paper," May 2009.

Turkey's Electricity Generation Mix by Primary Energy Source

January-July 2012



Source: Deloitte Consulting for USAID, Turkish Power Market Monthly Report (July 2012)

(ENTSO-E), Georgia and Azerbaijan will be able to export their electricity surplus to Turkey and, through energy swaps, to Europe. Turkey has been in the process of joining ENTSO-E since 2010. The third and last phase of synchronizing operations among the Turkish, Greek, and Bulgarian energy grids should be completed by the end of 2013. Georgia and Turkey, along with Armenia and Norway, have observer status in the European Energy Community. The Community aims to extend EU energy policies into non-EU countries on Europe's periphery with the aim of creating integrated energy markets and improving supply security. Georgia is currently negotiating its full membership in the Community.

Turkey's Growing Energy Needs

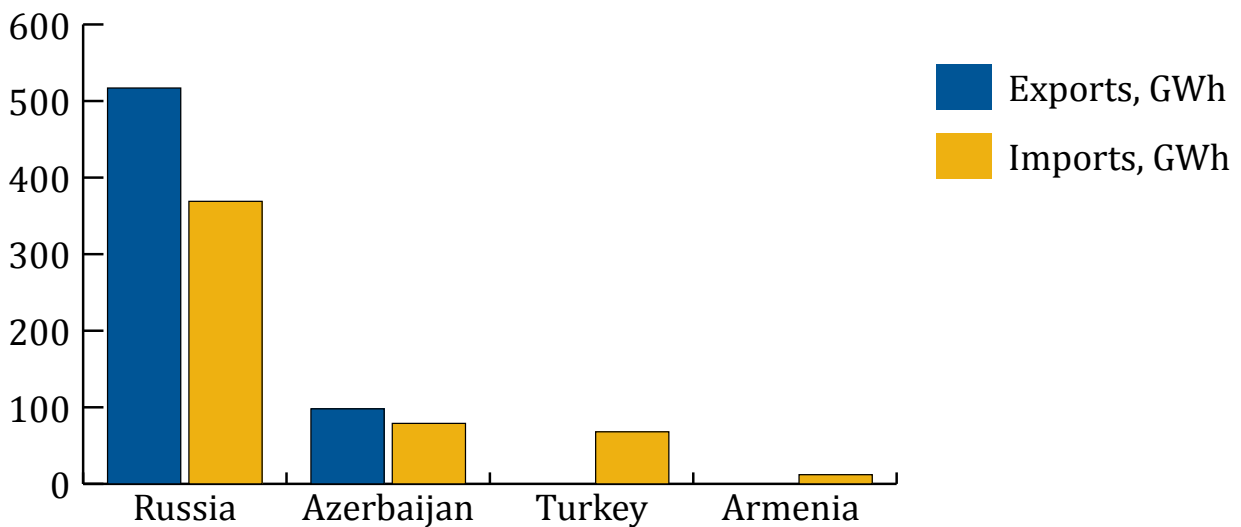
A brief drop in Turkey's electricity consumption in the aftermath of the 2008-09 world financial crisis was followed by swift recovery, and the country's consumption is expected to double by 2021. Both the IEA and the state electricity transmission company TEIAS estimate that Turkey's medium- to long-term energy demand will be one of the fastest growing in the world. Today, an average Turkish citizen consumes only one-third of the electricity used by an average EU citizen; as Turkey's GDP per capita continues to catch up with that of the EU, electricity consumption is also expected to grow. The TEIAS high and low

forecasts anticipate demand will grow by 6.5 to 7.5 percent annually, reaching 467,260 gigawatt hours (GWh) by 2021.⁸ Because of rapid growth in demand, inadequate production, and high input costs, the price of electricity in the Turkish private wholesale market is among the highest (on average nine US cents per kilowatt hour) in Europe, significantly higher than in the South Caucasus and Russia.

More than 70 percent of Turkey's energy needs are met by imports. Roughly 57 percent of its natural gas supply comes from Russia, 20 percent from Iran, and about 15 percent from Azerbaijan. Ankara also buys liquefied natural gas (LNG) from Algeria, Nigeria, Qatar, Egypt, and Norway. The share of Azerbaijani gas has significantly increased since the inauguration of the Baku-Tbilisi-Erzurum pipeline in 2007 and will continue to do so. Turkey's other energy generation options include coal, nuclear, and renewables, specifically wind, solar, and hydropower. Ankara is negotiating with foreign companies to build a coal-powered plant and two nuclear plants, but both coal and nuclear power (a new source of energy for the country) have drawbacks—the former increases CO₂ emissions, while the latter is costly. The price

⁸ Deloitte Consulting for the United States Agency for International Development (USAID), *Turkish Power Market Monthly Report, July 2012*, February 2013, p. 6.

Georgia's Energy Balance 2012



Source: ESCO 2012 Energy Balance Sheet

of nuclear electricity is estimated to be higher than the average price on the Turkish wholesale market.⁹ Besides lignite, Turkey's domestic energy resources include solar, wind, and hydro resources. With twenty-five river basins and a varied topography, Turkey has about 16 percent of Europe's hydropower potential, and about 28 percent of its electricity production is generated using water. Renewables other than hydro (wind and solar) constitute less than 4 percent of Turkey's electricity generation mix.

Despite the ambitious goals set by the Ministry of Energy and Natural Resources for 2023, new hydro, coal, and nuclear power plant projects face obstacles such as lack of funds and skilled engineers, lack of political consensus, and environmental hurdles. Today Turkey still relies on "energy swaps"—seasonal and peak hour exchanges of surplus energy with its neighbors—to meet the electricity demand. Electricity imports are likely to increase in the short- and medium-term, since the realization of Ankara's program is going to take at least a decade.

⁹ According to the agreement with Rosatom, TETAS will buy a fixed proportion of the power at a flat price of 12.35 US cents per kWh for fifteen years, while the average price on Turkish market is about 9 US cents. Source: World Nuclear Association, "Nuclear Power in Turkey," updated in July 2013, <http://world-nuclear.org/info/Country-Profiles/Countries-T-Z/Turkey/#.Uk2oohDI9vh>.

Electricity Surplus in Georgia and Azerbaijan

Power generation accounts for roughly 3 percent of Georgia's gross domestic product (GDP) and employs only 1 percent of the workforce, but strategically it is one of the key sectors of Georgian economy.¹⁰ Today 80 to 85 percent of total consumption, which was 7,221 GWh in 2012, is generated by hydropower plants (HPP)¹¹ and only 15 to 20 percent by coal- and gas-fired plants.¹² In its per capita concentration of natural hydro resources, Georgia is among the leaders in the world. It has the potential to fully replace gas-fired plants with locally generated hydropower and still have exporting capacity. According to official estimates, about 80 percent of the country's economically viable hydro potential has yet to be explored.

Georgia's domestic electricity demand is expected to grow about 6 percent annually, reaching 11,171 GWh a year by 2015,¹³ an increase that can be satisfied by expanding hydro electricity production and reducing distribution losses.¹⁴ Georgia's capacity to store extra water during the summer to generate electricity in the

¹⁰ Georgian National Investment Agency, "Hydro Power Hub Pitch Book," 2013, <http://www.investinggeorgia.org/index.php?m=165>.

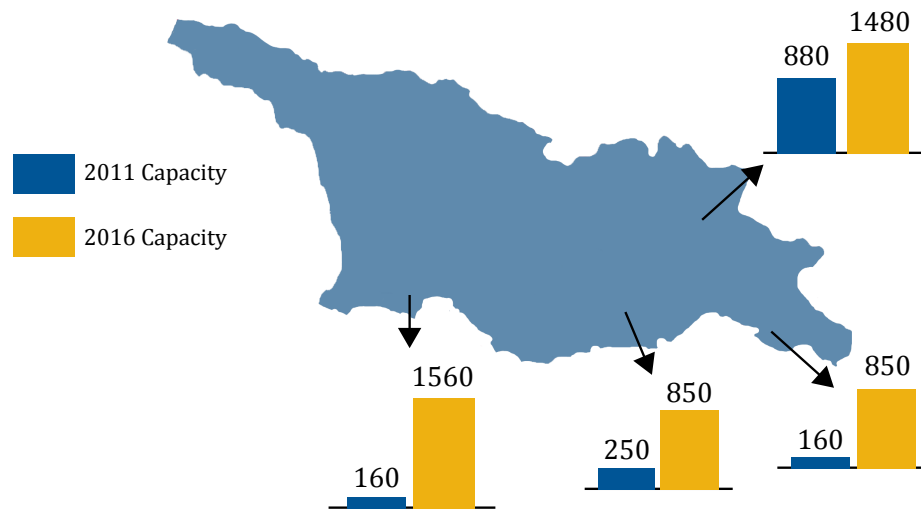
¹¹ Electricity System Commercial Operator (ESCO), "2013 Energy Balance of Georgia," http://www.esco.ge/index.php?article_id=105&clang=1.

¹² Georgia imports natural gas; the share of coal in energy mix is negligible.

¹³ Georgian National Investment Agency.

¹⁴ Transmission losses are below 2 percent in Georgia.

Planned Upgrades to Georgia's Electricity Transmission Capacity in Megawatts



Source: Georgian National Investment Agency, "Hydro Power Hub Pitch Book"

winter needs improvement, however. Surplus water is spilled in the spring and summer months, when the demand on the domestic market is relatively low. As a result, Georgia's total reservoir capacity is only about 10 percent of its annual generation, compared to 70 percent in Norway and 25 percent in Sweden and Switzerland.

In 2011 Georgia was a net electricity exporter. But the country can export only in summer months, and it imports power during the winter. Exports do not exceed 10 percent of total generation, which in 2012 was only 528 GWh; the rest is used domestically. If the right investments are made and distribution losses are reduced significantly, Georgia has the capacity to produce and export electricity at a competitive price.

Azerbaijan's electricity generation is dominated by natural gas, which together with oil, yields more than 60 percent of the country's GDP. Abundant gas supplies and subsidized natural gas prices on the domestic market have translated into an electricity surplus. Rapid expansion of generation capacity is coupled with slow growth of domestic demand for electric power. Since households account for the biggest share of electricity consumption, widening the gas distribution network and replacing electric with gas heating systems is significantly lowering consumption.

Increases in electricity prices, the introduction of meters, and better bill collection further incentivizes households to cut down on consumption. In 2007, an increase in electricity tariffs to seven US cents per kilowatt hour (kWh) reduced consumption by 11 percent.

Today Azerbaijan sells gas to Turkey for \$350 per thousand cubic meters, which is cheaper than the price of Iranian and Russian gas (\$500 and \$400, respectively),¹⁵ while the subsidized price for local consumers, from companies such as Azerenerji, the largest state-owned power generation and distribution company in Azerbaijan, is roughly \$120.¹⁶ At this price, the cost to generate and transmit electricity ranges from four to six US cents per kWh. Assuming that the average price on the Turkish market is eight to ten US cents, Azerenerji's net benefit is roughly four US cents per kWh.¹⁷ As long as the natural gas price for Azerbaijan's domestic users remains lower

15 "Azerbaijan's gas price for Turkey named," Today.Az, January 14, 2013, <http://www.today.az/news/business/117646.html>.

16 "Price Rise of Gas in Azerbaijan is to Increase Financial Opportunities of Gas Sector—Interview with the Secretary of the Tariff (Price) Council of Azerbaijan Republic," Tariff (price) Council of Azerbaijan Republic, July 2, 2009, <http://www.tariffcouncil.gov.az/?/en/news/view/43/>.

17 These calculations do not include the opportunity cost of selling natural gas to Turkey on average market price in the region. Source: Econ Pöyry AS, *Electricity Export Opportunities from the Caucasus to Turkey*, p.32.

than the average price of gas in Turkey, and as long as Azerbaijan keeps selling its gas to Turkey for lower than average market price of natural gas in the region, Azerenerji has incentives to increase production and seek export opportunities.

Azerbaijan is already a net exporter of electricity. However, total exports in 2012 did not exceed 341 GWh, which is less than 10 percent of total production. According to official estimates, Azerbaijan's energy industry is planning to add 1200 to 2000 megawatts of gas-fired generation capacity by 2015 and invest massively in infrastructure renovation to reduce transmission losses in the electricity grid from current 15 percent to more conventional 5 percent level.

Russia and Armenia

Both Russian and Armenian consumers enjoy low electricity prices, but Russian electric power generation relies upon heavily subsidized natural gas.

Despite Moscow's plans to reduce reliance on electricity generated from natural gas, the IEA predicts that instead the natural gas share in Russia's electricity mix is going to increase. More than half of the electricity consumed in Russia's Southern Grid, bordering the South Caucasus and the Black Sea, is generated by thermal power plants. To achieve parity between high international and low local tariffs, Gazprom is expected to raise domestic rates on natural gas by 15 percent in 2013.¹⁸ If the state allows such an increase, it will be reflected in Russian electricity prices on wholesale markets. Even if prices rise for households too, however, Russian consumers are not likely to use less electricity because of the inefficiency of the system. Russia is one of the least energy-efficient economies in the world, using almost three times as much energy per unit of GDP as the EU-25.¹⁹

Power consumption in Russia has surpassed the pre-financial crisis level already in 2011, reaching 1,021

18 "Russia Plans to Curb Gazprom's Domestic Gas Tariffs," Reuters, February 25, 2013, <http://www.reuters.com/article/2013/02/25/gazprom-tariffs-idUSL6N0BP8Z820130225>.

19 EU-25 represents all EU members except for Bulgaria, Romania, and Croatia. Because these three countries are the latest additions to the Union, certain data for them are not available and some of the analyses conducted prior 2007 do not include them. Source: Econ Pöyry AS, *Electricity Export Opportunities from the Caucasus to Turkey*, p.72.

terawatt hours (TWh). Roughly 80 percent of this electricity is sold on liberalized wholesale markets, but the household portion remains strictly regulated. Overall, Russia's electricity market suffers from unsustainably low prices that provide no return on investment, antiquated power plants, transmission and distribution infrastructure with high power loss, and inefficient consumption. Despite its current status as an energy exporter, Russia may become a lucrative electricity import market in the medium- and long-term, especially its Southern Grid, which has one of the highest demand growth rates in the country.

Armenia can meet its own electricity demand, which was roughly 5.8 TWh in 2012 and exports the excess for five to six US cents per kWh. However, 43 percent of Armenia's domestically-produced electric power is supplied by the Medzamor nuclear power plant, which is scheduled to be decommissioned in 2021. Yerevan is planning to replace it with a new nuclear power plant to be built in partnership with Russia. Funds for construction have yet to be secured, however. Another hit to Armenia's electricity market could be an increase in the price the country pays for Russian gas. Since July 2013 Yerevan has had to adjust to a roughly 18 percent hike in the Russian natural gas price, reaching \$374 per 1000 cubic meters.²⁰ This is about as much as western European consumers will pay in 2013, but still lower than the Russian gas price for eastern European countries.

Import-Export Potential and Electricity Markets

The pace of electricity **market liberalization** varies across the region. Turkey, Azerbaijan, and Georgia are all transitioning toward a more deregulated market; Turkey and Georgia are significantly ahead. Although its transmission system is still largely controlled by a state-owned TEİAS, the Turkish electricity market should be more open to independent, nonstate buyers by the end of 2015. In Georgia, liberalization reforms are driven by foreign direct investment (FDI) prospects and the desire to integrate the electricity system with Turkey and southeastern Europe. The electricity market is largely deregulated. State-owned

20 "Armenia: Could a Gas Price Hike Have Political Implications?," *Eurasianet.org*, June 6, 2013, <http://www.eurasianet.org/node/67096>.

Georgian State Electrosystem (GSE) and the United Energy System SakRusEnergo manage the biggest chunk of the transmission network and international trade. Local electric market prices are calculated by an independent regulatory agency, the Georgian National Energy and Water Supply Regulatory Commission (GNERC). Azerbaijan's electricity sector is dominated by Azerenerji. Retail prices are calculated by the Tariff Council and reviewed and approved by the Council of Ministers and the Office of the President.

Many decision-makers in Baku, Tbilisi, and Ankara fully understand the benefits and importance of deregulation for the development of the electricity sector, but maintaining control over electricity tariffs and keeping electricity bills low is one of the major instruments for keeping the electorate satisfied.

Major **technical challenges** that distribution companies face in these markets are losses from transmission and distribution because of infrastructure deficiencies, consumer looting, and problems with bill collection. Electricity lost from supply source transmission to distribution stations is in the range of 2 to 3 percent, which is relatively low compared to other developed markets. Moving electricity from distribution substations to consumers is more problematic. Electricity loss, mostly caused by pilferage, is 20 percent in Azerbaijan, 14 percent in Turkey, and 11 percent in Georgia.²¹ Azerbaijan still has significant problems with bill collection in rural areas and has not yet completed a metering process.

Electricity trade conditions among Georgia, Azerbaijan, and Turkey have been outlined in a number of agreements. In 2007, the countries' leaders signed a "Tbilisi Declaration" announcing plans to build a high-voltage line connecting Azerbaijan and Turkey via Georgia. In 2012, Georgian and Turkish delegates signed a Cross-Border Electricity Trade Agreement (CBETA). The agreement was ratified by the Turkish parliament in May 2013. Georgian-Turkish transmission capacity was strengthened by a new 500 kilovolt transmission line to which the electricity produced in Georgia's newly constructed HPPs will have preferential access.

21 The World Bank, "Electric Power Transmission and Distribution Losses (% of output)," <http://data.worldbank.org/indicator/EG.ELC.LOSS.ZS>.

Turkey has long exchanged electricity with its neighbors, particularly with Bulgaria, Greece, Northern Iraq, and Azerbaijan's Nakhichevan region. As Bulgaria prepares to decommission its Kozloduy nuclear power reactor in 2014, it will have to rely more heavily on imported electricity. Hence, Turkey's efforts to strengthen its transmission capacity westward under the ENTSO-E umbrella are timely.²² Electricity swaps are not new to Azerbaijan, Georgia, and Russia as well, but both in Soviet times and during the past two decades this trade has been limited to peak-hour or seasonal swaps on a barter basis.

Development of the energy sector requires far more **foreign investment** both in generation and transmission capacities. While Turkey and Azerbaijan are able to cofinance these costs, Georgia largely depends on outside investments and loans from international financial institutions. The Georgian Ministry of Energy is looking for investors for at least five large-size and up to seventy small- and medium-size HPPs, which could add roughly 1,500 MW of generation capacity.²³

Georgia is committed to facilitating electricity trade with its neighbors through greater technical compatibility with their power grids, harmonization of legislation, and development and renovation of the transmission infrastructure. The Georgian Ministry of Energy and Natural Resources has adopted a new Electricity Market Model and Electricity Trading Mechanisms²⁴ to be implemented by 2015. GNERC allows distribution companies to add on 60 percent of the total consumer cost to finance expensive upgrades of the grids and substations. Therefore, the end user tariff is high enough to ensure that companies can recover their investments, and Turkey is the only market in the region where such high prices could be competitive. Cross-border trade with Turkey is particularly important because of the seasonal character of hydropower generation. Georgia has

22 "Cross-border capacity between Bulgaria, Greece, and Turkey to Increase," ENTSO-E, April 22, 2013, https://www.entsoe.eu/news-events/announcements/newssingleview/article/cross-border-capacity-between-bulgaria-greece-and-turkey-to-increase/?tx_ttnews%25255Btmp%25255D=2&cHash=d112071b55541fc9a4da0893895b6729.

23 Econ Pöyry, Georgia Presentation, 2011.

24 Deloitte Consulting for USAID, *Georgian Electricity Market Model 2015 and Electricity Trading Mechanism*, January 2013.

the lowest demand and surplus capacity in summer months, when Turkey's power demand hits the highest point.

Challenges

Market liberalization is a long and politically sensitive process. Setting the regulatory agencies right and improving the legislative framework has been a challenge for all countries in the region. Large privatization projects and tariff calculation mechanisms remain opaque and politically sensitive. They are often subject to delays as a consequence of political changes or amended political priorities. International donors and potential investors systematically stress the need for further revision of the Georgian law on electricity and natural gas. Recommended amendments broaden GNERC scope of work and establish new market operating rules and technical and engineering standards.

Recalculation of tariffs for households and small businesses is particularly politicized due to domestic economic and social considerations. As governments try to keep inflation rates down or mitigate social tensions by lowering electricity bills, they are tempted to pressure regulatory committees to recalculate tariffs, undermining the independence of the regulators and the trust of investors. The fact that Georgia's new prime minister and outgoing president fought over the right to appoint members of the GNERC underlines the political sensitivity of the issue.²⁵ The same applies to Azerbaijan's largely state-owned electricity sector. Baku prefers to maintain control and be able to intervene when strategic decisions about the tariffs have to be made. Consistency in deregulation reforms, transparency of tariff calculation methodology, and independence of national regulatory agencies are essential parts of the sustainable development of the sector.

Private investors have incentives to favor easy, short-term projects. Today's economy and the political volatility of the region naturally encourage short-term and easy-to-implement investments in traditional ventures. Although less environmentally

friendly and economically sustainable in the long run, many Turkish companies find it safer to invest in thermal power generation, relying on relatively cheap Azerbaijani gas. Thermal power plants offer an easy and almost guaranteed profit, while most of the hydro power plants are more challenging to engineer and require more time, financial resources, and cross-border trade to be made economically viable. Without continued high-level backing from governments and international funders, the private sector will always have an incentive to favor short-term investments. The same applies to Georgian energy companies. Just recently, GSE announced the decision to build a 500-kilovolt power transmission line to Russia,²⁶ although sources of funding have not been specified. While added export capacity and diversification of the export-import market is good, throwing political capital behind a project of questionable economic viability in hopes of short-term political gains is not. The Russian and Georgian electricity grids are already connected via one 500-kilovolt line. While this existing line may benefit from further upgrade, investing an additional \$50 million in the new line to Russia, where energy prices are lower and future economic and political trends are largely unpredictable, is not the wisest thing to do. Tbilisi and Ankara should concentrate both political and financial resources on more expensive and lengthy, but economically and environmentally more sustainable hydro energy.

Large hydropower plants raise environmental concerns. Environmental and social impact issues receive some attention in Turkey and Georgia, but to a much lesser degree than in the northern European markets. As is often the case for emerging economies with strong growth, economic concerns tend to win over environmental or even social and local community concerns in project development. Negative consequences of HPPs on microclimates are outweighed by the benefits that energy independence and clean energy generation can bring to Georgia's economy and environment.

25 "Saakashvili Vetoes Bill That Cuts President's Power over Energy Regulator," *Civil.ge*, July 15, 2013, <http://civil.ge/eng/article.php?id=26245>.

26 "Georgia Plans to Build 500-kilovolt Power Transmission Line towards Russia," *Trend*, Tbilisi, July 16, 2013, <http://en.trend.az/regions/scaucasus/georgia/2171309.htm>.

Conclusions

Continued support from the US, EU, and international financial institutions is essential for the realization of the South Caucasus electricity corridor projects. The decision-makers in Ankara and Tbilisi should be constantly reminded of the long-term advantages of hydropower and the importance of energy independence for the region to make sure that short-term private interests do not outweigh long-term developmental projects of strategic importance.

Consistent liberalization of energy markets, strengthening of the legislative framework, and the independence and professionalism of regulatory agencies in Turkey, Georgia, and Azerbaijan are major preconditions for the development of the sector and for maintaining the trust of investors and international partners.

Just like the BTC and BTE pipelines, the South Caucasus electricity corridor initiative is ambitious and challenging, but can have a tremendously positive impact on the region's energy independence, and for the stability and security of this strategically important but volatile region.

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