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USAID ENERGY PROGRAM

ENERGY SECURITY IN GEORGIA

ASSESSMENT AND FUTURE CHALLENGES

USAID ENERGY PROGRAM

23 April 2019

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USAID ENERGY PROGRAM

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DATA

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ACRONYMS

| | |
|---------|---|
| bcm | Billion Cubic Meters |
| DM | Deputy Minister |
| EBRD | European Bank for Reconstruction and Development |
| EC | European Community |
| ECS | Energy Community Secretariat |
| EnCT | Energy Community Treaty |
| EPG | Energo-Pro Georgia |
| ESCO | Electricity Market Operator |
| EU | European Union |
| GCC | Gas Combined Cycle |
| GEDF | Georgian Energy Development Fund |
| GEOSTAT | National Statistics Office of Georgia |
| GNERC | Georgian National Energy and Water Supply Regulatory Commission |
| GoG | Government of Georgia |
| GOGC | Georgian Oil and Gas Corporation |
| GWh | Gigawatt Hour |
| HPP | Enguri Hydro Power Plant |
| IEA | International Energy Agency |
| KfW | German Government-Owned Development Bank |
| kV | Kilovolt |
| kWh | Kilowatt Hour |
| LNG | Liquefied Natural Gas |
| mcm | Million Cubic Meters |
| MoESD | Ministry of Economy and Sustainable Development of Georgia |
| MW | Megawatt |
| PPA | Power Purchase Agreements |
| SCP | South Caucasus Pipeline |
| SOCAR | State Oil Company of Azerbaijan Republic |
| TSO | Transmission System Operator |
| TWh | Terawatt Hour |
| UNDP | United Nations Development Program |
| USAID | United States Agency for International Development |
| USoA | Uniform System of Accounts |
| WEG | World Experience for Georgia |

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INTRODUCTION

USAID Energy Program is a \$7.5 million 3-year project aimed at supporting Georgia in the energy market development per Georgia's obligations under the Energy Community Treaty (EnCT). The ultimate goal of this program is to enhance Georgia's energy security through improved legal and regulatory framework and increased investments in the energy sector.

USAID Energy Program is designed to assist Georgia to meet the growing demand while safeguarding its economy against energy shortages, protecting its vulnerable citizens from rising energy prices, and regaining security over its energy supply. The country needs to invite increased investments in a more diversified mix of energy generation from native resources, open its market to trade with neighboring countries in the region, appropriately plan and project its infrastructure investments, and prevent unnecessary energy losses in the process of generation and supply.

The objective of USAID Energy Program is to support Georgia's efforts to facilitate increased investment in power generation capacity as a means to increase national energy security and facilitate economic growth. The Program will have a significant impact on energy market reform efforts of the Government of Georgia (GoG) to comply with the country's obligations under the EnCT. The investment objective will be achieved through the provision of technical assistance to a variety of stakeholders in the energy sector.

The ultimate expected outcome of the program is an energy legal and regulatory framework that complies with European requirements and encourages competitive energy trade and private sector investments.

This report "Energy Security in Georgia", provides input to Deloitte's Georgia Energy Project that is working for USAID to help continue the reforms in the Georgian energy system. Energy security is one of the main elements of the contract.

Georgia's Parliament ratified the Accession Protocol for Georgia's membership as a contracting party to the Energy Community Treaty (EnCT) in 2017, thereby committing the Georgian government to the implementation of key energy, competition and environmental directives of the European Community (EC). The Treaty establishes a framework for cooperation on energy security issues as well as sectoral reforms.

Energy security is very important to Georgia, given its adversarial neighbor Russia with its 7000 troops in Abkhazia and South Ossetia, or as Deputy Minister (DM) of Ministry of Economy and Sustainable Development of Georgia (MoESD) Ms. Natia Turnava stated on April 12th at the Energy Security Conference "Georgia's not easy surroundings". Georgia is almost totally dependent on imported oil and gas but has virtually reduced its major former dependence on Russia and has assumed a critical, strategic role in the transport of Azeri oil and gas to Western Europe and international markets.

This report is divided into four main sections: (1) analytical framework for energy security; (2) assessment of Georgia's current energy situation position; (3) future challenges for policy and action; (4) recommendations for the Georgian Government and USAID / Deloitte technical support.

ANALYTICAL FRAMEWORK FOR ENERGY SECURITY

1. External Energy Dependence

Energy plays a vital role in a country's economy and national defense. The degree to which a country is dependent on foreign sources for their energy supplies can be a cause for concern, especially if these supplies come from unreliable or politically unstable countries or regions. Countries can mitigate risks by building storage and emergency energy stocks and members of the International Energy Agency participate in a system that maintains stocks and provides for sharing in the case of emergency.

2. Energy Import Diversification

Countries that are dependent on imported energy generally seek to diversify their sources of energy supply to reduce risks of disruption from any source. But diversification may entail higher overall costs both in terms of delivered costs and in terms of the infrastructure needed to import the energy (e.g. additional pipelines, transmission lines, or Liquefied Natural Gas (LNG) receiving terminals).

3. Import Reliability, Price Stability, and Vulnerability to Disruptions

Energy security involves a consideration of the reliability of the supply source, how these sources may vary with respect to market or contractual prices, and whether the supply may be subject to disruption due to political actions (e.g. sanctions or attacks) or domestic economic trends in producing countries (e.g. reduced export capacity). The assessment of this reliability and vulnerability can draw on both historical factors and trends as well as political risk assessments of future policies and events.

4. Governance, Transparency, and Accountability

Although the assessment of energy security tends to focus on the above three factors, there are other considerations that could be included in a more robust framework for energy security. One of these is the state of governance, transparency and accountability of the government and its energy companies. A corrupt and/or secretive government reduces a country energy security by reducing reliability of contracts and introducing non-commercial factors into the supply equation. It may affect the willingness of external suppliers to enter into negotiations and supply arrangements.

5. Prices, Subsidies, System Costs and Sector Commercial Viability

Another important factor involves the relationship between energy prices, overall energy system costs, and the degree to which the energy sector or sub-sectors operate on a commercial basis. The political imperative to keep energy prices low and subsidize certain consumers may prevent the operating companies from covering costs of both energy supply and distribution. The poor financial position of an electricity, gas or oil distributor may limit their ability to make the investments needed to improve the efficiency and delivery of the service and reduce technical and commercial losses. Together such a situation can reduce reliability and security of supply.

6. Resiliency, Emissions, and Environmental Sustainability

A final element of energy security, which is becoming more important in the context of climate change, is the resiliency of the energy system to disruption due to drought, hurricanes and floods, tsunamis, ice storms and sea level rise. Such severe climate events can extract high costs on the economy and disrupt energy system operations. Policies and measures to mitigate emissions and adapt to changing conditions should be included in a modern concept of energy security.

ASSESSMENT OF GEORGIA'S ENERGY SECURITY POSITION

The following is a brief assessment of Georgia's energy security position using the above framework.

1. External Energy Dependence

- Georgia is heavily dependent on imported oil and gas and these levels have been rising to meet the demands of Georgia's growing economy. Oil and gas account for about 80% of Georgia's primary energy consumption. From January to August 2018, Georgia imported 733,200 tons of gasoline and fuel oil - an increase of 56,100 tons over the same period in 2017. Gas imports increased to about 2.5 bcm in 2018, which was about .3 bcm higher than 2017.
- Georgia's hydro-dominated electricity system (83% of electricity generation in 2018) is characterized by large seasonal swings in generation with thermal power generation based on imported gas and electricity imports needed from September to April. Demand has been growing (8 % to 11,876 GWh in 2017 and 6% to 12,596 GWh in 2018), increasing the need for electricity imports. Georgian net imports in 2018 were estimated at 880 GWh - imports totaled 1445 GWh, mainly from Azerbaijan, and exports were 565 GWh, largely to Turkey via the back-to-back high voltage transmission line commissioned in late 2013. Georgia also transits Azeri electricity to Turkey and Russian exports to Armenia and Turkey.

2. Energy Import Diversification

- Georgia imports gas from Azerbaijan, both as offtake gas from the South Caucasus pipeline and via a separate State Oil Company of Azerbaijan Republic (SOCAR) pipeline. Volumes in 2018 were: 1.1 bcm from the South Caucasus Pipeline and 1.4 bcm from the separate SOCAR pipeline.
- In 2018, Georgia apparently did not import gas for domestic use from Russia for the first time. Russia does ship about 2 bcm of transit gas to Armenia via the North-South line and in the past Georgia has taken both in-kind gas and cash as payment for this transit.
- Electricity imports were received last year from Azerbaijan and Russia. The average reported price for electricity imports was about 4 cents per kWh. The bulk of the imports have come from Azerbaijan. According to Electricity Market Operator (ESCO), the Russian systems has constraints that limit its ability to provide power during the winter.
- In 2019, the Georgian government entered into an agreement to buy Russian natural gas but the terms have not yet been disclosed. The volumes are likely to be relatively small and probably not of great concern from an energy security standpoint.

3. Import Reliability, Price Stability, and Vulnerability to Disruptions

- In contrast to past years when Georgia depended heavily on uncertain gas and electricity imports from Russia, the increasing import relationship with Azerbaijan has improved supply reliability.
- The offtake agreement to provide 5% of the transit volume of South Caucasus Pipeline (SCP) to Georgia provides greater certainty and price stability. The offtake gas is equivalent to a much lower price (\$143 per tcm) than direct gas purchases from either SOCAR or Gazprom. But the offtake is a constant level and there are times during summer when gas offtake exceeds domestic requirements.
- Azerbaijan, like Georgia, is experiencing increased internal gas demand in winter. Azerbaijan is forced to buy gas from Russia to cover this requirement (reportedly 1 bcm in 2018). Even so, SOCAR Gas Georgia indicated that there have been several days a year when coincident peaks during cold weather have led to constraints in the supply from Azerbaijan.

4. Governance, Transparency, and Accountability

- Georgia's institutional framework in the energy sector has evolved in both the electricity and gas sub-sectors. Separate companies and management boards have been established in both sub-sectors and bilateral contracts govern relationships between generators, gas suppliers and distribution companies. Large industrial consumers and thermal power plants buy power directly from the transmission system operators. The State companies are owned under the Government's Partnership Fund.
- In 2017, the Government decided to eliminate the Ministry of Energy and place it under the Ministry of Economy and Sustainable Development of Georgia. This demotion resulted in a major

reduction in staff. Some experts believe it was politically motivated, not driven by a general policy to reduce the number of Ministries. Nevertheless, it reflects a curious downgrading of the priority given by the Government of Georgia (GoG) to this critical sector.

- The Georgian National Energy and Water Supply Regulatory Commission (GNERC) has developed considerable professional competence and works to monitor the market, promote improved reporting by the operating companies, analyze and establish certain prices. They are playing a key role in the development of the new legal / regulatory framework, electricity and gas market design and rules, working with staff in the Energy Community Secretariat (ECS) and donor organization experts.
- An extensive effort to develop Uniform System of Accounts (USoA) for major state entities is underway to increase financial transparency and accuracy of information.
- Meetings however revealed considerable lack of transparency in the energy relationship with Russia, the decisions and contracting for electricity imports, and the allocation of rights to export power to Turkey, especially given the significant curtailment of allowable import levels by the Turkish Transmission System Operator (TSO).

5. Prices, Subsidies, System Costs and Sector Commercial Viability

- Substantial progress has been made in improving the commercial viability of the sector and losses have been reduced. SOCAR Gas Georgia indicated that they have reduced losses from 33% to 2.4% over the last ten years with several hundred million dollars in investment and despite a large expansion of the customer base. The electricity distributors, Energo-Pro Georgia (EPG) and Telasi, have also significantly improved their collections and reduced losses.
- Retail rates for most residential customers are regulated and targeted subsidies exist for electricity. However, in gas, the low-cost gas from the SCP offtake is used to maintain low residential gas prices, while commercial gas prices are twice as much and SOCAR has just raised commercial and industrial prices by 10%. This differential was highlighted by Georgian Oil and Gas Corporation (GOGC) as a concern with respect to the competitiveness of Georgian industry.
- Although most gas customers have been insulated from price increases, electricity system costs have been increasing as less low-cost Enguri hydro supply is available to the Georgian system and the expansion of smaller private hydro units and greater thermal power requirements and imports has increased overall generation costs.
- Growth in tourism and related commercial and service industries and urban building construction has stimulated changes in the electricity load curve, with increasing peak requirements in summer for air conditioning.

6. Resiliency, Emissions, and Environmental Sustainability

- Resiliency does not appear to be a major concern at present, since hydrological conditions have been relatively stable over the past few years. But droughts events have occurred in the past and Georgia's major dependence on hydro presents risks with rising temperatures and climate variability.
- Georgia is a relatively low emissions energy economy but thermal power generation and domestic gas use has been growing. Transportation emissions are also a major concern with the relatively large vehicle ownership levels.

FUTURE CHALLENGES FOR POLICY AND ACTION

1. Increasing Investments in Renewable Energy

- Georgia can increase its energy security and supply diversification by pursuing a more aggressive approach to developing its renewable energy potential, particularly wind and solar energy that have the potential to generate electricity during the winter low-water period. The wind resources appear to be of high quality in certain areas (e.g. Shida Kartli); and there is considerable investor interest. Georgian Energy Development Fund (GEDF) financed an initial 20 MW wind farm and is pursuing with private developers and international financial institutions at least three other larger projects from 50 MW to 100 MW. The Georgian State Electrosystem (GSE) estimate of a 330 MW grid limit by 2022 and 660 MW by 2025 for wind energy integration needs to be reviewed and the costs of more rapid penetration evaluated. The legal, regulatory, and market framework for renewables also should be clear and attractive and the new Renewable Energy Law should be passed as soon as possible. Given the potential for considerable additional hydro development, the growing opposition to hydro projects at local and community levels is a disturbing development that needs to be addressed.

2. Enhancing Gas and Hydro Generation Efficiency

- Although more efficient Gas Combined Cycle (GCC) plants have been built (i.e. the JSC Partnership Fund's 230 MW, 55% efficient GCC at Gardabani in 2016) and a second unit is under construction (with Chinese support), the low efficiency of the older Gardabani units (with below 30% efficiency) needs to be addressed. Additional investment will be needed to replace these units and create the capacity to meet growing future demands during the winter as well serve as back-up to wind and solar installations. Based on experience in other countries, e.g. Brazil, the feasibility of replacing turbines at older hydro sites with more efficient systems, should be examined.

3. Designing a viable power exchange

- Georgia's joining of the EnCT has created an obligation to adopt European Union (EU) energy, competition and environment acquis and to work toward competitive gas and electricity markets. In electricity, there are efforts to develop a new market approach, including Day Ahead, Balancing and Ancillary Services markets. Moving from the current, highly concentrated bilateral contracts system to one with open, competitive trading, will be a challenge. The system has both low-cost, larger regulated hydro utilities and many private hydro generators under long-term Power Purchase Agreements (PPA), with a limited number of large thermal generators. It will be difficult to attract new investment in wind and solar without either a favorable feed-in tariff, premium or tax incentives, or at least medium power purchase agreements. To expect these projects to be financed purely on a merchant market basis is probably not realistic at first. Regarding the rationale for a power exchange, GSE argued that a competitive market will help improve and make more transparent decisions on power imports that are now highly political and developed through negotiations.

4. Developing the Azerbaijan-Georgia-Turkey electricity corridor

- The issue of establishing a competitive electricity trading system will also affect the potential and structure of the emerging electricity corridor among Azerbaijan, Georgia and Turkey. GSE has indicated renewed interest within Azerbaijan in producing and exporting thru Georgia to Turkey over the back-to-back line and a new 330 kV transmission line is under consideration. But the constraints in the Turkish market will have to be addressed as well as improvements in the system and rules for accessing the interconnect by both Azeri and Georgian companies.

5. Preparing for increasing gas offtake from SD2

- The expansion of SCP to accommodate the Shah Deniz 2 project's increase in gas production has important ramifications for Georgia and its gas system. With the expansion of SD1&2 volumes from 7 bcm to 22 bcm after 2022, the offtake gas to Georgia will greatly expand. Although Georgia's gas demand is expected to grow from 2.447 bcm in 2018 to 3.5 bcm by 2030, the SCP offtake will be at constant levels throughout the year, creating problems for the Georgian system in summer, when thermal power requirements are lowest. A project to construct a gas storage capacity in Georgia is proceeding and may help accommodate these seasonal offtake volumes as well as provide the capacity to meet peak winter requirements. The

development of a independent Gas Storage Operator as well as a Gas Market Operator are planned in the new legal and regulatory framework.

6. Improving end-use energy efficiency

- With Georgia's growing imports of electricity, gas, and oil products, stronger energy efficiency measures are urgently needed. The growth in peak demand with the increase in building construction and air conditioning use is also an emerging problem in managing the system and minimizing system costs. Under the EnCT, countries are expected to develop energy efficiency action plans and implement specific EU energy efficiency directives, e.g. building energy performance. Georgian government efforts to date have not given energy efficiency a high-enough priority. A great opportunity to develop a comprehensive approach to energy efficiency and load management exists at present. This approach can include incorporating demand management in bidding markets, providing tax incentives, and instituting regulations for both appliances and vehicles.

RECOMMENDATIONS FOR GEORGIAN GOVERNMENT AND USAID ENERGY PROGRAM TECHNICAL SUPPORT

With the growth of the economy and the increasing demand for imported electricity and gas, there is an urgent need to put in place the new legal and regulatory framework required under the EnCT. New investment is needed to develop indigenous supplies and a prolonged uncertainty with respect to this legal / regulatory framework and the detailed market designs may deter investment. Based on a 5% electricity growth projection, 7-8 TWh of new generation may be required by 2029 and the MoESD has estimated that \$3 billion in investment is needed by 2025.

USAID Energy Program, the ECS and other donors are working with the MoESD on the Primary Energy and Water Law, Renewable and Energy Efficiency Laws, market design and balancing rules, and many pieces of secondary legislation in both the electricity and gas sub-sectors. Judging from the USAID Energy Program's Electricity and Gas Action Plans, many of these key elements have been drafted, are under review and appear to be nearly ready for submission to Parliament.

The electricity and gas sectors have become more interdependent as demand and imports have grown. From both an energy security and investment standpoint, government energy planning needs to take this symbiotic relationship into account. Careful consideration of the impact of changes to introduce a more competitive market structure and functioning on the ability to mobilize critical investments should be a high priority. This is especially true for stimulating the development of a viable wind and solar energy industry in Georgia.

Although over 583 MW of hydro has been added by private entities since 2012, Georgia still has substantial untapped hydro potential. But the growing resistance to hydro development, both large and small, is a troubling sign. The situation is exacerbated by the increasing loss of hydro supplies from the low-cost Enguri Hydro Power Plant (HPP) due to rising demand in Abkhazia, which is increasing overall electricity system costs. A United Nations Development Program (UNDP) / Swiss pilot project for metering to reduce demand is beginning. Throughout Georgia, concerted efforts are needed to work with local communities and to communicate and discuss the costs and benefits of hydro development, from both a local and national perspective.

With the process to develop the new competitive markets well underway, it is important to keep energy security considerations front and center. Russian actions since the Crimean occupation in 2014 have become more aggressive and problematic. While open and transparent markets and greater disclosure on import deals with external suppliers is to be encouraged, it does not appear to be in Georgia's best interest to permit full participation of Russian companies in these markets. Georgia's energy future lies in close coordination and integration with the Azerbaijan, Turkish and EU markets and its continued development as a reliable corridor for oil and gas and increasingly electricity transit.

APPENDIX 1

PRE-CONFERENCE MEETINGS – APRIL 10 AND 11, 2019

GOGC: Mr. Temur Gochitashvili, Chairman of the Supervisory Board: Mr Gochitashvili prepared 10-year strategic gas development plan and was interested in support for publishing. We discussed the nature of the gas system and the planned expansion of SCP to 16 bcm. He focused on high concentration index with respect to role of SOCAR. Interesting discussion on price differential between residential prices that benefit from low-cost offtake gas (\$150 mcm) and commercial prices (\$370 mcm). He argued that wind and solar development would need gas backup power.

GSE: Mr. David Tvalabeishvili, Rehabilitation Manager / Chairman of the Management Board: We discuss the work that developing plans for electricity markets and consulting advice from Nord Pool and Blueberry. Large regulated generators and private units under PPAs would have to be managed differently in new market. GSE sees continuing development of hydro and reduction in constraints in Turkish market. Exports had been limited in some instances to 125MW on line to Turkey. German Government-Owned Development Bank (KfW) and other seeking to change Armenian position on back to back interconnection. He indicated that Azerbaijan was showing increased interest in exporting power to Turkey. Expressed concern about Enguri and the financing needed to rehabilitate the complex, especially intake tunnel. He said proposal for Georgia-Romania undersea cable was being discussed.

SOCAR Georgia Gas: Mr. Azer Mammadov, CEO: He discussed tremendous progress company has made in modernizing and expanding the network and growing customer base to 680,000. Losses have been reduced from 31.5% to 2.4% since 2008 and they have invested over \$300 million to meet purchase obligations. They have 5-year strategic plan beginning from 2016. Substantial increase in customers. Some tariff pressure to serve. Major uncertainties in shift to EU market requirements and issues of gas allocation with increased offtake.

GEDF: Mr. George Chikovani, CEO: GEDF main role in pre-project feasibility and support and some provision of seed capital. Pioneered wind development with public 20 MW project. They are now working on 5 wind projects from 50-100 MW and several solar pv projects. Using reverse auctions. GSE see grid limit of 330 MW until 2022 and 660 MW until 2025. Issue of financing and PPA was discussed. He agreed that pushing plants to open competitive market without PPA would be problematic. Government was considering feed-in premium incentive approach. GEDF was looking at energy efficiency and demand management. He mentioned the potential for improvements with 10 major industrial customers. I related experience in demand management bidding in some US markets that might be relevant when market is created in Georgia.

National Statistics Office of Georgia (GEOSTAT): Mr. Gogita Todradze, Head of Business Statistics Department: No real energy statistics before 2013. GEOSTAT published first balance in 2014. Since 2016 has been working with EC to develop Europe compatible energy statistics and meeting monthly reporting requirements. Energy questions have been added to regular institutional surveys. Seeking to develop statistics on energy use in industry, construction and other sectors. Trying to develop infographics and other ways to assist policy makers.

ENERGY SECURITY CONFERENCE NOTES

Session I Opening:

The DM Ms. Natia Turnava opened the panel by highlighting the importance of energy security and the “not easy surroundings” and challenges in the regional conflict environment. She stressed two points: (1) need for openness and a more liberal market together with enhanced infrastructure development; (2) need for Georgia to develop its own energy resources and to address seasonality issues. Sound regulations that lay out clearly the rules of the game were critical but she did not comment on the new Energy and Water Law and the process to finalize.

USAID Mission Director Mr. Peter Wiebler confirmed USAID long-term commitment to helping Georgia in energy and discussed the need for long and short-term investments to reduce vulnerability and increase self-reliance. He mentioned key areas in which USAID was working, including legal and regulatory, grid development, the competitive market, and hydro, wind and solar development as well as regional trans-boundary trade.

Romanian Ambassador to Georgia Mr. Radu Horumba pledged Romania's readiness to work with Georgia to promote reforms and regional integration and adoption of EU rules. He stressed the importance of Georgia's continued democratic development.

The Head of the Parliament's Committee of Sector Economy and Economic Policy, Mr. Revas Arveladze highlighted Georgia's dependence on oil and gas imports and the threat of Russia to Georgian independence. He supported hydro, wind and solar development and indicated the Parliament was ready to act on the new Energy Law when they receive it.

Session II: Georgian Views on Energy Security

The CEO of the GEDF opened the presentation by discussing the risks and opportunities in the sector. He reviewed their development of HPPs and indicated that more hydro development was possible along with new wind and solar. He also emphasized energy efficiency as an area for GEDF involvement.

GSE Chairman of the Management Board, Mr. David Tvalabeishvili concentrated on the GSE's efforts to develop and expand interconnections with regional neighbors Turkey, Azerbaijan, Armenia and Russia. He highlighted preparation for a new 330 kV line with Azerbaijan given the increasing imports. In the future, he saw the possibility of a Black Sea submarine cable with Romania.

The General Director of the ESCO Mr. Vakhtang Ambokadze talked about the important work on the new electricity market design and rules and the plans for a power exchange. He noted the constraints in terms of trade with Russia due to problems in the Russian system, the limitations in the Turkish system, and the delays in the Armenian back-to-back interconnection.

GNERC Commissioner Mr. Gocha Shonia described GNERC role in monitoring the market and how electricity consumption was growing rapidly in Georgia (7.5%) put strains on the system. He focused on the situation of Enguri, the "backbone of the system" and the deteriorating revenue situation. He also noted the growing demand in the Adjara and Batumi areas and implications for infrastructure development. He saw the need for increased incentives for investors in new infrastructure.

The General Director the Enguri HPP Mr. Levan Mebonia further highlighted the problems facing Enguri in terms of its revenue position and the need for investment in rehabilitation. He indicated that with the rising demand in Abkhazia and non-payment, as much of 70% of Enguri output could be given free of charge. A UNDP / Swiss effort is proposing a metering project in Abkhazia with an estimated cost of \$91 million. The decision has been made to start with a \$5-6 million pilot project. On rehabilitation, European Bank for Reconstruction and Development (EBRD) is looking at a next phase loan.

Chairman of GOGC's Supervisory Board Mr. Temur Gochitashvili provided an overview of the situation in the gas sector, with its growing demand, including the new combined cycle at Gardabani, expected to be completed in 2019. He discussed the important implications of the increasing SCP volumes and offtakes for Georgia and the efforts to develop gas storage. He indicated that major gas rehabilitation plan was scheduled to be completed by 2023. He noted the rising gas demand in Batumi area and raised the issue of potential gas supplies to Abkhazia.

The final speaker was Mr. Romeo Mikautadze, Director of Energotrans. He discussed the concern about the opposition to hydro development by local communities and environmental groups in the context of the growing import requirements.

Session III:

Mr. Ichord provided a keynote address (attached) providing a general framework for analyzing energy security, discussing Georgia's significant progress since the difficult times in the mid-1990, outlining major features of the current regional and national situation, and presenting future challenges and some thoughts on Georgia policy priorities.

Mr. Duncan Millard from the International Energy Agency (IEA) presented his views on the importance of energy statistics for policy and operations, the progress that GEOSTAT has made in this respect, and called for participating companies and organizations to give priority to this area and help improve the data system.

Mr. David Managadze from the EBRD Tbilisi Office reviewed EBRD's extensive work in the Georgian energy sector, including their financing of Enguri repairs, the back-to-back line with Turkey and hydro projects, with total funding for energy of 800 million euros or 40% of EBRD's total disbursements. He expressed strong support for wind and solar development and, while recognizing the need for PPA

initially, indicated his hope that eventually project could be developed and financed on a merchant basis as the competitive market evolves.

The KfW representative described their strong commitment to the energy sector, with special attention to transmission project financing as well as a new project for underground gas storage and a policy loan focusing on energy efficiency reforms.

The EU representative stressed their focus on energy policy and regulatory reform in the context of the EnCT requirements. Energy efficiency is also a priority of their program.

Session IV:

Additional speakers addressed a range of issues in the electricity and gas sectors. Former Minister of Energy Mr. David Mirtskhulava expressed criticism of the current policy framework for not integrated adequately economic, technical, security and geopolitical factors. Mr. Levan Vepkhvadze from the GREDA saw the priority need to improve the investment climate to mobilize the resources for new renewable energy projects.

Closing Session:

Ms. Veronica Lee, Economic Growth Office Director, USAID Georgia, Mr. Murman Margvelashvili, Director, World Experience for Georgia (WEG) and Mr. Ichord expressed appreciation for the excellent Conference and need to continue and broaden the dialogue on energy security issues. Ms. Lee highlighted the important interaction between geopolitical and national issues in determining energy policies and choices. Mr. Margvelashvili reinforced Mr. Duncan's points on the need for good energy planning and data. Mr. Ichord stressed the urgent need to promote new investment, approve the new legal framework, address the opposition to hydro, and accelerate efforts for the development of wind and solar resources.

APPENDIX 2

PRESENTATION ON GEORGIA'S ENERGY SECURITY: PAST, NOW AND FUTURE

Georgia's Energy Security: Past, Now and Future

- Dr. Robert F. Ichord, Jr.
- Ichord Ventures LLC and Deloitte Consultant
- April 12, 2019
- Tbilisi, Georgia

Energy Security Policy Framework

External Energy Dependence

Import Diversification

Import Reliability, Price Stability and Vulnerability to Disruptions

Governance, Transparency and Accountability

Prices, System Costs and Sector Commercial Viability

Resiliency, Emissions and Environmental Sustainability

Georgian Energy Security : Positive Developments

Georgia has reduced its energy dependence on Russia and increased its integration with the West and international markets.

Georgia has demonstrated that it is a reliable corridor for the transit of oil and gas from the Caspian to Turkey and soon Europe.

Georgia has improved the management of its energy sector and is adopting the EU Directives as a member of the Energy Community.

Georgia's oil and gas prospects are attracting more international companies and there is a possibility that Georgia can reduce its dependence on imported oil and gas in the future.

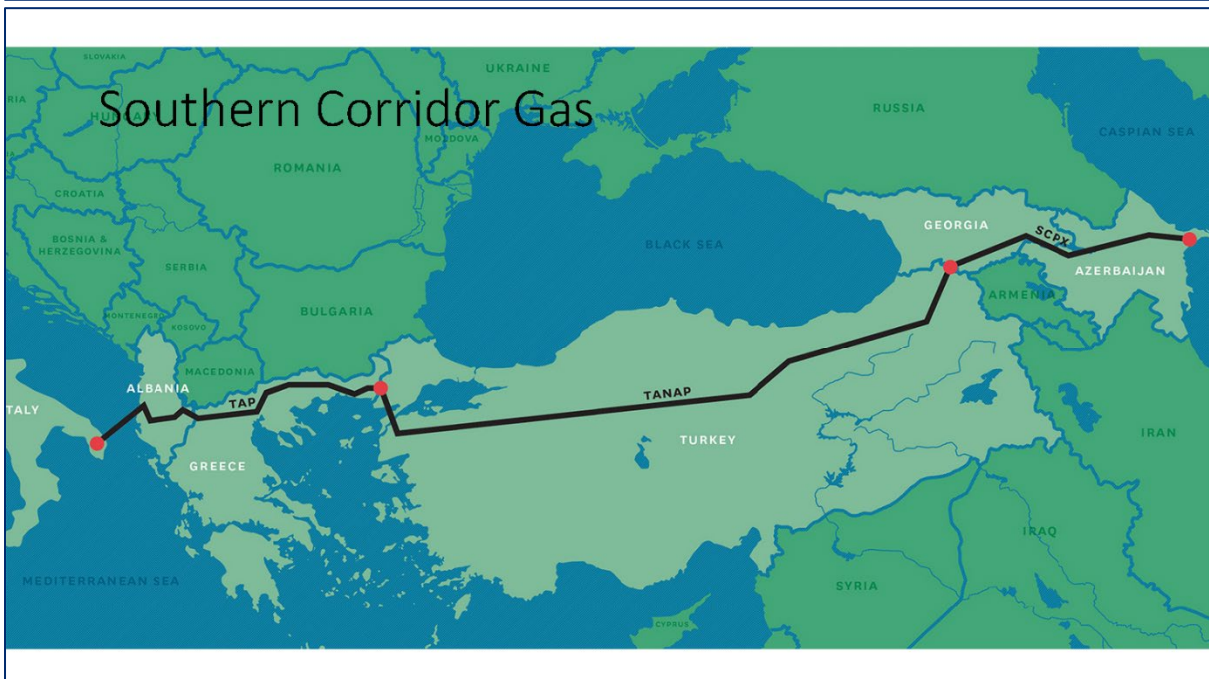
Georgia can continue to be a relatively low-emissions economy and expand its use of renewable energy resources despite growing gas use.

Past: Towards a More Secure and Viable Commercial Energy Sector

- **External Dependence and Diversification:** Development of BTC and SCP – operational in 2006; helped reduce dependence on Russian gas.
- **Improved reliability and price stability with gas-offtake.**
- **Governance:** Breakup of Sakenergo and privatization of distribution and thermal generation, creation of GNERC, GWEM, ESCO and GSE.
- **Commercial Viability:** Improved collections, loss reduction and commercial operation, first in electricity and then in gas
- **Investment and System Costs:** Russian invasion was a turning point and US and West responded with energy assistance effort to strengthen electricity and gas transmission systems and attract private investment in hydro alternatives to Enguri.
- **Regional Cooperation and Trading:** Effort to integrate electricity system with Turkey and expand links with Azerbaijan and Armenia.

Current Situation

- Major achievement in the realization of Southern Corridor – but uncertainties in European gas supply given Russian Turkstream project and Nordstream 2
- SD2 is proceeding promising even greater integration of Georgian and Azeri energy systems – not only for gas but also for electricity given the seasonality of hydro and need for electricity imports.
- Lower than expected potential for electricity exports to Turkey given economic slowdown, lower price, Turkish expansion of generation and transmission constraints.
- Armenian delay of back to back interconnection project
- Continued vulnerability of Enguri and problem of growing demand in Abkhazia and need for further rehabilitation.
- Strong natural gas demand growth, peak demand issues and price differentials between residential and commercial customers.



Gas Pipelines in South Europe and the Balkans: Current and Proposed



Future: Trouble in the Neighborhood

Future: Trouble in the Neighborhood

- Russia focus on Turkey and undercutting NATO
- Uncertainty of Putin's intentions and actions after Crimea and Ukraine; US sanctions policy
- VP Pence to NATO: Turkey has to choose; problem over S-400 missile system.
- Iranian overtures with Armenia – proposed gas exports, including to Georgia
- Turkstream and Ukrainian transit agreement which expires at end of year

Future: Georgian Energy Policy Priorities

1. Electricity Diversification: Wind and Solar Development – 300 to 1000MW
2. Improved Gas Generation Efficiency
3. Load Management and Building Energy Efficiency – market and tax mechanisms
4. EU Acquis and Electricity and Gas Legislation and Secondary Regulations
5. Market Design, Competition, Subsidy Policy and Investment Issues
6. Gas Storage Decision
7. Continued efforts to enhance regional cooperation and interconnections



Conclusion

GEORGIA CAN INCREASE ITS ENERGY SECURITY AND EXPAND ITS ROLE AS A MAJOR CORRIDOR FOR ELECTRICITY AS WELL AS OIL AND GAS.

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