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This policy brief is intended for public policy makers and practitioners; it will also be useful for those groups and individuals seeking to influence the policymaking processes.

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Georgian Energy Sector Development Prospects

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Summary

This policy brief reviews Georgian energy policy and explores how current energy sector trends correspond to sustainable energy principles. The document concludes that Georgian government continues to support so called "traditional' energy projects (large hydro and thermal power plants) and does not take efficient steps to support such important elements of sustainable energy as, for instance, environmental integration, renewable energy sources and energy efficiency. The document also stresses that political decisions in support of "traditional" energy projects are often taken without proper economic analysis and justification, without consideration of all costs and benefits; such decisions result in negative impact on environment and the public. The document also provides recommendations on the measures to be undertaken in the nearest years to support, as the author believes, establishment of consistent and sustainable energy sector in Georgia.

1. Context and importance of the problem

The analysis of Georgian energy sector shows that it has huge potential for sustainable energy development in terms of hydro power resources, as well as wind and solar energy resources.

According to "Main Directions of State Policy in the Power Sector of Georgia" (2006)[1], the most important long-term objective is "*full and gradual satisfaction of the demand on electricity resources on the basis of its own hydro resources*", "*first with the help of import, then by its substitution with thermal generation*". Another, longer-term objective could be discerned here, namely: "*from a state that imports energy resources, Georgia should gradually become a state that possesses high technical-economic characteristics, stable, competitive [and] flexible, independent energy capabilities*".

Otherwise progressive objectives of Georgia's energy policy are interpreted to just existence of energy resources and development of export potential. In recent years Georgian government has sought to position the country as a future regional renewable energy hub[2]. According to President Saakashvili, "*the energy sector should constitute one of the three pillars of Georgia's future economic development (along with agriculture and tourism) on which the country's future economic development will be based*". According to the President the government plans to attract in the nearest years the investments in the amount of USD 5 billion for Georgia's electric energy sector[3].

It is noteworthy that the final goal of Georgia's energy system development is not the establishment of sustainable energy system. Such a system should be based on the following principles: (1) environmental integration both in energy generation and in consumption; (2) energy-security; and (3) development of competitive energy systems – for wider social policy objectives ensure low costs to foment industrial competition. The large hydro (and sometimes coal) power development trends in Georgian energy system could hardly be described as sustainable and renewable.

2. Electricity Transmission System

Georgian Government considers building of transmission lines to Turkey, as well as to Armenia and Azerbaijan, as one of the preconditions for becoming the exporting country. According to the Ministry of Energy and Natural Resources of Georgia, harmonization of Georgia's energy system with that of Turkey is planned on the initial stage. It is planned to enter South-East Europe electric power market by 2015-2017[4].

In 2009 Black Sea transmission line project started, implying building of 500 KV transmission line from Azerbaijan to Turkey via Georgia. The project is funded by European Bank of Reconstruction and Development (EBRD), German Bank of Development (KfW) and European Investment Bank (EIB). The project aims at increasing grid stability of Georgia and export of surplus electric power to Turkey. The Black Sea transmission line project stresses that the project is closely linked with building greenfield hydro-power stations in Georgia and increase of revenues through electricity export[5].

In the end of 2010 Asian Development Bank started preliminary works for building regional transmission line. The project aims at increasing transmission capacities to Azerbaijan, Armenia and Turkey to sell and to provide transit of electric power. It is stressed in project description that the project implementation would facilitate Georgia's becoming renewable energy based regional energy center[6].

3. Development of Large and Medium Hydro Power Engineering

There is more than 3000 megawatt installed capacity in Georgia, of which hydropower stations (HPP) account for about 2700 MW and thermal plants – for about 500 MW.

[1] See: www.minenergy.gov.ge

[2] Regional Power Transmission Enhancement Project, Georgia, www.adb.org

[3] See: http://www.voanews.com/georgian/news/georgia/hydro electic-plants-georgia-108428799.html

[4] See: http://csrdg.ge/index.php?module=text&link_id=149&lang=geo&lang=geo

[5] See: www.minenergy.gov.ge

[6] See: www.adb.org

According to the information provided at the web-site of the Ministry of Energy and Natural Resources, Memorandum of Understanding has been signed with foreign investors on investing about USD 3 billion to build about 2000 MW installed capacity HPPs (30 large and medium capacity HPPs are listed)[7]. According to the Ministry, preparatory works are ongoing for building Namakhvani HPP cascade (installed capacity 700 MW) and Khudoni HPP (installed capacity 638 MW). Besides building 30 large and medium HPPs, Georgian government is looking for investments to build about 50 small and medium hydro power plants in Georgia[8] with total installed capacity over 1000 MW – these plants are not included in the above Ministry's list. For instance, Samtskhe-Javakheti HPP cascade with installed capacity of about 210-220 MW is not included in the list[9].

It should be noted that large hydro-dams cannot be considered as sustainable and renewable energy source. Construction of large hydro-dams is not consistent with the principles of sustainable development; they may cause significant negative impact on the environment and dramatically change social and demographic situation. According to the World Commission on Dams (WCD) 2000 Report, negative impacts of large dams/HPPs on natural and social environment (involuntary resettlement, loose of traditions, destruction of natural environment and cultural heritage, landscape and local climate change) is so extensive, that they can never more be regarded as part of renewable energy[10].

Besides, true profitability of large dams remains elusive. The WCD study on costs analyses shows average 89 percent overrun. The average cost overrun of the 81 large dam projects included in the WCD cross-check survey was 56 percent (according to official data – 21 percent). The World Bank 1996 independent survey revealed that costs at completion on 66 hydro energy projects were on average 27 percent higher than planned (four dams with the highest overrun were not included in this analysis). Cross-study committee collected data from other financial institutions and found that most of the dams, from the very beginning, showed very low profitability even when they do not account for the social and environmental costs associated with the dams[11].

In the beginning of 2011 the European Parliament heavily criticized World Bank for supporting large dams and urged to support alternative, small scale energy projects[12]. Regrettably, as is evident in case of Paravani HPP, the EBRD and the IFC ignored this recommendation and development funds are allocated for creation of environmental and social problems and not their solution[13].

4. Construction of Thermal Power Plants

In addition to the development of water resources, construction and operation of gas and coal power plants remain topical in Georgia. Georgian International Energy Corporation stated in December 2010 about planning to build Tkibuli coal-fired power plant and published draft environmental and social impact assessment (ESIA) study. Besides, as it becomes evident from the Corporation's website, building of following coal-fired power plants is in its agenda[14]:

Akhaltsikhe thermal power plant
Capacity: 300 MW
Number of generating units: 2x150
Annual output: 2,2 billion KWh
Annual coal consumption: 1.9 ton
Term of construction: 3-4 years

Gardabani thermal power plant
Capacity: 300 MW
Number of generating units: 2x150
Annual output: 2,2 billion KWh
Annual coal consumption: 1.9 million ton
Term of construction: 3-4 years

Khofa thermal power plant
Capacity: 150 MW
Number of generating units: 1x150
Annual output: 1.1 billion KWh
Annual coal consumption: 600 thousand ton
Term of construction: 3 years

[7] See current investment projects at Ministry of Energy and Natural Resources' website: http://www.minenergy.gov.ge/

[8] See the national programme "renewable energy 2008" at: http://www.minenergy.gov.ge/index.php?m=396

[9] See: www.minenergy.gov.ge

[10] See: www.dams.org

[11] See: www.dams.org

[12] See: http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P7-TA-2011-0067&language=EN&ring=B7-2011-012

[13] Paravani HPP, Georgia, see: http://bankwatch.org/publications/paravani-hydro-power-plant-georgia

[14] See: http://gi-ec.com/index/chvens_shesakheb/0-10

Tkibuli thermal power plant
Capacity: 600 MW
Number of generating units: 2x300 – 4x150
Annual output: 4 billion KWh
Annual coal consumption: 2.4 million ton
Term of construction: 3-4 years

According to draft ESIA study for Tkibuli coal-fired power plant, *"in case of implementation of the planned activity 300 MW electricity will be generated and supplied to country's energy system through 220 KW transmission line from thermal power plant to Zestafoni substation. Putting into operation of the planned thermal power plant will be a significant step forward on the way to country's energy independence. Especially noteworthy are the benefits during low-water period, when hydro power stations do not work at full capacity and the energy system of the country experiences shortage".*

With regard to the above mentioned, note should be taken of the following: there are gas power plants in Georgia, including "Mtkvari" Ltd, "Tbilsresi", owned by the developer of Tkibuli coal-fired power plant project and air-turbines (Energy-Invest). Besides, according to the Order No.8 of 9 February 2010 by Minister of Energy of Georgia[15] forecast for energy balance for the period of September 2009 - August 2010 is as follows: thermal power plants – 996 million KWh, HPPs – 9378.7 million KWh, import – 277.8 million KWh of which "Mtkvari" Ltd (300 MW) – 872.7 million KWh, air turbine (110 MW) – 20,6 million KWh, "Tbilsresi" (260 MW) – 102.7 million KWh.

Though energy balance shows increase of electricity generation by thermal plants in low-water period, it is clear that installed capacity is not fully mastered, which is main cause for electricity import in the country. Accordingly, justifications provided for building the Tkibuli thermal power plant are absolutely detached from the existing energy development context.

Construction of coal-fired power plants, on the one hand, does not coincide with Georgia's energy policy and on the other, is in sharp contrast to country's commitments under the UN Convention on Climate Change and threatens to successful implementation of Georgia-EU Action plan.

[15] On changes to the Order No.60 of August 27 2009 by Minister of Energy of Georgia "On approval of electricity (energy) balance of 2009-2010"

5. Economic justification of the projects

Unfortunately both proposed HPPs as well as coal-fired power plant projects do not contain economic assessments and the economic return rates. Hence, it is quite difficult to judge on acceptability of a project, as well as to see if external costs are included (displacement, reimbursement to affected public, infrastructure, mitigating measures, etc.). Such approach, above all, complicates the decision-making process.

For example, Paravani HPP and the transmission line construction project cost is USD 160 million; 80 million of it are attracted by a Turkish company through EBRD and IFC loans[16]. According to project documentation "if the hydro power station fails to be constructed Georgia will loose annually about USD 40 million". Since the project implementation is based on BOO (Building, Operation, Ownership) scheme, the above mentioned USD 40 million shall be the Turkish company income of which only property tax and income tax shall be transferred to Georgian budget. The project will be run by Turkish engineers and local population will have to be content with unskilled labor.

Economic justification of any of the energy projects usually stresses that it would help energy system to cope with energy shortages in winter. For example, one of the main benefits of Paravani HPP is that it will supply energy to Georgian energy system in winter. As a matter of fact, Paravani River sometimes freezes in winter, but these are details, totally ignored by project developers.

Another aspect, stressed by project sponsors and proponents, including Ministry of Energy and Natural Resources, is possibility to increase energy export. According to the Ministry, construction and putting into operation of 18 hydro power plants in 2018 shall triple energy export capacity[17]. It evokes parallels with 2000-2003 Georgian government rhetoric with regard to Baku-Tbilisi-Ceyhan pipeline – the government's hopes for significant increase of Georgia's budget, economic development and carefree future were linked with this pipeline.

[16] i.e. funds designed for development of Georgian economy

[17] See: http://www.ambebi.ge/masmedia/36413-saqarthvelos-energetikuli-siakhleebi.html#ixzz1Msf88gzs

Georgian society has less grounds for optimism, as it is unaware of such things as transmission rate, net profit from each HPP and when to expect it and how transparent reallocation of budget revenues will be (will they be spent for building fountains in towns or will they have any positive impact on health or education system). In other words, the society is unaware of winnings and losses as a result of these projects implementation. It will depend on the answers to these questions whether the society would accept the construction of Khudoni HPP at the cost of flooding Khaishi village or construction of Namkhvani HPP cascade at the cost of Namkhvani waterlog.

Answering the above questions is important also for preventing potential conflicts: in 2009, when Ministry of Energy raised the issue of construction of Oni HPP cascade, local population, as well as civil society responded quite harshly. The sponsor's representative had to acknowledge in a conversation, that they did not expect such strong public resistance. Their concern was flooding of farmlands and Racha villages as well as project related geologic and seismic threats.

6. Internalization of external costs

Another major problem is the costs, which are unforeseen but are necessary to compensate the damage incurred to social infrastructure and the environment. Regrettably, external costs often are not included in the project cost and then it turns out that it is state budget and/or local population to bear such costs.

For instance, during public hearings of Khudoni HPP project in 2008 the project cost was estimated at USD 780 million. The project technical group admitted about 25 percent overrun, as they were not sure of reliability of the existing infrastructure. Our analysis showed that external costs (river basin reinstatement, stabilization works, drainage system, permanent monitoring of mountainside erosion, construction of about 30 km motorway, etc.) were not included in total project cost[18].

According to official data, in April 2011 the project cost reached USD 935. Increase in project cost is not surprising but here again, we believe, external costs are not included. According to the statement of Minister of Energy and Natural Resources the investor should present the plan of resettlement of local population. Therefore, it turns out that amount of compensation have been decided without any consultations with affected public.

In the case of Paravani HPP, project implementation will entail drastic change of ecological status of in Paravani river - the project envisages preservation of only 10 percent of the river flow in its present bed; the project also increases the risk of flooding Khertvisi village and its adjacent areas and no mitigation measures are envisaged; the transmission line already hampers access to grazing land.

Baku-Tbilisi-Ceyhan pipeline project has demonstrated vividly that such implementation of mega-projects may cause irreversible damage to local population in both, environmental and social terms. Tsemi village, known for its recreational capacities is a good example - as headwaters were damaged during the pipeline construction works, local population was devoid of safe drinking water and the income from tourists.

In Georgia, unfortunately, political decisions on project implementation are often taken without detailed planning and thorough consideration of pros and cons. As a result it is the population and the environment that become victims of such decisions.

7. Renewable energy and energy efficiency

It should be mentioned that in addition to the development of large hydropower, Georgia has potential for small hydropower development[19]. Small hydropower development can be decentralized, which on the one hand would reduce losses in transmission lines, and on the other, would increase access to energy for local population. Besides, Georgia has high potential of using wind power (about 4,5 TWh technical potential). Wind power is

[18] See: http://www.greenalt.org/webmill/data/file/EIA.pdf

[19] "The analysis of more than 300 rivers of Georgia shows that it would be possible to construct 1 200 derivation type small hydropower plants, of which 700 could be built in western Georgia. The total installed capacity of these plants would equal 3 000 MW, of which 2 000 MW could go to western Georgia, with an annual generation of 16 000 GWh (11 000 MWh in western Georgia)". GEF Small HPP capacity Assessment, 2005, volume II

more and more widely used all over the world, though Georgia has made no steps in this direction.

Regardless the existing potential, it is doubtful that Georgia's energy sector will develop on the basis of renewable energy resources and sustainable energy system will be established. Georgian government's above mentioned initiatives, as well as energy policy document, that states that "utilization of alternative sources of energy on the conditions that application of traditional and alternative sources of energy shall be treated", and where energy efficiency is not, in fact, part of energy sector, give cause to such skepticism.

In our opinion, it is impossible to promote renewable energy development, when traditional and alternative sources enjoy equal opportunities. This approach basically limits the development of alternative sources and totally contradicts to EU practices and principles of alternative energy development. The EU-Georgia Action Plan, signed under European Neighborhood Policy aegis (2006) stresses the importance of adopting law on energy efficiency and renewable energy sources. After signing the Action Plan, no valid national plan on energy efficiency and renewable resources has been developed, leave alone its approval. According to a representative of Ministry of Energy and Natural resources, due to the absence of appropriate expertise, it is not planned until 2012 (it should be mentioned, that in summer 2008 Georgian government suspended USAID financed group working on draft law).

The Action Plan also provides for convergence of country's energy policies with objectives of EU energy policy, in particular development and implementation of well-designed and long-term energy policy, which would gradually be harmonized with EU energy policy objectives, including security of energy supply.

Also noteworthy is that Georgian government has been considering full membership in European Energy Community (EEC) since the end of 2009 (in 2007 it was granted an observer status). Full membership would result in a legal obligation for implementation of the Treaty and the associated EU legislation, including Kyoto Protocol, IPPC Directive (96/61), Environmental Impact Assessment Directive (85/337), Renewable Energy Directive, etc.

In 2010 the Georgian European Policy and Legal Advice Centre developed the preliminary assessment and recommendations for Georgian government regarding obligations steaming from full membership of the EEC[20]. According to the study, Georgia has no legislation at all with regard to a range of issues. The facts and the analysis provided in this document reinforce the need and the importance of the efforts by Ministry of Energy and Natural Resources towards convergence of the Georgian legislation with that of the EU and enhancement of cooperation with environmental authorities.

8. Conclusion and recommendations

All the above allows to conclude that Georgian government tries to support development of "traditional" projects without any proper economic justification (including disregard of external costs); as for renewable energy resources and energy efficiency measures, they are not believed to be essential and urgent matters. It should also be noted that, proceeding from the fact that Georgian government attempts to attract investments for a number of large HPPS simultaneously, the veracity of supporting so called "traditional" projects is also doubtful; this seems to be a problem, provided current economic situation.

Georgia has a long and difficult way ahead to establish a consistent and sustainable energy system. However, we believe there are feasible and urgent measures to be carried out in the nearest future for achievement of declared objectives. In our opinion, Georgian government should:

- initiate development of a new energy policy package in conformity with EU energy policy 2020;
- develop renewable energy and energy efficiency legislation and plan concurrent activities with active public involvement;
- support attraction of investments for rehabilitation of small HPPs and development of decentralized renewable energy sources;

[20] See: http://geplac.ge/newfiles/Environmental%20Implications%20vs% 20ECC_JSarnacki%20May%202010.pdf

- work out Georgian energy sector strategic plan on the basis of environmental impact assessment, to select optimal and environmentally sound models for development of the sector.

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