

GEORGIAN POWER INDUSTRY AT THE BEGINNING OF XXI CENTURY

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Condition of Georgian power industry over the years of 1990-2010 is reviewed. There was power crisis in the country within the years of 1990-2000. Power generation decreased twice, and the consumption – 2,2 times. Higher specific weight of the power losses in the amount of 30-35% of the total consumption was encountered. Power system operated under nonstandard and emergency parameters. The situation improved since 2005. The power generation would increase annually and its growth achieved 16,6%. The results of the last eight months of 2010 achieved as a result of the reform and reasonable technical-economic policy run in the field and the support of the European community are very impressive.

Twenty projects for hydropower plants are being implemented. Construction of number of hydropower plants, power transmission lines and sub-stations has been commenced. Implementation of current and future investment projects provides steady basis for the further development of Georgian power industry and the country's future.

Key words: Power balance, water resources, alternative sources, energy-intensive technologies, transmitting systems.

Georgia suffered power crisis over the last decade of the XX century. Over 1990-2000, power generation in the country dropped almost twice and power consumption – 2,2 times. Over 1990-1997, it decreased 8,8 times in the industry and 5,2 times - in the transport. Analogous tendency was observed in the agriculture. In 1997, annual consumption here made 14,4 kW/hr, in the construction – 38,1 million, in communal services – 384,1 million, etc. The power consumption increase was observed in just residential sector – 2,5 billion kW/hr in population making 33,5% of the total consumption, i.e. 1,5 times more energy was consumed than it was consumed by the industry, agriculture, transport, construction and communal services all together.

Speciality of the energy balance in Georgia was also the relatively high specific weight of “losses”. For instance, in 1994 the losses in the public networks made 31,3% of the total consumption and 35,4% of the total power generation.

In such conditions the power system had to work under nonstandard and emergency parameters which appeared to have destructive effect on its appliances and power equipment. Power industry of the Republic faced extremely complicated problems. Due to the absence of necessary sources, maintenance works at the power units were almost shut; problems arose in fuel supply of the power stations too. Power consumption became uncontrollable. There was extremely unfavorable situation in the field of recording and payment for the power consumed by the population. It was impossible to succeed to consume the existing capacities at a maximum level. In early 1995, the capacity of all kinds of the power stations made 4800 thousand kW/hr, when the power stations with the total capacity of 1800 thousand kW/hr, i.e. 28,7% were in working condition. Power crisis within these years achieved peak. The consequences were: economic destabilization, total breakdown of discipline in the field, robbery at power units, qualified employee turnover and other negative phenomena.

Due to the interruption of natural gas supply to the power industry of the country, it was necessary to fulfill the functions unusual for it, such as: heating of the building, cooking, and hot water supply. In technologic cycle, fuel at some plants, especially at the bakery plants and bakeries that were founded in large quantities, was replaced by the electric

power. Power consumers were unable to pay for the power consumed at the plants, demand on power decreased dramatically. At the same moment, the power consumption by the population significantly increased: power was without any control supplied to both payers and non-payers. Revenues in the field ranged within 15-20% due to which the number of capital and current maintenances at the power units, input of new capacities, issuance of salaries to the workers and employees decreased dramatically. Plant facilities functioning by inertia operated with outmoded and energy intensive technology. The supply of electric power here appeared to be a favorable factor for producing noncompetitive product. As a result, not only the field and the consumers, but the entire country bore significant losses, debts were accumulated the significant share of which could have been reflected in tariff forming in future.

Acute crisis in the power industry was accompanied by compromising approach from the state's side and, which is the most important, by introducing inconsistent pricing policy. Electric power was supplied to the consumers at artificially reduced rate.

The situation in the field almost did not improve within the first years of the XXI century. Over 2000-2004 the power generation even decreased by 10%, and the consumption increased by almost 1%. Therefore, power shortage increased up to 1,2 billion kW/hr in an annual profile, i.e. the shortage increased three times. It was necessary to increase the power import twice (up to 1,2 billion kW/hr), and of course, there was no export at all (see table).

Table

Power Generation and Consumption in Georgia Over 2000-2010, in million kW/hr

Year	Generation	Including		Consumption	Balance (+) (-)
		HPP	TPP		
2000	7446,0	5953,0	1493,0	7847,0	-401,1
2001	6942,0	5531,0	1411,0	7296,3	-354,3
2002	7256,0	6767,0	489,0	7724,7	-468,7
2003	7163,8	5723,0	1440,0	7898,0	-735,0
2004	6706,0	5892,8	813,2	7916,0	-1210,0
2005	6880,8	5850,2	1030,6	7842,8	-962,0
2006	7419,9	5316,1	2103,8	8114,9	-695,0
2007	8169,5	6724,5	1445,0	7973,3	+196,2
2008	8279,1	7053,6	1225,5	8248,5	+30,6
2009	8278,1	7314,6	963,5	7783,5	+494,6
2010 (8 month)	6184,4	5898,1	286,3	5766,8	+417,6

Positive changes in the power industry were observed after 2005. The power generation from this period would annually increase and in 2009 achieved 8278,1 million kW/hr. In comparison with year 2005, growth made 16,6%. Respectively, the import volume reduced 5,5 times and export increase 6,2 times. If the share of import in the total power generation made 16,7% in 2005, this figure in 2009 decreased to 3,9%, i.e. by more than 5 times. Under contemporary conditions of the economy development, its surplus is already observed in the power industry balance. Such a tendency has been recorded since 2007 and the surplus in 2009 achieved almost 500 million kW/hr.

Positive role in this process was plaid by efficient and rational power consumption. Consequently, over 2005-2009, the power consumption in the country reduced by 7,1%.

The results of the last eight months of 2010 are more impressive. 6184,4 million kW/hr electric power was produced within this period in Georgia; this exceeds the demand by

417,6 million. It is obvious from the table that the power demand in the country today is not only satisfied by the generation of the hydropower plant, but its significant portion is exported.

The export is mainly conducted in Autumn-Summer period when there are excess water resources. Main export direction is Turkey and Russia and Armenia too. Significant portion of power (4,5 and more billion kW/hr) is generated by regulating hydropower plants. This year more than 1,2 billion kW/hr power was exported within the eight months.

In 2010, from February till September, thermal power plants actually did not operate – within the last 6 months they have generated just 14 million kW/hr power. Compared to the export, the amount of imported power was scanty too and within the eight months of this year it made just 38,6 million kW/hr.

The results achieved are conditioned by the reforms run in the field, weighted technical-economic policy and the support provided by the EU countries.

Key problem of the long-term state policy in Georgian power industry is total satisfaction of the country's power demand on the account of local water resources. The import and heat generation is limited as much as possible. Well-directed development of rich water resources is conducted.

By now (by October 2010) about 20 projects of hydropower plan construction are being implemented. Its implementation will allow the country to put into the operation the power plants with total established capacity of 2015,3 thousand kW/hr and annual power generation of 6452,78 kW/hr. Below is a list of such hydropower plants:

Hydropower plant	Capacity, thousand kW/hr	Generation, kW/hr
Chorokhi-1	24	152
Chorokhi-2	24	152
Khelvachauri	22,4	144,1
Kirnati	14,4	96
Bakhvi	6	35
Kura	43	200
Khudoni	750	1500
Aragvi	8	50
Khobi-1	46,5	247
Khobi-2	39,5	223
Paravani	78	425
Namakvani HPP system:	450	1677
Tvishi	100	403
Namakhvani	250	928
Zhoneti	100	346
Lukhuni-1	10,8	66,07
Lukhuni-2	12	73,58
Lukhuni-3	7,5	46,03
Kvirila	5,2	22
Zoti	36	144
Nenskra	438	1200

For the construction of the listed hydropower plants, the required investments will approximately make 3,1 billion. The construction is carried out by various countries. The investors are the representatives of Turkey, Czech Republic, South Korea, India, and

Estonia. It should be noted, that the construction of 8 hydropower plants (Kura, Aragvi, Khovi-1, Khobi-2, Lukhuni-1, Lukhuni-2, Lukhuni-3, Nenskra) is fulfilled by Georgian companies. The construction of the hydropower plants will be carried out at different times. The construction of number of hydropower plants (Bakhvi, Kura, Paravani) has already been commenced. It is estimated to complete the construction of Bakhvi hydropower plant in June 2011, Paravani hydropower plant – in June 2013, Kura hydropower plant – in September 2015.

The development of rich water and power resources of Georgia is a non-stop process. The list of 36 hydropower plants to be constructed as the potential alternative sources is provided on the web-site of Georgian Ministry of Energy (www.minenergy.gov.ge). Within the scope of the state programme “recoverable energy-2008”, Georgian Ministry of Energy expressed its interest in the construction principles, operation and ownership form. Respective terms and conditions are specified as well. In particular, within 10 years from putting the power plant into the operation, the power generated by the hydropower plant annually, within the three winter months, in a total volume should be realized for satisfying just internal needs of Georgia. During the reminder months of the year, the investor should be free in its market choice.

Under the relevant Memorandum, it is agreed that each year, within the three winter months, the sales of the electric power should be conducted according to the decision of the responsible person and should be sold to any buyer in Georgia at free tariffs. Under another option, the sales can be conducted under the agreement with the commercial electric power system operator, where the tariff is identified in accordance with the applicable law.

All the obligations of both the state and the investor are thoroughly specified in the Memorandum. The Memorandum is executed in compliance with earlier approved standard forms and is strictly binding for both parties to fulfill the specified requirements.

Creation of new capacities in the power generation indeed includes the construction of new power transmission lines and sub-stations for both their inclusion in the existing power system of the country and for switching them to the foreign power systems. New capacities should contribute to the growth of reliability and energy safety of the power supply, liquidation of still existing faults in the power supply and the reduction of excessive (supernormal) power losses.

One of the main tasks of the long-term policy of Georgian power sector is effective switching of the country’s power complex into the operation of import-export and transit of energy substitutes. From this viewpoint, the most actual issue is the development of the transmission systems. For this purposes, it is anticipated to:

- construct 400 kW power transmission line “Meskheti” from Alakhadze to the Turkish boarder (length 34 km);
- complete the construction of power transmission line “Zekari” (length 59 km) from “Zestaponi-500” sub-station to Alakhadze;
- complete the construction of 500 kW power transmission line “Vardzia” (length 188 km) from “Gardabani-500” sub-station to Alakhadze;
- construction of “Alakhadze” sub-station with the capacity of 500, 400 and 220 kW with direct current switching facilities.

Rehabilitation of the infrastructure connecting the Georgian power system with the power system of the neighboring countries as well as the construction of new power transmission

lines, sub-stations and direct current switching will ensure the stability of the power supply system, effective use of water-power resources, provision of the power safety, increase of the export of the excessive primary energy. It can create wonderful opportunities for the transit of the electric power from Russia to Azerbaijan, help to grow the interest in the power sales and expand it in the Black Sea region, help to increase diversification of the power supply.

The implementation of the ongoing and future investment projects will create solid basis for the further development of Georgian power industry and the country's future.

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