

### Information on the Energy Sector of Afghanistan

#### *Situation of the energy sector of Afghanistan at the end of the 80-s.*

Energy sector of Afghanistan was poorly developed. Only 6% of the country's territory was electrified and only 9% of country's population could use electricity. Annual production of electric power per capita made less than 70 kW/h.

According to the data of 1985 installed capacity of the power production sources of Afghanistan was as follows:

- HPP – 261 MW with average annual production of 585 mln. kW/h
- HPP – 51 MW with average annual production of 237 mln. kW/h
- Gas-turbine PP-103 MW with average annual production of 228 mln. kW/h
- DPP - 65 MW with average annual production of 40 mln. kW/h
- TOTAL : 480 MW with average annual production of 1090 mln. kW/h.

High-voltage distribution lines of Afghanistan with a maximum voltage of 110 kV included 5 substations of 110 kV with total transforming capacity of 293 MVA, 17 substations of 35-44 kV with total transforming capacity of 45 MVA, 737 km of high-voltage lines of 110 kV and 690 km of high-voltage lines of 35-44 kV.

Summary demand in electric power in that period was about 1500 mln. kW/h, that's why there were constant limits in the power networks.

Energy system existed only in the central region of the country (region around Kabul). Three hydro power plants (Naglu, Makhpar and Sarobi) with a total power of 188 MW and two gas-turbine power plants (1 and 2) with established capacity of 88 MW were a part of 'Kabulenergo'. On the rest of the territory of Afghanistan there were small independently working energy sources. In the north in the area of Mazari-Sherif ('Balkhenergo') there was thermal power plant belonging to the plant of nitrogenous fertilizers with capacity of 48 MW. In 1985 a high-voltage of 110 kV from Amuzang (in Uzbekistan) to Mazari-Sherif had been put into operation. At Djar-Kuduk gas field in the area of Shibergan gas-turbine station was in operation with capacity 12 MW. In Bagkan province two HPP were operated: Puli-Khumri I with capacity of 4,8 MW and Puli-Khumri II with capacity of 9 MW. In 1986 from Tadjikistan to Kunduz a high-voltage line of 110 kV had been put into operation (temporarily at 35 kV). HHP Kadjaki with capacity of 33 MW, constructed in the southern part of the country, was providing with electricity the area of Kandagar city till 1981 and stopped its operation because of the damaged high-voltage lines of 110 kV and substation of 110 kV around Kandagar. In 180 km from the city of Gerat construction of the HHP Salma with capacity of 40 MW had begun, but wasn't finished.

Starting from 1963 and till the year of 1989 'Sredazenergosetproject' (former 'Energosetproject') actively participated in the design of power networks grid of Afghanistan.

For the said period the following facilities have been designed: substation 'Vostochnoya' of 110/15 kV in Kabul; 'Naglu-Kabul' high-voltage line of 110 kV; 'Puli-Khumri – Ballan - Kunduz' high-voltage line of 35 kV with substations of 35 kV in Baglan and Kunduz; 'Gosgranitsa – Mazari-Sherif' high-voltage line of 110 kV with substation of 110 kV in Mazari-Sherif; substation of 110 kV in Puli-Charhi; high-voltage line of 220 kV to Kholm with substation of 220/110/10 kV in Kholm; 'Gosgranitsa – Kunduz' high-voltage line of 110 kV and a number of other power network facilities. Design of the power transmission line of 220 kV 'Uzbekistan – Kabul' with substations of 220 kV in Puli-Khumri and Kabul started but was not completed.

*Prospects of Afghanistan's energy sector development, outlined in the end of the 80-s.*

In view of the absence of prospected and available for strong energy sector fuel resources and also because of the scarcity of suitable for power engineering hydro resources the focus was made on the power supply from the Central Asian republics to Afghanistan.

Development prospects of the energy sector of Afghanistan were elaborated by 'Sredazenergoprojekt'.

In 1977 the 'Diagram of power supply of the northern region of Afghanistan' has been developed.

In 1978 the 'Feasibility Study on construction of ore-mining and processing plant in Aynak. External power supply' has been developed.

In 1979 the 'Diagram of power supply of Kabul region' has been developed.

In 1987 the 'Feasibility Study on cascade of HHP Sorobi-2 on Kabul river' and its chapter 'Connection to the power grid' has been developed.

Development prospects of the power networks of Afghanistan are shown on the "Map of the power grid of Afghanistan", see Annex 3.

Western Afghanistan (Gerat region) was supposed to be supplied by power from Turkmenistan (from substation of 220 kV in Takhta-Bazar).

Central part of Afghanistan was supposed to be supplied with power from Uzbekistan by double-circuit power transmission line of 220 kV with a length of more than 400 km from 500 kV substation in Surkhan till Kabul with intermediate substations of 220 kV in Kholm and Puli-Khumri. This power transmission line was supposed to provide a power capacity of 200-230 MW and electric power of 1,0 – 1,2 bln. KW/h. Implementation of this project has been started. The first section of 220 kV high-voltage line till substation in Kholm has been designed and constructed to a significant extend. Design of the other sections of transmission line was begun. Studies on the climatic and avalanche conditions in the area of Salang mountain pass have been conducted. Also there were surveys on selection of the route of the 220 kV high-voltage line and the grounds for 220 kV substations in Puli-Khumri and Kabul. However, the working design of the line from Kholm to Kabul was not completed.

North-East region of Afghanistan was supposed to be supplied with power from Tadjikistan by 110 kV high-voltage line till Kunduz.

Besides the above mentioned power transmission lines going from the countries of Central Asia, the drawings on development of the energy sector of Afghanistan were envisaging construction of a number of their own energy sources, in particular HPP Sarobi-2 on Kabul river with capacity of 90 MW with an output of 300-350 mln. kW/h, HPP Bagdara on Panjsher river with an output of more than 1,0 bln. KW/h, coal fueled TPP Samangan with capacity of 200-300 MW and a number of others.

During the elaboration of the development prospects of the energy sector of Afghanistan it was determined that under favourable conditions of country development the growth of electric power consumption for the 20-year period can rise from 1,5 to 5-6 bln. KW/h.

D.I. Kulbatsky  
Chairman of the Board  
'Sredazenergoprojekt'

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