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Research Article

THE ROLE OF THERMAL POWER PLANTS IN THE DEVELOPMENT OF THE ENERGY INDUSTRY OF UZBEKISTAN

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ABSTRACT

The article presents information about the role of thermal power plants in the development of the electric power industry of Uzbekistan, the history of the TPP, modernization work carried out during the years of independence.

KEYWORDS

Electric power industry, electric power, electric sources, power station, fuel energy industry.

INTRODUCTION

In Uzbekistan, ekonomikietining expects to carry out major repairs. Mr. yilarida Uzbekistan power engineering of Gorno-Badakhshan Autonomous Region. Uning is compiled by loiha, kurilish-installation, construction, repair and energy foidalanish existing enterprise.

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MATERIAL AND RESEARCH METHODS

By 1993, due to the introduction of large production capacities in thermal power plants, the installed capacity of the electrical system reached 11 thousand. 52 billion a year. The possibility of generating more than kWh of electricity was created [24].

As a result of the construction of large NPS, the installed capacity of the energy system in Uzbekistan in 2005 reached 12.0 thousand MW.

Due to the great work done in Uzbekistan on the electrification of production, the production of electricity is growing from year to year. If in 2000 in Uzbekistan 46 bln. kWh of electricity was produced, compared to 49.3 billion kWh in 2002 alone [5, 165], an average of 48-57 billion kWh per year in 2000-2007 [2, 17], and 51 billion kWh in 2009, 50.6 billion kWh in 2010 and 51.4 billion kWh in 2011. hours [11, 21]. By 2014, the country produced 137,000 kWh of electricity per day. This is 140 times more than the electricity generated in 1940 [13, 26].

Scientists and specialists of the energy industry of the republic have developed the "Concept of development of electric power of Uzbekistan". According to this concept, in 2010 56 bln. kWh of electricity is generated. At the same time, the main part of the growth was due to thermal electricity.

From 1991 to 2017, the capacity of the main power plants in Uzbekistan increased from 11 MW to 12.5 MW. The development of electricity was accompanied by the expansion of industrial production, modernization and technical re-equipment of various sectors of the economy (oil and gas), the creation of new energy-intensive industries - railway engineering, automotive. Geographically, the manufacturing sector is characterized by high levels of concentration in two regions: Syrdarya (accounting for about 1/3 of total production) and Tashkent (about 40%) [9].

In 2010-2011, 11.5 mln. 37 thermal and hydroelectric power plants with a capacity of kW. They generated more than 55 billion kWh of electricity per year. The length of power lines was more than 228 thousand kilometers [7, 369]. The total capacity of the network transformers was 42.6 MW [12, 30].

The share of thermal power plants in the installed capacity of the energy system of Uzbekistan exceeds 85% [6, 146] and is 22.52% higher than the world average [18, 70]. These thermal power plants generate 17 billion kWh of electricity per year. m3 of natural gas is consumed [20, 3].

The basis of the power system is large power plants such as Syrdarya, Navoi, New Angren and Tashkent Thermal Power Plant [17, 3]. These power plants are equipped with more than 30 modern power units with a unit capacity of 150 to 300 thousand kW [16, 14]. Natural gas is the main fuel for thermal power plants in Uzbekistan. In 2002, natural gas accounted for 84.7% of the total fuel used by thermal power plants, liquid fuel oil for 11.1% and coal for 4.2%. From 2002 to 2012, the number of electricity consumers in the country increased from 1 million to 5.5 million. In 2012, the demand for electricity amounted to 59.3 billion. kWh, which is 66.7 billion in 2019. kWh. From this it can be seen that the demand for electricity increased by 12% during this period. In turn, the value of electricity generated in 2012 amounted to 52.9 billion kWh, while by 2019 it will produce 63.5 billion kWh. Based on these figures, the electricity generated and the demand for it differed by 12%, but by 2019 this figure had decreased to 5% [15, 11-12].

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The main demand is for industrial enterprises (about 40%) and agriculture (20-25%). The share of households was 20-25%, while that of commercial organizations was 5%.

The largest thermal power plants of the republic are Syrdarya TPP with 3000 MW, Yangi-Angren TPP with 2100 MW, Tashkent TPP with 1920 MW, Navoi TPP with 1250 MW, Takhiatash TPP with 730 MW [3, 125] . They are equipped with more than 30 modern power units, each with a capacity of 150 MW to 300 MW [22, 9].

With the commissioning of 500 kW Sogdiana substation with a total capacity of 1002 MVA in Samarkand region, the quality of electricity supplied to consumers has been improved, electricity transmission losses have been reduced, electricity transmission losses have been reduced by 200 million kWh [14, 11].

In December 2000, the Government of Uzbekistan approved the "Plan for the development and reconstruction of energy generating capacity in the energy sector of the Republic for 2001-2010."

The plan envisages the renovation and reconstruction of Syrdarya, Tashkent, Navoi thermal power plants, Tashkent and Mubarek thermal power plants, including the use of gas and gas turbine equipment. Following the adoption of the plan, two units of the Syrdarya TPP were re-commissioned (the unit's capacity was increased to 360 MW) with a loan from the European Bank for Reconstruction and Development (ERRB). As a result, the capacity of each block was brought to the project cost, ie 49 thousand tons per year. fuel and energy savings of more than 60 MW [19, 25]. The Tashkent Thermal Power Plant Renovation Project was implemented with a soft loan from the Government of Japan. The commissioning of Unit 1 of the Talimarjan Thermal Power Plant in 2005 with a capacity of 800 MW will reduce the energy intensity of the Samarkand-Bukhara power grid and will provide 320,000 kWh per year. fuel and energy are being saved. At the same time, a 500 kV substation with transformers with 1002 MV was put into operation [4, 5-6].

In addition, Uzbekenergo has modernized a number of thermal power plants:

1. In 2001, at the expense of the EBRD, the first phase of construction of two power units No. 7 and No. 8 of Syrdarya TPP was completed with Siemens for $ 27.8 million. To increase the efficiency of the power unit, the power unit control system was reconstructed with the transition from mechanical control to automation. As a result of the reconstruction, the capacity of the power unit was increased to the design capacity of 300 MW [1, 24]. By increasing the actual capacity of the units to 60 MW, reducing the specific fuel consumption to 40 g / kWh, the operating efficiency of the power units was increased.
2. According to the program developed on the basis of the Resolution of the President of the Republic of Uzbekistan "On priorities for the development of industry of the Republic of Uzbekistan in 2011-2015", major modernization projects have been implemented at the Syrdarya TPP. In particular, in accordance with the program, modernization and reconstruction of 2 power units of the station was carried out. As a result, their service life was extended to 20 years. In addition, the $ 60 million project saved more than 120,000 tons of fuel in 2015 alone, reducing costs by 10 percent. After this modernization, the management and control of the 1st boiler-turbine shop was transferred to an automatic system [21, 1-2]. Due to these projects, the company has the opportunity to generate an additional 50 megawatts of electricity. In addition,

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the amount of conventional fuel used to produce one kWh of electricity has been reduced, and the cost of this has been significantly reduced. As a result, more than 30% of the electricity generated in the country, ie an average of 15 billion kWh per year, was generated at this station and delivered to the economy and the population.

3. In 2002, the Government of the Republic of Uzbekistan and JBIC signed an agreement on the modernization of the Tashkent TPP. Under the agreement, the Japanese government has allocated a soft loan of 24.955 million Japanese yen. The project envisages the construction of a combined heat and power plant with a capacity of 370 MW and 78 Gcal-hours of heat at the Tashkent Thermal Power Plant. The project was completed in 2007. The launch of the steam-gas plant has resulted in an annual saving of 300 million m3 of natural gas [19, 40].
4. The Navoi TPP modernization project envisages the construction of a modern steam and gas unit with a capacity of 360 MW. The total cost of the project is $ 232 million.
5. The purpose of the investment project of Mubarek TPP was to reconstruct and expand the existing capacity of Mubarek TPP with the commissioning of 2 gas-turbine units with a total capacity of 106.3 MW of electricity and 400 tons of steam per hour. The total cost of the project, according to the feasibility study, is $ 103.2 million.
6. The main purpose of the modernization of the main transmission lines was to effectively meet the demand for electricity in Central Asia. The project includes the rehabilitation of 500 kW substations and distribution equipment, modernization of dispatching and communication facilities, installation of cross-border meters and their control systems. The Asian Development Bank has provided $ 70 million and the EBRD $ 47.5 million for the project.

In addition, in accordance with the program for the development of the energy industry in 2009-2015, the government has done a lot to build new energy facilities, power transmission lines and the reconstruction of existing ones. In particular, the power unit with a capacity of 800 MW at the Talimarjan thermal power plant in 2005 and the thermal power plant at the Navoi thermal power plant with a capacity of 478 MW in 2012 ($ 351 million loan from the Fund for Reconstruction and Development of Uzbekistan; with its own funds, financed by $ 46.8 million in loans from Uzbek banks) [26], a steam-gas plant was launched, which will reduce conventional fuel consumption by 1.5 times and save 300 million cubic meters of natural gas. Projects on construction of steam and gas equipment with a capacity of 250 MW to 450 MW were implemented at Talimarjan, Navoi and Takhiatash thermal power plants [8, 2]. In addition, two steam and gas power plants with a total capacity of 900 MW were built in Turakurgan district.

Prospective projects implemented in the energy system have also become an important factor in the rapid development of production and improving the welfare of the population. This can be clearly seen in the example of large-scale measures taken on the ground. In particular, the Turakurgan Thermal Power Plant, built on 76 hectares in the village of Shohidon, Turakurgan district, is one of such large projects. It is planned to improve the power supply in the Fergana Valley through this facility, the construction of which began by a special decree of the President. The necessary equipment for the station was provided by the Japanese agency JICA. The first phase of the $ 1 billion 195.9 million project is scheduled to launch the most modern steam and gas turbine with a capacity of

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450 mV by 2017. [10] According to experts, in 2016, the demand for electricity in the Fergana Valley regions amounted to 1,700 MWh. By 2030, with population growth and manufacturing sectors, this figure is expected to reach 1,900 mV per hour. The capacity generated at the Turakurgan thermal power plant fully meets this need. Another important aspect is that 726.9 million cubic meters of natural gas are saved annually thanks to the most advanced technologies.

Uzbekistan has Fergana, Mubarek and Tashkent thermal power plants (TPPs), which generate heat at the same time as electricity. Fergana Thermal Power Plant has a capacity of 330,000 kW, Mubarek IEM 60, Tashkent IEM 30,000 kW.

CONCLUSION

Energy is the lifeblood of the economy. Therefore, the development of this sector is one of the most pressing issues. Today, the country has power plants with a total installed capacity of 14,000 megawatts, which will reach 20,000 megawatts by 2030. In other words, today's annual demand for electricity is 59-60 billion. At a time when kWh, by 2030 this figure will reach 107 billion. kWh.

Also, as a result of the development of economic sectors and the growing needs of the population in our country, the demand for electricity is growing day by day. In 2000, one household user used 114 kWh of electricity per month, while in recent years this figure has risen to 200 kWh. Today, the share of the population in the total use of electricity in the country has reached 26.5%. In 1990, this figure was 13.9 percent [20, 3].

A stable and uninterrupted supply of energy resources is essential for any economic development. Unless the power supply is perfected, remote areas of Uzbekistan will remain financially risky for entrepreneurs.

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