Technological aspects of state regulation of the development of power engineering

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Abstract. The article discusses the reasons for the unsatisfactory state of the technical, technological and sectoral structure of power engineering. The importance of power engineering as the most important branch of the domestic industry, providing the release of high-tech equipment for various types of power plants and industrial energy, is substantiated. It is revealed that ensuring timely progressive transformations in this industry is the most important task of state regulation of the economy.

In recent years, some positive trends in the development of domestic power engineering have been traced. Judging by the statistics of the last few years, positive growth rates have been observed in such important segments of the power engineering industry as AC motors are multi-phase, universal motors. Also increased the production of generators for steam, gas and hydraulic turbines. However, the natural production volumes of the main types of power equipment, which have not yet reached the values of the pre-reform period, testify to the unsatisfactory dynamics of the production of a number of products. This is especially true of such production segments of the studied industry as the production of turbines, centrifugal, steam and drive pumps, alternators and electric machines. In addition, there is an accelerated moral and physical aging of the basic production assets of the studied industry. So, the degree of wear of machinery and equipment of power engineering enterprises at the end of the first decade of the 21st century already reached 75% [6]. At the same time, high-performance power engineering equipment is concentrated mainly in the production of gas turbines, which is relatively new in the industry under consideration.

The increasing role of the state in solving structural problems of the economies of developed countries in the early 1980s, objectively increased the attention of domestic and foreign scientists to the problem of the development of state regulation of structural processes. In the course of the structural transformation of the domestic economy of industry, there were changes in government regulation, which were accompanied by the accumulation of numerous structural deformations, a significant reduction in state support for the development of power engineering, and an increase in the country's scientific and technical and technological dependence on supplies of foreign technologies and equipment, and a decrease in the national security of energy supply.

The analysis shows that the main reasons for this situation are not only a significant reduction, and sometimes a complete cessation of state support for the development of power engineering, but also mistakes made in:
- Privatization and privatization and price liberalization;
- ...
· Changes in the regulatory framework for structural change and enterprise restructuring;
· Implementation of adopted government programs in the field of structural reforms in the industry and enterprise reform [3].

The structural transformation of the power engineering industry is constrained by the presence of a number of problems, the most important of which is the wear and tear of machinery and equipment of power engineering enterprises, which reaches critical values.

Another problem is that the price of domestic equipment exceeds the level of prices for similar Chinese equipment and is almost equal to the prices of American, European, and Japanese companies. In addition, the domestic market of power engineering is poorly protected, the average rate of duties on power equipment is from 5 to 15%.

It is obvious that progressive structural changes in industry cannot occur without the implementation of changes at the microeconomic level. That is why the most important sphere of state regulation of structural transformations of the economy is the stimulation of investment and innovation activities of industrial companies, which largely implies their restructuring.

In view of the growing openness of the national market, on the one hand, and tougher conditions of competition in the world market, on the other hand, the commitment of power engineering enterprises to the innovative type of development becomes a key factor of competitiveness, and strategic management of innovations is an important task of restructuring, the implementation of which largely depends on investment activity power engineering companies. Meanwhile, in our country, the share of the state budget for technological innovations over the past 7 years has decreased by 13.6%. The share of own funds of enterprises is also actively reduced [5].

A number of key documents are called upon to reform the power engineering industry; a number of key documents are devoted to the industry:
- Strategy for the development of the power engineering industry of the Russian Federation for 2010–2020 and for the future until 2030;
- subprogram Power Electrical Engineering and Power Engineering "of the State Program" Development of Industry and Increasing Its Competitiveness for the Period up to 2020

The main objectives of the Russian power engineering development strategy are:
- elaboration of coordinated actions of state authorities of various levels and business in key areas of development of power engineering in the medium and long term;
- identifying promising areas for the development and adjustment of the legislative and regulatory legal framework for the development of power engineering;
- development of a set of measures aimed at creating and introducing new types of competitive unified innovative equipment for power engineering at power generation enterprises, which, by its technical and operational characteristics, will ensure competitiveness in the global market for power engineering equipment, import substitution and enhancement of energy security and efficient use of fuel and energy resources and functioning electric power one complex of Russia.

As part of the implementation of the strategies, the tasks should be solved, allowing to achieve the following results:
1. Creating a system of innovative development of the electric power industry on the basis of the scientific, technical and innovative potential of the domestic power engineering industry and the use of public-private partnership mechanisms.
2. Creating a competitive new equipment and technology to address the strategic objectives of the development of the power industry, ensuring safe and reliable operation of the UES of Russia.
3. Overcoming the technological lag of the Russian power engineering industry from the world's leading manufacturers based on the development of 66 innovative developments of high-tech energy-efficient equipment and the modernization of power engineering enterprises.
4. Creation of an organizational and technological infrastructure conducive to the effective creation and introduction of new equipment and technologies for solving the strategic tasks of the development of the electric power industry.
5. Creation and development of a network of engineering centers of power engineering to ensure an integrated approach in the process of creating and implementing high-tech equipment for the power industry in the framework of investment projects.

6. Maximum localization at domestic enterprises of the production of power engineering equipment manufactured under licenses from foreign manufacturers or in the framework of joint ventures with foreign participation.

7. Creation of equipment for new highly efficient environmentally friendly technologies for the production of electrical and thermal energy.

8. Improving the reliability, survivability, manageability and efficiency of the power industry, incl. the creation of high-tech equipment and software and hardware for modern intelligent electric power systems.

9. Creation of equipment and technologies for the implementation of effective energy-saving measures, reducing electricity losses in electricity and heat in heat networks.

10. Development of information and telecommunication infrastructure of power engineering in order to accelerate the process of developing and introducing new types of equipment.

11. Creation and implementation of modern systems for diagnostics and monitoring of process equipment at electric power industry facilities.

12. The introduction of a system of training and staff development for enterprises of power engineering.

13. Implementation of the priority areas of scientific and technological progress in the power engineering industry, as defined in the Energy Strategy of the Russian Federation for the period up to 2030 and the General Scheme.

14. Improving the regulatory framework in the field of power engineering.

15. Development of the technical regulation system in power engineering.

In March 2015, the Ministry of Industry and Trade of Russia approved an action plan for import substitution in the field of power engineering, cable and electrical industries of the Russian Federation. In accordance with this plan, the development of the following areas (products and technologies) is planned:

In the power engineering industry: - gas turbine plants of various capacities, especially large power from 100 to 200 MW, gas turbine blades, steam and hot water boilers, equipment for renewable energy sources (wind-generating plants, photovoltaic modules).

In the electrical industry: 70 - transformers, autotransformers, reactors, complete switchgear and devices for switching, control and protection of electrical circuits for a class up to 750 kV, measuring current and voltage transformers, equipment for automated control systems, relay protection and automation, automated systems management and communications; - pumping equipment, electric motors for pumping, ventilating compressor equipment and driving systems in power engineering; - batteries of various types, the creation of new materials for the production of batteries; - diesel generators and gas piston installations with a capacity of more than 100 kW, generators for gas turbine and diesel generator sets with a capacity of up to 1 MW; - “dry” cooling towers for power units of 125-235 MW; - gas cleaning and dust removal equipment.

In the cable industry: - high-voltage cables and materials for them, cables for offshore installation, aeronautics, nuclear, oil and gas industries, optical fiber for optical cables, heat cables.

Equipment imports to the Russian Federation currently for some items range from 100 to 60%, as part of the implementation of the plan for import substitution, it is planned to reduce it to 80-30%.

The primary task, which today is being solved by measures of state elimination of critical dependence on foreign technologies and equipment in the electric power industry. It is necessary to implement a set of measures that would allow the development of technologies and the growth of the production of Russian equipment for the electric power industry.

Thus, it is obvious that power engineering as a type of economic activity is a priority in the Russian Federation, the development of which is directed by a special subprogram “Power electrical engineering
and power engineering” of the State program “Development of industry and increasing its competitiveness for the period up to 2020”.

To create modern competitive products in the field of power engineering it is necessary to carry out a full innovation cycle: basic research - applied research - experimental development - pilot samples - production.

The Russian Federation approved a plan for import substitution in power engineering, which reflects the main product niches of the development of the power engineering industry and related industries.

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