Technological Innovation and Energy Saving In Light Industry

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Abstract — This article provides analytical information on energy saving measures in the light industry and textile industry in Uzbekistan.

Keywords —light industry, energy consumption, energy resources, fibers and products, enterprises in the light industry.

Introduction

In 2020, there was an increase in the production of light industry products. The index of textile and clothing production amounted to 107.3%, and the production of leather and footwear - 116.7%. The financial results of the industry, as well as production indicators, have a clear tendency to improve. The total volume of commercial products in 2020 in actual prices for textile and clothing production increased, exceeding the same value of the previous year by 33.8%, in the production of leather and footwear, exceeding the same value of the previous year by 21.3%. The amount of profit for the textile and clothing industry increased 5 times. The level of profitability of production in light industry remains low. In 2020, it was less than 3%, in fact, reflecting the lack of development potential.

The price competitiveness of light industry products is low. Light industry products are experiencing fierce competition in the market, which is mainly associated with the pressure of cheap semi-legal or illegal goods imported without paying any duties and taxes. It is very difficult to increase free prices for light industry products. Shadow producers receive additional profits as a result of avoiding all types of taxes (VAT, UST, income tax, etc.). Consumer prices for light industry products are significantly influenced by the pricing policy of trade organizations. Under these conditions, enterprises in the light industry, especially in the textile industry, are forced to reduce production prices by reducing the cost of producing goods, excluding energy-intensive products from production, reducing the average wage below the industry average, etc.

Materials and methods

Light industry is a non-energy-intensive industry. The structure of costs for the production of light industry products in 2018–2020. was quite stable. The share of material costs remains at the level of 66.58–63.8%. In 2020, the decrease in costs amounted to 2.7% against 2018. The main share is made up of costs for the purchase of raw materials, materials, purchased semi-finished products and components - 53.89–53.8%, respectively. A significant part in 2020 was the cost of imported materials, the share of which has increased over the past three years from 4% to 6.8%.

The share of costs for energy consumption in 2020 is 7.56% against 7.42% in 2018. The share of costs for the consumption of natural gas and coal in the cost structure is small, the share of costs for the consumption of electricity and heat amounted to 2018 and 2020 year, respectively, 5.52% and 5.58%. In 2020, there is a slight increase in the share of labor costs. In 2018, it was 18.96%, and in 2020 - 20.3%. However, the growth of the average monthly wages in the industry lagged behind the average Russian indicators. The impossibility of a significant increase in the share of wages and other items of expenditure is due to the need to reduce costs in the face of increased competition, both from illegal imports and from the shadow sector.

The analysis of the costs of light industry for energy resources for 2018 and 2020, respectively, shows that there was a reduction in the cost of electricity in the light industry. At the same time, in the light industry there is an increase in the cost of gas consumption due to the production of clothing, dressing and dyeing of fur. The costs of light industry for natural gas in 2020 compared to 2019 increased by 15% on average in the industry.

An increase in the average wholesale price of gas for light industry by 1.5 times by 2021, and up to 100% for electricity by 2021 compared to the price level in 2018, even taking into account regional benefits and compensations, sharply reduces its own potential enterprise development, reduces the competitiveness of products. Even if the current level of costs is maintained, the planned changes in prices for natural gas and a phased planned change in free prices for electricity will lead to an increase in energy costs in the light industry by 2 times and, accordingly, to an increase in the cost of textile products.

Discussion

The existing system of energy consumption in light industry does not meet modern energy saving requirements. The inefficient consumption of energy resources, which has survived from the time of their artificial cheapness, is aggravated by the general economic crisis and the lack of investment for restructuring the production sphere in light industry.

The main task of the light industry is the introduction of innovative technologies, highly efficient fuel and energyconsuming equipment, heat-insulating materials and the transition from purely resource-based to innovative resource-based energy consumption.

The accelerated innovative technological transition of the Uzbek light industry to a qualitatively new technological stage requires finding solutions to the implementation of resource and energy efficient technologies, in-depth processing of raw materials, technologies that make it possible to place in Uzbekistan exactly those links of the value chain that provide the greatest income and ensure long-term competitiveness. Today, the competitiveness of light industry is based on the relatively low price of raw materials and energy resources, while in the structure of production costs, the cost of raw materials exceeds 50%, energy resources are about 8%. However, even having such an advantage as cheap resources, the Russian light industry still loses due to the low technological level.

To restructure the energy-intensive structure of light industry into an energy-saving structure, it is urgent to replace old technologies with innovative resource-saving technologies. Below are examples of innovative resource-saving technologies for light industry. One of the directions of work to reduce the cost of processing and energy resources is the chemicalization of the raw material base at the modern level, which is especially important in the context of the loss of the raw material base of natural fibers in the form of cheap cotton, natural silk and high-quality wool, which were previously supplied from the former Central Asian republics. The forecast assessment of the world consumption of various types of fibers per capita per year until 2025 shows that there is a steady trend towards an increase in the production and consumption of man-made filaments as compared to man-made chopped fibers. The processing of man-made filaments makes it possible to exclude energy-intensive processes of production, dyeing and bleaching of yarn. The general trend in the growth rate of consumption of textile fibers and threads for the production of cotton-type fabrics in 2020–2025.

The share of fiber consumption per capital in 2021 will change in favor of synthetic fibers: polyester - 38% and polypropylene - 12%, cellulose - 4.0%, polyamide (staple fibers) - 0.6%, polyacrylonitrile - 4.7%. cotton - 32%, wool - 2.0%, other fibers - about 6.7%. For the period up to 2025, an almost linear growth in the consumption of chemical fibers and threads is forecasted.

The use in the manufacture of products of special chemical fibers of low combustibility, antimicrobial, fungicidal, antiallergic, changing in color depending on temperature and lighting, temperature-regulating, protecting against static electricity, ultraviolet rays, etc. makes it possible to exclude energy-intensive wet finishing processes traditionally used for imparting the specified properties.

The production of the latest nonwoven materials that exclude energy-intensive processes of spinning and weaving is relevant. Innovations in the production of new chemical fibers and the emergence of new technologies for their processing have significantly increased the production and competitiveness of nonwovens. The scope of application of nonwovens is expanding significantly, mainly due to the use of fibers with special performance properties. These are agrotextiles and geotextiles, hygienic and medical textiles; industrial, construction, transport, packaging textiles; textiles for environmental protection; textiles for advertising, etc.

The absence in Russia of the production of modern chemical fibers and threads in the required volume and range, including low-tonnage, aggravates the crisis state of the light industry, impoverishes the consumer market for consumer goods, does not significantly reduce energy consumption for the production of products, significantly reduces the number of jobs, and the state loses significant tax revenues. The previously planned large organizational and economic measures to develop and improve the raw material base, increase the production of chemical fibers and threads, including new modifications, remain unfulfilled.

World experience shows that the success in the market of chemical fibers and products from them is due to the structural association of enterprises producing chemical fibers and enterprises producing and selling textile products. For example, around the DuPont corporation (USA), which produces chemical fibers, there are firms producing fabrics and knitwear, dyeing and finishing, as well as firms producing and selling ready-made clothes. This type of association facilitates the exchange of scientific and technical information and contributes to the successful development and implementation of new technologies.

It is of interest to include works on the creation and production of new types of chemical fibers and threads in projects partially financed from the Uzbek Investment Fund.

An example of energy-saving technologies in finishing production is the use of a printing method without preliminary chlorination on fabrics made from wool modified in low-temperature plasma. The traditional process includes chlorination (using free chlorine), stanning and other "wet" operations with unavoidable emissions to the environment. All of these procedures are replaced by a "dry" plasma treatment process, without any use of chemicals or process water. Drying of fabric and heating of working solutions is also excluded, which saves energy resources. It turns out to be possible to eliminate some complex and hazardous environmentally harmful wet finishing processes.

The above implemented innovative projects are isolated examples. To increase the investment attractiveness of light industry, it is necessary: to rapidly and massively introduce technologies that will make it possible to make a breakthrough in the competitiveness of light industry goods.

Conclusion

The solution of these tasks is possible only with the active participation of the state in the form of ensuring a direct protectionist policy in relation to domestic producers. Failure to take effective measures may lead to the fact that the technological backwardness of Russian enterprises will become an irreversible process, and the technological and strategic dependence of Uzbekistan on external producers will increase on an ever-increasing scale.

To create conditions for the introduction of innovative resource-saving technologies, it is recommended:

Create preferential mechanisms to attract a significant flow of additional funds, primarily of an investment nature, in the long term to light industry.

Quotas for the import of imported light industry goods that can be produced in Uzbekistan. To raise the rates of duties on light industry products.

The need for government orders for light industry products must be satisfied by at least 51% with domestically produced goods.

Develop clear schemes of public-private partnership in the development and implementation of new technologies for energy supply and energy saving. Increase responsibility for the implementation of technologies developed with the participation of state capital.

Develop cross-sectoral cooperation programs: encourage contracts for the production of corporate textiles for use in oil, gas, coal, forestry, food and other industries.

To create a focal point for the development of programs and specific mechanisms for the implementation of schemes of interaction and coordination of interests of enterprises and ensuring their equal benefits for all participants.

To carry out research and development work to create a range of products of a new generation.

Develop a national project on energy supply and energy saving in Russian industry, including light industry.

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