

Use of Secondary Energy Resources at the Enterprise

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Abstract: One of the main problems of world energy at present and in the near future is the problem of energy conservation. The gradual depletion of fossil fuel reserves, rising energy prices, a noticeable deterioration of the environmental situation, the ever-increasing competition in the world markets for food products and industrial products and services make the problem of rational energy consumption even more acute.

Key words : Primary energy sources, secondary energy sources, alternative energy sources, renewable energy sources, recycling.

In accordance with the concept of the development of the energy sector of the Republic of Uzbekistan until 2030, the study of the potential of alternative energy sources, as well as secondary energy resources and their effective use, the implementation of comprehensive measures to increase the energy efficiency of the economy, is defined as a major task [1].

According to the 24th goal of the development strategy, by 2030, using alternative energy sources and secondary energy resources, the indicator of providing 25% of electricity production and reducing the amount of toxic gases released into the environment by 10% was set. In order to achieve this goal, it is necessary to strengthen state policy measures in the field of energy saving and energy efficiency improvement in the sectors of the economy with the highest energy consumption [2].

In this regard, actual saving of fuel and energy resources (FER) can be realized in two ways. Firstly, by improving technological processes and devices, which results in increased efficiency and reduced fuel and energy consumption. Secondly, through the utilization of secondary energy resources (SER), through which 30–35% of fuel and energy resources can be saved. The relevance of the widespread introduction of various recycling measures at enterprises and in industry as a whole is also due to the fact that this can significantly reduce the harmful effects of technological facilities and energy industry facilities on the human body and the environment. Also, recycling measures of secondary fuel and energy resources in general are designed to help improve energy efficiency indicators at all levels of production and thereby have a significant impact on reducing energy consumption levels in the country and the world as a whole. In the system of various technical energy-saving measures in heat and energy technologies, three areas are distinguished: recycling measures, intensive energy saving and energy modernization. When introducing recycling measures, we are talking about the use of “energy waste” - SER [3]. SER are divided into the following groups: flammable SER; thermal SER; SER overpressure [4]. SER can be operated either without changing the type of energy carrier to provide the production process with fuel and heat, or with changing the energy carrier through the generation of heat, cold, electricity or mechanical work in recycling plants. This diagram shows different ways of getting energy from primary and secondary energy sources. (fig.1) [4].

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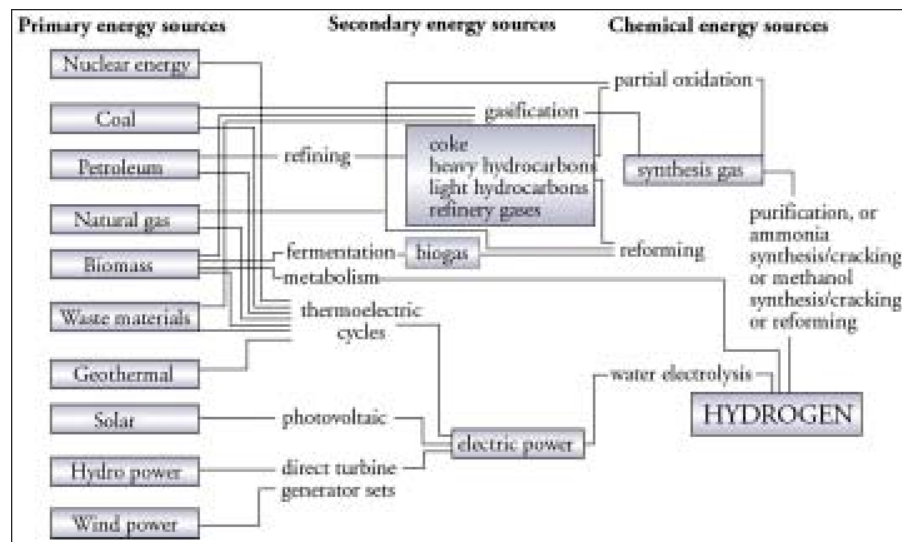


Fig. 1. Schematic diagram of getting energy from primary and secondary energy sources

Based on the type and characteristics of the working fluids, the areas of use of SERs are divided into four main ones: fuel (combustible components act as fuel); thermal (uses heat obtained directly in the form of SER, heat or cold obtained with the help of SER in recycling plants or in absorption refrigerators); power (use of mechanical or electrical energy obtained in recycling installations (stations) through the use of renewable energy sources); combined (use of heat, mechanical or electrical energy simultaneously generated using renewable energy resources) [4].

Enterprises of ferrous and non-ferrous metallurgy, oil refining and petrochemical industries, enterprises of the chemical industry, construction materials industry, as well as the gas industry, heavy engineering and other sectors of the economy have the largest reserves of secondary fuel and energy resources [5].

Nowadays, enterprises in the ferrous metallurgy industry use about 30% of the amount of renewable energy resources determined by complete recycling [4]. Less than 10% of energy resources are recycled in blast furnace and coke production. The largest volume of utilization was achieved in the production of open-hearth steel through the installation of waste heat boilers, which use the heat of exhaust gases and the heat of hot process gases, as well as through the operation of evaporative cooling systems. Such cooling makes it possible to increase the efficiency of these furnaces from 15–20 to 25–35%, as well as reduce cooling water consumption and thereby reduce energy consumption for pumping water [6].

The production of petroleum products, synthetic rubbers and synthetic alcohols, as well as soot are among the main sources of energy resources. At enterprises producing synthetic rubber and alcohol, the amount of SER is 35–40% of their total energy consumption. The total heat demand at synthetic rubber plants is met by approximately 25% through the utilization of thermal energy and energy resources [4, 5]. The degree of utilization of SER depends on the size, structure and mode of energy consumption, as well as on the type, characteristics and quantity of SER generated [3].

Unfortunately, at some enterprises, secondary energy resources are still considered waste and, for example, the cost of waste gas heat is not taken into account in the cost of recovery steam. In fact, the labor costs for the production of the main product are also the costs for the formation of by-products and waste. Waste has no consumer value until the technical capabilities of its rational use at the enterprise appear.

Thus, the use of renewable and secondary energy sources is currently an important factor of energy saving in production in the enterprise and in Uzbekistan as a whole and in the whole world. Nevertheless, the problem of SER should be considered from two sides: to improve production to reduce the yield of SER, and if they are formed, to use them fully and rationally. This is explained by the fact that the significant yield of SER in a number of thermal processes is not an advantage. A



rationally constructed energy system of the technological process should ensure the maximum use of heat with minimal losses (waste), which, ultimately, should create a technology without waste.

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