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POWER SAVING POSSIBILITES IN INDUSTRY OF KAZAKHSTAN

Zhuspekov Samat Allabergenovich
kdyussenov@yandex.ru, somromantic@gmail.com
muster student of "Thermal Power Engineering" department ENU L.N. Gumilev,
Nur-Sultan, Kazakhstan
Scientific leader – K.M. Dyussenov

Energy saving is currently one of the priority tasks. This is due to the shortage of basic energy resources, the increasing cost of their production, as well as to global environmental problems.

Energy saving is the efficient use of energy resources through the use of innovative solutions that are technically feasible, economically justified, acceptable from an environmental and social point of view, and do not change the usual way of life. This definition was formulated at the UN International Energy Conference.

Energy conservation in any area is essentially reduced to waste of energy. Analysis of losses in the production, distribution and consumption of electricity shows that most of the losses - up to 90% - are in the field of energy consumption, while losses during transmission of electricity are only 9-10%. Therefore, the main energy saving efforts are concentrated precisely in the area of electricity consumption [1].

The main role in increasing energy efficiency belongs to modern energy-saving technologies. Energy-saving technology is a new or improved technological process, characterized by a higher efficiency factor of fuel and energy resources.

The introduction of energy-saving technologies into the economic activities of both enterprises and individuals at the household level is one of the important steps in solving many environ-

mental problems - climate change, air pollution (for example, emissions from thermal power plants), depletion of fossil resources, etc.

Typically, businesses implement the following types of technologies that provide significant energy savings:

1. General technologies for many enterprises related to the use of energy (variable speed motors, heat exchangers, compressed air, lighting, steam, cooling, drying, etc.).

2. More efficient energy production, including modern boiler houses, cogeneration (heat and electricity) and trigeneration (heat, cold, electricity); replacement of old industrial equipment with new, more efficient one.

3. Alternative energy sources [2].

The energy saving mode is especially relevant for mechanisms that part of the time work with reduced load - conveyors, pumps, fans, etc. There are many devices that allow you to reduce losses during the operation of electrical equipment, the main of which are capacitor banks and variable frequency drives. Variable frequency drives with built-in energy optimization functions flexibly change the speed depending on the real load, which saves up to 30-50% of the consumed electricity. At the same time, it is often not necessary to replace the standard electric motor, which is especially important when modernizing production facilities. Such energy-saving electric drives and automation equipment can be implemented in most industrial enterprises and in the housing and utilities sector: from elevators and ventilation units to enterprise automation.

Scientists have developed an installation, during the operation of which part of the heat that goes into the pipe after combustion in the production of natural gas is used to generate additional energy that can provide illumination of five sixteen-story buildings [3].

Energy-saving technologies in construction are of a complex nature, including wall insulation, energy-saving roofing, energy-saving paints, double-glazed windows, economical heating and surface cooling systems.

One of the most common energy-saving technologies with great potential for improvement in housing construction is boiler houses. Modern technologies can significantly reduce energy consumption, reduce maintenance costs, and even increase efficiency. In addition, replacing a boiler house often allows a company to switch from environmentally dirty and expensive coal or fuel oil to cheaper and cleaner fuels such as gas or wood pellets.

It also gives great savings if, instead of detached central heating points, an individual heating point is placed in the building, equipped with modern silent pumps, compact and efficient plate heat exchangers.

When organizing ventilation in a building, recuperation systems (utilization for reuse) of exhaust air heat and variable performance of air handling units are used, depending on the number of people in the building. These systems allow not to waste heat generated by people, lighting fixtures, retail and office equipment, and thereby reduce heat consumption from an external source - a heating network or boiler room [4].

An example of houses that in the future will allow a person to live in harmony with nature, while at the same time not depriving himself. I of the usual comfort are the so-called zero energy houses or passive houses, collectively referred to as energy efficient houses. A house in which a comfortable temperature is maintained in winter without using a heating system and in summer without using an air conditioning system will be considered "energy efficient".

There are other ways to use electricity more rationally, not only in production, but also in everyday life. So, "smart" lighting systems have been known for a long time. The energy-saving effect is based on the fact that the light turns on automatically exactly when it is needed. The switch has an optical sensor and a microphone. During the day, when the light level is high, the lighting is turned off. At dusk, the microphone is activated. If noise occurs within a radius of up to 5 m (for example, footsteps or the sound of a door being opened), the light will automatically turn on and stay on while the person is in the room. These lighting systems use energy efficient lamps [5].

LED luminaires can achieve significant energy savings compared to traditional light sources, incandescent lamps (up to 80%) and fluorescent lamps (over 40%). These luminaires can

be used in lighting a wide variety of objects: underground pedestrian crossings and car parks, garden and park lighting, street lighting, lighting in housing and communal services and emergency lighting [6].

There are also promising energy-saving projects in the transport industry. American engineers have come close to the production of passenger cars equipped with nozzles that convert the heat of exhaust gases into electricity. A heat generator installed on a muffler converts some of the heat from the exhaust gases into electricity, which can further power the climate control system, music system, etc.

German scientists are developing highly efficient, energy-saving devices required for hybrid vehicles. The device runs on oil on the freeway and on electricity in the city, thus using relatively less energy.

Consistent with the global drive for inclusive and sustainable growth Kazakhstan adopted national and regulated development programs and strategies to create preconditions for sustainable development. Kazakhstan became the first state in Central Asia to create an organizational and legal basis for the transition to green growth through the adoption of a number of legislative documents, including the Environmental Code (2007), the Law on Supporting the Use of Renewable Energy Sources (2009), and the Transition Concept towards a green economy (2013). The authorities have established effective relationships with numerous international financial institutions and strategic partners regarding the promotion and development of renewable energy, clean technology and infrastructure. Moreover, Kazakhstan promotes international cooperation for sustainable development through the Green Bridge Partnership Program.

Kazakhstan faces structural imbalances, socio-economic and environmental problems such as overdependence on the export of raw materials, unequal distribution of wealth, low living standards and limited access to basic services. Environmental issues include water scarcity, inefficient use of natural resources, high energy consumption, unsustainable agricultural practices and food security issues, and poor waste management.

To date, the government of Kazakhstan has adopted a number of development strategies and programs and action plans aimed at sustainable growth, but it is clear that fundamental problems remain unresolved, while efforts for regional cooperation in terms of their effectiveness are limited. Addressing and overcoming environmental, social and economic issues and challenges will require the adoption and implementation of comprehensive government policies and cooperation between regional authorities.

Kazakhstan has significant potential for using renewable sources energy that can contribute to sustainable economic development and growth.

Wind energy potential in Kazakhstan is 10 times higher than projected needs countries in electricity by 2030. Kazakhstan has adopted primary renewable energy legislation and established support measures such as access to the electricity system and feed-in tariffs. However, Kazakhstan is the only state in the region with the capacity to generate both solar and wind energy, which contributes to the pursuit of renewable energy development [7].

The adopted Strategy "Kazakhstan-2050": the new political course of the established state sets clear guidelines for building a stable and effective model of the economy based on the country's transition to a "green" path of development [8].

"Green economy" is defined as an economy with a high level of quality of life of the population, careful and rational use of natural resources in the interests of present and future generations and in accordance with the international environmental obligations adopted by the country, including the Rio de Janeiro principles, the Agenda for XXI century, the Johannesburg Plan and the Millennium Declaration.

The "green economy" is one of the important instruments for ensuring the country's sustainable development. The transition to a "green economy" will allow Kazakhstan to achieve its goal of becoming one of the 30 most developed countries in the world.

According to calculations, by 2050, transformations within the framework of the "green economy" will allow an additional increase in GDP by 3%, create more than 500,000 new jobs, cre-

ate new industries and services, and ensure universally high standards of quality of life for the population.

In general, the volume of investments required for the transition to a "green economy" will amount to about 1% of GDP annually, which is equivalent to USD 3-4 billion per year.

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