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The Basic Principles of Energy Conservation Policy in Russia at the Present Stage

[1] Roman A. Vorontsov
[2] Nina M. Pestereva

[1] Sochi State University, Russia
Sovetskaya street 26a, Sochi city, Krasnodar Krai, 354000
Student
E-mail: volk008@gmail.com
[2] Sochi State University, Russia
Sovetskaya st. 26a, Sochi city, Krasnodar Krai, 354000, Russia
PhD, Professor
E-mail: evqenia-vv@mail.ru

ABSTRACT. The article deals with the introduction of new energy-saving technologies in enterprises of the Russian Federation, the study of international experience of energy saving and the development of recommendations to improve the energy efficiency of the Russian Federation. Reducing energy consumption and increasing energy efficiency of power systems – is the main objective of energy conservation policy Russia at present.

Keywords: energy efficient cluster; innovative energy efficient technologies; energy efficiency management; renewable energy sources; clean energy; energy conservation.

INTRODUCTION. In the last two decades of power provides the welfare of the world in equal shares by increasing production and improving energy use in developed countries, energy conservation measures gave 60–65 % growth. As a result, energy consumption of the national income declined over this period in the world by 18 % in the developed world – by 21–27 %. It is no accident radical improvements in energy efficiency of the economy (system of energy saving measures) is the central task of the Energy Strategy of Russia. Energy Strategy envisages intensive implementation of organizational and technological measures to conserve fuel and energy, ie, Carry out targeted energy conservation policy. To do this, Russia has great potential organizational and technological energy. Mastered in the implementation of national and international practices of organizational and technological measures for saving energy capable by 2020 to reduce their consumption in the country by 40-48% or 360-430 million ss. tons a year. About a third of the energy saving potential are Energy industry, another third are concentrated in the remaining industries and in construction, more than a quarter – In the residential sector, 6.7% - in transport and 3% - in agriculture.

The main purpose of this study is the introduction of new energy-saving technologies in the enterprise of the Russian Federation, the study of international experience in energy conservation and the development of recommendations to improve the energy efficiency of the Russian Federation.

Energy resources is one of the greatest challenges of the XXI century. From the results of this problem depends on the place of our society in a number of economically developed countries and the standard of living of citizens. Russia not only has all the necessary natural resources and intellectual capacity to successfully address its energy problems, but also objectively a resource base for the European and Asian countries exporting oil, petroleum products and natural gas in the volumes of strategically important for the importing countries. However, excessive fuel and energy resources in our country is not to provide energorastochitelnost, unnecessarily only energy-efficient economic management in an open market economy is the most important factor of competitiveness of Russian goods and services. The society set very ambitious goal - to double the gross domestic product (GDP) for 10 years, but to solve this problem without changing radically related to energy and resource saving without reducing energy intensity of production, will not succeed.

Energy conservation should be attributed to the strategic objectives of the state, being both a primary method of ensuring energy security, and the only real way to maintain high revenues from hydrocarbon exports.

Required for the internal development of energy can be obtained not only by increasing the production of raw materials in remote areas and the construction of new power and performance, lower cost, energy savings directly to the centers of consumption of energy resources - both large and small settlements.

The strategic goal of saving one and follows from its definition - is to increase energy efficiency in all sectors, in all the towns and in the country as a whole. The task - to determine what measures can be done and how it is promoted.

Energy conservation and the same with the other goals of municipalities, such as improving the environment, improving efficiency of power supply systems, etc.

Reducing consumption can provide the connection of new customers with minimal capital expenditure on infrastructure and eliminate the problem of allocation of land for new construction of generation facilities, disposal of sanitary protection zones, etc., which generally has a positive impact on urban development.

Meeting the challenges of energy efficiency at this stage, when there is a large pool of low-cost measures, and also coincides with the majority of the strategic objectives of the state and businesses.

One of the most effective ways to reduce the human impact on nature is to increase energy efficiency - saving technology. In fact, modern energy, based primarily on the use of fossil fuels (oil, gas, coal), has the most massive impact on the environment. Starting from the extraction, processing and transportation of energy and ending their combustion to produce heat and electricity - all this is very detrimental to the ecological balance of the planet.

The main role in increasing the efficiency of energy use belongs to modern energy-saving technologies. After the energy crisis of the 70's of the XX century, they have become a priority in the development of the economy of Western Europe, and after the beginning of market reforms - and in our country. However, their implementation, in addition to the obvious environmental advantages, is the very real benefits - reducing the costs associated with energy consumption.

Energy saving is becoming one of the priorities of any company working in the field of production or service. The issue here is not so much in environmental requirements, but rather in a pragmatic economic factors.

According to experts, the share of energy costs in the cost of production in Russia is 30–40 %, which is much higher than, for example, in Western Europe. One of the main reasons for this are outdated energorastochitelnye technology, equipment and instruments. Obviously, the reduction of costs and the use of energy-efficient technologies can improve business competitiveness.

In Russia, 75 % of all electricity consumed in the production is used to drive the various motors. As a rule, the majority of domestic enterprises with a large installed electric power reserve, based on the maximum capacity of the equipment, despite the fact that the peak hours are only 15-20% of the total working time. As a result, electric motors with constant speed requires significantly (to 60 %) more energy than necessary.

According to European experts, the cost of electricity consumed annually average engine in the industry, almost 5 times greater than its own value. In connection with this obvious need for energy-saving technologies and equipment optimization using electric drives.

A comprehensive approach to this problem has, for example, Japanese company Omron, specializing in products for automation and manufacturing processes.

In particular, the well-proven variable frequency drives with built-in power optimization. The bottom line is a flexible change of frequency of rotation depending on the actual load, which can save up to 30–50 % of the electricity consumed. This often does not require replacement of the standard motor, which is especially important when upgrading facilities.

Power Save mode is particularly relevant to the mechanisms that part-time work at low load - conveyors, pumps, fans, etc. In addition to reducing energy consumption, the economic effect of variable frequency drives is achieved by increasing the service life of electrical and mechanical equipment, which is an additional plus.

These energy-efficient electric drives and automation can be implemented in most industries and in the housing sector: from the elevator and ventilation systems to enterprise automation, where wasteful energy consumption due to the presence of obsolete equipment. According to various sources, in European countries to 80 % run-up drives are already regulated. In our country, while their share is much lower, and the need for energy-efficient technologies more relevant.

There are other ways of rational use of energy, not only in manufacturing but also in everyday life. So, have long been known, "smart" lighting system, widely implemented in the countries of Western Europe, the U.S. and especially in Japan. The interest in them is not surprising, given that, depending on the purpose of the premises, the lighting can be consumed up to 60% of the total energy consumption of residential and office buildings. According to specialists of the Russian company "Svetek" to develop such solutions in our country, energy efficient lighting systems can reduce lighting costs up to 8-10 times!

Energy-saving effect is based on the fact that the light turns on automatically, just when you need it. The switch has an optical sensor and a microphone. In the afternoon, with a high level of illumination, lighting is off. At dusk the activation of the microphone. If the radius of up to 5 m in noise (eg steps or the sound of a door opening), the light is automatically switched on and off, while the person is in the room.

Of course, such lighting systems would not be complete without the use of energy-saving lamps. They can be divided into two groups by Usage: powerful energy saving lamp large, designed for lighting offices, retail, cafes, and compact fluorescent lamps with standard socket for use in apartments. Save energy with the use of these lamps is 80%, not to mention the fact that, compared to conventional incandescent their lifetime is much longer.

Among the most "voracious" equipment used in residential and office buildings, include practically all climatic technology, especially air conditioners. Of course, the struggle for energy efficiency could not pass by this category of consumer devices.

Recognized competence in the field of reducing energy intensity of ventilation and air-conditioning are companies Hoval (Liechtenstein) and Dantherm (Denmark). In its products use the latest technology and design development that reduce energy consumption while maintaining high performance.

For example, a feature of the production units Hoval is using patented air distribution, ensuring the formation of supply air jet with a long-range from 3.5 to 18 m by automatically Adjustable blades, spinning airstream. The main advantage of this design is the high energy efficiency thanks to improved organization performance ventilation, air circulation and heat recovery.

According to experts, in Russia, over a third of the country's energy is consumed for heating of residential, office and industrial buildings. Therefore, all of these techniques and methods of energy saving will be ineffective without a struggle with unproductive heat loss.

What sort of ways you can improve the energy efficiency in utilities? According to specialists ROCKWOOL, a world leader in the production of non-combustible insulation should be divided into three main areas of energy conservation.

First, the reduction of losses during production and transport of heat - that is, increase the efficiency of thermal power plants, upgrading TSC replacing wasteful equipment, the use of long-lasting insulation materials when installing or upgrading heating systems.

Second, the energy efficiency of buildings through the use of integrated solutions for insulating outer envelope (primarily, facades and roofs). In particular, plaster system ROCKFACADE facade insulation can reduce heat loss through the exterior walls of at least two times.

And, thirdly, the use of central heating radiators with automatic regulation and ventilation systems with heat recovery.

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In recent years, energy-efficient technologies are combined in the concept of so-called passive home, that is the home, the most friendly to the environment. In Western Europe, passive houses are being built with energy consumption of 15 kW, ch/m3 year, more than 10 times more economical than a typical domestic "Khrushchev". We can say that these buildings – the future of world construction, because they actually are heated by heat generated by people and appliances.

Thus, energy-efficient technologies can solve several problems at once: to save a significant portion of energy to solve the problems of the domestic housing sector, improve production efficiency and reduce the load on the environment.

Today in Russia, and all over the world, there is demand for energy-saving materials, due to rising energy prices. Various materials are used for thermal insulation of walls, roofs and floors. Consider the main ones.

Mineral materials – a heat-insulating materials, which are made of stone and slag. These materials are cotton, which serve as raw material for the basaltic rocks, limestone, dolomite and other. Slag produced from mining products nonferrous and ferrous metallurgy. These materials have a number of impressive quality – high heat and sound insulation, resistance to moisture, heat, and fluids. They are non-combustible, lightweight, environmentally friendly. Installation of these materials is quite simple, as they are easy to change shape and size. Materials based on mineral wool used in fire protection systems.

These products are often used to create a facade insulation systems as a conventional wet plaster, and can also serve as an insulation layer mounted in facades and walls. Mineralnovatnye materials used for insulation, both internal and external walls.

Materials for thermal insulation of glass have similar properties with mineralovannymi products, but there are several differences. Because the glass fibers are longer and thicker, glass more elastic and durable, it is easy to strain and takes a more tangible form. This type of insulation also has good sound quality. Fiberglass products are not affected by corrosive media, chemicals and micro-organisms, so the battery life is almost unlimited. Fiberglass also combustible. Glass wool is well suited for internal insulation of any structures.

Fiberglass is more elastic material than wool. He also has all the positive qualities of wool. Based on fiberglass insulating material was created Izover KT11, which can be used for wide applications in various types of buildings. This material can be warm as brick and wood, and concrete walls. Packaging of this material allows its transportation and storage without any problems.

Another modern insulation material is extruded polystyrene. Styrofoam plates have low thermal conductivity, which is quite high density. This fact allows the use of this material not only as a heater, but also as a structural material of which can be made up part of the wall or ceiling. Just EPS has low hygroscopic, that is, it does not absorb moisture.

Styrofoam, which is available under the brand name URSA, flammable and has a good sound insulation qualities.

Polyethylene foam is used for heat, hydro – and sound insulation of building and industrial projects. Products are available in rolls, mats, ropes and hollow tubes of standard thicknesses and diameters. For example, pipe insulation Stenofleks-400 (Russia) and Tubeks (Czech Republic) is a shell with a longitudinal section that should be put on top of pipes and glued special adhesive tape, glue or staples are connected. These materials are easy to cut, so with the help of special patterns can be, even with no special skills, easily make the insulation on the knee, valves, branch. Foam have good thermal conductivity - 0.04 W / (m * K), at a temperature of + 25 ° C. According to the group they belong to the flammability of the group G2, ie umerennogoryuchy on SNIP 21-01-97 *. Vapor diffusion resistance (or water vapor permeability) - 4600 linear temperature shrinkage - no more than 1.5%. The closed cell structure, the material is not afraid of water: water absorption - less than 0.8% after 7 days of being in the water. Polyethylene foam has a chemical resistance to oils, construction materials, biologically degradable. Operating temperatures of isolation - 50 ° C + 90 ° C, the life reaches 25 years of age.

This isolation is called "reflective". Foil materials not only allow utilities to clothe the "aesthetic packaging", but also to prevent heat loss, increase the life of the equipment.

The main difference of insulation foam rubber – the extended temperature range (-200 ° C + 175 ° C), higher resistance to vapor diffusion (7000, and for some modifications – above 10,000) and a clear separation of types of insulation for specific tasks, from cryogenic plants to protect steam temperatures up to + 175 ° C. Heat index of synthetic rubber - 0.036 W / mK at 0 ° C. It is also important that this type of insulation is certified flammability G1. The wall thickness of pipe insulation foam rubber provides more broad line of standard sizes. In addition, pipe insulation with ultra-low temperatures the carrier is only possible with this material, unnecessarily it is characterized by high resistance to vapor permeability and special additives that allow the individual brands of temperatures up to - 200 ° C.

Use material foamed on gives comprehensive protection utilities. Within the parameters of insulating materials, we can estimate the economic feasibility of using any type of insulation in a variety of engineering systems.

In hot water with a temperature of 90 ° to the carrier with a well-insulated by foamed polyethylene. The wall thickness can be calculated with the aid of computer programs provided by the manufacturers of isolation.

At a temperature above 90 ° carrier must be used on the basis of insulation foam rubber as polyethylene can not long withstand such temperature conditions without loss of properties.

In cold water becomes the main problem of the protection pipes condensate. Good job with this rubber insulation, but from an economic point of view it is more convenient to use the foam insulation of a foiled layer. Foil is an excellent vapor barrier.

For pipe insulation and air conditioning systems used foam rubber or reflective insulation. The installation of these materials allows the efficiency of the system, increase its durability and reduce noise levels in accordance with the requirements of SNIP 03/23/2003.

In the cooling system, especially in cryogenic systems must be used exclusively specialized foam rubber stamps that can withstand low and ultra-low temperature. This is due to their high resistance to water vapor diffusion.

Organization of energy across the country – a task extremely difficult. Russia does not have the experience of such a large project in the absence of a rigid vertical of power. At the same time, energy efficiency of the popular slogan is becoming a pressing need. Lack of electric power and natural gas in periods of strong cooling, the global fight against greenhouse gas emissions necessitate a radical change in attitude towards energy conservation.

CONCLUSION. This process should be involved, most governments, all organizations and citizens. Such a large-scale problem can be effectively addressed in each municipality, region and in Russia in general only programmatically with a clear allocation of tasks for each level. Status of an energy conservation program should be even higher than that of infrastructure development programs, unnecessarily develop utility systems can be carried out simultaneously, and by energy conservation, and the creation of new facilities. Reducing energy consumption and increasing the power supply systems – Is interrelated processes and should be considered in energy planning together.

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Основные принципы энергосберегающей политики России на современном этапе

[1] Роман А. Воронцов
[2] Нина Михайловна Пестерева

[1] Сочинский государственный университет, Россия
354000, Краснодарский край, г. Сочи, ул. Советская, 26 а
Студент
E-mail: volk008@gmail.com
[2] Сочинский государственный университет, Россия
354000, Краснодарский край, г. Сочи, ул. Советская, 26 а
Доктор географических наук, профессор
E-mail: pnm_06@mail.ru

Аннотация. В статье рассматривается внедрение новых энергосберегающих технологий на предприятиях Российской Федерации, изучение международного опыта энергосбережения и разработка рекомендаций по повышению энергетической эффективности РФ. Снижение потребления энергоресурсов и увеличение мощности систем энергосбережения – это главная задача энергосберегающей политики Россия на современном этапе.

Ключевые слова: энергоэффективный кластер; инновационные энергоэффективные технологии; управление энергоэффективностью; возобновляемые источники энергии; «чистая» энергия; энергосбережение.