

## NEW TECHNOLOGIES IN ENERGY SECTOR AND AUTOMATED ENERGY ACCOUNTING SYSTEMS AND THEIR MAIN FACTORS OF INFLUENCE ON ECOLOGY

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**Abstract-** This article analyzes the newest technologies and their application in the energy sector. Energy is one of the main areas of the economy, so the introduction of information technology is the main task of improving the human condition. The more complex the production, the more automation is needed. It is stated that the implementation of an automated dispatch control system requires an automatic emergency control and accident data recording system, bandwidth control and voltage regulation, regulation of power flows and limitation of power and frequency flows. With the development of technology in the energy sector and in other industries, the negative impact on the environment that causes environmental degradation is growing. It has been argued that the main objective is to prevent these negative conditions and minimize them.

**Keywords:** Energy, Economics, Automated Dispatch Control System, Information Technology, Electric Energy.

### 1. INTRODUCTION

In the energy sector, innovation is introduced at a high speed, and is the foundation of the energy sector. The aviation and railway industries, mechanical engineering, oil and gas production and refining, the development of industries pollute the environment. The energy field is developing with high intensity. The energy of the wind and the sun is processed in a special way into electricity.

The use of LED lamps is a successful technology in the energy sector. They reduce electricity consumption and lighting costs. LED lamps do not contain mercury and save energy up to 90%. For many years, the impact of humanity on the environment has led to environmental consequences. In all developed countries, acts have been adopted to limit environmental pollution and threats to public health. Therefore, it is important to be able to predict processes that may adversely affect maintenance personnel, as well as normalize electromagnetic radiation and noise. During the construction of production, careful observance of the technological sequence of work is necessary.

The main task of science is to prevent mistakes and create normal conditions for the operation of nuclear plants. And for this it is necessary to establish acceptable risk values and their following. To minimize the impact of nuclear power plants on the surrounding territory, comprehensive monitoring is carried out.

Training of employees of the power plant is being carried out. Electricity is a major industry. It provides electric and thermal energy to the needs of the population and the national economy, and exports electricity to other neighboring countries. The proper functioning of the industry ensures the country's energy security, and important factors in development of the economy [1-3].

### 2. INDUSTRY INNOVATION

The most innovative types of modern technologies in the energy sector are the use of biofuels instead of gasoline, which destroy oil and chemical pollution of the environment. Fracking is also used as a shockwave force for mining, oil from shale layers occurring at great depths and enhanced oil recovery from old fields. According to the method of cracking, fresh water is not used for technical purposes. The method of using industrial carbon dioxide old wells can be processed for the third time.

At present, hydroelectric power stations with osmostation are being replaced. The osmosis effect occurs in tree trunks, where nutrient juices are transferred to the photosynthesis zone. Scientists have proposed to apply a similar process in the energy sector, in the operation of hydroelectric power plants. The pressure difference between fresh and salt water at the stations creates an osmosis effect, which forces the turbines to rotate and generate electricity. And, of course, it is much cheaper than the construction of hydropower plants. It is known that electricity builds up in the atmosphere. And one of the options for its use is the capture of electrical energy by lightning. In the XIX century, scientists began to engage in the task of transferring energy to a distance without wires, the "energy Internet". An example is a smartphone wireless charging device. But so far in the industrial implementation, the "energy Internet" has not received.

### **3. INFORMATION TECHNOLOGY IN ELECTRICITY**

The introduction of new technology will reduce utility bills. For this, projects are being developed "smart homes", heating elements, batteries, solar panels, etc. To achieve this technology, automated and automatic control systems, new network technologies are needed. The power industry provides consumers with energy and the conditions of human life depend on it.

Computer technology in the energy sector regulates the frequency and power in the power system, minimizes human labor, and distributes the load on the generators of the power plant. Accidents can harm the equipment of high-voltage power lines and, of course, entail severe consequences for the power system. And therefore, without automated emergency control systems, the use of high-voltage power lines is prohibited. The energy sector of Azerbaijan is developing every day and is the main industry in the Caucasus.

As you know, after the collapse of the Council of Socialist, each country began to develop independently. Despite the financial difficulties of the countries, the government of each country sought to raise its country. Azerbaijan also faced such difficulties. In each country, energy resources and the construction of power plants began to develop. At the beginning of the 90s, it was possible to stop the destructive processes in all sectors of industry and the economy, including in the energy sector [4, 5].

Of course, power plants in Azerbaijan were built in Soviet times - in the South Caucasus, the EEE Azerbaijan with a capacity of 2,400 MW, the Mingachevir hydroelectric power station with a capacity of 402 MW. Currently, there is a 400 MW combined cycle plant. Today, the capacity of the power plant in Azerbaijan is 6400 MW, and there are in Baku, in Khachmaz in Nakhichevan, Sumgait, etc. In the future, it is planned to increase the capacity to 8000 MW. The energy network is divided into system-forming, supply and distribution networks. The backbone network is substations and power transmission lines [9, 10].

### **4. NEWEST AUTOMATED SYSTEMS CONTROL AND ACCOUNTING OF ENERGY RESOURCES**

Automated energy control and metering systems record and measure the amount of energy. Automated systems minimize human labor. Recently, attention has been paid to reducing emissions, which leads to energy efficiency in the sectors of energy production and consumption. In the sector of fuel consumption, electric energy, increasing efficient energy production and switching to alternative low-carbon fuels, the development of nuclear energy can reduce emissions by about 50%. In the developed countries of Europe, an improved pulverized-coal power unit is being developed.

All technological components for CO<sub>2</sub> capture and storage in coal-fired power plants are manufactured by industry. There are great expectations with the use of

carbon dioxide capture and storage technology at thermal power plants of thermal power plants. This technology can also be applied at the enterprises of chemistry, oil refining and petrochemistry, metallurgical plants and other large enterprises.

The discovery of the possibility of obtaining materials and the invention of a steam engine accelerated the growth of cities. But on the other hand, smoke from factories polluted the air. Pollution of the atmosphere and the environment has focused most European countries and the United States on the adoption of laws to protect atmospheric air. At the end of the 20th century, flue gas cleaning became the main task. In most developed countries, industries are equipped with electrostatic precipitators, sulfur treatment plants. It is clear that the faster the technology grows, the faster the environmental load increases, causing environmental degradation. The problem of environmental protection has become one of the global problems of the world community.

Some substances have a negative impact on the environment either after chemical changes in the atmosphere, or directly, or by interaction with other substances. As you know, atmospheric air is the main environment for the existence of the biosphere, including humans.

One of the main sources of environmental pollution are thermal power plants. The operation of thermal power plants has various negative effects on all components of the biosphere. Polluting gas and aerosol emissions from energy facilities upset the balance of the environment on a local, regional and global scale. When burning liquid and solid fuels, emissions in the form of solid particles occur. They form aerosols in the atmosphere. They are formed directly in the atmosphere as a result of chemical reactions and natural processes. Emissions of thermal power plants depending on the particle size can be classified into dust - solid particles, fog - solid or liquid particles, smoke - particles, aerosols - mainly an accumulation of gaseous molecules [6-8].

The thermal effect of energy facilities violates the thermal equilibrium of the environment. A more significant factor in thermal pollution of the environment is greenhouse gases, an increase in the concentration of which in the atmosphere contributes to the greenhouse effect. There is a noise impact of thermal power facilities on the environment. Noise is understood as any unwanted sound, or elastic waves propagating in an elastic medium in the form of various vibrations and caused by some source. Sound is characterized by the intensity of sound energy transfer, the speed and direction of propagation of sound waves, sound pressure.

The most intense noise sources are turbines (especially gas), boilers, compressors, various types of pumps, steam lines, synchronous compensators, etc. The most powerful noise source is steam discharge. To reduce emissions of toxic substances into the atmosphere, it is necessary to ensure energy efficiency and environmental safety of energy facilities using the technology of fuel cleaning and processing.

The most optimal is the thermodynamic factor that affects all parameters and indicators of environmental hazard. Dust collecting devices are divided into mechanical, hydraulic, filters with a porous filter layer, electrostatic precipitators. The disadvantage of mechanical devices is their significant wear due to the impact of dust particles on the walls and their sliding on them. Typically, wet dust collectors and electrostatic precipitators are used in power plants. In electrostatic precipitators, gas purification from solid or liquid particles occurs under the influence of electric forces. Electro filters differ from each other in the area of the active section, the height of the electrodes, the area of deposition and other parameters [6-8].

### **5. NUCLEAR ENERGY, RADIOACTIVITY AND ENVIRONMENTAL IMPACT OF NUCLEAR POWER PLANTS AND THERMAL POWER PLANTS AND VEHICLES**

It is known that nuclear power plants and thermal power plants adversely affect the environment by chemical, thermal and radioactive pollution of the environment and the maintenance staff, especially by noise and electromagnetic effects. It is clear that it is not possible to eliminate these drawbacks to zero, it is necessary to minimize these negatives to the environment. And for this, additional costs are required for the relevant measures for constant monitoring of these processes in the form of monitoring. Of course, in the design and operation in the nuclear industry, a set of measures is taken to prevent accidents and to develop them in case of occurrence.

Despite the environmental impact of nuclear power plants less than other technological industries, however, in the event of an accident, radiation is one of the dangerous factors that will destroy wildlife. A nuclear power plant can even be compared to nuclear weapons. A nuclear power plant has the thermal impact of cooling systems and spray pools on the environment. Of course, they affect wildlife within a radius of several kilometers from the object, the climate, the state of drinking water. In addition to nuclear power plants, the technogenic load is also provided by the power industry.

The main fuel of the TPP is natural gas, followed by coal. Due to changes in the fuel balance structure, pollutant emissions increased. When coal is burned, gaseous emissions and heavy metals are released into the atmosphere, which in turn are part of dust particles. Also, transports make a polluting contribution to nature. Harmful substances from moving sources are a complex mixture of more than 200 toxic components. Unfortunately, emissions of these hazardous components cannot be controlled. Unlike industrial enterprises that are built outside residential buildings, transports have access to living spaces [6-8].

In densely populated countries, energy development plays a major role. In countries such as India and China, energy consumption is growing every year. And this makes us think about a long-term strategy. India is in third place after China and the United States in energy

consumption. In a developing country, China, energy consumption is growing more rapidly. On the example of these countries, we can say that the atom will be used in the future as an energy source. After the accident at the Fukushima nuclear power plant in Japan, many countries decided to abandon nuclear power.

In 2017, a drop in nuclear power capacities was observed. In some developing countries, the construction of nuclear power plants is beginning. The reason is population growth, and at the same time, of course, energy consumption. In developed countries, everywhere they refuse to burn coal for energy purposes. The abandonment of the atom is planned to be compensated by renewable energy sources. To this end, wind generators, solar power plants are being built everywhere, and research is being conducted on use of biofuels [6-8].

### **6. ENERGY SOURCES**

The energy industry is one of the largest consumers of fossil fuels. Almost all industries are sources of air pollution. During the operation of the chimneys as a result of the interaction of sulfur oxides contained in the flue gases with condensate flowing down the walls of the chimney, an aggressive liquid is formed that destroys both concrete and reinforcement. We are talking about several hundred industrial reinforced concrete chimneys only in the energy sector.

Therefore, the issue of extending the resource for their further exploitation is very relevant. On the other hand, the deterioration of the chimney causes corresponding damage to the ecological state of the environment. The operating mode has a great influence on the technical condition of the chimney.

Specialists in the field of energy should know their subject area and become in demand in the industry. For this purpose, it is necessary to create and use specialist models in the learning process. The principles and methods of forming, developing and using a specialist model were considered by A.Ya. Savelyev. In his opinion, the general initial principles for constructing models include the determination of specific goals and objectives of modeling, analysis and synthesis of information related to the formulated tasks, while the reliability and completeness of the initial information are necessary conditions for constructing a well-founded model, identifying the main factors that influence changing trends and patterns of the investigated phenomenon.

Thermal loads at the heat supply source are regulated by the temperature schedule. The temperature graph is the dependence of the temperature of the network water on the outside temperature. Regulation should maintain a balance of the required heat for heating the air.

A pressurized-water pressurized hull power nuclear reactor is popularly used by stations. He is the representative of one of the most branches of the development of nuclear power plants, which are widely used in the world. Nuclear power plants based on this reactor are characterized by safety, a double protective shell, in which the inner shell prevents leakage of

radioactive substances during accidents. Countries such as Taiwan and Bulgaria, France and the United States refuse to build new nuclear power plants.

Currently, many countries have developed a whole range of measures to improve the utilization and recycling of municipal solid waste. Every year, a large amount of municipal solid waste is generated in the country.

In developing countries, there are enterprises processing and sorting waste. They produce various types of products. It should be noted that at present, a huge amount of human waste is accumulating in the world. These wastes, which totals billions of tons, poison the earth, water and, of course, air [11-14].

Municipal solid waste is a mixture of inorganic and organic components of complex composition. They include waste produced by various kinds of institutions, trade enterprises, etc. Waste can conditionally be grouped into secondary raw materials, biodegradable waste and non-recyclable waste. Municipal solid waste contains individual components that differ in properties, origin and chemical composition. Their composition is studied with the goal of rational disposal.

It is clear that for the sustainable development of society, the necessary requirement is the availability of energy. The main source of energy is hydrocarbon fuel. The increase in fuel consumption also increases the amount of fuel combustion products emitted into the atmosphere. As a result of this, the global problem of air pollution by combustion products appears, which leads to the need for its urgent solution. Renewable resources, such as solar radiation, wind, tidal energy is environmentally friendly.

Recently, the use of hydrogen has become increasingly important. The effective use of hydrogen as a fuel for land, water and air transport has been proven by many research projects.

Hydrogen is the most fuel-rich form of energy. In Japan, hydrogen gas stations are installed. In developing countries such as the United States, in Germany, these gas stations exist, and about 37 countries are under construction. Many car manufacturers have already created experimental models. All these data indicate that mankind is actively engaged in the use of hydrogen in our daily lives.

Due to the high pressure of compressed hydrogen, gas stations are a very risky area for humans. Hydrogen is odorless, colorless, and tasteless. And this can be a risk for leaks. Therefore, experts are developing devices that automatically report a hydrogen leak. There are many different ways to produce hydrogen. The first and most obvious way to produce hydrogen is from water by thermal decomposition. This method requires tremendous energy to produce hydrogen. Under laboratory conditions, hydrogen is produced by electrolysis. This, of course, is the easiest option. It is also possible to obtain hydrogen by methane conversion. We hope that hydrogen will find widespread use in engine building [11-14].

## 7. CONCLUSIONS

The role of computer technology in the power industry is enormous. Currently, information technology allows optimizing the technological processes of generation, distribution and consumption of electric energy in order to reduce losses, improve the financial performance of the enterprise and others. Thus, the analysis shows that the development of human activities directly or indirectly affects the natural environment. To avoid these negative results, it is necessary to minimize environmental emissions into nature and continuous monitoring, which could reveal negative effects.

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**BIOGRAPHIES**



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