

with the HERZ Smart Comfort system and using an alternative heat source – heliosystem, which consists of 180 solar collectors. It was established that the 1-st measure has such an annual effect: energy – 130,3 Gcal or 11.1%; ecological: reduction of natural gas consumption – 16.5 thousand m<sup>3</sup>, reduction of CO<sub>2</sub> and NO<sub>x</sub> emissions – 32.0 tons and 0.035 tons, respectively; economic: reduction of payment for searing – 249.5 thousand UAH; 2-nd measure has such an annual effect: energy – an additional amount of thermal energy – 376.7 Gcal or 20.2%; ecological – reduction of natural gas consumption – 47.7 thousand m<sup>3</sup>, reduction of CO<sub>2</sub> and NO<sub>x</sub> emissions – 92.6 tons and 0.101 tons, respectively; economic: reduction of payment for thermal energy – 721.3 thousand UAH; the payback period of the measure is 5 years.

The research results showed such properties of the proposed method for evaluating the effectiveness of energy-saving measures, such as: high information content of the results, providing the possibility of multicriteria optimization of the parameters of heat supply systems and heat consumption of the research object, ability to improve by increasing the number of studied performance indicators.

#### **References:**

1. The Covenant of Mayors for Climate and Energy Reporting Guidelines / Covenant of Mayors & Mayors for climate and energy. Adapt Offices and the Joint Research Centre of the European Commission, 2016. – 78 p.
2. Alibekova A., Shaimerdenova G., Agilbaeva M. Ecological problems of thermal power plants. *Journal of Industrial Technology and Engineering*, 2013. No.4(09). – P. 40–44.

## **ENVIRONMENTAL PROBLEMS OF THE OIL AND GAS INDUSTRY**

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Our environment is constantly changing. We cannot deny this fact. Technological progress does not have the most beneficial effect on the environment.

We all worry about the environment. Environmental problems must be resolved now, but this requires enormous financial difficulties and human resources. Nowadays, many people lead unnatural lifestyles. They lose touch with nature. Such simple things in life as sunlight and fresh air become something special. Tall buildings block the sun. Exhaust fumes pollute the atmosphere.

In my report, I want to talk about the environmental problems of the oil and gas industry. This problem directly affects me since I want to work in this

industry in the future. I will tell you exactly how oil and gas drilling affects the environment.

The oil and gas industry is truly global: operations are carried out in all corners of the globe, from Alaska to Australia, from Peru to China, and in every habitat from the Arctic to the desert, from tropical rainforests to temperate forests, from mangroves to the open sea.

The exploitation of oil and gas reserves did not always go without any environmental side effects. Oil spills, land damage, accidents and fires, as well as cases of air and water pollution, were registered at different times and in different places. Recently, the social impact of this industry has attracted attention. The oil and gas industry has worked to solve the problem of protecting the environment. Now I will talk about the most important environmental problems of the oil and gas industry in my opinion.

1. Oil and gas production is a threat to wildlife. Loud noises, human traffic and vehicle traffic resulting from drilling operations can harm bird communication, breeding and nesting. Infrastructure built for energy development can also be a hindrance. Power lines, wells, fences and roads separate the habitats of many species.

2. Air and water pollution damage the life of people. In the US, 1.3 million oil and gas facilities are existing production wells and refineries. More than 12 million people live within 1/2 mile of these facilities, and many are exposed to air and water pollution every day, which can lead to a number of health problems. Oil and gas production is one of the largest killers in the world, according to the United Nations. When fossil fuels are burned by power plants, automobiles, and industrial facilities, they emit toxic gases. Inhaling this air can cause respiratory problems such as asthma, cardiovascular disease, and even cancer.

3. Hazardous emissions cause climate changes. After the industrial revolution, people burned more and more fossil fuels, releasing more greenhouse gases into the atmosphere. These emissions trap unwanted solar heat and cause the temperature of the planet to rise. The consequences are all around us in the form of longer seasons of forest fires, stronger hurricanes and sharp heat waves. The majority of polluting emissions come from fossil fuels. The most common type of greenhouse gas is carbon dioxide, which is mainly released into the air because of burning oil, coal and gas, which feed everything from automobiles to production.

4. The inevitable effect of gas and oil production is manifested in the use of large areas of land for drilling sites, parking areas for trucks, equipment, gas processing and transportation facilities, as well as access roads. The main possible negative impacts are emissions of pollutants into the air, groundwater pollution by uncontrolled gas and liquid flows, leakage of drilling fluids caused by their emissions, and uncontrolled discharge into water. Liquids that are extracted contain hazardous substances.

5. Burning gas emits CO<sub>2</sub>. Although oil does not produce the same amount of CO<sub>2</sub> as with coal combustion, it still emits greenhouse gases into the atmosphere and increases global warming.

In conclusion, I can give many examples of environmental pollution resulting from the processing of oil and gas products. Today's priorities for the development and production of oil and gas should be overestimated taking into consideration the fact that the risks and the burden of negative impacts on the environment food is not compensated by a corresponding potential benefits, as indicators of the production of this gas is very low.

#### **References:**

1. [www.wilderness.org/articles/blog/7-ways-oil-and-gas-drilling-bad-environment](http://www.wilderness.org/articles/blog/7-ways-oil-and-gas-drilling-bad-environment)
2. [www.barentswatch.no/en/articles/Environmental-impact-of-oil-and-gas-activities/](http://www.barentswatch.no/en/articles/Environmental-impact-of-oil-and-gas-activities/)
3. [www.dummies.com/education/science/environmental-science/what-is-the-environmental-impact-of-petroleum-and-natural-gas/](http://www.dummies.com/education/science/environmental-science/what-is-the-environmental-impact-of-petroleum-and-natural-gas/)
4. [www.frontiersin.org/articles/10.3389/fenvs.2016.00058/full](http://www.frontiersin.org/articles/10.3389/fenvs.2016.00058/full)

## **HOME HEATING SYSTEMS**

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A warm dwelling has long been a concern of the man; today this topic has not lost its relevance. Thermal comfort in the house is provided by various heating systems. For many centuries, mankind has used the simplest heating system namely the oven. It heated everything: from royal palaces to peasant houses. The oven is still used to heat private houses, especially in rural areas. However, scientific and technological progress has improved the system of heat supply, which has led to the emergence of various modern heating systems.

Heating is understood to be the artificial heating of premises during the heating period in order to compensate for heat loss and maintain a given temperature level that meets the conditions of thermal comfort and the requirements of the technological process. In our country it is one of the main components of a modern comfortable home.

Modern technologies and appropriate equipment have made it possible to create a wide range of heating systems that meet almost any requirements: sanitary and hygienic, economical, construction and installation, operational, etc. As a rule, all heating systems consist of three elements: heat-generating installation (heat sources), means of the heat carrier delivery (heat pipes) and