Problem Tasks in the Field of Resource and Energy Saving Technologie

IOP Conf. Series: Journal of Physics: Conf. Series **1066** (2018) 012021 doi:10.1088/1742-6596/1066/1/012021

PROBLEM TASKS IN THE FIELD OF RESOURCE AND ENERGY SAVING TECHNOLOGIE

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Abstract. The current problems of the rational use of mineral raw materials, including the stages of extraction, processing and utilization of wastes using modern technologies are considered. Classification is proposed and a list of the main directions of resource and energy saving in the production environment and in the sphere of related processes and factors is given.

Of all the minerals extracted, which is about 150 billion tons per year, only about 2% are used as useful products, while the rest in the chemically small-modified state is waste [1].
If to add to this huge volumes of processing and the corresponding amounts of waste in agriculture, food industry, chemical production, timber processing, household sector and many other sectors, the problem of resource-saving becomes world-wide.

More than 90% of all production costs ultimately connected with the wasteful use of resources of all types are carried out at large industrial facilities [2]. Therefore, in order to implementthe problems of energy saving, an urgent task is to search for and assess sources of reducing resource consumption in basic sectors of the national economy, mainly in the processes of processing and transformation of various materials and obtaining finished products

The purpose of work:

- identify the main areas of increasing the efficiency of the technological production sphere;
- highlight the most important components that have a significant impact on the rational use of all types of resources;
- to present ways of solving the problems of energy and resource saving in the technologies of various sectors of the national economy.

For a holistic perception of the analyzed problem, the entire system of technological resource saving will be conditionally divided into the production environment and the sphere of adjacent processes and factors. We will consider each of its componentsmore specifically.

Production environment of technological resource-saving:

- optimization of exploration and production of minerals;
- reduction of fuel consumption and primary energy;
- primary preparation and processing of raw materials;
- increasing the degree of processing and extraction of mineral products
- increaseof materials and waste in the share involvement in the production of raw materials,;
- synthesis of new compounds and compositions;
- optimization of technological processes and increase of their non-waste technology;
- Increase the service life of the products.

It is appropriate to initially allocate exploration and extraction of minerals, as a huge amount of materials must be produced and the largest volumes of primary waste are formed. This concerns the exploration and extraction of ore and non-metallic materials, energy raw materials, water, products for mining

chemistry, etc. The use of overburden at mining companies in the Kursk Magnetic Anomaly may be one of the examples of rational resource conservation[3, 4].

A reduction in the use of primary energy, the specific per capita consumption of which in the world in 2015 amounted to 1.85-1.90 tons of oil equivalentcan be considered the most important direction of resource saving [5]. Decrease of this indicator most actively affects many aspects of resource saving: volumes of extraction of raw materials and materials, transport costs, environmental costs, construction of various facilities, and much more. The main ways of solving them are known and are developing [5, 6]. However, for a number of countries, incl. Russia and Belarus, they are paramount for sustainable development.

The stage of primary preparation and processing of raw materials forms the entire subsequent cycle of technological production of materials. This is a multifaceted technology, but designintegrator redistributionformstheir backbone, which consumes about 10% of the total generated electricity and to 2% of the produced metalis lost for wearing [7].

At the same time, resource losses are no less great. The Granit mine of the city of Mikashevichi in the Brest region can serve as an example, where 18 million tons are extracted annually as a rock mass for granite grains, of which 4 million tons is a sifting of at least 5 mm in size and 95 % going into irretrievable losses. Such kind of resource waste is found everywhere and their practical realization has great prospects, but it is connected with many difficulties, mainly it concerns the organizational plan.

Increasing the degree of processing and extraction of minerals is a fundamental problem in the technological sphere of production and largely determines its effectiveness. This problem is exacerbated by the depletion of natural resources and the need to use finely divided and difficult-to-access minerals. One of the complex solutions in this direction can serve as selective ore preparation [7].

The problem of increasing the share of raw materials, materials and waste involved in production has a special attention. At the same time, we should talk about expanding the raw material base of the industry by developing new technologies for processing waste, utilizing harmful dust emissions, efficient water and other wastewater treatment, reasonable management of the forest fund, etc. In recent decades, the share of processed heterogeneous and complex in composition and properties of materials has increased significantly, which requires the creation of new technologies and equipment [8, 4].

Synthesis of new compounds and compositions is included in the sphere of advanced technologies and is based on modern advances in science and technology. Its range starts from nanotechnology and ends with the most multi-tonnage production, where more energy and materials are spent. The applied technologies are characterized here as obvious archaic and undoubted perfection, and in large-scale production they are characterized by stable conservatism and low intensity of development. The production of concrete products can serve as an example of the latest technology particularly in the processes of mechanical activation of concrete mixture components [9],

Resource-saving based on the increase the periods of operation of manufactured products should be regarded as the simplestway to save material resources of all kinds. Initially, it requires an increase in the cost of creating high-quality materials and products, but reduces initial production costs and subsequent operational costs. The reliability factor works successfully on non-durable products and is not determinative in the production of products for a market with high competitive offers or rush demand. Hence the conclusion-evaluation of this direction requires a differentiated approach and concrete justifications.

The sphere of related processes and factors includes:

- functional design;
- Optimization of building structures;
- technological energy saving and electric drive;
- technological transport of materials;
- use of renewable energy sources;
- Innovative management of the technological environment;
- personnel training.

The sphere of related processes and factors that also exert a certain influence on resource saving consists of directions that are described in detail in [6] and cover functional design of all types of technologies, optimization of building structures, technological energy saving, technological electric drive, technological transport of materials, use of renewable energy sources, innovative management of the technological environment, as well as training personnel training.

This is a purely subjective assessment of the non-productive sphere of technological resource saving, which allows us to expand our understanding of the potential and possibilities of this direction in addition

to the production sphere of technological resource saving. Full-scale analysis of the technological environment requires additional research and collection of statistical, expert and other information.

In our opinion, it is necessary to highlight the most important problems and unsolved problems in the sphere of modern resource-saving:

- Increase the degree of processing and extraction of useful components;
- increase of the share of raw materials, materials and waste involved in the practical use;
- Synthesis of new compounds and compositions that ensure the usable use of raw materials, techno genic materials and waste;
- Optimization of technological processes that contribute to improving quality and saving expensive components;
- the discrepancy between the level of development of the technological machine-
achievements in the field of materials science;
- the disparity of the scientific and technical and project base and corporate barriers in the sphere of technological resource saving;
- the absence of a single global center for the organization and management of the development of technological resource-saving.

At present, material science has moved far ahead, which allows creating new efficient materials, products and technologies, but their practical use is limited to extremely old technological equipment, control and management systems. World science has produced a large number of very different of anomalous effects in the processes of technological processing of materialsin nature and conditions of the occurrence.

However, in industrial technologies they are used extremely little. Thus, in particular, the mechanism proposed by the authors for the absorption enhancement of the strength of disperse structures, shown by the example of the introduction of solid natural adsorbents into concrete mixtures [10, 11],is not still used. It is assumed that after full-scale studies, its functions can go far beyond the proposed effect of Rebinder.

The most difficult situation with innovative development in the sphere of so-called production technologies is typical for Russia and Belarus. Here there is a paradoxical situation when foreign producers have wide access to our markets with very mediocre equipment and technologies, and their developers, capable and willing to create high-class equipment of the world level, do not have the opportunity to self-actualize in the conditions of the domestic market [12,13].

Conclusions. From the analysis of the above research and production tasks in the field of resource and energy saving technologies, it follows that the use of new forms of organization of creative teams that unite specialists of various profiles in their ranks can provide effective energy saving based on the creation of new materials, technologies, machines and complexes.

Acknowledgments
The article was prepared within the framework State task No. 9/11523/2018/11.12

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