

ENVIRONMENTAL ENGINEERING, INNOVATIONS, AND MANAGEMENT. EDITORIAL REVIEW

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Original Manuscript Submitted: 7/21/2022; Final Draft Received: 7/23/2022

In recent years, special attention has been paid to environmental safety in various fields of application. Among all human activities, applications related to energy are always in high demand. At the same time, many of them affect climate change and can lead to biodiversity degradation and other environmental problems. The International Journal of Energy for a Clean Environment is a periodical that publishes high-quality research on the intersection of energy and the environment. The current issue of the journal presents the results obtained by researchers from different countries and different fields of research, devoted to some points in the field of energy and environmental management.

KEY WORDS: *energy efficiency, coefficient of performance, environmental protection, low emission combustion, power engineering, hydrogen engineering*

1. WASTE MANAGEMENT AND ENERGY SAVING

Aimbetova et al. (2023) and Maliga et al. (2023) provide the solving of environmental issues from the point of view of energy saving and cost management. The researchers demonstrated a practical-oriented approach that is implemented in the Republic of Kazakhstan.

The use of industrial waste as the main content of thermal insulation (Aimbetova et al., 2023) allows a decrease in energy spending on heating or cooling and makes a great contribution to the cleansing of natural areas from pollution.

Metallurgical production is one of the largest sources of heat loss and CO₂ emissions. Applying the improved thermal insulation materials to the existing metallurgical furnaces (Maliga et al., 2023) leads to a decrease in heat loss that, in turn, reduces energy demand for the industrial-technological processes and eliminates the carbon footprint of the production.

2. ENGINEERING APPROACH

It is obvious, that changing the convenient lightings (filament lamps) to the energy-efficient light-emission diode lightings is important. This allows decreasing in the energy

demand; consequently, this leads to a decrease in greenhouse-gases emissions during the lamp operation. However, the production of light-emission diodes itself is not environmentally friendly. Therefore, the quality of the end-user goods plays a significant role in the entire cycle of green energy production and use and circular economy effectiveness. Of course, the lighting manufacturers carry out the quality tests of the production, but there are always better and worse products with similar characteristics. The use of better ones cares more about the environment. Thus, the simple method to evaluate the quality of the light-emission diode lightings with similar parameters, proposed by Kayumov et al. (2023), is in high demand. We believe this is an interesting and useful approach.

3. FOOD SECURITY

The manuscripts of the authors' team from the Portuguese Republic, Nanga et al. (2023) and Curto et al. (2023), consider the improvement of agricultural products cooling and saving. Thus, the solution is applied to both energy-saving technology and food security. Food security covers the areas of some sustainable development goals adopted in 2015 by the United Nations. Directly: no. 1 – No poverty; no. 2 – Zero hunger; no. 3 – Good health and well-being. Indirectly: no. 11 – Sustainable cities and communities; no. 12 – Responsible consumption and production. From the point of view of energy efficiency, the authors' research can help achieve sustainable development goal no. 7 – Affordable and clean energy.

And, of course, these works are interesting from the point of view of monitoring the research and implementation of a scientific idea.

4. POLLUTION MANAGEMENT

The elimination of various pollution from industry and energy is a task that constantly attracts the attention of scientists around the world. The research in this field is devoted to various areas: technical solutions, legislative applications, economical approaches, and evaluation methods.

It may seem that the dust removal methods are already well developed. They are used over the world in many technological projects. However, the researches in this area continue. Pryiomov et al. (2023) demonstrated a self-developed simple solution for the improvement of the cyclone-based dust removal apparatus. The solution is beautiful, and simple, and can be easily implemented in the existing purification lines at working enterprises of any size—from small to large. In our view, those types of solutions are very attractive and should be considered and implemented.

Ukraine is one of the countries that use, mainly, fossil fuels for power generation. Moreover, the main energy fuel in Ukraine is coal. Thus, the evaluation of the CO₂ emissions in the power engineering sector of Ukraine is an important point to a decrease in the sector's effect on climate warming. An existing method for calculation of the CO₂ emissions from thermal power plants developed by the Intergovernmental

Panel on Climate Change is complex and can be a challenge, especially for the thermal power plant's staff. Dr. Nikolay Chernyavskiy is an expert from the Thermal Power Engineering Institute of Ukraine. He is very experienced in the development of efficient coal combustion processes, improvement of the boilers' operations, and forcing boilers for power generation from a standard (projected) fuel to non-design coal sources and mixtures. In his paper (Chernyavskiy, 2023), a simplified method of the carbon dioxide emissions calculation is discussed that differs from the Intergovernmental Panel on Climate Change recommendations. However, the method offered by the author was agreed upon by the staff of the technical support unit of IPCC. It is a highly recommended manuscript for reading.

5. BIOFUELS SPECIFICS

Biomass, and fuel pellets as well, are considered renewable green energy sources. Although we personally, do not agree with the application of the "green" term to them both, biomass is more environmentally friendly than coal, no doubt.

It is known that pellets are made from different types of biomass, and their characteristics vary in a wide range. Therefore, an investigation of the influence of pellets' source type on the boiler's efficiency is important. Vorobyov et al. (2023) discuss some interesting details of combustion processes.

6. TRANSITION TO RENEWABLES

Moving from fossil fuels to renewable sources is a modern trend that all countries wish to complete. However, not all countries can do this easily and quickly. Magomadov et al. (2023) discuss specific issues that Russia meets in this way. That country has a large territory with directly opposite climatic conditions; therefore, green energy transition is a big challenge for Russia. Factors of economic, technical, legislative, and terrestrial nature must be taken into account and coordinated with each other. The manuscript provides the authors' vision, which deserves attention.

7. IMPORTUNATE OIL AND GAS

In our opinion, the current trends in the transition to "green" energy are overestimated in terms of time. To deteriorate climate changes moving from fossil fuels to renewable ones is important but cannot be made in such a fast mode as thought. Fossil fuels, especially gas and oil, will keep their position in the energy generation processes for a long time.

The more correct way is to put more attention on the energy efficiency of the existing processes and facilities simultaneously with the development of new energy sources and technologies of generation. For example, we use internal combustion engines with the maximal coefficient of performance around 38–42%. There is enough room to move forward and grow.

Similar considerations can be applied to different fields where fossil fuels are used, including the mining industry. Thus, improvements in the mining industry, particularly in the oil and gas area, are extremely needed.

Katanov and Vaganov (2023) and Katanov et al. (2023) discuss the ways of eliminating the losses in gas and oil production by the use of more accurate statistical models. The authors have developed approaches to modeling the oil/gas reservoir, and forecasting the well's management and accident prevention.

8. HYDROGEN ENERGY

In the final paper of this special issue, Guryanov et al. (2023) consider efficient hydrogen combustion in a bidirectional burner. It is worth noting that hydrogen pretends to be one of the important sources of clean energy generation. Therefore, the technologies for its effective and safe combustion are in high demand. At the same time, burning fuels in swirling flows is a perspective process. It allows for a significantly decreasing in emissions, and swirling burners are developed for different applications. The authors (Guryanov et al., 2023) have carried out high-quality research and provided convincing results of bidirectional combustion superiority.

The guest editors hope that readers will enjoy the selected articles in this special issue.

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