SUSTAINABLE PRODUCTION: TECHNOLOGICAL CHALLENGES FOR UKRAINE

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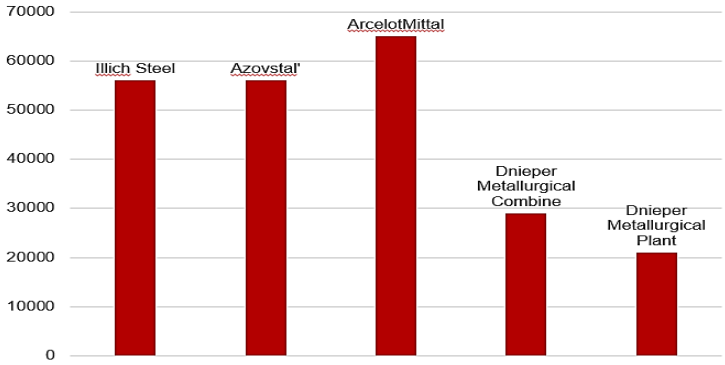
Introduction. Sustainable development involves equalizing the quality of life of the population of different countries and it's further growth. Improving the quality of life must be based on new advances in science. Modern conditions require everyone to reduce resource consumption, switch to other types of materials and energy sources, and introduce advanced non-resource intensive and waste free technologies, reducing the burden on the environment and human health. In November 2018, the European commission announced the implementation of a long-term climate protection strategy to achieve the goals stated in the Paris agreement. This has posed a technological challenge to Ukraine: technologies and approaches need to be changed to ensure that the products meet environmental requirements. (Latysheva et al., 2019). The article aims to review the main directions of innovative technology development in the leading industries of Ukraine, such as metallurgy, information technology, aircraft construction, space industry, and medicine.

Presentation of the main research. Metallurgy can be considered the main industry of Ukraine. As is known, the metallurgical cycle has the following stages: ore beneficiation, pig iron smelting in blast furnaces, metal production in open-hearth furnaces or converters, casting of billets on special rolling mills, production of metallurgical products from billets. Each of these stages is harmful to the environment, energy-intensive, dangerous for employees of relevant enterprises. The Figure 1 shows the average level of carbon dioxide emissions in tons per year.

Due to the use of the latest technologies in the field of 3D printing, this figure can be significantly reduced (Tarasenko, 2014). An example of such technology is xBeam 3D Metal Printing from Ukrainian developers, which reduces the use of raw materials in the production of titanium, parts from 20-30 to 3-5 kilograms.

Figure 1

Emission level of metallurgical enterprises of Ukraine, t. CO2 for a year (Kuznetsov, 2020)



The technology allows reducing the level of harmful emissions by 6 times.

Revolution 4.0 makes metallurgical production safer and more efficient. Thus, since 2020, within the framework of the industrial digitalization program "Industrialization 4.0", the Ukrainian company INTECH has opened a new direction of digital solutions based on artificial intelligence, machine vision, and the Internet of Things. There is an integration of machine learning algorithms in the steelmaking process to optimize the use of ferroalloys. Algorithms can learn to work with any task, for example – to control the shortcomings of slabs or fix the defect and its type in the cold rolling shop at a speed of more than 20 meters per second.

The information technology industry has the fastest growth in Ukraine (Galuta, 2020). In the last 5 years alone, the level of exports of IT services has increased more than 4 times. In recent years, there have been several breakthroughs that have been used in our world. For example, Looksery - developed by the Odessa team – is a program for mobile devices that allows you to use filters to improve the quality of photos and videos in real-time. In 2015, Snapchat bought startup Looksery for about $ 150 million. Grammarly is a real-time English spell checker. Today 5 million people worldwide use it.

There are also interesting examples of innovative solutions in the field of aircraft construction (Galuta, 2020). These include BAK (unmanned aerial vehicle complex), Gorlytsia, Strategic BAK, Target Complex, as well as various specialized modifications of ANTONOV aircraft. Leading development in medicine is the portable Cardiomo device, which can prevent more than 40 different diseases, especially heart disease.

The first batches of Cardiomo were ordered by the Okhmatdyt Institute of Cardiology. The developers also have about 700 orders from around the world, including medical universities and nursing homes. The inventors estimated that when large-scale production of the device is established, it will be able to save the lives of 16 million people each year (Galuta, 2020).

Conclusions. The use of the latest technologies in the main directions of Ukraine's development allows increasing the quality, quantity, and usefulness of proposals while reducing the harmful impact on the environment for the health of citizens. Thanks to sustainable development, which involves more and more Ukrainian companies and developers, new areas of research and jobs are being offered in Ukraine and around the world.

References

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