6. Сєдін В. Л., Грабовець О. М., Ковба В. В., Ульянов В. Ю., Микало В.В. Використання гірських порід облицювання будівель ПДАБА в учбовому процесі. Український журнал будівництва та архітектури. ДВНЗ ПДАБА, 2021. № 2(002). С. 88-98.

A. Bondarenko (PSACEA, Dnipro)
Scientific supervisor: O. Shybko, Cand. Sc. (Tech), Assoc. Prof.
Language consultant: K. Shabanova, English lecturer

THE LATEST TRENDS IN THE DEVELOPMENT OF SCIENCE AND TECHNOLOGY

The latest trends in the development of science and technology for 2024 span across various domains, reflecting significant advancements and the continuous evolution of the sector. Key areas of focus include sustainable technology, healthcare innovations, space exploration, and advancements in artificial intelligence (AI) and machine learning (ML), among others.

1. Sustainable Technology and Environmental Conservation:

- Sustainable catalysts are gaining attention for their environmental benefits and less reliance on precious metals, aiming to reduce carbon footprints significantly.
- Lithium-ion battery recycling technologies are evolving, with over 800 patents published in 2023, focusing on enhancing battery safety, durability, and reducing environmental impact.
- New energy solutions are also a prominent trend, emphasizing greener transportation and energy usage, including electric vehicles and renewable energy sources. [1]

2. Healthcare Innovations:

- The rise of biomaterials, such as bioelectronic materials for biomedical applications and 3D-printed organs, promises to revolutionize patient care and treatment methods.
- Weight-loss drugs and treatments based on CRISPR gene-editing technology, which have seen significant advancements, including regulatory approvals for sickle-cell disease treatments. [2]

3. Space Exploration:

- The global Artemis program aims to land the first woman and the first person of color on the Moon by 2025, with further plans for sustainable human presence and exploration of other celestial bodies. [3]

4. Artificial Intelligence and Machine Learning:

- Tailored generative AI models are becoming more popular, catering to niche markets and specialized needs, offering privacy and security benefits over large, generalized models.
- The demand for AI and ML talent continues to grow, highlighting the need for professionals skilled in AI programming, data analysis, and machine learning operations (MLOps). [4]

5. Robotic Process Automation (RPA) and Edge Computing:

- RPA is automating repetitive tasks across various industries, while edge computing addresses the limitations of cloud computing by processing data closer to where it's needed. [5]

6. Quantum Computing, Virtual Reality (VR), and Augmented Reality (AR):

- Quantum computing is advancing rapidly, with potential applications in healthcare, finance, and more. VR and AR technologies are increasingly integrated into training and entertainment. [6]

These trends illustrate the dynamic nature of the technology landscape, with innovations aimed at addressing environmental concerns, improving healthcare outcomes, expanding human knowledge through space exploration, and leveraging AI and ML for efficiency and personalized solutions. The continuous demand for specialized talent in these areas underscores the importance of skill development and education in driving future technological advancements.

REFERENCES

1. Behera B., Prasad R. Environmental Technology and Sustainability. India: Elsevier, 2020. 230 c. URL: https://shop.elsevier.com/books/environmental-technology-and-sustainability/behera/978-0-12-819103-3

1.SMART Materials for Biomedical Applications: Advancements and Challenges / K. Kumar та ін. // 15th International Conference on Materials Processing and Characterization (ICMPC 2023) / Northumbria University. England, 2023. C.1-8. URL: https://www.researchgate.net/publication/374505566_SMART_Materials_for_Biomedical_Applications_Advancements_and_Challenges

2.National Aeronautics and Space Administration. (2017). NASA's Artemis Moon Missions: all you need to know. URL: https://www.rmg.co.uk/stories/topics/nasa-moon-mission-artemis-program-launch-date

3.Chui M., Yee L., Hall B. та ін. // The state of AI in 2023: Generative AI's breakout year // McKinsey Global Institute. 2023. URL: https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-ais-breakout-year

4.Bajaj N. Increasing Productivity: The Effect Of Cloud Integration And Robotic Process Automation // Chemspeed Technology. 2024. URL: http://chemspeed.com

5.Skyrme T. Quantum Computing 2023-2043 // Strategic Advantages of Quantum Computing. URL: https://www.idtechex.com/en/research-report/quantum-computing-2023-2043/912

M. Borets (PSACEA, Dnipro)
Scientific supervisor: O. Adegov, Cand. Sc. (Tech), Assoc. Prof.
Language consultant: L. Druzhinina, Assoc. Prof.

APARTMENT HEAT POINTS AS SOLUTION FOR ENERGY EFFICIENT USE OF COOLANT

Existing heating networks do not fully meet the current requirements for regulating heat consumption in buildings. However, they contain significant potential that has to be realized in an energy-efficient manner in the near future yet [1].

The distribution and regulation of heat energy both outside and inside buildings according to demand is one of the main approaches to energy saving [1]. One of the most advanced technical solutions in this area is the use of apartment heat substations (AHS). AHS is a set of fittings and devices designed to produce hot water using heat exchanger and heat from the heating system.

The main advantages of apartment heating systems (HS) are the ability of the consumer to individually regulate the operation of the heating and hot water systems and provide convenient energy metering. Also, hot water consumption will be significantly reduced because hot water will start flowing from the tap in a few seconds and, thanks to its compact design, the hot water systems (HWS) can be installed in any convenient place (for example, instead of a classic boiler). There is also the possibility of flush mounting. The assessment shows that the costs associated with the AHS device will be recouped in up to 5 years at the current level of tariffs. After the payback period, the system with AHS will bring users net savings in operating costs with a significant increase in comfort. The heat energy savings in the operation of apartment buildings with AHS is about 20% respectively [2].

One of the possible reliable options is the use of the EvoFlat FSS apartment heat source by Danfoss, schematic diagram Fig. 1 [3]. This AHS is designed for HWS preparation and connection of a radiator heating system, designed for a maximum operating temperature of 95°C, with nominal pressure of 10 bar.