The project addresses one of today's pressing environmental issues—methane (CH_4) emissions from reclaimed municipal solid waste landfills. CH_4 is among the most harmful greenhouse gases, with a global warming potential over 25 times greater than that of carbon dioxide (CO_2). While landfilling remains the primary method of waste disposal worldwide, closed and inactive landfills can continue to emit CH_4 for many years, often in ways that are difficult to monitor or control. As a result, they become long-term sources of climate pressure and air pollution, especially in areas undergoing urbanization or significant land-use changes. Scientists have increasingly indicated that landfills, due to processes such as accelerated erosion, sedimentation, and greenhouse gas generation, may exhibit characteristics of the Anthropocene—a proposed new geological epoch shaped by human activities. One of the key approaches to mitigating CH_4 emissions is the use of technical cover systems, which act both as gas barriers and as layers that prevent surface settlement and rainwater infiltration. The most commonly used solutions include compacted mineral layers and synthetic covers made from geomembranes. Although these systems have been used in practice for many years, there is still a lack of reliable and comparable data on their long-term effectiveness—especially in terms of reducing gas emissions, which is crucial for ensuring the safe use of land after reclamation. Existing research tends to be limited in scope, often based on single-point measurements or focused on one type of technology. This makes it difficult to draw reliable conclusions and create actionable recommendations for engineering practice and regulatory guidelines. The main goal of this project is to compare the two most widely used types of technical covers—mineral and synthetic—in terms of their impact on CH_4 emissions and surface deformation in reclaimed landfill areas. The project's innovation lies in the use of unmanned aerial vehicles (UAVs) equipped with advanced CH_4 sensors and photogrammetric systems, allowing for fast, precise, and spatially continuous monitoring of gas emissions. This approach significantly surpasses traditional field methods in accuracy, repeatability, and the ability to visualize issues across the entire landfill surface. Incorporating this technology into routine monitoring could revolutionize how post-closure landfills are supervised. The research will be conducted at two reclaimed landfill sites—one in Poland and one in the Czech Republic. The selected locations account for climatic, operational, and technological differences, which will enhance the generalizability of the results. The project involves both current CH_4 measurements using UAVs and analysis of historical gas emission data, along with conventional CH_4 testing. Based on the collected data, predictive models of methane emissions will be developed to support long-term forecasting and the planning of appropriate mitigation measures. The output of the project will be the creation of a practical decision-support tool—an interpretive key—that will help select the most efficient and safest cover systems for closed landfills. This tool will be of use to environmental authorities, engineers, landfill operators, and regulatory agencies responsible for implementing waste and climate policy. The resulting recommendations will be broadly applicable, including in other EU countries and developing markets. This project aligns with the goals of the European circular economy strategy and climate action policies by supporting efforts to reduce GHG emissions in the waste management sector. The outcomes will contribute to a deeper understanding of CH_4 emissions, the effectiveness of reclamation technologies, and modern environmental monitoring methods using UAVs. Thus, the project not only provides significant scientific insight but also carries strong implementation and application potential, fostering a transition toward more sustainable waste management.