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MODELING AND ASSESSMENT OF THE ECONOMIC POTENTIAL OF METHANE EMISSION REDUCTIONS IN UKRAINE'S OIL, GAS, AND COAL SECTORS

This article examines the economic potential of reducing methane emissions in Ukraine's oil and gas and coal sectors through 2040 in the context of implementing Regulation (EU) 2024/1787, based on economic and mathematical modelling. The methodological framework consists of an integrated toolkit that combines the TIMES-Ukraine model with sector-specific models for the oil and gas and coal sectors. Two scenarios included in Ukraine's National Energy and Climate Plan (NECP) are considered – WEM and WAM, as well as two target scenarios for implementing specific sectoral measures over 10 years (WAM-10) and 5 years (WAM-5). Results of scenario modelling show that reducing the share of fossil fuels (oil, gas, coal) in the energy balance alone is insufficient to reduce methane emissions, which are caused by leaks in existing infrastructure and residual emissions from abandoned facilities. Under the WEM scenario, cumulative emissions for the period 2026–2040 are estimated at 12.4 million metric tons of CH_4, and the implementation of sector-specific measures makes it possible to limit them to 5.04 million metric tons in WAM-10 and to 4.01 million metric tons in WAM-5, representing reductions of 7.3 and 8.4 million metric tons, respectively, compared to the WEM scenario. By 2040, annual methane emissions could decrease from 0.63 million metric tons to 0.19 million metric tons with gradual implementation of measures, and to 0.06 million metric tons with accelerated implementation.

Keywords: methane emissions, oil and gas sector, natural gas, coal sector, coal mine methane, TIMES-Ukraine, government regulation, Regulation (EU) 2024/1787.