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Carbon Capture, Utilization and Storage (CCUS) perspectives in Indonesia and Visegrád Countries

Muhammad Raynaldi[1,2], Gabor Harangozo[1], Miroslav Variny[2]

[1]Department of Sustainability Management and Environmental Economics, Corvinus University of Budapest, Budapest Hungary, email: Muhammad.raynaldi@stud.uni-corvinus.hu, gabor.harangozo@uni-corvinus.hu

[2]Department of Chemical and Biochemical Engineering, Slovak University of Technology in Bratislava, Bratislava, Slovakia, email: miroslav.variny@stuba.sk

Abstract

As a key technology for global climate change mitigation and the pursuit of carbon neutrality, Carbon Capture, Utilization, and Storage (CCUS) is examined through a comparative analysis between Indonesia, leveraging its practical experience in the oil and gas sector and its target of 15 CCUS projects by 2030 and the Visegrád countries, which operate within the European Union's regulatory framework, including the "Fit for 55" package. Applying a socio-techno-economic approach, this study integrates the Levelized Cost of Carbon Capture (LCOCC), Social Cost of Carbon (SCC), and Levelized Cost of Electricity (LCOE) to evaluate project feasibility by calculating the Social Net Present Value (NPV Social), thereby internalizing environmental externalities. By contrasting LCOCC and SCC scenarios and incorporating the Nordhaus–Stern discount rate debate, the research identifies strategic conditions such as the need for subsidies and technological efficiency improvements under which CCUS projects can generate positive net social benefits, offering policy-relevant insights to help align technical deployment with long-term climate objectives and socio-economic sustainability in both regions.

Keywords: CCUS, LCOCC, Social Cost of Carbon (SCC), Sustainability Assessment, Indonesia, Visegrád Group.