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Repurposing of coal power plants with Nuclear Methanol hybrid energy system –A South African case study

As the world makes strides towards achieving climate goals and reducing carbon emissions, it is worthwhile to consider the opportunities of repurposing coal power plants that have been mothballed or are reaching its end of life. Coal still dominates the South African energy mix by providing 80% of the total system load. Hybrid energy systems are perfect candidates to address the current energy demands by reducing carbon emission challenges caused by coal power plants. A Nuclear Methanol system is investigated as a proposed case study for the repurposing of a coal power plant with Small Modular Reactor (SMR) operation. Methanol is well known as 'liquid Hydrogen' which is more stable and less flammable and is thus a more attractive option because it presents much lower storage and transportation risk. Factors that need to be considered include, but not limited to, site zoning, multi-module plants, operational and safety challenges, regulatory and licencing challenges, etc. The viability of the hybrid energy system with specific focus on the South African landscape will be investigated along with the challenges and opportunities presented for the deployment of SMRs to the established sites.

References:

[1] Nils Haneklaus, Staffan Qvist, Paweł Gładysz, Łukasz Bartela, Why coal-fired power plants should get nuclear-ready, Energy, Volume 280, 2023, 128169, ISSN 0360-5442, <https://doi.org/10.1016/j.energy.2023.128169>

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