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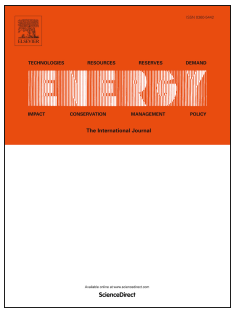

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A Techno-economic Assessment of Gas-to-Liquid and Coal-to-Liquid Plants through the Development of Scale Factors

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Abstract

Fluctuations in conventional crude oil price globally and initiatives towards the phase-out of coal-based power have initiated a focus on alternative sources of liquid fuels from natural gas and coal. Gas-to-liquid (GTL) and coal-to-liquid (CTL) processes are two liquefaction technologies that could be used. There is a limited work on either the development of scale factors to estimate capital costs or on techno-economic assessments of the plants. This study addresses this gap and focusses on western Canada, which has large deposits of coal and natural gas. The capital costs of the plants' key equipment are estimated through the development of cost scale-up factors. The production cost for 50,000 bbl/day of liquid fuels from GTL and CTL plants is estimated through modelling using a bottom-up approach. The developed scale-up factors for the GTL and CTL plants were found to be 0.7 and 0.65, respectively. For both plants, most of the benefits of economies of scale are achieved at a capacity of 20,000 bbl/day. The production costs of the GTL and CTL processes are 44.61 and 57.65 Canadian cents/liter

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