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A novel approach to develop and identify optimal bio-jet fuel pathway

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The aviation sector is one of the decentralized emitters of greenhouse gases in the world. Given this sector's growing contribution to global CO_2, aviation strategy and action plans could play a key role in meeting the global climate targets. Decarbonizing the aviation sector via switching to more energy dense biofuel could reduce atmospheric CO_2 concentration across the country and globally while transitioning to Future Energy System. Commercialization of the bio-jet fuel market requires the governments recognizing targeted jet-fuel strategies. Currently, there are different and scattered activities across the supply chain of bio-jet fuel within the industry, small/medium enterprises, university researchers, forest management and airlines. With so many competing feedstock and technology options, there is a need for holistic modeling tools to enable the decision makers to target investment at the right mix of feedstock, right technology solutions, and the best location, to meet the demand for bio-jet fuel while addressing the uncertainties in future policy and regulations. Using our novel approach, a holistic optimization functionality can be applied for analyzing different combinations of feedstock and technologies to select the combinations which together minimized the total cost while meeting the constraints or targets. This presentation will include the design and architecture of the toolkit which could provide the context required for making informed investment decisions considering the gaps, risks, and barriers, to develop a market for sustainable fuel alternative. Rather than being a scenario developer or forecasting tool, our design tool is an optimization tool which finds the optimal pathways, for example the least-cost system, or the highest production system that meets the emission reduction target or the required blending ratio, whilst taking account of feedstock availability, technology operations, product demand and quality and the associated constraints.

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