Illuminating the Path towards Co-Optimized Fuels and Engines through Analysis of Sustainability, Scale, Economics, Risk, and Trade

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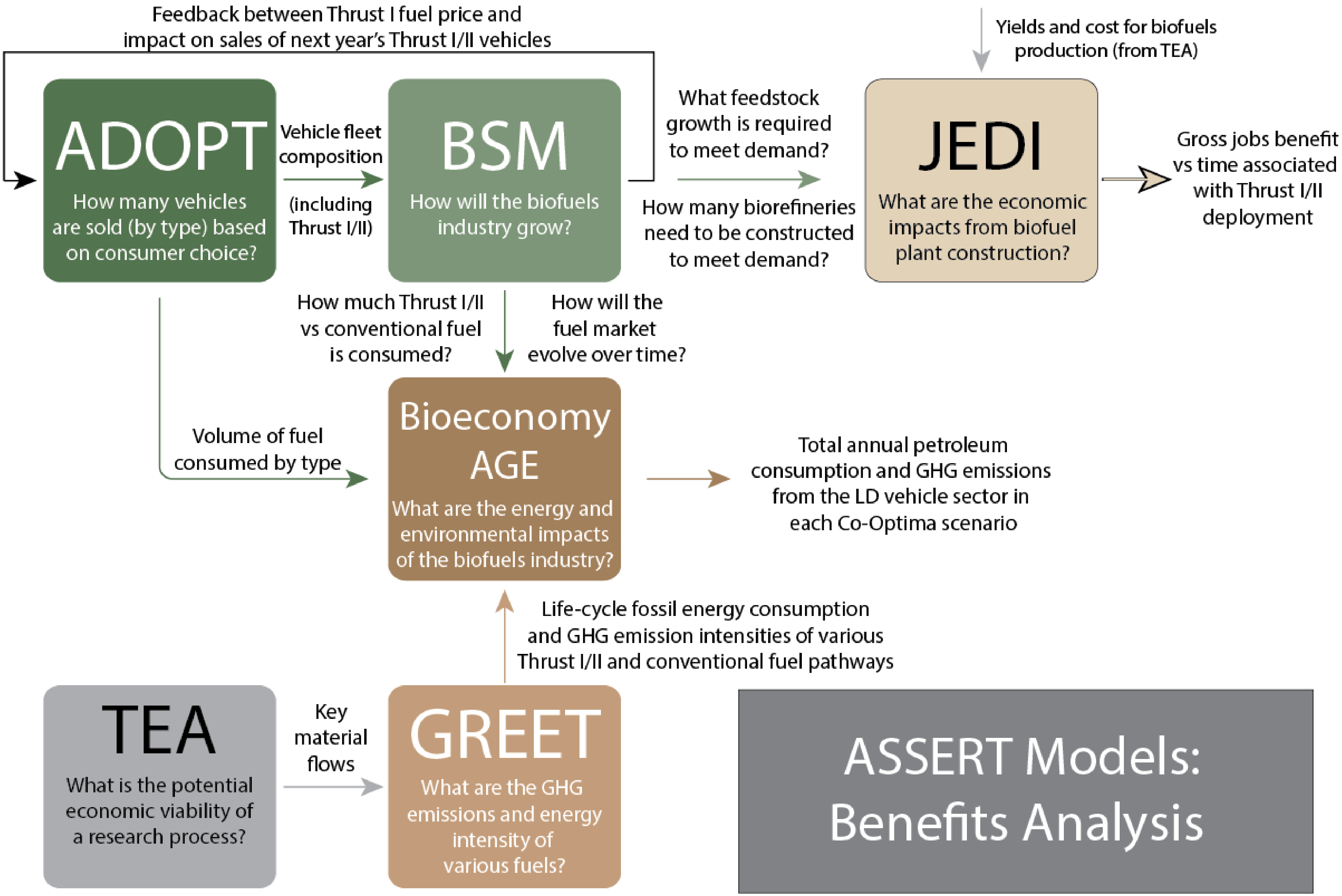
Evaluate the fuels and vehicle technologies under consideration from an environmental and economic perspective while conducting research and development-guiding analyses.

Examine potential benefits of deployment and adoption of Thrust I and Thrust II fuels and vehicles.

Conduct techno-economic and life cycle analysis of candidate blendstocks.

Examine routes to scale up of feedstock supply.

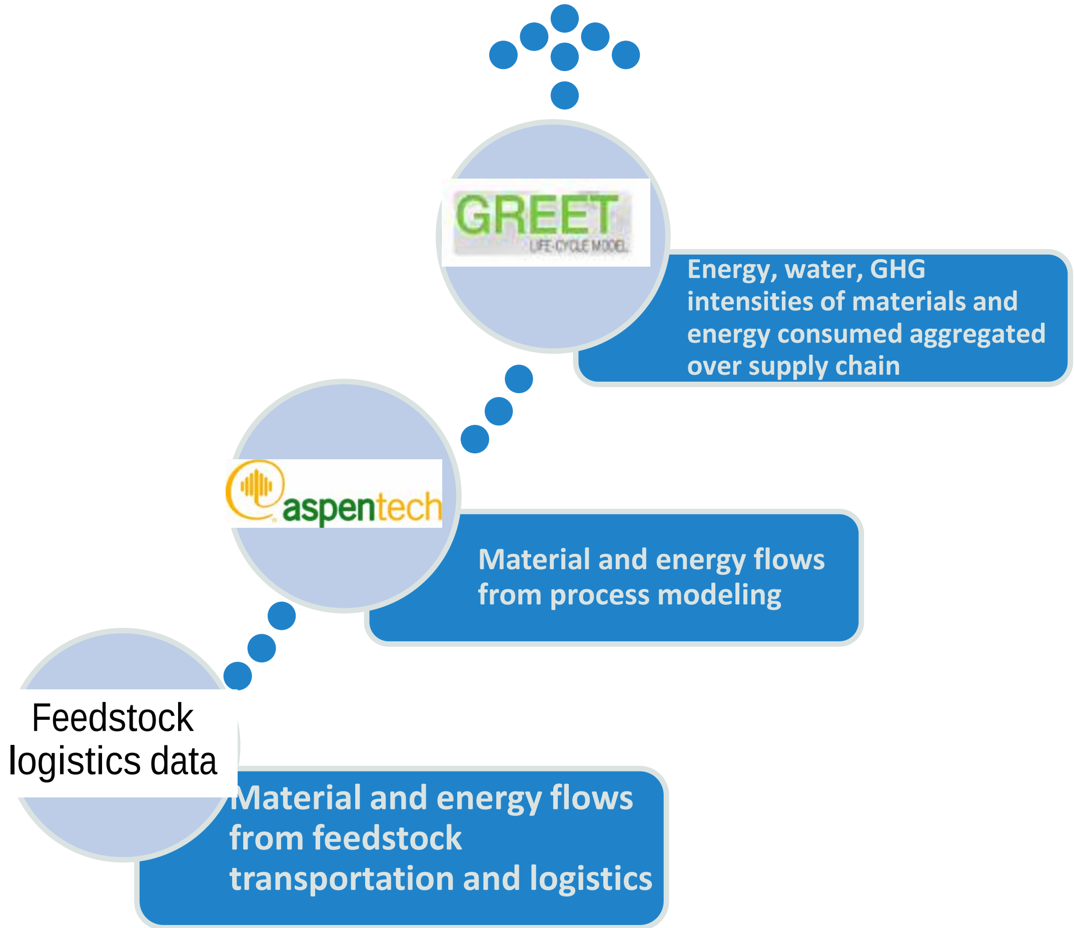


TEA: Techno-economic Analysis

Three Scenarios to Assess Potential Benefits

Scenario	Description
Thrust II Fuel Penetration	No fleet turnover specified.
Thrust II Vehicle high penetration	Forced fleet turn over to Thrust II vehicles within 10 years after introduction.
Thrust I Vehicle High Penetration	Forced fleet turn over to Thrust I vehicles within 10 years after introduction.

Interaction between techno-economic and life-cycle analyses



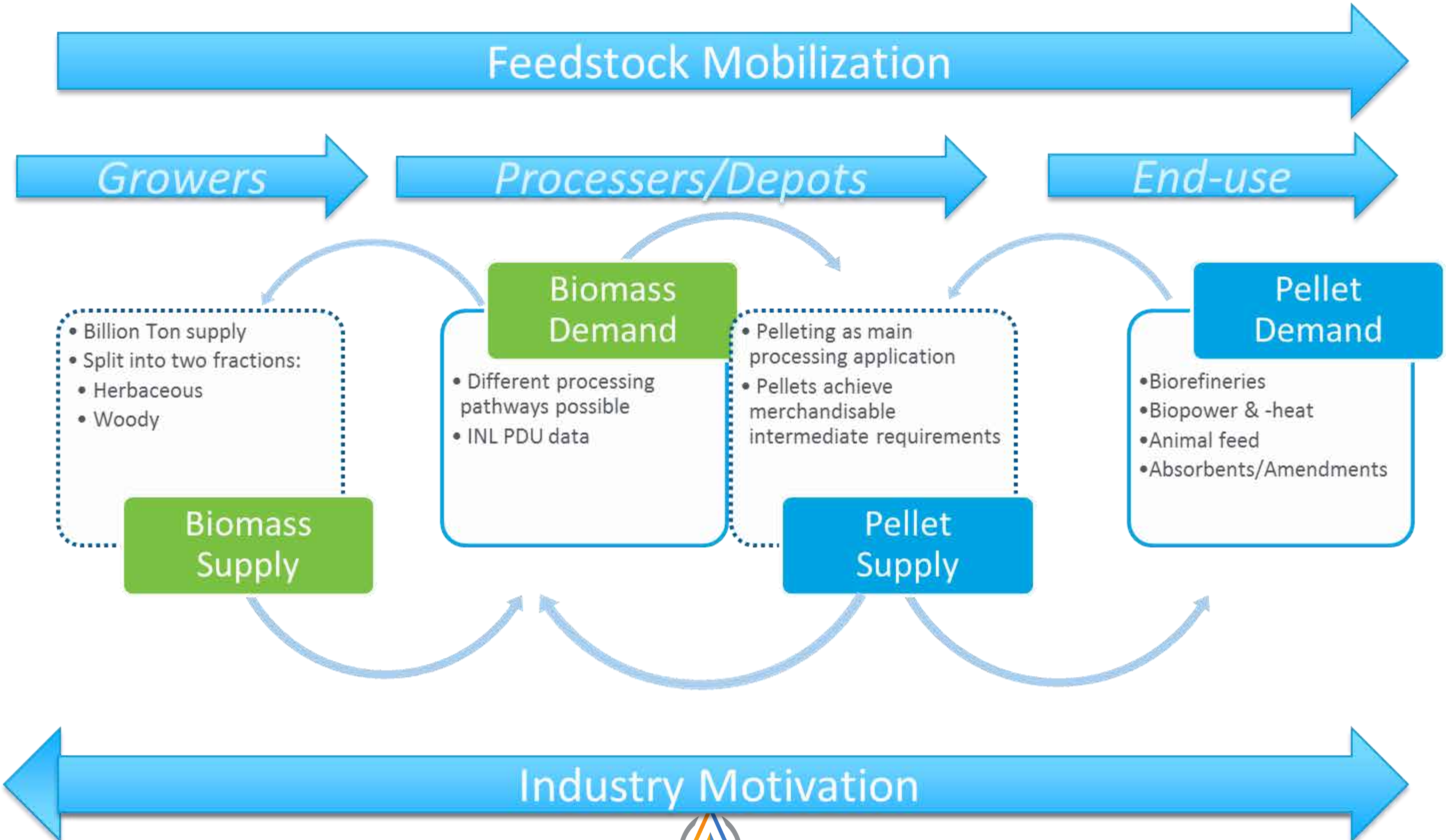
Fifteen Metrics Developed for Tier II Screening

Metric	Favorable	Neutral	Unfavorable	Approach
Target cost	Ranks in top 33% compared to other pathways	Ranks between 33-66% compared to other pathways	Is in the bottom 33% when compared to other pathways	Cost will be adopted from BETO established TEAs (design cases, articles), published TEA data (design cases, articles) and newly developed high level analysis as needed. All cost will be compared on a $/GGE basis. Pathway shows a near-term feasible direction towards meeting thee determined target cost.
Life-cycle GHG emissions	Likely to achieve a greater than 60% reduction in life-cycle GHG emissions as compared to conventional gasoline in 2015.	Could achieve a greater than 60% reduction in life-cycle GHG emissions as compared to conventional gasoline in 2015.	Unlikely to achieve a greater than 60% reduction in life-cycle GHG emissions as compared to conventional gasoline in 2015.	Estimate life-cycle GHG emissions of candidates with GREET model. Rely on preliminary TEA information, feedstock production data, and background GREET data (e.g., for electricity and natural gas). Develop baseline comparison for 2015 gasoline based on shares of feedstocks (e.g., oil sands, conventional crude) as in GREET1_2015.

Feedstock Supply Companion Markets

- Past DOE-funded work has identified up to one billion tons of cellulosic feedstocks that could potentially be sustainably produced in the US in the future, supporting the achievement of Co-Optima production targets and a growing bioeconomy.
- However, the challenge is mobilizing the resources, which require the appropriate drivers.
- This work explores the potential of non-biofuel markets, termed “companion markets,” to facilitate the transition from existing feedstock supply systems to a commodity-based “advanced” system, enabling the realization of the billion ton potential.

Concept: Demand-Supply Interactions



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Thank you!

Questions?