

# UNDERSTANDING BIOREFINERY INVESTMENT RISKS

## THE CHALLENGES TO REACHING CRITICAL MASS

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A corollary issue to which renewable fuels will likely be adopted by the airline industry – and indeed may be a driver of that adoption – is what fuels are likely to achieve competitiveness at commercial scale. Oliver Wyman, in conjunction with researchers at the Massachusetts Institute of Technology and Metron Aviation (a leader in air traffic management systems research), has been working to assess renewable fuel refineries from just such an investment perspective.

Recently, this team developed a methodology to value hydro-processing refineries producing aviation-grade biofuel and renewable diesel,

which could aid prospective investors in determining under what market conditions a profitable refinery could be constructed. Most critically, this methodology includes an analysis of fuel price uncertainty and uncertainty around government mandates and support, using the United States Biodiesel Blender Tax Credit and Renewable Identification Numbers as examples of the latter.

To “build in” uncertainty, the team constructed uncertainty profiles for each key input to a discounted cash flow model previously developed at MIT. They then used Monte Carlo simulations to calculate ranges of a project’s net present values.



Scenarios were constructed around a potential facility's size, price correlation and working cost of capital.

The analysis determined that a medium-size refinery (producing 4,000 barrels per day with a cost of capital of 16 percent and medium price correlation between commodity inputs) operating today would require government subsidies for a minimum of nine years to achieve an economic return (that is, for three years of construction and six years of operation). Otherwise, the risk of the refinery losing money over its 20-year lifespan would be large enough to make financing prohibitively expensive.

Indeed, after performing 20 million years of simulations, the team found that the likelihood of any discrete year showing positive value generation was less than 15 percent, indicating that some sort of financial externality would be required for the lifespan of the refinery – or it would close as soon as subsidies expire.

While a larger facility offers a higher likelihood of producing greater value, given the uncertainty surrounding the

price of inputs and products, our analysis showed that the risk and magnitude of a loss or shortfall also increases. Clearly, then, until the industry achieves critical mass and some level of stability in terms of supply, demand and government support, investors would be wise to carefully weigh the issue of uncertainty when considering biorefinery investments.

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