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Developing a cellulosic aviation biofuel industry in Indiana: A market and logistics analysis

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1 Developing a Cellulosic Aviation Biofuel Industry in Indiana: A Market and Logistics Analysis

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9 Abstract10
11 With the non-advanced portion of the US Renewable Fuel Standard having been largely met by
12 corn ethanol, many states are looking to cellulosic crops as the next source of biofuels. In Indiana,
13 attention is turning to biojet fuels and renewable diesel as forming the demand for these crops. This
14 paper seeks to determine the optimal manufacturing site locations and supply chain logistics for the
15 conversion of biomass sources to jet fuel and renewable diesel within Indiana. A sequential start-
16 up model is developed for this application, using a mixed integer non-linear (quadratic) program, in
17 which firms sequentially optimize unit costs by choosing the conversion site location, scale, and
18 feedstocks. The results indicate that firms wish to locate conversion sites near biomass sources as
19 opposed to fuel destinations, and that early entrants to the industry gravitate towards counties rich
20 in corn stover, a less expensive residue. However, even with existing subsidies firms would barely
21 break even. Finally, the benefits of the sequential model are elucidated in contrast to a social
22 planner's model, with the key benefit being that the sequential model can generate supply curves
23 independent of demand levels.24
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30 Keywords: Renewable Fuel Standard, Jet Fuel, Renewable Diesel, Cellulosic Biomass, Supply Chain,
31 Competition32

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