Building the Biomass Supply Chain: Strategies for Rural Areas

Incorporating Bioenergy in Sustainable Landscape Designs
Workshop Two: Agricultural Landscapes
Jun. 24-26, 2014 • Argonne, IL

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Illinois Institute for Rural Affairs
Closing the loop on biophysical systems...

...and socioeconomic systems.

Iutzi, 2013
Economic development “bucket”

**A. Exports**
Economic Base brings dollars into the local economy by exporting goods out of the local economy

**B. Imports**
Dollars lost out of the local economy by importing goods into the economy

**C. Resource Depletion**

**D. Economic Activity**
Local Production and Consumption of Goods and Services

\[ A - B - C = D \]

Adapted by Merrett (2011) from Hearn & Tanner (2009)
Integrated biomass development

Biomass development priority:
Leverage a (mostly) common supply chain among heat, power, liquid fuels, & bioproducts.

Iutzi, 2013
Feedstock cost level & variability

Agusdinata et al., 2011
Can small heat or power projects stimulate useful technological learning?

<table>
<thead>
<tr>
<th>#</th>
<th>Project</th>
<th>t d⁻¹ DM</th>
<th>t yr⁻¹ DM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EIU CHP</td>
<td>50</td>
<td>18,250</td>
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<tr>
<td>2</td>
<td>ESE IL 10% high res. heat</td>
<td>100</td>
<td>36,500</td>
</tr>
<tr>
<td>3</td>
<td>PPI Pearl 20 MW</td>
<td>300</td>
<td>109,500</td>
</tr>
<tr>
<td>4</td>
<td>Abengoa 25 MGY EtOH</td>
<td>1,000</td>
<td>365,000</td>
</tr>
<tr>
<td>5</td>
<td>Agusdinata 25 MGY biojet</td>
<td>2,000</td>
<td>730,000</td>
</tr>
<tr>
<td>6</td>
<td>Nominal 4,000 t d⁻¹ EtOH</td>
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<td>1,460,000</td>
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<tr>
<td>7</td>
<td>Nominal 8,000 t / d EtOH</td>
<td>8,000</td>
<td>2,920,000</td>
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Data Source: USDA, IIRA
Data Current: 2011
Map Created by: A. Rupe, GIS Specialist, IIRA
Depending on experience curve, path B may be much cheaper and easier than path A.

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Depending on experience curve, path B may be much cheaper and easier than path A.
Can local biomass stakeholders play a meaningful role in advanced biofuel project development?

Review of corn ethanol build-out may shed light.

Iutzi, 2013
Corn ethanol in Illinois

- 15 plants built, 13 operational
- 1,304 MGY installed capacity (390 wet mill + 914 dry grind)
- Most of the dry grind plants had substantial local involvement.

Photo: Illinois River Energy, courtesy ILRFA

Iutzi, 2013
Higher capital costs differentiate advanced biofuels from corn ethanol, but....

Coyle (USDA), 2010

Figure 5
Comparing corn and cellulosic ethanol production costs

Corn ethanol
Total = $1.65 per gallon

Cellulosic ethanol
Total = $2.65 per gallon

....smaller initial plant sizes may put the costs in the same ballpark.

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<th>Corn</th>
<th>Cellulosic</th>
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<tbody>
<tr>
<td>Production cost, $ gal⁻¹</td>
<td>$2.54</td>
<td>$3.55</td>
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<tr>
<td>(BNEF, 2013)</td>
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<tr>
<td>Assumed capex</td>
<td>10%</td>
<td>40%</td>
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<tr>
<td>Capex cost per unit, $ gal⁻¹</td>
<td>$0.254</td>
<td>$1.42</td>
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<tr>
<td>Project size scenario, MGY</td>
<td>100</td>
<td>25</td>
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<tr>
<td>Capex costs, $ yr⁻¹</td>
<td>$25.4M</td>
<td>$35.5M</td>
</tr>
<tr>
<td>Initial outlay, $ (BNEF, 2013)</td>
<td>$215M</td>
<td>$300M</td>
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</table>

Linking farmers, businesses, researchers, and agencies to accelerate development of a sustainable, profitable biomass energy sector in Illinois.

www.IllinoisBiomass.org
IBWG participation base

- Attendance at IBWG events to date: 514
- Names in IBWG email list: 317
Website
IllinoisBiomass.org

Email list
Contact:
info@illinoisbiomass.org
The Illinois Renewable Energy Conference

July 16, 2014, Normal, IL

bit.ly/ILREC14
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Value-Added Sustainable Development Center