Subsidies to Biofuels: Magnitude and Options for Redirection

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The Simple Life
Biofuels in the United States: Policy-Enhanced Investing

• More than 220 subsidies to ethanol and biodiesel nationwide, and growing.
• 49 states have at least one incentive for ethanol or biodiesel.
  – 9 states have > 20 policies each.
  – Additional funding via conventional economic development programs.
• Since December 2007:
  – Energy Independence and Security Act and the 2008 Farm Bill have become law.
  – Both have major new subsidies to biofuels.
• States continue to add mandates and tax exemptions for E85, biodiesel, cellulosic ethanol.
Ethanol Subsidies Today: Part of a Long Tradition

- Extraordinarily high subsidies in early years; declining with higher production base.
- Likely the highest subsidy intensity of all energy resources.
- Rapid growth: $26b/year; still more than $1/gallon through 2022.

<table>
<thead>
<tr>
<th>Year</th>
<th>Subsidy/ $Millions</th>
<th>Subsidy/ Gallon of E100</th>
<th>Subsidy/ MMBtu</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>$131</td>
<td>$6.57</td>
<td>$65.70</td>
</tr>
<tr>
<td>1980</td>
<td>$413</td>
<td>$10.33</td>
<td>$137.72</td>
</tr>
<tr>
<td>1981</td>
<td>$554</td>
<td>$7.39</td>
<td>$92.36</td>
</tr>
<tr>
<td>1982</td>
<td>$772</td>
<td>$3.68</td>
<td>$42.90</td>
</tr>
<tr>
<td>1983</td>
<td>$1,389</td>
<td>$3.70</td>
<td>$43.39</td>
</tr>
<tr>
<td>1984</td>
<td>$1,240</td>
<td>$2.88</td>
<td>$34.44</td>
</tr>
<tr>
<td>1985</td>
<td>$1,573</td>
<td>$2.52</td>
<td>$29.68</td>
</tr>
<tr>
<td>1986</td>
<td>$2,193</td>
<td>$2.92</td>
<td>$34.82</td>
</tr>
<tr>
<td>1989</td>
<td>$1,290</td>
<td>na</td>
<td>$17.56</td>
</tr>
<tr>
<td>2006</td>
<td>$7,020</td>
<td>$1.30</td>
<td>$15.15</td>
</tr>
<tr>
<td>2007</td>
<td>$8,390</td>
<td>$1.30</td>
<td>$15.05</td>
</tr>
<tr>
<td>2008</td>
<td>$11,070</td>
<td>$1.30</td>
<td>$15.30</td>
</tr>
<tr>
<td>Average, 2009-22</td>
<td>$26,615</td>
<td>$1.32</td>
<td>na</td>
</tr>
</tbody>
</table>

Sources: Koplow (2006, 2007); Earth Track calculations
Major Subsidies

- Federal excise tax credits
- Market price support from mandates, tariffs
- State exemptions from motor fuel taxes
- Pro-rata share of feedstock subsidies
- Accelerated depreciation benefits
- Subsidized access to credit
## Biofuel Subsidies in 2007 (before-EISA, Farm Bill)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Corn Ethanol</th>
<th>Biodiesel</th>
<th>Hypothetical Cellulosic Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Total subsidies (billions USD)</td>
<td>$6.9-$8.4</td>
<td>$1.2-$1.5</td>
<td>na</td>
</tr>
<tr>
<td>2. Subsidies/GGE or GDE</td>
<td>$1.40-$1.70</td>
<td>$1.80-$2.30</td>
<td>na</td>
</tr>
<tr>
<td>3. Subsidies/retail price (%)</td>
<td>45-55%</td>
<td>55-70%</td>
<td>na</td>
</tr>
<tr>
<td>4. Subsidies/mt CO2-eq avoided</td>
<td>$300 - ($600)</td>
<td>$215 - ($705)</td>
<td>$110-$200</td>
</tr>
<tr>
<td>5. Tons of offsets subsidies could buy on CCX</td>
<td>80-155</td>
<td>55-185</td>
<td>30-55</td>
</tr>
</tbody>
</table>

Source: Koplow/GSI, 2007
Subsidizing Biofuels Among the Most Expensive GHG Reduction Options

Sources

Offset prices: Average of contract values from CCX (2008-10) and ECX (2008-12).
Subsidy data: Earth Track, Inc.
New Subsidies in EISA and 2008 Farm Bill

- RFS Mandate increased from 7.5 to 36 bgy.
- Sub-mandates protect specific fuel constituencies (cellulosic, biodiesel).
- New PTC for cellulosic ethanol.
- Potentially very large support for cellulosic feedstocks; higher ag support for conventional crops.
- Reduced VEETC; ethanol tariff and biodiesel tax credits remain unchanged.
- Continued growth in R&D and production facility support through grants, credit subsidies.
### Preliminary Estimates of Subsidies Under the New Rules, 2009-2022

<table>
<thead>
<tr>
<th>Metric</th>
<th>Corn Ethanol</th>
<th>Biodiesel</th>
<th>Cellulosic</th>
<th>Other &quot;Advanced&quot;</th>
<th>Total, All Biofuels</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mandated consumption in 2022 (bgy)*</td>
<td>15</td>
<td>1</td>
<td>16</td>
<td>4</td>
<td>36</td>
</tr>
<tr>
<td>2. Total subsidies (billions USD)</td>
<td>$118</td>
<td>$28</td>
<td>$247</td>
<td>$17</td>
<td>$410</td>
</tr>
<tr>
<td>3. Average subsidies/year (billions USD)</td>
<td>$8.4</td>
<td>$2.0</td>
<td>$17.6</td>
<td>$1.2</td>
<td>$26.7</td>
</tr>
<tr>
<td>4. Subsidies/gallon biofuel</td>
<td>$0.60</td>
<td>$2.15</td>
<td>$3.44</td>
<td>$0.60</td>
<td>$1.32</td>
</tr>
</tbody>
</table>

**Source:** Earth Track calculations

1. Other "advanced" biofuel can include a ethanol from sugar, sorghum, and other feedstocks; as well as biodiesel. Subsidy calculations assume it receives only the same level of subsidy as corn ethanol.
2. Valuation includes only federal tax credits and market price support provided by the purchase mandates and the import tariffs. Actual subsidy values would be substantially higher.
3. Estimate assumes mandates won't be waived or exceeded. Either case would alter resulting subsidy costs.
Major Subsidy Trends: More Money, Less Visibility

• De-emphasizing corn ethanol; increasing level of support for cellulosic.
• Largest sources of support shifting to less visible mechanisms:
  – Much higher consumption mandates with carve-outs for specific fuels.
  – Potentially very large credit subsidies under Title XVII of EPACT.
  – Support to cellulosic feedstocks.
• Introduction of environmental screens on consumption mandates, though possibly of limited efficacy.
  – Shift domain of argument from political arena to arcane and complex lifecycle models.
  – Full integration of appropriate environmental metrics seems politically unlikely.
• Erosion of position of imports: larger gap between tariffs and VEETC; tightening of drawback options; restriction of new cellulosic subsidies to domestic production/consumption.
Redirecting Biofuel Subsidies to Achieve a Better Outcome

- **Competitive tender** of subsidies to all methods of displacing oil in transport.
  - Alternative fuels.
  - Alternative drive-trains, more efficient internal combustion engines or diesels.
  - Demand side, fleet management.
- **Automatic phase-outs**: time or production limits; trigger prices.
- **Environmental impacts more central**:
  - Invest in policing life cycle modeling efforts.
  - Apply environmental screens to all large subsidies, not just mandates.
  - Stop ignoring the feedstock impacts.
  - Careful review of CCX offset contracts relating to biofuels sector.
- **Remove structural bias** even across different biofuel options.