Opportunities for Co-location of Advanced Biofuels Production

Meghan Sapp

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The Clean Energy Ministerial launched the Clean Energy Solutions Center as a major initiative in 2011.

The Solutions Center:

- Helps developing governments design and adopt policies and programs and identify finance measures that support the deployment of clean energy technologies.
- Partners with 35+ international energy and finance organizations to provide a range of resources, from web-based information to webinars and trainings.
- Offers the Ask an Expert service, which connects governments with a global network of 50+ energy and finance experts for direct technical assistance to develop solutions to policy and finance barriers to clean energy.
Ask an Expert: Our Experts in Action

Benefits of the Ask an Expert Service

• Quick and Easy access to assistance.
• No cost for assistance and no commitment.
• Objective assistance from experts is personalized to help governments meet local clean energy goals.
• High-quality assistance includes:
  – Access to a collaborative network of over 50 vetted, international experts with authority on clean energy policies and financing.
  – Independent review of assistance to ensure quality.

CleanEnergySolutions.org

Delivered no-cost assistance for more than 250 requests from over 100 countries/regions.

Expert support available to developing countries

• Request can come from staff or officials at all levels of government – national, regional, local.
• Service also supports organizations working with governments.

To request assistance, go to cleanenergysolutions.org/expert
Advanced Biofuels

- Non-food feedstocks
  - Primary
  - Energy crops
  - Algae
  - Wastes
  - Residues

- Non-commercial technologies
  - Cellulosic ethanol
  - Biomass diesels
  - HVO/HEFA
  - FT/gasification
  - Aviation biofuels
  - Bio-methane

- Improved GHG performance vs. 1G
  >70% vs. fossil fuels
Co-Location of Advanced Biofuels

Opportunities

• Some technologies already proven
  – Speeds up learning to get technologies to market
• Lower capex=reduced risk, faster implementation
• Extensive synergies with 1G, heavy industry & oil refineries
Examples of Co-Location

Source: Mian et al 2014
Examples of Co-Location

Source: Canter et al 2016
Co-Location of Advanced Biofuels

Challenges

• Key 2G challenges remain
  – Feedstock supply chain
  – Expensive & complicated technology
  – Higher energy costs

• Few opportunities to co-locate biodiesel with 2G

• Sustainability
  – Land use requirements/LUC
  – Resource competition
  – Soil health
Co-Location of Advanced Biofuels

Sustainability

Source: IRENA 2016
Co-Location of Advanced Biofuels

Sustainability

Source: Canter et al 2016
Co-Location of Advanced Biofuels

Policy

- Long-term policy support required: **10 years min.**
  - Even where policies like RED and RFS exist, still policy uncertainty

<table>
<thead>
<tr>
<th>Policy design principle</th>
<th>Renewable energy Mandate</th>
<th>GHG reduction Target</th>
<th>Price guarantee</th>
<th>Fuel tax reduction/production tax credit</th>
<th>Investment tax credit</th>
<th>Grants and loan guarantees</th>
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<tbody>
<tr>
<td>Long-term support</td>
<td>Binding mandate for at least 10 years</td>
<td>Contracts for at least 10 years</td>
<td>Duration of at least 10 years</td>
<td>Duration of at least 5 years</td>
<td>N/A</td>
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<td>Avoid competition with first-generation biofuels</td>
<td>Separate target for AAF</td>
<td>Dedicated fund for AAF</td>
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<td>Deal with sustainability up front</td>
<td>Accounting for indirect emissions and other environmental concerns in policy design</td>
<td>Eligibility restriction to sustainable fuels</td>
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<td>Support offtake</td>
<td>Requirement for fuel suppliers to supply/blend fuel</td>
<td>Government offtake contracts</td>
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<td>Cost containment</td>
<td>Credit price ceiling and potentially floor</td>
<td>Maximum reimbursement</td>
<td>Tax credit phase out after certain volume achieved</td>
<td>Set amount of funding available</td>
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Source: Bitnere et al 2017
Co-Location of Advanced Biofuels

Policy

• Integrate policies supporting co-location into existing AB policy structures
  – Requiring industries to reduce carbon intensities (pulp&paper, oil)
  – Direct investment incentives
    • Ej. financing schemes, tax exemptions and low-interest rate loans
  – Biorefinery policies and investment schemes
  – Demonstration of bolt-on technologies to speed up learning
    • Ej. pyrolysis, FT, etc.
  – Awareness raising and capacity building: spread the word!

Source: Bitnere et al 2017
GRAZIE!

For more information, please contact:
Meghan Sapp  meghan@planetenergynow.com
Victoria Healey  victoria.healey@nrel.gov