America’s Energy Future: New solutions to fuel economic growth & prosperity

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An Energy Technology Corporation to improve energy innovation

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The Innovation Pathway

R&D ➔ Demonstration ➔ Deployment

• Conventional rationale for Gov’t support: Private sector under investment R&D.

Four points:

- R&D alone is insufficient
- Demonstration step is key (and has not been well done).
- Need ENERGY TECHNOLOGY CORPORATION - new quasi-public agency to implement technology demonstration projects.
- Subsidies for deployment more doubtful (and more expensive). Perhaps justified to compensate for market externality or market failure.
Purpose of technology demonstration

- Provide information on technical performance, cost, environmental effects.
- Pioneer projects private sector will not undertake because of uncertainties.
- Examples: carbon sequestration, solar thermal power, grid, nuclear, biofuels.

ETC responsibility for managing the selection and execution of technology demonstration projects.

- Independent board of directors
- One-time appropriation of resources $60 billion.
- ETC would have flexible hiring authority

The mechanisms for providing project assistance and contracting should be according to commercial practice and not government.
Three energy technology demonstration “epochs”

- Early 1970s Direct ERDA/DOE project support.
- Late 1970s-Early 1980s Synthetic Fuels Corporation (SFC).

Desirable attributes of technology demonstration projects.

<table>
<thead>
<tr>
<th>How well did they do?</th>
<th>DOE ‘70s</th>
<th>SFC</th>
<th>ARRA 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explicit policy</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Analytic support</td>
<td>No</td>
<td>Some</td>
<td>Some</td>
</tr>
<tr>
<td>Strong project mgmt.</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
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<td>Indirect assistance</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<td>Information Dissem.</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Outside expertise</td>
<td>No</td>
<td>Yes</td>
<td>Some</td>
</tr>
<tr>
<td>Free of gov’t regs.</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Evaluation/ metrics</td>
<td>No</td>
<td>No</td>
<td>No</td>
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How much spending commitment?

$10b  $60b  $43b
Options for technology demonstration

- Clean Energy Deployment Admin. (Senate Eng. & Nat. Res Com)
- DOE funded industry consortia (e.g. EPRI)
- Clean Energy Banks (CAP)
- Industry investment boards (Romer)
- Do Nothing

Some interesting facts

- No one knows how much is spent on energy innovation (fed + state direct outlays + tax expenditures).
- $6 billion DOE 2012 R&D BA.
- $17.1 billion ARRA technology demo commitments as of 1/1/11.
- 2010 Performers of DOE RD&D
  - DOE national labs 43%
  - Industry 20%
  - Universities 8%
  - States 5%

+ 22% for ARRA Energy Efficiency outlays
Absent demonstration, new technology languishes.

Successful technology demonstration creates private sector options.

ETC organization needed to implement projects in credible and efficient manner.

Projects resolve uncertainty, create options

Production targets should be avoided

R&D retains priority – Not how much, but how:

- DOE lab role
- Relation to VC activity