Modeling and Analysis Session: Market, Value, and Policy Analysis

2008 Solar Annual Review Meeting
Austin, Texas
April 23, 2008

Robert Margolis
National Renewable Energy Laboratory
robert_margolis@nrel.gov

NREL/PR-670-43356
Presented at the Solar Energy Technologies Program (SETP) Annual Program Review Meeting held April 22-24, 2008 in Austin, Texas
Solar America Initiative Alignment and Budget

- **Primary objectives:**
  - To provide a broad range of analytical support to the Solar Program.
  - To anticipate and respond to the rapidly evolving analytical needs of the Solar Program.

- **Three broad types of analysis are being carried out under this project including:**
  - **Market analysis**: Developing a PV market penetration model – the SolarDS model – and other tools, in order to gain insight into the factors influencing market penetration of PV technology in U.S. markets.
  - **Value analysis**: Providing inputs to, support for, and review of the annual GPRA benefits analysis. Also developing methods and tools for improving the quantification of the benefits and cost of solar technologies.
  - **Policy analysis**: Defining and carrying out analysis that meets the needs of the Solar Energy Technologies Program in a timely fashion, for example evaluating the potential role of solar in the energy economy in the long-term.

<table>
<thead>
<tr>
<th>Organization</th>
<th>FY07 Budget</th>
<th>FY08 Budget</th>
<th>Total Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>NREL</td>
<td>$ 510k*</td>
<td>$ 1,350k</td>
<td>TBD</td>
</tr>
<tr>
<td>LBNL</td>
<td>$ 100k</td>
<td>$ 100k</td>
<td>TBD</td>
</tr>
</tbody>
</table>

* An additional $280k in carryover from FY06 was used to support this project in FY07.
Market analysis example: High PV penetration analysis with PVFlex

- Used PVFlex to evaluate the limits of PV in the electricity generation system in the U.S. (ERCOT example).
- Examined the potential role of:
  - Increased flexibility
  - Energy Storage
  - Controls/Load shifting

  A combination of increased flexibility, storage and controls could enable PV to contribute ~50% of the systems energy with a modest cost penalty.

![Graph showing the relative cost of PV electricity as a function of PV penetration for a flexibility factor (FF) of 60% and 70% (simulations are for ERCOT using 2000 load and insolation data).](image1)

![Diagram showing options for using surplus solar PV generation.](image2)
Value analysis example: Enhanced Web-based distributed PV value clearinghouse

- Improved clearinghouse interface,
- Expanded content in clearinghouse.

Access at: http://www.nrel.gov/analysis/pvclearinghouse/
Policy analysis example: Solar investment tax credit (ITC) analysis (using NEMS).

- Examined various approaches for structuring the Solar ITC.
- Estimated market impacts, benefits (jobs, energy displaced, etc.) and cost to Treasury.

Impact of 8-year ITC extension

- Benefits continue after ITC ends
- Additional 30 GW of PV in 2030
Future Directions

- Provide analytical and technical support to the PV Industry Roadmap process.
- Continue to maintain and enhance the PV Value Clearinghouse.
- Support the annual GPRA benefits and Program Decision Support analysis efforts.
- Continue to produce a series of topical reports that anticipate and respond to emerging critical needs of the Solar Program.
FY07 Publications