Tribal Clean Energy for Sovereignty and Economic Development

Travis Lowder
National Renewable Energy Laboratory

Wednesday, June 29th 2016
Economic Development
# Why Complete a Renewable Energy Project?

<table>
<thead>
<tr>
<th>Economic</th>
<th>Social</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Jobs</td>
<td>• Energy reliability (diversification)</td>
<td>• Air Quality</td>
</tr>
<tr>
<td>• Energy cost savings</td>
<td>• Energy independence</td>
<td>• Avoided Emissions</td>
</tr>
<tr>
<td>• Income</td>
<td>• Quality of life</td>
<td>• Climate change</td>
</tr>
<tr>
<td>• Energy cost stabilization</td>
<td>• Community and stakeholder participation</td>
<td>• Mitigation</td>
</tr>
<tr>
<td>• Industry exposure</td>
<td>• Educational Benefits</td>
<td>• Adaptation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Resiliency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Demonstrated Environmental Leadership</td>
</tr>
</tbody>
</table>

*Benefits vary based on the type and scale of projects*
Facility: single-building system
Primary goals: offset building energy use/costs
Development timeline: 1 month to 1 year

Community: multiple buildings/campus
Primary goals: Offset community energy use/costs, promote energy self-sufficiency
Development timeline: 6 months to 2 years

Commercial: stand-alone project
Primary goals: sale of power generation, financial benefits
Development timeline: 3 to 5 years
Investing Returns (Energy Savings or Sales Revenue)

- Community Reinvestment
- Social Programs
- Fiscal Stimulus
- Renewable Energy Programs
- Job Creation
Project Development & Onsite Labor Impacts

- **Sample job types**
  - Truck driving
  - Crane operation, hoisting, rigging
  - Earth moving
  - Pouring cement
  - Management, support
  - Siting
Supply Chain Impacts

- Equipment manufacturing & sales
- Property taxes
- Financing, banking, & accounting
Induced Impacts

Money spent locally on goods and services from increased revenue. E.g. restaurants, childcare, grocery stores, clothing, medical services
Job Training and Skills Development
Tools
NREL’s System Advisor Model (SAM) is a free computer program that calculates a renewable energy system’s hourly output and cost of energy over the project lifetime.
SAM General Modeling Workflow

System

- Weather Data
- System Specs
- Electricity Production

Economics

- Financing Options
- Utility Rates & Incentives
- Cost Data

Energy Output, Levelized Cost of Energy (LCOE), Net Present Value (NPV), Payback, Revenue, Capacity Factor, Savings
The OpenEI Utility Rate Database (URDB) is the largest publicly available source of utility rate information [http://en.openei.org/wiki/Utility_Rate_Database](http://en.openei.org/wiki/Utility_Rate_Database).

SAM pulls from the URDB to assess economics against a given utility rate.
Jobs and Economic Development Impacts (JEDI)

Available at: [http://www.nrel.gov/analysis/jedi/](http://www.nrel.gov/analysis/jedi/)

- Freely available input-output tool to estimate gross employment and economic impacts from investment in new power generation or fuel production
- Default inputs are from developers and industry experts, based on existing projects
- User input can be minimal with defaults or be detailed for more precise results.
### Local Economic Impacts - Summary Results

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>During construction and installation period</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Development and Onsite Labor Impacts</td>
<td>4.2</td>
<td>$275.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction and Installation Labor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction and Installation Related Services</td>
<td>6.3</td>
<td>$346.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td>10.6</td>
<td>$621.3</td>
<td></td>
<td>$878.3</td>
</tr>
<tr>
<td>Module and Supply Chain Impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing Impacts</td>
<td>0.0</td>
<td>$0.0</td>
<td>$0.0</td>
<td>$0.0</td>
</tr>
<tr>
<td>Trade (Wholesale and Retail)</td>
<td>2.7</td>
<td>$157.6</td>
<td>$471.1</td>
<td>$312.9</td>
</tr>
<tr>
<td>Finance, Insurance and Real Estate</td>
<td>0.0</td>
<td>$0.0</td>
<td>$0.0</td>
<td>$0.0</td>
</tr>
<tr>
<td>Professional Services</td>
<td>1.0</td>
<td>$42.8</td>
<td>$126.4</td>
<td>$78.4</td>
</tr>
<tr>
<td>Other Services</td>
<td>2.2</td>
<td>$235.9</td>
<td>$664.1</td>
<td>$412.7</td>
</tr>
<tr>
<td>Other Sectors</td>
<td>5.0</td>
<td>$168.0</td>
<td>$359.7</td>
<td>$245.9</td>
</tr>
<tr>
<td>Subtotal</td>
<td>10.8</td>
<td>$604.2</td>
<td>$1,621.3</td>
<td>$1,049.9</td>
</tr>
<tr>
<td>Induced Impacts</td>
<td>5.7</td>
<td>$226.3</td>
<td>$676.9</td>
<td>$412.9</td>
</tr>
<tr>
<td><strong>Total Impacts</strong></td>
<td>27.1</td>
<td>$1,451.8</td>
<td>$3,346.2</td>
<td>$2,341.0</td>
</tr>
<tr>
<td><strong>During operating years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onsite Labor Impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV Project Labor Only</td>
<td>0.1</td>
<td>$8.3</td>
<td>$8.3</td>
<td>$8.3</td>
</tr>
<tr>
<td>Local Revenue and Supply Chain Impacts</td>
<td>0.0</td>
<td>$2.5</td>
<td>$6.0</td>
<td>$5.1</td>
</tr>
<tr>
<td>Induced Impacts</td>
<td>0.0</td>
<td>$1.2</td>
<td>$3.7</td>
<td>$2.2</td>
</tr>
<tr>
<td><strong>Total Impacts</strong></td>
<td>0.2</td>
<td>$12.1</td>
<td>$20.0</td>
<td>$15.7</td>
</tr>
</tbody>
</table>

Notes: Earnings and Output values are thousands of dollars in year 2010 dollars. Construction and operating period jobs are full-time equivalent for one year (1 FTE = 2,080 hours). Economic impacts “During operating years” represent impacts that occur from system/plant operations/expenditures. Totals may not add up due to independent rounding.

- **Jobs (FTEs):** Number of people working the equivalent of 40 hr weeks, 52 weeks/yr
- **Earnings:** Income from work; Includes wages, salaries, employer provided supplements (retirement, health)
- **Gross output:** Measure of total economic activity; Revenue plus expenditures on inputs
- **Value Added:** GDP
Interpreting Results and Model Limitations

- JEDI results are gross, not net
- JEDI does not factor in far-reaching impacts from development such as changes in utility rates, greenhouse gas emissions, property values or public health
- Input-output models cannot estimate impacts from supply-side changes such as technological improvements, price changes, or changes in taxes/subsidies
- JEDI doesn’t evaluate a project’s feasibility or profitability
- NREL is not responsible for how the model is used, applied or results interpreted
Need Help?
On-Request Technical Assistance

Apply for up to 40 hours of in-depth technical assistance to:
• Address a specific challenge
• Fulfill a need that is essential to a current project’s successful implementation

Two categories of technical assistance:
1. **Strategic Energy Planning**—an on-site workshop that walks tribal leaders and staff through a nine-step planning process
2. **Project Development Support**—Expert guidance and analysis that helps address specific project barriers. Examples include:
   - Third-party independent reviews of transmission studies, financing structures, lease agreements, project reports
   - Modeling and analysis (or assistance using modeling/analysis tools)
   - Pre-feasibility transmission Studies
   - Interconnection agreement facilitation
   - Economic evaluations
   - System design reviews

**Learn more and apply online:**
[energy.gov/indianenergy/technical-assistance](http://energy.gov/indianenergy/technical-assistance)
Thank you!

travis.lowder@nrel.gov