



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?

Economic

- Jobs
- Energy cost savings
- Income
- Energy cost stabilization
- Industry exposure

Social

- Energy reliability (diversification)
- Energy independence
- Quality of life
- Community and stakeholder participation
- Educational Benefits

Environment

- Air Quality
- Avoided Emissions
- Climate change
 - Mitigation
 - Adaptation
 - Resiliency
- Demonstrated Environmental Leadership

Benefits vary based on the type and scale of projects

Project Scale

Facility: single-building system

Primary goals: offset building energy use/costs

Development timeline: 1 month to 1 year



NC Solar Center, NREL 09373

Community: multiple buildings/campus

Primary goals: Offset community energy use/costs, promote energy self-sufficiency

Development timeline: 6 months to 2 years



Orange County Convention Center, NREL 18077

Commercial: stand-alone project

Primary goals: sale of power generation, financial benefits

Development timeline: 3 to 5 years



Tucson Electric Power, NREL 13327

Investing Returns (Energy Savings or Sales Revenue)

- Community Reinvestment
- Social Programs
- Fiscal Stimulus
- Renewable Energy Programs
- Job Creation



NREL/PIX 25046

Project Development & Onsite Labor Impacts

- **Sample job types**

- Truck driving
- Crane operation, hoisting, rigging
- Earth moving
- Pouring cement
- Management, support
- Siting

Photo from Cross Island Farms, NREL/PIX 19923



Photo from Stephanie Lively, Boise State University, NREL/PIX 16147



Photo from istock 947687



Photo by David Parsons, NREL/PIX 05572



Photo from Northern Power Systems, NREL/PIX 13853



Supply Chain Impacts



NREL/PIX 11074

Photo from iStock/5676592



Photo from Clarence Council, NREL/PIX 09091



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



Photo from iStock/4088468

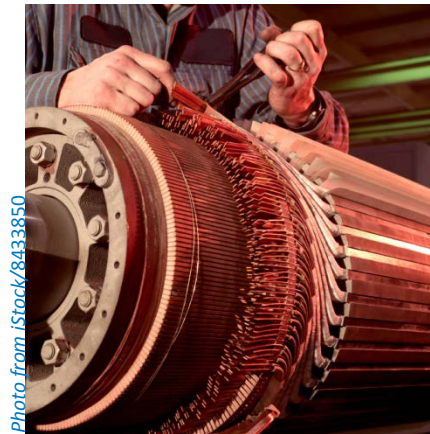


Photo from iStock/8433850

Photo from iStock/7792082



Photo from iStock/8384987



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

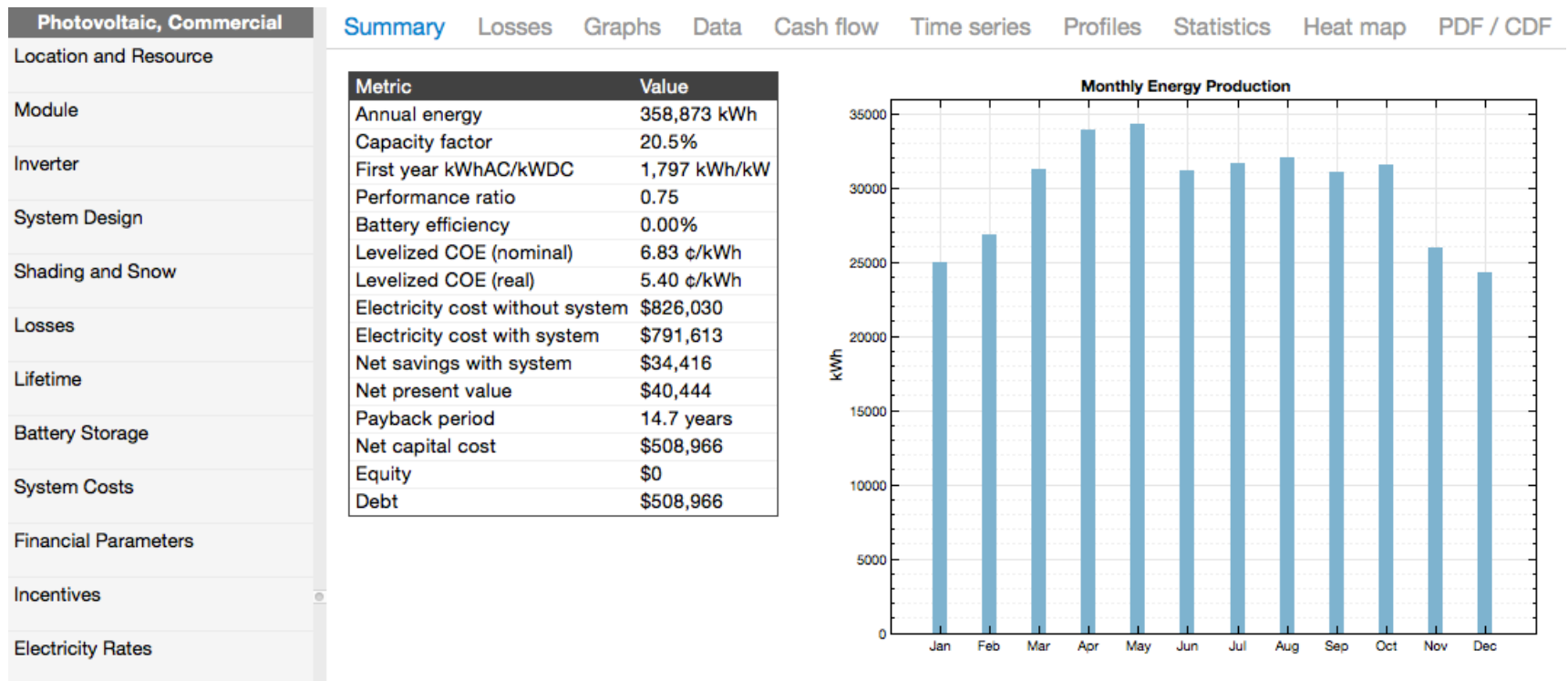


Tools

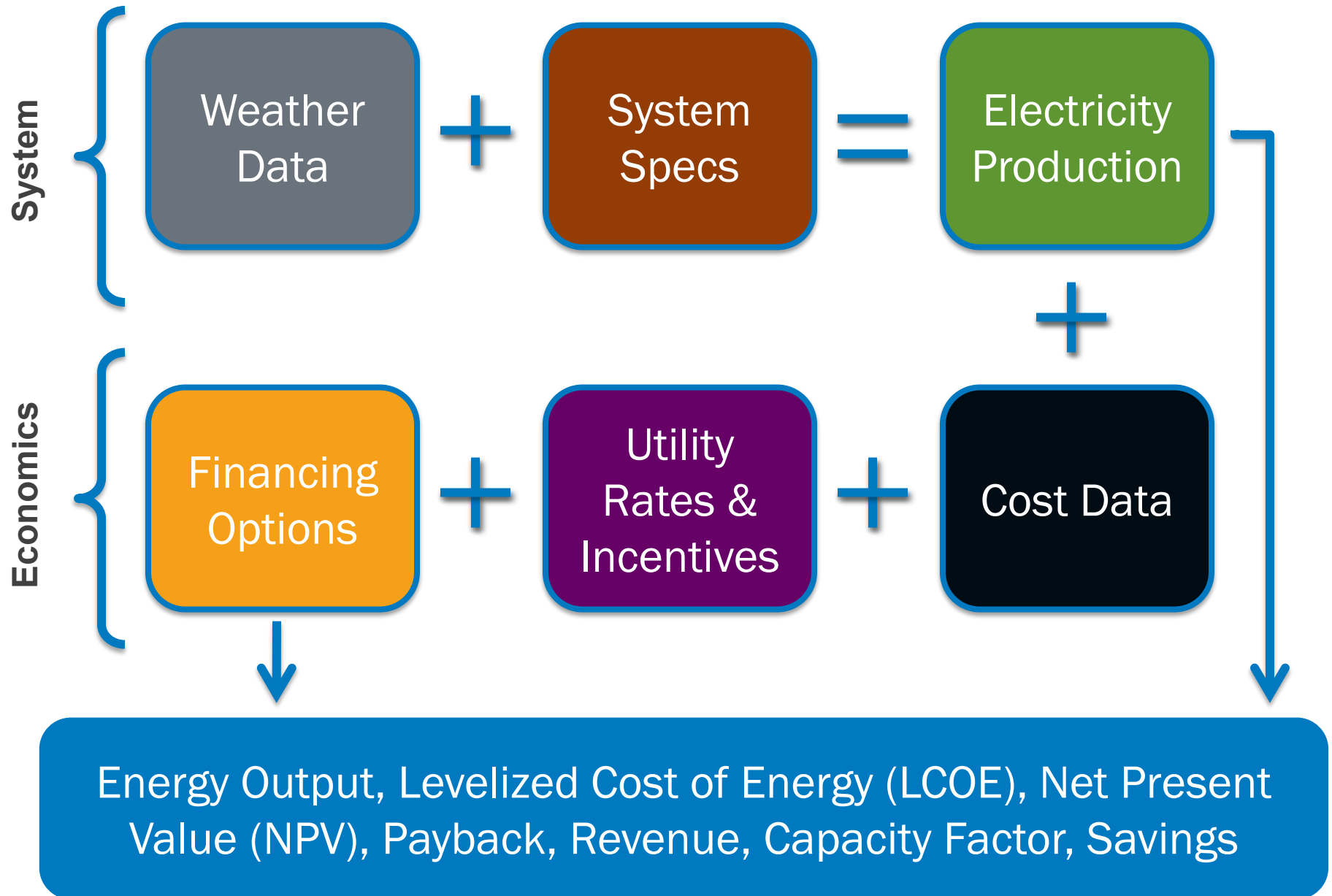
System Advisor Model (SAM)

Available at: <https://www.nrel.gov/analysis/sam/>

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



Benchmarking Against Utility Rates

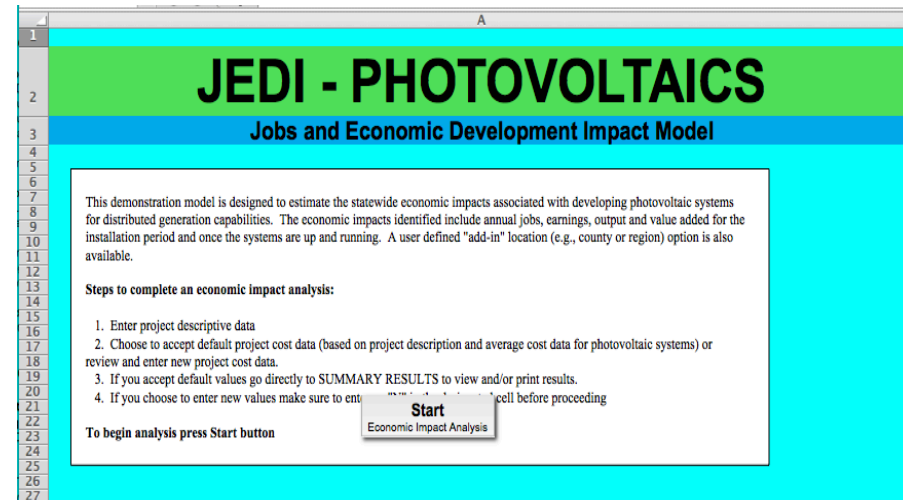
- The OpenEI Utility Rate Database (URDB) is the largest publicly available source of utility rate information http://en.openei.org/wiki/Utility_Rate_Database
- SAM pulls from the URDB to assess economics against a given utility rate



Jobs and Economic Development Impacts (JEDI)

Available at: <http://www.nrel.gov/analysis/jedi/>

- 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.



Jedi Results

Local Economic Impacts - Summary Results				
	Jobs	Earnings \$000 (2010)	Output \$000 (2010)	Value Added \$000 (2010)
During construction and installation period				
Project Development and Onsite Labor Impacts				
Construction and Installation Labor	4.2	\$275.1		
Construction and Installation Related Services	6.3	\$346.2		
Subtotal	10.6	\$621.3	\$1,048.0	\$878.3
Module and Supply Chain Impacts				
Manufacturing Impacts	0.0	\$0.0	\$0.0	\$0.0
Trade (Wholesale and Retail)	2.7	\$157.6	\$471.1	\$312.9
Finance, Insurance and Real Estate	0.0	\$0.0	\$0.0	\$0.0
Professional Services	1.0	\$42.8	\$126.4	\$78.4
Other Services	2.2	\$235.9	\$664.1	\$412.7
Other Sectors	5.0	\$168.0	\$359.7	\$245.9
Subtotal	10.8	\$604.2	\$1,621.3	\$1,049.9
Induced Impacts	5.7	\$226.3	\$676.9	\$412.9
Total Impacts	27.1	\$1,451.8	\$3,346.2	\$2,341.0
During operating years				
Onsite Labor Impacts				
PV Project Labor Only	0.1	\$8.3	\$8.3	\$8.3
Local Revenue and Supply Chain Impacts	0.0	\$2.5	\$8.0	\$5.1
Induced Impacts	0.0	\$1.2	\$3.7	\$2.2
Total Impacts	0.2	\$12.1	\$20.0	\$15.7

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

Apply for Technical Assistance

Use this online form to request technical assistance from the Tribal Energy Program for planning and implementing renewable energy and energy efficiency projects.

To help us determine whether your request fits within the program's scope and can be addressed with available resources, please provide the information below and then click on "Submit Request."

Only requests from federally recognized Indian tribes, bands, nations, tribal energy resource development organizations, and other organized groups and communities—including Alaska Native villages or regional and village corporations—will be considered.

*Required

Salutation*	<input type="text"/>
First Name*	<input type="text"/>
Last Name*	<input type="text"/>
Title/Position*	<input type="text"/>
Are you a designated tribal representative with the authority to request technical assistance on behalf of the tribe/Alaska Native village/regional or Native village corporation?*	<input type="radio"/> Yes <input type="radio"/> No
Type of Affiliation*	<input type="text"/>
Name of Affiliation*	<input type="text"/>
Reservation Name or Location*	<input type="text"/>
Address*	<input type="text"/>
Address 2	<input type="text"/>
City*	<input type="text"/>
State*	<input type="text"/>
ZIP Code*	<input type="text"/>
Phone*	<input type="text"/>
Email*	<input type="text"/>
Confirm Email*	<input type="text"/>

Learn more and apply online:
energy.gov/indianenergy/technical-assistance

Thank you!

travis.lowder@nrel.gov

www.nrel.gov

