

Energy Optimization Model; Preliminary Results



Purpose

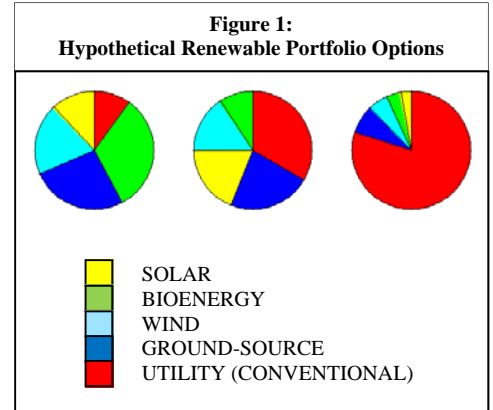
This Project is designed to provide the Oneida Tribe of Indians of WI with a **comprehensive energy investment strategy** for renewable energy and conventional energy sources. It is called the *Energy Optimization Model*. It is a component of the larger energy management plan that aims to capitalize on *Tribal energy sovereignty*. Establishing a renewable portfolio standard (RPS) is a clear commitment to future generations.

Definitions

1 Megawatt = 1,000 kilowatts = 1,000 kw.
 1 Megawatt-hour = 1,000 kilowatt-hours = 1,000 kWh.
 The average home in Wisconsin uses 9,000 kWh/year.
 RE = renewable energy, e.g. solar, wind, bioenergy, ground-source

Objectives

- ⇒ Assess local, RE resources;
- ⇒ Assess Tribal property to determine RE potential;
- ⇒ Provide a feasibility study for RE development;
- ⇒ Research funding strategies;
- ⇒ Develop a model that creates different RPS scenarios: 5%, 10%, 20%;
- ⇒ Create a plan that will maximize the Tribe's RE development potential.



Preliminary Results - Electricity

- **Total electrical use of Tribal facilities:** 31 million kWh;
- 15 buildings consume 81%; 50+ buildings consume 19%;
- *Utility policies for interconnecting solar or wind to their transmission lines are economically challenging;*
- **Large wind power: least expensive/kWh, but lowest value**
 - ◇ Requires considerable negotiation over wholesale pricing,
 - ◇ Permitting is very extensive (up to 3 years),
 - ◇ Wind resource is best at west and south boundaries,
 - ◇ Interconnection is limited to sub-stations,
 - ◇ Controversial reputation,
 - ◇ Utility RPS already fulfilled.

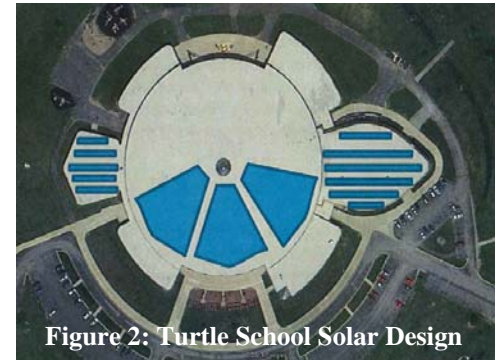
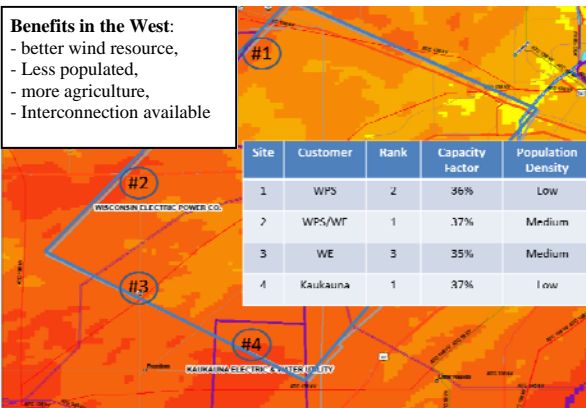


Figure 3: Wind Resource at 70 meter elevation



- **Solar is preferred technology**
 - ◇ Easy to install, flexible, scalable,
 - ◇ Array on benign part of building (the roof),
 - ◇ Rest of equipment has small footprint,
 - ◇ Building is direct recipient of energy produced,
 - ◇ Maintenance can be performed by Tribal staff,
 - ◇ Can sell to utility at retail rate,
 - ◇ More funding opportunities.

	Solar	Wind
Project size	1.0 Megawatt	3.4 Megawatts
Production (kWh)	1.3 million	10.7 million
Location	13 buildings	1 of 3 sites (KU declined)
Cost	\$3 million	\$8 million
IRR	<2%	<2%
Revenue	\$0.10/kWh	\$0.04/kWh
Limitations	cost	Power purchase agreement



Renewable Portfolio Standard

- **Utilities serving the Tribe:** Wisconsin Public Service and WE Energies
- **Current utility energy generation by fuel:** Coal 70%; Natural Gas 23%; Hydropower 3%; Wind 3%.
- 1.3 million kWh from solar will give Oneida a 4% RPS;
- Future investment in other technologies will increase the Tribe's RPS and commitment to RE over time.

Funding Strategies

- Tax benefits are important for RE development: 30% Investment Tax Credit, depreciation;
- Oneida Tribe is a non-taxable entity;
- A taxable investor, as a partner, can get value from tax benefits;
- **Recommended financing flip model:**
 - ⇒ LLC partnership: front-end ownership by taxable investor with payments from the Tribe to the LLC.
- Other models: Sale-Leaseback approach, Allocation-by-Lease approach.

Other Funding Used for Cost-share

- Department of Energy Deployment Grants
- 3rd party energy provider - not fully defined by Public Service Commission
- Crowdfunding - Techniques to raise money from small investors
- Solar utility cooperative -

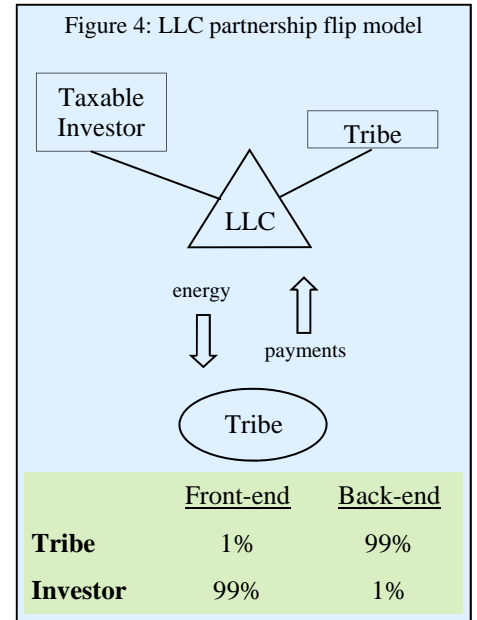


Figure 5: Tribal internships

Supplemental Results

- Tribal student involvement;
- Heating the Midwest conference, April 2014;
- Conservation Department Energy Reduction Project
- Collaboration with Wisconsin State Energy Office;
- Formation of Midwest Tribal Renewable Energy Association (MTERA);
- Policy monitoring at the state and federal levels;
- Oneida Tribe & Brown County energy work featured by UW-Extension;
- Oneida Energy Crop Study with UWGB (refer to Native Grasses Project Update);
- Investigating natural gas commodity markets for competitive, reliable pricing;
- Investigating the Tribal Utility Authority concept;
- Investigating hemp as a supplemental source for local production.

Partners

- U.S. Department of Energy,
- University of Wisconsin Green Bay,
- H&H Energy Management Services,
- Godfrey & Kahn,
- UW-Extension

- Oneida Farm,
- Land Management,
- Engineering,
- Planning,
- Housing Authority,
- Land Commission,
- Oneida Sustainable Resource Advisory Council,
- Energy Development Program.

Oneida Energy Team:

- Environmental Resources Board,
- Department of Public Works,

Contact Information

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