Shekóli (Greetings) from Oneida
Solar Deployment on Tribal Facilities

Department of Energy
Tribal Energy Program Review
Denver, Colorado
May 4-7, 2015

Michael Troge
Oneida Tribe of Indians of Wisconsin
AGENDA

• Past work
• Proposed solar project
• Other
Thank you!


• Oneida Tribe Energy Team, Business Committee, Land Commission, Finance, Legal, Land Management, Public Works, Engineering, Environmental Division, Environmental Resource Board, Planning, Staff


• Energy Information Administration and the Energy Laboratories for their stats and research
1 QUAD is enough energy to power 32 million homes.

https://flowcharts.llnl.gov (Lawrence Livermore National Laboratory)
Observations:

CHANGE

is inevitable!

COMPETITION

is the standard!
CHALLENGES

- Population
  - Carrying Capacity
  - Water
  - Food
- Infrastructure
  - Climate
  - Energy
- Money!
What’s the concern????

We are a small community in a GLOBAL ECONOMY!

We face an uncertain future!

PERSONAL OPINION: COMPETITION AMONG COMMUNITIES IS NOT IN OUR BEST INTEREST!
Sustainability & Cooperation

Competition....Winners and Losers

Do we want to get bigger, or do we want to get smaller?

Choice?
Oneida Energy Team

• Formed in 2005-2008
• EE & RE an important combined strategy
• Supported Brown County, WI (2008)
  • Energy Independent Community, 25 by 25
• Energy Audit Program (2013)
  • low-hanging fruit was limited
• Energy Optimization Model (2014) revealed:
  • No obvious RE winner – solar, wind, bio, ground
  • Financial incentives best opportunity to RPS
## Oneida Energy Situation

Current Tribal community energy usage as of 2011 = **412,000 MMBtu**.

= 121 million kWh

<table>
<thead>
<tr>
<th>Energy Type</th>
<th>Amount</th>
<th>MMBtu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional electricity:</td>
<td>31,000,000 kilowatt-hours</td>
<td>105,000</td>
</tr>
<tr>
<td>Institutional natural gas:</td>
<td>540,000 therms</td>
<td>54,000</td>
</tr>
<tr>
<td>Institutional transp fuel:</td>
<td>145,000 gallons</td>
<td>5,000</td>
</tr>
<tr>
<td>Housing electricity:</td>
<td>16,000,000 kilowatt-hours</td>
<td>48,000</td>
</tr>
<tr>
<td>Housing natural gas:</td>
<td>2,000,000 therms</td>
<td>200,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RPS Percentage</th>
<th>MMBtu</th>
<th>kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>5% RPS</td>
<td>20,600 MMBtu</td>
<td>6 million</td>
</tr>
<tr>
<td>10% RPS</td>
<td>41,200 MMBtu</td>
<td>12 million</td>
</tr>
<tr>
<td>20% RPS</td>
<td>82,400 MMBtu</td>
<td>24 million</td>
</tr>
</tbody>
</table>
Electricity Use by Building (not therms)

- Main Casino: 17%
- IMAC: 13%
- Mason Street Casino: 10%
- Oneida Nation Elementary School: 4%
- Norbert Hill Center: 4%
- Oneida Community Health Center: 4%
- Social Services & 4 Cottages: 4%
- Anna John Nursing Home: 3%
- One Stop Packerland: 2%
- Wastewater Treatment Facility: 2%
- Skendandoah: 2%
- Travel Center Casino: 2%
- One Stop Hwy 54: 2%
- Gaming Warehouse: 2%
- Remaining 77 Buildings: 19%, each using less than 415,000 kWh/yr.
WE ENERGIES

- Coal: 71%
- Natural Gas: 21%
- Hydro: 3%
- Peaking: 1%
- Wind: 4%

Oneida Energy Mix

- Coal: 71%
- Natural Gas: 23%
- Hydro: 3%
- Wind: 3%

WISCONSIN PUBLIC SERVICE

- Coal: 70%
- Natural Gas: 23%
- Hydro: 3%
- Peaking: 1%
- Wind: 4%

- Coal: 90%
- Natural Gas: 10%
Energy Team Projects

### Energy Audits & Upgrades
- Improved lighting
- Decreased energy use

### Energy Crop Study
- Locally grown energy crop for heat, fuel
- UWGB partner

### Anna John Solar
- 48 collectors, 75% of hot H2O
- 75% grant funded

### Wind Power Study
- Wind best in the west
- Part of clean energy strategy

### Biomass Energy
100,000 Btu biomass boiler Demonstration

### Solar Deployment Project
- Application to DOE for $1 M
- Solar electric on 9 buildings
Solar Deployment
Oneida Tribe of Indians of Wisconsin

Project Title:
SOLAR ELECTRIC DEPLOYMENT ON TRIBAL FACILITIES
IN THE ONEIDA RESERVATION

System size = 695 KW on 9 facilities
That's enough energy for 100 homes.

Example of facility solar electric in Wisconsin.
Kohl's Dept. Stores is an EPA Green Power Partner.
Photo of Milwaukee store with a 200 kilowatt array on the roof.

PHOTOVOLTAIC DEPLOYMENT ON TRIBAL FACILITIES
1 = Irene Moore Activity Center, 170 kw
2 = Turtle School, 100 kw
3 = Community Health Center, 100 kw
4 = Norbert Hill Center, 90 kw
5 = Gaming Warehouse, 80 kw
6 = Elder Services, 95 kw
7 = Department of Land Management, 20 kw
8 = Food Distribution Center, 20 kw
9 = Oneida Police Department, 20 kw
### Oneida Elementary (Turtle) School

<table>
<thead>
<tr>
<th>Facility</th>
<th>Usage</th>
<th>Size PV</th>
<th>Cost</th>
<th>% of Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turtle School</td>
<td>1,373,600 kWh</td>
<td>550 kw</td>
<td>$1.65 million</td>
<td>49%</td>
</tr>
</tbody>
</table>

662 kW total, 510 kW on the shell, 107 kW on the head, 45 kW on the tail.

**Assumptions:** 60 cell modules (avg. 265 watts each), 25 deg tilt, ballasted design, no inverter site constraints
## Economics

### Energy Production, Cost, Economics and Environment

<table>
<thead>
<tr>
<th>Energy Production</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV system rated capacity (kW - DC)</td>
<td>659.85</td>
<td>659.85</td>
</tr>
<tr>
<td>Estimated annual output (kWh/yr)</td>
<td>816,894</td>
<td>816,894</td>
</tr>
<tr>
<td>Percentage of facility usage</td>
<td>49%</td>
<td>49%</td>
</tr>
</tbody>
</table>

### Cost

<table>
<thead>
<tr>
<th>Cost</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated solar PV installed cost</td>
<td>$1,667,340</td>
<td>$1,667,340</td>
</tr>
<tr>
<td>Federal tax credit</td>
<td>$0</td>
<td>$500,202</td>
</tr>
<tr>
<td>Focus on Energy rebate (pre tax value)</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Net present value of accelerated depreciation (5 years)</td>
<td>$0</td>
<td>$564,747</td>
</tr>
<tr>
<td>System cost after incentives (after tax benefits)</td>
<td>$1,667,340</td>
<td>$602,391</td>
</tr>
</tbody>
</table>

### Economics

<table>
<thead>
<tr>
<th>25 year discounted net present value (NPV)</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-$79,475</td>
<td>$985,474</td>
</tr>
<tr>
<td>25 year internal rate of return (IRR)</td>
<td>2.3%</td>
<td>10.5%</td>
</tr>
<tr>
<td>years until cost recovery</td>
<td>26.3</td>
<td>9.5</td>
</tr>
</tbody>
</table>

### Value

<table>
<thead>
<tr>
<th>GROSS value of energy production over 30 years (NPV)</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$1,904,697</td>
<td>$1,904,697</td>
</tr>
<tr>
<td>NET system value over 30 year system life (NPV)</td>
<td>$237,357</td>
<td>$1,302,306</td>
</tr>
<tr>
<td>your pre-purchased energy price with a solar PV system ($/kWh)</td>
<td>$0.073</td>
<td>$0.026</td>
</tr>
</tbody>
</table>

### Environment

<table>
<thead>
<tr>
<th>CO₂ emission offset (tons/year)</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>905.1</td>
<td>905.1</td>
</tr>
</tbody>
</table>

### Assumptions

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>System cost per kW</td>
<td>$2,527</td>
<td>$2,527</td>
</tr>
<tr>
<td>Federal income tax rate</td>
<td>35%</td>
<td>35%</td>
</tr>
<tr>
<td>State income tax rate</td>
<td>7.9%</td>
<td>7.9%</td>
</tr>
<tr>
<td>Electric rate in current year ($/kWh)</td>
<td>$0.080</td>
<td>$0.080</td>
</tr>
<tr>
<td>Estimated electric rate price inflation (%/year)</td>
<td>3.20%</td>
<td>3.20%</td>
</tr>
<tr>
<td>Panel efficiency degradation (%/year)</td>
<td>0.50%</td>
<td>0.50%</td>
</tr>
<tr>
<td>Discount rate (used only in NPV)</td>
<td>2.70%</td>
<td>2.70%</td>
</tr>
</tbody>
</table>

*Note:* A - Tribal owned with no tax credits applicable, B - Private taxable entity ownership
Watching where we spend!

- Finance Operations (CFO)
  - A tight ship
  - Due diligence
  - Fiscal responsibility
  - 3-bid procurement
  - Audit trail
  - Maximize value to the Tribe
  - “trust, but verify”
Staying Competitive

• Economic path
  – “Economy strong, gaming strong”
  – “Economy weak, gaming weak”
  – Tied to a global economy
  – Economic collapse of 2007/8 was a direct hit
  – Need diversification
  – Need savings
Funding the Project

• Project cost: $2 million

• DOE grant: up to $1 million

• Investor/partner: $1 million

• Tribal Contribution:
  • In-kind project management
  • ~$73,000 / year for 8 years paying for solar
  • NOT $73,000 / year indefinitely
Now

Tribe

$73,000 per year

Utility costs

PPA

Tribe

$73,000

for 8 years

Utility Costs

Investor Loan & energy
Figure 4: LLC partnership flip model

<table>
<thead>
<tr>
<th></th>
<th>Front-end</th>
<th>Back-end</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tribe</td>
<td>1%</td>
<td>99%</td>
</tr>
<tr>
<td>Investor</td>
<td>99%</td>
<td>1%</td>
</tr>
</tbody>
</table>
## Renewable Energy Funding Matrix

<table>
<thead>
<tr>
<th>Financing Method</th>
<th>Risk</th>
<th>Likelihood of Success</th>
<th>Rates of Return</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tribe Self-Funds Projects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Bond/Debt</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Grants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOE Tribal Energy Grant</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Focus on Energy (State-Level) Grant</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td><strong>Partnership with Taxable Investor</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sale Leaseback</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Partnership Flip</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>
Why is this a last, good opportunity?

- 30% Investment Tax Credit expires Dec, 2016
- Accelerated depreciation
- Department of Energy grants are fewer
- Few chances when ITC and grants are available at the same time
- Funding for large projects is going to get tougher!
The Tribe’s Situation

• Oneida does **NOT** qualify for tax credits

• Oneida **DOES** quality for grants

• Oneida has multiple facilities with roof space that is going un-used (unprofitable space)

• Solar-electric on a roof is space-efficient, directly connected, and generates revenue as savings
**RPS**

- **Existing Renewable Energy From Utility** 5%
- **Remaining Fossil Fuel Generation From Utility** 55%
- **Solar PV Projects** 14%
- **Single Large Wind Turbine** 26%

**Investment Required:**
- **$7.58 M**
  - Expected Rate of Return: 2-11%
  - Cost of Energy Generated: $0.026 - $0.095 / kWh

**Investment Required:**
- **$3.6 M**
  - Expected Rate of Return: 0-5%
  - Cost of Energy Generated: $0.027

**Cost of Energy Purchased Over Next 25 Years (3.2% inflation):** $0.12
Main reasons these technologies are not adopted...

- Competitive markets don’t recognize social/env. Benefits
- Utilities don’t want to play – RE a competitor
- “Do we want to overcome the barriers?”
- Fossil fuel industry firmly established
- Subsidies and taxes are misdirected
- Not policy driven or inconsistent policies
- Price we pay for energy does not reflect the cost of producing it
- WI uses Canadian hydro
Exploring other support mechanisms

• **GET CREATIVE!**
• 3\textsuperscript{rd} party ownership
• Bulk purchase programs
• Community investment
• Renewable Energy Credits
• PACE – Property Assessed Clean Energy
• Energy efficiency is still the primary goal
MTERA

- Midwest Tribal Energy Resources Assoc

- Bigger voice for Tribes & Midwest energy

- Newly formed, drafting by-laws

- Looking for members
Yaw^ko!

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