Shekoli from Oneida

Dept. of Energy Tribal Energy Program
Tribal RE Business Development and Financing

Funding Strategies for Solar Thermal, etc.

Oneida Tribe of Indians of Wisconsin

Michael Troge

August, 2011

Agenda

* History – what's been done…
* Future – what do we want to do…
* Research – how do we get there…
* Feasibility – what will work…
*Implementation – how do we make the best ideas reality…
* ORCCC – case in point…
* Conclusions!

A little about me…

Environmental Program Manager;
Working with Oneida since 1995;
Started on Nonpoint and Restoration work;
Got into energy in 2000 inspired by MREA and solar;
Installed and educated PV for a few years;
NABCEP certified;
Gradually shifted my job responsibilities around energy between 2009 and 2011 - still have some non-point ties;
Currently an Energy Strategist (unofficial title).

Pros and Cons of PV

Good

- Easy to Install,
- Build to any size,
- Easy to Interconnect,
- Low Maintenance,
- Very flexible and versatile,
- Very compatible to grid,
- More light then Germany,
- Easy to sell,
- Prices coming down!
- Lots of incentives,
- Lots of research.

Bad

- COST,
- COST,
- COST,
- Can get lazy,
- Interconnection,
- Incentives going away,
- Less light then the southwest,
- Economy drives ideas, good or bad (short term – long term)!
- Supply and demand.

Reality check!

The energy source has to be more then just a good idea!

Available resource?

Feasibility?

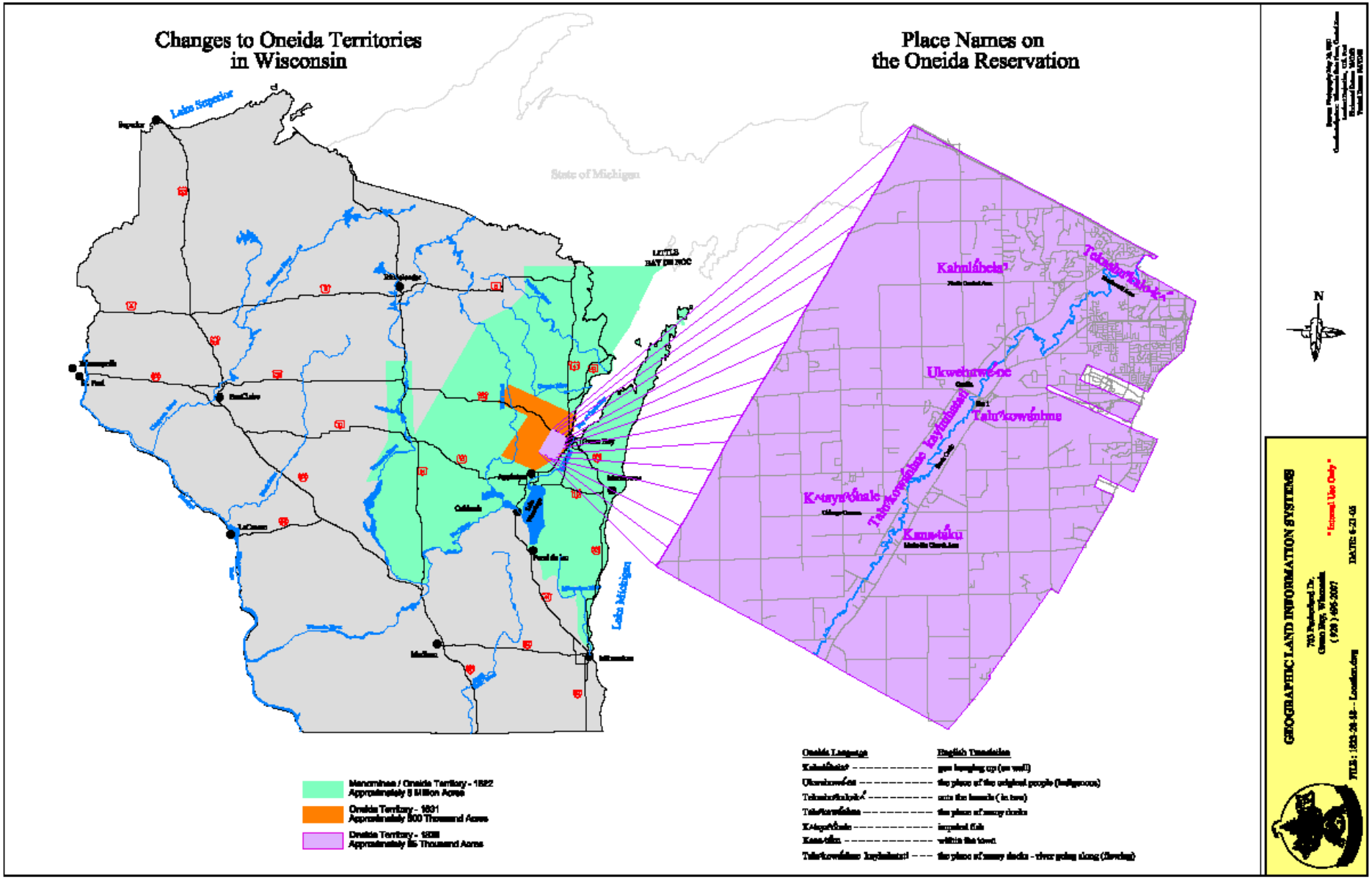
Life cycle?

Jobs?

Funding?

Does it meet a Tribal need?

Energy History


Changes to Oneida Territories in Wisconsin
Place Names on the Oneida Reservation
Lake Superior
State of Michigan
LITTLE BAY DE NOC
Lake Michigan
Kahnláheia
Ukwehuwé-ne
Talu'kowánhne
Kanatáku
Menominee / Oneida Territory - 1822
Approximately 5 Million Acres
Oneida Territory - 1831
Approximately 500 Thousand Acres
Oneida Territory - 1838
Approximately 65 Thousand Acres
Oneida Language
English Translation
gun hanging up (on wall)
the place of the original people (indigenous)
cuts the heads (in two)
the place of many docks
impaled fish
within the town
the place of many docks - river going along (flowing)
N
GEOGRAPHIC LAND INFORMATION SYSTEMS
"Internal Use Only"

Oneida Reservation

65,000 acres, 100 sq miles.

About 5,000 community members live in the area surrounding Oneida (15,000 total).

75% agriculture, 25% urban/suburban.

Primary fuels for heating:

Natural gas, propane, wood, oil, electricity, tiny solar.

No fossil source.

Sufficient solar and some wind.

100 Tribal buildings > $3M/year.

about 2,500 residences > $5M/year.

Investing in Energy Efficiency.

Reality check!

No matter the versatility, no one power or energy source was going to light the way for Oneida!

No matter how much energy efficiency Oneida does, they will always be 100% importers of energy.

MAYBE!

Renewable Energy History

Energy Projects

- Installed between 1999 and 2002:
- Solar Hot Water Systems
- Photovoltaic – Solar Electric Systems (Food Distrib, Community Center)
- Solar Trailer
- Tsyunhehkwa Greenhouse

- Since 2002:
- Wind Assessments
- Solar Hot Water Training
- Inspection and Maintenance Program
- Food Distribution PV System in WE Energies Buy-Back Program
- Grant Research (DOE, BIA)
- Wind Study
- Geothermal experiment
- OHA and DPW energy efficiency
- ORCCC Solar Hot Water

Food Distribution PV

Provides 10% of Facility Electricity Demand, 20% of costs; built 2002.

Solar Hot Water Training
Solar Hot Water Maintenance Program
Fall, 2008

Geothermal misunderstandings

“Only way for a commercial building to achieve net-zero status.”

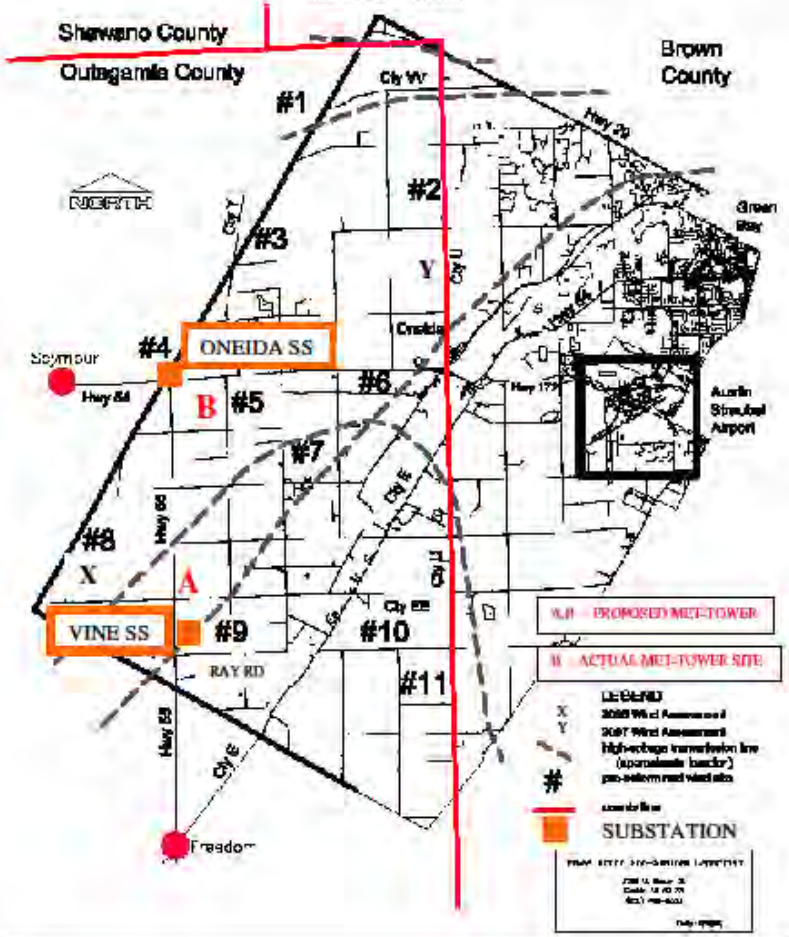
vs

“Costs way too much!” or
“It doesn’t work!”

- Everyone’s getting into the business…Have an experienced contractor do the analysis.
- Residential and commercial are NOT the same!
- Design is critical.
- Have all your ducks in order; building audits and energy efficiency go a long way when measuring performance.
- Bad experiences are hard to overcome.

ONEIDA NATION WIND STUDY

WITH SUBSTATIONS AND
PROPOSED CLIMATE TOWER (MET-TOWER) LOCATIONS
Original February, 2009
updated November, 2009
updated January, 2010



Focus on Energy

- State program for incentives since 1999;
- Incentives for energy efficiency, small renewables, Geoth, qualified big projects, some feasibility;
- Funded predominantly from rate payers and made available by the Public Service Commission (oversees WI utilities);
- Gradually cut since the beginning;
- Recent audit indicate a small return for renewables,
- Most recently, is undergoing a major overhaul;
- Anticipate that energy efficiency will get the predominant buck (99%), and only those renewables that can meet a certain NPV or payback will get the nod.
- Still rely on tax breaks, credits, borrowed money, and federal grants to make projects reality.

Reality check!

Just because you build it doesn't mean they'll really come; Make sure everyone is on board, including end-users.

Buyer Beware!

Design a program that is devoted to installing AND maintaining systems.

Can't rely on Programs.

Education intensity will make or break a good idea…
Supply and Demand too.

Energy Future

DOE First Steps Grant

For Oneida Nation Energy Optimization (ONEO) model.

Feasibility…Likelihood

Feasibility not taken lightly!

What is our energy portfolio going to be?

To include bio, wind, geo, solar, AND coal, N.G., propane, oil, transportation fuels.

Which wind?

Small wind

- Expensive.
- Specific building needs.
- Less politics.
- Small planning team
- Small group involvement.
- Relatively short timeframe.
- Moderate attention to resource.
- Fewer upfront costs to get to construction.
- Desirable to find lower maintenance cost turbine to encourage Tribal initiative (Renewegy hydraulic tower)

Big wind

- Very expensive.
- More bang for the buck.
- More momentum.
- Large planning team.
- Many parties have a vested interest.
- Relatively long timeframe.
- Much attention to resource.
- Considerable upfront costs to get to construction.

Bio-Energy

Considerable interest on the part of many organizations nationwide (UW, Tribes, other public and private interests).

Grass agriculture crop that Oneida is equipped to manage.

Requires land base (got it!)

Challenge : Creating a market (that economy thing again! Supply and Demand).

Solar? How much?

Geothermal? How much?

Oneida Resident Centered Care Community

ORCCC Solar Hot Water

- Large hot water users are the best recipients of solar hot water.
- 48 beds; 3,500 gallons hot water / day
- 48x4’x10’ collectors = 1,922 square feet
- 2,000 gallons solar storage
- 40% of hot water needs
- $8,000 savings per year
- Cost of system: $200,000

RETScreen Financial Analysis - Heating project

Financial parameters

General

Fuel cost escalation rate	%	2.0%
Inflation rate	%	2.0%
Discount rate	%	8.0%
Project life	yr	40

Finance

Incentives and grants	$	150,000
Debt ratio	%	

Income tax analysis

Annual income

Electricity export income

GHG reduction income

Net GHG reduction	tCO2/yr	24
Net GHG reduction - 40 yrs	tCO2	945

Customer premium income (rebate)

Other income (cost)

Clean Energy (CE) production income

Project costs and savings/income summary

Initial costs

Heating system	100.0%	$	225,600
Balance of system & misc.	0.0%	$	0
Total initial costs	**100.0%**	**$**	**225,600**
Incentives and grants		$	150,000

Annual costs and debt payments

O&M	$	200
Fuel cost - proposed case	$	6,275
Total annual costs	**$**	**6,475**

Periodic costs (credits)

User-defined - 10 yrs	$	500

Annual savings and income

Fuel cost - base case	$	10,403
Total annual savings and income	**$**	**10,403**

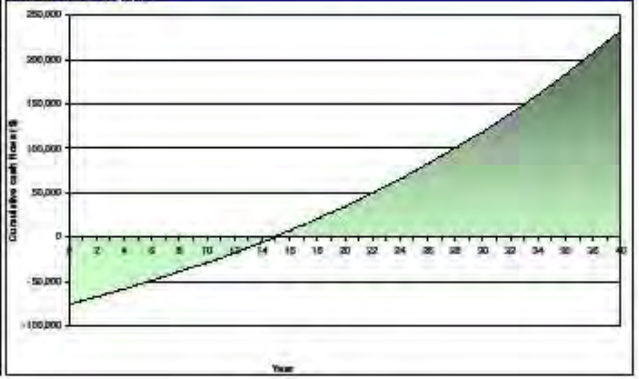
Financial viability

Pre-tax IRR - equity	%	7.4%
Pre-tax IRR - assets	%	7.4%
After-tax IRR - equity	%	7.4%
After-tax IRR - assets	%	7.4%
Simple payback	yr	18.5
Equity payback	yr	14.0
Net Present Value (NPV)	$	-5,132
Annual life cycle savings	$/yr	-514
Benefit-Cost (B-C) ratio		0.97
GHG reduction cost	$/tCO2	25

Yearly cash flows

Year	Pre-tax $	After-tax $	Cumulative $
0	-75,600	-75,600	-75,600
1	4,128	4,128	-71,472
2	4,252	4,252	-67,220
3	4,380	4,380	-62,840
4	4,511	4,511	-58,329
5	4,646	4,646	-53,683
6	4,785	4,785	-48,898
7	4,929	4,929	-43,969
8	5,077	5,077	-38,892
9	5,230	5,230	-33,662
10	4,715	4,715	-28,946
11	5,546	5,546	-23,398
12	5,715	5,715	-17,683
13	5,886	5,886	-11,797
14	6,063	6,063	-5,734
15	6,244	6,244	510
16	6,432	6,432	6,942
17	6,625	6,625	13,566
18	6,823	6,823	20,390
19	7,028	7,028	27,418
20	6,396	6,396	33,794
21	7,456	7,456	41,249
22	7,680	7,680	48,930
23	7,910	7,910	56,840
24	8,148	8,148	64,988
25	8,392	8,392	73,380
26	8,644	8,644	81,024
27	8,903	8,903	89,927
28	9,170	9,170	99,097
29	9,445	9,445	108,542
30	8,515	8,515	117,057
31	10,086	10,086	127,143
32	10,391	10,391	137,534
33	10,701	10,701	148,235
34	10,950	10,950	159,185
35	11,278	11,278	170,463
36	11,616	11,616	182,079
37	11,965	11,965	194,044
38	12,324	12,324	206,368
39	12,694	12,694	219,062
40	11,443	11,443	230,505

Cumulative cash flows graph



Oneida Resident Centered Care Community
Solar Hot Water System budget
revised: 5/19/2010

Summary of results from bids received to date, Retscreen model results, research. Retscreen is the model used by Wisconsin Focus on Energy to determine results for solar hot water renewable energy projects.

Proposed	**Base**	**1**	**2**	**3**	**4**	**5**
Usage (gallons/day)	3100	3100	3100	3100	3100	3100
# of collectors	0	**24**	**32**	**40**	**48**	**56**
array size		967.2	1289.6	1612	1934.4	2256.8
40.3 sq ft/collector						
storage (gallons)		1000	1350	1685	2000	2350
hot water from solar	**0%**	**25%**	**32%**	**38%**	**44%**	**49%**
natural gas consumption	10653	8028	7283	6600	5973	5401
therms saved		2625	3370	4053	4680	5252
annual fuel cost	$10,483	$7,900	$7,166	$6,494	$5,877	$5,315
$1 NG cost/therm						
10 year savings		$25,830	$33,161	$39,882	$46,051	$51,680
unit cost		**$110**	**$110**	**$110**	**$110**	**$110**
solar cost		$106,392	$141,856	$177,320	$212,784	$248,248
FOE		$34,125	$43,810	$48,000	$48,000	$57,772
WPS		$34,125	$43,810	$48,000	$48,000	$57,772
EECBG		$38,142	$55,000	$55,000	$55,000	$55,000
total incentive		$106,392	$142,620	$151,000	$151,000	$170,544
Tribal Contribution		**$0**	**-$764**	**$26,320**	**$61,784**	**$77,704**
equity payback (years)		0.0	4.2	8.6	12.5	13.3
IRR		100.0%	27.3%	14.7%	10.6%	9.9%
NPV		$63,207	$66,688	$56,973	$39,792	$32,877
Benefit Cost ratio		1.59	1.47	1.32	1.17	1.13
Annual life cycle savings		$5,301	$5,592	$4,778	$3,085	$2,757

ORCCC Funding Sequence for solar

- Funding for solar not part of budget,
- Focus on Energy Grant ~ $50,000,
- Non-profit match ~ $50,000 (WPS territory) ,
- Energy Efficiency and Conservation Block Grant ~ $50,000,
- Balance ~ $50,000 (Tribal Contribution),
- At the very least, build the building to be Solar-Ready – minimum structural and plumbing requirements are met during construction.

Tribal Contribution

* Federally Tax Exempt bond,
* Negotiated by CFO (one year +),
* based on bond ratings (credit score),
* The budget for a number of capital improvements and the associated budget was compiled,
* “Essential Governmental Purpose”,
* Majority of dollars in EE upgrades,
* funds opened up for solar.

Funding Creativity

QECBs
PACE
3rd party
Partnerships
Carbon credits
Grants
USDA (Sec 17 Corp.)
Tribal Contribution

www.climatecommunities.us

Creative Accounting

Typically, revenue from incentives or other income is directed to the General Tribal Fund and applied to fiscal needs

Have been somewhat successful to redirect this revenue into a revolving account; as capital builds, annual maintenance will need to be included into the final number

(the inverse of depreciation).

Reality check!

Legal, financial, political entities need to be involved to go after the creativity.

Don’t underestimate creative avenues, you just have to do a little homework.

Yaw^ko!