

# *Shekóli (Greetings) from Oneida*





# Solar Deployment on Tribal Facilities

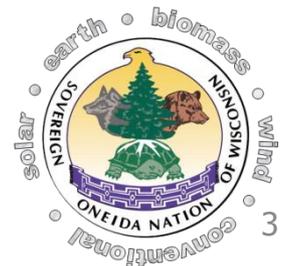


## Department of Energy Tribal Energy Program Review Denver, Colorado May 4-7, 2015

Michael Troge  
Oneida Tribe of Indians of Wisconsin

# AGENDA

- Past work
- Proposed solar project
- Other

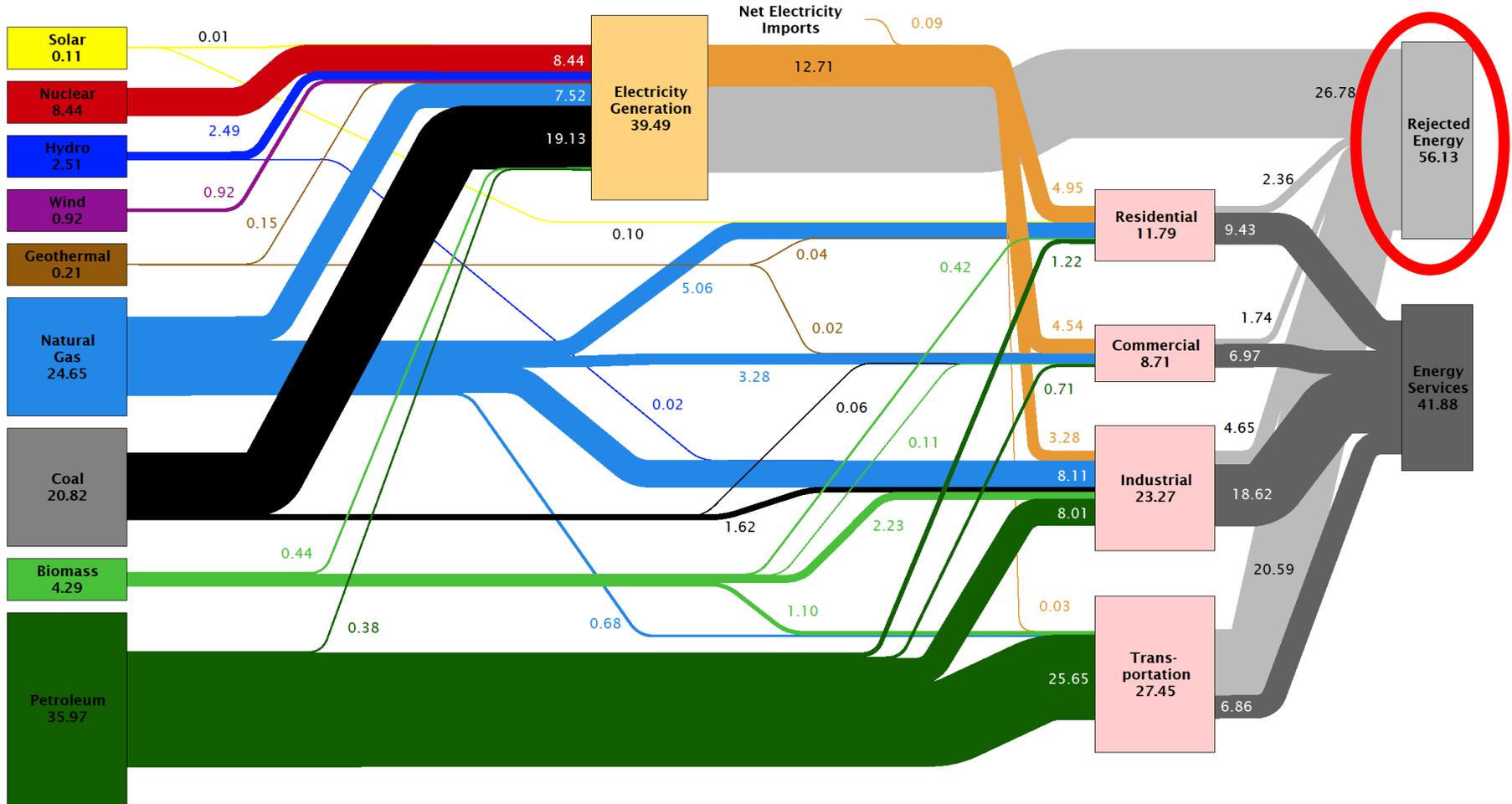


# Thank you!

- **Department of Energy, Tribal Energy Program, Office of Indian Energy, & National Renewable Energy Lab.**
- **Oneida Tribe Energy Team, Business Committee, Land Commission, Finance, Legal, Land Management, Public Works, Engineering, Environmental Division, Environmental Resource Board, Planning, Staff**
- **Partners: UW-Extension, State Energy Office, Focus on Energy, USDA, EPA, Wisconsin Public Service, WE Energies, University of Wisconsin Green Bay, Midwest Tribal Energy Resources Assoc.**
- **Energy Information Administration and the Energy Laboratories for their stats and research**



# Estimated U.S. Energy Use in 2010: ~98.0 Quads



Source: LLNL 2011. Data is based on DOE/EIA-0384(2010), October 2011. If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports flows for hydro, wind, solar and geothermal in BTU-equivalent values by assuming a typical fossil fuel plant "heat rate." (see EIA report for explanation of change to geothermal in 2010). The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 80% for the residential, commercial and industrial sectors, and as 25% for the transportation sector. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

**1 QUAD is enough energy to power 32 million homes**

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

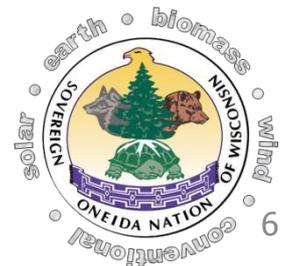


Observations:  
**CHANGE**

**is inevitable!**

**COMPETITION**

**is the standard!**

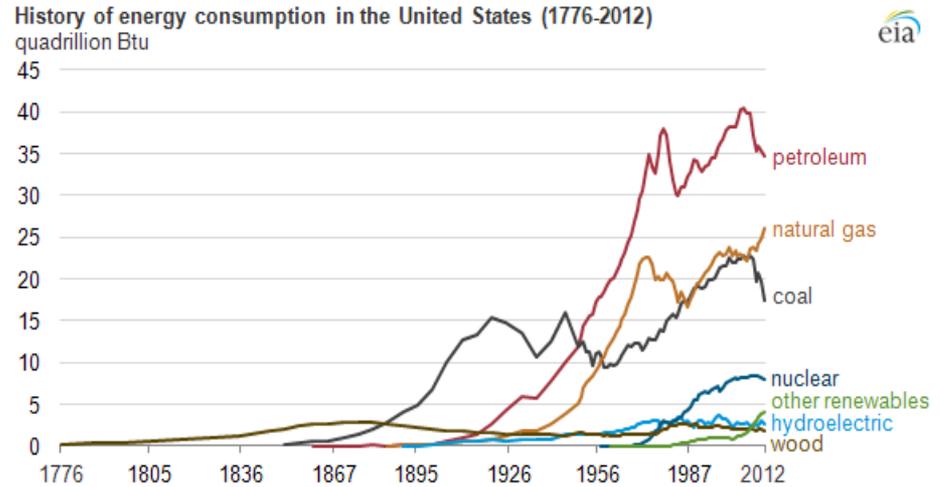
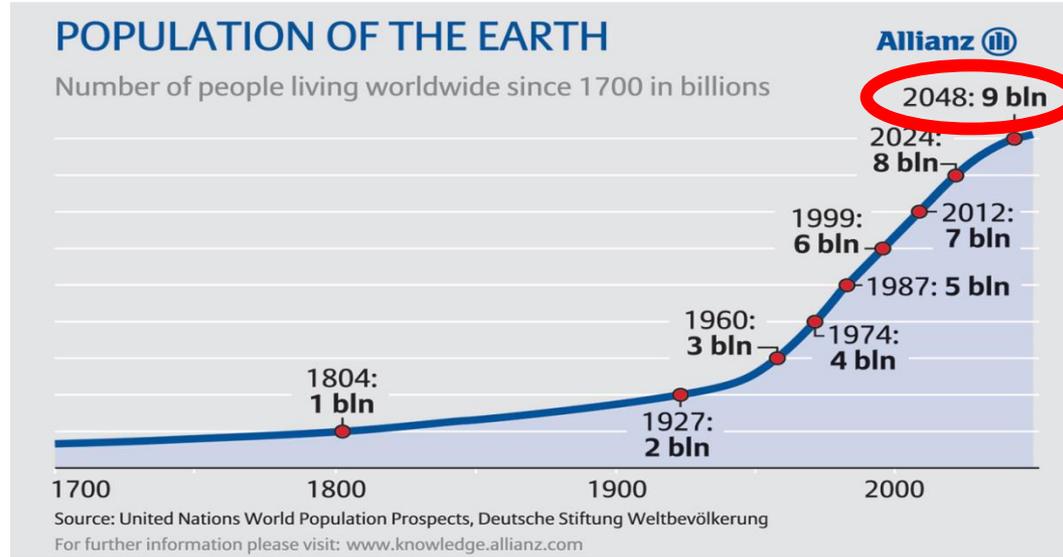


# CHALLENGES

## • Population

- Carrying Capacity
  - Water
  - Food
- Infrastructure
- Climate
- Energy

## • Money!



2100  
???

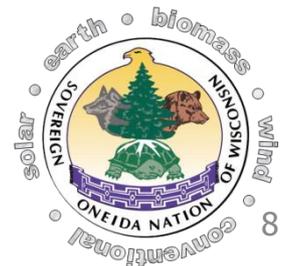
# What's the concern????

We are a  
small community  
in a

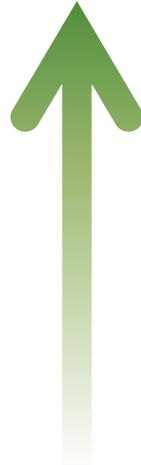
**GLOBAL ECONOMY!**

**We face an uncertain future!**

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



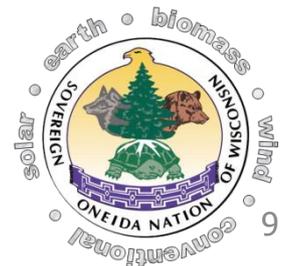
# Sustainability & Cooperation



**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**

Institutional electricity:	31,000,000 kilowatt-hours	=	105,000 MMBtu
Institutional natural gas:	540,000 therms	=	54,000 MMBtu
Institutional transp fuel:	145,000 gallons	=	5,000 MMBtu
Housing electricity:	16,000,000 kilowatt-hours	=	48,000 MMBtu
Housing natural gas:	2,000,000 therms	=	200,000 MMBtu

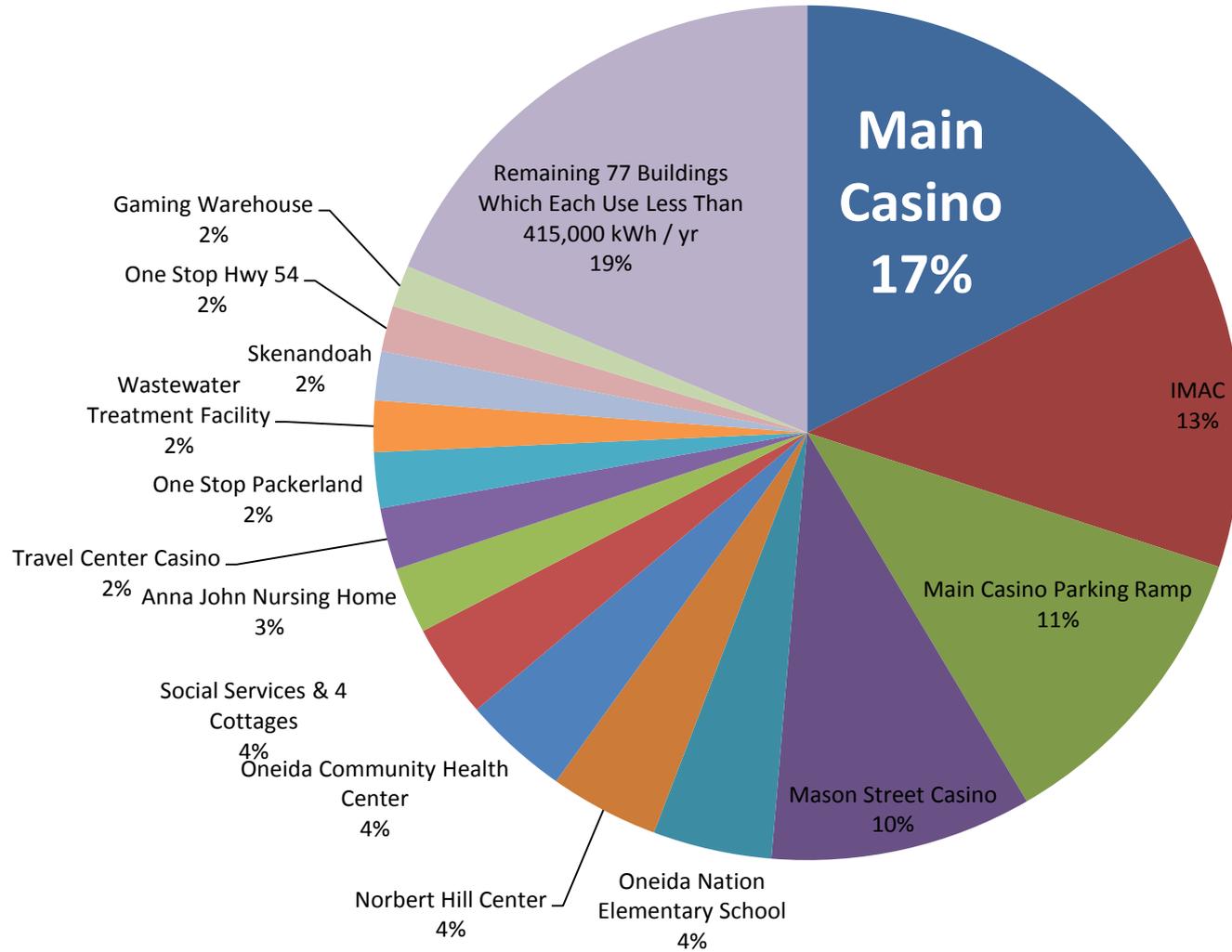
**5% RPS = 20,600 MMBtu = 6 million kWh**

**10% RPS = 41,200 MMBtu = 12 million kWh**

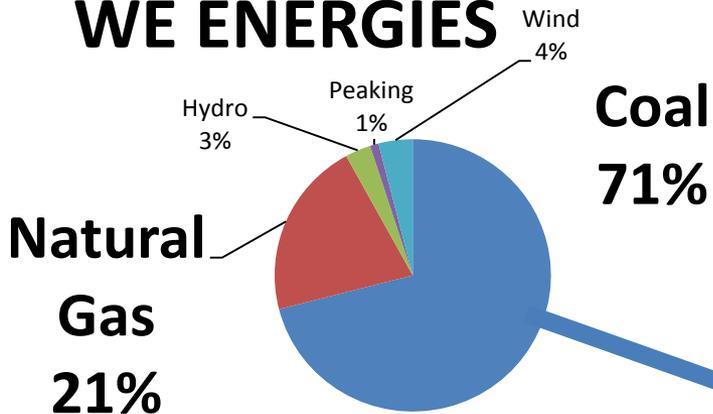
**20% RPS = 82,400 MMBtu = 24 million kWh**



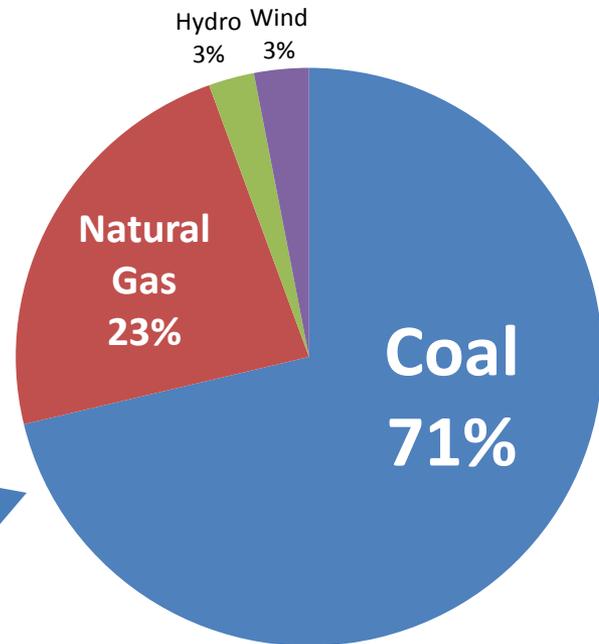
# Electricity Use by Building (not therms)



# WE ENERGIES

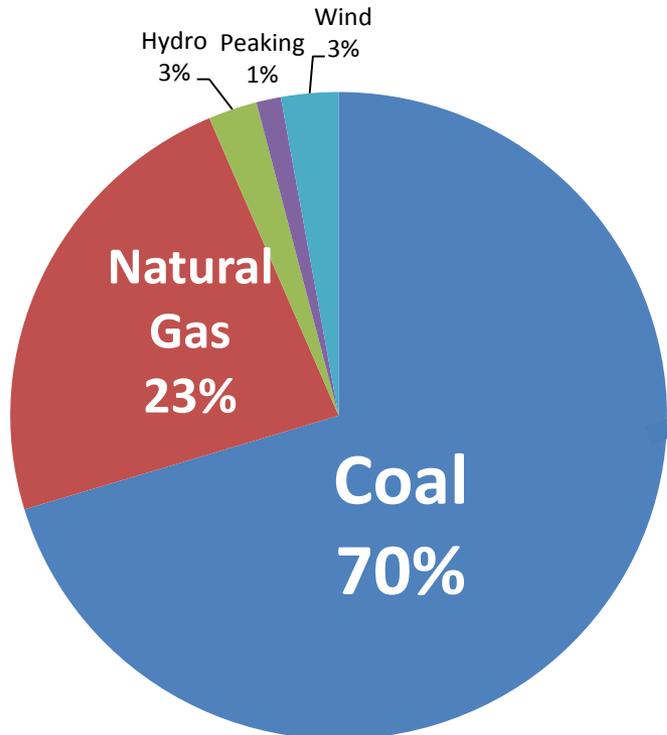


# Oneida Energy Mix



10%

90%



# WISCONSIN PUBLIC SERVICE



# Energy Team Projects

## Energy Audits & Upgrades

- Improved lighting
- Decreased energy use



Turtle School Gym

## Energy Crop Study

- Locally grown energy crop for heat, fuel
- UWGB partner



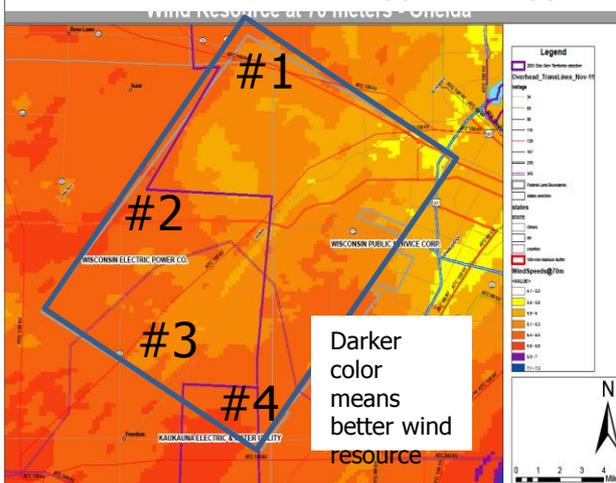
## Anna John Solar

- 48 collectors, 75% of hot H2O
- 75% grant funded



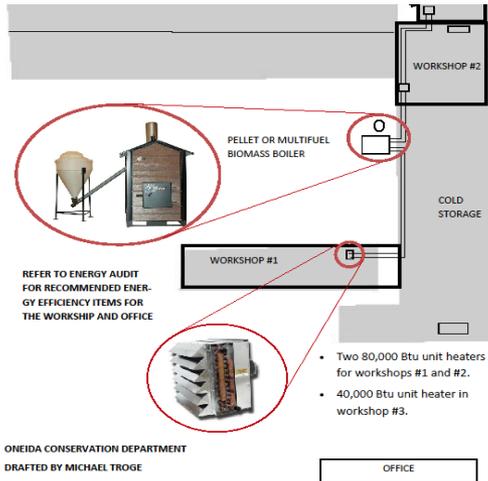
## Wind Power Study

- Wind best in the west
- Part of clean energy strategy



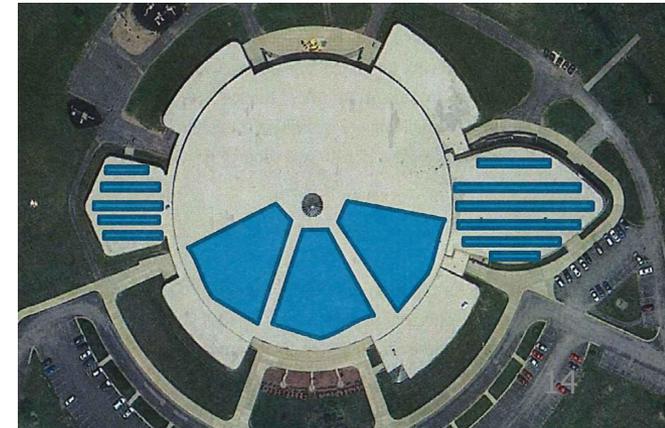
## Biomass Energy

100,000 Btu biomass boiler Demonstration



## Solar Deployment Project

- Application to DOE for \$1 M
- Solar electric on 9 buildings



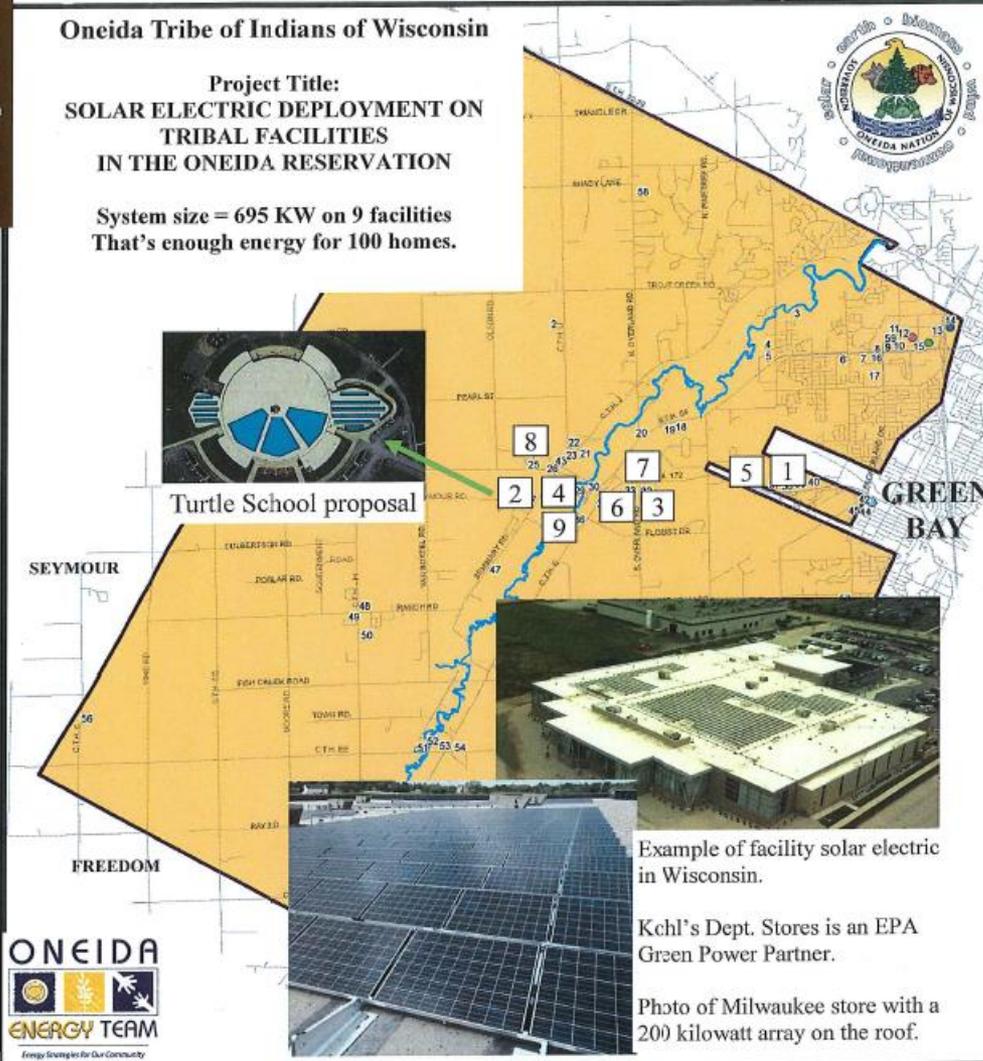
# Solar Deployment



**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.**



Turtle School proposal



Example of facility solar electric in Wisconsin.

Kchl'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 | 6 = Elder Services, 95 kw                |
| 2 = Turtle School, 100 kw               | 7 = Department of Land Management, 20 kw |
| 3 = Community Health Center, 100 kw     | 8 = Food Distribution Center, 20 kw      |
| 4 = Norbert Hill Center, 90 kw          | 9 = Oneida Police Department, 20 kw      |
| 5 = Gaming Warehouse, 80 kw             |  |

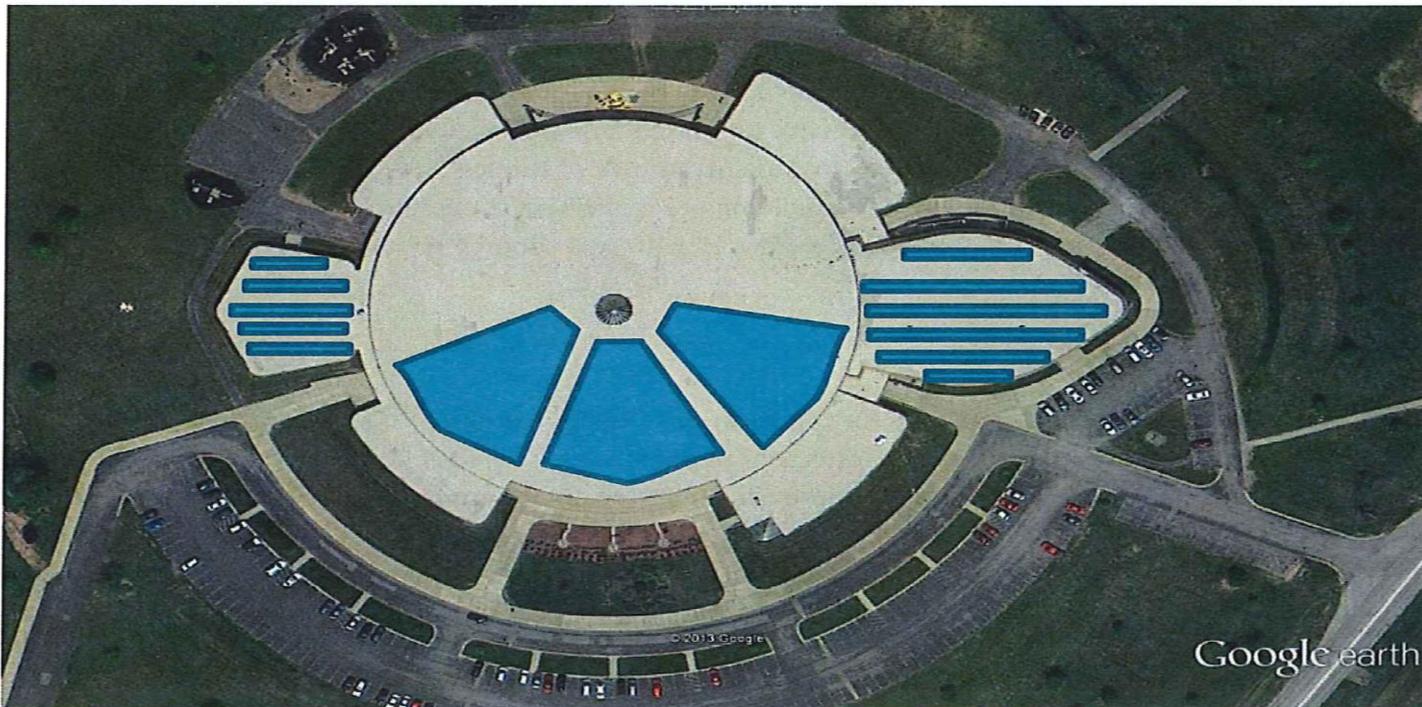
**Contact Information**

Michael Troge, Environmental Project Manager  
320-869-4572, mtroge@oneidation.org



## Oneida Elementary (Turtle) School

Facility	Usage	Size PV	Cost	% of Usage
Turtle School	1,373,600 kWh	550 kw	\$1.65 million	49%



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		
Energy Production	A	B
Solar PV system rated capacity (kW - DC)	659.85	659.85
Estimated annual output (kWh/yr)	816,894	816,894
Percentage of facility usage	49%	49%
Cost		
Estimated solar PV installed cost	\$1,667,340	\$1,667,340
Federal tax credit	\$0	\$500,202
Focus on Energy rebate (pre tax value)	\$0	\$0
Net present value of accelerated depreciation (5 years)	\$0	\$564,747
<b>System cost after incentives (after tax benefits)</b>	<b>\$1,667,340</b>	<b>\$602,391</b>
Economics		
25 year discounted net present value (NPV)	-\$79,475	\$985,474
25 year internal rate of return (IRR)	2.3%	10.5%
years until cost recovery	26.3	9.5
Value		
GROSS value of energy production over 30 years (NPV)	\$1,904,697	\$1,904,697
NET system value over 30 year system life (NPV)	\$237,357	\$1,302,306
your pre-purchased energy price with a solar PV system (\$/kWh)	\$0.073	\$0.026
Environment		
CO <sub>2</sub> emission offset (tons/year)	905.1	905.1
Assumptions		
System cost per kW	\$2,527	\$2,527
Federal income tax rate	35%	35%
State income tax rate	7.9%	7.9%
Electric rate in current year (\$/kWh)	\$0.080	\$0.080
Estimated electric rate price inflation (%/year)	3.20%	3.20%
Panel efficiency degradation (%/year)	0.50%	0.50%
Discount rate (used only in NPV)	2.70%	2.70%

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**

# Funding Diagram

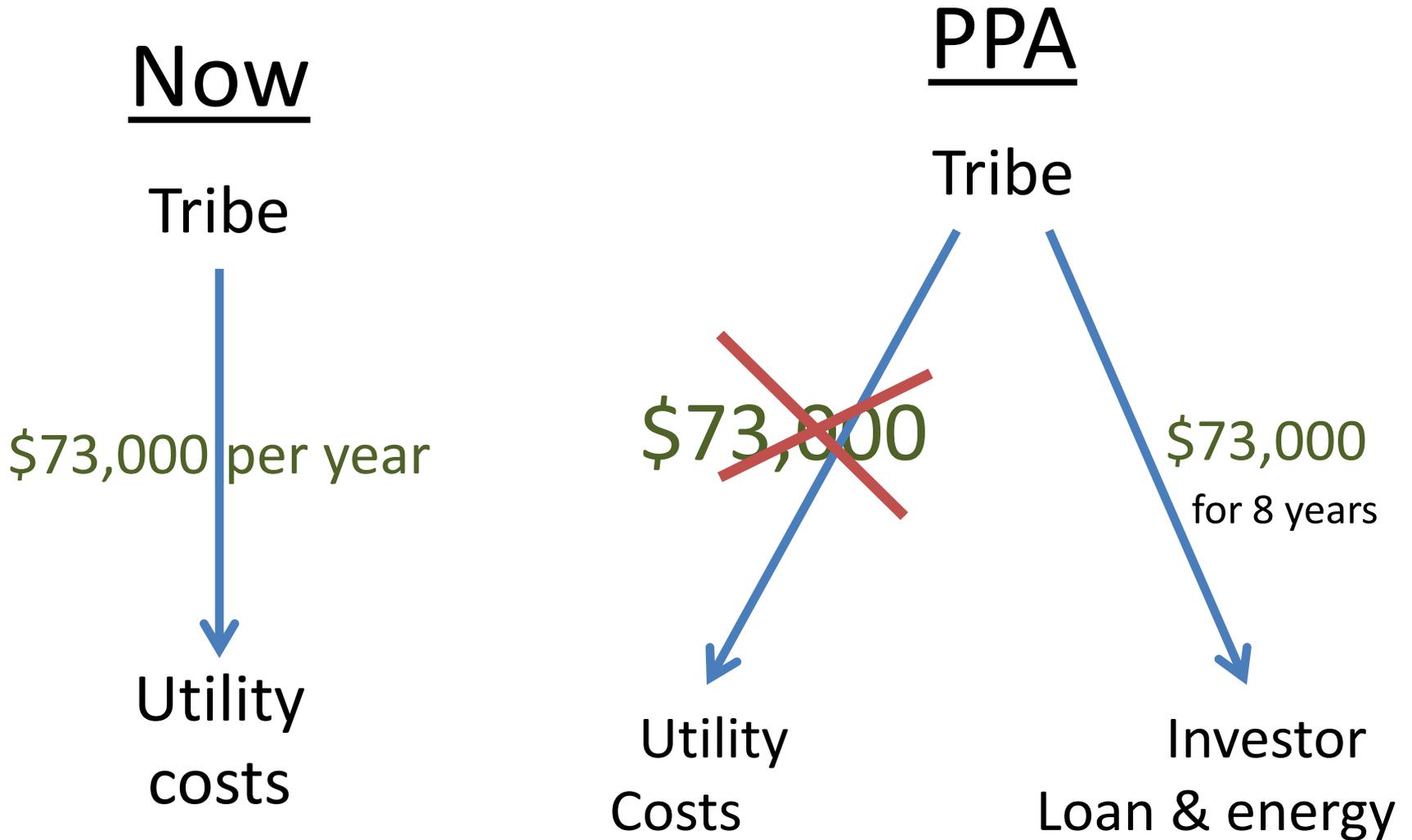
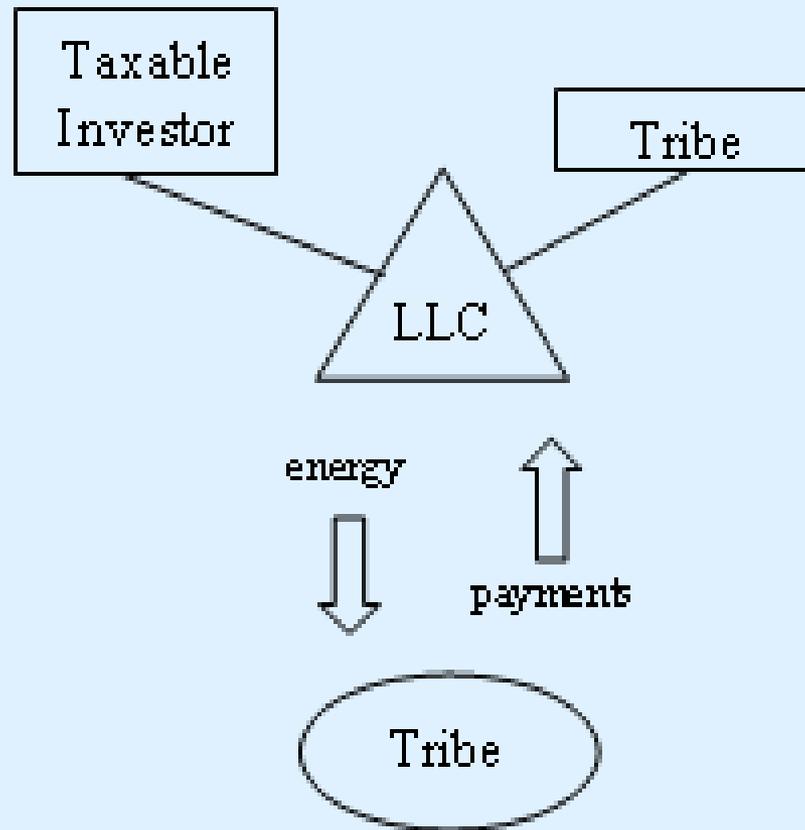


Figure 4: LLC partnership flip model



	<u>Front-end</u>	<u>Back-end</u>
<b>Tribe</b>	1%	99%
<b>Investor</b>	99%	1%



# Renewable Energy Funding Matrix

	Financing Method	Risk	Likelihood of Success	Rates of Return
<b>Tribe Self-Funds Projects</b>	Cash	Low	High	Low
	Bond/Debt	Low	High	Low
<b>Grants</b>	DOE Tribal Energy Grant	Low	Low	High
	Focus on Energy (State-Level) Grant	Low	Medium	High
<b>Partnership with Taxable Investor</b>	Sale Leaseback	Medium	Medium	High
	Partnership Flip	Medium	Medium	High



# 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** qualify 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

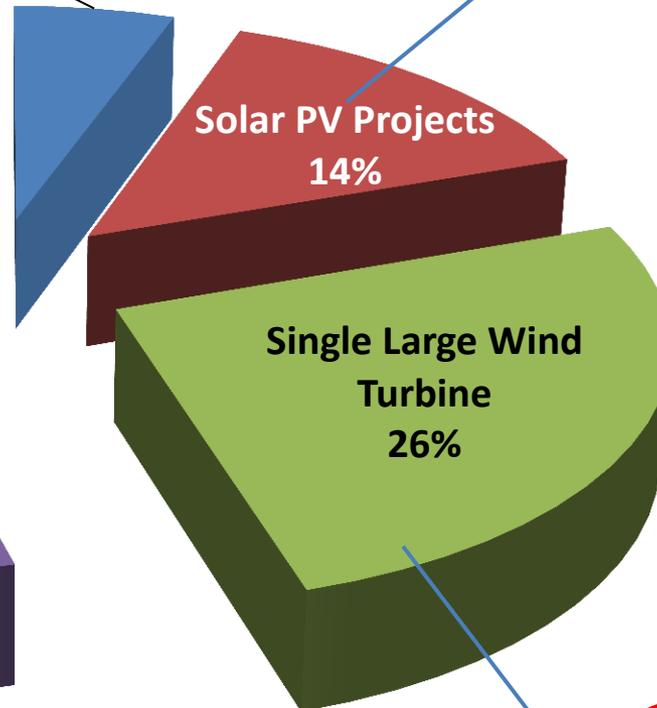
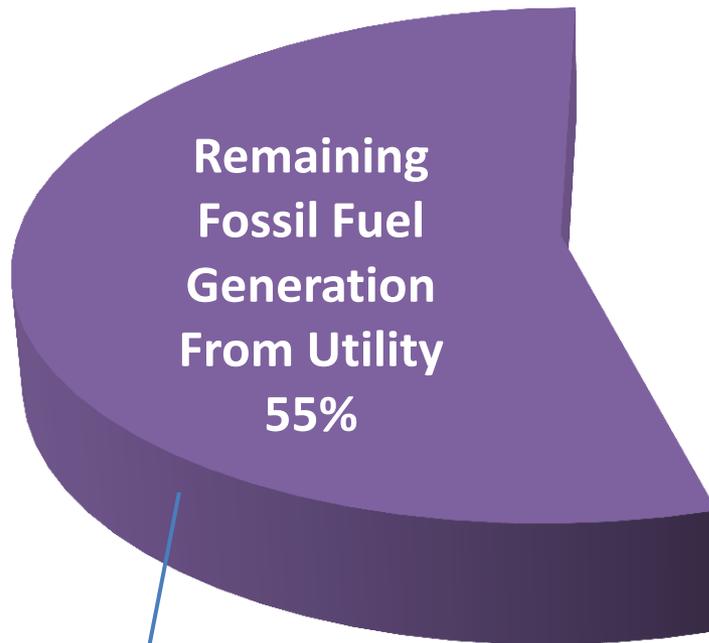
# RPS

Investment Required: **\$7.58 M**

Expected Rate of Return: 2-11%

Cost of Energy Generated: \$0.026 - \$0.095 / kWh

Existing Renewable Energy From Utility 5%

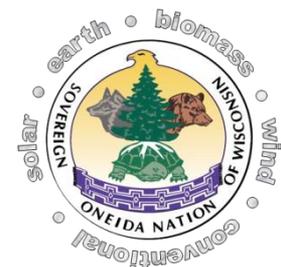


Cost of Energy Purchased Over Next 25 Years (3.2% inflation): \$0.12

Investment Required: **\$3.6 M**

Expected Rate of Return: 0-5%

Cost of Energy Generated: \$0.027



# 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<sup>rd</sup> party ownership
- Bulk purchase programs
- Community investment
- Renewable Energy Credits
- PACE – Property Assessed Clean Energy
- Energy efficiency is still the primary goal



# M T E R A

- Midwest Tribal Energy Resources Assoc
- Bigger voice for Tribes & Midwest energy
- Newly formed, drafting by-laws
- Looking for members



# Yaw^ko!

Michael Troge  
Environmental Project Manager  
Oneida Tribe of Indians of Wisconsin  
PO Box 365  
Oneida, WI 54155  
[mtroge@oneidanation.org](mailto:mtroge@oneidanation.org)  
920-869-4572

