



## Chapter 7

# The Resources for Our Future

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### RESOURCE HISTORY

Energy costs for the Oneida Nation are high resulting from cold winters, hot summers, and the presence of some sub-standard housing stock. Every year Tribal members spend millions of dollars on electricity, natural gas, and propane to heat, cool, and light their residences. Tribal buildings and operations also experience similar costs, and the energy spikes of 2007-2008 highlighted this vulnerability. Furthermore, millions more are spent on gas for individual and public transportation. Energy efficiency and conservation are the easiest ways to achieve a sustainable utilization of energy resources.

Energy resource applications in solar thermal, solar electric, wind, ground-sourced heat, and a variety of biomass and biogas options have been implemented in Oneida or are being investigated. The Oneida Nation has ample land base for implementation of a variety of renewable energy opportunities. Oneida is continually reviewing new sources for funding and technological advances to realize opportunities. In 2005, the Oneida Nation took steps towards prioritizing energy management within the Oneida organization. In 2008, a charter for an Energy Team was completed, along with assessments of past projects and current initiatives. Through review of this information four separate sub-teams (Buildings & Operations, Residential, Renewable, and Transportation) developed Action Plans. These plans are currently being formulated into an overall Energy Management Plan.



## RESOURCE DESCRIPTION

### Wind Resources

The Environmental, Health & Safety Division (EH&SD) and Environmental Resource Board have been reviewing wind opportunities on the Oneida Reservation for several years. Three separate wind site assessments have been co-sponsored with the Wisconsin Focus on Energy program to target installation of a 35–90 kilowatt turbine. However, the economics of small wind systems have changed. Maintenance requirements at this small scale have proved to be challenging to justify in an annual budget for either staff or a contractor to perform the work.

Recently, megawatt-scale systems have shown greater promise as a viable investment at the community level, though many variables still must be considered. Throughout the region and the state, hundreds of megawatts of wind turbines are in the planning stages or have commenced construction. This activity has spurred considerable interest in community and large-scale wind facilities for private and public entities. Oneida contracted with Seventh Generation Energy Systems in 2009 to complete a general wind resource assessment and construct a meteorological tower. Currently in 2011 data monitoring of the wind resource is being performed and a complete final report of findings will be completed soon.



Installation of Wind Monitoring Tower in December 2009



Based on the findings, Oneida will decide whether or not to pursue construction of megawatt scale wind turbines, a complex process estimated to take 3–5 years. Challenges include negotiations between the Tribe and potential recipients of the energy generated, choosing a sound investment strategy, understanding the construction logistics, and long-term maintenance. A cross-functional team including experts in finance, law, energy and more will be needed to accomplish a successful community wind project.

### **Solar Thermal Resource**

There are 18 solar hot water systems on the Oneida Reservation. Many of these systems were installed through a U.S. Department of Energy grant and are currently in need of repair. Solar hot water systems are a cost-effective renewable energy option, especially considering incentives available through the state, local utilities, and applicable federal tax credits.

A large solar hot water system was installed at the tsyunhéhkwv organic farm but is also in need of repair. Large single applications of solar thermal on facilities with a large hot water demand are attractive, especially where facilities have dedicated maintenance staff. One priority identified by the Energy Team is to install solar thermal on Oneida's large facilities. Presently the new Resident Centered Care Community, an elder care facility, is being programmed for such a system. Other facilities under consideration include the Family Fitness swimming pool, the Health Center, and any planned facilities that meet minimum solar requirements. Furthermore, a cross functional team including Housing Authority, Land Management and EH&SD staff are planning installations on new Housing Authority homes.

The challenges in solar thermal deployment are up-front costs and long-term maintenance. These systems typically have a soft maintenance schedule, but still require regular monitoring. Until the facility staff has achieved a technical comfort level with solar thermal systems that is equal to that of conventional HVAC equipment, the facility staff will have to adopt an intense solar thermal maintenance plan complete with an educational component.



### Solar Electric Resource

Oneida features solar electric technology in two commercial scale systems: a 2 kW system on the County Hwy. H Community Center and an 11 kW system on the Food Distribution Center. These projects were initiated as a demonstration that a community government can invest in the technology and reap some gains. These projects have since evolved into an examination of how maintenance of non-conventional power-producing systems should be integrated into the regular staff schedule. Additionally, these projects have proved quite valuable due to the availability of special green pricing programs available in the WE Energies service area.

### Biomass Resource

Research and implementation are occurring regionally with biomass and biofuels. As Wisconsin expands its capacity and expertise, Oneida will look to implement cost effective and environmentally friendly technologies for Tribal members and Tribal operations. Some opportunities potentially include:

- Switch grass and hybrid poplar trees are two potential opportunities to diversify agriculture and provide watershed protection/hunting opportunities. Hybrid poplar needs no fertilizer, is planted only once, and is harvested after 3 years. Production is 5–10 tons an acre per year. A co-generation facility is a possibility to process poplar and use waste heat for building heat.
- Pellet Stoves may be an effective biomass option for Oneida to assist Tribal members with heating bills. Access to a consistent supply of pellets can be an issue. Pellets burn cleaner and pollute less than wood. Oneida may be able to manufacture pellets from wood or switch grass.
- Anaerobic Digestion is a developing technology, and the Energy Team will continue to monitor its progression.
- Ethanol poses some concerns as a long-term solution due to potentially compromising food security, and further expanding the production of corn may be environmentally problematic.



- Biodiesel vehicles are being researched for Oneida Transit and Oneida Casino. The Oneida Farm currently uses biodiesel fuel. Future opportunities may occur if Oneida grows and processes biodiesel itself or as part of a collaborative project. Water and soil impacts will need to be evaluated.

One of the biggest challenges with biomass technology is finding local fuel supply. There are many branches of the technology that can use a variety of biomass sources. Typically, small and large woody debris is the most understood fuel source. Though Oneida has a strong forestry program, an extensive local source of woody debris does not exist within the Reservation. The predominant land use is agriculture; corn, soybeans, alfalfa, etc. It would take time to transition to a managed forest system or grassland operation that could be used for biomass harvesting. Other sustainable sources are generally greater than fifty miles away, making the investment uneconomical based on transporting material.



### Ground-Sourced Heat Pumps

Ground-sourced heat is growing in popularity to provide heating and cooling to buildings. This is an innovative technology that utilizes ground temperatures in the immediate vicinity of the building to temper the building using a reversed refrigeration process. The heat pump is small and relatively affordable. The excavation work is the most costly part of the project. The challenge is finding a sustainable energy source to operate the ground-sourced heat pump. Essentially, this is an electric heating and cooling system. Tempering a building with electricity from the utility can be an expensive proposition. Considering the efficiency ratings of a coal-fired power-plant are approximately 30%, reliance on utility electricity is an unsustainable venture.

### Hybrid Energy Systems

Likely a combination of renewable and conventional energy technologies, in addition to energy efficiency and conservation activities, will drive the Oneida Tribe of Indians Energy Plan. Until a viable, affordable means to store renewable energy has been developed and made available, the ability to eliminate our dependence on fossil fuels continues to be a challenge. Using fossil fuels sparingly while using renewable sources as a supplement will provide the greatest costs savings in the short and long-term.

## Energy Conservation

Strategic energy planning advises that before more energy is extracted, conservation of existing resources should be the first priority. The Oneida Nation is an U.S. Environmental Protection Agency (EPA) Energy Star Partner and a frequent participant in the Wisconsin Focus on Energy program. Oneida is also utilizing Leadership in Energy and Environmental Design (LEED) standards as a guide in new facility construction as well as Energy Star principles for new residences. The Energy Team is effectively implementing this in the following areas:

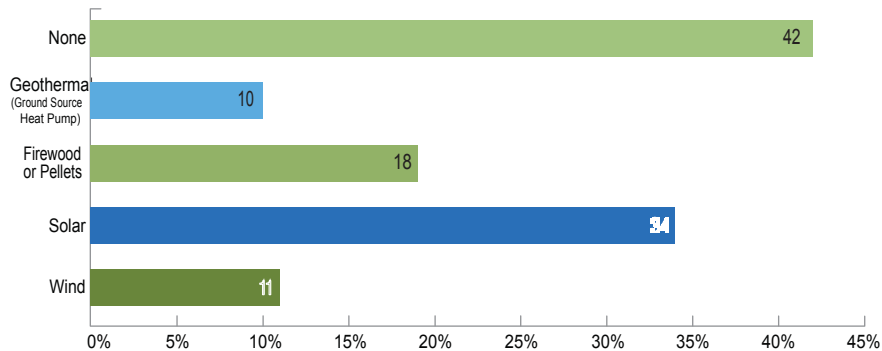
**Buildings & Operations:** Department of Public Works (DPW) has a goal for energy audits on 44 Oneida facilities. DPW also has a comprehensive list of completed and future projects regarding lighting, motion sensors, HVAC, insulation, windows, etc.

**Residential:** Home performance tests and weatherization of existing residential units is being undertaken collectively by the Housing Authority, Land Management, Office of Self-Sufficiency, and the Environmental Resource Board.

**Transportation:** Transit, Fleet, and Retail are respectively reviewing more efficient public transit routes, hybrid and reduced gas mileage vehicles, and a more efficient refueling policy.

## COMMUNITY SUGGESTIONS & FEEDBACK

Figure 7.1 Renewable Energy Sources Respondents are Likely to Incorporate into Their Homes in the Next 10 Years





The results from the Live, Sustain, Grow survey show that 34% of Oneida's are interested in incorporating solar energy into their homes, 18% on incorporating firewood or pellets, 11% on incorporating wind energy, and 10% interested in incorporating ground source heat pumps into their homes. These results show that the Oneida community has alternative energy opportunities on their minds. Regarding energy efficiency, community members were asked what they have done in the past 5 years to improve the energy efficiency of their homes. 48% have done weather sealing/caulking, 41% have replaced windows and/or doors in their homes, 37% have added insulation, and 11% have had an energy audit completed on their homes. Other improvements mentioned by respondents include fluorescent light bulbs, pellet stoves, new roofs, and unplugging appliances. These results show the movement towards improved efficiency, but also demonstrate the large amount of work waiting to be performed.



## **GOALS AND OBJECTIVES**

### **Energy Conservation**

Continue efforts on commercial and residential building energy audits and retrofits, as well as using LEED and Energy Star for new construction, to ensure sustainability and affordability for the Oneida Nation organization and Tribal members.

### **Residential Scale Solar Hot Water**

Oneida is developing an annual inspection program to assist system owners with maintenance. This program may evolve into a site assessment program available to all home owners to determine renewable energy potential for their home.

### **Complete Energy Security Plan**

Energy Team will complete work on integrating Action Plans into comprehensive Energy Management Plan for the Oneida Nation, to be approved by the General Manager and sent to the Business Committee for final adoption.

### **Wind Feasibility Development**

Completion in 2011 of data monitoring from the wind monitoring tower and creation of final report findings. Creation of cross-functional team to assess potential for community wind development in Oneida.

## Commercial Scale Solar Hot Water

Install a solar thermal water system on Resident Centered Care Facility and any other appropriate large facilities.



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## BENEFITS ASSESSMENT

### Environmental

- Reduction of Oneida's carbon footprint. Oneida's commercial buildings alone currently use the equivalent of 125 railway cars per year of coal. Energy efficiency improvements and renewable energy opportunities can help curb this polluting influence on climate change.

Figure 7.2 Oneida Commercial Buildings Utilize 125 Rail Cars of Coal Each Year

 **EQUALS 5 COAL RAIL CARS**



### Social

- Energy efficiency improvements to homes improve quality of life by providing a more comfortable environment to live and grow.





## Cultural

- Haudenosaunee principles state that humans are part of nature's complex web. Steps to reduce energy use and develop renewable options reflect a grateful respect for the fragile Earth and the impacts of climate change.

## Economic

- Energy efficiency improvements keep money in the pockets of Oneida Tribal members and ensure the sustainability of the Oneida organization.
- Improvements help keep budgets stable by minimizing impacts from the large fluctuations ever present in energy prices for electricity, oil, and natural gas.



## IMPLEMENTATION PLAN

### Energy Conservation

Oneida Engineering and Oneida Housing Authority are providing leadership in design in these areas for Oneida's government buildings and residential housing respectively.

### Residential Scale Solar Hot Water

Housing, Land Management, and EH&SD are coordinating a program for new solar hot water installations.

### Complete Energy Security Plan

An Energy Summit is also being planned for 2011 to give input and guidance for implementation of the plan.

### Wind Feasibility Development

Completion in 2011 of data monitoring, review of final report findings, and discuss creating cross-functional team for any implementation steps.

### Commercial Scale Solar Hot Water

Complete installation of a solar thermal water system on the Oneida Resident Centered Care Community facility in 2012.

