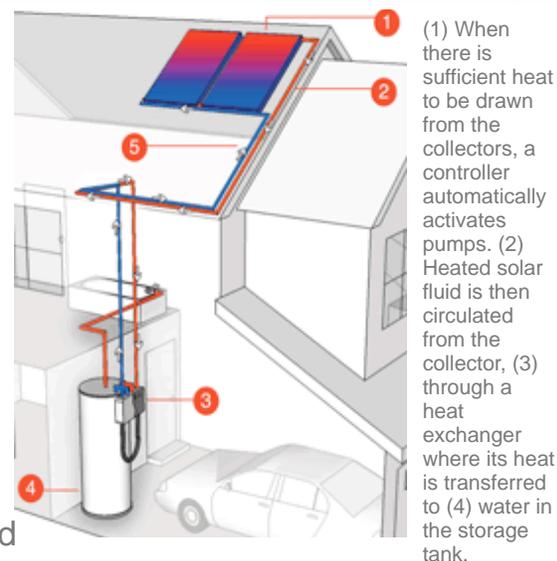


Renewable Energy Retrofit to Nenana Teen Rec. Center.

Projects completed by Yukon River Inter-Tribal Watershed Council

2010 2010



(5) The solar fluid is then pumped back to the collector to once again be reheated. This circulation loop will continue as long as there is heat to be drawn from the collector. During times when there is little or no sun, a backup heating system will be activated to provide adequate hot water.

Your Project, your Community

The Yukon River Inter-Tribal Watershed Council partnered with the city of Nenana and the Nenana Tribal Council to put together an energy retrofit for the Nenana Rec Center. The project consisted of 3 major components: Zone valves and programmable thermostats were added to the building's existing heating system, solar hot water collectors were installed on the building's roof to heat domestic hot water, and a 4.4kW fixed-mount solar array was installed to offset the buildings electrical load. The YRITWC plans to determine the effectiveness of these projects by comparing the building's heating and electric bills over the coming years with those collected since it opened in 2007. A BIG thanks goes out to the City of Nenana, the Nenana Tribal Council and to the following community members who helped us complete these projects. Jakob Kukes, Daniel Marks, Leon McElroy and Mike Pitka.



Project Statistics

- 20 - 220 watt Trinna™ Solar panels were installed total peak production of array: 4.4kW
- 20- Enphase micro-inverters DC-AC power
- 10 Programmable thermostats controlling 12 zone valves
- 2 Heliodyne™ 4'x10' solar collectors
- Estimated yearly electrical production from solar panels: ~4000kWh/yr.
- Estimated reduction in fuel cost \$2k-4k



Solar PV?

Solar PV is a method of harnessing the sun's energy to produce electricity. In areas of the far north (such as Alaska) mounting solar panels on a dual axis solar tracker is the most effective method of capturing solar energy. A dual axis tracker follows the sun on one axis as it moves across the sky over the course of a day and on a second axis as the sun moves higher and lower on the horizon over the course of the year. However, since trackers are expensive and need a large unobstructed area, we opted to instead purchase more panels and use a fixed mount array on the Rec Center's south facing roof. The 4.4kW system uses Enphase™ micro-inverters which convert the electricity from DC -> AC energy on the back of the solar panel then connect to the building's main circuit breaker. Electrical loads in the building use this power first before drawing power from the grid. To view the array's real-time electrical production you can go on the web to:

<http://enlighten.enphaseenergy.com/public/systems/BTcD7969>



Solar Thermal - Domestic Hot Water...

One of the simplest forms of harnessing solar energy is through the heating of Domestic Hot Water. This system works on the same principle as a car roof heating up on a hot day. Copper fins in the 2 - 4'x10' Heliodyne™ Solar collectors (Shown above next to a good looking installer) transfer heat from the sun to glycol that flows through a copper pipe in the collectors. The glycol is then pumped into a double walled heat exchanger in the building's utility room where cold water from the water main can be pre-heated before entering the hot water tank and being distributed to sinks and showers throughout the building.

National averages show that Domestic Hot Water accounts for roughly 25% of a home's total energy bill. With this technology, we hope to significantly lower that percentage and hope to completely turn off the boiler during summer months, when hot water use is low and sun exposure high.



Smart Building Controls...

Even though Renewable Energy projects showcase exciting new technology and can produce low cost, carbon-free electricity for years to come, the cheapest energy is the energy you never use. Significant savings can be achieved by knowing how much energy your major appliances and home heating systems use and taking appropriate conservation measures to reduce and control it!

One of the major improvements we were able to make at the Rec Center was to install zone valves on the heating loops in each room. Each zone valve controls the amount of heat that a room receives through its baseboard heaters. By wiring these zone valves to smart thermostats, users are now able to program each room to heat-up and cool down based on a preset schedule determined by room use. Rough estimates show this improvement alone could save 10%-20% on annual heating oil costs.



The Yukon River Inter-Tribal Watershed Council: A consortium of over 72 Tribes and First Nations spread throughout the Yukon River Basin in Canada and Alaska. The YRITWC was formed in 1997 through an inter-tribal accord signed by tribal and city leaders which committed their communities to help clean up the Yukon River and its tributaries, reduce pollution and create a sustainable future for generations to come. The Energy department was formed in 2008 and has been involved with the installation of wind, solar and hydrokinetic projects within the watershed. We are dedicated to the belief that CLEAN WATER NEEDS CLEAN ENERGY and Thank Nenana for hosting our 2010 Renewable Energy project. Please direct any questions to the YRITWC Energy Dept P: 907-451-2530