NORTHERN ARIZONA UNIVERSITY

NAU Solar Thermal Air Heating

selected as a finalist in the category of Arizona Forward's 35th Annual Environmental Excellence Awards program in the category of the Governor's Award for Arizona's Future

In January, 2015, Northern Arizona University installed the first known ***multi-panel solar thermal hot air system in the country.***

Project Authors

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Project Overview

The project outfitted the Property Surplus building at the NAU Flagstaff campus with six solar heating panels. These six panels provide over 40,000 BTUs/hr. (or 12 kWh) of renewable energy to the building which offsets the natural gas heating system. The panels are a closed loop system. They take air from inside the building, pass it through the thermal panels outside where the air is heated by an additional 70-80 F°, and then a fan pushes the solar heated air back into the building. The Property Surplus building is approximately 10,000 sq. ft. and each panel can heat approximately 1,000 -1,500 sq. ft.

Project Goals

- Reduce the heating costs of the building by 30%
- Determine if this novel solar heat technology should be further expanded
- Reduce NAU greenhouse gas emissions associated with heating and natural gas use

Project Results

As validated by ongoing, real time output measurement, the pilot installation is performing as designed and delivering over 40,000 BTUs per hour and is directly eliminating over three tons of CO_2 from the air annually. Additionally, this system is on track to reduce natural gas expenditures by well over 30% in this building. The manufacturer of the product (SolarThermiX) is working with Engineering students at NAU to continually track the output of the system and further support a key NAU goal of being a "Living Laboratory". At NAU, we're creating this Living Laboratory, where a student dominated committee votes to approve funding for innovative, on-campus projects like this that are then researched by students.

Going Forward

NAU is working to communicate the success of this project across the country. Solar thermal holds the potential to significantly improve the ROI for renewables for every building in cooler climates in the country. There are multiple popular options for displacing electricity with renewable energy (wind and solar), but hardly any for displacing our huge demand for natural gas heating. This project demonstrates a miraculously simple and efficient solution to this global problem. NAU hopes to work with energy service companies to teach them about this financially sound and environmentally preferred breakthrough technology.

What is the Green Fund?

In 2010, NAU students overwhelmingly voted to support a $5 fee every semester to go towards "projects that reduce NAU's negative impact on the environment and create a culture of sustainability." The Green Fund committee is predominately made up of students and has supported over 40 projects worth approximately $800,000 to date.

Pictured right: The 2015 Green Fund committee accepting the 2015 Environmental Caucus award for "NAU Organization".

Funding

Financing was done through the student generated Green Fund. The Green Fund awarded the project $9,889 for the 12kW solar thermal system. The $9,889 total project allowance covered the purchase of six SolarThermiX air heat panels, all ducting, an 800 CFM fan, dedicated $500 data acquisition system and included $1,500 for contracted outside hole drilling activity.

Project Specifications

Panels	Six, 4"x 8"
Area Heated	10,000 sq. ft.
BTU	Up to 42,000 per hour
Annual CO_2 Mitigated	3 tons
Comparable Output	12kW
Cost	$9,889
Results	Less than $1/watt