



**Northwest  
Renewable  
Energy** CORP

Innovating Green Technology  
NWREC.us

# Reduce The Cost Of Cooling Your Open Truss Ceiling Buildings!

**Nearly all companies are searching for ways to reduce their energy consumption. Energy loss through inefficiencies cost the commercial sector untold millions of dollars every year. One often overlooked area of energy savings is with the cooling inefficiencies of Open Truss Ceiling (OTC) structures.**

North West Renewable Energy Corp has developed a way for building owners to reduce their cooling loads to cool radiative and conductive heat generated by the sun. Solar radiative and conductive heat is transferred through roof and wall structures into conditioned spaces because heat transfer naturally migrates towards lower or cooler temperatures.

NWREC's efforts have been directed at increasing the energy efficiency of cooling OTC structures. In particular, structures that already have a "Cool Roof" roofing surface installed. Structures that do not have a "Cool Roof" will see even greater energy savings.

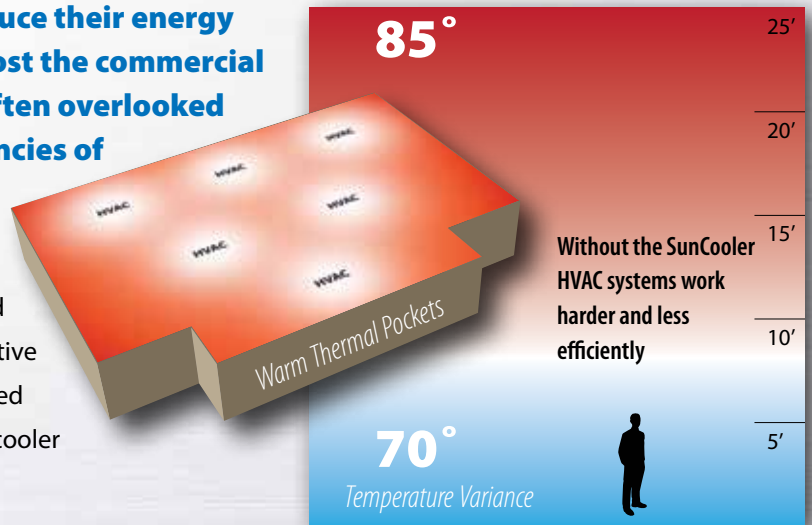
"Cool Roof" structures can see significant energy savings by removing the heat gain transferred through the roof structure components into the conditioned space below.

Nearly all open truss ceiling structures that serve large commercial purposes are air conditioned. National store chains such as Costco, Wal-Mart, Home Depot, Lowe's, Kroger Co., Safeway, Albertsons etc... all operate facilities with an open truss ceiling as well as drop ceiling designs. These facilities are designed with several large air handling units placed strategically across the roof. These air conditioning systems are designed to direct the cool air down to the human occupancy level. The temperature may be maintained at 68-72°F degrees at 6' above the floor level, yet with a typical ceiling height of up to 25', temperatures naturally can rise into the 80's and higher as you get closer to the underside of the roof deck. For structures without a "Cool Roof". Those temperatures can rise to above 100°F degrees. See the "Temperature Variance" and the "Warm Thermal Pockets" illustrations to the right.

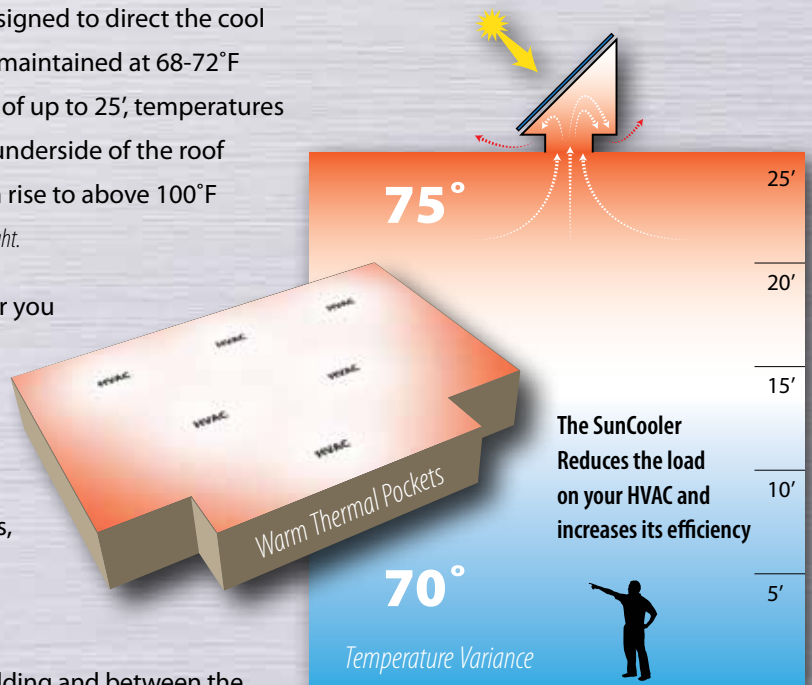
Energy savings can be realized by removing excess heat. The closer you get towards the roof deck ceiling, naturally the warmer the air temperature becomes. This is affected by several factors, for instance; heat gain transferred through the roof deck, heat generated through human activity, windows & skylights, equipment such as refrigeration motors, electrical devices, lighting, etc...



The upper atmospheric ceiling spaces located around the perimeter of the building and between the



**By removing the warm air pockets that are continually generated throughout the day light hours, energy savings of up to 20% or more can be realized through a reduction in the energy load required for cooling.**



air conditioning units will generally have the highest temperatures. The air conditioning equipment continually works against the hotter temperatures generated from heat transfer through the roof structure. The same principle that a refrigerator kept full, will use less energy than one that is half full, applies to OTC structures. If warmer air pockets are removed with a temperature controlled removal process, less energy is required to maintain the desired cooled environment throughout the entire facility. This warm air removal process must be temperature regulated and controlled so as to not remove the preferred conditioned/cooled air.

NWREC estimates that by removing these warm air pockets that are continually generated throughout the day light times, energy savings of up to 20% or more can be realized through a reduction in the energy load required for cooling. Certainly structures located in hotter climates can see more savings than a similar facility in a cooler climate. Significant energy savings potential exists for all facilities in all climates who employ a warm air thermal pocket removal process.

NWREC developed the “SunCooler” a “Solar Powered Rooftop Ventilator”, specifically designed for these commercial applications. The SunCooler units operate powered by the sun. They are independent of the facilities electrical system. Electrical permits are not required to install SunCooler units. See the SunCooler brochure for specific performance details and specifications. Contact NWREC for further application information and or SunCooler unit questions.



The SunCooler is easily installed onto existing openings

SunCooler units are designed, engineered and manufactured in Oregon. NWREC also uses Oregon made PV modules.

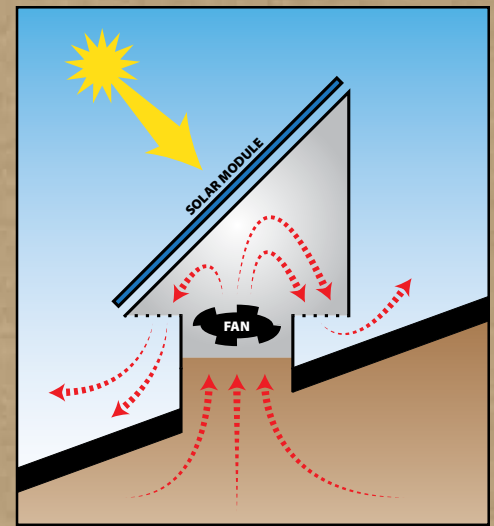
For further SunCooler product applications or general questions please contact NWREC at the contact information listed below.

This Open Truss Ceiling report was written by:  
Jason Wright President & CEO

NWREC is the only company manufacturing solar powered ventilation products made specifically for institutional, commercial, industrial and agricultural applications.

- Powered by sun light, the SunCooler cost nothing to operate
- Easy “mount & walk away” installation by your roofing or HVAC contractor—no electrician or electrical service needed
- Reduces your company’s grid supplied energy usage
- LEED certification (use of the suncooler may qualify your building to earn points toward a LEED certification)
- Increase your building’s LEED building performance (consult your local LEED certified engineering firm for LEED qualification details)
- Reduces the load on grid powered AC equipment—saving you money and extending the life of your HVAC equipment
- Visual proof with thermal imaging of the structure, before the SunCooler and after the SunCooler is available.
- SunCooler tax credits  
(30% federal tax credit—consult your CPA)

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### Here’s how the SunCooler works

Powered by the sun, the units draw out undesirable warm air through an exhaust fan ventilation system. The units are self contained and are powered on and off through their control system which is regulated by adjustable temperature control. To avoid the removal of air conditioned cool air while the units are off and not operating, they are sealed closed with a normally closed damper. When the temperature rises to a programmed set point, the damper opens and the unit turns on and will remain on during daylight hours until such time as the air temperature has dropped to the shutdown point. A unit will in fact start up and shut down as needed throughout the day based upon the environmental thermal conditions it is operating in. When the units have insufficient solar gain for normal operation as is the case through out the night time, the damper remains closed to prevent conditioned air loss through the unit. Easily wall mounted wireless on & off controls are available for units for applications where increased individual control is desired.

For info on buildings with drop ceilings, please Visit: [nwrec.us](http://nwrec.us)



Engineered, Designed and Manufactured in Oregon

