Heated Vehicle Storage Barn and Maintenance Shop

Location: Duluth
Installation date: 04/29/2010

System Description

224ft² Solar Air Heat (SAH) array of high efficiency glazed, back-pass collectors in portrait orientation and parallel configuration. Flush mounted on south-facing wall at 90° tilt and 10° azimuth.

20Amp thermal differential controller operates 12” AC air handling unit at 3660 CFM to distribute energy evenly throughout the facility.

Site Description and Load

- Heated structure houses large scale diesel equipment for county road maintenance and snow removal.
- It is kept above 55°F to permit cold weather diesel engine ignition and comfortable winter vehicle maintenance.
- Structure is of typical metal pole barn construction with standard insulation and large auto-bay doors.
- Served area is 29,250ft²

Production Estimate

Solar system provided more than 20MMBtus of utilized thermal energy during a partial year of data-logging from December 2010 through June 2011. Additional thermal energy was supplied to the structure from April 2010 through November 2010 which is not reflected here. Actual annual production for this system is far greater than the 20MMBtus employed here.

System Cost

$15,031
$751/MMBtu ($2.56/Watt)

Energy Savings and Financial Performance

Data was only available for partial year. Energy which was supplied between July 1st and November 30th was not datalogged and is not included here. Actual annual savings and return on investment will be substantially better than shown here.

| Value of 10 years thermal energy supplied (propane) | $8,265* (partial year production) |
| 25-year Internal Rate of Return (IRR) | 4.24%* (partial year production) |
| Years to cost recovery | 18* (partial year production) |

* First year fuel cost of $1.89/gal, annual fuel escalation rate of 5.32%, offsetting 80% efficient furnace, tax bracket of 0%.