



Northeast Solar
 Bringing Your Home/Business Into The Future

Solar BTU's per SF of horizontal area per month per day
Horizontal Insolation rate from Retscreen KWH/sq meter/day Providence, RI
50% to 70% solar panel efficiency. Flat plate solar panel collectors are more efficient in the warmer weather conditions and less efficient in cold weather conditions.

The below is the production of Natural Gas or oil in dollars produced from an eight solar panel system (256SF). These figures below are conservative monthly figures (30 days) system operating between 60 and 85% capacity due to adverse weather conditions. Overall system efficiency will be higher because of the combined heat delivery system or using one pipe to deliver heat from eight panels linked together. The bottom line number was multiplied by 5% due to system efficiency. Increasing the angle of inclination will have a greater impact of BTU output per month during the winter months.

Winter conditions will vary depending on snow cover (reflection from the snow) and summer conditions also will be higher due to an increase in panel efficiency during warm weather conditions. December and January have the most severe weather conditions and or lack of sunlight hours. Assuming natural gas is equivalent to \$2.00/gallon in home heating oil and identical operating efficiency of 80%. Calculations were done @ 140,000 BTU'S /gallon of oil and 100,000 BTU'S/therm. Fossil fuel devices have standby losses also present with solar however not costly and not factored into the below. Summer stand by losses are more costly than winter.

Newport, Rhode Island Separate climate data not used below: From the US Weather Bureau Daily Averages, BTU per Sq Ft of Solar Energy Received on a Horizontal Surface by Months below
 Jan 583 Feb 845 Mar 1196 Apr. 1,535 May 1,786 June 1,963 July 1,860 August 1,683 Sep. 1,358 Oct 1,092
 Nov. 668 Dec. 524. Average yearly insolation rate per day on a horizontal surface is 1,250 BTU's per Sq. foot.

The data below is from the computer program above and panel efficiency is from SRCC testing. Note: A drain back system and external heat exchanger is approximately 20% more efficient than a standard closed loop pressurized glycol system.

The below output is for eight 4x8 standard flat-plate collectors:

	BTU'S/Sq Ft of Collector Area/Day	\$ in natural gas or oil saved/month	Panel Effi
January	583	\$44.18	.50
February	845	\$68.20	.50
March	1,196	\$101.57	.50
April	1,536	\$137.49	.55
May	1,786	\$207.82	.60
June	1,963	\$259.03	.65
July	1,860	\$273.39	.70
August	1,683	\$211.75	.65
September	1,358	\$148.14	.60
October	1,092	\$131.72	.55
November	668	\$49.12	.50
December	524	\$37.02	.50

Calculation to achieve \$ in natural gas or oil saved/month

$$\left(\frac{S \times B \times 30 \times P}{112,000} \right) \times 2 = \$$$

Total For \$ Saved Per Year= \$1,635.28

Key: S= Square Foot of Collector Area
B= BTU'S/Sq Ft of collector area/day
30= 30 days (Month)
P= panel efficiency
112,000= BTU'S in a gallon of oil burned @ 80% efficient
2= \$2.0/gallon of oil
\$= in natural gas or oil saved or solar energy produced/month

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