State of New York
Public Service Commission

Energy Efficiency Portfolio Standard (EEPS) **Case 07-M-0548**

New York Standard Approach for Estimating
Energy Savings from Energy Efficiency Programs
90 Day Program Single Family Residential Measures
Notice Soliciting Comments dated October 22, 2009.

November 23, 2009

Dear Secretary Brilling,

EarthKind Energy, Inc. and its subsidiary, EarthKind Solar, have been actively designing and installing solar thermal systems in New York State. Earthkind Energy's joint venture partner in EarthKind Solar, Phoenix Sonnewarmer AG, has completed over 40,000 residential installations throughout Europe.

EarthKind Energy has also participated in solar thermal monitoring programs for residences in New York State. Our comments are based on experience in New York, as well as those of our joint venture partner throughout the world.

The TechMarket Works approach used for estimating savings from solar thermal is flawed. This is particularly unfortunate since this same estimation approach has been used throughout the Energy Efficiency Portfolio Standard proceeding. The result has been the consistent undervaluation of solar thermal as a measure that can provide long term energy savings to the citizens of the state.

On page 69, the report references using F Charts to predict performance, using a study a 30 year old study from 1977. The use of these factors fell into disfavor after computer software was developed that utilizes F factors and other calculation engines to better predict performance.

The equations utilized by TechMarket Works are fairly elaborate, but appear to double-count loses, and clearly reach erroneous conclusions . Water consumption estimates are calculated using 25 year old data from Canada. Based on the TechMarket results presented, a standard 2 collector system for a family of 4 would be ineligible for the Federal Tax Credit, since it does not meet the 50% energy reduction standard. Clearly this is not the case.

The errors from using this antiquated calculation methodology also include inappropriately factoring in the efficiency of the backup tank. Third party, independently verified software exists that cost effectively and more accurately predicts solar thermal systems performance.

There is no reason why New York State should not avail itself of the current evaluation technology, instead of relying on a method that the industry - and most other states - have abandoned.

Appended is the analysis for Albany using the Ret Screen Software for Albany. Instead of the TechMarket identified solar faction of 29.6%, the third party independently-verified software shows the result to be 57%.

A similar result of 56.7% is obtained from the software program T Sol (attached). In addition we have appended a typical OG 300 analysis for a 2 collector system for Albany, showing their projected solar fraction of 56%.

The results of the Techmarket approach are inaccurate and show consistently lower results than industry accepted modeling programs. New York State should reject this estimating method and utilize available computer modeling tools.

We suggest considering RET Screen, since it is independently-verified, third party software that utilizes collector testing data, along with NASA historical weather averages, to much more accurately predict the performance of solar thermal systems.

Using RETScreen or a similar computer modeling program, will allow the consultant to avoid unnecessary, cumbersome, complicated, and error-prone calculations.

Sincerely,

Ron Kamen

Senior Vice-President

SOLAR WATER HEATING CERTIFICATION AND RATING

SRCC OG-300

CERTIFIED SOLAR WATER HEATING SYSTEM

SUPPLIER: **Solene**
927 Fern Street Suite 1500
Altamont Springs, FL 32701 USA
(407) 831-1941
(407) 831-1208 Fax

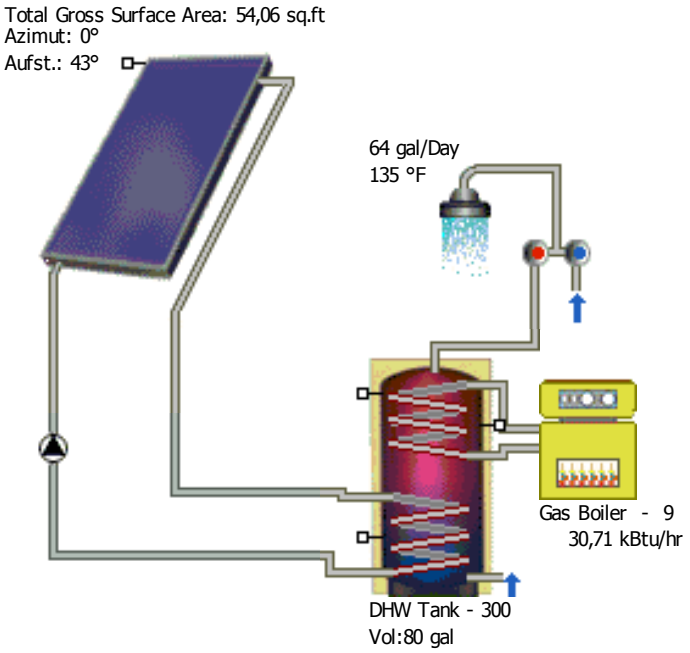
SYSTEM NAME: Solene/Chromagen DC Closed Loop

SYSTEM TYPE: Indirect Forced Circulation

LOCATION: NY-ALBANY

Description: Glazed Flat-Plate, Differential Controller, Wrap Around Internal Heat Exchanger with a Double Wall and Positive Leak Detection, No Load Side Heat Exchanger , Freeze Tolerance: -10 F, Fluid Class II, Electric Auxiliary Tank

System Model_name	Cert 300#	Cert Date	Collector Panel Manufacturer	Collector Panel Name	Total Panel area(Sq-m)	Total Panel area(Sq-ft)	Solar Tank Vol (l)	Solar Tank Vol(g)	Aux Tank Vol(l)	Aux Tank Vol(g)	SEF	Annual Savings (kWhr)	Annual Solar Fraction
SLCR64DC-80HE	2006003C	17-MAR-06	Solene	SLCR-32	5.9	64	303	80			3.3	2754	.57
SLCR80DC-80HE	2006003D	17-MAR-06	Solene	SLCR-40	7.4	80.1	303	80			5.5	2997	.62
SLCR60DC-80HE	2006003E	17-MAR-06	Solene	SLCR-30	5.6	60.6	303	80			3.1	2689	.56
SLCR64DC-120HE	2006003F	07-NOV-08	Solene	SLCR-32	5.9	64	454	120			2.6	2692	.56
SLCR80DC-120HE	2006003G	07-NOV-08	Solene	SLCR-40	7.4	80.1	454	120			3.5	2956	.62



Results of Annual Simulation

Installed Collector Power:	11,99 kBtu/hr	
Installed Gross Solar Surface Area:	54,056 sq.ft	
Collector Surface Area Irradiation (Active Surface):	24,38 MBtu	492,35 kBtu/sq.ft
Energy Produced by Collectors:	10,54 MBtu	212,88 kBtu/sq.ft
Energy Produced by Collector Loop:	9,43 MBtu	190,37 kBtu/sq.ft
DHW Heating Energy Supply:	14,84 MBtu	
Solar Contribution to DHW:	9,43 MBtu	
Energy from Auxiliary Heating:	7,34 MBtu	
Natural Gas (H) Savings:		**17.020 cu.ft**
Natural Gas (H) Savings:		**172,01 therm**
CO2 Emissions Avoided:		**2.247,23 lbs**
DHW Solar Fraction:		**56,2 %**
Fractional Energy Saving (EN 12976):		**56,2 %**
System Efficiency:		**38,7 %**

Basic Data

Climate File

Location:	Albany NY
Climate Data Record:	"Albany NY"
Total Annual Global Radiation:	4,69 MBtu
Latitude:	42,75 °
Longitude:	73,8 °

Domestic Hot Water

Average Daily Consumption:	64 gal
Desired Temperature:	135 °F
Load Profile:	Detached House (evening max)
Cold Water Temperature:	February:58 °F / August:58 °F
Circulation:	No

System Components

Collector Loop

Manufacturer:	Phönix SonnenWärme AG
Type:	Infinity 323
Number:	2,00
Total Gross Surface Area:	54,056 sq.ft
Total Active Solar Surface Area:	49,514 sq.ft
Tilt Angle:	43 °
Azimuth:	0 °

Bivalent (Twin Coil) DHW Tank

Manufacturer:	T*SOL Database
Type:	DHW Tank - 300
Volume:	80 gal

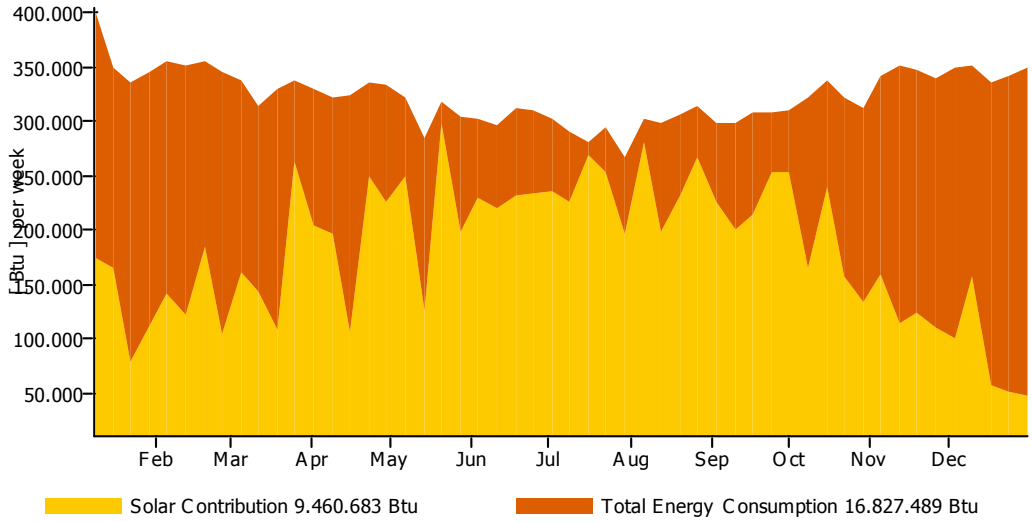
Auxiliary Heating

Manufacturer:	T*SOL Database
Type:	Gas Boiler - 9
Nominal Output:	30,71 kBtu/hr

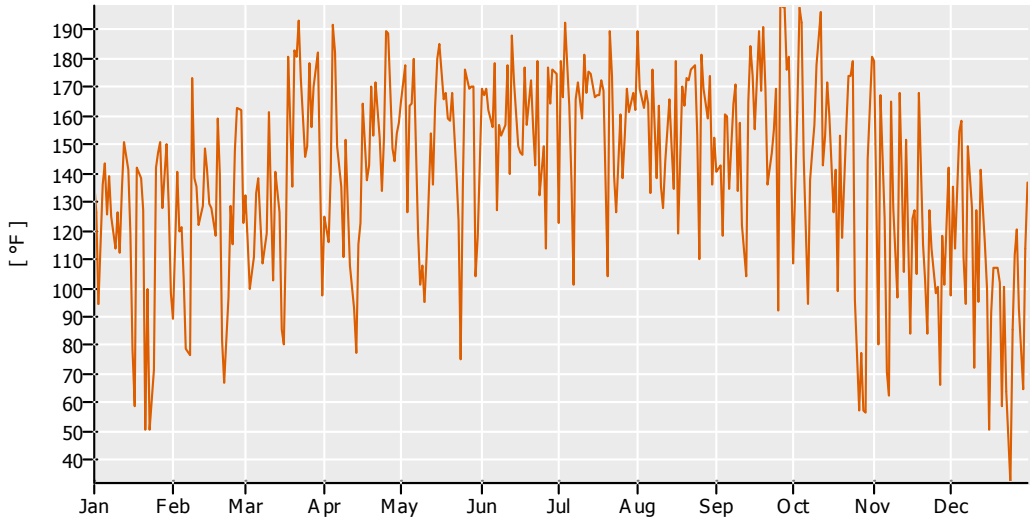
Legend

Original T*SOL Database
With Test Report
Solar Keymark

Solar Energy Consumption as Percentage of Total Consumption



Daily Maximum Collector Temperature



These calculations were carried out by T*SOL Pro 4.5 - the Simulation Programme for Solar Thermal Heating Systems. The results are determined by a mathematical model calculation with variable time steps of up to 6 minutes. Actual yields can deviate from these values due to fluctuations in climate, consumption and other factors.The system schematic diagram above does not represent and cannot replace a full technical drawing of the solar system.

RETScreen Energy Model - Heating project

Heating project

Technology		**Solar water heater**				
Load characteristics						
Application	☐ Swimming pool ☉ Hot water					
	Unit	**Base case**	**Proposed case**			
Load type		House				
Number of units	Occupant	4				
Occupancy rate	%	100%				
Daily hot water use - estimated	gal/d	63				
Daily hot water use	gal/d	88	88			
Temperature	°F	130	130			
Operating days per week	d	7	7			
☐ **Percent of month used**						
Supply temperature method		Formula				
Water temperature - minimum	°F	38.4				
Water temperature - maximum	°F	55.9				
	Unit	**Base case**	**Proposed case**	**Energy saved**	**Incremental initial costs**	
Heating	million Btu	22.2	22.2	0%		
Resource assessment						
Solar tracking mode		Fixed				
Slope	°	45.0				
Azimuth	°	0.0				
☐ **Show data**						
Solar water heater						
Type		Glazed				*See technical note*
Manufacturer		TecMarket				*See product database*
Model		per report				
Gross area per solar collector	ft²	30.92				
Aperture area per solar collector	ft²	28.97				
Fr (tau alpha) coefficient		0.75				
Fr UL coefficient	(Btu/h)/ft²/°F	0.74				
Temperature coefficient for Fr UL	(Btu/h)/ft²/°F²	0				
Number of collectors		2	2			
Solar collector area	ft²	61.84				
Capacity	kW	3.77				
Miscellaneous losses	%					
Balance of system & miscellaneous						
Storage		Yes				
Storage capacity / solar collector area	gal/ft²	1				
Storage capacity	gal	57.9				
Heat exchanger	yes/no	Yes				
Heat exchanger efficiency	%	90.0%				
Miscellaneous losses	%	2.0%				
Pump power / solar collector area	W/m²					
Electricity rate	$/kWh					
Summary						
Electricity - pump	MWh	0.0				
Heating delivered	million Btu	12.6				
Solar fraction	%	57%				
Heating system						
☐ Project verification		**Base case**	**Proposed case**			
Fuel type		Electricity	Electricity			
Seasonal efficiency		80%	80%			
Fuel consumption - annual	MWh	8.1	3.5	MWh		
Fuel rate	$/kWh	0.180	0.180	$/kWh		
Fuel cost	$	1,462	628			

Project information

See project database

Project name	TechMarket
Project location	Albany
Prepared for	
Prepared by	
Project type	Heating
Technology	Solar water heater
Analysis type	Method 1
Heating value reference	Higher heating value (HHV)
Show settings	☑
Language - Langue	English - Anglais
User manual	English - Anglais
Currency	$
Units	Imperial units

Site reference conditions

Select climate data location

Climate data location	Albany
Show data	☑

	Unit	Climate data location	Project location
Latitude	°N	42.8	42.8
Longitude	°E	-73.8	-73.8
Elevation	ft	292	292
Heating design temperature	°F	2.1	
Cooling design temperature	°F	85.6	
Earth temperature amplitude	°F	38.8	

Month	Air temperature	Relative humidity	Daily solar radiation - horizontal	Atmospheric pressure	Wind speed	Earth temperature	Heating degree-days	Cooling degree-days
	°F	%	kWh/m²/d	kPa	mph	°F	°F-d	°F-d
January	21.4	71.2%	1.77	100.7	9.8	19.7	1,334	0
February	24.1	68.5%	2.64	100.7	10.1	22.9	1,129	0
March	34.3	64.8%	3.62	100.6	10.7	32.3	932	0
April	46.6	61.2%	4.66	100.4	10.5	45.4	535	0
May	58.1	65.7%	5.48	100.5	9.0	57.7	195	251
June	66.6	69.7%	6.01	100.4	8.3	67.5	0	497
July	71.4	70.6%	6.05	100.5	7.6	71.7	0	664
August	68.9	74.1%	5.19	100.6	7.2	69.5	0	586
September	61.0	75.7%	4.11	100.8	7.4	61.5	103	329
October	50.0	72.4%	2.81	100.8	8.1	48.6	446	0
November	39.7	73.1%	1.71	100.7	9.4	37.2	740	0
December	27.1	74.0%	1.41	100.7	9.6	25.9	1,155	0
Annual	47.6	70.1%	3.79	100.6	9.0	46.8	6,568	2,327
Measured at	ft				32.8	0.0		

Complete Energy Model sheet