Project information

See project database

Project name	Dubai Villa Pool
Project location	Arabian Ranches UAE
Prepared for	Stephan & Denise Jungen
Prepared by	FreeFuelForever.com
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	Metric units

Site reference conditions

Select climate data location

Climate data location	Dubai Intl Airport
Show data	☑

	Unit	Climate data location	Project location
Latitude	˚N	25.3	25.3
Longitude	˚E	55.3	55.3
Elevation	m	5	5
Heating design temperature	°C	13.2	
Cooling design temperature	°C	41.1	
Earth temperature amplitude	°C	14.7	

Month	Air temperature	Relative humidity	Daily solar radiation - horizontal	Atmospheric pressure	Wind speed	Earth temperature	Heating degree-days	Cooling degree-days
	°C	%	kWh/m²/d	kPa	m/s	°C	°C-d	°C-d
January	18.8	65.7%	3.90	100.5	3.4	22.1	0	273
February	19.7	64.9%	4.79	100.3	3.8	22.6	0	272
March	22.1	62.4%	5.31	100.0	3.8	25.0	0	375
April	26.1	55.4%	6.36	99.7	3.7	28.9	0	483
May	30.4	50.7%	7.27	99.2	3.9	33.1	0	632
June	32.5	56.4%	7.40	98.7	3.9	35.8	0	675
July	34.5	55.6%	6.94	98.5	3.9	37.2	0	760
August	34.8	54.3%	6.70	98.7	3.9	36.9	0	769
September	32.4	59.3%	6.21	99.2	3.6	34.8	0	672
October	29.1	60.0%	5.39	99.8	3.2	31.4	0	592
November	24.8	61.3%	4.32	100.2	3.2	27.6	0	444
December	20.9	65.5%	3.67	100.5	3.2	23.9	0	338
Annual	27.2	59.3%	5.69	99.6	3.6	30.0	0	6,285
Measured at	m				10.0	0.0		

Complete Energy Model sheet

RETScreen Energy Model - Heating project

Heating project

Technology		Solar water heater	
Load characteristics			
Application	◉ Swimming pool		
	○ Hot water		

	Unit	Base case	Proposed case
Type		Outdoor	
Area	m²	20.0	20.0
Cover use	h/d	0.0	0.0
Temperature	°C	29.0	29.0
Makeup water	%/w	5%	5%
Wind sheltering - season of use	%	15%	15%
Solar shading - season of use	%	10%	10%

Percent of month used

Supply temperature method		Formula	
Water temperature - minimum	°C	24.3	
Water temperature - maximum	°C	29.9	

	Unit	Base case	Proposed case	Energy saved	Incremental initial costs
Heating	MWh	38.6	38.6	0%	

Resource assessment

Solar tracking mode		Fixed
Slope	°	30.0
Azimuth	°	0.0

Show data

Solar water heater

Type		Evacuated		$ 5,400	*See technical note.*
Manufacturer		Tsinghua			*See product database.*
Model		16 tube U Pipe			
Gross area per solar collector	m²	1.62			
Aperture area per solar collector	m²	1.33			
Fr (tau alpha) coefficient		0.57			
Fr UL coefficient	(W/m²)/°C	1.11			
Temperature coefficient for Fr UL	W/(m - °C)²	0.008			
Number of collectors		9	9		
Solar collector area	m²	14.58			
Capacity	kW	8.38			
Miscellaneous losses	%	3.0%			

Balance of system & miscellaneous

Heat exchanger	yes/no	No
Miscellaneous losses	%	5.0%
Pump power / solar collector area	W/m²	10.00
Electricity rate	$/kWh	0.120

Summary

Electricity - pump	MWh	0.3
Heating delivered	MWh	10.3
Solar fraction	%	27%

Heating system

	Base case	Proposed case		
Project verification				
Fuel type	Electricity	Electricity		
Seasonal efficiency	100%	100%		$ -
Fuel consumption - annual	38.6 MWh	28.4 MWh	MWh	
Fuel rate	0.120 $/kWh	0.120 $/kWh	$/kWh	
Fuel cost	4,636 $	3,405		

Emission Analysis

Base case electricity system (Baseline) Country - region	Fuel type	GHG emission factor (excl. T&D) tCO2/MWh	T&D losses %	GHG emission factor tCO2/MWh
Canada	Natural gas	0.384	8.0%	0.417

GHG emission

Base case	tCO2	16.1			
Proposed case	tCO2	12.0			
Gross annual GHG emission reduction	tCO2	4.1			
GHG credits transaction fee	%	0.0%			
Net annual GHG emission reduction	tCO2	4.1	is equivalent to	0.8	Cars & light trucks not used

GHG reduction income

GHG reduction credit rate	$/tCO2	0.00

Financial Analysis

Financial parameters

Inflation rate	%	7.0%
Project life	yr	25
Debt ratio	%	0%

Initial costs

Heating system	$	5,400	100.0%
Other	$	0	0.0%
Total initial costs	$	5,400	100.0%
Incentives and grants	$		0.0%

Annual costs and debt payments

O&M (savings) costs	$	
Fuel cost - proposed case	$	3,441
Other	$	
Total annual costs	$	3,441

Annual savings and income

Fuel cost - base case	$	4,636
Other	$	50
Total annual savings and income	$	4,686

Financial viability

Pre-tax IRR - assets	%	31.5%
Simple payback	yr	4.3
Equity payback	yr	3.7

Cumulative cash flows graph