Solar Hot Water Overview
Delaware Commercial For Profit Business

April, 2017

ECOTERMIC

SOLAR UNLIMITED

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Solar Hot Water Concepts - Introduction

Three Building Blocks of Solar Thermal

- Solar Collectors – 4’x8’ or 4’x10’
  - Each Solar Collector is rated by the International Energy Agency at 2 to 2.5 KW-thermal.
  - Each Solar Collector Reduces CO2 by 2000 to 3000Kilograms per Year
- Heat Transfer Station
  - Heat Transfer Stations Contain Pumps, Heat Exchangers, and Controls to Transfer Heat and Manage the System.
  - Scalable from 10 to 200 KW-thermal.
- Solar Tank – **Atmospheric** Stainless Solar Tanks are the Preferred Long-Lasting Solar Tank
- Made in the USA

Solar Thermal Applications

- Office Buildings
- Dormitories and Hotels
- Schools
- Hospitals
- Cafeterias
- Fitness Centers and Child Care Centers
- Maintenance Facilities
- Dairy Farms

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Solar Hot Water Concepts – the Solar Collector

Solar Collectors

SolarHot Solstice Collector – 4'x8' or 4'x10'

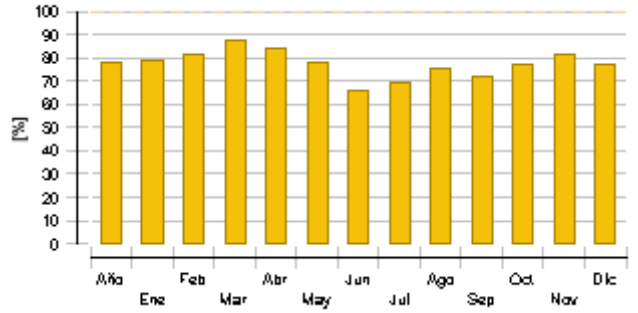
- Designed Specifically for Hot Water Heating
- Highly Rated By SRCC
- Made in USA

Hospital Hot Water - Example

- Example – Hospital, Mexico City
- 30 SolarHot Solstice 4X8 Solar Collectors Projected to Provide over 75% of Yearly Hot Water for both the Childrens and the Nursing Buildings.
- Reduce the consumption of gas by the Hospital's Steam Boilers by 1 Million Megajoules each Year.
- Reduce Production of CO2 by the Steam Boilers by 200,000 Kilograms (441,000 lbs) each Year.

Month By Month Solar Contribution

Fracción solar: porcentaje de energía solar al sistema [SFn]



72 Roof Mounted SolarHot Solstice 4X10s

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Solar Hot Water Concepts – the Large Facility Solar Heat Transfer Station

Unique Commercial and Industrial Solar Heat Transfer Stations

- Unique in Solar Thermal Industry
- Three Scalable Sizes
- Customizable
- Made in USA

This Heat Transfer Station Will Manage up to 100 Solar Collectors

Solar Collector Interface

- Two Top Facing Pipes Connect to Solar Tank
- Two Top Facing Pipes Connect to Solar Collectors on Roof

Solar Hot Water Interface

- Two Side Facing Pipes Connect to Solar Tank
- Two Side Facing Pipes Connect to Building Hot Water System

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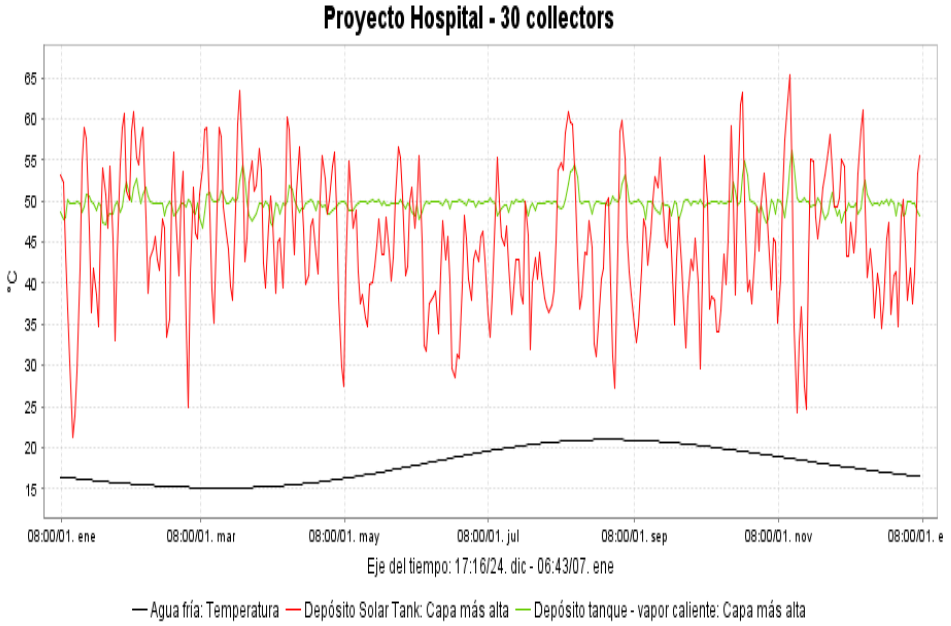
Solar Hot Water Concepts – the Solar Tank

Atmospheric Solar Tanks

- 14 gage of 16 gage stainless steel
- Customizable – any size or shape
- Cost is 65% less than a pressurized storage tank. Made in USA

Picture Customized Atmospheric Solar Tank Waiting For Shipment from SolarHot. The Tank Shown is 11,000 Liters (2,900 gals). The most common size is 2,500 (660 Gals) to 5,000 (1,320 gals) Liters.



Dormitory Example

- Black Line – Ground Water Temperature in Mexico City
- Red Line – Atmospheric Solar Tank Temperature – shows the contribution of solar hot water over a full year
- Green Line – Existing Hot Water Tank Temperatures – Note that The Solar Tank Can be Hotter than the Conventional Tank

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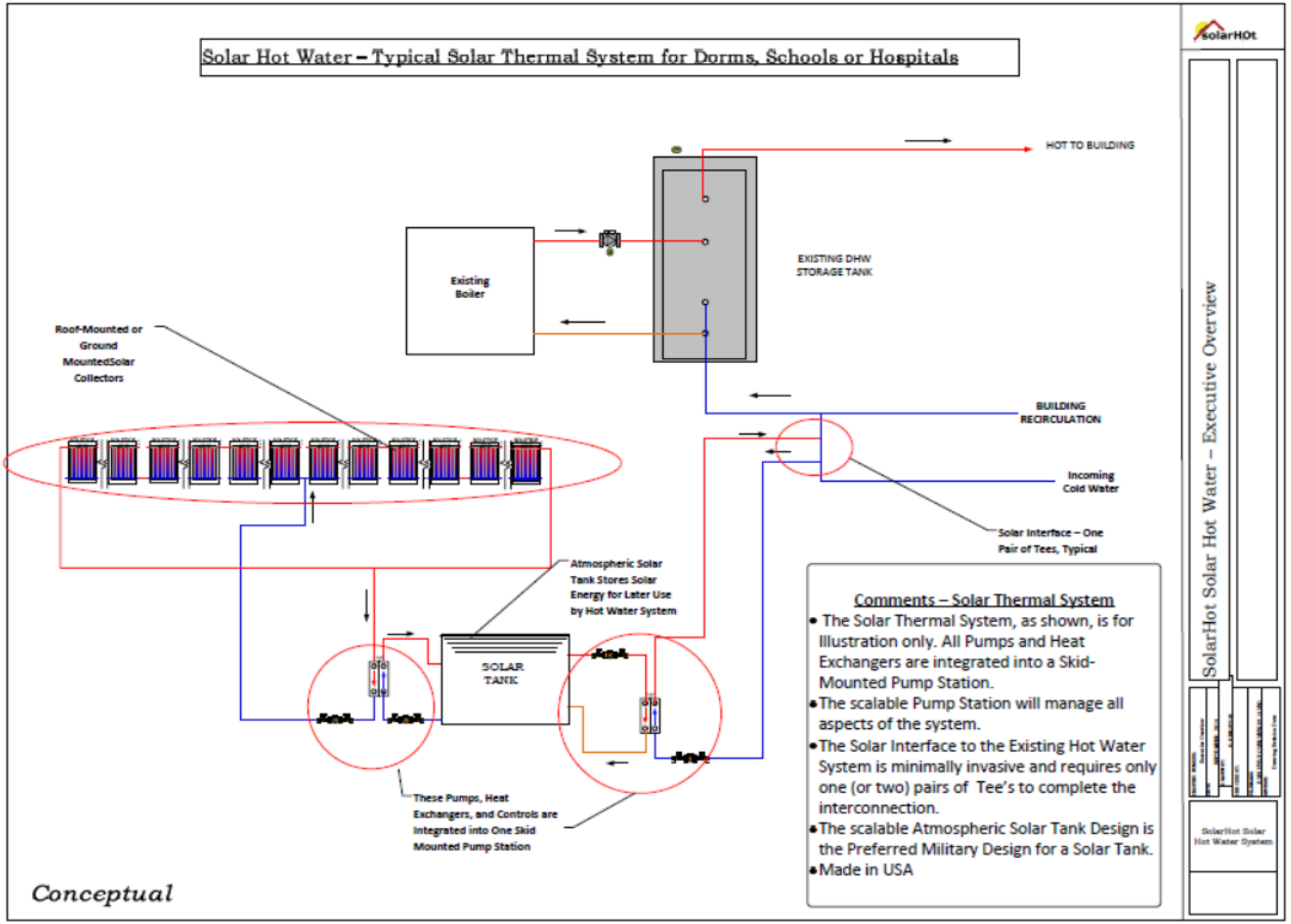
Pulling the Components into a Solar Hot Water System



What is the Financial Story?

SOLAR UNLIMITED North America Inc.

Delaware Commercial For Profit Business Solar Hot Water Financial Projection

Year	1	2	3	4	5	6	10	15	20
Estimated Total System Price [1]	$180,000								
Less:									
Federal Tax Credit [2]	-$54,000								
USDA REAP Grant [3]	$0								
Delaware Grant [3]	-$75,418								
Other Incentive [3]	-$20,000								
Loan [3]	-$21,861								
Depreciation (MACRS - 6 Yrs) [4]	-$8,721	-$13,954	-$8,372	-$5,023	-$5,023	-$2,512	$0	$0	$0
Net Investment	**$0**	**-$28,113**	**-$50,981**	**-$70,844**	**-$91,059**	**-$109,120**	**-$175,061**	**-$266,532**	**-$375,906**
Loan Payment - from Configuration Sheet	$1,701	$1,701	$1,701	$1,701	$1,701	$1,701	$1,701	$1,701	$0
Steam Maintenance Savings/Yr [6]	-$12,000	-$12,240	-$12,485	-$12,734	-$12,989	-$13,249	-$14,341	-$15,834	-$17,482
Energy Cost Savings Per Year [5]	-$3,861	-$3,958	-$4,056	-$4,158	-$4,262	-$4,368	-$4,822	-$5,455	-$6,172
Annual Cost/(Savings):	-$14,159	-$14,496	-$14,840	-$15,191	-$15,550	-$15,916	-$17,462	-$19,588	-$23,654
Cumulative Cost/(Savings):	**-$14,159**	**-$42,609**	**-$65,821**	**-$86,035**	**-$106,608**	**-$125,036**	**-$192,523**	**-$286,120**	**-$399,560**

Financial Foot Notes

1. The total installed system price is an estimate until additional data is available. Cost is based upon 30 4'x10' collectors.

2. The **Federal Tax Credit** is 30% of the solar project investment with no limit and can be carried back one year and carried forward 10 years or more. **The Tax Credit reduces the cost basis 15% for depreciation.**

3. **USDA Rural Energy for America Program** (REAP) Grant is guaranteed loan financing and grant funding to agricultural producers and rural small business for solar renewable hot water energy systems.

What funding is available?

a. Grants for up to 25% of total eligible project costs.
b. Combined grant and loan guarantee funding up to 75% of total eligible project costs.

Delaware Grant: Here's how it works: A grant application is submitted with an engineer-sealed Polysun engineering configuration. The Grant will pay $1 per Kilowatt of solar up to 50 percent of the total installation cost

Other Incentives: Visit www.dsireusa.org.

Loan: Delaware Sustainable Energy Utility loan terms are up to 20 years in length, interest rates begin at 2% and the borrowing enity must be credit worthy.

4. The **Modified Accelerated Cost Recovery System** (MACRS) has a "Class life" of 6 years: Yr 1. 20%, Yr 2. 32%, Yr 3. 19.2%, Yr 4. & 5. 11.52% each, Yr 6. 5.76%. Depreciation is based upon the project Total Cost. The tax savings are based upon Federal tax savings of 25% marginal rate and 3.5% effective marginal rate for the State of Delaware. The state and Federal marginal rate is 28.5%.

5. **Natural Gas Energy** cost per the University of Delaware's energy audit from May 2015 through April 2016 averaged $0.563/therm. Since April 2016 the price of Natural Gas has increased 13.8%. You should expect a cost increase when your contract renews.

6. **Annual Steam Maintenance Savings**: This is based upon an estimate by Francis Winnington, GM, Apex Piping Systems, Boiler Division. The combination of contaminants and **usage** are the primary factors that lead to the repalcment every 3 to 5 years of the steam traps, steam control valves and even the heat exchangers. A solar hot water system will reduce the consumption of steam and there by, reduce the circulation of contaminants that are embedded in the steam system. A solar fraction (the percentage of annual hot water from the solar collectors) of 70% can produce a **savings of 60% of steam maintenance cost**. The steam maintenance savings exceeds the energy savings by 300% in this example.