SPECIFICATION
Data Sheet

DAWN SOLAR

PRODUCT NAME

Solar Fueled Combined Heat & Power (CHP) System

MANUFACTURER

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PRODUCT DESCRIPTION

Basic Uses
The Dawn Solar CHP System is an architecturally integrated system used to collect and distribute solar-heated water and solar electricity (photovoltaic) from a shared and common roof or wall area. The electricity from the integrated photovoltaic panels can be used in all conventional grid tied and off grid applications. The solar thermal energy collected can be used to heat or pre-heat domestic and process water requirements for domestic use or space heating or process heating.

The concept uses the Patent Pending Dawn Solar System Model 3004 collector installed with minimum pitch of 1:12. The exposed surface of the solar thermal collector incorporates a photovoltaic (PV) panel from one of several established manufacturers.

The Dawn Solar CHP System should be considered whenever performance requirements demand solar electricity and solar water heating, and architectural design criteria dictate building integrated systems. Energy savings depend on several project specific factors and can be predicted by computer modeling. Factors that influence system effectiveness are the energy distribution systems in the building, length of heating season, utility rates for heating, system slopes and orientation.

In all instances the system is assembled on site and installed on existing or new structures in conformance with local requirements. The system is supplied with a minimum 300 square foot area that is configurable in a variety of shapes (see Table). Depending upon weather and site variables, a 300 square foot system will supply hot water preheating for a typical 4 person household and have a rated capacity of a nominal 1500 - 2500 watts (STC). Electrical ratings of each PV system will vary as a function of each systems configuration.

The CHP System is supplied complete with all materials necessary to achieve a waterproof installation that will serve as a hardened component of a buildings envelope. The solar thermal system is terminated at a multiport manifold, ready for connection to circulating and storage systems provided by others. The PV system is supplied with connections ready for connection to main electrical systems typically provided by others. Applications are limited only by the designer's creativity.

Ideal applications include:
- Roofing + siding installations with slopes from 1:12 – 21:12
- Shade Structures
- Car Ports
- Patio Awnings
- Retail Awnings
- Residential
- Industrial
- Hospitals
- Schools and gymnasiums
- Arenas
- Laboratories
- Maintenance facilities
- Government and military buildings
- Warehouses
- Theaters and conference centers
- Restaurants

Major system components may include:
- Roof Panels
- PV panels, PV Laminates, PV tiles
- Flashings, purlins, misc. hardware
- Temperature sensors, controls, manifolds
- Trim and closures

Envelope Composition and Materials
The CHP System incorporates 24 gauge galvalume steel as the roofing/siding material, fiber cement PV panels or "PV Tiles" such as those manufactured by Unisolar, GE, Sharp, Kyocera, Elk and others.

Sizes and Profiles
The overall thickness of the CHP System is~2.75", not including flashings that may project 2" above or below the system as a function of site specific variables. Sample widths and lengths are contained in the table below. Large scale implementations are easily achieved by installing systems in parallel or series. Architectural details can easily be accommodated.

Color and Finish
With a metal envelope, a choice of 23 colors is available in Kynar 500® or Hylar 5000® based finishes for collector panels and accent components. (Request color chart or chips). PV Tiles and Fiber cement PV panels come in one standard color.

Limitations
The performance of a solar energy system is heavily dependant upon site specific construction, weather conditions and latitude and they are not designed to entirely replace conventional water heating, space heating or electrical supplies. Consult local codes for applicable standards in all applications.

TECHNICAL DATA

Applicable Standards
Solar Thermal Collector System: The underlying technology for

building integrated solar thermal collector applications has been the subject of extensive testing by The National Renewable Energy Laboratory of the U.S. Department of Energy and the Florida Solar Energy Center (FSEC), a research institute of the University of Central Florida. Certified product performance data that can be used for applications modeling is on file at FSEC and the Solar Rating and Certification Corporation (SRCC).

Exterior Finish Materials
DS-CHP systems can be installed under the following exterior finishes:
Standing Seam roofing
Metal siding
Fiber Cement PV Panels
PV Roofing Shingles
Tile PV Panels

Metal Roofing and Siding Materials
Metal envelopes typically incorporate Kynar 500® or Hylar 5000® based finishes tested by paint supplier for:
- Desc.: Method: Durability: Substrates
- Gloss ASTM-D-523-85 20-30 @ 60° steel and aluminum.
- Pencil Hardness ASTM-D-3363-74 HB-H steel and aluminum.
- Flexibility T-Bend ASTM-D-4145-83 1-T steel and aluminum.
- Flexibility T-Bend ASTM-D-4145-83 2-T steel.
- Mandrel ASTM-D-1737-85 no cracking steel and aluminum.
- Adhesion ASTM-D-3359-87 no adhesion loss steel and aluminum.
- Reverse Impact ASTM-D-2794-84 no adhesion loss, steel and aluminum
- no cracking.
- Falling Sand ASTM-D-968-84 100 liters per mil. DFT steel and aluminum.
- Mortar Resistance ASTM-C-267 no effect steel and aluminum.
- Acid Pollutants AAMA-605.2-91 <5 units color change steel and aluminum.
- Acid Rain Kesternich 10 cycles min. steel and aluminum.
- Alkali Resistance ASTM-D-1308-87 no effect steel and aluminum.
- Salt Fog ASTM-B-117-85 passes 3000 hours aluminum.
- Salt Fog ASTM-B-117-85 passes 1000 hours steel.
- Humidity ASTM-D-2247-87 passes 3000 hours aluminum.
- Humidity ASTM-D-2247-87 passes 1000 hours steel.
- Color Retention ASTM-D-822-86 passes 3000 hours steel and aluminum.
- S. Florida Exposure ASTM-D-2244-85 max. 5 units change steel and aluminum.
- Chalk Resistance ASTM-D-659-86 min. rating of 8 steel and aluminum

Environmental Considerations
The Dawn Solar CHP System is a renewable energy collection system that benefits the environment by:
- Harvesting ~2KW as heat (STC rated Thermal Equivalent) and ~1.5-2 KW of solar energy (STC rating) as electricity per nominal 300 square foot of system coverage area
- Collecting solar thermal energy that is suitable for water and space heating
- Reducing annual CO2 production by offsetting fossil fuels and electricity with solar energy
- Utilizing components that contain recycled material and are recyclable.
- Projects with this technology may qualify for LEED TM credits in renewable energy, optimizing energy performance, recycle content, recyclability and other areas.

INSTALLATION

The CHP System is typically installed on a plywood deck that is properly engineered, framed and flashed into a structure or built as a free-standing mounting structure (all provided by others). The system is pre-engineered and then site assembled from components delivered in kit form to the project site. The configuration of the system will accommodate existing penetrations in roofs and openings in walls. No cranes or rigging are required. Installation manuals and project specific installation drawings are available.

AVAILABILITY & COST

Availability
The Dawn Solar CHP system is available through dealers, distributors and direct from the manufacturer.

Cost
Systems costs are highly competitive with single mode solar thermal and PV systems. Significant economies are achieved due to integrations into building structures. Maintenance costs are lower than single mode products due to system simplicity. Contact product distributors for current pricing on systems. Many state and federal incentives are available.

WARRANTY

The solar thermal system carries the Dawn Solar System 25 year warranty. The standing seam roof material carries the manufacturers 30 year warranty. The Photovoltaic component of the system carries the manufacturers 20 year warranty.

MAINTENANCE

Dawn Solar CHP Systems are virtually maintenance free, requiring annual services similar to conventional HVAC Systems. Periodic testing of the glycol fluids in the closed loop solar thermal collector is required.

TECHNICAL SERVICES

Complete technical information and literature and design services are available from Dawn Solar Systems Inc.

Many state and federal incentives are available.