Decision 82 04 020 APR - 6 1982

ORIGINAL

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of Solar Edwards, Inc. for exemption from certain checklist requirements of Decision Nos. 92251, 92501 and 92769.	Application 61086 (Filed November 30, 1981)

OPINION ON MINIMUM SIZE OF A SOLAR WATER HEATER

On September 16, 1980 we issued Decision (D.) 92251 establishing demonstration solar financing programs for Pacific Gas and Electric Company, San Diego Gas & Electric Company, Southern California Edison Company, and Southern California Gas Company. We subsequently modified this decision by D.92501, December 5, 1980, and D.92769, March 3, 1981. In these decisions we specified a checklist of requirements for domestic solar water heaters. Solar water heaters must meet all sizing and checklist requirements to be eligible for the solar financing program effective March 1, 1981.

By its Application 61086 filed November 30, 1981, Solar Edwards, Inc., (Solar Edwards) requested eligibility and certain exemptions from the checklist requirements established by D.92251, 92501, and 92769.

Solar Edwards' Request

Solar Edwards manufactures a flat-plate thermosyphon unit consisting of a collector with storage tank attached directly above it. Water circulates without an electric pump. However, an electric heating freeze protection device is needed in California's occasionally freezing climate.

Solar Edwards requests eligibility in the program based on minimum system sizes proposed by it, as well as exemption from certain checklist requirements, including the one that requires freeze protection by a means other than heat.

Solar Edwards also believes that the use of a conventional electric backup water heater is not necessary because there is an electric auxiliary heater in the Solar Edwards storage tank.

Freeze Protection

Solar Edwards proposes to use electric energy for freeze protection in its solar water heaters. It is the policy of the Energy Conservation Branch (ECB) of the Commission solar water heating systems should make the minimum possible use of nonrenewable sources of energy such as electricity consistent with cost-effectiveness. For this reason, the ECB staff opposes use of electricity either directly or indirectly for freeze protection.

Solar Edwards argues that an exemption to allow electric freeze protection is appropriate in its case because its thermosyphon system even with electrical freeze protection will use less electricity than solar water hearing systems with electric pumps which have already been approved for participation in the OII 42 program. ECB staff recognizes there are savings in electric energy use gained by avoiding use of electric circulator pumps.

The ECB staff notes that no other system of freeze protection appears practical for Solar Edwards' system. However, the ECB staff believes that at installations above 2,300 feet elevation, the energy losses associated with electric freeze protection will substantially negate the gains from solar energy. Therefore, the ECB is willing to grant eligibility to Solar Edwards' system with electric freeze protection, only for locations below 2,300 feet elevation.

Tempering Valves

Solar Edwards requests exemption from the checklist requirement that its system have a tempering valve. The ECB maintains that safety considerations dictate that all installations, including Solar Edwards', include tempering valves to automatically mix cold water with hot water from the solar tank if the water temperature is above the temperature setting of the valve. Water

in excess of 130 degrees can scald an adult. Even lower temperature water can be hazardous to children. Hot water should not be allowed to exceed 140 degrees at any domestic faucet.

Weight

A third issue concerns the weight of Solar Edwards systems on rooftops. The ECB notes that the 80-gallon Model L-305 weighs 950 lbs. when full and the 112-gallon Model L-440 weighs about 1,300 lbs. A roof must have the structural capability to support the weight of the unit(s) to be installed. The ECB recommends that Solar Edwards systems be roof-mounted only where the roof is, or may be made, capable of bearing the additional weight. The checklist requires such analysis above 10 pounds per square feet (psf). Furthermore, Solar Edwards should carefully comply with the requirement of securing building permits for its installations.

Sizing

It was hoped that a usable standard performance test would be available to evaluate this application in time for this decision. However, it appears that while a national standard comparative test is forthcoming, it is not usable in its present form to predict performance of individual systems in California. In the absence of such a test, Solar Edwards suggested that the Commission adopt sizing criteria similar to that adopted by the

Commission in prior decisions for comparable systems. The ECB supports this recommendation until the results of the Commission's monitoring program establish otherwise. The ECB recommends that the minimum sizing criteria for Solar Edwards' L-305 and L-440 systems be set as follows:

Number of Bedrooms	Number of Panels	Storage Tank Capacity (gallons)
1	2	80
2	2*	80
3	3	80*
4	3	112**
5	Two x 2-Br. Rqmt.	Two x 2-Br. Rqmt.
6	Two x 3-Br. Rqmt.	Two x 3-Br. Rqmt.

* A third panel is required on 2-bedroom installations and a 112-gallon tank is required on 3- and 4-bedroom installations if the system is oriented more than 60 degrees from true south or the tilt angle is more than 45 degrees from the horizontal, or the installation is a one-tank system (auxiliary heating within the solar storage tank).

** Except in San Diego Inland (Zones 10 and 15) where only an 80-gallon storage tank will be required.

Specific Exemptions

Solar Edwards requests exemption from certain checklist items for the reason that these items are inapplicable to its thermosyphon system. The requested exemptions concern requirements related to closed loop systems or electric circulator pumps. The ECB staff concurs with Solar Edwards request. In prior decisions, we directed the ECB to recommend the granting of exemptions to the quality and safety standards only if such exemptions would in no way decrease system quality or safety. Therefore, we have determined that the following numbered items should not apply to Solar Edwards thermosyphon systems (and need not be answered for system eligibility):

Appendix A: 5, 11, 12, 19, 20, 22, 23, 24b, 24c, 35, 46, 47, 48, 49 and 50.

Appendix B: 3, 7d, 8 and 9.

ECB Monitoring

We direct ECB staff to evaluate Solar Edwards solar systems based on the monitoring objectives set forth below:

a. Determine whether the systems are large enough to provide at least 60% of the metered usage of conventional energy for water heating including adjustments for amount of hot water consumed.

b. Implement the monitoring program in households which the ECB considers likely to use 300 therms of natural gas per year (or an equivalent amount of electricity) for water heating.

The ECB will evaluate the performance of Solar Edwards systems through the monitoring of eight systems randomly picked by the ECB, including four in warm climate areas and four in cold climate areas. Two systems in each climate area shall be served with natural gas and two with electric backup.

The system-monitoring program will last a minimum of nine months with interim reviews. After six months of monitoring, if any of the eight solar systems is not displacing 60% of conventional energy use (according to data extrapolated over 12 months), then the ECB staff will discuss these results with Solar Edwards and develop a recommendation to upgrade all future installations in similar locations to avoid disqualification from the program.

ECB and Solar Edwards agree that systems with electrical backup will be monitored with three meters: a water meter to determine the volume of hot water used, an electric meter to measure electricity consumption, and a second electric meter to measure freeze protection energy use. (On natural gas backup systems, a gas flow meter will be used to measure conventional

energy use.) This monitoring equipment will be used to estimate the energy consumption of the conventional water heater before the solar retrofit, and to determine whether the solar system is displacing 60% of that energy.

ECB staff has discussed with Solar Edwards these and other technical issues and performance-monitoring questions. ECB is satisfied that reasonable supporting data is available for Solar Edwards to proceed as a participant in the Demonstration Solar Financing Program based on the following conditions (as used below, "Solar Edwards" refers to Solar Edwards, Inc. and/or its installers):

a. Solar Edwards' electric heat freeze protection for its solar systems will be permitted only in locations below 2,300 feet elevation

b. Solar Edwards' standard 5/10-year warranty will cover system repair or replacement due to damage by freezing wherever installed.

c. Solar Edwards will assure that functioning backup gas or electric water heaters are not removed or disconnected except as provided in d. or e. below. In no case shall a residence be converted from gas water heating to electric water heating.

d. Solar Edwards will instruct customers to turn off pilot lights on gas backup water heaters during summer months.

e. Solar Edwards will instruct customers to turn off electric backup water heaters during summer months.

f. Solar Edwards will recommend installation of time clocks on all electric backup water heaters.

g. Solar Edwards will not install its units on any roof that is not capable of supporting the added weight. Solar Edwards will also secure all necessary building permits for any installation.

h. Solar Edwards will install valves on all systems for flushing purposes. If the accumulation of hard water deposits in the system causes a serious loss of system efficiency, Solar Edwards agrees to assist customers purchasing its open loop systems in flushing and removing hard water deposits from the system. No charge will be made for such service during the first five years.

i. Solar Edwards retains the right to examine, on a monthly basis, the data gathered from the monitoring of its systems.

j. Solar Edwards retains the right to ask the CPUC to adjust system performance results if needed to account for deviations from expected solar insolation levels and expected hot water consumption during the monitoring period.

Solar Edwards and its installers will meet the minimum quality and sizing criteria as contained in D.92251, 92501, and 92769 and all subsequent decisions (including checklist items A-6 and A-34 regarding independent operation and tempering valves), and will meet the standards of the California Energy Commission's Solar Energy Tax Credit Guidelines when installing the L-305 and L-440 units. Solar Edwards and its installers will size systems according to the chart on page 4. Results of a full system test carried out for evaluation of its own system or for compliance with state solar tax credit requirements will be submitted to ECB staff. ECB reserves the right to alter sizing requirements prospectively based on results of such a test when modified by a method to be developed to reflect California conditions.

Solar Edwards also agrees that any reference to this order in its correspondence, marketing literature, or media advertising must contain the following full text of this Disclaimer of Product Endorsement:

> "The California Public Utilities Commission in no way endorses, recommends, or warrants the durability, suitability, or the reliability, or the short- or long-term energy savings performance of this or any other brand of system or component for domestic water heating or any other application".

While this disclaimer is applicable to any system under our demonstration program, we must be certain that this order is not viewed by the public as an implied endorsement.

We believe that public hearings would serve no useful purpose. This application should be granted ex parte to the extent provided in the following order.

Findings of Fact

1. Solar Edwards systems need to comply with applicable checklist standards regarding independent operation in order to maintain high levels of quality and safety.

2. The electric freeze protection of the Solar Edwards system provides acceptable freeze protection up to an elevation of 2,300 feet.

3. Solar Edwards systems may reasonably be expected to displace 60% of conventional energy use when sized as previously discussed.

Conclusions of Law

1. The exemption requested by Solar Edwards regarding the need to install valving which permits independent operation of solar and backup systems is not reasonable and would result in systems of lower quality and lesser safety.

2. The exemption requested by Solar Edwards regarding freeze protection is reasonable and would not be contrary to the overall program goals.

3. The numbered checklist exemptions discussed on page 5 are inherently not applicable to the Solar Edwards thermosyphon water heater.

4. The following order should be effective the date of signature in order to allow participation in the solar financing program and competition with other solar manufacturers at the earliest time.

O R D E R

IT IS ORDERED that:

1. Solar Edwards' flat plate thermosyphon solar hot water heater is hereby eligible to obtain utility financing in the OII 42 program subject to the conditions set forth below.

2. The exemptions requested by Solar Edwards, Inc. (Solar Edwards) to checklist requirement A-6 and A-34 are denied. Thus, Solar Edwards shall be required to provide valving allowing the independent operation of both solar and conventional two-tank systems.

3. Solar Edwards' system is eligible only for installations at less than 2,300 feet elevation. For such installations below 2,300 feet elevation, the firm is hereby granted its requested exemption to checklist requirement B-7c regarding freeze protection.

4. Solar Edwards is hereby granted exemption from checklist items listed on page 6 of this decision.

5. Solar Edwards' eligibility for utility financing under the OII 42 program is conditional on the firm's full acceptance and compliance with the specified conditions including the use of the Disclaimer of Product Endorsement.

6. Except as granted and provided, Solar Edwards and its contractors shall adhere to all other currently effective installation requirements set forth in D.92251, 92501, and 92769 or subsequent orders in this proceeding.

This order is effective today.

Dated APR 6 1982, at San Francisco, California.

JOHN E. BRYSON
President
RICHARD D. GRAVELLE
LEONARD M. GRIMES, JR.
VICTOR CALVO
PRISCILLA C. GREW
Commissioners

I CERTIFY THAT THIS DECISION WAS APPROVED BY THE ABOVE COMMISSIONERS TODAY.

Joseph E. Bodovitz, Executive Director