

ORIGINAL

Decision 93593 OCT 6 1981

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of TRENDSETTER
 INDUSTRIES for exemption from
 certain checklist requirements of
 Decision Nos. 92251, 92501 and
 92769.

Application 60346
 (Filed March 12, 1981)

O P I N I O N

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. 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 letter to George Anaroli of the Energy Conservation Branch (ECB) of March 2, 1981, which was docketed as Application 60346, on March 12, 1981, Trendsetter Industries (Trendsetter) requested exemption from the following checklist requirement of D.92251, Appendix B:

"C-14 The solar system piping must be at least three-quarter inch type L copper pipe or CPVC or PVDF plastic tubing where permitted by local codes."

This requirement has been modified to 3/4"- type M copper pipe or better and has appeared in all subsequent versions of the checklist, most recently as Number 14 in Appendix A of D.92769 dated March 3, 1981. A Commission decision is required for any checklist or specification modifications that do not relate to alternative freeze protection methods or non-flat-plate collector systems.

Trendsetter requests use of 1/2" copper pipe between the solar collector tank and the panels on both supply and return lines as discussed below.

Trendsetter's Position

Trendsetter manufactures a drain-back system which not only does not need 3/4" pipe but which will be adversely affected by it. Its system uses a small high head pump which pulls water from a nonpressure storage tank, pumps it to the panels, and then returns the water to the tank. When the pump turns off, the water drains from the piping and the panels back into the tank which

obviously requires that when the pump turns on, it must have sufficient head to lift the water from the tank to the highest point in the system.

Trendsetter has determined that, once water flow is established through the panels and enters the return piping, the weight of the water in the return pipe can create a sufficient siphon effect to lift the water from the tank to the highest point, thereby reducing the load on the pump, provided that the return line can be completely full of water. The normal flow rate for a two-panel system is 2 gpm which will fill a 1/2" pipe but which will not fill a 3/4" pipe.

It is difficult for Trendsetter to create the desired siphon action if a 3/4" pipe is used. Trendsetter's system provides a patented air vent at the tank which works to let small quantities of air in and out of the system and also to exchange air and water in the tank as the panel and siphon system is filled and drained.

Trendsetter's patented tanks will also meet the local fire code and local building codes for minimum health and safety standards.

Trendsetter contends the following:

- a. Its systems use patented siphon systems to assist in the circulation of solar heated water. No loss in panel efficiency can occur from mineral deposits in tubes, since Trendsetter's dealers will use only distilled or deionized water in the solar loop.
- b. Trendsetter's siphon system saves space with "piggy bank" design; there is no need for two tanks on the floor. Its solar tank can be installed outdoors since it has foam insulation.
- c. It uses a single wall type "L" copper heat exchanger with nontoxic water as recirculation fluid for high efficiency and has positive freeze protection with drainback.
- d. Proper application of Trendsetter's unit can produce over 60% (net) of a family's domestic hot water energy use for eligibility in the demonstration program in California.

Staff Position

The Commission adopted checklist does not permit the use of 1/2" piping due to efficiency losses, especially following eventual accumulation of mineral deposits in pipes. Staff is persuaded, however, that through the use of distilled or deionized water in the circulator loop Trendsetter may avoid the problems anticipated by the ECB.

ECB is persuaded by Trendsetter's analyses that its systems have the potential of meeting the program performance criteria. By using its patented gravity circulation techniques with an electric pump, and 1/2" copper piping Trendsetter's units may, through proper sizing, save 60% of the energy as required. However, ECB proposes that the Trendsetter units which are monitored serve households using 300 therms per year for water heating or the electric equivalent use to best establish their practical use in California. Each installation must yield 60% net energy savings established by a rigorous monitoring program in randomly selected installations. The installations selected will be at the sole discretion of the ECB.

Discussion

In D.92251 we specifically directed the staff to evaluate under a monitoring program "the extent to which solar water heating can be relied upon to provide adequate and reliable supplies of energy". We then adopted, in D.92501, a checklist by which the installer of each system must certify that the system will deliver a net 60% solar fraction. We also required the staff to evaluate applications for exemptions to the rules.

ECB evaluations of Trendsetter equipment will be based on the monitoring objectives set forth in Table 1.

Solar domestic water heating systems monitored in California prior to our signing requirements have yielded solar fractions well under 60% as installed under uncoordinated industry methods. These units appear to be too inefficient to produce worthwhile savings for their users or for ratepayers.

Table 1

Objectives of Program to Monitor
Trendsetter Solar Water Heaters

- o The system must be large enough to provide at least 60% of the actual usage of conventional energy for water heating.
- o The monitoring system testing shall be carried out with households which have been determined by the ECB to have used 300 therms of natural gas or a comparable amount of electricity per year for water heating.
- o In households where less than 300 therms per year or equivalent is used, Trendsetter systems will be eligible for the program provided the solar contribution is at least 60%.

The ECB has established its method for monitoring of eight systems to include four picked at random by it in a warm climate area and four picked at random by it in the colder climate areas. Two systems in each area shall be served with natural gas and two with electric backup.

Trendsetter contends that with its patented siphon system it can meet the OII 42 60% net solar contribution criteria. Trendsetter agrees that where its patented gravity circulation system is not sufficient to meet the 60% solar contribution criteria, it will upgrade prospectively all similar noncomplying Trendsetter systems in that area and all future similarly situated installations. If proven effective in upgrading the solar system performance, this upgrading will include the reconnection of original existing conventional hot water heaters in solar water heating systems installed since March 1, 1981, at Trendsetter's expense, within one month or reasonable period thereafter.

ECB and Trendsetter agree that systems with electrical backup will be fitted for monitoring with two electrical meters and one water flow meter. The water meter will be used to determine family hot water use in gallons. One electric meter will be used to monitor pumping power and the second electric meter will be used to measure electric backup energy requirements. The same monitoring

equipment will be used to establish actual electric conventional hot water heating energy consumption. A 60% net savings over the actual measured consumption will be required of solar systems for OII 42 compliance.

On natural gas backup systems a gas flow meter will be used for measurement of natural gas backup fuel use. Other metering will be the same as for the electric backup systems.

On natural gas backup systems each kilowatt-hour of electricity used for freeze protection will be converted into a base resource energy and added to the system auxiliary backup usage.

ECB staff has met with representatives of Trendsetter to resolve these and other technical issues and performance specifications questions. ECB is satisfied that Trendsetter has provided reasonable supporting data to proceed as a participant in the Demonstration Solar Financing Program based on the following conditions:

- a. Trendsetter will meet the minimum quality and sizing criteria as contained in D.92251, 92501, and 92769 and all subsequent decisions.
- b. Trendsetter reserves the right to ask for modifications of the above requirements pending system monitoring results.

- c. Trendsetter may use 1/2" copper pipes between the solar collector tank and the panels on both supply and return lines provided that no tap water is used in these lines. Only distilled or deionized filtered water may be used in the heat exchanger loop. Two tablespoons of nontoxic emulsifying oil will be added for additional corrosion protection.
- d. Trendsetter and/or its representatives will instruct customers to turn off pilot lights on gas water heaters during summer months.
- e. Trendsetter will recommend installation of time clocks on all systems that use electricity as auxiliary backup.
- f. Trendsetter and/or its representatives will instruct customers to turn off the auxiliary electric backup during summer months.
- g. To evaluate on-site hot water heating conventional performance, Trendsetter reserves the right to request monitoring results of base energy use when the Trendsetter solar system is monitored not to exceed one month at a time, including the option to do this in different seasons.
- h. If the accumulation of hard water deposits should occur in the system and cause a serious loss of system efficiency, Trendsetter agrees to assist customers in flushing and removing the hard water deposits from the system. No charge will be made for such service during the first five years.

- i. Trendsetter reserves the right to request adjustment of system performance results if needed to account for deviations from:
 - 1) Expected insolation levels (unusual climate), and
 - 2) Expected water consumption during the monitoring period.
- j. Any reference by Trendsetter to this order in correspondence, marketing literature, or media advertising must contain the full text of the following disclaimer.

"Disclaimer of Product Endorsement

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

While this disclaimer is applicable to any system under our demonstration program, it is important to set it out here because of the exemption being requested by Trendsetter, to remove any doubts on whether or not this order would constitute an implied endorsement.

- k. The Commission acknowledges that the Trendsetter collector system has certain innovative features which may allow it to perform in a manner similar to other solar domestic water heating systems which regularly qualify for installation under the demonstration solar financing program.

We agree with ECB's position and the agreement it has reached with Trendsetter as set out above.

ECB recommends the application be granted ex parte. We believe that public hearings would serve no useful purpose.

Findings of Fact

1. Trendsetter systems may reasonably be expected to supply 60% net energy savings over nonsolar consumption as previously discussed.

2. It is reasonable to allow Trendsetter to use 1/2" copper pipes between the solar collector tank and the panels on both supply and return lines provided that no tap water is used in these lines. Only distilled or deionized water may be used in the heat exchanger loop.

Conclusions of Law

1) The exemptions requested by Trendsetter are reasonable and should be granted subject to the agreements between ECB and Trendsetter as previously discussed.

2) The following order should be effective the date of signature in order to allow Trendsetter to participate in the solar financing program at the earliest time.

O R D E R

IT IS ORDERED that:

1. Trendsetter Industries (Trendsetter) is granted the requested exemption, to Appendix B, Item C-14 of D.92251, to use 1/2" copper piping.

2. The exemption requested is granted subject to Trendsetter's full acceptance and compliance with the requirements specified by ECB and its agreement with ECB as specified, including the Disclaimer of Product Endorsement.

3. Except as granted and provided, Trendsetter and its contractors shall adhere to all other currently effective installation requirements set forth in D.92251, 92501, and 92769.

This order is effective today.

Dated OCT 6 1981, at San Francisco, California.

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

I certify that this decision was approved by the above Commissioners today.

John E. Bryson

