

Decision No. _____

ORIGINAL

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Joint Investigation by the Public)
 Utilities Commission and the Energy)
 Resources Conservation and Develop-)
 ment Commission into the availability)
 and potential use of solar energy in)
 California. PACIFIC GAS AND ELECTRIC)
 COMPANY, SAN DIEGO GAS AND ELECTRIC)
 COMPANY, SOUTHERN CALIFORNIA GAS)
 COMPANY, LOS ANGELES DEPARTMENT OF)
 WATER AND POWER, SACRAMENTO MUNICIPAL)
 UTILITY DISTRICT, AND CITY OF SANTA)
 CLARA MUNICIPAL ELECTRIC DEPARTMENT,)
 Respondents.)

CPUC Case No. 10150
 ERCDC No. 76-R&D-1
 (Filed August 3, 1976)

(Appearances are listed in Appendix A.)

O P I N I O N

On August 3, 1976 the California Public Utilities Commission (PUC) and the California Energy Commission (CEC) issued a joint order instituting an investigation to determine and evaluate the solar energy activities of utilities and others for the purpose of adopting rules or appropriate orders to encourage and accelerate the development of solar energy.

During the period from September 1976 to February 1978, a total of 24 days of hearing were held at such locations as San Francisco, Sacramento, Los Angeles, and San Diego. The matter was submitted on February 18, 1978 upon the receipt of briefs, which provided for findings and conclusions.

Joint findings and conclusions were filed by both Commission staffs. The only other filings were made by Pacific Gas and Electric Company (PG&E), San Diego & Electric Company (SDG&E), Southern California Edison Company (SCEC), and Southern California Gas Company (SoCal).

The focus of evidence with respect to the technological issues presented in connection with this proceeding has been on-site thermal uses - particularly solar water heating and solar space conditioning. The second major subject area explored by this proceeding was the question concerning which programs and services should be provided by the private sector, the public utilities, and/or the government in order to promote the use of solar energy in the State of California.

While specific findings and conclusions are set forth below, the extensive material presented in this proceeding has demonstrated the following propositions:

1. Solar water heating and passive solar space conditioning systems are technically mature and will provide a reliable source of energy for California consumers.

2. It is clear that solar water heating and passive solar space conditioning systems can be designed to be cost-effective.

3. It is vital that solar energy use be implemented on a large-scale basis now, so that should future energy shortages occur and/or the prices of fossil fuels escalate further, there will be a reliable, established and competitive source of energy to which California consumers may turn.

4. Natural gas is the most desirable backup fuel for solar energy systems where it is available. It is also the best transitional energy source until solar energy use becomes widespread. Natural gas is clearly preferable to electricity for water and space heating and its use should be maximized for solar backup purposes (see PUC Decision No. 89177).

5. There is a serious need for improved means by which to inform and protect consumers of solar energy products.

6. There are many appropriate programs and services which utilities, as well as the private sector and government, may implement to promote the commercialization of solar energy in California.

There are two questions concerning the appropriate role of utilities in solar energy which will not be resolved by today's

order. All issues concerning utility involvement in the sale and leasing of solar devices will be resolved in the decision resulting from PUC Order Instituting Investigation No. 13.

The second unresolved issue concerns the mechanism by which to create long-term, low-interest solar financing programs for the benefit of utility customers. The staffs of the two Commissions have recommended that the PUC order the utilities to finance solar systems purchased by utility customers that are designed for essential uses for which electricity and/or natural gas would otherwise be required. However, subsequent to the submission of briefs in this case, several things have occurred which cause us to want to consider this matter further. The Legislature has passed and the Governor has signed a bill which would mandate the PUC to "investigate the feasibility of alternative methods of providing low-interest, long-term financing of solar energy systems for utility customers, including, but not limited to, direct financing by investor-owned utilities and conventional financing through banks, savings and loan associations, or other sources." (AB 3247, Calvo.) Further, the Legislature has passed and the Governor has signed a bill which allows, State-chartered savings and loan associations to extend first mortgages for purposes of financing solar energy systems. (AB 2225, Young.) We believe further study of this issue is required and the staff of the PUC will be directed to prepare an Order Instituting Investigation concerning this entire matter.

Finally, it should be noted that the original Order instituting this investigation called for consideration of legislative programs to encourage solar energy implementation. A multitude of legislative proposals addressing many of the issues discussed herein were introduced and acted upon in the recently concluded session of the California Legislature. The staffs of both Commissions analyzed these bills and both Commissions expressed their views with respect to various solar bills. We have therefore excluded specific recommendations on legislative proposals in this order.

We make the following findings and conclusions:

I. GENERAL CONSIDERATIONS

Findings

1. Solar energy is a renewable resource. Unlike oil, natural gas, or coal, solar energy will always be available. The use of solar systems will allow the State to reduce its dependence on nonrenewable energy resources and allocate those scarce resources to applications for which there are no adequate substitutes.
2. Solar energy is an exceptionally clean, safe, and environmentally sound resource. These attributes represent a powerful advantage over nonrenewable fuels and must be considered in decisions to commit resources to solar energy. Increased use of solar energy would reduce dependence upon those conventional energy sources which cause serious environmental and safety concerns.
3. Once a solar system is installed, the user is less subject to unpredictable fuel price increases. With the possible exception of maintenance and replacement costs, solar systems provide cost stability for their users. This cost stability is important to consumers and businesses and is particularly beneficial to citizens on fixed incomes. The economic health of the State would be greatly improved if such a secure source of inflation-free energy were provided.
4. Since the end use applications of solar thermal energy are decentralized, it creates few of the costs and problems which are associated with large-scale development of new oil and gas supplies or electric power plants. In addition, when solar thermal energy is substituted for electricity or natural gas, the thermodynamic quality of the energy is closely matched to its end use and additional peak period transmission and generation costs are reduced or eliminated.
5. The widespread development of the solar industry has a tremendous potential to create jobs for Californians. This industry is relatively labor intensive (per unit of delivered energy) when compared to conventional energy delivery systems. Studies of solar job potential have been performed

by the Lawrence Berkeley Laboratory, the Employment Development Department and the California Public Policy Center and these studies are in general agreement on this potential. Moreover, these newly created jobs will generally not require individuals with extensive technical training. Thus solar energy's greatest beneficial impact on the labor market will probably fall on the construction and trade workers.

6. Solar water heating systems and passive design applications are technologically mature and are ready for commercial applications.

Conclusions

1. The State should promote the rapid, widespread implementation of solar energy systems, particularly passive space conditioning and active solar water heating systems.
2. The two Commissions should declare their intention to selectively employ the resources of the State and the State's utilities to promote the rapid, widespread installation of solar energy systems, particularly passive space conditioning and active solar water heating systems.
3. The two Commissions should designate solar energy, along with conservation, as a preferred element of supply planning to meet California's future needs.
4. The two Commissions should adopt a joint Solar Implementation Plan to serve as the basis for the State solar program.

II. COST-EFFECTIVENESS OF SOLAR ENERGY SYSTEMS

Findings

1. Solar energy is now cost-effective for certain uses. It will become more cost-effective as the technology and the industry develop and as other energy sources become increasingly expensive. In addition, solar applications must be developed now to fulfill future needs.

2. The great expense of developing new conventional energy supply systems is not fully reflected in the present cost of conventional fuel to the consumer.
3. The direct and indirect subsidies given to traditional energy supply systems may make these conventional sources appear unrealistically attractive relative to solar energy.
4. Future supplies of conventional fuels are uncertain. As these supplies diminish, their prices will rise and alternative energy sources clearly become more cost-effective. Renewable energy sources must be developed now to prepare for future scarcities of expensive conventional fuels upon which California currently depends.
5. Since solar systems are typically more expensive to install, but less expensive to operate, than conventional systems, it is necessary to employ some form of life-cycle costing when comparing the costs associated with these differing energy technologies.
6. Many of the analyses submitted by the utilities in this proceeding were submitted before the 55 percent solar tax credit was enacted. (AB 1558, Calif. Stat. of 1977, Ch. 1082.) This tax credit substantially enhances the cost-effectiveness to the participating solar system customer.
7. Taking the solar tax credit into account, we find:
 - a. Both active solar water heating and passive space conditioning systems are cost-effective when compared to the replacement costs of conventional fuels (e.g., new supply sources for natural gas).
 - b. Both active solar water heating and passive space conditioning systems are cost-effective when compared to the average costs of electricity.
 - c. Some combined active space and water heating solar systems are now in operation in California and their installed costs have varied widely. Some of these systems appear to be cost-effective when compared to the use of electricity and natural gas from new supply sources.

8. In addition to the advantages described in Finding 7, there are numerous other benefits to these solar applications which are not easily quantifiable. (See General Considerations, supra.) These additional benefits should be considered by the two Commissions in their determination of the total costs and benefits of solar systems to the people of California.

Conclusion

The State of California should promote the widespread adoption of active solar water heating systems and passive space conditioning designs. Utilization of these and other solar applications should be encouraged in part through the use of tax credits and other incentives to promote the optimal rate of solar implementation for essential uses.

III. PASSIVE SOLAR ENERGY APPLICATIONS

Findings

1. Of the solar technologies considered in these hearings, passive design features are among the most promising applications for space conditioning because of their low costs, simplicity, and performance. These design techniques can be employed in both residential and nonresidential buildings.
2. Passive designs are not novel. In general, passive systems represent a return to previous design practices suited to an era of high energy costs, but with modern materials and architectural designs.
3. Passive design features can be incorporated into new construction with little change in construction costs, but these design aspects may be more difficult to retrofit.
4. Passive designs can replace most of the normal heating and cooling load in many California regions. Since active solar cooling technology is still immature, passive designs currently represent the best means to reduce cooling load. Because cooling loads are a major portion of California's electric peak load and this peak load contributes significantly to the costs of power production, the widespread usage of passive designs could be of major benefit to California.

5. The Legislature considers the rapid development of passive solar technology in California to be a high priority. (AB 1512, Calif. Stat. of 1977, Ch. 1081.)
6. Since passive design techniques involves an adaptation of building designs to local climatic conditions, both improved climatic resource information and experimentation with a wide variety of passive applications throughout California's diverse climate zones would assist in determining the optimal design for each region.
7. Builders and developers have expressed little interest in deviating from present practices due to the tight housing market in new construction.
8. CEC is required by statute to develop standards for new residential and nonresidential buildings to minimize energy consumption while not increasing the costs to the consumer over the lifetime of the structure.

Conclusions

1. The rapid, widespread adoption of passive designs is a critical part of California's energy future. CEC should accelerate the fulfillment of the passive solar portions of its legislative mandate and include these design features in standards for new buildings.
2. To assist CEC in developing and calibrating analytical design tools and to foster additional interest in passive designs among the architectural community and the general public, CEC and PUC should support the concept of regional passive design programs with appropriate financial incentives. These programs should include retrofit application to homes already built, as well as proposed new homes designed to incorporate passive solar features.
3. Passive solar medallion building programs should be developed (see Section IV. B.5.d.).

IV. UTILITY ROLES IN SOLAR ENERGY

A. Solar Financing

Findings

1. A long-term, low-interest solar financing program would eliminate the initial cost barrier and permit the consumer to pay for the solar system at a rate more closely approximating the rate at which benefits from the system are received. Such financing would enable the consumer to pay for the system with monthly payments which are closer to the dollar amount which would normally be paid to the utility company.
2. Both Commission staffs have recommended the establishment of a limited utility financing plan for solar systems purchased by utility customers which are designed for essential uses for which electricity and/or natural gas would otherwise be required.
3. The California Legislature has recently passed and the Governor has signed a bill to require the PUC to study the implementation of a financing program which provides long-term, low-interest solar financing to utility customers, and to consider all alternative funding sources, including utilities, banks, savings and loan associations, or any other source (AB 3247, Calvo).
4. The California Legislature has passed and the Governor has signed a bill which allows, State-chartered savings and loan associations to open up first mortgages for purposes of financing solar energy systems (AB 2225, Young).
5. A further investigation concerning the development of a long-term, low-interest solar loan program is necessary.

Conclusion

PUC staff should be directed to prepare for consideration of the PUC an Order Instituting Investigation into the alternative means by which it might implement a solar loan program for the benefit of utility customers in California.

B. Other Services Related to Solar Energy

Findings

1. Utility companies are capable of providing a range of other services related to solar energy equipment utilization.
2. The performance of such services by any utility should be subject to review and scrutiny by the Energy Conservation Branch of the PUC.
3. The actual dollar expenditure associated with the provision of such services should be subject to review by PUC in an appropriate rate case of the particular utility involved.
4. For ratemaking purposes, all reasonable and prudent expenditures incurred pursuant to the services discussed herein should be treated as allowable operating expenses rather than as additions to the rate base.
5. The other utility services related to the development of solar energy are:

a. Gas Priorities

Findings

1. Residential gas use, as defined in Decision No. 85189, is assigned the highest priority use in California.
2. Large multi-family residential complexes which use boilers in central heating plants under the current priority system in California do not enjoy the same priority accorded to single-family residential properties.
3. Assigning a higher priority to those large multi-family residential complexes currently assigned to a lower priority as well as commercial buildings which utilize solar energy as a primary source should accelerate the development of solar energy in California.
4. The utilization of solar energy in these situations should conserve, and thus provide, substantial additional gas supplies to lower-priority customers.

5. The use of solar energy systems as the primary source of energy for large residential or commercial complexes should, if properly sized, obviate the need for any other alternative backup source to obtain natural gas service.

Conclusions

1. The PUC should give special consideration, with respect to the assignment of gas priorities, to any large residential or commercial complex which utilizes solar energy systems for its principal source of energy.
2. All utilities should develop programs to advise their customers of the options and procedures available with respect to this issue.

b. Mastermetering

Findings

1. For large residential and commercial buildings, central boiler hot water systems appear to be the most amenable to the use of solar energy.
2. The program for individual metering of multi-unit residential complexes is designed to maximize the efficient use of natural gas for essential usages. This purpose can also be accomplished through the use of central solar heating systems with natural gas support energy wherever efficient and practicable.
3. For existing buildings, the addition of solar energy equipment to systems with a mastermeter may be a more effective conservation technique (that is, save more gas and/or be more cost-effective) than conversion to individual submetering without solar. Such tradeoffs should be considered by the PUC on an individual case-by-case basis.

Conclusions

1. Residential and commercial complexes which utilize solar water heating installations, together with other conservation measures, should be considered by the PUC for exemption from any requirement to convert to individual meters.
2. Such exemptions should be considered on a case-by-case basis after careful investigation and evaluation of an energy analysis for the given complex.

c. Line Extension Rules

Findings

1. The PUC is reviewing its line extension rules in Case No. 10260.
2. Solar energy use is beneficial because it reduces the need for new electric generating facilities and new gas supply projects.
3. Utilities should allow customers who install energy-saving solar systems to be granted the maximum allowance available under existing rules, as well as under any new measures adopted pursuant to Case No. 10260.

Conclusions

1. Main line extension credit rules currently favoring conventional supply sources should not be a disincentive to the use of solar energy.
2. The PUC should grant maximum line extension allowances to customers who install solar energy systems which significantly reduce the use of nonrenewable resources.

d. Solar Medallion Programs for New Construction

Findings

1. Incentives to builders, in addition to line extension credit rules, are needed to encourage the use of passive design features in new construction.

2. Historically, utilities have successfully offered financial incentive programs, such as "gold medallion homes," to encourage builders to equip new buildings with various appliances powered by conventional energy sources.
3. A "solar medallion" program may provide confidence to home buyers and needed financial encouragement to home builders to promote the use of passive solar technology.

Conclusion

Utilities, CEC, and other interested parties should present suggestions in appropriate proceedings for the development of "solar medallion" programs and other means for utilities to promote passive solar designs.

e. Load Management

Findings

1. Electricity, unlike natural gas, cannot be conveniently stored, but must be produced to match the actual level of demand. This demand level for electricity varies in regular cycles with both the time of day and the season of the year.
2. In California, the highest levels of demand (which are known as "peak periods") generally occur on summer afternoons primarily because of the associated cooling loads. Similarly, within each day the late nights have the lowest demand levels, primarily because of the lack of most human activities.
3. During these peak periods utilities operate their most expensive power plants, so the price of peak power is generally higher than during normal operating periods. Similarly, within each day, power is generally produced more cheaply in the late night periods.

4. In general, consumer costs would be lower if either demand were reduced during the peak periods through conservation measures or if some demand were shifted from peak periods to other times. Policies which promote more constant levels of power demand are known as "load management" strategies.
5. Passive solar houses can significantly reduce summer peak loads, along with reduced winter heating loads (see Section III above). Because of their impact upon summer cooling loads, these housing designs should be promoted as an integral part of load management policies.
6. Active solar systems are typically composed of a collection system, a circulating fluid, a circulating system (typically a pump), a storage system for thermal energy and a backup device fired by conventional fuels to assist the solar unit. Load management strategies can focus on the pump, the backup system, and/or the storage system.
7. If the backup water heating system is not powered by electricity, any solar system impact upon utility loads should be minimal.
8. If the backup water heating system is powered by electricity, the storage system can be used to shift electricity demand to off-peak levels. Policies to promote this shift may consist of interruptible rates to systems with demand control devices, time of use rates for systems with either time clocks, separate metering devices, and/or adequate sizing of the collector area and the storage capacity.
9. At the present saturation rate of solar systems, these devices have little impact upon the demand levels of utilities.
10. Even with a massive solar commercialization program, there will be time to determine the most appropriate load management strategies after some of the uncertainty about the impact of solar systems on utility load characteristics is resolved.

11. There are a variety of rate reform and load management policies under active consideration by the PUC and CEC. Since active solar system performance is highest on those sunny days when the cost of power production is highest, it is clear that electric rates for backup systems should not be set higher than other residential electric rates.

Conclusions

1. Electric backup rates should not be a disincentive to the use of solar energy.
2. The Commissions should promote the use of natural gas where available for solar backup. Where gas is not available and electricity is the best backup option, the consumption of electricity by these backup devices should be discouraged during peak periods. An integral part of these proposals should be the promotion of passive solar homes (see Section III).
3. The PUC and CEC shall reexamine the issue of load management for retrofit solar installations where electricity must necessarily be the backup energy source. Pursuant to this reexamination, all the electric utilities subject to the regulation of the two Commissions shall present concrete proposals for solar load management within 120 days.

f. Gas Rate Structure

Findings

1. The gas utilities under the jurisdiction of the PUC should continue to provide lifeline quantities of natural gas to customers with solar systems. To do otherwise would be discriminatory treatment of those who install solar equipment.
2. With a properly designed solar domestic water heating system, it is very likely that a customer would require no natural gas for water heating purposes during many months of the year.

Conclusions

1. Gas backup rates should not be a disincentive to the use of solar energy.
2. Gas utilities, under the jurisdiction of PUC, should continue to provide pre-solar installation lifeline quantities of natural gas to customers with solar systems.

g. Data Collection Information Programs

Findings

1. Collecting load survey and climate data to predict the effect that solar systems will have on future loads is a logical utility role.
2. It is important to develop a variety of solar information sources, including the utilities, in order to inform consumers of available solar energy alternatives.
3. A number of serious problems are associated with allowing utilities to independently gather and disseminate solar information.
4. Such problems include, among others, the potential duplication of effort, wasteful expenditure of capital, and potentially conflicting public information programs.
5. The need for a coordinated solar information program for consumers is clear.

Conclusions

1. Within 120 days, the utilities should submit to the executive directors of the two Commissions a full description of their existing and planned programs to collect and assess load survey and climate data relating to solar energy.
2. In order to expense the cost associated with any solar information program, a utility should provide the CEC and PUC with an opportunity to review and comment upon programs and material intended to be

employed in the solar information program, and provide both Commissions with copies of all programs and materials actually disseminated in its solar information program.

h. Service Calls

Findings

1. Utilities have long-term and consistent service relationships with their customers.
2. Utility service representatives currently provide a valuable service in times of conventional furnace and water heating failure and could also provide similar functions with respect to solar systems.
3. Utility service calls to determine solar system maintenance problems would not present a significant burden to ratepayers, since utilities now visit their customers' homes frequently by invitation. PG&E's records indicate, for example, that the company averages more than one utility service call per average household per year.
4. The serving utility should visit a customer's home when requested to assist the customer in isolating problems with a solar-assisted space and/or water heating system, and then refer the customer to his or her contractor to make needed repairs.
5. The utility should also assist the customer to ensure that the solar system warranty is honored by the contractor or manufacturer.

Conclusions

1. Utilities, under the jurisdiction of the PUC, should train their service representatives to identify problems and make minor repairs to solar-assisted space and water heating systems.

2. If a solar system malfunction requires extensive service and/or costly replacement parts, the utility should then direct the customer to qualified solar contractors.

C. Direct Utility Involvement in Sales, Leasing, and Ownership

Findings

1. The utilities appear to have a distinct and potentially unfair market advantage over others seeking to sell or lease solar energy devices.
2. While the utilities did not express plans to participate in the marketing of solar energy devices through most of this proceeding, at least two utilities (SDG&E and SoCal) have announced plans to enter the field.
3. Various representatives of the solar industry and consumer groups oppose the entry of the utilities into the sales, leasing, or ownership of solar equipment.
4. There are a number of unresolved issues concerning such utility roles, including the impact of utility involvement on the competitive nature of the solar industry; the relationship of solar marketing to other energy sources marketed by the subject utility; possibilities of subsidization of solar installations through the sale of other regulated fuels; and the means by which to develop large-scale use of solar energy devices as quickly and as inexpensively as possible. Resolution of these issues requires further investigation.

Conclusions

1. The PUC has authorized a further investigation into all issues concerning utility involvement in the sale and leasing of solar devices. (PUC OII No. 13.)
2. The CEC should authorize its staff to participate in the above proceeding.

D. Regulatory Response

Findings

1. It is vital that solar energy use be developed on a large-scale basis now, so that should future energy shortages occur and/or the prices of fossil fuels escalate further, there will be a reliable, established and competitive source of energy to which consumers may turn.

Conclusions

1. The imagination and vigor with which the utilities, under the jurisdiction of the PUC, implement the utility roles specified in Section IV-B above should be a significant factor in determining the appropriate rate-of-return in each utility's pending rate case.
2. The imagination and vigor with which the utilities implement the utility roles specified in Section IV-B, supra, should be seriously considered by the CEC in matters under its jurisdiction in all instances where such consideration is appropriate.

V. CONSUMER PROTECTION

A. Warranties

Findings

1. Solar energy systems that provide an essential service must be reliable. Warranties should offer meaningful assurance of the reliable provision of these essential services.
2. Consumer uncertainty regarding the reliability and durability of solar products is a major impediment to the rapid utilization of solar energy systems in residential and nonresidential buildings. Consumer reticence can be attributed to fears that solar products may not be safe, long-lasting, or efficient.
3. Potential purchasers of solar systems for water heating or space conditioning are understandably reluctant to make such an investment without meaningful assurance that they will receive a reliable product.

4. A warranty is only as strong as the business entity which offers it. Widespread occurrence of significant product failure combined with a high rate of business failure could seriously impair public confidence in the solar industry.
5. A solar warranty insurance fund, which pools the cost of business failure over the entire solar industry, would protect the purchasers of solar energy systems and strengthen public confidence in solar products, solar warranties, and the solar industry as a whole. Such an insurance fund would also strengthen the confidence and capability of small, new solar firms to guarantee the performance of their products.

Conclusions

1. Manufacturers and retailers of solar energy systems and components should be encouraged to guarantee the performance and operation of their products for a period sufficient to encourage consumers to confidently invest in solar energy systems. As part of the CEC's Testing and Inspection Program for Solar Equipment, the CEC should certify as durable and reliable only those systems or components which are accompanied by a 5-year full (parts and labor) manufacturer's warranty.
2. Both Commissions should support the creation of a solar warranty insurance fund to be sponsored by the State, the Federal government, or the solar industry.

B. Training and Licensing Installers

Findings

1. Installation of solar energy systems by trained, qualified, and licensed installers will boost consumer confidence in solar energy systems and help ensure proper performance of the systems.
2. Several recent programs to train solar installers have proven to be successful and have received an enthusiastic response. However, these training programs have been available to only a small number of eligible trainees.
3. Programs to train solar installers should be significantly expanded through trade associations, labor unions, state agencies, and colleges and universities.

4. Existing state contractors' licensing procedures do not currently provide training and skills requirements which specifically relate to solar energy systems and components. (Calif. Business and Professions Code Section 7000 et seq.)

Conclusions

1. The CEC should promote the expansion of solar installer training programs through expansion of labor union and trade association training programs, university and college training courses, and state agency-sponsored training workshops and related activities.
2. Both Commissions should encourage and assist the Contractors' State Licensing Board to clarify and simplify licensing procedures for installers of active and passive solar energy systems, and to include specific provisions relating to solar energy systems in the training and skills requirements for contractor's licenses.

C. Building Codes

Findings

1. Some state and local building codes can inhibit deployment of solar systems. Varying and inconsistent provisions in local building codes such as those regarding earthquake protection, aesthetic restrictions, or restrictions on the use of toxic substances in domestic hot water systems can inhibit the installation of some solar systems.
2. When solar systems are first introduced into a community, building officials are frequently unsure about how to evaluate solar applications in both retrofit and new construction. This initial uncertainty presents a significant barrier to consumers as well as to installers who seek to introduce solar systems into new market areas.
3. A Uniform Solar Building Code is one means to assure consumers that solar systems are properly sized and installed.

Conclusions

1. The CEC, in cooperation with the Department of Housing and Community Development, should continue to promote the development and adoption of a Uniform Solar Building Code.

2. The CEC, in cooperation with the Department of Housing and Community Development, should continue to develop training workshops and materials to inform local building officials about active and passive solar energy systems and related construction practices.

D. Ensuring Solar System Quality

Findings

1. Legislation enacted last year (AB 1512, Calif. Stat. of 1977, Ch. 1081) requires the CEC to adopt standards for the testing, inspection, certification, sizing, and installation of solar devices. The CEC adopted its first set of regulations pursuant to this authority in April 1978, and is continuing to develop additional standards in this area. These standards, which are being developed in cooperation with affected industry and consumer representatives, will encourage the use and development of solar energy and provide maximum information to the public concerning the quality, safety, durability, and performance of solar devices.
2. Proper sizing of active solar systems is necessary to achieve maximum cost-effectiveness. Separate size selection criteria are appropriate for northern and southern California areas due to the differing climate and insolation characteristics of each area.
3. The CEC standards should be amended to provide for the proper sizing of solar collector area (square feet) and storage system capacity (gallons) to allow for cost-effective conservation of nonrenewable energy sources. Inadequate collector area or storage capacity can lead to poor solar system performance. Inadequate storage capacity is the second major contributor to poor performance.
4. Some solar systems have been installed with supplemental heat supplied either by natural gas or electricity to the preheater storage tank. This has resulted in preheating with nonrenewable resources at night and suppression of solar assistance heating during the day until all the previously heated water is used. This decrease

in efficiency is unwarranted. In order to maximize the conservation of nonrenewable resources, no systems should be so designed or installed and the heating of water in preheating storage tanks should be by solar system only.

Conclusions

1. The CEC should continue to give high priority to the adoption of standards for testing, certification, inspection, sizing, and installation of solar systems and devices.
2. Such standards should be amended to include provisions for the proper sizing of solar panels and storage systems and for the proper design of preheating storage tanks.
3. In adopting such standards, the CEC should consider hardware specifications for quality solar systems proposed by the PUC and all other interested parties.

O R D E R

IT IS ORDERED that:

1. Within one hundred twenty days after the date hereof, all gas and electric utilities subject to the regulatory jurisdictions of the Public Utilities Commission and/or the California Energy Commission shall file with the respective commission exercising such jurisdiction a full description of their existing and planned programs to collect and assess load survey and climate data relating to solar energy.
2. Within one hundred twenty days after the date hereof, all electric utilities subject to the regulatory jurisdictions of the Public Utilities Commission and the California Energy Commission shall file with the respective commissions load management strategies designed to minimize on-peak electric consumption by solar backup systems.

3. The issue concerning utility participation in the sale and leasing of solar energy equipment shall be resolved in PUC OII No. 13.

4. Within one hundred twenty days after the date hereof, all gas and electric utilities subject to the regulatory jurisdictions of the Public Utilities Commission and/or the California Energy Commission shall file with the respective commissions exercising such jurisdiction proposed plans for training their service representatives to identify problems with and make minor repairs to solar-assisted space and water heating systems, and for directing customers to qualified solar contractors for major repairs.

5. The PUC staff shall prepare for consideration by the PUC an Order Instituting Investigation into the alternative means by which we might implement a solar loan program for the benefit of utility customers in California.

6. All specific proposals and recommendations contained in our findings and conclusions shall be implemented by respondents.

The Executive Director shall serve certified copies of this decision by certified mail upon all gas and electric utilities subject to the regulatory jurisdictions of the Public Utilities Commission and the California Energy Commission.

The effective date of this order shall be thirty days after the date hereof.

Dated at San Francisco, California, this 31st day of OCTOBER, 1978.

I will file a dissent.
William Symons Jr

I abstain
Vernon L. Sturgeon

Robert Bateman

President

Richard P. Howell

Clair T. Doolittle
Commissioners

APPENDIX A

LIST OF APPEARANCES

Respondents: Kermit R. Kubitz, Attorney at Law, for Pacific Gas and Electric Company; Thomas D. Clark, David B. Follett and Robert M. Loch, Attorneys at Law, for Southern California Gas Company; Ms. Leslie Kalin, Attorney at Law, for San Diego Gas & Electric Company; Lowell B. Orange and David S. Kaplan, Attorney at Law, for Sacramento Municipal Utility District; Nick Davis, for the City of Santa Clara; E. B. Hakel, for Southern California Edison Company; and Joseph P. Perlmutter and David A. Ogden, Attorney at Law, for Department of Water and Power, City of Los Angeles.

Interested Parties: Louis Possner, for the City of Long Beach; Warren F. Osborn, for Federal Energy Administration; Robert E. Burt, for California Manufacturers Association; Henry F. Libbitt, for California Gas Producers Association; Boris H. Lakusta and David J. Marchant, Attorneys at Law, for California Hotel & Motel Association; Richard Cotton, Attorney at Law, for Natural Resources Defense Council; Sylvia M. Siegel, for Toward Utility Rate Normalization (TURN); Marshall G. Berol, Attorney at Law, for Swimming Pool Energy, Codes and Legislation (SPEC); Jack M. Cherne, for TRW Energy System; Alan H. Marviss, for Public Interest Group re Solar Energy; John Leoduska, Attorney at Law, for Ecosol Ltd.; Wallace C. Kolberg, for Southwest Gas Corporation; Rickey A. Visoria, Attorney at Law, for ERDA; Mark Braly, for the Mayor of the City of Los Angeles; Michael Kavanaugh, for Public Interest Economics; Dr. Ronald J. Baschbie, for EDS Nuclear Inc.; William S. Shaffran, Deputy City Attorney, for the City of San Diego; Robert K. Laughead, for the City and County of San Francisco; Dean L. Hunt, for the Department of Water Resources; E. S. Davis, for Jet Propulsion Laboratory; Manuel Kroman, for Department of Public Utilities & Transportation, City of Los Angeles; Fred Branfman, for California Public Policy Center; Peter Barnes, for The Solar Center; John Geesman, for California Citizen Action Group (CALCAG); William J. Murray, for Gnostic Concepts, Inc.; Don V. Collin, Attorney at Law, for California Builders Council; John Curtis Lakeland, for Curtis Machine Co.; Philip M. Feingold, Tim Brackett, Walter Camp, Phillip Eric Bonham, and Ronald H. Smith, Attorney at Law, for themselves.

ERCDC Staff: Alexander Jenkins and Gregory Wheatland, Attorney at Law.

Commission Staff: Janice E. Kerr and James J. Cherry, Attorneys at Law.

Solar Investigation

COMMISSIONER WILLIAM SYMONS, JR., Dissenting

Today's proposed solar opinion reads more like an artful press release than a deliberative Commission decision.

Findings and conclusions begin almost immediately (starting on page 4). These lack both sufficient supporting discussion in the opinion as well as hard back-up evidence in the record.

The opinion's unwarranted exaggeration of the cost-effectiveness of active solar systems may unfortunately lead California consumers into a reliance on solar systems that is misplaced and premature.

Wish and fantasy should not replace fact. Californians must maintain a realistic understanding that the proportion of society's energy needs satisfiable by commercially-feasible solar technology will remain small through the end of this century.

The evidence in this case is negative as to the cost-effectiveness of solar electric generation, active solar space heating and cooling, as well as active solar water hot water heating. Pool heating and passive solar design do have economical applications and can be considered for implementation in California at this time.

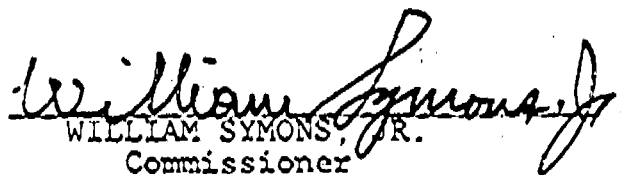
We must be clear on the cost-effectiveness of any solar system we would use the power of the state to promote. The decision rails at direct and indirect subsidies which it says mask the true cost of new supplies of energy from conventional sources. (Finding II-2 and 3). The opinion then does an abrupt about face in the case of solar power and embraces a multitude of subsidy schemes both direct and indirect. The 55% solar tax credit, for example, is crucial to the decision's findings on cost-effectiveness. The opinion also contemplates the major indirect aid of financing with interest set below-the-market cost. Further, the opinion looks forward to general ratepayer absorption of 1) limited repair costs, 2) distribution costs for back-up systems, 3) costs of increased load instability, 4) effective extension of lifeline-priced energy for non-essential needs, 5) lenient main extension rules, 6) higher priorities, 7) data gathering and 8) solar medalion cash awards.

It should be clear that when we as a state agency are making judgements on the cost-effectiveness of a proposed solar system we must consider the net costs to society as a whole. Subsidies do not reduce the cost of solar power, subsidies simply shift the costs to someone other than the user.

This investigation has revealed the amount of unknowns that still exist in the future usefulness of solar power a supplemental source to our existing energy systems. Much more

intensive knowledge should be gathered before we launch into a major redirection of capital investments in our complex energy supply infrastructure.

San Francisco, California
October 31, 1978


WILLIAM SYMONS, JR.
Commissioner