SERI/TP-62-046

Solar Warranties Workshop

A Summary

Co-sponsored by the

Solar Energy Research Institute
National Conference of State Legislatures

March 23 and 24, 1978

Produced by

SERI
Solar Energy Research Institute
A Division of Midwest Research Institute

Department of Energy
Contract No. EG-77-C-01-4042

Department of Energy
Contract No. EG-77-C-01-4042

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A SUMMARY

MARCH 23 and 24, 1978

GOLDEN, COLORADO

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OVERVIEW

On March 23 and 24, 1978, the Solar Energy Research Institute (SERI), Technology Commercialization Division, and the National Conference of State Legislatures co-sponsored a workshop on "Government Imposed Solar Warranties." The main purpose of the workshop was to bring together individuals concerned with the solar warranty issue and provide them with an opportunity for in-depth discussion of the ideas and alternatives which would both protect consumers and support the evolution of a healthy industry. The workshop focused on (a) identifying key issues relative to mandatory warranties, (b) assessing potential impacts of mandated warranties on the solar industry, (c) clarifying areas of agreement and disagreement between representatives of the solar industry, government, and consumer interests, and (d) analyzing alternatives for assuring quality performance of installed solar energy systems.

The workshop was undertaken to provide an open and neutral forum for discussing issues and ideas pertinent to solar energy warranties. It was fortunate that the workshop could coincide with the HUD Cycle-4 Warranty mandates and the California Energy Commission's decisions regarding warranties as a pre-requisite for receiving solar tax credits (authorized by California Law AB-1558). As both agencies' actions might serve as models for other states and the federal tax credit proposals now before Congress, the workshop offered the participants an opportunity to examine the benefits, problems, and policy implications inherent in any new legislation and to explore how other agencies are responding to the consumer protection problems in the solar energy field.

During the first day of the workshop a number of positions and viewpoints were presented by selected participants. Time was alloted throughout

the day for discussion of the various strategies and approaches presented. On the second day, the morning was devoted to further clarification and resolution of the major conference issues and then participants spent the remainder of the day in small group sessions developing position papers on the role of warranties. At the conclusion of the workshop, representatives from each small group presented that group's ideas for discussion. These small group reports are included in Section I of this report.

The participants were selected, deliberately, from diverse interest groups so that a balanced discussion of issues would occur. Representatives were present from the National Conference of State Legislatures, the Department of Energy, the Federal Trade Commission, a Connecticut consumer group, the National Solar Energy Industries Association, the California Energy Conservation and Development Commission, the Massachusetts Solar Action Office, the Florida Solar Energy Center, the AFL-CIO Building Trades Council, a small solar manufacturer/installer, and a solar design firm. A neutral group leader was contracted from Applied Management Corporation, Denver, Colorado, and a legal authority on warranty law served as a content specialist.*

In retrospect, it would have been helpful to have had additional input from other organizations and individuals. Although the participant group was strong in its knowledge of industry, consumer and state problems, there was not adequate presentation of the federal perspective.

Participants addressed first the primary question: Should government mandate warranties for solar equipment? Subtopics included the adequacy of existing consumer protection under the Magnuson-Moss Warranty-Federal Trade Improvement Act and the Uniform Commercial Code, consumer needs for

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* *Workshop participants are listed in Section III.*

protections, the necessity of government imposed warranties to ensure quality, the appropriate role of government under a variety of conditions, and alternatives to warranties. Discussions about the potential impacts of mandated warranties on the solar industry included the magnitude of the impact, whether warranties would eliminate other potential energy alternatives, the effect of warranties on innovations, the effect of warranties on small business, whether warranties would increase the sales of solar systems throughout the industry or in given areas, enforcement methods, responsibilities, and costs.

It was the intent of both SERI and the National Conference of State Legislatures to provide a summary report, based on the discussions and findings from the workshop, that would assist policy makers in their attempts to find realistic solutions to the solar warranty issue. Although no specific proposal was endorsed as to how and by whom consumers would be assured adequate protection in the solar energy market, the lack of specific proposals resulted primarily from the complexity of the problem. This report, therefore, provides a summary of the problems and approaches inherent in providing consumer protection in the solar energy market and attempts to provide some insights into those problems in order to assist policy makers as they begin deliberations in this area.

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EXECUTIVE SUMMARY

The purpose of this workshop was to discuss the role of warranties in the development of a credible market for solar energy and the appropriate role for government to play in requiring warranties.

Government involvement in mandating solar warranties is a complex issue. Whether or not it will have significant ramifications on the future development of solar energy is unknown. The primary objective of government mandated solar warranties has been to assure the quality of solar products and, therefore, to protect consumers. As these warranties have not been in effect very long, it may be too early to tell if they are an effective method for accomplishing this objective.

During the last several years, the federal government and numerous state legislatures have implemented tax credits and other incentive programs to stimulate the solar energy industry. The solar energy industry is still very young, however, and solar energy companies tend to be small and, frequently, undercapitalized. Because the industry is not yet fully developed some industry spokesmen feel that mandated warranties designed to protect the consumer might, potentially, place crippling burdens on the numerous small businesses that characterize the industry. Conversely, it has been argued that there is no evidence that mandated warranties will hurt small business and, furthermore, that government required warranties are legitimate complements to government incentive programs that provide financial stimulus for the solar industry.

Although a dual need exists for consumer protection and for a stable, innovative industry, there are no simple solutions for guaranteeing that these needs will be met. This problem raises questions about the advisability of having the solar industry develop its own standards and regulate

its own performance without government intervention while still assuring consumer protection. If government intervention is desirable, it is essential to decide how, when, in what form, at what level of government cost, and by whom these standards should be adopted and enforced. These are the fundamental questions facing all those involved in developing solar energy as a viable energy alternative.

Participants in the March 1978 Solar Warranties Workshop felt, in general, that warranties of any kind were not necessarily the best protection for the consumer. They did feel that it is appropriate for government to require specific warranty coverage under certain circumstances such as government sponsored grants and/or incentive programs. It was generally concluded, however, that governmental mandating of 'traditional' warranties probably cannot assure the quality of total solar systems. Therefore, alternative approaches to consumer protection, such as a warranty and/or a service contract program, augmented by a warranty insurance program, may be needed.

Workshop participants reached a clear consensus that the solar industry should be involved in developing quality assurance programs and solar industry standards. Most participants felt that a good industry-developed guarantee system is preferable to government mandated programs, but that government should be prepared to either lend assistance to industry or assume the responsibility for assuring consumer protection if industry cannot provide adequate guarantees on its own.

After two days of discussion, it was clear that the issues need much more careful thought and study than has occurred so far. Working in two separate groups, the participants suggested two main areas of focus for future activities:

(1) develop a better understanding of the infrastructure of the solar industry (e.g., manufacturers, designers, installers) and how warranty responsibilities should be assigned to each of these elements; and (2) explore the viability of a consumer protection mechanism that would (a) provide an inspection and certificate of performance as each installation is completed, (b) establish a warranty pool for solar businesses to handle consumer problems with solar systems, and (c) develop periodic preventive service contracts to keep systems in working order after warranties have expired.

In addition, several areas were highlighted for further study. Those seen as the most important were: What are the institutional barriers to assuring quality products and consumer protection; who should be responsible for enforcing warranties; development of model warranties; cost/benefit comparison of service contracts versus long-term warranties; development of meaningful quality, durability, and performance tests for certification programs; can and should performance of total systems be warrantied; extent to which warranties increase costs of solar installations; effect of mandatory warranties on viability of small solar businesses; and the possibility of establishing an information system for solar firms to learn from each other's experiences with product/component performance and durability.

SECTION I. ABSTRACTS OF PRESENTATIONS

A. What is Happening in the States?

Presented by: James Matthews, Director
Energy Programs
National Conference of State Legislatures

Since 1974, thirty-two states have enacted solar-related legislation. Twenty-seven states have adopted some form of property tax incentives, fifteen states have income tax incentives, and six states have sales tax incentives. In 1978, over ninety pieces of solar-related legislation were introduced in twenty-nine state legislatures.

Although we should see the fruit of all this legislation in the stimulation of the marketplace, we have already begun to see a lot of new problems. At the National Conference of State Legislatures, we are reviewing requests for information on a variety of solar issues. For example: How long should tax incentives remain in effect? Can you let them ride forever? Can you ignore this source of revenue? How much control should there be, and who is responsible for monitoring and overseeing the administration of a solar energy problem?

The first issue that most states are facing is assuring quality installations and solar products on residential property. Solar devices and their installations can be certified. Standards can be created and labeling programs can be put into effect. The range of options is limitless ranging from total government involvement to no government involvement. In order, though, not to jeopardize the development of this new industry, we need to use our experiences and imagination to ensure the continuance of the innovative attitudes that are so prevalent in the solar industry.

B. History and Purpose of Warranties

Presented by: Professor Neil Littlefield
University of Denver, College of Law

When there is a new and developing industry which will be significantly important in the next two decades, like the solar energy industry, the presence of warranty liability and how it is handled by the courts, by the legislatures and by Congress, can inhibit or promote the development of that industry. In order to determine if warranties will be a help or a hindrance to the solar industry, we must understand the nature and types of warranties.

There are several meanings of the term "warranty." The first refers to the seller's obligation with respect to the quality of the product sold. In this sense, warranty obligations always have existed in the law because there is a contract of sale. It is the reasonable expectation of the parties, nothing else being said. The second meaning of the word warranty refers to the piece of paper that comes with a product and is called a "warranty." If a consumer does not have that piece of paper, however, he/she still has protection under the warranty provision of the Uniform Commerical Code.

There are many instances in which dealers or manufacturers give limited warranties in an attempt to restrict their liability. The following comments focus on the liability of the seller which exists even when there is no piece of paper called "warranty."

In this case, there are two types of warranties: implied and express. An implied warranty is an obligation on the seller of the goods with respect to the quality of the product. The best example of an implied warranty is the so-called Implied Warranty

of Title covered by 2-312 of the Uniform Commerical Code.

To illustrate:

> *You go to a television store and you purchase a television set. You take it home and two days later someone knocks at your door and says, "Let me see the serial number of your television set. Oh, that was stolen from me two weeks ago."*

That person has a right to recover his or her television set from you, even though you paid money for it, because the law protects legal title. Now the problem is, you have to go back to the store and tell them they sold you a stolen television. Suppose the store owner says, "But I didn't promise you it wasn't stolen." The contractual obligation of the seller to give you clear title is implicit in the transaction.

Another type of implied warranty is the Implied Warranty of Merchantability that states when the seller is a merchant who deals with goods of a kind, the seller has an obligation to sell goods that are fit for the ordinary purposes for which such goods are sold. For example, a power saw has to be able to cut a 2" by 4" board, and, presumably, a solar energy collector has to be able to collect solar energy.

An express warranty is an affirmation of fact or a promise made by the seller, relating to the goods, which becomes part of the basis of the bargain. A description of the goods is an express warranty. If you sell a solar collector and it is not a solar collector, then the express warranty of description has been breached. There is a difference between an express warranty and an implied warranty. A merchant who is in the business of selling goods of a kind makes an implied warranty. The express warranty is the spoken or

written promise made by the seller which becomes a part of the bargain. In the absence of an express warranty, the law still implies certain warranties about the goods.

Magnuson-Moss is federal warranty law that requires full disclosure of the warranty obligation to the seller. That is all that it does--it is like truth in lending. There are full warranties and limited warranties, and each must say certain things.

Generally, the law of warranties, as established by the Uniform Commercial Code, does not work well because it is tied to the trial court system. Consumers seldom get satisfaction by threatening to go to court because costs involved tend to be prohibitive. In the Magnuson-Moss Act, however, there is strong encouragement for resolving disputes other than through the courts. Therefore, it is important to decide whether or not a warranty is the best instrument for protecting consumers and/or installers, for aiding tax incentive programs, or for giving the solar industry a better image.

There are several topics that should be addressed about the obligation of the seller with respect to performance of products. For example, a measure of a pump's performance is that it will deliver so many gallons per minute. That is a characteristic of the pump, and it should be warrantied. Another aspect of product performance can be more subjective. For example, in the case of the solar system, will it cut a heating bill by fifty percent? It is important to be careful about warranties that require systems to deliver up to performance standards because there is not a good historical data base, and there are many environmental factors that affect the system's utility.

C. California's Tax Credit Program and Warranty Requirements

Presented by: Commissioner Ronald Doctor, Ph.D.
California Energy Commission

The California Energy Conservation and Development Commission is the state agency charged with planning and forecasting, chiefly for electricity supply and demand, but also for other forms of energy. The Commission is responsible for developing and implementing mandatory energy conservation actions in the state, and there is an array of actions that have been implemented in the Commission's three-year life. The Commission's budget is about $20 million a year and is raised through a surtax, currently 0.15 mills per kilowatt hour on electricity sales.

Our goal in California is to have 1½ million solar systems installed by 1985. In addition to investigating the possibility of mandating solar water heating in new construction, we are also looking at utilities giving rebates to consumers who install solar energy systems. We are exploring both cash rebates and rebates on monthly utility bills. The rebate money may be raised by increasing rates to all other utility customers. We expect those rebates to be between $300 and $700 depending on the system installed.

Last year, the California Legislature approved a credit against state income taxes for solar installations. The credits range from 55% for a single family residential unit (up to a limit of $3,000) and an additional credit of 25% for non-single family users (e.g., multi-residential, commercial, industrial). The 25% credit has no limit. The credit may be carried forward, so any part of the credit that is not used in the first fiscal year will be carried forward to subsequent fiscal years. In California the average personal state income tax payment per family is about $500, so the $3,000 credit could defray

taxes for several years.

The Commission has adopted interim guidelines for the state income tax credit. The guidelines also include tax credits for conservation actions taken in conjunction with solar installation. For example:

> *If you install a solar space heating system and then decide to insulate your walls, you receive tax credit for both actions up to the limit. If you install a solar space heating system, you also must insulate and weather strip your attic. If you install a solar water heating system, then you must wrap insulation around your water heater in order to get credit.*

Under the tax credit legislation, the equipment must have a useful life of a least 30 years in order to be eligible (this is applicable primarily to active systems).

The warranty requirements under this program include (a) a one-year warranty from the installer on the entire system and (b) two additional years (parts and labor) on the large components (i.e., the collector, heat exchanger, and storage tank). The manufacturer is required to pass on instructions about components that are not compatible with the system. If the system designer ignores the instructions, then he is liable.

Draft legislation, entitled the "Solar Energy Consumer Warranty Insurance Program," would establish a non-profit solar industry association. Association membership would be voluntary for companies that have collectors (and other systems) going through the California Test and Certification Program. Testing and certification would be required for all solar systems sold in California beginning in 1980. The concept is to establish an institution that consumers can count on to back up warranties. Although membership would be voluntary, it would be required in order to be approved by the state under the testing and certification program. If a company chooses not to get the state seal, it does not have

to be a member of the Association.*

The California Solar Energy Industry Association has devised a plan for backing warranties, and we are looking at combining its ideas with ours. The Industry Association will establish a hot line system that will assure that solar energy systems are inspected immediately.

Although the fear was expressed that the proposed warranty standards would force small businessmen out of the industry, we asked for evidence but did not get any.

Because small manufacturers tend to have capital problems, legislation is being introduced to establish a non-profit corporation to provide capital to smaller solar manufacturers.

The governor has instructed the state's business and transportation agencies to try to get commitments from the largest builders to install solar water heating in 10% of their new construction this year. There has been good response so far. In return for reducing some of the "red tape" connected with these building projects, we have received firm written commitments for 5,000 solar water heating units to be installed this year in residential construction. Our goal is 10,000 units this year, and we expect to achieve that. For next year, we are asking the same builders to commit to 20%. Our staff also is working with municipal utilities to encourage them to establish solar utilities.

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*Note: This bill has since died in committee in the California State Legislature.

D. New England's Response to the HUD Cycle-4 Demonstration Program

Presented by: William Osborn, Esq.
Massachusetts Solar Action Office

The Massachusetts Solar Action Office is administering the HUD Hot Water Initiative Program which is the largest demonstration program in the country. It involves ten thousand single family solar domestic hot water heater units in ten northeast states and Florida. The program was designed to commercialize ready-made equipment based on manufactured systems. It is administered by the states, and each state has an administrative budget in order to select the recipients and design the methods for testing and evaluating the equipment.

HUD has two basic requirements that it feels will ensure that high quality equipment is used and that there is adequate consumer protection. The hot water system must meet fifty percent of the needs of a typical family of four, and the major components of the system must be warrantied. So HUD encouraged the states to develop the programs and work out a process for testing the equipment on a regional basis. The states also were encouraged to develop similar performance requirements so that manufacturers would not have to meet different standards.

Massachusetts' involvement in the HUD program followed a solar hot water experiment conducted by the New England Electric System. The results of the Mass Electric experiment were devasting (Mass Electric is an operating company in the New England Electric Company system.) There were terrible installation problems throughout the whole experiment. There was widespread warranty failure. Over two-thirds of the equipment had major installation problems which took, on the average, more than a month to fix. Because of these difficulties, we realized that there are a lot of well meaning small manufacturers in the field that are undercapitalized and which, if they had to face stiff warranties, might go out of business.

After studying warranties and asking industry for its input, we discovered that the most difficult problem with warranties is not what the Uniform Commercial Code says, or the written warranty. It is managing and enforcing the warranties. In a major effort such as the Cycle-4 Program, there are a variety of problems including who has the responsibility of shipping the parts back to the factory to get the warranty honored.

From the Massachusetts' point of view, the warranty developed for this program is excellent. It includes not only a five year warranty against defects and manufactured materials, but also defines the responsibility for shipping warrantied parts back to the factory, paying the labor costs (once the defect is found), etc. These are things that most warranties do not cover. There also is a provision that the heat exchanger and storage tank are covered for five years.

Experience has shown us that it is very important to explore ways to allocate the risks more fairly in this new industry. One possibility is a government supported warranty insurance program, that small companies can buy into, similar to the small business loan program.

E. Florida's Response to the Solar Warranty Issue

Presented by: Polly Craighill, Esq.
Consumer Specialist
Consultant to the Florida Solar Energy Center
Consumer Protection Project

In contrast with many other areas, the Florida Solar Energy Center has a collector testing/certification program that is not mandated by state law. It is basically voluntary, although several municipalities have written into their local building codes that the collectors must be certified by the Center. In administering the HUD Hot Water Initiative, the Center set a one year minimum warranty on the collector with a limited warranty for four additional years but stressed that it hoped that manufacturers would provide more warranty protection for the consumer. It has been very satisfying to see that a number of the manufacturers' systems, approved for the HUD program, have stronger warranties.

One of the interesting innovations the Center developed is the use of the term "system vendor" instead of "installer" or manufacturer." The theory is that the "system vendor" is the person who ultimately sells the system and so has contact with the consumer. This concept has been included in the Center's warranties.

In addition to its other activities, the Center also is conducting a consumer protection project for the Department of Energy to find out what the solar user has experienced in Florida. One thing we have discovered is that everybody deludes themselves if they think the consumers interviewed did any comparison shopping on warranties prior to purchase and, in fact, did not even ask if there was a warranty before they bought the system.

Consumers tend to rely on oral claims and written representation such as brochures and advertisements. To the extent that written warranties

have been provided, few consumers understand the terms, and they do not know what coverage to look for or what kinds of questions to ask. The pre-saleability regulation promulgated under Magnuson-Moss requires that warranties must be available to the consumer prior to sale of merchandise. Obviously the purpose was to provide consumers with a basis for comparison shopping but because this happens so rarely, one has to question whether warranties are really a viable mechanism for meeting this objective.

The infrastructure of the solar industry today presents some very unique problems. In many instances, there may be a defect in the installation itself, but the defect may be caused by the manufacturer not providing adequate training or installation instructions. There may be a manufacturer's defect in a part, so that even if the installation were done properly, the system would never work. The consumer cannot get the situation corrected while the installer and manufacturer debate their respective responsibilities.

This kind of situation does not result in a satisfied public as far as solar energy is concerned. The tax incentives that have been passed by states for solar systems are, in effect, promotional items that clearly benefit the commercialization of solar energy, and there must be a quid pro quo. If we are deliberately promoting an industry we also must ask certain things from that industry. There is a real risk that the consuming public's bad experiences with solar energy will affect not only the commercialization of solar energy but also the research and development of other energy sources.

F. Industry Association Viewpoint

Presented by: Allan Howe, Esq.
Legislative Counsel
Solar Energy Industries Association

The solar industry is hoping to receive a major impetus from the National Energy Act, but it will depend upon what Congress passes. Recently, a 50% solar commercial tax credit came out of the Senate Finance Committee but was cut on the floor to 25%. The House had passed the commercial tax credit at 20%. For residential credit, there is not too much difference: Up to $2,150 in the House version and up to $2,200 in the Senate version.*

If industry is going to take the benefit from public incentives, then it must be willing to accept what the public, through its elected officials in government, tells them--particularly with respect to warranties. From the industry's point of view, a five-year warranty period is too burdensome on a new and fledgling industry. Many of the manufacturers feel that warranties will give the public a false sense of security about the products. Many manufacturers believe that increased costs associated with meeting warranties almost mandate raising prices and passing the costs on to the consumer. There must be some balance in order to keep the industry in the hands of the small business sector, where it is today, and to not force small businesses to merge with the major corporations that dominate the energy field.

The Solar Energy Research and Education Foundation, (SEREF), the research arm of the Solar Energy Industries Association (SEIA), has a DOE contract for certification of laboratories, testing, certification labeling requirements, etc. They are trying to function responsibly by setting industry standards and policing themselves.

*At the time of this printing, this legislation was still pending in Congress.

G. A Small Businessman's Perspective

Presented by: Don Erickson, President
Rocky Mountain Products

There is a transition taking place with regard to the type of customer you have now in solar. Our first customers were people who were astute and who really understood solar, but a new type of customer is emerging.

It needs to be understood that contractors are innovators. Once they get the feel for solar, they buy a collector here, a tank or pump there, and put together their own little systems. It becomes complicated when one starts talking about a system warranty. Although there are many tests that can be performed to show that a system doesn't work, it's important to note that a warranty doesn't necessarily dictate or guarantee performance. However, the contractor has to make sure that the customer is happy, whether the system is warrantied or not.

As I understand some of the warranties being discussed, like the 10-year guarantee on the collectors, they will guarantee that the collector will produce 80% as much 10 years from now as it did in the first year. It would be our responsibility to prove that the collector is performing to that rate, but the cost of doing so is more than the collector is worth. I could build a collector out of rusty steel that would last for 40 years and produce solar energy, but it would be a lousy collector.

One of our problems is flexibility--often we cannot get the right materials. Insulation isn't always the same, and if we get a collector that was tested in a material that is not available, we continually have to look for alternatives. I am really concerned about the solar industry overselling its capability. There are too many people who only talk about how good the industry is. They are making guarantees that they know they can't live up to, but all they are trying to do is build their company up

and unload it on someone else.

The real need is to provide the manufacturers with a sounding board and feedback on the results of their work. We need to know why a system went bad and what the problem was. It is also important that smaller businesses receive information about equipment that has been proven effective. SERI could be a real asset in these areas by researching these areas and making the information available to people in the solar industry. As manufacturers, we need to be given input if we are doing things wrong--this is important for the whole industry's image.

H. The Role of the Solar Energy Research Institute

Presented by: Dr. Karl Zaininger, Assistant Director
Technology Commercialization Division
Solar Energy Research Institute

SERI serves as the lead institution for the Department of Energy in the performance of solar research, development, and demonstration opportunities. This includes functioning as an objective evaluator and analyst of the progress and direction of the solar energy effort.

At the present time, the National SERI, headquartered in Golden, Colorado is addressing these issues from a national perspective, while the regional centers are concentrating their efforts on the commercialization aspects of solar development.

As defined by Congress, SERI's mission is to perform various functions which lead to the establishment and commercialization of a solar energy industrial base. In this regard, a major focus has been technology commercialization including identification of technical, institutional, and attitudinal barriers to solar development and analysis of methods aimed at reducing the economic risks in this new industry. As part of this effort, SERI will evaluate commercial readiness, marketability, economic viability and other aspects of solar commercialization.

This workshop is sponsored by SERI because of its charge to provide expertise in the area of technology transfer--the conveyance and dissemination of knowledge through educational training. SERI intends to play an active role in this area by providing forums of this kind which lead to exchanges of ideas between all the sectors involved in the commercialization of solar energy.

SECTION II. MAJOR DISCUSSION ISSUES

This section identifies the major issues discussed during the morning of the second day. Although there was resolution on some issues, others were not resolved, either because of lack of time or insufficient information.

Part A of this section addresses the major discussion issues and provides a synopsis of the arguments presented on each. Because these issues tended to be complex, there was no firm resolution on most of them. Part B, however, lists issues on which votes were taken to determine the extent of agreement.

Part C presents synopses of two programmatic proposals developed by the workshop participants. They provide options and approaches for dealing with solar warranty-related problems and were endorsed by the group generally.

Part D lists the issues the participants felt should receive further research and study. In a number of instances, there is an overlap between the issues recommended for further study and those already discussed in other parts of this section. Although there may have been some resolution on a particular issue, the participants felt, in some cases, that further study was warranted.

A. General Discussion Issues

1. Can warranties guarantee performance? What are the measurement criteria relative to performance and is it possible to guaranty performance of a solar system?

   The issue of performance was discussed at length, particularly in relation to guarantying performance of individual component parts versus the entire solar system. Some of the participants

felt that warranties, in and of themselves, do not guarantee system performance but can help ensure that components meet certain mechanical standards. Athough there was some discussion about the differences between guarantying system performance versus component performance, that distinction was not accepted by the total group. There was general agreement that at some point in time solar systems should be expected to operate at certain levels of efficiency and produce results (e.g., reductions in utility costs).

However, it was felt that there is insufficient industry history about how solar systems function under various situations, and warrantying system performance might be premature.

Because a solar system usually is a composite of various manufacturers' parts, it is extremely difficult to guarantee system performance through warranties. This problem is complicated because of numerous environmental considerations that affect the operation of a solar system but which are beyond the control of the manufacturer and/or installer (e.g., poor water quality that causes corrosion of the collector).

2. What is the most effective complaint resolution process for consumers? What process needs to be established to ensure that consumer expectations are appropriate?

Although the participants agreed that resolution through the court system is not effective, there was no consensus about the "most effective" process. Ideas such as consumer hot lines and industry or government supported fact-finding and arbitration

processes generally were favored, but no specific solutions were endorsed.

Often, consumers have unreasonably high expectations about solar systems' performance levels and the possible cost savings that may be realized. Much of this phenomenon is attributed to over-selling of solar systems by both industry and government in an attempt to generate interest and support for alternative energy sources.

Consumer education and more appropriate advertising were discussed as methods for alleviating this problem, but there were not sufficient data for resolution of the issue.

3. How to allocate the financial risks in a new industry more fairly and encourage the production of quality products without forcing small businesses out of the market? Is the imposition of warranties a legitimate cost (offset by tax incentives) to the manufacturer?

One position presented was the possible crippling of the solar industry due to warranty liability. This was based on the assumption that one of the characteristics of any new industry is imperfection in its initial delivery of products and of product longevity. An additional problem is that enormous startup costs are involved in creating a market and building consumer acceptance of a new product. It was postulated that if new small businesses are over-regulated and have to respond to a significant number of complaints from users who want large sums of money for breach of warranty, this might unduly hamper the economic development and commercialization of solar energy. Therefore, warranties should

not be required until the industry has developed and has solved its manufacturing problems.

In opposition to the above viewpoint: State and federal legislatures have passed, and will continue to pass, incentive programs to stimulate the solar industry. They feel that when there is a deliberate promotion of an industry, it is legitimate to require certain things of that industry. During hearings on the institution of solar warranties, several states asked for evidence of financial hardships to small manufacturers due to the imposition of warranties. In none of these instances was any proof or even evidence presented that small businesses would suffer financial hardships because of warranty requirements.

Although there were two opposing viewpoints about whether or not the imposition of warranties is a legitimate offsetting cost to industry and whether warranties would drive small businessmen out of the industry, there was a general consensus that some type of insurance program would be beneficial to the small businesses, and ultimately the consumer. There was no resolution about how such an insurance program should work.

4. Can specific requirements be mandated in solar warranties?

Those who supported specific warranty requirements felt that the consumer must have guarantees that problems associated with fixing and shipping defective parts will be handled. Several states already have warranties that include similar requirements, and participants who were knowledgeable about those warranties felt that they worked well.

Those in opposition to specific requirements felt that there is a lack of historical data on the longevity of solar components and systems. Without accurate data (on the expected life of parts, etc.), it is difficult, if not impossible, to determine appropriate durations of warranty coverages.

5. Is a five-year warranty "excessive"? Should the manufacturer be responsible for warrantying the system as compared to component parts?

A number of participants felt that a five-year warranty is not excessive if it covers the large and expensive system components such as the storage tank and heat exchanger. There has been no proof that a five-year warranty causes financial hardship to small businesses.

Those in opposition to a five-year warranty felt that the extra costs associated with a manufacturer's warranty would, of necessity, be passed on to the consumer. Industry is not in a position now to absorb these costs, but may be in the future.

There was no consensus about who should be responsible for warrantying the solar system (as a complete package), but there was some agreement that products should carry their own warranties. An installer's warranty should include pass-through warranties from the component manufacturers. There was some support for the notion that because the manufacturer cannot control the quality of an installer's work, he should not be required to warranty a system which he did not install.

There were differing opinions as to whether manufacturers generally install their own systems and should warranty them, or whether the installer is usually an independent businessman. The current infrastructure of the solar industry causes difficulities in assigning responsibility for warranty coverage and consumer satisfaction.

6. When there is a complaint or problem with a solar system, whose responsibility is it to determine what the defect is and how it will be remedied?

   A variety of options were presented including:

   - the "system vendor" (see "Florida's Response to Solar Warranties," Section I, for explanation);
   - industry should establish and support groups of experts that identify problem areas and determine responsibility;
   - problems should be remedied through a dispute resolution process;
   - neutral, third parties (e.g., insurance authority) should be responsible for determining responsibility.

   Although there was not agreement on the most acceptable or practical approach, there was clear agreement that a complaint handling process should be established so that all parties involved would understand their responsibilities and how to access it. The warranty pool concept was well received but problems associated with it were not resolved (e.g., would premiums be based on a sliding scale to discourage bad installations; does a consumer have direct access to the pool or have to go through the system vendor?).

7. Is it possible to have uniform warranties/standards in each state? There was no consensus about whether it is possible to have uniform warranties, but there was some consensus that maximum similarity is desirable. Information on specific state constraints that might prohibit uniform standards was not available.

B. Votes

In order to reach an understanding of the group's attitudes toward warranty issues, votes were taken on a number of questions. After the votes were taken, further discussion ensued to better define those areas which has the greatest consensus. The questions and corresponding votes listed below deal with two issues that were central to the workshop: (1) Does the consumer need to be protected? If so, (2) should government be involved and to what extent? Following this logic, questions one (1) through four (4) address the need for quality control. Question five (5) deals with the specifics that should be included in government-mandated warranties under different conditions. In question five (5), distinctions were made between the government mandating specific terms of express warranties (i.e., standard definitions), standard warranty coverage (i.e., length of warranty coverage, etc.), and remedies for breach of warranties (i.e., who is responsible and what is the remedy process).

QUESTION	RESPONSE		
	YES	NO	DON'T KNOW
1. Do you agree there is a need to protect the consumer in the solar area?	10	0	0
- Agree to only impose warranties when a program is small enough to not constitute a majority of the solar market (e.g., the HUD demonstration projects where only a limited number of individuals are involved, and general tax credits aren't a factor).	1	7	2
- Agree that warranties may be imposed when the program is large enough to constitute a substantial portion of the solar market (only if industry has not developed an adequate warranty).	9	1	0
2. Do you agree there is a role for warranties to assure quality in the solar area? (Mechanical standards such as adequate materials and workmanship).	10	0	0
3. Do you agree there is a role for warranties to assure that basic components will be operational?	8	0	2
4. Do you agree there is a role for warranties to assure that the solar system will do what it's supposed to do (for example, heating, cooling, where it is installed?)	9	0	1

5. Do you agree that government should mandate warranties if:

(a) No incentive or grants are involved (see footnotes for table interpretation)

	Mechanical Standards: Materials and Work-manship (2)	Component Operation-ability(3)	System Operation-ability(4)
Standard terms of express warranties	7*	6	6
Standard warranty coverage	3	3	5
Remedies for breach of warranty (in addition to traditional remedies)	7	7	8

(b) If incentives or grants are involved:

	Mechanical Standards: Materials and Work-manship (2)	Component Operation-ability(3)	System Operation-ability(4)
Standard terms of express warranties	7*	7	7
Standard warranty coverage	7	8	9
Remedies for breach (in addition to traditional remedies)	8	8	9

*All numbers represent affirmative votes

(2) See question #2 on previous page
(3) See question #3 on previous page
(4) See question #4 on previous page

C. Programmatic Proposals

Utilizing the outcomes of the votes discussed in Part B, workshop participants developed two programmatic proposals based on analyses of two key issue questions. The following synopses provide highlights of those proposals. It should be noted that these proposals were not discussed at length by the total group, due to time limitations, and consequently did not receive the group's endorsement.

1. What will be the impact of government mandated warranties on the solar industry?

   Discussion on this question focused on the structure and dynamics of the solar delivery system. Participants felt that the impact of government mandated warranties on the industry could not be analyzed without an understanding of the industry's infrastructure. Based on that discussion, the following groups and individuals were identified as playing significant roles in the delivery system:

   - manufacturers (including parts supply houses)
   - contractors/installers
   - labor unions
   - financial lenders
   - utility companies
   - inspectors (codes, zoning, etc.)
   - maintenance/service repair personnel

   The issue of impact related to government mandated warranties was narrowed to discussion of impacts on either manufacturers or installer/contractors because these are the individuals most substantially affected. It was agreed that requiring warranties

from just the manufacturer, or just the installer/contractor would be inequitable because both are so intricately involved in guaranteeing the quality of the solar system.

The proposals that evolved contained the following conclusions:

- consumers should only have to deal with one person in order to remedy a problem with their solar system, and the most logical and accessible person is the installer/contractor;
- a one-year warranty should be required from the installer/contractor to the consumer;
- manufacturers should be required to carry warranties on their products for the same duration as the installer/contractor's warranty (for the protection of the installer/contractor);
- any warranty program should be designed to encourage small businesses to stay in the solar market.

Another possible solution presented by this group was that an insurance program should be developed to provide protection for all parties. Fees should be on a sliding scale for members (either installer/contractors or manufacturers) based on the member's record relative to breach of warranty.

2. Are there viable alternatives to a warranty program?

A variety of alternatives was examined ranging from government mandated service contracts to educational programs. While a number of these alternatives would protect consumers, they were potentially restrictive for the industry.

The proposal presented below identifies some alternatives to warranties which could assure quality performance of installed solar

systems and, at the same time, continue to stimulate the healthy growth of the solar industry. The basis of this proposal involves a three-part warranty pool that would:

a. Provide for periodic inspections by a nonpartisan third party at the time the system is installed, six months later, and at the end of one year. A certificate of performance would be issued which would then allow the consumer to qualify for any available tax incentives.

b. Establish a warranty pool (or a Warranty Insurance Authority such as the one proposed by the California Energy Commission). A team of skilled inspectors would be provided to determine the cause of problems and to suggest corrections to systems found performing below minimum standards. Financing of any necessary corrections would be provided by a pool composed of state and/or federal funds, a percentage of gross income from participating manufacturers, on a sliding scale basis, and possibly from the insurance industry through a premium charge.

c. After the first year of installation, require service contracts which should include a bi-annual service schedule, maximum charges for service calls, and owner "write-offs" for defective replacement parts.

The warranty pool package would help assure that installed systems performed to standards. It would also encourage manufacturers and installers to take the economic risk and invest the time necessary to get into and stay in the solar business.

D. Future Study Issues

The issues identified during the workshop are listed under

the interest group(s) that the participants felt would be most appropriate to provide an in-depth analysis of that issue. Priority rankings, based on participant responses, appear on the left hand margin opposite each issue listed. A score of one (1) is the highest priority, and five (5) is the lowest.

Legislative Study Groups

1 What are the institutional barriers to assuring quality products and consumer protection?

1.8 Who should be responsible for enforcing warranties--government, industry, courts?

2.1 Do warranties offset the impact of tax incentives by forcing vendors out of the market?

Legal Organizations

1 Development of model warranties

1.9 Would service contracts serve as well as long-term warranties?

2 Can the presence of warranties for certain components/systems create problems for which no warranty system has yet been developed?

2.5 Do existing laws and procedures adequately protect the consumer?

2.6 What is the basic purpose of warranties?

4.3 Legal, jurisprudence study of what are warranties.

Economic Organization

2.25 How much will warranties increase the cost of solar installations?

2.6 The economic trade-off between solar incentives and the cost of solar warranties.

2.8 Survey of state revenue departments for the economic impact of solar tax incentives for the tax year 1977.

2.75 Implications of warranties on business--do they encourage or inhibit it?

2.9 Do warranties increase consumer demand for solar products?

3.5 Cost analysis of complying with HUD Cycle-4 program.

Solar Energy Organizations

1 Explore warranty insurance program for small solar manufacturers and contractors/installers.

1 Development of meaningful quality, durability, and performance tests and certification programs.

1.3 To what extent can and should performance of total systems be warrantied?

1.8 How much will warranties increase the cost of solar installations?

1.9 Can small solar businesses afford to stay in business with mandatory long-term warranties?

2.1 Do warranties offset the impact of tax incentives by forcing vendors out of the market, and if so, to what extent?

2.1 What are the alternatives to warranties?

2.35 Investigate the possibility of private carrier insurance program rather than warranties.

2.5 How can industry best learn from its mistakes?

Engineers/Architects

1 Development of meaningful quality, durability, and performance tests and certification programs.

2.3 Do warranties for durability guarantee system performance?

2.8 State-of-the-art study on solar performance standards.

SERI

1 What are the institutional barriers to assuring quality products and consumer protection?

1.7 Design of a system for sharing information about product performance and durability.

1.8 Who is primarily responsible for enforcing warranties--government, industry, courts?

2.6 Consumer education handbook on what to shop for.

Consumer Organizations

2.6 Does a warranty do anything but raise consumer expectations?

2.6 Consumer education handbook on what to shop for.

2.9 Do warranties increase consumer demand for solar products?

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SECTION V. WORKSHOP AGENDA

The following is a condensed version of the two-day workshop agenda. It is presented to aid the reader in understanding the general areas covered and activities undertaken during the course of the workshop.

A. Formal Presentations

A variety of "experts" were asked to make presentations regarding solar warranties and other related issues. Questions and discussion followed each presentation.

B. Major Discussion Topics

Numerous topics were discussed during the two days. The major topical areas that the participants were asked to address during the workshop were:

- Should the government mandate warranties for solar equipment? If so, under what conditions?
- Consumer protection under Magnuson-Moss and the Uniform Commercial Code.
- The necessity of government imposed warranties to assure quality.
- The potential impact on the solar industry--whether warranties would affect future innovations, increase sales, or increase costs.

C. Working Discussion Groups

Participants were assigned to one of two groups in order to discuss and reach consensus, if possible, on the following topics (each group took one of the issues):

- The impact of government imposed warranties on the solar industry.
- Alternatives to government imposed warranties.

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