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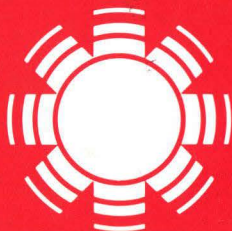
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# Product Liability and Small Wind Energy Conversion Systems (SWECS): An Analysis of Selected Issues and Policy Alternatives

Robert J. Noun



# SERI

**Solar Energy Research Institute**

A Division of Midwest Research Institute

1617 Cole Boulevard  
Golden, Colorado 80401

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PRODUCT LIABILITY AND SMALL WIND  
ENERGY CONVERSION SYSTEMS (SWECS):  
AN ANALYSIS OF SELECTED ISSUES AND  
POLICY ALTERNATIVES

ROBERT J. NOUN

DECEMBER 1979

PREPARED UNDER TASK No. 5321

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## FOREWORD

This report represents the final phase of SERI's study, "Product Liability Issues Associated with Small Wind Energy Conversion Systems (SWECS)," Task No. 5321. The report explores a number of policy alternatives for DOE and others to consider in dealing with those issues. It was prepared by Robert Noun of SERI's Institutional and Environmental Assessment Branch.

The author wishes to acknowledge the extensive research assistance provided by A. C. Lusby, SERI Research Assistant, in all phases of the study. Because this report delves heavily into the sensitive interplay of law, technology, and public policy, the advice and guidance furnished by Alvin Weinstein, Professor of Mechanical Engineering and Public Policy at Carnegie-Mellon University, was extremely valuable. In particular, much of the report's treatment of SWECS product safety analysis was derived from Dr. Weinstein's book, "Products Liability and the Reasonably Safe Product" — itself a unique tool for helping manufacturers understand the requirements of product liability law.

Finally, the author is deeply grateful to those individuals who helped shape the study with their valuable comments. They include Barry Satlow and Robert McConnell, SERI; Louis Mayo, George Washington University; Howard Taubenfeld, Southern Methodist University; William Thomas, American Bar Foundation; George Tennyson and Neil Strauss, DOE; and Neil Hosenball, NASA. However, the author is solely responsible for all legal conclusions and any factual errors or omissions.

Approved for:

SOLAR ENERGY RESEARCH INSTITUTE



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Robert Odland, Chief  
Institutional and Environmental  
Assessment Branch

## SUMMARY

The federal government has proposed a major commitment to the development and commercialization of wind energy technology. A small but nevertheless important part of the contribution of wind power to our future energy needs will come from small wind energy conversion systems (SWECS). To assure timely commercialization of SWECS, technology development must be accompanied by identification and reduction of potential legal/institutional barriers to SWECS use. In particular, the introduction of SWECS into the marketplace will require an appreciation of what the law may demand of the SWECS manufacturer concerning the safety and performance of his product.

A number of legal issues are raised by the manufacture and sale of SWECS. The threshold question of whether the law will assess liability on either the SWECS manufacturer or seller for injuries allegedly caused by the product requires an examination of the interface of traditional product liability law and the new generation of small wind machine technology that is now emerging.

The manufacture and sale of SWECS create certain legal responsibilities for the product maker and seller. These responsibilities are expressed in the principles of law against which the conduct of the manufacturer or the performance of the product are measured. The planned large-scale deployment of SWECS in new-use environments, especially in urban and residential areas, makes it difficult to predict how the courts are likely to apply traditional tests of liability to SWECS manufacturers. Similarly, there exist neither sufficient performance data nor industry-wide safety standards to assist the courts in determining whether the SWECS manufacturer has met the established legal standards of responsibility for the product. Absent such product experience and safety standards, the courts can be expected to look closely at the SWECS manufacturer's own product decision-making process to determine whether safety concerns were reasonably addressed.

Various legal issues are raised at each stage of the SWECS manufacturing and marketing processes. SWECS manufacturers will need to recognize these issues and understand the requirements of product liability law to minimize potential liability. Recent judicial decisions indicate that the courts, when seeking to determine whether a product was unreasonably dangerous, increasingly are attempting to balance the product's utility against the potential risk of harm stemming from its use. Factors such as foreseeable use, probability and severity of harm, compliance with relevant standards of product safety or performance, and the cost of an alternative design are being carefully scrutinized. If these factors are considered by the SWECS manufacturer, especially during the design process, his subsequent liability can be minimized. In addition, it is important that the process of developing SWECS safety standards gives the same attention, prospectively, to the interplay of product behavior and human behavior as the courts do, retrospectively, after an injury has taken place. \*

SWECS manufacturers can best minimize potential liability by implementing product safety design review procedures that anticipate what the law requires regarding product safety. Documentation of such procedures is equally important. In addition, SWECS product safety standards should be developed with these legal requirements concerning product safety firmly in mind, to ensure that adherence to such standards will be accorded maximum weight by a court in the event of a SWECS product claim. Moreover, effective product safety review procedures and standards produced by a reputable and thorough standard-setting process could have a favorable impact on the SWECS manufacturer's ability to obtain affordable liability insurance for its product.

A number of policy alternatives are suggested that the U.S. Department of Energy (DOE) may want to consider to assist SWECS manufacturers in minimizing potential liability. Each alternative, however, has its advantages and disadvantages. Thus, care must be exercised in assessing the potential benefit to SWECS manufacturers of any one alternative. Among the options for DOE to consider are (1) providing SWECS performance and safety data in a timely manner to SWECS manufacturers, prospective insurers, and state/local government officials; (2) helping the private sector develop SWECS performance and safety standards based upon a reputable and thorough standard-setting process; and (3) providing technical assistance to SWECS manufacturers to encourage and aid the development of SWECS product safety design review procedures.

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## SECTION 1.0

### INTRODUCTION

#### 1.1 SWECS: A DEFINITION

The U.S. Department of Energy (DOE) defines a small wind energy conversion system (SWECS) as a wind energy system (or systems) capable of producing up to 100 kW of electricity. In addition, SWECS generally refers to a system with small-scale applications; i.e., individual and shared urban, residential, and rural on- and off-site power production, power production for small isolated communities, and power production for small factories.

#### 1.2 SWECS AS A "NEW" PRODUCT

In 1973, the federal government began to accelerate the development of reliable and economically viable wind energy systems. More recently, efforts have begun to "enable the earliest possible commercialization of wind power" [1]. The importance attached to the urgency of these endeavors requires that technology development be accompanied by assessment of the non-technological issues associated with wind energy system commercialization. In other words, economic, legal/institutional, environmental, and social issues must be addressed before significant benefits from wind power can be realized [1].

The commercial development of SWECS can be seen essentially as the reemergence of an old technology in the form of new products. This view of SWECS is compelled not so much by technological improvements over ancestral windmills as by the intensive scale and new applications (especially off-site power production and use in urban and residential settings) planned for SWECS. As with any new product, the introduction of SWECS into the marketplace will create legal responsibilities on the part of SWECS manufacturers and sellers to users or consumers of their products, as well as to those who come in contact with them. Hence, if a person is injured or property is damaged as the result of a design or manufacturing defect in the SWECS, how does one determine whether the law will assess liability on either the SWECS manufacturer or seller? Similarly, if the actual performance of a SWECS fails to measure up to its promised performance, will the manufacturer or seller be liable for any resulting economic loss to the purchaser?

Because SWECS are new products with little industrywide performance experience, and because many variables, such as size, use, and location, are likely to govern the nature and extent of liability, these and other fundamental legal questions arising from the operation of SWECS are difficult to analyze in terms of predicting liability. Likewise, the present lack of industrywide SWECS performance and safety standards will make it more difficult for the courts to apply traditional principles of law against which either the conduct of the SWECS manufacturer (or seller) or the quality of the product can be tested. Without such product experience and industry standards to aid the courts, questions about the reasonableness of the manufacturer's own internal product safety review process could be decisive on the basic issue of liability.

Finally, this assessment of potential product liability issues associated with SWECS comes at a time when the present legal system's ability to resolve product claims is being seriously questioned. Consequently, an evaluation of legal issues relating to the manufacture and sale of SWECS must also address the present judicial system — its problems and proposed reforms — in which those issues ultimately must be resolved.



### 1.3 PURPOSE AND SCOPE OF WORK

This report is intended to identify significant product liability issues relevant to the manufacture and sale of SWECS, and provide an integrated set of policy alternatives for DOE and others to consider in dealing with those issues. This report is intended as a guide to the legal issues involved. It should not be assumed to express definitive legal conclusions about the potential liability of individual SWECS manufacturers and sellers in particular cases. This report, moreover, does not address liability associated with the ownership or operation of a SWECS. It considers product liability issues concerning small wind energy conversion systems only, as defined in Sec. 1.1.

The report focuses primarily on the legal aspects of product liability law as applied to SWECS. While the legal issues discussed here are often closely connected with the related issue of availability and cost of SWECS product liability insurance, the subject of insurance is beyond the scope of this report.\*

### 1.4 METHODS

This report begins with an overview of the various legal issues regarding SWECS performance and safety, according to when such issues may arise during the SWECS manufacturing and marketing processes. Next, the most significant issues are translated into a series of questions, followed by a legal analysis that addresses these questions within the framework of the present product litigation system. The special problems presented to SWECS by judicial treatment of design defect cases and the relevance of industry standards in product cases are emphasized. Finally, a number of policy alternatives for DOE and others to consider are examined concerning their relative advantages and disadvantages in dealing with selected issues.

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\*SWECS liability insurance is the subject of an extensive DOE study conducted by the Rockwell-Rocky Flats Wind Systems Group.

## SECTION 2.0

### PRODUCT LIABILITY AND THE SWECS MANUFACTURER: AN OVERVIEW

Could a SWECS manufacturer be held liable for an injury that occurs from the use of his product when that product was manufactured to the most exacting quality assurance procedures available? If the manufacturer warns about dangers that could have been designed out of the product, could that manufacturer still be liable? If a SWECS malfunctions and causes injury because it was not properly maintained by the user, could the manufacturer still have a liability problem?

These are the kind of questions that pertain to the legal requirements of a SWECS manufacturer regarding product performance and safety. The legal issues in a product liability case generally involve elements of these and related questions. Factors like the reasonableness of a manufacturer's safety design considerations, foreseeable use of the product, and the sufficiency of product warnings underly the basic questions of liability in such cases. These elements are, in turn, parts of a larger balancing process by which the legal system integrates human behavior and product behavior to determine whether or not a product has met established legal requirements for safety.

What are some of the elements a court concerns itself with when attempting to balance a product's utility against the dangers stemming from its use? Would it be useful for the SWECS manufacturer to consider, prospectively, these same elements to help minimize liability?

To begin with, there is the question of who may be expected to use the product. The SWECS manufacturer should carefully assess the potential user population, because the courts will view the performance and safety of the machine in the hands of its ultimate user, whose expertise may be considerably less than that of the original buyer. Thus, for example, users of a 1.5 kW SWECS may be defined generally as adult homeowners or adult farm operators; yet, a younger and less experienced family member of either group also could be a foreseeable user of the machine.

Must the manufacturer also anticipate how his machine may be used? To a great extent, yes. Generally, a manufacturer will escape liability if an otherwise safe product is made unsafe by subsequent alteration, misuse, or if it is used in an unintended manner; but only if such alteration or use was unforeseeable by the manufacturer. The question of foreseeability is usually left to the jury in such cases, which may often mean that hindsight is applied by asking what manufacturers should have known, rather than what they could have known, at the time of manufacture.

Also relevant to the question of foreseeable use is whether the manufacturer owes a duty to protect a person other than a user from an unreasonable risk of harm. Could a person who is injured while installing, servicing, or repairing the SWECS recover from the manufacturer? The answer is generally yes, assuming that injury to such person was, again, reasonably foreseeable.

What about an injury to a neighbor of the SWECS user or even to a bystander? If, for example, a child were to fall from the SWECS support tower after gaining access to the tower by climbing a protective fence, would the manufacturer be liable for any resulting injuries to the child? The answer will largely depend on the choice of legal theory applied by the court to determine the manufacturer's responsibility to such a person.

Again, whether an injury to the child was reasonably foreseeable will be an important factor.

Assessing the product's performance and safety in the hands of various users is one way the SWECS manufacturer can evaluate potential liability. It is also important that the manufacturer thoroughly understand the product within its potential use environments. Consider a 1.5 kW SWECS with three 15-ft-diameter blades mounted on a 40-ft tower. Would a court view this machine as presenting a greater risk of harm if it were located in a low-density residential neighborhood, rather than located on a farm? The law indicates that the use of the same product in two different environments (residential and rural, for example) may lead to different conclusions about liability. Thus, whether a court would consider a SWECS defective or unreasonably dangerous can depend largely on the context of the SWECS function and use.

An initial assessment of potential users and use environments for a product can lead the SWECS manufacturer into other useful areas of inquiry. In the design phase, the manufacturer should ask whether a SWECS would be considered defective in design simply because it caused an injury. The answer is, not necessarily. A court will usually evaluate design safety by testing the reasonableness of the trade-offs (e.g., more safety versus added cost) considered by the manufacturer before making a final design decision.

Suppose a SWECS manufacturer has to make a choice between two safety design alternatives to control machine speed. Alternative "A" would be a brake large enough to stop the motion of the machine at any wind speed. This alternative, however, would add substantially to the cost. Alternative "B" would be a smaller brake that would merely stop the blades from rotating to permit access to the machine for repairs. This alternative would add very little to the cost of the machine but would sacrifice some measure of safety. It is at this point — the final design decision-making process — that the SWECS manufacturer can plan most effectively to minimize liability. For, if the manufacturer evaluates safety design alternatives by applying the same legal concepts (e.g., foreseeable use, probability of harm, effect on product cost, etc.) that the courts consider when balancing product risk against utility, the manufacturer can point to the reasonableness of the design review process as an indication that legal responsibilities have been met.

It is also at this stage of SWECS product development that the manufacturer must consider the critical issue of whether to design out a hazard or merely warn against it. If, in the above example, the manufacturer only warns against the dangers associated with machine speed, rather than dealing with them through one of the braking alternatives, would the manufacturer be relieved from subsequent liability? The answer would be no if either braking system could substantially reduce such dangers.

What about the efficacy of warnings in reducing the manufacturer's exposure to liability? Would a warning that merely informs the user of the dangers presented by improper use of the SWECS be adequate to insulate the manufacturer from liability? No; the courts have held that a warning, to be sufficient, must not only tell the user (or bystander) what the dangers are, but also how to avoid them.

Suppose the SWECS manufacturer designs his product for maximum safety, using the best technological information currently available to the industry. Will the manufacturer still be held liable if later technological advances could have made the product even safer? The courts have split sharply on this question. Some have implied that it is sufficient to establish liability if, at the time of trial, a product is shown to be unreasonably dangerous; others have refused to hold the manufacturer liable for a hazard which was scientifically unknowable at the time of manufacture; they suggest that the manufacturer is only required to meet the "state of the art" existing at that time.

A related issue the SWECS manufacturer needs to address during the product design phase is the relationship of useful product life to the various statutes of limitation. Can a SWECS manufacturer be confident that he will not be liable for an injury that occurs from use of the product many years after it was sold? The answer to this question may rest more with the manufacturer's own response to the question of product life than with a legal response to the question. That is, if the elements of useful product life (proper maintenance, consumer expectations, etc.) are considered in the design and marketing process, the SWECS manufacturer can design the product so that its useful life meets the needs of its ultimate user.

A final question to be considered during the SWECS design process is the relevance of industry standards in product liability cases. If standards regarding SWECS safety and performance are developed, would compliance with those standards establish that a SWECS was not defectively designed? While adherence to such standards would be an important factor in establishing the reasonableness of the SWECS design, industry standards are viewed only as setting minimum requirements for the manufacturer. Significantly, the weight accorded to standards by the court will depend largely on the thoroughness and reputation of the standard-setting body that developed them. Thus, the SWECS manufacturer must judge whether forthcoming industry standards are a sufficient benchmark for safety when considering his design trade-offs.

As the product moves from the design stage to the manufacturing stage, the SWECS manufacturer is confronted with a new set of liability issues. Would there be liability even though the SWECS was manufactured to the most demanding quality control procedures available? The answer would largely depend on the court's choice of legal theory. If the theory is negligence — which tests the conduct of the manufacturer — the SWECS manufacturer could assert that quality assurance techniques met the standard of reasonableness and that the manufacturer should not, therefore, be liable when one of its machines slips through the process with a production error. If, however, the theory applied is strict liability — which looks not to conduct but rather to the quality of the product — the manufacturer could be held liable even though all reasonable care was exercised in the making of the SWECS. The possible application of strict liability to SWECS should signal the importance of liability exposure in weighing the cost-effectiveness of better quality control procedures.

The manufacturer should next attend to the SWECS marketing process. It is here that special problems regarding product warranties and disclaimers must be addressed. If a manufacturer expressly guarantees a rated output of 2000 watts at a windspeed of 25 mph and the SWECS fails to perform as promised, could the manufacturer be liable for resulting economic loss to the consumer? Generally, yes, assuming the buyer could prove that the loss resulted directly from the failure of the SWECS to measure up to the manufacturer's representations.

At what point does a representation become a warranty? SWECS manufacturers should recognize that an express warranty can be created from several sources: a description of the machine in advertising brochures, drawings of the machine, and oral representations all may constitute warranties. Does mere opinion or "sales talk" give rise to a warranty? No, but a broad assertion of product quality, particularly one related to safety, such as that a SWECS is "durable", can be found to include a representation that there is nothing to make the SWECS unsafe.

Finally, there is the role of disclaimers in avoiding liability. Could a SWECS manufacturer rely on a contract with his buyer that relieves him from all liability? The answer

would depend largely on the nature of the sale, i.e., whether it is a "commercial" transaction in which the validity of a disclaimer is unquestioned, or is a "consumer" case in which an unequal bargaining position between the SWECS seller and buyer may invalidate the disclaimer, especially where the action is based on strict liability as distinguished from warranty.



## SECTION 3.0

### SELECTED PRODUCT LIABILITY ISSUES RELEVANT TO SWECS

The preceding section briefly identified some of the potential liability issues regarding the manufacture and sale of SWECS. The following questions pose issues that may be most relevant to SWECS and that are more fully examined in subsequent sections (inside parentheses).

- What traditional theories of liability could be applied to SWECS manufacturers or sellers in a product liability action? (Sec. 4.1)
- Because SWECS will operate in a variety of use environments, to what extent are differences among such environments likely to affect the choice of liability theory to be applied? How are such differences likely to influence the manner in which the theory is applied? (Secs. 4.1.2, 4.5)
- To what extent may a SWECS manufacturer be required to anticipate how the product may be used and by whom? (Secs. 4.1.2, 4.5)
- Would a SWECS manufacturer or seller be liable to a person whose own negligence, such as by improper maintenance, contributed to his or her injuries? (Sec. 4.1.1)
- Would liability ever shift from the SWECS manufacturer to retailers, distributors, even to component part manufacturers, for product defects — including defects that could not have been detected? (Sec. 4.1.2)
- Would a SWECS seller be able to rely on a contract with the buyer that relieves the seller from all liability? (Sec. 4.1.2.2)
- How may differences in the way the courts define standards of manufacturer responsibility affect the SWECS manufacturer in the event of a product claim? (Secs. 4.1.2, 4.2.1.1)
- Given the anticipated long useful life of some SWECS, will they ever become too "old" for a product liability claim? (Secs. 4.2.1.2, 4.5)
- If a SWECS is considered safe in view of the "state of the art" or industry custom at the time of manufacture, may the manufacturer still be held liable if later SWECS technological advances could have made his product even safer? (Sec. 4.2.1.3)
- What is the impact on potential liability of SWECS manufacturers of the present lack of industrywide safety standards? If industry standards were established, would compliance with those standards make a SWECS "legally" safe? (Secs. 4.2.1.4, 4.5)
- If a SWECS is significantly modified by a user or other person and it subsequently causes injury, how may such modification affect the manufacturer's legal responsibility? (Sec. 4.2.1.5)
- If a product liability claim were made by an injured bystander based upon the negligence of a SWECS owner and the strict liability of a SWECS manufacturer, would the manufacturer be able to obtain contribution from the owner if the basis for recovery were strict liability? (Sec. 4.2.1.6)
- If a SWECS manufacturer warns about dangers that could have been designed out of the product, may the manufacturer still be held liable? (Sec. 4.5)

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## SECTION 4.0

### PRODUCT LIABILITY LAW AND ITS APPLICATION TO SWECS MANUFACTURERS AND SELLERS

Product liability is the legal doctrine used to describe the liability of manufacturers or sellers for injury caused by their products to the person or property of buyers or third parties.\* Product liability is primarily a matter of state law. Thus, the way that Weinstein et al. group the relevant legal theories on which an action in product liability is based can be used to examine the application of the law to SWECS manufacturers and sellers [5]. The three basic legal principles available in most states as the basis for an action in product liability — negligence, strict liability, and warranty — are grouped as follows:

- negligence, which tests the conduct of the defendant (manufacturer/seller);
- strict liability and implied warranty, which test the quality of the product; and
- express warranty and misrepresentation, which test the performance of products against the explicit representations made on their behalf by manufacturers and sellers [5, p. 5].

The proof required of a plaintiff seeking to recover for injuries from an unsafe product is largely the same for all three theories of liability. The plaintiff must establish that:

- the product was defective;
- the defect caused the harm; and
- the defect existed when the product left the defendant's hands [2,5].

In the case of negligence, the plaintiff must, in addition, show that the defendant's conduct was unreasonable [2].

As to the element "product defect," it is important to note that the courts generally will distinguish between a manufacturing defect (when a production error causes the product to fall short of the manufacturer's own standards) and a design defect (when the product meets the manufacturer's standards but the design or standards are considered inferior and, therefore, judged defective) [5]. In the case of a SWECS, a production defect might be a weld with little or no penetration or the wrong bolt fastening two pieces. A SWECS design defect might be the absence of a braking mechanism or the absence of a warning. In either case, any irregularity or "flaw" in the condition or quality of the SWECS, if judged substandard in litigation, may be said to be a defect [5].

On the question of production defect in a negligence case, distinguished from a case based on strict liability, the SWECS manufacturer must always bear in mind the basic conceptual distinction between these two legal theories. Negligence focuses on the

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\*The following discussion of product liability law draws heavily from Prosser, The Law of Torts [2], particularly Chapter 17, "Products Liability." Examination of legal issues, including product liability, that are associated with wind energy conversion systems (WECS) generally can be found in Mayo, Legal-Institutional Implications of Wind Energy Conversion Systems (WECS) [3] and in Taubenfeld and Taubenfeld, Barriers to the Use of Wind Energy Machines: The Present Legal/Regulatory Regime and a Preliminary Assessment of Some Legal/Political/Societal Problems [4].

conduct of manufacturers and asks whether they acted reasonably. Strict liability focuses on the product itself and asks whether the product is defective, regardless of how or why it became defective. Thus, while it might be easily determined that a product was defective (e.g., it was flawed in production and its substandard performance resulted in injury), the manufacturer still might not be considered negligent. That is, despite the defect in the product that caused the injury, the manufacturer, perhaps by pointing to a reasonable quality-control program, might have acted reasonably in marketing his product [5].

In a design defect case, however, there is no internal standard for establishing the existence of a defect; the product, by definition, meets the manufacturer's own internal standards. Instead, in attempting to define an external standard to determine whether a design defect exists, the courts employ a balancing test. Again, the standard is basically one of reasonableness [5]. Judicial application of the reasonableness test will be governed by the choice of applicable legal theory. When the test involves the conduct of the manufacturer, as it does under negligence theory, the reasonableness test is well understood. When, however, the product itself must be examined, as it must under strict liability, then the element of "unreasonable danger" comes into play. The unreasonable danger concept can be the most important and the most confusing element in a product liability case. Weinstein et al. offer a useful explanation of the term:

Products are not capable of reasoning — only persons are. When we speak of the "unreasonably dangerous" product, we begin with the premise that all products present risks to the consuming public. Some risks, when balanced against the important functions the product performs and the cost of providing for greater safety, are deemed "reasonable." This means that a reasonable person who had actual knowledge of the product's potential for harm would conclude that it was proper to market it in that condition.

How does this differ from negligence? Strict liability theory, unlike negligence, is not concerned with the conduct of the defendant that brought about the unreasonably dangerous condition. Thus, for example, assume that a defendant manufacturer has acted reasonably in designing a product and has adequately tested it before it is marketed. After the product is in actual use in the marketplace, however, it is discovered that the testing and design process failed to account for certain dangers, and even though it was reasonable not to anticipate those dangers, the design is in fact substandard. It will not be a defense in this case that the defendant acted reasonably. If we can proclaim that the product is in fact not reasonably safe — that a reasonable person who had knowledge of the danger would have decided against marketing without the design alteration or additional warning — then the product is unreasonably dangerous. [5, p. 32]

Sec. 4.5 demonstrates this important distinction, one that SWECS manufacturers will want to note.

## 4.1 THE RELEVANT THEORIES

### 4.1.1 Negligence

Negligence has been defined as "conduct which falls below the standard established by law for the protection of others against unreasonable great risk of harm" [6]. To be

negligent, the conduct must be unreasonable in that it fails to guard against a risk of danger to others that is or should be apparent to someone in the defendant's position. The standard "established by law" against which such conduct is tested is based upon what society demands of individuals rather than on their own notions of proper conduct. It is often referred to as the standard of "reasonable or due care," or as the "reasonable person" standard [2].

In a product liability action based on negligence, the plaintiff must establish that the defendant-manufacturer owed a duty of reasonable care to take precautions against foreseeable and unreasonable risks of injury to others [2, Sec. 30]. The element of reasonable care may offer some problems unique to the manufacture of SWECS in terms of predicting liability based on negligence.

There are two particular areas in which liability is based primarily on a departure from proper standards of care so that the action becomes essentially a matter of negligence.

The first area involves the product design [7], which may include choice of materials and attention to safety precautions. There is no doubt that the SWECS manufacturer will be obligated to use reasonable care in designing a product that is reasonably safe for its intended use [8] and for other foreseeable uses [9]. The question turns on a definition of reasonable care and safety in SWECS product design. That is, the manufacturer is not required to design the best possible product, so long as it is reasonably safe [2, p. 645]. However, the existence of a competitor's similar product with a safer design may influence the determination of whether the defendant-manufacturer exercised reasonable care [2, p. 645]. Moreover, conformity to customary or industrywide standards or practices is not a defense to negligence unless these practices and standards are consistent with reasonable care [3, p. 177].

In determining whether a product is defective in design, the courts often try to balance the benefits of the challenged design against the risk of danger inherent in that design. For example, a recent California case [10] adopted this kind of utility-risk test for design defects, stating that, in weighing the benefits of the product against the risks, the jury may consider, among other factors: (1) the gravity of the danger posed by the challenged design, (2) the likelihood of that danger, (3) the mechanical feasibility of a safer design, (4) the cost of an improved design, and (5) any adverse consequences to the product and to the consumer that would result from an alternative design.

Such factors should tell those responsible for the design of SWECS something about how the courts are likely to regard the trade-offs and engineering decisions that were part of the product design. These factors ought to be appreciated before, not after, the product is manufactured and placed on the market.

The second negligence liability area comprises warnings of the dangers involved in product use and directions for use [2, Sec. 96]. SWECS manufacturers or sellers must therefore be mindful of their duty to give adequate warning of unreasonable dangers of which they are, or should be, aware. The standard of reasonable care requires that the warning be conspicuous and reasonably calculated to caution users of the product to exercise the degree of care necessary to deal with the potential danger [3, p. 178]. This duty extends to all advertising [2, Sec. 96] and extends to the period after sale if manufacturers or sellers learn of new hazards or of improved safety devices [5, Sec. 96].

How might these broad negligence standards apply to SWECS? Product liability law has more recently evolved from the theory of strict liability, which focuses on the product itself, while negligence focuses on the conduct of the manufacturer or seller. Thus, in most instances, negligence standards would be relevant where injury is caused by defects



in the design of SWECS structural components (especially larger components such as the tower and rotors — including choice of materials and design safety precautions) and lack of adequate warnings or instructions (warnings about electrical hazards or directions governing safety procedures during high-wind periods).

There are certain traditional defenses available to the manufacturer-defendant in product liability actions based on negligence. First, there is the "assumption of risk" defense that applies when the injured party has voluntarily and unreasonably encountered a known danger. A subjective standard requires the defendant to prove that the plaintiff knew of the defect and appreciated the danger but continued to use the product in the same way, resulting in injury [2,3].

Second, the manufacturer-defendant may attempt to show that the plaintiff altered the product after buying it, and before using (or misusing) it thereby causing the injury.

Third, contributory negligence is a defense to a negligence action in product liability. That defense will bar an action in negligence if it can be established that the plaintiff failed to exercise reasonable care in using the product.

Finally, a few states have adopted comparative negligence statutes designed to diminish the defendant's dollar liability in proportion to the degree of negligence assigned to the plaintiff [12].

#### **4.1.2 Strict Liability and Implied Warranty**

##### **4.1.2.1 Strict Liability**

The doctrine of strict liability first emerged as an independent theory of recovery in product liability cases in 1963 [13]. Its clearest expression can be found in the Restatement (Second) of Torts, Sec. 402A (1965):

- (1) One who sells any product in a defective condition unreasonably dangerous to the user or consumer or to his property is subject to liability for physical harm thereby caused to the ultimate user or consumer, or to his property if
  - (a) the seller is engaged in the business of selling such a product, and
  - (b) it is expected to and does reach the user or consumer without substantial change in the condition in which it is sold.
- (2) The rule stated in Subsection (1) applies although
  - (a) the seller has exercised all possible care in the preparation and sale of his product, and
  - (b) the user or consumer has not bought the product from or entered into any contractual relation with the seller.

Most states have adopted some form of strict product liability.\* Thus, it is important to recognize the significant differences between negligence and strict liability theories when examining the latter's potential application to SWECS manufacturers and sellers.

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\*Approximately 25 jurisdictions follow Sec. 402A of the Restatement in applying strict liability [14].

To determine whether a product is unreasonably dangerous, in strict liability the basic focus is on the product itself and not on the conduct of the manufacturer. That the manufacturer acted reasonably — that he exercised all possible care in the preparation and sale of his product — will not be a defense to an action in strict liability. Nor will it be a defense under strict liability that better quality control procedures are prohibitively expensive. If the product is in fact unreasonably dangerous and is shown to have caused the plaintiff's injury, the manufacturer can be held liable [5, p. 8]. It should be noted, however, that if the plaintiff's claim is that the defendant's product is defective in design, the courts weigh the "burden of precaution" against the gravity and likelihood of the danger involved, as in a negligence action. In testing a design defect, then, the risk-utility balancing test applies to both negligence and strict liability theories in product cases [5, p. 9].

This kind of balancing test illustrates current judicial efforts to clarify what is meant by a design defect in liability. For example, in Barker [10] the court held that a product is defective in design if (1) the plaintiff proves that the product failed to perform as safely as an ordinary consumer would expect when used in an intended or reasonably foreseeable manner; or (2) the plaintiff proves that the product design caused his injury and the defendant fails to prove, considering the relevant factors, that the benefits of the challenged design outweigh any inherent dangers in that design. The relevant factors that may be considered by the jury include the cost of an improved design and any adverse consequences to the product and consumer that could result from an alternative design.

Another recent decision [15] adopts a utility-risk test similar to that in Barker. The impact of these decisions could make it easier for a product liability plaintiff to prove a design defect, and it is incumbent upon the manufacturer to demonstrate various trade-offs and complex engineering decisions considered in designing the product [16]. Whether these new, judicially created definitions of the term "defect" will be followed in other jurisdictions is unclear. But the fact that the courts are attempting to define more precisely this area of product liability law should serve notice to manufacturers that they may be required to show that these trade-offs were considered "before their product rolled on the assembly line — and before it rolled off" [16]. The question is, will SWECS manufacturers be able to demonstrate that these considerations were made during their own design processes?

Another important distinction between negligence and strict liability arises from the potential liability of various defendants in the "distributive chain" [5, p. 9]. Under strict liability, potential liability may reach to the retailer [17], wholesaler [18], distributor [19], and even to a component part manufacturer [20], in addition to the product manufacturer. This distinction is well expressed by Weinstein et al.:

It should be clear that under the negligence theory many of the members of the distributive chain would not be at fault, since there would be no practical way for them to inspect and discover the defect. They would thus have been acting "reasonably" in failing to inspect. Since strict liability focuses on the condition of the product in its use environment, not on the conduct of any party, liability may attach to any member of the distributive chain regardless of the reasonableness of his conduct. [5, p. 10]

A careful reading of Sec. 402A of the Restatement yields a number of questions about the possible application of strict liability to SWECS manufacturers and sellers. Depending on how they are defined, the words "unreasonably dangerous" may have special meaning for SWECS. For example, we have seen how some courts have attempted to

fashion a more precise definition of design defect by determining whether the product failed to perform as safely as an ordinary consumer would expect, or whether the benefits of its challenged design were outweighed by any dangerous condition inherent in that design [10]. The implication is that there are products that may meet consumer expectations but that are nevertheless "unreasonably dangerous," and thus require the utility-risk balancing test to establish whether an acceptable level of safety has been met [5, p. 45].

By contrast, the Restatement (which bases liability upon a finding that a product is "in a defective condition unreasonably dangerous to the user or consumer") seems, as Weinstein et al. suggest, to "emphasize that the consumer expectation test is the essence of strict tort liability" [5, p. 45]. For example, a product is considered defective when "it is . . . in a condition not contemplated by the ultimate consumer, which will be unreasonably dangerous to him"; and a product is found to be unreasonably dangerous when it is "dangerous to the extent beyond that which would be contemplated by the ordinary consumer who purchases the product, with the ordinary knowledge common to the community as to its characteristics" [21].

Finally, there is the "unreasonable danger" test itself. A balancing test is used again — this time with considerably broader criteria against which the product is tested to determine if it is defective and unreasonably dangerous [5, p. 47]. One suggested expression of these criteria is found in Dean Wade's list [5, p. 47]. The criteria are:

- the usefulness and desirability of the product;
- the availability of other and safer products to meet the same needs;
- the likelihood of injury and its probable seriousness;
- the obviousness of the danger;
- common knowledge and normal public expectation of the danger (particularly for established products);
- the avoidability of injury by care in use of the product (including the effect of instructions or warnings); and
- the ability to eliminate the danger without seriously impairing the usefulness of the product or making it unduly expensive [22].

SWECS, as we have noted, are essentially new products. Some modern SWECS designs resemble the old countryside windmills of the past. However, hazards related to their projected widespread use to produce electricity (especially in new environments such as urban and residential areas) and any potential dangers resulting from the size and weight of some of their components (rotors, tower, etc.) may not be either fully appreciated or expected by the public in the early stages of SWECS operation. Similarly, the social value of SWECS is expected to increase as conventional fuels become more scarce and expensive.

Given these characteristics, should strict products liability be applied to SWECS, the broad criteria of the unreasonable danger test could be best suited to the sensitive balancing process of risk and utility in determining whether a product is defective. Again, the point is made well by Weinstein et al.:

While certain of these indicia may be quantifiable and others require subjective evaluation, the final decision on whether a product is defective

and unreasonably dangerous is an amalgam of all seven indicia. The determination of defect and unreasonable danger is, in one sense, subjective, because each product must be viewed in the particular context of its function and use. The use of the same product in two different environments, domestic and industrial, for example, may lead to different conclusions regarding defectiveness and unreasonable danger. Thus it is critical that the product be understood thoroughly within its use environment before the appropriate focus is established for application of the Wade indicia. [5, p. 47,48]

The SWECS manufacturer should recognize that, unlike negligence, which looks at the conduct of the manufacturer, strict liability evaluates unreasonable product danger within the context of product use; i.e., within its use environment. It should be clear, then, that whether or not a design is determined to be unreasonably dangerous is an expression, through the legal process, of what is found to be a socially acceptable design [5]. As in the example of the SWECS speed control design alternatives, under the utility-risk test, if the cost of the larger brake to make the SWECS safer would far outweigh the probable danger, the SWECS would be considered "reasonably safe" with the smaller, less expensive brake. If, however, it is determined that the risks of harm, which could not be lessened adequately by the smaller brake, exceed the benefits of lower product cost, the SWECS would be considered "unreasonably dangerous."

While a majority of courts that have adopted the principle of unreasonable danger use the Restatement definition, a number of states, notably California and New Jersey,\* whose courts are often at the cutting edge of product liability development, have rejected this element as a requirement of strict liability [23].

Another question relevant to the application of strict liability under Sec. 402A of the Restatement to the manufacture and sale of SWECS is suggested by the words "user or consumer." Although the Restatement expresses no opinion regarding the application of Sec. 402A to persons other than "users or consumers," the comments to this section offer a broad construction of these terms [24]. Moreover, it has been generally held that anyone may sue where his or her injury from a defect is reasonably foreseeable [25].

What may be more significant to the potential liability of SWECS manufacturers to third persons is whether injured bystanders can sue a manufacturer in strict liability. The majority of relevant case law suggests that they can [26]. Obviously, the issue of "foreseeability" is central to these cases and on this issue the jurisdictions are split; some require that the plaintiff be foreseeable, others extend strict liability to virtually any plaintiff [27].

A related issue which could arise in an action by an injured bystander concerns the application of the law of joint tortfeasors [2, chap. 2]. It is conceivable that in an action brought by an injured bystander against both the owner and manufacturer of a SWECS, where the issues are negligence on the part of the owner and strict liability as to the manufacturer, the latter may be unable to obtain contribution from the former if the basis for recovery is strict liability. For example, in Fenton v. McCrory Corp. [28], the court stated:

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\*New Jersey apparently has rejected the unreasonable danger element as a requirement of strict liability only in cases alleging a product, as opposed to a design, defect [15, p. 289].

There is no right of contribution between a party whose liability is imposed under the strict liability rule of 402A, Restatement of Torts, 2d, and a party whose liability is based on negligence or want of due care. Strict liability is imposed regardless of the exercise of due care by the person sought to be charged; contribution exists between tort-feasors both of whom are charged with a want of due care.

Finally, a word about traditional defenses to actions in strict liability. Assumption of risk is an available defense to a strict liability action, but it must be established that the plaintiff "voluntarily and unreasonably encountered a known risk" [29]. Mere failure to discover a defect or unknowing misuse of the product will not defeat a plaintiff's claim based on strict liability. In addition, misuse of the product by the plaintiff may also be an available defense. Disagreement continues, however, as to whether contributory negligence, as distinguished from assumption of risk, can be a defense to such an action [2, p. 79].

Limitations on the time during which an injured party may bring suit are as important as the extent of, and limitations on, liability in strict product liability cases. This subject may be considerably important to SWECS manufacturers and is treated in more detail elsewhere in this report. For purposes of the statute of limitations in strict liability cases, the time at which the injury occurs is the time at which the cause of action accrues [3, p. 185].

#### **4.1.2.2 Implied Warranty of Merchantability**

Implied warranty of merchantability is one of two warranties about the quality of a seller's product implied in a contract, as provided in the Uniform Commercial Code (UCC). Sec. 2-314 of the UCC reads in relevant part:

- (1) Unless excluded or modified, a warranty that the goods shall be merchantable is implied in a contract for their sale if a seller is a merchant with respect to goods of that kind.
- (2) Goods to be merchantable must be at least such as . . .
  - c. are fit for the ordinary purposes for which such goods are used.
  - f. conform to the promises or affirmations of fact made on the container or label if any.

This section of the code defines the minimum standards that apply to sales by merchants (defined to include sellers and manufacturers). The section is generally believed to afford the same protection to the consumer as the Restatement requirement that a product be reasonably safe [5, p. 10].

Because the concept of warranty has arisen essentially out of contract law principles, it is unclear whether a seller can disclaim, by contract, the liability that might normally arise from the sale. Thus, proceeding against a manufacturer or seller for breach of an implied warranty requires careful attention to the contract principles found in other provisions of the UCC, especially: (1) Sec. 2-607, which deals with the effect of acceptance of the product and notice to the seller of a claim for breach of warranty; and (2) Sec. 2-316, which recognizes the right of the seller to contract against warranty liability through appropriate disclaimer provisions.



As to the disclaimer of an implied warranty of merchantability, the courts have differed sharply on whether such a disclaimer may be used in a case where the plaintiff has suffered personal injury [5, p. 11]. However, a disclaimer will be unavailing when the basis of recovery is strict liability [30].

SWECS manufacturers or sellers will want to be aware of these provisions of the UCC should they be subject to liability under implied warranty of merchantability. They should be particularly mindful of the UCC requirement that permits exclusion or modification of implied warranties only by conspicuous language (or other circumstances) and use of the expression "as is," which protects the buyer from surprise. They should also be aware that the plaintiff's examination of the product before sale gives rise to the plaintiff's assumption of the risk of defects the examination ought to reveal [31].

Finally, the SWECS manufacturer will want to become familiar with the effect on disclaimers of warranty liability under the Magnuson-Moss Warranty Act [32]. The Act applies only to consumer products, defined as "any tangible personal property which is distributed in commerce and which is normally used for personal, family, or household purposes" [33]. The Act does not require manufacturers to give a warranty for their products; rather, it simply regulates the form and effect of those warranties that manufacturers choose to offer. It does, however, prohibit sellers from disclaiming any implied warranty (whether of merchantability or fitness) whenever they either offer a written warranty or enter into a service contract with the consumer within 90 days of sale [34]. Thus, the Act allows sellers to disclaim or modify implied warranties whenever no written warranty or service contract on the product exists.\*

#### **4.1.3 Express Warranty and Misrepresentation: Implied Warranty of Fitness**

An express warranty is an affirmation of fact, including a description or sample, or a promise made by the seller that relates to the product and is made part of the bargain with the buyer. This rule of warranty has also been codified by the UCC, as provided in Sec. 2-313:

Section 2-313. Express Warranties by Affirmation, Promise, Description, Sample

- (1) Express warranties by the seller are created as follows:
  - (a) Any affirmation of fact or promise made by the seller to the buyer which relates to the goods and becomes part of the basis of the bargain creates an express warranty that the goods shall conform to the affirmation or promise.
  - (b) Any description of the goods which is made part of the basis of the bargain creates an express warranty that the goods shall conform to the description.

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\*For a checklist of what a manufacturer of solar equipment must do to comply with the Magnuson-Moss Act and FTC requirements regarding warranties, see Vakeries and Cutler, Solar Warranty Guidelines, Federal Trade Commission Requirements for Warranties Under the Magnuson-Moss Act; 1978.

- (c) Any sample or model which is made part of the basis of the bargain creates an express warranty that the whole of the goods shall conform to the sample or model.
- (2) It is not necessary to the creation of an express warranty that the seller use formal words such as "warranty" or "guarantee" or that he have a specific intention to make a warranty, but an affirmation merely of the value of the goods or a statement purporting to be merely the seller's opinion or commendation of the goods does not create a warranty.

This section consolidates, under express warranties, the obligations raised in the contracting process. Express warranty can be distinguished from strict liability in that the finding of a defect is not required to establish liability. Thus, proceeding under a theory of express warranty, it need not be established that the product was defective (unreasonably dangerous), only that it failed to have certain characteristics or failed to perform in the manner warranted or represented by the seller. All that is required of plaintiffs to recover under express warranty is knowledge of the seller's assertions and injury resulting from a reasonable reliance on those assertions [3,5].

SWECS manufacturers and sellers should recognize that an express warranty can be created from several sources, including (1) the name of the product; (2) descriptions of the product found in advertising, catalogs, brochures, or packaging; (3) drawings, pictures, or other representations that accompany the product; and (4) oral representations made by the seller (or an agent) to the buyer [2, p. 652]. Thus, it becomes important to ask whether claims (such as those relating to SWECS system productivity, safety features, maintenance, and repair requirements, or as to the projected useful life of the system) made by the SWECS manufacturer or seller will give rise to liability.

At what point does a representation become a warranty? Mere "opinion" and "sales talk" are not treated as express warranties. Broad, general assertions of product quality, however, especially those relating to safety, may be found to include a representation that there is nothing to make the product unsafe [2].

The UCC also requires the seller's representation to be part of the "basis of the bargain." However, considerable authority supports the opinion that liability exists if the representation was only one of several factors leading to a plaintiff's injury [2, 97].

The caution exercised by SWECS manufacturers or sellers not to "oversell" their products is important. A SWECS marketed beyond its capability to perform may result in liability; this result will hold regardless of a manufacturer's honest and reasonable belief in the truth of representations made about the product [5,35]. Express warranty is a form of absolute liability [5].

An additional warranty theory is found in UCC 2-315:

Where the seller at the time of contracting has reason to know any particular purpose for which the goods are required and that the buyer is relying on the seller's skill or judgment to select or furnish suitable goods, there is unless excluded or modified under the next section an implied warranty that the goods shall be fit for such purpose.

Thus, for example, if a SWECS seller is aware that a buyer is relying on the seller's judgment to obtain a system for the sole use of generating electricity to pump water, the seller may be liable if the SWECS turns out not to be suited to this task.

## 4.2 THE IMPACT ON POTENTIAL SWECS LIABILITY OF CURRENT JUDICIAL DIRECTION IN PRODUCT LIABILITY LAW

Product liability is largely an expression of manufacturers' legal responsibilities to others, as determined by testing either their conduct or the performance of their products against certain principles of law. Having reviewed the various legal principles underlying product liability law that may be relevant to the manufacture and sale of SWECS, it becomes important to examine how these principles operate in the present tort litigation system.

In the past decade, product litigation has proliferated considerably. That litigation has created serious, increasing problems for the business community [36]. The Interagency Task Force on Product Liability, established by the federal government in 1976 to study the impact of product liability problems on the economy, not surprisingly concluded that among the principal causes of product liability problems was the tort litigation system itself [37].

In addition, manufacturers often cite the significant increase in product liability litigation as the major cause of current problems [34]. The expansion of product litigation has been exacerbated by the breakdown of traditional fault principles — such as negligence — in favor of the strict liability approach [2,38]. But this trend toward expanding the plaintiff's remedies has progressed well beyond the adoption of strict liability. It has witnessed, in addition: (1) an extension of the time during which a manufacturer can be held liable for a defective product;\* (2) the application of a standard of care in accordance with industry technology at the time of trial rather than at the time of manufacture [39]; and (3) the continued erosion of traditional defenses such as privity [40], intervening cause [41], contributory negligence [42], and exclusion of evidence of product modification by the plaintiff or others [43].

These rapid, significant changes in the law of product liability have contributed to present uncertainties and alleged inequities in the tort litigation system. Remedial measures have been proposed, and, while it appears there is little consensus about the form they should take, many problems and proposed reforms of the tort litigation system are likely to have an impact on SWECS manufacturers and sellers in terms of potential product liability.

### 4.2.1 The Tort Litigation System: Current Problems

Product liability law falls under the law of torts. The principal function of tort law is to shift the costs of an accident from the victim to the responsible party, consumers, or society, when any of the latter is judged responsible for the former's injuries. Product liability law, then, should impose liability only where it is fair to judge the product seller or manufacturer responsible for an injury. While there can be little argument with the basic principle that the maker of a "defective product unreasonably dangerous" should be held liable for injuries to others caused by his product, the law has failed in the practical application of that principle, thereby creating current problems in the product liability adjudicative process [44].

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\*E.g., in Rosenau v. City of New Brunswick [20] an action was held permissible for negligence and strict product liability for a defective water meter 22 years after sale.

These problems are usually described in terms of either the "uncertainties" or "inequities" associated with the judicial administration of product liability claims [44,45]. The uncertainties that characterize the present system appear to arise from two sources: (1) rapid changes in the application of product liability rules and lack of uniformity with respect to those rules among the states, and (2) the multiplicity of approaches the courts take in attempting to define the basic standard of responsibility applying to product sellers [44,45].

Because the development and application of tort law has traditionally been left to the states, product liability rules are changing constantly and are applied retroactively in 50 different jurisdictions. Thus, it is virtually impossible to predict when courts will change the law and thereby either broaden or limit product sellers' exposure to liability. Additionally, because the authors of Sec. 402A of the Restatement seem to have focused on problems related to construction defects and were not concerned with problems related to defects in design or with the duty to warn [45], the courts have been left with the difficult task of defining the seller's responsibilities in such cases [45].

Apart from the current uncertainties plaguing the product litigation system, certain inequities exist. While the Interagency Task Force found few cases that were clearly unfair to manufacturers, the inability to predict when courts will change the law and broaden manufacturers' exposure to liability could mean that the incidence of such cases will continue and perhaps increase [45]. Manufacturers may note the newly extended time during which they may be held liable for a defective product, and the erosion of traditional defenses to product liability claims, as persuasive evidence that the pendulum has swung unfairly to the plaintiff [42, p. 219, note 17].

While many specific problems generally associated with either the uncertain or perhaps unfair nature of current product litigation have been identified [34], the following may be especially relevant to SWECS in their potential impact.

#### **4.2.1.1 Lack of Precisely Defined Judicial Standards of Manufacturer Responsibility**

As the courts continue their struggle to articulate standards of manufacturer responsibility in product cases, SWECS sellers and manufacturers could be faced with this question: Depending upon the jurisdiction in which a SWECS product claim may arise, which of the various judicial tests is the court likely to apply when defining the SWECS manufacturer or seller's scope of responsibility? Whether a particular court, in determining the appropriate standard of responsibility, adheres to the traditional Restatement approach (with its emphasis on "consumer expectations") or instead applies some form of the utility-risk balancing test (as in Barker) could produce considerably different results as to how much liability the SWECS manufacturer could face. This could be particularly true in product design cases where resolution of the uncertainty regarding the meaning of the terms "defect" and "unreasonably dangerous" has been most troublesome for the courts.

#### **4.2.1.2 The Length of Time Sellers Are Subject to Liability for Injuries or Damage**

Statutes of limitation are legislatively imposed limits within which a person is permitted to bring a lawsuit. Most states have held that for purposes of the statute of limitations in negligence or strict liability, the time the injury occurs is the time from which the cause of action accrues [20]. Thus, many manufacturers claim that there is indefinite

liability potential in product cases, particularly where the useful life of a product extends over a period of 20 to 30 years [38].

Therefore, it is easy to see why the period of time in which SWECS manufacturers may be subject to liability for their products is important. Some SWECS will (or must, to be economical) achieve a 20- to 30-year useful life [47]. Thus, the question of whether to provide an outside limitation period, which runs from the time the product leaves the manufacturer's hands rather than from the time the injury occurs, becomes significant for SWECS, given the projected useful life of the system.

#### **4.2.1.3 Application and Effect of the "State-of-the-Art" Defense**

Manufacturers have expressed concern that their products are being judged by hindsight; i.e., that design defects are being found in light of current technological and scientific information rather than information that existed at the time of manufacture [38]. There is at least one jurisdiction in which the state-of-the-art defense has been held irrelevant in strict liability cases [48]. Some manufacturers are pressing strongly for a statutory state-of-the-art defense, which would permit evidence to be introduced concerning either industry custom or general feasibility of product design that existed at the time of manufacture [38]. Because the technology information base upon which SWECS are designed is rapidly evolving, leading perhaps to safer designs in the future, the question of whether to give full effect to the state-of-the-art defense is an important one for SWECS, especially to those directly responsible for the system design.

#### **4.2.1.4 Relevance of the Seller's Compliance with Legislative or Administrative Safety Standards**

Most jurisdictions [49] have held that a manufacturer's compliance with either government-imposed standards or voluntary industry standards is admissible to establish that a product is not defective in design or that the manufacturer is not negligent [36]. Yet, these standards are considered generally only to establish minimum manufacturing requirements [50]. Moreover, a manufacturer's violation of a government-mandated standard conclusively establishes the manufacturer's negligence, in some jurisdictions [51]. Some manufacturers have proposed that compliance with safety standards, particularly those required by law, should be an absolute defense. Such a defense might have a very favorable impact on the availability and cost of product liability insurance (see Sec. 4.4).

Significantly, the potential problem confronting SWECS is the absence of standards, not whether compliance with established safety standards may be a defense. The question, then, is whether fair standards can be created that address every circumstance in which a SWECS may be dangerous when used as intended, and whether these standards can be produced by a reputable and thorough standard-setting process (see Sec. 4.3).

#### **4.2.1.5 The Effect of Product Alteration or Misuse**

In a product liability action, a plaintiff is required to prove that the product was defective when it left the hands of the manufacturer or seller and that the defect was the

cause of his injuries.\* Thus, where a user or third party has altered or modified the product after sale, making an otherwise safe product harmful, the manufacturer will escape liability if the alteration was unforeseeable. Additionally, if a plaintiff does not use the product in ways intended by the manufacturer, the latter would not be liable if such inappropriate use was unforeseeable [54,55]. The focus in these cases is on the question of "foreseeability," which is generally up to the jury to determine. Consequently, the notion of foreseeability has been broadly interpreted; the courts are believed to allow the jury to engage in hindsight [38,56]. It has been further suggested that uncertainty about these cases may be yet another cause for the rise in cost of product liability insurance [34].

Because some SWECS are likely to be installed, serviced, or repaired by persons other than the original seller or manufacturer, the judicial treatment of situations asserting alteration, modification, or misuse of the product after sale, as well as the broad interpretation given to the term "foreseeability," may be of special interest to SWECS manufacturers and sellers.

#### **4.2.1.6 Factors Determining Proportionate Liability and Contribution Among Joint Tortfeasors**

An injured bystander might allege, in the same case, negligence on the part of the owner and strict liability on the part of the manufacturer as grounds for recovery for injuries claimed to result from a defective SWECS. Because some jurisdictions may not permit the manufacturer to obtain contribution from the owner in strict liability [28] (even though the owner may be found not to have exercised due care), various proposals to permit contribution in such instances and to establish guidelines for the judge in determining proportionate responsibility could benefit SWECS manufacturers or sellers.

#### **4.2.2 The Tort Litigation System: Proposed Reforms**

The preceding section outlined some current problems in the tort litigation system that may be relevant to the manufacture and sale of SWECS. In this section, some of the more significant proposals aimed at modifying these particular areas of the law and their potential impact on SWECS are examined.

The expansion of product liability law has resulted primarily from recent judicial decisions at the state level. From the consumer's viewpoint, this expansion has been a welcome development. From the manufacturer's perspective, however, judicial decisions in this area have imposed unreasonable standards for product liability and have created an uncertain and unfair system for resolving product claims. Manufacturers have called for federal legislation to offset the effects of these decisions. The result has been increased legislation at the state level [38] as well as some intense activity in Washington to determine whether federal legislative solutions may be desirable and, if so, what form they should take [38,45].

The U.S. Department of Commerce has published a proposed draft uniform product liability law for the states to use [57]. This "Uniform Product Liability Act" was introduced in the 96th Congress as H.R. 1676 [58]. The proposed model law is comprehensive and reflects, in large part, the work of the Interagency Task Force. Because it also

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\*See Restatement, Sec. 402A.

draws heavily from product liability legislation already enacted at the state level,\* the proposed model federal law serves as a useful vehicle for examining legislative trends in the area of state product liability law reform.

The preamble to the model law is worth noting:

This Act sets forth uniform standards for state product liability tort law. It does not cover all issues that may be litigated in product liability cases; rather, it focuses on those where the need for uniform rules is the greatest. The purpose of these uniform rules is to eliminate existing confusion and uncertainty on the part of both product users and product sellers about their respective legal rights and obligations. Improving the level of certainty as to how state product liability law will deal with claims for injuries caused by allegedly defective products should also, over time, promote greater availability and affordability in product liability insurance and greater stability in rates and premiums.

Since certain problems in the present tort litigation system have particular relevance to SWECS (Sec. 4.2.1), the following sections of the model law should be of special interest to SWECS manufacturers and sellers:

- Section 104 - Basic Standards of Responsibility

This section would define the standards of responsibility of sellers in product liability actions by distinguishing cases based on (1) defects in construction, (2) defects in design, and (3) defects caused by a failure to instruct or warn [57, p. 3004]. This approach appears to impose strict liability for construction defects only, and to apply negligence for design-defect and failure-to-warn cases.

- Section 109 - Length of Time Product Sellers Are Subject to Liability for Harm Caused by Their Products

This section is intended to provide product sellers some security against stale claims, while at the same time preserve the claimant's right to obtain damages from the manufacturer or seller of an unsafe product. Sec. 109 seeks to accomplish this result through provisions on (1) useful safe life, which identifies certain factors that may help the judge determine how long a product reasonably can be expected to operate safely; (2) statute of repose, which differs from a statute of limitations in that it sets a fixed limit beyond which the product seller will not be held liable; and (3) statute of limitation, which requires any claim under the Act to be brought within three years of the time the claimant discovered, or should have discovered, the facts giving rise to the claim [57, p. 3008, 3009].

- Section 106 - Relevance of the State of the Art

This section would exclude the showing of post-accident changes in the design of a product, "state of the art," or industry custom when such evidence intends to show that a product was defective at the time it was manufactured [57, p. 3006].

- Section 107 - Relevance of Compliance with Legislative or Administrative Standards

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\*For a general review and analysis of recent state legislative activity in this area, see Birnbaum [38, pp. 269-285].



This section conforms to the common law approach by not treating compliance with legislative and administrative standards as an absolute defense. However, it does allow some credit for compliance with such standards in proper circumstances [57, p. 3008].

- **Relevance of Third-Party Alteration or Modification of a Product**

This section shields a product seller from liability for harm that would not have occurred "but for the fact that his product was altered or modified by a third party." However, this provision is very narrowly drawn because of the hardship that can result from an overly broad limitation on liability based on product alteration or modification [57, p. 3011].

- **Section 112 - Multiple Defendants: Contribution and Implied Indemnity**

Sec. 112(a) establishes the basic rule that contribution between multiple defendants will be determined by the proportionate responsibility of each defendant and outlines procedures for the judge to follow to make proper determinations [57, p. 3012].

### **4.3 THE ROLE OF STANDARDS IN ASSESSING POTENTIAL SWECS LIABILITY**

Two questions were posed in previous sections of this report concerning the relevance of performance and safety standards to potential SWECS liability. First, what is the impact on potential SWECS liability of the present lack of industrywide safety standards? Second, if industry standards were established, would compliance with those standards make a SWECS "legally" safe? The answers lie in understanding the role of standards in the context of litigation.

Standards are an agreed-upon language used by producers, consumers, governmental agencies, and others to communicate the characteristics of materials, procedures, systems, and services [59]. The weight courts generally accord standards in a product liability case largely reflects the adequacy of the process that produced those standards. To properly understand the role of SWECS safety standards in assessing potential liability, then, it is useful to examine the legal implications of the SWECS standards development process now under way.

#### **4.3.1 SWECS Standards Development: Current Status**

Standards of performance, reliability, safety, and life expectancy do not yet exist for SWECS [60]. However, a comprehensive standards development program has been initiated as part of the Federal Wind Energy Program (FWEP) [61].

The Rocky Flats Wind Systems Program provides the principal technical and management support for achieving the objectives of the small wind systems component of the FWEP [62]. The Rocky Flats program provides technical support to the formation of standards by the private sector to be used in the manufacture, product testing, and data reporting of SWECS [62]. At present, Rocky Flats is conducting tests and collecting performance data on a number of commercially available and prototype SWECS to help define specific standards which could accelerate SWECS commercialization. Once such standards have been defined, technical support to private industry standards development will be implemented in cooperation with the American Wind Energy Association (AWEA) [62].

AWEA will be the SWECS industry's focal point for establishing standards. In this role, AWEA has developed a plan [63] for SWECS standards development with four major elements: (1) terminology development, (2) standard performance data, (3) testing procedures, and (4) standards development guidelines. The plan also calls for the creation of an advisory board representing consumers, manufacturers, and distributors; standards organizations; and general interests.

The AWEA plan is based on the development of SWECS standards through voluntary consensus, the most widely used and accepted system for standards development in the U.S. The underlying principle in this process is that all who have an interest in the standard should have a voice in its development. The system works through committees established under the sponsorship of one of the private standards-writing organizations [63]. Examples of such organizations are the American Society for Testing and Materials (ASTM) and the American Society for Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE); both have become involved in standards development for solar technologies [59].

The standards development plan proposed by AWEA, under contract to Rocky Flats, is a long-term effort. In the meantime, an interim standard relating to performance, safety, and reliability of wind systems has been developed by DOE with limited wind industry coordination [64]. However, the standard is only an interim measure designed to provide the minimum criteria necessary for the inclusion of SWECS in the Residential Conservation Service Act pursuant to Title II of the Energy Conservation Policy Act (ECPA) [65].

Use of the standard for any other purpose is not authorized. The standard itself indicates that should voluntary consensus standards be developed by the private sector during the life of the Act, consideration should be given to replacing the interim standard with voluntary consensus standards [64].

#### **4.3.2 The SWECS Standards-Setting Process: A Legal Perspective**

SWECS manufacturers need standards so that their machines can be understood by consumers. The establishment of minimum quality standards should increase consumer confidence and broaden the markets for SWECS. Moreover, standards can be an important tool for federal, state, and local governments to use to qualify SWECS for tax incentives and loan programs. But standards can serve another important function: they can aid the SWECS manufacturer — and ultimately the legal system — in establishing the appropriate minimum utility-risk level for judging whether or not a SWECS is unreasonably dangerous.

Traditionally, the courts have maintained that all standards, even those imposed by government, should furnish lower limits for product acceptability at the very least. This means that if a product falls below the established standard of safety, it will be deemed unreasonably dangerous [5]. Moreover, the courts generally refuse to allow a manufacturer's compliance with such standards as an absolute defense in a product liability action [32]. There are three basic reasons why the courts view standards, and a manufacturer's compliance with them, in this way. First, there is the feeling that it would be inappropriate for the judiciary to set a standard below that established by an accepted standard-setting body [5]. Second, it is argued that no matter how carefully the standards were drafted, they could not comprehend every circumstance in which the product might be dangerous when used as intended. Third, it is often suggested that a lapse of time can cause safety standards to become outdated; the standards may fail to reflect advances in the state of the art [37].

The adequacy of a standard to protect the consumer from the risk of harm is at the heart of the debate over its general admissibility as evidence in product liability cases. Failure to comply with any standard is a failure to do the minimum; however, compliance with a standard might not equal doing the best possible job to protect the consumer from an unreasonable risk of injury [37].

The courts' willingness, in a product liability case, to look behind product standards to the quality of the process that produced them suggests the need for careful consideration of the legal requirements associated with the SWECS standards development process. A number of factors should be considered in this regard.

First, a standard can address the performance and safety of a SWECS only in a prescribed-use environment. A problem could arise in the actual environment of SWECS use if that environment is inappropriate either because of the location of the machine or because the SWECS is incompatible with the system to which it is coupled. A standard may not be able to address this problem. Thus, consideration should be given to providing appropriate assistance to potential users to ensure reasonable performance of the SWECS.

Second, the standards development methodology must prescribe a process that is open, that involves all interested parties, and that has a mechanism for adversarial resolution of issues. The process must be documented well enough to permit determination of the efficacy of the process and establish that trade-offs were resolved through comprehensive analysis.

Third, the process must provide for a review mechanism as new data become available to reassess the standard. This mechanism is particularly critical for products such as SWECS where only limited field data are available and where the technology will undoubtedly be evolving at a rapid rate.

Finally, the weight courts will place on voluntary consensus standards could largely depend on the reputation of the standards — setting organization [5]. In the context of litigation, the procedural credibility of the organization becomes as important as its technical credibility. Failure by the SWECS standards development process to adhere to any procedural or legal consideration also may call into question its technical credibility [60]. If, however, a court finds that the standard in question (1) was developed through careful, thorough product testing; (2) included consumer as well as manufacturer interests in its formulation; and (3) was up-to-date in light of the technological and scientific knowledge available at the time the product was manufactured, it will be more likely to regard compliance as a defense [37].

In assessing SWECS standards development from a legal perspective, it is important to note that SWECS performance criteria or standards can be used by federal, state, and local governments to develop legislative guidelines to qualify SWECS for tax incentives and loan programs. At the federal level, an interim standard has already been developed for qualifying SWECS for inclusion in the Residential Conservation Service Act. In addition, at least two states now require, in lieu of adopted standards, that a wind system must be tested at Rocky Flats to be eligible for state tax credits [66].

These developments indicate the potential for confusion and misinterpretation that could occur between the type of conventional standard described above and standards called for in legislation dealing with tax incentives and the like. These may or may not be standards in the conventional sense. The federal interim wind standard is described as a

"qualifying" standard. As such, its limited application (i.e., only for use under the Residential Conservation Service Act) should be carefully assessed by SWECS manufacturers when determining whether such a standard represents a reasonable level of minimum safety. Likewise, legislation such as the two state laws described here often calls for equipment to be "certified" by some agency or organization to be eligible for some protection or benefit bestowed upon it by the state. However, this may mean something other than the conventional certification process commonly undertaken by an established private organization.

Given these characteristics, a court would probably not give much credit to a manufacturer's compliance with either the interim standard or Rocky Flats certification if seeking to establish whether the minimum level of safety had been achieved by such compliance. Neither the standard nor certification, in their present state of development, could be deemed to have been produced with the requisite procedural due process, thoroughness, and review now required by the courts.

#### **4.4 THE IMPACT OF POTENTIAL LIABILITY ON SWECS PRODUCT LIABILITY INSURANCE**

Again, product liability law does not, in general, impose absolute liability on product manufacturers. In many instances, a jury is asked to balance the economic burden on the manufacturer to produce a safe product against the probability and severity of harm stemming from the product's use. In light of these factors, the jury is asked to determine whether the product is reasonably safe. Nevertheless, some courts do not view product liability law as a means of apportioning responsibility among parties, but as a legal compensation system. Their philosophy is that the manufacturer is in a better position to distribute the risk than the consumer is to bear it [37].

While such cases appear to be relatively few, insurers have regarded them as quite important in their pricing practices. As the Interagency Task Force (ITF) observed, insurance company ratemaking is an area where "perceptions of reality become as important as reality itself." [37]

Thus, even if ratemaking practices were improved, the spectre of these cases could still serve as an arguable justification for increasing premiums. Insurers have stressed that the current "hodge-podge" of product liability rules in each of the fifty states makes it virtually impossible to set rates with any degree of confidence. If one state court reaches a decision of this type, others could follow, making it impossible to predict when courts will change product liability rules and thereby broaden the exposure of insureds. As a result, insurers have indicated that in view of the current legal climate, past data are not a reliable source of ratemaking [43].

Affordable product liability insurance for SWECS manufacturers may be less available in the present legal climate than for other manufacturers. SWECS essentially are new products. There are few SWECS performance data, and no claims experience, upon which prospective insurers can determine rates. Moreover, SWECS are being designed for broad, new applications in unfamiliar use environments. There are no industry-wide safety standards to guide minimum design and performance requirements. It may be a mixed blessing that very few court cases involving windmills [67] are known to exist. On the one hand, this suggests that first-generation wind machines were relatively safe; on the other hand, the scarcity of case law regarding these machines makes any attempt to predict how the courts would treat product cases involving new-generation SWECS

extremely difficult, and mostly conjectural. In short, insurers are faced with assessing risk exposure and potential liability of a product that now is largely a mystery to them. In such circumstances, the uncertainties and possible unfairness in the present legal system regarding a manufacturer's responsibility for his product become even greater burdens on SWECS manufacturers who seek to obtain affordable liability insurance.

Given the absence of past data to determine rates, prospective insurers can be expected to utilize more subjective criteria for extending coverage [27]. One factor often considered is the size of the business seeking coverage. Information currently available suggests that the SWECS manufacturing industry generally comprises small manufacturers [68]. It is therefore useful to review some of the ITF's findings concerning the impact on small businesses, in particular, of the current product liability problem.

In general, the ITF found smaller companies to be less flexible in their insurance needs and unable to adapt their coverage to meet the exigencies of the current product liability problem. More specifically, the ITF found:

- Product liability problems alone have not caused businesses to fail; however, increased product liability costs may be one of several factors that may cause small manufacturers of high-risk products to terminate operations.
- In general, the impact of premium increases has been greater for small than for large businesses.
- Circumstantial evidence suggests that some businesses may be operating without sufficient economic resources to enable them to respond to a series of product liability judgments [37].

Additionally, information from the Product Liability Advisory Committee to the Under Secretary of Commerce and from the National Association of Insurance Commissioners (NAIC) indicates that product coverage is less affordable for small companies than for larger firms [37].

One of the reasons given by insurers as to why premiums may be less affordable for small companies is that some small firms are less able to keep abreast of and implement technological advances relating to product safety [37]. In this regard, the ITF data show that a much higher percentage of large companies have implemented some form of product liability loss prevention program than have small companies, and that insurers appear more willing to provide product liability advice to large rather than small insureds [37].

These findings are significant when one assesses the potential impact of such programs on the availability and cost of SWECS liability insurance. If you ask an insurer what may be the most effective solution to the current product liability problem and how best to reduce, or at least stabilize rates, he is not likely to tell you that reform of the present legal system is the answer. He is more likely to suggest placing the safest product on the market. Support for this approach is well-documented. For example, the ITF Insurance Study concluded that "the ultimate remedy to the product liability problem is to reduce the number and severity of product-related accidents" [37, p. VII-173]. The ITF Industry Study observed that "product liability prevention programs clearly place a significant incentive for risk prevention where it is potentially most effective" [37, VII-173]. This view has also been reflected in the testimony of some consumer groups before Congress [69]. Perhaps most important from the legal perspective are the comments of Dean Wade to the ITF. "The place where the Federal Government and its agencies will do most is not in regard to the law or the system for approaching it, but . . . in regard to

finding ways of cutting down . . . accidents." [37, p. VII-174]. Insurance companies do occasionally consider product liability prevention techniques of prospective insureds, among other factors, in making their underwriting decisions [37].

The relationships among an uncertain legal climate, the ability of manufacturers to address potential liability by marketing safer products, and the effect of safer products on the availability and cost of insurance are becoming more and more evident. The problem facing SWECS manufacturers is the same problem that confronts most small businesses today: the lack of financial resources or technical knowledge necessary to implement some kind of product liability prevention program on their own. The following section addresses the need for such programs to help minimize potential SWECS liability.

#### **4.5 PRODUCT LIABILITY PREVENTION: APPLYING THE LESSONS TO SWECS**

The ITF final report found that one of the basic causes of the product liability problem is that some manufacturers are producing unreasonably unsafe products [37, p. I-24]. A review of 655 appellate cases dealing with product liability strongly indicated that careful quality control procedures would have eliminated the basis for many lawsuits where a defect in construction had been charged [37, p. I-25]. The same sampling of cases indicated that plaintiffs were less successful when they asserted that a defect in design caused their injuries. In some of these cases, the courts seem to have permitted a "hindsight" judgment about whether the manufacturer designed his product carefully. However, in many cases, liability was imposed because the product was deemed to have had an unreasonable design in light of technology available at the time the product was made. Improved design review by the manufacturer might have eliminated those cases [37, p. VII-173].

This report has maintained that if SWECS manufacturers give the same attention to the legal elements of product performance and safety as courts do after an injury has occurred, their potential liability can be effectively minimized. The result of assessing concepts like foreseeable use and probability of harm is marketing the most reasonably safe product possible. The ITF sampling of product liability cases adds persuasive support to this conclusion. The mechanism for ensuring that unsafe or defective products do not enter the market is the product liability prevention program (PLPP).

##### **4.5.1 Elements of a Product Liability Prevention Program**

A PLPP may take many forms and may be identified under various titles such as product safety, product assurance, and risk management practices. Generally, a comprehensive PLPP will contain elements that describe manufacturer responsibility from initial design and production through marketing and service activities [37].

Almost all PLP programs stress a number of similar processes or practices. These include quality control, design review, labeling and packaging improvement, review of advertising and warranties, and, when applicable, greater emphasis on maintenance and servicing procedures [37].

Given that most SWECS manufacturers lack the financial resources to implement a comprehensive PLPP, the following major elements derived from the ITF study could be the most useful and cost-effective to undertake:

- An explicit manufacturer policy concerning product safety, quality control, and risk prevention.
- Rigorous testing of the SWECS within the context of its use environment.
- Procedures to assure that industry standards for SWECS safety are understood and considered at all operating levels and are used as minimum requirements for product design.
- Procedures for evaluation, during the design process, of the potential for personal injury or property damage during use or any reasonably expected misuse of the product.
- Review of existing quality control procedures in relation to developing product liability law.
- Documented adherence to quality control and inspection procedures.
- Review of all advertising materials, warranties, warnings, and instructions to ensure that information provided is accurate, clear, and complete.
- Maintenance of records through the expected life of each SWECS to document design tradeoffs, testing, quality control, and other aspects of a PLPP.

The existence and features of a quality assurance program are usually inadmissible in an action for strict liability if used to demonstrate the reasonableness of the production process or the improbability that a product was defective when it left the hands of the manufacturer [37]. But such a program, "described in the context of the overall risk-utility balancing process, can indicate the attention paid by the manufacturer to all elements of product formulation and can have a persuasive impact on the court's understanding of the issue of reasonable risk" [5].

Perhaps the most significant benefit of a PLPP to SWECS manufacturers is that it can take product misuse into account in the design, testing, or other appropriate stage of manufacture. As we have seen, the element of foreseeable use is often a decisive factor to be weighed by the judge and jury in a product liability case. However, as a practical matter, a PLPP itself is not a defense in such a case. Only its result — a reasonably safe product — offers a defense to product liability. Product liability prevention programs clearly place a substantial incentive for risk prevention where it is potentially most effective, and incorporate that effort into the price of the product [34].

Because such procedures may add to the price of the SWECS, their cost-effectiveness must be carefully appraised in light of market competition. One way to reduce the costs of a PLPP is to select only those elements that are deemed essential to a SWECS product safety program. For example, the critical assessment and necessary revision of SWECS instructions, warnings, advertisements, and warranties can be accomplished more readily and economically than other labor-demanding aspects of PLP programs such as design, engineering, and quality control procedures [37]. For this reason, implementation of this segment of a total program should be particularly attractive to a small manufacturer of SWECS.

As Section 4.1.2 reflects, in cases where a defect in design is asserted, the courts have had great difficulty in formulating standards of manufacturer responsibility. More certainty in the law is required in this area. Moreover, it would seem likely that affordable liability insurance would be more available if manufacturers' responsibilities regarding the design of their products were spelled out in understandable rules that contemplate the balancing of the cost and benefits of marketing products against the risks attending their use [70].



Assessing SWECS performance and safety by utilizing the utility-risk balancing test can ultimately benefit manufacturers by minimizing their potential liability. For these reasons, it is suggested that product safety design review may be the single most important element of product liability prevention SWECS manufacturers could undertake.

#### **4.5.2 SWECS Safety By Design: The Special Problems of the Design Defect Case**

As noted, the legal distinction between the reasonably safe product and the unreasonably dangerous one is made primarily by balancing the product's utility against the potential risks of injury stemming from its use. The SWECS manufacturer's decision-making procedures prior to marketing ought to reflect the firm's best judgment of the same balancing process in order to minimize potential liability [5].

Section 4.1.2 reviewed the various elements of the unreasonable-danger test, the basic method in a product liability case for evaluating the efficacy of a product. The same elements can form the basis of a manufacturer's design review process before the product leaves the drawing board [5].

The preceding sections have examined the broad legal responsibilities courts increasingly are imposing on manufacturers. Underlying these responsibilities is the assumption that a product must be designed for foreseeable use as well as intended use. This means that once the functional characteristics of a product are determined, a subjective, analytical process should begin. This process should articulate the kinds of use and misuse a product can experience in the hands of all who may come in contact with it. The process should also anticipate the hazards and risks of harm that are likely to be encountered by the various users. Once this is accomplished, the product design should be reviewed and decisions made regarding which design alternatives, warnings, and instructions should be incorporated to minimize or remove perceived risks of harm. Here, the choice of materials, as well as production and inspection procedures for minimizing product flaws, become part of the process [5].

To apply these concepts in a more useful form for SWECS manufacturers, consider the reformulation of the Wade indicia, found in Sec. 4.1.2, suggested by Weinstein et al. for use in the design process:

- Delineate the scope of product uses.
- Identify the environments within which the product will be used.
- Describe the user population.
- Postulate all possible hazards, including estimates of probability of occurrence and seriousness of resulting harm.
- Delineate alternative design features or production techniques, including warnings and instructions, that can be expected to effectively mitigate or eliminate the hazards.
- Evaluate alternatives compared with expected performance standards of the product, including the following:
  - Other hazards that may be introduced by the alternatives.
  - Their effect on the subsequent usefulness of the product.
  - Their effect on the ultimate cost of the product.

- A comparison with similar products.
- Decide which features to include in the final design [5, p. 140].

To be effective, this procedure should commence after the initial design has been formulated, after the requirements of relevant standards have been incorporated. But the manufacturer must always remember that courts generally view standards as floors, not ceilings, when judging a product's reasonableness.

As each element in this process is addressed, effects on product usefulness and cost must, of course, be introduced [5]. SWECS manufacturers should recognize, however, that the cost of their products is not based merely on materials, labor, marketing, and profit. Part of that cost arises from injuries either from the possible fraction of machines perhaps marketed with a production flaw or from hazards that the final design failed to minimize. Whether such costs are partially paid through liability insurance premiums, settlements, or legal fees is unimportant; they are part of the real cost of the product and should substantially affect decisions about which safety features to incorporate in the final design. Weinstein et al. elaborate:

If the manufacturer's risk-utility trade-offs are to be made realistically, they must be made with a full recognition of the potential risk of liability compared with the utility of marketing a product without safety design features that would raise the cost. Unquestionably, competitive market position is important in decision-making and can influence the process. It should not, however, be the only consideration.

Admittedly, the safety design review procedure suggested here is highly subjective. Its success is predicated on the basic integrity and scope of the analysis undertaken. Procedures exist, such as fault-tree and failure-modes-and-effects analyses . . . as well as others, that provide matrices for a structured analysis of hazards and risks. They are useful tools, particularly for complex products. But they are tools only. The results of such techniques only reflect the quality of the input. If, for example, the scope of anticipated product uses, users, and environments is restricted, the hazard and risk analysis will be also.

These are the necessary ingredients for an effective product safety design review. Add to these procedures a thorough documentation of the decision-making process, and the court will have the necessary benchmarks for judging the reasonableness of a SWECS manufacturer's utility-risk balancing process, and hence, the product's social acceptability.

If it can be shown that effective product liability prevention techniques, safety design review procedures, and adequate standards minimize potential SWECS liability and improve the prospects for obtaining affordable liability insurance, the question becomes: Is there a useful role for the federal government to help assure that product liability issues do not impede the manufacturing and marketing of SWECS?

## SECTION 5.0

### POLICY ALTERNATIVES TO HELP MINIMIZE SWECS LIABILITY: THE FEDERAL ROLE

There are two distinct ways of looking at SWECS product liability issues. One approach would be to examine the symptoms of the current product liability problem as they apply to SWECS manufacturers. This might include considering proposals aimed at reducing the present high cost of product liability insurance for SWECS, or examining alternative sources of insurance. The kind of alternative insurance mechanisms that could be considered are: (1) a federal product liability insurance program specifically designed for SWECS manufacturers; (2) federal reinsurance; (3) a mandatory or voluntary pooling mechanism; (4) permission for a qualified SWECS manufacturer to set aside a portion of his pre-tax income to fund a specific reserve for self-insurance against product liability claims; and (5) modification of federal tax law to encourage the formation of SWECS captive insurance companies.\*

While such remedies might reduce the cost of product liability insurance and make such insurance more readily available to SWECS manufacturers, they could also obscure the real causes of the problem and thereby delay meaningful long-term solutions. On the other hand, dealing with causes takes time. Measures not related to causes may have the advantage of providing immediate relief to SWECS manufacturers who now find it difficult to obtain affordable commercial liability insurance. In any event, alternative insurance remedies, mentioned at the beginning of this report, will be thoroughly addressed in the forthcoming Rocky Flats study.

Another approach to SWECS liability issues involving causes could begin with the unsafe product. The advantage of this approach is evident throughout this report. The failure of some manufacturers to use effective product liability prevention measures, which incorporate the legal requirements of the utility-risk balancing test, leads, in turn, to more product-related injuries and claims. This, in turn, leads to greater insurance and other costs for all manufacturers and ultimately for the product consumer or user [45]. If, however, a manufacturer has (1) the necessary product safety information, (2) an adequate set of industry standards to establish a minimum level of safety, and (3) sufficient financial resources to implement product liability prevention and safety design review procedures, he can effectively minimize his potential liability and improve the prospects for obtaining affordable liability insurance.

The ITF Final Report concludes that while occasionally a number of federal regulatory agencies have alerted manufacturers to product hazards or defects, neither the federal nor state governments appear to have any general information-sharing program that would bring such information to the attention of all relevant businesses [37]. Likewise, while insurers claim they are providing assistance in the area of product liability loss prevention, generally they have not provided detailed guidance to smaller manufacturers. Also, some manufacturers have complained that the present insurance ratemaking system does not create incentives for implementing product liability prevention programs. They claim that they do not receive credit in their premiums for undertaking such programs [45].

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\*These proposals are derived from the Department of Commerce's Options Paper on Product Liability and Accident Compensation Issues [45, pp. 14618-14620].

The SWECS manufacturing industry generally comprises small firms. Few of these firms are likely to have either the required expertise or the financial resources to assemble SWECS risk information properly and implement a PLPP on their own. In light of the present legal climate, the absence of effective internal measures to analyze reasonable product safety may make the SWECS manufacturer increasingly vulnerable to product liability. The lack of such measures may also contribute to insurers' present reluctance to provide coverage for SWECS at affordable rates.

Recalling the federal government's interest in assuring that legal issues do not impede SWECS commercialization, is there a role DOE in particular might play in helping SWECS manufacturers to minimize potential liability? The following policy alternatives define a potential DOE role. The question underlying each alternative is whether it can contribute effectively to reducing potential SWECS liability without burdening SWECS manufacturers. Accordingly, the relative advantages and disadvantages of each alternative are also briefly described.

### **5.1 DEVELOPING A PROGRAM OF SHARING PRODUCT RISK INFORMATION WITH SWECS MANUFACTURERS**

Again, one of the reasons given by insurers as to why liability insurance premiums may be higher for small companies is that some small firms are less able to keep abreast of and implement technological advances relating to the safety of their products. A program coordinated by DOE for acquiring and sharing SWECS risk information with the industry would address this problem. Such information would include specific characteristics of the machines associated with potential SWECS-related accidents. Translating SWECS safety and performance data collected at Rocky Flats into risk data could provide a useful starting place for gathering necessary information. But the essential feature of such a program would be its ability to get the information into the hands of the SWECS manufacturer quickly. As the ITF Final Report noted, some federal agencies do gather product risk information, but the information does not always reach the product manufacturer [37].

There is also some precedent for including product risk information from agencies other than DOE in such a program. For example, a structure like the Interagency Regulatory Liaison Group\* could pool SWECS product information gathered from a number of sources. DOE field offices could be used to distribute such information.

#### **Advantages:**

- If the program were designed to acquire SWECS product risk information solely from field test data taken by Rocky Flats, it would be unnecessary to obtain such information from the manufacturers themselves, saving time and money.
- The mechanism for obtaining SWECS risk data and the basis for such information already exist at Rocky Flats.

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\*This group, made up of the FDA, CPSC, EPA, and OSHA, is cooperating to make efficient use of government resources to protect the public from the adverse effects of toxic and hazardous substances [45].

**Disadvantages:**

- Unless the program is carefully designed, it could lead to additional DOE expenditures.
- Other government agencies have experienced difficulty gathering product risk information.
- Some SWECS manufacturers may regard unsafe products as the least important cause of potential liability and their difficulty in obtaining insurance. If the program were designed to collect information directly from the manufacturers, they might regard any additional reporting requirements as compounding their problems.
- Such an approach might not fully meet the needs of SWECS manufacturers with respect to product liability prevention in general. Although they might be alerted to product hazards or defects they were not aware of, this approach would not actually provide the technical guidance to deal with those hazards under an on-going PLPP.
- If used in litigation, such information could increase manufacturers' potential liability by indicating what they should have known about the safety of their products.

**5.2 ASSISTING IN THE DEVELOPMENT OF SWECS STANDARDS BY ENSURING A REPUTABLE AND THOROUGH STANDARD-SETTING PROCESS**

As previously indicated, the relevant issue in a product liability case as to standards is whether they were produced by a reputable organization based on an open, objective, and thorough standards-setting process. Additionally, the courts will often inquire as to whether the standard for the product is matched by a complimentary system of controls on the use of the product, such as by certification [37].

DOE already plays an intermediate role in assisting private-sector development of SWECS performance and safety standards. DOE, however, could focus more on the adequacy of the SWECS standards development process from a legal perspective. Hastily developed standards may be either too stringent, and thus beyond the scope of certain manufacturers' compliance; or too flexible, and thus of questionable value for establishing a reasonable minimum level of product safety. In either case, the potential long-term damage to SWECS commercialization could be sizable if the standards and the process by which they are produced, are not carefully and continually assessed in light of existing legal and procedural requirements.

In this regard, DOE and AWEA might consider adding a member to the SWECS standards-development advisory board who has expertise in the product liability area so that the legal sufficiency of the process can be better assured. Because of the importance the courts attach to the reputation of the standards-setting organization, DOE may wish to assess more carefully both the adequacy of the testing procedures upon which the standards are based and the process for certifying product compliance with those standards. Finally, DOE may want to take special care to see that an appropriate review mechanism is established to ensure that the requirements of SWECS standards can be immediately reassessed as new data become available.

**Advantages:**

- A comprehensive SWECS standards development program is in progress in which DOE already plays a significant role. Refocusing DOE's efforts in this area would not require major additional expenditures nor would it unduly expand DOE's involvement in the process.
- Although the SWECS standards-setting process has begun, it is still in a very early stage of development, with final standards perhaps two or more years away. Addressing the legal and procedural requirements of that process now could avoid the need to incorporate legal considerations later, when it may be difficult to do so.

**Disadvantage:**

- Proper attention to the legal aspects of the process alone will not "legally" insulate a manufacturer from liability. Product standards and adherence to them by SWECS manufacturers make up only one element of an effective product liability prevention program. Standards produced by an adequate standards-setting process would likely be given maximum weight by a court only if such standards represented the beginning, not the end, of a product safety review procedure.

**5.3 PROVIDING THE MEANS WHEREBY TECHNICAL ASSISTANCE IN THE AREA OF PRODUCT LIABILITY LOSS PREVENTION IS SUPPLIED TO SWECS MANUFACTURERS**

Insurers are expected to begin assessing more critically the product safety practices of manufacturers and the product liability prevention programs being implemented by firms seeking insurance. However, greater involvement by insurers in this role will increase the cost of providing insurance coverage. For large firms, product safety services provided by the insurer represent only a small fraction of the total premium cost. However, the cost of liability prevention insurance services may often be prohibitive for small manufacturers [37]. Because the SWECS manufacturing industry largely comprises small businesses, few of these firms are likely to be in an economic position to utilize available product liability prevention services offered or required by prospective insurers.

Three options present themselves as mechanisms for federal assistance to SWECS manufacturers to assure the availability of product liability preventive measures:

- (1) Require SWECS manufacturers to use reasonable product liability prevention techniques as a "quid pro quo" for participation in federal reinsurance or pooling programs.

If federal funds were used to subsidize a SWECS product liability reinsurance program or a mandatory SWECS product liability pool, such a program should be designed to assure that program beneficiaries use reasonable product liability prevention measures. This was the position of the ITF with respect to establishing such a program nationwide [37, p. VII-175]. In this regard, the Crime Insurance Programs of 1970 required that beneficiary insureds implement self-protective devices as a condition of coverage.

This approach is unique in that it combines a non-cause-related remedy (federally subsidized insurance) with a cause-related remedy (product liability prevention). The question for DOE is how to provide the technical assistance to SWECS manufacturers to implement a product liability prevention plan and how to evaluate the effectiveness of those plans. One possibility is to reimburse insurers participating in a reinsurance program for providing product liability prevention services, when needed, to individual insureds. The insurer might also be responsible for certifying that its insureds followed reasonable product liability prevention programs.

**Advantages:**

- The ITF found no objection from the firms it surveyed to the prospect of complying with product liability prevention program requirements as a "quid pro quo" for guaranteed availability of liability insurance. In fact, most firms welcomed such a proposed remedy [37, p. VII-176].
- If the program were made available on a strictly voluntary basis, it could probably also win support of insurers and consumers.

**Disadvantages:**

- Implementing such a program could be difficult. If the requirements of the PLPP were too stringent, the result could be that some SWECS manufacturers might not be able to participate in it.
- Insurers may not be equipped to provide comprehensive product liability assistance and advice.

- (2) Provide direct DOE or other federal assistance to SWECS manufacturers in the area of product liability prevention.

The ITF's Briefing Report suggested that the federal government, through an appropriate agency, could furnish product liability prevention information and, in special cases, technical personnel to assist businesses in making their products safe [37, p. VII-183]. Applying this concept to SWECS manufacturers, DOE, perhaps in cooperation with other agencies, might again collect, assemble, and distribute SWECS risk information to the industry. The approach described above, however, would combine the information-gathering function with the actual provision of product liability prevention personnel to SWECS manufacturers having a special need for such assistance.

While it seems useful to explore whether DOE might appropriately coordinate information gathering and dissemination, the issue of whether DOE should provide direct technical assistance to SWECS manufacturers is more difficult to resolve. Questions concerning both the cost effectiveness of such a program and whether sufficient personnel might be available, would need to be addressed. If it considers such an approach, DOE perhaps should determine first whether qualified private-sector product liability prevention specialists should be used before attempting to undertake that responsibility directly.

**Advantage:**

- This approach addresses the product liability problem facing SWECS manufacturers more directly than any other alternative.



**Disadvantage:**

- The number of government personnel capable of providing technical assistance in product liability loss prevention is limited. Direct DOE assistance would involve uncertain new expenditures without the benefit of cost-effectiveness data for such a program.
- (3) Establish a special loan program directed at providing loss prevention technical assistance to SWECS manufacturers who would otherwise be unable to afford it.

Under this approach, DOE, in cooperation with the Small Business Administration, would furnish loans designed to encourage SWECS manufacturers to obtain product liability loss prevention assistance in the private sector. It should be noted that the SBA currently provides loans to companies that manufacture renewable energy equipment, including "wind energy conversion equipment," under the Small Business Energy Loan Act [71]. In this regard, a determination could be made to make product liability loss prevention services available to SWECS manufacturers eligible for loans under the existing program, or to establish an additional loan program for this purpose.

**Advantage:**

- An SBA special loan program already exists that could be used as a vehicle for obtaining loans for product liability prevention assistance.

**Disadvantage:**

- A loan program of this kind would involve uncertain new expenditures without cost-effectiveness data demonstrating the wisdom of such a program.

## SECTION 6.0

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