

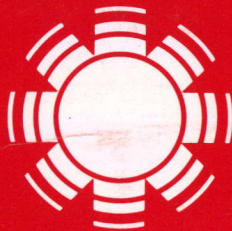
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Legal Issues Arising from Passive Solar Energy Systems

John Overdorf



SERI

Solar Energy Research Institute

A Division of Midwest Research Institute

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Golden, Colorado 80401

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SOLAR ENERGY RESEARCH INSTITUTE
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PREPARED UNDER TASK NO. 6721.40

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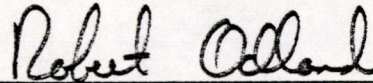
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FOREWORD

This paper on legal issues arising from passive solar energy systems was prepared by the Solar Energy Research Institute (SERI) to fulfill, in part, SERI's solar information dissemination function. The paper is part of the Community and Consumer Branch Law Program, which is in turn part of the overall program of the Planning Applications and Impacts Division. The function of the SERI Law Program is to identify and analyze significant legal issues affecting the development of solar technologies.

This paper was written as part of the Law Program's 1979 Summer Law Intern Program. The Program provided an opportunity for law students to research and address topics relating to law's impact on solar energy. The 1979 Program resulted in eight papers that discussed primary legal issues that are, or will be, generated by the commercialization of solar technologies.

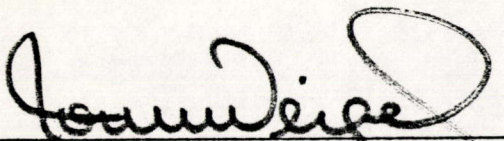
The author of this paper, John Overdorf, was a law student at the Vanderbilt University School of Law while he was participating in the Program. He is now a third year student at Vanderbilt Law School. The Law Program is supervised by Jan G. Laitos, SERI Senior Legal Specialist.



Robert Odland, Chief
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Approved for:

SOLAR ENERGY RESEARCH INSTITUTE



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SUMMARY

While passive solar systems are recognized as a critically important way to reduce the energy demands of buildings, the commercialization of passive solar systems may be accompanied by some level of consumer disappointment. This disappointment may result from insufficient solar access, personal injury or property damage resulting from the use of the system, inadequate system performance, or tax credit ineligibility. Representations regarding passive solar systems will affect the level of consumer disappointment with the systems. Erroneous representations may give rise to various legal causes of action. The control of representations concerning passive solar systems is the focus of this report.

One method of protecting consumers from erroneous representations is to elevate consumer awareness. The energy audit provisions of the National Energy Conservation Policy Act could be a significant consumer education mechanism. However, any consumer education efforts are limited by the consumers' willingness and ability to use the information that is made available to them. Therefore, other methods, in addition to consumer education, must be available to adequately protect consumers from erroneous representations.

Consumers may be protected in part from erroneous representations by the public regulation of representations. The Federal Trade Commission, pursuant to the Federal Trade Commission Act, and state agencies, pursuant to state deceptive trade practice laws and consumer protection acts, have the power to regulate the content of representations. Federal Trade Commission trade regulation rules frequently are used to control representations. One FTC rule promulgated for representations regarding home insulation may even serve as a model for regulating passive system representations. Consumers disappointed by erroneous representations may have several legal theories available to them on which to base a claim for relief. Some of these legal theories (i.e., breach of express warranty, fraud, and negligent and innocent misrepresentation), are based on representations expressly made, while others (i.e., breach of implied warranty, negligence, and strict liability) are based on representations implied by law. Under some of these legal theories, only personal injury and property damage are compensable; economic loss is not. This limitation on recovery may prove significant to passive consumers, since consumer disappointment with passive systems is likely to be in the areas of energy savings and thermal performance, both of which are items of economic loss.

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SECTION 1.0

INTRODUCTION

On July 20, 1979, President Carter established a national goal of supplying 20% of the country's energy needs from solar energy and renewable resources by the year 2000 [1]. President Carter commended passive solar systems as one solar technology that is currently competitive with conventional fuels, and proposed tax credits to encourage passive commercialization [2]. One estimate of meeting the 20% goal indicates that 6-8 million residences will need to utilize some form of passive design [3]. Other estimates indicate that as many as 20 million homes will have to incorporate passive designs by the year 2000 [4]. In the near term, consumer consideration of passive systems will accelerate as tax credit assistance is made available and as utilities provide energy audits of existing homes pursuant to the National Energy Conservation Policy Act [5]. The draft regulations for implementing the National Energy Conservation Policy Act recommend passive for every region in the United States [6].

A passive solar building is designed to use solar energy to supply most of the building's energy needs [7]. The architectural design, building components, and site characteristics are means for collecting (or dissipating), storing, and distributing energy [8]. The hazards associated with passive applications are estimated to be minimal because passive relies on existing construction materials and techniques [9]. However, as the use of passive increases, it can be predicted that consumer disappointment problems will arise. The residential consumer, even without the inclusion of passive applications, faces a very fragmented and complicated construction industry, where 10% of all new structures are estimated to have serious structural problems [10]. Home improvement fraud has been estimated to be \$500 million to \$1 billion annually [11]. The incorporation of passive applications into traditional construction techniques increases structural defect risk by adding complexity to building design and construction. In addition, consumer disappointment will arise when performance does not match consumer expectations in such matters as energy savings, thermal comfort, or temperature fluctuations.

This report focuses on the control of representations made with respect to passive solar energy systems. Representations generally are of two types: those that relate to product safety, and those that concern product performance. Representations concerning safety may be either explicit or implied by law [12]. Where implied by law, society is, in effect, judging whether the product or service is as safe as it should be, independent of explicit representations made to the consumer [13]. Purchasers of passive systems are not likely to be disappointed by representations as to the safety of the systems. The risks of personal injury or property damage associated with the use of passive systems generally are considered to be minimal [14]. Purchasers of passive systems are more likely to be disappointed by representations as to product performance. For example, as energy prices continue to rise, representations such as "cut your heating costs up to 70%," or "provides 60-75% of your heating requirements," are certain to interest consumers seeking to reduce fuel bills [15]. If the use of passive systems does not in fact result in such energy savings, representations such as these may give rise to causes of action against the representers. Even in the absence of express representations concerning product performance, the law may give disappointed consumers a cause of action against a representer where a level of performance was "suggested" by a culpable representer to innocent consumers. Other claims, such as those made with respect to government tax credit eligibility, may also present misrepresentation questions [16].

This report describes public regulation of representations, and private theories of liability based upon those representations [17]. Section 2.0 introduces the reader to passive technologies and identifies potential consumer disappointment issues. Section 3.0 describes consumer education efforts in the energy area which may serve as one means of consumer protection. Section 4.0 discusses the public regulation of representations as another means of consumer protection. Section 5.0 surveys legal theories available to a disappointed consumer seeking redress. Specific attention is given to the applicability of these theories to the major contacts a residential consumer has in the passive technology delivery system—the architect, the manufacturer, and the lender [18].

SECTION 2.0

A DESCRIPTION OF THE TECHNOLOGY AND ASSOCIATED RISKS

This section briefly describes four types of passive solar systems that are integral parts of a residence. These systems are direct gain, thermal storage wall, solar greenhouse, and roof pond [19]. For each system, design parameters and costs are noted. Design parameters establish important safety and performance limitations. For example, a roof pond retrofitted onto an existing structure creates a potential structural safety problem because of weight. Performance levels vary according to the design parameters of each passive system.

This section also introduces potential consumer disappointment issues associated with passive solar systems. Solar access is briefly discussed, since it is a crucial performance determinant. Personal injury, property damage risks, and system performance issues are also considered. Consumer disappointment arising from representations of tax credit eligibility is addressed since belief as to eligibility can greatly affect evaluation of economic worth.

2.1 TYPES OF PASSIVE SYSTEMS

The most widely accepted definition of a passive system is one in which "the thermal energy flow is by natural means (involving conduction, convection, radiation, and evaporation)" [20]. An active system uses forced means, such as fans or pumps, to control the thermal energy flow [21].

The elements of a solar space heating system are a space to be heated, a collector, and a thermal storage medium [22]. The collector admits solar radiation into the system, where the thermal storage wall converts and absorbs the heat. The thermal storage wall provides control over the stored heat. Possible thermal energy flows exist between the collector and storage, collector and space, and storage and space. A space cooling system contains a space to be cooled, an environmental sink, and a thermal storage medium. Heat is discharged into the environmental sink for cooling. The environmental sink may be the sky, the atmosphere, or the ground. Possible thermal energy flows exist between the space and sink, space and storage, and sink and storage [23].

A major debate concerning the definition of a passive system is whether the use of any mechanical equipment (fans or pumps) for thermal energy flow control transforms a passive system into an active system. Dr. J. Balcomb, testifying at the House of Representative's Passive Solar Energy Hearings, stated that passive systems, by definition, "preclude the use of pumps or fans or other mechanical equipment to force energy to flow from one place to another" [24]. The Department of Energy has sought to expand the simple passive/active dichotomy by the use of a "hybrid" system in which at least one of the significant energy flows is by natural means, and at least one is by forced means [25]. Hybrid systems are included in the term "passive systems" for the purposes of this report.

It is important to note that the distinction between active and passive rests upon the factor causing energy flow and not on the degree of control over that flow. Dampers, movable insulation, and drapes permit regulation of natural energy flows in a passive system. The important point is that the flow motivation derives from nonmechanical sources [26].

2.1.1 Direct Gain

In a direct gain system, the space to be heated receives the sun's radiation directly. Within the space, a thermal storage medium is necessary to store the energy until needed. Direct or diffuse energy transmitted through the glazing is utilized. Therefore, direct gain systems work well in cloudy as well as sunny climates [27]. Generally, the building is elongated in an east-west direction, with spaces needing heat located along the south wall [28]. The major glass areas of each space to be heated are oriented to the south for maximum heat gain in winter, providing both collection and daylighting functions [29]. Proper design is necessary to reduce glare from the glazing [30].

A properly designed direct gain system integrates all the architectural elements within each space—window, floor, roof, and interior surface finishes. For this reason, it would be extremely difficult to retrofit an existing structure with a direct gain system. In new construction, masonry walls and floors (as thin as 4 inches) or built-in water storage walls can be utilized as the heat storage medium [31]. As there are no heating ducts or registers, the direct gain system is not separable from the structure except to the extent a water barrel storage wall is present. Where conventional masonry building construction is prevalent, a direct gain system poses little, if any, incremental costs. Nationally, the incremental costs of adding a direct gain system are estimated to be \$8-\$18/ft² of collector area [32].

Daily indoor temperature fluctuations in a direct gain system may range from 10-30° F [33]. Once sunlight is admitted into the space, there is minimal control over heat flows within that space. Overheating can be regulated by manually or mechanically operated shading devices, or by opening windows or using exhaust fans [34]. Backup conventional heating will maintain relatively uniform interior temperatures should there be a long, cloudy or abnormally cold period. Edward Mazria rates the efficiency of a properly designed direct gain system as roughly 30-75% efficient in winter [35].

2.1.2 Thermal Storage Wall

Thermal storage walls, often referred to as "Trombe walls," can be characterized as indirect gain systems [36]. Unlike direct gain systems, in which the space to be heated receives the sun's radiation directly, in indirect gain systems, a thermal storage wall is interposed between the sun and the space to be heated. The two types of thermal storage walls, water and masonry, transfer heat by different principles.

The exterior face of a thermal storage wall is usually painted black or a dark color for maximum solar absorption. Absorption of solar radiation raises the surface temperature. This surface heat is then conducted (by masonry walls) or convected (by water walls) to the interior of the thermal storage wall. Heat is then supplied to the space by radiation from the interior face of the wall.

The solar radiation passing through the glazing on the exterior face of the wall can heat the surface of a masonry wall to 150° F [37]. Convection currents within a water wall will keep its surface relatively cool. The high surface temperature of a masonry wall can be utilized to thermocirculate additional heat to a space. This surface temperature raises the air temperature in the space between the storage wall and the collector. Vents located in the upper and lower ends of the wall permit the heated air to escape through the upper vent, thereby drawing in cooler air to be heated [38].

Use of a thermal storage wall limits the depth of the space to be heated to approximately 15-20 feet [39]. South facing glass is required, but it functions as a collecting surface only. Windows can be included in the thermal storage walls for lighting, direct gain, and viewing purposes. Prevention of heat loss from the exterior face of the wall is accomplished by double glazing and/or shutters that are manually or mechanically operated at night [40].

Thermal storage walls are suitable for new or retrofit construction. It is hoped that "bolt-on" retrofit systems will develop as mass-marketed products [41]. However, use of water as a thermal storage medium requires careful attention to structural capacity in an existing residence [42]. A thermal storage wall is estimated to add \$2-\$11/ft² of collector area to the cost of the structure [43].

Regulation of thermal storage walls is a function of wall thickness, thermocirculation vents with operable dampers, and glazing and movable insulation panels on the exterior and interior faces of the wall. The efficiency is estimated at 30-45%, with a water wall being slightly more efficient than a masonry wall [44].

2.1.3 Attached Greenhouse

An attached greenhouse combines direct and indirect gain systems. The greenhouse space is heated by direct gain, with the common wall between the greenhouse and the interior space of the house serving as the thermal storage wall. This interior space receives its heat indirectly from the common wall. Upper and lower vents in the common wall permit thermocirculation. A hybrid system can be utilized to draw warm air from the greenhouse and store the heat in a rock bed located under the interior floor. Heat is then delivered upward by radiation and convection [45].

The greenhouse must be affixed to a south-facing wall adjacent to the space to be heated. Simply heating one square foot of building floor area (excluding the greenhouse) requires approximately one and one-half as much greenhouse glass area as is required in a thermal storage wall system, although somewhat less is necessary if a hybrid system is used [46]. Attached greenhouses are suitable for new or retrofit construction [47]. The primary construction materials are the collector, made of glass or plastic, the thermal storage medium, and the wall and/or rock bed, if a hybrid system is used [48]. An attached greenhouse is estimated to add \$5-\$15/ft² of collector area to the cost of the structure [49].

Temperature control in a solar greenhouse is effective if the collector area and thermal mass are properly designed and sized. Additional control can be accomplished by means of thermocirculation vents with operable dampers, and movable insulation panels [50]. The efficiency of a greenhouse system is approximately 60-75% during the winter months [51]. A secondary advantage of greenhouses is the potential to grow foods for household consumption [52].

2.1.4 Roof Ponds

The roof pond system can function as well as a heating or cooling system. The basic concept is the thermal mass, consisting of water, supported by the roof/ceiling (usually a metal deck) of the space to be heated or cooled. The crucial component is a reliable, movable insulation system that can be used to cover the pond [53]. In winter, the pond is

uncovered during the day to permit absorption of heat; at night, the pond is covered and the absorbed heat is radiated to the space below. The coverage schedule is reversed in summer. Coverage during the day prevents exterior heat absorption, while removing the insulation panels at night cools the water by natural convection and radiation. The pond then serves as an environmental sink into which the interior space heat is discharged [54].

A roof pond does not limit building orientation or configuration. It permits total latitude with respect to interior spaces. However, building height is restricted. A roof pond is considered most suitable for a one-story building, or the upper floor of a two- or three-story structure. The roof shape can be flat, pitched, or stepped-up to the north [55].

Roof ponds are generally not suitable for retrofit construction. As roof ponds are generally 6-12 inches in depth, they add a dead load of 32-65 lb/ft² to the structural requirements [56]. This would require excessive structural and modular reconstruction. In new construction, a structural metal deck is commonly used as the support. A roof pond is estimated to add \$10-\$25/ft² of collector area to the construction cost of a house [57].

Roof ponds create fairly stable temperature fluctuations, ranging from 5-8° in a masonry building and 9-14° in a building constructed of lightweight material such as wood frame. Roof ponds that are double-glazed have efficiencies from 30-45% [58]. The effectiveness of the seal that is made by the movable insulation and the reliability of the movable insulation system greatly affect the efficiency of the roof pond system.

2.2 POTENTIAL CONSUMER DISAPPOINTMENT ISSUES

2.2.1 Solar Access

The amount of sunlight available to a passive system user is a critical factor in the design and utilization of a passive system. Unless the building to be heated has direct access to the low winter sun between 9:00 a.m. and 3:00 p.m., its suitability for solar heating is greatly diminished or totally eliminated [59]. Perhaps the most widely discussed legal issue involving solar energy applications is solar access [60]. A complete discussion of the solar access issue is beyond the scope of this report. Only a brief discussion follows.

Under common law, a landowner does not have the right to continued access to sunlight that previously fell upon his property. Neighbors may block the sunlight with shade from trees or by adding structure height when permitted under applicable zoning regulations [61]. To alleviate this problem, various states and municipalities are considering or have adopted legislative solutions. Public control of shading has been adopted or considered in a number of jurisdictions [62]. The most common solution is to permit solar access easements that allow private agreements between neighboring landowners. Solar access legislation sets forth the necessary contents of easements and the requirements to bind subsequent owners. However, since the easements are negotiated and purchased, access cannot be assured unless the neighbor voluntarily sells an easement [63]. New Mexico has rejected this approach in favor of controversial legislation granting a legally protected solar right that is created by the prior appropriation of the sunlight [64].

Zoning and land-use planning can encourage or restrict solar access. Some states have considered or adopted solar legislation that prohibits zoning restrictions on solar devices [65], that provides that the inability to make effective use of solar systems may

be an "undue hardship" so as to justify granting a zoning variance [66], or that adds solar access as a legitimate zoning purpose for municipal consideration [67]. In California, the subdivision process must now include consideration of the solar potential of the land being developed [68].

Residential subdivision developers frequently provide elaborate sets of covenant restrictions and controls on the individual lots in the development, rooftop equipment or structures, height and setbacks, and exterior materials. Any variation proposed is subject to approval by a neighborhood architectural review board, created by covenant in many subdivisions [69]. Generally, courts have been reluctant to disturb private covenants. A recent California case held that a covenant that prevented the use of solar equipment was unenforceable because it violated the state's public policy in favor of solar energy use [70]. However, an Arizona court has recently upheld a covenant that allegedly prevented the use of a solar system [71].

Because passive solar systems are dependent upon the availability of direct sunlight, careful planning with respect to solar access is necessary to ensure adequate system performance. Failure to adequately consider and, if necessary, take steps to protect solar access might be grounds for liability should solar access be represented as sufficient.

2.2.2 Damage Issues

The use of solar energy is often considered to be environmentally benign and to present few or no health hazards. However, all technologies impact the environment in which we live, and all technologies induce situations that can lead to personal harm and property loss. Solar energy is no exception, but the negative aspects appear to be far less hazardous than many other technologies if solar energy systems are carefully designed. [72]

Personal injury and property loss are commonly understood items of damage. Even though passive solar systems generally employ existing construction materials and techniques, poor design, improper installation, or defective materials present potential damage situations. For example, the installation of roof ponds requires careful attention to structural capacities because of the great weight involved. Leakage from collapse of the roof pond might involve serious damage.

The collector presents potential risk situations from the glazing and the sealant utilized. Glass or plastic may shatter or break if unable to withstand stress from wind, snow, rain, or hail. Solar degradation may damage plastic glazing much faster than anticipated or warranted. Improper consideration of the maximum operating temperature of the glazing material could lead to warping, release of toxic or combustible gases from plastic material, and ignition of plastic materials [73].

Rubber seals are used to seal the glazing to the collector frame. Improper matching of the expansion coefficients of the glazing material and the supporting structure will produce stress and possible failure of the seal [74]. Leakage or collapse is possible. High-temperature stability, fire properties, and outgassing at high temperatures are usage considerations of sealant materials [75].

Even though thermal storage does not generally involve new construction materials or techniques, the potential for damage still exists. Defective construction of a masonry

storage wall may result in replacement or injury costs. Water storage walls require structural capacity consideration and possible leakage prevention [76]. Insects or the accumulation of mold or fungi in rock storage medium may require unexpected user expenditures [77]. Phase-change materials present toxicity and performance questions [78].

The insurance industry has identified the following potential hazards of solar energy applications: broken glass, roof collapse, broken pipes, water leakage, fire, explosion, personal injury, and additional living expenses [79]. Most of these possibilities are considered minimal risks. Additional experience with solar systems is necessary to determine the actuarial risks associated with system reliability and safety, system breakage and durability, and abnormal problems such as vandalism or hail [80].

2.2.3 System Performance

A defect in a component part of a passive solar system may result in personal injury or property damage. The general laws governing liability in residential construction and design determine personal injury and property damage liability with respect to defective passive system components. A more complex question concerns the existence and scope of liability for failure of the system to match the performance expectations of the user. Comfort, convenience, and economy are interwoven in consumer expectations [81].

For the moment, let us assume that convenience is not an issue. Either the user is willing and able to take whatever steps are necessary (e.g, close the drapes or operate the insulating panels on a roof pond) or reliable, mechanical equipment does it for him [82]. Under this assumption, comfort and economy are directly related to each other. The more uncomfortable the user feels using the passive system only, the more likely the user will turn to the conventional fossil-fuel heating or cooling system, which increases energy expenditures.

Human comfort tolerances are difficult to quantify precisely, since they vary over time and between cultures. ASHRAE has developed a comfort envelope that is defined by dry bulb temperature between 73° and 77° and a water vapor pressure between 5.0 and 14.0 mm Hg [83]. Some observers point out that merely wearing appropriate clothes (e.g., sweaters in the winter, lighter clothes in the summer) could extend the comfort range to 68-80° F. [84]. President Carter's recent executive order on public buildings established upper and lower limits for thermostat settings: 65° in the winter and 78° in the summer.

The economy of the passive solar system is directly related to user comfort requirements. If passive solar is marketed as a product, the purchaser expects certain returns. Definite comfort ranges at an assured monthly backup system cost, as measured by fuel bills, will be sought by the purchaser [86]. The inducement to purchase may be implied or guaranteed energy savings. Development of reliable passive performance prediction models may encourage energy savings quantification by architects, builders, and lenders [87].

Pressure to quantify energy savings also comes from solar advocates seeking to reduce the cost of passive solar systems and to expand the ability of users to purchase passive solar systems. Meeting building code regulations and other requirements for conventional fossil-fuel heating systems are sometimes seen as excessive costs in passively heated homes. A solar building code is under consideration that would factor in solar thermal performance when determining the amount of conventional fossil-fuel capacity

necessary to heat a residence [88]. A serious effort is being made to have lenders consider passive energy savings when deciding if a prospective home purchaser can make the mortgage payments [89]. The quantification of energy savings to reduce costs or qualify marginal buyers is a representation intending to influence consumer behavior.

Performance prediction and quantification are heavily dependent upon the user's activities [90]. The average homeowner has come to expect a technology mode of comfort that requires adjusting a thermostat [91]. His understanding of passive system principles, and his ability and willingness to spend time, when necessary, as a part of the system himself, are crucial issues in system performance and consumer satisfaction. For example, consumer disappointment could arise if the consumer does not understand the slow heat production of a water thermal storage wall [92].

2.2.4 Representations Concerning Tax Credit Eligibility

One of the principal consumer considerations in deciding whether or not to purchase a passive system is the initial cost [93]. A commercialization strategy is to reduce this initial cost through governmental financial assistance, including tax credits and tax rebates. President Carter has directed the Treasury Department to develop legislation that would provide a 20% federal tax credit up to a total of \$2,000 for passive systems in new residences [94]. Tax credits and tax rebates are also provided in state legislation [95]. Thus, the representation of eligibility for financial assistance will be a significant factor in consumer purchase decisions.

Deliberate misrepresentation of eligibility is always a possibility. A more common problem may be the mistaken representation of eligibility because of the complexity of financial assistance programs as applied to passive systems. There is a virtually unlimited number of design configurations that could be alleged to be passive designs and therefore eligible for financial assistance [96]. Furthermore, even if a design configuration is determined to be a passive design, financial assistance such as a tax credit will not be granted for the costs of passive materials and components that also have a significant structural function in the building in which they are to be used [97].

Enumerating qualifying specific components or designs, and developing minimum system performance standards, are two approaches used to define eligibility. Neither approach eliminates the problem of erroneous representations, which will continue as long as the dichotomy of structural versus passive system construction remains. Enumerating specific components or designs creates complex definitions not subject to common understanding [98]. Even though the definitions could be simplified, such definitions could be subject to differing interpretations. Moreover, there is the possibility that the uncertainty involved in such definitions will discourage innovative and efficient passive systems [99].

The use of performance-based standards may lead to differing predictions as to eligibility because of the difficulty of establishing general performance standards and testing procedures for site-specific passive systems [100]. Prior certification of system eligibility resolves the problem of predictability but requires case-by-case analysis. The administrative time and cost required for such analysis restricts the usefulness of prior certification in large states or in any federal program [101].

In summary, uncertainty about financial assistance eligibility will be present in some passive system purchases. A potential source of consumer disappointment is deliberate or mistaken representation as to such eligibility.

SERIO 

SECTION 3.0

CONSUMER KNOWLEDGE

The residential consumer receives information from a vast number of sources. This section describes consumer education efforts in the energy area, and the impact of the National Energy Conservation Policy Act (NECPA) on consumer awareness. The term "consumer education" is used in this paper to refer to techniques that increase the consumer's knowledge about residential energy use without specific reference to the consumer's own residence. Pursuant to NECPA, residential consumers will be able to obtain energy-related information specific to their own residences.

3.1 CONSUMER EDUCATION

The cornerstone of the entire commercialization approach is education and information dissemination. Education of the consumer will stimulate demand for passive solar systems. Education of the key participants in the building industry (designers, builders, developers, lenders, etc.) and expansion of existing professional design and trade organization education and information programs will greatly stimulate near-term use. [102]

A great deal of general solar consumer information has been published by local, state, and federal agencies and organizations. Actual consumer use of the information in purchase decisions is a function of the form, kind, and dissemination channels of the information as well as the receptivity of the consumer. Existing passive users generally reside in custom-built residences in which they provided design input. Such users frequently buy on an "appeal" basis rather than by gathering information about system operations or economics [103]. The number of factors affecting energy consumption, including site positioning, climate, lifestyle, and type of dwelling, makes it difficult for even knowledgeable consumers to evaluate the potential or actual effectiveness of passive space conditioning [104].

An initial state and local government role in consumer education could involve mandatory programs in energy conservation, including passive design principles. Such a program could outline the basic principles of energy production and conservation, and the economic efficiencies of different energy modes. Increasing attention is being devoted to energy curriculum in all levels of education [105]. Mandatory education is often overlooked as a consumer fraud prevention strategy [106].

Once initial awareness and interest have been fostered in passive solar, detailed information is required for intelligent purchasing decisions. The Solar Energy Research Institute (SERI) [107] and the National Solar Heating and Cooling Information Center [108] supply consumer buying information. The Department of Energy and the Department of Housing and Urban Development also provide significant information [109]. State energy offices and the four regional solar energy centers can provide information specific to regional or state climate considerations [110]. Local governments are also sources of information [111].

State solar energy associations have exhibited tremendous growth and often conduct seminars or provide pamphlets on consumer buying information. Vendors and builders

provide information that is generally product-specific. Private consumer and testing organizations not only provide general information, but also specific product information and evaluations [112].

Self-policing of a market can be accomplished by informed consumers. Such self-policing occurs in purchases of high fidelity equipment, "where an informed minority of consumers, dealing with a limited number of firms, fostered higher quality systems" [113]. This self-policing is not likely to occur in the passive solar system market. The efforts of the informed purchaser of a custom-built home will not affect the unlimited number of firms in the fragmented construction industry, and the vast majority of homeowners are totally dependent upon and expect home-buying information and packaged systems from builders and realtors [114].

Information availability can be distinguished from all other forms of consumer protection in that it leaves "both the number of choices and quality of alternatives unchanged" [115]. All other methods affect the numbers, quality, or nature of options available to the consumer. A consequence is that consumers are free to disregard their own best interest, even if all the proper information is available and used by the consumer [116]. One response of the law to such neglect of information is limited representative liability in situations where the consumer knew or should have known certain facts concerning a representation [117].

3.2 THE NATIONAL ENERGY CONSERVATION POLICY ACT

The National Energy Conservation Policy Act (NECPA) [118] provides a vehicle for consumer education concerning passive retrofit potential. The act requires that utilities and home heating suppliers, under certain conditions, undertake energy audits of residential buildings to determine the cost of purchasing and installing suggested energy conservation and renewable resource (including passive) measures [119].

Each audited customer will receive significant system installation and financial information. The auditor, for each passive system suggested, will provide an "estimate of the cost of hiring a contractor to install . . . , including materials and labor and . . . any site preparations or structural alterations or modifications necessary. . ." [120], as well as an estimate of energy savings over a specified time period [121]. Annual maintenance costs for each suggested measure must also be provided [122]. A description of the suggested system and its function is required. Other provisions of NECPA control the passive system suggested by the utility, installation and materials standards, and contractor and lender eligibility in the program.

The energy audit itself influences product flow since the auditor has discretion to choose the passive solar devices that will substantially affect the cost and savings estimates and the attractiveness of the measure to the consumer [123]. Moreover, the auditor is prohibited from providing any information to the customer about products other than suggested measures, unless the customer specifically requests such information [124]. States and utilities have discretion to present do-it-yourself installation costs [125].

NECPA allows the Secretary of the Department of Energy to determine if safety and efficiency standards are necessary for "residential energy conservation measures," including renewable resource measures such as passive. Draft regulations reserve the secretary's right to establish passive material and installation standards [126]. Two arguments were advanced against prescribing material and installation standards at this

time. First, the premature development of standards in a developing technology inhibits innovation and increases costs. Second, numerous passive devices vary greatly in cost, heating/cooling output, and operation, with no common comparison technique yet established [127]. Material and installation standards will define the quality of care in negligence actions [128]. Injured consumers will thus have an objective criterion against which to judge material and installation defects.

NECPA requires that state plans contain procedures for the preparation of a master record of all suppliers, contractors, and lenders who sell, install, or finance suggested measures in the state. An installation contractor must meet the following minimum requirements:

- comply with all applicable installation and material standards;
- install only measures covered by the program warranty;
- furnish the customer with a written contract detailing the job to be performed and its cost, and certifying that all applicable state plan requirements for installation and material standards will be complied with;
- include in every contract a guarantee that the contractor will correct any violation of installation or material standards without cost to the consumer; and
- agree to participate in good faith in the complaint processing procedures. [129]

Suppliers must meet the following minimum requirements:

- supply measures that meet all applicable material and installation standards, and carry the program warranty required in this act for each suggested measure or parts of suggested measures that the supplier is listed as supplying, and
- prominently display, wherever suppliers sell suggested measures or parts of suggested measures, a statement explaining that such measures meet all applicable Department of Energy material standards and carry the program warranty defined in this act. [130]

Lenders must meet the following minimum requirements:

- if a periodic bill is provided, follow the procedure required by the state plan for resolving billing disputes;
- not take security in real property that is the principal residence of the eligible customer, unless the eligible customer acknowledges in writing that he/she is aware of the consequences of default on the loan; and
- permit a rebate of unearned finance charges if an eligible customer prepays a loan (either voluntarily or as a result of default). [131]

The draft regulations indicate that consideration was given to requiring all contractors and suppliers who wish to be included on the lists to agree to meet the standards in every job they perform, whether "under the program" or not [132]. As finalized in the draft, contractors, suppliers, and lenders must meet the standards if installation is arranged by a covered utility or home heating supplier. States are free to increase the coverage requirement situations where the utility or home heating supplier does not arrange installation [133]. A basic tension exists between inclusive listing procedures that limit potential suppliers, contractors, and lenders, and the prerogative of the consumer to choose lesser quality systems at reduced prices.

NECPA requires that mechanisms be provided for resolving complaints by customers against persons who sell or install suggested measures under the Residential Conservation Service Program [134]. NECPA further requires that a mechanism be provided in every state plan to assure that any person alleging injury under any provision of the state plan will be entitled to redress [135]. Such a mechanism must include a right of action in state court.

The impact of NECPA is to make covered utilities significant contact points with residential consumers. Such contact is heavily laden with potential representational liability. Care has been taken to deflate consumer expectations about the accuracy of the energy savings estimate by a disclosure requirement. Upon providing an estimate of energy savings, the following disclosure must be supplied to a residential consumer:

The energy cost savings estimates you receive are based on systems which may be different than the ones you purchase. Also, these estimates were not determined using actual conditions but using simulated measurements. Therefore, the cost savings we have estimated may be different from the savings which actually occur. [136]

However, representations of certain minimum quality levels in the auditor and in the contractors, lenders, and suppliers included in the master list are at least implicit in the selection process. Since consumer injury from unqualified auditors or persons included on the master list is foreseeable, a theory of negligent selection could impose liability on a utility.

SECTION 4.0

PUBLIC REGULATION OF REPRESENTATIONS

In this section, federal and state regulation of representations is discussed. At the federal level, the Federal Trade Commission has power to regulate the content of representations, and to remedy the use of deceptive representations through the Federal Trade Commission Act. The Federal Trade Commission also regulates the content of written warranties pursuant to the Magnuson-Moss Act. State deceptive practice laws and consumer protection laws affecting representations are also described in this section.

4.1 THE FEDERAL TRADE COMMISSION

4.1.1 The Federal Trade Commission Act

The Federal Trade Commission (FTC) was established by Congress in 1914 [137]. The FTC's purpose is to eliminate unfair competition in business and to protect the public from abusive or deceptive advertising and business practices by sellers of goods and services [138]. In addition to the now amended 1914 Federal Trade Commission Act [139], the FTC administers several other federal consumer protection statutes, including the Magnuson-Moss Warranty/Federal Trade Commission Warranty Act that is discussed in Section 4.1.2 [140].

The FTC act prohibits unfair and deceptive acts and practices that "affect" interstate commerce, which gives the FTC jurisdiction over almost all forms of consumer fraud [141]. The FTC implements its general mandate to prescribe unfair and deceptive acts by defining specific prohibited practices in guides, rules, and cases. Certain advertising practices are exclusively regulated by the FTC, including image advertising, deceptive endorsements and testimonials, deceptive demonstrations and pictorial misrepresentations, nondisclosure of the full terms of transactions (e.g., energy consumption figures of EPCA), and unsubstantiated advertising [142].

Documentation of advertising with respect to energy saving claims could be a significant consumer protection issue [143]. FTC policy is to require substantiation only for those "major advertising themes which appear to be most suspect and to have the greatest impact on buyer decisions" [144]. Substantiation is now required for insulation-related claims that state insulation can "slash," "lower," or cut fuel bills by any stated percentage [145].

The most difficult question is determining the methodology for showing substantiation. In some cases, such as insulation, specific scientific tests may give a reliable measure of the properties needing substantiation [146]. Substantiation methodology will be especially difficult for site-specific passive solar systems for which no single product comparison element has been developed, such as R-value used for insulation.

If product claims are not substantiated, the FTC must obtain a cease-and-desist order to stop the practice [147]. Critics have pointed out the "laborious" nature of this process [148]. An alternative approach, recommended by a House Committee, is the promulgation of a trade regulation rule for solar sales [149]. The House Committee recommends:

The FTC should give serious consideration to promulgating a Trade Regulation Rule for solar sales, which would prescribe basic disclosure requirements, and provide for civil penalties or require violators to make restitution to injured customers. Disclosure requirement could include warranty coverage, operating and maintenance instructions, explanation of thermal performance, and other test results or ratings, representations as to eligibility for tax credits and clear and full explanations for any cost or energy savings claim. [150]

The FTC has promulgated a trade regulation rule governing the labeling and advertising of home insulation [151]. The rule requires certain prepurchase point-of-sale disclosures. Three specific regulated claims that might also be made for passive systems are savings, government, and tax claims. Insulation savings claims must be substantiated; moreover, when savings claims are made or implied, the following disclosure must also be made: "Savings vary. Find out why in the seller's fact sheet on R-values. Higher R-values mean greater insulating power" [152]. Manufacturers are liable if there is no reasonable basis for the energy savings claim before the claim is made. Someone who is not a manufacturer is liable if he knew or should have known the manufacturer does not have a reasonable basis for the claim [153]. No representations as to qualification for tax benefits, government certification, or compliance with government standards can be made unless the representation is true [154]. A similar trade regulation rule governing government and tax claims would be applicable to passive system representations. However, a different energy savings provision should be considered for passive systems because of the absence of the single comparison element between passive systems and geographical locations. The use of R-value in insulation provides a unifying, objective factor against which to judge energy savings and substantiation claims.

The traditional remedy available to the FTC is a "cease and desist" order. Section 5 of the FTC Act provides that upon determination that an individual or business may be employing an unfair or deceptive advertisement or sales practice, the FTC may seek an order "requiring such person to cease and desist from using such method of competition or such act or practice" [155]. This approach has been criticized because of the common 3- to 5-year delay between issuance of a complaint and the final cease-and-desist order, during which time the defendant may continue the deceptive advertising [156]. However, court settlements may be reached prior to obtaining a court order. For example, an aluminum siding company agreed not to make any claims of fuel reduction, heat loss reduction, energy savings, fuel savings, or thermal insulation representations for residential aluminum siding, whether or not the product is insulated [157]. The FTC is currently investigating energy savings claims made about solar window shades [158].

One section of the Magnuson-Moss Warranty/Federal Trade Commission Warranty Act amended the Federal Trade Commission Act to give the FTC restitutionary power in specific situations [159]. Such power can be exercised through court or consent order. Court relief may include, but shall not be limited to: the rescission or the reformation of contracts, the refund of money or the return of property, the payment of damages, and public notice respecting the rule violation and the unfair or deceptive act or practice [160]. Imposition of exemplary or punitive damages is not authorized [161].

Two FTC cases, when considered together, offer potential relief for construction defects or performance disappointment in passive system residences. The FTC accepted a consent order from Kaufman and Broad, Inc., one of the nation's largest homebuilders, involving more than 20,000 homes. The company agreed to an FTC order "prohibiting the company from using unfair or deceptive practices in the advertising, sale and con-

struction of its residential housing and requiring the firm to furnish warranties and to repair specified defects in homes purchased from it as far back as 1972" [162].

The complaint that led to the consent agreement alleged that Kaufman and Broad misrepresented that its housing was of top quality workmanship, free from defects that could impair the homes for ordinary use, and built in accordance with good construction practices in the housing industry [163].

Such general representations could easily occur with passive space-conditioned residences. Passive space-conditioned residences subject to extreme temperature fluctuations or unreasonable conventional fossil-fuel costs may be sufficiently defective to impair the home for ordinary use. Leakage problems in roof ponds or water thermal storage walls may also impair the homes for ordinary use.

In another FTC case, the Fedders Corporation agreed to recall defective heat pumps and to provide restitution for defects that occurred after the expiration of the heat pump warranty [164]. This case is especially significant because the defective heat pumps caused economic injury only. The complaint alleged that Fedders Corporation "represented, directly or by implication, by and through the offering for sale of its split system heat pumps that (they) do not have any latent defects (that) substantially affect the reliability, durability, or performance of the pumps" [165].

The Kaufman and Broad case and the Fedders case indicate that FTC restitutionary and cease-and-desist relief can be obtained only for construction or system defects that endanger safety or cause economic injury. Increased attention should be paid to this mode of relief as performance and construction representations are made about passive dwellings and subdivisions.

4.1.2 The Magnuson-Moss Warranty/FTC Improvement Act

The Magnuson-Moss Act applies to written warranties and service contracts for consumer goods costing more than five dollars and manufactured after 4 July 75 [166]. The act does not require written warranties but does govern those voluntarily given. The disclosure standards of the act are aimed at "improving the adequacy of information available to consumers, preventing deception in warranties, and enhancing competition in the marketing of consumer products" [167].

The act covers consumer goods, which are defined as "tangible personal property which is normally used for personal, family, or household purposes" [168]. Property that is intended to be attached to or installed in any real property is also covered by the act, without regard to whether it is attached or installed and independently of whether the item would be considered a fixture under state law [169]. However, a traditional construction contract between a consumer and a builder, under which the builder constructs a home or a substantial addition to a home, does not involve consumer goods and is not covered by the act to the extent that the building materials are "integrated" into the structure [170]. This limitation on the coverage of the act becomes important in passive new construction since passive architectural designs, mainly to reduce overall costs, utilize structural features for heating and cooling, such as having a wall serve as both a structural component and a thermal storage medium [171].

An FTC advisory opinion establishes a separateness test for determining whether a residential "item" is or is not covered by the Magnuson-Moss Act:

The key . . . lies in the distinction between the physical separateness of an items (sic) and the separate function of an item. For example, both roofing shingles and furnaces may be physically separate items at a given point in time. However, physical separateness of the item is not determinative, rather it is the separateness of function which distinguishes the two. A furnace has a "mechanical, thermal or electrical function" apart from the realty, whereas roofing shingles have no function apart from the realty. Such items as humidifiers, burglar alarms, smoke detectors, water heaters and kitchen appliances are separate items of equipment which have separate functions of their own. However, such items as wiring, ducts, gutters, cabinets, doors and shower stalls are not functionally separate from the realty. [172]

Note that all the numerous products that go into residential construction are consumer products when sold "over the counter," as by hardware and building supply retailers. This is also true where a consumer contracts for the purchase of such materials in connection with the improvement, repair, or modification of a home (for example, paneling, dropped ceilings, siding, roofing, storm windows, remodeling). [173] Any component of a passive retrofit system would probably be considered a consumer product covered by the Magnuson-Moss Act. New construction creates a more complex situation. Windows, walls, ceilings, and fireplaces are not considered consumer products under the Magnuson-Moss Act when sold as part of a new home [174]. A masonry thermal storage wall, though perhaps thicker than in traditional construction, probably would not be a consumer product covered by the Magnuson-Moss Act. However, a water barrel storage wall may arguably be a consumer product. The water barrel storage wall may have no structural load bearing capacity and the component water containers may be movable [175]. It might also be contended that the barrels have no thermal function apart from the realty. Case-by-case analysis of each passive component will be needed to determine whether the component is covered by the Magnuson-Moss Act.

To the extent that a product is covered by the Magnuson-Moss Act, the act has implications for written warranty content standards, disclosure standards, and remedial rights and procedures [176]. Federal content and disclosure standards for written consumer product warranties as well as remedies available for the breach of warranty or service contract obligations are set forth in Title I of the act.

In a real estate transaction, both the definition of a consumer product and the identification of the parties who create warranties must be addressed. The definition of a consumer product has been given extensive treatment by the FTC; the identification of warrantors for purposes of the Magnuson-Moss Act has not been given any treatment [177]. The Magnuson-Moss Act generally defines a warrantor by reference to state law. A person who under state law makes a "written affirmation of fact, promise, or undertaking" is treated as a warrantor [178]. Contractors can be warrantors if they provide their own written warranties. However, it appears that contractors are not required to pass through the terms of any written warranties on products within the real estate package prior to purchase [179]. Thus, any warranties on passive components (such as insulating curtains) provided by the manufacturers may not come to the attention of the consumer until after the purchase. As a result, a consumer may lose the benefit of the protection of the Magnuson-Moss Act [180].

The federal minimum content standards for consumer warranties contained in section 104 of the act provide that written warranties must comply with the following requirements:

- The warrantor must remedy malfunctions or defects in the product within a reasonable time and without charge. The warrantor must also be responsible for correcting the failure of the product to conform to the terms of the warranty in any other manner;
- The warrantor must not impose any limitation on the duration of any implied warranty on the product;
- The warrantor must not exclude or limit consequential damages for breach of any written or implied warranty on the product, unless the exclusion or limitation appears conspicuously on the face of the warranty;
- The warrantor must agree to permit the consumer to elect either a refund or a replacement of a defective or malfunctioning product if after a reasonable number of attempts he has been unable to correct the defect or malfunction [181].

Only a warranty that meets these minimum standards may be designated a "full warranty." A warranty not meeting the requirements is labeled a "limited warranty." All warranties on products costing more than \$10 must be labeled as either full or limited with higher standards and more stringent requirements for full warranties [182]. Under a full warranty, the warrantor may not impose any duty on the consumer other than that of notifying the warrantor of his responsibility to repair defects or malfunctions within a reasonable time, unless the warrantor can show that such an additional duty (e.g., taking the product to a certain place for repair) is reasonable under the circumstances [183].

Section 2304 of the act contains a provision setting forth a defense to an alleged breach of the duties of the warrantor. If the warrantor can show that the defect, malfunction, or failure of the warranted product was the result of damage caused by the consumer, including the failure to provide necessary care and maintenance, the warrantor is not required to perform any of the obligations set forth in the minimum content standards [184].

Under the disclosure provisions of the act, the FTC is empowered to prescribe rules governing the availability of warranties to the consumer prior to the purchase of a product [185]. Two broad categories of FTC disclosure requirements can be discerned [186]. The first category relates to disclosure of just how much protection the warranty actually provides. For example, the product or parts covered by the warranty must be designated, exclusions from the warranty must be stated, and limitations on the duration of any implied warranties or consequential damages must be indicated [187]. The second category relates to disclosure of information necessary in case of a breach of the warranty. Thus, clear identification of the warrantors is required as well as a statement of the step-by-step procedure that a consumer must follow in order to obtain performance of any obligation under the warranty. The existence of any informal dispute settlement procedure that the consumer must initially resort to and legal remedies available to the consumer must also be disclosed [188].

Section 2302 further prohibits any warrantor from conditioning his written or implied warranty on the consumer's use of any other brand name article or service in connection with the product. However, this restriction applies only to other products that are identified by name. An exception to this regulation allows the warrantor to impose such conditions on his warranty if he can show that the warranted product will function only if the named product or service is used in connection with it, and the Commission finds that

a waiver of the rule is in the public interest [189]. Because the manufacture of passive solar components is a rapidly evolving industry with many proprietary rights and "named" products, this "brand-name" provision of section 2302 could have significant impact on component tie-ins [190].

A preliminary investigation of manufacturers offering warranties on active solar systems has indicated a number of Magnuson-Moss violations, including potential tie-in violations [191]. Other warranty deficiencies include failure to designate warranties as full or limited, failure to adequately describe parts covered by the warranty, and failure to indicate who is responsible for parts and service (the manufacturer only or the dealer, distributor, and retailer as well). Further FTC investigation into warranty performance issues is expected [192]. Similar deficiencies could arise with respect to passive system component warranties.

If a warranty violation is alleged pursuant to the Magnuson-Moss Act, section 110 of the act establishes informal dispute settlement mechanisms. Section 110 provides the FTC with the authority to establish minimum requirements for these informal dispute mechanisms and to disapprove any procedures that do not comply with its rules [193]. The manufacturer creating a settlement procedure bears the initial burden of showing that the procedure complies with the act and with FTC rules [194].

Use of informal procedure is encouraged by a provision which states that if an informal procedure is established by the warrantor in compliance with the rules governing such procedures, the warrantor may incorporate the procedure into the written warranty, with the requirement that a consumer must resort to it before pursuing legal remedies in the courts [195]. The requirement is effective only when the informal procedure includes a provision for participation by governmental or independent consumer agencies [196]. Aggrieved consumers may petition the FTC to review the operation of informal procedures. Should a violation be shown, the FTC may take appropriate remedial action as provided in the Federal Trade Commission Act [197].

Purchasers of passive space-conditioned residences can take advantage of the Home Owner's Warranty (HOW) program established by the National Association of Home Builders. As currently operated, participation by individual homebuilders is voluntary, although there is pressure to expand the number of homebuilders participating [198]. The HOW program involves minimum building standards, builder's warranty obligations, and dispute settlement procedures. Prior to sale, the HOW builder must give the purchaser all builder's warranties, plus all manufacturer's warranties that the builder passes through. The HOW program is a limited warranty program since the HOW builder retains the option of repair, replacement, or refund on the product he sells. Ten years of coverage is provided, with major structural defects covered only during the third through the tenth years [199].

Individual aggrieved consumers may bring suit for damages or other appropriate relief in state or federal courts, if no satisfaction has been obtained through an informal procedure. Suit may be brought in federal district court only if each individual claim exceeds \$25, and the sum total of the matter in controversy, including all claims in the dispute, exceeds \$50,000 [200]. In either state or federal actions, even if no informal dispute procedure exists, a suit may not be brought until the person obligated under the warranty is afforded a reasonable opportunity to remedy the malfunction, defect, or other breach.

The Magnuson-Moss Act does not invalidate or restrict any right or remedy to the consumer available under state law [201]. The act does not supersede or limit any liability

imposed on a warrantor for personal injury to the consumer resulting from a malfunctioning or defective product [202]. Thus, while under the act, the warrantor is not liable for damages resulting from personal injury to the consumer, he may nevertheless be liable under state law. State laws governing disclosure standards and minimum warranty content requirements are superseded unless the FTC determines that they offer greater protection to the consumer and do not unduly burden interstate commerce [203].

In addition to individual consumer remedies, the Magnuson-Moss Act authorizes the Attorney General or the FTC to bring an action to restrain a warrantor from making a deceptive warranty or from otherwise failing to comply with the provisions of the act [204]. The FTC may issue a temporary restraining order without bond [205].

4.2 STATE DECEPTIVE TRADE PRACTICE AND CONSUMER PROTECTION ACTS

There has been significant growth in state consumer legislation since the mid-1960s. The general approach is to "make it unlawful to use or otherwise engage in unfair or deceptive acts or practices in the conduct of trade or commerce" [206]. Frequently, these acts are "Mini-FTC Acts," patterned after section 5 (a)(1) of the Federal Trade Commission Act [207]. Prohibitions found within the Uniform Deceptive Trade Practices Act (UDTPA) [208] and the Uniform Consumer Sales Practice Act (UCSPA) [209] are often combined with FTC Act provisions. These combined acts will be referred to as UDAP/CP acts (Uniform Deceptive Acts and Practices/Consumer Protection acts).

A threshold question is the applicability of these acts to passive solar system transactions. The sale of retrofit passive components and systems can be classified as a transaction in merchandise; the sale and installation may be either a sale of merchandise or a rendering of a service. Under various circumstances, the advertising or sale of a service is not within the scope of particular state consumer protection statutes [210]. In some cases, particular state consumer protection statutes have been held not to apply to various transactions involving the sale of real estate [211]. Thus, sales of passive new construction would not be subject to the UDAP/CP Act. Some UDAP/CP acts also exempt public utilities from their coverage [212].

Assuming that a particular state consumer law does apply to the advertising or sale of passive solar systems and components, care must be given to judicial interpretation of the elements that constitute "unfair or deceptive acts or practices." In the absence of specified statutory guidelines, some courts have held that "unfair or deceptive acts or practices" embrace only those acts and practices actionable under various common-law theories, such as fraud and deceit [213]. In addition, intent to deceive may or may not be an element necessary to establish a violation of a state deceptive trade practice or consumer protection statute [214]. Use of meticulous definitions and requirements is avoided in these statutes to prevent ease of technical evasion; therefore, the lawfulness of particular acts or practices is determined by the factual circumstances presented in a specified case [215].

Representations as to the performance, uses, or benefits of goods offered for sale are within the coverage of state deceptive trade practice acts or consumer protection statutes [216]. Representations with respect to performance, use, or benefits of passive solar systems may be subject to UDAP/CP regulation. In one state, the UDAP/CP Act is detailed in its performance, use or benefits misrepresentation section, prohibiting deception concerning a product's construction, durability, reliability, performance, strength, condition, life expectancy, ease of operation or repair, or benefits. Examples are false

claims that a product is "automatic," "shrink-proof," "rust-proof," "fire-proof," "unbreakable," or "lifetime durable" [217]. In most states, likelihood of confusion or misunderstanding is a flexible standard used in evaluating representations, with courts finding liability as the risk or likelihood of confusion or misunderstanding increases [218]. "Maintenance free" or "completely safe" representations, for example, when used with passive systems, may be scrutinized carefully by state courts under UDAP/CP acts.

The range of remedies available under UDAP/CP acts includes both public and private actions. Public enforcement authorities can pursue both administrative and legal remedies. Rule making, investigation, assurances of voluntary compliance, injunctions, cease-and-desist orders, and civil penalties [219] are available to attorneys general, offices of consumer protection, and other departments or agencies charged with the enforcement of consumer laws. Most UDAP/CP activity has been characterized as mediation aimed at resolving individual complaints [220]. This is extremely important to the passive residential consumer seeking to resolve an individual complaint against an architect, builder, or home improvement contractor.

The preceding remedies are not restitutionary in nature. They do not seek to compensate the injured consumer. The remedies merely stop illegal acts and, in some situations, punish the wrongdoer [221]. In some states, enforcement authorities may seek termination or modification of a deceptive advertisement, or may disseminate information to the public concerning the truth of the claims [222]. Cease-and-desist orders have been used with home improvement contractors [223]. Most state consumer laws allow the enforcing authority to seek temporary restraining orders as well as preliminary and permanent injunctions to restrain deceptive acts or practices. In addition to injunctive relief, enforcing authorities can seek civil or criminal penalties, including fines and jail sentences [224].

Under the common law, a governmental unit was usually without standing to obtain redress for private wrongs to individual citizens [225]. However, it is now common practice to statutorily grant the enforcing authority the power to seek restitution for consumers injured by violations of UDAP/CP acts [226]. In a few recent cases, courts have held that enforcing agencies may maintain an action for restitution without specific statutory authorization [227]. It has been suggested that even absent legislation providing for injunctive relief or restitution, it might be possible for an enforcing authority to obtain restitution under a nuisance theory of consumer fraud, or under an approach based upon the state's role as *parens patriae* [228].

Many states grant private rights of action to individual consumers who suffer loss of money or property as a result of UDAP/CP violations. Usually, the consumer can choose to sue for an injunction, rescission, or damages [229]. Certain acts permit the recovery of attorney's fees, trial costs, and punitive or treble damages [230]. Generally, the statutes require that the consumer first make a written demand for relief to the prospective defendant before filing suit. The demand for relief is required in order to give notice to the seller of the consumer's complaint and to afford the seller an opportunity to settle the problem out of court [231]. The provisions for attorney's fees, trial costs, and treble damages are important in cases involving passive systems, where proof of individual claims presents difficult problems and absolute performance losses are small. Because individual recovery is often so small as to discourage consumers from bringing suit, and legal counsel from representing consumers in such suits, many states permit individual consumers to join together in a class action against a defendant [232]. However, since the current passive new construction market is primarily custom-built homes,

use of the class action procedure is generally inappropriate. A class action could be appropriate with respect to large-scale passive subdivisions. Remedial action under UDAP/CP acts that focuses on defining and preventing deceptive acts and regulating firms and individuals will be important in protecting residential consumers against larger volume architects, builders, and home improvement contractors. Mediation efforts of UDAP/CP agencies will be important where low volume architects, builders, and home improvement contractors are accused of misrepresentation by consumers.

SERIO 

SECTION 5.0

PRIVATE REMEDIAL ACTIONS

Consumer protection through consumer education and public regulation of representations has been described. By raising the level of consumer knowledge and providing relevant and complete information to the consumer, wise buying decisions are presumably fostered. Nevertheless, preventative measures cannot be designed to absolutely protect each individual consumer. Remedial actions are necessary to compensate individual injury and to assure compliance with required preventative measures [233]. In this section, the legal theories grounded in a representational theory are discussed [234]. These theories are then applied to three significant consumer contact points in the solar technology delivery system—the architect, the contractor, and the lender.

The legal theories may be based on explicit representations made from one party to another; e.g., an architect guaranteeing certain cost savings or performance in a passively designed residence. Legal theories based on explicit representations include fraud, negligent misrepresentation, innocent misrepresentation, and express warranty [235]. Other legal theories are implied by law: negligence, implied warranties of merchantability, fitness for a particular purpose, and strict liability [236]. These implied theories developed as courts moved away from a hard-bargained contractual notion of the producer-consumer relationship and began to note the power of representations [237].

An injured consumer may choose the legal theory that best fits the facts of his situation. Three major issues will affect the particular theory utilized. The first is the level of consumer knowledge at the time of the transaction. The consumer's remedial action may not be successful where reliance upon the representation is an element of the cause of action if the consumer knew or should have known certain information. Second, not all legal theories are applicable to design professionals or construction contractors. An example is the implied warranty of fitness for a particular purpose. Third, certain legal theories will not compensate the consumer where the loss complained of is only economic and does not reflect personal injury or property damage. This limitation on recovery is important with respect to passive systems, where misrepresentations as to performance may be the prevalent type of injury.

The buyer of a passive solar system faces potential personal injury, property damage and economic loss. Economic loss would be present, for instance, where the passive system did not adequately heat or cool the home to the level of consumer expectations. Economic loss could also occur if representations as to eligibility for tax credits are erroneous and the tax credit is denied. Erroneous representations that the system complies with building code requirements and that necessitate remedial action to meet code requirements would also create economic loss.

When a consumer incurs economic loss as a result of a defective product, a majority of courts hold that the loss is not recoverable under the tort theories of negligence or strict liability. Rather, the courts will deem the express and implied warranty theories of the law of sales to be an adequate vehicle for recovery. The rationale behind this theory is that the law of sales, rather than the law of torts, was intended to protect the economic interests of consumers [238].

There is, however, one exception to the general rule prohibiting recovery of economic loss under negligence or strict liability theories. This exception may be referred to as

the property damage exception. In a property damage exception case, the product defect causes the product to sustain physical harm in a violent or sudden manner [239]. In a normal economic loss case, the product defect causes the product to sustain physical harm in a gradual manner or simply renders the product useless. The rationale for the property damage exception is that "in situations where personal injuries could have occurred, courts should not hesitate to grant relief to the party suffering [the economic loss] damage simply because he was fortunate enough to have escaped personal injury" [240]. Leakage problems with roof ponds or thermal water storage wall collapse are examples which could qualify for the property damage exemption.

Economic loss is recoverable under express and implied warranty theories. But, even in a case where the plaintiff is clearly entitled to the benefit of his bargain, the courts will not order damages measured by the cost of corrective work which would be uneconomic [241]. In passive new construction, minor deviations from the expectations of the consumer would be judged against the standard of corrective work cost. This cost could be substantial where the passive component is incorporated within the structure.

Common-law consumer fraud theories based on the representation itself can protect the economic interests of consumers. Justifiable reliance on the part of the consumer may be an element of the cause of action. Thus, consumer knowledge at the time of the transaction will affect the availability of the fraud theory.

5.1 LEGAL THEORIES

5.1.1 Negligence

There are four elements in a cause of action for negligence: a duty on the part of the defendant to conform his behavior to some standard, a failure on the part of the defendant to conform to this standard, a causal connection between the defendant's conduct and the injury complained of, and actual loss or damage [242].

The defendant generally must exercise the care of a reasonable man under the circumstances [243]. However, statutes may establish specific standards of care. NECPA intends that installation standards promulgated pursuant to NECPA establish the standard of care for installation of renewable resource measures, thereby superseding commonly accepted installation industry standards [244]. Increasing architectural certification and recertification requirements elevates the standard of care of a reasonable architect designing passive residences [245]. Negligence may arise under numerous situations. There can be negligent failure to inspect or test materials [246] or, in the installation of the finished product [247], to discover defects. In the sales process, there must be reasonable care in advertising, to avoid misrepresentation of the product [248], or to disclose known defects and dangers [249]. The safety of a product and the adequacy of danger warnings concerning product use are frequently determined by a negligence standard of care [250].

Personal injury and property damage are compensable in a negligence action. "But where there is no accident, and no physical damage, and the only loss is a pecuniary one, through loss of the value or use of the thing sold, or the cost of repairing it, the courts have adhered to the rule . . . , that purely economic interests are not entitled to protection against mere negligence, and so have denied the recovery" [251].

5.1.2 Strict Liability

Most states [252] have adopted Section 402A of the Restatement of Torts (Second), which provides:

Special liability of seller of products for physical harm to user or consumer:

- (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. [253]

The major question is which defect makes a product unreasonably unsafe [254]. Defects can include manufacture errors, unreasonably dangerous design, and inadequate instructions and warnings of the dangers attending a product's use [255]. The significant requirements to establish strict liability are proof of the defect, plus injury or damage of an appropriate type that was proximately caused by the defect [256]. The trend is to equate proof-of-product malfunction with existence of a defect [257].

It is generally agreed that personal injury and property damage are compensable losses. Economic loss is compensable only under limited circumstances [258].

Strict liability has been extended to builder/vendors selling newly built residences. Thus, builders and subdivision developers of passive residences face strict liability if some component of the passive system is in a defective, unreasonably dangerous condition (e.g., a roof pond built on a structurally inadequate foundation). Applicability of strict liability to design professionals has not been resolved.

5.1.3 Warranty

In situations involving the sale of goods under a contract, the Uniform Commercial Code (UCC) defines the scope of warranty protection available to the consumer. In situations that do not involve the sale of goods, courts have implied and analogized UCC warranty protection [259]. Therefore, an examination of UCC warranty provisions is useful in all transactions. Express and implied warranties applicable to non-UCC transactions are specifically discussed in Section 5.2.2.

An initial consideration of UCC warranty provisions must begin with the UCC's coverage of any particular transaction. The UCC covers transactions in "goods." Goods are defined as all things (including specially manufactured goods) that are movable at the time of identification to the contract of sale [260]. Passive solar systems are not

covered by the UCC when sold as part of a new dwelling, since their sale is then a sale of real estate and not goods [261]. A retrofit passive system may or may not be goods subject to UCC warranty provisions. UCC coverage of passive retrofits depends upon whether the retrofit is deemed to be goods, which are covered by the UCC, or a service, which is not covered. Installation and minor repair provisions will not prevent the application of UCC warranty provisions [262].

In passive retrofit, the services/goods issue arises because the contractor may be either designing and installing the system or the contract may be for labor with an incidental furnishing of equipment and material. A contract to remodel a kitchen or to install a heating and air conditioning system has been held to be a service contract and not a sale of goods [263]. However, it was held a sale of goods when a company sold and installed a carrier steam heater unit [264]. Case-by-case development will be necessary to define UCC applicability to passive retrofit transactions.

Assuming that a transaction is found to be a transaction in goods, three potential warranty approaches are incorporated within the Code. The seller may create either an express warranty or implied warranties of merchantability or fitness for a particular purpose.

Express warranties may be created by (1) affirmation of fact or promise made, (2) description, or (3) sample or model [265]. All three types of express warranty must be part of the "basis of the bargain," that is, part of the contractual agreement of the parties. Section 2-213 of the UCC states: "It is not necessary for the creation of an express 'warranty' or 'guarantee' that he have a specific intention to make a warranty, but an affirmation merely of the value of the goods or a statement purported to be merely the seller's opinion or commendation of the goods does not create a warranty" [266]. Characterization as a "warranty" or "merely the seller's opinion" is a difficult fact question [267]. Express warranties may be made by technical specification or blueprints or previous course of dealing [268]. Samples and models used by the seller may create express warranties [269]. A model passive space-conditioned residence may create an express warranty that the residence to be built will match the design. An issue to be considered is whether such a warranty also implies performance, given the difference in location and site positioning between the model and the actual house.

The UCC implies a warranty of merchantability in a contract for the sale of goods if the seller is a merchant with respect to such goods [270]. The goods must be fit for the ordinary purposes for which they are to be used [271]. To a degree, the implied warranty of merchantability is closely connected with, and supplements, the express warranty by description. If the parties in their contract for sale do not adequately and completely describe the goods, especially as to quality characteristics, it is the function of the implied warranty of merchantability to finish the incomplete description. Course of dealing and usage of trade are important in establishing the meaning of merchantability [272]. The implied warranty of merchantability also requires certain basic minimum standards of quality and safety in a product [273]. Since passive systems utilize existing construction materials, the implied warranty of merchantability for passive components will apply to those materials.

The implied warranty of fitness for a particular purpose is defined in Section 2-315 of the UCC:

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.

The two elements for the establishment of the fitness warranty are knowledge by the seller of the particular purpose and reliance by the buyer. The seller must have reason to know not only of the particular purpose, but also of the buyer's reliance [274]. The installation of a passive retrofit system, where the seller knows the purpose is energy savings and where the buyer and lender incorporate such energy savings in a loan decision, could present a situation in which a warranty of fitness for a particular purpose would be implied.

5.1.4 Common Law Consumer Fraud

Common law consumer fraud actions may be based on one of several theories: deceit, strict liability for misrepresentation, or negligent misrepresentation. Dean Prosser lists the following basic elements in a deceit action: false representation (normally one of fact), scienter, intent to induce reliance upon the misrepresentation, justifiable reliance, and resulting damage [275].

A representation that purports to be one of opinion only, cannot generally support an action for deceit [276]. Such representations are commonly called puffing and are considered to be offered and understood as only the seller's opinion. In Bareham and McFarland v. Kane [277], a seller stated that a heating plant would heat to 70° at a cost not exceeding \$350. Whether this was mere puffing or a statement of fact was held to be a question for the jury [278].

A crucial element in a deceit action is scienter, defined as the seller's knowledge of the falsity of his representation or his ruthless disregard of its truth or falsity [279]. The speaker must intend to induce reliance on the part of the buyer. In general, reliance by the buyer is justifiable if a person of ordinary prudence would rely upon it [280]. Some courts will use a subjective test in which the court will consider the knowledge of the seller, the relative ignorance of the buyer, and the disparity in business experience between the parties [281].

The reliance issue is important to passive in light of the varying consumer education and knowledge levels. The person who is contracting for a custom-built passive residence and who is involved in the designing of such residence is less likely to place uncritical reliance upon the representations of others than is the traditional residential purchaser relying upon the information provided by the builder. In retrofit, NECPA poses an interesting problem since the level of general consumer knowledge is increased. Nevertheless, home contractors might make representations specific to a residence on which the owner might rely.

One difficulty with the deceit theory is that it requires proof of scienter. In some jurisdictions, when a consumer cannot meet the difficult burden of proving scienter, he may be able to recover damages for innocent misrepresentation. Innocent misrepresentation is a strict liability in tort theory paralleling strict liability in tort for defective products [282].

The doctrine of strict liability in tort for misrepresentation is expressed in Section 402B of the Restatement of Torts (Second):

Misrepresentation by seller of chattels to consumers:

One engaged in the business of selling chattels who, by advertising, labels, or otherwise, makes to the public a misrepresentation of material fact concerning the character or quality of a chattel sold by him is subject to liability for physical harm to a consumer of the chattel caused by justifiable reliance upon the misrepresentation, even though

- (a) it is not made fraudulently or negligently and
- (b) the consumer has not bought the chattel from or entered into any contractual relation with the seller. [283]

Personal injury and property damage are clearly recoverable under this theory. Economic loss may or may not be recoverable. The proposed Section 552D of the Restatement of Torts (Second) would permit economic loss recovery in cases of physical injury or property damage [284]. Innocent misrepresentation is a form of strict liability which, in essence, makes the representer liable for his product representation, regardless of his own belief in the truth of the representation, as long as consumer reliance is reasonable. A purchaser of a passive space-conditioned residence might use this theory to rescind a purchase if he can show misrepresentation of a material fact, such as misrepresentation of structural adequacy or the adequacy of conventional fossil-fuel heating.

In some jurisdictions, a consumer can resort to a negligent misrepresentation theory. The elements of negligent misrepresentation are: a duty of care owed or voluntarily assumed by the seller, a breach of that duty by the seller, a false representation by the seller, a belief on the part of the buyer that the seller's representation is true, and reliance on the part of the buyer to the buyer's detriment [285].

A duty of care arises if the seller knows that the information is desired for a serious purpose, that the buyer intends to rely on it, and that if the information is false the buyer will be injured. A duty of care also arises if policy and reason require the existence of such a duty [286]. Failure to rely is a good defense [287]. Although negligence actions basically compensate only physical injury, economic loss is recoverable under a negligent misrepresentation theory. Negligent misrepresentation might be successfully utilized with respect to erroneous representations of eligibility for tax credits. Although such eligibility is not easily determined [288], someone making such a representation should be under a duty to use ordinary care in making the representation. A consumer would be justified in relying upon the representation.

An interesting negligent misrepresentation case is Hanberry v. Hearst Corp. [289]. Defendant Good Housekeeping Consumer's Guaranty Seal represented that certain shoes were "good." Plaintiff relied on the representation, purchased the shoes, and suffered personal injury when she slipped on a vinyl floor while wearing the shoes. The court held plaintiff's complaint sufficient to state a claim for negligent misrepresentation on the grounds that since defendant voluntarily used its reputation to promote the product, public policy imposed a duty to use ordinary care when making representations [290]. Endorsers of passive products or components could face similar negligent misrepresentation liability for failure to adequately check the accuracy of the representation.

5.2 APPLICATION OF LEGAL THEORIES

5.2.1 Design Professionals

A design professional supplying defective plans for a passive space-conditioned home may be liable under either tort or contract theories. The supplying of defective plans may constitute not only negligence but also a breach of contract, since the design professional, by his contract with the owner, undertakes to comply with the standards of practice employed by average local design professionals [291].

Courts traditionally use tort language in design professional malpractice suits, even when a contract exists between the plaintiff and defendant design professional [292]. In contract and tort, the architect implies that he possesses the necessary competence and ability to enable him to furnish plans and specifications prepared with a reasonable degree of technical skill [293]. The standard of technical skill is based upon the knowledge available to the profession at the time the architect was employed [294]. The current standard for knowledge of energy conservation techniques, including passive solar, is relatively low since energy conservation techniques have not been a standard part of educational or certification requirements. However, the standard of knowledge will be raised as efforts succeed to include energy conservation courses in educational curricula and in certification and recertification procedures [295].

In the absence of contractual warranties, the architect does not imply or guarantee a perfect plan or satisfactory result. Therefore, under negligence principles, the architect will be liable for personal injury or property loss, but not economic loss, in a negligence action [296]. Thus, consumer expectations about passive performance will be protected only if the consumer has the foresight and bargaining power to obtain a contractual warranty of performance. Without such a guarantee, negligent calculation in positioning a residence for solar access, which would decrease performance, would not result in liability.

A design professional has a duty to have a detailed knowledge of the building code and a duty to prepare his plans and specifications in accordance with building code requirements [297]. Failure to prepare designs in accordance with code requirements constitutes negligence [298]. The legal hazards faced by a design professional with respect to passive space-conditioned houses are multiplied because of the diversity of standards set by different local building codes, and the rapid evolution of "solar" code provisions [299].

The application of the strict liability doctrine to architects is a matter of controversy. It has been argued that architects should be held strictly liable for injuries caused by their nonnegligent errors inevitable in the course of their business [300]. Architects can spread their risk by increasing fees and purchasing malpractice insurance [301]. On the other hand, it has also been argued that the architect's liability does not fall within the traditional justifications for strict liability, which are:

- the difficulty of proving negligence in the setting of industrial mass production. The architect usually designs a unique product rather than a mass-produced commodity.
- the social policy that the risk should be assumed by those who can bear and redistribute it. It is argued that the owner of the building rather than the designer should bear the risk, since the owner gets the economic benefit of the building and can spread the risk by purchasing insurance.

- deterrence of carelessness in design and manufacture. The architect does not have much control over methods of construction [302].

To date, strict liability has not been applied to architects although some cases portend such an application of the doctrine [303]. The doctrine of strict liability seems to have been applied to the designer of a home that was not mass-produced and in which defective house design may have caused personal injury [304]. A potential strict liability issue in passive is inadequate structural capacity for roof ponds.

By contract, an architect may expressly warrant performance and thereby expose himself to economic loss liability [305]. A minority of states have held that an architect impliedly warrants the sufficiency of his plans for the intended purpose [306]. The majority of courts still hold that, when the function is design, the plaintiff must prove negligence [307].

The fitness warranty appears ideally suited for passive space-conditioned house designs. Since it is unlikely that design professionals will expressly warrant specific thermal and economic performance, the implied warranty of fitness for a particular purpose could serve to establish performance parameters. The client contracting for a passive space-conditioned house obviously relies on the architect's skill and judgment to prepare a design reasonably suitable for thermal comfort. The court system is suited to case-by-case examination of whether the comfort conditions provided by the design meet an implied fitness warranty.

Design professionals are potentially liable under common law consumer fraud theories. Misrepresentation may occur in the preparation of contracts, drawings, surveys, or test data [308]. Strict liability for misrepresentation is applicable by analogy to design professionals, even though they are not engaged in the business of selling chattels. Representations by design professionals as to adequacy of solar access, eligibility for tax credits, and compliance with building codes are potential sources of common law consumer fraud liability.

5.2.2 Contractors

The traditional rule applied to real sales has been that of caveat emptor [309]. However, the current trend is to impose a higher standard of duty in sales of new homes [310]. Passively designed houses, adding additional complications to real estate development, will confront the higher standards.

Some cases have held a builder of a new home liable on a negligence theory. The builder may be liable for injury caused by a dangerous defect that he knew or should have known existed [311]. Latency of the defect and the inability of the purchaser to discover the defect through reasonable inspection are factors in determining liability [312]. Other cases, following Section 353 of the Restatement of Torts (Second) have found the builder liable for failure to disclose dangerously defective construction that he knew or should have known existed [313]. Strict liability in tort based on section 402 A of the Restatement of Torts (Second) has been applied [314].

Builders may also be liable for breach of an express warranty, whether oral or written, as well as for breach of contract [315]. Magnuson-Moss provisions apply to builder-written warranties and builder distribution of written manufacturer warranties [316]. The builder may warrant compliance with FHA-approved plans and specifications, to build in a "good

and workmanlike" manner, in conformance with a model house, and according to prepared plans and specifications [317]. Representations that a passive residence complies with approved solar codes and other government requirements are likely to occur as passive construction increases.

It should be noted that a contractor is not responsible for insufficiencies caused by defects in plans prepared by someone else and followed at the owner's request [318]. Ordinarily, a builder who is not negligent may not be liable for latent defects in materials specified by the owner (or the owner's agent) and purchased by a reputable dealer [319]. This is an important provision if the builder is constructing a custom-built house according to plans prepared by the owner or for the owner by an architect.

An implied warranty of fitness theory is evolving with respect to sales of new houses [320]. Some courts hold that the sale of any new house raises implied warranties of fitness for habitation and good and workmanlike construction [321]. Other courts view such a warranty as arising only when the purchase of a new house was made while the house was under construction [322]. With passive, defective system performance could render a house thermally uninhabitable, especially if the conventional fossil-fuel system provided less than 100% of the house's space conditioning needs [323].

In every contract to build, it is implied that the building will be constructed in conformity with all laws and ordinances [324]. If the builder willfully or negligently violates the building code provisions, the builder will be compelled to allow the purchaser an abatement or deduction from the contract price adequate to remedy the defect [325]. The buyer may sue for damages if he has paid the entire contract price [326].

The builder is also subject to liability based upon misrepresentations as to the quality and condition of a building [327]. In builder/developer situations, misrepresentation issues may also arise with respect to tax credit eligibility as builders utilize governmental financial assistance as an inducement to sales. Consumers expect and rely upon information from builders with respect to comfort control systems. Builder representations concerning tax credit eligibility, energy savings, and sufficiency of conventional fossil-fuel systems will significantly affect consumer purchase decisions. Evidence of misrepresentation here should be weighted in favor of justifiable consumer reliance in the absence of evidence to the contrary.

5.2.3 Lenders

The incremental add-on costs of a passive solar heating system are approximately \$2,000 to \$8,000 [328]. The willingness of lenders to loan such funds is a crucial factor in passive commercialization. The interests of the lender and of the borrower are the same—to protect a mutual investment in a structure. A survey of lenders found that new solar construction receives far greater attention than does retrofit [329]. Home improvement loan officers generally do not evaluate retrofit systems and components, but instead rely upon the financial strength of the borrower [330]. Lenders advancing mortgages on new construction may evaluate systems directly, or utilize conservation appraisal techniques to indirectly judge passive system marketability [331]. A lender in Denver required a 5-year warranty from the producer of proposed solar equipment, a certificate of compliance from the insulation contractor and builder, a title-insured legal easement for solar rights, and a statement from the bank's own engineer that the home was energy efficient and the design acceptable, before advancing funds on a solar subdivision [332].

The pressure to evaluate systems and performance claims will increase as lenders consider adoption of energy efficiency in mortgage-approval determinations. Common rules-of-thumb hold that principal plus interest plus taxes plus insurance (PITI) should not exceed 25% of a purchaser's gross income [333]. Some have argued that "E" or average energy costs for the home should be included with PITI, with the 25% ratio adjusted accordingly [333]. This would help make energy efficient homes easier to finance. A lender fear is that marginal buyers may overextend themselves and be unable to handle unforeseen system defects or performance failures [334].

Some analysts have argued that the lender is a crucial screening agent in solar, and that care should be taken to avoid diluting the lender's role. Government performance standards and certification procedures discourage potentially effective system development that does not qualify for financing under existing government programs, and encourage "red tape." Lender-oriented programs that "ensure that loan officers retain a stake in seeing that the systems financed are the best available in terms of design, cost effectiveness, quality of manufacture, and installation" have been recommended [335].

Traditionally, a financing agency is not liable to the purchaser of a new home or structure for the consequences of construction defects unless the financing agency was the builder or a partner or a joint venturer with the builders [336]. For example, in Bradler v. Craig [337], the court held that mere approval of plans and specifications, and periodic inspections of hazards during construction, were normal procedures for any construction lender, and that no legal duty to protect purchasers of the property was present [338].

However, in Connor v. Great Western Savings & Loan Assoc. [339], a financing agency was held liable because it did not qualify as a builder, partner, or joint venturer with the builder. Subsequently, a California statute limited the Connor holding by providing:

A lender who makes a loan of money, the proceeds of which are used by the borrower to finance the design, manufacture, construction, repair, modification, or improvement of real or personal property for sale or lease to others, shall not be held liable to third persons for any loss or damage occasioned by any defect in the property, or for any loss or damage resulting from the failure of the borrower to use due care, unless such loss or damage is a result of an act of the lender outside the scope of the activities of a lender of money, or unless the lender has been a party to misrepresentations with respect to such property. [340]

The Connor case, nevertheless, remains important as a potential theory of lender liability. In passive, the Connor case takes on added significance and three trends emerge:

- "mass-marketing" of passively designed subdivisions and systems [341],
- inclusion of energy savings in the PITI rule of thumb [342],
- modifications of backup heating systems [343].

New subdivisions, where site orientation, structural design and components, and solar access can be controlled, represent a very significant market for passive commercialization efforts. It is significant to note that such subdivisions are often financed in a manner similar to that employed in Connor. Inclusion of energy savings (E) in traditional mortgage lending decisions means increased lender involvement in design, construction, and performance estimates of particular structures.

In Connor, it was held that a savings and loan association was under a duty to buyers of homes to exercise reasonable care to protect the buyers from damages caused by major structural defects. The savings and loan association was deeply involved in the development of a residential subdivision, but not to the extent of a joint venturer [344]. The relationship of the savings and loan association included agreements whereby the savings and loan association would supply the funds necessary to enable the developer to purchase the land in return for the savings and loan association's right to make construction loans on the homes built, and the right of first refusal to make permanent loans to the home purchasers [345].

The court rejected a lack of privity defense as well as a superseding developer negligence defense. The court balanced a number of policy factors in imposing liability, relying primarily on the steady expansion of tort liability, extending to any entity that fails to exercise care to protect others from reasonably foreseeable risks. In the instant case, those in the business of financing tract builders could reasonably foresee the possibility that they might be under a duty to exercise their power over tract development to protect the usual buyer from seriously defective construction, knowing the usual buyer is ill-equipped to discover structural defects [346]. Moreover, since the lender's security depends on construction of sound homes, the lender has always been under a duty to its shareholders to exercise reasonable care to prevent the construction of defective homes.

Property damage and/or personal injury from passive systems could result from roof collapse, leakage, and component breakage. To the extent that Connor would be an acceptable legal theory, a court could establish a standard of care in relation to the seriousness of the defects and the involvement of the defendant lender.

The more difficult question involves performance quantifications. To protect his interest, a lender willing to incorporate energy savings into his mortgage calculations may do his own extensive evaluations of system and component performance. Based on these calculations, a lender might acquiesce in modifications to conventional backup space conditioning systems in order to let the builder reduce total construction costs. Thus, energy savings quantifications become the key to the borrower's thermal comfort as well as his ability to repay the mortgage.

If the house is so defectively constructed that thermal comfort is not possible, a theory similar to Connor might be utilized. If the house simply does not produce the energy savings expected by the consumer and quantified into the mortgage, it is not clear whether liability ensues. Economic loss is rarely an element under negligence actions such as in Connor [347]. The property damage exception permits economic loss recovery in negligence, but generally only if the defect causes the product to sustain physical harm in a violent or sudden manner [348]. Such an exception might be applicable in passive roof pond or water storage systems, in cases of sudden collapse or leakage.

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SECTION 6.0

CONCLUSIONS

Representations regarding passive system safety, performance, resulting energy savings, and financial assistance eligibility are likely to influence consumers considering the purchase of a passive system. A consumer who is disappointed with a passive system he has purchased theoretically has a wide range of available remedies. However, the cost of obtaining court relief, coupled with the time involved, will discourage individual actions unless serious injury has occurred. This is especially true in economic loss cases where locating the cause of alleged insufficient thermal performance presents an extremely complex evidentiary problem.

Public regulation of representations may be a more efficient consumer protection alternative, especially with respect to performance representations. The FTC trade regulation rule promulgated for home insulation can serve as a model for permissible passive system representations. Representations of financial assistance eligibility or compliance with government standards would not be permitted unless such representations were true. Consumers alleging false representations would have the advantage of federal or state agency assistance in evaluating the accuracy of the representation. State agency assistance is especially valuable in mediating claims between consumers and representers. Energy savings claims made with respect to passive systems present somewhat more difficult substantiation problems than do those made with respect to home insulation, because no single comparison element, such as R-value for insulation, is available for passive systems. Nevertheless, because energy savings claims are powerful representations, those making such representations should have the burden of substantiation.

Consumers also will be protected by lenders and utilities. The lender's willingness to advance funds for passive systems is an extremely important factor in commercialization. As pressure mounts to reflect energy savings in PITI calculations, the lender's role in checking the accuracy of the energy savings representation increases. The lender and the homeowner have a mutual investment in the residence. Accurate energy savings estimates, checked and verified by the lender, will be necessary if the lender decides (or is required) to incorporate energy savings in mortgage lending decisions.

Utilities and required home heating suppliers under NECPA will play a significant role in increasing consumer knowledge, through the energy audit process. Not to be overlooked, however, is the important screening process that will occur in the development of the contractor, installer, and lender master list. This process could serve as a check between the consumer and the home improvement industry.

Passive solar energy should and will play an important role in the transition away from complete dependency on fossil fuels. While consumer disappointment problems are certain to arise, these problems can be resolved by the legal system.

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SECTION 7.0

REFERENCES

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11. See Rothschild, D. Consumer Protection, 846 (2d ed. 1976).
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14. See note 9 supra. For planning purposes, therefore, the typical "run of the mill" case will proceed without problems. One of the purposes of the law however, is to consider and evaluate the atypical case. See Horowitz. The Courts and Social Policy. 1977.
15. See advertisements in Solar Age Magazine, May 1979, 21, 50. See also similar inducements with respect to home insulation, Federal Trade Commission. Trade Regulations: Labeling and Advertising of Home Insulation. Vol. 44, p. 50218; 27 Aug. 79. (To be codified at 16 C.F.R. 460.)
16. See notes 93-101 and accompanying discussion.
17. Shapo. "A Representational Theory of Consumer Protection: Doctrine, Function and Legal Liability for Product Disappointment." 60 Va.L.R. 1109 (1974).
18. For a description of the Solar Technology Delivery System, see Solar Energy Incentives Analysis: Psycho-Economic Factors Affecting the Decision Making of Consumers and the Technology Delivery System. 4, Jan. 1978. Prepared by for the U.S. Dept. of Energy, Secretary for Conservation and Solar Applications under Contract No. EX-76-G-01-2534. (Hereinafter cited as Psycho-Economic Factors.)
19. There are numerous ways to characterize passive systems. Mazria classifies systems by direct gain, indirect gain (including thermal storage wall, solar greenhouse), and isolated gain (e.g., thermosyphon system). See Mazria, E. note 27 infra.

The draft regulations for the Residential Conservation Program of NECPA characterize passive as follows: direct gain glazing systems, indirect gain systems, solarial sunspace systems, thermal pond systems. See Residential Conservation Program Service, supra note 6, at 16590 (§ 456.105(r)(4)). The National Program Plan categorizes passive systems according to aperture collection characteristics. See National Program Plan, supra note 8, at 35-53.
20. National Program Plan, supra note 8, at 14.
21. Id.
22. Id.
23. Id. at 16.
24. Passive Solar Hearings, supra note 4, at 3.
25. National Program Plan, supra note 8, at 14.
26. Id.
27. See Mazria, E. The Passive Solar Energy Book: A Complete Guide to Passive Solar Home, Greenhouse, and Building Design. 29-31, 1979. (Hereinafter cited as Passive Solar Energy Book.)
28. Anderson, B. Solar Energy: Fundamentals in Building Design. 81, 1977.

29. A house facing within 20° east or west of true south is suitable for solar heating. See Sunset. Homeowner's Guide to Solar Heating. 8, 1978.
30. Id. at 45. See also Anderson, B., supra note 28, at 87.
31. Mazria, E., supra note 27, at 108.
32. House Subcomm. on Oversight and Investigations of the Comm. on Interstate and Foreign Commerce. Solar Energy and Today's Consumer. Comm. Print 95-75, 95th Cong., 2d Sess. 51, 1978 (Hereinafter cited as Today's Consumer.)
33. Mazria, E., supra note 27, at 108. A 5-15° temperature has been estimated by other observers. Homeowner's Guide, supra note 29, at 16.
34. Mazria, E., supra note 27, at 108.
35. Id. Mazria defines efficiency as: "the percentage of the solar energy incident on the face of the collector (glazing) that is used for space heating. When the glazing area normally used in a space doubles as the collector area, then the system's efficiency will be high, approximately 75%. However, if the collector area is additional to the amount of glazing that would normally be used in a space, then the system's efficiency will be lower, on the order of 30% to 60%."
36. In an indirect system, the thermal storage medium is placed between the space to be heated and the sun. Id.
37. Anderson, B., supra note 28, at 122.
38. Mazria, E., supra note 27, at 110. See Fundamentals, supra note 28, at 99.
39. Mazria, E., supra note 27, at 109.
40. Id. at 110.
41. Passive Solar Hearings, supra note 4, at 83 (Statement of Alan Hirshberg).
42. The Berkeley Solar Group. "Solar For Your Present Home." Solar Age. 17, 19, July 1979.
43. Today's Consumer, supra note 32, at 51.
44. Mazria, E., supra note 27 at 110.
45. Id. at 111.
46. Id.
47. Homeowner's Guide, supra note 29, at 19. A solar greenhouse may be the easiest system to retrofit, provided the house has a wall with southern exposure.
48. Mazria, E., supra note 27, at 111.
49. Today's Consumer, supra note 32, at 51.

50. Mazria, E., supra note 27, at 111.
51. Id.
52. Homeowner's Guide, supra note 29, at 19. Other advantages of solar greenhouses are:
 - aesthetic, gardenlike addition to house,
 - convenient airlock to prevent undue heat loss when the house door is opened, and
 - in winter, plants in the greenhouse help to humidify and purify stale, dry house air.
53. See Passive Solar Hearings, supra note 4, at 19.
54. Homeowner's Guide, supra note 29, at 19-20.
55. Mazria, E., supra note 27, at 112.
56. Id.
57. Today's Consumer, supra note 32, at 51.
58. Mazria, E., supra note 27, at 113.
59. Id. at 73.
60. Extensive bibliographies on solar access can be found in: Hayes, G. Solar Access Law: Protecting Access to Sunlight for Solar Energy Systems. 171-172, May 1979. Prepared by the Environmental Law Institute for the U.S. Dept. of Housing and Urban Development, Office of Policy Development and Research, under Contract No. H-8213G; Jaffee, M; Erlay, D. Protecting Solar Access for Residential Development: A Guidebook for Planning Officials. 153-154, May 1979. Prepared by American Planning Association for the U.S. Dept. of Housing and Urban Development, Office of Policy Development and Research, under Contract No. H-2573.
61. Hayes, G., supra note 60, at 9. For a short history of the evolution of the common law with respect to access to sunlight, see Thomas, W; Miller, A; Robbins, R. Overcoming Legal Uncertainties About Use of Solar Energy Systems. 20-27, 1978.
62. See, e.g., Ch. 1366, 1978 Cal. Stats. (to be codified at Cal. Pub. Res. Code §§ 25980-25986).
63. Johnson, "State Approaches to Solar Legislation: A Survey." 1 Solar L. Rep. 55, 110 (1979).
64. Ch. 169, 1977 N.M. Laws, Solar Rights Act, N.M. Stat Ann. §§ 70-82 et seq. (Interim Supp. 1976-1977).
65. Johnson, supra note 63, at 116.

66. Id.
67. See Tennessee Acts 1979, Ch. 259, The Solar Access Law of 1979 (to be codified in § 64 Tennessee Code Annotated).
68. Ch. 1154, 1978 Cal. Stats. (to be codified at Cal. Gov't Code §§ 66573.1, 66475.3).
69. See Legal Barriers to Solar Heating and Cooling of Buildings. 15-17, March 1978. Prepared by Environmental Law Institute for the U.S. Dept. of Energy, Assistant Secretary for Conservation and Solar Applications, under Contract No. EX-76-C-01-25281; see generally, Wiley. "Private Land-Use Controls as Barriers to Solar Development: The Need for State Legislation." 2 Solar L. Rep. 281 (1979).
70. *Kraye v. Old Orchard Assn. 1*, No. C 209453 (Cal. Super. Ct. for Los Angeles Cty., 28 Feb. 79) reported in 1 Solar L. Rep. 8 (1979).
71. *Nicholas v. Gurtler No. C 384239* (Superior Ct. for Maricopa County, Ariz., 10 May 79) reported in 2 Solar L. Rep. 251 (1979).
72. Searcy, J. Hazardous Properties and Environmental Effects of Materials Used in Solar Heating and Cooling (SHAC) Technologies: Interim Handbook. 9, Feb. 1979. Prepared by Sandia Laboratories for U.S. Dept. of Energy. (Hereinafter cited as Hazardous Properties.)
73. Hazardous Properties, supra note 72, at 72-73.
74. Id. at 71.
75. Id. at 64.
76. Id. at 78.
77. Id.
78. Id.
79. "Solar Accepted by Nation's Insurers, Solar Status." 22 May 79. (National Solar Heating and Cooling Information Center); see also Schifflett & Zuckerman, "Solar Heating and Cooling: State and Municipal Legal Impediments and Incentives." 18 Natural Resources. 313, 333 (1978).
80. The National Association of Mutual Insurance Companies (NAMIC) has formed an Alternative Energy Committee to collect and analyze information for their member companies. A series of Alternative Energy Source Bulletins is being published that includes a description of solar energy systems, a questionnaire to assist underwriters in evaluating solar energy installations, procedures for adjusting claims, and inspection guidelines.
81. See, e.g., Balcomb, S. "The Solar Consumer—Living In a Glass House." Passive Solar: State Of the Art. Proceedings of the 2nd National Passive Solar Conference; American Section of the International Solar Energy Society; Philadelphia; 16-18 Mar. 78. Vol. 3 at 778.

82. See Passive Solar Hearings, supra note 4, at 86.
83. Olgyay, V. Design With Climate: Bioclimatic Approach to Architectural Regionalism. 17-19, 1973.
84. Griffen, G. Energy Conservation in Building Techniques for Economical Design. 1974.
85. N. Y. Times. 11 July 79.
86. See Psycho-Economic Factors, supra note 18, at 22-24.
87. For a description of various analytical methods that can be used to predict passive system performance, see Analysis Methods For Solar Heating and Cooling Applications. 1979. Prepared by the Solar Energy Research Institute for the U.S. Dept. of Energy under Contract No. EG-77-C-01-4042.
88. See The Energy Consumer. Vol. 1, No. 2 at 16. June/July 1979. Published by the U.S. Dept. of Energy, Office of Consumer Affairs.
89. See note 8 supra.
90. Psycho-Economic Factors, supra note 18.
91. Id.
92. See note 42 supra at 25.
93. See Psycho-Economic Factors, supra note 18.
94. See note 1 supra.
95. See Johnson. "State Approaches to Solar Legislation: A Survey." 1 Solar Law Rep. 55, 1979; Ashworth. "Implementing Solar Financial Incentives: The Experience of Selected State Programs." 2 Solar Law Rep. 369 (1979).
96. See Ashworth J. The Implementation of State Solar Incentives: A Preliminary Assessment. 100, Jan. 1979. Prepared by Solar Energy Research Institute, for U.S. Dept. of Energy under Contract No. EG-77-C-01-4042.
97. See note 2 supra.
98. "Confused Panel Returns Energy Tax Plan." The Denver Post. 8, 1 Aug. 79 Examples of the complex definitions include the definition for a qualified awning: it must be . . . "attached to the building . . . does not obstruct the (window) on Dec. 21 between 10 a.m. and 2 p.m. . . . and has a shading coefficient of 0.36 or less."
99. Ashworth, supra note 97.
100. Standards development is currently being carried out by ATSM, which has established a subcommittee to examine passive standards. Its scope is as follows:

To develop, provide, and publicize, as needed, standard definitions, practices, methods, classifications, and specifications as required to evaluate characteristics and performance of materials, products, components, and systems used in passive solar applications.

The Passive Systems Division of the American Section of the International Solar Energy Society has established a committee to investigate passive standards as they relate to testing procedures, recommended performance levels, and building codes. Finally, the Architectural Aluminum Manufacturing Association, through its solar energy committee, is to consider long term performance data on the thermophysical properties of glazing in various combinations in different framing assemblies. See Holtz, M. Standards for Passive Solar Heating and Cooling. 1978. Prepared by Solar Energy Research Institute for U.S. Dept. of Energy under Contract No. EG-77-C-01-4042.

101. See Ashworth, supra note 95, at 406.
102. Commercialization Strategy Report for Passive Solar Heating. 10, 1978. Report prepared by Department of Energy Task Force. (Hereinafter cited as Commercialization Strategy Report.)
103. Psycho-Economic Factors supra note 18.
104. Similar factors have been discerned in consumer evaluation difficulties with home insulation. Since consumers infrequently purchase insulation (or passive residences), there is little experience to draw upon in the purchase decision. See the discussion with respect to home insulation, supra note 15.
105. See Ashworth, supra note 96.
106. Sheldon J. Consumer-Fraud: An Analysis of Impact and Opportunities for Intervention. 145, 1978. Prepared by National Consumer Law Center for U.S. Dept. of Justice, Law Enforcement Assistance Administration under Contract No. 76-NI-99-0122. (Hereinafter cited as Opportunities for Intervention.)
107. The Solar Energy Research Institute (SERI) was created by Congress through the Solar Energy Research, Development, and Demonstration Act of 1974. Pub. L. No. 93-473, 88 Stat. 1431 (1974). An important SERI objective is the development and implementation of a Solar Energy Information Data Bank (SEIDB). See Solar Energy Information Locator (prepared by Solar Energy Research Institute for U.S. Dept. of Energy under Contract No. EG-77-C-01-4042.)
108. The National Solar Heating and Cooling Information Center (NSHCIC) is operated by the Franklin Institute Research Laboratories under a contract with the U.S. Dept. of Housing and Urban Development in cooperation with the U.S. Dept. of Energy. It offers the following toll-free numbers for information requests:

Pennsylvania:	800/462-4983
Elsewhere:	800/523-2929
109. See, e.g., Buying Solar. 1976. U.S. Federal Energy Administration, Office of Consumer Protection.

110. For addresses of state solar energy offices and the four regional centers, see Solar Energy Information Locator, *supra* note 107.
111. For analysis of local public and private organization consumer protection efforts, see Rothschild and Carroll. Consumer Protection Reporting Service. 577-761, Vol. 2, 1979. See also Sheldon, J. Survey of Consumer Fraud Law. 175-135, 1978. Prepared by National Consumer Law Center for the U.S. Dept. of Justice, Law Enforcement Assistance. Administration under Contract No. 76-NI-99-0122 Hereinafter cited as Survey.
112. See, e.g., Consumer Action Now's Council on Environmental Alternatives, Inc. Plugging Into Solar & Turning the Sun on in Your Home. 1975; Gunn, A. A Citizen's Handbook on Solar Energy. 1975, (Public Interest Research Group).
113. Schwartz and Wilde. "Intervening on Markets on the Basis of Imperfect Information: A Legal and Economic Analysis." 127 U. Pa. L. Rev. 630, 665 (1978).
114. Psycho-Economic Factors, *supra* note 18, at 22-24.
115. See Mayer and Nicosia. Consumer Information: Sources, Audiences, and Social Effects in Protecting the Consuming Interest. R. Katz ed. 1976.
116. "People have accepted the right to consume, but not ethical reasons in choosing what they consume. Yet it is precisely consciousness of moral and social dimensions of consumption and action following from this awareness that is essential if the programs of both government and business concerning . . . energy conservation . . . are to be effective. Therefore, consumer education must necessarily involve consumption consequences to society as a whole." *Id.* at 66.
117. See notes 275-288 *infra* and accompanying discussion.
118. Pub. L. No. 95-619, 92 Stat. 3200 et seq. (1978).
119. *Id.* § 215.
120. U.S. Dept. of Energy. Residential Conservation Service Program. Draft Regulations; Vol. 44, 16546, 16594; 19 Mar. 79. To be codified as 10 C.F.R. 456.307 (c)(i).
121. *Id.* 10 C.F.R. 456.307 (c)(ii).
122. *Id.* 10 C.F.R. 456.307 (c)(v)(A).
123. Supplementary Information: Residential Conservation Service Program, *supra* note 120, at 16559.
124. *Id.* See 10 C.F.R. 456.307 (7)(1).
125. *Id.* 16558.
126. See 10 C.F.R. 456.704.

127. Supplementary Information: Residential Conservation Service Program, *supra* note 120, at 16558.
128. *Id.* at 16565.
129. See 10 C.F.R. 456.312(b)(1).
130. *Id.* 456.312(b)(2).
131. *Id.* 456.312(b)(3).
132. Supplementary Information: Residential Conservation Service Program, *supra* note 120, at 16562.
133. *Id.*
134. National Energy Conservation Policy Act, Pub. L. No. 95-619, § 213(a)(5), 92 Stat. 3206 (1978).
135. *Id.* § 213(c).
136. A "three-tiered" process has been proposed in draft regulations promulgated to implement NECPA:
 - conciliation conference for customers,
 - informal redress procedure that results in decisions enforceable under state law and that is available to all involved in the program, and
 - availability of state courts for recovery of damages resulting from activities under a state plan. See 10 C.F.R. 456.315.

Initially the conciliation conference is suggested to voluntarily and informally resolve complaints by eligible customers against persons who sell, install, or finance the sale or installation of suggested measures under a state plan. *Id.* at 456.315(a). Note that contractors, suppliers, and lenders must agree to participate in good faith in the conciliation conferences as a condition to being included on the master lists 456.315(b). The program announcement and energy audit must also disclose the existence of the conciliation conference 456.306(c) and 307(e).

The conciliation conference procedure adopted in the state plan must ensure free, easily accessible participation by the consumer, voluntary participation by the consumer alleging injury, and an impartial conciliator who has no financial interest in common with any party involved in the complaint or in the outcome of the proceeding 456.315(a).

Participation in the conciliation conference is not mandatory before a consumer uses the redress procedure required in the state plan. All persons who have a substantial interest in the outcome of the redress proceeding must be given timely and adequate notice of the proceeding and have an opportunity to participate in the proceeding. The hearing will be held before an impartial hearing officer who must deliver a written decision and reasons therefore. Formal rules of evidence are not required. Nevertheless, the decision must be enforceable under state law. An administrative agency or state court can administer the redress proceedings 456.315(b)(i)(ii).

137. 38 Stat. 791 (1914).
138. The legislative history of Section 5 of the FTCA, which provides that unfair methods of competition in commerce are unlawful and subject to cease and desist orders, is analyzed in Note. "The Limit of FTC Power to Issue Consumer Protection Orders." 40 Geo. Wash. L. Rev. 496, 505-511 (1972); See also Note. "Corrective Advertising Orders of the Federal Trade Commission." 85 Harv. L. Rev. 477 (1971); Note. "Deceptive Advertising." 80 Harv. L. Rev. 1005 (1967).
139. The Wheeler-Lea Amendment of 1938, 52 Stat. 111 91938) dealt generally with health-related issues.
140. The following consumer protection statutes are administered by the FTC:
- The Fair Packaging and Labeling Act, 80 Stat. 1296 (1966), 15 U.S.C. § 145.
 - The Truth in Lending Act, 15 U.S.C. § 1601 et seq. This act was promulgated as Title I of the Consumer Credit Protection Act of 1968 to require full disclosure of credit terms before the extension or completion of a consumer credit transaction.

While the Residential Conservation Service Program draft regulations show that the Department of Energy believes Congress did not intend for NECPA to extend coverage to previously exempt utilities or fuel suppliers, the option of extending similar coverage is reserved to the States. Residential Conservation Service Program, *supra* note 120, at 16560.

The Federal Reserve Board has promulgated Regulation Z (FRB Reg. Z, 12 C.F.R. 226 (1974)) under the act which details how the "cost" of credit is to be ascertained and disclosed. While Regulation Z may not be applicable to periodic billings by utilities under NECPA, the draft Residential Conservation Service Program provides parallel treatment. *Id.* at 16561.

- The Fair Credit Reporting Act, 15 U.S.C. §§ 1681 1/2 (1976).
 - The Equal Credit Opportunity Act, 15 U.S.C. §§ 1667-1667e (1976).
 - The Consumer Leasing Act of 1976, 15 U.S.C. § 2301 et seq.
141. Section 201 of Pub. L. No. 93-637 expanded the FTC's jurisdiction from acts and practices "in" interstate commerce to those "affecting" interstate commerce. See S. Rep. No. 93-151, 93rd Cong., 1st Sess. 26 (1973). The jurisdiction issue may still arise if only a limited number of custom built houses are designed or built.
142. See Survey, *supra* note 111, at 144-146.
143. The FTC is currently monitoring advertising relating to thermal performance claims and economic claims. See "FTC Monitors Solar Advertising in Current Developments." 2 Solar L. Rep. 250 (1979). See also the problem in home insulation, *supra* note 15.
144. (1974) Trade Reg. Rep. (CCH) ¶ 7573.70 The reasonableness of offered substantiation is determined on a case-by-case basis, considering such factors as the specificity of the claim, the nature of the product offered, the consequence if the claim is false, the consumer's reliance on the claim, and the accessibility of substantiating data. See Survey, *supra* note 111, at 146.

145. 16 C.F.R. 460.19, supra note 15, at 50244.
146. Id.
147. See Survey, supra note 111, at 158-160.
148. Id.
149. Today's Consumer, supra note 32, at 31.
150. Id.
151. Federal Trade Commission. Trade Regulations: Labeling and Advertising of Home Insulation. Vol. 44, p. 50218; 27 Aug. 79. (To be codified at 16 C.F.R. 460.)
152. 16 C.F.R. 460.19(b).
153. 16 C.F.R. 460.19(e).
154. 16 C.F.R. 460.21 and 460.22.
155. 15 U.S.C. § 45(b) (1970).
156. See Weston. "Deceptive Advertising and the Federal Trade Commission: Decline of Caveat Emptor." 24 Fed. B.J. 548, 561 (1964); Survey, supra note 111, at 158-160.
157. Aluminum Co. of America, (1979) Trade Reg. Rep. (CCH) ¶ 21,512.
158. (1979) Trade Reg. Rep. (CCH) ¶ 10,199.12.
159. Pub. L. No. 93-637, § 206(a).
160. Id.
161. Id.
162. Kaufman and Broad, Inc., (1978) Trade Reg. Rep. (CCH) ¶ 21,436.
163. Id.
164. (1978) Trade Reg. Rep. (CCH) ¶ 21,532.
165. Id.
166. 15 U.S.C. § 2308 (1975).
167. Id. § 2302(G).
168. See 16 C.F.R. 700.1
169. See 16 C.F.R. 700.1(a) and (d).

170. Id. at 700.1(e).
171. Passive Solar Hearings, *supra* note 4, at 30. (Statement of J. Balcomb.)
172. Home Owner's Warranty Corp. and National Assn. of Home Builders, (1976) Trade Reg. Reg (CCH) ¶ 21,245 (advisory opinion).
173. 16 C.F.R. 700.1(e).
174. Id. See Home Owner's Warranty Corp., *supra* note 172.
175. One analysis of active systems indicated the following coverage: "The Federal Trade Commission would probably view solar collectors, storage tanks, hot water tanks and pumps as consumer products whether sold as part of a building or over the counter for retrofit. Certain components, such as absorber plates and plate covers, would probably be viewed by the Federal Trade Commission as consumer products when sold as replacement parts but not when included in the complete piece of original equipment." O'Connor and Hannon. Solar Warranty Guidelines. 6, 1979. (Prepared for the Solar Energy Industries Association.)
176. Title I of the act. The FTC is currently investigating warranties being offered by the solar industry for compliance with Magnuson-Moss requirements. See "Federal Trade Commission Surveys Solar Warranties." Reported in Current Developments, 2 Solar L. Rep. 271 (1979).
177. Reitz, C. Consumer Protection Under the Magnuson-Moss Warranty Act. 135, 1978.
178. 16 C.F.R. 700.4. "Section 110(f) of the Act provides that only the supplier actually making a written warranty is liable for purposes of FTC and private enforcement of the Act. A supplier who does no more than distribute or sell a consumer product covered by a written warranty offered by another person or business and which identifies that person or business as the warrantor is not liable for failure of the written warranty to comply with the Act or rules thereunder. However, other actions and written and oral representations of such a supplier in connection with the offer or sale of a warranted product may obligate that supplier under the Act. If under state law the supplier is deemed to have 'adopted' the written affirmation of fact, promise or undertaking, the supplier is also obligated under the Act. Suppliers are advised to consult state law to determine those actions and representations that may make them co-warrantors, and therefore obligated under the warranty of the other persons or business."
179. Reitz, C., *surpa* note 177 at 136.
180. Id.
181. 15 U.S.C. § 2304 (1975)
182. Id.
183. Id.
184. Id.

185. 15 U.S.C. § 2302.
186. 16 C.F.R. § 701.3; see Eddy. "Effects of the Magnuson-Moss Act on Consumer Product Warranties." 55 N. Carolina L. Rev. 835 (1977).
187. Id.
188. Id.
189. 15 U.S.C. § 2302.
190. See "Federal Trade Commission Surveys Solar Warranties." Reported in Current Developments, 2 Solar L. Rep. 271, 273 (1979).
191. Id.
192. Id.
193. 15 U.S.C. § 2310.
194. Id.
195. Id.
196. Id.
197. Id.
198. Potential FTC action may be taken if more builders do not voluntarily enroll in HOW. See Willmann. "Builders Resisting Mandatory Warranties." The Washington Post. 21 July 79, at E8. The Kaufman and Broad consent order, supra note 162 required more extensive warranties than HOW provides.
199. Id.
200. 15 U.S.C. § 2310
201. 15 U.S.C. § 2311.
202. Id.
203. Id.
204. 15 U.S.C. § 2310.
205. Id.
206. See Annot., 89 A.L.R. 3d 399,403 (1979); Sebert. "Enforcement of State Deceptive Trade Practice Statutes." 42 Tenn. L. Rev. 689 (1975).
207. See Rothschild, D. Consumer Protection. 886-887 (2d ed., 1976). Lovett. "State Deceptive Trade Practice Legislation." 46 Tulane L. Rev. 724 (1972).

208. Id.
209. Id.
210. See Annot., 89 A.L.R. 3d 399 (1979).
211. See, e.g., *Nebraska v. Blair*, 141 N.J. Super. 365, 358 A.2d 473 (1976). The court held that the term "merchandise" as used in the New Jersey Consumer Fraud Act does not include real estate. The court reasoned that "merchandise" as defined in the act includes "any object, wares, goods, commodities, or services," and that the legislature specifically deleted the words "real estate" from a subsequent amendment that expanded the statutory definition of "merchandise." The court further stated that "real estate" is not a product or service in the popular sense. See generally Annot., 89 A.L.R. 3d 399,420-421 (1979).
212. See Lovett, *supra* note 207, at 731.
213. See Annot., 89 A.L.R. 3d 449 (1979).
214. Id.
215. See *Commonwealth v. De Cotis*, 306 Mass. 234, 316 N.E. 2d 748 (1974); see also, Survey, *supra* note 111, at 28-31.
216. See Annot., 89 A.L.R. 3d 449 (1979).
217. See Rothschild, D., *supra* note 207.
218. See Survey, *supra* note 111, at 28-31.
219. See Rothschild, D., *supra* note 207, at 915-919.
220. See Sebert, *supra* note 206, at 696.
221. See Annot., 59 A.L.R. 3d 1222, 1225 (1974).
222. See Rothschild, D., *supra* note 207 at 917.
223. Id. at 919.
224. Id. at 918.
225. See Annot., 59 A.L.R. 3d 1222, 1226 (1974).
226. Id.
227. See Annot., 59 A.L.R. 3d 198, 199 (1974).
228. See Wade and Kamenshine. "Restitution For Defrauded Consumers: Making the Remedy Effective Through Suit By Government Agency." 37 Geo. Wash. L. Rev. 1031, 1064 (1969).

229. See Rothschild, D., *supra* note 207, at 922.
230. See Annot., 62 A.L.R. 3d 168, 171 (1975).
231. See Rothschild, D., *supra* note 207 at 923.
232. *Id.* at 921.
233. Preventative measures cannot be designed to protect absolutely each individual consumer. Therefore, remedial measures are necessary to deal with individual injury. Further, remedial sanctions are necessary to assure compliance with required preventative measures. See Barton, B. "Private Recourse for Consumers: Redress or Rape." 199, in Protecting the Consumer Interest. (R. Katz ed. 1976). Sweet, J. Legal Aspects of Architecture, Engineering and the Construction Process. 299 (2d ed. 1977).
234. See Shapo, *supra* note 17.
235. *Id.* at 1155-1203.
236. *Id.* at 1204-1285.
237. *Id.* at 1204.
238. See Note. "Product Liability: Expanding the Property Damage Exception In Pure Economic Loss Cases." 54 Chi-Kent L. Rev. 963, 964 (1978).
239. *Id.*
240. Note. "The Vexing Problem of the Purely Economic Loss in Products Liability: An Injury in Search of a Remedy." 4 Seton Hall L. Rev. 145, 154 (1973). See also *Seeley v. White Motor*, 63 Cal. 2d 9, 45 Cal. Rptr. 17, 403 P. 2d 145 (1965).
241. *Jacobs v. Kent*, 230 N.Y. 239, 129 N.E. 889 (1921).
242. Prosser, W. Law of Torts. § 30, at 143 (4th ed. 1971) (hereinafter cited as Prosser).
243. *Id.*
244. Supplementary Information: Residential Conservation Service Program, *supra* note 120, at 16565.
245. Commercialization Strategy Report, *supra* note 102.
246. See, e.g., *Willey v. Fyrogas Co.*, 251 S.W. 2d 635, 363 Mo. 406 (1952).
247. *Kross v. Kelsey Hayes Co.*, 29 App. Div. 2d 901, 287 N.Y.S. 2d 926 (1968).
248. *La Plant v. E. I. du Pont de Nemours & Co.*, 346 S.W. 2d 231 (Mo: App. 1961).
249. See Interagency Task Force on Product Liability. Vol. II, 58-87, Jan. 1977. Prepared by the Research Group, Inc. for the U.S. Dept. of Commerce under Contract No. G-36250.

250. Id.
251. Prosser, *supra* note 242, § 101, at 665.
252. See Rothschild, D., *supra* note 207, at 531.
253. Restatement of Torts (Second) § 402A (1965).
254. See II Product Liability, *supra* note 249, at 18.
255. Id. at 187.
256. See *Kridder v. Ford Motor Co.*, 422 F. 2d 1182 (3rd Cir. 1970).
257. See Comment. Consumer Protection—liability without fault—personal injuries—products liability—when a plaintiff establishes a prima facie case that he was injured due to a product's design, the burden of proof shifts to the defendant to prove that the design is not defective—*Barker v. Lull Engineering Co.*, 20 Cal. 3d 413, 573 P2d 433, 143 Cal. Rptr. 225 (1978), 47 U. Cin. L. Rev. 635 (1979).
258. See *Santor v. A & M Karagheusion, Inc.*, 44 N.J. 52, 207 A 2d 305 (1965) (economic loss allowed). See generally, Note. "The Vexing Problem of the Purely Economic Loss in Products Liability: An Injury in Search of a Remedy." 4 Seton Hall L. Rev. 145 (1973); Note. "Products Liability: Expanding the Property Damage Exception In Pure Economic Loss Cases." 54 Chi-Kent L. Rev. 963 (1978).
259. See Rothschild, D., *supra* note 207, at 500; U.C.C. § 2-213, comment 2.
260. U.C.C. § 2-105 (1978 Official Text).
261. White, J; Summers, R. Handbook of the Law Under the Uniform Commercial Code. 44, 1972; *Spoonseller v. Meltebele*, 230 Ore. 361, 570 P.2d 974 (1977).
262. See *Riffe v. Black*, 548 S.W. 2d 175 (Ky., 1977).
263. *Busch v. United Aluminum Metal Products Corp* (1970), cited in 8 U.C.C. Rep. 335; *Mingledorff's, Inc. v Hicks* (1974), cited in 15 U.C.C. Rep. 963.
264. *Thorman v. Polytemp, Inc.* (1965), cited in 2 U.C.C. Rep. 772.
265. U.C.C. § 2-313 (1978 Official Text).
266. U.C.C. § 2-312(2). Official Comment 8 reads:

Concerning affirmation of value or a seller's opinion or commendation under subsection (2), the basic question remains the same: What statements of the seller have in the circumstances and in objective judgment become part of the basis of the bargain? As indicated above, all of the statements of the seller do so unless good reason is shown to the contrary. The provisions of subsection (2) are included, however, since common experience discloses that some statements or predictions cannot fairly be viewed as entering into the bargain. Even as to false statements of value, however, the possibility is left open that a remedy may be provided by the law relating to fraud or misrepresentation.

267. See, e.g., *Knight v. Cantrell*, 390 P.2d 948 (Colo. 1964) ("good house," "well built," held to be mere puffing).
268. U.C.C. § 2-213, comment 5.
269. U.C.C. § 2-313(1)(c).
270. U.C.C. § 2-314(1). A person making an isolated sale of goods is not a "merchant" within the meaning of this section, and, therefore, no such warranty would be implied. U.C.C. § 2-314, comment 3.
271. Minimum requirements for goods to be merchantable are listed in U.C.C. § 2-314(2).
272. U.C.C. § 2-314(3).
273. See U.C.C. § 2-314(2).
274. U.C.C. § 2-315, comment 1. The buyer need not specifically inform the seller of the particular purpose. It is sufficient that the seller have reason to realize the purpose intended.
275. Prosser, *supra* note 242, § 105, at 685.
276. *Id.* § 109, at 720.
277. 240 N.Y.S. 123, 228 App. Div. 396 (1930).
278. *Id.*
279. *Derry v. Peck*, 14 App. Cos. 377 (House of Lords 1889).
280. See, e.g., *Fox v. Southern Appliances, Inc.*, 264 N.D. 267, 141 S.E. 2d 522 (1965).
281. See, e.g., *Daugert v. Holland Furnace Co.*, 107 Ga. App. 566, 130 S.E. 2d 763 (1963).
282. See Restatement of Torts (Second), 402A (1965).
283. Restatement of Torts (Second), 402B.
284. "One engaged in the business of selling chattels who by advertising, labels or otherwise, makes to the public a misrepresentation of a material fact concerning the character or quality of the chattel sold by him is subject to liability for preliminary loss caused to another by his purchase of the chattel in justifiable reliance upon the misrepresentation, even though it is not made fraudulently or negligently."
285. See *Schweiger v. Loewi & Co., Inc.* 65 Wis. 2d 56, 221 N.W. 2d 882 (1974).
286. See *Ultramares Corp. v. Touche*, 255 N.Y. 170, 174 N.E. 441, 74 A. L. R. 1139 (Ct. App. 1931).

287. Prosser, *supra* note 242, § 108, at 714.
288. See notes 93-101 and accompanying discussion.
289. 276 Cal. App. 2d 680, 81 Cal. Rptr. 519 (1969).
290. *Id.*
291. See *Willner v. Woodward*, 201 Va. 104, 109 S.E. 2d 132 (1959); see generally, Note. "Architectural Malpractice: A Contract-Based Approach." 92 Harv L. Rev. 1075, 1979. (Hereinafter cited as Architectural Malpractice.)
292. See Architectural Malpractice, *supra* note 291, at 1089.
293. See generally, Annot., 25 A.L.R. 2d 1085 (1952).
294. *Id.*
295. Commercialization Strategy Report, *supra* note 102, at 20.
296. See Annot., 25 A.L.R. 2d 1085 (1952).
297. Acret, J. Architects and Engineers: Their Professional Responsibilities. § 3.3, at 46 (1977).
298. *Id.*
299. Building codes are a function of the "police power" of states to protect the public health, safety, and welfare. City and county governments, which frequently promulgate and administer building codes, acquire power to do so by delegation under the Home Rule Doctrine:

Building codes set standards for new construction of residential, commercial and industrial structures by regulating all aspects of building design and construction, including structural design (size and location of rooms, minimum ceiling heights, structural loads and stresses, foundations, floor systems, exterior walls), light and air (windows, ventilation, lighting, stairways, means of exit and fire-escapes), fire-protection (fireproofing of materials, chimneys and floors, fire walls), and mechanical and electrical systems (heating equipment, sanitary equipment, plumbing and electrical wiring). Saher, L.; Wilcox, C. "Building Codes." 168 in Energy Primer (Portola Institute 1974).

Building codes are generally of two types. The most common type uses specification standards that specify what kinds of equipment may be used and how. Such standards usually incorporate an "equivalency" provision to allow consideration of new materials or construction techniques and to protect the process against charges of fundamental unfairness. Actual proof of "equivalency" is frequently so difficult as to render the provisions meaningless. In some situations, performance standards are used. In this approach, only the goal of a particular component is specified. The means by which the goal is achieved is left open.

Specification standards are often cited as a barrier to solar commercialization. Codes that prohibit certain materials or that dictate window type, area, and location can restrict passive design options. Especially with active systems, the vast number of localized code requirements (in 1973, over 4,500 jurisdictions were reported to have some sort of building code) inhibits mass-produced, standardized products. Supporters of specification standards point to the role of building codes in protecting society against hazard, the necessity for simplified standards and mechanisms, given manpower and personal skill constraints, the wide diversity of technology and geographic conditions, and the use of model codes to incorporate new situations.

Model codes and the Federal Housing Administration minimum property standards exert strong influence on local building codes. The three codes are:

- the Basic Building Code of the Building Official and Code Administrators, International (found mostly in the East and Midwest);
- the Uniform Building Code of the International Conference of Building Officials (found mostly in the West); and
- the Standard Building Code of the Southern Building Codes Conference (found mostly in the South).

An analysis of these codes is contained in Legal Barriers, supra note 69, at 49-76.

A number of states and local political subdivisions have adopted versions of one of these three model codes. The Federal Housing Administration (FHA) minimum property standards (MPS) apply to homes receiving federal mortgage insurance. Local adoption of the model codes of the MPS is voluntary. The Department of Energy is currently developing a "Model Document for Code Officials on Solar Heating and Cooling of Buildings." This document addresses installation, materials, and other subjects covered in building codes relating to passive and active solar energy systems. First Draft, Model Document for Code Officials on Solar Heating and Cooling of Buildings. March 1979. Prepared by Council of American Building Officials et al. for the U.S. Dept. of Energy under Contract No. EM-78-C-01-4281. Some consideration has been given to require mandatory adoption of the Model Document by state governments. See Supplementary Information: Residential Conservation Service Program, supra note 120 at 16566.

Removal of building codes as barriers will expand consumer choice in passive purchase decisions. However, building codes may also be used affirmatively to require utilization of passive techniques. One such building code was adopted in 1975 by Davis, California. The thrust of the Davis Energy Conservation Ordinance is that new housing shall not experience excessive heat gain in the summer nor excessive heat loss in the winter. To this end, the city's building inspection division tests the "thermal efficiency" of all housing designs. The design must meet certain requirements depending on the size of the housing unit. The requirements are measured in Btu's gained or heat lost per square foot of the house per day. Builders and designers have the option of following specification standards or meeting performance standards. Passive concepts are an integral consideration, including glazing area and glazing shading. The specification standards are flexible since credits are given when standards are exceeded such as by the use of heat storage concepts in one part of the house which can

also be applied to other portions of the house. Davis is also developing land use and design standards for subdivisions as part of the energy conservation program. See the Davis Experiment: One City's Plan to Save Energy (The Elements, 1977).

300. See Comment. "Architect Tort Liability in Preparation of Plans and Specifications." 55 Calif. L. Rev. 1361 (1967).
301. Id.
302. See Note. "Liability of Design Professionals—The Necessity of Fault." 5 Iowa L. Rev. 1221 (1973).
303. See Annot., 29 A.L.R. 3d 1425 (1970).
304. See, e.g., Hyman v. Gordon, 35 Cal. App. 3d 769, 111 Cal. Rptr 262 (1973).
305. See, e.g., Bloomsburg Mills v. Sordonic Construction Co., 401 Pa. 358, 164 A. 2d 201 (1960).
306. Note. "Liability of Design Professionals—The Necessity of Fault." 5 Iowa L. Rev. 1221 (1973).
307. Audlane Lumber & Bldrs. Sup. v. D.E. Britt & Assoc. Inc., 168 So. 2d 333 (Fla. 1964). The court stated:

With respect to the alleged "implied warranty of fitness," we see no reason for the application of this theory in circumstances involving professional liability. An engineer, or any other so called professional, does not "warranty" his service or the tangible evidence of his skill to be "merchantable" or "fit for intended use." These are terms uniquely applicable to goods. Rather, in the preparation of design and specifications as the basis of construction, the engineer or architect "warrants" that he will or has exercised his skill according to a certain standard of care, that he acted reasonably and without neglect. Breach of this "warranty" occurs if he was negligent. Accordingly, the elements of an action for negligence and for breach of the "implied warranty" are the same. The use of the term "implied warranty" in these circumstances merely introduces further confusion into an area of law where confusion abounds.

308. See Acret, J., supra note 297, § 1.13, at 14.
309. See Prosser, supra note 242, § 104, at 680.
310. Id.
311. Restatement of Torts (Second) § 353 sets forth the concept of concealing or failing to disclose known dangers.
312. Id.

313. *Id.* But see *Stonhardt v. Flintkote*, 84 N.M. 796, 508 P. 2d 1283 (1973) (roofing material not unreasonably dangerous).
314. See, e.g., *Kriegler v. Eichler Homes, Inc.*, 269 Cal. App. 2d 224, 74 Cal. Rptr. 749 (1969).
315. See Walker, N.; Walker, E.; Rohdenburg, T. Legal Pitfalls in Architecture, Engineering, and Building Construction. 110 (2d ed, 1979); Kratovil, R. Real Estate Law. (7th ed. 1979).
316. See Peters. "How the Magnuson-Moss Warranty Act Affects the Builder/Seller of New Housing." 5 Real Estate L. J. 338 (1977).
317. See Annot, 25 A.L.R. 3d 382 (1969).
318. *Kerr v. Milwee*, 202 Md. 235, 96 A. 2d 1 (1952).
319. Walker, N., *supra* note 315, § 6.6, at 120.
320. See generally Haskell. "The Case for an Implied Warranty of Quality in Sales of Real Property." 53 Geo. L. Rev. 633 (1965).
- See *Wawak v. Steward*, 247 Ark. 1093, 449 S.W. 2d 922 (1970) (house flooded through heating and air conditioning unit; contractor liable for breach of warranty).
321. See Annot., 25 A.L.R. 3d 383 (1969).
322. See *Gilson v. Imoleuske*, 153 Colo. 274, 387 P.2d 260 (1963).
323. See proposals to size conventional backup systems to expected passive system performance, *supra* note 88.
324. *Carpenter v. Donohoe*, 154 Colo. 78, 388 P. 2d 399 (1964).
325. *Id.*
326. *Gutowski v. Crystal Homes, Inc.*, 26 Ill. App. 2d 269, 167 N.E. 2d 422 (1960).
327. See 37 Am. Jur. 2d, Fraud and Deceit, § 108.
328. The \$2,000 to \$8,000 is the cost of passive building elements that would reduce the energy cost on an average of 50% in single-family residences. The range of retrofit costs is greater than for new construction, although average costs are similar. Commercialization Strategy Report, *supra* note 102.
329. Barrett, D.; Epstein, P.; Haar, C. Financing the Solar Home. 1977.
330. *Id.* at 84.
331. *Id.*
332. Cited in Wagner, R. "A Builder's Guide to Solar Financing." Solar Age. Jan. 1979, at 16.

333. Barrett, *supra* note 329.
334. Commercialization Strategy Report, *supra* note 102, at 20.
335. Barrett, *supra* note 329, at 110-113.
336. See Annot., 39 A.L.R. 3d 247 (1971).
337. 274 Cal. Ap. 2d 466, 79 Cal. Rptr. 401 (1969).
338. *Id.*
339. 69 Cal. 2d 850, 73 Cal. Rptr. 369, 447 P. 2d 609 (1968).
340. Cal. Civil Code § 3434.
341. A planned 3000 dwelling unit subdivision in California will be heated entirely by passive solar energy. See Sun Up: Energy News Digest. Vol. 3, No. 6, p. 1 (June 1979).
342. See note 333, *supra* and accompanying text.
343. See note 88, *supra* and accompanying text.
344. Connor v. Great Western Sav. and Loan Assoc. 69 Cal. 2d 850, 73 Cal. Rptr. 369, 447 P. 2d 609 (1968).
345. *Id.*
346. *Id.*
347. See Economic Loss, *supra* note 238.
348. *Id.*



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