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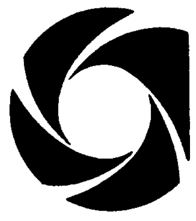
BARRIERS and INCENTIVES to SOLAR ENERGY DEVELOPMENT

AN ANALYSIS OF LEGAL AND INSTITUTIONAL ISSUES IN THE NORTHEAST

Arnold R. Wallenstein

December 1978



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Northern Energy Corporation
Northeast Solar Energy Center
70 Memorial Drive, Cambridge, MA 02142

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SUMMARY

Northern
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Northeast Solar Energy Center

This publication analyzes the legal and institutional barriers and incentives to commercializing alternate energy sources, with particular emphasis on solar energy. Written for use by small solar businesses, manufacturers, consumers, and legislators, it details the laws that constitute either legal barriers or possible incentives in the commercialization of solar energy in the nine states served by the Northeast Solar Energy Center. *

Each barrier or incentive is briefly described in conceptual terms and then each issue area is analyzed in detail, within the context of the law of the nine states in the Region. Federal law is discussed when it pre-empts state law or whenever there are concurrent statutes or significant interactions or conflicts among the Federal and State regulatory systems. Also included are suggestions for legislative amendments to these laws.

Section I contains an analysis of Federal patterns of spending and subsidy, indicating that non-renewable and nuclear energy sources have received hundreds of billions of dollars in incentives and subsidies over the past decades. Solar and renewable energy alternatives have received minimal support. Thus solar energy is competing against heavily subsidized, centralized energy resources. Accelerated commercialization of solar energy will require either substantial government subsidy, or modified Federal Government energy incentives and patterns of spending so that all energy sources can compete on an equal basis.

The section also addresses life-cycle costing, the problem of obtaining loans and insurance, DOE patent regulation issues, and briefly describes potential Federal and state financial sources for solar energy development.

Section II on Consumer Protection and Business Regulation discusses laws in the nine-state region that address product and tort liability, warranty protection, consumer credit, consumer protection, trade and business regulation statutes, and equipment certification and product standards problems. The investigation concludes that only the equipment certification and product standards area requires significant, immediate attention by government. Product standards must be developed and solar equipment certified to meet these standards. This would not only increase consumer confidence in these products, but aid in obtaining financing, insurance and approval by local building and zoning officials. Product liability, warranty, consumer protection and business regulation are all adequately handled by the existing state of the law, and no unique changes are needed to meet solar energy problems.

The Chapters in Section III on Solar Access and Building Siting and Structural Regulations focus on zoning, land use, sun and wind access, and building codes and inspection problems. The analysis indicates that zoning and land use planning can encourage solar energy development through planning and siting of buildings. It will also prevent such problems as obstruction of solar collector areas. Consequently, we recommend passage of state enabling legislation to authorize local communities to plan, zone and enact subdivision regulations that will address solar energy in new developments..

---

* Connecticut
Maine
Massachusetts
New Hampshire
New Jersey
New York
Pennsylvania
Rhode Island
Vermont

However, because of the legal, practical, political, and other barriers that could be raised, states are advised to be cautious about enactment of legislation creating sunrights for individual solar collector owners. These words of caution come from the findings of a workshop held by the Northeast Solar Energy Center on the constitutionality and practicality of solar access legislation.

Since building codes contain no guidance concerning solar energy systems, local building inspectors have been free to reject solar systems or to place expensive testing requirements on the units before a permit is given. A uniform building code could resolve this problem, therefore attention should be focused on the national effort being conducted by the Department of Energy to develop a national solar energy building code.

Section IV covers public utility regulations, state energy solar office enabling legislation, and labor jurisdiction questions. The public utilities chapter includes a number of cases where solar energy rates and wind power buy-back questions are discussed. Accompanying tables indicate that it might be possible for solar energy to receive lower utility charges rather than the higher discriminatory charges that have been feared. The possibility of jurisdictional disputes among labor unions over solar energy unit installation projects, and inter-union agreement concerning allocation of solar energy work is also explored.

FINANCIAL AND MARKET DEVELOPMENT BARRIERS AND INCENTIVES

1

Northern Energy Corporation
Northeast Solar Energy Center

A. Federal Government Energy Development Spending Policies

One of the primary barriers to the speedy commercialization of solar and other alternate energy technologies is the current high cost of these systems relative to oil, coal, natural gas and nuclear-derived energy sources. However, solar energy systems are not competing with these other energy sources on an equal basis. Oil, coal, natural gas and nuclear energy have received from the Federal government in the last four decades, billions of dollars in direct and indirect incentives, subsidies and tax benefits to both build the physical energy delivery systems, and to explore and produce the raw energy resources. Solar and renewable energy sources have received negligible support during this period.

This policy has made fossil and nuclear energy sources much less expensive and more available than solar energy, and has virtually guaranteed that solar energy will make only a small contribution to U.S. energy supplies in the near and mid-term. Unless these federal spending policies that favor the development of fossil and nuclear fuel sources are modified, solar energy will continue to make only a small contribution in the mid-to long term.

This assertion can be substantiated by a recent study released by The Department of Energy entitled, *An Analysis of Federal Incentives Used to Stimulate Energy Production.*[1] The study states that the federal government has spent $123.6-$133.7 billion from 1947 to 1977 to subsidize the research, development, production, marketing and commercialization of the use of oil, natural gas, hydroelectricity, coal and nuclear power, while providing a miniscule amount during that same period to develop solar energy. (See Exhibit 1.)

It should be noted that these are relatively conservative figures and do not include nonquantifiable incentives such as liability insurance premiums not paid by the nuclear industry due to the Price-Anderson Act, or immeasureable environmental costs caused by — but not paid for by — the energy industry.

It can be contended that if this federal policy were applied with equal commitment to support the research, development, demonstration and commercialization of solar energy, there could be a substantially greater market penetration of solar energy in a much shorter time, and at lower prices. The Council on Environmental Quality estimates that with an accelerated solar energy development policy, by the year 2000, 25 percent of U.S. energy could come from solar-based sources, and by the year 2000, 50 percent of U.S. energy could be solar-based. (See Exhibit 2.) Other studies have also projected substantial solar contributions to U.S. energy supply pursuant to an increased federal incentives and development policy.[2]

Consequently, one of the major legal and institutional barriers to developing solar energy would appear to be this federal energy development spending policy. An entirely new series of laws and regulations, or a total revision of the legal and institutional structure, may not be needed if the proper federal incentives to solar energy are offered. These policies, in many ways, would be analogous to the "Manhattan" project or the Apollo moonshot effort, or more appropriately, could be modeled on the massive research, development, and financial support that built the U.S. nuclear industry. The goal here, however, would be to develop private sector use and commercialization of solar and other alternate energy sources to the maximum extent in the minimum amount of time. This investment would be returned over and over again. It would begin to reduce the $50 billion a year spent by U.S. citizens for imported oil; decrease America's vulnerability to foreign oil embargoes; decrease the amount of capital needed to build large central station fossil or nuclear electricity generating plants, and create many new manufacturing, installation and maintenance jobs, which would directly benefit the low income sector. It has, in fact, been estimated by the Congressional Office of Technology Assessment that solar energy construction requires 1.5 to 2.5 times more labor than the construction of a conventional coal-fired facility of equal energy output.[3] More liberal estimates by the California Energy Commission state that solar energy can provide 25 to 50 more permanent jobs per trillion BTU's used yearly by consumers than oil, coal or nuclear power.[4]

In sum, the economics of solar energy are directly affected by Federal spending patterns and incentives for non-renewable and nuclear energy sources. If solar is to compete on an equal basis with these other heavily subsidized energy forms, then solar must also receive substantial subsidies to put it on a parity basis with fossil and nuclear fuels. Moreover, solar subsidies will be significantly less costly than those given to fossil and nuclear sources, because they consist primarily of tax credits, loan and other guarantees, and technical assistance; not the massive grants and R & D programs used to develop centralized energy technologies.

However, if Federal policies are not modified, then it is likely that it will be a long time before solar and alternate energy sources will, if ever, make a significant contribution to U.S. energy supplies.

EXHIBIT 1

An Estimate of the Cost of Incentives Used to Stimulate Energy Production (in Billions of 1976 Dollars)

	Nuclear	Hydro	Coal	Oil	Gas	Total
Taxation		1.7	3.0	40.5	11.3	54.0
Disbursements	1.2			30.3	3.5	33.8
Requirements		0.03	0.04	0.6	0.2	2.43
Traditional Services			1.8	5.0	0.1	6.9
Nontraditional Services	12.4-14.2		1.6	0.8		14.8-16.6
Market Activity	1.7	7.5-17.5				10.9-19.2
Totals	15.3-17.1	9.2-17.5	6.8	77.2	15.1	123.6-133.7
Percent of Total Incentives	13%	10%	5%	60%	12%	100%

Source: Battelle Northwest Laboratories, "An Analysis of Incentives Used to Stimulate Energy Production".

Notes to Exhibit 1

"Taxation" includes oil depletion allowances, deduction of drilling, production, and other business expenses. "Disbursements" includes Maritime Commission shipbuilding and operating subsidies, natural gas well-head price controls, and stripper-well price incentives; "Requirements" includes legal mandates and requirements for safety (OSHA), environmental (EPA) and other economic regulations (SEC, Justice) which necessitates federal enforcement expenditures; "Traditional Services" includes activities traditionally undertaken by government such as construction of hydroelectric dams, nuclear weapons, or petroleum reserves and maintenance of ports and waterways for tankers; "Non-traditional Services" includes research, development and demonstration projects, as well as all study and knowledge acquisition programs; and "Market Activity" includes the production and marketing of inexpensive hydroelectricity.

EXHIBIT 2

CEQ ESTIMATES OF MAXIMUM SOLAR CONTRIBUTION TO U.S. ENERGY SUPPLY UNDER CONDITIONS OF ACCELERATED DEVELOPMENT

(Units: quads per year of displaced fuel)[a]

	1977	2000[b]	2020[b]
Heating and Cooling (Active and Passive)	Small	2-4	5-10
Thermal Electric	None	0-2	5-10
Intermediate Temperature Systems	None	2-5	5-15
Photovoltaic	Small	2-8	10-30
Biomass	1.3	3-5	5-10
Wind	Small	4-8	8-12
Hydropower	3	4-6	4-6
Ocean Thermal Energy Conversion	None	1-3	5-10

Total U.S. energy demand in 1977 was 76 quads. Estimated total U.S. energy demand is from 80 to 120 quads for the year 2000 and from 70 to 140 quads for the year 2020.

(a) A quad is a quadrillion or 10^{15} Btus. Electricity is converted to equivalent fuel that would have to be burned at a power plant to supply the same amount of power. The conversion rate used here is 10,000 Btu per kilowatt-hour.

(b) The estimates in these columns are not strictly additive. The various solar electric technologies will be competing with one another, and their actual total contributions will be less than the sum of their individual contributions.

Source: Council on Environmental Quality, "Solar Energy Progress and Promise"; 1978

B. Government Tax Exemptions and Credits

The National Energy Act* provides income tax credits of 15 percent of the first $2000, up to a maximum credit of $300, for installation of energy saving materials and equipment, such as insulation and storm windows, installed in the taxpayer's principal residence. Tax credits of 30 percent of the first $2000, and 20 percent of the next $8000, up to a maximum credit of $2,200 are available for purchase and installation of solar heating and cooling and wind energy devices in the taxpayer's principal residence. Businesses are eligible for a 10 percent investment tax credit, for installation of energy conservation, solar and wind energy equipment in their facilities. A detailed description of the incentives and grants for solar energy and energy conservation that are found in the various parts of the National Energy Act is included in the Appendix.

Tax credits of this magnitude have been estimated to increase the number of solar residential hot water systems installed from 1978 to 1982 by 46 percent, for a total of 259,000 units installed over that time period.[5] These tax credits should therefore be a powerful boost to the development and use of alternate energy sources.

All the states in this region, except for Pennsylvania, have enacted property tax exemptions; five states have enacted sales or use tax exemptions; only Vermont has enacted an income tax credit (25%); and Massachusetts has enacted an income tax deduction for corporations.

Enactment of property tax exemptions has been the most common initiative legislatures have used to remove barriers to solar energy. Thirty states had passed such exemptions as of January, 1976.[6] This has occurred because installation of a solar system on a building will lead to an increase in the assessed valuation of the structure, with a consequent increase in property taxes. Since for many home owners, increased property taxes will likely represent a significant barrier to installing a solar hot water or heating system, passage of limited (in time) property tax exemptions for the value of the solar system has been used as a simple way of dissolving this barrier. Municipalities did not expect large numbers of solar systems to be installed, therefore, they did not anticipate a significant loss of tax revenue.

Some of the statutes simply exempt solar systems from taxation. Other statutes state that solar equipment should not cause an increase in valuation of the building, and some state that solar homes should be assessed as if they were equipped with a conventional system. Some states require the solar system to meet detailed state issued certification requirements to quality for a loan or tax exemption. Connecticut, Maine, New Jersey, New York, and Rhode Island require that the system meet some rudimentary standards adopted by the state. (See Exhibits 3 and 4.)

We recommend that all states enact property tax exemptions. Any such statutes, however, should: (1) precisely define a "solar energy system" and what components will be exempt from taxation; (2) clarify how back-up heating systems are to be assessed; (3) state whether passive systems are eligible for exemption, and what parts of the system; and (4) state whether solar systems are "fixtures," or part of the real estate, or whether they are considered as personal property and exempt from real property taxation.[8]

One study of the impact of solar system property tax exemptions has suggested that such legislation could increase utilization of solar energy to 38.6 percent in the year 2000, with the increase concentrated in small owner-occupied homes.[9]. This finding makes the legislation effective in reducing this legal barrier to solar commercialization.

Sales and use tax exemptions, and income tax deductions, are being enacted, but to a lesser extent. Massachusetts, for example, has passed a corporate income tax deduction for solar or wind energy climate control systems. More significantly, Vermont has passed a tax credit for

*Energy Tax Act of 1978, HR 5263

residential taxpayers of 25 percent up to $1000 for active or passive, solar, wind, hydro, or wood furnace energy systems, and 25 percent up to $3000 for businesses. California has passed an income tax credit of 55 percent up to $3000 for single-family homes. For a building other than a single-family home, if the cost of the system exceeds $6000, the credit is the greater of $3000 or 25 percent of the system's cost; the tax credit expires on December 31, 1980.[10] This should prove to be the most powerful of all state tax incentive statutes. Its effectiveness versus cost in tax revenues should be watched closely by other state legislatures, and, if deemed to be a powerful incentive to the installation of solar energy systems, such a statute should be enacted.

EXHIBIT 3

STATE OF NEW YORK

AN ACT to amend the real property tax law, in relation to granting of a property tax exemption for solar or wind energy systems in certain cases

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Legislative findings and intent. The legislature hereby finds that solar and wind energy systems do not require fuel, and thus will aid in energy conservation. Because at this time they involve relatively high initial capital expenditure, the long term economic advantages of an installed solar or wind energy system would be substantially reduced by an increase in property tax. This increase would frustrate state policy to encourage the greater use of solar and wind energy.

The purpose of the legislature is to provide for exemption from real property taxation for approved installations of solar and wind energy systems in order to encourage their greater use. This offers a tax incentive to property owners without reducing tax income to the community.

§ 2. The real property tax law is hereby amended by adding thereto a new section, to be section four hundred eighty-seven, to read as follows:

§ 487. Exemption from taxation for certain solar or wind energy systems. 1. As used in this section:

(a) "Solar or wind energy equipment" means collectors, controls, tanks and other storage devices, heat pumps and pumps, heat exchangers, windmills, and other hardware or equipment necessary to the process by which solar radiation or wind is received and converted into another form, such as thermal, electrical, mechanical or chemical energy that is capable of human utilization.

(b) "Solar or wind energy system" means any system designed to provide heating, cooling, hot water, or mechanical, chemical, or electrical energy by the collection and storage of solar or wind energy. It does not include pipes, controls or other equipment which are part of the normal heating or cooling system of a building, but relates to means of collecting, converting and storing energy from solar radiation or wind.

(c) "Energy office" means the state energy office established by subdivision one of section 5-101 of the energy law.

(d) "Owner of real property" means a person or corporation, public or private, which is the owner of record of real property situated within the state.

(e) "Assessor" means those departments, boards or agencies responsible for the assessment of real property for the taxing district or districts within which the solar or wind energy system is located.

2. The owner of real property who installs a solar or wind energy system certified in accordance with the provisions of this section may have deducted annually from the assessed valuation of the property, for a period of fifteen years from the first taxable status date after such system is installed, the sum which is equal to the remainder of the assessed valuation of the real property with the solar or wind energy system included, minus the assessed valuation of the real property without such system.

3. The commissioner of the energy office, on or before January first, nineteen hundred seventy-eight, shall establish standards and performance criteria for the design, construction, installation, safety and durability of solar or wind energy systems sold or installed on real property within this state.

4. No solar or wind energy system shall be entitled to any exemption from taxation under this section unless such system meets the standards and performance criteria set by the commissioner of the energy office and all other applicable provisions of law.

5. The exemption granted pursuant to this section shall run with the real property regardless of ownership, provided however, that such exemption shall only be applicable to solar or wind energy systems which are existing or constructed prior to July first, nineteen hundred eighty-eight. Such exemption shall be effective as of the first taxable status date occurring subsequent to the approval of the application for exemption by the assessor of the appropriate taxing authority.

6. Such exemption shall not be unreasonably denied, but shall be granted only on application by the owner of real property on a form prescribed by the energy office and made available by the state board of equalization and assessment in cooperation with the energy office. The applicant shall furnish such information as the board shall require. The original of such application shall be filed with the assessor of the appropriate county, city, town or village on or before the taxable status date of such county, city, town or village. A copy of such application shall be filed simultaneously with the state board of equalization and assessment.

7. The assessed value of any exemption granted pursuant to this section shall be entered by the assessor on the portion of the assessment roll provided for property exempt from taxation.

§ 3. This act shall take effect immediately.

EXHIBIT 4

Massachusetts

ACTS, 1975. — CHAPS. 734

Chap. 734. AN ACT PROVIDING FOR A REAL ESTATE TAX EXEMPTION FOR THE UTILIZATION OF SOLAR OR WIND POWERED SYSTEMS.

Be it enacted, etc., as follows:

SECTION 1. The introductory clause of section 5 of chapter 59 of the General Laws, as appearing in section 1 of chapter 831 of the acts of 1974, is hereby amended by inserting after the word "Eighteenth" the words: — or Forty-fifth.

SECTION 2. Said section 5 of said chapter 59 is hereby further amended by adding the following clause: —

Forty-fifth, Any solar or wind powered system or device which is being utilized as a primary or auxiliary power system for the purpose of heating or otherwise supplying the energy needs of property taxable under this chapter; provided, however, that the exemption under this clause shall be allowed only for a period of ten years from the date of the installation of such system or device.

SECTION 3. The provisions of this act shall apply to taxes levied for the fiscal years commencing July first, nineteen hundred and seventy-six and thereafter.

Approved December 11, 1975.

Note: Exemption extended to twenty years by Ch. 388 (1978)

EXHIBIT 5

STATE SOLAR TAX INCENTIVES

	CT	ME	MA	NH	NJ	NY	PA	RI	VT
PROPERTY TAX EXEMPTION	yes	yes	yes	yes	yes	yes	no	yes	yes
- Statewide or Local Option	local	state	state	local	state	state	—	state	local
- Must Meet State Standards	yes	yes[1]	no	no	yes	yes	—	yes[2]	yes
SALES & USE OR EXCISE TAX EXEMPTION	yes	yes	yes	no	yes	no	no	no	yes
- Type	sales & use	sales & use	sales	—	—	—	—	—	excise
- Exemption or Refund	exempt.	refund	exempt.	—	exempt.	—	—	—	exempt.
- Must Meet State Standards	yes	yes[1]	no	—	yes	—	—	—	yes[3]
- Statewide or Local Option	state	state	state	—	state	—	—	—	local
STATE INCOME TAX CREDIT/DEDUCTION	no	no	deduct.	no	no	no	no	no	credit
- Personal or Corporate	—	—	corp.	—	—	—	—	—	both

1 Must be certified to be a solar heating or cooling system.
2 System must meet standards established by the U. S. Dept. of Housing and Urban Development.
3 Eligibility rules will be established by the Commissioner of Taxes.

STATE LAW: TAX EXEMPTIONS

1. Property Tax Exemptions

CONNECTICUT

C.G.S. 12-82 (56), P.A. 409 (1976) as amended by P.A. 490 (1977)

Authorizes municipalities to exempt from increased assessment for fifteen years a solar or wind heating, cooling, or electricity-generating system if built or added to the building between October 1, 1976, and October 1, 1991. The system must meet the standards established by regulation by the Commissioner of Planning and Energy Policy. See Department of Planning and Energy Policy regulation 16a-14-1 —16a-14-3.

Contact: Local Board of Assessors
Commissioner
Department of Planning and Energy Policy
Hartford, Connecticut

MAINE

36 M.R.S.A. 656 (1) (H) Ch. 542 (1977)

Exempts solar heating (only) equipment from property taxation for five years after installation if a claim for an exemption is applied for.

Contact: Local Board of Assessors

MASSACHUSETTS

M.G.L. Ch. 59:5 (45), Ch. 734 (1975); as amended by Ch. 388 (1978)

Real estate tax exemption for solar or wind systems for twenty years after installation.

NEW HAMPSHIRE

N.H.R.S. 72:61-63; Ch. 391 (1975)
N.H.R.S. 72:33; Ch. 502 (1977)

Allows cities or towns to adopt, by local referendum or town meeting, property tax exemptions for solar energy heating and cooling systems. Exemptions must be applied for.

Contact: Local Board of Assessors

NEW JERSEY

54 N.J.R.S. 4; Ch. 256 (1977)

Property tax exemption for solar heating and cooling systems in the amount of the difference between the assessed value of the property with the system and the assessed value of the property without the system. The system must meet the standards set by the State Energy Office. Exemption must be claimed by December 31, 1982. See N.J. Department of Energy Regulation 14A:4

Contact: Director
Division of Taxation
Trenton, New Jersey

NEW YORK

The Real Property Tax Law, 487; Ch. 322 (1977)

Property tax exemptions for solar and wind systems installed prior to July 1, 1988, in the amount of the difference between the assessed value of the property with the system, and the assessed value of the property without the system. The system must be approved to meet the standards and performance criteria established by the State Energy Office. Exemption lasts for fifteen years after approval of the application for exemption.

Contact: Local Board of Assessors

PENNSYLVANIA

None

RHODE ISLAND

R.I.G.L. Ch. 44-3-18

Provides that solar heating and cooling systems in existing or new buildings be assessed at no more than the value of a conventional heating system, effective immediately. The system must meet performance criteria established by H.U.D. pursuant to the provisions of the Solar Heating and Cooling Demonstration Act of 1974, 42 U.S.C. 5506.

VERMONT

32 V.S.A. 3845, Ch. 226 (1976)

Towns may exempt alternate energy sources from real property taxation, including solar and wind systems and all component parts and land not to exceed one-half acre.

Contact: Local Board of Assessors

2. Sales/Use/Excise Tax Exemptions

CONNECTICUT

C.G.S. 12-412 (dd), P.A. 77-457

Provides for exemption from the sales and use tax for solar energy systems until September 30, 1982.

MAINE

36 M.R.S.A. 1760 (37)

Provides for refund of the sales or use tax paid on solar energy equipment certified by the Office of Energy Resources.

Contact: Office of Energy Resources
Augusta, Maine

MASSACHUSETTS

M.G.L. Ch. 64H(6); Ch. 989 (1977)

Exempts sales of solar, wind or heat pump systems from the sales tax.

NEW JERSEY

54 N.J.R.S. 32B-8; Ch. 465 (1977)

Exempts solar energy heating or cooling systems from sales tax.

See N.J. Department of Energy Regulation 14A:5.

VERMONT

32 V.S.A. 3845, Ch. 226 (1976)

Allows towns to exempt alternate energy sources from personal property taxation, including solar and wind systems, components, and land up to one-half acre.

3. Income Tax Deductions and Credits

MASSACHUSETTS

M.G.L. Ch. 63:38, Ch. 487 (1976)

Allows a corporation to deduct the cost of a solar or wind system from its gross income.

VERMONT

32 V.S.A. 5921; H.555 (1977)

Provides for an income tax credit equal to 25% of the cost of a renewable energy system, or $1000, whichever is less, (including installation costs), against the tax liability of a resident individual taxpayer installing the system in his residence prior to July 1, 1983. Renewable energy systems include active or passive solar energy heating or cooling equipment, wind or hydroelectric systems, or a wood furnace designed to operate as a central heating system. Unused credits may be carried over for four years. Businesses may receive a tax credit of 35% of the cost of the system, including installation, or $3000, whichever is less, up to July 1, 1983; the credit may be carried over for four years.

CITY LAW

NEW YORK CITY

J, 51-2.5 (1976)

City subsidized loans for rehabilitating principal residences, which can include cost of solar energy systems.

Property tax abatement for rehabilitated residences, including value of solar energy systems.

Contact: Housing and Development Administration
City of New York
New York, New York

C. Life-Cycle Costing

Life-cycle costing estimates the net costs of a solar energy system over its useful life, including acquisition costs, operating and maintenance costs, salvage value, and net savings. This relatively simple tool can impress upon the prospective purchaser of a solar system, the long-term savings to be derived from installing a solar system; since nearly all the expense of a solar energy system is the initial cost, the financial advantages over a conventional system (which is lower in installation costs and higher in operating, i.e., fuel costs) can be made apparent by what is essentially a "labeling" device.

It should also be noted that the value of a property will likely be increased by the installation of solar energy equipment in the building. This equipment will appreciate the value of the property, just as the construction of a new kitchen or bathroom or any other home improvement would. Moreover, since the initial investment is recoverable when the building is sold, there is an immediate 100% payback. The consumer need not rely on fuel saving payback over many years to profit from his investment.

Consequently, life cycle cost theory can be supplemented by the fact that the solar investment will be paid back either in fuel savings over time, or immediately upon sale of the building. The ultimate return of the solar energy investment over time is thus assured by either one of these calculation methods.[11]

Only Massachusetts, Maine and Connecticut in the nine-state region require life-cycle costing before construction of new publicly funded buildings; California, Florida, North Carolina, Colorado, and Washington have also enacted similar statutes.[12] The Federal General Services Administration has let only two contracts for solar systems based on life-cycle costing.[13]

Representatives of the savings and loan industry state that perhaps as much as one-third of that industry utilizes life-cycle costing in their evaluation of projects. Otherwise, most savings and loan institutions were unfamiliar with the concept.[14]

Due to the importance of overcoming the high capital cost burden of solar systems, and the necessity of putting it in proper perspective with the total lifetime costs of conventional space heating systems, it is recommended that states, as well as Congress, (1) mandate use of life-cycle costing in estimating the energy costs of new public buildings, and (2) consider whether life-cycle cost estimates should be made before the sale of residential units can be completed. This latter requirement would best be placed on mortgage lenders, who should have the capability and resources to handle this task.

STATE LAW: LIFE-CYCLE COSTING

MASSACHUSETTS

M.G.L. Ch. 149:44M; Ch. 433 (1976)

Directs that life-cycle cost estimates be made for all new state and local buildings or additions which add ten percent to the gross floor space, and whose construction costs exceed $25,000. Life-cycle cost estimates shall include the cost of installing, financing, fueling, maintaining, and replacing a solar or wind energy system, including the cost of energy conservation measures to reduce the building's energy consumption. For the purpose of determining life-cycle cost estimates, location of initial building design upon the selected site must maximize exposure to the sun for the solar or wind energy system. The Bureau of Building Construction will issue regulations mandating the minimum number and types of energy systems for which life-cycle cost estimates must be obtained. No state authority will be required to select any energy system other than the one desired by that authority.

Contact: Bureau of Building Construction
Boston, Massachusetts

MAINE

M.R.S. 5:1761-1765

Energy Conservation in Buildings Act. No public building or public school in excess of 5,000 square feet may be built without first performing a life-cycle cost analysis. The Bureau of Public Improvements will issue guidelines for life-cycle cost analysis and orientation of buildings on their sites towards the sun.

CONNECTICUT

P.A. 77-597 (1975)

Directs that state buildings, schools, or buildings constructed or renovated with state funds, which have 25,000 or more gross square feet, or any other building designated as a major facility by the Commissioner of Public Works cannot be commenced until a life-cycle cost analysis has been performed. Standards for such life-cycle cost analyses shall be established by the Commissioner, and must include positioning on the site, amount of glass and direction of exposure, amount of insulation, occupancy and operating conditions, and architectural features affecting energy consumption.

D. Banking

On February 6 and 7, 1978, the Northeast Solar Energy Center conducted a workshop with mortgage bankers to explore their concerns and attitudes regarding solar energy.* It was found that most bankers are unfamiliar with the essentials of solar energy systems, and, being conservative in their lending practices, would tend to hesitate before lending money for a solar equipped house or building. The bankers would focus more on the customer's ability to pay back the loan and on his credit rating, than on the life-cycle costs or change in property value after installation of the system. Although a solar installation would generally tend to increase the property's value,

*The workshop proceedings are available from the Northeast Solar Energy Center

there could be instances where a system would be an overimprovement, and its cost unrecoverable at resale.

The general consensus of the workshop indicated that a strong education program is needed to explain to loan officers the operation of solar energy systems and the increase that they can add to property value. Without this education, lenders will tend to remain conservative and many good loans will be turned down for lack of sufficient information on the operation of, and lack of risk in, a solar system.

Other studies confirm that the borrower's income and credit rating are more important in obtaining a loan on a solar-equipped home, than the projected fuel savings based on life-cycle cost estimates.[15] Generally, the best sources of loan funds will be commercial banks, savings and loan associations, and mutual savings banks, but only when the borrower and building itself are seen as good risks. The presence of solar heating and cooling equipment would be a secondary factor (i.e., life-cycle fuel costs), and many conservative lenders will still hesitate to finance solar houses. There is little chance of obtaining funds for solar development from ultra-conservative organizations such as life insurance companies or pension funds.[16]

Some states limit the amount of money that can be loaned out on a first mortgage, or for a home improvement loan which would be used to finance a solar energy system retrofit. In Massachusetts, recent legislation that authorizes all state-chartered savings banks, co-operative banks, credit unions, and trust companies to lend money for home improvements, specifically mentions solar energy installations as a valid lending purpose. It is recommended that the other states pass statutes similar to that enacted in Massachusetts in order to overcome the inherent conservatism of banks in lending money for a solar installation or retrofit.

Finally, individual banks have, on their own, introduced innovative solar energy system financing arrangements. For example, San Diego Federal Savings and Loan Association will make an additional loan on its existing mortgages to cover the cost of a solar energy system at current residential prime rates. Significantly, the mortgage will be re-written (for up to 30 years) so that the monthly payments remain the same. No refinance fees or points will be charged with the exception of a flat fee of $200. The system must qualify for the California 55 percent tax credit. Thus the home owner can finance the entire cost of the solar energy system, relieving him of the initial cost burden. He continues to pay the same monthly mortgage outlay because the term of the mortgage will have been extended.

STATE LAW: BANKING

MASSACHUSETTS

	Ch. 28 (1977)
	Ch. 260 (1977)
M.G.L. Ch. 168:35 (10)	(savings banks)
M.G.L. Ch. 170:26 (6)	(co-operative banks)
M.G.L. Ch. 171:24 (D)	(credit unions)
M.G.L. Ch. 172:55 (C)	(trust companies)

These amendments authorize state-chartered savings banks, co-operative banks, credit unions, and trust companies to make loans to finance the purchase and installation of solar or wind-powered systems or heat pumps for up to ten years, if the loan is secured by a mortgage on the subject real estate. Maximum loan amounts are $5,000 for a savings bank, $12,000 for a co-operative bank, $9,000 for a credit union, and $7,000 for a trust company, if, in all cases, at least $2,000 of such loan is spent on the purchase or installation of the solar and wind system.

Contact: Local state-chartered savings bank, co-op,
credit union, or trust company.

E. Insurance

The Northeast Solar Energy Center, on February 21-22, 1978, sponsored a workshop for the insurance industry to explore problems encountered in obtaining product liability insurance or homeowners insurance for solar energy equipment and systems.*

In the area of product liability insurance, there was general agreement among the attendees that there is nothing particularly unique about solar equipment, and that solar energy systems present no unusual risks to insurers. Solar systems consist of pipes, valves, hot water tank, and glass, all of which are found in conventional hot water systems or generally around a home. These components have been insured for years and present no new or unusual hazards that would prevent a home with a solar system from receiving insurance, or even having the premium remain the same. In addition, most domestic hot water systems contain approximately five gallons of water in the roof collectors and thus present no significant water damage problem. Other risks, such as roof weight problems, leakage and wind-loosened components, can be avoided through proper, professional installation.

Consequently, the group reached a general consensus that solar systems should not present a major products liability problem. The real barrier, they felt, is the underwriters and insurers' lack of knowledge concerning solar. They may refuse to insure solar-equipped homes without knowing that there is no new or unusual risk involved. It was agreed that a thorough education program for the insurance industry would go far in overcoming this problem.

The group also considered another method that could provide underwriters with information about solar systems. They suggested collecting and publishing historical or empirical data concerning the risk, or lack thereof, in solar installation. This data would provide a documentary basis on which to evaluate insurability, as well as give a firm basis to support a conclusion that solar presents no unusual risks.

One particular problem identified by the conferees was their potential hesitancy in extending "completed operations" insurance to an installed solar system (in contrast to insurance on individual system components). The attendees stated that they would be extremely hesitant to extend liability insurance on a solar product installed by someone whose compentence and skill were not known and proven to them by experience. They noted that an improper or shoddy installation of a system, by an unknowledgeable contractor, particularly a "do-it-yourselfer," can cause a quality solar system to fail and result in unexpected damage.

This "completed operations" liability insurance problem can be overcome in several ways. One method is to eliminate any undue risk by gaining personal knowledge and confidence in the skill and competence of the contractor and installer. Another important method is to establish product standards, and then test and certify the particular solar system to those standards. Thus any insurer can be assured of facing a minimal risk from the system by referring to a list of certified products. Certification of installers is also an option.

Another method to alleviate the problems of insurability would be to insert solar-related standards into building codes. Inspection by building code officials would guarantee that the solar system had been installed in accordance with those standards.

In addressing the issue of homeowners' insurance, it was noted that many companies are insuring solar-equipped homes without knowing it. Few companies inspect the homes they cover, and solar-specific information is not requested on applications. Moreover, the few solar claims that actually have arisen are usually recorded as wind or water losses, and do not specify that they were incurred on a solar system. Also, a solar-heated claim is often just a small part of a large

*The proceedings are available from the Northeast Solar Energy Center

claim; for example, a hurricane loss might damage solar collectors, but would also destroy the entire roof.

The general consensus of this session that again there appears to be no real risk with underwriting insurance for a solar-equipped home. It was noted, however, that wood-burning stoves carry much higher risks, with claims increasing by as much as 600 percent in four years. On the other hand, some passive solar-designed systems are so efficient, that the risks are actually reduced, since the conventional back-up systems are used so infrequently.

Finally, it was agreed that product standards with concurrent testing and certification procedures for solar equipment would be very helpful as a reference base in determining if a particular system presents an insurable risk.

The specific solutions and suggested methods of implemention that were agreed on during the workshop are as follows:

1. Conduct an educational and information dissemination effort directed towards the insurance industry emphasizing the lack of unusual risk when underwriting homeowners or product liability insurance; develop risk data on solar energy.

2. Develop product standards, testing and certification procedures to provide the insurance industry with a reference point for particular systems. The H.U.D. Minimum Property Standards and the PINY testing effort can serve as a guide to more general and complete standards and certification. More preferable would be standards developed by the solar industry with evaluation by major testing organizations with established credibility, such as the Underwriters Laboratories.

3. Since "do-it-yourself" installations were viewed as presenting high risks, the industry should take steps to obtain the highest quality installations, training programs, complete and readable instructions, et cetera, to insure the compliance of the system with any existing codes or standards.

4. Gain personal knowledge and confidence in the skills of individual contractors and installers.

5. Support product liability and tort reform legislation to reduce the large and ever-growing size of jury verdicts in product liability cases, which must be paid by insurance companies. If this is accomplished, then insurance companies will have greater reserves available to cover solar systems, which are perceived as less favorable risks.

F. Patents

Patent law is pre-empted by the Federal Government pursuant to U.S. Constitution Article I, S.8, C1.8, and Federal law which gives the holder of the patent the power to exclude others from making, using, or selling the invention for seventeen years (35 U.S.C. 154). The ability to obtain a patent on new inventions and modifications in the solar energy technology area can provide great incentives to individual inventors as well as scientific and research companies to focus their efforts toward developing solar-related devices. The Department of Energy patent policy thus can have a substantial impact on solar technology innovation and invention.

D.O.E.'s nuclear patent policies are controlled by Section 152, of the Atomic Energy Act of 1954,[17] and nonnuclear patent policies are based on the Federal Nonnuclear Energy Research and Development Act of 1974, and the accompanying regulations codified in 41 C.F.R. Part 9-9 (42 F.R. 36120-36145), effective July 13, 1977.

Section 9(a) of the Nonnuclear Act states that DOE will take title to inventions, unless in the particular circumstances, the Secretary of Energy waives all or part of the rights to the inventions. Section 9(c) provides that a waiver of government patent rights may take place if the Secretary determines that the interests of the U.S. and the general public will best be served by such waiver. In making waiver determinations, the Secretary will have the following general objectives:

1. Making the benefits of the energy research, development, and demonstration program widely available to the public in the shortest practicable time.

2. Promoting the commercial utilization of such inventions.

3. Encouraging participation by private persons in the Department's energy research, development, and demonstration program.

4. Fostering competition and preventing undue market concentration or the creation or maintenance of other situations inconsistent with the anti-trust laws.

The Act provides for two types of waiver. The first is an advance waiver, pursuant to Section 9(d), which allows DOE, prior to contracting, to waive its rights to all inventions which may be made under the contract. The second method is a waiver on identified inventions, pursuant to Section 9(e), which allows DOE to waive its patent rights to a particular or identified invention which has been made and reported under a contract in which there has been no advance waiver.

In making an advance waiver determination Section 9(d) requires the Secretary to consider eleven specific goals, such as the extent to which the contractor contributes his own resources; these criteria are specified in Section 9(d), which is set out in Exhibit 6.

Section 9(e) requires that similar waiver considerations must be taken into account in waiving individual inventions identified in an existing contract, where there has been no advance waiver. It adds two specific considerations concerning the necessity of the waiver to induce private risk capital into the development of the invention, and the acceleration of the invention's commercialization. See Exhibit 6.

If the normal patent policy is followed, and DOE takes title to an invention, Section 9(f) provides that the contractor or inventor may retain a revocable or irrevocable nonexclusive, paid-up license for the practice of the invention throughout the world, and rights to such invention in a foreign country when DOE elects not to secure foreign patent rights. See Exhibit 6.

If a waiver of patent rights is given, Section 9(h) provides that DOE may *not* waive the right of the government to permanently retain an irrevocable paid-up license to make, sell, or use the invention in the U.S. and throughout the world, plus the following contingent "march-in" rights:

1. To require the contractor to license others at reasonable royalties if the invention is required for use by Government regulation, or is necessary to fulfill health, safety, or energy needs.

2. The right to terminate the waiver in whole or in part if the contractor is not, or within a reasonable time will not, take effective steps necessary to commercialize the invention.

3. The right to require licensing at reasonable royalties, or to terminate the waiver in whole or in part, if it is shown at a public hearing held four years after the grant of a waiver that:

    a. the waiver has tended to violate the antitrust laws and decrease competition;

EXHIBIT 6

Federal Non Nuclear Energy Research and Development Act

Section 9d.

(d) In determining whether a waiver to the contractor at the time of contracting will best serve the interests of the United States and the general public, the Administrator shall specifically include as considerations—

(1) the extent to which the participation of the contractor will expedite the attainment of the purposes of the program;

(2) the extent to which a waiver of all or any part of such rights in any or all fields of technology is needed to secure the participation of the particular contractor;

(3) the extent to which the contractor's commercial position may expedite utilization of the research, development and demonstration program results;

(4) the extent to which the Government has contributed to the field of technology to be funded under the contract;

(5) the purpose and nature of the contract, including the intended use of the results developed thereunder;

(6) the extent to which the contractor has made or will make substantial investment of financial resources or technology developed at the contractor's private expense which will directly benefit the work to be performed under the contract;

(7) the extent to which the field of technology to be funded under the contract has been developed at the contractor's private expense;

(8) the extent to which the Government intends to further develop to the point of commercial utilization the results of the contract effort;

(9) the extent to which the contract objectives are concerned with the public health, public safety, or public welfare;

(10) the likely effect of the waiver on competition and market concentration; and

(11) in the case of a nonprofit educational institution, the extent to which such institution has a technology transfer capability and program, approved by the Administrator as being consistent with the applicable policies of this section.

Section 9e.

(e) In determining whether a waiver to the contractor or inventor of rights to an identified invention will best serve the interests of the United States and the general public, the Administrator shall specifically include as considerations paragraphs (4) through (11) of subsection (d) as applied to the invention, and—

(1) the extent to which such waiver is a reasonable and necessary incentive to call forth private risk capital for the development and commercialization of the invention; and

(2) the extent to which the plans, intentions, and ability of the contractor or inventor will obtain expeditious commercialization of such invention.

Section 9f.

(f) Whenever title to an invention is vested in the United States, there may be reserved to the contractor or inventor—

(1) a revocable or irrevocable nonexclusive, paid-up license for the practice of the invention throughout the world; and

(2) the rights to such invention in any foreign country where the United States has elected not to secure patent rights and the contractor elects to do so, subject to the rights set forth in paragraphs (2), (3), (6), and (7) of subsection (h): *Provided*, That when specifically requested by the Administration and three years after issuance of such a patent, the contractor shall submit the report specified in subsection (h)(1) of this section.

b. the contractor has not, and is not expected to take effective steps to commericalize the invention.

Thus, DOE will normally retain title to inventions developed under DOE contracts, unless the Secretary is convinced that a waiver should be given to allow the inventor/contractor to retain the patent rights; but in all cases the United States Government will retain for itself an irrevocable and free license to use or make the invention, with accompanying "march-in" rights.[18]

DOE patent regulations refine the statutory provisions: Section 9-9.107.5 sets forth the normal research and development patent clause that will be included in DOE contracts (i.e., Government takes title to all inventions made under the contract, and the contractor receives a revocable license, the right to file for foreign patents when D.O.E. elects not to do so, and the right to request waivers on individual inventions pursuant to Section 9-9.109-6).

There are apparently four major issues of concern to solar inventors and contractors which arise out of the DOE patent regulations.[19] These issues include:

1. the background patent rights provision

2. the revocable license given to the contractor

3. the "march-in" rights which the Government must reserve, and

4. the waiver policy.

1. *Background Patent Rights Provision*

A background patent issue arises when a contractor, most qualified to carry out the contract, has background expertise that is covered by patented technology, but which will likely be included in the new invention developed under the contract; it is only included in contracts over $250,000.

41 C.F.R. 9-9.107-5 (k) defines a background patent as a patent which must cover an invention made before or outside of the contract effort and can be licensed by the contractor without the payment of royalties.

The rights taken by the government to the background patent will include a free right in the Government for research, development, and demonstration purposes only, and the right for third parties, at DOE's request, to a reasonable royalty license for the practice of only the contract results. However, third party licensing will *not* be required if the contractor can show DOE that a competitive alternative to the background patent is commercially available or can readily be introduced from one or more other sources, or the contractor or its licensees are supplying or can supply the subject matter of the background patent in sufficient quantity and at reasonable prices to satisfy market needs.

The primary issue is the chilling effect a background patent rights clause may have in discouraging the most qualified contractors from bidding on DOE contracts. Small businesses, in particular, may hold the background patents as their key assets. Although few contractors would object to use of their background patents for governmental research and development, most would object if their competitors were licensed to use a technology developed under the contract which was based primarily on the privately developed background patents.[20]

DOE feels, however, that only contractors holding a unique background technology necessary to solar energy development will be asked to license at reasonable royalties.[21] Thus, the issue resolves down to a question of whether there are any solar contractors that have patents that are absolutely necessary for further solar research and development. The Environmental Law Institute feels that this will not pose a major problem, but that DOE patent regulations should be revised to require background patent licensing only under narrow circumstances where the background patents are uniquely required for further solar research and development.[22]

2. *Revocable License to Contractor*

The contractor retains a revocable license to the invention, which may be revoked, only if the contractor is not taking steps to expeditiously commercialize the invention.

Contractors object to the possibility of having their patent rights revoked and an exclusive license given to a third party, with consequent loss of investment and profits. However, it is necessary that DOE retain this right if it is to ensure the development and commercialization of a significant solar technological achievement developed with public funds.[23] In addition, DOE notes that the conditions of revocation are very narrow and will only arise if the public interest definitely requires third party licensing and substantial utilization of the invention.[24]

3. *Retained Government Patent Rights*

Even if the contractor has received a waiver of patent rights, DOE must retain a nonwaivable, nonexclusive license. DOE must also retain the "march-in" right to require the contractor to license third parties at reasonable royalties if required for governmental purposes, health, safety, or energy needs. DOE can exercise this right if the contractor is not adequately commercializing the invention, or is violating the antitrust laws.

The DOE regulations state that normally, it would require the licensing of others rather than terminate the waiver. Termination will be reserved for cases of substantial abuse of the waived rights. However, if the contractor is investing money in the development of the invention, unless he is abusing the antitrust laws, he will virtually assure himself that the waiver will not be terminated.[25]

This would seem to be a reasonable policy that assures commercialization of solar inventions, and substantially protects the contractor's investment and effort in developing the technology.

4. *Waiver Policy*

The prime objection to DOE waiver of patent rights policy is that the regulations provide no clear standards or conditions to receive a waiver. Contractors and businesses must spend many months to negotiate whether and under what conditions a waiver will be given. Often that decision is not known until after the contract is signed.

The time necessary to negotiate patent waivers over the interpretation of complex DOE patent regulations will likely present a major barrier to small solar businesses contracting with DOE. Small businesses have neither the capability, resources, or time to press their need for a waiver. Not only might a DOE contract threaten their ability to retain exclusive rights to the inventions or systems they develop and market, but it could take away their only valuable resource — their background patents.

It is therefore suggested that DOE patent regulations be revised to give special considerations to small business, perhaps by granting them a limited-term exclusive license instead of the normal

nonexclusive license. Unless this is done, it is possible that DOE will be approached only by larger firms for solar research and development contracts. This will tend to concentrate the solar industry, and stifle the innovation and creativity in solar technology development that can be gained from maximum use of small solar business.[27] In addition, DOE should develop a procedure to help potential contractors understand the complex regulations on patent issues.

G. Federal and State Financial Incentives

The statutes and the agencies of the nine northeast states offer a number of incentives for developing solar energy sources. They include business development corporations, industrial development financial assistance, loan guarantee authorities, as well as market expansion opportunities that utilize urban redevelopment corporations and installation of solar units on publicly financed housing. The material presented herein will provide the user with a wide range of possibilities for obtaining direct or indirect governmental financing assistance. If a solar manufacturer or small businessman wishes to avail himself of these incentives, however, he must convince the sources of assistance that he has developed an adequate business plan, and that it presents a high quality risk. Many public authorities are conservative in nature, and will have to be assured of the long term stability of the solar market and the national necessity for developing a solar industry infrastructure.

The primary Federal financial incentives to the use of solar energy are contained in the National Energy Act which is analyzed the Appendix.

The Act contains income tax credits of 15 percent of the first $2000 of the cost of installing insulation and energy conservation devices for a maximum credit of $300, and a tax credit of 30 percent of the first $2000, and 20 percent of the next $8000 of the cost of purchase and installation of solar heating, cooling and wind energy equipment, for a maximum credit of $2200. Other significant solar energy market development incentives in the Act include:

- An additional 10 percent investment tax credit for businesses installing energy conservation and solar or wind equipment.

- A public utility residential energy conservation program. Utility companies inspect the homes of their residential customers, and offer to arrange for the purchase, installation and financing of energy conservation and solar and wind energy devices.

- A nine hundred-eighty million dollar program to conduct energy audits and install energy conservation and solar heating and cooling devices in schools, hospitals, local government buildings and public care institutions.

- Secondary market financing, including Federal purchase and insurance of home mortgage and improvement loans made by banks for solar installations; direct federal loans; and subsidized interest rates, through FHA, FNMA and GNMA.

- A one hundred million dollar demonstration program to install solar heating and cooling equipment in Federal buildings over three years; and a directive to retrofit all Federal buildings with energy conservation and solar energy equipment by 1990.

- A ninety-eight million dollar program to install photovoltaic equipment in Federal facilities over three years.

- Phased deregulation of natural gas which would raise the price of natural gas relative to solar energy equipment, thereby making the solar units more competitive.

In July 1978, The Small Business Energy Loan Act* was passed authorizing the Small Business Administration to make direct or indirect loans for facilities and equipment acquisition. This enables small business to design, manufacture, service or install active and passive solar thermal, photovoltaic, wind, hydro, biomass or energy conservation equipment. The small business applicant, however, must seek funding from non-Federal sources. The ceiling for SBA guaranteed loans is $500,000, and $350,000 for direct loans. Authorizations for $30 million in direct loans and $45 million guaranteed loans were approved with passage of this act.

All loans made must be of such sound value as to reasonably assure repayment, recognizing that greater risk may be associated with loans made to business concerns in the solar field.

In addition, HUD has been directed pursuant to Section 209 of the Housing and Community Development Amendments of 1978, to install solar energy systems in single and multi-family housing financed by HUD. Also, the Department of Agriculture has been authorized to undertake solar energy research and development programs for agricultural purposes, and to establish regional solar energy research and development centers for agricultural activities, pursuant to Sections 1446-1451 and of the Food and Agricultural Act of 1977, P.L. 95-113, respectively.

Other Federal sources of financial assistance will not be discussed in detail, and will only be cited for reference. These funding sources include Small Business Administration loans to small business; SBA support of small business investment companies; Community Services Administration loans and grants; HUD loans and grants for home rehabilitation; Federal tax advantages from accelerated depreciation; investment tax credits; interest deductions, nonrecourse loans, and Subchapter S Corporations. Most significant are the solar energy system tax credits contained in the National Energy Act. (See the footnote for useful financial resource materials.[28])

The state financial assistance programs can be divided into several categories. Industrial development authorities and bonds are oriented towards developing job-producing industry and business. Larger solar manufacturing concerns would best be able to make use of this source of funds. Product and business development, and credit corporations however, are oriented more towards commercial business or product development. This source of funds could best be used by solar manufacturers and distribution and installation enterprises.

Vast market development opportunities could be realized if states were to require public housing authorities and mortgage finance agencies, as well as those organizations receiving tax advantages (urban development corporations) to equip a certain percentage of their buildings with solar systems as a part of the quid pro quo for receiving state financial assistance, guaranteed loans, or tax advantages. Thousands of housing units are built each year by these public authorities with publicly guaranteed money. It is in the long-term public interest to require the recipients of these advantages to utilize solar in some of their new installations.

This incentive can be institutionalized if state legislatures direct that each public authority or state-chartered finance agency require minimum numbers of solar heating, cooling, and hot water units to be incorporated into a percentage of publicly financed units. It is recommended that this provision be included in every legislative agenda as soon as possible.

FEDERAL PROGRAMS: FINANCIAL ASSISTANCE

In addition to the new incentives recently introduced by the National Energy Act, (described in the Appendix) the U.S. Government has a number of ongoing programs providing loans and loan guarantees, grants, and other forms of financial assistance to a broad range of businesses, especially small businesses.

*P.L. 95-315, 15 U.S.C. 636

The following outlines federal agencies that provide financing for businesses, and lists the areas of financial activity of each. Details can be obtained from the specific agency.

Small Business Administration
- Business Loans and Loan Guarantees
  - Small business loans
  - Economic opportunity loans
  - Revolving line of credit
  - Surety bond guarantee
- Investment and Development Company Loans
  - Small Business Investment Companies (SBICs)
  - Minority Enterprise SBICs (MESBICs)
  - Local Development Company (LDC)
  - Small Business Lending Companies (SBLCs)
- Contact: SBA Regional Offices
SBA District Offices

Community Services Administration Special Impact Program
- Grants to Community Development Corporations (CDCs)
- Contact: Regional CSA Office

Department of Commerce
- Economic Development Administration (EDA)
  - Business development loans and guarantees
  - Trade adjustment assistance loans
  - Directory
- Contact: Regional Offices
Economic Development Representatives

Department of Agriculture
- Farmers Home Administration (FmHA)
  - Business and industrial development loan guarantees (B&I)
- Contact: Washington and State Offices
- Rural Electrification Administration
  - Rural electrification loans

Department of Housing and Urban Development
- Housing Production and Mortgage Credit/FHA
  - Guaranteed and insured loans for hospitals
  - Guaranteed and insured loans for nursing homes and related care facilities
  - Guaranteed and insured loans for low and moderate income apartment houses.
  - Property improvement loans for home owners
- Contact: Regional HUD Offices

Department of the Interior
- Bureau of Indian Affairs
  - The Indian revolving loan fund
  - The Indian business development program
  - Indian loan guaranty and insurance
  - Indian on-the-job training program
- Contact: Area Offices

Department of Labor
  Manpower Administration
    Job opportunities in the business sector (JOBS)
  Contact: Regional Offices

Defense Department
  Regulation V Loan Guarantees

Export-Import Financing Programs
  Export-Import Bank
    Preliminary commitments
    Direct loans
    Financial guarantees
    Small business assistance programs
    Export-credit insurance program
    Co-operative financing facility
    Commercial bank exporter guarantees
    Discount loan program
  Foreign Credit Insurance Association (FCIA)
  Contact: FCIA Offices
  Private Export Funding Corporation (PEFCO)
  Overseas Private Investment Corporation (OPIC)
    Foreign investment insurance
    Foreign investment guarantees
    Foreign currency loans (Cooley loans)
    Pre-investment assistance loans
    Direct investment loans

Federal Tax Deductions and Credits
  Accelerated depreciation, Internal Revenue Code (IRC) S. 167
  Bonus depreciation, Treasury Regulation 1.179.1
  Real estate depreciation, IRC S. 167
  Class Life Asset Depreciation Range System, Tres. Reg. 1.167 (a)-11
  Investment tax credit, IRC S. 46
  Nonrecourse loans, Tres. Reg. S. 1.752-(1) (e)
  Interest deduction, IRC S. 163
  Limited partnerships, Tres. Reg. 3301.7701-2j-3
  Subchapter S. Corporations, IRC S. 1371-1379
    Contact: Internal Revenue Service Office

STATE PROGRAMS: FINANCIAL ASSISTANCE

CONNECTICUT

Connecticut Product Development Corporation, C.G.S. 32-32 through 32-46

Provides risk capital to business for the development and marketing of new products. Funded by state and federal government.

Connecticut Development Credit Corporation, C.G.S. 32-23d-23e

Privately funded corporation making loans to business for all business purposes, including working capital, but requires full security and collateral for loans.

Local Industrial Revenue Bonds, C.G.S. 8-186 through 8-195

Local Industrial Development agencies may issue bonds for any industrial, commercial, or manufacturing facility.

Connecticut Development Authority, 32-11a through 32-23m
Connecticut Industrial Mortgage Insurance Program
Connecticut Industrial Revenue Bonds, C.G.S. S. 32-23a-23h

The Connecticut Development Authority is authorized to (1) guarantee mortgage loans made by banks to insure repayment of loans for industrial real property and machinery; and (2) to issue industrial revenue bonds that will directly fund businesses to finance industrial, manufacturing, processing, research, and commercial enterprises, as well as acquire machinery and equipment.

Connecticut Public Housing Opportunities
Municipal Housing Authorities, C.G.S. 8-38 through 8-119
Connecticut Housing Finance Authority, C.G.S. 8-241 through 8-282
Commissioner of Consumer Affairs, C.G.S. 8-120
Redevelopment and Urban Renewal and Capital Improvement Projects, 8-124 through 8-169

MAINE

Local Industrial Revenue Bonds., M.R.S.A. 30:5325-5340

Authorized municipalities to issue tax-free bonds to finance industrial, commercial, recreational, or combined projects. The Maine Guarantee Authority must approve the project and bonding.

Maine Guarantee Authority, M.R.S.A. 10:751-756

The Authority issues bonds to finance direct loans or guarantee commercial loans for construction or expansion of buildings and equipment for industry, fishing, and agricultural enterprises.

Maine Public Housing Opportunities
Maine State Housing Authority, M.R.S. 30:4711
Municipal Housing Authorities, M.R.S. 30:4551-4755
Municipal Community Development Program, M.R.S. 20:4851-4854
Urban Renewal Authority, 30:4801-4813

MASSACHUSETTS

Massachusetts Community Development Finance Corporation, M.G.L. Ch. 40F(1-5)

MCDFC will provide equity and venture capital to "any commercial, industrial, or real estate business, or other economic development activity" in "target areas" which are economically depressed or blighted pursuant to Ch. 121A (40F:1). To finance MCDFC, ten million dollars in General Obligation Bonds of Massachusetts will be sold in order to purchase one million shares of MCDFC stock. Additional funding comes from the cash flow of the fund itself via repayment of loans. (40F:4)

Investments will be made through (a) local Community Development Corporations (CDCs) or (b) Small Business Investment Corporations (pursuant to the Small Business Investment Company Act of 1958, P.L. 85-699) established as subsidiaries of MCDFC. Any company with a sound business plan, that is unable to receive private industry equity funding and is operating in an economically depressed area is eligible. MCDFC will not own more than 49 percent of the voting stock in a CDC or SBIC.

Contact: Massachusetts Department of Commerce and Development
Boston, Massachusetts

Massachusetts Business Development Corporation

This is a private corporation authorized to make loans to businesses in Massachusetts for any legitimate business purpose. Many of the applicants have been turned down by commercial lend-

ing institutions. Proceeds of loans can be used for any purpose.

Contact: Massachusetts Business Development Corporation
Boston, Massachusetts

Local Industrial Development Financing Authority, M.G.L. Ch. 40D as amended by Ch. 495, Acts of 1978

Authorizes municipalities to establish Industrial Development Authorities to finance local development projects. Enterprises include (1) industrial, (2) commercial (trade or business) but only in cities or towns with a population in excess of 35,000, (3) manufacturing, or (4) research and development. Financing can also apply to pollution control and solid waste disposal facilities. The authority may buy land, construct and improve facilities, or lease a project to an industrial occupant. Funding is by issue of tax free Industrial Development Authority bonds for up to fifty years, (40D:10). The municipality and the Department of Commerce and Development must approve the project (40D:12)

Contact: Municipality, or
Massachusetts Department of Commerce and Development
Boston, Massachusetts

Massachusetts Industrial Development Authority, M.G.L. Ch. 40E

This Authority may make loans (for up to 45 percent of the cost of the project) to local Industrial Development Authorities (M.G.L. Ch. 40D) in critical economic areas, or toward the purchase of first mortgages on projects, which include (1) industrial (not mercantile, commercial, or retail), (2) manufacturing, and (3) research and development enterprises (40E:1-5). The MIDA may issue tax-free bonds and notes and draw upon the Industrial Development Fund, which will receive legislative appropriations as well as repayments of principal and interest from loans (40E:7-13).

Contact: Massachusetts Department of Commerce and Development
Boston, Massachusetts

Massachusetts Industrial Finance Agency, M.G.L. Ch. 23A:29 as amended by Ch. 496, Acts of 1978

The Agency will insure mortgage loans given by conventional lenders to finance the acquisition and construction of industrial facilities which include (1) industrial, (2) commercial (trade or business), but only in cities and towns with a population in excess of 35,000, (3) manufacturing, (4) research and development or (5) pollution control or solid waste facilities. The fund is designed to respond to the lack of industrial loans for small business enterprises (Ch. 23A:29-33). Funds that insure up to 90 percent of a loan for thirty years come from MIFA bonds and from an Industrial Mortgage Insurance Fund. The fund consists of a one-time state appropriation of two million dollars that is held in Massachusetts banks.

Contact: Massachusetts Department of Commerce and Development

Economic Development and Industrial Corporation, M.G.L. Ch. 121C

Authorizes the establishment of Economic Development and Industrial Corporations to carry out "Economic Development Projects" necessary to retain existing industry and attract new industry to blighted areas. Projects, which include preparation, improvement, and rehabilitation of land and construction facilities, may be financed by issuance of tax free bonds.

Urban Redevelopment Corporations, M.G.L. Ch. 121A

Similar in intent and purpose as Ch. 121C Economic Development Corporations. This law is designed to give additional tax incentives to urban redevelopment projects by exemption of corporate income from taxation for fifteen years, and acceptance of payments in lieu of taxes based on gross revenues.

Massachusetts Housing Finance Agency, M.G.L. Ch. 23A Appendix
Massachusetts Home Mortgage Finance Agency, M.G.L. Ch. 23A Appendix
Local Housing Authorities, M.G.L. Ch. 121B

Authorizes establishment of public corporations to build housing financed by issuance of tax-free bonds. The Massachusetts Housing Finance Agency makes first mortgage loans to contract low and moderate income family rental housing. The Massachusetts Home Mortgage Finance Agency makes and insures loans to mortgage lenders and banks, for new residential home construction. Local Housing Authorities may construct public low and moderate income housing. Since these entities, as public corporations, receive funding from the state into their capital funds, they could be directed as a condition for receipt of state funds to equip with solar heating and cooling systems, a certain percentage of the construction financed by them. This would not only serve as a source of funding to requesting builders, but also act as a market development device to assist the entire solar industry.

Massachusetts Technology Development Corporation, M.G.L. Ch. 406, Ch. 497 Acts of 1978

MTDC was established as a public corporation to purchase securities of small Massachusetts businesses engaged in manufacturing, research and development, or in providing services "involving a significant amount of technology." MTDC is authorized to provide "seed capital" for product development and "commercialization." There is a one million dollar investment limit and a 49 percent ownership limitation in any one enterprise. MTDC is also authorized to operate as a licensed Small Business Investment Corporation.

Applicants for assistance must submit a detailed business plan, and the entrepreneurs must make substantial investments of time and money in the enterprise.

MTDC is funded by a two million dollar grant for the Economic Development Administration of the U.S. Department of Commerce, and appropriations from the Commonwealth of Massachusetts.

Community Economic Development Assistance Corporation, M.G.L. Ch. 404, Ch. 498, Acts of 1978

CEDAC was established as a public corporation to provide "technical assistance" to community development corporations or any other non-profit organization contributing to the economic development of "target" blighted or economically depressed area. Technical assistance includes professional and other aid to help the eligible organizations plan, organize and implement economic development activities. These activities include financial, marketing, business planning, accounting and legal services. Technical assistance does not include cash grants.

Contact: Massachusetts Executive Office of Manpower Affairs
Boston, Massachusetts

Massachusetts Capital Resource Company

MCRL was established and funded by domestic life insurance companies to provide new sources of capital 1) to businesses unable to obtain financing elsewhere, and 2) which will be used to increase employment in Massachusetts.

Contact: Massachusetts Capital Resource Company
Boston, Massachusetts

NEW HAMPSHIRE

Industrial Revenue Bonds, issued by:

Cities, N.H.R.S. S. 162-G:1

Local Industrial Development Authorities, N.H.R.S. S. 162-G:151

New Hampshire Industrial Development Authority, N.H.R.S. S. 162A:1-16, 162I:1-16

These three channels may be used to obtain financing for land, buildings, machinery, and equipment for industrial manufacturing enterprises. Money can be obtained by issuance of tax-free bonds.

New Hampshire Business Development Corporation

This private corporation lends money for business purposes, but not for start-up or equity financing.

New Hampshire Public Housing Opportunities

New Hampshire Housing Commission, N.H.R.S. 204A:1-12

New Hampshire Housing Finance Agency, N.H.R.S. 204B:1-45

Municipal Housing Authorities, N.H.R.S. 203:1-27

NEW JERSEY

New Jersey Economic Development Authority, N.J.S.A. S. 34:1B(1-20)

The Authority issues tax-exempt Industrial Revenue Bonds that provide loan funding for manufacturing, processing, assembly, research, office, industrial, commercial, or recreational enterprises. The "Loan Support Program" is aimed at increasing the number of small businesses financed by the Authority.

Department of Community Affairs Business Incentives Loans, N.J.S.A. 52-270-71-107, 52:270-74

Provides loans for inventory, equipment, and working capital to businesses in need of financing who are willing to settle or expand into deteriorating areas; businesses in urban renewal areas also receive a property tax abatement on buildings and facilities.

New Jersey Public Housing Opportunities

New Jersey Mortgage Finance Agency, N.J.S.A. 17:1B-7

State Housing Authority, N.J.S.A. 55:14H 1-37

Local Housing Authorities, N.J.S.A. 55:14A 1-26

Others, see N.J.S.A. 55:14D, 55:14B, 55:14I, 55:14J, 55:15, 55:16, 55:17

NEW YORK

New York Job Development Authority, Public Authorities Law 1800-1839

Financed by selling bonds, this general economic development authority is authorized to make low-cost long-term second mortgage loans for up to 40 percent of the cost of construction or expansion of industrial sites, plants, machinery, and equipment. Loans may go to local development corporations.

New York Business Development Corporation

Private corporation for business purposes, requisitions, plant and working capital; a subsidiary, NYBDC Capital Corp., provides equity financing for start-ups.

Local Industrial Development Authorities, N.Y. Gen. Municipal Law S. 850-874

Local IDAs may issue tax-free, industrial revenue bonds to finance manufacturing, research, commercial, industrial, or recreational enterprises or facilities.

New York Public Housing Opportunities

New York State Housing Finance Agency, Private Housing Law S. 40-61

Municipal Housing Authorities, Public Housing Law S. 400-541, S. 70-76a, Local Finance Law S. 150

Other, State Finance Law S. 60 (housing bonds)

Private Housing Law S. 200-211 (Urban Redevelopment Corp.)

Private Housing Law S. 650-670 (Limited Dividend Housing Corp.)

Private Housing Law S. 800-805 (Loans to multiple-dwelling owners)

PENNSYLVANIA

Pennsylvania Industrial Development Authority, P.S.A. 73;301-314

Provides loans in critical economic areas for acquisition and construction of industrial and manufacturing, or research and development enterprises, or to Industrial Development Authorities.

Local Industrial and Commercial Development Authorities, P.S.A. 73:371-386

This County and municipal industrial development authority may issue tax-free bonds to finance industrial, commercial, manufacturing, or research and development enterprises.

RIDC Industrial Development Fund

Provides loans to Pittsburgh area businesses that are unable to secure loans from commercial institutions. Loans are for working capital, expansion, and occasionally for equity investments.

Southeastern Pennsylvania Development Fund

Provides loans for Philadelphia area businesses unable to secure bank financing for expansion of facilities, working capital, and equipment.

Pennsylvania Development Credit Corporation

Provides loans to areas of the state not covered by the two preceding corporations. It addresses small businesses unable to secure bank loans. The proceeds are used for facilities, equipment, working capital, recreational, or industrial projects.

Pennsylvania Public Housing Opportunities

Pennsylvania Housing Finance Agency, P.S. 35:1680.101-.603

Local Housing Authorities, P.S. 35:1541-1561

RHODE ISLAND

Local Industrial Development Commissions

Rhode Island Port Authority and Economic Development Corporation

R.I.G.L. S. 42-64-(1-32)

Municipalities and the Rhode Island Port Authority and Economic Development Authority may issue industrial development bonds for financing any industrial, commercial, or business enterprise or project. Although RIDA and EDC also issue Industrial Revenue Bonds for industrial, commercial or business purposes, their activities are limited to major projects.

Rhode Island Industrial Building Authority, R.I.G.L. 42-34-(1-9)

The Authority may insure up to 90 percent of a first mortgage loan for industrial projects requiring over $100,000 in financing.

Business Development Corporation of Rhode Island

This private corporation will lend to any type of enterprise for any business purpose.

Rhode Island Public Housing Opportunities

Rhode Island Housing and Mortgage Finance Corporation, R.I.G.L. 42-55-1 through 44-55-27

VERMONT

Vermont Industrial Development Authority

Vermont Industrial Revenue Bonds, V.S.A. 10:211-263

Municipalities or the Vermont Industrial Development Authority may issue industrial revenue bonds for the establishment or expansion of any industrial facility. VIDA is also authorized to make first mortgage loans, or to insure mortgage loans for industrial businesses. VIDA may also provide loans to local development companies.

Vermont Development Credit Corporation, V.S.A. 8:1801-1804

Provides loans for industrial, agricultural, recreational, or other enterprises.

Vermont Public Housing Opportunities

Vermont Housing Finance Agency, V.S.A. 10:601-643
Local Housing Authorities, V.S.A. 24-4001-4026
Vermont State Housing Authority, V.S.A. 24:4005
Vermont Mortgage Guarantee Board, V.S.A. 10:381-398

CONSUMER PROTECTION AND BUSINESS REGULATION

2

Northern Energy Corporation
Northeast Solar Energy Center

A. Product and Tort Liability

Manufacturers of solar equipment and consumers of solar products should be aware of the duties and protection imposed by product liability law. This law will hold a manufacturer, designer, or seller liable to anyone injured by a defective product pursuant to either a negligence or a strict liability theory.

Negligence

Under a negligence theory (applicable in all states), a solar manufacturer can be held liable if he did not exercise a degree of care and skill which a reasonably prudent manufacturer would exercise in designing and manufacturing such a product. Negligence, or lack of due care, can be shown by proving (a) lack of adequate warnings about the hazards of the product or insufficient directions about its proper use; (b) negligent design; (c) negligent manufacture; (d) negligent failure to provide safety features; (e) negligent failure to inspect for defects; (f) negligent failure to test for defects that may occur after prolonged use.

Defenses to negligence include (a) all possible care was taken to insure the product was safe for its intended use; (b) compliance with applicable safety standards; (c) compliance with industry trade or custom; (d) similarity to millions of others of the same product on the market; (e) plaintiff's carelessness caused the accident; and (f) plaintiff voluntarily assumed the risk of injury.

All the states in the region allow anyone harmed by a defective product to sue the manufacturer, even if the person was not a direct purchaser (i.e., elimination of the privity of contract defense).

Strict Liability

Under a strict liability in tort theory, manufacturers, sellers, component parts manufacturers, suppliers, distributors, retailers, and lessors can be held liable to any person injured by a defect in their products. Defect is defined as "anything which renders the product unfit for its intended use and is unnecessarily dangerous." See *Restatement of Torts* (2nd), Section 402A (1965).* In the nine-state region, only Massachusetts has not adopted strict liability in tort, but it is expected to do so soon.

In such cases, the injured person need only prove that the product had a "defect" which existed when it left the manufacturer's control, and that the product eventually caused the injury; no proof of negligence in the design or manufacture of the product need be shown. This strict liability without proof of negligence is based on a social policy to maximize consumer protection. It holds liable, manufacturers and all others in the marketing chain responsible for product defects, and provides the greatest incentive to manufacturers to not only use considerable care to design and produce safe products, but to eliminate dangerous products from the marketplace as well. This responsibility extends to anyone injured by the product who might reasonably be expected to use or be affected by the product.

Defenses to strict liability claims fall into two categories: (a) that the product was not defective, by showing the product incorporates state of the art technology, industry and government safety standards, or industry trade and custom; that the product is like millions of other identical items on the market; or that the defect was obvious and no duty exists to protect against it; and (b) that the defect did not actually cause the accident, by proving abnormal use by plaintiff; alteration of the product after it left the manufacturer's control; intervening conduct by a third person which caused the injury; contributory negligence by the injured; or that the injured assumed the risk by using a product he knew was defective. Comparative negligence may also be used to reduce a recovery proportionate to the plaintiff's degree of fault.

The Northeast Solar Energy Center has studied the product liability law of the nine states in the region, and the conclusions reached were that the liability of solar equipment manufacturers,

*This theory of liability has been adopted in forty states.

designers and sellers will be similar to that of their counterparts in the industrial world. They must use reasonable care in the design, manufacture, testing, and distribution of their products; incorporate available safety features; and furnish adequate warnings and instructions for installation and use. The products need not incorporate the ultimate in safety, but they must be free of defects throughout their useful life, and be reasonably safe for their intended purpose. If these standards are met, no manufacturer of properly designed and built solar energy equipment should be deterred from entering the marketplace, or be unduly alarmed by fear of product liability suits.[29]* Thus products liability law poses no unusual barrier to the solar energy industry.

State Law: Product and Tort Liability

Every state in the region, except Massachusetts, has adopted strict liability in tort, and Massachusetts is expected to adopt this theory soon. Each state in the region also allows any person injured by the product to sue, even if there was no direct dealing with the manufacturer (no privity requirement).

CONNECTICUT

Garthwait v. Burgio 216 A.2d 189(1965) (strict liability, no privity required)
P.A. 76-293 (Suit must be brought within three years from the date of injury, but no longer than eight years from the date of the sale of the product)

MAINE

M.R.S. 14:221 (strict liability)
M.R.S. 14:161 (no privity required)
M.R.S. 14:752 (suit must be brought within six years of accident)

MASSACHUSETTS

Turcotte v. General Motors 494 F.2d 173 (DCMA, 1974) and *Calhoun v. General Motors* Dist. Ct. no.75-1721-2, 1975, suggesting the state is on its way to adopting strict liability in tort; (but may bring a negligence-based product liability suit)
M.G.L. Ch. 106-2—318 (no privity required) (suit must be brought within two years of injury)

NEW HAMPSHIRE

Buttrick v. Lessard 260 A2d 111 (S. Ct., 1969) (strict liability)
N.H.R.S. 382-A:2-318 (no privity required)
N.H.R.S. 508:4 (suit must be brought within six years of injury)

NEW JERSEY

Santor v. A. and M. Karagheusian, Inc. 207 A2d 305 (1965) (strict liability)
Schipper v. Levitt and Son 207 A2d 314 (NJ 1965) (no privity required)
N.J.S.A. 2A:14-2 (suit must be brought within two years of injury)

NEW YORK

Goldberg v. Kollsman Instrument Corp. 12 NYS2d 432, 191 NE2d 81 (1962) (strict liability)
Mull v. Colt Inc. 31 F.R.D. 154 (DCNY, 1962) (no privity required)
Victorson v. Bock Laundry 37NY2d 398 (1975) (suit must be brought within three years of injury)

PENNSYLVANIA

Webb v. Zern 220 A2d 853 (1966) (strict liability)
Mannsz v. MacWhyte Co. 155F.2d 445 (3rd cir., 1946) (no privity required)
12 P.S. 31 (suit must be brought within two years of injury)

*This report is available from the Northeast Solar Energy Center

RHODE ISLAND

Ritter v. Narraganset Electric Co. 283A.2d 255 (S.Ct., 1971) (strict liability)
Buszta v. Southern 232A2d 396 (S.Ct., 1967) (no privity required)
R.I.G.L. 9-1-13 (suit must be brought within three years of injury)

VERMONT

Zaleski v. Joyce 333 A.2d 110 (1975) (strict liability)
O'Brien v. Comstock Foods, Inc. 212 A.2d 69 (1965) (no privity required)
V.S.A. 12:512 (4) (suit must be brought within three years of injury)

B. Warranties

A purchaser of a solar energy system that is found to be defective or nonconforming to the product specifications, may also sue on the grounds of breach of express or implied warranties, in addition to negligence-based product liability theory. An action for breach of warranty proceeds on a contract theory, as distinguished from the tort or negligence approach, and focuses on the nonperformance of express or implied promises made by the defendant to the plaintiff, and not on the defendant's failure to provide reasonable care. The plaintiff need only prove the product did not conform to the defendant's promises about the product, and that he was injured by the defect.

Warranty law has been codified in sections 2-313, 2-314, 2-315, 2-316, and 2-317 of the Uniform Commercial Code, which is effective in all states (with some local variations) except Louisiana. These sections are presented in Exhibit 7.

The express warranty of section 2-313 is a promise or description of the goods by the seller, which is expressly made part of the bargain with the buyer. Express warranties arise by written guarantees, descriptions of the product on packaging or accompanying papers, or oral representations made by the seller about the product. The seller need not specifically use the word "warranty" or "guarantee" to create an express warranty.

Implied warranties do not refer to any promise made by the seller, but are imposed independently by law, as a matter of public policy. The implied warranty of merchantability in Section 2-314 means that the product must be fit for the ordinary purposes for which such products are used, or conform to ordinary trade standards. The implied warranty of fitness for a particular purpose of Section 2-315 provides that if the seller knows the particular purpose for which the goods are being bought, and the buyer is relying on the seller's judgment, then there is a warranty implied that the goods will be suitable for that specific use or purpose.

Section 2-316 allows a seller to modify or eliminate the implied warranty of merchantability by specifically mentioning merchantability, and if in writing, the words must be conspicuous. To modify the implied warranty of fitness for a particular purpose, the language must be in writing. All implied warranties may be excluded by use of expressions like "as is" or "with all faults."

However, Maine, Massachusetts, and Vermont have amended Section 2-316 to provide that a seller cannot eliminate or disclaim implied warranties on sales of consumer goods, which are defined as goods used or bought for personal, family, or household purposes (Sections 2-103(3), 9-109). Since solar energy systems for homes should be considered as consumer goods, there will always be implied warranties of merchantability and fitness for a particular purpose on equipment sold to consumers for their residences in these three states.

Finally, Section 2-318 states that a seller's express or implied warranty extends to the benefit of the purchaser's family, household, or guests, if they could reasonably be expected to

use or be affected by the goods. In effect, this section eliminates the defense of lack of "privity of contract" (the absence of direct dealing between plaintiff and defendant), and the purchaser's family, et cetera, can recover, even though they had no direct dealings with the seller. However, the nine Northeast states, either by statute or judicial decision, have eliminated privity of contract as defense against *any* other purchasers who may sue the manufacturer, seller, or supplier. Thus, anyone who may be injured by defective solar products can now recover under a warranty theory from any person or company throughout the chain of distribution.

Magnuson-Moss Warranty Act

There is one federal statute that solar manufacturers should be particularly aware of. The Magnuson-Moss Warranty Act of 1975, 15 U.S.C. 2301-2312 requires any manufacturer, seller, or distributor who gives a written warranty on a consumer product*, to: provide the detailed information items stated in Section 2302 describing the conditions of the warranty, service and disputes settlement procedures; provide a warranty that is conspicuous and not misleading to the average consumer; adhere to other requirements which may be imposed by the FTC by regulation. If the warranty is designated as a "full" warranty, then it must meet the additional federal minimum standards for a warranty in Section 2304. These state that the warranty must be unlimited in duration; that it provide for refund or replacement if the goods are defective; that the consumer need only notify the warrantor of the defect to gain a remedy; and that the warranty must be conspicuous. (See Exhibit 8.)

Any warranty not meeting the federal minimum standards must be designated as a "limited warranty."

The Act also provides that no supplier may disclaim or modify any *implied* warranty to a consumer if the supplier gives any written warranty. The implied warranty, however, may be limited to the same duration as the written warranty (Section 2308). In addition, the Act does not invalidate any rights of a consumer under other state or federal laws. The statute does, however, override (pre-empt) state requirements pertaining to written warranties which conflict with those of the Act. This pre-emptive situation prevails unless the FTC, upon application by the state, finds the state law provides consumers with greater protection, and does not unduly burden interstate commerce (Section 2311).

The FTC is directed to issue rules regarding informal warranty dispute settlement procedures; to enforce violations of the Act; and to prosecute warrantors making "deceptive" warranties on consumer products. The Attorney General may also enforce this law (Section 2310). Consumers injured by breach of a written or implied warranty may also sue, bring a class action, and, if they prevail in court, recover court costs and attorney's fees. (Section 2310d)

It should be stressed that the Act does not require that any warranty be given. If a written warranty is given, however, then the minimum warranty requirements will apply. In addition, the Act does not revoke any implied warranties of merchantability or fitness pursuant to state law, and the Act applies only to the person actually making the warranty. Other persons in the chain of distribution of the product are not affected unless they specifically affirm the warranty in writing (Section 2310F). Finally, Section 2302C prohibits tie-in agreements unless a waiver is given by the FTC.

The HUD solar domestic hot water demonstration program has required that all solar energy systems comply in full with the Magnuson-Moss Warranty Act. Systems should feature: (a) a one-year warranty from the installer against failure of the system or components caused by a defect in materials, manufacture, or installation; (b) a five-year warranty from the manufacturer to cover

*Consumer product is defined as any tangible personal property, "normally used for personal, family, or household use, including any such property intended to be attached or installed in any real property . . . (irrespective) as to whether it is so attahced or installed." This definition should include solar energy systems for residential use.

defective materials, manufacture, and corrosion; and (c) a reasonable warranty on heat exchangers, storage tanks, and other major system components.

Many representatives of the solar industry have stated that these heavy warranty requirements could overwhelm small solar manufacturers who cannot comply with the Act in full. These warranty requirements could mean costly informal dispute settlement procedures, full warranties of unlimited duration, and the necessity of establishing cash escrows (for meeting warranty obligations) at the demand of lenders who want to protect their investment. If these conditions prevail, the solar industry could become dominated by only the large companies who can afford to meet all the requirements of the law. The innovation and dynamic entrepreneurship that can be provided by small companies, and which is needed to develop a young and growing industry, might be lost or stifled.

On the other hand, warranty requirements are needed to overcome consumer hesitancy about these new and unfamiliar products. Full warranties can make a significant contribution to inducing people to install solar energy systems when they would otherwise not do so. This could accelerate the growth of the solar industry, and ultimately be better for the industry and the nation, than if the warranty requirements were not imposed.

We should not ignore the fact that these warranty requirements add to the cost of solar units to consumers. It is estimated by NESEC staff that the HUD warranty requirements have increased the selling price of solar domestic hot water systems by approximately $300 to $350 per unit.

In sum, there is a tension between the financial burdens placed on industry by requiring a full warranty, (with the possible effect of eliminating the small solar businessman) and the necessity for warranties to overcome consumer hesitancy. On balance, however, it would seem to be in the best long-term interests of both the industry and consumers to have some warranty requirements. Warranties would help prevent and weed out unworkable designs, inadequate materials, shoddy workmanship, "fly-by-night" operations, and ultimately, extensive product liability suits. A failure in consumer confidence in solar energy systems at this point in time would be disastrous for the solar industry and aggravate the country's energy crisis. Warranty requirements can be one element in strengthening consumer support and demand for a growing solar industry.

Private Warranties

It should be noted that the home building industry and unions are offering warranty plans that will aid the solar consumer. For example, the Home Owners Warranty Corporation insures enrolled builders for a ten-year warranty on the houses they have built, if they comply with HOW-approved construction standards, and standards for financial soundness and fair dealing with the consumer. The home purchaser receives a ten-year, transferable warranty that covers major structural defects and faulty workmanship. The warranty would cover any solar system installed in a home.

The HOW program is administered by 116 local HOW councils in 44 states and is expected to expand. Underwritten by a major national insurance company, the Home Owners Warranty Corporation is a subsidiary of the National Association of Home Builders. The HOW program meets the standards of the Federal Housing Administration, the Veterans Administration and the Federal Trade Commission.

There are additional private companies offering similar home maintenance contracts which would also cover any solar system installed in a home.

Finally, the Sheet Metal Workers International Association has announced that the union will guarantee the workmanship of any union member installing a residential solar system. If inferior or shoddy workmanship is evident, the union will inspect and repair the system free of charge.

These building industry and union warranty plans, and subsequent programs, should enable the solar home purchaser to obtain sufficient warranty coverage that he need not resort to the enforcement mechanisms provided in state or federal law.

State Law

B. WARRANTIES

Citations to the Uniform Commercial Code:
CONNECTICUT: C.G.S. 42a-2-313, through 2-318
MAINE: M.R.S. 11-2-313 through 2-318
MASSACHUSETTS: M.G.L. Ch. 106:2-313 through 2-318
NEW HAMPSHIRE: N.H.R.S. 382-A:2-313 through 2-318
NEW JERSEY: N.J.S. 12A:2-313 through 2-318
NEW YORK: N.Y. U.C.C. 2-313 through 2-318
PENNSYLVANIA: 12A P.S. 2-313 through 2-318
RHODE ISLAND: R.I.G.L. 6A-2-313 through 2-318
VERMONT: V.S.A. 9A:2-313 through 2-318

State Variations

M.R.S. 11:2-313 adds: for express warranties on consumer goods the description must affirm the goods are fit for the ordinary purposes for which they are sold
N.J.S. 12A:2-313.1, 2-313.2 adds: warranties on consumer goods for less than 90 days and cost less than $1,000 begin to run from the day received or installed
M.G.L. Ch. 106:2-316A) adds: a seller cannot exclude or modify implied
M.R.S. 11:2-316(5)) warranties of merchantability or fitness
V.S.A. 9A:2-315(5)) on consumer goods

CONNECTICUT: *Garthwait v. Burgio* 216 A.2d 189 (Conn., 1965) adds: anyone injured by a defective product may sue the manufacturer, seller, or supplier if the person was one who might have reasonably been expected to use or be affected by the goods, i.e., elimination of the lack of privity defense to sue for breach of warranty.

MAINE: M.R.S. 11:2-318
MASSACHUSETTS: M.G.L. Ch. 106:2-318
NEW HAMPSHIRE: N.H.R.S. 382-A:318
NEW JERSEY: *Henningson v. Bloomfield Motors* 161 A.2d 69 (1960)
NEW YORK: N.Y. U.C.C. 2-318
PENNSYLVANIA: *Salvador v. I. A. English Co.* Pa. S. Ct. 1974, C.C.H. Products Liability Reports, p. 7197
RHODE ISLAND: R.I.G.L. 6A-2-318
VERMONT: V.S.A. 9A-2-318

EXHIBIT 7

Uniform Commercial Code

SECTION 2-313. *Express Warranties by Affirmation, Promise, Description, Sample.*—(1) Express warranties by the seller are created as follows:

(a) Any affirmation of fact or promise made by the seller to the buyer which relates to the goods and becomes part of the basis of the bargain creates an express warranty that the goods shall conform to the affirmation or promise.
(b) Any description of the goods which is made part of the basis of the bargain creates an express warranty that the goods shall conform to the description.
(c) Any sample or model which is made part of the basis of the bargain creates an express warranty that the whole of the goods shall conform to the sample or model.

(2) It is not necessary to the creation of an express warranty that the seller use formal words such as "warrant" or "guarantee" or that he have a specific intention to make a warranty, but an affirmation merely of the value of the goods or a statement purporting to be merely the seller's opinion or commendation of the goods does not create a warranty.

SECTION 2-314. *Implied Warranty: Merchantability; Usage of Trade.*—(1) Unless excluded or modified (Section 2-316), a warranty that the goods shall be merchantable is implied in a contract for their sale if the seller is a merchant with respect to goods of that kind. Under this section the serving for value of food or drink to be consumed either on the premises or elsewhere is a sale.

(2) Goods to be merchantable must at least be such as
(a) pass without objection in the trade under the contract description; and
(b) are of fair average quality within the description; and
(c) are fit for the ordinary purposes for which such goods are used; and
(d) run, within the variations permitted by the agreement, of even kind, quality and quantity within each unit and among all units involved; and
(e) are adequately contained, packaged, and labeled as the agreement may require; and
(f) conform to the promises or affirmations of fact made on the container or label if any.*

(3) Unless excluded or modified (Section 2-316) other implied warranties may arise from course of dealing or usage of trade.**

SECTION 2-315. *Implied Warranty: Fitness for Particular Purpose.*—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.*

SECTION 2-316. *Exclusion or Modification of Warranties.*—(1) Words or conduct relevant to the creation of an express warranty and words or conduct tending to negate or limit warranty shall be construed wherever reasonable as consistent with each other; but subject to the provisions of this Article on parol or extrinsic evidence (Section 2-202), negation or limitation is inoperative to the extent that such construction is unreasonable.

(2) Subject to subsection (3), to exclude or modify the implied warranty of merchantability, or any part of it, the language must mention merchantability, and, in case of a writing, must be conspicuous, and to exclude or modify any implied warranty of fitness the exclusion must be by a writing. Language to exclude all implied warranties of fitness is sufficient if it states, for example, that "there are no warranties which extend beyond the description on the face hereof."

(3) Notwithstanding subsection (2)

(a) unless the circumstances indicate otherwise, all implied warranties are excluded by expressions like "as is," "with all faults" or other language which is common understanding calls the buyer's attention to the exclusion of warranties and makes plain that there is no implied warranty; and

(b) when the buyer before entering into the contract has examined the goods or the sample or model as fully as he desired or has refused to examine the goods there is no implied warranty with regard to defects which an examination ought in the circumstances to have revealed to him; and

(c) an implied warranty can also be excluded or modified by course of dealing or course of performance or usage of trade.

(4) Remedies for breach of warranty can be limited in accordance with the provisions of this Article on liquidation or limitation of damages and on contractual modifications of remedy (Sections 2-718 and 2-719).**

SECTION 2-318. *Third Party Beneficiaries of Warranties Express or Implied.*—A seller's warranty whether express or implied extends to any natural person who is in the family or household of his buyer or who is a guest in his home if it is reasonable to expect that such person may use, consume or be affected by the goods and who is injured in person by breach of the warranty. A seller may not exclude or limit the operation of this section.*

EXHIBIT 8

Magnuson-Moss Warranty Act

WARRANTY PROVISIONS

15 USC 2302

15 USC 2302

SEC. 102. (a) In order to improve the adequacy of information available to consumers, prevent deception, and improve competition in the marketing of consumer products, any warrantor warranting a consumer product to a consumer by means of a written warranty shall, to the extent required by rules of the Commission, fully and conspicuously disclose in simple and readily understood language the terms and conditions of such warranty. Such rules may require inclusion in the written warranty of any of the following items among others:

(1) The clear identification of the names and addresses of the warrantors.

(2) The identity of the party or parties to whom the warranty is extended.

(3) The products or parts covered.

(4) A statement of what the warrantor will do in the event of a defect, malfunction, or failure to conform with such written warranty—at whose expense—and for what period of time.

(5) A statement of what the consumer must do and expenses he must bear.

(6) Exceptions and exclusions from the terms of the warranty.

(7) The step-by-step procedure which the consumer should take in order to obtain performance of any obligation under the warranty, including the identification of any person or class of persons authorized to perform the obligations set forth in the warranty.

(8) Information respecting the availability of any informal dispute settlement procedure offered by the warrantor and a recital, where the warranty so provides, that the purchaser may be required to resort to such procedure before pursuing any legal remedies in the courts.

(9) A brief, general description of the legal remedies available to the consumer.

(10) The time at which the warrantor will perform any obligations under the warranty.

(11) The period of time within which, after notice of a defect, malfunction, or failure to conform with the warranty, the warrantor will perform any obligations under the warranty.

(12) The characteristics or properties of the products, or parts thereof, that are not covered by the warranty.

(13) The elements of the warranty in words or phrases which would not mislead a reasonable, average consumer as to the nature or scope of the warranty.

Availability prior to sale.

(b)(1)(A) The Commission shall prescribe rules requiring that the terms of any written warranty on a consumer product be made available to the consumer (or prospective consumer) prior to the sale of the product to him.

Information, presentation.

(B) The Commission may prescribe rules for determining the manner and form in which information with respect to any written warranty of a consumer product shall be clearly and conspicuously presented or displayed so as not to mislead the reasonable, average consumer, when such information is contained in advertising, labeling, point-of-sale material, or other representations in writing.

(2) Nothing in this title (other than paragraph (3) of this subsection) shall be deemed to authorize the Commission to prescribe the duration of written warranties given or to require that a consumer product or any of its components be warranted.

Time extension.

(3) The Commission may prescribe rules for extending the period of time a written warranty or service contract is in effect to correspond with any period of time in excess of a reasonable period (not less than 10 days) during which the consumer is deprived of the use of such consumer product by reason of failure of the product to conform with the written warranty or by reason of the failure of the warrantor (or service contractor) to carry out such warranty (or service contract) within the period specified in the warranty (or service contract).

Conditions.

(c) No warrantor of a consumer product may condition his written or implied warranty of such product on the consumer's using, in connection with such product, any article or service (other than article or service provided without charge under the terms of the warranty) which is identified by brand, trade, or corporate name; except that the prohibition of this subsection may be waived by the Commission if—

(1) the warrantor satisfies the Commission that the warranted product will function properly only if the article or service so identified is used in connection with the warranted product, and

(2) the Commission finds that such a waiver is in the public interest.

Publication in Federal Register.

The Commission shall identify in the Federal Register, and permit public comment on, all applications for waiver of the prohibition of this subsection, and shall publish in the Federal Register its disposition of any such application, including the reasons therefor.

(d) The Commission may by rule devise detailed substantive warranty provisions which warrantors may incorporate by reference in their warranties.

(e) The provisions of this section apply only to warranties which pertain to consumer products actually costing the consumer more than $5.

FEDERAL MINIMUM STANDARDS FOR WARRANTY

15 USC 2304

SEC. 104. (a) In order for a warrantor warranting a consumer product by means of a written warranty to meet the Federal minimum standards for warranty—

(1) such warrantor must as a minimum remedy such consumer product within a reasonable time and without charge, in the case of a defect, malfunction, or failure to conform with such written warranty;

(2) notwithstanding section 108(b), such warrantor may not impose any limitation on the duration of any implied warranty on the product;

(3) such warrantor may not exclude or limit consequential damages for breach of any written or implied warranty on such product, unless such exclusion or limitation conspicuously appears on the face of the warranty; and

(4) if the product (or a component part thereof) contains a defect or malfunction after a reasonable number of attempts by the warrantor to remedy defects or malfunctions in such product, such warrantor must permit the consumer to elect either a refund for, or replacement without charge of, such product or part (as the case may be). The Commission may by rule specify for purposes of this paragraph, what constitutes a reasonable number of attempts to remedy particular kinds of defects or malfunctions under different circumstances. If the warrantor replaces a component part of a consumer product, such replacement shall include installing the part in the product without charge.

(b)(1) In fulfilling the duties under subsection (a) respecting a written warranty, the warrantor shall not impose any duty other than notification upon any consumer as a condition of securing remedy of any consumer product which malfunctions, is defective, or does not conform to the written warranty, unless the warrantor has demonstrated in a rulemaking proceeding, or can demonstrate in an administrative or judicial enforcement proceeding (including private enforcement), or in an informal dispute settlement proceeding, that such a duty is reasonable.

(2) Notwithstanding paragraph (1), a warrantor may require, as a condition to replacement of, or refund for, any consumer product under subsection (a), that such consumer product shall be made available to the warrantor free and clear of liens and other encumbrances, except as otherwise provided by rule or order of the Commission in cases in which such a requirement would not be practicable.

(3) The Commission may, by rule define in detail the duties set forth in section 104(a) of this Act and the applicability of such duties to warrantors of different categories of consumer products with "full (statement of duration)" warranties.

(4) The duties under subsection (a) extend from the warrantor to each person who is a consumer with respect to the consumer product.

(c) The performance of the duties under subsection (a) of this section shall not be required of the warrantor if he can show that the defect, malfunction, or failure of any warranted consumer product to conform with a written warranty, was caused by damage (not resulting from defect or malfunction) while in the possession of the consumer, or unreasonable use (including failure to provide reasonable and necessary maintenance).

"Without charge."

(d) For purposes of this section and of section 102(c), the term "without charge" means that the warrantor may not assess the consumer for any costs the warrantor or his representatives incur in connection with the required remedy of a warranted consumer product. An obligation under subsection (a)(1)(A) to remedy without charge does not necessarily require the warrantor to compensate the consumer for incidental expenses; however, if any incidental expenses are incurred because the remedy is not made within a reasonable time or because the warrantor imposed an unreasonable duty upon the consumer as a condition of securing remedy, then the consumer shall be entitled to recover reasonable incidental expenses which are so incurred in any action against the warrantor.

(e) If a supplier designates a warranty applicable to a consumer product as a "full (statement of duration)" warranty, then the warranty on such product shall, for purposes of any action under section 110(d) or under any State law, be deemed to incorporate at least the minimum requirements of this section and rules prescribed under this section.

C. Consumer Protection/Consumer Credit

There exist two well developed bodies of statutory law that can be relied upon to protect all consumers, including solar system purchasers. One series of statutes protects the consumer from fraud and unfair or deceptive acts or practices; the other set of statutes regulates the business of issuing the consumer credit to purchase goods. These statutes focus on complete disclosure of all finance charges and regulation of retail installment loans.

1) *Consumer Protection Laws*

A. The Federal Trade Commission

The Federal Trade Commission, the basic consumer protection arm of the Federal government, was created by Congress in 1914 to eliminate unfair competition in business and to protect the public from abusive or deceptive advertising and business practices. The FTC comprises the Bureau of Competition, which enforces the anti-trust laws and oversees anticompetitive practices, and The Bureau of Consumer Protection, which protects consumers from widespread unfair deceptive acts or practices by business. The FTC's powers were expanded in 1938 by the Wheeler-Lea Amendment which proscribed false advertising of foods, drugs, devices or cosmetics.

The FTC's primary focus is on general patterns of fraud that affect large segments of the population, particularly if they are of an interstate nature. The FTC will regulate widespread abuses, or unfair or deceptive practices, prevalent in an entire industry by issuing an advisory opinion; an industry guide; or a trade regulation rule governing or prohibiting particular industry-wide practices. These trade regulation rules have the force of law and violations are treated in the same manner as a violation of a statute.

The FTC will concern itself with individual consumer problems only if it believes that investigation will lead to discovery of a pattern of commercial misconduct. The FTC has considerable discretion in determining what constitutes an unfair business practice or method of competition, and violations are enjoined by a "cease and desist" order to terminate the offending practices. These orders rarely help the individual consumer as they usually do not provide for recovery of individual losses. Moreover it can take 3-5 years to obtain a final order, during which the unlawful practice may continue.

The FTC also has the authority to order corrective advertising and to require businesses to substantiate advertising claims by submitting pre-existing evidence of the validity of the claim. If the advertising claims are not substantiated by documentation, the FTC may obtain a cease and desist order against the advertiser.

In 1975, the Federal Trade Commission Improvement Act, (Title II of the Magnuson-Moss Warranty Act) significantly expanded the FTC's ability to seek relief for injured consumers by authorizing the Commission to initiate civil suits (previously initiated only by the Department of Justice) and by allowing the FTC to seek restitution and compensatory damages for consumer losses. The FTC, however, is not considered the best vehicle to handle individual consumer complaints. The injured consumer should look to state law and enforcement officials for aid.

The FTC also enforces the Fair Packaging and Labeling Act, aimed at preventing unfair and deceptive packaging and labeling of certain commodities, and the Consumer Leasing Act of 1976, which requires disclosures of rights and obligations of potential rental customers before they sign a lease for personal property. The commission also enforces other consumer credit laws which are discussed under a separate heading.

B. *State and Local Consumer Protection Law*

Most states have enacted laws to eliminate unfair or deceptive trade practices. They are enforced either by the state's Attorney General or Consumer Protection Agency.

The consumer protection or anti-fraud law follows a general pattern throughout the nine-state region. In every state the law prohibits unfair competition and deceptive acts or practices in the sale of goods, and gives the state Attorney General the right to bring suit against violators for injunctions or civil penalties; in Connecticut, the Commissioner of Consumer Protection enforces the Consumer Protection Law. In Vermont, Massachusetts, Pennsylvania, New Hampshire, and Connecticut the Attorney General or Commissioner may promulgate regulations defining the unfair or deceptive practices that will constitute violations of the law.

Finally, in all the states, except New York, individual consumers who have been harmed by unfair or deceptive acts or practices may bring a civil suit against the seller. Thus, purchasers of solar equipment, if they have been cheated or defrauded, can rely on the Consumer Protection Acts of their states to make amends. They may urge the state Attorney General to bring suit, or may file their own action to enforce the state law. Widespread or prevalent trade practices may draw the attention of the Federal Trade Commission.

These Federal and State Consumer Protection Laws appear to offer sufficient protection to the consumer of solar equipment for after-the-fact prosecution of frauds or deceptions. No new solar-specific consumer protection legislation appears warranted. However, equipment standards, certification and system evaluation, and possibly building codes may be necessary to serve as before-the-fact information mechanisms to help the solar consumer make an informed purchase. In fact, these innovations could be more significant than consumer laws in protecting the consumer from unfair or deceptive trade practices.

2) *Consumer Credit Law*

To protect consumers who obtain credit via a retail installment loan, the federal government has imposed strict regulations pursuant to the Consumer Credit Protection Act of 1968, 15 USC 1601 (popularly known as the "Truth in Lending Act").

Title I of this Act requires the complete disclosure of all finance charges or other charges through a total annual percentage rate figure. It also regulates consumer credit sales, loans, advertising, and billing. This law is implemented by Regulation Z of the Federal Reserve Board, 12 CFR 226.1 - 226.15. The Federal Trade Commission enforces the other requirements of the "Truth in Lending Act" with respect to issuance of credit cards, finance companies, retailers and other credit vehicles.

Other Federal consumer credit laws which are enforced by the FTC include:

(1) The Fair Credit Reporting Act, which is aimed at protecting consumers against dissemination of inaccurate credit reports. The Act gives consumers the right to know what information is contained in their credit reports, and to have any erroneous information corrected.

(2) The Fair Credit Billing Act, which gives consumers procedural rights when alleging errors in billing statements.

(3) The Equal Credit Opportunity Act, which protects the public from denial of credit based on sex, marital status, age, religion, national origin or the receipt of public assistance.

Each of the nine states in the northeast region has enacted similar consumer credit laws regulating retail installment sales; maximum interest rate (usury) laws; disclosure requirements for the interest rate on consumer loans; defaults; rights to sue; and home sales and solicitation. Again, the purchaser of solar equipment who obtains the money to finance the acquisition of the solar system through a regulated consumer credit vehicle can rely on this existing body of concurrent federal and state law for protection. No changes or additional legislation in this area seems necessary at this time to protect the solar consumer in particular.

C. CONSUMER PROTECTION/CONSUMER CREDIT

CONNECTICUT
- C.G.S. 42-110a (unfair trade practices regulation)
- C.G.S. 36-393-417j (truth in lending law)
- C.G.S. 42-83-143 (retail installment sales and financing)
- C.G.S. 42-136-43 (home solicitation sales)
- C.G.S. 36-1-9 (usury)

MAINE
- M.R.S. 17A:901-906 (consumer fraud is a crime)
- M.R.S. 10:206-214 (unfair trade practices)
- M.R.S. 9:228 (legal interest rate (usury law))
- M.R.S. 9:3721-4029 (home repair financing act)
- M.R.S. 9A:1.101-7-127 (Maine consumer credit code)
- M.R.S. 32:4661-6470 (home solicitation)

MASSACHUSETTS
- M.G.L. 93A (The Consumer Protection Act)
- M.G.L. 140C:1-13 (truth in lending law)
- M.G.L. 93:48 (home solicitation)
- M.G.L. 255D:1-32 (retail installment sales and services)
- M.G.L. 271:49 (usury law)

NEW HAMPSHIRE
- N.H.R.S. 358A:1-13 (Consumer Protection Act)
- N.H.R.S. 399-B:1-8 (truth in lending)
- N.H.R.S. 361-B1-3 (retail selling)
- N.H.R.S. 320:1-22 (home solicitation)
- N.H.R.S. 366:1 (usury)
- N.H.R.S. 358-C (unfair collection practices)

NEW JERSEY
- N.J.R.S. 56:8-2.1-2.5 (consumer fraud)
- N.J.R.S. 17:3B-1-3 (truth in lending)
- N.J.R.S. 17:16C-1-61 (retail installment sales
- N.J.R.S. 17:16C-61.1-61.9 (home solicitation)
- N.J.R.S. 17:16C-62-103 (Home Repair Financing Act)
- N.J.R.S. 31:1-(1-6) (usury)

NEW YORK
- Executive Law S. 550 (State Consumer Protection Board)
- The General Business Law S. 349 (Deceptive Acts and Practices)
- Banking Law S. 14a (rate of interest)
- Banking Law S. 108 (personal loan)
- Banking Law Ch. 2 491-502 (sales finance companies)
- General Obligations Law S. 501-901, 1301 (usury)
- Personal Property Law S. 401-422 (Retail Installment Sales Act)
- Personal Property Law S. 425-431 (home solicitation)

PENNSYLVANIA

73 P.S. 201-1-9.2 (Unfair Trade Practices and Consumer Protection Law)
41 P.S. S. 101-604 (truth in lending/usury)
69 P.S. S. 1101-2303 (Goods and Services Installment Sales Act)
69 P.S. (500-101)-(500-602) (home improvement financing)
7 P.S. 6202, 6 & 17.1 (Consumer Discount Company Act)

RHODE ISLAND

R.I.G.L. 6-13.1-1-6-13.1-15 (unfair trade practices)
R.I.G.L. 6-26-(1-10) (interest - usury)
R.I.G.L. 6-27-(1-8) (Truth in Lending and Retail Selling Act)
R.I.G.L. 6-28-(1-8) (Home Solicitation Sales Act)

VERMONT

9 V.S.A. 2451-2461 (consumer fraud)
5 V.S.A. 1301-1306 (banking and insurance/finance charges)
9 V.S.A. 41-50 (interest rates)
9 V.S.A. 2401-2410 (retail installment sales)

D. Regulation of Business and Competition

Solar manufacturers and businesses, just as any other business, should be aware of and comply with the federal antitrust laws and state trade regulation statutes. In this respect the law presents no new or unusual barriers to the solar industry.

FEDERAL TRADE REGULATION

The federal antitrust law pre-empts state laws dealing with competition and monopoly as they apply to interstate commerce; state law will still be valid for regulation of intrastate commerce. The federal antitrust statutes are:

1. The Sherman Antitrust Act, 15 U.S.C. 1 et seq., which prohibits (a) contracts, combinations, or conspiracies to restrain trade, and (b) monopolies.

2. The Federal Trade Commission Act, 15 U.S.C. S. 41 et seq., which prohibits unfair methods of competition or unfair or deceptive acts or practices. The FTC determines what acts are prohibited.

3. The Clayton Act, 15 U.S.C. S. 12 et seq., which prohibits (a) sales on the condition that the purchaser not deal with competitors of the seller (i.e., exclusive dealing or tie-in arrangements), (b) anticompetitive mergers, (c) interlocking directorates, and (d) price discrimination (added by the Robinson-Patman Act).

These laws are enforced by the Antitrust Division of the Department of Justice, and the Bureaus of Competition and Consumer Protection of the FTC.

The specific forms of conduct which solar energy businesses should be aware of and avoid include:

1. *Price-Fixing* — Any price-fixing between a solar manufacturer and its dealers or distributors or among competitors is per se illegal, irrespective of motive or method of agreement.

2. *Territorial and Customer Restrictions* — Horizontal agreements among competing solar businesses to divide up markets or to allocate customers will be per se antitrust violations. However, vertically imposed territorial restrictions between a solar manufacturer and his dealers are judged by a "rule of reason" analysis to discern their reasonableness and effects on competition. The U.S. Supreme Court has recently held in *Continental T.V., Inc. v. G.T.E.-Sylvania, Inc.*, 433 U.S. 36 (1977) that under the proper circumstances exclusive dealerships, franchises, or agency agreements are reasonable restraints on trade and therefore legal. Thus a solar manufacturer can now appoint exclusive dealers (or grant franchises) for particular areas to aggressively market its products, without competition from other dealers in the same area.

3. *Tie-In Arrangements* — Tie-ins, where a solar business, selling a solar energy system or service, conditions the sale upon the buyer's purchase of a separate or distinct product, are illegal.

4. *Boycotts* — Horizontal refusals to deal, where a group of solar manufacturers refuse to deal with, for example, a particular dealer or supplier, are, per se, illegal.

5. *Reciprocal Dealing* — If a solar business uses its purchasing power to force a supplier to purchase reciprocally, the solar business's products, then this will be judged by the rule of reason as to whether it is an antitrust violation.

6. *Deceptive Advertising* — Unsubstantiated claims of performance or savings; untrue statements; reference to tax credits not yet enacted into law; or failure to disclose material facts will subject the solar business to FTC investigation or prosecution.

7. *Franchising* — Any solar manufacturer who decides to distribute his products by franchises, rather than by company-owned outlets, should have fair and good-faith termination and nonrenewal clauses, and should be explicit concerning the services it will provide a franchisee, and the profitability and refundability of the franchise. The FTC, showing concern for this area, issued a proposed Trade Regulation Rule on October 5, 1977, mandating disclosure requirements and prohibitions concerning franchises. Solar businesses should be aware of FTC activity in this area.

STATE TRADE REGULATION

The state laws in the nine-state region follow similar patterns of prohibiting monopolies; restraint of trade; price-fixing and discrimination; and sales below cost for anticompetitive reasons (to drive competitors out of business). However, New Hampshire, Pennsylvania, Rhode Island, and Vermont do not have explicit statutory antimonopoly or restraint of trade laws.

None of the region's states, except for Maine, have Fair Trade laws, which would prohibit a solar retailer from reselling goods received from a solar manufacturer at a lower price than stipulated by the manufacturer. Thus, the retailer is free to sell his goods at his own price.

These statutes are enforced by the Attorney General or by civil suits by the damaged party. There is no apparent need for amendment of these laws at this time, as they do not affect the solar industry in any unique or adverse way.

State Laws

D. REGULATION OF BUSINESS AND COMPETITION

CONNECTICUT

C.G.S. 35-24-45 Antitrust Act — prohibits monopolies, restraint of trade, and price discrimination

MAINE

M.R.S. 10:1101-1107 — prohibits restraint of trade and monopolies
M.R.S. 10:1151-1155 — Fair Trade Act
M.R.S. 10:1201-1207 — prohibits sales below cost

MASSACHUSETTS

M.G.L. Ch. 93:1-9 — antimonopoly and restraint of trade law — prohibits price discrimination, price-fixing, and sales below cost

NEW HAMPSHIRE

N.H.R.S. 356-1-14 — prohibits trusts to restrain trade
Constitution, Art. 83 — allows legislature to prevent monopolies and unfair business practices

NEW JERSEY

N.J.R.S. 14:3-10 — prohibits restraint of trade
New Jersey Laws of 1970, Ch. 73 — New Jersey Antitrust Act
N.J.R.S. 107:3 — prohibits retail price maintenance

NEW YORK

General Business Law S. 340-347 — prohibits monopolies and restraint of trade
General Business Law S. 369a — prohibits retail price maintenance

PENNSYLVANIA

No applicable provisions, except for prohibiting sales below cost

RHODE ISLAND

R.I.G.L. 6-13-8 — prohibits sales below cost
No other applicable statutory provisions

VERMONT

No applicable statutory provisions

E. Equipment Certification and Product Standards

In the summer of 1977, the Northeast Solar Energy Center conducted a series of workshops concerning solar commercialization, research and development, and the public interest*. In nearly all of these sessions, as well as in the workshops on banking and insurance held in early 1978, there was a consensus that a definite need exists for solar equipment testing, certification, and development of product standards (cf. Sections ID and IE, above).

Traditionally, standards for conventional heating and cooling equipment have been developed in the private sector by such groups as the American National Standards Institute (ANSI); the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE); the American Society of Testing and Materials (ASTM); Sheet Metal and Air Conditioning Contractors National Association (SMACNA); and the Solar Energy Industry Association (SEIA). The International Association of Plumbing and Mechanical Officials (IAPMO) has drafted a uniform solar energy code which is in use in some parts of the country.

*The proceedings of these workshops are available from the Northeast Solar Energy Center.

Product standards and certification can be significant in establishing user confidence in solar energy systems. They can also help accelerate solar commercialization by providing bankers, insurance underwriters, contractors, building code inspectors and consumers with guidelines as to whether a particular solar component or system is designed to meet particular performance, safety and efficiency standards.

At this early stage in the development of solar technology, these standards must be established with great care. Too strict or inflexible standards or certification processes can inhibit the development of new and innovative designs, systems, and materials. Technology might be channeled into only those designs which have been determined to be reliable and safe, even though these designs may not be the most efficient nor lead to the development of more cost-effective designs and mass production techniques. Passive solar systems, which are quite cost-effective, but which can not easily fit traditional testing and design standards, have been cited as particularly hard hit victims of the standards' emphasis on active solar collector testing design.

Consequently, there is a tension between the needs of consumers, bankers, insurers, and local officials, who want immediate development of mandatory government-imposed product or system standards and certification, and small solar manufacturers and designers who want industry, and not government, to slowly develop consensus standards. These industry-developed standards would presumably allow solar manufacturers to develop new designs and products without suffering in the marketplace because the new technique is not yet government-approved or certified. The cost of these certifications and tests will probably be paid indirectly by the consumer as part of the price of the solar systems. This could establish new financial barriers that may partly offset the incentives to solar use provided by the certification to standards. In addition, there is a possibility that some small solar manufacturers could not afford the additional cost burdens of testing and possible overdesign. This could result in the solar industry being dominated by large manufacturers.

The solar industry has taken the lead in developing such component system certification and testing methods. The Solar Energy Research and Education Foundation (SEREF), an arm of the Solar Energy Industries Association, is developing such component certification and testing methods. Under contract to the Department of Energy, SEREF is studying system reliability, desirability and safety testing procedures; testing laboratory selection; accreditation and validation procedures; design of collector ratings; designs of a label format; and development of a certification program.

On the governmental front, the U. S. Department of Housing and Urban Development has promulgated "Intermediate Minimum Property Standards for Residential Buildings." A supplement to these standards for solar heating and domestic hot water systems was issued on July 30, 1977; cf. HUD Document 4930.2, which supplements MPS 4900.1, MPS 4910.1, and MPS 4920.1.

In addition, ASHRAE 93-77 contains standards for methods of testing the thermal performance of solar collectors; ASHRAE 94-77 contains standards for testing the thermal performance of thermal storage devices; and ASHRAE 90-75 contains standards for energy conservation in new building design. The National Bureau of Standards has also issued preliminary standards for materials performance.

In the northeast region, New Jersey (Exhibit 9), Connecticut and New York have directed development of solar equipment standards to qualify installations for property tax exemptions. Maine has directed only that a system be certified as a workable solar energy system. In other regions, the State of California has developed standards for systems to qualify for its income tax credit (see footnote 10); Florida has directed the Florida Solar Energy Center to develop system standards and testing procedures, pursuant to Chapter 246, Laws of 1976; and the State of Minnesota has directed the Building Code Division of the Department of Finance to develop perfor-

mance criteria pursuant to Chapter 333, Laws of 1976 for solar systems made or sold in the state.

It is recommended that the development of solar product and system standards, testing, and certification be continued, preferably by industry working together with government. Care should be taken not to inhibit the flexibility or development of new materials, methods, systems or place excessive burdens on small solar manufacturers. This should result in helping the consumer make an informed purchase decision while not burdening him with unreasonable extra costs.

EXHIBIT 9

Excerpts from
New Jersey Department of Energy

TECHNICAL SUFFICIENCY STANDARDS FOR SOLAR ENERGY HEATING AND COOLING SYSTEMS

14A:4-1.1 Purpose and Scope

The technical sufficiency standards for solar energy systems in buildings are designed to establish minimum performance standards for the purpose of obtaining a property tax exemption pursuant to P.L. 1977, C. 256.

14A:4-1.3 Definitions

''Active solar systems'' means those systems which convert the sun's energy into thermal energy, and transport this energy to a storage device through the use of a heat transport medium such as air or a liquid. At this point, the heat is withdrawn and utilized for the purpose for which the system was designed. ''Active solar systems'' also designate those systems which convert energy directly derived from solar flux into electricity which can then be used in thermal applications.

''Passive solar heating systems'' means those systems which utilize the architecture of a building to maximize solar heat gains during the cold seasons and minimize heat gain in the hot seasons.

''Solar energy'' means energy which has recently originated in the sun, including direct and indirect solar radiation from such sources as wind.

''South'' shall be defined as falling within the 90 degree envelope from 45 degrees East to 45 degrees West of the true South.

''Thermal contact ceiling'' means a combined roof and heating and/or cooling system composed of containers filled with a liquid solution placed above the roof beams of a building, and is utilized as a heat sink for solar radiation or heat transfer medium from building to atmosphere for cooling during the daylight hours and as a thermal storage insulator during the nocturnal hours. Movable insulation is placed over the water filled containers at nght and during cold weather as a means of retaining the absorbed heat.

''Trombe wall'' means a south facing wall of the building envelope composed of a mass wall surface with exterior glazing. The mass wall functions as a heat storage device and exterior wall.

14A:4-2.1 Eligible Equipment

The following solar energy equipment is eligible for a (Property Tax) exemption as specified below:

(a) *Equipment in solar heating and/or cooling systems and hot water systems including equipment for converting, storing and transporting solar energy shall be considered eligible solar energy equipment.*

(b) *Solar energy collectors purchased or constructed for heating and/or cooling of a building or other thermal applications shall be considered eligible solar energy equipment.*

(c) *Heat transportation systems which are part of a solar heating system to be used in a building up to a thermal storage device, or until it is integrated with a conventional heating system shall be considered eligible solar energy equipment.*

(d) *Solar-electric generation devices, of which 100% of the electricity produced is utilized for thermal applications, shall be considered eligible solar energy equipment.*

(e) *Batteries used to store electricity produced by eligible solar-electric generation devices shall be considered eligible solar-energy equipment.*

(f) *Equipment of the following types in passive systems:*

(1) *Glazing material used on the designated solar surface of south facing walls in fenestrating a building as part of a design for the purpose or direct solar heat gain shall be eligible solar energy equipment based on the following equation:*

X = *Percentage of glazing contained within the designated solar surface of the south facing wall in respect to the area of that wall.*

Y = *Percentage of glazing on non-solar surfaces (north, east, west wall, and non-solar south walls) in respect to the area of those walls.*

Z = *Percentage of glazing eligible for abatement.*

$$X - Y - Z$$

The percentage of glazing eligible as solar energy equipment (Z) is then multiplied by the total increase in value due to the glazing used on only the designated solar surfaces of the south facing walls.

The product of these calculations will be the basis of the exemption for glazing considered as equipment.

(2) *Equipment such as heads, sills, and jambs used solely as bracing for glass on designated solar surfaces shall be considered eligible solar energy equipment in the same percentage as the glass.*

(3) *50% of skylights and roof glazing shall be considered eligible solar energy equipment only if such devices are used for direct solar heat gain during the daylight hours, and if capable of reducing the heat loss at night and during cold weather through the use of insulating devices.*

(4) *Glass, fiberglass, or other glazing materials used to enclose attached south facing areas such as patios, atriums, or greenhouses for purposes of entrapping solar heated air shall be considered eligible solar energy equipment provided that the warm air be circulated through the building by use of a permanently installed air movement system and that adequate provisions have been made to prevent nocturnal heat losses and cold weather heat losses through use of insulating devices.*

Equipment such as ductwork and fans used in circulating solar heated air accumulated within enclosed south facing areas such as patios, atriums, or greenhouses, shall be considered eligible solar energy equipment up to the point where such a system is integrated with a conventional heating system. Movable insulation shall be considered eligible solar energy equipment.

(5) *Material used in the construction of a mass wall of non-load bearing Trombe wall of a building shall be considered eligible solar energy equipment provided that such a wall is used solely for thermal storage. Should the mass wall of a Trombe wall be a load-bearing structural member, only 50% of the wall shall be considered eligible solar energy equipment. Should the floor of a building be utilized for the same purpose as a mass wall, 25% of the floor shall be considered eligible solar energy equipment.*

South facing glazing material used in the construction of a Trombe wall of mass floor of a building shall be considered eligible solar energy equipment in the percentage determined using the formula stated in 14A:4-3.1, f, i.

(6) *50% of the materials purchased for the construction of a thermal contact ceiling shall be considered eligible solar energy equipment.*

(7) *Insulation used to minimize heat loss largely caused by nocturnal radiation through areas used for direct solar heat gain during the daylight hours shall be considered eligible solar energy equipment.*

14A:4-2.2 Ineligible Equipment
The following materials and equipment shall not be considered eligible solar energy equipment:

(a) *Building insulation used to reduce heat lost through walls, roofs, slabs, and foundations.*

(b) *Uninsulated skylights*

(c) *Heat storage devices or delivery systems which are also utilized for other means of heating and/or cooling including back-up systems.*

(d) *Bracing equipment used as building structural members such as columns, beams, and studs.*

(e) *Exterior walls and floors constructed of masonry as a means of reducing heat loss.*

(f) *Devices such as draperies, venetian blinds, and curtains.*

(g) *Heat pumps and other refrigerators shall not be considered solar energy equipment.*

(h) *Devices used to extract and store heat generated by organic waste piles.*

(i) *Trees, shrubbery, and other forms of vegetation incorporated into a building or site design.*

(j) *Solar-powered batteries used to store electricity used to operate lighting equipment and/or household appliances.*

(k) *Retaining walls used as thermal storage devices in the case of subterranean housing.*

14A:4-3.1 Applicability of New Jersey Uniform Construction Code

Until the New Jersey Department of Energy promulgates standards for the manufacturing, sale of installation of solar components and/or systems, solar energy systems constructed or purchased for heating and/or cooling utilizing active and/or passive concepts shall comply with applicable provisions of the New Jersey Uniform Construction Code (N.J.A.C. 5:23 et seq.).

E. EQUIPMENT CERTIFICATION AND PRODUCT STANDARDS

CONNECTICUT

C.G.S. S. 16a-14, P.A. 76-409 – directs the Commissioner of Planning and Energy Policy to establish standards for solar energy systems sold in the state to make them eligible for a property tax exemption. Cf. Regulation 16a – 14-1

MAINE

M.R.S. 36:1760 (37) – directs the Office of Energy Resources to certify solar energy equipment eligible for a tax rebate from the sales tax.

NEW JERSEY

N.J.R.S. 54:4 – municipal building officials must certify a system to be a solar heating and cooling system to be eligible for property and sales tax exemptions. These standards have been developed by the N.J. Department of Energy, Cf. NJ002 Regulations Chapters 14A P[4], and 14A:5.

NEW YORK: Real Property Tax Law, S. 487, Ch. 322, Acts of 1977

The Commissioner of the Energy Office must establish standards and performance criteria for the design, construction, installation, safety, and durability of solar or wind energy systems sold or installed in the state. The system must meet these standards to be eligible for the property tax exemption.

RHODE ISLAND

RIGL Ch. 44-3-18 – solar energy systems must meet performance criteria established by the U. S. Department of Housing and Urban Development pursuant to the Solar Heating and Cooling Demonstration Act of 1974, in order to be eligible for a property tax exemption.

SOLAR ACCESS AND BUILDING SITING AND STRUCTURAL REGULATIONS

3

Northern Energy Corporation
Northeast Solar Energy Center

A. Zoning/Land Use

Zoning laws, sun rights, and building regulations all will have significant impact upon the development and use of solar energy systems. By their very nature they can raise significant legal barriers if proper judicial interpretations and legislative amendments do not evolve. They focus on property law concepts that determine whether solar collectors can be installed within the provisions of zoning and building codes, and whether the building and associated collectors are properly sited on the lot to obtain sufficient sunlight.

Moreover, these issues will not resolve themselves through economic or political changes. They are more sensitive to change or modification in the law than other solar energy barriers and incentives problems.

The power to zone is based upon the police power of the state for purposes of protecting public health, safety, and general welfare, and is delegated to local governments. Consequently, whether a solar system may be placed on a building is up to the decision of thousands of local zoning boards or building officials. In a few actual cases to date, homeowners have been prevented from installing solar equipment because of violations of the local zoning ordinances (See Exhibit 10).

Solar systems could possibly violate zoning laws by (a) exceeding height restrictions, if the roof collectors went above the maximum allowable height; (b) exceeding side yard and setback restrictions, if a solar unit were placed on the ground too close to lot boundaries; (c) exceeding density or percentage of lot area coverage restrictions, if a ground collector used up enough area to exceed the legal building-to-lot area size ratio; (d) violating accessory use limitations, if placed on the wrong part of the lot, or if out-structures are not allowed at all; (e) being characterized as a nonconforming use, in an area where zoning has been later imposed, and the nonconforming building is exempted from zoning, but no subsequent additions to the structure are allowed; (f) violating use regulations, if a residentially zoned lot is used to produce electric power; and, finally, (g) violation of aesthetic or architectural controls on style, materials, design, or color.[30]

In addition, subdivision regulations completely ignore solar energy considerations concerning orientation of streets and buildings towards the sun, and restriction of vegetation to prevent shading of the collectors.

Any of these potential zoning code violations could prevent a solar system from being installed on a building. There are, however, a number of methods of avoiding many of these zoning problems. One solution would be to enact state legislation, similar to that passed in Oregon[31] and Connecticut (See Exhibits 11 and 12). It enables municipalities to adopt ordinances permitting solar energy systems to be installed, or requires them to regulate height, location, and setback to encourage use of solar equipment and to protect and assure access to sunlight. Alternatively, localities could be instructed not to unreasonably restrict construction or retrofit of solar systems on buildings through their zoning ordinances.[32]

Zoning statutes have been suggested that would require municipalities to create three categories of solar overlay zones that would prevail over local zoning codes. These zones would either mandate use of solar energy, encourage its use, or grant exemptions from any hindering regulations.[33] Similarly, others have proposed solar radiation overlay zones that would assure homeowners access to the sun for their building if it were within the zone.[34]

On August 3 and 4, 1978, the Northeast Solar Energy Center hosted a workshop on solar access zoning and legislation that was attended by lawyers, planners and state officials active in this area.* It was the consensus of this group that all states should consider and enact enabling

*The proceedings of the workshop are available from the Northeast Solar Energy Center.

EXHIBIT 10

Albany Times Union, February 14, 1978

Colonie solar heater hassle warms up again as town acts

Richard D'Aurio's unconnected solar heater may be collecting the sun's rays in a pawnshop window soon if Colonie officials succeed in their second attempt to force him to move the unit from his front lawn.

Colonie police served D'Aurio with a summons to appear in court in November because the uninstalled unit violated town zoning statutes. The justice court appearance was adjourned because of D'Aurio's ensuing legal battle with the town.

A town building inspector visited the D'Aurio property late last week and signed a deposition stating the 22-foot long, triangular unit was located in the front yard and violated town zoning ordinances. A summons based on the most recent inspection was being prepared Monday.

According to town zoning codes, no structures are permitted in the front yard in a residential area, said Ralph Hildenbrandt, head of Colonie's building department.

D'Aurio was summoned to appear in town court in November because he failed to remove the unit from his property by Oct. 7. His attorney, Gary O'Connor, obtained a court order prohibiting the town from forcing removal of the structure while D'Aurio appealed a zoning board decision in State Supreme Court.

The Colonie Zoning Board of Appeals denied D'Aurio a variance to install the $4,000 solar energy collector. State Supreme Court Justice Roger Miner upheld the zoning board decision.

D'Aurio will not appeal Miner's January decision to the Appllate Division, said O'Connor Monday.

C.f. D'Aurio v. Board of Zoning Appeals of Colonie, N.Y. 401 N.Y. Supp. 2d 425 (1978)

OREGON LEGISLATIVE ASSEMBLY—1975 REGULAR SESSION

EXHIBIT 11

A-ENGROSSED

House Bill 2036

Ordered by the Senate April 18
(Including Amendments by House March 6 and by Senate April 18)

By order of the Speaker (at the request of the Joint Interim Committee on Environmental/Agricultural and Natural Resources)

SUMMARY

The following summary is not prepared by the sponsors of the measure and is not a part of the body thereof subject to consideration by the Legislative Assembly. It is an editor's brief statement of the essential features of the measure.

Adds solar energy consideration to comprehensive planning; allows county planning commission to recommend ordinances protecting and assuring access to incident solar energy and governing height and setback of buildings; allows city planning commission to recommend zoning ordinances limiting or conditionally limiting aspects of buildings and to recommend energy saving incentives. Permits city council to consider solar energy potential in regulating buildings and open spaces. Requires council to exercise powers so as to preserve constitutional rights.

NOTE: Matter in **bold face** in an amended section is new; matter [*italic and bracketed*] is existing law to be omitted; complete new sections begin with **SECTION.**

1 A BILL FOR AN ACT

2 Relating to planning and zoning; amending ORS 215.055, 215.110, 227.090
3 and 227.230.

4 **Be It Enacted by the People of the State of Oregon:**

5 Section 1. ORS 215.055 is amended to read:

6 215.055. (1) Any comprehensive plan and all zoning, subdivision or
7 other ordinances and regulations authorized by ORS 215.010 to 215.233
8 and 215.402 to 215.422 and adopted prior to the expiration of one year
9 following the date of the approval of state-wide planning goals and
10 guidelines under ORS 197.240 shall be designed to promote the public
11 health, safety and general welfare and shall be based on the following
12 considerations, among others: The various characteristics of the various
13 areas in the county, the suitability of the areas for particular land uses
14 and improvements, the land uses and improvements in the areas, trends
15 in land improvement, density of development, property values, the needs
16 of economic enterprises in the future development of the areas, needed
17 access to particular sites in the areas, natural resources, **including inci-**
18 **dent solar energy and utilization**, of the county and prospective needs for
19 development **and utilization** thereof, and the public need for healthful,
20 safe, aesthetic surroundings and conditions.

21 (2) Any plan and all zoning, subdivision or other ordinances and reg-
22 ulations authorized by ORS 215.010 to 215.233 and 215.402 to 215.422 and
23 adopted after the expiration of one year after the date of the approval
24 of state-wide planning goals and guidelines under ORS 197.240 shall be
25 designed to comply with such state-wide planning goals and any subse-
26 quent revisions or amendments thereof.

27 (3) In order to conserve natural resources of the state, any land use
28 plan or zoning, subdivision or other ordinance adopted by a county shall
29 take into consideration lands that are, can or should be utilized for sources
30 or processing of mineral aggregates.

31 Section 2. ORS 215.110 is amended to read:

32 215.110. (1) The commission may recommend to the governing body
33 ordinances intended to carry out part or all of the comprehensive plan

1 adopted by the commission. The ordinances may provide, among other
2 things, for:
3 (a) Zoning,
4 (b) Official maps showing the location and dimensions of, and the
5 degree of permitted access to, existing and proposed thoroughfares, ease-
6 ments and property needed for public purposes,
7 (c) Preservation of the integrity of the maps by controls over con-
8 struction, by making official maps parts of county deed records, and by
9 other action not violative of private property rights, and
10 (d) Conservation of the natural resources of the county.
11 (2) The commission may also recommend to the county governing
12 body ordinances renaming public thoroughfares, **protecting and assuring**
13 **access to incident solar energy,** numbering property, and controlling sub-
14 division and other partitioning of land and the location, construction, main-
15 tenance, repair and alteration of buildings, **including height and setback,**
16 and other structures.
17 (3) The governing body may enact, amend or repeal ordinances rec-
18 ommended by authority of this section, together with whatever amend-
19 ments it believes the public interest requires. The governing body may
20 also enact, amend or repeal with reference to any subject mentioned in
21 subsection (1) of this section, an ordinance on which the governing body
22 initiates action, provided that it first requests from the commission a re-
23 port and recommendation regarding the ordinance and allows a reason-
24 able time for submission of the report and recommendation. The gov-
25 erning body may also enact, amend or repeal with reference to any sub-
26 ject mentioned in subsection (2) of this section, an ordinance on which
27 the governing body initiates action, regardless of whether the county
28 has a planning commission; provided that, in the event the county has
29 a planning commission, the governing body first requests from the com-
30 mission a report and recommendation regarding the ordinance and al-
31 lows a reasonable time for submission of the report and recommendation.
32 (4) The governing body may refer to the legal voters of the county

1 for their approval or rejection an ordinance or amendments thereto for
2 which subsection (3) of this section provides. If only a part of the county
3 is affected, the ordinance or amendment may be referred to that part only.
4 (5) An ordinance enacted by authority of this section may prescribe
5 fees and appeal procedures necessary or convenient for carrying out the
6 purposes of the ordinance.
7 (6) No retroactive ordinance shall be enacted under the provisions of
8 this section.
9 Section 3. ORS 227.090 is amended to read:
10 227.090. Except as otherwise provided by law, the commission may:
11 (1) Recommend and make suggestions to the city council and to all
12 other public authorities concerning laying out, widening, extending, park-
13 ing and locating of streets, sidewalks and boulevards, relief of traffic
14 congestion, betterment of housing and sanitation conditions and estab-
15 lishment [*of zones of districts limiting*] **of zoning ordinances limiting**
16 the use, height, area and bulk of buildings and structures.
17 (2) Recommend to the city council and all other public authorities
18 plans for regulation of the future growth, development and beautifica-
19 tion of the municipality in respect to its public and private buildings and
20 works, streets, parks, grounds and vacant lots, and plans consistent with
21 future growth and development of the city in order to secure to the city
22 and its inhabitants sanitation proper service of all public utilities, **includ-**
23 **ing appropriate public incentives for overall energy conservation and**
24 harbor, shipping and transportation facilities.
25 (3) Recommend to the city council and all other public authorities
26 plans for promotion, development and regulation of industrial and eco-
27 nomic needs of the community in respect to private and public enterprises
28 engaged in industrial pursuits.
29 (4) Advertise the industrial advantages and opportunities of the
30 municipality and availability of real estate within the municipality for
31 industrial settlement.
32 (5) Encourage industrial settlement within the municipality.
33 (6) Make an economic survey of present and potential possibilities of
34 the municipality with a view to ascertaining its industrial needs.

1 (7) Study needs of existing local industries with a view to strength-
2 ening and developing local industries and stabilizing employment con-
3 ditions.
4 (8) Do and perform all other acts and things necessary or proper to
5 carry out the provisions of ORS 227.010 to 227.180.
6 (9) Study and propose in general such measures as may be advisable
7 for promotion of the public interest, health, morals, safety, comfort, con-
8 venience and welfare of the city and of the area six miles adjacent thereto.
9 Section 4. ORS 227.230 is amended to read:
10 227.230. (1) The council may by ordinance regulate, restrict and seg-
11 regate the location of industries, the several classes of business, trades
12 or callings, the location of apartment or tenement houses, clubhouses,
13 group residences, two family dwellings, single family dwellings and the
14 several classes of public and semipublic buildings, and the location of
15 buildings or property for specified uses, and may divide the city into dis-
16 tricts of such number, shape and area as the council may deem best suited
17 to carry out the purposes of ORS 227.220 to 227.280, subject to the provi-
18 sions of ORS 227.250 and 227.260.
19 (2) The council may place reasonable regulations and limitations up-
20 on the height**, setback** and bulk of buildings erected after May 29, 1919,
21 and regulate and determine the area of yards, courts and other open
22 spaces having due regard of the use and occupancy **of the land and may**
23 **also consider the site slope and tree cover, with regard to solar exposure**
24 in such case. **The council shall not unreasonably restrict construction where**
25 **site slope and tree cover make incident solar energy collection unfeasible,**
26 **except an existing solar structure's sun plane shall not be substantially**
27 **impaired.**
28 (3) In order to conserve natural resources of the state and the pros-
29 pective needs for development thereof, any land use zoning ordinance
30 adopted by a city shall take into consideration lands that are, can or
31 should be utilized for sources or processing of mineral aggregates.
32 **(4) The powers given in this section shall be so exercised as to preserve**
33 **constitutional rights.**

EXHIBIT 12

Substitute House Bill No. 5797

PUBLIC ACT NO. 78-314

AN ACT CONCERNING INCLUSION OF ENERGY CONSIDERATIONS IN LOCAL PLANNING AND ZONING FUNCTIONS.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. Section 8-2 of the general statutes, as amended by section 1 of public act 77-509, is repealed and the following is substituted in lieu thereof:

The zoning commission of each city, town or borough is authorized to regulate, within the limits of such municipality, the height, number of stories and size of buildings and other structures; the percentage of the area of the lot that may be occupied; the size of yards, courts and other open spaces; the density of population and the location and use of buildings, structures and land for trade, industry, residence or other purposes, and the height, size and location of advertising signs and billboards. Such zoning commission may divide the municipality into districts of such number, shape and area as may be best suited to carry out the purposes of this chapter; and, within such districts, it may regulate the erection, construction, reconstruction, alteration or use of buildings or structures and the use of land. All such regulations shall be uniform for each class or kind of buildings, structures or use of land throughout each district, but the regulations in one district may differ from those in another district, and may provide that certain classes or kinds of buildings, structures or use of land are permitted only after obtaining a special permit or special exception from a zoning commission, planning commission, combined planning and zoning commission or zoning board of appeals, whichever commission or board the regulations may, notwithstanding any special act to the contrary, designate, subject to standards set forth in the regulations and to conditions necessary to protect the public health, safety, convenience and property values. Such regulations shall be made in accordance with a comprehensive plan and shall be designed to lessen congestion in the streets; to secure safety from fire, panic, flood and other dangers; to promote health and the general welfare; to provide adequate light and air; to prevent the overcrowding of land; to avoid undue

(Note: Sections 3 (Planned unit developments), 4 (Subdivision regulations) and 5 (Regional planning agencies) not included, as the language is similar in all these sections)

concentration of population and to facilitate the adequate provision for transportation, water, sewerage, schools, parks and other public requirements. Such regulations shall be made with reasonable consideration as to the character of the district and its peculiar suitability for particular uses and with a view to conserving the value of buildings and encouraging the most appropriate use of land throughout such municipality. Zoning regulations may be made with reasonable consideration for the protection of historic factors and may provide that proper provision be made for sedimentation control, and the control of erosion caused by wind or water. SUCH REGULATIONS MAY ALSO ENCOURAGE ENERGY-EFFICIENT PATTERNS OF DEVELOPMENT, THE USE OF SOLAR AND OTHER RENEWABLE FORMS OF ENERGY, AND ENERGY CONSERVATION. Such regulations shall not prohibit the continuance of any nonconforming use, building or structure existing at the time of the adoption of such regulations. Any city, town or borough which adopts the provisions of this chapter may, by vote of its legislative body, exempt municipal property from the regulations prescribed by the zoning commission of such city, town or borough; but unless it is so voted municipal property shall be subject to such regulations.

Sec. 2. Subsection (b) of section 8-13d of the 1977 court reorganization supplement to the general statutes is repealed and the following is substituted in lieu thereof:

(b) Such regulations shall establish standards governing the density, or intensity of land use, in a planned unit development. Such standards shall (1) take into account that the density, or intensity of land use, otherwise allowable on the site under existing zoning regulations enacted pursuant to chapter 124, may not be appropriate for a planned unit development; (2) may vary the density, or intensity of land use, otherwise applicable to the land within the planned unit development in consideration of (A) the amount, location and proposed use of common open space; (B) the location and physical characteristics of the site of the proposed planned development [and] ; (C) the location, design and type of dwelling units; AND (D) THE OBJECTIVES OF AN ENERGY-EFFICIENT PATTERN OF DEVELOPMENT, THE USE OF SOLAR AND OTHER RENEWABLE FORMS OF ENERGY, AND ENERGY CONSERVATION; and (3)

statutes that would authorize cities and towns to zone to encourage use of solar energy, and to pass subdivision control ordinances to protect solar access in new developments. Thus the builder, before he received approval of his comprehensive subdivision plan, would have to demonstrate that the buildings were sited and oriented for proper access to the sun, and that energy conservation measures were incorporated into the building design and lot layout. Large developments, such as malls and industrial parks, should be specifically planned for solar use before the necessary permits are given.[35]

The workshop participants felt that tree and shade control regulations for existing vegetation could be a very politically sensitive issue, as people would resent government ordering their trees to be cut down. The group cautioned about the practicality and advisability of such bylaws.

Other zoning and subdivision techniques have also been suggested, including contract, compensation and incentive zoning; transferable development rights; open space laws; condemnation approaches; mandatory solar-use zones; and planned unit development designs.[36]

The American Society of Planning Officials has been working on zoning and planning techniques to remove barriers to the use of solar energy. Guidebooks for local building and zoning officials, containing detailed site planning and regulating solar access via zoning and subdivision controls, scheduled for release in late 1978, should be prime resources on this issue.

All of the nine states in this region have delegated to localities, the power to zone, but only Connecticut has specific provisions encouraging the use of solar energy (Exhibit 12). This lack of specific statutory enabling legislation in the other states could work to the disadvantage of solar energy. There is nothing to prevent conservative local zoning or building officials from ruling against an installation of solar energy equipment because of technical violations of the zoning code, or architectural review boards and historical commissions ruling out solar systems for aesthetic reasons. Consequently, state laws should be enacted directing localities to amend their zoning laws to allow for and encourage installation of solar equipment, and to specifically prevent discretionary boards from disapproving solar applications on aesthetic, historical, or other grounds not related to public health and safety.

Finally, some of the states in the region have enacted land use planning laws, such as Vermont's Act 250, which could be used as an incentive for installation of solar in large land developments (malls and industrial parks) that are subject to these laws. Amendments should be placed before the state legislatures requiring solar planning and orientation to be added as a factor that must be satisfied before a development permit could be issued.

State Law

A. ZONING

CONNECTICUT

C.G.S.A. 8-1 through 8-14 – Zoning Enabling Act

C.G.S.A. 22a – Environmental Policy Act

C.G.S.A. 8-2, P.A. 77-509, authorizing zoning commissions, planned unit developments and regional planning agencies to include provisions to encourage the use of solar and other renewable forms of energy, and energy conservation.

P.A. 78-262 – establishing a state energy policy to reduce energy consumption and to utilize renewable energy resources such as solar and wind to the maximum practical extent.

MAINE

M.R.S.A. 30:4961-4963 – Zoning Enabling Law

M.R.S.A. 38:481 – Site Location of Development Law (over 20 acres)

M.R.S.A. 12:4811 – Shoreland Zoning Law

M.R.S.A. 12:681 – Land Use Regulation Commission Law (unorganized territories)

MASSACHUSETTS

M.G.L. Ch. 40A — Zoning Enabling Act
M.G.L. Ch. 30:61-62 — Massachusetts Environmental Policy Act

NEW HAMPSHIRE

N.H.R.S 36:1 et seq. — Zoning Enabling Act

NEW JERSEY

N.J.R.S. 40:55D — Planning and Zoning Law

NEW YORK

Town Law S. 261-284 — Zoning and Building Regulations
General City Law S. 20(24) — Zoning and Building Regulations
General Municipal Law S. 239M — Zoning and Building Regulations
Village Law S. 7-710 — Zoning and Building Regulations

PENNSYLVANIA

53 P.S. 10101 — Municipal zoning
53 P.S. 10601-11012 — Municipal zoning
53 P.S. 12128, 14751-15176 — Cities of first class zoning
53 P.S. 24851 — Cities of second class zoning

RHODE ISLAND

R.I.G.L. 45-24-1 — Zoning Enabling Act
R.I.G.L. 28:1-1 — Land Use Planning Law

VERMONT

V.S.A. 24:4401-4493 — Zoning Enabling Act
V.S.A. 24:4321, 4341 — Municipal and Regional Planning Commissions
V.S.A. 10:6001-6082 — Land Use and Development Act (permits for construction on more than ten acres, or one acre in towns without zoning laws) "Act 250"

B. Sun and Wind Access

No issue has generated more interest concerning solar energy and the law than that of guaranteeing access to the sun for a building's solar collectors. If adjacent landowners construct buildings, plant trees, allow trees to grow large enough to shade the collectors, erect fences, or otherwise block the lateral sunlight, then the usefulness and efficiency of a building's solar energy system will be greatly diminished. Therefore, if there is any potential obstruction to the unit's solar access, the property owner will want to guarantee his legal right to sunlight and be able to prevent neighboring landowners from taking any action impinging on his solar access, particularly before he makes a substantial investment in solar equipment.

The law of sun rights was originally codified by the ancient English "Doctrine of Ancient Lights." This doctrine states that a property owner is entitled to sunlight across his neighbor's land if he has received that light "from the time when the memory of man runneth not to the contrary."[37] Thus, one could gain rights to the sun in England merely by using the sunlight for a long period of time. This law was enacted into statute by the "Limitation Act" of 1623, setting the time period at twenty years; it was extended to twenty-seven years by "The Right to Light Act" of 1959.[38]

The English law of sun rights is *not,* however, the law of the United States. The American case most often cited as repudiating this doctrine is *Fountainbleau Hotel Corp. v. Forty-five Twenty-five, Inc.,* 114 So. 2d 357, 181 Fla. Supp. 74 (1959). The Florida court held that the

Eden Roc hotel (in Miami Beach) could not prevent its neighbor, the Fountainbleau Hotel, from adding an additional fourteen stories, which would block the sun from reaching the Eden Roc's swimming pool during the winter. The court found that the Eden Roc had no right to the sunlight coming across its neighbor's land, and that the Doctrine of Ancient Lights was not the accepted law in the United States. The decision was based on public policy grounds, primarily because growth of American cities made the doctrine less suitable here than in England, and because there is a strong feeling in the United States that landowners must have the right to improve and build on their property with as few governmental restrictions as possible.[39]

To emphasize this point, it should be noted that Massachusetts law specifically states that no one can acquire an easement of light (i.e., right to sunlight) by mere continuance of windows overlooking another's land so as to prevent erection of a building on that land. See M.G.L. Ch. 187:1. Thus one cannot gain a sunlight easement by prescription solely by using the sunlight over time.[40]

There is some evidence, however, that shadows on solar devices may not in reality pose a major problem. Aerial photography has shown that in many communities, the roofs of the majority of houses were free of shade between 9 a.m. and 3 p.m. in all seasons.[41] It should also be noted that it is expected that most new solar installations or retrofits will take place in either new residential buildings, new subdivisions, or industrial buildings and industrial parks, where proper planning of building and lot layout and restriction of vegetation for solar access will obviate sun shading problems. These developments are also more likely to take place in the suburbs, where lot sizes are large and there is room to properly situate the building and the solar system. This, of course, would not be the case in a dense urban high-rise setting.[42] However, actual disputes involving sun rights are rare, and legal cases reporting decisions concerning sun access to solar collectors are non-existent. Thus there may not, in reality, be a problem that requires sun rights legislation, at least at this point in time.

Many of the participants at the Northeast Solar Energy Center's Workshop on Solar Access Legislation, held on August 3-4, 1978, felt that there was no need at this time to create sun rights by statute for a number of reasons. Some felt that preventing a neighbor from developing his property because it would obstruct a collector's solar access would be an unfair and perhaps unconstitutional burden on that neighbor. Others felt that it would be costly and time consuming to individuals to engage architects, engineers or lawyers to define the protected easements, prepare documents and argue cases before local zoning boards of appeal. Ultimately, the statutes may raise more barriers to solar energy use than they would remove. Others indicated that new solar access laws or regulations would be too complex for building and zoning officials to properly enforce, and would cause litigation as to their application, reasonableness or constitutionality.

The proponents of sun rights legislation at the workshop emphasized the severity of the energy problem in the United States, and the need for government to give incentives to induce the maximum use of solar energy. Among these incentives would be statutes to protect those who may lose their investment in solar energy by having their solar collectors shaded. The legislation would thus have a beneficial impact on the entire solar market.

In examining the need for the creation of sun rights, we must consider the possibility that these laws might represent an unconstitutional taking of property rights without just compensation, a violation of the Fifth and Fourteenth Amendments of the United States Constitution. This situation could arise when a sun rights statute prohibits a property owner from building on his land because the new structure would shade his neighbor's solar collector. This could cause him the loss of valuable property development rights. Whether or not this would be an unconstitutional taking without just compensation must be considered in light of the decision of the U.S. Supreme Court in *Penn Central Transportation Company v. City of New York,* — U.S. — No. 77-444, decided June 26, 1978. The Court held that the City of New York could prohibit the building of an office tower over the Grand Central Terminal Building by designating it an historic landmark.

Despite the fact that the Penn Central Company lost millions of dollars in valuable property development rights, the court found there was sufficient public purpose in historic preservation, and not such a significant economic loss to the company or diminution of value of the property to constitute a taking, and thus no compensation was necessary (even though transferable development rights were given to the company).

This case could consequently serve as strong precedent to uphold the constitutionality of sun rights legislation.

In addition to the "taking" issue, another constitutional question concerning the creation of sun rights would be whether this would be a reasonable application of the state's police power, particularly in light of the fact that creation of these rights will directly benefit only a limited number of individuals, and not the public in general. If creation of these rights would constitute a valid public purpose, then why not have everyone protected and granted sun rights? Otherwise, under a permit system statute, the individual who puts up his collector first, gains sun rights at the expense of another individual (his neighbor) who loses valuable property development rights. If it can be construed that creation of sun rights confers a benefit on relatively few individuals, and not a general system of benefits for the whole community, then this would arguably be an unreasonable application of the state's police power.

The debate as to how far the state can restrict or regulate the use of private property before there is a "taking" which requires compensation, on the one hand, and what is reasonable use of the police power, on the other, is a continuing legal thicket. It is unlikely to be settled in favor of the constitutionality of solar access legislation, without much litigation, cost and delay.[43]

There have been a number of approaches suggested to create sun rights. A Massachusetts bill (H 5711) would create a solar energy building permit system, which preserves solar access once a permit for a particular solar window is given. A New York bill (S. 8561-A) requires registration of sun rights and preserves solar access as it existed at the time of registration. A California bill (A.B. 3250)* invalidates contracts, deeds and local ordinances prohibiting solar energy systems (with exceptions); validates solar easements; authorizes localities to plan and zone for the solar access; and requires new subdivisions to provide for solar access to each parcel. Another California bill (A.B. 2321)* prohibits any person to plant or allow any tree or other vegetation to grow so as to cast a shadow of greater than 10 percent over a solar collector area between 10 a.m. and 2 p.m.

Other approaches, such as that taken in the New Mexico statute, have been suggested. It states that in disputes involving sun rights, priority in time shall take precedence. A Minnesota bill (not enacted) would have granted an easement for sunlight to owners of solar heated and cooled buildings, and neighboring property owners would not be permitted to erect any object that would interfere with the solar system.[44] This approach would appear to be based upon the prior appropriation doctrine of water rights law, found primarily in the western states. Close analysis of this theory, however, finds it to be impractical in application to sun rights.[45] Use of the common law remedies of public and private nuisance suits; trespass suits; and oil and gas law analogies have been examined, and also found to be not useful or feasible in the sun rights area.[46]

Even if statutes creating sun rights are not passed, there are a number of private legal remedies to protect access to a solar collector. The most feasible method would be to purchase or acquire an express negative easement of sunlight from across a specified sector of your neighbor's land. The agreement should (a) be in writing, (b) state the money or consideration given, (c) specify the vertical and horizontal angles of the easement, (d) specify the length of time it will be in effect, (e) state any other terms or conditions under which it is given, (f) specify that the easement is appurtenant, or runs with the land, to burden all future owners of the affected

* Signed into law, September, 1978

properties, and, finally, (g) the easement must be recorded in the applicable registry of deeds to be effective.

Six states have already passed statutes specifically providing for the recognition of solar easements,[47] and specifying what they must contain. The Kansas statute and the American Bar Foundation's suggested statute are found in Exhibits 13 and 14 respectively.

Another private legal approach which is particularly useful for new subdivisions, malls, and industrial parks is the use of restrictive convenants. A restrictive covenant is a promise involving land, made between property owners. Recorded in the registry of deeds, it is placed in the deed of every benefited and burdened estate.

Traditionally, restrictive covenants have been used to control aesthetic, design, or uses of the land or the buildings in a specified area for the mutual benefit of all the property owners, e.g., that neon lights will not be put on the outside of a house, or that the homeowners will maintain a private pond for their own use. In the solar area, new subdivisions can incorporate in every deed, a restrictive covenant to guarantee each house's solar access. The covenants could be worded similar to a solar easement, and could specify generous setback requirements, building height limitations, or limits on trees, fences, and other structures. Large, new subdivisions should be required by state law to provide such agreements.[48]

If the restrictive covenant is included in every deed, it will be enforceable against future purchasers. It is critical, however, that the restrictions be written in clear, precise language, in order to prevent future purchasers from arguing that they were not given adequate notice, and were therefore deprived of their right of due process.

The public remedies to the problem of guaranteeing solar access have been discussed in Section III A, Zoning and Land Use. These include adoption of state laws authorizing localities to amend their zoning ordinances to permit or encourage solar energy systems; creating solar overlay zones; requiring new subdivisions to be designed to facilitate solar installations; and proper land use planning to encourage use of solar energy.

A good example of a local zoning ordinance that protects solar access by zoning and planning mechanisms rather than by explicit creation of solar access rights, can be found in Davis, California. Also see Section 14-58 of the zoning ordinance of Colorado Springs, Colorado which denies a building permit to any building that would infringe upon a previously, privately negotiated airspace solar easement protecting the sun access of a solar collector.

None of the nine states in the region has passed laws creating sun rights; only Connecticut has enacted a statute authorizing zoning, planning and subdivision controls to protect solar access (see Exhibit 12). However, the Environmental Law Institute and the American Society of Planning Officials have been examining in depth, the legal and planning aspects of solar access protection. Their findings, model statutes, and handbook for local zoning officials, are worth close examination by the states, and should be available by late 1978.

EXHIBIT 14

AN ACT TO AUTHORIZE SOLAR–SKYSPACE EASEMENTS (SS 200)

Section 101. Declaration of Policy

(a) The legislature finds and declares that the use of solar energy systems (1) reduces consumption of irreplaceable fossil fuels; (2) reduces requirements for capital, land, water, and other resources needed for central-station generation of electricity; (3) reduces air and water pollution resulting from the use of conventional energy sources; (4) requires a source of auxiliary energy, which is not always available at reasonable rates and conditions without imposing adverse effects on users of conventional energy systems; (5) is compatible with public utility operations; (6) requires effective legislation and efficient administration of state and local programs to be of greatest value to the citizens of this state; and (7) is of such importance to the public health, safety, and welfare that the state should take appropriate action to encourage its use.

(b) It is the purpose of this statute (1) to promote the public health, safety, and welfare by minimizing the detrimental environmental and land-use effects caused by production and use of conventional energy sources through the encouragement of widespread use of solar energy systems; (2) to match the demands for auxiliary energy needed by users of solar energy systems with the supplies of conventional energy; (3) to reduce financial barriers that might inhibit use of solar energy systems; (4) to increase public awareness of how solar energy systems can be used to enhance the public health, safety, and welfare; and (5) to provide for fair and timely administrative proceedings on issues related to use of solar energy systems.

Section 102. Definitions

Solar energy system: A complete design or assembly consisting of a solar energy collector, an energy storage facility (where used), and components for the distribution of transformed energy (to the extent they cannot be used jointly with a conventional energy system). Passive solar energy systems are included in this definition but not to the extent that they fulfill other functions, such as structural and recreational.

[Optional for certification] The definition includes only those systems which are certified by the [official/agency] or which meet criteria established by the [official/agency].

Solar energy: Radiant energy (direct, diffuse, and reflected) received from the sun at wavelengths suitable for conversion into thermal, chemical, or electrical energy.

Source: Thomas, Miller, and Robbins, "Overcoming Legal Uncertainties About Use of Solar Energy Systems," American Bar Foundation, January 1978, pp. 44-46.

Section 103. Creation and Termination of Solar-Skyspace Easements

Solar-skyspace easements are interests in real property which may be acquired and transferred and which must be recorded and indexed by the [registrar of deeds] as are other conveyances of interests in real property. Solar-skyspace easements shall run with the land or lands benefited and burdened and shall terminate upon the conditions stated therein or by court decree based upon abandonment or changed conditions, but not sooner than [10] years after their creation unless expressly stated therein or otherwise negotiated by all owners of benefited and burdened parcels.

A recorded instrument in the following form is sufficient to create a solar-skyspace easement.

Solar-Skyspace Easement

Section 1. Estates Burdened and Benefited by the Solar-Skyspace Easement

[Grantor(s)] hereby conveys, grants, and warrants to [Grantee(s)] for the sum of [$______] a negative easement to restrict in accordance with the following terms the future use and development of the real property of Grantor(s) recorded as follows with the [registrar of deeds] of [County]:

The solar energy collector(s) for which solar skyspace is to be protected [is/are/will be] at the following location(s) on the real property of Grantee(s) recorded as follows with the [registrar of deeds] of [County]:

The boundaries of the solar skyspace for the solar collector(s) of Grantee(s) are as follows:

Section 2. Conditions of the Easement

[Alternative (a)] No structure, vegetation, or activity or land use other than the ones which exist on the effective date of this easement and which are not required to be removed herein or excepted herein shall cast a shadow on the solar energy collector(s) of Grantee(s) described above during the times specified in this section. Exceptions are utility lines, antennas, wires, and poles that in the aggregate do not obstruct more than 1 percent of the light that otherwise would be received at the solar energy collector(s) and [other exceptions].

[Optional] A shadow shall not be cast from [3 hours] before noon to [3 hours] after noon from [September 22 through March 21] and from [4 hours] before noon to [4 hours] after noon from [March 22 through September 21], when all times refer to mean solar time.

[Alternative (b)] No structure, vegetation, or activity or land use other than the ones which exist on the effective date of this easement and which are not required to be removed herein or excepted herein shall penetrate the airspace at a height greater than [_____] over the [above-described real property of Grantor(s)/following areas of the above described real property of the Grantor(s) [__________]] with the exception of [__________].

Section 3. Effect and Termination

Burdens and benefits of this easement are transferable and run with the land to subsequent grantees of the Grantor(s) and of the Grantee(s). This solar-skyspace easement shall remain in effect until use of the solar energy collector(s) described above is abandoned, but not sooner than [10 years] after creation of this easement, or until the Grantee(s) and Grantor(s) or their successors in interest terminate it.

Section 4. Definitions

Solar energy collector: A device, structure, or part of a device or structure which is used primarily to transform solar energy into thermal, chemical, or electrial energy. It includes any space or structural components specifically designed to retain heat derived from solar energy [optional] and any mechanism that converts wind energy into electrical energy and any photosynthetic process specifically maintained to produce photosynthetic products.

Solar skyspace: The space between a solar energy collector and the sun which must remain unobstructed between [9:00 a.m. and 3:00 p.m.] mean solar time in order to permit sufficient solar energy to impinge on the collector for thermally efficient operation. *Structure:* Anything constructed or installed or portable that requires for normal use a location on a parcel of land. This includes any movable structure located on land which can be used either temporarily or permanently for housing, business, commercial, agricultural, or office purposes. It also includes fences, billboards, poles, pipelines, transmission lines, and advertising signs.

Section 5. [Optional]

The attached map showing the affected properties and the protected areas of the solar skyspace is incorporated as part of this instrument.

Section 6. [Other matters depending upon state laws: notary clause, signatures, attestation, and recordation.]

STATE LAW

The following cases would implicitly indicate that there is no Legally Protected Sun and Wind Access.

Connecticut: *Goodman v. Hammersly,* 69 Conn. 115, 36A 1065 (1897)

Maine: *Pierre v. Fernald,* 26 Me. 436 (1847); *White v. Bradley,* 66 Me. 309 (1877)

Massachusetts: *Keats v. Hugo,* 115 Mass. 207 (1874); *Tidd v. Fifty Associates,* 238 Mass. 421, 131 NE 77 (1921)

New Jersey: *Hayden v. Drucker,* 31 N.J. Eq. 217 (1879); *Engel v. Siderides,* 112 N.J. Eq. 431, 164A 397 (1933)

New York: *Parker v. Foote,* 19 Wend. 309 (N.Y., 1838)

Pennsylvania: *Rennyson's Appeal,* 94 Pa. St. 147 (1880); *Bechershoe v. Bomba,* 112 Pa. Super 294, 170 A 449 (1934)

C. Building Codes and Building Inspection

A building code is an enforceable legal document which sets forth particular specifications and requirements relating to the construction and use of buildings. Building codes incorporating solar standards could be useful in providing a reference point for builders, developers, planning boards, and building code officials. The codes could also inform the solar industry of what minimum standards of efficiency, safety, and design the solar energy system must meet before a building permit for installation can be issued. They could also provide guidelines to consumers, insurers, and lenders to inform them as to whether a particular solar energy system meets minimum legal, safety, design and efficiency requirements, and therefore is worthy of purchase. These advantages are similar to those provided by product and system standards, discussed in Section IIE, above.

There are three major model building codes and code organizations in the United States: (1) The International Conference of Building Code Officials (ICBO Uniform Building Code) which is found predominantly in the west; (2) Building Officials and Code Administrators International (BOCA Basic Building Code) which is found mostly in the east and mid-west; (3) Southern Building Code Congress (SBCC) which is found in the south. These organizations each have separate codes for plumbing, mechanical and electrical construction.

Generally, many specific consensus standards such as a mechanical code, plumbing code and gas or electrical code supplement the basic building codes. Often building codes reference these standard supplemental codes in the Appendix of the basic code, and then spell out the conditions for the applicability of the supplemental codes in the text of the basic code. For example, the BOCA Basic Building Code references over 400 standards.

Building codes have traditionally been enacted by local governments pursuant to their police powers, and thus, there are literally thousands of locally enacted building codes. In the past few years, however, the states have taken a more active role in promulgating and enforcing building codes, and in many cases providing minimum requirements which must be adopted by local jurisdictions. In a number of states, state-wide mandatory building codes have been enacted.

A problem arises in that the lack of building code uniformity may inhibit the development and deployment of solar systems as different states and localities will require differing standards to be met by the same solar system. It will be too expensive for most solar manufacturers to customize the solar systems to meet the requirements of each state or locality, and thus, in some instances, they may decide to withdraw from a particular state market.

Another problem that arises is that since few building codes incorporate standards or reference national code provisions for solar systems, the solar systems are subject to local building code officials' discretionary powers to deny a permit where there are no solar-oriented provisions that can easily be referred to, in order to determine whether the particular piece of equipment or component meets nationally recognized testing or design standards. Thus a conservative local building code official may require costly testing of the design or strength of the materials or components by the consumer before they will issue a building permit, which has presented a major problem in a number of cases. If the collector or system could meet nationally recognized standards referred to in the building code, then they could receive a building permit as routinely as any other ordinary piece of plumbing, HVAC or electrical equipment.

Moreover, local building code officials often lack the technical solar expertise to adequately enforce discretionary building code criteria. Thus their unfamiliarity with solar systems or any new solar code provisions may induce them to call for submission of expensive engineering plans before granting the building permit, thus adding a costly financial barrier to the development of the solar systems. If the denial of a building permit is opposed, the resulting appeal process also raises a significant time and cost barrier.

In a search for a solution to the building code issue, the Environmental Law Institute has extensively analyzed the potential barriers to solar energy development in each of the widely used building codes. The Institute has suggested that the best long-term solution to this problem, would be nationally recognized standards and testing procedures for solar heating and cooling systems, and a nationally recognized accreditation agency to certify compliance with these standards. The standards would be adopted by reference in all local and state building codes, and would be accepted as sufficient proof of code approval if equipment is installed in compliance with the conditions given within the building code. This would merely put solar heating and cooling systems on the same footing as gas and electric heating systems. They are automatically granted a building permit if the particular equipment meets nationally recognized standards.

The major governmental agencies and professional code standard organizations are currently involved in developing uniform solar building code provisions. The National Bureau of Standards, in conjunction with The National Institute of Building Sciences, has studied the need for, and recommended the development of, solar code provisions. The American National Standards Institute (ANSI) has established a Solar Energy Standards Development Committee (E-44) to develop a single national solar building code. As previously mentioned in Section IIE, ASHRAE has developed standards 93-77 and 94-77 for testing the thermal performance of collector and storage devices; standard 90-75 for energy conservation in new buildings; and is still developing 96P and 95P standards for testing solar heated swimming pool and domestic hot water systems. The three major organizations for building code officials, ICBO, BOCA, and SBCC, are working on consolidating their model building codes, including uniform solar code provisions. The American Society of Testing and Materials (ASTM) has developed testing methods for collector cover glass, sealants, storage containers and 30-day stagnation tests which can be referenced into solar building codes. Finally, SEREF is also developing collector testing standards, as discussed in Section IIE, above.

The Department of Energy is attempting to coordinate all these various national efforts to develop uniform solar building code provisions in its Model Solar Code Development Program. DOE intends to support the development of a model solar code through the combined efforts of all interested Federal Government agencies, and major national building code organizations and professional societies. They would be aided by representatives of consumers, labor, the solar industry, public interest groups, and state and local government. An Executive Committee on Solar Energy Code Development, composed of representatives of all these groups, will be responsible for obtaining consensus on the standards. Whatever code provisions that may be developed will not be imposed by DOE, but will be the fruits of an effort to develop a true consensus standard ac-

cepted by the solar industry, government and representatives of consumer interest. The first draft of the model code should be developed by mid-1979, and a final version agreed upon after a lengthy review process. Thereafter, it will be up to states and localities as to whether to incorporate these code provisions.

This effort to develop a uniform solar building code has been criticized by small companies manufacturing solar equipment, especially passive systems, small builders, and representatives of local government who will have to enforce the new code. Small solar companies complain that the codes will require costly testing or redesign; that the codes are overly detailed documents which are too complicated for small businessmen and unsophisticated building code officials to understand and work with; and, in general, that there is too much government regulation and interference in the solar business, with no valid end or objective. Designers of systems that do not utilize active solar collectors object to the fact that these passive and nontraditional systems cannot be easily addressed in the codes, and that this greatly discourages use of passive and innovative designs. Others feel that instead of a whole new code for solar, brief solar provisions need only be incorporated into existing building codes.

Consequently, there are definite perceived advantages and disadvantages to solar building codes. Designers of these new standards must be sensitive to the potential harm that can be done to the future of solar energy use and the solar industry as a whole before uniform solar building code standards are promulgated and enforced.

A number of states, however, have already taken the initiative to add solar specific provisions to their building codes. For example, Connecticut has added a solar section to its State Building Code (Article MCA-14), effective January 1, 1979.

California has recently enacted a statute which provides that any city or county may require new buildings that are subject to the state housing law, to be constructed to permit the future installation of solar devices, and to specify roof pitches and alignment to the sun (Chapter 670, Laws of 1976). A later enactment requires that all new state buildings over 10,000 square feet in floor area be equipped with a supplementary solar hot water heating system (Chapter 773 Laws of 1977). In Santa Clara, California, the building code gives the builder a bonus in the design of the building if solar energy is used, thus providing an incentive to voluntary installation of solar equipment.[49]

More significantly, the City of Davis, California has adopted building code provisions concerning window glazing, orientation, arrangement and movable insulation, as well as specifying solar heat gain requirements and maximum heat loss allowances. These provisions will have a positive impact on the passive solar design of buildings. (Ordinances 784, 787, and 1833.)

The Nevada building code will be revised to include standards for the design and construction of solar, wind, and non-depletable energy sources, which will apply to all newly constructed public and private buildings (Chapter 513, Laws of 1977). Minnesota has also directed the state building code division to promulgate quality and performance standards for solar energy systems (Chapter 307, Laws of 1974); pursuant to this law, the Minnesota Department of Administration has filed its "Design and Evaluation Criteria for Energy Conservation in New Buildings."

In Florida, the state building code was amended to require that all new single-family residences must be designed to facilitate future installation of solar water heating equipment (Chapter 361, Laws of 1974). This has been interpreted to require a T-pipe fitting on the inlet water pipe of the water heating unit.

A state building code can be one of the most important vehicles for requiring or encouraging use of solar energy systems. The state legislatures of Connecticut, Massachusetts, New Jersey,

New York, and Rhode Island, within this region, could direct their building code authorities to insert solar energy standards into the state codes. In the other four states, however, building regulation is left up to local city and town building codes; thus a statute would have to be designed which directed each locality to insert provisions and criteria for solar energy installations. This method would, however, result in a number of non-uniform code standards, a highly undesirable development at this time. The state law should, therefore, provide a standard set of solar building code amendments which must be adopted by the city or town as a uniform package.

State Law

C. BUILDING CODES AND BUILDING INSPECTION

CONNECTICUT: C.G.S.A. 19-395 through 19-403 - State Building Code
  Article MCA-14, Solar amendments, effective January 1, 1979.
MAINE: M.R.S.A. 5:1742 (6H) - building code for state buildings
MASSACHUSETTS: M.G.L. Ch. 23B:16-24, ch. 43:3A - State Building Code, enforced by local officials
NEW HAMPSHIRE: N.H.R.S.A. 156-1-5 - local building code authority
NEW JERSEY: N.J.R.S.A. 52-27D-119-151 - State Uniform Construction Code Act
NEW YORK: Executive Law 370-387 - State Building Code (must be accepted by municipality)
PENNSYLVANIA:
  53 P.S. 10101, 10601-1102 - municipal building regulations
  53 P.S. 4101-04 - building regulation in cities of 2nd and 3rd classes
  53 P.S. 12128, 14751-15176 - building regulation in cities of 1st class
RHODE ISLAND: R.I.G.L. 23-27 .2-1 - State Building Code
VERMONT: V.S.A. 24:311-3120 - local building codes and inspection

OTHER BARRIERS AND INCENTIVES

4

Northern Energy Corporation
Northeast Solar Energy Center

A. Public Utility Company Regulations

Solar energy systems have been viewed both as a major burden as well as a major opportunity for public utility companies. The primary issues center on questions of rate and service discrimination against solar customers; cost burdens on utilities; whether multi-user solar systems will be considered to be regulated public utilities; the opportunity for utility companies to install solar units on a mass basis in customer residences; interconnection of solar systems with the utility grid; whether solar power generators would be reliable enough to become public utilities.

Rate Discrimination

Electric customers with solar systems could experience higher rates than under traditional utility rate structures. For example, if a large number of solar users reduce their regular demand, but draw on the utility for backup service for their total heating and hot water requirements during extended periods of cloudiness or extreme cold temperatures, and these time periods coincide with the peak demand period on the utility, then the utility will have to maintain generating capacity to meet these occasional peak demands. Since this extra equipment has level capital costs which must be paid for during the extended periods when there is no demand, and thus no revenue generated, the unit costs for serving the occasional solar customer will be higher than the costs for serving the non-solar customer, who has a higher, but steadier demand. Thus the utility would charge solar users higher rates for their infrequently used back-up electrical service to make up for revenue losses resulting from the necessity to maintain capacity with high, level capital costs.[50]

Solar users may also pay proportionately higher electric bills because of the application of declining block rate structure commonly used by utilities. For example, even if the solar homeowner cuts his consumption by 70 percent, his electric bills may drop by only 50 percent, because the declining block rate imposes a higher fee for the first blocks of service, which will be the larger part of the solar building's usage. The solar user would probably not qualify for the lower electric heating or water heating rate, and this would also decrease potential savings.

The conflict between solar energy users and utilities has already surfaced in Colorado, where the Public Service Company requested a dual demand/energy rate for solar customers. The energy charge reflected the total kilowatt hours used, while the demand charge was based on maximum kilowatt demand during any fifteen-minute period, which would reflect the cost of generating capacity. It was asserted that the demand charge would be discriminatory against solar users, as they would pay a high charge for any occasional demand, despite very low total energy consumption. It was estimated that a solar system which provides seven percent of the heating needs would reduce the electric bill by 35 percent under the existing declining block rate, but only 15 percent under the proposed demand charge.[51]

These rates were not designed to discriminate against solar users, but their impact would be discriminatory in effect. Although utility regulatory provisions prevent arbitrary or unjust rates, the utility will argue that its cost structure justifies the "discriminatory" rate, if the higher rates are necessary for maintaining costly peak-use generating equipment, as well as other elements of a fair back-up charge.

In New York, both the issue of what rates to charge solar heated and cooled houses, and an electricity producing windmill was settled temporarily in favor of the solar and wind customers on an experimental basis involving a limited number of people for a limited time.

One customer had built an extremely energy efficient house with (1) a solar assisted pump to provide heating and cooling, with electric strip heaters as a backup; (2) a solar domestic hot water system with an electric hot water tank as a backup; and (3) a two day thermal storage capacity. The solar energy system could provide the house with 100 percent of its hot water in the sum-

mer, and between 32 percent and 100 percent during the remaining eight months. It also provided between 37 percent and 100 percent of its space heating requirements monthly, with an annual average of 58 percent of requirements.

The New York Public Service Commission found that the house would draw only about one-quarter of normal energy requirements, but the need for total backup during more than two days of cloudy or cold weather would require the utility to maintain full capacity requirements for back-up electric heating and hot water. If the normal electric rates were applied, the revenue to the company would drop roughly 75 percent. However, the utility did not ask for higher rates to compensate it for full capacity back-up with less revenues. Instead, the utility, in an experiment to acquire some sound data on operational load and cost, proposed to charge the customer the regular residential electric rate, but limit the time period and number of customers involved. It requested special metering.[52]

The New York Public Service Commission observed that the rate would be below the utility's cost of service for that customer, but allowed the subsidization of this customer's rates in order to encourage the use of solar energy, and develop sound, cost-justified rates based on empirical load data. The Commission also encouraged the design of solar energy systems that can use cheaper off-peak electricity to heat the thermal storage at night. This way it would decrease the house's demand for power during cloudy periods which would otherwise be supplied by costly peak power backup service. In addition, the experimental rates would be limited to the first 20 customers who applied; would terminate on December 31, 1978; and the Public Service Commission would not allow the customer to receive a 500 kwh water heating block summer discount.[53]

In another New York case, rates were set for a customer with a 2 kilowatt capacity windmill which was estimated to generate about 200 kwh monthly. The utility in this case stated that it would still have to provide sufficient capacity to serve the full load of the customer, and proposed that the customer pay a rate of $2.50 per month for each kilowatt of windmill capacity. This estimated minimum cost of backup service for this customer would compensate the utility for revenue losses during periods when the customer makes heavy use of the windmill generation.[54]

In addition, the utility would buy back any excess electricity generated by the customer at a rate equal to the Company's average cost of fuel per kilowat hour. The customer, however, would be charged $1.00 per month for a special meter required to measure any sales of electricity back to the company.[55]

There is also some interesting economic analysis in the P.S.C. staff report indicating that at this time, windmill generation is approximately 10 times more expensive than the utility's current cost of electricity — 4.2¢/kwh vs. 41.5¢/kwh for windmills.[56]

In another New York windmill case, the P.S.C. similarly allowed the utility to charge the customer a monthly kwh rate to cover minimum customer cost of service to provide back-up power and to compensate for revenue losses. Also a charge of $1.00 per month for installation of a meter to measure the energy sold by the customer to the utility was allowed, and the customer would be credited for excess energy sold at the company's average fuel costs.[57]

Data from the Office of Technology Assessment indicate that the cost to a utility of back-up generation for solar customers can, in some cities, be lower than the cost of back-up generation for conventional houses, because solar devices can actually reduce utility fuel costs.[58] For example, the back-up energy required for solar users in Albuquerque and Fort Worth costs utilities one and six percent more, respectively, but costs the utilities thirteen poercent *less* per kwh in Boston and seven percent less in Omaha (See Exhibits 15 and 16).

Off-peak thermal energy storage systems, in solar homes can reduce utility costs to an even greater extent. For example, the Boston case which costs the utility 13 percent less for back-up

EXHIBIT 15

Table V-5.—The Fractional Difference Between the Utility Costs [¢/kWh] Required to Provide Backup Power to the Systems Shown and the Costs to Provide Power to a Residence Equipped With an Electric Heat Pump [see note for explanation]

	Albuquerque	Boston	Fort Worth	Omaha
1. Single family house with gas heat, hot water, and air-conditioning*	0.02	-0.09	-0.15	0.03
2. Single family house with gas heat and hot water, and central electric air-conditioning*	0.26	0.28	0.15	0.32
3. Single family house with baseboard heat, electric hot water, and window air-conditioning*	– 0.14	-0.14	-0.15	-0.10
4. Single family house with solar heat and hot water backed up with a heat pump and electric hot water*	0.01	-0.13	0.06	-0.07
5. Single family house with extra insulation, electric hot water, and heat pump with:**				
a. Photovoltaic system with no battery and no sale to the utility	-0.06	-0.27	-0.02	-0.07
b. Photovoltaic system with no battery and sales to utility permitted	0.07	-0.23	0.03	-0.01
c. Photovoltaic system with battery and no sales to utility	-0.30	-0.27	0.01	-0.05

* Compared with single family house with electric hot water and heat pump.
** Compared with single family house with extra insulation, electric hot water, and heat pump.

NOTE: let C_r = incremental utility costs resulting from adding 1,000 reference houses with heat pumps.
let K_r = the incremental number of kWh generated when 1,000 reference houses with heat pumps are added to the utility.
let C_t and K_t be the equivalent quantities resulting from adding 1,000 houses with a different kind of energy equipment.
Then the fractional change illustrated above is given as follows: $F = \frac{C_t/K_t - C_r/K_r}{C_r/K_r}$

Source: "Application of Solar Technology to Today's Needs", Office of Technology Assessment, U.S. Congress, 1978, p. 153.

EXHIBIT 16

Table V-7.—Ratio of Price Utilities Can Pay for Solar Energy Generated Onsite to the Price Charged by Utilities for Electricity

	Albuquerque		Boston		Fort Worth		Omaha	
	Purchase base	Purchase reference	Purchase base	Purchase reference	Purchase base	Purchase reference	Purchase base	Purchase reference
1. Single family house with no onsite batteries	0.67	0.65	0.62	0.55	0.31	0.28	0.57	0.59
2. Single family house with onsite batteries	0.40	0.39	1.09	0.98	0.29	0.26	0.64	0.66
3. Single family house with extra insulation and no onsite batteries	0.64	0.62	0.58	0.49	0.66	0.64	0.50	0.50
4. High rise apartment with no onsite batteries	0.64	0.66	0.51	0.48	0.29	0.29	0.42	0.44
5. High rise apartment with onsite batteries	0.41	0.43	0.38	0.36	0.29	0.28	0.36	0.38

Let x = (utility cost supplying building not selling electricity minus utility costs for building selling excess electricity to the utility)

Let y = (kWh generated by utility in supplying building not selling electricity minus utility costs in supplying building selling excess electricity)

Let z = (added utility cost incurred in supplying building with no solar equipment) divided by (added kWh required to supply the building)

Let w = (total utility costs) divided by (total kWh produced by the utility)—no additional buildings

$$\frac{\text{Purchase}}{\text{Base}} = \frac{x/y}{w} \qquad \frac{\text{Purchase}}{\text{Reference}} = \frac{x/y}{x}$$

All utility costs are delivered costs.

Source: "Application of Solar Technology to Today's Needs", Office of Technology Assessment, U.S. Congress, 1978, p. 153.

EXHIBIT 17

Table V-9.—The Impact of Offpeak Storage on Utility Costs [fractional increase or decrease in backup costs per kWh—see notes]

	Albuquerque	Boston	Fort Worth	Omaha
Nonsolar houses				
• Offpeak storage for heat and hot water	-0.37	-0.38	-0.29	-0.34
• Offpeak storage for heat, hot water, and cooling	-0.47	-0.45	-0.48	-0.44
Houses with solar heating and hot water				
• No offpeak storage	0.03	-0.11	0.12	-0.06
• Offpeak storage for heating and hot water	-0.11	-0.24	0.003	-0.21
• Offpeak storage of heating, hot water, and cooling	-0.30	-0.35	-0.32	-0.36

Notes: The "reference house" is a single family house using electric resistance heating and hot water and window air-conditioners. All solar houses generate only heating and hot water from solar energy.

Let C_r = added utility costs resulting from the addition of 1,000 reference houses

K_r = added kWh resulting from the addition of 1,000 reference houses

C_t = added utility costs resulting from the addition of 1,000 test houses (type noted in left column above)

K_t = added utility costs resulting from the addition of 1,000 test houses

The fractional change ratio shown above is calculated as follows:

$$F = \frac{(C_t/K_t) - (C_r/K_r)}{(C_r/K_r)}$$

Source: "Assessment of Solar Technology to Today's Needs", Office of Technology Assessment, U.S. Congress, 1978, p. 157.

charges, changes to costing the utility 24 percent less with heating and hot water storage capacity, and up to 35 percent less for a solar house with off-peak storage for heating, hot water, and air conditioning storage capacity. (See Exhibit 17.)

Consequently, this type of data can be used to argue effectively against any utility rate increases that discriminate against solar customers. If it can be shown that solar users actually cost the utility less for service than do non-solar customers, then perhaps solar users can argue for lower, and not higher rates.

Service Discrimination

Utilities may try to avoid rate structure problems by simply refusing to provide service connections to solar equipped homes. However, since the basic duty of a public utility company is to serve everyone within the area it is given a monopoly over, there should be no sufficient legal reason for a utility company to deny service to a solar equipped residence.[59] It has even been suggested that a utility could use service discrimination to favor solar use; for example, a gas company suffering natural gas shortages and curtailments might wish to refuse to provide gas connections to new residences that do not install solar space and water heating equipment.[60]

Multi-User Solar Energy Systems

There are many economic and technical advantages to be derived from a solar energy system that can serve more than one user, particularly if various users have their peak uses at different times. Such small multi-user systems include apartment buildings; mobile home parks; shopping centers; industrial parks; and district heating and cooling plants. The question then arises as to whether these small solar systems would be considered as regulated public utilities, with all the consequent burdens of public utility regulation (i.e. necessity to serve all customers who demand service, PUC approval of rate schedules, approval for a certificate of public convenience and necessity, safe, adequate, and reliable service requirements, et cetera).

In most states, a facility in which the owner is the sole customer of the energy produced is exempted from utility regulation.[61] However, if power is sold to others, then the system could conceivably become subject to regulation. The majority rule in most states is that a system is serving the public if it has "dedicated its property to a public use," which is evidenced by a willingness to provide service to all those who request service, and unrestricted solicitation of customers within an area.[62]

Thus an owner of an apartment building, an industrial park, or a large mall who offers, and is willing to provide, heat and electric power to all tenants within the "service area" might meet such public utility criteria. This occurred in Utah in *Cottonwood Mall Shopping Center v. Utah Power and Light Co.* 440 F2d 36 (10th Cir., 1971), where the Federal Appeals Court upheld a decision which held that a shopping mall could not generate electricity for sale to businesses in the mall without utility regulation.

The state law is very vague on this question. There are some statutory provisions which explicitly allow apartment owners to sell electricity without regulation.[63] Some state commissions have determined that such service is not subject to its jurisdiction,[64] while other regulatory commissions have held the owner to be subject to public utility regulation.[65] Similarly, rural electric co-operatives and municipal utilities may or may not be subject to PUC regulation, depending on which state law is applicable.[66]

Finally, if the system generates excess power, can the utility be forced to purchase this reverse flow of power, and at what rates? There are no clear answers to these questions.

Public Utilities and Solar Commercialization

Some utility companies consider direct involvement in the solar energy market as a significant opportunity; this involvement might be the purchase and installation of solar equipment in customer's homes, financing of solar purchases, or manufacturing of solar equipment.

Utility ownership of on-site solar equipment has a number of advantages: (a) utilities can raise a large amount of capital for large solar investments at a lower interest rate than an individual; (b) utility purchase of a large amount of solar equipment can stimulate the growth of a solar manufacturing industry; (c) utilities can optimize the mix of generating and storage equipment in its service area; (d) utilities have the sales, distribution, service, marketing, and billing network in place to reach and service a large number of potential solar energy customers; (e) utility purchase and reliance on solar equipment could increase consumer confidence in solar equipment; and (f) if utilities purchase the solar equipment and merely sell the customer power, then the individual homeowner is automatically relieved of the burden of selection, purchase, installation and maintenance of the solar energy system; the consumer is also freed from the necessity to worry about the efficiency of the systems, or of other problems that might come up, or even enforcing a warranty in case of difficulty. The concept of having the consumer pay the utility only for energy actually received may in fact be an ideal consumer protection mechanism for the solar purchaser.

For example, the Long Island Lighting Company has initiated a program to install, at cost, 600 domestic solar water heating systems in customers' homes. The systems should provide 50 percent of the average family's hot water needs. Participating customers will be able to heat water at night using LILCO's lower off-peak electric energy storage rate.

This is just one of hundreds of solar projects that have been initiated by both gas and electric utilities. For a thorough review of all such projects, see "Electric Utility Solar Activities", Electric Power Research Institute, ER-649-SR, February, 1978, and "Solar Energy Utilization, Natural Resource Conservation by the Gas Utility Industry", American Gas Association, January, 1978.

There are also critics of utility involvement in solar energy. They fear that utilities, with a government-backed market advantage (assured rate of return), could dominate the solar industry and squeeze out small solar companies. Opponents also point out that since utility companies have always been focused on centralized energy production, they might favor central station solar electric power plants (power towers, etc.) over decentralized solar technology applications. This approach would rule out the benefits of not needing a transmission system, insensitivity to blackouts or system failures, and other independence and life style advantages. Other arguments against utility involvement include the tendency of utilities to invest in equipment (on which they earn a rate of return), and the supposed lack of utility innovation in new and untried energy systems, and lack of utility incentives to keep costs down.

These issues also bring up a number of other related legal problems. For example, utilities might wish to obtain a monopoly on the distribution of solar systems within their service area. It is unlikely, however, that a state regulatory commission would give its approval, and federal antitrust law would prohibit such anticompetitive practices. It is likely that utilities would be directed to compete with other distributors. There would be few antitrust problems as long as utilities purchased the solar equipment from independent suppliers, hired independent contractors to install the devices, and did not attempt to obtain monopoly control over any segment of the industry.

The other major issue centers around whether a public utility could provide such services as a part of its regulated business, or, if the utility attempted to provide this service as unregulated business via a controlled subsidiary, whether the state PUC would attempt or could legally impose restrictions on the utility's nonregulated outside business activity. Again, the legal precedents are not clear, and run both for and against the utility providing solar equipment services.[67]

One final issue involving public utilities and solar energy arises in the case where an enterprise is producing electricty from solar equipment. Will the power output be considered stable and reliable enough to be certified as a public utility? The inability to provide continuous power at a specified level could prevent solar-based systems from ever gaining public utility status (a question for the future).

As described above, the interface of solar energy systems, public utility companies, and state regulatory commission rate and service regulations will be the source of many novel and complex legal problems. If efforts are not taken to eliminate these obstacles, these issues can constitute significant legal and regulatory barriers to the commercialization and use of solar energy. The passage of the National Energy Act may solve some of these problems, but it is recommended that interaction begin immediately among state utility commissions, the utility industry and solar energy concerns to resolve as many of these problems in advance, before they become major barriers to the use of solar energy.

State Law

PUBLIC UTILITY REGULATORY PROVISIONS

CONNECTICUT
C.G.S. 16:1 et seq. - Public Service Corporations
Public Utility Control Authority

MAINE
M.R.S.A. 35:1 et seq. - Public Utility Law
Public Utilities Commission

MASSACHUSETTS
M.G.L. Ch. 164:1 et seq. - Manufacture of Gas and Electricity
Department of Public Utilities

NEW HAMPSHIRE
N.H.R.S.A. 362 et seq. - Public Utilities Law
Public Utilities Commission

NEW JERSEY
N.J.S.A. 48:1 et seq.
Department of Public Utilities

NEW YORK
Public Service Law S. 1 et seq.
Public Utilities Commission

PENNSYLVANIA
P.S. 66:452 et seq.
Public Utilities Commission

RHODE ISLAND
R.I.G.L. 39-1-1 et seq. - Public Utility Law
Public Utilities Commission

VERMONT
V.S.A. 30:1 et seq. - Public Service Law
Public Service Board

B. Labor Jurisdiction

Labor unions have identified installation of solar energy systems as providing new opportunities for their members, particularly plumbers, sheet metal workers, and roofers. The Sheet Metal Workers Union has completed a study of solar energy and noted a significant market potential for sheet metal workers in constructing and installing duct work for air circulating solar energy systems.[69]

Labor law issues, however, could create some barriers to use of solar energy, particularly through conflicts over work assignments, representational disputes, and union resistance to new technologies. Conflicts over work assignments can arise when different unions, representing plumbers, roofers, or sheet metal workers, claim responsibility for the same task, such as connecting roof-top solar components to pipes or ducts. The Federal government, through the National Labor Relations Board, has pre-emptive authority to settle labor disputes pursuant to the National Labor Relations Act of 1947 (Taft-Hartley Act).[70] However, the NLRB would have the power to resolve a work assignment dispute only when a union threatens to strike over the issue, or if an actual conflict exists. This would be too late to actually settle the dispute in advance.

Private dispute settlement, or a state arbitration agency, could provide options to settlement of work assignment disputes by the NLRB. However, any state law requiring mandatory participation would be pre-empted by the Federal law; this alternative would be useful in providing unions with a less adversary process to settle work assignment problems.

A second possible problem is union resistance to new technologies, such as use of plastic pipe; or fabrication of systems in factories. Unlike the plastic pipe case, solar technologies would not threaten existing jobs, and thus there should be less opposition.[71]

A third area of dispute could be over representation of new skills. Since solar technologies rely primarily on traditional skills, this should not be a problem. The potential of this problem should only arise if a new skill should be developed.

One method for resolving labor disputes in advance is to incorporate division of labor over installation of solar energy systems into the building code, as has been done in Houston, Texas. Recent code amendments provide that a plumber should work on solar water heating or swimming pools, an electrician on solar electric conversion equipment, and an air conditioning mechanic on an air circulating solar system.[72]

It is likely, however, that these provisions could be pre-empted by a decision of the NLRB; thus the building code division of labor would be merely used as a guide, and would not be binding on a union that wanted to dispute these work assignments before the NLRB.

Finally, it should be noted that interunion co-operation may preclude any labor conflicts from ever becoming a major solar energy barrier. For example, an interim agreement between the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada, and the Sheet Metal Workers' International Association provides that (1) solar equipment with tubing and piping for liquid flow as well as all supports and rigging will be handled and erected by a composite crew equal in number of members of the respective unions; (2) sheet metal workers will install installations of solar collectors where liquid is not the collector mechanism; (3) all pipe work will be performed by members of the Pipe Fitters Association; and (4) duct work will be performed by members of the Sheet Metal Workers' Association.[73]

In addition, as indicated in the section on warranties, the Sheet Metal Workers International Association will guarantee the workmanship of any new or retrofitted residential solar installation performed by union sheet metal workers. If any customer is dissatisfied, the union will inspect the system and if necessary perform the repair work free of charge.

Finally, The Solar Energy Research Institute conducted a conference in June, 1978 to discuss labor's role in solar energy with the leaders of organized labor. The conference resulted in many detailed observations and recommendations on labor's eagerness and ability to enter the solar energy field. The proceedings of the conference, "A Report on Organized Labor and Solar Energy" will be published by SERI.

NOTES

Northern Energy Corporation
Northeast Solar Energy Center

1. Battelle Pacific Northwest Laboratories, *An Analysis of Federal Incentives Used to Stimulate Energy Production,* PNL-2410, Contract E4-76-C-06-1830.

2. Lovins, "Energy Strategy, The Road Not Taken?" *Foreign Affairs,* October, 1976; Epstein and Barrett, "Federal Incentives for Solar Homes, An Assessment of Program Options", R.U.P.I., Inc. (1977); McDonald, "A Review of Solar Market Studies", Northeast Solar Energy Center, (1978).

3. "Application of Solar Technology to Today's Needs", Office of Technology Assessment, U.S. Congress, June, 1978, p.II-15.

4. "Solar Energy in California: "Residential Thermal Applications", California Energy Commission, February, 1978, p.II-15.

5. Epstein and Barrett, "Federal Incentives for Solar Homes, An Assessment of Program Options", R.U.P.I., Inc. (1977), p.-III-6.

6. See National Conference of State Legislatures, Energy Project, "Energy: The States' Response" (1975-1977). This document analyzes and provides the text of all state energy legislation (including solar) and can be obtained from the N.C.S.L. Energy Project in Denver, Colorado.

7. Thomas, Miller, and Robbins, "Overcoming Legal Uncertainties About Use of Solar Energy Systems", American Bar Foundation, Chicago, Illinois, January, 1978: this document includes a suggested property tax exemption statute and analysis.

8. See Environmental Law Institute, "Legal Barriers to Solar Heating and Cooling of Buildings", March, 1977, pp. 158-164.

9. Peterson, *The Impact of Tax Incentives and Auxiliary Fuel Prices on the Utilization Rate of Solar Energy Space Conditioning,* Utah State University, 1976, p. 10.

10. Ch. 168 (1976, Ch. 1072 (1977)). Also see "Guidelines and Criteria for a State Solar Energy Tax Credit", California Energy Commission, April, 1978; and "California Solar Information Packet", distributed by the California Energy Commission, August, 1977; and Docket No. 77-AID-2, Solar Energy Tax Credit Information Packet, from the California Energy Commission.

11. See statement of Stephen Savits to the Solar Energy Policy Committee, reported in Energy Users Report, No. 256, July 6, 1978, p. 9.

12. California Government Code S. 14951: Fla. Stat. Ann. S.14951; N.C. Gen. Stat. S. 143.64. 10-44; Wash. Rev. Code. Ann. S. 39.35.010; Colo. 24-37-100.2.

13. Environmental Law Institute, supra note 8, p. 79 and note 17.

14. Barrett, Epstein, and Haar, *Financing the Solar Home: Understanding and Improving Mortgage Market Receptivity to Energy Conservation and Housing Innovation,* Regional and Urban Planning Implementation, Inc., Cambridge, Mass., 1976, p. 80. Also Environmental Law Institute, supra note 8, p. 79.

15. Twombly, "Investment Possibility of Financial Institutions in Solar Heating", University of Pennsylvania Energy Center, June, 1974.

16. Id.

17. DOE's nuclear statutory patent policy guidance is found in Section 152 of the Atomic Energy Act of 1954:

    > Any invention or discovery, useful in the production or utilization of special nuclear material or atomic energy . . . shall be vested in, and be the property of, the Commission, except that the Commission may waive its claim to any such invention or discovery under such circumstances as the Commission may deem appropriate, consistent with the policy of this section.

    The Atomic Energy Act, therefore, provides DOE with a "title" patent policy and provides the flexibility of waiving rights to inventions when deemed appropriate. No other guidance is provided as to when waivers should or should not be granted.

18. Cf. House Conference Report, 93-1563, (12/11/74), accompanying the passage of the Nonnuclear Act (S. 1283).

19. This section is based upon a paper written by Robert M. Poteat, Patent Counsel for DOE, "DOE Policies and Procedures on Patents, Data and Copyrights (41CFR Part 9-9)," given at the January, 1978 Conference on Solar Energy Law, Policies and Financing.

20. Environmental Law Institute, supra note 8, p. 138.

21. Id.

22. Id.

23. Id., p. 132.

24. Poteat, supra note 19, p. 15.

25. Id., p. 17.

26. Environmental Law Institute, supra note 8, pp. 134-136.

27. Id.

28. See particularly Smollen, Rollinson, and Rubel, *Source Guide for Borrowing Capital,* Capital Publishing Corporation, Chicago, Illinois, 1977; also see *Legal-Institutional Implications of Wind Energy Conversion Systems,* National Science Foundation, Research as Applied to National Needs, NSF/RA-770204, September, 1977, pp. 135-156; *Catalogue of Federal Domestic Assistance,* Office of Management & Budget Printing Office, 1978.

29. Hayward, "Assessment of Regional Legal Barriers: Product Liability", prepared for the Northeast Solar Energy Center, March, 1978.

30. Proceedings of the Workshop on Solar Energy and the Law, American Bar Foundation, Chicago, Illinois, February 10, 1975, pp. 15-17, National Science Foundation Report NSF/RA S.75-004.

31. Oregon Laws, Ch. 153, 1975.

32. Miller, Hayes, and Thompson, "Solar Access and Land Use: State of the Law, 1977", National Solar Heating and Cooling Information Center, 1977, pp. 17-22; *also see* Environmental Law Institute, supra note 8.

33. Id., p.22; a complete discussion of the use of zoning as a tool to protect sun access is found in Eisenstadt and Utton, "Solar Rights and their Effect on Solar Heating and Cooling". 16 *Natural Resources Journal* 363, 379 (1976).

34. Id., p.22, note 146.

35. A detailed discussion of the technical criteria and factors that should be included in a zoning ordinance is found in Eisenstadt and Utton, supra note 33, p. 388.

36. Supra notes 30, 32 and 33.

37. ABF Proceedings, supra note 30, p. 7; also see Reitze, "A Solar Rights Zoning Guarantee: Seeking New Law in Old Concepts", 3 *Washington University Law Quarterly* 376, 389 (1976); and Becker, "Common Law Sunrights: An Obstacle to Solar Heating and Cooling?" 3 *Journal of Contemporary Law* 19 (1976), p. 22.

38. Right to Light Act, 1959, 7 and 8 Eliz. 2, C. 56, Sec. 2, 3. For a full discussion of the English law, see A.B.F. proceedings, supra note 30, pp. 7-8.

39. Miller, Hayes and Thompson, supra note 32, pp. 5-6; Becker, supra note 37, p. 24; Eisenstadt and Utton, supra note 33, p. 368.

40. For a complete description of the use of implied easements for sunlight and air see Eisenstadt and Utton, supra note 33, p. 369; and Moscowitz, "Legal Access to Light: The Solar Energy Imperative", 9 *Natural Resources Lawyer* 197 (1976).

41. Dubin, Analysis of Energy Usage on Long Island from 1974 to 1995 ..., Suffolk County Department of Environmental Control, (Suffolk County, N.Y., 1975); also see Phillips, Assessment of a Single Family Residence Solar Heating System in a Suburban Development Setting (City of Colorado Springs) Annual Research Report 92 (1975); American Institute of Architects Research Corp., Early Use of Solar Energy in Buildings (1976); W. Harris, "Is the Right to Light a California Necessity?", Rand Corp. Paper p-5558, (Dec., 1975).

42. Becker, supra note 37, pp. 34-35.

43. There have been a number of cases and law review articles concerning the extent to which government may regulate the use of land before there will be considered to be a taking which requires compensation; see, for example: *Maine v. Johnson,* 275 2d. 711, (Me. 1970); *Golden vs. Board of Selectmen of Falmouth,* 358 Mass. 519, 265 N.E. 2d. 573, (1970); *Just v. Marinette County,* 56 Wis. 2d. 7, 201 N.W. 2d. 761 (1972); *U.S. v. Certain Parcels of Land in Kent County,* 252 F. Supp. 319 (W.D. Mich., 1977); Eisenstadt and Utton, supra note 33, p. 382; Note, "State and Local Wetlands: The Problem of Taking Without Just Compensation", 58 *Virginia Law Review* 876; Sax, "Takings, Private Property and Public Rights", 81 *Yale Law Journal* 149 (1971); Bosselman, Callies and Banta, "The Taking Issue", Council on Environmental Quality, 1973.

44. Minn. H.B. 2064 (1976).

45. Miller, Hayes and Thompson, supra note 32, pp. 27-29; Reitze, supra note 37, pp.380-384; but see "The Allocation of Sunlight: Solar Rights and the Prior Appropriation Doctrine", 47 *University of Colorado Law Review* 421 (1976), which argues in favor of using water law as an analogy for protecting solar rights.

46. Becker, supra note 37, p. 26; Reitze, supra note 36, p. 384.

47. Colorado, Ch. 326, Laws of 1975.
Kansas, Ch. 227, Laws of 1977.
Maryland, Ch. 934, Laws of 1977.
New Mexico, Ch. 169, Laws of 1977.
North Dakota, Ch. 425, Laws of 1977.
Oregon, Ch. 193, Laws of 1975.

48. See Becker, supra note 37, p. 32; Miller, Hayes & Thompson, supra note 32, p. 15, note 73.

49. A.B.F. Proceedings, supra note 30, p. 3.

50. Environmental Law Institute, supra note 8, p. 95.

51. Id,. p. 95.

52. S.A.P.A. EL-18, Case 27130, Orange & Rockland Utilities, Inc., State of New York Public Service Commission, Power Division Rates and Valuation and Tariff Analysis Section Report of April 6, 1977.

53. S.A.P.A. EL-18 Case 27130, Orange and Rockland Utilities, Inc., State of New York Public Service Commission Decision of April 12, 1977; and Power Division — Tariff Analysis Section Report of July 12, 1977.

54. S.A.P.A. EL-84, Central Hudson Gas & Electric Co., Special Permission Application EL-1675, September 9, 1977; Public Service Commission News Release 77308/CH, Sept. 19, 1977.

55. Id., p. 5.

56. Id., p. 7.

57. S.A.P.A. EL-39, Consolidated Edison Company of New York. Special Permission Application EL-1660, Power Division — Tariff Analysis Section Reports of April 22, 1977 and March 23, 1977; Con. Edison General Requirements for Parallel Operation of Windmill Generators with Low Tension Service, Application and Design Manual No. 4, May 4, 1977.

58. Office of Technology Assessment, Supra note 3, Chapter V.

59. Enviromental Law Institute, supra note 8, pp. 92-93. For a complete discussion of the legal aspects of utilities and solar energy see the O.T.A. study, supra note 3, pp. 184-194.

60. Id.

61. Id.

62. *Legal-Institutional Implications of Wind Energy Conversion Systems,* National Science Foundation, RANN/NSF/RA-770204, Sept., 1977, pp. 112-113.

63. Minn. State. Ann S. 216B.02(4).

64. Wisconsin, 44 P.U.R. 3d 44 (1962).

65. See note 62, supra, p. 113, note 7.

66. Id., p. 114, notes 11, 12, 13; and Environmental Law Institute, note 8, supra, pp. 99-101.

67. See Environmental Law Institute, supra note 8, pp. 103-109.

68. Cohen, Harlow, Johnson, and Sepewak, *Impact of Energy Developments on the Sheet Metal Industry,* MITRE Corp., M 75-44, June, 1975, p. 6-2.

69. 29 U.S.C. 158.

70. Environmental Law Institute, supra note 8, pp. 154-156.

71. City of Houston, Building Code, Chapter 88, Regulating Direct Solar Energy Applications, November 9, 1976.

72. *Solar Engineering,* April 1977, n. 4, p. 17.

APPENDIX

Analysis of National Energy Act — Solar and Energy Conservation Related Provisions

Northern
Energy
Corporation
Northeast Solar Energy Center

ENERGY TAX ACT OF 1978

HR 5263, Senate Conference Report 95-1324

The National Energy Act contains five major parts: Energy Tax Act of 1978; National Energy Conservation Policy Act; Public Utility Regulatory Policy Act; Power Plant and Industrial Fuel Use Act (coal conversion); and Natural Gas Policy Act (deregulation).

This analysis will summarize those portions of the Energy Tax Act, Energy Conservation and Public Utility Regulatory Policy Act that are relevant to solar energy and energy conservation issues.

Title I - Residential Energy Credit*

This title provides an income tax credit for individuals (non-business) for the following expenditures:

* "Energy conservation expenditures" will receive a tax credit of 15% of the expenditures of $2,000, for a total yearly credit of $300.

* "Renewable energy sources" will receive a credit of 30% of the first $2,000 of expenditures plus 20% of so much of the expenditure as exceeds $2,000 but does not exceed $10,000, for a total yearly credit of $2,200.

"Energy conservation expenditures" include insulation, a furnace replacement burner, flue opening modification devices, electrical or mechanical furnace ignition systems, storm or thermal windows or doors, automatic thermostats, caulking and weatherstripping of exterior doors and windows, metering devices, and other types of energy-saving devices specified in IRS regulations.

These energy conservation expenditures must be installed on the taxpayer's principal residence, the construction of which was "substantially completed" before April 20, 1977, and the equipment must remain in use for three years or more. These devices must also meet performance and quality standards which will be prescribed by the IRS and which would be in effect at the time of the acquisition of the item.

"Renewable energy source expenditures" include solar energy, geothermal and wind energy and any other form of renewable energy specified in IRS regulations to supply hot water, heating and cooling in the taxpayer's principal residence, which will remain in use for at least 5 years, and which meet IRS performance and quality standards. Costs eligible for the tax include purchase price as well as labor costs for the onsite preparation, assembly or installation of the equipment. For these items, the residence may have been constructed at any time. Swimming pools used as an energy storage medium are not eligible for the credit.

The Conference Report indicates that the tax credits may also apply to passive as well as active systems, and the definition of solar given in the statute is broad enough to include passive systems. The Report defines a passive solar system as one based on the use of "conductive, convective or radiant energy transfer . . . using portions of the residential structure which serve as solar furnaces so as to add heat to the residence. However, expenditures for labor, materials and components which will serve a *significant structural function* in the dwelling (e.g., extra thick walls) would *not* be eligible for the credit." (Emphasis supplied.)

*Cf. Form 5695, and Publication 903

The expenditures for both energy conservation and renewable resource equipment eligible for the tax credit must be made after April 20, 1977, and no later than December 31, 1985. However, the tax credits not used by the taxpayer in any one year may be carried over until used to reduce subsequent tax liability; however, any expenditures made in 1985 may be carried over only until December 31, 1987.

Since no ownership requirement is imposed on the taxpayer's principal residence, renters are eligible to take tax credits, although the taxpayer must be residing in the building for at least 30 days before he will be eligible for the credit. The taxpayer is also eligible for credits for proportionate costs of items installed in buildings in cases of joint occupancy or in cooperative housing preparations and condominiums.

Finally, the basis of any property affected by material or equipment eligible for the tax credit will be reduced by the amount of the tax credit.

Title III - Business Investment Credit to Encourage Conservation of Oil, Gas and To Encourage New Technology*

Of most immediate relevance to the solar field is Section 301 which grants an additional ten percent investment tax credit *in addition to* the regular investment tax credit for businesses that convert or purchase specified ''energy property.''

Equipment eligible for the 10 percent energy investment tax credit includes:

1. Solar or wind energy equipment used for heating, cooling or to provide hot water or to generate electricity. This credit is also *refundable,* which none of the other equipment described below would be eligible for. However, the definition of solar equipment *does not* include ''passive'' solar equipment, as pointed out in the Senate conference report; the specific equipment eligible under this definition will have to be worked out in the IRS regulations.

   Note that solar heating, cooling and wind equipment which supplies only space conditioning or hot water will be eligible only for the new 10% energy investment tax credit, but not the regular 10% ITC. Solar and wind equipment which provides process heating, cooling or electricity integral to the manufacturing process will receive both the regular investment tax credit *and* the additional 10% energy investment tax credit. This divergence in eligiblity arises because 26 USC 38 (the ITC section of the Internal Revenue Code) as defined by 26 USC 48 allows the ITC only for depreciable* property used in trade or business. The property is tangible personal property, or other tangible property which is not a building or a structural component, and is an integral part of manufacturing, production, or furnishing transportation, communications, electricity, gas, water or sewage disposal services. IRS regulations, in fact, specifically exclude items such as central air conditioning from ITC eligibility, cf. 26 CFR 11.48-1(d). Consequently, solar heating and cooling systems for space conditioning and hot water will receive only the new 10% energy ITC, and not the regular 10% ITC. However, if these solar systems provide process heating and cooling directly used in manufacturing, or where strict temperature control is necessary for the process, then such solar systems are eligible for both regular and energy ITC, for a total of 20% ITC.

2. ''Alternate energy property'' includes a boiler or a burner, the primary fuel for which will be an ''alternative substance,'' which is any fuel other than oil or natural gas, or an oil or

*Cf. Schedule B, Form 3468, and Publication 572

*Cf. 26 USC 167

natural gas product; equipment for converting an ''alternate substance'' into a synthetic liquid, gaseous or solid fuel; equipment designed to modify existing equipment that uses oil or natural gas as a fuel or feedstock so that the equipment will use a substance which is not less than 25% of some other fuel other than oil or natural gas; equipment which uses coal as a feedstock; pollution control equipment installed on any of the above equipment; equipment used for unloading, transfer, storage or preparation of any of the above equipment; and equipment used to distribute or produce geothermal energy.

3. ''Specially-defined energy property'' used to reduce energy use in ''existing'' industrial or commercial facilities, and which includes recuperators, heat wheels, regenerators, heat exchangers, waste heat boilers, heat pipes, automatic energy control systems, turbulators, pre-heaters, combustible gas recovery systems, economizers, or other property specified in the regulations.

4. ''Recycling equipment'' which includes equipment to sort and prepare solid waste for recycling.

5. Shale oil production equipment.

6. Equipment for producing natural gas from geopressurized brine.

All the above equipment, except for solar and wind energy equipment, are not eligible for a refundable credit, but the credits may be used to offset 100% of tax liability. The regular investment tax credit must be applied first before applying the special energy investment tax credits. The credits are available for any equipment acquired or placed in service after September 30, 1978, and no later than December 31, 1982. Public utilities and charitable organizations are not eligible for the energy investment tax credits.

Investment tax credits are denied for boilers fueled by natural gas or oil, except for ''exempt uses,'' which include residences, office and commercial buildings, hotels, vehicles and aircraft, and non-manufacturing operations. In addition, oil and natural gas burners will be denied rapid depreciation, but special depreciation allowances are allowed for early retirement of oil or natural gas fueled boilers.

There are many more detailed provisions within this title concerning eligibility, application and denial of the tax credits, and the specific statutory provisions and regulations must be checked before investment commitments are made.

NATIONAL ENERGY CONSERVATION POLICY ACT

HR 5037, House Conference Report 95-1751

This Act contains a number of significant measures to provide financial and technical assistance, as well as market development incentives for energy conservation and solar energy devices. Title II establishes a residential energy conservation program which directs utility companies to offer to assist in the installation of energy conservation and solar equipment in residences; a secondary financing and loan insurance for energy conservation improvements and solar energy by GNMA, FHLMC, FNMA, and FHA; as well as for publicly-assisted housing and newly-constructed residential housing insured by FHA and FmHA.

Title III provides a $985 million program to install energy conservation and solar equipment to schools, hospitals, public-care institutions and buildings owned by units of local government.

Title V contains Federal energy initiatives which include a major demonstration program for solar heating/cooling of federal buildings; retrofit of all federal buildings with energy conservation and solar energy devices by 1990, and a major federal photovoltaic purchase and utilization program for federal facilities.

Title VI includes supplemental state energy conservation plans and minority economic impact provisions with loans to assist minority business enterprises.

These titles are detailed below.

Title II - Part I - Utility Residential Energy Conservation Program

This program would require regulated and non-regulated gas and electric utilities* as well as home heating oil suppliers to "inform" residential customers about "residential energy conservation measures" and "offer" to install such measures. "Residential energy conservation measures" include caulking and weatherstripping of doors and windows; furnace efficiency modifications including replacement burners, furnaces or boilers, flue opening modification devices, and electrical and mechanical furnace ignition systems; clock thermostats; ceiling, attic, wall and floor insulation; water heater insulation; storm windows and doors; load management techniques; and devices to utilize solar energy or wind power for any residential purpose including heating of water, space heating and cooling. These measures must include three-year warranties from the manufacturer to meet specified levels of performance.

Briefly, the Secretary of Energy will first promulgate rules for State plans to implement the utility program within 45 days of enactment, pursuant to which a state governor may submit a "state residential energy conservation plan" within 180 days of the rules for regulated utilities; nonregulated utilities must also submit plans, or be covered by the state plans.

These plans will require that within six months of the approval of the state plan or by January 1, 1980, each utility must:

1. "Inform each of its residential customers who owns or occupies a residential building of the "suggested" energy conservation measures and the energy cost savings from such measures, the availability of installation arrangements, and the lists of suppliers, installers, and financing institutions.

2. Thereafter, the utility must "offer" to each residential customer to inspect the building to determine the cost of installing the suggested measures.

3. "Arrange" to have the suggested measures installed.

4. "Arrange" for a lender to make a loan to the residential customer to finance the purchase and installation of suggested measures. Payments for these services may be made through the customer's periodic utility bill over three years; however the PUC may elect to spread part of the costs of these programs across all utility customers.

The Act prohibits a public utility from actually supplying or installing any residential energy conservation measure, or from making a direct loan to any customer greater than $300 to purchase or install such equipment. It allows the utility to finance the full cost of purchase and installation of only furnace efficiency modifications, burners, flue opening and furnace ignition systems, clock thermostats, and caulking and weatherstripping.

*If yearly sales exceed 10 billion cubic feet of natural gas or 750 million kwh of electricity.

The Act would allow the utility to continue to supply, install or finance specific energy conservation measures that it was offering as of the date of the Act, or where state law in effect as of enactment permits such utility activity. However, the utility may request a waiver from the Secretary of Energy, if supported by the Governor of the State, to allow it to purchase, install and finance energy conservation and solar energy services.

The prohibition against utility purchase, installation or finance of solar or wind energy systems will provide a major barrier to utility entry into the solar area, and thereby deprive the solar market of potential sources of lower cost capital, mass purchasing agents, and market development vehicles, and deprive consumers of potential relief from the burden of purchase, installation, maintenance and warranty enforcement. Thus the waiver provisions would be a crucial barrier-removal device for utilities that are inclined to enter the solar market.

The submission of state plans and utility implementation of these programs is couched in non-mandatory language. However, Section 219 of the Act provides for Federal Standby Authority for the Secretary of Energy, if the state does not submit a state residential energy conservation plan, to issue a plan on his own, which would require each regulated and non-regulatory utility to offer to install such measures to residential customers, and there are substantial civil penalties for any utility which does not comply with the DOE plan. Thus this apparently voluntary program is, in reality, mandatory.

Note finally that these provisions, with some modifications, do apply to home heating oil suppliers.

Title II - Part 3 - Secondary Financing and Loan Insurance for Energy Conservation Improvements and Solar Energy Systems

Sections 241 through 248 provide a major federal secondary financing vehicle to make more money available for the purchase and installation of energy conservation and solar energy systems. This will be accomplished through FHA, GNMA, FNMA, FHLMC, and direct federal purchase and insurance of loans and mortgages from banks who lend money for this equipment. By federal purchase of the loan notes or mortgages from the private lender, the banks can reacquire their money in order to make the funds available for more loans. Similarly, insurance of the loan or mortgages reduces the risk of the loan to the bank and thereby will induce the bank to more readily extend the credit to the purchaser.

Specifically, the following secondary financing and loan insurance vehicles are offered:

1. The Federal Housing Administration will provide loan insurance for energy conservation improvements and solar energy systems* for any single or multi-family dwelling unit under Title I, Section 2(a) of the National Housing Act.

2. The Government National Mortgage Association will purchase loans for energy conservation improvements insured by FHA under Title I of the National Housing Act, which are made to low and moderate income families in one- to four-family units, if the loan does not exceed $2,500. Three billion dollars in purchases and commitments are authorized under this section.

3. The Government National Mortgage Association is given standby authority, when insufficient credit is available, to purchase loans for energy conservation improvements made by banks to owners of one- to four-family dwelling units insured by FHA under Title I or Section 241 of the National Housing Act. Two billion dollars in loans are authorized to be purchased under this section.

4. The Government National Mortgage Association is authorized to purchase loans made to owners of one- to four-family homes insured under Title I of the National Housing Act for the purpose of purchasing and installing solar energy systems,* if the loan does not exceed $8,000. The total amount of outstanding loans under this section may not exceed $100 million at any one time.

5. The Federal Home Loan Mortgage Corporation may provide secondary financing for residential mortgages insured under Title I of the National Housing Act which are given to finance energy conservation improvements and solar energy systems* to residential real estate.

6. The Federal National Mortgage Association may purchase, service, sell or lend on the security of loans given to install energy conservation improvements and solar energy systems,* whether or not insured under Title I of the National Housing Act.

7. FHA/HUD may provide loan insurance for energy conservation improvements and solar energy,* in systems installed in multi-family housing projects pursuant to Section 241 of the National Housing Act.

8. An increase of 20% in mortgage limits to cover the cost of solar energy systems* insured by FHA under the National Housing Act is provided for one- to four-family housing (Section 203b2), for multi-family housing (Section 207c3) as well as for loans made or insured or guaranteed by the Farmers Home Administration under Section 501 of the Housing Act of 1949.

9. HUD may provide $10 million yearly to finance the purchase and installation of energy conservation improvements for existing low-income projects pursuant to Section 5c of the U.S. Housing Act of 1937, Section 202 of the Housing Act of 1959, or which are subject to mortgages insured under 221d3 of Section 236 of the National Housing Act (low and moderate income multi-family housing); $25 million is appropriated for this section.

Finally, both the FHA and the Farmers Home Administration are directed to establish minimum property standards for energy conservation for newly constructed residential housing insured by those two agencies.

Title III - Energy Conservation Programs for Schools and Hospitals and Buildings Owned by Local Governments and Public-Care Institutions

Part I of Title III provides a total of $900 million for conducting preliminary energy audits, providing technical assistance and paying for the design, acquisition, construction and installation of energy conservation and solar equipment. Eligible equipment includes: insulation; storm doors and windows; automatic energy control systems; equipment required to operate variable steam, hydraulic and ventillating systems; solar space heating and cooling, hot water or solar electric generating systems; furnace or utility distribution system modifications (replacement burners, furnaces, flue opening modifications, furnace ignition systems and conversion of oil- or gas-fired boilers to alternate energy sources including coal); caulking and weatherstripping; replacement or modification of lighting fixtures; energy recovery systems; cogeneration systems and other measures identified by DOE or the grant applicant.

Hospitals eligible include public or private nonprofit hospitals; and schools eligible include any public or private nonprofit elementary, and secondary school, or schools offering a bachelor's or

*Includes passive solar energy systems.

higher degree, or a two-year B.A. degree program. All eligible buildings must have been completed before April 20, 1977.

Initially, program guidelines will be issued by DOE for energy audits within 60 days of enactment. Thereafter the Governor of any state may apply to DOE for grants to pay for 50% of the cost of preliminary energy audits, and more detailed energy audits for schools and hospitals in the state. One hundred percent grants may be given for energy audits, but the extra amounts will be reduced from the state's total share of funding. If the state does not conduct preliminary energy audits within two years, DOE may conduct the audits in the state.

After the energy audits have been carried out, the state energy agency may submit to DOE a state plan* indicating the results of the energy audits, and the procedures the state will use to install the necessary energy conservation measures in schools and hospitals within the state. DOE must approve or disapprove the plan within 90 days of receipt.

After approval of the state plan, the state energy agency may submit yearly, a single application to DOE for all schools and hospitals in the state for grants to pay for 50% of the cost of actual installation of the energy conservation measures, as well as for specialized technical assistance studies. However, 90% of these costs may be covered if DOE determines that the projects meet hardship criteria which include climate, fuel costs, fuel availability, ability to provide the non-federal share of the costs and other factors deemed appropriate by DOE. Note that these hardship criteria for which 90% grants are available seem to match very well with the situation in the Northeast region.

Finally, the single state application must be submitted through or approved by the state hospital and school facilities agency.

Twenty-five million dollars through September 30, 1979 are authorized for preliminary energy audits and detailed energy audits, and $875 million through September 30, 1980 are authorized to pay for the actual energy conservation implemention grants, for a total of $900 million for the schools and hospital section. Allocation of grants among the states shall be implemented by a formula, 80% of which will be based on population, climate** and other factors, 10% of which will be based on the cost of fuel and energy use,** and the remaining 10% will be made available for hardship grants.

Part II of Title III provides funds to local government buildings (county, municipality or town which is not a state agency) and for public-care institutions which include a long-term care, rehabilitation or public health center or a residential child care center.

Grants under this Part will be made available by DOE to conduct preliminary energy audits, as well as detailed energy audits and technical assistance program costs, which include studies identifying and specifying energy savings and cost savings likely to be realized as a result of modification of operating procedures and the installation of specified energy conservation measures. Note, however, funds are not made available for the actual installation of the energy conservation measures as in the section above for schools and hospitals.

Similarly, the governor shall first apply for energy audit grants and then for technical assistance grants through a state plan submitted to the Department of Energy. Grants may be used to pay for up to 50% of the technical assistance program costs, but there are no hardship provisions allowing for a 90% cost average.

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*DOE regulations for state plans will be issued within 90 days of enactment.

**This again favors the Northeast Region.

Fifteen million dollars is authorized to conduct energy audits to September 30, 1979, and $50 million is appropriate through September 30, 1979 for technical assistance grants.

Title V - Federal Energy Initiatives

Title V consists of a number of programs to be carried out by the federal government for federal buildings and facilities. This Title includes a demonstration program for solar heating and cooling in federal buildings; retrofit of all federal buildings by 1990 with energy conservation and solar energy, and a federal photovoltaic purchase and utilization program.

Specifically, Part 2 of Title V provides $100 million through 1980 for demonstration of solar heating and cooling equipment in federal buildings. This will be implemented by the submission to DOE of proposals from federal agencies to install and demonstrate solar heating and cooling equipment in the agencies' buildings. A life-cycle cost analysis must be done on all such proposed installations and submitted to DOE for evaluation.

The authorization for this section is appropriated to DOE, which will transfer the money to the individual federal agencies for installation in the federal buildings.

Part 3 of Title V requires that on or before January 1, 1990, all federal buildings will be retrofitted to improve their energy efficiency and to minimize their life-cycle cost. These measures include installation of energy conservation measures, solar heating and cooling, other renewable energy resources, and maintenance and operating procedures modifications.

Initially, life-cycle costing methods and energy performance targets for all federal buildings will be established by DOE, in consultation with GSA, OMB and NBS. Thereafter, all *new* federal buildings must be life-cycle cost-effective. Subsequently, energy audits of all federal buildings with 30,000 or more square feet must be completed by August 15, 1979; buildings with 1,000 to 30,000 square feet must be audited by August 15, 1980. Thereafter, each Federal agency, on the basis of the energy audits, will begin to retrofit appropriate buildings with energy conservation and solar energy equipment. At least one percent of the total gross square floor footage in all federal buildings must be retrofitted within one year of the enactment of this act; each year thereafter an additional percentage of gross square floor footage will be retrofitted, with all buildings to be retrofitted by January 1, 1990.

Each federal agency will submit budget requests for retrofit within its own appropriation packages to Congress for approval as a separate line item.

Part 4 of Title V is the Federal Photovoltaic Utilization Act. This act establishes a photovoltaic energy commercialization program for the accelerated procurement and installation of photovoltaic solar electric systems in federal facilities, with the explicit purpose to accelerate the growth of a commercially viable and competitive industry.

Pursuant to this program, the Secretary of Energy will procure photovoltaic solar electric systems at an annual level substantial enough to allow use of low-cost production techniques by system suppliers. This program will begin within 60 days after the enactment of this bill by establishing a photovoltaic systems evaluation and purchase program.

DOE is directed to purchase the most advanced and reliable technologies, and should schedule purchases in a manner to stimulate the early development of a permanent low-cost private photovoltaic production capability in the U.S. and to stimulate the private sector market for photovoltaic power systems. DOE should procure up to 30 megawatts of photovoltaic electric systems by September 30, 1981. However, nothing in this act should preclude any other federal agency from directly procuring a photovoltaic solar electric system apart from the DOE purchase program.

Ninety-eight million dollars is authorized for this procurement program through September 30, 1981. An interagency advisory committee is established to assist DOE in the conduct of this program composed of DOD, HUD, NASA, GSA, DOT and SBA, FTC and the Postmaster General.

PUBLIC UTILITY REGULATORY POLICY ACT OF 1978

House Conference Report 95-1750, HR 4018

Titles I - VII of the Public Utility Regulatory Act contain a number of provisions which will substantially modify the standards by which state regulatory agencies regulate public utility rates and methods of operation. Title I contains retail regulatory policies for electric utilities; Title II supplements the authority of the Federal Energy Regulatory Commission to regulate utilities under its jurisdiction; Title III contains retail policies for natural gas utilities; Title IV establishes a program to provide money for studies and loans for small hydroelectric power projects; Title V contains provisions for crude oil transportation systems; and Title VI contains miscellaneous provisions regarding utility policies and study efforts.

Title I of the Act establishes retail regulatory policies for electric utilities. Within two years of enactment, state public utility commissions must "consider", and within three years of enactment "make a determination", whether to adopt the following federal standards for regulation of the rates of electric utilities:

1. Designation of rates to reflect costs of providing electric service to each class of customer.
2. Elimination of declining block rates.
3. Establishment of time-of-day rates.
4. Establishment of seasonal rates.
5. Establishment of interruptable rates.
6. Establishment of a program that offers load management techniques to its electric customers.

Although each state PUC must consider and determine whether to adopt such rates, the statute does not require that the PUC actually adopt any of these standards.

The statute also requires that the state PUC consider whether to adopt within two years after enactment, another set of standards not relating to rates but to conditions of service. These standards concern:

1. Whether to prohibit master metering.
2. Whether to eliminate automatic rate adjustment clauses.
3. Transmission of information to consumers concerning rate schedules.
4. Prohibiting termination of electric service to customers without prior notice, or to customers who establish an inability to pay or for whom termination would be especially dangerous to health, particularly the elderly or handicapped.
5. Prohibiting promotional or political advertising from being a rate-base expense.

As with the federal standards above, the state PUC must consider whether to adopt these standards, and state in writing its reasons for adopting or not adopting the standards.

The act also requires the state PUC to consider whether to approve lifeline rates; this would, in effect, be an exception from the cost of service standards mentioned above.

The Secretary of Energy, as well as any affected electric utility or electric consumer, may participate as a matter of right in any proceeding relating to these rate standards. In addition, compensation for the cost of participation or intervention in these proceedings will be provided to consumers if they substantially contributed to the approval of a position advocated by the consumer and adopted by the PUC; compensable costs would include attorney's fees, witness fees, and other costs incurred in the preparation and advocacy of his position.

Finally, DOE is authorized to make grants to state PUC's or nonregulated electric utilities, to implement the Public Utility Regulatory Act in order to better be able to consider and implement the standards mentioned herein. Forty million dollars is authorized for state regulatory assistance.

This title of PURPA is significant for future potential solar energy use, for if some of these standards are adopted, particularly elimination of declining block rates and implementation of time-of-day pricing, this could provide a major incentive to solar energy use by electric utility customers. For example, elimination of declining block rates for a utility customer with solar heating and hot water will lessen his total bill, as the first blocks of kilowatt hours, which even solar users cannot avoid, will thereafter be much cheaper, and this will result in substantial cost savings.

In addition, time-of-day rates will charge customers the true costs of the utility supplying them capacity during the peak use periods. If solar customers use their solar systems for heat and hot water during peak use periods, then they will not pay the much higher peak use rates, and this could result in a substantial savings in their electric bill. More importantly, this will begin to reduce the need for the utility to provide peak load capacity, and could, over the long run, result in savings for all customers of the utility.

Similarly, institution of seasonal and interruptable rates, use of load management techniques, and institution of master metering, could all, in the long run, provide great incentives to increase solar use by the utility's customers.

Title II - Federal Regulatory Commission and the Department of Energy Authorities

Title 2 authorizes the FERC to order electric utilities to interconnect and to wheel power among themselves, as well as a number of other service-related provisions.

However, more directly relevant to encouraging the use of alternate energy sources, particularly cogeneration and small power production, is Section 210, which authorizes FERC to promulgate rules to encourage cogeneration and small power production by requiring electric utilities to offer to sell electricity to, and purchase electricity from, qualifying cogeneration and small power facilities, and that the rates for such purchases and sales will not discriminate against cogenerators or small power producers. ''Small power production facilities'' include solar, wind, hydro, waste or biomass electric energy and storage systems producing less than 80 MW.

Moreover, within one year of the date of enactment, the FERC must prescribe rules exempting, in whole or in part, qualifying cogeneration or small power facilities from the Federal Power Act, Public Utility Holding Company Act, or from *state laws* and regulations concerning rates, financing and organization, or any combination of the above. For the purposes of exemption from

regulation, a small power production facility is one that generates less than 30 megawatts, except, however, that *any* qualifying small production facility which produces electric energy solely by the use of biomass as a primary energy source may be exempted by the Commission from the Public Holding Company Act and from state laws and regulations.

This section, of course, would be significant for small generators using biomass, small hydro, or any other alternate energy source qualifying as a cogenerator or small energy producer, and would be a significant removal of an institutional barrier to such energy use.

Finally, it should be noted that Section 213 provides that FERC may grant an exemption from regulations and licensing requirements for conduit hydro-electric facilities generating less than 15 MW, which are located on nonfederal lands, and utilize for generation only the hydro-electric potential of man-made conduits which are operated for the distribution of water for agricultural, municipal or industrial consumption, and not primarily for the generation of electricity. This exemption from licensing could increase the use of low-head hydro from such conduit hydro-electric facilities.

Title IV - Small Hydro-Electric Projects

Title IV requires the Secretary of Energy to establish a program to encourage municipalities, electric cooperatives, industrial development agencies, nonprofit organizations and other persons to develop small hydro-electric projects in connection with existing dams which are not being used to generate electric power. A small hydro-electric power project is defined as a project which is located at the site of an existing dam which has not more than 15,000 kilowatts of installed capacity.

DOE is authorized to make 90 percent loans to conduct feasibility studies of small hydro-electric power projects and to prepare license applications. Thereafter, DOE may make loans to municipalities, electric coops, industrial development agencies, nonprofit organizations or other persons of up to 75% of the costs of the project. Preference for loans will be given to those who do not have available alternate financing.

Moreover, DOE must establish a simple and expeditious licensing procedure under the Federal Power Act for small hydro projects in order to encourage quick implementation of this Section.

A total of $110 million through 1980 is authorized to implement this Section.