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The Implementation of State Solar Incentives: Financial Programs

John Ashworth

SERI

Solar Energy Research Institute

A Division of Midwest Research Institute

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FOREWORD

This report documents work performed in compliance with Contract No. EG-77-C-01-4042, Task No. 5125. The report was prepared by J. H. Ashworth of the Policy Analysis Branch of the Solar Energy Research Institute. This report is a part of a larger report entitled "The Implementation of State Solar Incentives: A Preliminary Assessment."

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Approved for:

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TABLE OF CONTENTS

	<u>Page</u>
Foreword	ii
Summary	1
1.0 Introduction	3
2.0 Review of the Available Financial Incentives at the State Level	5
3.0 State Financial Incentive Initiatives in the Period 1973-1978	9
3.1 Sales Tax Exemptions	10
3.2 Slightly Subsidized Loans	10
3.3 Property Tax Exemptions	11
3.4 Income Tax Rebates, Credits, and Deductions	12
3.5 Low-Interest or Guaranteed Loans	13
4.0 The Experience of Implementing Financial Incentives in Selected States	15
4.1 The Choice of Cases	15
4.2 The Method of Analysis	17
4.3 The Location of Rule-Making	18
4.4 The Role of Inter-Agency Committees	25
4.5 The Role of the Implementing Agency in Setting Policy	29
4.6 Lessons Learned from the Individual State Implementation Experiences	31
5.0 Conclusions and Areas for Further Research	39
5.1 Conclusions	39
5.2 Areas for Further Research	40
General Bibliography	43
State Bibliography	44
Appendix A: Summary of State Incentives	47
Appendix B: Financial Incentives in Case Study States	51
Appendix C: Individuals Interviewed	55

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1	Summary of Decision-Points for Core Issues in State Solar Incentive Programs	29
2	Summary of Decision-Points for Core Passive Issues in State Solar Financial Incentive Programs	30
3	1977 New Mexico Solar Tax Rebates (through September 1978)	33

SUMMARY

Financial incentives to stimulate the use of solar energy systems have been enacted in over 30 states in the period since the 1973 Arab oil embargo. Some of these incentives have had substantial impacts on consumer choices, while others have been largely symbolic gestures which have not affected levels of demand for solar equipment or for solar design. In approving these incentives, state legislators have provided mechanisms which assist in the achievement of either of two solar energy commercialization strategies: the reduction of market prices or the removal of perceived barriers to solar energy equipment installation.

In formulating solar incentive policy, each state has had a choice among a number of different fiscal instruments. In the following report, the full range of incentives are presented in summary form. These range from those judged to be largely symbolic in nature (sales tax exemptions and slightly subsidized conventional loans) to those with major potential either to reduce solar market prices or to remove institutional and legal barriers to solar usage. The rate and degree of adoption by the 50 states of each incentive option has varied widely, and the report briefly outlines the adoption process for seven incentive types.

The success of these incentive programs is dependent not only on their size and scope but also on the way they are administered. The rule-setting and administrative processes are central for the determination of what solar systems or components qualify for the incentive, which portions of the population will be able to take advantage of the incentive, and how rapidly the benefits of the incentive will be distributed. They also help determine the ease with which individual consumers can take advantage of the incentive.

To clarify the role of implementation in incentive success, the report examines the recent experience with financial incentives in six states: California, New Mexico, Arizona, Oregon, Maine, and Massachusetts. These states have been selected because their incentive programs possess one or more of the following characteristics: they have been in place for several years; they offer incentives which are substantial in size, producing large market price reductions for the consumer; they are innovative in design; and/or they have served as models for other state incentive programs. California, New Mexico, Arizona, and Oregon all allow large credits or rebates against the state income tax. Arizona and Oregon also exempt homeowners from property tax increases due to the installation of a solar system as do Maine and Massachusetts. Oregon and Massachusetts have developed subsidized loan programs for solar energy equipment purchase and installation. Maine recently sponsored a grant program to encourage the installation of solar hot water heaters.

Each of these programs is examined for lessons learned. Particular emphasis is placed on the choice of the rule-setting agency, the eligibility guidelines developed, and the relationship between rule-setting and administering agencies. In the six case study states, three different locations for rule-setting are identified: the state energy office, the state taxing authority,

and the independent state agency. Each of these organizational types is examined for its effects on the implementation of the incentive. Several issue areas which created problems for rule-setting in most of the case study states are briefly outlined: e.g., passive systems, the inclusion of labor costs, mandatory conservation, and speculatively built housing. A systematic survey of the six states shows that the setting of policy in these difficult areas is usually done by the rule-setting agency because of lack of guidance from the enabling legislation. This is found to be especially true in passive design, an area which received a great deal of attention from rule-setting officials and administrators but on which legislative history is usually silent. Many of the difficulties which had been predicted for rule-setting by state tax authorities and independent agency officials do not exist in the six case study states. For example, taxing authorities adopted approaches similar to the energy office for passive technologies and exhibited an admirable penchant for clear and concise eligibility regulations. The independent agencies examined also demonstrate considerable administrative flexibility in the evaluation of solar systems.

In the final portion of the report, a number of tentative conclusions and items for further research are set forth. Clarity of eligibility guidelines is essential to the successful implementation of a financial incentive, regardless of the type of incentive mechanism, the size of the state, or the nature of the administering agency. The choice of the type of implementing agency is not as crucial as was expected, with great variations occurring in the types of rules and procedures adopted. Certain of the more innovative implementation techniques (prior certification of systems, rebates and grants) have important positive secondary impacts on the ease of implementation and on consumer choice. Because these programs are currently in existence only in small states, it is difficult to predict whether they could be adapted for successful use in large populous states.

Innovative implementation mechanisms for financial incentives have been administered by state agencies without difficulty, so long as the eligibility guidelines are clear and precise. Concerns over the unwillingness or inability of state agencies to run efficiently relatively unfamiliar programs such as rebates appear to be unwarranted.

SECTION 1.0

INTRODUCTION

This report examines the experience of selected states in implementing financial incentives for solar energy. While the range of available fiscal mechanisms is surveyed in Section 3.0, the emphasis throughout this report will be upon "major" incentives--those which possess the potential to have a significant impact on the rate of installation of solar energy systems, either through a reduction in the market cost to buyers or through the removal of a legal or institutional barrier to the use of solar energy systems. The objective of this study is not to judge the design of state incentive programs or to criticize the activities of rule-setting and administering agencies. Rather, the emphasis will be on gathering, assessing, and disseminating information resulting from the practical experience of officials in pioneering states. Specifically, we will focus on what factors are important for the translation of a law into a workable solar energy financial incentive program. It is hoped that this information will be useful to officials of states contemplating the adoption of incentives of solar energy, to state officials considering the modification of existing incentives, and to federal policy analysts seeking to promote the diffusion of solar technologies.

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SECTION 2.0

REVIEW OF THE AVAILABLE FINANCIAL INCENTIVES AT THE STATE LEVEL

There are a large number of fiscal instruments which individual states can use to encourage the installation of alternative energy systems. Most of these instruments are rooted in the power of the state government to tax and to grant exemptions to existing taxes. In addition, there are direct grant and direct subsidy options, as well as regulatory actions which the state government can take to influence the lending practices of the private financial sector and the standard practices of key sectors, such as the building industry.

All these financial incentives are directed at assisting in the development of either of two strategies:

- the reduction of the market price of solar units; and
- the removal of barriers to installation of solar units.

These two different strategies are often inextricably joined in the minds of state governmental policymakers and of solar advocates alike. Actually, these objectives are quite different, and are best approached by means of two different sets of incentive packages. Since this report deals primarily with major financial instruments, we will focus on price reduction strategies. As we will see in the discussion of state implementation procedures below, concern over barrier removal often enters into rule-making decisions and the creation of administrative guidelines.

Market price reduction strategies are aimed at the solar consumer. They usually seek to lower the price of a solar unit at the time of purchase (or shortly afterwards). Less commonly, they seek not to affect the first cost but to lower the life-cycle cost of the solar system (primarily through low or no-interest loan programs). These strategies are aimed at increasing the use of and demand for solar systems by bringing the initial cost in the marketplace closer to the initial capital costs of conventionally-powered systems. In the case study states, many advocates of price reduction strategies argue to the legislature that these incentives are temporary and transitional: the combination of sharply rising fossil fuel costs and of increasing mass production of solar units will soon make solar energy systems economically attractive without any governmental encouragement.

There are six basic solar financial incentives which are currently in use and aimed at lowering the price to the end consumer. While many more than six solar incentive programs have been enacted or are being currently considered by individual states and localities, they vary from one another primarily in the magnitude of each incentive, the mix of the six basic types enacted, and the method of administration. The six market price reduction strategies are:

- Direct Grants
- Income Tax Rebates
- Income Tax Credits
- Deductions from Taxable Income
- Sales Tax Exemptions
- Subsidized Loan Programs

These incentives all affect the perceived consumer price, but they are not identical and they are not necessarily interchangeable. They differ in the amount of price reduction they bring about, in the social groups within the society that can take advantage of the incentive, and in the types of solar technologies that they encourage. These differences may well be magnified by the rules and regulations adopted by state administrators in the implementation of the incentive. For example, a tax credit of any magnitude may well exclude any solar systems created by the poor, since low-income groups do not normally pay significant amounts of state taxes. Strict performance criteria may exclude many low-cost, home-built systems, and the exclusion of labor from allowable costs will favor manufactured active systems (where the labor component is already included in the market price) over site-built active systems and over passive systems. Section 4.0 will examine further these questions of the impact of incentive type on consumer choice and on the distribution of benefits among sectors of the society.

The removal of barriers involves the elimination of laws, procedures, perceptions, and practices which prevent solar energy from competing on an equal basis with conventional forms of energy. Many of these barriers to solar commercialization do not require (and probably would not be responsive to) financial incentives. Most are questions of land-use planning, zoning and administrative procedure, rather than of barriers within the energy marketplace. For example, zoning which prohibits the location of solar collectors on the roof of a house will require legal changes at the local or county level, and will not be altered without those legal modifications. The protection of a solar device from shading by adjoining structures and foliage will also require legislative action. These issues are thoroughly addressed in the land-use planning section of this report.

There are two barriers to the installation of current solar technologies which are amenable to fiscal solutions. The first problem is the valuation of solar systems for property tax purposes. Current solar technologies are highly capital intensive. Active systems in particular require the installation of collectors, pumps, storage devices, and supporting structures. These can cost from \$1,000 to over \$20,000. If the costs of these solar components are immediately added into the valuation of the house or commercial building on which they are installed, the increase in property taxes will greatly reduce or possibly offset the savings generated by reduced consumption of conventional fuels. This barrier can be overcome by granting to the purchaser or to the builder of the solar system an exemption to increased property taxation.

This tax variance is most commonly permanent, but it can also be for a set number of years ranging from five (Maine and North Dakota) to 15 (New York). A slightly different approach is to assess the home as if it has a conventional system rather than solar components.

The second barrier amenable to state fiscal remedies is the availability of credit to finance the purchase of a solar system. A common assumption is that the private banking sector is unwilling to grant conventional loans for residences using an alternative energy system. This preliminary research effort has not found that financial institutions discriminate against homeowners or businesses planning solar installations. Nonetheless, the widespread perception that financing is unavailable has generated several loan guarantee programs. These programs, patterned after existing state and federal programs aimed at special sectors of the population (such as armed services veterans, farmers, and low-income groups), transfer risk from the private to the public sectors by promising to the participating financial institution that it will recover from the government a certain percentage of the loan value (usually 75%-100%) if the borrower should default or if the system does not perform as anticipated.

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SECTION 3.0

STATE FINANCIAL INCENTIVE INITIATIVES IN THE PERIOD 1973-1978

Prior to the 1973 Arab oil embargo and the subsequent quintupling of world petroleum prices, there were no state solar incentives. The promotion of the installation of solar technologies and the removal of barriers to solar energy use were not seen as state functions. The dramatic rise in fossil fuel (and nuclear fuel) prices, combined with growing environmental concerns and with increasing awareness of U.S. dependence on imported petroleum, all led to a strong interest by individual state legislators in initiating new solar energy financial programs.

There was an initial delay in state action on these proposals, as the result of the intermittent nature of state legislative sessions and of the need to identify and study alternative solutions. By mid-1978, however, 37 states had passed over 135 laws which dealt with solar issues. Sixty-one of the laws contained provisions for one or more of the financial incentives outlined in Section 2.0 above. Since there are already a number of excellent current summaries of state solar legislation,* this report will not provide an exhaustive catalogue and comparison of existing incentive packages. Rather, it will briefly touch upon selected general issues central to the process of enactment of solar incentives and then turn to the main focus of this project--the experience of the states in implementing the enacted solar incentives laws. For reference purposes, a two-page summary of state financial incentives is included in Appendix A below.

In the past five years, there have been enacted a number of state programs which are primarily symbolic in nature. By the term symbolic, we mean incentives which in the opinion of state officials and solar industry members thus far have not had a significant impact on the rate of solar installation or on the distribution of these installations among the different solar technologies. These incentives do not by themselves affect consumer market decisions, but rather give a slight "bonus" to those who have already decided to purchase or build a solar system for other reasons. Before turning to major incentives, we will briefly outline state experience with the two major types of symbolic assistance: sales tax exemptions and slightly subsidized loans.

*The Franklin Institute, State Solar Legislation, National Solar Heating and Cooling Information Center, Washington, D.C., July 1978.

Joan E. Porte, "Solar Legislation of the Fifty States," Consumer Action Now, Washington, D.C., April 19, 1978.

Janet Pardue, "State Solar Legislation 1974-1977," Energy Report to the States, Volume 4, Number 8, National Conference of State Legislatures, Denver, April 28, 1978.

3.1 SALES TAX EXEMPTIONS

Starting with Texas in 1975, eight states have enacted laws which exempt solar systems from state sales taxes or which later refund the sales tax collected to the end user.* Such an exemption lowers the first cost to the consumer by 3% to 6% but does not overcome the problem of high initial capital costs for solar systems. For a \$2,000 domestic hot water system, an exemption from a 5% sales tax would mean a savings of \$100. This would not be expected to induce consumer participation when the front-end cost of a comparable natural gas heater would be \$150-300.

However, the state sales tax exemption does have several attractive secondary features when it is administered as a rebate. First, it provides a convenient mechanism for collecting data on the number and type of solar installations: individuals must apply to receive it. Secondly, the rebated sales tax will reach more individuals. The rebate form allows participation by the do-it-yourself solar builder, who may have gathered his construction materials from a wide variety of sources. He or she submits copies of his or her receipts and is reimbursed by the state treasury for the sales tax paid. Otherwise, only retailers who specialize in solar units (primarily manufactured systems) would be prepared to make the sales tax exemption at the time of purchase.

3.2 SLIGHTLY SUBSIDIZED LOANS

The second major type of symbolic incentive is the "slightly subsidized" loan, meaning commercial loans which are available with standard downpayment and repayment schedules but with a rate of interest 1/2% to 1% below the current lending rate. Such programs have not yet proved to be important in sparking consumer participation, because the dollar amount involved is not significant. For example, if a consumer decides to retrofit his existing home with a \$2,000 hot water system and a \$5,000 hot air space heating system, a 25% down payment, 11.5% five-year loan would mean an initial downpayment of \$1,750 and monthly payments of \$115.45. A 1/2% interest reduction would mean the same down payment and \$114.14 per month, while a 1% interest reduction would only lower the monthly payments by \$2.65 to \$112.80.** Such a program has been attempted on a voluntary basis by the Massachusetts Department of Consumer Affairs. In January 1978, the governor and ranking state officials met with representatives of the state's banking community. One hundred fifteen savings, commercial, and cooperative banks and credit unions agreed to write loans for energy conservation measures and for solar systems at 1% to 2% below the current interest rate. From fragmentary evidence gained by a survey of

*Arizona, Connecticut, Georgia, Maine, Massachusetts, Michigan, New Jersey, and Texas.

**Calculated from repayment schedule tables in David Thorndike (ed.), Thorndike Encyclopedia of Banking and Financial Tables Warren, Gorham and Lamont, Inc., New York, 1974.

the participating banks, it appears that the consumer response to the program by the end of July 1978 has been limited. The 39 banks answering the survey indicated that they had received 744 inquiries about the program and had granted a total of 354 loans. Virtually all these loans were for energy-conserving home improvements, with less than 1% being for solar systems.*

The Massachusetts experience has shown that slightly subsidized loans are not a major financial incentive to the installation of solar energy systems. However, a detailed analysis of the same program shows that the response varied widely from bank to bank and from region to region within the state. Six of the 39 banks responding to the survey accounted for over 60% of the loans granted and ten banks provided 268 or more than 75% of the loans. This active consumer response to a few of the lending institutions is based on the willingness of these particular banks to actively advertise and promote the program.

It is important that a private bank or governmental agency advertise that it is willing to make solar loans. The interest reduction simply serves as notice to the consumer that the financial institution is serious in its commitment to promote solar utilization. The question remains: how low does the rate of interest have to fall before it begins to become an incentive to consumer participation? The Oregon Department of Veterans Affairs has provided financing for 50 to 60 solar systems in the first few months of its solar loan program, which allows up to \$3,000 at 5.9% interest for alternative energy systems. However, the success of this program, to be discussed at length below, may be attributable to factors other than the interest rate--such as the lack of a down payment, the long repayment schedule, and the many local offices of the department--than to the interest charged.

3.3 PROPERTY TAX EXEMPTIONS

After the oil embargo and the rapid rise of world crude oil prices, state legislatures first moved to address the issue of procedural barriers to solar installations. They focused initially on the question of property taxes. Requiring or permitting an exemption from increased property taxes because of the addition of solar components was an ideal first step. This step had high visibility, placed the legislature on record as endorsing equal or preferential treatment for solar technologies, but required no expenditure of state funds. The income foregone came out of municipal and local revenue rather than state tax income. No new administrative agencies had to be created, either at the state or local level. The additional training for existing assessors was simple and relatively straight forward. By the end of 1975, ten states had passed laws which took one of three approaches:

*Data drawn from Massachusetts Energy Office internal memorandum, "Results of Low-Cost Loan Program Questionnaires," July 25, 1978.

- solar systems will be assessed no more than comparable conventional fossil-fuel systems;
- solar systems will be exempt entirely from property taxation; or
- local governments have the right to enact measures which exempt solar systems from property taxes.

The number of states enacting one of these three approaches has grown steadily each year. By July 1978, 25 states had passed some form of property tax incentive legislation. Bills patterned after existing laws have been proposed in a number of the other states and will be considered in the 1979 legislative session. If these new initiatives pass, the property tax barrier for solar systems will become one of decreasing importance. However, given current concern in the state legislatures over citizen revolt over the subject of tax levels in general and property tax levels in particular, there is some concern over whether the movement toward universal adoption of solar property tax exemptions may be halted. There is growing legislative unwillingness to grant property tax exemptions or reductions of any kind unless they are administered across-the-board to all taxpayers.

3.4 INCOME TAX REBATES, CREDITS, AND DEDUCTIONS

The development and passage of legislation authorizing state income tax rebates, income tax credits, and income tax deductions for solar energy equipment has been slower and more deliberate than that of property tax exemptions. Unlike property tax or sales tax exemptions, solar tax credit and rebates could possibly constitute a significant demand upon the state treasury. In drafting tax legislation, each state has had to determine the size of the incentive needed to meet the legislature's objectives. This was complicated by a lack of consensus on what the goals should be. Mechanisms for administration had to be developed, standards and codes for systems drafted, and legislative oversight planned. Starting with the pioneering programs in Arizona and New Mexico in 1975, 16 states to date have enacted financial incentives which involve rebates, credits, or deductions from the state income tax.* These range all the way from the California 55% tax credit to the programs in Idaho and Colorado which allow the taxpayer to deduct the cost of his solar system from his gross income before determining his state tax liability. These incentives, together with the property tax programs, are listed in Appendix A. Half of these income tax related incentives are targeted solely at the residential consumer, while the others also serve commercial and industrial solar users.

*Alaska, Arizona, Arkansas, California, Colorado, Hawaii, Idaho, Kansas, Massachusetts, Montana, New Mexico, North Carolina, North Dakota, Oklahoma, Oregon, and Wisconsin.

3.5 LOW-INTEREST OR GUARANTEED LOANS

Beginning in 1975, six states* have adopted laws which provide for the granting or insuring of loans for the purchase of solar systems. As noted above, several of these programs have proved to be symbolic rather than major incentives since they provide for loan terms close to those of standard commercial banks. Others, however, offer significant savings to potential borrowers, either from reduced interest rates or from more liberal conditions (such as low down payments and extended repayment schedules). Several loan programs have been made available only to certain specific groups within the state population. For example, California has a no-interest loan program for disaster victims which provides up to \$2,000 if they install solar systems while rebuilding their homes, and has recently granted the Department of Veterans Affairs the power to increase its lending for homes with solar systems. Oregon has a program available only to veterans. The source of the capital to be lent in these programs ranges from electric utilities (Montana) to general state revenues (California) to special bond issues (the Oregon Department of Veterans Affairs).

In developing loan programs, the states have sought to overcome one or more of the following three perceived financial obstacles to rapid solar adoption:

- the high initial down payment on a capital-intensive system;
- the high total cost (because of both high initial capital costs and accrued interest);
- the unavailability of financing for solar systems, even on commercial terms, because of the reluctance of the financial community to lend funds on unfamiliar and untried technologies.

The major loan programs have tended to address the first two obstacles, while the more symbolic activities have been targeted primarily at the third perceived obstacle. As has already been noted, we have not found any evidence that commercial lenders have been unwilling to provide funds at prevailing rates for lenders with good credit ratings who are seeking to build well-designed solar units. Several major private lending institutions (the Bank of America and San Diego Federal, for example) have initiated their own programs of reduced-interest loans for energy-conservation measures or for solar systems.

*California, Massachusetts, Minnesota, Montana, Oregon, and Tennessee.

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SECTION 4.0

THE EXPERIENCE OF IMPLEMENTING FINANCIAL INCENTIVES IN SELECTED STATES

4.1 THE CHOICE OF CASES

As shown in Appendix A, 37 states have enacted some form of solar financial incentive. However, initial background research indicated that the universe of states with major solar incentives was in fact much smaller. Many states had enacted a single symbolic incentive or, most commonly, a solar property exemption. Time limitations and the pilot nature of this study also dictated that we focus on a few carefully chosen programs. After internal discussions and consultation with outside state solar leaders, we selected six states to examine in detail. These states' solar financial incentive programs shared some or all of the following characteristics:

- they contained substantial incentive packages, capable of giving sizable reductions in solar market prices to buyers;
- they were innovative, serving as models for other states seeking to develop solar incentive systems;
- they had been in place long enough to have developed experience on the process of implementing solar incentives.

A brief outline of the six states' programs follows. A more complete description of the details of each of the incentive packages is contained in Appendix B.

4.1.1 California

In late 1977, the California state legislature enacted the largest state solar tax incentive to date. The law allows a tax credit of 55% (up to \$3,000 maximum) on the cost of the solar system. For systems costing more than \$6,000 the taxpayer can file for either a \$3,000 credit or for 25% of the total cost, whichever is larger. The tax credit applies to both residential and to commercial installations, and unclaimed balances can be carried forward for five years. The credit is scheduled to terminate at the end of 1980 and recently has been revised (AB 3623) to clarify a number of points about systems and components qualifying for the tax credit and to clean up ambiguous sections in the original legislative language. As already noted, California also has a no-interest solar loan program for disaster victims. In late 1978 the legislature set up the Cal-Vet solar loan program, which allows an increase of \$5,000 on the ceiling amount for the existing veterans loan program if the home is equipped with a solar energy system. This last program has not yet been implemented.

4.1.2 New Mexico

New Mexico has the only state financial incentive which is administered as a rebate. Passed in 1975, the law allows a 25% credit, up to a total of \$1,000, for solar systems installed in a principal residence. Swimming pool heaters were added to the allowable systems in a 1977 legislative amendment. In addition, New Mexico allows an income tax credit, not to exceed \$25,000, for solar irrigation pumping systems. The last credit can be carried over for three successive tax years.

4.1.3 Arizona

Arizona has enacted a large number of financial incentives for solar energy, starting in 1974 with an exemption from increases in property taxes resulting from solar installations. Arizona also has a tax credit of 35% (up to \$1,000) for a solar system installed on a taxpayer's residence. Alternatively, a residential or commercial solar system can be amortized in 36 months against one's income for computing state tax liability. Lastly, solar devices are exempt from transaction privilege (sales) and use taxes.

4.1.4 Oregon

Oregon has developed a series of interlocked incentives to encourage the installation of alternative energy devices. In 1977, a 25% (up to \$1000 limit) tax credit for installing a solar system during the period between the beginning of 1978 and the end of 1984 was enacted. The credit can be carried forward for five years. To qualify, systems must provide either 10% of the total energy requirements of the home or 50% of the total hot water heating needs. There is also a property tax exemption for solar systems which will last through the end of 1997. Finally, veterans can receive a 5.9% interest loan of up to \$3,000 above the maximum allowable loan amount (currently \$42,500 on non-farm loans) if the additional funding is used for installing a solar system on the veteran's home. This system must provide 10% of the energy requirements of the house.

4.1.5 Massachusetts

Massachusetts has passed a number of small but innovative financial incentives for energy in addition to its major emphasis on energy conservation. The first provides for an income tax deduction for corporations only which allows them to subtract the total cost of a solar system from taxable income in the year the system is installed. Solar systems are exempted from property taxation for ten years and from state sales taxes as well. In addition, Massachusetts has two loan programs. The first allows banking institutions to make extended loans with higher total values for solar systems. The second is the voluntary program, already outlined above, in which 115 banks agreed to offer home-improvement loans with lower interest rates for solar installations and for energy conservation measures.

4.1.6 Maine

Maine recently conducted a successful state solar grants program to encourage the installation of solar equipment. Forty grants of \$400 each were given to individuals throughout the state to install solar domestic hot water heaters. The state also exempts solar devices from property taxation and rebates sales tax to purchasers of solar equipment. Both of the latter incentives run through the end of 1982.

4.2 THE METHOD OF ANALYSIS

Each of these six states was visited by one or more of the SERI project team. In the case of the larger, more complex solar incentive programs, three to five project members spent several days with local officials discussing problems of implementation, rule-setting, and institutional coordination. Whenever possible, in-depth interviews were held with three groups of individuals:

- the legislators and/or legislative staffers responsible for drafting the enabling legislation;
- the individuals charged with creating rules, regulations, and qualifications, and with processing claims for incentives;
- local solar energy activists, solar manufacturers, builders, and architects involved in solar design.

The focus of the discussions was implementation. Specifically, we were interested in ascertaining the role of the rule-setting agency in actually formulating policy; the basis on which the rule-setting and administering agencies made their implementation decisions; the way in which the more difficult policy questions were dealt with; and the effects these implementation decisions had on the promotion of different solar technologies and on the population segments within the state able to take advantage of the financial incentives.

In the following subsections, we will differentiate between rule-setting and administration. Rule-setting for these financial incentives includes the creation of eligibility criteria for solar systems, the development of standards and codes, and the interpretation of the portions of eligible systems allowable for state incentives. Administration deals with handling of applications for the state incentive once eligibility criteria have been determined and includes the development of forms, the requirement of supporting documents (receipts, certificates of residency, etc.), and the interpretation of the eligibility criteria in particular cases.

4.3 THE LOCATION OF RULE-MAKING

The state legislatures have delegated authority for rule-setting and administration in solar financial incentives to a number of different types of state agencies: tax departments, building code authorities, state energy and natural resource departments, consumer affairs departments, banking regulatory bodies, and specialized constituent service agencies. In some cases (such as Oregon), a number of different programs have been developed, each with a different rule-setting and administering agency. In other instances, the enabling legislation has made no delegation at all, leaving it for interested agencies to determine among themselves who should interpret the legislative intent. In more than one case, the agency that wrote the rules and regulations was not the one specified in law but the one with the most interest and expertise in solar energy and energy conservation.

Each of these patterns will be considered in turn as an option. For each of these locations of rule-making, we will enumerate a number of potential advantages and drawbacks that individuals active in the solar field have expressed during our interviews. Then the actual impact on the implementation process of the different types of rule-setting and administrative institutions will be examined, based on the experience of the limited number of states visited during this survey. In a subsequent part of this section, the lesson learned from each state will be sketched to provide information to officials in other states contemplating solar financial incentives.

A word of caution is in order. The universe of cases in some of these categories is extremely small, making generalizations difficult and potentially misleading. As the sample size diminishes, the influence of extraneous outside variables increases. Nonetheless, we feel it may be useful for state officials planning incentives or for researchers considering the evaluation of incentive programs for this report to indicate which of the common concerns about implementation have been justified in a select sampling of states.

4.3.1 Rule-Setting by the State Solar Energy Office

The most common pattern encountered in this study was for the solar office within the State Energy Department or within the State Department of Natural Resources to write the rules and regulations governing the enacted state financial incentives. This usually took place at the direction of the legislature, but there were cases (e.g., the Massachusetts tax credit for commercial installations) where the local solar office volunteered to undertake the task for the agency legally responsible for rule-setting.

Rule-setting by the state solar office has several potential advantages. First, the individuals writing the regulations are generally familiar with the range of solar technologies and with the problems being confronted by local solar manufacturers and installers. This is particularly important for

passive solar systems. The complexity of passive configurations can present major difficulties even to an experienced solar engineer when determining system eligibility for financial incentives. Second, members of state solar offices tend to be aware of the approaches attempted by other states. The solutions developed by the pioneering states (particularly New Mexico but now also California) have been adopted selectively by other state energy offices as models for their own programs. Third, solar advocates argue that state energy offices will promulgate rules and regulations which will be more inclusive of the broad spectrum of solar technologies than those developed by other institutions. The energy office officials are more familiar with and comfortable with non-standard hot water heating, space conditioning, and energy conservation systems than are other state officials. This is particularly important for passive design and for low-cost, low-efficiency units (greenhouses, window hot-air heaters, "bread-box" water heaters, etc.).

The main concern voiced by solar advocates and by solar builders interviewed was that the state solar energy offices tend to take a highly technical engineering approach. This means writing rules and regulations which are very detailed and complex, sometimes difficult to understand, and inflexible. There is also concern that solar energy office rules are biased toward efficient units, requiring that many energy-conserving but capital-intensive supplements (mandatory conservation devices) be added along with an installed solar unit.

In California, Arizona, and Oregon, the state energy agency was the lead institution for the determination of eligibility for state financial credits and the formulation of implementing regulations. In Maine, the State Office of Energy Resources was responsible for rule-setting and administration of the state-funded solar hot water initiative. State energy offices or state solar offices played lesser but still critical roles in the determination of eligibility for the Oregon V.A. loan program and the Massachusetts corporate tax deduction. In every case, the drafting of the rules and regulations was the work of one or two individuals (although in California an extensive coordinating system was set up for comments both from within the Energy Commission* and from other interested agencies). These individuals normally devoted a major portion of their work time to solar energy, alternative energy technologies, and/or energy conservation. They were familiar with solar concepts and solar hardware. This acquaintance with solar technology and with developments within the solar community led them to share several common perceptions. All were strong advocates of passive design. All were concerned that the state government should encourage the installation of low-cost, home-built systems. These common perceptions were reflected in the rules and regulations which were drafted. In five of the six states, the rule-drafting individuals

*The formal title of the Energy Commission is the Energy Resources Conservation and Development Commission. It will be referred to in this report by its popular name, the California Energy Commission or CEC. It should also be noted that the solar office staff does not actually engage in rule-setting. Rather, it makes recommendations to the commissioners, who then approve, modify, or reject the recommendations.

devoted considerable attention to passive design concepts (with the exception of Maine, which was by legislative edict only concerned with manufactured hot water systems). All allowed some credit for home-built or backyard systems, although they varied considerably on the question of installation costs.

All the energy office staff members who drafted implementation procedures for solar tax incentives were aware of the procedures adopted by other states. The imprint of the New Mexico eligibility criteria, in particular, can clearly be seen on the programs that were developed in 1977 and 1978. But energy office staff members were not aware of how the implementation process had worked in other states and what problems had been encountered using the criteria and regulations that had been developed. They also displayed a general lack of knowledge about what local political, demographic, and climatological factors led to specific choices of rules and regulations in other states. There is, therefore, some danger of the transfer of inappropriate implementation procedure, but thus far it has not been a significant problem.

One obvious question that arises is: is there a conflict between being a solar energy specialist and being the impartial administrator of legislative intent? Are the rules developed by the energy office staff members more liberal toward solar energy than those developed by the staffs of other agencies? The tentative conclusion we have reached is a mixed one. Because they are aware of the broad spectrum of currently available or evolving solar technologies, state energy offices tend to issue guidelines or adopt procedures which include in detail virtually every conceivable solar configuration. This is particularly true of the California guidelines, which are a virtual encyclopedia of possible combinations of active and passive components, storage mechanisms, heat transfer systems, and controls.

The breadth of the analysis does not mean that all of these components are considered to be totally eligible for the tax credit. Rather, the broad analysis is introduced precisely so that differentiation can be made between similar components, some providing useful energy and others not. The detailed criteria are often designed to exclude bad systems as well as to include new and innovative technologies. For example, the California Energy Commission (CEC) established three separate climatological zones (Heating, Heating/Cooling and Cooling), and then spelled out separate eligibility criteria for each. For example, a thermal mass wall must be fully shaded for the entire day on August 21 in the Cooling climate zone and in the Heating/Cooling climate zone to qualify for the tax incentive. No more than 75% of the thermal wall cost will be eligible in the Cooling climate zone (100% in the other two zones).

At the other end of the spectrum, the Oregon Department of Energy has adopted virtually no rules and regulations, other than ones to insure that the solar system is safely constructed. The basic eligibility criteria are the ones established by the legislature: the solar system must provide 10% of the energy requirements of the home and must be located on or in a taxpayer's primary or second residence. There is a conscious effort to make the tax credit available even to unusual or untried designs. Only four requests have been turned down thus far, two because the systems were clearly mis-sized for the structures and two because they were submitted by builders who engaged in speculative housing. The Oregon Department of Energy screens and evaluates each system before it is built, allowing its staff to suggest modifications

which will make the system work better or which will bring down the estimated cost. In this capacity, the Oregon Department of Energy serves not only as an eligibility adjudicator but also as an energy extension service.

4.3.2 Rule-Setting by the State Taxing Authority

In a few states, the Department of Revenue has been instructed by the legislature not only to administer a solar financial incentive but also to write the rules and regulations that determine the systems and components which qualify. The concept of such an approach elicits strong but mixed reactions from state officials and solar advocates. On the positive side, the taxing authority can be expected to write regulations which are relatively uncomplicated and therefore easy to administer. As the author of the New Mexico solar tax incentive rules and regulations explained his approach,

. . . You can make regulations just as complicated as you want or as simple as you want. My experience over the years has been that every set of state or federal regulations that I have run into has been so complicated with governmental gobbledygook that John Doe on the street could not understand it. Our approach in the very beginning was to develop regulations that would be easily understood by anyone and that would be readily administered by the Bureau . . . [and] by a person who was not necessarily of a technical or professional background.*

Second, as part of the drive to ease administrative burdens, the taxing authorities tend to write regulations which are unambiguous. The line between systems which qualify for the incentive and those which do not is clearly drawn. This helps reduce the uncertainty of the consumer over whether or not a system he or she is considering will qualify for the financial incentive.

Other officials and private individuals interviewed in the course of this study expressed concern over whether taxing authorities should be in the business of writing solar rules and regulations even if they were to be implementing those rules. The major worry is that the taxing and revenue departments will write restrictive regulations in order to limit the impact of the incentive on the state treasury. A narrow interpretation of the legislative intent or the inclusion of restrictive performance standards could well blunt the effectiveness of even a large solar financial incentive. There is also concern that the taxing authorities will restrict eligibility to the proven designs (generally manufactured active systems) because of their lack of familiarity with solar design and because they wish to insure that the systems supported by state funds will definitely work. Thirdly, there is apprehension that state treasury officials will be opposed to using the state taxing structure to provide incentives for anything, and will not provide adequate staffing to handle the solar tax incentive load. Slow processing will, in turn, discourage citizens from applying for the incentives.

*Interview with M.L. Morton, August 18, 1978.

In the six states that were surveyed for this section, the state tax departments were involved to different degrees in the implementation of the financial incentive legislation. In New Mexico, the Department of Revenue and Taxation both drafted the eligibility criteria and administered the certification and approval of solar systems applying for the 25% tax credit. This case will be discussed below under "Lessons Learned from the Individual States Implementation Experiences." In the other five states, the taxing authority developed the regulations for the administration of the financial incentive and acted in an advisory capacity to the energy office in the creation of the eligibility criteria and in the interpretation of the legislative intent.

The disparities among the state taxing authorities and among the state solar incentive packages makes it difficult to formulate generalizations. But, from discussions with officials in the states visited for this project and from examination of the transcripts of the state public hearings on proposed solar rules and criteria, several common threads do emerge.

First, taxing authorities generally insist on a stricter interpretation of legislative mandate than do state energy offices or specialized state solar offices. Taxing and revenue officials are generally less willing to stretch the language of the statute to accommodate solar technologies if they have not been specifically addressed.

Second, state taxing authorities are leading advocates of simplicity within the state government in implementing regulations. They are willing to sacrifice some technical rigor in the enumeration of all possible solar configurations in exchange for a simple codification of system types and all allowable incentive amounts.

Third, state tax officials are strong supporters of labeling programs, such as the Cal-Seal program.* Such a program, run either by a state agency or by the industry itself, would simply indicate whether or not the system qualifies for the financial incentive. The state tax auditor then would have only to look for the certificate of eligibility; those with a certificate would automatically qualify and only the unusual or non-standard systems would have to be dealt with on an individual (and time-consuming) basis.

Fourth, there are officials within the various state taxing offices (and within other agencies as well) who are philosophically opposed to the use of the taxing system for any other reason than the collection of revenue. They are not anti-solar. Indeed, many think that the encouragement of solar energy is a correct public policy choice. Rather, they are against using the tax mechanism to provide incentives or subsidies of any kind. They argue that this practice makes the tax system more complex and more difficult to adminis-

*The Cal-Seal program (officially the California Tax Credit Labeling Program) is a joint government-industry project designed to assure the consumer that the system he is purchasing meets state-established criteria for the state financial incentives. The program is being developed by the California Solar Energy Industry Association, with the label being affixed by the installer.

ter. The income tax system may become less equitable by granting tax exemptions not on the basis of income but by some extraneous criteria (the installation of a solar device). The effect these feelings have on the implementation of solar financial incentives is unclear. There does not appear to be, in any of the states visited, any effort by the tax department to adopt restrictive practices or to institute requirements which would make it difficult to apply for the incentives.

Tax departments have shown some initial reluctance to provide additional services for the energy policy planner which are clearly outside the tax field. For example, the California Energy Commission staff originally proposed that the Franchise Tax Board (FTB) request the attachment of a solar questionnaire to those returns seeking to claim the California 55% tax credit. The Franchise Tax Board staff strongly objected, arguing that it was not its function to do so and that the FTB did not even have the legal right to request this from taxpayers. After lengthy negotiations, the Research and Statistics division of the Franchise Tax Board agreed to provide to the CEC a sophisticated analysis of the returns of those individuals claiming the solar credit for the 1977 tax year. What will be needed for other states is the creation of institutional mechanisms for gathering data useful to program evaluation, such as the information the California Franchise Tax Board is currently developing or that the New Mexico Department of Taxation and Revenue has already prepared (see Table 3 below).. This may require the transfer of funds or personnel from the energy office to the taxing authority, since revenue officials may see this function as an unnecessary burden and a waste of scarce resources.

4.3.3 Rule-Setting by an Independent State Authority

The third alternative is to delegate the power to implement a solar financial incentive to an agency whose primary function is neither energy nor taxation. For example, the law establishing the corporate income tax deduction for solar or wind systems in Massachusetts delegated the implementation to the Bureau of Building Construction. The Oregon state legislature authorized the state Department of Veterans Affairs to grant up to \$3,000 above its maximum lending limit for single family homes for the addition of solar systems.

Most of the same potential problems foreseen with state taxing authorities can also be encountered with independent agencies. The promotion of solar energy and/or energy conservation is not the primary institutional objective of such an agency. Its officials are not necessarily familiar with the alternative energy technologies, with the development of incentives in other states, or with the potential impacts of certain types of rules and regulations on the level and direction of solar activity. But the primary uncertainty stems from the high degree of autonomy enjoyed by such organizations, particularly if they are not dependent on the state legislature for annual appropriations. Such an organization can with impunity virtually ignore legislation which enables it to do something that it does not wish to do. The resistance to change, and to outside pressure of some large state agencies (such as the New York Port Authority or the highway departments of most states) is legendary. However, this autonomy can also work to the advantage of a state solar incentive. Such agencies are quite free to interpret their legislative mandates

liberally, and to write general guidelines rather than strict sets of rules and regulations. They are also free to change their internal working procedures, as they gain more experience with solar technologies, without recourse to extensive public notice and hearings. They can engage in multi-year planning. We will return to the question of institutional autonomy at length below, both as a general question and in the context of the solar incentive administration by the one state independent agency that we examined in depth.

In the states covered by this analysis, there was only one significant example of the creation of rules by an autonomous state agency: the solar loan program of the Oregon Department of Veterans Affairs (DVA). The program is unusual in both its concept and implementation. The program's success in both promoting solar installations and encouraging innovative designs results from a number of factors which are difficult to separate. The size and importance of the Oregon Department of Veterans Affairs within the state's housing market must be emphasized. It provides financing for one out of every four single family dwellings in the state of Oregon, making it the largest originator of mortgages on such units in the United States. The total dollar volume of these new mortgage loans is currently over 75 million dollars a month or close to a billion dollars a year. All this activity (including the maintenance of fourteen field offices) is accomplished without appropriations from the state treasury. The DVA sells tax-exempt bonds, and charges the veteran loan applicants a rate which covers the bond service and all operating expenses (currently 5.9% interest). Thus, the DVA is both large, providing a major portion of the state's residential housing financing, and it also has considerable policymaking flexibility.

The DVA is authorized by a 1977 law to increase the maximum amount allowed for a loan by up to \$3,000 in order to cover the cost of solar system. The enabling legislation has only one requirement, that the alternative energy system provide 10% of the energy requirements of the residence. In implementing the law, the Oregon DVA consciously has chosen not to write an extensive set of rules and regulations to interpret and codify the legislative intent. Instead, it has added only two common-sense qualifications to the 10% requirement:

- "Minimum expected operating life of alternative energy systems must be at least 10 years."
- "Alternative energy devices must be installed in a location and in a manner that will optimize their operation."

These internal guidelines are designed primarily to insure consumer protection rather than to dictate the choice of a solar system. As the chief reviewer for solar applications in the central DVA office put it, "To summarize our requirements for our solar program, it's like a loose set of pajamas that most anyone can fit into." The lack of specific guidelines could provide some difficulties for the individual loan officer, particularly because the loan approval authority is decentralized to the fourteen DVA field offices. This has not been a problem thus far. Each loan office has local consulting

architects and engineers on call for assistance. Where the local consultants are uncertain about the feasibility of a proposed system, the central office provides a technical review.

Because of the decentralized nature of the DVA review process, it is difficult to obtain estimates of the number of loan applications which have taken advantage of the solar provisions. This is particularly a problem with passive solar systems, since some loan officers have not interpreted new homes with mass walls and/or large south facing windows as solar homes but as regular houses. If the individual does not require the additional \$3,000 for the loan principal, no notice is taken. A best guess of the central DVA office is that there had been 50-60 approved solar loan applications through the end of July 1978, but there is currently no way to verify this figure.

Although administration of the DVA solar loan program is decentralized, rule-setting is not. It resides with the director who is responsible for day-to-day operations. He does not have to go through the normal notice and comment procedures required of other state officials. When there is a perceived need to change internal procedures to facilitate administration, these changes are simply promulgated and distributed to the field offices. Such flexibility is unusual for a state governmental agency, reflecting the traditional autonomy from political direction that the Oregon DVA has enjoyed. As experience with the solar loan program grows, this administrative adaptability will enable the DVA to rapidly fine-tune its programs and procedures to increase public participation and acceptance.

4.4 THE ROLE OF INTER-AGENCY COMMITTEES

In the six states surveyed for this section, none had formal rule-setting or administration by a joint agency task-force. In each case, one agency was charged with that responsibility by the legislature. In many specific programs the enabling legislation did require coordination between agencies either to insure compatibility between the rules promulgated and the administrative practices or to make certain that rules and regulations were technically correct. The Oregon Department of Veterans Affairs was required to adopt minimum performance criteria for alternative devices "with the advice and assistance of the Department of Energy." The law mandating the California 55% tax credit stated:

On or before January 1, 1978, the Energy Resources Conservation and Development Commission shall, after one or more public hearings, establish guidelines and criteria for solar energy systems which shall be eligible for the credit provided by this section. The Franchise Tax Board should describe such regulations as may be necessary to carry out the purposes of this section.*.

*California Revenue and Tax Code, Chapter 1082:17052.5.

In the smaller state governments examined in this study, such mandated cooperation has been largely unnecessary. Effective coordination during the rule-drafting stage is usually assured by the interpersonal contact between officials working in the same issue areas. A shortage of personnel in the offices charged with writing regulations and criteria also has necessitated drawing upon the time and expertise of individuals from various interested governmental offices.

In the larger state governments, coordination and consensus-building are major problems. Each large organization has its own internal objectives and operating procedures. The California Energy Commission, for example, has 600 employees, while the Franchise Tax Board has a staff of over 2000. Reaching a consensus within such large organizations, much less between them, is often difficult. The difficulty increases when the legislative mandate is ambiguous or when a great deal of discretion is delegated to the rule-setting agency. During the drafting of the eligibility criteria for the California 55% tax credit, a dispute arose within the CEC between the Solar Office and CEC's Conservation Division over the inclusion of mandatory conservation practices within the interim guidelines to be published at the end of 1977. The Conservation Division wanted to require a large number of conservation steps in order for a solar system to qualify for the tax credit, while the Solar Office felt that these were not within the legislative mandate and would discourage taxpayers from applying for the credit. The Conservation Division published its results separately, rather than trying to integrate them with the Solar Office draft, and this caused further difficulties in building consensus in the public hearings that followed. By contrast, the Franchise Tax Board, the CEC Solar Office, the CEC legal staff, and the Office of the State Architect worked together informally to go over numerous drafts of the proposed regulations, so that institutional concerns over implementation and administration could be accommodated before the rules were filed as administrative regulations (thereby giving them the force of law).

Finally, the term "inter-agency cooperation" can be considered a euphemism for the transfer of effective rule-formulation from one agency to another. For example, the Massachusetts state legislature delegated to the Bureau of Building Construction the responsibility of identifying which systems would be eligible for the 1976 corporate alternative energy tax credit. Each solar or wind system would have to comply with "applicable provisions of regulations and standards issued by him [the director of the Bureau of Building Construction] pursuant to law." This rule-setting responsibility was given to the BBC because it had been the implementing agency for earlier legislation on life-cycle costing and because, as one legislative aide put it, it "had the technical staff." At the time that the Solar Action Office came into existence in mid-1977, no eligibility criteria had yet been developed or administrative procedures set up. In part, this resulted from the requirement in the law for the submission of a "manufacturer's British Thermal Unit impact statement" to the BBC as part of the certification process. No one involved had any concept of what this impact statement meant or what it was supposed to accomplish. Members of the Solar Action Office volunteered to assist in the formulation of implementing rules and regulations for this tax credit, in part because of their interest in insuring that the credit was applied to a broad range of solar technologies (including passive) and not just high efficiency

manufactured active systems. The Solar Action Office staff developed a comprehensive set of eligibility criteria, based heavily on the New Mexico rules and regulations, and gave them in draft form to the BBC for its use.

By the end of August 1978, no final eligibility criteria had been established. Both the BBC and the Solar Action Office have been pre-occupied with other more pressing matters, so implementation rules or administrative practices have yet to be formulated. Responsibility for writing rules and regulations was de facto transferred to another agency, but without the transfer of administrative power to insure that the program was in place, running, and accessible to the public. Whether the lack of momentum in implementing this particular incentive was the result of a lack of applicants for the credit or, alternatively, whether the lack of applicants was the result of the lack of administrative procedures and outreach efforts is difficult to ascertain.

4.5 THE ROLE OF THE IMPLEMENTING AGENCY IN SETTING POLICY

Virtually all the legislation enabling state solar energy financial incentives to date has been vaguely worded. A typical solar bill establishes the size and duration of the incentive program and usually indicates who is to undertake the administration. Few laws address in detail the issues of which systems or parts of systems qualify. In resolving these issues, the implementing body is in fact setting policy. The experience of the states examined in this study indicates that the delegation of policy-setting, as well as policy-implementation, has been substantial. Solar energy is a technology which state legislatures support but in which they have little accumulated experience. Therefore, there has been even more of a tendency to delegate authority in this field than in other more traditional state governmental activities.

There have been several major issues which have arisen in virtually every state during the implementation process. If they were not specifically addressed in the enabling legislation, they were resolved either by the enabling agency or by a ruling of an outside arbitrator. The treatment of these core issues, as much as the size and form of the incentive, will determine who will take advantage of the state incentive and what types of systems will be favored. These major issues are:

- the treatment of passive solar energy systems;
- the applicability of the incentive to installation costs;
- the eligibility of builder-financed (speculative building) residential units for a tax incentive; and
- the inclusion of mandatory conservation measures as part of the requirement for qualifying for the solar financial incentive.

To assess the actual impact on policy outcomes of the implementation process, we have attempted to examine systematically the experience of the major programs for direct grants, tax rebates, tax credits, or major loan programs

among the six states we visited in the course of this study. In each program, we have determined whether these four issues were resolved in the enabling legislation, by the rule-setting (regulatory) body, or by appeal to some outside arbitration agency for a ruling. When an outside agency was consulted, in each case it was the legal counsel for the energy agency or the legislative council who was asked to provide a legal opinion on the agreement of some proposed rule with the intent of the law. In Table 1 below, the results are shown in tabular form. As can be readily seen, the original legislation provided sufficient guidance in only a small minority of the cases. In those cases, this guidance usually was explicitly to eliminate an item from inclusion in the credit--installation costs in the case of Maine and New Mexico and nonactive systems in the case of the Maine property tax exemption. Otherwise, it was up to the energy office, taxation and revenue department, or legal counsel to determine just what the legislature intended to include. At times these decisions seemed to bear little resemblance to the original law. The best examples, perhaps, are the inclusion of swimming pool covers in California and swimming pool heaters in Oregon.

Most of the controversy in the development of implementation procedures has focused upon passive solar devices. In particular, much of the rule-setting effort and much of the public hearings and comments that followed the promulgation of rules has dealt with the treatment of four passive components: south-facing windows and skylights, trombe walls, greenhouses, and pool covers. As Table 2 below shows, the inclusion or exclusion of these four components in the computation of the major state financial incentives we have examined was determined almost exclusively by the agency writing the regulations, with some assistance from outside legal counsel. In virtually every case where the legislature has not predetermined the outcome, the rule-setting officials have opted for a partial or complete inclusion of the passive technology among the systems eligible for the financial incentive. The one exception was swimming pool covers, which straddle the line between solar systems and energy conservation devices.* Pool covers have caused a disproportionate amount of both political and public policy problems for the rule-setting agencies. They are only marginally solar devices, serving primarily to lower the energy necessary to heat the pool by other means (often natural gas). They also conserve water by limiting evaporation. They are normally purchased by individuals in upper income groups, which leads to the question of whether the state legislature intended to provide a financial incentive which would only apply to the affluent. However, the pool cover industries

*The controversy over whether pool covers provide positive solar gain is still unresolved and revolves in part around the difference in performance between clear and opaque covers. The California Energy Commission is currently considering the funding of a study to examine and compare the performance of different pool covers. For a good discussion of pool covers, rule-setting, and tax credits, see Michael DeAngelis, "The Challenge of Establishing Eligibility Guidelines for the California Solar Energy Tax Credit," Proceedings of the 1978 Annual Meeting of the American Section of the International Solar Energy Society, Inc., Vol. 2.2, 1978.

Table 1
Summary of Decision-Points for Core Issues
In State Solar Financial Incentive Programs

ISSUE AREA	Maine	New Mex.	INCENTIVE TYPE					Cal. Disaster Victims	Oreg. V.A.	
			Direct Grants	Tax Rebate	Tax Credit					Loans
					Cal.	Ariz.	Ore.			
Passive Systems	Non- Applicable	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem		
Installation (Labor Costs)	No Legisl	No Legisl	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem		
Mandatory Conservation	No Implem	No Implem	Yes Implem	No Implem	No Implem	No Implem	No Implem	Yes Legisl		
Speculative Housing	No Legisl	No Legisl	Yes Legisl	Yes Implem	No Arbitr	No Legisl	No Legisl	No Legisl		

Code: Legisl = determined by legislation
 Arbitr = determined by outside arbiter
 Implem = determined by rule-setting agency

Yes = is eligible in part or in entirety for financial incentive
 No = is not eligible for financial incentive

Table 2

Summary of Decision-Points for Core Passive Issues

In State Solar Financial Incentive Programs

	Direct Grants	Tax Rebate	Tax Credit				Loans	
Passive Issues Area	Maine	New Mex.	Cal.	Ariz.	Ore.	Mass.	Cal.	Oreg. V.A.
South-Facing Glass	No Legisl	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem
Trombe Walls	No Legisl	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem
Greenhouses	No Legisl	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem	Yes Implem
Pool Covers	No Legisl	Yes Implem	Yes Implem	Yes Implem	No (except w/solar pool heaters)	No Legisl	No Legisl	Yes Implem

Code: Legisl = determined by legislation
 Arbitr = determined by outside arbiter
 Implem = determined by rule-setting agency

are well-organized lobbying groups in certain states (particularly in California and Arizona). They have provided extensive testimony in public hearings and have marshalled significant political support from their home district representatives. Given these factors, it is likely that pool covers will continue to present a difficult dilemma for agencies in the West and Southwest attempting to implement ambiguously written state incentive laws.

4.6 LESSONS LEARNED FROM THE INDIVIDUAL STATE IMPLEMENTATION EXPERIENCES

4.6.1 California

Complex and comprehensive eligibility requirements may be required if the rule-setting agency wants to insure the performance of the solar system. This is particularly true in passive or direct thermal heating systems. The Solar Energy Office of CEC chose to list all the linked components (shading, ventilation, etc.) which should be present for acceptable performance of a direct thermal heating system and for each climatic zone of the state. Without these components, the system is not eligible for the tax credit. By contrast, the New Mexico criteria simply describe each system and indicate which components are eligible for tax credit. The homeowner or architect is assumed to be knowledgeable enough to provide the other system parts necessary for optimal performance.

Comprehensive rule-setting will provide some consumer protection, particularly in the area of passive heating systems, by denying eligibility to incomplete systems or to systems which are inappropriate for a particular climatic area. This leverage is possible primarily because of the large size of the California tax credit. Otherwise, builders and designers might just proceed with their construction of incomplete or badly sized, but cheaper, systems and forego the tax credit.

Procedures developed by a state rule-setting agency which require action by a separate administering agency should be coordinated at the earliest possible stage in the rule-setting process. This will prevent the need for later revisions and reworkings. However, there are instances where no compromise is possible. For example, the CEC staff provided in the interim solar tax credit guidelines for the inclusion of a data form to be submitted to the Franchise Tax Board. This provision had considerable merit, since it would provide invaluable information to policy analysts on the types of systems being installed and the type of individuals taking advantage of the credit. However, the Tax Board staff was opposed from the very beginning to handling this form for a number of legal and procedural reasons. No arrangement amicable to both organizations could be worked out before the regulations were promulgated and the idea was shelved for later consideration.

Rule-setting in areas not specifically addressed in the legislation may be more difficult in large states with more comprehensive state governments and active local solar energy industry groups. Such rules and regulations are likely to be challenged in public hearings or even in litigation if they go beyond the legislative mandate or any implied intent. In California, a

dispute arose because of the Energy Commission plans to require warranties and certain conservation devices. These were strongly challenged by the California Solar Energy Industries Association as being unsupported by the law and unnecessary.

The process of implementation is also one of consensus-building and compromise. Technical rigor and technical interpretation of legislative intent are sometimes discarded in the face of organized opposition. Such is the case in California for the treatment of pool covers. These devices were included within the eligibility criteria for the solar tax credit over strong objections within the Solar Energy Office. Certain staff members felt that pool covers were not proper solar devices and that their inclusion would act as a subsidy to the rich. This point of view was over-ruled, in part because pool covers are effective energy conservation devices and in part because the pool cover industry would have been a formidable political obstacle if pool covers had been excluded from eligibility.

4.6.2 New Mexico

The institutional location of the rule-setting individuals may be less important than their personal expertise and predilections. The fact that the creation of eligibility criteria was delegated to the Department of Taxation and Revenue did not result in a set of rules restricted to manufactured active systems or proven technologies. Instead, the rules established by the department not only specify all varieties of passive systems, storage mechanisms, and heat transfer mechanisms but also include experimental systems (eutectic salts) and theoretical systems which have just reached the experimental level (metal hydride systems).

Clear and precise eligibility criteria can be administered readily by individuals untrained in solar engineering and design. The New Mexico tax auditor currently charged with determining eligibility of systems and system sub-components is having no problem assessing even the complex passive systems which comprise a significant portion of that state's solar tax credit applications.

A rebate is no more difficult to administer than a credit or deduction, and may well require less administrative personnel. This is because taxpayers can apply over the entire course of the year, thereby spreading the administrative load relatively evenly. Tax credit applications, by contrast, occur between January 1 and April 15, with the actual processing load occurring between March 15 and July 1.

The initial results from the New Mexico Department of Taxation and Revenue indicate that the tax rebate is reaching the intended social and economic groups within the state. The rebates approved thus far in 1978 (for the tax year 1977) have reached a middle class constituency; there has been some participation by low-income groups as well. In New Mexico, solar energy is not just a plaything of the rich. This can be seen in Table 3 below which breaks down the rebate recipients by their adjusted gross income and marital status. Virtually all the single solar rebate applicants had incomes under

Table 3

1977 New Mexico Solar Tax Rebates (Through September 1978)

<u>Filing Status</u>	<u>Adjusted Gross Income</u>						Retired
	Low Income*	Under 10,000	10,000- 20,000	20,000- 30,000	30,000- 40,000	Over 40,000	
Married	3	17	46	37	15	14	1
Single	0	7	10	1			
Unmarried Head of Household	0	1		1			
Total	3	25	56	39	15	14	1
% of Total Approved Claims	2.0%	16.3%	36.6%	25.5%	9.8%	9.1%	0.7%

Source: This information was kindly compiled by Fabiola Gonzales and Michael Seabrook of the New Mexico Department of Revenue and Taxation.

*Low income means less than \$8,000 income from all sources.

\$20,000, and 75% of the married applicants had total incomes of under \$30,000. The New Mexico Department of Taxation and Revenue is currently compiling this information for the 1976 and 1975 returns as well, so that a time series description of the recipients will be available.

4.6.3 Arizona

The choice not to engage in rule-setting or in the development of eligibility criteria is a real option for implementing agencies. A lack of rule-setting can result from a number of factors, ranging from a lack of available manpower to write the regulations to a philosophical commitment to the promotion of innovation. The Arizona experience shows that one option for the rule-setting agency is generally to define solar systems and then leave the interpretation of the broad legislative mandate to the individual taxpayer. Those who feel they have built or purchased a system which qualifies simply indicate the cost of the system (including personal labor) in taking advantage of the tax credit.

State governmental administrative agencies can also elect not to adopt procedures for screening solar financial incentive applications. In Arizona, no forms have to be filled out nor does supporting documentation have to be submitted to take advantage of the tax credit. This lack of paperwork probably will result in an increased number of applicants taking advantage of the credit. The state does plan to require receipts and documentation if an application is selected for audit. The lack of extensive review procedure by the tax authorities also will lower the amount of administrative effort required by the solar credits during the peak period of state income tax processing. The maximum amount of innovation and experimentation will be encouraged, since the choice of solar technologies or configurations will not be restricted in any way.

The lack of eligibility criteria, prior certification, and administrative screening does create problems. A heavy burden is placed on the tax auditors who have no guidelines from which to work, no practical limitations on their authority, and limited experience in judging the technical feasibility or cost of solar systems. The lack of eligibility criteria also raises the questions of protection of the consumer and of protection of the state treasury from subsidy payments to useless, fraudulent, or marginal solar systems. All of these issues have been clearly identified by the Arizona state officials, and work is underway to develop eligibility guidelines and procedures by the end of 1978.

The Arizona state income tax credit will be added to any federal credits, rather than be reduced by the size of the federal credit as is the case of California. There are several advantages to initially designing a state financial incentive to complement future federal incentives. This approach will multiply the impact of each incentive on the prospective solar consumer, while sharing the total cost of the subsidy between levels of government. Structuring the credit as an additional incentive also demonstrates a concrete commitment to the solar industry and to the potential solar consumer. The state government's support for solar commercialization is shown to be long-

term and not just a stop-gap measure until the arrival of federal tax credits. In contrast, in New Mexico no income tax credit can be received from the state if credit is also received from the federal government.

4.6.4 Oregon

Prior certification, the approval by a state official that a proposed system meets eligibility criteria for a financial incentive, works. Case-by-case approval of solar applicants for the solar tax credit thus far has not caused any difficulties for the administering agency (the Oregon Department of Energy). Prior certification has several distinct advantages when used in the proper context. It removes the necessity for writing standards and codes. In their place, a simple performance criterion (10% of household energy needs) is used. Experimental or novel systems can qualify, thus encouraging innovation and local adaptation of existing technologies. Prior certification also reduces consumer uncertainty. The consumer knows before the system is built or installed that his or her system will qualify for a tax credit. Consumer uncertainty over whether or not the system has a reasonably good chance of performing as promised is also reduced. Experienced solar engineers within the Oregon DOE quickly can identify systems which are fraudulent or questionable. If the system is overpriced for its performance, the Oregon DOE examiner can suggest (and this has been done) that the consumer consider seeking bids from other sources. The examiner can make suggestions which will increase the system performance, thereby increasing the quality of the installations being subsidized by the tax credit. Finally, prior certification also greatly eases the administrative burden on the Department of Revenue (DOR). The applicants have already been screened, so the DOR simply has to verify that the installation was done as proposed. This does not require any solar engineering expertise on the part of the tax auditor, nor does it require extensive review for each application. On the other hand, the current prior certification process might become unmanageable if the number of applications increased dramatically. If 5,000 solar tax credit applications were received each year, a whole staff of engineers working full-time would be required just to screen them. Prior certification currently works in Oregon, but this does not insure that a similar system would work in California where the population is large and the number of solar system types quite diverse.

Independent state agencies such as the Oregon Department of Veterans Affairs can serve as powerful stimuli for accelerated solar commercialization. Institutional autonomy and administrative flexibility make the DVA an ideal choice to implement an incentive for a rapidly changing technology. Also, the DVA has an existing decentralized infrastructure for delivering information about the incentive to potential consumers. Although subsidized loans such as the DVA offers do not remove the problem of the high capital cost of a solar system, they do eliminate much of the front-end loading of that cost by spreading it over the term of the mortgage (usually 30 years). This program all but eliminates the initial down payment, thus allowing the consumer to pay off the cost of the solar system out of the saving from reduced consumption of conventional fossil fuels.

The bundling of incentive programs and of implementation procedures may be as important as the size of the individual components. In Oregon, the availability of subsidized solar loans from as pivotal a lender as the DVA may be crucial to the success of a 25% tax credit. The willingness of the DVA to provide loan capital for virtually any durable, reasonably efficient solar system enhances the impact of the tax credits.

The existence of a number of different governmental programs in Oregon, each with its own internal review process and eligibility criteria, has not proved to be a barrier to the effectiveness of the programs, either individually or collectively. The question of multiple standards is one of the chief concerns for analysts of the solar industry and has been a driving force behind the development of national standards. We have found in the case of Oregon that administrative flexibility and case-by-case treatment have lessened the need for common criteria. This is a single instance which may not be true for a large state or for the entire country.

4.6.5 Massachusetts

Massachusetts is a national leader in the field of energy conservation, energy-related education, and the development of consumer protection in the field of renewable resources. These concerns have taken precedent over the development of incentives for the installation of solar technologies. This may be partly the result of the placing of the Energy Policy Office within the Department of Consumer Affairs.

The two solar loan programs within the state, one voluntary within the banking industry and the other mandated by the state legislature, have been only modestly successful. Each has elicited only a small consumer response. However, the variation within the voluntary program has been quite striking. A small percentage of banks accounted for the majority of the loans made by the participating 115 banks. The key factor for consumer response to these slightly subsidized loans seems to be the eagerness of the bank management to seek out that business and to publicize it to potential customers.

Incentive programs can exist on paper, but may be too small or too complex to evoke a consumer response. They may also be considered as peripheral to the mission of the implementing agency, which will mean that they will not undergo rapid rule-setting nor will these incentives be adequately publicized. All these seem to describe the problems confronting the Massachusetts accelerated depreciation program for solar installations by corporations. At the time of this writing, no final guidelines have yet been developed and published by either the Solar Policy Office or the Bureau of Building Construction, two years after the passage of the law. No applications yet have been received or processed, despite a great deal of interest and activity in solar within the state and despite the high costs to industrial firms of fuels for space heating and process steam.

4.6.6 Maine

The Maine solar hot water initiative is a prime example of how an existing organization can implement a legislative mandate with a minimum amount of administrative and bureaucratic procedure. For a total of \$16,000 expended, the state of Maine stimulated the installation of 40 solar systems throughout the state, distributed so that there is at least one solar installation in each county to insure public visibility.

Since the selection of recipients was by lottery, and since the number of applicants far exceeded the funds available, the eligibility criteria developed by the implementing agency were not constraints on the number of installations. In fact, only two of the approximately 125 applications were rejected, on the grounds that the proposed locations were on substandard housing or badly sited. However, the Office of Energy Resources did determine what types of systems would be considered by deciding in the rule-setting process that only manufactured systems would be considered eligible. This was consistent with the legislative intent of replicating the hot water demonstration projects that the federal Department of Housing and Urban Development had been administering in the other New England states, but it did exclude the participation of the home-builder and backyard tinkerer.

A clearly drawn legislative mandate can restrict the ability of the rule-setting agency to include a broad range of solar technologies within the systems considered eligible for a financial incentive. This is true even when the excluded systems obviously would be logical choices for the climate and for local end-use energy needs. The legislation which created the Maine solar property tax and sales tax credits restricted it to active hot water and space heating. Passive systems and multi-purposed solar units (such as greenhouses) are ineligible by definition. This is one of the few examples of eligibility criteria encountered in this study of legislative dictation. Given the high capital-intensity of passive systems, the lack of a property tax exemption could act as a significant deterrent to the installation of passive solar systems within the state.

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SECTION 5.0

CONCLUSIONS AND AREAS FOR FURTHER RESEARCH

5.1 CONCLUSIONS

Clarity of eligibility guidelines is essential to the success of a financial incentive. It eases administrative burdens, speeds processing, and reduces consumer uncertainty. This is true regardless of the nature of the incentive, the size of the state, or the type of administrative agency.

The process of setting the eligibility guidelines for financial incentives is important. In this pilot study, we found many issue areas were not addressed in the enabling laws or in the legislative history. The rule-setting official then became responsible for determining the eligibility of types of different systems and components, or different types of consumers for the financial incentive. The decisions that the rule-setting official made were particularly important for the more intractable eligibility issues: the inclusion of passive technologies, the inclusion of labor costs, the eligibility of speculatively built housing, and the requirement of mandatory conservation. In virtually every case where the legislature did not specifically determine the applicability of the incentive to such problem systems or to such problem cost components, at least a partial eligibility was allowed by the rule-setting officials studied in this report.

The location of the rule-setting process (state energy office, taxing authority, or independent agency) is not as crucial to the final shape of eligibility criteria as expected. At the state level, taxing authorities are not necessarily overly protective of the treasury, and state energy office staff members have not necessarily produced guidelines which are more complex or overly concerned with system efficiency. Other outside variables such as the size of the state and the background of the individuals drafting the guidelines may be as important as the institutional setting in determining the type of rules developed to implement the legislation.

The ability of a financial incentive to stimulate the installation of solar systems and to reach target populations is partially dependent on the implementation and administration mechanisms selected. Some of the more innovative implementation mechanisms noted in this study may work best in small states where there are small populations, a limited number of applicants for the incentive, and an informal process of coordination among executive departments and between the executive and legislative branches of government. The best examples of this principle are the direct grants used in the Maine solar hot water heater initiative and the prior certification required for the Oregon solar income tax credit. Both programs were developed using a minimum amount of overhead expenditures and administrative procedures. In each case, one official was charged with designing and implementing the entire program while continuing to perform other duties. In a state receiving as many solar tax credit applications as California, prior certification or direct grant lotteries could become difficult and costly to administer. The prior approval

process could also become a major time bottleneck in the approval process. Conversely, there may be little need in smaller states for the encyclopedic eligibility guidelines developed by the California Energy Commission. Informal administrative discretion can substitute for complex and comprehensive guidelines so long as the discretion is based on a clear delegation of authority and on well-formulated general guidelines.

The method of implementing an incentive often has unforeseen secondary impacts which may be important to consumer decisions to take advantage of the incentive. These impacts should be considered when designing the implementation for an incentive program. Prior certification was specified by the Oregon Legislature to insure that the systems receiving income tax credits produce a certain minimal amount of the homeowner's energy needs. In practice, prior certification greatly simplifies the administrative burden on the Department of Revenue. It also directly and effectively attacks two barriers to the adoption of solar technologies: uncertainty about the quality of a particular commercial system and uncertainty over whether that system will qualify for existing market price reduction incentives.

Conventional legislative wisdom holds that state implementing agencies resist or are incapable of administering programs which vary significantly from existing practice. As a result, income tax credits and deductions have been selected as implementation mechanisms for solar financial incentives over more equitable but more unfamiliar techniques such as rebates and direct grants. The experience of the case-study states indicates that the common belief in administrative resistance does not reflect actual implementation experience in solar financial incentives. So long as the eligibility guidelines are clear and precise, the actual payment mechanisms are a minor consideration for the administering agency. The Maine Department of Revenue has indicated no difficulty with processing the hot water initiative grant checks, so long as the Department of Energy Resources certifies the systems as eligible. Similarly, the solar rebate program has created no major administrative problems for the taxing authorities in New Mexico. The rebate mechanism has in fact eased the administrative load since the processing is distributed throughout the year and not just during the peak income tax processing period.

5.2 AREAS FOR FUTURE RESEARCH

In the course of this preliminary look at state solar incentive programs, we uncovered a number of policy questions for which policymakers actively are seeking answers. Some of these questions concern how to evaluate the effectiveness of existing programs or to choose between different incentive approaches. Others are related to the effort to elicit more consumer participation without changing the size of the incentive; i.e., administrative effectiveness questions. Below is a partial listing of questions which should be addressed in the near future to aid decisionmakers at the state and federal level in making intelligent policy choices among different mixes of incentive types and among alternative implementation mechanisms.

5.2.1 Evaluation Questions

- Who is taking advantage of the state financial incentive programs? What are their socioeconomic characteristics? How are they divided on a geographical (urban vs. rural) basis? Preliminary data is now available from New Mexico, and California is beginning to tabulate its funding. This data should be gathered for the other key states as well.
- What is the incentive cost for each solar installation stimulated? What are the comparative administrative costs per solar unit installed for different incentive types?
- What impacts do different incentive programs have on the choice among different solar technologies?

5.2.2 Administrative Effectiveness

- What impact on consumer choice does the timing of the incentive delivery have? What is the consumer's indifference curve between a front-end loaded loan or grant versus a tax credit in the following year?
- How important is consumer uncertainty about solar technology and about the reliability of incentive payments? What difference in consumer participation would the existence of prior certification make?

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APPENDIX A

SUMMARY OF STATE INCENTIVES

(as of November 1978) 37 States

INCOME TAX: CREDIT13 STATES

55% -----	California (76)	
35% -----	Arizona (77) declines @ 5%/yr	
25% -----	Kansas (76)	
	New Mexico (75)	
	North Carolina (77)	
	Oregon (77)	
	Oklahoma (77)	
	Vermont (78)	
10% -----	Alaska (77)	
	Hawaii (76)	
Schedule -----	Wisconsin (77)	
	North Dakota (77) 10%/\$1000; 5%/\$3000	5%/2 yrs
	Montana (77) 10%/\$1000; 5%/\$3000	

INCOME TAX: DEDUCTION FROM TAXABLE INCOME6 STATES

100%/1 yr -----	Colorado (77)
	Arkansas (77) Residential
	Massachusetts (76) Business
100%/4 yrs -----	Idaho (76) Residential
100%/5 yrs -----	Kansas (77) Business
	Texas (75) Business

INCOME TAX: DEDUCTION FOR CAPITAL INVESTMENT1 STATE

Montana (77)

PROPERTY TAX: EXEMPTION FROM INCREASE15 STATES

Arizona (74)
 Connecticut (76) (allows city/county choice)
 Georgia (76) (allows city/county choice)
 Hawaii (76)
 Iowa (78)
 Maine (77) (5 yrs from installation)
 Massachusetts (75) (20 yrs from installation)
 Michigan (76)
 Minnesota (78)
 New Hampshire (75) (allows city choice)
 North Dakota (75) (5 yrs from installation)
 Tennessee (78)
 Vermont (76) (allows city choice)
 Virginia (77) (allows city/county choice)
 Washington (77) (7 yrs from installation)

PROPERTY TAX: EXEMPTION EQUAL TO ASSESSED VALUE
OF SOLAR SYSTEM

7 STATES

Indiana (74) Annual
Nevada (77)
New Jersey (77) Annual (till 87)
New York (77) (15 yrs)
Maryland (76) (allows city/county choice)
Oregon (75) (till 97)
South Dakota (78)

PROPERTY TAX: SOLAR HOUSE ASSESSED AS IF IT HAD A
CONVENTIONAL SYSTEM

4 STATES

Illinois (75)
Maryland (75)
North Carolina (77)
Rhode Island (77)

PROPERTY TAX: ASSESSES SOLAR SYSTEM AT 5% OF VALUE

1 STATE

Colorado (75)

PROPERTY TAX: REIMBURSEMENT

1 STATE

Kansas (77) (35% of total tax/5 yrs)

SALES TAX: EXEMPTION

6 STATES

*Connecticut (77)
*Georgia (76)
Massachusetts (77)
*New Jersey (77)
Texas (78)
*Maine (77)

USE TAX: EXEMPTION

6 STATES

Arizona (77)
*Connecticut (77)
*Georgia (76)
Michigan (76)
*New Jersey (77)
*Maine (77)
(* indicates both Sales & Use)

LOANS: AUTHORIZES SPECIAL PREROGATIVE6 STATES

California (78) \$2000 Emergency; no interest
Massachusetts (77) increased time and amounts
Minnesota (78) Low/moderate income housing
Montana (75) 7% interest loan (public utility)
Oregon (77) increase amount on V.A. loan
Tennessee (78) low/moderate income housing

GRANTS2 STATES

Maine (78) 40 @ \$400 hot water
Tennessee (78) 40 at \$400 hot water

ACCELERATED AMORTIZATION3 STATES

Arizona (75) 36 months
Kansas (77) 60 months--Business
Texas (75) 60 months--Business

OTHER3 STATES

Michigan (76) Solar system components not to be
included in Business Activities
Tax
New Mexico (77) Income tax credit for solar
irrigation pumps
Texas (75) Exempts corporations involved in
solar from Franchise Tax

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APPENDIX B

FINANCIAL INCENTIVES IN CASE STUDY STATES

ARIZONA--

CH 93-75 amended CH-129- 1976

Rule-setting agency: Arizona Solar Energy Commission (ASEC)

Administering agency: Arizona Dept. of Revenue

Nature: 36 month amortization of solar devices covers all acquisition and installation costs

CH 81 1977

Rule-setting agency: ASEC

Administering agency: Arizona Dept. of Revenue

Nature: 35% tax credit in the taxable year 1978

--Decreasing tax credits by 5% per year

--Five-year maximum carry over

--\$1,000 maximum credit (in lieu of other deductions)

Expiration: 1984

PL 165 1974

Rule-setting agency: ASEC

Administering agency: Local appraisers

Nature: Exemption from property taxation

--Exempts all solar energy devices from property taxation

CH 42 1977

Rule-setting agency: ASEC

Administering agency: Arizona Dept. of Revenue

Nature: Exemption from the transition and use taxes

CALIFORNIA--

CH 168 1976 amended CH 1082 1977, and AB 3623 1978

Rule-setting agency: Energy Resources Conservation and Development Commission

Administering agency: California Franchise Tax Board

Nature: 55% income tax credit

--If federal credit is created, then the total combined will be 55%

--\$3,000 maximum credit--if the system is over \$6,000 then the greater of \$3,000 or 25% of the actual cost of the system

--Can be carried forward against "net tax"

Expiration: 1981

SB 373

Rule-setting agency: Energy Resources Conservation Development Commission

Administering agency: Housing and Community Development

Nature: Non-interest bearing disaster loans

- Deferred payment date, beginning 12 months after loan origination
- Repayment in 18 months following deferrment
- Maximum 3% front end service charge
- Covers only rebuilding on present site
- \$180,000 revolving fund
- Must be located in a county declared a disaster area on or after July 1, 1977

AB 2851 1978

Rule-setting agency: Department of Veterans Affairs

Administering agency: Department of Veterans Affairs

Nature: Increases the allowable loans for veterans

- Allows DVA to expend up to \$5,000 above ceiling for homes with solar energy heating systems
- Requires DVA to exclude cost of solar system in determining market value of home

MAINE--

CH 542 1977

Rule-setting agency: Office of Energy Resources

Administering agency: Local tax assessor

Nature: Five year property tax exemption and sales tax refund

- Requires certification
- Refund of all use and sales taxes

Expiration: December 1982

LD 2102 1977

Rule-setting agency: Office of Energy Resources

Administering agency: Office of Energy Resources

Nature: Grants for hot water demonstration program

- Units must be commercially available or meet the HUD intermediate minimum production standards
- Units must be installed by a certified installer or submit to inspection
- No home-built units

MASSACHUSETTS--

CH 486 1976

Rule-setting agency:

Administering agency: Commissioner of Corporations and Taxation

Nature: 100% corporate tax deduction

- Corporations only
- Subject to tangible property tax

CH 734 1975

Rule-setting agency: Solar Action Office

Administering agency: Local assessors

Nature: Ten year exemption from property taxes

CH 989 1977

Rule-setting agency:

Administering agency: Mass. Dept. of Revenue

Nature: Sales tax exemption

--Good for any equipment

--Only on principal residence

CH 28 1977

Rule-setting agency:

Administering agency: Local banks and credit unions

Nature: Extension of loan features

--Maturation date is allowed to extend an extra 10 years

--\$7,000 increase in the loan amount for banks

--\$9,500 increase in the loan amount for credit unions

NEW MEXICO--

CH 12 s.s. 1975 amended CH 170 1978

Rule-setting agency: New Mexico Solar Energy Commission (NMSEC)

Administering agency: New Mexico Department of Revenue

Nature: 25% tax credit

--\$1,000 maximum/25% of total cost or \$1,000 refund if over the
"net tax" amount

--May claim only one year and only one principal residence

--Swimming pools included

CH 114 1977

Rule-setting agency: NMSEC

Administering agency: Energy Resources Board

Nature: \$25,000 maximum

--Must provide a 75% reduction in the use of fossil fuels

--No refund (credit) if claimed for federal refund of balance
over taxable gross

OREGON--

CH 460 1975

Rule-setting agency: Oregon Department of Energy (ODOE)

Administering agency: Oregon Department of Revenue

Nature: 25% tax credit

--\$1,000 maximum credit

--Requirement for the system capacity to produce 10% of energy needs

--Five-year carry over

--Certificate required

Expiration: 1985

HB 2262 1975 amended SB 339 1977

Rule-setting agency: ODOE

Administering agency: Local assessors

Nature: Property tax calculated by subtracting the value with the
solar system by the value without the system

Expiration: December 1997

CH 315 1977

Rule-setting agency: ODOE

Administering agency: Oregon Department of Veterans Affairs

Nature: Increases the allowable loans for veterans

--\$3,000 increase in the allowable loan amount

--Solar system must produce 10% of the energy needs of the structure

APPENDIX C

INDIVIDUALS INTERVIEWED

California

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