TAX CREDITS FOR ENERGY EFFICIENCY AND GREEN BUILDINGS: OPPORTUNITIES FOR STATE ACTION

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EXECUTIVE SUMMARY

States play a fundamental role in addressing energy use and the adoption of energy efficiency measures at the regional and local level. States can provide tax incentives that foster technology options matched to the needs of their residents. This report describes the current status of energy efficiency and "green buildings" tax incentives that states offer. Our goal is to assist state policymakers in designing and evaluating their own programs by providing insights about current programs in other states.

A properly designed state tax incentive has both short-term and long-range benefits. In the short run, the incentive can effectively increase market share of an advanced technology or practice that otherwise would be harder for the state's residents, businesses, and other organizations to find. By itself, the state's action increases the visibility of the technology or practice and validates it with the state's credibility. Greater market share launches a "virtuous circle:" As market share increases, more market actors (salespeople, specifiers, installers, etc.) become vested in the technology or practice because it can be more profitable than the status quo and can increase customer satisfaction. This vestment induces more firms to enter the market and the resulting competition can drive down prices and further increase market share. At some point, market share is large enough that the technology or practice is clearly cost-effective and has broad support from those who profit from it. By then, a state tax credit is no longer needed and building codes and other regulatory mechanisms can be revised to make use of the technology or practice mandatory.

State-funded energy efficiency incentive programs increase consumer choices by inducing innovation in the private sector. The programs thus benefit state energy, economic, and environmental objectives. The private sector needs encouragement to provide products and services that address broader energy security, system reliability, environmental, and economic goals. In particular, *market failures* limit private investment in cost-effective efficiency measures; for example, projected returns may be lower than for other, non-energy investments or technology deployment timeframes may be too long. Tax credits can accelerate customer acceptance and increase market share for high-efficiency products and services. Benefits accrue to the state and its residents, the United States and its citizens, and the global climate.

Both the federal government and a number of states enacted tax incentives during the 1970s. However, evidence emerged that these early tax credits had relatively little impact on consumer behavior, for several reasons: low efficiency requirements for eligibility led to large "free rider" expenditures; the credits tended to be small; they lacked promotion; and they had excessive administrative requirements. To maximize effectiveness, tax incentives should target cutting-edge, very high-efficiency technologies or practices that customers might not find otherwise. The incentives should be large enough to affect decision-making, while reporting requirements should be just stringent enough to make fraud insignificant. Table ES-1 shows the states with energy efficiency tax incentives for the private sector.

This report only briefly addresses other state initiatives to promote efficiency investments. These alternatives include utility demand reduction programs, public benefits

funds, direct state appropriations, and programs to assist with efficiency improvements in publicly owned buildings.

Table ES-1. States with Energy Efficiency Tax Incentives for the Private Sector

State	Type of Incentive			
	Vehicles	Equipment	Whole Buildings	Other
Arizona	X*			X
Hawaii		X		
Idaho		X		
Maryland	X	X	X	
Massachusetts			X	
New Jersey				X
New York			X	
Oregon	X	X	X	X

* The Arizona FlexFuel incentive was discontinued. See text box on page 13 for details.

Overview of State Tax Incentive Programs

Arizona's Energy Efficient Home income tax subtraction is a small state income tax credit. The homeowner is allowed an income tax deduction of 5% of purchase price (up to $5,000) if the residence is certified to be 50% more energy efficient than the 1995 model energy code (MEC) at closing. The average tax saving is $190. Arizona employs the Home Energy Ratings System (HERS) for certification of potential savings. Ninety HERS points are required to qualify for 50% above the 1995 model energy code. The Arizona Department of Commerce's Energy Office will adjust the eligibility criteria should the number of residences that qualify be larger than 5% of the total number of residences sold.

Hawaii offers a tax credit program that covers both renewable energy and energy efficiency. Hawaii provides an income tax credit for resident individual or corporate taxpayers for installation of renewable energy systems and heat pump water heaters (HPWH). Taxpayers receive up to 20% of the price of the installed HPWH unit (up to $400 for single-family homes and unlimited for commercial applications).

Idaho offers income tax deductions to residents for installation of insulation and alternative energy systems. Homeowners receive a deduction for the cost of insulation, storm doors, caulking, and weather-stripping. In the first year of operation of qualifying installations, 40% (up to $5,000) of the cost may be deducted. For the 3 years after installation, 20% (up to $5,000 a year) of the costs may be deducted. Participation is low due to low tax rates in Idaho: the maximum value of the deduction to the taxpayer is $390.

Maryland has two tax incentives promoting energy efficiency. The first is a sales tax waiver for consumers who purchase qualifying vehicles and certain ENERGY STAR® appliances. The second is a green buildings program that is beginning implementation in 2002 and closely mirrors the New York program.

New Jersey offers incentives to industries that employ cogeneration facilities as a source of power. The New Jersey program, which started in 1998 when the retail sale of gas and electricity became subject to sales tax, creates exceptions to this rule for cogeneration facilities. Cogeneration facilities are granted a tax exemption for all purchases of natural gas and utility service for use in the production of electricity.

New York is beginning to implement a green buildings program in 2002. The income tax incentive is intended to spur growth of the green buildings market including energy efficiency measures. This was the first state program of its kind but has been adapted by several other states.

Oregon offers a range of energy efficiency tax incentives for green buildings, businesses, and residents. These programs began in the late 1970s during the oil embargoes and have been expanded and updated.

Green Buildings Tax Credits

The green buildings state income tax credit has emerged recently. Since 1999, three states (New York, Maryland, and Oregon) have adopted a tax credit that encourages resource efficiency in buildings, including energy efficiency. A similar credit is pending in Massachusetts.

The New York State Income Tax Credit for Green Buildings, the original green buildings legislation, was adopted in 2000. The legislation instructed an advisory committee to develop regulations. The regulations were finalized in June 2001 and the program began implementation in January 2002.

Maryland passed its own version of the green buildings legislation in 2001. The Maryland law emulates New York State's but with some modifications. In addition to requiring that the new building must be 35% more efficient than current efficiency levels indicated in the ASHRAE 90.1 1999 energy standard, Maryland requires that builders meet criteria published by the Maryland Energy Administration (MEA).

A coalition in Massachusetts introduced green buildings legislation to the legislature in 2001. The Massachusetts bill is similar to the language in the New York and Maryland laws but also includes an education element to enhance its effectiveness. Massachusetts conducted a cost/benefit analysis that estimated a public benefit payback period of 6 years, with a public profit from the credit of over 6 million dollars after 10 years. The private sector payback was projected at 2 years. This bill was headed for enactment in 2001 until derailed by a looming state budget deficit.

Efficient Technology or Practice Tax Credits

Maryland enacted legislation in 2000 that waives the sales tax for purchases of energy-efficient appliances, heating and cooling systems, and passenger vehicles. Eligible products include ENERGY STAR appliances, air conditioners, and heat pumps; hybrid cars; and high-

efficiency water heaters and fuel cells. The sales tax legislation was specifically targeted to substitute for discontinued utility funding. Two important components are missing from the Maryland legislation: the legislation does not include funding for program implementation or evaluation. Due to these limitations, marketing of the program and tracking of product sales are limited, but interviews with retailers indicate that the program is helping to sell efficient products.

Minnesota enacted a sales tax exemption for energy-efficient products in 2001. Products included are compact fluorescent light bulbs, and highly efficient electric HPWHs, natural gas water heaters, and natural gas furnaces. These products were selected through a political process that considered current market penetration, energy use at peak times, and lost revenue. The Minnesota Department of Revenue, tasked with implementing the program, indicated that it will do so through mass mailings to retailers. Implementation began in late fall 2001.

Oregon has operated residential and business tax credit programs since 1979. The Oregon Residential Tax Credit program was initially focused on renewable energy and offered tax credits for products such as solar water heaters and geothermal heat pumps. The program was expanded to include appliances (including furnaces and heat pumps), alternative fuel vehicles, and compressed natural gas fueling stations. Oregon's Business Energy Tax Credit (BETC) program's focus is comparable to the residential program's focus on renewable resources and conservation, with recycling and energy efficiency becoming priorities in the 1980s. Initially, the state legislature set a 40 million dollars per year cost cap on the program. The most recent session of Oregon's state legislature removed the cost cap completely, allowing unlimited use of the credit by residents and businesses.

Hawaii offers tax credits for the private sector that cover both renewable energy and energy efficiency. The Hawaii Energy Tax Credit, extended to the end of 2003, provides an income tax credit for individual or corporate resident taxpayers of up to 20% of the price of an installed HPWH unit. Since 1979, over 25,000 have been installed in single-family residences while over 35,000 have been installed in multi-family residences.

Overall, efficient product tax incentives are becoming more common at the state level as Maryland, Minnesota, Hawaii, and Oregon have programs underway. Maryland and Minnesota offer sales tax rebates, while Oregon and Hawaii offer tax credits. We found that the programs that are very specialized to individual state needs are liked by retailers. The extent of consumer acceptance is difficult to measure due to the general absence of program evaluation.

Conclusions

State tax incentives for energy efficiency are a relatively new way to promote technologies that provide benefits to both residents and the state overall. The incentives have been well received in Oregon (the state with the longest running program) and initial results in Maryland and New York are promising.

Carefully designed tax incentives work in two ways.

- The tax credit *validates* the technology or practice with the credibility of the state's endorsement. By itself, this raises interest in the product and reduces the usual skepticism about emerging technologies.

- The actual incentive, if it is the "right" size, is a powerful motivator for purchasing decisions.

Maximizing effectiveness requires attention to detail in program design.

- The "right" incentive size is important. A sales tax incentive of about $0.50 on a $10 compact fluorescent bulb may not motivate sales, while the same 5–6% sales tax waiver on a $500 appliance may be a strong incentive.

- The threshold for credits must be at a high performance level, but one that is available in the market. Too low a performance standard increases program cost without significantly changing the market.

- *Budget effectively.* Allow enough money for effective marketing and program evaluation. Consider revenue loss caps. Effective programs have ranged in cost from much less than $1 per resident annually (appliance sales tax waivers) up to about $10 per resident annually for Oregon's very broad-range set of business and residential programs, combined. In Oregon, when the programs proved both popular and effective, they were removed to allow further growth.

- Programs must have long enough duration (probably 5–10 years) for credits to affect the market.

- In some cases, programs will be more effective if they allow choice among recipients of the credits. For example, if tax credits for highly efficient or green buildings can only be taken by building owners, the programs are essentially unavailable for government, religious, and educational buildings. Allowing construction firms or others in the buildings industry to take the credit as part of their job compensation will increase interest.

- Complement other policy initiatives (federal, municipal, and public benefits);

The impact of these factors is suggested by looking at one successful program. Oregon has no sales tax, so the state's leverage at the point of sale is very limited. However, Oregon offers substantial income tax credits for purchases of specific products and provides point-of-sale support to increase interest. For example, purchasers of condensing furnaces with electronically commutated motor (ECM) furnace motors are eligible for a $350 income tax credit. This is an important signal: First, it is about 10% or more of the purchase price. Second, Oregon is validating the dealer's efforts to "sell up" to premium equipment that has

greater customer benefits. In contrast, a sales tax incentive for compact fluorescent bulbs is a small amount, typically much smaller than the price variation among stores, and is less likely to have incentive value beyond the state's endorsement.

Energy efficiency tax credits enacted in other states can serve as starting points for new legislation, but a common theme we observed is the importance of considering the specific needs of the state in designing legislation. Tax credit programs should be tailored to individual state economic, energy and environmental objectives.

The most common energy efficiency tax credits are green buildings tax credits and efficient appliances credits. These programs offer large opportunities to encourage energy efficiency while minimizing lost revenue. Further, because other states have already used these approaches and programs are already in place, adapting the programs used in those states is generally easier and more effective than developing new approaches.

Many state programs lack specific funding for implementation and evaluation of the programs. Even if intended to provide greater funding for the credits themselves, a complete absence of funding for implementation and evaluation inevitably threatens the long-term viability of the programs by robbing them of adequate marketing and the ability to learn from experience and demonstrate success.

Adequate annual allocation for tax credits is important for their success. The purpose of a funding cap is to keep the programs affordable for the state, but if the caps are too low, then the credits will not allow the market to grow to desired levels. An adequate cap will create a level of incentive that encourages use of the credit and therefore gains the benefits of increased energy efficiency without harming the state.

Several factors influence the success of legislative efforts to enact financial incentives for energy efficiency investments. These factors include:

- Broad support for energy efficiency measures by multiple stakeholders;
- Model legislation and state programs that can be adapted for use in the state; and
- The fiscal capability of the state.

An effective plan for designing a state tax credit program must consider these factors and target specific measures that have the greatest potential. In most states, green buildings measures and efficient appliances measures are the dominant themes. Using the model language in Appendix A of this report, new legislation can be crafted that is effective, properly sized, and properly evaluated.

Recommendations

Based on the research compiled in this report, we offer the following recommendations to create effective state tax credits to encourage energy efficiency.

- *Efficient product sales and income tax credits*. Several states have launched programs encouraging the purchase of high-efficiency appliances, vehicles, and equipment. Sales tax rebates are the lowest cost of the tax credits and are attractive because of their administrative ease. First, they are implemented primarily at the retail level, involving only staff training to sell a product that is more profitable for the retailer. Second, selection of products is on a pass/fail basis, i.e., either the product is eligible or it is not. Choosing products is also easy since other states have already set guidelines or the federal ENERGY STAR program can be used as a baseline. Model legislation for sales tax removal for energy-efficient products can be found in Attachment A.

- *Green buildings tax credits*. Encouraging resource efficiency in the building industry has large payoffs in that there are many opportunities for energy and monetary savings. These programs have higher costs associated with them than the credits above and require setting regulations or using a third-party scoring system, such as the Leadership in Energy and Environmental Design (LEED) ratings system. Model legislation for this credit is located in Attachment A.

We recommend that the following aspects of tax credit legislation deserve legislative focus:

- *Funding for implementation and evaluation.* The best designed programs will not encourage market change without good market implementation. Funding for these activities should be included when developing a program. Planning for periodic evaluation of the program is also very important. Evaluation results can be used to identify appropriate program adjustments to enhance the program during implementation and also can assist other states to develop programs that build on the lessons learned from current programs. An alternative might include performance incentives for participating agencies.

- *Sunset dates.* The goal of these program is to accelerate adoption of advanced technologies in the market. We recommend that each program have a "sunset" or expiration date, or a provision to tighten qualifying levels in order that credits continue to spur market development for energy-efficient innovations.

- *Appropriate funding caps.* To be effective, tax credits must have an appropriate level of funding while not causing excess lost revenue to the state. We recommend setting qualifying performance levels that correspond to the upper few percent of the market, perhaps 5–10%. For emerging technologies, identifying the level of market penetration is never easy and will require discussions with market players and other stakeholders. The attached model language suggests appropriate caps for the green buildings credit and could be adapted for efficient product credits. The scale of caps ranges fairly widely. Maryland's appliance sales tax waiver costs roughly $0.20–0.40 per resident annually. More comprehensive programs are likely to cost about $1 per resident per year. At the high end, the very comprehensive suite of residential and commercial incentives in Oregon costs about $10 per person per year but has been so popular and effective that the state currently has no caps on expenditures for these purposes.

CHAPTER 1: INTRODUCTION

Although the federal government provides research, development, and implementation assistance for energy efficiency objectives of general national interest, the states play a fundamental role in addressing energy use and the deployment of energy efficiency measures. Since local climate and resources strongly influence energy use and technology choices, states are well suited to provide incentives that foster technology options matched to the needs of their residents.

With the recent rise in national attention to energy policy driven by volatile energy prices, electricity reliability concerns, and the release of the Bush Administration energy plan (National Energy Policy Development Group 2001), state policymakers and state-level advocates are increasingly looking for legislative actions they can take to help address reliability and price stability challenges through energy efficiency. State actions could include the following:

- Establishing a public benefit fund (a fund dedicated to providing support for energy efficiency, low-income programs, and other objectives, generally funded by a very small tax on electricity transmission services);.

- Direct state expenditures: these could include direct state investments (e.g., to upgrade performance of government facilities) or a state loan program.

- Establishing state tax credits, reductions, or deductions for efficient products, techniques, and services.

This report focuses on tax credits, the third option for increasing energy efficiency on a state level, for the following reasons:

- Tax credits directly reduce taxes. In general, the incentive is given as a credit on personal or corporate income taxes. Some mechanisms have been developed to provide equivalent incentives for non-profit organizations (such as schools) by allowing the general contractor or other party to claim the credit.

- Sales tax reductions or waivers are used in Maryland for specific appliances. They are directly coupled to the sales transaction, which seems to give the reductions or waivers influence beyond the scale of the discount (5%).

- Tax deductions, particularly applicable to construction programs, typically take the form of accelerated depreciation for efficiency investments.

Tax credits for energy efficiency, however, typically have implications beyond pure energy savings. For example, green buildings programs (see Chapter 3) promote resource efficiency and sustainable building principles that make the buildings healthier for employees and the environment. Energy efficiency is just one of a broad range of benefits.

Therefore, although the main focus of this report is on energy efficiency tax incentives, the impacts are much more broad and beneficial.

This report does not address companion programs currently provided by utilities as demand-reduction programs, state loan programs, direct appropriations, or programs designed to support efficiency improvements in publicly owned facilities. The objective of this report is to assist state policymakers in designing and evaluating their own individual programs by providing information from current state programs across the country. Knowledge of the process, design, legislation, assessment, and information sources associated with state-based financial incentives for energy efficiency will help policymakers design programs.

Chapter 2 provides an overview of financial incentives legislation in selected active states. Chapters 3 and 4 describe green buildings and efficient appliances programs. Chapter 5 discusses factors influencing state legislative efforts. Conclusions and recommendation are given in Chapters 6 and 7, respectively. Appendix A contains model legislative language while Appendix B provides additional sources of information on the state programs. Tax forms for applying for credits in Hawaii and Oregon are also provided in Appendix B.

Financial Incentives Are Needed to Address Market Failures

Incentives for energy efficiency measures are needed because private sector investments do not address the various energy security, system reliability, environmental, and economic goals of the states. Several *market failures* limit private investment in cost-effective energy efficiency measures. These may include:

- *First cost issues.* Although more efficient products may be highly cost-effective on a life-cycle basis (taking into account both purchase price and the present value of energy consumed over time), many have higher first costs that dissuade large classes of potential customers from the efficient choices. Although economists typically subsume these failures as "high implicit discount rates," the term obscures by clumping a complex and heterogeneous set of issues.

- *Risk aversion.* Few customers are true "early adopters" who seek out opportunities to make money or save energy through efficiency. By definition, emerging technologies that offer high efficiency never have a large market share.

- *Low visibility in the market.* Low market share means less customer awareness (i.e., emerging products are less advertised because small unit sales do not yield the cash flow to support effective marketing to mainstream customers).

- *Low importance to many customers.* Because energy is a relatively small business expense in most industries, decision-makers choose to focus on areas where there are greater perceived rewards for improving profitability. The decision-makers tend to focus on the "core" needs of their business and delegate efficiency to subordinates or

contractors. These groups tend to be more interested in reducing risks (particularly career risks) than in adopting better technologies and practices.

- *Inadequate "infrastructure.*" Main-stream products benefit from a critical mass of knowledgeable vendors, installers, and other trade allies. They generally have neutral rating methods and published performance standards. All of these factors make customer decisions easier but often are not available for efficient technologies and practices.

These market failures limit private investment in cost-effective energy efficiency because private sector objectives (primarily for lowest purchase costs) are not naturally aligned with public sector needs for greater energy efficiency. Public incentives can create the market pull that drives new consumer options. Furthermore, state governments have an interest in furthering economic development and reducing energy imports, and are attracted to incentives that foster consumer choices while benefiting statewide energy, economic, and environmental objectives.

Absent financial incentives, the private sector is more likely to take a "business-as-usual" approach to energy markets, introducing low-risk incremental improvements in new products and practices. Also, state-provided incentives indicate state-level approval and support of the technology or practice, decreasing the perceived risk to the consumer. Tax credits accelerate customer acceptance, consistent sales, and market share for high-

Demand-Side Management Programs and Public Benefit Funds

Many states encourage adoption of energy-saving technologies and practices through utility-operated demand-side management (DSM) programs or through public benefit funds (PBF) established by legislation or utility commission regulations. Since the 1980s, DSM programs have been operated by many utilities as part of efforts to reduce the environmental impacts of electricity generation and provide utility services at the lowest possible cost to customers (Nadel and Kushler 2000). In 1999 (the last year for which data is available), spending on DSM programs totaled approximately $1.4 billion and resulted in energy savings of 50 billion kilowatt-hours (kWh) (about 1.4% of total electricity sales that year) and reductions in peak electrical demand of about 26,500 megawatts (MW) (equivalent to the output of 88 power plants of 300 MW each) (EIA 2000) This corresponds to avoided costs of $0.028/kWh and $55/kW. These values are quite competitive with operating and purchasing new power plants.

Despite these accomplishments, DSM activity in recent years is down substantially from 1993–1994 levels, primarily due to the impact of electric industry restructuring that began in 1994. Under restructuring as generally practiced, customers are free to choose their electricity supplier and many local distribution utilities have prepared for restructuring by cutting all non-essential costs (including DSM programs) so that the utilities can better compete on price with other power providers. To address these funding cuts, many states, as part of restructuring, have enacted PBFs, which fund energy efficiency and other programs that benefit the public through a small surcharge on electric distribution service (Nadel and Kushler 2000). As of this writing, 20 states have enacted PBFs, with total annual funding of approximately $1.7 billion (ACEEE 2001).

DSM and PBF programs can be important complements to the energy efficiency tax credits discussed in this report. In particular, DSM and PBF programs can assist with marketing the tax credits, can provide information and technical assistance to consumers about products and practices covered by the tax credits, and sometimes can provide supplemental financial incentives to complement the tax credits.

efficiency products and services, leading to earlier high-volume production and resulting cost reductions for efficient alter-natives. Once the new technologies become widely accepted and produced on a significant sale, costs decline and the tax credits should be phased out or updated to include the newest and most efficient technologies and practices.

Benefits of State Financial Incentives for Energy Efficiency Investments

The benefits of state-funded financial incentives programs accrue to residents, the state, and local and global environments. Consumers benefit from both the smaller first cost premiums for new energy-efficient alternatives and the reduced energy bills associated with these alternatives. The state benefits from reduced demand on energy supplies and utility infrastructure, thereby improving electric system reliability and reducing degradation of local and regional environmental quality (Geller and Kubo 2000). Greater energy efficiency implies less air pollution from fossil fuel burning, both directly and for electricity generation. For states that are significantly affected when local air quality jurisdictions can no longer attain clean air standards, the greater efficiency that results from incentives can prevent loss of valuable federal support for various needs. The global environment benefits from decreased pollution from

environmental benefits (ACEEE et al. 1997).

State incentives may dovetail with federal tax incentives to further "leverage" each other. This year, Congress is considering billions of dollars of tax incentives at the federal level (see textbox). State incentives will compliment and amplify the impacts of these federal initiatives.

Federal Tax Credits for Advanced Energy-Saving Technologies

The Federal government is also considering tax credits for advanced energy-saving technologies as part of comprehensive energy legislation now making its way through Congress. In July 2001, the U.S. House of Representatives passed a bill that provides tax credits, for a 5-year period, for the following products:

- Efficient new homes that reduce energy use at least 30% relative to current model building codes;
- Efficient new commercial buildings that reduce energy use at least 50% relative to current model building codes;
- Hybrid and fuel-cell vehicles;
- Efficient refrigerators and clothes washers meeting current and future ENERGY STAR levels; and
- Combined heat and power systems and fuel-cell cogeneration systems.

The U.S. Senate is now considering its bill and is likely to include many of the same credits as are in the House bill, albeit with modifications.

Several of the items for which state credits are available are not included in the likely federal legislation. For example, the federal tax credits are unlikely to cover new dishwashers and central and room air conditioners. In addition, where federal and state credits do overlap, the state credits often include additional criteria. For example, for commercial buildings, state tax credits typically include green building criteria in addition to energy savings and typically target a somewhat lower level of savings (e.g., 30–35% savings). States are advised to review the latest available information on the federal tax credits and to structure state credits to complement the federal credits.

Earlier Experience with Tax Incentives for Energy Efficiency Investments

The federal government and a number of states enacted tax incentives during the 1970s to stimulate adoption of both

residential and industrial energy efficiency measures. The federal Energy Tax Act of 1978 included a 15% tax credit up to a maximum of $300 (i.e., a 15% credit on expenditures up to $2,000) for residential conservation and renewable energy investments made between April 1977 and December 1985. Eligible conservation measures included insulation, storm windows and doors, weather-stripping, and furnace modifications—standard energy efficiency measures at that time. During 1978–85, there were about 30 million federal claims for the residential energy conservation and renewable energy credits, amounting to nearly $5 billion in lost revenues for the Treasury.

Available evidence indicates that the tax credit had relatively little impact on consumer behavior. Although late in the process, a household survey conducted in 1983 found that 85% of households that implemented energy efficiency retrofits that year did not claim a tax credit. In addition, 88% of the households that claimed a credit that year reported that they would have made the improvement even if the credit had not been available (EIA 1986). Also, the credits tended to be claimed by wealthier homeowners. Based on this information, as well as the small size of the credit, lack of promotion, and administrative burdens, one review concluded that the credit itself probably did little to motivate retrofitting and that most recipients were free riders—participants who would have made the efficiency investment without the incentive (OTA 1992).

It appears that the residential tax credits in effect during 1978–85 cost state and federal treasuries a substantial amount of money but had relatively little net impact on fostering energy efficiency improvements. The credits were relatively small in percentage terms while eligibility extended to widely available and commonly adopted efficiency measures. This meant that a sizeable fraction of the incentives went to customers who would have purchased moderately more efficient products anyhow (i.e., they were free riders and the funds they absorbed were not available for other public purposes).

Furthermore, the early 1980s offered valuable lessons regarding the efficacy of certain forms of business tax credits for energy investments. For example, the state of California offered significant levels of tax credits for renewable energy development. Coupled with federal credits available at the time, the combined incentives were a critical factor in fostering the building of thousands of poorly designed solar hot water systems and early wind turbines during the 1980s in California. The credits were structured as investment tax credits (ITC) rather than as production tax credits (PTC), so there was little incentive to assure that the newly constructed projects would deliver the estimated energy. Currently, PTCs are working very well to help with new renewable energy development. The lesson learned by state legislators was that incentives needed both technology and energy objectives, plus built-in quality control mechanisms.

A properly designed state tax incentive has both short-term and long-range benefits. In the short run, the incentive can effectively increase market share of an advanced technology or practice that otherwise would be harder for the state's residents, businesses, and other organizations to find. By themselves, the state's actions increase the visibility of the technology and validates it with the state's credibility. Greater market share launches a "virtuous circle:" As market share increases, more market actors (salespeople, specifiers,

installers, etc.) become vested in the technology or practice because it can be more profitable than the status quo and can increase customer satisfaction. This vestment induces more firms to enter the market and the resulting competition can drive down prices and further increase market share. At some point, market share is large enough that building codes and other regulatory mechanisms can be revised to make use of the technology or practice mandatory (since it will be cost-effective and by now has broad support from those who profit from it). At that point or before, the state tax credit is no longer appropriate.

Of course, this two-part strategy of "ratcheting" code advances through the use of early tax credit investments just reflects the dynamism of the market. One corollary is that tax incentive programs must include relatively frequent reviews and revisions of the incentive levels. As the market share of more efficient equipment rises, whether from revised performance standards or market pressure induced by incentives, the performance level at which incentives kick in can and should be raised. This limits free riders and encourages a continuing stream of market innovations for greater efficiency.

Principles for State Energy Efficiency Tax Incentives

To ensure appropriateness of a tax credit, the following principles need to be applied.

- *Stimulate commercialization of advanced technologies and practices:* Use the incentives to help new energy efficiency options become established in the marketplace and emphasize those that can have a large impact on energy use and energy-related emissions over the long run. For example, incentives are more effective in the long run when helping to accomplish market transformation to higher-efficiency technologies, such as low-e windows, than when subsidizing end-use fixes, such as window weatherization for some homes. Oregon's programs encouraging residential and business energy efficiencies are examples of how consistent raising of the tax credit minimums supports long-term change in the market (see Chapters 3 and 4).

- *Adopt performance criteria where possible:* Stimulate innovation by defining targeted technologies broadly and adhering to consensus performance criteria; allow manufacturers to meet criteria as they choose; and pay incentives as qualifying units are produced and sold. Where appropriate, use sliding scale incentives to encourage and reward higher levels of performance. The Oregon Sustainable Buildings component of the Business Energy Tax Credit uses the U.S. Green Building Council's (USGBC) LEED rating system as regulation for the program. This system (discussed in Chapter 4) is flexible and allows customers to gain the credit through a variety of energy-saving techniques.

- *Allow adequate time*. It may take several years for marketing and distribution channels in the state to become familiar with both the qualifying technologies and the implementation processes for advanced technologies. Tax credits are at least a 5-year and often a 10-year effort (ASES 2001).

- *Pay appropriate incentives:* Make the incentives large enough to influence consumer decision-making and cover a sizable fraction of the incremental cost (but not significantly more) in order to reduce commercialization risk but require cost-sharing from users. The Maryland Hybrid and Electric Titling tax removal offers a credit of $125–2,000, which is similar to the size of factory rebates used to affect customer choices. Since auto companies have a compelling interest in product sales, they have devoted considerable resources to consumer research and determined the rebate levels that are effective. Such consumer research is beyond the means of most states, but by building on the knowledge of the auto industry, Maryland selected an appropriate credit level.

- *Budget effectively.* In addition to the direct costs of the incentives, allow enough money for effective marketing and program evaluation. States are legitimately concerned about revenue impacts, and some have imposed caps. Maryland's appliance incentives, which are sales tax waivers, will cost the state $0.20–0.40 per resident per year for 3 years. Maryland's green buildings incentives, if fully utilized, will cost less than $1 per resident in the peak program year and cumulative revenue losses will be less than $5 per resident for the entire program duration. Oregon's caps were in the range of $10 per resident annually for the combination of very comprehensive business and residential income tax credits. When the programs proved both popular and effective, they were removed to allow further growth.

- *Be flexible with respect to who receives the credits:* The simplest model has been tax credits for purchasers. In some cases, this limits applicability. For example, a relatively large fraction of commercial-scale construction is for government or non-profit sectors (schools, churches, etc.). Allowing tax credits to be taken by for-profit construction and design firms would greatly increase their interest in energy efficiency. Another possibility would be incentives for manufacturers or "middle-market" actors. If distributors of three-phase electric motors received state incentives for sales of premium (high-efficiency) motors, the distributors' inventory might shift toward better products that are highly cost-effective for customers.

- *Complement other policy initiatives:* Coordinate with ongoing efforts, including federal energy efficiency research, development, and deployment programs (e.g., ENERGY STAR labeling programs) in order to "jump start" a market in the state for emerging technologies; the Consortium for Energy Efficiency (CEE) and other market transformation efforts; state and utility DSM programs; and state building codes and state and federal equipment efficiency standards by promoting higher levels of efficiency than required by current codes and standards.

Illustrating the interplay of these factors, Dennis Frost, regional sales representative for Maytag, describes the purchase of energy-efficient appliances as a three-sided transaction that involves the customer, the vendor, and the state. Where all three come together, according to Frost, is "inside the store—where the rubber meets the road." He explained that Maytag offers rebates on several products; the combination of both the manufacturer and state rebates is a significant encouragement for consumers selecting energy-efficient appliances. Maytag's research in the stores suggests that special stickers on the floor display

models at the "point of purchase" explaining the incentives work very well, while "the current energy efficiency labeling is not very effective" and is "too confusing for the typical consumer." Frost said, "A lot of consumers know about ENERGY STAR and the credits" but that education is still critically needed at this early stage of the credits. He told the story of asking his local distributors themselves at a training conference what ENERGY STAR actually meant; most could not go beyond saying it was an "energy efficiency thing." When he explained that the term was reserved for appliances that went significantly beyond federal standards and by extension applied to mid- to high-value products, the distributors were very supportive (Frost 2001).

In the next year, energy efficiency tax incentives are likely to be proposed in many states to meet the concerns of their constituents about volatile and reduced electric system reliability. While tight state budgets will make it difficult to pass tax credits in some states, as discussed in the sections below, the costs of these tax credits are generally modest and the benefits significant. Even in tight economic times, well-targeted and well-constructed tax incentives for advanced energy-saving technologies and practices will often make sense.

CHAPTER 2: OVERVIEW OF STATE TAX INCENTIVE PROGRAMS

Table 2-1 is an overview of the state programs currently offered that use energy efficiency tax incentives.

Table 2-1. Summary of State Programs

State	Type of Incentive			
	Vehicles	Equipment	Whole Buildings	Other
Arizona	X*			X
Hawaii		X		
Idaho		X		
Maryland	X	X	X	
Massachusetts			X	
New Jersey				X
New York			X	
Oregon	X	X	X	X

* The Arizona FlexFuel incentive was discontinued. See text box on page 13 for details.

Arizona

Arizona's Energy Efficient Home income tax subtraction (or deduction) is scheduled to be in effect from January 2002 through December 2010. The legislation (SB 1329) was passed in the first regular legislative session in 2001. The deduction is available for any residence that is certified to be 50% more energy efficient than the 1995 model energy code at closing (AZ Statutes 2001). Arizona designates the Home Energy Ratings System for certification of potential savings. HERS is a project of the Residential Energy Services of America (RESNET), which was designed to ensure accurate and independent information to mortgage companies concerning energy efficiency mortgages. HERS is based on a 0–100 point system where HERS-certified technicians assign points for each of the efficient technologies and practices installed. Ninety HERS points are required to qualify for 50% savings relative to the 1995 MEC (RESNET 2001).

Buyers or sellers of new single-family residences qualify for an income tax deduction of 5% of the sale price, with the deduction capped at $5,000. Because the Arizona state income tax rate is relatively low, the Arizona Energy Office (AEO) estimated that 200 homes would qualify for an average credit of $190 annually. Based on that formulation, AEO determined that the average annual revenue loss would be $38,000 for the state. The small number of homes in the estimate reflects how costly AEO believes it is to reach a HERS rating of over 90 (Waschuk 2001).

The Arizona Department of Commerce Energy Office is tasked with reviewing the program each year and adjusting the qualifying HERS level, should the number of residences that qualify be larger than 5% of the total number of houses sold in Arizona (AZ Statutes 2001). This controls the revenue loss by the state, but it is not clear which stakeholders work for and are satisfied by such a small gesture and what impact it will have.

Idaho

Idaho offers income tax deductions to residents for installation of insulation and alternative energy systems. Homeowners whose principal residence was built before 1976 receive a deduction for the cost of insulation, storm doors, caulking, and weather-stripping. Also included are deductions for the costs of installing alternative energy equipment, including wind, solar, or geothermal systems. In the first year of operation of qualifying installations, 40% (up to $5,000) of the cost of the installation and acquisition of the system can be deducted. For the next 3 years after installation, 20% (up to $5,000 a year) of the costs can be deducted (IDWR 1995).

The Idaho tax deduction program was introduced during the oil embargo of 1976. No "official" evaluation of the deduction has been completed, but anecdotal information indicates that the deduction is used, but not by many residents. The maximum Idaho Individual State Income Tax rate is 7.8% and therefore the maximum value of the deduction is $390 ($5,000 times 7.8%). Given the high cost of installing new windows and insulation, this is not strong encouragement for their installation. Typically, the tax credit is not the primary incentive for installing new windows but is used when windows are replaced for a different reason (John 2001).

Maryland

Maryland has two tax incentives promoting energy efficiency. The first is a sales tax waiver for consumers who purchase certain ENERGY STAR appliances and qualifying vehicles (details in Chapter 4). The second is a green buildings program that is beginning implementation in 2002 and closely mirrors the New York program (details in Chapter 3).

Massachusetts

Citizens and non-profit organizations brought green buildings legislation to the Massachusetts legislature in 2001. The Massachusetts bill is similar to the language in the New York and Maryland laws but also includes an education element to enhance its effectiveness. Massachusetts conducted a cost/benefit analysis that estimated a public benefit payback period of 6 years, with a public profit from the credit of over 6 million dollars after 10 years. The private sector payback was projected at 2 years (details in Chapter 3). This credit was heading towards passage in 2001 when a looming state budget deficit derailed it.

New Jersey

New Jersey offers incentives to industries that employ cogeneration facilities as a source of power. The program, which does not have an expiration date, started in 1998 when the retail sale of gas and electricity became subject to sales tax. The program creates exceptions to this tax for cogeneration facilities, which are granted a tax exemption for all purchases of natural gas and utility service for use in the production of electricity. Under the program, natural gas used in cogenerated power production for onsite purposes is not taxable (NJ Tax 2001).

While the cogeneration tax exemption is a financial incentive, the enabling authority derives from the Public Utility Regulatory Policy Act (PURPA), a federal law enacted in 1978. It was after the passing of PURPA that utilities in New Jersey began interconnecting with significant numbers of cogenerators. With the tax law changes in 1998, private companies were able to reap "significant" savings from producing their own heat and power through cogeneration instead of buying these directly from the utilities (Leibowitz 2001).

The impacts of the New Jersey tax reductions are significant, but according to Leibowitz, "recent high [natural] gas prices have overcome the incentives." Also, high rates for backup and standby power are a problem; New Jersey utilities maintain a monopoly for such services, and high rates tend to work against the state incentives. New Jersey is currently transitioning cogeneration taxes from a 13% franchise tax to a 6% sales tax (the Transition Energy Facilities Assessment—TEFA) over the 5-year period from 1998 through 2003. Onsite cogenerators do not pay TEFA, nor are they assessed wires charges used to pay for stranded costs. The combined impact of both these exemptions is a powerful incentive. Leibowitz concluded, "As gas prices fall and the tax rate approaches 6%, we're expecting significant new interest in cogeneration in New Jersey. Projects with TEFA exemptions should be even more attractive, and I'd expect a lot of activity."

Direct State Funding for Energy Efficiency

An additional public policy tool for encouraging energy efficiency is to pass legislation requiring direct funding of energy efficiency programs. In response to its electricity reliability problems during the past 2 years, California has become the pre-eminent example of this policy.

In August of 2000, California passed legislation (AB970) creating a special state-funded "Peak Load Demand Reduction Program," eventually funded at $50 million. The fund was designed to speed energy efficiency projects to market in order to reduce peak electricity load. (This was in addition to extending California's Public Goods Charge for energy efficiency for 10 more years, which is funded through a utility bill surcharge totaling approximately $250 million per year.)

In 2001, as California's electricity crisis deepened, two more pieces of legislation were passed (AB 29X and SB 5X), allocating a total of $859 million from the state's Electric Power Fund for accelerated energy efficiency programs to be administered by state agencies.

While it is too soon to definitively report on the effects of each of California's policies and programs, it appears that in the aggregate, the effects of the overall effort have been huge—and unprecedented. Throughout the summer of 2001, total customer demand in California was more than 10% below the level of the prior year, even when adjusted for weather.

In times when maximum levels of energy efficiency are needed, legislation creating direct funding for energy efficiency programs can obviously be a significant incremental addition to a tax credit policy.

New York

New York will begin implementing a green buildings program in 2002. The income tax incentive is intended to spur growth of the green buildings market including energy efficiency measures. This was the first state program of its kind, but has been adapted by several other states. The program is discussed in detail in Chapter 3.

Oregon

Oregon offers a range of energy efficiency tax incentives for green buildings, businesses, and residents. These programs began in the late 1970s during the oil embargoes and have been expanded and updated. These programs are discussed in detail in Chapters 3 and 4.

Summary

State programs enacted to date are very diverse. They include vehicles, buildings, appliances and buildings equipment, and electricity generating systems. This reflects the tremendous diversity of needs among states—and is assumed to also mirror the strengths of different stakeholder groups in different states. Green buildings programs generally reflect strong advocacy by influential environmental activists, with support from urban advocates and leading-edge designers and construction firms. Consumer advocates often join environmental groups for efficient equipment tax credits. At the other extreme, New Jersey's strong industrial community and high utility rates have led to very strong involvement by an effective business lobby in cogeneration issues.

In the following sections we focus on two programs that represent a variety of programs and implementation types that have proven particularly popular with states in recent years—green buildings tax credits and incentives for efficient appliances and equipment. The strengths and weaknesses of these programs are selected as examples that illustrate how to create effective state policymaking for energy efficiency.

Overshooting the Goal:
Arizona's Alternative Fuels Tax Credit Program (AFTCP)

In 1999, the state of Arizona set out to implement one of the most aggressive and ambitious alternative-fueled vehicle (AFV) sales tax credit programs in the country. The program heavily subsidized the purchase of a new AFV depending on the vehicle's emissions rating. Consumers in Arizona took full advantage of the credit and applied for it in droves. However, the program eventually was rescinded after it began to heavily drain the state's funds.

The program rewarded the purchase of an AFV with increasing subsidy for cleaner vehicles. A description of the incentive levels is listed in the table below.

Arizona Incentive Levels (Based upon AFV Emissions)

Emission Level	New AFV (based on *total* vehicle cost)	Used AFV (based on *total* vehicle cost)
LEV	greater of 30% of cost or $5,000	greater of 15% of cost or $2,500
ULEV or ILEV	greater of 40% of cost or $7,500	greater of 20% of cost or $3,750
ZEV or SULEV	greater of 50% of cost or $10,000	greater of 25% of cost or $5,000
Heavy duty LEV	greater of 30% of cost or $30,000	greater of 15% of cost or $15,000

Note: Heavy duty LEV = gross vehicle weight more than 12,000 pounds
Source: Brown and Breckenridge 2001

AFTCP had two fatal flaws. First, the program had no fuel use mandate. This negated the purpose of the program, which was to increase the use of alternative fuels and help reduce the dependence on foreign oil. A person could purchase a flex fuel vehicle with the tax incentive and never run it on anything other than gasoline. Furthermore, many models already have the flex fuel option as a mandatory purchase option, so the incentive was not actually encouraging manufacturers to introduce new technology. The second problem was that the program accelerated the purchase of alternative-fueled vehicles past the point where the limited fueling infrastructure could support them. There were provisions in the tax credit program to subsidize the construction of alternative fuels fueling stations, but the program was cut off before this provision could really take effect. Anonymous sources involved closely with the program have said that perhaps an initial focus on private fleets would have helped build an infrastructure to support the AFVS as well as helped to acclimate the public and eased any concerns about buying AFVs and running them on alternative fuels.

CHAPTER 3: GREEN BUILDINGS TAX CREDITS

The term "green buildings" is used broadly to describe buildings that are resource-efficient, built using sustainable products, and in locations that are environmentally preferred. Advocates assert that green buildings credits encourage the use of clean materials, clean power, and less-polluting building materials. This improves the quality of life for building occupants, as well as public health. Green buildings criteria go well beyond the energy efficiency of the structure. For example, siting criteria give weight to the commuting energy reduction when a building is accessible by public transportation. The criteria also give credit for the use of recycled materials, which both avoid new manufacturing and decrease waste disposal needs.

Although the green buildings movement is growing, there are still considerable barriers to a large market share. These include high first cost and uncertainty regarding the technologies. Many owners and builders who recognize the benefits of green buildings will still need incentives to go beyond common practices until the technologies and practices of green buildings are generally accepted.

Some states have encouraged green buildings through an income tax credit for builders, developers, owners, and/or tenants. New York and Maryland have passed similar income tax credit legislation and implementation is beginning in early 2002. Non-profit and citizen groups in Massachusetts modeled bills they introduced to the Massachusetts legislature in 2001 after the New York and Maryland laws. In contrast, Oregon's legislation simply added green buildings as an integrated part of the Business Energy Tax Credit in 2001. Oregon also differs from other states, notably New York, in their acceptance of the criteria of an outside organization (the U.S. Green Building Council) instead of developing its own criteria in regulatory language.

New York

New York was first to implement a green buildings tax credit. The Natural Resources Defense Council (NRDC) originated a legislative campaign in the state in 1995 while working with USGBC on developing the Leadership in Energy and Environmental Design guidelines.[1] At that time, the New York State budget had a surplus and lobbying campaigns for tax credits were relatively successful. NRDC appealed to Governor George Pataki (R), who was receptive to the idea.

The first version of the green buildings tax credit legislation was submitted in 1998 as a joint initiative of NRDC and the Real Estate Board of New York (REBNY). The legislation failed that year and again in 1999. However, support for the initiative grew each year. As a result, the coalition of support for the legislation expanded to include the Environmental Business Association (EBA) and a number of indoor air quality lobbyists by the year 2000

[1] LEED is a rating system created by USGBC (available at http://www.usgbc.org) that offers guidelines for evaluating the environmental performance of buildings. It is voluntary, driven by market forces, and agreed on by the building industry, owners, and non-profit organizations (USGBC 2001).

legislative session. This larger coalition provided the level of support needed for passage but also broadened the scope of the legislation and delayed its introduction due to difficulties within the coalition regarding deciding the specifics of the legislation.

One of these disagreements in 2000 centered on which regulations would be used as guidelines for builders. Since the early development of green buildings language had been in conjunction with the development of the LEED guidelines (USGBC 2000), some believed the LEED language should be used. New York's legislation was signed into law in 2000. It stipulated that the New York State Department of Environmental Conservation (DEC) was responsible for developing regulations for buildings to follow in order to receive credits. Those regulations were not modeled on the LEED Standards but were compiled by an advisory committee.

The DEC advisory committee was a broad-based group of industry and non-profit professionals. There were difficulties within the advisory committee that delayed the release of the regulations. First, the advisory committee was set up by the New York State Energy Research and Development Authority (NYSERDA) but NYSERDA lacks formal regulatory authority, necessitating the involvement of a regulatory agency. DEC became involved and solved the regulatory problem but added another layer of bureaucracy to the process, slowing it down. A further problem was the diverse interests of the building industry in New York State. Political issues had to be addressed while developing the legislation, such as preferences for cooling system refrigerants and the degree of emphasis placed on indoor air quality. DEC finally adopted regulations in June of 2001 (NYDEC 2001).

There are still procedural problems with the regulations. For instance, they stipulate a relatively time-consuming and complicated application process for builders and architects; if an application is not completed properly, it is rejected without the option for corrections or appeal. On the positive side, there is consensus on the definition of a green building and what qualifies for the credit in New York State. NYSERDA recognizes the importance of education and the advisory committee wrote the regulation with infrastructure and education in mind. Finally, the legislation directs that these regulations be reviewed and updated every 2 years, providing an opportunity for these procedural problems to be addressed.

Perhaps most importantly, the ground broken by New York's green buildings law has allowed other states to introduce their own green buildings legislation.

Maryland

In 2000, a Maryland builder described the New York program to a delegate, and suggested that Maryland emulate it. The delegate agreed and introduced a bill in the 2000 legislative session; this first attempt was unsuccessful.

The bill was reintroduced in the 2001 session, with significant input from the New York green buildings legislation but with modifications based on a review of that law and also of the differences between the market for building in Maryland and New York. Like the New York bill, the Maryland bill was championed by public interest organizations in the state,

such as NRDC. With the language improvements and additional support, the Maryland green buildings legislation (SB 745) was enacted in May of 2001.

In Maryland, credits will begin to be offered in fiscal year 2003 (July 1, 2002). In order to qualify for the credit, builders have to meet criteria published by Maryland Energy Administration, consistent with the criteria developed by the Maryland State Green Building Council (established in 2001). MEA has indicated that it will use LEED certification to qualify, but the law specifies that to receive the income credit the new building must be 35% more efficient than current efficiency levels indicated by the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) 90.1-1999 guidelines. Over the life of the bill (fiscal years 2003–2011), the maximum cumulative revenue loss allowed is $25 million. The cap is further divided by years, graduating from $1 million in 2003 to $5 million in 2007 and then stepping back down to $1 million in 2010. Unused credit "headroom" is carried forward (MDDLS 2001). Even at its peak, the maximum revenue loss to the state is less than $1 per resident ($5 million, 5.4 million residents).

An innovative component cut from the bill was a section giving equal credits to non-profit organizations by allowing the credit for builders/architects, not only the building owner.

Massachusetts

A coalition of non-profit organizations and other advocates introduced a bill similar to the New York and Maryland laws to Massachusetts in 2001. In addition to the similarities, there are differences that accommodate the specific needs of the state.

The bill includes funding for both an education program and implementation program. It authorizes $150,000 in developer education programs for assistance in participating in the program. By adding this educational element, the coalition acknowledged that the transition to green buildings would be easier if there was a free education component. The money will help in early adoption and innovation and assist the building industry in applying the methodologies of sustainable buildings. The Massachusetts coalition completed a full cost/benefit analysis for the bill prior to introduction to assess its likely impact on both the public and private sectors. Public sector costs include lost tax revenues from the credit and (to a much smaller degree) reduced utility tax revenues from lower bills. Benefits to the public include increased employment, increased construction spending, reduced health costs, and reduced environmental costs. Massachusetts estimated that the public benefit payback period will be 6 years, with a public profit from the credit of over 6 million dollars after 10 years. In the private sector, costs include increased construction costs for green buildings features while benefits include reduced utility costs, higher productivity, and reduced operating and maintenance costs. The private sector payback is projected at 2 years (GBREB 2001).

Oregon

Oregon offers a green buildings incentive program, Sustainable Buildings, as part of its Business Energy Tax Credit program (see Chapter 4). Sustainable Buildings is the newest part of BETC, having been incorporated during the summer of 2001. Implementation began in October of 2001. Oregon is a leader in many energy efficiency and conservation issues and this program is no exception. The energy office admits, however, that the program is new and will require refinement over the coming years (Elias 2001).

This program is significantly different from the other state green buildings programs because it uses the LEED standard ratings system to determine the level of tax credits for applicants (includes owners, individuals, corporations, or non-profit organizations that file Oregon tax returns). Like the rest of the BETC credits, the credit is available for up to 35% of the full cost or incremental cost of the new building or renovation project (up to 10 million dollars per project), but the credit is broken down by dollars per square foot available according to the LEED silver, gold, and platinum certification criteria (see Table 3-1).

Table 3-1. Allowable Cost Caps per square foot in the Oregon Green Buildings Program

Building Area	Silver ($/sq. ft)	Gold ($/sq. ft)	Platinum ($/sq. ft)
First 10,000 sq. ft	5.71	9.29	14.29
Next 40,000 sq. ft	3.57	4.29	7.86
>50,000 sq. ft	2.00	2.86	5.71

Source: OOE 2001

In order to make the LEED certification more closely resemble regulatory language, the Oregon Statute requires not just the silver, gold, or platinum rating but also that the building exceed the energy efficiency base case by 20% for new buildings and 10% for renovation projects. The project must also receive the first point above the LEED base level for commissioning and report the building's solar income in British thermal units. The Oregon Office Energy (OOE) felt comfortable using LEED as a certification standard rather than writing their own for a variety of reasons.

- *The certification is already written.* The LEED Certification is a well-documented and supported green buildings document. OOE felt that writing its own regulations would have taken unnecessary time away from implementing the credit.

- *The architectural and engineering communities are familiar.* OOE felt that the architects and engineers in Oregon were already familiar with the LEED certifications, so using them as a baseline for the credit, instead of asking energy professionals to learn a new set of regulations, was a natural progression.

- *Pre- and post-certification.* To add regulatory action to the LEED Certification, OOE requires pre-certification and post-certification of projects by USGBC (authors of LEED) and also reserves the right to inspect any project for verification (Elias 2001)

Like other credits available in the BETC program, the credit must be approved prior to project construction and in this case a certification from USGBC is required before the credit application can be processed. OOE avoids the administrative costs of this program by requiring the applicant to pay certification costs, including the cost of obtaining the certificate from USGBC and the costs incurred by OOE for application processing.

Discussion

Table 3-2 compares the major parts of the bills. The bills have many similarities but also many differences in order to address state-specific needs and implementation difficulties. New York, Maryland, and Massachusetts cap the total credits at 25 million dollars per year. However, there are great differences in the size of the building markets among the states. Oregon's BETC has no cap on the amount of credits it issues, but individual credits are capped at $10 million per project.

There is a difference in the allowable cost credit caps for the states. New York, Maryland, and Massachusetts offer a range of 5 to 7% of eligible costs, defined as chargeable capital costs of construction, rehabilitation, or commissioning. Oregon offers a 35% tax credit for eligible costs that are defined as incremental cost beyond industry standard. The difference in definition is important because it allows Oregon to define more concisely what qualifies for a credit and what does not. The other states have a looser and more inclusive definition of costs but pay a smaller percentage and avoid the complexities of defining "incremental cost" and "industry standard."

New York has yet to begin offering credits, but experts (Bryk 2001; Hinge 2001) have expressed concerns over the appropriateness of the size of the cap in New York; it is possible that a very large building project could absorb most of the available credits. If demand for the credit exceeds available funding, then deciding which projects will be funded will be problematic. Maryland and Massachusetts have a similar funding cap on their tax credits but may avoid problems due to the relatively smaller size of their building markets. These differences in per capita funding among the three state bills may eventually become a factor in determining the effectiveness of the program. Oregon's lack of credit cap may prove to make it the most effective in changing the market. On the other hand, it's possible that Oregon's legislation may end up costing the state more money than planned.

These states have the same base credits for a variety of energy efficiency and renewable energy measures, including solar photovoltaic systems. Uniquely, New York has added a "green refrigerant" component and Maryland has added a wind turbine component; these reflect the political constituencies in the respective states. Oregon's credit system differs from the credit component system the other states use. Since the evolving program already includes credits for many items, the sustainable buildings credit is actually a component of that program. The BETC includes credits for a range of measures, awarding points according to the LEED scale. Points used in calculating the LEED score, such as advanced heating systems and renewables, cannot be also used to claim BETC credits.

In addition to including direct efficiency components, all four bills also contain additional components that foster building in areas needing economic development. These additional credits support the location of environmentally sustainable buildings in areas that would otherwise be developed with comparatively low-end construction. The bills also address environmental impacts by disallowing credits in areas of environmental fragility or, in Maryland's case, areas tied to Maryland Smart Growth policies (see www.op.state.md.us/smartgrowth). Massachusetts has a further guideline that protects historic buildings: all renovations must comply with the already in-place preservation building codes. Oregon does not have any specific rules written into the BETC, as the LEED rating system takes into account site location issues including brownfields and urban redevelopment (USGBC 2000).

Summary of Green Buildings Incentives

All four states have built-in evaluation regarding the amount of credits issued, to whom, and for what projects. New York further stipulates that the regulations be reviewed every 2 years. Evaluation is extremely important for assuring economic effectiveness and maintaining public support. It also helps states as they develop language for their own jurisdictions, assess the process, and make improvements.

Green buildings legislation has advanced greatly since its original inception with LEED in the mid-1990s. With laws being implemented in multiple states and traveling through the legislative sector of others, it appears that green buildings legislation may become the most widespread of the state tax credits. The variation on the New York law to conform to the needs of Maryland and Massachusetts shows not only the versatility of the language, but also is an example of how legislation can evolve and change with each new state. The Oregon program takes a different approach to accomplish the same goal. Although the state was forced to start from the beginning instead of using pre-written legislation, this approach shows that there are many ways to implement green buildings legislation.

CHAPTER 4: EFFICIENT PRODUCT TAX CREDITS

Some states have found value in relatively inexpensive incentives for energy-efficient products and techniques for residential and business customers. These state programs encourage innovations in efficient technology while lowering first cost to the customer. The long-term benefits of these programs include reduction in pollution and lower utility bills. The specific lessons learned from these programs are:

- *In general, programs should be state specific.*[2] Programs should be designed keeping in mind the needs of the constituents as well as the revenue and environmental needs of the state.

- *Low cost.* When appropriate caps are in place for these programs, there is not substantial revenue lost to the state. Inappropriate cost caps and poor execution can cost states large amounts of revenue (see Arizona FlexFuel sidebar on page 13).

- *Reviews.* It is advisable to include a mechanism to review revenue losses annually. If tax expenditures are running higher than anticipated, it may indicate that performance thresholds for credits should be raised.

Maryland

The Maryland state sales tax incentive for energy-efficient appliances was introduced to the state legislature as HB 20 and SB 670. In the House, the bill was presented in the 2000 Leadership Package, a package of twenty bills earmarked as high priority by the House leadership. Among the public interest organizations supporting the bill were NRDC and the Maryland Public Interest Research Group (MaryPIRG).

The concept of sales tax relief for consumers who purchase energy-efficient appliances began in Washington, D.C. as a suggestion to the newly elected mayor and legislators in 1999 (DC Environmental Network 1999). Work on legislation in Maryland began in the fall of 1999, after Maryland's investor-owned utility companies discontinued most of their incentive programs for energy efficiency in the wake of electricity restructuring in the state. The legislation substitutes sales tax relief for utility funding in order to help transform demand for energy-efficient appliances in the consumer market in Maryland. Table 4-1 lists the products that are tax exempt under the Maryland efficient appliance tax credit law.

The Maryland legislation went into effect on July 1, 2000 and will end on July 1, 2004. Many of the qualifying appliances have staggered start dates to coordinate with the start dates for new federal efficiency standards (Osann 2001). For example, while the clothes washer credit went into effect in 2000, the refrigerator credits were held back in order to coincide with new federal standards that took effect in mid-2001. This is a good example of how this program was designed to complement federal standards. If the credits had applied to

[2] *Regional* incentive (rebate) programs, primarily utility-funded, have established a strong record in the Northeast and Northwest. These are state-approved, but not state-funded, and not treated here.

the old standards, they would have saved less energy and not been effective in moving the market in a more efficient direction. The state estimates a revenue loss of $1–2 million per year, or about $0.20–0.40 per capita per year (MDDLS 2000).

Two important components are missing from the Maryland legislation that were problematic during initial introduction and may limit long-term effectiveness of the tax credit program. First, the legislation does not include funding for program implementation. Instead, the Maryland Energy Administration was tasked with implementing the program and "internalized" the implementation costs within their budget. The second missing component is the lack of evaluation included with the program. Evaluation is important for both mid-program changes and future program improvement. This absence is not easily overcome because there is no formal system in Maryland for tracking sales of equipment that qualifies for sales tax waiver.

Because Maryland's program complements the federal ENERGY STAR program, we can estimate the effectiveness of the program. D&R International, a consulting firm in Maryland, tracks sales of ENERGY STAR Appliances nationwide, including Maryland. Table 4-2 shows national and Maryland data.

Table 4-2. Comparison of ENERGY STAR Appliance Sales Nationally with Maryland. Note that these data only track sales by ENERGY STAR National Partnership stores, which tend to be larger chains and constitute only 20% of stores that sell ENERGY STAR products.

Product	Quarter (2001)	National (% ENERGY STAR)	Maryland (% ENERGY STAR)
Air conditioners	1	not reported	not reported
Air conditioners	2	13.45%	16.16%
Air conditioners	3	8.87%	19.85%
Clothes washers	1	10.37%	9.54%
Clothes washers	2	11.96%	11.83%
Clothes washers	3	12.51%	11.71%
Dishwashers	1	11.64%	12.67%
Dishwashers	2	14.74%	14.43%
Dishwashers	3	15.10%	16.46%
Refrigerators	1	0.50%	0.60%
Refrigerators	2	12.52%	10.49%
Refrigerators	3	23.00%	23.22%

Source: Hazard 2001

The fraction of ENERGY STAR appliances sold in Maryland ENERGY STAR Partner stores does not differ from national averages. For example, D&R found that the market share of ENERGY STAR washers in Maryland went up from 7.2% to 12% between the second quarter of 2000 and the third quarter of 2001. Although the timing of this jump coincides with the introduction of the Maryland state credit, it cannot be attributed to it since the national sales numbers went up 4.3% in the same time frame. Again, D&R's data cover only sales data of ENERGY STAR Partners, stores that carry an average of 20% of the ENERGY STAR market (for clothes washers, the partners cover 45% of the market).

To bridge gaps in the data, MEA is independently attempting to gather evaluation material from the smaller "Mom and Pop" stores by providing promotional packets to the stores. When MEA distributes the packets, it asks for volunteers in the stores to participate in the monitoring and evaluation of the incentive. MEA believes the tax credit is not enough of an incentive on its own and it must be paired with funding for both training and evaluation. The training would allow the salespeople to understand why the credit is there and teach them to sell the qualifying appliances (Mudd 2001).

Retailers report that the incentive does not single-handedly sell products but when combined with the retailers' ability to explain the benefits of energy efficiency to the customer (lower running cost, higher quality), the incentive helps to sell the products. Retailers are motivated to learn about the appliances for themselves because highly efficient appliances are generally premium appliances, meaning that they have a higher profit margin. Since energy-efficient appliances are generally higher quality, retailers perceive that there will be fewer customer complaints, too (DiMeco 2001). Sales staff at the Sears, Roebuck and Company store in Bethesda offered their own perspectives of the tax rebates (Ergueta 2001). One salesperson said that the rebates for clothes washers did not make a big difference to consumers: "Five percent is not going to bring in someone who wants to buy an energy-saving washer. These are high-quality washers. They save money and that makes people feel good about them. But these customers already know they want a machine like that when they come in." This opinion is consistent with the ENERGY STAR clothes washer sales numbers discussed above. Another salesperson who sells refrigerators in the same store expressed a different opinion, saying, "Customers see the ENERGY STAR sign that we put on top of some of these refrigerators and start from there. They know that the savings add up over the 10–20 years that they will own the refrigerator." Each model for a qualifying washer or refrigerator on the floor at this store had a bright yellow sign taped to the front saying, "Qualifies for 5% Maryland Sales Tax Rebate." In the case of refrigerators, unlike for clothes washers, the sales tax credit is approximately equal in value to the incremental cost of ENERGY STAR units, which could well explain the differing perceptions of the different salespersons.

The lack of implementation funding in Maryland also affects the energy-efficient motor vehicle portion of the program. Again, due to lack of funding, Maryland does not offer retail staff training at dealerships. MEA is, however, attempting to work with the Maryland Department of Motor Vehicles (MD-DMV) to develop an evaluation program for the vehicle side of the program (Mudd 2001). Another early problem is that implementation of the titling tax reduction for electric and hybrid vehicles is based on a federal standard that never passed. When the federal standard was not enacted, Maryland did not have the financial ability to design such a test. Therefore, instead of working on a sliding efficiency scale, all hybrid and electric cars were given the full refund. This system is fair at the current time, as both the hybrid cars available (Honda Insight and Toyota Prius) are very efficient. When the availability and variation within hybrid cars expands, however, there will be variability in their efficiency (Osann 2001).

A salesman at Toyota's Bethesda dealership said that the "sales tax rebates are great" but also noted that with a consistent 3-month back-order for Prius models since they were introduced, he wouldn't say that the rebates were definitely bringing in additional buyers

(Pang 2001). "I do get more Maryland buyers, though—but maybe that's because there are more environmental people in Maryland." A sales representative at Ourisman Honda in Montgomery County, where Honda Insight hybrid vehicles are sold, voiced similar comments and added, "The rebate will be a bigger deal with the new Civic [arriving in April 2002] than with the Insight this year" (Deen 2001). The hybrid version of the Honda Civic will bring Honda into a market segment where cost has greater influence, so the rebate will likely be more of a deciding factor for those buyers.

One drawback of the lack of the sliding scale for vehicle credits is that it does not continuously increase the standard for qualifying for the credit over time. The Maryland appliance side of the program does not have this drawback since it its levels coincide with ENERGY STAR levels. The appliance program is scheduled to end in 2004. At that time, the market for qualifying appliances can be reassessed and if the tax credits are accepted as advantageous for advancing the efficiency of the market, then new credits can be designed using higher standards.

According to Christina Mudd (2001) at MEA, the most important part of the program that is missing is the evaluation and program administration. MEA was instructed to implement the program and has distributed the responsibility within the organization while internalizing the costs within its budget. This has limited its effort to promote the tax credits and perhaps reduced the effectiveness of the credits. As the Maryland program is written, there will be no evaluation until the end of the program. A better approach would be to conduct evaluations during the program so as to improve it while its still running.

Minnesota

A bill providing for a sales tax exemption for consumers of energy-efficient products was introduced in the Minnesota Legislature in February of 2001 (H.F. 0961) and was enacted in June 2001. The bill reflected concern about rising gas and electricity prices during the previous winter.

The bill was based on a list of efficient household appliances that could reduce peak load and overall energy use in Minnesota, provided by the Minnesota Department of Commerce (MnDC). It used technical information about appliances and heating and cooling equipment, paired with cost/benefit analysis for both individual Minnesotans and society overall. The bill includes a large list of appliances and energy-efficient equipment, as well as motor vehicles, cogeneration, and petroleum products (MN Leg. 2001). The list was then refined based on:

- the effect on energy use especially at peak times;
- the political process involved;
- the degree of market penetration already exhibited by the product; and
- the amount of tax revenue lost from the state.

Ultimately, the final list was significantly shorter than the original list. During this process, debate was sparked on the qualifications standards to be set for the products: should

it be ENERGY STAR or higher state-mandated standards? The benefit of choosing the ENERGY STAR standard is that retailers are familiar with the program and can more simply encourage buyers. The benefit of choosing specific higher standards is that that would encourage market penetration of the most efficient products on the market and reduces the cost to the state since product sales are lower at levels above ENERGY STAR. The final list included a mixture of both. The final list, as well as its comparison to the national ENERGY STAR program, is given in Table 4-3.

Table 4-3. Comparison of Products Qualifying for Minnesota State Sales Tax Break with ENERGY STAR Standards

Product	Minnesota State Sales Tax Break Qualifications	Comparison to ENERGY STAR Qualifications
Compact fluorescent bulbs and light fixtures	ENERGY STAR	Same
Electric HPWH heaters	Energy factor greater than 1.9	No ENERGY STAR program
Natural gas water heaters	Energy factor greater than 0.62	No ENERGY STAR program
Natural gas furnaces	AFUE* greater than 92%	Minimum AFUE 90%

* AFEU = annual fuel utilization efficiency
Source: MNDR 2001a

Two other differences between the original Minnesota bill and the final bill are worth noting. The first difference is in the timing of the end of the program. The original bill would have the tax credit offered from June 30, 2001 until January 1, 2007. The final law stipulated a timeline of August 1, 2001 until July 31, 2005. The second difference is that no funding was put aside for program implementation or review. The Minnesota Department of Revenue was tasked with implementing the program and has indicated that it will do so through mass mailings to retailers.

In May, the Minnesota Department of Revenue issued a preliminary analysis of the legislation (MNDR 2001b). Its analysis estimated revenue losses of $35.8 million in fiscal year 2002, rising to $41.5 million in fiscal year 2005 (the fiscal year is defined as July 1 to June 30). The Minnesota estimates were based on the Minnesota portion of national sales data, multiplied by the expected fraction of ENERGY STAR-labeled sales as provided by the U.S. Environmental Protection Agency. However, the legislation that passed only includes a few of the products included in the original bill and thus the cost of the bill, as passed, will be much lower than these figures.

According to Mike Taylor, Program Administrator, an evaluation process was written into the original proposed bill but was not included in the enacted version of the law (MN Leg. 2001; Taylor 2001). The reasons for this are unclear but may have resulted from an effort to have the maximum amount of funding available for credits.

Dee Long, Director of Tax Incentives Programs for Minnesotans for an Energy-Efficient Economy (ME3), offered her perspective on the credits, “It’s too early to tell if the

[incentives] are effective. We are talking to retailers now about the numbers" (Long 2001). Long also said that, this early in the program, a significant proportion of retailers are continuing to charge sales tax on exempted items. There is no evidence to indicate that the retailers are keeping collected monies; rather, she believes that the sales tax collections are inadvertent and indicative of the low level of knowledge at the retail level. Finally, Long mentioned that the rebates are seriously threatened in next year's budget by an approximately $1 billion shortfall in the Minnesota state budget.

Because CFLs are relatively inexpensive (although costly compared to incandescent bulbs), there are questions about the value of sales tax waivers as purchase motivators: the sales tax waivers spotlight the state's endorsement but are only a few percent of the purchase price. In the case of CFLs, a sales tax waiver would be worth about $0.50 (depending on the retail sales price). The Midwest Energy Efficiency Alliance sponsored a four-state program offering $3 rebates for CFL purchases. Minnesota offered a sales tax waiver, in addition. Minnesota did not show greater participation in the rebate program than the other states. No conclusions about the efficacy of an isolated sales tax waiver should be drawn from this experience.

Oregon

In the aftermath of the oil embargo of 1973 and the energy crisis of 1979, several programs aimed at conserving energy and resources were created. Oregon has two tax incentive programs currently operating that have saved consumers millions of dollars since their inception. These programs are specifically designed to deal with both private businesses and residential consumers and have found enthusiastic support from legislators, retailers, and manufacturers, as well as consumers.

Oregon Residential Energy Tax Credit Program

The program started in 1979 as a way to reduce the state's energy needs following the energy crisis, but has evolved and been regularly revised to continue encouraging the most current technologies and practices. The program has increased at a steady pace in scope and in the performance level required to obtain the credit. The focus of the program has always been on conserving resources, therefore it is focused on renewable energy and offers tax credits for products such as solar water heaters and geothermal heat pumps. In recent years, the program has expanded to include appliances, with a tax credit equal to the amount noted on the list of qualifying appliances (determined by OOE) or 25% of the net purchase price of the appliance, whichever is less (see Table 4.4). Also included are alternative fuel vehicles and compressed natural gas fueling stations (Nesmith 2001).

Table 4-4. Summary of Oregon Residential Efficiency Incentives. Oregon has no sales tax. The credits are taken against income tax obligations.

Item	Eligibility Level	Incentive
Heating, Ventilation, and Air Conditioning (HVAC)		
air conditioning systems	SEER of 15 or higher and EER of 13 or higher	$150
ducts	sealing existing ductwork or installing a well-designed and sealed duct system in a new home	25% of the cost of the work, up to $250
furnaces	AFUE is 90% or higher	$225
	the air has an ECPM	$125
boilers	AFUE of 88% or higher.	$225
heat pump systems	installed on or after October 8, 2001; HSPF of 8.5 or higher; SEER of 13 or higher and EER of 11 or higher	$300–500
heat recovery and energy recovery ventilation system	no performance level specified	amount listed on Office of Energy's qualifying equipment list or 25% of the net purchase price, whichever is less
geothermal space heating/ground-source heat pumps	no performance level specified	$1,500 through 2/28/2002; $600–900 beginning 3/1/2002
combo space and water heating systems	AFUE of 90% or better and the air handler has an ECM	$350 or 25% of the purchase price, whichever is less
Water Heaters		
water heater unit	rating of 70%; most of those that qualify have 80%	the amount noted on the list of qualifying equipment or 25% of the net purchase price of the equipment (not including labor), whichever is less, up to $1,000 annually.
installation of 5 feet vertical drainpipe and other components	at least 5 feet of vertical drainpipe from the shower or on the main water drain; also includes the cost of other installation components	$80–120, not to exceed 25% of the cost
Appliances		
clothes washers	ENERGY STAR	$160–230
dishwasher	savings of $\geq$ 157 kW/h	$60
refrigerators	15–19.9% better than 2001 standards	varies depending on performance

Notes: SEER = seasonal energy efficiency ratio; EER = energy efficiency ratio; ECPM = electronically commutated permanent magnet motor; Heating Season Performance Factor. Work must be performed by an OOE-certified contractor to qualify for these tax credits. For more information, see http://www.energy.state.or.us/res/tax/taxcdt.htm.

Every year approximately 20,000 tax credits are granted according to a set of standards created by OOE. These standards exceed the ones set by the ENERGY STAR program for energy usage and include water savings as a criterion. These standards are performance

based, with credit amounts based on savings produced or production derived from eligible products. These credits are based on 40 cents per kWh per year (which is different from the BETC discussed in Chapter 3). Charlie Stephens, Energy Analyst for OOE, conducts the research for determining the standards by going shopping to see what products are available and talking to salespeople to see what the market will support (Stephens 2001). Clothes washers, refrigerators, and dishwashers have been the most popular appliances purchased with the tax credit, as described at http://www.energy.state.or.us/res/tax/taxcdt.htm. However, the recent addition of furnaces to the list of appliances has led to a huge increase in the total number of credits being taken. Qualifying furnaces have 90% or better AFUE and a variable speed (ECM) air handler fan motor. The furnace rebate is $350, of which $125 is for its electricity savings from the improved fan motor. According to Mr. Stephens, several HVAC dealers have sold out of furnaces that qualify for the credit and have stopped buying furnaces that do not.

One reason for the success of Oregon's Residential Tax Credit Program is that Oregon has made the program easy to use. Since Oregon has no sales tax, the credit is income tax based. By making the credit application available at the point of purchase, the program makes it consumer-friendly. As an example of how this credit works, at Stover, Evey, and Jackson, an appliance store in Corvallis, Oregon, a customer buying a qualifying refrigerator can have their tax credit applied for and ready to process within 10 minutes of making their purchase. Upon purchase, the vendor fills out the state tax credit form. This is attached to the customer's receipt for them to fill out and mail in to the Department of Revenue. Once the application is approved, the customer is then sent back a voucher that they will attach to their tax returns in order to receive the credit. Oregon is working to automate the system so the consumer can apply for the tax credit at the store instead of having to mail in the credit application (Stephens 2001).

Another reason for the success of the program is that there are other programs supporting ENERGY STAR in Oregon, thereby increasing the brand recognition for ENERGY STAR and training sales personnel to sell the products more effectively. These programs include ones operated by the Northwest Energy Efficiency Alliance Program (see http://www.nwalliance.org/projects/residential.html) and local utility programs. Some cities, like Corvallis, offer a rebate for energy-efficient appliances (Gentle 2001).

OOE is currently working to expand the program to further encourage energy efficiency. Furnaces and heat pumps were recently added to the list of appliances that can receive a tax credit and the immediate response was extremely positive. As the program has progressed, the state legislature has given it more ability to expand to include new products and create new standards. Political support for the program is very strong: Republicans like the program because it is a form of targeted tax relief while Democrats like it for its environmental benefits. The state legislature recently choose to allocate funds to evaluate the program.

There are some problems with the program. The largest is the administrative cost of the program since there is no application fee charged to the consumers. Instead, when the program was started, it was allotted a portion of money from the state's general fund to cover the administrative costs of processing the tax credits. As the program grew in popularity, the

administrative costs grew to be much larger than expected. A tax credit program like this will have a definite revenue impact on the state, and good budgeting is needed to minimize the effect of the lost tax revenue. Even so, the lost revenue is small (less than 0.5%) compared to Oregon's state budget of $10.6 billion.

The residential tax credit program cost less than 1 million dollars annually before the appliance credits were added. After that, the revenue loss increased to 3–4 million dollars annually. Expected cost for 2002, with the addition of more appliances and hybrid vehicles, is expected to be between 5 and 6 million dollars.

Oregon's Residential Energy Tax Credit Program is successful for several reasons. Possibly the most important factor, and the hardest to emulate, is the constituency for the program that exists in Oregon. People are willing to buy a new washing machine even if they have a perfectly good one at home, simply to be able to take advantage of the energy and resource savings.

Oregon Business Energy Tax Credit Program

Oregon's BETC program was started at the same time as the residential program and shares its focus on renewable resources and conservation, with recycling and energy efficiency becoming priorities in the 1980s. As with the residential program, the tax credits are performance based.

These credits cover all energy conservation projects including renewable retrofit projects. For retrofit projects, the eligible costs include all energy-related project costs including engineering and architectural expenses. New construction and replacement of equipment that is beyond its service life are limited to the extra cost of making the replacement 10% better than standard industry practice or required building code. For example, one case study relays the story of a Kinko's in Oregon that replaced its light fixtures with more efficient fixtures. The cost of the project was $3,400 for a 3,500 square foot store. The savings from reduced electricity use was $1,000 per year. Paired with a 35% ($1,185) credit through the BETC and a $385 credit through its utility, the payback time for the project was 1.5 years (Schwartz 2001). Without the credit, the payback time would have been almost double. More case studies are available at the Oregon Office of Energy website (http://www.energy.state.or.us/bus/tax/taxcdt.htm).

As an incentive program that began in the late 1970s, this program has proven adaptable. The newest addition to this legislation is the sustainable buildings incentive that began implementation in October 2001 (see Chapter 3).

When it was first started, the state legislature set a $40 million per year cost limit on the BETC in order to limit the revenue impact (there is no cost limit for Oregon's residential programs). It is important that $40 million is the cost of the qualifying investments; the maximum tax revenue loss is 35% of $40 million, or $14 million. From 1980–85 the program never reached its cost cap. Revenue impact at this time was approximately 3–7 million dollars. Oregon reached the cost cap first in 1986 (meaning applications late in the year were

denied for lack of funds) and every year after that as the program grew. At this point, the revenue impact grew to 4–9 million dollars. The last session of Oregon's state legislature removed the cost cap completely and the revenue impact is expected to be about 17 million dollars. In 2001, the credit was dominated by a pair of wind projects capitalized at $20 million each.

Hawaii

The state of Hawaii has an extensive income tax credit program for the private sector that covers both renewable energy and energy efficiency. The Hawaii Energy Tax Credit (Senate Bill 2092, Act 163) was originally scheduled to expire in 1998; it has since been extended to the end of 2003. This bill provides an income tax credit for individual or corporate resident taxpayers for installation (after 1989) of renewable energy systems and heat pump water heaters. Taxpayers receive up to 20% of the price of the installed HPWH unit (up to $400 for single-family homes and unlimited for commercial applications).

The market size for HPWHs is currently not well characterized. However, in 1995, the Pacific Northwest Laboratory estimated that the number of single-family residential HPWHs installed since 1979 in Hawaii was about 25,000 and that the number of HPWHs serving multi-family residences was about 35,000 (PNL 1995). About half of the installations were at federal facilities.

Although there has been extensive evaluation of the solar incentive, there has been little written regarding evaluation of the HPWH program. One of the largest suppliers of HPWHs to Hawaii is ColMac, Coil Manufacturing. Ryan Lawrence, commercial sales representative with Colmac, offered his own evaluation of the credits (Lawrence 2001). Lawrence said that the 20% credits "have made a difference. They definitely make sense, because the big challenge is the up-front capital cost." He noted that most commercial customers perform some form of life-cycle costing that demonstrates the cost-effectiveness of HPWHs, but added that a few very successful businesses, particularly restaurants, "don't see the bother to be worthwhile." Lawrence noted, "ColMac has sold hundreds of units to restaurants, hotels, hospitals, and laundries…where there's a need for both hot water and cool air, there's a good fit." Asked if he had any indication if the credits are effective, he noted anecdotally that several years ago, when the credits were scheduled to run out (but have since been renewed), he received a significant number of requests aiming to install the equipment before the looming deadline. According to the Hawaii Department of Taxation, the state loses about $4.5 million a year. This is the total for all devices that comprise the Energy Device Tax Credit: solar energy systems, heat pumps, wind energy systems, and ice storage. Unfortunately, ACEEE was unable to find any breakout of number or revenue amount by product type. Hawaii's income tax form is included in Appendix B.

Discussion

Overall, efficient product tax incentives are becoming more common at the state level. Maryland, Minnesota, Hawaii, and Oregon all have programs underway. Maryland and Minnesota offer sales tax rebates, while Oregon and Hawaii offer tax credits. Differences in

effectiveness between the two approaches could not be observed due to a lack of marketing evaluations for the programs.

It is clear from the strengths and weaknesses in the programs discussed that a beneficial tax credit program needs to respond to the needs of the specific state,[3] have a controlled revenue impact, and support sales and use of more efficient products. Relatively short-term efforts to increase market share should increase competition and drive down prices, with the end result being more efficiency than would otherwise have occurred.

[3] Coordinated regional utility incentive programs are effective in the Pacific Northwest and in New England. In the future, it may be possible to build regional markets through coordinated multi-state tax incentives, but there seems to be less interest now in this approach.

CHAPTER 5: FACTORS INFLUENCING STATE LEGISLATIVE EFFORTS

At the state level, several factors influence the success of legislative efforts to enact financial incentives for energy efficiency investments. Some of the factors contribute to a supportive climate for introducing energy efficiency legislation, whereas other factors contribute to success of the legislative campaign itself. Several of these key factors are listed below.

- *Broad support.* In some states, such as Maryland, success resulted from strong support by energy efficiency advocates within the state. Success is even more likely where a high level of advocacy is coupled with strong leadership by legislators.

- *Adapting other states' legislation.* As demonstrated by New York's leadership in developing its green buildings language, which was later used by Maryland and Massachusetts as a basis for their own legislation, adapting well thought-out and written legislation cuts away time and cost from the bill writing process. Risks and administrative costs are also reduced, as the program has been done before. It is very important, however, that while building on the New York language, other states are able to further evolve and improve their own legislation.

- *Fiscal capability.* Tax incentives reduce the revenues collected by the state, so incentives are supported more strongly where there is budget availability. However, tax reductions may also sometimes be used as market stimulus, so tax incentives for efficiency can be attractive components of any market stimulus legislation because they provide net savings to consumers and the state. Typical programs have annual revenue losses that range from much less than $1 per resident (Maryland appliances sales tax waiver) to about $10 per resident (Oregon).

- *Public benefits funds and other non-state-funded incentives.* In some states, such as California, public benefit funds have assumed a major role in funding energy efficiency measures. The existence of public benefit funds may reduce interest in pursuing tax credits. On the other hand, cuts in utility demand-side marketing funding helped lead directly to the introduction of public benefit funds and indirectly to the passage of the tax incentive legislation, such as in Maryland. And at times, tax credits and public benefits funds can go hand-in-hand. As illustrated by Oregon, New York, and Massachusetts, which are leaders in both tax credits and public benefits funding, when the two approaches are designed to compliment each other, they can be effective in encouraging energy efficiency.

CHAPTER 6: CONCLUSIONS

State tax incentives for energy efficiency are a growing means for increasing the use of technologies that provide benefits to both residents and the state overall. The incentives have been well received in Oregon (the state with the longest running program) and initial results in Maryland and New York are promising. Based on past experience with tax credits as well as the current policy, market, and technological context, greater effectiveness is achieved where tax incentives:

- Stimulate market acceptance of advanced technologies by establishing appropriate criteria and allowing appropriate time for credits to effect the market. Tax credits should be limited to high performance technologies and practices that have a high purchase price, long life, and very low present market penetration. The New York green buildings credit will be in effect for 10 years, the length of time the authors believed would be a good balance between tax revenue loss and market stimulation. The New York program also includes an instruction for the regulations to be updated every 2 years. The Oregon program ensures the inclusion of advanced technologies by employing a full-time staff person to ensure that the covered equipment and appliances are the most efficient on the market. Arizona will increase the level of efficient homes receiving its credit if the number of homes that qualify grows larger than 5% of the market.

- Are flexible with respect to who receives the credits. The green buildings programs have allowed the credit to go to owners, developers, and tenants. An even more flexible step would have been the stipulation that non-tax-paying entities can qualify. This was cut from both the New York and Maryland laws and was not included in either the Massachusetts bill or the Oregon law.

- Complement other policy initiatives (federal, municipal, and public benefits). In Maryland and Oregon, retailers commented that the state-funded tax credit was often not enough to convince buyers to make the more efficient choices. The retailers did say, however, that when combined with utility, manufacturer, and other incentives, there is often a large enough incentive to convince buyers.

The impact of these factors is suggested by looking at one successful program. Oregon has no sales tax, so the state's leverage at the point of sale is very limited. However, Oregon offers substantial income tax credits for purchases of specific products and provides point-of-sale support to increase interest. For example, purchasers of condensing furnaces with ECM furnace motors are eligible for a $350 income tax credit. This is an important signal: First, it is about 10% or more of the purchase price. Secondly, Oregon is validating the dealer's efforts to "sell up" to premium equipment that has great customer benefits. Where sensitivity to both water and energy resources is high, as in the Pacific Northwest, smaller incentives (such as sales taxes or utility rebates) may successfully motivate consumers to buy more efficient clothes washers. In contrast, a sales tax incentive for compact fluorescent bulbs is a small amount, typically much smaller than the price variation among stores, and is less likely to have incentive value beyond the state's endorsement.

The objectives of state-funded energy efficiency incentive programs are to foster consumer choices that benefit statewide energy, economic, and environmental objectives. Market barriers impede the ability of the private sector to provide products and services to address states' energy security, system reliability, environmental, and economic goals. Tax credits can accelerate customer acceptance and enlarge the market share for high-efficiency products and services, which leads to earlier high-volume production and resulting cost-reductions for efficient alternatives. Once the new technologies become widely accepted and produced on a significant sale, costs decline and the tax credits should be phased out or updated to more advanced technology or efficiency levels.

A common theme observed among all of the state tax credit programs is the importance of considering the unique needs of the state in designing legislation. Tax credit programs can be tailored to individual state economic, energy, and environmental objectives. Energy efficiency tax credits enacted in other states can serve as starting points for new legislation.

The most common tax credits are for green buildings and efficient products. These programs offer large opportunities to encourage energy efficiency while minimizing lost revenue. Furthermore, because other states have already used these approaches and programs are already in place, adapting the programs used in those states is generally easier and more effective than developing new approaches.

Many state programs lack specific funding for implementation and program evaluation. Even if intended to provide greater funding for the credits themselves, this has potentially harmful consequences. Withholding implementation funding precludes marketing to raise visibility of the tax credits. Without evaluation, programs cannot be refined or defended at times of increasing budget pressure.

Adequate annual allocation for tax credits is important for their success. The purpose of a funding cap is to keep the programs affordable for the state, but if the caps are too low, then the credits will not stimulate the market to grow to desired levels. An adequate cap will create a level of incentive that encourages use of the credit and therefore gains the benefits of increased energy efficiency without bankrupting the state. Arizona has led the way with a mechanism to review and adjust eligibility criteria: If there is too much revenue erosion from its credit for efficient houses, the assumption is made that the prescribed level is becoming mainstream. In such cases, raising the eligibility level reduces revenue losses and stimulates builders and manufacturers to seek ways to improve performance further.

The cost of efficiency and green buildings tax credits, expressed as state tax revenue losses, has been moderate and acceptable, except for the short-lived Arizona alternative fuels vehicle program. Maryland's 5% sales tax waiver for efficient appliances is projected to cost about $0.20–0.40 per resident per year, and the state's green buildings incentives are capped at less than $1 per resident in the year with the largest program cap. At the high end of the effective programs studied, Oregon "spends" about $10 per resident annually in forgone revenue.

At the state level, several factors influence the success of legislative efforts to enact financial incentives for energy efficiency investments. Several of these key factors are

- Broad support for energy efficiency measures by various stakeholders
- Legislation and state programs that can be adapted for use in the state
- The fiscal capability of the state
- The existence of complementary resources

An effective plan for designing a state tax credit program must consider these factors and target specific measures that have the greatest potential. In most states so far, green buildings measures and efficient appliance measures are the dominant themes. Using the model language attached, new legislation can be crafted that is likely to be effective, properly sized, and properly evaluated.

CHAPTER 7: RECOMMENDATIONS

Based on the research compiled in this report, we offer the following recommendations to create effective state tax credits to encourage energy efficiency:

- *Efficient product sales and income tax credits*. Several states have launched programs encouraging the purchase of high-efficiency appliances, vehicles, and equipment. Sales tax rebates are the lowest cost of the tax credits and attractive because of their administrative ease. First, they are implemented primarily at the retail level, involving only staff training to sell a product that is more profitable for the retailer. Second, selection of products is on a pass/fail basis, i.e., either the product is eligible or it is not. Choosing products is also easy since other states have already set guidelines or the federal ENERGY STAR program can be used as a baseline. Model legislation for sales tax removal for energy-efficient products can be found in Attachment A.

- *Green buildings tax credits*. Encouraging resource efficiency in the building industry has large payoffs in that there are many opportunities for energy and monetary savings. These programs have higher costs associated with them than the credits above and require setting regulations or using a third-party certification procedures, such as the LEED ratings system. Model legislation for this credit is located in Attachment A.

We recommend that the following aspects of tax credit legislation deserve legislative focus:

- *Funding for implementation and evaluation.* The best designed programs will not encourage market change without good market implementation. Funding for these activities should be included when developing a program. Planning for periodic evaluation of the program is also very important. Evaluation results can be used to identify appropriate program adjustments to enhance the program during implementation and also can assist other states in developing programs that build on the lessons learned from current programs. An alternative might include performance incentives for participating agencies.

- *Sunset dates.* Either sunset the credits to reflect increasing market acceptance in future years or more preferably "move the goalposts" so that credits continue to spur market development for energy efficiency innovations.

- *Appropriate funding caps.* The cost of efficiency and green buildings tax credits, expressed as state tax revenue losses, has been moderate and acceptable, except for the short-lived Arizona alternative fuels vehicle program. Maryland's 5% sales tax waiver for efficient appliances is projected to cost about $0.20–0.40 per resident per year and the state's green buildings incentives are capped at less than $1 per resident in the year with the largest program cap. At the high end for effective programs studied, Oregon "spends" about $10 per resident annually in forgone revenue for a very comprehensive suite of income tax credits for both residential and business taxpayers.

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Appendices A (Model Legislation) and B (Sources of Online Information for the States) are available as part of the hard copy of this report from ACEEE Publications, 202-429-0063 phone, ace3pubs@ix.netcom.com email, aceee.org website.