Local Government and Community Programs and Incentives for Renewable Energy—National Report

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EXECUTIVE SUMMARY

This report presents a summary of the renewable energy programs and incentives of 45 communities in 23 states as collected and catalogued by the Interstate Renewable Energy Council's (IREC) Database of State Incentives for Renewable Energy (DSIRE) project. Also included are summaries of state initiatives that impact implementation of renewable energy technologies on the local level. Programs and incentives in this report include:

COMMUNITY INVESTMENT & AWARENESS PROGRAMS

- Renewable Energy Projects
- Education & Assistance
- Green Pricing Programs
- Green Power Purchasing

FINANCIAL INCENTIVES

- Rebates, Grants, & Loans
- Tax Incentives
- Green Building Incentives
- Industrial Recruitment

RULES, REGULATIONS & POLICIES

- Solar & Wind Access
- Net Metering
- Construction & Design
- Contractor Licensing
- Equipment Certification
- Public Benefits Funds
- Renewable Energy Portfolio Standards
- Disclosure & Certification

Established in 1995, DSIRE is an ongoing project to summarize incentives, programs, and policies for renewable energy. The project is funded by the U.S. Department of Energy's Office of Power Technologies and is managed by the North Carolina Solar Center. *DSIRE on Line* makes the DSIRE database accessible via the web at: http://www.ncsc.ncsu.edu/dsire.htm. The website is updated daily and includes search capabilities for all incentives. In addition to state and local programs, the website features utility programs and a searchable bibliography.

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The DSIRE project team would also like to express our appreciation to those who have provided information to the project over the past five years. This includes the many Interstate Renewable Energy Council (IREC) state contacts who have done so much to initiate and sustain renewable energy programs. Thanks go to our friends in the organizations who have shared leading roles in developing and promoting renewable energy policies including the American Solar Energy Society, the Pace Law School Energy Project, Kelso Starrs and Associates, William A. Spratley and Associates, the International Council for Local Environmental Initiatives, American Public Power Association, and the Solar Electric Power Association (formerly UPVG).

We also want to acknowledge those at the U.S. Department of Energy (DOE) who have made important contributions to the DSIRE project development, including Jim Rannels, Director of the DOE's Office of Solar Energy Technologies; Lynne Gillette who works with Jim and provides support to IREC's programs; Peter Dreyfuss, Director of the Million Solar Roofs Program and Head of the DOE's Chicago Regional Office; Tina Kaarsberg of the Office of Power Technologies and current DSIRE contract manager; Larry Mansueti of the Office of Power Technologies; Richard Michaud of DOE's Boston Regional Office; and Joe Galdo of the DOE's Office of Distributed Technologies and past DSIRE contract manager.

Special thanks goes to the staff of IREC for assuring that the project moves forward, especially Jane Weissman who continues to serve as one of the most effective and important representatives for renewables in the country. We also thank Louise Urgo for serving as a primary liaison between IREC and the North Carolina Solar Center.

And, finally we thank Larry Shirley and Henry Rogers for their many years of service and dedication to the Solar Center and leadership on the DSIRE project. Larry is former Executive Director of the North Carolina Solar Center and current head of the North Carolina State Energy Office. Henry is the former DSIRE project manager and current web/IT specialist at a leading environmental science and policy research institute. Both Henry and Larry brought life and vision to the DSIRE project and will be missed at the Center.

INTRODUCTION

DSIRE Project Overview

The Database of State Incentives for Renewable Energy (DSIRE) serves as the nation's most comprehensive source of information on the status of programs and incentives for renewable energy. The database tracks these programs at the state, utility, local, and community level. Established in 1995, DSIRE is an ongoing project of the Interstate Renewable Energy Council (IREC) and is managed by the North Carolina Solar Center with funding from the U.S. Department of Energy's Office of Power Technologies.

The first three phases of the DSIRE project—surveys of state financial incentives, state regulatory policies, and utility programs and incentives—have been completed. Information from these databases has been published in three previous reports:

National Summary Report on State Financial Incentives for Renewable Energy (1997);
National Summary Report on State Programs and Regulatory Policies for Renewable Energy (1998); and
National Summary Report on Utility Programs and Incentives for Renewable Energy (1999).

These reports summarize incentives, programs, and policies that promote active and passive solar, photovoltaics, wind, biomass, alternative fuels, geothermal, hydropower, and waste energy sources. Given the rapidly changing status of state activities, an updated report—*National Summary Report on State Financial and Regulatory Incentives for Renewable Energy*—has been produced concurrently with this report on local initiatives.

While reports serve as a snapshot of the status of incentives and programs, constant revisions and additions to the database maintain DSIRE's role as the most up-to-date, national clearinghouse of information on incentives and programs for renewable energy. Through DSIRE on Line, the DSIRE database is accessible via the web at: http://www.ncsc.ncsu.edu/dsire.htm. In 2001, federal incentives will be added to the database, thereby providing a complete and comprehensive database of renewable energy incentives at all levels—national, state, and local.

IREC is a nonprofit consortium of state and local government renewable energy officials and is uniquely situated to oversee the effort to compile information on state, local, and utility incentives. IREC ensures that all information products produced are disseminated widely to federal, state and local agencies, federal laboratories, and other appropriate audiences.

The primary subcontractor to IREC for the DSIRE project is the North Carolina Solar Center. Established in 1988, the Solar Center is located in the College of Engineering at North Carolina State University in Raleigh, NC and is sponsored by the State Energy Office in the North Carolina Department of Administration. The Solar Center conducts programs in four areas: policy analysis, research and commercialization, technical assistance and training, and education and outreach.

DSIRE on Line

The DSIRE website provides a fast and convenient method for viewing incentive and program details, searching for specific incentives, and identifying primary contacts. *DSIRE on Line* also contains links to relevant statutes, codes, rulings, forms and documents. The advantage of an internet database is the ability to access constantly updated information. There are two methods for searching the database—through a table or a web-based form.

Figure 1 shows how the DSIRE website is formatted to provide access to a table of incentives and programs available in each state in the categories of:

- Financial Incentives;
- Rules, Regulations & Policies; and
- Investment & Awareness Programs.

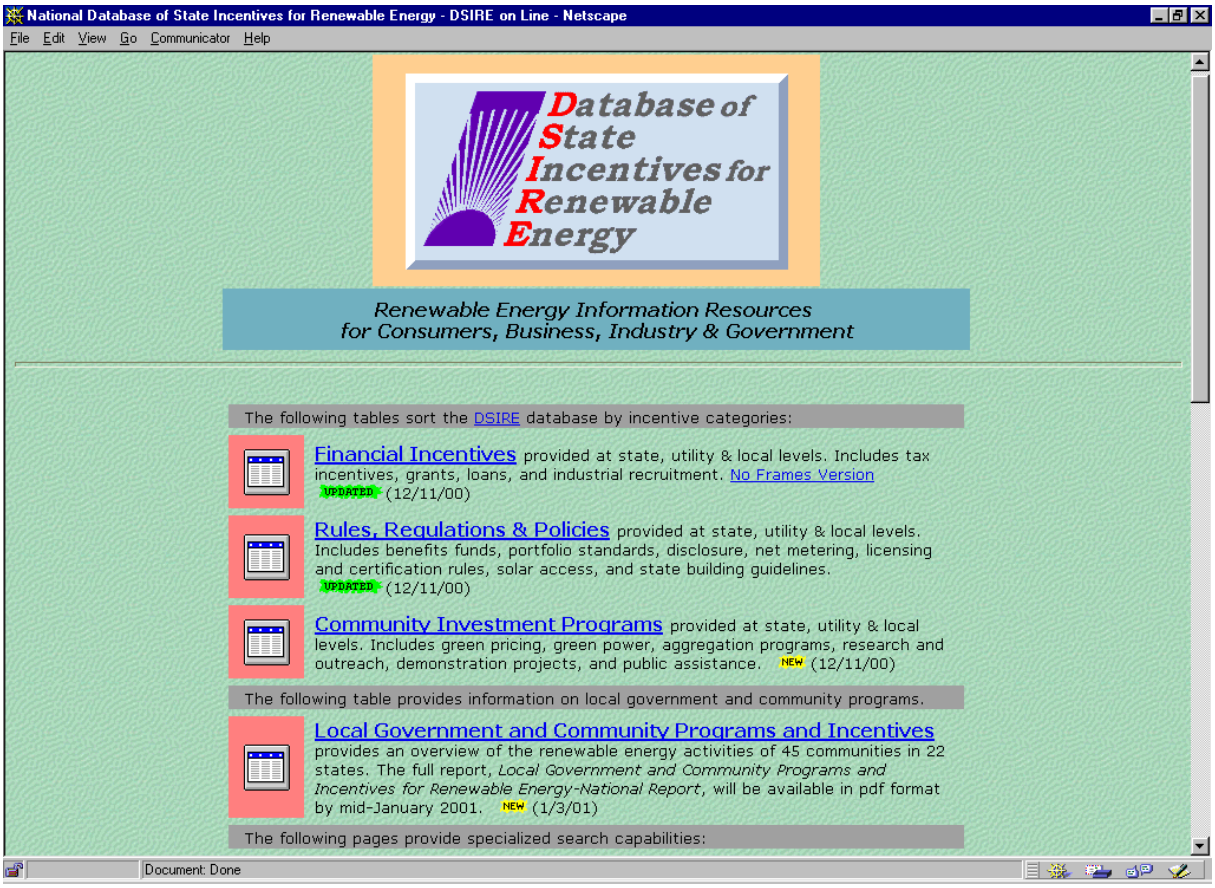

Figure 1: Screen Shot of DSIRE Website at http://www.ncsc.ncsu.edu/dsire.htm

Each table allows viewers to search by incentive type or by state (see **Figure 2**). In addition, within each table, color-coded buttons corresponding to state, utility, and local-level programs indicate the number of incentives or programs offered by each sector. For example, in California, there are four state grant programs and four local grant programs. Clicking on one of the buttons brings the viewer to a complete list of the grant programs with links to program details and contact information. Selecting a state brings up a list of all the state's incentives. From there, viewers can select a city to narrow the search.

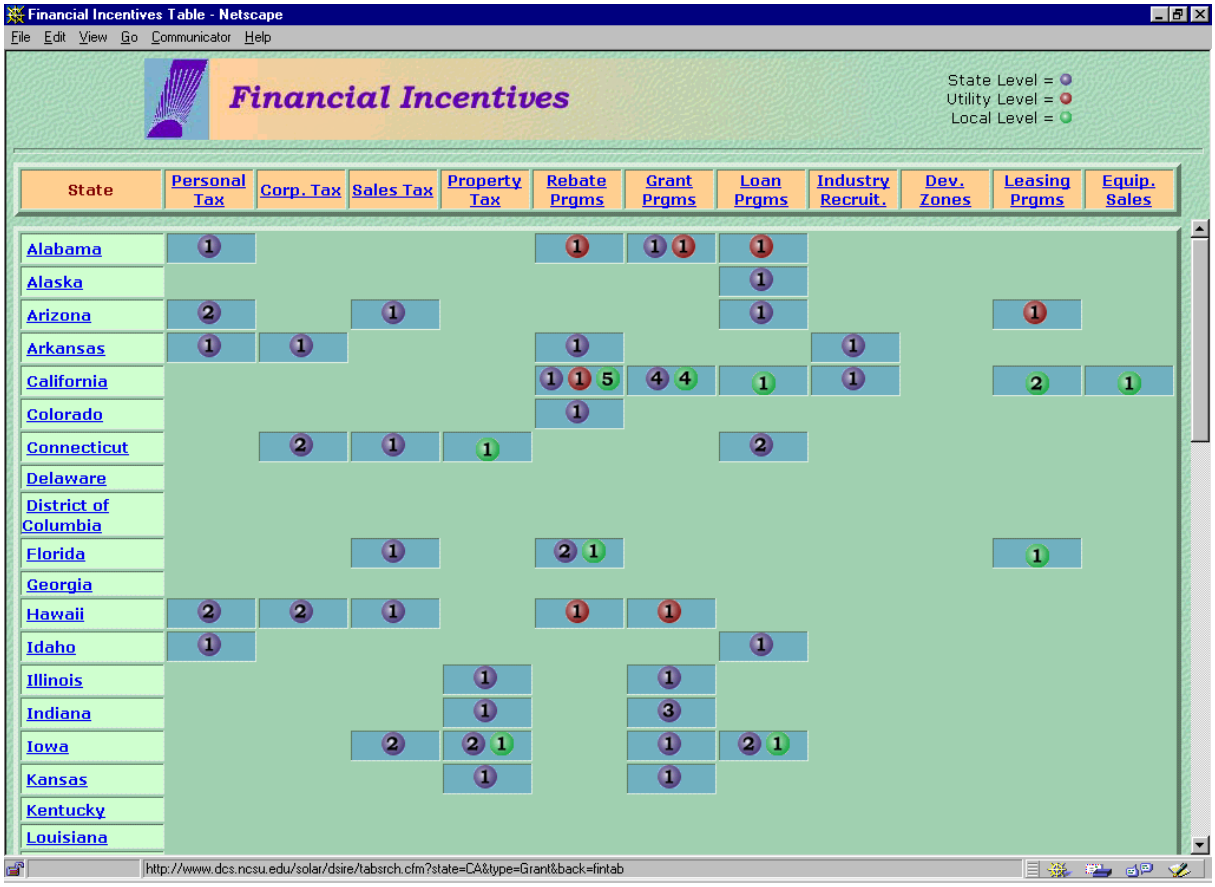

Figure 2: Screen Shot of Financial Incentives Table

DSIRE's homepage also provides a link to a form-based interface for searching the database. The form contains five pathways to view incentives and programs:

- State,
- City/Community,
- Incentive/program type,
- Renewable energy technology, and
- Eligible sector (e.g., commercial, industrial, and/or residential).

Other resources available from *DSIRE on Line* include:

- DSIRE Database of ***Schools Going Solar*** Programs developed and hosted for IREC's ***Schools Going Solar*** initiative.
- Searchable Online Bibliography of technical reports, papers, articles, books and journals related to state, utility & local level incentives, programs and policies for renewable energy.
- DSIRE weblinks to other resources on the internet.

Purpose of this Report

People want renewable energy.
In surveys over the past two decades, Americans have consistently expressed support for renewable energy and sustainable technologies over other energy alternatives and want them institutionalized as a greater part of the nation's energy mix.[1] Some local governments and community groups have responded to this interest by establishing innovative programs to educate, demonstrate, and promote the use of renewable energy. Local programs to support renewables are often successful because they respond to local interests, are designed for local renewable and community resources, and have a shorter implementation cycle.

Restructuring presents new opportunities and challenges to communities.
In 2001, electric utility restructuring continues to dominate energy policy discussions around the United States. By the end of 2000, 25 states had passed utility restructuring legislation. With electric utility restructuring heating up to a fever pitch, the coming years will be filled with innumerable changes in laws and regulations that support renewable energy development. Local governments have critical roles to play in this transition - as educators, customers, aggregators, regulators, financiers, and partners with private enterprise.

[1] *Energy and the Environment: The Public View*, Dr. Barbara Farhar, for the Renewable Energy Policy Project, October 1996.

Local governments are getting support…
Another recent factor influencing local programs and incentives has been the acceleration in the number of Million Solar Roofs (MSR) sites and partners at the local level. MSR provides grant funds to selected state and local partners for implementation of public solar energy programs. Currently there are 48 MSRI partners across the United States. Many feel that cities and towns will be the most active in and have the most to gain from this national initiative. Furthermore, federal programs such as the Department of Energy's *Brightfields Initiative*, and the Environmental Protection Agency-sponsored International Council for Local Environmental Initiatives (ICLEI) Cities for Climate Protection Campaign provide opportunities for communities to incorporate renewables into redevelopment and climate protection strategies.

But, barriers still exist.
There are still multiple institutional and cultural barriers to renewable energy projects even with an increase in federal, state and utility support for local programs. Difficulties include shortages in local government staff resources, access to technical expertise, and a limited ability to advance successful efforts beyond the local community. From the consumer's viewpoint, financial, regulatory, and informational barriers exist. As local governments seek to utilize the most effective methods for promoting renewables, the DSIRE database can be an important tool for guiding such decisions.

Take a look at what some communities are doing to promote renewable energy.
This report highlights incentives and programs for renewable energy that *are currently being implemented* at the local level in 45 cities across the United States. This report was conceived in an effort to meet the needs of:

(1) city and county council members, building and planning officials, and other local government officials which have approval or influence over the creation of many of the programs and incentives;

(2) municipal utilities, who may be considering the creation of new programs and incentives for renewables;

(3) consumers and businesses that will ultimately be taking advantage of the incentives;

(4) renewable energy industries, which need timely information on such incentives in order to organize their production and marketing efforts in the field; and

(5) groups working to support the use of renewable energy and protect the interests of consumers.

Methodology and Scope

The primary methods for identifying local incentives and programs were:

(1) internet searches of websites operated by local governments and municipal utilities, as well as those operated by such organizations as the National Renewable Energy Laboratory, U.S. Department of Energy, William Spratley & Associates, IREC, Public Technology Inc., Solar Electric Power Association (formerly the Utility PhotoVoltaic Group), American Public Power Association, and many others;

(2) a survey distributed to IREC contacts, local government officials, municipal utilities, and others familiar with renewable energy activities;

(3) searches of appropriate literature sources including journals, technical reports, magazines and newsletters; and

(4) an on-line survey available on the DSIRE website.

Any program that was identified through these sources was verified either with the help of a local, state or utility contact or on-line statutes. Extensive follow-up telephone and e-mail contact was necessary with many of the local officials.

The communities highlighted in this report were chosen based on the number of active programs and incentives, the level of renewable energy technology deployment, and the availability of information. It is important to note that there are many other communities across the country using renewable energy technologies and developing ways to promote it. This report is not an exhaustive catalogue of all the renewable energy activities implemented at the local level, but a sampling of some of the more prominent local efforts identified thus far. Local incentives and programs identified by the DSIRE project which have not been included in the report are being added to the database and will be accessible on the DSIRE website. The DSIRE project continues to track local programs and incentives and will update the database as information becomes available. Readers are encouraged to share information about efforts to promote renewable energy in their communities. Send to:

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Structure of the Report

This report begins with a *Guide to Local Programs and Incentives w*hich describes each of the renewable energy program and incentive types implemented by communities. State financial and regulatory initiatives are also discussed because they apply locally and provide models of what could be used by local governing authorities. The main section of the report summarizes the renewable energy initiatives of 45 communities in 23 states and is organized by state. Within each state section, one or more communities are featured. The summaries are divided among three categories as follows:

COMMUNITY INVESTMENT & AWARENESS PROGRAMS

- Renewable Energy Projects
- Education & Assistance
- Green Pricing Programs
- Green Power Purchasing

FINANCIAL INCENTIVES

- Rebates, Grants, & Loans
- Tax Incentives
- Green Building Incentives
- Industrial Recruitment

RULES, REGULATIONS, & POLICIES

- Solar & Wind Access
- Net Metering
- Construction & Design
- Contractor Licensing
- Equipment Certification
- Public Benefits Funds
- Renewable Energy Portfolio Standards
- Disclosure & Certification

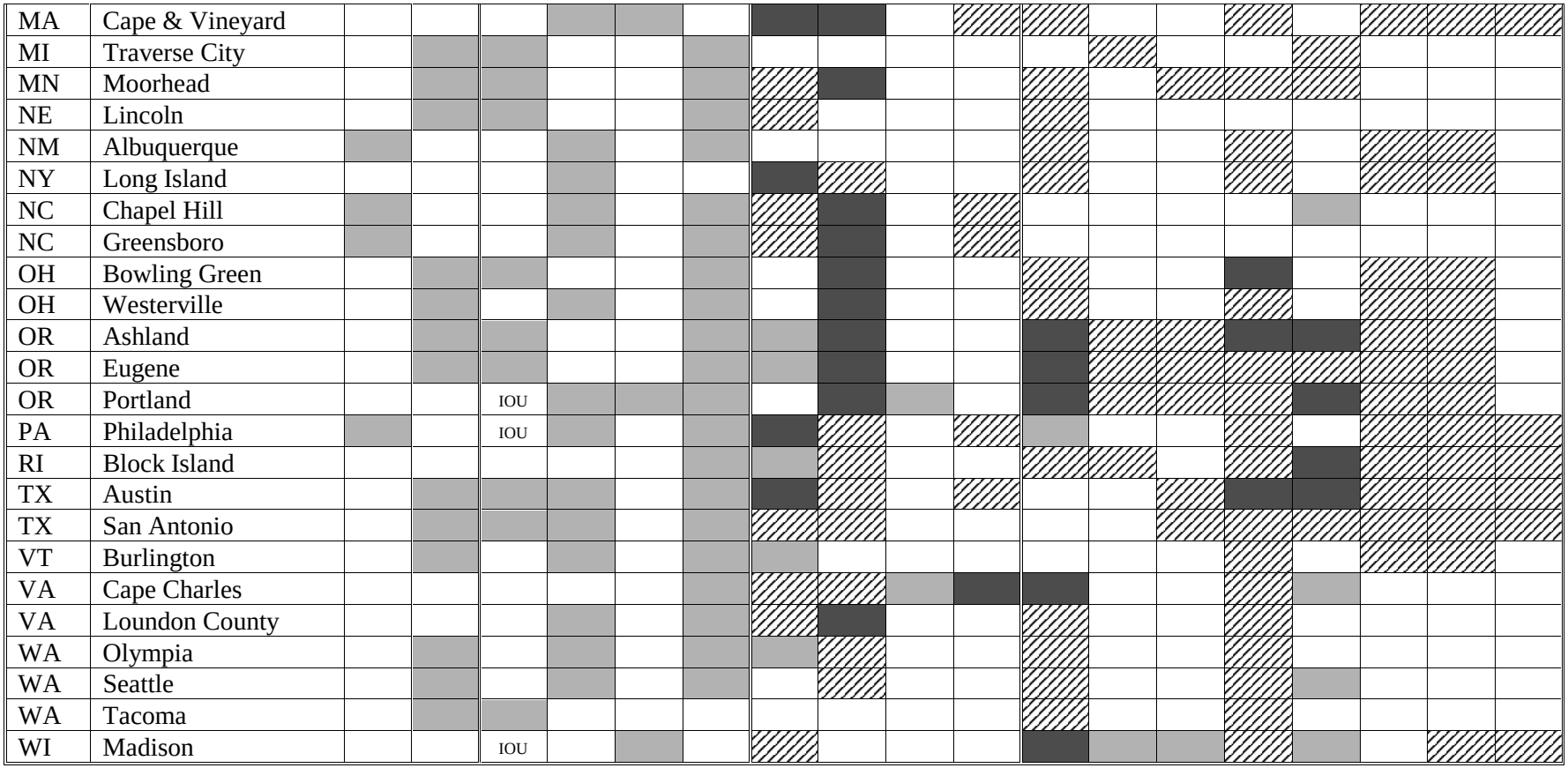
Contact information is included within each community's summary, and additional resources are listed in **Appendix A**. Appendices also include model local codes and policies designed to promote renewable energy.

Table 1 provides an overview of the local and state initiatives the DSIRE project has identified and is organized to reflect the report format. It also shows whether a community is a Million Solar Roofs local partner, and whether its electric utility is municipally-owned. Using shaded boxes, the table indicates whether the program is implemented at the local or state level, or both. Regarding solar access rules, for example, some local governments have ordinances that provide solar access protection beyond what is available through the state's solar easement statute. And, in a number of states, rebates or loans are available from both a state agency and the local utility. On the other hand, some regulatory incentives are offered only on the state level, such as renewable energy portfolio standards. Note that only local programs are included in the Community Investment & Awareness category.

TABLE 1

LOCAL AND STATE PROGRAMS AND INCENTIVES FOR RENEWABLE ENERGY

				INVESTMENT & AWARENESS				FINANCIAL INCENTIVES				RULES, REGULATIONS & POLICIES							
State	**City/Community**	**MSRI Partner**	**Municipal Utility**	**Green Pricing**	**Education & Assistance**	**Green Power Purchaser**	**Local Projects**	**Grant, Rebate or Loan**	**Tax Incentive**	**Green Building Incentive**	**Industrial Recruitment**	**Solar & Wind Access**	**Contractor Licensing**	**Equipment Certification**	**Net Metering**	**Construction & Design**	**Disclosure & Certification**	**Public Benefit Funds**	**Portfolio Standards**
AZ	Scottsdale			IOU	■	■	■	▨	▨		▨	▨	▨	▨	▨	■	▨		▨
AZ	Tucson	■		IOU	■		■	■	▨		■	▨	▨	▨	▨	■	▨		▨
CA	Los Angeles	■	■	■			■	■				■	■	■	■	■	▨	▨	
CA	Palo Alto		■	■				■				■	▨	▨	▨	▨	▨	▨	
CA	Sacramento	■	■	■			■	■				■	▨	▨	■	▨	▨	▨	
CA	San Diego	■		IOU	■		■	▨				■	▨	▨	▨	▨	▨	▨	
CA	San Jose	■		IOU	■		■	▨				■	▨	▨	▨	■	▨	▨	
CA	Santa Barbara			IOU	■	■		■		■		■	▨	▨	▨	■	▨	▨	
CA	Santa Clara		■	IOU	■		■	■				▨	▨	▨	▨	■	▨	▨	
CA	Santa Monica			IOU	■	■	■	▨				▨	▨	▨	▨	■	▨	▨	
CO	Aspen		■	IOU	■	■		■				▨	■	■	■	■			
CO	Boulder	■		IOU	■	■	■	▨				■	▨	■	▨	■			
CO	Denver			IOU	■	■	■	▨				▨	■		▨	■			
CO	Fort Collins		■	■				▨				▨	▨		■	▨			
DC	Washington						■								■		▨	▨	
FL	Gainesville		■	■			■	■	▨			■	▨	▨		▨	▨		
FL	Jacksonville		■		■		■		▨			▨	▨	▨	■	▨	▨		
FL	New Smyrna Beach		■	■			■	■	▨			▨	▨	▨	■	▨	▨		
IL	Chicago	■			■	■	■	▨	■		■				▨		▨	▨	
IA	Cedar Falls		■	■			■	▨				▨			▨				▨
IA	Waverly		■		■		■	▨				▨			▨				▨



Key

Local program

State program

Local and State programs

IOU *Investor-owned utility green pricing program*

GUIDE TO LOCAL PROGRAMS AND INCENTIVES

COMMUNITY INVESTMENT & AWARENESS

Education & Assistance

Nearly all the communities showcased in this report provide some kind of education or outreach program. A major component of many community programs in the Million Solar Roofs Initiative are renewable energy awareness campaigns. These programs sponsor public events and media campaigns designed to increase awareness of locally accessible assistance programs and technical information resources. Other education and assistance programs sponsor renewable energy activities in schools, technical training workshops for contractors and professionals, and consumer-oriented seminars. These forms of public outreach are clearly the first steps in building a strong market for renewable technologies.

In addition, local services providing technical information and design assistance to consumers are critical where a strong infrastructure is not present. These services help consumers overcome many of the barriers to a successful project. As the local commercial market grows, these services are able to offer business referrals and consumer advocacy services.

Local Renewable Energy Projects

Local government and community-supported renewables projects designed to increase public awareness and appreciation for the various applications of the technology are very popular with local organizations, governments, and industry partners. Nothing is more effective than seeing the rubber hit the road. And, some communities are going beyond demonstration projects by utilizing renewable energy for on-site or grid-connected applications such as:

- using solar water heating for the community swimming pool and recreational facilities;
- employing PV-powered school crossing signals, emergency power systems, security lighting, and bus shelter lighting;
- adding renewables to the municipal utility's energy mix by constructing a wind turbine;
- installing solar energy systems on local schools;
- incorporating solar energy systems in affordable housing projects; and
- using methane gas generated at the local sewage treatment facility for electricity generation.

Green Pricing Programs

Municipalities that own their electric utility are responding to their citizens' desire for cleaner energy by adding renewable energy to their utility's energy resource mix. Most of these municipal utilities offer their customers the opportunity to support green power through *Green Pricing*. Green pricing allows consumers to pay a premium to receive all or a portion of their electricity from renewable sources such as solar, wind, geothermal, biomass, landfill gas, or

small hydroelectric systems. The incremental price (or premium) is necessary to offset the higher cost of developing renewables compared to conventional energy sources. Municipal utility green pricing programs typically support either the development or expansion of local renewable resources, or purchases from non-local, utility-scale renewable energy facilities. In some cases the municipal utility owns a share in the non-local facility. Regardless of the current source of green power, a number of the utilities have used or will use some of the program revenue to develop additional local or regional renewable energy projects.

A similar type of program is the *Green Investment* program where utility customers pay a monthly premium to support the development of new local renewable energy resources that may not be on-line presently or demonstration projects not necessarily intended to supply power to the grid in proportion to subscribers. For example, a customer may pledge a flat rate of $5 a month or 1¢/kWh to support the construction of a new renewable facility regardless of how much energy the facility will put onto the grid. Green investment programs often solicit billing contributions from rate payers to fund demonstration projects or public benefit programs such as solar applications on schools or community facilities.

To date, more than 80 utilities, including investor-owned utilities, electric cooperatives, municipal utilities, and public utilities have either implemented or announced plans to offer a green pricing/investment option. Nearly 30 are municipal utility green pricing or investment programs. Most programs are open to all customer classes (residential, commercial, and industrial). With regard to renewable energy technologies employed, programs that identify wind as a renewable energy component are most prevalent. Some are dedicated entirely to photovoltaics.

In a recent study of utility green pricing programs conducted by the National Renewable Energy Laboratory (NREL)[2], municipal utilities were well-represented on each of the four "Top Ten" lists of program characteristics and results: Total Number of Customer Participants; Customer Participation Rates; Amount of New Renewables Development Fostered by the Program; and the Premium Charged to Support New Renewables development. Nine municipal utilities[3] were ranked among the top ten on at least one list, with five of them appearing on two or more lists.

Green Power Purchasing

Municipalities and local government agencies can play a critical role in promoting renewable energy technologies by buying electricity from renewable resources. Local governments can use their buying power to provide a market for renewables just as many have done for recycled materials through city green procurement requirements. At the very least, this can mean buying green power for municipal buildings, streetlights, water pumping stations and the like. Many local governments in California have taken this approach. Some local

[2] NREL, *Top Ten Utility Green Pricing Programs*, at http://www.eren.doe.gov/greenpower/topten.shtml

[3] Sacramento Municipal Utility District*, Los Angeles Department of Water and Power*, Eugene Water and Electric Board*, Fort Collins Utilities*, Moorhead Public Service*, Cedar Falls Utilities, City of Bowling Green Utilities, Traverse City Power & Light, Austin Energy. *[* = appeared on more than one top 10 list]*

governments have the authority to aggregate the electricity loads of the entire community to purchase green power, or even to join with other communities or government agencies to form an even larger green power-purchasing block. This provision in electricity restructuring laws is known as "Community Choice." Two states, Massachusetts and Ohio, allow this type of "opt-out" aggregation. That is, citizens or businesses who wish not to participate can choose their own energy supplier. The Cape Light Compact, the first Community Choice effort in Massachusetts, is discussed in this report.

FINANCIAL INCENTIVES

Grants, Loans & Rebates

Grant, loan, and rebate programs for renewable energy installations are available from state and local governments, utilities, and public/private partnerships. These incentives provide funding for public, nonprofit, institutional or privately owned projects. The DSIRE project has identified nearly 20 financial incentive programs implemented at the local level; they are implemented almost exclusively by municipal utilities. Although only some of the programs appear in this report, details on all programs can be found on the DSIRE website.

Rebates are the most common local financial incentive type, and are available primarily for solar water heating and photovoltaic systems. A handful of programs began in the early 1990s as part of the utility's demand-side management program. Most programs have been initiated within the past few years. Level of participation varies among local financial incentive programs; many programs are new, making effectiveness difficult to evaluate at this time.

Rebates typically range from $150 to $1,500, although Los Angeles Department of Water and Power's *Residential and Commercial Photovoltaic Buydown Incentive Program* offers a maximum of $5/watt for photovoltaic systems manufactured inside the City of Los Angeles. The maximum payment per site is $50,000 for residential and $1 million for commercial customers. In some cases, rebate programs can be combined with low or no-interest loans.

Financial incentive programs are essential in establishing a foothold for renewables in communities where existing economic forces have yet to create a competitive market.

Tax Incentives

Local governments are more likely, and have the authority, to implement their own tax policies. Also, policies in this category can be used to directly promote the use of renewables rather than just to create a positive environment for their application. In addition to the tax policies listed below, some states offer sales tax exemptions and personal and/or corporate income tax credits or deductions for renewable energy system installations.

Property Tax Exemptions

The majority of property tax provisions follow a simple model that provides that the added value of the renewable energy device is not included in the valuation of the property for

taxation purposes. Fifteen states[4] automatically exempt certain renewable energy devices from local property taxes, while others give local authorities the option of providing property tax exemptions. The DSIRE project has identified six states with local option provisions: Connecticut, Iowa[5], Maryland, New Hampshire, Vermont, and Virginia.

Obviously the impact of such programs will depend on the number of cities/counties that participate. In many cases, the availability of the tax incentive is not promoted. Some states do not systematically track the local governments adopting property tax exemptions, while others maintain detailed statistics. For example, the New Hampshire Department of Revenue Administration reports that there are more than 800 homeowners in nearly 60 cities and towns receiving a total property tax exemption of more than $3.3 million as a result of their property tax exemption law. On the other hand, only one Maryland county, Hartford County, offers this tax incentive. However, it is unique in that it is a credit rather than an exemption.

Franchise Tax Incentives

Statutes that exempt renewable energy businesses from local franchise fees, corporate income taxes, and permit fees can attract new renewable businesses that help develop local infrastructure. While no such local incentives were identified as part of this project, it is included here as an option for local authorities to consider.

Green Building Incentives

In recent years, a number of cities have developed Green Building programs to encourage the design and construction of buildings that are resource efficient, more durable, and healthier for its occupants. All programs are comprised of an education and awareness component. The building guidelines of some programs are voluntary, while others are required under certain conditions. This report contains examples of programs that have implemented or are considering implementing "top of the stack" permit reviews, rebates, or other incentives that translate into increased profit for green builders. Direct financial incentives are included in a community's financial incentive section, while other favorable policies, such as expedited permit reviews are summarized in the rules, regulations & policy section of the summary. Renewables appear on a list of optional techniques, but are not a required component of most Green Building programs.

Industrial Recruitment

Unlike franchise tax incentives, this category focuses on special efforts and programs designed to attract renewable energy manufactures as opposed to distributors or installers. Industrial recruitment incentives may be in the form of a tax break, grant, or, in the case of Chicago's efforts to bring a photovoltaic factory to the City, in the form of a commitment to purchase a specific amount of the product for use by local government.

[4] Illinois, Indiana, Iowa, Kansas, Minnesota, Montana, Nevada, North Carolina, North Dakota, Ohio, Oregon, Rhode Island, South Dakota, Texas, Wisconsin

[5] Iowa allows any city or county to assess wind energy conversion equipment at a special valuation but has an automatic property tax exemption for solar systems and methane gas conversion equipment.

RULES, REGULATIONS & POLICIES

This category of local government and community programs and incentives deals with rules, regulations and polices that create either a favorable, or at least neutral, business environment for renewable technologies.

Solar & Wind Access

Access to solar and wind resources is a critical concern for the renewable energy industry: without a guarantee of continued access to an existing resource, investment in a renewable technology is unlikely. As the Million Solar Roofs Initiative boosts personal use of solar devices, states and local partnerships are working to ensure that their codes or covenants do not restrict access to or the use of solar energy. At the state level, solar easements are the most common provision for solar access. Communities around the country use many different mechanisms to protect solar access, including explicit solar access ordinances, development guidelines, zoning ordinances, solar permits, and covenant restrictions.

Solar & Wind Access Rules

These statutes provide for solar or wind easements or access rights. Easements allow for the rights to existing access to a renewable resource on the part of one property owner to be secured from an owner whose property could be developed in such a way as to restrict that resource. This easement is transferred with the property title. Access rights, conversely, automatically provide for the right to continued access to a renewable resource. Solar easements are the most common type of state solar access rule. Many states currently have laws regarding one or both of these rules.

Development/Zoning Guidelines

Guidelines favorable to solar access for city, neighborhood, or subdivision planning and design can be implemented by local governments. This report provides several examples of guidelines requiring proper orientation in street layout and building placement that prevents shading. In some municipalities, a property owner may apply for a solar access permit to protect solar access to a new or existing solar energy system located on the owner's real property. The permit is used to restrict the shade cast by certain types of vegetation on neighboring properties. **Appendix B** contains Ashland, Oregon's solar setback standards and solar permit provisions.

Covenant Restrictions

Unfortunately, residential developers occasionally write restrictions into neighborhood covenants that preclude the use of renewables. These restrictions generally target all types of roof-mounted structures, not just solar systems, so these cannot be perceived as targeting solar, although that is the result. Twelve states have addressed the problem of private restrictions on solar system siting by enacting legislation limiting the scope of such restrictions.[6] In states without this type of statute, local governments may be able to adopt

[6] Zalcman, Fred, *et al.* "Overcoming Private Land Use Restrictions On Solar Energy Systems." 1999.

an ordinance that offers similar protection. No such examples were identified as part of this project.

Net Metering & Interconnection

Interconnection issues broadly cover all of the steps that are taken when a small-scale renewable energy system is connected in parallel to the utility grid. Simply put, interconnection refers to the technical, contractual, rates, and metering issues that must be settled between the system owner and the utility and local permitting authorities before the system is connected to the grid. Net metering allows for the flow of electricity both to and from the customer through a single, bi-directional meter. Currently, thirty states and the District of Columbia have net metering provisions.

Most net metering and interconnection rules are set at the state level or by the utility—not at the local level. Only a handful of the municipal utilities in this report have developed their own interconnection or net metering rules, but we have included state or utility interconnection information in this report so that customers know what's available in their locality. For more information about interconnection and net metering, visit IREC's Connecting to the Grid website, which is maintained by the NC Solar Center at www.irecusa.org/connect.htm. **Appendix C** contains a model interconnection agreement.

Contractor Licensing

Many states have rules regarding the licensing of renewable energy contractors and the certification of renewable energy equipment. In those that do not, some local governments have stepped in and created their own rules. See **Appendix D** for Madison's regulations.

Equipment Certification

Statutes requiring renewable energy equipment to meet certain standards are generally seen as a tool for reducing the chance that consumers will be sold inferior equipment. Beyond being a consumer protection measure, equipment certification benefits renewables by reducing the number of problem systems and the resulting bad publicity. As is the case with contractor licensing, equipment certification rules are often implemented at the state level. Madison, Wisconsin is an example of a local government that has issued contractor licensing requirements and equipment standards in the absence of state laws. See **Appendix D** for Madison's regulations.

Construction & Design

Policies in this category cover the deployment of renewable energy systems. These programs play a critical role in removing the barriers of information access and technology acceptance. Though some states have policies in this category, it is the local government that plays the greatest role in establishment and implementation.

Building Codes & Inspections

State building codes have tended to adopt standardized building codes over the past few years. Local governments are generally responsible for enforcement of state-level codes and adoption of specific building code requirements pertaining to renewables. Adequate training of inspectors by local entities is a key measure in making renewables more accessible. Local building codes, such as energy codes, which apply specifically to renewables are included in this report. It is often the case that a municipal utility's grant or loan program will require an inspection in order to be eligible for the program. As another example, some community groups are proposing ordinances to require new homes or homes undergoing major renovation to be pre-plumbed/pre-wired for solar energy systems.

Green Building Guidelines & Policies

These guidelines and policies require or encourage consideration or implementation of renewable energy for the purchase of equipment and design and construction of facilities. Many Green Building programs include renewables on a menu of sustainable options from which builders can choose. A certain number of points is required for the building to be considered "green." Incentives in some Green Building programs involve expedited permit reviews and green marketing assistance (e.g., in Santa Barbara County). These policies create an initial market, show the benefits of the technology and increase the general acceptance of the technologies.

Some guidelines are voluntary measures for all building types, while others are requirements for municipal building projects or residential construction. Boulder, Colorado is unique in that it has a mandatory Green Building requirement for residential construction. Chapel Hill, North Carolina has an energy conservation ordinance requiring that renewables be considered for new town buildings and major renovations of existing buildings. This ordinance can be found in **Appendix E**.

Energy Management Policies

Similar to design and construction guidelines, policies mandating energy management programs at local government facilities can be a fertile market for the renewable industry. Energy management has historically been focused on efficiency, but some local governments see renewable energy generation as a tool for reducing peak demand charges as well as overall energy consumption. This report contains examples of cities that are developing sustainable city policies and greenhouse gas emission reduction plans that include recommendations for using renewables.

Public Benefits Funds

Public benefit funds (PBF) are typically state level programs developed through the electric utility restructuring process as a measure to assure continued support for renewable energy resources, energy efficiency initiatives, and low income support programs. Such a fund is most commonly supported through a charge to all customers on electricity consumption, e.g., 0.2¢/kWh. (This is also frequently referred to as a system benefits charge, or SBC.) The

following states have PBF for renewables: California, Connecticut, Delaware, Illinois, Massachusetts, Montana, New Mexico, New Jersey, New York, Ohio, Oregon, Pennsylvania, Rhode Island, and Wisconsin.

States have adopted public benefit funds for a variety of reasons, and there is a diversity of policies and funding levels from state to state. For many states that have created a PBF as part of restructuring, these funds are seen as mechanisms for continued or increased support for public programs which might otherwise go unfunded in a restructured energy market. Examples of how the funds are used include: rebates on renewable energy systems; funding for renewable energy R&D; and development of renewable energy education programs.

Renewable Energy Portfolio Standards

Renewable energy portfolio standards stipulate that a certain percentage of a utility's or a state's *overall* or new generating capacity must be derived from renewable resources by a certain date, i.e., 1% of the state's electric capacity must be from renewable energy by the year 2003. Currently, Arizona, Connecticut, Maine, Massachusetts, Nevada, New Jersey, Texas, and Wisconsin have portfolio standards in place, while Iowa and Minnesota have similar rules ("set asides") for renewables. Most states with a portfolio standard have included the RPS in restructuring legislation. Advantages of the portfolio standard include the following.

- The portfolio standard relies on market forces to bring down the costs of competing renewable resources where technology specific portfolio standards are not established.
- As with emissions credit trading systems, portfolio standards can incorporate a credit trading system that offers flexibility to those generators for whom developing renewables will be extremely costly.

Portfolio standards can impact local governments or communities because either the local municipal utility may be subject to the standard or a community may end up as the site for the local investor-owned or cooperative utility's new renewable generation system used to meet part of RPS. While an RPS is typically mandated at the state level, municipalities can establish their own sort of portfolio standard for their energy service provider in form of green purchase requirements as discussed above.

SUMMARIES OF LOCAL PROGRAMS AND INCENTIVES

Scottsdale

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Members of the Scottsdale community can purchase a portion of their electricity from renewable resources through investor-owned Arizona Public Service Company's (APS) *Solar Partners Program.*

Renewable Energy Projects

In 1997, Scottsdale joined the APS *Solar Partners Program*. At that time, the available role for the City was to provide facilities or land where APS, at no charge to them and no cost to the City, could install solar power generating systems. The solar power generated from these systems was added to the power grid where it became available for Scottsdale residents who subscribed to the *Solar Partners Program*. The first system installed was an 8,000 square-foot, 34-kW PV roofing system on employee parking lot carports at the City's Via Linda Campus. This solar roofing system generates enough renewable energy to power seven to 10 homes. The Civic Center Library is host to a 2-kW PV system. Educational signage at both locations informs visitors about solar energy generation and the site's installation. Other City solar installations include eight solar flood warning devices in five locations and solar lighting for airport signs.

Green Power Purchasing

APS expanded the *Solar Partners Program* to enable commercial enterprises and those partners whose facilities included APS solar power generating installations to purchase a portion of the solar power they generated. In June 2000, Scottsdale began an annual purchase of 40,500 kWh of solar energy for its Civic Center and Mustang Libraries.

Education & Assistance

Green Building Program

The City of Scottsdale Green Building Program offers a free lecture series to promote green building techniques to the general public and to builders. The program also offers assistance and other incentives to builders who meet program requirements (see Rules, Regulations & Policies section for construction and design guidelines). The Green Building Program is voluntary and is open to all home-builders in Scottsdale. Services include:

- *Priority plan review* – All qualified green building projects receive fast track plan review service;
- *Job site signs* – City green building construction job site signs are available to distinguish projects involved in the program;

- *Directory of participating designers and builders* – Participating architects, designers and builders are listed and published in promotional materials. This material is on the city web site;
- *Green building certification through independent inspections* – The City provides a series of green building inspections during the course of construction;
- *Homeowner's manual* – A homeowner's manual explaining the green building features is presented to the builder for transfer to the building owner;
- *Promotional package for builders/developers* – Promotional packages include green building logo for ads, brochures, and abbreviated green building checklists. The Green Building Program provides additional media coverage in the form of press releases and articles in the local news media; and
- *Workshops and seminars* – The workshops feature information and resources in the areas of site use, energy, building materials, indoor air quality, water and solid waste reduction.

There are currently 22 builders in the program with over 100 buildings completed or under construction. Green Building Program officials estimate that at least half of these projects incorporate passive solar design. A few homes are pre-plumbed for solar hot water. Thus far, only one home has a PV system. However, the Green Building Program is working with solar equipment businesses to help them promote the technology to builders.

FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Arizona – Financial Incentives

Personal income tax deduction – A tax deduction is allowed for 100% of the cost of converting an existing wood fireplace to a qualifying wood stove.

Personal income tax credit – A credit against personal income tax is allowed in the amount of 25% of the cost of a solar or wind energy device—up to $1,000.

Sales tax – Solar and wind systems are exempt from the sales tax.

Loan program – Low interest loans are available for companies that install or manufacture renewable energy systems.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Arizona's incentives.

RULES, REGULATIONS & POLICIES

Construction & Design

Green Building Program

A Green Building checklist and rating system is used to qualify homes for the program. Design flexibility is achieved by offering over 150 green building options. A builder or developer may enter any number of homes in any given subdivision into the program. There is discussion among public and private agencies about expanding the program in other communities around the valley and state. Each house must meet the program criteria as set forth in the Green Building Rating Worksheet. Among the options are PV, solar hot water, orientation for passive solar, and daylighting. All qualified green building projects undergo an expedited plan review process.

Energy Policy

Among the core principles of Scottsdale's energy policy is that "energy conservation and efficiency and use of renewable energy is key to a sustainable future." Objectives include:

- Demonstrate leadership in use of alternate energy and new energy technology to encourage the growth of both sectors;
- Evaluate the feasibility of adopting the International Energy Code which would result in decreased energy consumption for all new buildings constructed in Scottsdale;
- Contribute additional facilities to *Solar Partners Program* to enable more Scottsdale residents to obtain clean, renewable power;
- Evaluate and implement where feasible the use of alternate energy technologies to supply a portion of the City's energy requirements to reduce our use of non-renewable energy resources;
- Support State and Federal alternate energy and fuel programs by participating in programs, applying for available grants and testing products and processes;
- Continue partnership with Solar Energy Association to promote solar energy; and
- Continue to promote, develop incentives, and expand participation in the Green Building Program.

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State of Arizona – Regulatory Policies

Environmental portfolio standard – Utilities must derive .25% of their power from renewables in 2001, rising to 1.1% in 2007. At least 50% of renewables must be solar.

Public benefits funds – A total of $28 million collected annually for renewables. Additional funds collected to support the Environmental Portfolio Standard.

Net metering – Statewide, net metering is allowed for renewable systems up to 100 kW, but interconnection rules vary by utility.

Disclosure – Retail energy providers must disclose fuel mix and emissions information.

Line extension analysis – Electric utilities must conduct a cost/benefit analysis to compare the cost of line extension with the cost of installation of a stand-alone PV system for remote customers.

Contractor licensing – A specific solar plumbing license is required for hot water system installers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Equipment certification – There are equipment certification standards for hot water & PV systems.

Solar building standards – State buildings (including schools) over 6,000 ft^2 must consider solar.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Arizona's incentives.

Tucson

COMMUNITY INVESTMENT & AWARENESS

Education & Assistance

The Tucson Coalition for Solar (TCS) is a public-private partnership established in 1997 to promote the use of solar energy in the Tucson metropolitan region. Founding members are: Tucson Electric Power Company (TEP), Tucson Unified School District, Habitat for Humanity – Tucson, Primavera Builders, Progressive Solar, The Solar Store, Pima Community College, the Community of Civano, and Venture Catalyst, Inc. The Coalition is a local partner in the Million Solar Roofs Initiative. TCS offers technical education services to a wide audience, funded primarily through competitive U.S. Department of Energy grants awarded over the past three years. Activities have included:

- Sponsored solar energy training for plumbers and electricians in conjunction with the International Brotherhood of Electrical Workers, the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada – Local 741, Tucson Electric Power, the U.S. Department of Energy, and the Million Solar Roofs Initiative;
- Provided briefings to financial institutions and regional affordable housing builders; and
- Conducted workshops for city and county facilities managers, school districts and community colleges, code inspectors, architects, and contractors.

Renewable Energy Projects

TCS has provided funding and technical support to the Community of Civano, the first Habitat for Humanity – Tucson Solar Home, and other installations throughout the metropolitan area. Civano is a sustainable community designed to make light use of water and heavy use of sustainable building materials. Homes are at least 50% more efficient than the model energy code. The layout of the community maximizes neighborliness and public green spaces, and minimizes automobile use. The Global Solar Energy plant, which manufactures photovoltaic panels, is located on the south side of Civano. The neighborhood center features a 4-kW PV system. Most of the builders offer solar-batch, water-heating systems as standard features. Each builder also offers an optional PV system which is on display at a model home. The City of Tucson has invested $3 million in Civano.

Through the efforts of City staff who have been trained with IREC's Neighborhood Power Workshop-In-A-Box program, a 5-kW solar system was installed on the City's Southeast Service Center. The City's objective in undertaking this project was to design and build a commercial building using commercially available products that are highly energy efficient. It also demonstrated the city's commitment to meeting the Tucson Sustainable Energy Standard (see Rules, Regulations & Policies below).

Coalition member Tucson Electric Power (TEP) has contributed photovoltaic systems to the Habitat for Humanity project, the Reid Park Zoo, and the Pima Air Museum, which will use the system as part of a permanent solar energy exhibit. In addition, an inner-city solar village, developed by John Wesley Miller Companies and funded by TEP and its sister company, Global Solar Energy, is expected to celebrate its grand opening in March 2001.

TCS members have installed over 240 solar systems in 1999, and over 250 kW of PV in 2000.

Green Pricing

Tucson Electric Power – Green Watts Program

Members of the Tucson community can purchase green power from investor-owned TEP's *GreenWatts* program. Currently, the source of renewable energy is a landfill gas recovery project developed by the City of Tucson, TEP, and Zahren Alternative Power Corporation.

FINANCIAL INCENTIVES

Rebate Programs

Tucson Solar Alliance – PV Buydown Program

The Tucson Solar Alliance, a nonprofit coalition, offered grants that made it possible to purchase photovoltaic power systems at a discount. Through the alliance's Community Solar Program, the grants were available to homeowners, businesses, governmental organizations, and others. Under the program, a 1-kW photovoltaic system could be purchased for $3,000. Typically, such a system would cost at least $4,000. The program ended September 30, 2000. The program was funded by the Solar Electric Power Association (SEPA, formerly UPVG) through the Sacramento Municipal Utility District. Funding was discontinued in light of utility support for renewables.

Tucson Coalition for Solar – PV Buydown Program

TCS's PV buydown program was also funded by SEPA. Thirty participants received the $1,750 per kW rebate. A total of 85 kW was installed. This program also expired September 30, 2000.

Tucson Coalition for Solar – Solar Hot Water Buydown Program

TCS offers a $500 subsidy for solar hot water systems. Thus far, 132 systems have been installed, and another nine systems will be installed during the first quarter of 2001. The subsidy is funded through the U.S. Department of Energy Commercialization Program and expires in March 2001.

State of Arizona – Financial Incentives
Personal income tax deduction – A tax deduction is allowed for 100% of the cost of converting an existing wood fireplace to a qualifying wood stove.
Personal income tax credit – A credit against personal income tax is allowed in the amount of 25% of the cost of a solar or wind energy device—up to $1,000.
Sales tax – Solar and wind systems are exempt from the sales tax.
Loan program – Low interest loans are available for companies that install or manufacture renewable energy systems.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Arizona's incentives.

RULES, REGULATIONS & POLICIES

Construction & Design

Building Code

As a condition of the City of Tucson's investment in Civano, all facilities sited there (residential and commercial) are required to be designed and constructed to the Tucson Sustainable Energy Standard (TSES). The TSES requires commercial facilities to achieve a 50% reduction in energy usage over the CABO Model Energy Code 1995 edition. The standard also requires the beneficial use of solar energy. The solar energy utilization can be either passive or active. The City also adopted TSES for its own construction and design standards.

Energy Management Policy

The City of Tucson has implemented a "Solar Dividend" investment policy in which the rate savings from restructuring are converted into a budget line item for solar energy investment for the municipality. Implemented in fiscal 2000, the policy will be in effect for five years.

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State of Arizona – Regulatory Policies

Environmental portfolio standard – Utilities must derive .25% of their power from renewables in 2001, rising to 1.1% in 2007. At least 50% of renewables must be solar.

Public benefits funds – A total of $28 million collected annually for renewables. Additional funds collected to support the Environmental Portfolio Standard.

Net metering – Statewide, net metering is allowed for renewable systems up to 100 kW, but interconnection rules vary by utility.

Disclosure – Retail energy providers must disclose fuel mix and emissions information.

Line extension analysis – Electric utilities must conduct a cost/benefit analysis to compare the cost of line extension with the cost of installation of a stand-alone PV system for remote customers.

Contractor licensing – A specific solar plumbing license is required for hot water system installers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Equipment certification – There are equipment certification standards for hot water & PV systems.

Solar building standards – State buildings (including schools) over 6,000 ft^2 must consider solar.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Arizona's incentives.

Los Angeles

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Los Angeles Department of Water and Power – Green Power for a Green LA

Green Power for a Green LA is a green pricing program offered by the Los Angeles Department of Water and Power (LADWP), the largest municipal utility in the nation. According to a National Renewable Energy Lab survey of the nation's green power programs, LADWP's *Green Power for a Green LA* program ranked number one in the survey for its success in signing up new customers. The program has more than 55,000 customers.

Initiated on May 13, 1999, *Green LA* offers 100% renewable energy with 20% coming from new sources. *Green LA* enables all LADWP customers—residential, commercial and industrial—to participate. The average residential customer pays approximately $3 a month (6% premium). LADWP helps homeowners offset the increased cost of green power by providing two free compact fluorescent light bulbs and a free home energy audit.

LADPW buys renewable power (solar, wind, biomass and geothermal) on the open market in California. In June 2000, LADWP awarded AstroPower, Inc., a $6 million, 1.8 MW contract to supply solar electric power modules. The contract represents only the first phase of an ambitious four-year, $38 million program to provide solar power to LADWP customers. In August 2000, LADWP contracted with Enron Power Marketing, Inc. for the purchase of new renewable wind resources.

Renewable Energy Projects

LADWP is also constructing and operating solar photovoltaic systems on its libraries, community centers, municipal office buildings and multipurpose facilities, including a 400-kW system on the LA Convention Center. The solar programs are just a part of LADWP's environmental initiatives, which also include *Energy Solutions for a Green LA, Cool Schools* and *Electric Transportation for a Green LA.*

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FINANCIAL INCENTIVES

Rebate Program

LADWP – Residential and Commercial Photovoltaic Buydown Incentive Program

In June 2000, the LADWP Board of Commissioners approved a new solar buydown program designed to encourage the use of renewable energy through the installation of photovoltaic systems by residents and businesses in Los Angeles. *The Residential and Commercial Photovoltaic Buydown Incentive Program* for residential and commercial customers evolved from the 1-year pilot Solar Power Ownership Program launched in 1998.

The new incentive program began September 1, 2000 and will continue for 5 years. LADWP has earmarked $6 million for the program's first year. Each of the following four years has funds reserved at a minimum of $8 million. The program is funded under LADWP's public benefits program authorized by AB 1890, California's electric utility restructuring law. The program, which could be extended beyond the initial five-year period, also seeks to entice PV manufacturers to locate their businesses in Los Angeles. LADWP's goal is to have 100,000 systems on rooftops in LA City by the year 2010. This large number of systems will provide a reliable source of solar generated green power for LA.

To become eligible, homes and business must be located in the LADWP service area. The solar system must have a full five-year warranty and be installed by a licensed contractor. The LA Department of Building must inspect and approve the system to insure that it meets the city's building code. The property owner must apply for the funds, and the participating homes or businesses must remain connected to the LADWP power grid. Customers can choose to receive payments directly, or they can be paid directly to the seller of the system.

The financial incentives include a maximum of $3/watt for systems manufactured outside the City of Los Angeles, and a maximum of $5/watt for those manufactured within the City. The maximum payment per site is $50,000 for residential and $1 million for commercial customers. About 500 customers are expected to participate in the program in its first year.

State of California – Financial Incentives

PV Buydown – This program provides rebates of $3/kW for small-scale PV systems.

Grant programs – The Energy Innovations Small Grant (EISG) Program provides grants up to $75,000 to small businesses, non-profits, and academic institutions for research on innovative energy concepts. The Infrastructure Incentive program makes grants available for electric vehicle owners to install charging equipment. The Energy Technology Export program provides funds for companies conducting projects oversees. The Public Interest Energy Research grant program (PIER) makes funds available for renewable energy R&D. The Transportation Energy Technologies Advancement Program (TETAP) provides grants (up to 50% of project cost) for research, development, and demonstration of alternative transportation technologies.

EV Buydown – This program offers $5,000 rebates for the purchase of new OEM zero-emissions light duty vehicles.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on California's incentives.

RULES, REGULATIONS & POLICIES

Net Metering

LADWP offers net metering to residential and commercial customers under 10 kW.

Contractor Licensing

The Los Angeles Superintendent of Building issues separate Certificates of Registration for a number of different categories, including one for "domestic water piping/plumbing fixtures/hot water heaters/solar panels." To be eligible for the examination for a Certificate of Registration, the applicant must have a valid California State Contractor's License in an appropriate specialty.

Solar Access

The local zoning code's height regulations contain an exception for a solar energy system on top of a building so it can exceed a greater height than the limit established for the zone.

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State of California – Regulatory Policies

Net metering – Statewide, net metering is allowed for PV and wind systems up to 10 kW, and interconnection rules have been standardized.

Generation disclosure – Retail energy providers must disclose fuel mix information through a standardized label on bills.

Contractor licensing – California has specific solar licenses for solar hot water and PV installers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on California's incentives.

Palo Alto

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

City of Palo Alto Utilities Department – Future Green Power

On Earth Day 2000, the City of Palo Alto Utilities (CPAU) began offering its customers a *Future Green Power* purchase option. Palo Alto residents can choose from one of three rate plans—they can receive 25%, 50%, or 100% of their electricity from "future" green resources with the remainder of the product supplied with "existing" green resources. Resources used to supply the program may include small hydroelectric, geothermal, wind, and landfill gas. Projects built before 2000 and which are providing green power now are considered "existing."

The price premiums are as follows: 1.2¢/kWh for the 25% future renewables product; 2.0¢/kWh for the 50% product; and 3.4¢/kWh for the 100% product. City staff propose to use public benefits funds to lower the price of each product by 0.4¢/kWh. An average residential customer choosing the 100% option pays about $15.00 more per month. The program currently has 150 participants.

FINANCIAL INCENTIVES

Grant Program

City of Palo Alto Utilities Department – Remote Renewables Program

CPAU is providing grant funding for Renewable Energy Projects located outside of its territory. The purpose of the *Remote Renewables Program* is to assist grid-connected renewable energy projects that need a small amount of additional funding to move them from "good ideas" to completed projects.

In December 1999, CPAU sent out a Request for Proposals and received 19 proposals totaling $1.5 million in grant requests. A total of $500,000 is available through the *Remote Renewables* grant program. Eligible sectors include residential, commercial, industrial, institutions, and government.

CPAU has selected 17 projects for possible funding. The projects are all located in California and include: one project for biomass anaerobic digestion and 16 solar photovoltaic projects, two of which include small wind turbines. The proposed grants range from $2,000 up to $80,000.

CPAU is very pleased with the quality of the proposals. Many of the proposals have already gathered significant co-funding and are looking to Palo Alto to provide the little extra to make the project feasible. Many of the proposed energy projects include significant levels of public

energy education and demonstration components. Over the coming months, Palo Alto will be working with the grant applicants to process the grants and sign grant agreements. Grant payments from the City of Palo Alto will only be made after the projects are constructed and fully operational.

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Rebate Program

City of Palo Alto Utilities Department – PV Partners Program

CPAU initiated a PV rebate program in May 1999. *PV Partners* offers $4/Watt to the utility's customers—residential, commercial, industrial, schools—who install qualifying PV systems. The customer selects a PV system and forwards a copy of the purchase order along with the application to reserve their rebate. Once the system has been installed, the customer sends in the claim form with a copy of the final invoice and building permit to get their rebate.

The two-year program has an annual budget of $200,000 to fund 50 kW of PV systems on a first come, first served basis. Half of the budget is reserved for residential systems. Residential and small commercial customers with systems under 10 kW are eligible for net metering. The $4/watt *PV Partners Program* has four systems installed for a total of 11 kW and $43,675. An additional five demonstration systems have been installed which were eligible for a $6/watt grant. The program is promoted through bill inserts, newspaper ads, workshops, and tours. The program is scheduled to expire in June 2001.

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State of California – Financial Incentives

PV Buydown – This program provides rebates of $3/kW for small-scale PV systems.

Grant programs – The Energy Innovations Small Grant (EISG) Program provides grants up to $75,000 to small businesses, non-profits, and academic institutions for research on innovative energy concepts. The Infrastructure Incentive program makes grants available for electric vehicle owners to install charging equipment. The Energy Technology Export program provides funds for companies conducting projects oversees. The Public Interest Energy Research grant program (PIER) makes funds available for renewable energy R&D. The Transportation Energy Technologies Advancement Program (TETAP) provides grants (up to 50% of project cost) for research, development, and demonstration of alternative transportation technologies.

EV Buydown – This program offers $5,000 rebates for the purchase of new OEM zero-emissions light duty vehicles.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on California's incentives.

RULES, REGULATIONS & POLICIES

Solar Access

Palo Alto subdivision regulations require that all major subdivisions provide, to the extent feasible, for future passive or natural heating or cooling. The regulation also typically requires a tentative map with a list of which parcels have good potential for passive solar design residences.

State of California – Regulatory Policies

Net metering – Statewide, net metering is allowed for PV and wind systems up to 10 kW, and interconnection rules have been standardized.
Generation disclosure – Retail energy providers must disclose fuel mix information through a standardized label on bills.

Contractor licensing – California has specific solar licenses for solar hot water and PV installers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on California's incentives.

Sacramento

COMMUNITY INVESTMENT & AWARENESS

Green Pricing/Renewable Energy Projects

Sacramento Municipal Utility District – Greenergy

Greenergy is a green pricing/investment program offered by the Sacramento Municipal Utility District (SMUD). It consists of the *Renewable Energy Options Program* (traditional green pricing) and *Community Solar* (green investment).

Renewable Energy Options offers the "All Renewables" option (100% of electricity from renewables) for a premium of 1¢/kWh. Current resources for the "All Renewables" option are being purchased from geothermal plants. The "Renewables Advocate" option, with a premium of 0.5¢/kWh, guarantees that SMUD will match one-half of the customer's monthly electricity needs with purchases from renewable resources. Nearly half of SMUD's generation comes from renewable energy facilities, which includes hydroelectricity, geothermal, photovoltaic cells, and wind turbines.

Begun in June of 1997, *Community Solar* supports the installation of photovoltaic panels on community buildings, such as schools, churches, and other government or commercial buildings. More than 600 customers participate in SMUD's *Community Solar* program by paying 1¢/kWh above their current rate. Both commercial and residential customers can contribute to the program.

Community Solar also offers the attractive option of allowing customers to earmark their contributions to particular SMUD projects. The first project funded in this manner was a 3.7 kW PV system installed in April 1998 on the Sacramento Zoo gift shop. The second PV project was a system installed in September 1998 on the Effie Yeaw Nature Center in Ancil Hoffman Park. SMUD has approximately 6,300 participants in the *Greenergy* program, which it promotes through the media and bill inserts sent to customers.

Sacramento Municipal Utility District - PV Pioneers I

Perhaps the most well known solar green pricing program in the United States is the *PV Pioneers Program* sponsored by SMUD. Through *PV Pioneers I*, utility-owned and operated PV systems have been installed on the rooftops of over 600 residential and commercial customers, who pay a premium of $4 per month. *PV Pioneers II*, on the other hand, focuses on the direct sale of PV systems to participants. *PV Pioneers I* systems typically range in size from 2 kW to 4 kW and are connected to the utility side of the meter. These PV units provide SMUD with over 2 MW of power generated near the point of use in the utility's distribution system.

The *PV Pioneers I* program has been in operation since 1993. In a typical year, SMUD receives 400 to 1,000 applications and installs about 100 PV systems. Customers have the advantage of being locked into their electric rate until it increases by 15%. Participants must also sign a ten-year commitment. The program is promoted to the public by once-a-year bill

inserts, news articles, occasional mailings, information packets, and word-of-mouth referrals. *PV Pioneers* has had a strong public response.

The total yearly program cost of the *PV Pioneers I* program is $5,265,000. Residential participants raise roughly $20,000 of this annual amount. Part of the remainder is covered by a Solar Electric Power Association (formerly UPVG) grant of $659,000 through the DOE-sponsored TEAM-UP program. The rest of the costs are covered by general rates collected from the remainder of SMUD's customers.

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FINANCIAL INCENTIVES

Buy-Down & Loan Program

Sacramento Municipal Utility District – PV Pioneers II

In the 1999, SMUD started offering a buy-down program to encourage customers to purchase their own PV systems. This program, *PV Pioneers II*, allows customers to purchase installed roof-mounted PV systems from the utility for less than $5,000. SMUD buys down about half the cost of the system, then provides a financed loan to cover the balance. The loan is repaid over a period of ten years at a financing rate of 9.5% for the 60 or 48 module systems and 10.5% for the 32 module system. Both traditional PV modules and building-integrated PV "roof shingles" are available under the program. Customers receive net metering, so that when the PV systems produces more energy than the customer's load, the electric meter turns backwards and the energy is sold back to SMUD at retail prices.

Loan & Rebate Program

Sacramento Municipal Utility District – Solar Water Heater Program

SMUD offers rebates and loan financing to customers who install solar water heating units. The program was started in 1991 as part of the utility's demand-side management program. Performance-based rebates, typically around $700, are available for SMUD residential customers who have electric water heating. In addition to the rebate, SMUD offers 100% financing, with an 8.5% interest rate over a ten-year repayment period. Most loans come to an average of $2,300. SMUD provides all the funding for these incentives, as well as free maintenance inspections at five-year and ten-year intervals. To date, approximately 3,000 solar water heating units have been installed under this program, which comes to over half the

systems currently installed in the city of Sacramento. About 75% of these systems were financed through loans.

The program is contractor-driven, since the contractors promote these incentives to the public and handle the necessary paperwork. All solar water heating units must meet standards set by the Solar Rating and Certification Corporation (SRCC), be installed by a SMUD-approved solar contractor, and pass inspection by SMUD representatives.

To be eligible for SMUD's *Solar Water Heating Program* participating SMUD contractors must provide a full 3-year warranty on systems they install. These warranties cover the entire system. Any problem occurring during this period is resolved at zero cost to the customer. In addition to the 3-year system warranty, the solar collector is covered for 5 years with a prorated warranty from the 6th year through the 10th year.

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State of California – Financial Incentives

PV Buydown – This program provides rebates of $3/kW for small-scale PV systems.

Grant programs – The Energy Innovations Small Grant (EISG) Program provides grants up to $75,000 to small businesses, non-profits, and academic institutions for research on innovative energy concepts. The Infrastructure Incentive program makes grants available for electric vehicle owners to install charging equipment. The Energy Technology Export program provides funds for companies conducting projects oversees. The Public Interest Energy Research grant program (PIER) makes funds available for renewable energy R&D. The Transportation Energy Technologies Advancement Program (TETAP) provides grants (up to 50% of project cost) for research, development, and demonstration of alternative transportation technologies.

EV Buydown – This program offers $5,000 rebates for the purchase of new OEM zero-emissions light duty vehicles.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on California's incentives

Solar Access

Sacramento's zoning regulations contain a provision requiring the planning commission or zoning administrator to consider energy conservation issues, including adequate orientation for maximum solar access. Furthermore, the local zoning code's height regulations contain an exception for a solar energy system on top of a building so it can exceed a greater height than the limit established for the zone.

State of California – Regulatory Policies

Net metering – Statewide, net metering is allowed for PV and wind systems up to 10 kW, and interconnection rules have been standardized.

Generation disclosure – Retail energy providers must disclose fuel mix information through a standardized label on bills.

Contractor licensing – California has specific solar licenses for solar hot water and PV installers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

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San Diego

COMMUNITY INVESTMENT & AWARENESS

The San Diego Regional Energy Office (SDREO) hopes to install 20,000 solar rooftop systems in the San Diego area by the year 2010. SDREO is an agency formed by the San Diego Association of Governments, San Diego State University Foundation and San Diego Gas & Electric Company,

The San Diego Regional Energy Office became a local partner in the Million Solar Roofs Initiative in June of 1999. On September 29, 1999 SDREO convened a kick-off meeting to launch their program. The event drew over 100 participants, including representatives from the solar energy industry, local utilities, energy companies, government agencies, the military, and local nonprofit organizations.

Education & Assistance

- *Partnerships* – SDREO has joined forces with Sun Systems and Shea Homes, the second-largest builder in the San Diego Region and the 12th largest builder in the nation, to promote solar water heating in the new home construction market. Shea Homes currently offers solar water heaters as a standard option in two new home developments, Canterbury (*Carlsbad*) and Hillsdale Ranch (*El Cajon*).

- *Solar Photovoltaic Systems Code Compliance Workshop* – With support from the California Energy Commission, SDREO sponsored a free workshop for local electrical inspectors on national standards and codes related to the installation and inspection of grid-connected PV systems.

- *Training* – SDREO and Sun Systems conducted solar water heater training for the Shea Homes sales team.

- *Solar Design Workshop* – SDREO collaborated with the AIA San Diego Chapter, the New School of Architecture, Woodbury University (architecture school) and the San Diego Building Industry Association to conduct a Solar Design Workshop.

- *Solar Leadership Award* – Two renewable energy projects received SDREO Leadership 2000 Awards. The Navy Environment Leadership Program was recognized for the 21.6 kW PV Solar Electric/Electric Vehicle Project. The other winner was Shea Homes San Diego for their efforts in building homes that are up to 30% more energy efficient than standard homes and offering solar water heaters as an option in selected developments.

- *PV in New Home Construction* – SDREO held a meeting in which PV manufacturers presented turnkey PV packages to Shea Homes for consideration in new home construction.

- *Earth Day Education Program* – SDREO sponsored the *Earth Fair* (San Diego's major Earth Day event) and VIP (Very Important Planet) Reception.

Renewable Energy Projects

- The Solar Lunch Pavilion at Teofilo Mendoza Elementary School in Imperial Beach features a 12-kW thin-film PV system that feeds electricity directly into the school's power system. An "envirometer" displays system output and estimated pollution reduction.
- A 5-kW grid-connected Solar-Powered Electric Vehicle Charge Port was installed at the San Diego County Administration Building to provide electricity for six Electric Vehicle Chargers.
- San Diego Unified School District recently installed four 4-kW systems on local elementary schools. SDREO plans to work with the school district to promote the four sites.

FINANCIAL INCENTIVES

Shea Homes recently reduced the price of their solar water heater option—from $3,145 to $2,600—resulting in a net savings of about $3.50 per month to customers. Traditionally, Shea Homes required all home buyers to pay 100% of the value of options up-front. Shea recently altered its policy to allow home buyers to pay only 20% of the value of options up-front. However, Shea waived the deposit rule for the solar water heater options; that is, now home buyers do not have to pay any money up-front to purchase the solar water heater option and can wrap the entire cost into their mortgage. This has removed a barrier to sales. The energy crisis in San Diego has heightened awareness about energy and likely will spur more sales.

State of California – Financial Incentives

PV Buydown – This program provides rebates of $3/kW for small-scale PV systems.

Grant programs – The Energy Innovations Small Grant (EISG) Program provides grants up to $75,000 to small businesses, non-profits, and academic institutions for research on innovative energy concepts. The Infrastructure Incentive program makes grants available for electric vehicle owners to install charging equipment. The Energy Technology Export program provides funds for companies conducting projects oversees. The Public Interest Energy Research grant program (PIER) makes funds available for renewable energy R&D. The Transportation Energy Technologies Advancement Program (TETAP) provides grants (up to 50% of project cost) for research, development, and demonstration of alternative transportation technologies.

EV Buydown – This program offers $5,000 rebates for the purchase of new OEM zero-emissions light duty vehicles.

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RULES, REGULATIONS & POLICIES

Solar Access

San Diego's regulations for planned developments include a provision to ensure that a proposed development's potential impacts on solar access will be minimized. The regulations require that a shadow plan be submitted when structures or landscaping may have an impact on an adjacent property's access to solar exposure.

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State of California – Regulatory Policies

Net metering – Statewide, net metering is allowed for PV and wind systems up to 10 kW, and interconnection rules have been standardized.

Generation disclosure – Retail energy providers must disclose fuel mix information through a standardized label on bills.

Contractor licensing – California has specific solar licenses for solar hot water and PV installers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

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San Jose

COMMUNITY INVESTMENT & AWARENESS

Education & Assistance

San Jose is a member of the Bay Area Solar Consortium, a local partner in the Million Solar Roofs Initiative. The consortium is in the process of planning a number of education, awareness, and training events, including a financing workshop.

San Jose's Green Building Program provides educational workshops and lectures, a monthly newsletter, and an extensive website with resources and links.

The San Jose Environmental Services Department has conducted workshops for architects, builders, developers, and city staff to promote the implementation of San Jose's voluntary Solar Site Design Guidelines.

Renewable Energy Projects

Solar Applications in Emergency Planning

San Jose received a grant from the Urban Consortium Energy Task Force in 1999 to explore and test priority applications of renewable energy systems for disaster relief and for building disaster-resistant communities. Tasks included:

- Identifying disaster, emergency, community and/or security applications which can be better served by solar PV power;
- Installing and evaluating a solar PV system at one or several of the City's key locations or mobile units;
- Working with regional and state Emergency Managers' Associations to provide information on the emergency and disaster applications of solar photovoltaics; and
- Developing a Sustainable Energy Emergency Plan for the City of San Jose.

Due to fiscal, equipment security, and resource constraints, no pilot project was installed within the City. However, the interest in solar applications increased within other departments throughout the city and work is underway to identify other solar applications and installations.

FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of California – Financial Incentives

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Grant programs – The Energy Innovations Small Grant (EISG) Program provides grants up to $75,000 to small businesses, non-profits, and academic institutions for research on innovative energy concepts. The Infrastructure Incentive program makes grants available for electric vehicle owners to install charging equipment. The Energy Technology Export program provides funds for companies conducting projects oversees. The Public Interest Energy Research grant program (PIER) makes funds available for renewable energy R&D. The Transportation Energy Technologies Advancement Program (TETAP) provides grants (up to 50% of project cost) for research, development, and demonstration of alternative transportation technologies.

EV Buydown – This program offers $5,000 rebates for the purchase of new OEM zero-emissions light duty vehicles.

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RULES, REGULATIONS & POLICIES

Solar Access

The San Jose Environmental Services Department has developed voluntary guidelines to encourage solar orientation in new construction. These Solar Site Design Guidelines specify that the long axis of new dwellings should face within 30 degrees west and 45 degrees east of true south. Because houses in a subdivision usually face the street, planners in San Jose found that the easiest way to achieve solar orientation was to orient the streets with 30 degrees of the true east-west axis. Homes in such a subdivision would have good solar orientation by default.

Construction & Design

Green Building Project

San Jose's Green Building Project is developing guidelines likely to be based on the Silver Rating of the U.S. Green Building Council's LEED Guidelines. The guidelines will include information on solar and renewable design possibilities. LEED stands for Leadership in Energy and Environmental Design, and is a voluntary, consensus-based, market-driven green building rating system. LEED is a self-certifying system designed for rating new and existing commercial, institutional, and multi-family residential buildings. It contains prerequisites and credits in five categories: Sustainable Site Planning, Improving Energy Efficiency, Conserving Materials and Resources, Embracing Indoor Environmental Quality, and Safeguarding Water. There are four rating levels: Bronze, Silver, Gold, and Platinum.

State of California – Regulatory Policies

Net metering – Statewide, net metering is allowed for PV and wind systems up to 10 kW, and interconnection rules have been standardized.

Generation disclosure – Retail energy providers must disclose fuel mix information through a standardized label on bills.

Contractor licensing – California has specific solar licenses for solar hot water and PV installers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on California's incentives.

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Santa Barbara

COMMUNITY INVESTMENT & AWARENESS

Green Power Purchasing

The Santa Barbara City Council voted on April 20, 2000 to contract with San Jose-based green power marketer Go-Green.com (formerly cleen 'n green) to meet up to 90% of the city's total municipal electricity demand with renewable energy. The purchase, which is valued at $1.6 to $1.8 million, places Santa Barbara among the largest direct purchasers of green power.

Education & Assistance

Renewable Energy Promotional Campaign

Santa Barbara County is using interactive strategies to market the economic and environmental benefits of solar energy systems for commercial and residential uses. The County produced an 8-minute video and a promotional brochure. Information in the videos and the brochure cover solar energy system basics, available financing and rebates, energy savings, typical payback periods, new technology advancements, environmental benefits, and aesthetically pleasing designs.

Using the videos and the brochure as marketing tools, the County of Santa Barbara has conducted a local outreach campaign to market solar systems. Their marketing strategy focused on local examples of solar systems. The County has made presentations to local contractors, architects, financiers, realtors, and homeowners, and has promoted their materials at local events.

The Earth Café Television series, produced by Community Network Television, featured Santa Barbara's promotional campaign in one of their shows. The videos include footage of solar applications in Santa Barbara County, interviews with local residents who use solar technologies, updates on solar applications, examples of the cost effectiveness of solar applications specific to Santa Barbara County, a listing of available rebates and financing mechanisms and a summary of the environmental benefits of solar energy.

The County received a $35,000 grant from the Urban Consortium Energy Task Force (UCETF) to develop the promotional campaign. The Urban Consortium (UC) is a body of 150-170 city and county governments working together to develop and transfer innovative management practices and technologies that make the nation's cities and counties better places to live and work. Other partners include the National Renewable Energy Laboratory and the City of Denver.

Innovative Building Review Program

The Santa Barbara County Planning & Development Department established an Innovative Building Review Committee consisting of professionals to advise the public on energy-efficient building design. During the early stages of designing a project, owners and

designers can request design guidance from the Committee on cost-effective methods to exceed California Energy Standards (Title 24) by 15% or more for residential development, or 25% or more for commercial and industrial development. Information on renewable energy applications is provided. Free services include:

- Information on financing energy-efficient improvements through energy savings;
- Free consultation and design assistance on energy-efficient improvements;
- Professional advice on types of energy-efficient designs and equipment;
- Information on state rebates for energy-efficient and renewable energy equipment; and
- Eligibility for the County of Santa Barbara *Energy-Efficient Builder of the Year Award*.

FINANCIAL INCENTIVES

Green Building Incentive

As part of its Innovative Building Review Program, Santa Barbara offers incentives to builders who exceed California Energy Standards (Title 24) by 15% or more for residential and 25% or more for commercial and industrial developments. These include an expedited permit review by the Building Division, and a 50% reduction in the Energy Plan-Check Fee.

State of California – Financial Incentives

PV Buydown – This program provides rebates of $3/kW for small-scale PV systems.

Grant programs – The Energy Innovations Small Grant (EISG) Program provides grants up to $75,000 to small businesses, non-profits, and academic institutions for research on innovative energy concepts. The Infrastructure Incentive program makes grants available for electric vehicle owners to install charging equipment. The Energy Technology Export program provides funds for companies conducting projects oversees. The Public Interest Energy Research grant program (PIER) makes funds available for renewable energy R&D. The Transportation Energy Technologies Advancement Program (TETAP) provides grants (up to 50% of project cost) for research, development, and demonstration of alternative transportation technologies.

EV Buydown – This program offers $5,000 rebates for the purchase of new OEM zero-emissions light duty vehicles.

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RULES, REGULATION, & POLICIES

Construction & Design

Innovative Building Review Program

This voluntary program (described above) provides an "Energy-Efficient Target Menu" as a guideline for builders who wish to exceed California's minimum standards for energy-efficiency.

State of California – Regulatory Policies
Net metering – Statewide, net metering is allowed for PV and wind systems up to 10 kW, and interconnection rules have been standardized.
Generation disclosure – Retail energy providers must disclose fuel mix information through a standardized label on bills.
Contractor licensing – California has specific solar licenses for solar hot water and PV installers.
Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on California's incentives.

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Santa Clara

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Projects

The City of Santa Clara has installed solar energy equipment for its own facilities. The Community Recreation Center and the International Swim Center use solar-heated water.

Education & Assistance

Silicon Valley Power (SVP), Santa Clara's municipally-owned utility, offers training and education classes and presentations for community and school groups. Topics include: Energy Conservation, Renewable Energy, and Public Benefits Programs. In addition, SVP promotes its solar electric rebate program at local fairs and other events.

FINANCIAL INCENTIVES

Rebate Program

Silicon Valley Power – Solar Electric BuyDown Program

Silicon Valley Power (SVP), formerly Santa Clara Electric Department, offers rebates up to 40% off the price upon installation of new grid-connected PV systems through a buy-down program. Participants can save up to $16,000 ($4 per output watt) on installation.

To qualify for these programs, participants must be a resident of the City of Santa Clara, receive electricity from Silicon Valley Power and make the purchase from participating retailers. Schools are also eligible. Design plans for the system must be approved by the SVP permit center. At completion of project, the system must be inspected by a building inspector to confirm the system has been installed per specified qualifications. The program runs from July 1, 1999 to June 30, 2001. One installation is complete after one round of direct mailing, one utility bill insert, and many local fair promotions.

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Leasing Program

City of Santa Clara Water & Sewer Utilities – Solar Water Heating Program

Since 1975, the City of Santa Clara has taken a leading role in developing and promoting the use of solar energy. That year, the City established the nation's first municipal solar utility. Under the *Solar Water Heating Program*, the City supplies, installs and maintains solar water heating systems for residents and businesses within Santa Clara through its Water & Sewer Utilities Department. More than 300 solar pool systems and 600 residential solar hot water systems have been installed.

Solar equipment is offered by the City for the heating of swimming pools, process water, and domestic hot water. The pieces of hardware (solar collectors, controls and storage tanks) are owned and maintained by the City under a rental agreement. The renter pays an initial installation fee and a monthly utility fee. These amounts vary according to the size of the installation:

- ***Solar Pool Heating System****:* Installation cost is $450 plus $25 per panel.
- ***Solar Domestic Hot Water System*** *(Single Family):* Approximate cost is $440.
- ***Solar Domestic Hot Water System*** *(Multi-Family):* Varies; typical installation fee for system to serve 10 dwelling units is approximately $2,500.

For all above installations there is a monthly service charge based on the number of panels. Pool systems are billed a monthly service charge for six billing cycles per year (generally from April to September), although the system is available for use all year.

The program is promoted through monthly newsletters enclosed with the utility bill, the utility's website, and customer referrals.

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State of California – Financial Incentives

PV Buydown – This program provides rebates of $3/kW for small-scale PV systems.

Grant programs – The Energy Innovations Small Grant (EISG) Program provides grants up to $75,000 to small businesses, non-profits, and academic institutions for research on innovative energy concepts. The Infrastructure Incentive program makes grants available for electric vehicle owners to install charging equipment. The Energy Technology Export program provides funds for companies conducting projects oversees. The Public Interest Energy Research grant program (PIER) makes funds available for renewable energy R&D. The Transportation Energy Technologies Advancement Program (TETAP) provides grants (up to 50% of project cost) for research, development, and demonstration of alternative transportation technologies.

EV Buydown – This program offers $5,000 rebates for the purchase of new OEM zero-emissions light duty vehicles.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on California's incentives.

RULES, REGULATIONS & POLICIES

Construction & Design

To qualify for SVP's PV rebate program, design plans for the system must be approved by the SVP permit center and, after completion, the system must be inspected by a building inspector.

State of California – Regulatory Policies

Net metering – Statewide, net metering is allowed for PV and wind systems up to 10 kW, and interconnection rules have been standardized.

Generation disclosure – Retail energy providers must disclose fuel mix information through a standardized label on bills.

Contractor licensing – California has specific solar licenses for solar hot water and PV installers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

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Santa Monica

COMMUNITY INVESTMENT & AWARENESS

Green Power Purchasing

The City of Santa Monica made history June 1, 1999 as green electricity began powering all municipal facilities—including the Santa Monica Airport, City Hall and the Santa Monica Pier—making it the first city in the world to switch to 100% renewable resources to meet the power needs of city facilities. Under the contract, the city purchases approximately 5MW of renewables. The proposed purchase is equivalent to the amount of electricity used by 5,000 to 6,000 homes. Because California's electric restructuring law prohibits municipalities from serving as an electric service aggregator for the community, Santa Monica's 90,000 residents and its substantial business community will not be able to participate in the program. Instead, they will continue to purchase nuclear, coal and gas electricity from Southern California Edison and the California Power Exchange. (See discussion of "Community Choice" in the Cape Cod and Martha's Vineyard, Massachusetts summary.)

Santa Monica's green energy is supplied by Commonwealth Energy Corporation from the world's largest geothermal resource, the Geysers, located nearby in Sonoma and Lake Counties. The city will pay a 5% premium, or about $140,000 more annually, for the electricity. Commonwealth has pledged to develop new geothermal power plants near the Salton Sea in Imperial County.

Education & Assistance

The city's switch is the first success of Global Green USA's Go Green Power campaign. Led by local business people, GG USA is spearheading a Southern California media and grassroots effort called the "Green Power Campaign" to get business and residences to choose green power. Together with the city of Santa Monica, Go Green Power is now launching a public education campaign to convince local businesses and residents to follow the town's example.

Renewable Energy Projects

Solar Ferris Wheel

Santa Monica is home to the world's first solar-powered ferris wheel. Located at the Pacific Park Amusement Park on the Santa Monica Pier, the ferris wheel is powered by a 43-kilowatt PV system. Photovoltaic cells are located on rooftops around the park and produce over 71,000 kWh of electricity a year. Pacific Park saves $7,000 a year in reduced energy costs.

"SolarPort"

The covered parking area outside the City's Civic Center is not just good for providing shelter for 40 cars, it is an electric generating station. The steel roof of the structure is made up of PV cells bonded to a conventional steel roof deck. Electricity is fed into the Santa Monica Civic Auditorium via an underground cable. The 26-kW SolarPort system will produce

44,400 kWh of electricity each year and will also be equipped with charging units for electric vehicles in the near future.

The City and Edison Technology Solutions funded this project with support from the U.S. Department of Energy, the California Energy Commission, and the Solar Electric Power Association (formerly the Utility PhotoVoltaic Group). The SolarPort was designed and constructed by Solar Utility Company Inc., located in Culver City, CA.

FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of California – Financial Incentives

PV Buydown – This program provides rebates of $3/kW for small-scale PV systems.

Grant programs – The Energy Innovations Small Grant (EISG) Program provides grants up to $75,000 to small businesses, non-profits, and academic institutions for research on innovative energy concepts. The Infrastructure Incentive program makes grants available for electric vehicle owners to install charging equipment. The Energy Technology Export program provides funds for companies conducting projects oversees. The Public Interest Energy Research grant program (PIER) makes funds available for renewable energy R&D. The Transportation Energy Technologies Advancement Program (TETAP) provides grants (up to 50% of project cost) for research, development, and demonstration of alternative transportation technologies.

EV Buydown – This program offers $5,000 rebates for the purchase of new OEM zero-emissions light duty vehicles.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on California's incentives.

RULES, REGULATIONS & POLICIES

Construction &Design

Building Energy Conservation Ordinance

Santa Monica's building conservation ordinance aims at a higher level of environmental and resource performance for buildings than state or federal requirements. This performance-based ordinance requires building projects to meet or exceed a performance target, but allows complete flexibility in the methods used. The City of Santa Monica requires lower annual energy consumption than California's Title 24 regulation as follows:

- All commercial, institutional, and light industrial buildings must meet an annual energy conservation target that is 25% lower than the corresponding minimally-compliant Title-24 building; and
- Multifamily residential and retail buildings must meet a conservation target that is 20% below Title-24.

The ordinance requires the use of computer simulations to demonstrate that non-residential buildings meet the energy conservation target.

Green Buildings Design & Construction Guidelines

These Guidelines[1] include required and recommended practices that are intended to reduce life-cycle environmental impacts associated with the construction and operation of both commercial and municipal developments and major remodeling projects in Santa Monica. The guidelines help designers and builders satisfy and surpass the building energy conservation ordinance. Among the recommended practices are properly orienting buildings for daylighting and passive solar heating, using solar hot water heating, and incorporating PV systems into the building fabric.

Solar Energy Design Standards

The City of Santa Monica's zoning regulations contain solar energy design standards intended to incorporate, to the extent feasible, passive heating and cooling opportunities into the design or modification of residential developments. While the standards include provisions that require screening of equipment under certain circumstances, they also state that "any pool or spa facilities other than single family homes owned and maintained by a homeowners association, cooperative, or similar entity shall be provided with a solar cover or solar water heating system."

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State of California – Regulatory Policies

Net metering – Statewide, net metering is allowed for PV and wind systems up to 10 kW, and interconnection rules have been standardized.

Generation disclosure – Retail energy providers must disclose fuel mix information through a standardized label on bills.

Contractor licensing – California has specific solar licenses for solar hot water and PV installers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on California's incentives.

[1] http://greenbuildings.santa-monica.org/Main.htm

Aspen

COMMUNITY INVESTMENT & AWARENESS

Green Power Purchasing

Seven local government jurisdictions in the Aspen area purchase wind power for their municipal facilities from Holy Cross Energy: The City of Aspen purchases 35% of their electricity requirements for their facilities from the wind. The government entities of Carbondale, Snowmass Village, Pitkin County, Pitkin County Airport, Basalt, and Eagle each purchase more than 10 % of their electricity from wind facilities at a premium

The Community Office for Resource Efficiency (CORE), Aspen's local nonprofit energy office, has worked closely with the City of Aspen Municipal Utility and the Glenwood Springs Municipal Utility to purchase green power for their customers. Each utility has agreed to purchase all the output from 700-MW wind turbines owned by Public Service of Colorado (PSCo). The wind energy purchase has increased the City of Aspen Municipal Utility's renewables portfolio by 3 %—to approximately 50%. The wind power purchase by Glenwood Spring Municipal Utility represents 2% of their purchases and puts both in the top five wind power purchasers of over 2000 municipal utilities in the U.S. The municipalities voted to absorb the wind power premium in the overall utility rate.

Education & Assistance

CORE works with both Holy Cross and PSCo to market wind power to the community through the *Windsource Program*.

Green Pricing

Customers of PSCo and Holy Cross Energy Cooperative can purchase wind power under PSCo's *Windsource* program. Purchasing wind power costs $2.50 for a 100-kWh block per month. Customers can sign up for one or more blocks. Almost 5 % of Holy Cross' 40,000 customers are now buying wind power. *Windsource* is currently sold out. In 2001, PSCo will be adding new turbines and CORE will help market this new wind power in the region. Holy Cross will be increasing its local commitment to 5 MW as part of the expanded program.

FINANCIAL INCENTIVES

Rebate and Loan Program

Community Office for Resource Efficiency - Sun Power Pioneers Program

CORE initiated the *Sun Power Pioneers Program* in November 1998 to recruit local businesses, schools, and homeowners to install solar PV systems. The program is available to

customers of Aspen Municipal Electric and Holy Cross Energy in the Roaring Fork and Vail Valleys. All of CORE's systems are connected to the existing power grid. CORE has installed approximately 25 kW *under Sun Power Pioneers* and through the *Solar for Schools Program*.

Participants in the *Sun Power Pioneers Program* earn $0.25/kWh for all the power their systems produce for four years. This incentive translates to about 3.5 times the retail electricity rate in Colorado. The advantage of a production incentive (rather than a traditional upfront subsidy) is that those who install PV recover their investment over time. A $500 rebate for solar hot water is also available. Over 20 solar hot water systems have been installed under *Sun Power Pioneers*.

The up-front cost of buying a renewable energy system can be a barrier to customer investment in solar. CORE has just finalized its first Zero Interest Loan for a solar system. Homeowners or businesses investing in solar can qualify for a zero interest loan through the Aspen Community Bank. CORE pays the interest on the money with REMP support.

Sun Power Pioneers Program began with the help of a $30,000 Solar Grant from the International Council for Local Environmental Initiatives (ICLEI) Cities for Climate Protection Campaign, funded by the U.S. EPA. Additional funding is provided by Aspen Municipal Electric, Turner Foundation, Holy Cross Energy, Aspen Skiing Company's Environment Foundation, and Aspen's CORE. The program now has a continuing funding source from the City of Aspen and Pitkin County's Renewable Energy Mitigation Program (see REMP below).

State of Colorado – Financial Incentives
Alternative fuel vehicle rebate – Colorado offers a rebate of 15%-50% for AVFs.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Colorado's incentives.

RULES, REGULATIONS & POLICIES

Construction & Design

Renewable Energy Mitigation Program (REMP)

Through the energy policy in the building code, the City of Aspen and Pitkin County regulate the amount of exterior energy uses for snowmelt, spas and swimming pools. The energy for these uses must come from the house energy budget or 50% can be supplied from on-site renewable energy systems. The REMP program allows the payment of a mitigation fee instead of installing on-site renewable energy systems. In addition, houses over 5000 ft^2 are required to install a small renewable energy system on site or pay a fee of $5000. The fee for houses over 10,000 ft^2 is $10,000. In its first year, the fund has accumulated approximately $500,000.

REMP is now supporting investments in renewable energy and energy efficiency for public buildings and affordable housing and leveraging private investments in renewables and efficiency. CORE is administering the funds and the projects with approval of the City of Aspen and Pitkin County. REMP will offset at least 2 pounds of CO_2 for every pound permitted under REMP over 20 years. Currently the projects are offsetting 6-8 lbs. of CO_2 for every pound permitted.

Net Metering

All of CORE's systems are connected to the existing power grid. Aspen Electric's and Holy Cross Electric's net metering policies allow customers to get credit for the power supplied to the system—at a net meter rate of 7¢/kWh. Holy Cross and Aspen Municipal Electric have agreed to net meter the first 50 kilowatts of PV in their service territories. The utility gives full retail credit (7¢/kWh) for any surplus generated.

The customer's PV system must include a separate PV meter to measure its output. Holy Cross will donate the meter. CORE will read it once a year, prior to paying the solar incentives for every kWh produced at 25¢/kWh.

Contractor Licensing & Inspection

To be eligible for the CORE program, the PV system must be installed by a Colorado Solar Energy Industries Association-certified installer and use UL-listed components. An inspection by CORE is also required.

State of Colorado – Regulatory Policies

Net metering – Net metering is allowed for PSCo customers for renewable systems up to 10 kW; municipal utilities have individual programs.

Line extension analysis – Electric utilities must conduct a cost/benefit analysis to compare the cost of line extension with the cost of installation of a stand-alone PV system for remote customers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Solar building standards – The Governor's Office of Energy Management and Conservation (OEMC) works with other state agencies to encourage renewable technologies.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Colorado's incentives.

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Boulder

COMMUNITY INVESTMENT & AWARENESS

In March 1999, the Boulder Energy Conservation Center (BECC) formed a Community Partnership under the Million Solar Roofs Initiative (MSRI). The partnership is made up of BECC, the City of Boulder Environmental Services Group, the City of Boulder Housing Authority, the Colorado Solar Energy Industries Association (COSEIA), the Home Builders Association (HBA) of Metropolitan Denver, Altair Energy, and RMS Electric. Below are highlights of their recent activities.

Education & Assistance

- Held a one-day workshop on "Overcoming Private Land Use Restrictions to Residential Solar Use."
- Hosted the 2000 Solar Tour of Homes for Boulder County. Over 200 people attended the one-day event to tour 13 homes.
- Worked closely with the City of Boulder Office of Environmental Affairs staff to increase visibility and citizen participation in the Green Points program. BECC holds quarterly Green Builder certification workshops for builders/architects/developers, which have been well attended.

Renewable Energy Projects

- Promoted the use of solar technologies in the North Boulder Recreation Center remodeling/expansion project. This project is moving forward and is highly supported by the City Council and Parks & Recreation Board. A proposal for a 6,000 ft^2 flat-plate collector system that will heat the domestic water and a large percentage of the two swimming pools at the Center has been submitted.
- There are now approximately 30 certified contractors/architects in Boulder County and 55 Green Point homes using solar technologies.
- Met with the City of Boulder Housing Authority to plan the building of three affordable housing projects as "green developments" in 2001. Each project is comprised of single-family, multi-family, and commercial space. The City has committed to developing these projects as pilots for expanding it's residential *Green Points* Program (see below) to include requirements for commercial development.
- In 1995, prior to its MSRI activities, BECC started ReSource 2000, a construction material salvage program. Located in east Boulder County, the ReSource 2000 yard operated without power for almost four years. Through a grant from the Public Service Company's Renewable Energy Trust, ReSource 2000 was able to install a 750-watt PV system that provides electricity for lights, power tools, and battery chargers. The system was installed on April 17, 1999.

Green Power Purchasing

The City of Boulder purchases a portion of its electricity supply from wind power through Public Service of Colorado's *Windsource* program.

Green Pricing

Members of the Boulder community can purchase wind energy through Public Service of Colorado's *Windsource* program.

FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Colorado – Financial Incentives
Alternative fuel vehicle rebate – Colorado offers a rebate of 15%-50% for AVFs.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Colorado's incentives.

RULES, REGULATIONS & POLICIES

Construction & Design

Green Points Building Program

The Boulder *Green Points Building Program* is a mandatory residential green building program that requires a builder or homeowner to include a variety of sustainable building components based on the size of the proposed structure. Renewable energy technologies are among the optional components a builder can use to earn "points." The Green Points Program has two levels:

1. The *Green Points New Home Program* applies to new construction and additions larger than 500 square feet. This program requires building permit applicants to earn points by selecting optional green techniques in order to receive a building permit.
2. The *Green Points Remodeling Program* is voluntary and applies to remodeling projects and additions less than $500ft^2$. Homeowners and contractors are encouraged to include as many green options in their remodeling projects as they can.

Compliance with each measure must be demonstrated by one of two methods—inspection by City Inspection Services or by self-certification of compliance on the Green Points application.

Solar Access

The City of Boulder's solar access ordinance guarantees access to sunlight for homeowners and renters in the city. This is done by setting limits on the amount of permitted shading by

new construction. A solar access permit is available to those who have installed or who plan to install a solar energy system and need more protection than is provided by the ordinance. For new developments, all units which are not planned to incorporate solar features must be sited to provide good solar access. They must also have roofs capable of supporting at least 75 square feet of solar collectors per dwelling unit. Non-residential buildings have similar requirements for siting. When applying for a building permit, a simple shadow analysis must be submitted to the City's Building Department. (City of Boulder Department of Planning and Community Development: (303) 441-3270).

State of Colorado – Regulatory Policies

Net metering – Net metering is allowed for PSCo customers for renewable systems up to 10 kW; municipal utilities have individual programs.

Line extension analysis – Electric utilities must conduct a cost/benefit analysis to compare the cost of line extension with the cost of installation of a stand-alone PV system for remote customers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Solar building standards – The Governor's Office of Energy Management and Conservation (OEMC) works with other state agencies to encourage renewable technologies.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Colorado's incentives.

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Denver

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Project

On May 3, 2000 the city of Denver celebrated the installation of new solar electric systems at the Stapleton Airport redevelopment site. A 1.5 kW utility-connected solar electric system and two 75-watt off-grid systems were placed at the 19-acre community "Urban Farm." The use of solar PV technologies will showcase effective uses of PV for urban and rural applications. This project was funded by the City and County of Denver, coordinated by Energy 21, and installed by Altair Energy.

Education & Assistance

Denver's Department of Environmental Health (DEH) provides the *Earthkeepers* public education program for middle school students, which includes a renewable energy component. DEH also promoted renewable energy at the City's Earth Day 2000 event.

Green Power Purchasing

The City and County of Denver purchase a portion of their electricity supply from wind power through investor-owned Public Service of Colorado's *Windsource* green pricing program. Denver purchased 667 100-kWh blocks of power. The wind turbines have the capacity of generate over 25 MW of electricity.

Green Pricing

Members of the Denver community can purchase wind energy through Public Service of Colorado's *Windsource* program.

FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Colorado – Financial Incentives
Alternative fuel vehicle rebate – Colorado offers a rebate of 15%-50% for AVFs.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Colorado's incentives.

RULES, REGULATIONS & POLICIES

Solar Access

Development Guidelines

These voluntary guidelines, which apply to both residential and commercial developments, provide information on how to orient buildings to capture solar energy.

Construction & Design

Building Codes & Inspections

Municipal guidelines set forth requirements for solar installations in Denver. There are standards for plumbers, electricians, heating and air conditioning contractors, and general contractors. A "Solar System Permit" is required for solar installations.

Sustainable Buildings Guidelines

The City's Department of Environmental Health developed sustainable buildings guidelines for retrofitting, renovation or construction of new municipal buildings. Architects and engineers can use these guidelines to design more energy-efficient buildings. The Environmental Protection Division has been promoting sustainable city buildings by applying the LEED (Leadership in Energy and Environmental Design) rating system to Denver's bond projects. The new Civic Center Office Building will be designed for LEED certification. Police stations and other new buildings will also examine energy saving features for implementation.

Contractor Licensing

A "Plumbing Class A" license is required to install, add to, alter or repair solar plumbing utilized for potable water. An exam is required to get the license. A "Hot Water Contractor " license is required to install, add to, alter or repair solar water heating systems in certain types of buildings.

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Web: http://www.denvergov.org

State of Colorado – Regulatory Policies

Net metering – Net metering is allowed for PSCo customers for renewable systems up to 10 kW; municipal utilities have individual programs.

Line extension analysis – Electric utilities must conduct a cost/benefit analysis to compare the cost of line extension with the cost of installation of a stand-alone PV system for remote customers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Solar building standards – The Governor's Office of Energy Management and Conservation (OEMC) works with other state agencies to encourage renewable technologies.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Colorado's incentives.

Fort Collins

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Fort Collins Utilities - Wind Power Program

The *Wind Power Program* is a green pricing program offered by the City of Fort Collins Utilities and Platte River Power Authority (Platte River). Platte River is a joint action agency that provides electricity to the cities of Estes Park, Fort Collins, Longmont and Loveland through an all requirements contract. All residential and commercial customers are allowed to participate by purchasing all or a portion of their electricity needs with wind power. Businesses may purchase electricity in any number of 1,000-kWh blocks for $25 per block per month. Residents may purchase blocks for $10 per block per month. Public promotion is done through brochures, bill inserts, news releases, radio and newspaper advertisements, the City of Fort Collins website, and quarterly newsletters. Participants are required to make a one-year customer commitment.

This program began in 1996 as a three-year pilot aimed at evaluating the demand for green pricing in the utility's service area. Energy was initially provided in 1998 by two 600-kW wind turbines located at Platte River's Medicine Bow Wind Power site in Wyoming. About 530 residential and 13 commercial customers participated in the pilot program. In 1999, Fort Collins Utilities expanded the program, purchasing half of the energy generated by five additional 660-kW wind turbines installed at the Medicine Bow site. As a result of growing demand for green power by several northern Colorado communities, Platte River installed two more turbines, both 660 kW, in the summer of 2000. Fort Collins Utilities is committed to purchasing more than half of this new capacity. The program currently has approximately 715 residential and 23 commercial subscribers.

Fort Collins Utilities was the first utility in Colorado to offer wind power to its customers. In addition to winning three awards in 1997-98, Fort Collins Utilities and Platte River were awarded the 2000 American Wind Energy Association's *Utility Leadership Award* for "leading the electric utility industry toward increased reliance upon wind energy technology."

Platte River's Medicine Bow Wind Power site also provides power for the green pricing programs offered by the municipal utilities in Estes Park, Longmont, and Loveland, Colorado. Summary and contact information for these programs is provided on the following page. These programs also require a one-year commitment.

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Web: http://www.fcgov.com/Utilities

FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Colorado – Financial Incentives

Alternative fuel vehicle rebate – Colorado offers a rebate of 15%-50% for AVFs.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Colorado's incentives.

RULES, REGULATIONS & POLICIES

Net Metering

Fort Collins Utilities offers net metering for solar energy systems up to 3 kW.

State of Colorado – Regulatory Policies

Net metering – Net metering is allowed for PSCo customers for renewable systems up to 10 kW; municipal utilities have individual programs.

Line extension analysis – Electric utilities must conduct a cost/benefit analysis to compare the cost of line extension with the cost of installation of a stand-alone PV system for remote customers.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Solar building standards – The Governor's Office of Energy Management and Conservation (OEMC) works with other state agencies to encourage renewable technologies.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Colorado's incentives.

Town of Estes Park Light & Power Department – Wind Power Program

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Assistant to the Director
Light & Power Department
Town of Estes Park
170 MacGregor Avenue
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Estes Park, Colorado 80517
Voc: (970) 586-5331
Fax: (970) 586-6909
Web: http://www.estesnet.com/LightPower
E-mail: mmangelsen@estes.org

Premium: Residential: $2.50/100-kWh block per month;
Business: minimum of 10, 100-kWh blocks for $12.50/mo.
Participants: 52 residential; 3 commercial
Applicable Sectors: Residential, Commercial

City of Longmont Power & Communications – Wind Energy Program

Contact: Bill Ewer
Longmont Power & Communications
1100 S. Sherman St.
Longmont, CO 80501
Voc: (303) 651-8793
Fax: (303) 651-8796
E-Mail: lpc@ci.longmont.co.us
Web: http://ci.longmont.co.us/LPC/Gen/wind_pwr.htm

Premium: $2.50/100-kWh block per month
Participants: 293 residents; 2 businesses
Applicable Sectors: Residential, Commercial

City of Loveland Water and Power Department – Wind Energy Program

Contact: Gail Doxtader
Utility Conservation Coordinator
City of Loveland Water and Power Department
200 North Wilson Avenue
Loveland, CO 80537
Voc: (970) 962-3566
Fax: (970) 962-3400
E-mail: doxtag@ci.loveland.co.us
Web: http://www.ci.loveland.co.us

Premium: $2.50/100-kWh block per month
Participants: 248
Applicable Sectors: Residential, Commercial and Industrial

Washington

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Projects

Brightfields Project

Washington, D.C. is exploring opportunities to create a green industrial park on a former brownfields located in Anacostia, east of the Potomac River. Plans for the park include a fuel cell manufacturer, a solar energy manufacturer, environmentally-friendly auto repair and painting demonstration sites, and a business incubator to assist small environmental and energy businesses. The Department of Energy, as well as several other federal agencies and other local governments, are assisting the City with the redevelopment project. The City intends to incorporate energy efficiency, renewable energy, and other green design components in building construction as part of the redevelopment.

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Web: http://www.dcenergy.org

Solar-Powered Bus Shelter Lights

Washington D.C.'s Metropolitan Area Transit Authority (WMATA) has found that solar power provides a cost-effective solution to solving lighting problems at station platforms and Metrobus shelters. WMATA is having solar strobe lights installed to alert commuters exiting trains of when a bus has pulled into the terminal. The strobe lights are powered by 20-watt PV modules. The lights also alert bus drivers to the fact that more passengers are coming. The lights strobe for three minutes, the average time it takes to get from the station platform to the bus terminal. During that time, the bus drivers are required to wait at the stop.

In addition to the solar train station lights, three solar lights are being installed at Metro bus stops as part of a pilot program. The package, which consists of three 20-watt solar panels, is installed by simply mounting it on a pole facing south. Patrons press a button within the shelter which turns on the lights for 15 minutes.

During the pilot, which will last for about six months, Metro will test the equipment to see if it can endure constant use and exposure to the elements. After the pilot project is evaluated,

WMATA officials will decide whether they will install more solar lighting at other shelters. The solar bus shelters are located in the District of Columbia, in Bladensburg, Maryland, and in Alexandria, Virginia.

Contact Information
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Transit Authority
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Washington, DC 20001
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Web: http://www.wmata.com.

Georgetown University Building Integrated PV

The Georgetown University solar system was built to test the use of large-scale, building-integrated photovoltaics on commercial buildings. With funding from the U.S. Department of Energy and PV modules from BP Solar, Georgetown, located in Washington, D.C., showcases what many consider the future of solar energy systems.

The array is not simply placed on top of the building but incorporated into the building itself. It actually displaces the use of some building materials and creates a more aesthetically pleasing appearance while providing up to 50% of the building's power needs. The 337-kilowatt array is built into the steeply slanted roof of the University's Intercultural Center. (BP Solar Contact: Sarah Howell at 301-698-4272.)

FINANCIAL INCENTIVES

There are no local financial incentives at this time.

RULES, REGULATIONS & POLICIES

Net Metering

Residential and commercial customers can net meter renewables, fuel cells, and microturbines up to 100 kW.

Gainesville

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Gainesville Regional Utilities – Green Pricing/PV Demonstration Project

In January 1997, Gainesville Regional Utilities (GRU) installed a 10 kW PV demonstration project on the roof of the utility's Electric System Control Center in Gainesville, FL. The project was partially funded through community donations raised by a pilot green pricing program. Other funding sources included grants from the Florida Energy Office and the Solar Electric Power Association (formerly UPVG) TEAM-UP program.

The average premium comes to $3.27 per month. To date, over $78,000 has been raised from over 660 customers. Community participants who contributed $50 or more were honored by having their names inscribed on a plaque that was presented at a celebration of the project. GRU promoted the program through a monthly customer bulletin and inserts in the local newspaper.

The demonstration project is expected to be fully paid for by the fall of 2000. After that date, GRU will stop any ongoing contributions to the original project, send a thank-you letter to original contributors and ask them to consider signing up for a new project. GRU is in the process of setting up a green pricing program designed to support grid-connected PV systems to be installed at schools.

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FINANCIAL INCENTIVES

Rebate Program

Gainesville Regional Utilities - Solar Rebate Program

Gainesville Regional Utilities (GRU) began the *GRU Solar Rebate Program* in early 1997 as part of its demand-side management initiatives. The program provides rebates to residential customers who replace their electric water heaters with solar units. Both passive solar systems, which must be of the double-glazed integrated collector storage type, and closed-loop active solar systems are covered by the rebates. The range for rebates is $150 to $450, depending on the size and cost of a unit. The rebates increase as the cost per delivered BTU goes down for both passive and active solar water heating systems.

To qualify for the rebate program, the solar system must have current Florida Solar Energy Center (FSEC) approval; the system's performance must have current FSEC certification; and contractors must be currently certified to install solar water heaters by the Florida Construction Industry Licensing Board. In addition, a GRU energy audit is required before the system is installed.

Funding for the rebates comes solely from the utility's revenues. GRU promotes the program in bill inserts, in public service announcements, on their website and at an annual architectural exhibition. To date, about 24 GRU customers have received rebates after satisfying the program's requirements.

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Web: http://www.gru.com

State of Florida – Financial Incentives

PV Rebate Program – Rebates of $2 per installed watt are available to all sectors. Maximum rebate is $8,000 for non-commercial systems, $25,000 for commercial systems.

Sales tax – Solar energy equipment is exempt from the sales tax.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Florida's incentives.

Interconnection Standards

GRU is in the process of developing interconnection standards, but consensus has not been forthcoming, according to utility officials. GRU does not offer net metering at this time.

Solar Access

The City of Gainesville requires that public facilities be sited to allow for proper solar access. Removal or relocation of regulated trees must be approved by the city manager if the tree prevents the installation of solar energy equipment.

State of Florida – Regulatory Policies

Contractor licensing – A solar license is required for installing, maintaining, and repairing solar energy equipment. Contractors licensed in a related area, such as plumbing or electrical work, are not required to obtain a solar license in order to install or perform maintenance on solar systems.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Equipment certification – There are certification standards for solar energy equipment.

Construction standards – The use of solar technologies in state buildings is required when economically feasible. All new educational facilities must include passive solar design.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Florida's incentives.

Jacksonville

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Projects

JEA – Clean Power Program

Through its *Clean Power Program*, JEA (formerly Jacksonville Electric Authority), has committed to achieving a 7.5% clean power capacity (approximately 250 MW) most of which will be from renewable sources. The utility plans to implement the initiative without raising electric rates. Projects include:

- Installation and operation of an grid-tied solar photovoltaic (PV) system in every public high school in JEA's service territory (primarily Duval County) through a new *Solar For Schools Program*. There are now 21 active systems totaling 84 kW at 18 schools. Additionally, JEA has offered curriculum and teacher training to the school system to educate students about solar energy. This project has the additional benefit of producing trained local contractors that the private sector can use for future installations. It also gives JEA first-hand experience in distributed generation so that it can develop a PV-friendly policy for commercial and residential applications. By the end of the year 2000, JEA had generated a total of ~ 32,000 kWh of PV-generated electricity. An additional 80 kW of PV systems are being planned for 2001;
- Four additional installations of solar PV systems are at JEA sites totaling 14 kW. An existing 4 kW site at the E. Dale Joyner Nature Preserve has been in operation since 1983;
- JEA has ordered 25 Ford Ranger EV trucks to add to its service fleet. The energy from some of the solar PV sites will be used to assist in recharging the trucks;
- Investigating the practicality of using biomass fuels grown at JEA tree and grass farms in a closed-carbon cycle for power generation. Wastewater would be reused for hyper-irrigation;
- Investing $500,000 in a solar technology development project at the planned Florida Community College at Jacksonville's Advanced Technology Center. A new type of high-temperature solar collector will be applied to a Rankine cycle 100-kW steam power plant. If viable, JEA will investigate using the technology in a utility-scale plant. Prototype testing is currently underway; and
- Generating electricity using landfill gas produced at two Duval County landfills. Current gas capacity yields 3.9 MW.

FINANCIAL INCENTIVES

A JEA *Clean Power Program* Task Force is currently working on a strategic plan for solar energy projects within Duval County, in collaboration with other business, government and

community groups. A policy to provide financial incentives is expected to be an integral part of this plan.

State of Florida – Financial Incentives

PV Rebate Program – Rebates of $2 per installed watt are available to all sectors. Maximum rebate is $8,000 for non-commercial systems, $25,000 for commercial systems.

Sales tax – Solar energy equipment is exempt from the sales tax.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Florida's incentives.

RULES, REGULATIONS & POLICIES

Net Metering

JEA offers net metering and will provide, at the customer's expense, a second meter to measure energy deliveries to the utility.

Contractor Licensing

A plumbing permit is required for installation of solar hot water heaters. The installer must have a current certificate of competency as a plumber.

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State of Florida – Regulatory Policies

Contractor licensing – A solar license is required for installing, maintaining, and repairing solar energy equipment. Contractors licensed in a related area, such as plumbing or electrical work, are not required to obtain a solar license in order to install or perform maintenance on solar systems.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Equipment certification – There are certification standards for solar energy equipment.

Construction standards – The use of solar technologies in state buildings is required when economically feasible. All new educational facilities must include passive solar design.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Florida's incentives.

New Smyrna Beach

COMMUNITY AWARENESS & INVESTMENT

Green Pricing

City of New Smyrna Beach Utilities Commission - Green Fund

The *Green Fund* is a green pricing program launched by the New Smyrna Beach Utilities Commission to allow its 20,000 customers to donate $5 or $10 each month to support the installation of PV systems on municipal buildings and schools in New Smyrna Beach's service area. The contributions are collected via monthly bills. The Coronado Beach Elementary School was the first beneficiary of the project when the Utilities Commission, working with the Florida Solar Energy Center, dedicated a grid-connected 4-kW PV system on the school's outdoor pavilion on June 11, 1999. Although there is no solar curriculum at the school, the pavilion does have an outdoor display that explains solar electricity.

FINANCIAL INCENTIVES

Rebate Program

City of New Smyrna Beach Utilities Commission - PV Program

The City of New Smyrna Beach Utilities Commission is helping residential customers to become owners of rooftop PV systems through a buydown incentive. The utility pays one-third of the cost of the installation, the Florida Solar Energy Center pays one-third, and the homeowner pays one-third. At the current system cost, participants pay approximately $1.82/watt. This program has proven to be very popular and the Commission currently has a waiting list of 60 homeowners. The systems are owned by the customer and the energy produced is net metered back to the utility. The utility has a 2400 watt and a 1200 watt system installed, with permitting proceeding on five more installations. A bid package is being prepared to purchase 10 more systems.

State of Florida – Financial Incentives
PV Rebate Program – Rebates of $2 per installed watt are available to all sectors. Maximum rebate is $8,000 for non-commercial systems, $25,000 for commercial systems.
Sales tax – Solar energy equipment is exempt from the sales tax.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Florida's incentives.

RULES, REGULATIONS & POLICIES

Net Metering & Interconnection Standards

New Smyrna Beach Utilities Commission offers net metering and follows the Florida Solar Energy Center and industry standards regarding standards of equipment.

State of Florida – Regulatory Policies

Contractor licensing – A solar license is required for installing, maintaining, and repairing solar energy equipment. Contractors licensed in a related area, such as plumbing or electrical work, are not required to obtain a solar license in order to install or perform maintenance on solar systems.

Solar access – Covenants or ordinances that restrict the use of solar are forbidden.

Equipment certification – There are certification standards for solar energy equipment.

Construction standards – The use of solar technologies in state buildings is required when economically feasible. All new educational facilities must include passive solar design.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Florida's incentives.

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Chicago

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Projects

"Brightfields" Project

The City of Chicago, in partnership with Commonwealth Edison (ComEd), the Department of Energy, and Spire Corporation, is redeveloping an unused factory site to build a photovoltaic panel factory. An estimated 100 people will get jobs assembling solar power equipment for installation in Chicago area schools, bus stop shelters, and homes. In addition, a solar energy system will be installed at the brownfield, both to supply some of the company's electricity needs and to serve as a demonstration and educational site. The factory, owned by the Spire Corporation, is known as "Spire Solar Chicago."

A two-story building on the site is being rehabilitated into the headquarters of Chicago Solar and Greencorps Chicago, which trains low-income Chicagoans in landscaping and horticulture. It is being designed through a partnership of the Chicago Department of Environment and the American Institute of Architects Environment Committee. The site design includes a greenhouse, rooftop solar panels, energy-efficient landscaping and reuse of captured rainwater.

A new 2.5 MW Brightfield is being built as part of the Lake Calumet Area Sustainable Development Strategy. The city is installing a 2.5 MW solar array on an abandoned landfill, known locally as the Cluster Sites. This site will also feature a 4.5 MW landfill gas generation station. The first 500 kW of solar has been promised by ComEd, and the additional 2 MW will be announced at a later time.

The Chicago project is the first of DOE's new Brightfields Initiative. DOE is working with local governments and industry to link solar energy technologies to brownfields redevelopment. The brightfields approach can help local governments to address their concerns about land use, economic development, climate change, air quality, and energy goals. Other communities working with DOE to develop brightfields include Cape Charles, VA; Stamford, CT; Los Angeles, CA; Washington, DC; New York/New Jersey/Connecticut; Minneapolis, MN; Babylon, NY; and Livermore, CA.

Solar on Schools & in the Community

The City of Chicago and ComEd jointly have committed $8 million to purchase solar systems in the next five years. The solar systems will be installed on other brownfield sites as well as schools, office buildings, transportation routes, and municipal and commercial properties. Reilly Elementary School (10kW and interactive kiosk) and ComEd Chicago North Side Call Center (25kW) are home to the first two installations. The City of Chicago, the Chicago School Board, and Commonwealth Edison announced that they will share the cost of 10 kW

PV systems on 5 more schools. These five schools follow the success of Reilly Elementary School project. The City hopes to make their Solar Schools program a long term initiative and plans to install PV on as many as 50 schools in near future. The City is also developing science curriculums incorporating solar and renewable energy ideas into the classroom.

Solar on Chicago Museums

The City of Chicago and ComEd are planning to install $4 million worth of solar panels atop Chicago's nine major museums and Lincoln Park Zoo. Each installation will generate approximately 50,000 kWh of electricity per year. The solar cells for the project will be purchased from Chicago Solar. The city hopes to finance up to 60 percent of the project from the Renewable Energy Trust Fund grant.

Green Power Purchasing

In July 2000, the City of Chicago joined with 47 other local government bodies in a green municipal aggregation effort. A request-for-services, which includes a green power requirement, has been issued to the 13 power providers that have been licensed to sell power in Illinois' deregulated power market. To win the group's business, a provider must lower costs for each member of the purchasing group and generate 20% of the power (or 80 MW out of 400 MW) from renewable sources, such as solar or wind energy, by 2005. The providers also must submit plans to reduce the pollution caused by the power they generate.

The 48 government agencies use about 400 MW of electric power, or about what it would take to power 65,000 homes. The City of Chicago consumes about 200 MW, the Chicago Transit Authority takes another 100 and the 46 other agencies use the remainder. The 80 MW of renewable power would be the largest purchase in the nation to date by a non-utility customer.

The electric power contracts are expected to take effect in 2001 and last at least three years. The green power requirement will start at 3% in the first year and increase over time. It involves only electricity purchased by government, not by residential or commercial customers. This is the first opportunity government agencies have had to purchase power competitively since Illinois deregulated electricity in 1997.

FINANCIAL INCENTIVES

Industrial Recruitment

The City of Chicago offered financial incentives to Spire Corporation to locate a photovoltaic manufacturing plant in the City. The City committed to purchase and install at government facilities at least 250 kW of equipment from Spire at a cost of about $2 million. The equipment will be installed initially at schools, City colleges, and large fleet facilities. The City also settled litigation with its resident utility, Commonwealth Edison. As part of the settlement, ComEd has agreed to purchase and install within the City at least $12 million worth of solar photovoltaic equipment. The City worked out arrangements with ComEd so that at least $6 million of that commitment will be purchased from the Spire plant.

State of Illinois – Financial Incentives

Property tax assessment – Solar, wind, and geothermal systems are valued no greater that conventional heating systems for property tax purposes.

Grant and loan programs – Illinois offers grants and loans for renewables through funding from the state public benefits funds.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Illinois's incentives.

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RULES, REGULATIONS & POLICIES

Net Metering

Commonwealth Edison allows for net metering of solar and wind energy systems of 40 kW or less. The utility has developed a simplified application process.

State of Illinois – Regulatory Policies

Public benefits funds – Two programs have been developed: Renewable Energy Resources Trust Fund and the Clean Energy Community Trust Fund.

Net metering – Commonwealth Edison customers can net meter solar & wind systems up to 40 kW.

Disclosure – Utilities must inform customers of generation fuel mix and emissions.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Illinois's incentives.

Cedar Falls

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Cedar Falls Utilities - Wind Energy Electric Project

Since February 1999, Cedar Falls Utilities (CFU) has sponsored a green investment program to support the Wind Energy Electric Project, a wind farm established by the Iowa Distributed Wind Generation Project (IDWGP). CFU customers can donate $2.50 each month to support the operation and maintenance of three 750-kW wind turbines located near Algona, Iowa. To date, some 700 customers, or 4.5%, have signed on.

The IDWGP is a consortium of seven municipal utilities: CFU, Algona Municipal Utilities, City of Estherville, City of Westfield, Ellsworth Municipal Electric, Fonda Municipal Electric, and Montezuma Municipal Light. CFU owns two-thirds of the wind project.

This consortium -- the first of its kind -- is a result of the member utilities' common belief that the new electric industry restructuring legislation will include mandates for non-hydro renewable generation resources. The IDWGP believes this wind farm project will demonstrate their proactive approach to renewable energy resources before it becomes mandated by law.

The IDWGP is funded through the Turbine Verification Program (TVP), a joint research project of the U.S. Department of Energy and the Electric Power Research Institute. The project cost $2.8 million, $1.3 million of which was funded by TVP.

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FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Iowa – Financial Incentives

Local option for special assessment of wind energy devices – Cities and counties are authorized to assess wind energy conversion equipment at a special valuation for property tax purposes.

Property tax exemption for solar systems – The added value of installing a solar energy system on a building shall not be included in the property tax assessment for the first five full assessment years.

Property tax exemption for methane gas conversion – Property used to convert methane gas to energy is exempt from state property tax.

Wind Energy Equipment Exemption – The total cost of wind energy equipment and all materials used to manufacture, install, or construct wind energy systems is exempt from the state sales tax.

Grant Program – Research grants are awarded in three categories: renewable energy, energy efficiency, and information transfer. Amount varies.

Building Energy Management Program – Financing is available for public and nonprofit agencies for energy conservation programs.

Renewable Fuel Fund – A combination grant/loan program is available for commercial or industrial renewable fuel projects. The maximum amount per project is $900,000.

Loan Program – Zero-interest loans are available for up to half of the alternative energy project cost up to a maximum of $250,000. Technologies include solar, methane, biomass, and wind.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Iowa's incentives.

RULES, REGULATIONS & POLICIES

State of Iowa – Regulatory Policies

Net metering – Net metering is allowed for renewable energy systems. There is no system size limit, and net excess generation is purchased at the utility's avoided cost.

Solar access – Property owners and public bodies may voluntarily agree to create a solar access easement.

Renewables set aside – Investor-owned utilities are required to purchase a combined total of 105 MW of their generation from renewable and small hydropower sources.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Iowa's incentives.

Waverly

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Projects

In 1993, Waverly Light and Power (WL&P) became the first public power system in the midwest to own and operate wind generation. A Zond 80-kW turbine was placed at a farm north of Waverly. A research grant from the American Public Power Association (APPA) helped to defray the cost. In return for the funding assistance, WL&P monitors the turbine's performance and reports findings to APPA so that other public power utilities may learn from the Waverly experience. The City of Waverly worked with the University of Northern Iowa to establish a Midwest Wind Energy Program (MWEP) at the site to demonstrate the advantages of wind energy and to provide hands-on training, university classes, and seminars.

Positive response from local consumers, a grant from the National Renewable Energy Laboratory and the success of the original turbine lead to additional turbines. In 1999, two 750-kW Zond Z-50 wind turbines were erected near Alta, Iowa as part of the Storm Lake Wind Facility. The expansion of wind generation is part of Waverly Light and Power's goal to have 10% of all system requirements met by renewable sources.

Customers did not experience a rate increase from the project, as the capital costs for the turbines were covered by the utility's reserves and by a grant from the Department of Energy. Wind now produces electricity for over 500 homes in the Waverly area, amounting to 15% of residential customers and 4% of the system requirements. WL&P opted not to introduce "green pricing" and charge customers a premium for electricity generated from wind, believing that all customers should share in the costs as well as the benefits of developing wind power.

In 1999, the American Public Power Association presented WL&P with the *Energy Innovator Award* in recognition of its contribution. WL&P has also received awards and recognition from the American Wind Energy Association, Electric Power Research Institute (EPRI), U.S. Department of Energy, and the Sierra Club.

Education & Assistance

The MWEP has provided the leadership, experience, and data necessary for others in the Midwest region to employ wind energy in their resource mix. The success of MWEP, as well as additional up-to-date information about wind machines and wind energy, have been provided to utilities, farmers, businesses and general consumers since the program's inception.

Students from both the University of Northern Iowa and Wartburg College utilize the project's data for various projects. Wartburg College student interns maintain a website that provides quarterly and annual data collection and experience for the wind turbines' performance at www.waverlyia.com/wlp.htm.

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FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Iowa – Financial Incentives

Local option for special assessment of wind energy devices – Cities and counties are authorized to assess wind energy conversion equipment at a special valuation for property tax purposes.

Property tax exemptions – (1) The added value of installing a solar energy system on a building shall not be included in the property tax assessment for the first five full assessment years. (2) Property used to convert methane gas to energy is exempt from state property tax.

Wind energy equipment exemption – The total cost of wind energy equipment and all materials used to manufacture, install, or construct wind energy systems is exempt from the state sales tax.

Grant program – Research grants are available for renewable energy projects.

Building energy management program – Financing is available for public and nonprofit agencies for energy conservation programs.

Renewable fuel fund – A combination grant/loan program is available for commercial or industrial renewable fuel projects. The maximum amount per project is $900,000.

Loan program – Zero-interest loans are available for up to half of the alternative energy project cost up to a maximum of $250,000. Technologies include solar, methane, biomass, and wind.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Iowa's incentives.

RULES, REGULATIONS & POLICIES

State of Iowa – Regulatory Policies

Net metering – Net metering is allowed for renewable energy systems. There is no system size limit, and net excess generation is purchased at the utility's avoided cost.

Solar access – Property owners and public bodies may voluntarily agree to create a solar easement.

Renewables set aside – Investor-owned utilities are required to purchase a combined total of 105 MW of their generation from renewable and small hydropower sources.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Iowa's incentives.

Massachusetts

Cape Cod & Martha's Vineyard

COMMUNITY INVESTMENT AND AWARENESS

Education & Assistance

Cape & Islands Self-Reliance Corporation – Green Energy Citizen Project

The Cape & Islands Self-Reliance Corporation was founded as a nonprofit organization in 1980 in order to promote community self-reliance in energy, water and food. Self-Reliance was pivotal in assuring that the Massachusetts Restructuring Act contained the Community Choice provision, leading to the formation of the Cape Light Compact (see details below). Self-Reliance also assisted Ohio Citizen Action in conducting the educational outreach that led to the passage of Community Choice in the Ohio Restructuring Act.

Through the Green Energy Citizen Project, Self-Reliance educates members of the community how they can: (1) use the Cape Light Compact to get more clean and renewable energy in their power supply, and (2) create programs that will make renewable energy technology affordable to working families and small businesses. Self-Reliance makes presentations, provides outreach material, maintains a website, and fosters alliances with other organizations, including the Compact. The two-day Earth Day 2001 Conference will focus on educating citizens about renewable energy issues and opportunities .

Green Power Purchasing

The Cape Light Compact

The Cape Light Compact (Compact) is an aggregation of 21 towns and two counties on Cape Cod and Martha's Vineyard and represents 185,000 metered electric customers in Massachusetts. The Compact was formed in 1997 through resolutions passed by town meeting, and the board of selectmen or town council, in each member community. Among the goals of the Compact are to acquire the best market rate for electricity; to utilize and encourage renewable energy development through contract provisions, demonstration projects, and state-mandated system benefit charges for renewable energy; and to utilize and encourage demand side management and other forms of energy efficiency through contract provisions and state-mandated system benefit charges for renewable energy. Participation in the Compact is voluntary for the towns and for each individual consumer.

The Compact is the first "Community Choice" model for municipal aggregation in Massachusetts. Community Choice offers consumers the ability to act together to gain an economic advantage in a deregulated market place by jointly choosing power supply through their local governments. In establishing contracts with suppliers, cities can specify or negotiate the amount of green power to be supplied, prices, service, and protections for vulnerable customers like the elderly or low-income.

In March 2000, the Compact contracted with Select Energy to supply electricity for Cape Cod and Martha's Vineyard consumers. The contract, which covers all classes of consumers—industrial, governmental, commercial and residential—is one of the first of its kind in the nation. Select Energy is a Connecticut-based power marketer and an unregulated subsidiary of Northeast Utilities. The contract includes options to establish opportunities for consumers to purchase "Green Power" from renewable energy sources, and development of distributed energy and energy efficiency-related products and services.

The contract requires approval of the Compact member towns, as well as state regulators. Individual consumers who do not wish to participate will have the option to "opt-out" and choose the existing supplier, Commonwealth Electric, or choose another competitive supplier if one is available. In August 2000, the Department of Telecommunications and Energy approved the Compact's municipal aggregation plan. The Compact's contract is expected to go into effect during 2001.

The Cape Light Compact's members are the Cape Cod [Barnstable County], Massachusetts towns of Barnstable, Bourne, Brewster, Chatham, Dennis, Eastham, Falmouth, Harwich, Mashpee, Provincetown, Sandwich, Truro, Wellfeet, and Yarmouth; the Barnstable County Commissioners; the Martha's Vineyard [Dukes County] towns of Aquinnah, Chilmark, Edgardown, Oak Bluffs; Tisbury, and West Tisbury; and Dukes County.

Other public aggregators and/or groups which are investigating public aggregation in Massachusetts include Franklin County, Hampshire County, Town of Lexington, and South Coast EmPOWERment. SouthCoast emPOWERment is an intergovernmental organization of eight municipalities in Southeastern Massachusetts that have been authorized by their Town Meetings to join with other municipalities to aggregate electrical loads similar to the Cape Light Compact. The member towns are Acushnet, Dartmouth, Fairhaven, Freetown, Marion, Mattapoisett, Rochester and Westport.

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FINANCIAL INCENTIVES

Loan Program

Cape & Islands Self-Reliance Corporation - Home Energy Loan Program

Cape & Islands Self-Reliance Corporation provides low-interest loans for energy-related home improvements (including solar water heater and photovoltaic installations) under its *Home Energy Loan Program.* The financing is available in cooperation with Cape Cod Bank & Trust. Self-Reliance uses funds generated by its member-benefit programs to underwrite loans for energy-related home improvements for its members. The fixed interest rate for HELP loans is based on the 90-day U.S. Treasury Bill rate plus 2%. One solar hot water system has been installed under the program in last 12 months, but interest in renewables has been growing in recent months.

Requirements for participation are:

- membership in Self-Reliance
- the home must be occupied year-round
- annual applicant income must not exceed $80,000
- applicant must meet credit approval standards at CCB&T

Proposed Loan/Rebate Program

Cape & Islands Self-Reliance Corporation – Proposed Loan/Rebate Pilot Program

Self-Reliance is developing a pilot program to prove that a green energy program is feasible. The group hopes to make photovoltaic systems or other renewable energy devices affordable to consumers by subsidizing 50% of the cost and providing a zero interest loan for the balance over a long term. State incentives include a 15% state income tax credit, and no sales tax, on solar installations. After the subsidy and the tax credit, the cost of the system will be about $3000. In order to finance the program, Self-Reliance is working with the Cape Light Compact to use energy efficiency program funds. Under the state's restructuring law, the Compact will be able to receive the line fees formerly collected by the utilities to design and implement their own energy efficiency programs. Self-Reliance is also seeking funds to develop a demonstration project.

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State of Massachusetts – Financial Incentives

Patent exemption – An income tax deduction is available for any income derived from a patent associated with energy conservation.

Property tax exemption – A property tax exemption is allowed for solar, wind, and hydropower.

Sales tax exemption – Solar, wind, and heat pump systems exempt from 5% sales tax.

Personal tax credit – Homeowners can take a tax credit up to 15% of the cost of a solar, wind, or hydro system.

Corporate tax deduction – Corporations can deduct 100% of the cost of a solar or wind system, and these systems are exempt from the corporate excise tax.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Massachusetts's incentives.

RULES, REGULATIONS & POLICIES

State of Massachusetts – Regulatory Policies

Renewable portfolio standard – The standard ramps up to 4% by 2009 and continues thereafter.

Public benefits funds – Funds for renewables administered by the Massachusetts Technology Collaborative (MTC).

Net metering – Net metering is allowed for renewables and cogeneration up to 60 kW.

Disclosure – Utilities must inform customers of generation fuel mix and emissions.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Massachusetts's incentives.

Traverse City

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Traverse City Light and Power - Green Rate

The *Green Rate* program allows residential and small commercial customers of Traverse City Light and Power (Light and Power) to support the utility's 600-kW wind turbine. Additional funding comes from a $50,000 grant from Michigan Public Service Commission. Participants receive all their power from the wind turbine, which has generated over 3.3 million kWh of electricity since installation in May 1996. The highest one month total was 113,615 kWh, generated in November 1999. While Light and Power officials feel these totals are good, the actual output is still below what was forecasted before the wind turbine was constructed. The utility has reduced the number of customers on the Green Rate to reflect the lower output levels. There are now approximately 110 residential (down from 245) and 16 commercial (down from 26) customers on the *Green Rate* program. Nevertheless, the wind generator continues to be an attraction for school groups, environmentalists, and a source for good publicity for the utility.

Customers pay a premium of 1.58¢ per kWh. This averages out to a monthly rate of $7.58 for residential subscribers and $27 for commercial subscribers. Residential participants are required to make a three-year commitment, while commercial customers must sign up for a ten-year commitment. The program has raised approximately $15,000 per year. Traverse City Light and Power has used media, display ads, direct mailings, and in-person sales efforts to market the program to businesses. A report prepared by Ed Holt for the Renewable Energy Policy Project (REPP) details the Traverse City program and examines its efforts to enlist commercial customers. The report is titled "Green Power for Business: Good News from Traverse City" and is available from REPP (Voc: (301) 405-4550). *Green Rate* has also provided the model for the Fort Collins, CO wind power green pricing program.

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FINANCIAL INCENTIVES

There are no local or state financial incentives at this time.

RULES, REGULATIONS & POLICIES

State of Michigan – Regulatory Policies
Contractor licensing – A specific solar plumbing license is required for hot water system installers.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Michigan's incentives.

Moorhead

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Moorhead Public Service – Capture The Wind

Capture The Wind is a wind power green pricing program created in April 1998 by Moorhead Public Service (MPS). All of the utility's customers are eligible to sign up for this program, which supports a 750-kW wind turbine erected near the Centennial Ball Fields in Moorhead. Over 500 people attended the turbine's dedication ceremony on June 24, 1999. Participants pay a monthly premium of 0.5¢ per kWh. They can choose to buy all of their electricity from renewable sources or just in one 1,000 kWh block per month (one 1,500 kWh block for commercial customers). For the average residential customer, this comes to about $5 more a month. MPS guarantees that this half cent premium won't increase during the duration of a customer's subscription. The commitment period is three years. The contract will undergo one-year automatic renewals, unless the customer notifies the utility otherwise.

Capture The Wind was promoted through direct mailings sent out to MPS customers in the summer of 1998. The goal was to recruit 425 participants as Charter Members of the program. The response was so positive that marketing was discontinued. *Capture The Wind* initially had 400 Charter Members and about 100 customers on the waiting list.

Due to the success of the *Capture The Wind* program, MPS announced plans for a second wind turbine, once again offering customers the opportunity to sign up for the program. The utility plans to have the new turbine installed and operating by October 2001. Again, more than 400 new customers signed up. With a total of 900 of its 12,500 customers now participating in the program, MPS can claim the highest participation rate (7.2%) of any green pricing program in the country to-date. MPS keeps its customers posted about the progress of the program through reports mailed to subscribers and on its website postings.

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FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Minnesota – Financial Incentives

Wind loan programs – Two separate agricultural loan programs exist for wind systems.

Production grants – Minnesota offers 1.5¢/kWh production grants for wind and hydro generation.

Ethanol grant – There is an ethanol production grant program available.

Property exemption – There is a property tax exemption for the value added by wind & PV systems.

Sales tax – Wind and solar utilized in qualifying industrial parks is exempt from the state sales tax.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Minnesota's incentives.

RULES, REGULATIONS & POLICIES

State of Minnesota – Regulatory Policies

Wind set aside – Through settlements with the state commission, Xcel Energy (formerly Northern States Power) must install over 800 MW of wind by 2013.

Net metering – Statewide, net metering is allowed for renewable systems up to 40 kW, but interconnection rules vary by utility.

Solar access – Solar and wind easements are allowed. Zoning boards can restrict covenants.

Equipment certification – SRCC standards for hot water & space heating systems apply.

Solar building standards – State buildings must consider active and passive solar.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Minnesota's incentives.

Lincoln

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Lincoln Electric System - Renewable Energy Program

In April 1998, the Lincoln Electric System (LES) created a wind power green pricing program. The *Lincoln Electric System Renewable Energy Program* is open to all of the utility's customers. Residential participants may subscribe for a maximum of two subscription units, while commercial and industrial customers must limit themselves to five units each. The customer commitment period is three years.

The first stage of energy production for the *Renewable Energy Program* was completed in December 1998. It consists of a 660-kW wind turbine located in the City of Lincoln, NE. Due to increased customer interest, LES installed a second 660-kW wind turbine in November 1999. To date, the utility has received customer commitments for about 2,600, 100-kWh monthly blocks of power, for which it charges a rate premium of 6¢ per kWh, or $6 per 100 kWh. A REPI tax credit of $1.70 for each 100 kWh unit was approved by the federal government, so participants pay only $4.30 per month for each subscription unit. LES is still about 200 blocks short of fully subscribing the second turbine. Figures for revenues are not yet available, but the program is expected to become self-supporting. The utility is considering the possibility of installing another type of renewable resource, such as a landfill-gas facility.

To acquire the initial subscriptions necessary to get the *Renewable Energy Program* started, LES conducted a major marketing campaign in mid-1998. The program was promoted through billboards, news releases, radio and print advertisements, media news coverage, bill inserts, and the LES web site. An effort was made to promote the program to state agencies, resulting in Nebraska's governor signing up the governor's mansion for the program. The campaign was so successful that the initial subscription limit was reached in less than sixty days. Subscribers are provided with bumper and window stickers. Businesses receive advertising packets that suggest how they can promote their participation to the public. A utility newsletter keeps subscribers informed about the program activities.

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FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Nebraska – Financial Incentives

Loan program – Low interest loans are available for residential and commercial energy efficiency improvements, including renewable energy projects.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Nebraska's incentives.

RULES, REGULATIONS & POLICIES

State of Nebraska – Regulatory Policies

Solar & wind access – Property owners may create binding solar easements and wind easements.

Construction policy – State agencies are required use renewable energy resources and technologies, and energy-efficient practices and technologies wherever cost-effective, available, and practical.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Nebraska's incentives.

Albuquerque

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Projects

Indian Pueblo Cultural Center Solar Carport[2]

In November 1999, the All Indian Pueblo Council, a consortium of the 19 Pueblo communities in New Mexico, dedicated a solar carport. The PV array covers the carport at the Indian Pueblo Cultural Center (IPCC) in Albuquerque and provides power for the cultural center building. The array consists of 92 120-watt AstroPower modules and generates more than nine kilowatts of power per hour at peak, while providing shade for cars. At the time of its dedication, the project was the largest commercial PV array in New Mexico, and the probably the largest PV array on Indian lands in the U.S. The carport, which is clearly visible to the 400,000 people who visit the center each year, not only provides car shading and electricity, but also provides an opportunity to increase public awareness of solar energy.

The solar carport is tied to Public Service Company of New Mexico's (PNM) electric utility grid and is net-metered—the building's electric meter runs backward when the system is producing excess electricity. The IPCC is credited for this on its electric bill.

The New Mexico Department of Energy, Minerals, and Natural Resources provided grant funding for the project. The installed cost of the system was $86,300. Diversified Systems Manufacturing, a Native American-owned and operated contractor, managed the project.

PV Applications

The City of Albuquerque utilizes photovoltaics in a variety of applications, including:

- security lighting for bike paths,
- activation of automatic sprinkler systems,
- battery power for radio communications, and
- emergency traffic flashers.

Education & Assistance

The dedication of the solar carport was filmed by a city television crew and the footage was seen on the Earth Cafe program and used for an Earth Cafe solar video. The video was a joint project with the City of Denver. Financing for education and outreach was provided through a Million Solar Roofs grant to the state energy office.

[2] From *UPVG Record online* Spring 2000 newsletter at http://www.fccg.org/upvg/record/rc100pue.htm. UPVG is now called the Solar Electric Power Association.

FINANCIAL INCENTIVES

There are no local or state financial incentives at this time.

RULES, REGULATIONS & POLICIES

Solar Access

The City of Albuquerque's zoning regulations contains a solar permit ordinance "as a means to settle property rights so that people can build structures and plant vegetation knowing what solar rights restrict their development and so that people can know the extent of the solar rights which attach to a solar collector." Owners of property where the solar collector is located can apply for a permit for solar rights. A public hearing is held, and any interested party may appear.

Information to be provided on the application includes: plans for the proposed solar energy system, land topography and relevant structures and vegetation, property boundaries, and a spatial and temporal definition of the solar rights requested. Few permits have been requested because their availability has not been well publicized by the City.

The city's zoning regulations also contain building height restrictions and requirements for street orientation in new developments to protect solar access. However, the provisions also allow for less than east-west orientation as long as stronger energy efficiency measures are used in construction.

State of New Mexico – Regulatory Policies
Net metering – Renewable systems up to 10 kW are eligible for net metering. Interconnection requirements vary by utility.
Line extension – For customers seeking a power line extension, utilities must provide info on PV.
Solar access – Property owners can create easements to protect solar access, and local authorities can develop other zoning requirements to promote solar access.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on New Mexico's incentives.

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Long Island

COMMUNITY INVESTMENT & AWARENESS

Education & Assistance

Long Island, with its high electric rates and above average amount of sunshine, has always been an ideal location for using solar energy. State legislation and community action is making it more attractive for Island residents to enjoy the power of the sun.

Long Island Solar Roof Initiative (LISRI) is a Long Island-based community partnership, which aims to have 10,000 or more solar energy systems on Long Island by 2010. LISRI got off to a formal start with its first organizational meeting on March 29, 2000. Long Island Power Authority (LIPA), the Citizens Advisory Panel (CAP), Pace Energy Project, and KeySpan Energy are the lead agencies of the LISRI.

The community partnership has formed three subcommittees to specifically address electrical inspections of PV systems, PV installation training requirements, and consumer outreach. The Citizens Advisory Panel has published a Photovoltaics Fact sheet, a Solar How Water Fact Sheet, and was a contributor to the *New York Consumer Guide to Buying a Solar Electric System*.

FINANCIAL INCENTIVES

Rebate Program

LIPA Solar Power Pioneer Program

On May 3, 1999 the Long Island Power Authority adopted its $32 million/5-year Clean Energy Initiative, which consists of a package of programs designed to help Long Island's businesses and residents to use energy more efficiently. As part of the clean Energy Initiative, LIPA has launched its "Solar Pioneer Program," a five-year initiative in support of residentially based, grid-connected solar PV systems on Long Island.

The Solar Pioneer Program offers direct consumer incentives toward the installation of LIPA-qualified PV systems between 250 and 10,000 watts. LIPA provides a $3.00 per watt rebate for installing LIPA-approved solar equipment. LIPA is also offering a financial incentive to reduce the interest rate on loans used to finance solar modules, with the consumer's monthly payment equivalent to a 6% interest rate.

In order to jumpstart the program, LIPA gave away 30 free PV systems through a lottery. The systems have been installed, and 10 new applications have been received. Of these, six have been approved by the utility company while four are pending due to problems with the

interconnection of PV systems in Long Island Power Authority's territory on homes fed by residential underground distribution systems (RUDS). A technical solution seems likely. PV systems on homes with RUDS will require an isolation transformer between the inverter and the home loads and a disconnect switch at the outdoor pad-mounted transformer serving the home.

State of New York – Financial Incentives

Personal tax credit – There is a 25% tax credit ($3,750 maximum) for net metered PV systems up to 10 kW.

Green building credit – Tax credits are available for PV and fuel cells integrated into buildings. Credit amounts vary by technology.

Renewables loans – The Energy $mart Loan Fund for renewables and energy efficiency makes interest reductions on loans from participating lenders.

PV Rebate – Residential PV systems qualify for a rebate of $3/Watt.

R&D Grants – NYSERDA grants from $10,000 to $200,000 to fund up to 50% of a project's costs.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on New York's incentives.

RULES, REGULATIONS & POLICIES

State of New York – Regulatory Policies

Public benefit funds – NYSERDA administers the public benefits funds for renewables and weatherization.

Generation disclosure – Retail energy provides must disclose fuel mix information.

Net metering – Statewide, net metering is allowed for residential PV systems up to 10 kW, and standardized interconnection rules are in place.

Solar access – Property owners can create solar easements, and local zoning boards can create rules regarding solar access.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on New York's incentives.

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Chapel Hill

COMMUNITY INVESTMENT & AWARENESS

Education & Awareness

In the fall of 2000, Chapel Hill became a local partner under North Carolina's commitment to the Million Solar Roofs Initiative (MSRI). The Town hopes to facilitate the installation of 500 systems by 2010. To assist with the planning efforts, Chapel Hill has committed local funds to hire a program coordinator and has appointed a steering committee for the MSRI program. The Town's MSRI Steering Committee, consisting of approximately 20 Town Council appointees from across Orange County, held it first official meeting in December 2000.

Neighboring Durham/Durham County has also joined North Carolina's MSRI efforts, launching its program on November 18, 2000 with a consumer-oriented seminar on solar technologies. Other communities in North Carolina with MSRI programs include Guilford County (Greensboro) and Watauga County (Boone).

Renewable Energy Project

The Town of Chapel Hill has installed a 3.5-kW grid-connected PV system on the roof of the Hargraves Recreation Center. The project was made possible by coordinated efforts of the Chapel Hill Public Works Department, the Town Council, and the North Carolina Solar Center (NCSC). The Town received the PV modules at a greatly reduced cost as one of six projects facilitated by the NCSC under the Virginia Alliance for Solar Electricity (VASE) program.

FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of North Carolina – Financial Incentives

Corporate and personal tax credit – A 35% tax credit is available for all renewable energy systems, with maximum limits varying by technology and sector.

Property tax exemption – This exemption allows for active solar heating and cooling systems to be assessed at not more than the value of a conventional system for the purposes of property taxation.

Industrial recruitment – A corporate income tax credit is available to manufacturers of PV systems. The credit is equal to 25% of the installation and equipment costs of construction.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on North Carolina's incentives.

RULES, REGULATIONS & POLICIES

Construction & Design

Energy Conservation Requirements for Town Buildings

The Town of Chapel Hill's energy conservation ordinance requires that any town-owned buildings must be designed to achieve a goal of using at least 30% less energy than required by the North Carolina State Building Codes (1997). Furthermore, the code lists energy saving features that include solar water heating, daylighting, passive solar design, and natural cooling that must be considered for new town buildings and major renovations of existing buildings. For those features not incorporated, design documents must explain why the feature was omitted from the design.

In order to be selected to design a Town building, an architect has to demonstrate that the architectural firm has previously designed a building using some or all of the energy efficiency and renewable energy techniques listed in the ordinance. For major construction projects or substantial renovations of existing buildings, the architect or the staff project manager must monitor the energy performance of the building and assist the staff in optimizing energy use of the building during the first year. Twelve (12) months after completion of the project, the architect must prepare a written report on the energy consumption performance of the building and present the findings to the Town Council. This ordinance can be found in Appendix B.

Interconnection & Net Metering

Investor-owned Duke Power has a pilot program which allows interconnection of PV systems up to 10 kW, but these systems are not net metered.

The State of North Carolina does not have rules, regulations, or policies promoting renewable energy at this time.

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Guilford County

COMMUNITY INVESTMENT & AWARENESS

Education & Assistance

Guilford Solar Communities Program

With two of the state's largest cities (Greensboro and High Point), Guilford County has sponsored numerous conferences, workshops, seminars, tours and training sessions over the past 20 years to help educate both its citizens and professional on the value of solar energy. The County is also a local partner under North Carolina's commitment to the Million Solar Roofs Initiative. The Guilford Solar Communities Program is coordinated and chaired by the Guilford County Office of the N.C. Cooperative Extension Service. Here's a look at some of their activities:

- Sponsored consumer and professional training workshops on solar home building, photovoltaics, and solar water heating. Each workshop has drawn about 150 participants;
- Presented an exhibit for builders and the public on solar applications;
- Established a permanent solar resource center at Greensboro's downtown public library; and
- Sponsored renewable energy poster and essay contests for Guilford County elementary school children in 2000. Savings bonds were awarded to the top three posters and top three essays in each grade. Awards were presented at an Earth Day 2000 celebration.

In February 2001, Guilford County, together with the North Carolina Solar Center and North Carolina Agricultural and Technical State University (NC A&T) will present *The Solar Connection* Seminar and Tour. The seminar will cover a variety of topics—from solar water heating and PV to landscaping and green building products. Participants will also tour NC A&T's solar installations (described below).

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Renewable Energy Projects

NC A&T is conducting a manufactured housing comparison study to demonstrate the benefits of energy efficiency and solar technologies. One home features energy efficient materials and products as well as a solar hot water system designed to meet more than 60% of the hot water

needs of a family of four. A second home contains Department of Housing and Urban Development-code standard technologies. Data is being collected to show the relative energy use and cost savings of the two manufactured homes.

NC A&T also has also worked with the Greensboro Housing Authority (GHA) and the North Carolina Solar Center to install a 2.5-kW PV system in a GHA multifamily residential unit to demonstrate a thin-film photovoltaic technology. The system is grid-connected to Duke Power.

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FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of North Carolina – Financial Incentives

Corporate and personal tax credit – A 35% tax credit is available for all renewable energy systems, with maximum limits varying by technology and sector.

Property tax exemption – This exemption allows for active solar heating and cooling systems to be assessed at not more than the value of a conventional system for the purposes of property taxation.

Industrial Recruitment – A corporate income tax credit is available to manufacturers of PV systems. The credit is equal to 25% of the installation and equipment costs of construction.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on North Carolina's incentives.

RULES, REGULATIONS & POLICIES

Interconnection & Net Metering

Investor-owned Duke Power has a pilot program which allows interconnection of PV systems up to 10 kW, but these systems are not net metered.

The State of North Carolina does not have rules, regulations, or policies promoting renewable energy at this time.

Bowling Green

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Bowling Green Municipal Utility – Green Power Rate

Ohio's first green pricing program is being offered to the 13,000+ residential, commercial, and industrial customers of the Bowling Green Municipal Utility (BGMU). Based initially on hydro, the rate may potentially include local wind and photovoltaic resources.

Since August 2000, 3% (352) of Bowling Green customers have opted to pay a monthly premium for green power at 1.35¢/kWh for 100% renewable electricity; 1.04¢/kWh for 75%; 0.69¢/kWh for 50%; and, 0.35¢/kWh for 25% or a flat monthly contribution toward the development of local sustainable energy resources. The program is promoted through bill inserts, and participants receive a window cling to demonstrate their support for the program. In a survey conducted by the utility, about 500 of the city's customers expressed interest in participating in the program.

Power for the program is supplied from the newly constructed 42-MW, municipally-owned Belleville hydro plant of which Bowling Green owns a 6 MW share. The city will use the additional funds collected from customers to construct new solar or wind resources. In November 2000, a 1-kW photovoltaic system at Kenwood Elementary School was the first installation. The system is grid-connected and net metered.

FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Ohio – Financial Incentives

Sales, Property, and Corporate tax exemptions – Renewables such as solar, wind, biomass, and alternative fuels exempt from sales and property taxes and franchise taxes where applicable.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Ohio's incentives.

RULES, REGULATIONS & POLICIES

Net Metering & Interconnection Standards

BGMU offers net metering. A standard interconnect permit is available for wind, solar, hydro, fuel cell installations and micro generators up to 25 kW. Larger installations have site-specific requirements.

State of Ohio – Regulatory Policies
Public benefit funds – Public benefit funds totaling $100 million to be collected over ten years for renewable energy, low income, and weatherization programs.
Disclosure – Retail energy providers must disclose fuel mix and emissions information.
Net metering – Statewide, net metering is allowed for all renewable and fuel cell systems with no restriction on system size. Standardized interconnection rules are in place.
Solar access – Property owners can create solar easements.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Ohio's incentives.

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Westerville

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Projects

Westerville Electric, the city's municipal utility, has created several partnerships and committed to deployment of solar electric systems in a number of applications. In partnership with the school district, it is developing educational materials and posting information on the Internet. Westerville Electric has also been active in working with the both the city government and the traffic division to deploy solar electric technologies as a practical solution to emergency power needs after natural disasters and power for traffic signals. In October 2000, as a result of these efforts, the City of Westerville Electric Division received the *Development of a Solar Community Award* from the Solar Electric Power Association (formerly UPVG).

Longfellow Elementary School, a magnet school with a science curriculum, is home to Westerville's first city/school district solar project. The 1-kW solar panel array was dedicated on April 7, 2000. The system provides enough electricity to light one room in the school.

Education & Assistance

As part of the Longfellow Elementary School project, a monitoring device was connected to the output of the solar panel inverter. The device provides tabular and graphical data of the solar panels' performance which can be used in the computer lab for use in various energy-related lesson plans. This project was made possible by a grant from the Foundation for Environmental Education. In conjunction with the Foundation, the city and school district hope to have similar solar power projects installed at all Westerville city schools.

Green Pricing

Westerville Electric is considering implementing a green pricing program as a source of funding for future projects. As a first step, Westerville Electric Division is working with the Westerville South High School Marketing Class to develop a marketing strategy for a Green Power Program for the utility's customers. The marketing class will be surveying Westerville residents and business owners during the 2000-2001 school year to determine whether customers would voluntarily pay a green pricing premium to add solar power to Westerville's energy portfolio. Funds generated from the proposed program would be dedicated entirely to solar projects for schools and other public buildings.

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FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Ohio – Financial Incentives

Sales, Property, and Corporate tax exemptions – Renewables such as solar, wind, biomass, and alternative fuels exempt from sales and property taxes and franchise taxes where applicable.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Ohio's incentives.

RULES, REGULATIONS & POLICIES

State of Ohio – Regulatory Policies

Public benefit funds – Public benefit funds totaling $100 million to be collected over ten years for renewable energy, low income, and weatherization programs.

Disclosure – Retail energy providers must disclose fuel mix and emissions information.

Net metering – Statewide, net metering is allowed for all renewable and fuel cell systems with no restriction on system size. Standardized interconnection rules are in place.

Solar access – Property owners can create solar easements.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Ohio's incentives.

Ashland

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Solar Pioneer Program

Ashland's *Solar Pioneer Program* is a result of a unique partnership that combined the efforts and the financial resources of a number of organizations, both public and private, and more than 260 Ashland citizens and businesses to bring solar power to Ashland. The 30-kilowatt project, divided among three key sites in downtown Ashland, is the largest grid-connected solar electric generation system located in the Northwest to date.

The installations were funded by the Bonneville Environmental Foundation (BEF), Avista Energy, the State of Oregon Office of Energy, local institutional partners, and voluntary contributions from the community. The Oregon Shakespeare Festival and Southern Oregon University contributed $15,000 each and are the "hosts" for 5-kW PV systems. The largest system of the project, at 20 kW, is located at the Ashland Civic Center and includes an interactive informational kiosk. The dedication ceremony took place on July 28, 2000.

The system will produce enough energy to fully power the Ashland police station, parts of Southern Oregon University, and the Oregon Shakespearean Festival. Surplus energy will flow into the Ashland electric grid.

In June 1999, the City of Ashland launched a green investment pilot program to support the *Solar Pioneer Program*. Interested customers of Ashland Electric make a two-year commitment to contribute $4 per month to support the solar projects. This surcharge will be used to reimburse the Festival and the University for solar generated electricity at 25¢/kWh, until their investment is fully recouped. The city needs to generate $30,000. By the end of 2000, the green investment program had garnered $27,000 in pledges.

Ashland is considering a second phase of the project inviting residents and businesses to take part as well, either as host sites or as purchasers of blocks of City solar power, or both. Community interest is high, and some residents have already expressed their willingness to sign up for Phase II service. In this second phase, the City would market solar power and systems directly to the Ashland public through its municipal electric department.

FINANCIAL INCENTIVES

Rebate & Loan Programs

Ashland Electric Utilities Department - "The Bright Way to Heat Water"

The City of Ashland's Electric Utilities Department offers a solar water heating program to its residential customers who are currently using an electric water heater. Under *The Bright Way to Heat Water* Program, cash rebates are available for approved systems. The rebate amount varies depending on a system's energy savings. Qualified home owners may take advantage of the City's zero-interest loan program in place of the cash rebate. Interested customers are provided with a qualified contractor list, a consumer educational guide, and information about available solar systems. Participation has been minimal—less than 20 systems have been installed under the program during the past four years. According to utility officials, solar hot water systems are being installed primarily in new construction, not as replacements for electric water heaters. In addition, most homes use natural gas rather than electricity for heating, making those customers ineligible for the program.

State of Oregon – Financial Incentives

Business Energy Tax Credit (BETC) – This is a 35% tax credit up to $10 million for renewable energy and recycling projects.

Small Scale Energy Loan Program (SELP) – This program makes loans of $20k up to $20 million for residential, commercial, and public sector energy projects.

Remote Water Pumping Rebate Program – For PV powered remote water pumping systems, the Oregon Energy Office offers tech assistance, $100 rebate, and 35% tax credit.

Property tax exemption – Renewables do not add to assessed property value for tax purposes.

Utility Independent Home Rebate Program – This is a $2,000 rebate for off-grid PV.

Residential energy tax credit – Tax credits up to $1,500 are allowed for residential renewable systems, as well as energy efficient appliances and duct work.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Oregon's incentives.

RULES, REGULATIONS & POLICIES

Solar Access

Solar Setback Standards

The City of Ashland has been promoting the use of solar energy since 1981, when it passed one of the first citywide access protection ordinances in the United States. This ordinance contains solar setback provisions designed to insure that shadows at the north property line do not exceed a certain height, depending on the zone in which the property is located.

Solar Access Permit

Property owners can apply for a Solar Access Permit for protection of shading by vegetation only. Shading by buildings is protected by the solar setback provision.

Ashland's solar access rules can be found in Appendix A.

Net Metering

In 1996, a net metering law was passed which established a simple grid interconnection policy. It encourages solar systems by allowing net metering and committing the City to purchase, at full retail price, up to 1,000 kWs of excess electricity per month from small wind or solar generation resources.

Construction and Design

Performance Standards Options

Developers are permitted to increase the base density of residential units by incorporating energy efficiency, architectural creativity and innovation, and the use the natural features of the landscape. Density may be increased—up to a maximum of 15%—based on bonus points earned for meeting energy usage, water usage, and air quality guidelines. Conservation features include renewable energy options. This program is voluntary.

State of Oregon – Regulatory Policies
Disclosure – Retail energy providers must disclose fuel mix and emissions information.
Net metering – Solar, wind, biomass, and fuel cell systems up to 25 kW are eligible. Simplified interconnection rules have been established by most of the state's utilities.
Solar and wind access – state law allows municipalities to establish solar and wind access laws.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Oregon's incentives.

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Eugene

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Eugene Water & Electric Board – Windpower

In April 1999 Eugene Water & Electric Board (EWEB) launched a green pricing *Windpower* program, selling power from the Foote Creek Rim Wind Project to its customers. This wind farm, which is also known as the Wyoming Wind Project, consists of 69 wind turbines that generate a total capacity of 41.4 MW. EWEB owns a little more than 8 MW, or 21%, of this total, while PacifiCorp owns the remaining 33 MW. EWEB plans to sell about 2 megawatts to Bonneville Power Administration, reserving the remaining 6 MW for its customers.

Under the *EWEB Windpower* program, residential customers can choose from four options. They can designate the following percentages of their monthly electricity bill for *Windpower*:

- 10%, or 4.615¢ per kWh
- 25%, or 5.012¢ per kWh
- 50%, or 5.672¢ per kWh
- 100%, or 6.993¢ per kWh

As a basis for comparison, the rate for non-participants (0% *Windpower*) is 4.351¢ per kWh.

Small and medium-sized businesses also have these four options, though the rates differ slightly. Large commercial customers, on the other hand, can only purchase power in 1,000-kW blocks for $29.00/month.

EWEB initially promoted the program through a low-key marketing campaign -- small newspaper advertisements and bill inserts. The utility's goal is to achieve 100% subscription for the program within two years, eventually signing up nearly 70% of all their customers. However, as participation has dropped slightly (currently 2500), EWEB is preparing for a more aggressive marketing campaign which includes another direct mailing and training of customer service personnel to promote the program when new residents call to sign up for service. This strategy is particularly important in this college town where one-third of the electric service customers changes each year.

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Renewable Energy Projects

Fuel Cell Demonstration

Emerald People's Utility District (EPUD) is sponsoring a demonstration of a five-kilowatt fuel cell, connected to an all-electric house. Northwest Power Systems and Bonneville Power Administration will operate their fully-integrated Proton Exchange Membrane Fuel Cell to meet the electrical needs of this home. The house will be disconnected from the electricity grid and hooked directly to the three-cubic-foot fuel cell. This particular fuel cell uses a mixture of methanol and water as a fuel source. Emerald PUD anticipates fuel cells will soon be a cost-effective option to provide electricity to customers living away from the existing power grid.

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FINANCIAL INCENTIVES

Loan & Rebate Programs

Eugene Water & Electric Board - "The Bright Way To Heat Water"

Eugene Water & Electric Board (EWEB) offers its customers a loan and rebate program called *The Bright Way To Heat Water* ™. The program is designed to promote the replacement of electric water heaters in residences with solar units. It was begun in May 1990 as part of a demand-side management initiative, with the current types of loans and rebates offered since May 1995. To date, over 800 customers have installed solar water heaters under this program, receiving both the loan and rebate.

EWEB provides all funding for both loans and cash discounts. Customers can apply for loans of up to $4,000. Borrowers pay 0% interest and can adopt a repayment period of up to sixty months. The loan must be approved by EWEB before installation of the system, while loan payments begin after the utility has fully inspected the solar water heater. The rebates usually range from $400 to $600. Solar water heating systems with the best energy savings qualify for the higher discount amounts. The cash discount is paid directly to the contractor by EWEB after the system has passed final inspection.

Customers can also apply to the State of Oregon for an individual income tax credit of up to $1,500 for each installed solar water heater. The amount of each tax credit will be based on the estimated annual energy saved by each system. The tax credits are available through December 31, 2001. EWEB provides customers with a System Information Chart that

calculates the range of tax credit amounts applicable to each size and type of system. The utility also gives directions on where to find more information.

The Bright Way program is promoted through radio and newspaper advertisements, in the telephone yellow pages, at special events, and by messages printed directly on utility bills. The utility bill messages have been the most successful.

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Emerald People's Utility District – Solar Water Heater Program

The Emerald People's Utility District, which serves over 17,000 customers in its rural 550-square-mile service district, started its *Solar Water Heater Program* in 1997. All EPUD residential customers with electric hot water heaters are eligible for the program. Participants are automatically eligible for a cash incentive, or grant. They also have the option of applying for a zero-interest loan.

To be eligible for the grant, participants must select a contractor approved by EPUD for the *Solar Water Heater Program*. The contractor first evaluates the site for solar access capability and gives the customer information on the program, a loan application, and an Oregon State Tax Credit form. Then, after choosing a system and installer, the customer must fill out the necessary paperwork and send it to EPUD via the contractor for approval. Once EPUD has notified the customer of contract approval, usually within fifteen days, the solar water heater can be installed. Finally, an EPUD representative inspects the installed system.

The grant budget is approximately $18,000 per year. EPUD itself provides full funding for the cash incentives. Each participant receives a one-time grant of between $400 and $600 per solar water heater. The amount of the incentive depends on the size of the unit and how much energy it saves. So far, about $35,000 in grants have been awarded under this program.

Participating customers are given the option of applying for a one-time loan when they fill out the paperwork for their installation contract. They can borrow up to $2,500 at 0% interest to cover any costs not handled by the cash incentive, ranging from $400 to $600. The repayment period is three years (36 months) for loans of $1,500 or less, and up to five years (60 months) for loans of $1,500 to $2,500. EPUD screens potential loan recipients and notifies them within fifteen days if their applications are approved. The utility is the sole provider of funding for these loans, with no participation from banks. EPUD maintains a

budget of $75,000 per year for its customer loans. To date, about $110,000 in loans have been awarded to *Solar Water Heater Program* participants.

The EPUD Solar Water Heater Program has approximately 60 participants so far. The program is promoted at home shows, through radio spots and newspaper advertisements, and on monthly utility bills. EPUD plans to approve the installation of an average of 30 solar water heating units per year.

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State of Oregon – Financial Incentives

Business Energy Tax Credit (BETC) – This is a 35% tax credit up to $10 million for renewable energy and recycling projects.

Small Scale Energy Loan Program (SELP) – This program makes loans of $20k up to $20 million for residential, commercial, and public sector energy projects.

Remote Water Pumping Rebate Program – For PV powered remote water pumping systems, the Oregon Energy Office offers tech assistance, $100 rebate, and 35% tax credit.

Property tax exemption – Renewables do not add to assessed property value for tax purposes.

Utility Independent Home Rebate Program – This is a $2,000 rebate for off-grid PV.

Residential energy tax credit – Tax credits up to $1,500 are allowed for residential renewable systems, as well as energy efficient appliances and duct work.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Oregon's incentives.

RULES, REGULATIONS & POLICIES

Solar Access

Solar Setback Standards

Eugene's solar setback standards are designed to promote the use of solar energy and to minimize shading of buildings by other buildings. The solar setback standards apply to an application for a building permit for all buildings on lots located in certain zoning districts. Developers must essentially maintain access to solar energy for neighboring lots when they build. A solar site plan is required in order to get a building permit. This ordinance is currently being fought by local builders, developers, and some of the city building department staff as being too complex and restrictive.

Solar Access Guarantee

Owners, or potential owners, of solar energy systems in Eugene can apply for a "Solar Access Guarantee" which protects a solar energy system or proposed buildable area from the shade cast by new vegetation planted on other lots, no matter what the zoning district. The Solar Access Guarantee defines height limitations for such new vegetation. The protection from shade afforded by a Solar Access Guarantee may not exceed that afforded by the applicable Solar Setback Standards.

State of Oregon – Regulatory Policies

Disclosure – Retail energy providers must disclose fuel mix and emissions information.

Net metering – Solar, wind, biomass, and fuel cell systems up to 25 kW are eligible. Simplified interconnection rules have been established by most of the state's utilities.

Solar and wind access – state law allows municipalities to establish solar and wind access laws.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Oregon's incentives.

Portland

COMMUNITY INVESTMENT & AWARENESS

Green Power Purchasing

In 1995, prior to deregulation of the electric market in Oregon, the City of Portland signed an innovative five-year contract with Portland General Electric (PGE) that allowed direct purchase of renewable resources. The contract allowed the City to take advantage of wholesale rates for a 10 MW minimum purchase and to designate 5% of that purchase to be from wind power. The result is a substantial cut in costs for 95% of the purchase, and a City-paid premium for the 5% of renewables. The overall result was a net savings of $300,000 per year. Portland will return a portion of the savings to ratepayers and use the remainder to fund new renewable energy projects. This project is part of the city's broader effort to establish 400 average megawatts of new renewable resources by 2010, a goal set in its 1993 CO_2 reduction strategy to lower the city's impact on global climate change.

Portland continues its commitment to green power. Just before Earth Day 2000, the City entered into agreements with both Portland General Electric and Pacific Power to purchase renewable energy through green pricing programs. The City committed to buy $30,000 worth of renewable energy (over 600,000 kWh/year). These purchases were made by the City's Office of Transportation, Water Bureau, and Bureau of Environmental Services. In addition, the Energy Office is promoting green power purchases to other City bureaus, local businesses, and other institutions in order to promote the further development of wind, solar, and geothermal power.

Renewable Energy Projects

Waste Methane-Powered Fuel Cell

In July 1999, the City of Portland's Bureau of Environmental Services officially unveiled a waste methane-powered fuel cell at the Columbia Boulevard Wastewater Treatment Plant. The 200-kW fuel cell is one of only a handful of fuel cells operating on a renewable fuel. It is producing more than a million kilowatt-hours a year. This is enough energy to power nearly 100 homes and will save the City about $50,000 a year. Funding to make this project possible was obtained through federal and state grants, a state tax credit, and a rebate of $247,000 from Portland General Electric. Additional financing was provided by Western Bank, a subsidiary of Washington Mutual Saving Bank.

Education & Assistance

Green Building Initiative

Portland's Energy Office provides green building-related technical resources and outreach activities to facilitate the design and construction of healthy, ecologically sensitive, and resource-efficient buildings and surrounding landscapes. The voluntary design & construction guidelines include a number of renewable energy technologies. The City is also planning at least four innovative demonstration green buildings in Portland, including two

City fire stations, a large private development, and an affordable housing development. Renewable power—on site and outside purchases—will be encouraged.

FINANCIAL INCENTIVES

Proposed Green Builder Grant Program

As part of the Green Building Initiative, the City hopes to offer "top of the stack" processing for green building projects. In addition, the City is planning to develop financial incentives for developers and builders who build green, including a performance-based grant program to fund innovative building practices. A fee may be charged to non-green builders to fund the proposed incentive. The final details on these incentives should be determined by early 2001.

State of Oregon – Financial Incentives

Business Energy Tax Credit (BETC) – This is a 35% tax credit up to $10 million for renewable energy and recycling projects.

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Visit www.ncsc.ncsu.edu/dsire.htm for more info on Oregon's incentives.

RULES, REGULATIONS & POLICIES

Solar Access

Solar Access Permit

A property owner may submit an application for a solar access permit to protect solar access to a new or existing solar energy system located on the owner's real property. The permit is used to restrict the shade cast by certain types of vegetation on neighboring properties.

Subdivision Requirements

At least 80% of the lots must comply with one or more of the solar access design options provided—a basic site orientation for solar access, use of a solar building line to protect solar access, and/or a performance option in which a specific percentage of the building's south wall is protected from shade.

Construction & Design

Green Building Initiative

The City is developing a green building policy and ordinances for the City of Portland and a resolution addressing voluntary guidelines for private developments. The Green Building Initiative's voluntary design and construction guidelines include orientation for passive solar and daylighting opportunities, and use of PV, solar hot water, fuel cells, natural cooling, and wind.

Energy Management

Global Warming Local Action Plan

The City is updating its Energy Policy and CO_2 Emission Reduction Strategy. In early 2001 a Global Warming Local Action plan will be unveiled combining elements of both prior policies. Included in an early draft of this plan is a goal to deploy 170 megawatts of new renewable energy resources by 2010.

State of Oregon – Regulatory Policies

Disclosure – Retail energy providers must disclose fuel mix and emissions information.

Net metering – Solar, wind, biomass, and fuel cell systems up to 25 kW are eligible. Simplified interconnection rules have been established by most of the state's utilities.

Solar and wind access – state law allows municipalities to establish solar and wind access laws.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Oregon's incentives.

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Philadelphia

COMMUNITY INVESTMENT & AWARENESS

Education & Assistance

The Philadelphia Million Solar Roofs (PMSR) Community Partnership is a collaborative of local organizations and small businesses committed to helping the five-county region of Southeastern Pennsylvania install over 500 new solar energy systems by 2010. Community partners include local energy providers, utilities, solar energy system designers, installers, local government representatives, and community based energy experts. The PMSR Community Partnership provides informational and technical resources for an individual or businesses that are considering solar power. The Energy Coordinating Agency of Philadelphia is the regional host for the PMSR Partnership. Here's a look at some of their activities:

- A dedicated web site has been established to provide information on design and installation, regional solar service providers, financing, interconnection & net metering, zoning & building code issues, and other resources. See www.phillysolar.org;
- The *Solar Services Guide for Southeastern Pennsylvania* has been published and is distributed, along with other promotional materials, to PMSR partners, environmental organizations and consumers upon request;
- PMSR representatives have met with the City of Philadelphia's Department of Licenses and Inspections to share concerns about building and electrical codes issues that are potentially restrictive to solar system installations. The PMSR Partnership will continue to advocate for the standardization of local code and zoning procedures that impact solar installations;
- The PMSR Community Partnership is working with area educational institutions to develop and adopt solar energy curricula; and
- The PMSR Community Partnership has developed recommended minimum standards for solar installer certification.

Renewable Energy Projects

Solar on Schools

Conectiv Energy and the Clean Air Council, both PSMR Partners, are working together to offer solar rooftop systems to 25 schools in the Philadelphia area. This is the first program of its kind in Pennsylvania. The Clean Air Council (www.cleanair.org) is a nonprofit environmental organization dedicated to protecting Pennsylvanians' right to clean air. Conectiv Energy (www.conectiv.com) is an electricity and natural gas provider serving 70,000 homes and businesses in the Mid-Atlantic region.

The 2-kW systems will be installed and maintained by Conectiv at no cost to the schools. In return, each participating school will purchase the remainder of its electricity from Conectiv Energy's Nature Power Program, which provides electricity from renewable resources. Conectiv also will provide a solar energy curriculum and advanced metering equipment that will send energy data to Internet-based displays in the classroom. The Clean Air Council will help with the outreach and marketing of the project to schools.

FINANCIAL INCENTIVES

Loan and Grant Programs

Sustainable Development Fund (SDF) Solar/Energy Star® Consumer Loan Program

The PMSR Partnership is working with the Sustainable Development Fund (www.trfund.com/sdf) to make more solar financing options available. Options will include financing for the purchase and installation of PV, solar hot water systems and other cleaner energy systems, as well as energy conservation/efficiency upgrades to existing and newly constructed residences and small commercial buildings.

The Sustainable Development Fund (SDF) was created by the Pennsylvania Public Utility Commission in its final order in the PECO Energy electric utility restructuring proceeding. The fund's purpose is to promote renewable energy, advanced clean energy technologies, energy conservation, and energy efficiency. The SDF is funded out of the distribution rates paid by all ratepayers. The amount collected is 1/200 of a cent per kilowatt hour. SDF will receive additional funding as a result of the PECO Energy/Unicom merger settlement—$15 million to help develop wind energy and $4 million to install photovoltaic roof-top facilities.

Sustainable Development Fund Grants

The SDF offers Sustainable Energy Business Planning Grants and Sustainable Energy Business Start-Up Grants to businesses located in the PECO Energy territory that design, manufacture, sell, install, operate or service renewable energy or energy efficiency products, technologies or services. In addition, Green Building Design Grants are available to architectural firms, engineering firms, building developers and building owners that are committed to designing and building green buildings in the PECO Energy service territory.

Sustainable Development Fund Energy Loans

The SDF provides financial assistance for the following types of projects in the form of commercial loans, subordinated debt, royalty financing, and equity financing:

- Companies and ventures that generate electricity using renewable energy sources;
- Manufacturers, distributors and installers of renewable energy, advanced clean energy and energy-conserving products and technologies; and
- Companies and organizations that are end-users of renewable energy, advanced clean energy and energy-conserving products and technologies.

AFC First Energy Loan Program

AFC First Financial Corporation (www.afcfirst.com) has extended their current energy loan program to include solar PV and solar hot water system installations.

HUD Title I Loans

Philadelphia Redevelopment Authority's PHIL Loan Program offers 3%, 6%, & 9% home improvement loans for solar installations. These loans are available through PNC, First Union, and Mellon Bank.

State of Pennsylvania – Financial Incentives

Alternative Fuels Incentive Grant Fund (AFIG) – This program for residential, commercial and public entities provides grants up to 20% of project cost for AFVs.

Solar for low-income – Under the state's restructuring law, three of the state's distribution utilities established PV and solar hot water sales programs for low income customers.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Pennsylvania's incentives.

RULES, REGULATIONS & POLICIES

Net Metering

PECO Energy, an investor owned utility, serves Southeastern Pennsylvania. PECO offers allows net metering to all qualified renewable generation (solar, wind, hydro, biomass, and methane gas), as well as fuel cell generation.

State of Pennsylvania – Regulatory Policies

Public benefits funds – Each of the state's four major distribution utilities collect and administer their own funds for renewables, low income, and weatherization per individual settlements with the utilities commission.

Net metering – renewable and fuel cell systems up to 10 kW are eligible. All customer classes apply. Net excess generation at the end of the month is granted to the utility.

Disclosure – Utilities must disclose fuel mix information, but emissions info not disclosed.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Pennsylvania's incentives.

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Block Island

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Projects

Block Island, located about 10 miles off the cost of mainland Rhode Island, is home to about 1,000 year-round residents and the destination of another 10,000 energy-consuming, summer-time tourists. Residents pay one of the highest electricity rates on the East Coast and about three times as much as is charged on the mainland during summer peak season. Block Island Power Company (BIPCO), an investor-owned utility, supplies power to the community using a fleet of diesel generators.

Block Island received a grant from the Department of Energy's State Energy Program to install cost-effective photovoltaic, solar hot water, and wind systems on the Island. The Block Island Renewable Energy Grant (BIREG) has funded 60 renewable energy projects, and is now starting a waiting list in case additional funds become available. The program was promoted through a number of seminars and vendor information days, advertising, mailings and technical assistance provided by ENTECH. All projects must be installed by June 30, 2001.

The majority of the projects are residential. Twenty-six projects are solar hot water, 35 are solar electric, and eight are wind. (Some projects are hybrids of a combination of these technologies, which is why the individual count by technology is higher than the total project count). Most of the PV systems are grid-connected and net metered. The largest project installed is a 6-kW solar electric project by the United States Postal Service. The Block Island School will soon be home to a 2-kW PV array with battery back-up that will power the school's computer network.

FINANCIAL INCENTIVES

Loan and Rebate Programs

During the development of BIREG, ENTECH Engineering (administrators of BIREG), developed several financing programs including:

- Washington Trust home equity loans at 1/2% below normal rates;
- Loans from the Rhode Island Mortgage and Financing Corporation, who offered the Home Repair Equity Loan at 4.75 % APR for incomes under $32,881; and
- Energy Saver Home Equity Loans for homeowners, offering 7.99% APR financing for incomes under $63,000.

Through BIREG, residents, businesses, and the municipality are eligible for a rebate of up to 25% of equipment and labor costs for renewable energy system installations. Homeowners who install their own systems are eligible to receive a rebate of 35% of material costs provided they are qualified installers. Determination of qualifications is made on a case-by-case basis by BIREG administrators.

These local incentives, combined with a 25% state tax credit, no state sales tax, no increased appraisal value for property tax purposes and high energy costs, make installations of solar energy systems on Block Island highly cost-effective.

State of Rhode Island – Financial Incentives
Grant program – Grants are available for PV systems on residential, school, and public buildings through the Rhode Island Renewable Energy Collaborative.
Corporate and personal tax credit – Tax credits of 20% of the system costs are available for wind energy and certain solar systems. The credit will be 15% in 2002; 10% in 2003; and 5% in 2004.
Property tax exemption – For purposes of local property tax assessment, wind and certain solar energy systems are not assessed at more than the value of a conventional system.
Sales tax refund – A refund on sales tax is available for wind and certain solar energy systems.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Rhode Island's incentives.

RULES, REGULATIONS & POLICIES

Net Metering

BIPCO has agreed to formalize a net metering agreement with the Public Utilities Commission. In six months, the utility will provide a cost-benefit analysis on the deployment of renewables in the community. The criteria used in the analysis are subject to review and approval by the Block Island Sustainability Coalition.

Construction & Design

Inspections

To be eligible for the BIREG rebate, an inspection by BIREG is required. Once the system has been tested and certified, a rebate check is issued.

Proposed Building Code Requirement

The Block Island Sustainability Coalition is hoping to introduce an ordinance to require new homes or homes undergoing major renovation on the Island to be pre-plumbed/pre-wired for solar energy systems. This will substantially lower the cost of installing solar energy systems in the future.

State of Rhode Island – Regulatory Policies

Solar access – Property owners may create binding solar easements.

Net metering – All renewables are eligible for net metering. Net excess generation is purchased at the utility's avoided cost. The maximum allowable capacity depends on the utility.

Contractor licensing – Rhode Island has a specific solar contractor license.

Public benefit funds – The charge is $0.0023 per kWh for a minimum of five years. Funds raised through the charge have primarily supported existing demand-side management programs.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Rhode Island's incentives.

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Austin

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Austin Energy – GreenChoice

Among the most ambitious utility green pricing efforts to date, Austin Energy kicked off the new millennium by inviting its 350,000 customers to sign up for *GreenChoice*. Under the *GreenChoice* program, residential and business customers may opt to apply the fuel charge portion of their electric bill, plus a small premium, to obtain clean renewable energy. In addition, Austin Energy will match participants' subscriptions dollar-for-dollar. Just 10 months after officially launching its *GreenChoice* green pricing option, Austin Energy fully subscribed the initial 40 MW of wind and landfill-gas-generated electricity it will distribute through its system beginning in 2001. In total, more than 3,000 customers have signed up for the service. Unlike many other utility green pricing programs, business customers have committed to purchase a majority of the available power—nearly 85%.

In October 2000, the Austin City Council decided to expand Austin Energy's *GreenChoice* program by 56.7 MW through the purchase of additional wind energy. The utility will now supply nearly 100MW of new renewables to its customers with most of the energy coming from wind. The action allows Austin Energy to purchase up to $8 million of wind power a year over the 10-year term of the agreement. Through the expanded wind power purchase, Austin Energy expects to meet 53% of its projected load growth between 2000-2003 through new renewable energy sources and savings from energy efficiency. Other renewables being developed for the program include landfill gas recovery projects located in Austin, Houston, San Antonio and near Dallas.

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Green Pricing/Renewable Energy Projects

Austin Energy - Solar Explorer

Solar Explorer is a green pricing program created by Austin Energy to support photovoltaic installations on community facilities around Austin. All of Austin Energy's customers are eligible to participate in *Solar Explorer*. The program officially got off the ground in 1998 and is expected to operate for six years.

Approximately 1252 blocks of solar power have been sold to almost 1000 residents and businesses who pay a monthly premium of $3.50 per 50-watt block and make a two-year customer commitment. So far, these contributions have gone towards the construction of three grid-connected PV systems. One PV unit is located over the taxi waiting area at Austin's Bergstrom Airport, the second system is on covered parking at the Howson branch of the Austin Library, while the third is also at the Airport. Austin Energy and a Solar Electric Power Association (formerly UPVG) TEAM-UP grant cover the rest of the program's funding.

Solar Explorer was promoted to the public through bill inserts and direct mailings to environmental organizations. Participants receive several promotional perks when they sign up. These include a Solar Explorer membership card, a Solar Explorer T-shirt (first 640 members only), and a Solar Explorer decal for home, business, or vehicle.

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FINANCIAL INCENTIVES

Loan & Rebate Programs

Austin Energy – Home Energy Loans & Air Conditioning and Appliance Rebates

Austin Energy began the *Home Energy Loan* program in 1985 as a program that offered low-interest financing to customers to finance home energy efficiency Customers choose one of two loan options:

- a 5.99%interest Home Improvement Loan – 3, 5, 7, or 10 year repayment periods, and $6,000 maximum loan amount ($9,000 for duplexes); or
- a 7.99% interest Major Home Improvement Loan – 3, 5, 7, or 10 year repayment periods, and $9,000 maximum loan amount.

The *Home Energy Air Conditioning and Appliance Rebate* program offers customers a rebate on solar water heaters and energy-efficient equipment, such as heat pump water heaters, heat recovery water heaters, and package air conditioners and heat pumps. Funding for the rebates comes from Austin Energy's revenues.

For solar water heaters, there are three rebate options available to customers:

- 16 square foot collector area or less **–** $150;
- 16 to 35 square foot collector area **–** $250; and
- 36 square foot collector area or more **–** $350.

Austin Energy promotes both the *Home Energy Loan* and the *Home Energy Air Conditioning and Appliance Rebates* programs to the public through bill inserts, on billboards, and in advertisements for TV, newspapers, and magazines. The utility also publicizes the loans and rebates at presentations to neighborhood associations and businesses, and in literature distributed at home improvement shows and the Austin City Chamber of Commerce. Participating customers must choose to accept either the loan or the rebate, but not both.

State of Texas – Financial Incentives

Property tax exemption – Solar and wind systems do not add to assessed property value for tax purposes.

Corporate deduction – Corporations can deduct 100% of the cost of a solar energy system from the state franchise tax.

Manufacturer incentive – Texas exempts solar manufacturers from the state franchise tax.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Texas's incentives.

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RULES, REGULATIONS & POLICIES

Net Metering & Interconnection

Austin Energy will allow customer meters to run forward and backward. Before interconnection can take place, Austin Energy must review the project specifications. PV systems must be in compliance with the National Electrical Code and IEEE 929. As the last step before interconnection, Austin Energy performs an inspection of the system and performs an anti-islanding test.

State of Texas – Regulatory Policies

Renewable portfolio standard – 2880 MW of renewables must be installed by 2008; interim mark is 1,280 MW by 2003.

Net metering – All renewable technologies up to 50 kW are eligible for net metering. All customer classes can net meter.

State building requirements – state agencies must compare the cost of providing energy to new buildings from alternative energy sources.

Equipment certification – To be eligible for sales tax exemptions, solar collectors must be certified by the Solar Rating & Certification Corporation or the Air Conditioning & Refrigeration Institute.

Disclosure – Retail energy providers must disclose information on fuel mix, environmental impacts, water consumed in producing power.

Line extension – Electric utilities must provide information on renewable energy alternatives to customers requesting a line extension.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Texas's incentives.

San Antonio

COMMUNITY INVESTMENT & AWARENESS

Education & Assistance

Solar San Antonio, Inc.

Solar San Antonio is a nonprofit advocacy group sponsored by City Public Service, San Antonio's municipal utility. Initiated in July of 1999, Solar San Antonio is working with a variety of stakeholders to educate citizens and local governments in an effort to advance sustainable and renewable energy technologies. Here's a look at some of their activities:

- Organized a regional alternative energy symposium in San Antonio on February 25th, 2000. It featured recognized experts in the field of renewable energy and drew 130 citizens, civic leaders, and guests;
- Held a Green Building symposium on September 22, 2000 for architects, builders, developers and government officials. The Symposium was sponsored by the U.S. Department of Housing and Urban Development, the City of San Antonio, Bexar County, San Antonio City Public Service and ICF Counseling;
- Held a charette to propose designs incorporating green building and renewable energy technologies for one new building and one retrofit project for the City of San Antonio;
- Worked with a local community college to develop a training course for solar installers. There is currently no state solar contractor license requirement;
- Organized a seminar for local builders and bankers to educate them about a new Fannie Mae and Freddie Mac lending policy for energy efficient homes. The seminar was co-sponsored by Fannie Mae and Freddie Mac; and
- Worked with the City's housing agency to incorporate solar hot water systems into its new 25-home construction project.

Renewable Energy Projects

City Public Service – Solar Customer Service Center

CPS is in the process of retrofitting a building to house its new customer service center -- one that will be a showcase for renewable and energy efficient technologies. It will be aptly named "Solar Serve." The nearly $7 million plan calls for PV and water-heating solar panels, natural gas air conditioners, and other green building elements. Solar Serve is being designed for tours; equipment will be on display and available for hands-on inspection.

Parade of Affordable Homes

CPS is providing funding to install solar hot water systems on 15 homes for next year's "Parade of Affordable Homes."

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Green Pricing

San Antonio City Public Service - Windtricity™ Program

City Public Service (CPS), serving more than 550,000 customers in San Antonio, began offering a wind power green pricing option to all of the city's retail customers in April 2000. Power for the *Windtricity*™ program will eventually be supplied from a 25-MW wind project planned for West Texas. In the meantime, CPS is purchasing 600,000 kWh of wind power each month from an existing wind project. Wind energy is available in 100-kWh blocks for an additional $4.00 per month, or a premium of 4¢/kWh. Customers can choose the number of "blocks" they want, up to the total of their monthly electric use. There is no minimum time commitment.

Participants receive a semi-annual newsletter relating to renewable energy and the environment, a *Windtricity*™ yard sign indicating that their home uses wind energy, and a *Windtricity*™ "window cling" for their vehicle.

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FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Texas – Financial Incentives

Property tax exemption – Solar and wind systems do not add to assessed property value for tax purposes.

Corporate deduction – Corporations can deduct 100% of the cost of a solar energy system from the state franchise tax.

Manufacturer incentive – Texas exempts solar manufacturers from the state franchise tax.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Texas's incentives.

RULES, REGULATIONS & POLICIES

Net Metering

City Public Service is currently investigating net metering possibilities.

State of Texas – Regulatory Policies

Renewable portfolio standard – 2880 MW of renewables must be installed by 2008; interim mark is 1,280 MW by 2003.

Net metering – All renewable technologies up to 50 kW are eligible for net metering. All customer classes can net meter.

State building requirements – state agencies must compare the cost of providing energy to new buildings from alternative energy sources.

Equipment certification – To be eligible for sales tax exemptions, solar collectors must be certified by the Solar Rating & Certification Corporation or the Air Conditioning & Refrigeration Institute.

Disclosure – Retail energy providers must disclose information on fuel mix, environmental impacts, water consumed in producing power.

Line extension – Electric utilities must provide information on renewable energy alternatives to customers requesting a line extension.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Texas's incentives.

Burlington

COMMUNITY INVESTMENT & AWARENESS

Education & Assistance

Burlington Electric Department - SunWise Program

The Burlington Electric Department (BED) initiated its SunWise Program at the end of 1998 to promote grid-tied PV and solar domestic hot water installations in Burlington. To start up the program, BED received a $30,000 Solar Grant from the International Council for Local Environmental Initiatives (ICLEI) Cities for Climate Protection Campaign, funded by the U.S. EPA. So far, 40 inquiries have been made, including two local schools. Through the *SunWise* program, BED provides technical assistance, project management and bill-based financing for five sizes of PV systems and three sizes of hot water systems (60-, 80- and 120-gallon).

The *SunWise* Program also demonstrates a practical application of Vermont's recently enacted "net metering" legislation, which encourages the use of small-scale solar and wind power by giving customers the ability to sell back any excess power they generate to their local utility. Depending on the size and type of solar system installed, a typical family with average electrical usage could save up to $285 a year as a result of the net metering legislation.

BED's marketing and education plan for *SunWise* incorporated brochures, direct marketing to select business and schools, and 30 free site assessments. Three articles and two TV interviews resulted. In addition, BED's energy auditing staff informs hundreds of customers each year about solar options.

Burlington Electric, the state's largest publicly-owned electric utility, serves 19,580 Burlington residents and businesses. The *SunWise* program joins eight other BED energy-efficiency programs that have saved customers more than $4 million a year.

Renewable Energy Projects

BED also set up a demonstration project to promote the *SunWise* Program – Energy specialists installed a 4' × 6' photovoltaic panel (250 watts) on the south side of BED's Pine Street office building in August 1999.

The PV system generates enough electricity to power the utility's compact fluorescent light bulb display in the lobby. The panels are tied to a meter inside the building, which displays the amount of solar energy the panels are collecting.

FINANCIAL INCENTIVES

Rebate & Loan Program

Burlington Electric Department - SunWise Program

SunWise offers subsidies of $1.15 per installed watt for PV systems, with a maximum of $1500. Customers can also receive loans of up to 10 years at an 8.25% rate. Customers choose from among several pre-configured solar systems put together by BED rather than having to create a specific design for their own location. To further reduce customer uncertainty, all SunWise systems are sold with a 10-year warranty and maintenance contract. To date, 40 inquiries have been made, including two local schools, and BED has installed 7 systems.

Joining BED in the project are Solar Works, Inc., a solar systems integrator and contractor, and the Vermont Energy Investment Corporation (VEIC), a nonprofit organization with a strong record of designing and implementing innovative and cost-effective renewable energy and energy efficiency programs.

State of Vermont – Financial Incentives

Property tax exemption – The State allows municipalities the option of offering property tax exemptions for certain renewable energy systems.

Sales tax exemption – All equipment purchased to construct and install a net metered renewable energy system is exempt from the state's 5% sales tax.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Vermont's incentives.

RULES, REGULATIONS & POLICIES

State of Vermont – Regulatory Policies

Net metering – Net metering is allowed for any utility customers. A "net metering" Certificate of Public Good from the Vermont Public Service Board is required. Size is limited to 15 kW for solar, wind, and fuel cells systems and 100 kW for methane gas conversion systems.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Vermont's incentives.

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Cape Charles

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Projects

Sustainable Technologies Industrial Park

Cape Charles Sustainable Technology Industrial Park (STIP), located on the Eastern Shore of Virginia, is an eco-industrial park that is taking advantage of a number of energy technologies, including solar energy systems. One company, Solar Building Systems, a manufacturer of architecturally integrated photovoltaic systems, recently relocated to a new building in the sustainable technology park - about half of which consists of brownfields.

Building One in the STIP is designed to showcase green building design that will distinguish all the buildings in the Park. Features include photovoltaics, indoor air quality monitoring, energy efficiency technologies, and skylights for natural daylighting. Building One was funded in part by the National Oceanic and Atmospheric Administration, the U.S. Department of Energy, and the Virginia Department of Environmental Quality.

What may be the largest roof-integrated, thin-film solar electric system in North America has been installed on Building One. The 42-kW PV system was funded in part by the Virginia Alliance for Solar Electricity and the Solar Electric Power Association's (formerly UPVG) TEAM-UP program.

In 1999, the Cape Charles Sustainable Technology Park was selected as a "Joint Center for Sustainable Communities Award Winner" and a "HUD Secretary Award Winner" by the U.S. Department of Housing and Urban Development and the Joint Center for Sustainable Communities.

FINANCIAL INCENTIVES

Performance Incentives

Occupants of STIP are awarded rebates if they exceed the "Minimum Sustainability Requirements." Sustainability audits are conducted annually. The Performance Incentive Award is given to owners in the form of a reduction of up to 5% of their annual assessment for exceeding minimum environmental criteria, and up to an additional 5% reduction for exceeding minimum social criteria. For occupants to lease their lots, the incentive award is in the form of a base rent reduction of up to 6% for exceeding minimum environmental criteria, and up to an additional 6% reduction for exceeding minimum social criteria.

Occupants are subject to a "Non-Compliance Penalty"—a monthly fee equivalent to 5% of the occupant's proportionate share of the annual assessment.

At the State level, programs are in place to provide significant financial incentives to companies locating or expanding in the Cape Charles STIP. The Park is included in a Virginia Enterprise Zone. However, only incentives related to renewable energy are listed below.

State of Virginia – Financial Incentives

Grant program – Any manufacturer making solar photovoltaic panels in Virginia is entitled to receive an annual grant of up to 75 cents per watt of the rated capacity of panels sold.

Grant program -- Through the Virginia Alliance for Solar Electricity, grants are available to develop and deploy PV systems. Commercial and residential applications are eligible.

Tax credit – Businesses manufacturing or converting vehicles to operate on clean fuel and manufacturers of components for use in clean fuel vehicles are eligible to receive an income tax credit for each new full-time job created over and above the previous year's employment level. The credit is equal to $700 in the year the job is created, and in each of two succeeding years if the job is continued, for a maximum of $2,100 per job.

Property tax exemption – The State gives local authorities the option to exempt solar energy equipment from local property taxes. Residential, commercial, or industrial property is eligible.

Low income loan program – Low interest loans are available for low and moderate income homeowners for repairs that reduce energy consumption. Includes renewable energy technologies.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Virginia's incentives.

RULES, REGULATIONS & POLICIES

Solar Access

Architectural Guidelines

Buildings and adjacent landscaping in the STIP must be situated to avoid shading of solar energy elements.

Construction & Design

Covenants & Restrictions

Buildings in the STIP must attain a minimum Silver ranking using the LEED ranking system. There are also minimum standards of performance related to "Sustainability Criteria." The Sustainability Criteria are designed to measure an occupant's performance within the categories of environmental sustainability and social sustainability. Each category is comprised of a list of criteria, and Sustainability Criteria Points are awarded on the basis of compliance with and satisfaction of these criteria. One of the environmental criteria is:

"Percentage of Occupant's day-to-day operations devoted to research and development of new technologies on energy efficiency, renewable energy, pollution prevention, industrial ecology and/or other emerging sustainability concepts." A range of 10-25% earns one point; 26-40% earns two points; and 41% or more earns three points.

State of Virginia – Regulatory Policies

Solar access – Property owners may create binding solar easements.

Net metering – Net metering is allowed for customers with solar, wind, or hydropower residential systems. Size is limited to 10 kW for residential systems and 25 kW for commercial systems.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Virginia's incentives.

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Loudon County

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Projects[3]

What began as a simple barn renovation will become the State of Virginia's largest solar power system thanks to the vision of a Loudoun County community group. The group, known as The Barns of Franklin Park, Inc., had planned to build Loudoun County's first theater in an abandoned dairy barn at a 240-acre county park. When the barn burned down, they seized the opportunity to design and build a unique, energy-efficient, environmentally friendly, solar showcase. The building, expected to open in the spring of 2001, will serve as a theater, astronomical observatory, solar energy learning center, and community center.

The Barns at Franklin Park will be powered by a 70-kilowatt PV array with a storage capacity of 200 kilowatt-hours. Old Mill Power Company, headquartered in Charlottesville, Virginia, will install the array. In addition to giving the group a discount on the modules, BP Solar donated the engineering services to design the solar array will also donate coordination of the installation. The building also incorporates other energy-efficient lighting, heating, and cooling systems.

Old Mill Power will own and maintain the solar power system and will sell any power not needed by the theater to the County. The building itself will be the property of Loudoun County.

The barn was handraised by volunteers from the Timber Framer's Guild of North America. No trees were cut down for the barn construction; instead, hundred-year-old Douglas fir beams recovered from the St. Lawrence Seaway were used. The 9,000-square-foot building will house a 300-seat, public performing arts theater that will open this summer. The auditorium and 1,000-foot stage were designed to meet the special needs of an award-winning performing arts group.

The building will cost $2.7 million to complete. The Barns at Franklin Park, Inc., has already raised $2.1 million through in-kind donations, grants, and fundraising. This includes about $750,000 in equipment donations, and a Virginia Alliance for Solar Electricity (VASE) Grant of $280,000.

Education & Assistance

The engineering departments of several Virginia Universities—including George Mason, University of Virginia, and Virginia Military Institute—will use the The Barns at Franklin Park facility to teach solar energy principles to students.

[3] From *UPVG Record online* Spring 2000 newsletter at http://www.sunlightpower.com/upvg/record/rc100brn.htm. UPVG is now called the Solar Electric Power Association.

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FINANCIAL INCENTIVES

Tax Incentive

Local Property Tax Exemption for Solar and Recycling Equipment

The Virginia State tax code allows any county, city or town to exempt, or partially exempt, solar energy equipment or recycling equipment from local property taxes. Residential, commercial, or industrial property is eligible. The statute broadly defines solar energy equipment as any "application which would otherwise require a conventional source of energy." Loudoun County is one of several local governments in the state to offer this incentive. This incentive doe not apply to The Barns at Franklin project, however, since it is located on county property. Other counties and cities currently offering the tax incentive include:

Alexandria	Falls Church	Isle of Wight	Richlands
Albemarle	Fairfax	King and Queen	Roanoke
Charlottesville	Hampton	Prince William	Spotsylvania
Chesterfield	Hanover	Pulaski	Warren
			Wise

State of Virginia – Financial Incentives

Grant program – Any manufacturer making solar photovoltaic panels in Virginia is entitled to receive an annual grant of up to 75 cents per watt of the rated capacity of panels sold.

Grant program -- Through the Virginia Alliance for Solar Electricity, grants are available to develop and deploy PV systems. Commercial and residential applications are eligible.

Tax credit – Businesses manufacturing or converting vehicles to operate on clean fuel and manufacturers of components for use in clean fuel vehicles are eligible to receive an income tax credit for each new full-time job created over and above the previous year's employment level. The credit is equal to $700 in the year the job is created, and in each of two succeeding years if the job is continued, for a maximum of $2,100 per job.

Property tax exemption – See discussion above.

Low income loan program – Low interest loans are available for low and moderate income homeowners for repairs that reduce energy consumption. Includes renewable energy technologies.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Virginia's incentives.

RULES, REGULATIONS & POLICIES

State of Virginia – Regulatory Policies

Solar access – Property owners may create binding solar easements.

Net metering – Net metering is allowed for customers with solar, wind, or hydropower residential systems. Size is limited to 10 kW for residential systems and 25 kW for commercial systems.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Virginia's incentives.

Olympia

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Projects

Solar Pioneers Program

At the beginning of 1999, Olympia received a $30,000 Solar Grant from the International Council for Local Environmental Initiatives (ICLEI) Cities for Climate Protection Campaign, funded by the U.S. EPA. Olympia is using its grant to fund the installation of municipal PV systems, as well as to create a municipal buy-down for residential and commercial PV systems. The City's intention is to demonstrate that renewable energy technology can play a valuable role in the pacific northwest.

Photovoltaic panels have been installed on the Master Gardeners' booth at the Olympia Farmer's Market. This demonstration booth currently lacks power and extending standard electric lines would be expensive. The PV system powers lights, a computer, and an educational display. The location is a perfect, high-traffic area with great educational opportunities, especially as a demonstration of solar power's cost-effectiveness in inaccessible locations. PV systems have also been installed on six other farmer's market booths near the Master Gardeners' display.

Education & Assistance

Olympia's program also includes an extensive grassroots education campaign. The "Solar Pledge" program enlists residents in pledging to fight global warming by using solar energy, and committing to host a neighborhood meeting on the program. Residents that take the Solar Pledge get their names printed in the local newspaper. This effort is just getting underway.

Green Power Purchasing

A community advisory group has been established to evaluate the inclusion of a green power requirement in the City of Olympia's franchise agreement with investor-owned Puget Sound Energy. The committee may also examine the feasibility of creating Olympia's own municipal electric utility, which would provide greater opportunities for the City to invest in renewable energy resources.

FINANCIAL INCENTIVES

Rebate Program

PV Buy-Down Program

Olympia's *Solar Power Pioneers* program offers a 25% buy-down program for residential and commercial PV systems as part of its ICLEI grant. Thus far, one nonprofit organization and

one commercial business (a local coffee roaster) have installed PV systems under the program. The coffee roaster's system is highly visible and includes and educational activity booth inside the building. Olympia will seek additional grants to fund future installations. Otherwise, city funds will be used to the extent possible.

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State of Washington – Financial Incentives

Rebate program – A 25% rebate is available for pre-packaged, pre-engineered off-grid PV systems.

Sales tax exemption – This exemption is for solar and wind systems that generate > 200 kW.

Industrial recruitment – Manufacturers of qualifying high technology, including alternative energy resources, are exempt from the state corporate excise tax.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Washington's incentives.

RULES, REGULATIONS & POLICIES

State of Washington – Regulatory Policies

Net metering – Net metering for is allowed for all customers with solar, wind, and hydropower systems of 25 kW or less.

Solar access – Property owners may create binding solar easements.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Washington's incentives.

Seattle

COMMUNITY INVESTMENT & AWARENESS

Renewable Energy Projects

The City of Seattle municipal utility, City Light Department (SCL), collaborated with the Seattle Center and other sponsors in a solar power project—a 2-kW PV system—which SCL will monitor. The data collected will help SCL and their customers understand the level of performance they can expect from a solar system in Seattle.

Green Power Purchasing

SCL has issued a request for proposals to provide up to 100 megawatts of electricity from wind, solar, geothermal or other renewable resources, for a period ranging from 1 - 20 years to meet City Light's load growth over the next 10 years. The city council also passed a resolution that commits SCL to spend $2 million per year, or 0.49% of its annual revenue, to purchase energy from non-hydro renewable resources.

Education & Assistance

SCL co-sponsors the Sustainable Building Advisor Certificate Program, now in its second year of instruction. This course is a nine-month, specialized training program, designed to enable graduates to advise employers or clients on strategies and tools for implementing sustainable building. The program is intended for Architects, Engineers, Developers, Construction Managers, and Resource Conservation Specialists. Daylighting and use of renewables are part of the curriculum. SCL posts recent Sustainable Building Case Studies on its website.

FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Washington – Financial Incentives

Rebate program – A 25% rebate is available for pre-packaged, pre-engineered off-grid PV systems.

Sales tax exemption – This exemption is for solar and wind systems that generate > 200 kW.

Industrial recruitment – Manufacturers of qualifying high technology, including alternative energy resources, are exempt from the state corporate excise tax.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Washington's incentives.

Construction & Design

Sustainable Building Policy

Seattle's Sustainable Building Policy calls for new City projects and renovations with over 5000ft^2 of occupied space to achieve a Silver Rating using the US Green Building Council's LEED Rating System. LEED stands for Leadership in Energy and Environmental Design, and is a voluntary, consensus-based, market-driven green building rating system. LEED is a self-certifying system designed for rating new and existing commercial, institutional, and multi-family residential buildings. There are four rating levels: Bronze, Silver, Gold, and Platinum. The LEED system awards a range of 1, 2 or 3 points for 5%, 10%, or 20% of a building's total energy use coming from renewables. In addition, a point is awarded for contracting to purchase green power as defined by the Center for Resource Solutions Green-e requirements.

Energy Management Strategy

The City of Seattle, with its long-standing commitment to environmental protection, has established a long-range goal of meeting its electric energy needs with no net greenhouse gas emissions, using a combination of energy efficiency and renewables. If fossil fuels must be used, the utility must offset any greenhouse gas emissions through other measures such as forest protection.

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State of Washington – Regulatory Policies

Net metering – Net metering for is allowed for all customers with solar, wind, and hydropower systems of 25 kW or less.

Solar access – Property owners may create binding solar easements.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Washington's incentives.

Tacoma

COMMUNITY INVESTMENT & AWARENESS

Green Pricing

Tacoma Power EverGreen Options Program

Tacoma Power, which serves more than 140,000 customers, launched a green pricing pilot program in April 2000. There are three levels of participation for residential customers: "frog" ($3 per month), "salmon" ($6 per month) and "otter" ($10 per month). Business and institutional customers can participate by paying an extra $6 to $100 each month, depending on the size of the business and the level of commitment. Currently, there are nearly 300 residential and 13 business or institutional participants.

The power for the *EverGreen Options* program is supplied by the Bonneville Power Administration (BPA) from by a run-of-the-river hydro facility near Packwood, Washington, and wind power facilities in Oregon and Wyoming. These power sources have been endorsed by various environmental groups, including the Northwest Energy Coalition, Natural Resources Defense Council and the Renewable Northwest Project.

A portion of the revenue collected from the program will be used to cover the additional cost of the green power. The remainder will go to the Bonneville Environmental Foundation to support the development of new renewable resources and improve watersheds and fish and wildlife habitats in Washington and Oregon. Tacoma has agreed to purchase 1 MW of power from BPA for the program, enough to serve the average electricity needs of about 600 homes.

The program has been promoted via a variety of methods such as newspaper advertisements, direct mail pieces, bill stuffers and assorted community events. Tacoma Power staff have worked with the local environmental groups, such as Tahoma Audubon Society and Citizens for a Healthy Bay, to seek input and to help promote *EverGreen Options*. In addition, pencils made from recycled US currency displaying the *EverGreen Options* logo have been distributed at community events. Several video stories have run on the local Tacoma cable station.

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FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Washington – Financial Incentives

Rebate program – A 25% rebate is available for pre-packaged, pre-engineered off-grid PV systems.

Sales tax exemption – This exemption is for solar and wind systems that generate > 200 kW.

Industrial recruitment – Manufacturers of qualifying high technology, including alternative energy resources, are exempt from the state corporate excise tax.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Washington's incentives.

RULES, REGULATIONS & POLICIES

State of Washington – Regulatory Policies

Net metering – Net metering for is allowed for all customers with solar, wind, and hydropower systems of 25 kW or less.

Solar access – Property owners may create binding solar easements.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Washington's incentives.

Madison

COMMUNITY INVESTMENT & AWARENESS

Green Power Purchasing

In 1999, Madison's Metro Maintenance & Administration Facility began purchasing 25% of its electricity from Madison Gas & Electric's wind power program. The additional cost to purchase the wind power is approximately $26,000 per year. Metro officials estimate that their wind power purchase is equivalent to running ten buses per year with no carbon monoxide emissions.

FINANCIAL INCENTIVES

There are no local financial incentives at this time.

State of Wisconsin – Financial Incentives

Renewable Energy Assistance Program (REAP) – This performance based grant program for renewables provides construction grants funds for 10-20% of a project up to $75,000.

Property tax exemption – Solar and wind systems do not add to assessed property value for tax purposes.

Demonstration Grants – Grants are available from Energy Center of Wisconsin through WisconSUN solar energy installations and training programs.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Wisconsin's incentives.

RULES, REGULATIONS & POLICIES

Solar Access

To facilitate solar access, Madison's land subdivision regulations require streets to be "oriented in an east-west direction to the maximum extent possible or to within 20 degrees of such orientation." There are some exceptions based on topography, property size and shape, existing street patterns, and the like. In addition, "the installation of trees shall take into account solar access objectives…so as to minimize future shading of the most southerly side of contemplated building locations."

Contractor Licensing and Equipment Standards

The City of Madison provides an example of a local government issuing rules for contractor licensing and equipment standards where no state laws exist specific to renewable energy

systems. In the City's Heating, Ventilating and Air Conditioning Code is a requirement for a Class A-4 license for "a person desiring to enter into the business of installing, altering or repairing active solar heating equipment." In addition, equipment standards for solar thermal equipment cover subjects such as orientation of the collector, shading of solar collectors, mounting and roof support, material corrosion, sensors, piping and insulation, fluids, storage, monitoring and manuals. Madison's HVAC Code pertaining to renewables is provided in Appendix C.

Energy Management Strategy

The City of Madison is one of more than 290 cities and counties around the world in the International Council for Local Environmental Initiatives (ICLEI) Cities for Climate Protection Campaign. With grant funding from ICLEI, the City developed a Climate Protection Plan. Among its strategies to reduce greenhouse gas emissions are plans to add a renewable energy source to one city building and to develop a green building program.

State of Wisconsin – Regulatory Policies

Public benefits funds – There is a $84 million public benefits fund with at least 4.5% or $3.8 million going toward renewables projects.

Renewable portfolio standard – Utilities must use 0.5% renewables by the end of 2001 and 2.2% renewables by the end of 2010.

Net metering – Solar and wind systems up to 20 kW are eligible for net metering, which is available to all customer classes. Interconnection rules and procedures vary by utility.

Solar and wind access laws – Residential and commercial property owners can apply for permits to protect solar access.

DSM and renewables – Wisconsin Energy Bureau manages the Demand Side Applications of Renewable Energy (DSARE) program which provides some funding for renewables.

Visit www.ncsc.ncsu.edu/dsire.htm for more info on Wisconsin's incentives.

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Appendix A

Resources

The following resources are a sample of some of the excellent national organizations and sites available on the web for renewable energy policy. If you can't find what you're looking for at the DSIRE website (www.ncsc.ncsu.edu/dsire.htm), you'll probably find it at one of these sites.

American Council for an Energy-Efficient Economy (ACEEE)

A Summary Table of Public Benefit Programs and Electric Utility Restructuring is updated periodically and includes details on state system benefit charges, renewable portfolio standards, and generation disclosure. Web address: www.aceee.org./briefs/mktabl.htm.

American Solar Energy Society (ASES)

The Society has issued a set of principles on electric industry restructuring and renewable energy resources, disclosing information for customer choice, community aggregation, connecting to the grid, and distributed generation. The Solar Today Magazine (www.solartoday.org.) often carries articles on utility restructuring, solar portfolio standard, green pricing, net metering, etc. Web address: www.ases.org./solarguide/position.html.

Center for Resource Solutions (CRS)

CRS launched the Green-e Renewable Electricity Branding Program - the country's first voluntary certification and verification program for environmentally-preferred electricity products. The web site lists the Green-e certified products as well as discusses the criteria and code of conduct for eligibility. (Also see Power Scorecard) Web address: www.green-e.org.

Clean Energy Funds Network (CEFN)

CEFN is a non-profit project to provide information and technical services to state energy fund managers. On this web site you will find information about the state funds, as well as the CEFN monthly newsletter the Clean Energy Funder. Web address: cleanenergyfunds.org.

Database of State Incentives for Renewable Energy (DSIRE)

State-by-state listing of information on financial incentives, rules, regulations and policies, and community investment programs. The on-line database is searchable and includes state energy contacts. Operated by the North Carolina Solar Center. Web address: www.ncsc.ncsu.edu/dsire.htm.

Electric Utility Restructuring Weekly Update

This weekly information has been compiled by Energetics, Inc. for the U.S. Department of Energy. Sections include information on national and federal restructuring activities, mergers, stranded benefits, and regional and state activities. Web resources and previous issues are also listed. Web address: www.eren.doe.gov/electricity_restructuring/weekly.html.

Energy Efficiency and Renewable Energy Network (EREN)
The EREN site provides links to a great deal of renewable energy information. You can also sign up for their weekly renewables newsletter, the EREN Network News. Web address: www.eren.doe.gov.

Energy Information Administration: Department Of Energy (EIA)
The status of state electric utility deregulation activity is presented in an on-line table and map. Web address: www.eia.doe.gov/cneaf/electricity/chg_str/tab5rev.html.

Green Power Network
Through the DOE EREN website, this is a clearinghouse of information on electric power industry green marketing efforts. It provides current news on green power markets and utility green pricing programs. Links to green power and renewables information, relevant literature, conferences, etc. Also includes a section on state-by-state net metering programs. Web address: www.eren.doe.gov/greenpower.

The International Council for Local Environmental Initiatives (ICLEI)
ICLEI is an international environmental agency for local governments. Through its Cities for Climate Protection Campaign, ICLEI offers technical assistance, training, publications and marketing tools to support local programs and policies which improve energy efficiency and reduce greenhouse gas emissions. Web address: www.iclei.org.

LEAP Letter
LEAP Letter a subscription-based, state-by-state bimonthly newsletter covering state legislation on restructuring of the electric industry. Newsletter also includes a guest columnist, information on national trends and activities, retail pilot projects, and other issues. Available as a hard copy subscription or through internet access (LEAPNet). Web address: www.spratley.com/leap.

Million Solar Roofs (MSR)
The Department of Energy's MSR Initiative works with partners in the building industry, local governments, state agencies, the solar industry, electric service providers, and non-governmental organizations to remove barriers and strengthen the demand for solar technologies. The newly redesigned website includes renewable energy information, as well as contact information on MSR partners. Web address: www.millionsolarroofs.org.

National Association of Regulated Utility Commissioners (NARUC)
NARUC's website lists information on publications, resolutions, meetings, and membership. See the NARUC Electric Restructuring Database at www.naruc.whatsup.net. NARUC also provides links to all state utility commission websites and maintains a restructuring database on the web at ragtime.xenergy.com/Client/NARUC/Production/naruc.nsf. Web address: www.naruc.org.

National Association of State Energy Officials (NASEO)
NASEO's website provides links to energy offices in all fifty states. Also on the NASEO site, you will find their September 1999 report on public benefits funds at www.naseo.org./energy_sectors/power/system_benefit.htm. Web address: www.naseo.org.

National Council on Competition and the Electric Industry
The Council is a partnership of the National Association of Regulatory Utility Commissioners (NARUC) and the National Conference of State Legislatures (NCSL). Its mission is to make available quality information about the future of the electric industry to state, regional and federal government officials. Web address: eetd.lbl.gov/NationalCouncil.

Office of Power Technologies
The U.S. Department of Energy's Office of Power Technologies, in the Office of Energy Efficiency and Renewable Energy, has been closely tracking electric utility restructuring developments across the country. Their website includes documents and web sites for detailed, up-to-date information on electric utility restructuring. Web address: www.eren.doe.gov/electricity_restructuring.

PV4You Project
In addition to the DSIRE project, the Interstate Renewable Energy Council (IREC) manages the national PV4You Project. This program includes the National Consumer Project, the Going Solar Campaign, Schools Going Solar, and the National Interconnection Project. Web address: www.irecusa.org.

Power Scorecard
This site, which is maintained by the Pace University Law School's Energy Project, provides information on the environmental impacts of utility power offerings in restructured states. (Also see Green-e). Web address: www.powerscorecard.org.

Public Technology, Inc. (PTI)
PTI is the nonprofit research, development, and commercialization subsidiary of three national local government associations—the National League of Cities, the National Association of Counties, and the International City/County Management Association. PTI's Urban Consortium Energy Task Force develops and tests energy management solutions and shares the resulting products or management approaches with local and state governments. Web address: www.pti.org.

Regulatory Assistance Project (RAP)
Publishes issue letters, reports, and other documents on current regulatory issues and trends. Topics include electric industry restructuring, default service, customer choice, environmental disclosure, green pricing, system benefits charge, stranded costs, IRP and competition, and more. Web address: www.rapmaine.org.

Renewable Energy Policy Project (REPP)
Publishes issue briefs on such topics as net metering, disclosure and certification, green power, and energy and the environment. REPP provides policy research support for the

renewable energy community and educates policy makers and energy professionals on renewable energy. Web address: www.repp.org.

State Renewable Energy News

A compilation of renewable electric activities in the states. Prepared by the NARUC Subcommittee on Renewable Energy. It is issued three times annually to coincide with the NARUC committee meetings. Web address: www.nrel.gov/analysis/emaa/projects/sren.

Solar Electric Power Association

Formerly known as the Utility Photovoltaic Group (UPVG), the Solar Electric Power Association is a membership organization for electric service providers and the solar industry. This site includes information on many utility photovoltaic projects and programs. Web address: www.upvg.org/upvg/index.htm.

The Utility Connection

This website provides links to all electric, gas, and water utilities. Web address: www.utilityconnection.com.

APPENDIX B

Ashland, Oregon
Solar Access Ordinance[4]

TITLE 18 LAND USE

CHAPTER 18.70 SOLAR ACCESS

SECTION 18.70.010 Purpose and Intent.

The purpose of the Solar Access Chapter is to provide protection of a reasonable amount of sunlight from shade from structures and vegetation whenever feasible to all parcels in the City to preserve the economic value of solar radiation falling on structures, investments in solar energy systems, and the options for future uses of solar energy.

SECTION 18.70.020 Definitions.

A. Exempt Vegetation. All vegetation over fifteen (15) feet in height at the time a solar access permit is applied for.
B. Highest Shade Producing Point. The point of a structure which casts the longest shadow beyond the northern property boundary at noon on December 21st.
C. Natural Grade. The elevation of the natural ground surface in its natural state, before man-made alterations. The natural ground surface is the ground surface in its original state, before any grading, excavation, or filling.
D. Northern Lot Line. Any lot line or lines less than forty-five (45) degrees southeast or southwest of a line drawn east-west and intersecting the northernmost point
of the lot. If the northern lot line adjoins any unbuildable area (e.g., street, alley, public right-of-way, parking lot, or common area) other than a required yard area, the northern lot line shall be that portion of the northerly edge of the unbuildable area which is due north from the actual northern edge of the applicant's property.
E. North-South Lot Dimension. The average distance in feet between lines from the corners of the northern lot line south to a line drawn east-west and intersecting the southernmost point of the lot.
F. Solar Energy System. Any device or combination of devices or elements which rely upon direct sunlight as an energy source, including but not limited to any substance or device which collects sunlight for use in the heating or cooling of a structure or building, the heating or pumping of water, or the generation of electricity. A solar energy system may be used for purposes in addition to the collection of solar energy. These uses include, but are not limited to, serving as a structural member of part of the roof of a building or structure and serving as a window or wall.
G. Solar Envelope. A three dimensional surface which covers a lot and shows, at any point, the maximum height of a permitted structure which protects the solar access of the parcel(s) to the north.
H. Solar Heating Hours. The hours and dates during which solar access is protected by a solar access permit, not to exceed those hours and dates when the sun is lower than twenty-four (24) degrees altitude and greater than seventy (70) degrees east and west of true south.
I. Solar Access Permit Height Limitations. The height limitations on affected properties required by the provisions of a Solar Access Permit displayed as a series of five (5) foot contour lines which begin at the bottom edge of the solar energy system protected by the permit, rise at an angle to the south not less than twenty-four (24) degrees from the horizon, and extend at an angle not greater than seventy (70) degrees to the east and west of true south and run parallel to the solar energy system.

[4] http://www.ashland.or.us/MunicipalCode/TITLE_18/70/index.html

J. Solar Setback. **The minimum distance that a structure, or any part thereof, can be located from a property boundary.**

K. Slope. A vertical change in elevation divided by the horizontal distance of the vertical change. Slope is measured along lines extending one hundred fifty (150) feet north from the end points of a line drawn parallel to the northern lot line through the midpoint of the north-south lot dimension. North facing slopes will have negative (-) values and south facing slopes will have positive (+) values.
L. Sunchart. Photographs or drawings, taken in accordance with the guidelines of the Staff Advisor, which plot the position of the sun during solar heating hours. The sunchart shall contain at a minimum the southern skyline as seen through a grid which plots solar altitude for a forty-two (42) degree northern latitude in ten (10) degree increments and solar azimuth measured from true south in fifteen (15) degree increments. If the solar energy system is less than twenty (20) feet wide, a minimum of one (1) sunchart shall be taken from the bottom edge of the center of the solar energy system. If the solar energy system is greater than twenty (20) feet wide, a minimum of two (2) suncharts shall be taken, one (1) from the bottom edge of each end of the solar energy system.

SECTION 18.70.030 Lot Classifications.

Affected Properties. All lots shall meet the provisions of this Section and will be classified according to the following formulas and table:
FORMULA I:
Minimum N/S lot dimension for Formula I = 30’
0.445 + S
Where: S is the decimal value of slope, as defined in this Chapter.
FORMULA II:
Minimum N/S lot dimension for Formula II = 10’
0.445 + S
Lots whose north-south lot dimension exceeds that calculated by Formula I shall be required to meet the setback in Section (A), below.
Those lots whose north-south lot dimension is less than that calculated by Formula I, but greater than that calculated by Formula II, shall be required to meet the setback in Section (B), below.
Those lots whose north-south lot dimension is less than that calculated by Formula II shall be required to meet the setback in Section (C), below.

SECTION 18.70.040 Solar Setbacks.

A. Setback Standard A. This setback is designed to insure that shadows are no greater than six (6) feet at the north property line. Buildings on lots which are classified as Standard A, and zoned for residential uses, shall be set back from the northern lot line according to the following formula:
SSB = H - 6’
0.445 + S
WHERE:
SSB = the minimum distance in feet that the tallest shadow producing point which creates the longest shadow onto the northerly property must be set back from the northern property line.
H = the height in feet of the highest shade producing point of the structure which casts the longest shadow beyond the northern property line.
S = the slope of the lot, as defined in this Chapter.
B. Setback Standard B. This setback is designed to insure that shadows are no greater than sixteen (16) feet at the north property line.
Buildings for lots which are classified as Standard B, or for any lot zoned C-1, E-1 or M-1, or for any lot not abutting a residential zone to the north, shall be set back from the northern lot line as set forth in the following formula:
SSB = H - 16’
0.445 + S

C. Setback Standard C. This setback is designed to insure that shadows are no greater than twenty-one (21) feet at the north property line.
Buildings for lots in any zone whose north/south lot dimension is less than Standard B shall meet the setback set forth in the following formula:

$$SSB = H - 21'$$

$$0.445 + S$$

D. Exempt Lots. Any lot with a slope of greater than thirty percent (30%) in a northerly direction, as defined by this Ordinance, shall be exempt from the effects of the Solar Setback Section.
E. Lots Affected By Solar Envelopes. All structures on a lot affected by a solar envelope shall comply with the height requirements of the solar envelope.
F. Exempt Structures.
1. Existing Shade Conditions. If an existing structure or topographical feature casts a shadow at the northern lot line at noon on December 21, that is greater than the shadow allowed by the requirements of this Section, a structure on that lot may cast a shadow at noon on December 21, that is not higher or wider at the northern lot line than the shadow cast by the existing structure or topographical feature. This Section does not apply to shade caused by vegetation.
2. Actual Shadow Height. If the applicant demonstrates that the actual shadow which would be cast by the proposed structure at noon on December 21, is no higher than that allowed for that lot by the provisions of this Section, the structure shall be approved. Refer to Table D for actual shadow lengths.

SECTION 18.70.050 Solar Access Performance Standard.

A. Assignment of Solar Factor. All land divisions which create new lots shall be designed to permit the location of a twenty-one (21) foot high structure with a setback which does not exceed fifty (50%) percent of the lot's north-south lot dimension. Lots having north facing (negative) slopes of less than fifteen percent (15%) (e.g., 10%), and which are zoned for residential uses, shall have a north-south lot dimension equal to or greater than that calculated by using Formula I. Lots having north facing (negative) slopes equal to or greater than fifteen percent (15%) (e.g., 20%), or are zoned for non-residential uses, shall have a north-south lot dimension equal to or greater than that calculated by using Formula II.
B. Solar Envelope. If the applicant chooses not to design a lot so that it meets the standards set forth in (A) above, a Solar Envelope shall be used to define the height requirements which will protect the applicable Solar Access Standard. The Solar Envelope, and written description of its effects, shall be filed with the land partition or subdivision plat for the lot(s).

SECTION 18.70.060 Variances.

A. Variances to this Chapter shall be processed as a Type I procedure, except that variances granted under subsection B of this Section may be processed as a Staff Permit. (Ord. 2484 S3, 1988)
B. A variance may be granted with the following findings being the sole facts considered by the Staff Advisor:
1. That the owner or owners of all property to be shaded, sign and record with the County Clerk on the affected properties' deed, a release form supplied by the City, which contains the following information:
a. The signatures of all owners or registered leaseholders who hold an interest in the property in question.
b. A statement that the waiver applies only to the specific building or buildings to which the waiver is granted.
c. A statement that the solar access guaranteed by this Section is waived for that particular structure and the City is held harmless for any damages resulting from the waiver.
d. A description and drawing of the shading which would occur, and
2. The Staff Advisor finds that:
a. The variance does not preclude the reasonable use of solar energy on the site by future buildings; and
b. The variance does not diminish any substantial solar access which benefits a habitable structure on an adjacent lot.
c. There are unique or unusual circumstances which apply to this site which do not typically apply elsewhere.

SECTION 18.70.070 Solar Access Permit for Protection from Shading by Vegetation.

A. A Solar Access Permit is applicable in the City of Ashland for protection of shading by vegetation only. Shading by buildings is protected by the setback provisions of
this Ordinance.
B. Any property owner or lessee, or agent of either, may apply for a Solar Access Permit from the Staff Advisor. The application shall be in such form as the Staff
Advisor may prescribe but shall, at a minimum, include the following:
1. A fee of Fifty ($50.00) Dollars plus Ten ($10.00) Dollars for each lot affected by the Solar Access Permit.
2. The applicant's name and address, the owner's name and address, and the tax lot number of the property where the proposed solar energy system is to be located.
3. A statement by the applicant that the solar energy system is already installed or that it will be installed on the property within one (1) year following the granting of the permit.
4. The proposed site and location of the solar energy system, its orientation with respect to true south, and its slope from the horizontal shown clearly in drawing form.
5. A sun chart.
6. The tax lot numbers of a maximum of ten (10) adjacent properties proposed to be subject to the Solar Access Permit. A parcel map of the owner's property showing such adjacent properties with the location of existing buildings and vegetation, with all exempt vegetation labeled exempt.
7. The Solar Access Permit height limitations as defined in Section 18.70.050 of this Ordinance, for each affected property which are necessary to protect the solar energy system from shade during solar heating hours. In no case shall the height limitations of the Solar Access Permit be more restrictive than the building setbacks.
C. If the application is complete and complies with this Ordinance, the Staff Advisor shall accept the solar access recordation application and notify the applicant. The applicant is responsible for the accuracy of all information provided in the application.
D. The Staff Advisor shall send notice by certified letter, return receipt requested, to each owner and registered lessee of property proposed to be subject to the Solar Access Permit. The letter shall contain, at a minimum, the following information:
1. The name and address of the applicant.
2. A statement that an application for a Solar Access Permit has been filed.
3. Copies of the collector location drawing, sunchart, and parcel map submitted by the applicant.
4. A statement that the Solar Access Permit, if granted, imposes on them duties to trim vegetation at their expense.
5. The advisability of obtaining photographic proof of the existence of trees and large shrubs.
6. The times and places where the application may be viewed.
7. Telephone number and address of the City departments that will provide further information.
8. That any adversely affected person may object to the issuance of the permit by a stated time and date, and how and where the objection must be made.
E. If no objections are filed within thirty (30) days following the date the final certified letter is mailed, the Staff Advisor shall issue the Solar Access Permit.
F. If any adversely affected person or governmental unit files a written objection with the Staff Advisor within the specified time, and if the objections still exist after
informal discussions among the objector, appropriate City Staff, and the applicant, a hearing date shall be set and a hearing held in accordance with the provisions of Section 18.70.080.

SECTION 18.70.080 Hearing Procedure.

A. The Staff Advisor shall send notice of the hearing on the permit application to the applicant and to all persons originally notified of the Solar Access Permit application, and shall otherwise follow the procedures for a Type I hearing.
B. The Staff Advisor shall consider the matters required for applications set forth in Section 18.70.070(B) on which the applicant shall bear the burden of proof, and the following factor on which the objector shall bear the burden of proof: A showing by the objector that the proposed collector would unreasonably restrict the planting of vegetation on presently under-developed property.
1. If the objector is unable to prove these circumstances and the applicant makes the showings required by Section 18.70.060(B), the Staff Advisor shall approve the permit.

2. If the applicant has failed to show all structures or vegetation shading of the proposed collector location in his application, the Staff Advisor may approve the permit
while adding the omitted shading structures or vegetation as exemptions from this Chapter.
3. If the objector shows that an unconditional approval of the application would unreasonably restrict development of the objector's presently under-developed property, the Staff Advisor may approve the permit, adding such exemptions as are necessary to allow for reasonable development of the objector's property.
4. If the Staff Advisor finds that the application contains inaccurate information which substantially affects the enforcement of the Solar Access Permit, the application shall be denied.
C. Any decision by the Staff Advisor is subject to review before the Planning Commission as a Type II planning action according to the usual procedures contained in this Title. (Ord. 2775, 1996)

SECTION 18.70.090 Limits On Solar Access Permits.

A. No Solar Access Permit may be filed which would restrict any lot which has an average slope of fifteen (15) percent in the northerly direction.
B. A Solar Access Permit becomes void if the use of the solar collector is discontinued for more than twelve (12) consecutive months or if the solar collector is not installed and operative within twelve (12) months of the filing date of the Solar Access Permit. The applicant may reapply for a Solar Access Permit in accordance with Chapter 18.70.070, however, the application fee shall be waived.

SECTION 18.70.100 Entry of Solar Access Permit Into Register.

A. When a Solar Access Permit is granted, the Staff Advisor shall:
1. File the Solar Access Permit with the County Clerk. This shall include the owner's name and address and tax lot of the property where the recorded collector is to be located, any special exceptions or exemptions from the usual affects of a Solar Access Permit, and the tax lots of the ten (10) or fewer adjacent properties subject to the Solar Access Permit.
2. File a notice on each affected tax lot that the Solar Access Permit exists and that it may affect the ability of the property owner to grow vegetation, and that it imposes certain obligations on the property owner to trim vegetation.
3. Send a certified letter, return receipt requested, to the applicant and to each owner and registered lessee of property subject to the Solar Access Permit stating that
such permit has been granted.
B. If a Solar Access Permit becomes void under Section 18.70.090(B), the Staff Advisor shall notify the County Clerk, the recorded owner, and the current owner and lessee of property formerly subject to the Solar Access Permit.

SECTION 18.70.110 Effect and Enforcement.

A. No City department shall issue any development permit purporting to allow the erection of any structure in violation of the setback provisions of this Chapter.
B. No one shall plant any vegetation that shades a recorded collector, or a recorded collector location if it is not yet installed, after receiving notice of a pending Solar Access Permit application or after issuance of a permit. After receiving notice of a Solar Access Permit or application, no one shall permit any vegetation on their property to grow in such a manner as to shade a recorded collector (or a recorded collector location if it is not yet installed) unless the vegetation is specifically exempted by the permit or by this Ordinance.
C. If vegetation is not trimmed as required or is permitted to grow contrary to Section 18.70.100(B), the recorded owner or the City, on complaint by the recorded owner, shall give notice of the shading by certified mail, return receipt requested, to the owner or registered lessee of the property where the shading vegetation is located. If the property owner or lessee fails to remove the shading vegetation within thirty (30) days after receiving this notice, an injunction may be issued, upon complaint of the recorded owner, recorded lessee, or the City, by any court of jurisdiction. The injunction may order the recorded owner or registered lessee to trim the vegetation, and the

court shall order the violating recorded owner or registered lessee to pay any damages to the complainant, to pay court costs, and to pay the complainant reasonable attorney's fees incurred during trial and/or appeal.
D. If personal jurisdiction cannot be obtained over either the offending property owner or registered lessee, the City may have a notice listing the property by owner, address and legal description published once a week for four (4) consecutive weeks in a newspaper of general circulation within the City, giving notice that vegetation located on the property is in violation of this Ordinance and is subject to mandatory trimming. The City shall then have the power, pursuant to court order, to enter the property, trim or cause to have trimmed the shading parts of the vegetation, and add the costs of the trimming, court costs and other related costs as a lien against that property.
E. In addition to the above remedies, the shading vegetation is declared to be a public nuisance and may be abated through Title 9 of the Ashland Municipal Code.
F. Where the property owner or registered lessee contends that particular vegetation is exempt from trimming requirements, the burden of proof shall be on the property
owner or lessee to show that an exemption applies to the particular vegetation.

For Setback Tables A through D, see: http://www.ashland.or.us/MunicipalCode/TITLE_18/70/index.html

Model Interconnection Agreement

This model one-page interconnection agreement for small scale solar, wind, and microhydro systems is being used by a number of utilities around the country – municipals, cooperatives, and investor-owned. This one-pager was originally developed by a solar systems integrator in cooperation with utilities in Rhode Island. Aside from its simplicity, the salient points of this document are the references to existing national standards: Institute of Electrical and Electronics Engineers (IEEE) Standard 929, Underwriters Laboratories (UL) 1741, and the National Electrical Code (NEC) Article 690. These three documents lay out the relevant technical requirements for grid interconnected systems and preclude the need for utilities to develop their own standards.

Interconnection requirements include both technical and contractual issues that define the relationship between the small system owner and the utility. Although 30 states and the District of Columbia now allow net metering, many of these states have not addressed interconnection issues, thereby effectively limiting the implementation of net metering and slowing the growth of the grid-connected market for small renewables like PV. The primary purpose of this one-page agreement therefore is to provide a simplified template to address all the relevant technical and contractual issues.

Frequently, in addition to this one-page agreement, utilities (or utility commissions) will establish rules that outline some of the contractual details such as contact with the utility, processing of interconnection agreements, access to customer premises, insurance and indemnification requirements (if any), and conflict resolution.

For more information about interconnection issues and interconnection/net metering activity around the country, visit www.irecusa.org/connect.htm.

Model Interconnection Agreement for Solar, Wind, and Hydro-Power Systems 10 kW Or Smaller

Section 1. Customer Information

Name: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Street address (if different than above): _____

Daytime Phone: _____ Evening Phone: _____

Utility Customer Account Number (from utility bill): _____

Section 2. Generating Facility Information

System Type (check box): Solar Wind Hydro Generator Size (kW AC): _____

Inverter Manufacturer: _____ Inverter Model: _____

Inverter Serial Number: _____ Inverter Power Rating: _____

Inverter Location: _____

If over 5 kW: Disconnect Type: Meter Removal Separate Disconnect – Location: _____

Section 3. Installation Information

Licensed Electrician: _____ License #: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Daytime Phone #: _____ Installation date: _____

Section 4. Certifications

1. The generating facility's inverter meets the requirements of IEEE 929, "Recommended Practice for Utility Interface of Photovoltaic (PV) Systems" and Underwriters Laboratories (UL) 1741, "Standard for Static Inverters and Charge Controllers for Use in Photovoltaic Power Systems"; and

Signed (Equipment Vendor): _____ Date: _____

Name (Printed) _____ Company: _____

2. The generating facility has been installed in compliance with the [Utility's] "Standards for Interconnection and Parallel Operation of Small-Scale, Customer-Owned Solar or Wind Powered Generating Facilities of 10 kW or Smaller"; and with all applicable requirements of the National Electrical Code and local building codes.

Signed (Electrician): _____ Date: _____

Name (printed) _____ Company: _____

3. The system has been installed to my satisfaction and I have been given system warranty information and an operation manual, and have been instructed in the operation of the system.

Signed (Owner): _____ Date: _____

Section 5. Local Building Division Inspection and Approval

1. Application Approved: _____ Date: _____

2. System Inspection by: _____ Inspection Date: _____

APPENDIX D

Madison, Wisconsin
Contractor Licensing and Equipment Standards

CHAPTER 30: HEATING, VENTILATING AND AIR CONDITIONING CODE

Section
30.01 Administration.
30.02 Definitions.
30.03 General Conditions.
30.04 Electric Space Heating.
30.05 Active Solar Collector Systems. (Cr. by Ord. 8348, 5-25-84)

(b) There shall be five (5) classes of licenses issued pertaining to heating in the City of Madison.

1. Class B license shall be issued to a person desiring to install gas, oil, or coal conversion automatic equipment and controls in existing heating plants, and service, clean, and repair above-mentioned equipment, but shall not alter or repair any part of the distribution system.

2. Class A-1 license shall be issued to a person desiring to enter into the business of installing, altering, or repairing warm air space heating equipment utilizing all types of energy.

3. Class A-2 license shall be issued to a person desiring to enter into the business of installing, altering, or repairing steam or hot water equipment utilizing all types of energy.

Exception. Gas-fired unit heaters not connected to ductwork may be installed by a Class A-2 license holder.

4. Class A-3 license shall be issued to a person licensed with the City of Madison as a Class A or AA Electrical Contractor as defined in Section 19.06 of the Madison General Ordinances who desires to enter into the business of installing, altering, or repairing electrical space heating equipment (of the electric resistance type installed in the zone of its occupancy).

5. Class A-4 license shall be issued to a person desiring to enter into the business of installing, altering or repairing active solar heating equipment."

30.02 DEFINITIONS.

Active Solar Collector. An active solar collector is a device that passive solar devices or installations.) (Cr. by Ord. 8348, 5-25-84)

Active Solar Thermal System. An active solar thermal system is an auxiliary heating system using solar collectors to augment the building's primary heat source for space or water heating. (This definition does not include passive solar greenhouses.) (Cr. by Ord. 8348, 5-25-84)

30.05 ACTIVE SOLAR COLLECTOR SYSTEMS.

(1) Orientation Guidelines.

(a) For solar systems used only for winter space heating, the collector tilt angle measured from the horizontal shall be 55° to 90°, and the azimuth angle measured from due south shall be 25° or less.

(b) For solar systems which are not utilized during the months of November, December, January, or February, the collector tilt angle measured from the horizontal shall be 14° to 45°, and the azimuth angle measured from due south shall be 35° or less.

(c) For solar systems used the entire year for space heating or water heating, the collector tilt angle measured from the horizontal shall be 45° to 60°, and the azimuth angle measured from due south shall be 30° or less.

(d) Any variations from the orientation guidelines above and the shading percentage of the solar collector required in Sec. 30.05(2) below, must be consented to and acknowledged by the owner in writing prior to installation of the solar system.

(2) Shading of Solar Collectors. No more than five percent (5%) of the area of the solar path shading diagram shall be obstructed.

(3) Collector Mounting. Every solar collection system shall be securely anchored to prevent damage to the collector(s) and structure to which they are attached. Fully engineered mounting and rack details showing collector attachment and support anchorages shall be approved by the Department before installation. The collectors shall be installed according to the manufacturer's instructions.

(4) Roof Support. Every solar collection system installed on a roof shall be analyzed to determine if the roof system is strong enough to support the collector system and any anticipated snow loads. Details showing roof structure reinforcements shall be approved by the Department before installation.

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(5) Use of Wood in Solar Collection Systems. All wood components used in collector mounting which are exposed to the weather shall be pressure treated wood, meeting Interim Federal Specifications TT-W-571J-Rev. 1974, as amended or revised. Wood used in collector frames or housing shall be protected against pyrolysis.

(6) Corrosion. All materials used in the manufacturing and installation of active solar systems shall be of corrosion-resistant material. All connections shall be made with compatible materials.

(7) Sensors. All sensors and controllers installed in active solar systems shall be located to provide for servicing, be installed according to the control manufacturer's instructions and be protected from damage. All sensor wiring shall be securely attached and protected from damage and moisture.

(8) Liquid Systems - Piping and Penetration.

(a) When three (3) or more collectors are installed in any one system, a Z-flow piping configuration shall be used unless an alternate flow configuration is recommended by the manufacturer.

(b) Piping shall be installed so the system can be completely drained.

(c) No permanent piping shall connect the solar system with potable water.

(d) All piping used in the solar loop shall be made and assembled of materials that will not distort or deteriorate from fluids, temperatures, pressure, or exposure.

Note: CPVC Piping has performed poorly in certain installations.

(e) All solar loop building penetrations shall be made using weatherproof devices which will allow for expansion and contraction. All penetrations into the building shall be weatherproofed to prevent leaks, insects and drafts from entering the building.

(f) All of the components of a closed loop solar collector system shall be sized to provide adequate flow to the collectors.

(9) Air Systems: Ducting and Penetration.

(a) All ducts used in the solar loop shall be made and assembled of materials that will not distort or deteriorate from temperature, pressure, or exposure.

(b) All solar loop duct building penetrations shall be made using weatherproof devices which will allow for expansion and contraction. All penetrations into the building shall be weatherproofed to prevent leaks, insects and drafts from entering the building.

(c) All of the components of a solar collector duct system shall be sized to provide adequate airflow to the collectors. 30 - 20a Rev. 7/15/84

(d) The solar loop ductwork from the mechanical equipment (i.e. risers to the collector(s), and manifold(s) if used) shall be leak tested with a calibrated blower and the recorded leakage at one-inch water column shall not exceed ten percent (10%) of the system design airflow rate.

Note: The City will accept silicone caulk, Hard Cast or equivalent as sealants for metal ducts and Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) approved aluminum tape or approved equivalent as sealants for fiberglass ducts. All ducts in unconditioned spaces shall be sealed with one of the above. Duct tape is not approved for solar application.

(e) All ductwork shall be fabricated and installed to meet SMACNA standards.

(f) Back-draft dampers or motorized dampers shall be installed so as to prevent air passage through the collectors except when solar energy is being collected.

(g) The system shall be designed and installed to prevent cold airflow across the water heating coil. If mechanical dampers are used to meet this requirement, they shall meet a leakage test not to exceed five percent (5%) of the system design air flow rate at one-inch water column.

(h) All systems shall incorporate a secondary freeze protection system in case of mechanical failure. An electrical freeze sensor which activates the pump to circulate fluid through the domestic coil will meet this requirement.

(i) Systems incorporating domestic heating shall be equipped with a summer bypass to the solar storage during the non-heating season.

(j) All air systems used for space heating shall incorporate the use of a high efficiency air filter installed in the cold air riser duct to the collectors. The air filter shall have a minimum average efficiency of thirty percent (30%) as rated by the filter manufacturer.

(10) Liquid Systems - Pipe Insulation.

(a) All pipe insulation in the solar collection system shall be at least R-3 in insulating value. Pipes of nominal size of one and one-half inch or larger shall be insulated with at least R-4 insulation.

(b) Exterior pipe insulation shall resist ultraviolet and environmental degradation. Exterior insulation joints, seams and connections shall be sealed to prevent entry of moisture. Elastomer insulation shall not be used for exterior solar application.

Note: One-inch thickness of urethane, fiberglass and phenolic foam, with appropriate cover will meet the requirements of Subsection (b) above.

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(11) Air Systems - Duct Insulation and Piping.

(a) Ductwork located in unheated spaces shall be insulated to a minimum value of R-7.

(b) Ductwork located in heated spaces shall be insulated to a minimum value of R-3.

Note: It is recommended that all duct chases be insulated to a minimum insulating value of R-11. Some acceptable materials for insulation include: fiberglass duct wrap, fiberglass duct liner, fiberglass duct board.

(c) A vapor barrier, if installed, shall not be located on the cold side of the ductwork.

(d) All domestic water piping used in conjunction with a solar air system shall meet the piping requirements for liquid systems.

Exception: The cold-water inlet to the storage tank need not be insulated beyond two (2) feet from the storage tank.

(12) Heat Transfer Fluids.

(a) Every solar collection system using fluids for heat transfer shall have a label attached to the storage/transfer tank indicating what fluid is contained in the collection system, its freezing point, Ph and installation date.

(b) The fluid contained in a non-drain down system shall be able to withstand temperatures of at least -30°F before freezing.

(c) Instructions shall be attached to the system indicating the fluid manufacturer's recommendations for proper checking and maintenance procedure.

(d) Only fluids recommended by the manufacturer for use in solar systems shall be used in solar systems. Ethylene glycol shall not be used for solar systems due to its toxicity.

(e) The heat transfer fluid used in the collectors shall be isolated from the potable water supply through the use of an approved double wall heat exchanger.

(13) Valves, Vents and Dampers.

(a) Adequately sized pressure relief valves shall be located on all storage tanks within the system. The pressure relief valve shall be piped to discharge fluids within ten (10) inches of the floor.

(b) All closed loop solar collector systems filled with antifreeze fluids shall be provided with a bleed valve installed at the highest point in the piping system.

(c) All closed loop solar collection systems shall be provided with a pressure relief valve in the solar loop piping. The relief valve shall be piped to a safe location to avoid personal injury or damage to the building.

(d) All closed loop solar collector systems filled with antifreeze fluid shall be pumped from the bottom of the collector array to the top of the collector array during normal operation. A check valve shall be provided in the system to prevent flow in the opposite direction.

(e) Controls, dampers and valves shall be marked to identify their function.

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(14) Storage Tanks - Liquid Systems.

(a) Storage tanks shall be located in heated (+50°F) areas whenever possible.

(b) Storage tanks located in unheated areas (+49°F or less) shall be insulated to an overall value of R-20 or greater. The insulation shall be permanently fastened in place.

(c) Storage tanks installed in heated spaces shall be insulated to an overall value of R-11 or greater. The insulation shall be permanently fastened in place.

(d) Storage tanks shall be located to provide for proper servicing.

(e) All storage tanks shall be designed and installed to withstand all anticipated loads and environmental conditions.

(f) All air vented tanks shall be covered.

(15) Storage - Air Systems.

(a) Storage systems shall be located in heated (+50°F) areas whenever possible.

(b) Storage systems located in unheated areas (+49°F or less) shall be insulated to an overall value of R-38 or greater. The insulation shall be permanently fastened in place.

(c) Storage systems installed in heated spaces shall be insulated to an overall value of R-11 or greater. The insulation shall be permanently fastened in place.

(d) All storage systems shall be designed and installed to withstand all anticipated loads and environmental conditions.

(e) If rock is utilized for thermal storage, it shall be washed before it is placed into the storage area.

(f) If phase change storage materials are utilized in an air storage system, the storage materials shall be placed in sealed containers.

(g) When a rock storage system is utilized, an inlet plenum and an outlet plenum shall be provided.

(16) Monitoring and Manuals.

(a) Every active liquid solar system shall have a thermometer installed on the storage tank, to measure the temperature of the fluid in the storage tank. A single tank system would not be considered as having a storage tank.

(b) Arrows shall be placed on the piping/ducting of the solar collector loop to indicate the direction of the fluid/air flow.

(c) Suppliers and installers of solar systems shall supply manuals to the owner explaining the operation and maintenance of the installed solar equipment. The manufacturer's name and model number of all major components shall be furnished
to the owner.

(17) Site Built and Non-Standard Systems. The intent of this code is not to inhibit or discourage site built and non-standard systems but to insure that they are adequately designed and installed. Site built collectors shall conform to the provisions of this code, except 30.01(10)(c)7.b.

(Sec. 30.05 Cr. by Ord. 8348, 5-25-84)
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APPENDIX E

Chapel Hill, North Carolina
Energy Conservation Ordinance

CODE OF ORDINANCES Town of CHAPEL HILL, NORTH CAROLINA
Codified through Ord. No. 99-11-22/0-4.1, enacted Nov. 22, 1999. (Suppl)

SUBPART B

Chapter 5 BUILDINGS AND BUILDING REGULATIONS*

ARTICLE VII. ENERGY CONSERVATION IN DESIGN AND CONSTRUCTION OF NEW AND RENOVATED TOWN BUILDINGS

Sec. 5-121. Intent.

The Comprehensive Plan for the Town of Chapel Hill says that, "The Town shall encourage site planning, landscaping, and structure design which maximizes the potential for energy conservation by reducing the demand for artificial heating, cooling, ventilation and lighting, and facilitating the use of **solar** and other energy resources."

It is the intent of the Council to provide the citizens and employees of the Town of Chapel Hill with new and renovated buildings which will give the optimum comfort, ensure the durability of investments for the taxpayer, consider the health of building occupants and provide the greatest awareness possible of the environmental impacts of what we do.

(Ord. No. 97-5-12/O-4, 5-12-97)

Sec. 5-122. Energy conservation goals in building design.

Any buildings built with Town funds shall be designed to achieve a goal of using at least 30 per cent less energy than required by the North Carolina State Building Codes in effect as of February 1, 1997, as long as the estimated energy savings exceed the marginal cost of the energy saving features over the expected life of the building and subject to fiscal constraints established by the Council. In order to avoid increased cost of operation, care shall be taken to avoid complex systems that would require extensive technical training of personnel. Acceptable methods for energy use analysis can be found in Energy Efficient County Facilities For Wake County. A copy of this document is on file and available for loan from the Internal Services Division, Chapel Hill Public Works Department.

(Ord. No. 97-5-12/O-4, 5-12-97)

Sec. 5-123. Qualification of architects.

In order to be selected to design a Town building, an architect has to demonstrate that the architectural firm has previously designed a building using some or all of the techniques listed herein. The architect chosen for any building must incorporate the conditions of this article in the building design or show justification why not.

To help ensure compliance with this article, at least one (1) member of each architectural selection review panel shall be a recognized energy professional. The Citizens' Energy Task Force shall maintain a list, updated annually, of qualified volunteer energy professionals including of brief summary of their qualifications and experience. For projects where the estimated cost of architectural and engineering services is less that $30,000, the manager is authorized to select a panel member from the list. For projects where the estimated cost of architectural and engineering services is $30,000 or more, the Manager shall solicit a nomination from the Citizen's Energy Task Force to identify the selection panel member.

(Ord. No. 97-5-12/O-4, 5-12-97)

Sec. 5-124. Energy performance monitoring and reporting.

For major construction projects or substantial renovations of existing buildings (construction costs of $200,000 or more and/or architectural fees of $30,000 or more) the Town shall require either the architect or the staff project manager to monitor the energy performance of the building and assist the staff in optimizing energy use of the building during the first year.

Twelve (12) months after completion of the project, the architect shall be required to prepare a written report on the performance of the building in relation to the requirements of this article and to present their report to the Council at a regularly scheduled business meeting. The Town Manager may either require these services of the architect or assign similar responsibilities to the staff project manager.

The Town Manager's annual report to Council will include a section reporting the energy consumption performance of each Town building.

(Ord. No. 97-5-12/O-4, 5-12-97)

Sec. 5-125. Use of energy efficient technologies in town buildings.

Energy saving features, including but not limited to the following, shall be considered for new Town buildings and major renovations of existing buildings. Design documents shall include an explanation of how the features listed below are incorporated into the design or, for those features not incorporated, an explanation of the financial or operational reasons why the feature was omitted from the design.

(a) Solar orientation, with the long axis facing south;
(b) Use of daylighting;
(c) Use of appropriate glass for minimizing heating and cooling loads;
(d) Insulation beyond minimum standards;
(e) Use of renewable energy for heating and cooling;
(f) Use of renewable energy for heating and swimming pools;
(g) Use of water conservation measures including dual water systems if available;
(h) Landscaping for summer cooling effect and for blocking winter winds;
(i) Use of energy efficient motors;
(j) Use of energy efficient lighting;
(k) Use of energy management systems;
(l) Parking areas designed to limit heat absorption;
(m) Use of building materials and color to decrease cooling load;