

Executive Summary



PIONEER VALLEY CLEAN ENERGY PLAN

January 2008

Prepared by the

Pioneer Valley Renewable Energy Collaborative

Funding assistance provided by the Renewable Energy Trust
of the Massachusetts Technology Collaborative

**The plan and appendices are available at
www.pvpc.org and www.frcog.org**

Executive Summary

The Pioneer Valley Clean Energy Plan seeks a future where we minimize our impact on the earth's climate through the efficient use and generation of energy—energy that is safe, clean, ample, and helps sustain the economy. The Clean Energy Plan is part of a larger effort in the Pioneer Valley to create an ecologically sustainable region¹. This plan offers a path to a clean energy future, which will need to be implemented by communities, businesses, institutions, and even individuals, in their homes, backyards, businesses, and municipalities.

The Pioneer Valley Planning Commission initiated this planning process in 2003 by analyzing local barriers to the siting of clean energy projects in the Pioneer Valley and inventorying clean energy efforts underway². This analysis and inventory highlighted the need for a regional strategic energy plan for the Pioneer Valley. In 2005, the Pioneer Valley Planning Commission and the Franklin Regional Council of Governments secured funding from the Massachusetts Technology Collaborative to develop a clean energy plan for the region.

To help formulate this clean energy plan, project staff created an advisory committee known as the Pioneer Valley Renewable Energy Collaborative. Members were recruited from industry, planning, education, municipal governance, the not-for-profit sector, and the general public. This committee worked in conjunction with the Pioneer Valley Planning Commission and the Franklin Regional Council of Governments staff and volunteers to analyze the energy situation in the Pioneer Valley and to propose a path to a clean and safe energy future. Methods for this effort included data collection research and analysis, education, surveys, stakeholder analysis, and participatory planning. Details on the methods used to develop the plan are in the Appendix. In addition, we developed a clean energy primer that is also included in the Appendix.

More than 900 people helped to develop this plan in a very participatory planning process facilitated between October 2006 and July 2007. The participatory planning process included:

- Public outreach and on-line public survey.
- On-line targeted surveys with email follow-up of municipal planning boards, public works and planning staff, and town administrators.
- Stakeholder interviews, educational sessions, workshops and conferences
- An online planning process held between October and November 2006 with more than 300 people participating that developed the guiding principles, goals, project siting guidelines, and implementation strategies.
- Three in-person hearings with 60 people held in October 2006 (one in each of the three counties addressed in the plan).
- A day-long forum in April, 2007.
- An online survey and forum to provide feedback on the first draft of the Clean Energy Plan with more than 900 people participating from April to July 2007.

Make no little plans; they have no magic to stir people's blood and probably themselves will not be realized. Make big plans; aim high in hope and work, remembering that a noble, logical diagram once recorded will never die, but long after we are gone will be a living thing, asserting itself with ever-growing insistency. Remember that our children and grandchildren are going to do things that would stagger us. Let your watchword be order and your beacon beauty.

Daniel Hudson Burnham (1846–1912)

We have produced a clean energy plan for the Pioneer Valley with four very ambitious goals.

Goals

Goal One: Reduce our region's energy consumption to 2000 levels by the end of 2009 and reduce that by 15 percent between 2010-2020.

Goal Two: Site sufficient new capacity to generate 214 million kilowatt hours of clean energy annually in the Pioneer Valley by the end of 2009 and another 440 million kilowatt hours by 2020.

Goal Three: Reduce our region's greenhouse gas emissions by 80 percent below year 2000 levels by 2050.

Goal Four: Create local jobs in the clean energy sector.

Our plan does not identify the specific projects that will achieve our clean energy generating goals because local officials and state regulators are the people who will decide which projects will be sited and permitted. There is no widespread regional consensus about the kinds of renewable energy resources or the scale of facilities people want to have sited in the Valley, but there is regional consen-

sus on the need to act. More public dialogue and education are needed to develop a shared understanding of precisely which renewable energy resources to site and where to site them. In the coming years, a large number of new projects will be proposed that we have not heard about yet, and so we focused our limited time developing guidelines for decision making (Guiding Principles) which can be applied both to proposed projects and to the many projects our communities will consider in the future and (Selection Criteria) to help local decision-makers make the best choice for their community and the region. Finally, we conducted a preliminary build-out analysis of our region's clean energy capacity so local decision-makers know what is possible.

Self-determination has to mean that the leader is your individual gut, and heart, and mind or we're talking about power, again, and its rather well-known impurities. Who is really going to care whether you live or die and who is going to know the most intimate motivation for your laughter and your tears is the only person to be trusted to speak for you and to decide what you will or will not do.

June Jordan (b. 1939), U.S. poet, civil rights activist. "Civil Wars," *Moving Towards Home: Political Essays* (1989).

Our Clean Energy Guiding Principles (condensed):

In the Pioneer Valley, we want to support efforts that:

- Reduce energy consumption through conservation and efficiency, reduce dependence on fossil fuels, and nuclear energy and reduce greenhouse gases.
- Protect and improve the environment and the quality of life in the Pioneer Valley.
- Increase use of solar, wind, small hydro, clean biomass, and clean fuels technologies produced in community-scale, locally owned facilities that benefit all members of the community and create jobs.
- Focus government resources and policies on supporting the cleanest forms of energy and efficiency.
- Promote a comprehensive public transportation system while also working to make our communities more pedestrian and bicycle friendly and energy efficient.
- Encourage farmers and large land owners to preserve open space through development of energy production as an additional income stream.
- Make the Pioneer Valley one of the leaders in the country for reducing energy consumption and for producing clean energy and improving energy technology.

Selection Criteria

In order to accomplish the goals of this plan, we need to build new renewable energy generating plants in the Pioneer Valley. The siting of new renewable energy plants is often controversial. Siting decisions are made locally, not at the regional level since the legacy of home rule is cherished throughout the Commonwealth of Massachusetts. To assist local decision makers, residents and project developers, we developed nine criteria to evaluate proposed clean energy projects. Preferred clean energy projects in the Valley should:

- Reduce fossil fuel and nuclear energy use.
- Involve a clean renewable technology— “clean” as defined by the Massachusetts Technology Collaborative – includes solar, wind, small hydro, and biomass-fueled facilities that meet all DEP requirements.
- Involve a community-scale facility i.e. promote community-ownership of renewable energy resources and support small businesses.
- Increase employment, gross sales, and patents generated by renewable energy-related businesses in the Pioneer Valley—to create local jobs with a living wage.
- Increase the affordability of clean energy for low and moderate-income households.
- Expand public transportation, car-sharing and car-pooling, pedestrian opportunities, bicycle use, alternative fuels, and zero or low emission vehicle use.
- Make it easier for farmers and forest landowners to maintain their open land due to lower energy costs and additional revenue streams.
- Maintain the water, air, vegetation, wildlife habitat, and other natural resources inherent to the site and the surrounding region.
- Be able to be implemented within two to three years because it has strong local support and is consistent with existing local and regional plans and has identified funding sources.

Implementation—Key Action Recommendations

Based on research, expert opinions, and results of a very dynamic public planning process, this plan endorses the following action items for immediate implementation by the key target audiences identified below:

Municipalities:

- Join ICLEI (Local Governments for Sustainability Cities for Climate Protection) and inventory community greenhouse gas emissions and then develop and implement a plan to reduce them by 80 percent by 2050.
- Consider hosting or owning a clean energy generating system or plant in your community (financial assistance available from the Massachusetts Technology Collaborative) where resources and environmental conditions allow.
- Adopt bylaws or ordinances to require or give incentives to encourage green buildings, energy efficiency, renewable energy production, public transportation, clean fuels, efficient vehicles, smart growth, and sustainable development.
- Conduct energy audits and implement efficiency and conservation measures identified (municipalities may want to consider a performance contract with an energy management service company (ESCO) to spread costs for energy efficiency over a longer term).
- Include an energy element in your municipalities' comprehensive plan.
- Collaborate with the Pioneer Valley Planning Commission and the Franklin Regional Council of Governments to seek funds for plan implementation.

- Endorse the clean energy policy statement adopted by the Pioneer Valley Planning Commission and the Franklin Regional Council of Governments.
- Purchase clean energy.
- Work with the western Massachusetts legislative delegation to assure prompt adoption and implementation of this plan's policy recommendations.
- Establish an energy committee.

“Future solutions would lie in the use of existing renewable energy technologies, greater efforts at energy efficiency and the dissemination of decentralized energy technologies and options”

From “energy {r}evolution: A BLUEPRINT FOR SOLVING GLOBAL WARMING,” European Renewable Energy Council, p. 3

Energy Committees (some are housed within municipal government and others are independent):

- Collaborate with planning and building departments to develop and adopt bylaws or ordinances to require or give incentives to encourage green buildings, energy efficiency, public transportation, clean fuels, efficient vehicles and sustainable development.
- Work with your municipal government to conduct energy audits, implement recommended improvements and build renewable energy systems.
- Seek funding to support appropriate siting and installation of renewable energy systems on municipal property and in the community.
- Work with nonprofits, advocacy groups, planning commissions, universities and colleges to educate people in your community about clean energy.
- Collaborate with energy committees throughout the region to share ideas, lobby elected officials to assure prompt adoption and implementation of this plan's policy recommendations, and continue the development of a clean energy future for the Pioneer Valley.
- Provide public education regarding clean energy in collaboration with non profits, advocacy groups, planning commissions, and educational institutions.

Regional Planning Agencies:

- Update regional plan as necessary.
- Staff PVREC.
- Collaborate with members of the collaborative to assure plan implementation
- Take leadership role in securing funding to assist in implementation of planning-related recommendations.
- Support efforts of member municipalities to act on their recommendations.

Businesses:

- Perform an energy audit within the next two years, if not done in the last 12 months, and every five years thereafter.
- Implement all feasible recommendations of your energy audit within two years.
- Participate in your municipality's energy conservation and efficiency programs.
- Support green buildings, energy efficiency, smart growth, public transportation, clean fuels, efficient vehicles and sustainable development.
- Incorporate clean energy systems into all operations including siting a clean energy system in or on your building or property.
- Purchase clean energy.
- Donate money to support local energy efficiency efforts, including but not limited to compact fluorescent bulb sales, solar home tours, home installation workshops, home energy audits, weatherizing, idling reduction programs, and solar hot water heater sales.

Nonprofits/Advocacy Groups:

- Perform an energy audit within the next two years and every five years thereafter.
- Implement all feasible recommendations of your energy audit within two years.
- Participate in your municipality's energy conservation and efficiency programs to the best of your ability.
- Encourage municipalities, businesses, and residents to build new renewable energy systems, become more energy efficient and conserve more energy.



- Support green buildings, energy efficiency, public transportation, clean fuels, efficient vehicles, and sustainable development.
- Advocate for renewable energy and energy efficiency legislation.
- Provide public educational materials and seminars tailored for municipalities, businesses, and individuals; continue public discussion regarding how the region will respond to climate change and the need to convert energy sources.
- Incorporate clean energy systems into all operations including siting a clean energy system on your building(s) or property and/or purchasing clean energy.

Individuals:

- Request a free energy audit of your property (www.masssave.com) or contact your utility company directly; implement as many recommendations as financially possible.
- Reduce your energy use, use energy more efficiently and get the energy you need from local, renewable clean energy.

- Support green buildings, energy efficiency, public transportation, smart growth, clean fuels, efficient vehicles and sustainable development.

Massachusetts Legislators and Policy Makers

- Implement the Massachusetts Climate Action Plan and commit to guiding Massachusetts toward a 20% reduction in greenhouse gas emissions by 2010 and an 80% reduction by 2050.
- Facilitate siting, permitting, and grid interconnection for renewable energy, particularly wind, solar, and biomass installations using the most efficient, cost effective, and least polluting technology available. Consider the full lifecycle costs of all forms of electricity generation and favor renewable sources of energy generation over the combustion of fossil fuels.
- Work with the Governor to fund a comprehensive energy efficiency program that has as its basis the recommendations put forth by the New England Energy Efficiency Partnership.
- Transportation, Land Use, and Waste Reduction — support policies and laws that promote compact development in urban and suburban areas, protect open space, including watersheds and drinking water discharge areas, wildlife habitat and farmland, and support mixed use districts, town and city centers that are transit-oriented, walkable, and bikeable.



- Provide funding to regional planning agencies and others to develop regulatory tools for Pioneer Valley cities and towns to facilitate energy efficient construction and rehabilitation of homes and other buildings and to achieve the goals of Architecture 2030 (www.architecture2030.org).
- Provide funding to enable all cities and towns in the Pioneer Valley to join ICLEI-Local Governments for Sustainability and to fully participate in their cities for climate protection program (www.iclei.org).
- Provide funding to implement a grassroots organizing program, that would encourage every household and business in the Pioneer Valley to reduce electricity use by doing such things as getting an energy audit, implementing recommendations of the audit, using efficient appliances, buying locally grown food, using public transportation, encouraging smart growth, switching light bulbs to compact fluorescent lights, and installing clean energy systems.
- Support expansion of existing programs of utilities and not for profit groups such as the Center for Ecological Technology (CET) (www.cetonline.org) that conduct home and business energy audits and fund implementation of recommended improvements.
- Provide funding to regional planning agencies (RPAs) to develop, and work with communities to adopt, zoning bylaws or ordinances and subdivision regulations to help cities and towns to facilitate the siting of renewable energy projects that have strong community support (examples available at www.cleanair-coolplanet.org).
- When requested by a city or town, strongly support through media and other means the development and siting of clean renewable energy technologies in the Pioneer Valley that meet a majority of the selection criteria and that will help achieve our clean energy goals by 2020.
- Provide funding to develop a western Massachusetts public information and education campaign featuring local success stories of energy savings, reduction, efficiency, and the generation of clean energy.
- Support the development of sustainable feedstock biofuel plants to increase the supply of liquid fuels for transportation, heating, and energy generation, replacing fossil fuels currently used for these purposes.

- Aggressively support the development of start-up clean energy companies in the Pioneer Valley.

Pioneer Valley Renewable Energy Collaborative:

- Continue to meet as necessary, and no less than quarterly to:

Work to secure funding for plan implementation.

Assess progress toward plan goals.

Address issues and adjust the plan as needed.

Develop recommendations and tactics to support the plan.

Respond to stakeholder needs.



- Seek financial support to maintain and expand the region's capacity to proactively identify and facilitate renewable energy project development to serve its business, institutional, and municipal facilities. Support for this effort will be sought from contributions within the region, and from the MA Renewable Energy Trust. The support will enable the regional to address a significant development gap in community scale renewable energy, which is the early stage efforts needed to identify good project opportunities, develop project champions, conduct feasibility studies, and facilitate the project development process.
- The region has a history and unique on-going activities and commitment to support community or cooperative ownership of renewable energy projects. The region will convene an expert committee to prepare a business plan and propose the establishment of a community-based renewable energy investment fund to create a significant local project financing source for community-scale projects developed in the region. Such a financial mechanism will benefit project finan-

cial feasibility in the region, maintain project economic benefits locally, and enhance a community's support of renewable energy projects.

This plan is only the beginning. Additional work is needed by all members of the Pioneer Valley community to implement this plan. The actions we all need to take to reduce energy use are clear and available. Funding to act is not always at hand, but together we can bring the resources we need to our region. We have thoroughly researched the different ways our region can achieve Goal Two (site 214 million kilowatt hours of clean energy production in the Pioneer Valley by the end of 2009 and another 440 million kilowatt hours by 2020), but now individual communities, homeowners and business owners must step up and either build, or allow to be built, clean energy generating facilities in their backyards. The project selection criteria and guiding principles clarify the kinds of projects we want here in the Pioneer Valley. Our region has more work to do to understand how we can implement the actions we know to be effective to reduce our energy use through conservation and efficiency, community planning, waste reduction, improved transportation infrastructure and improved local food systems. This plan identifies best practices others are pursuing in these areas, but we were not able to develop detailed plans for each area given time and resource constraints. We know that as facilities are planned, and as municipalities and individuals and organizations request energy audits and do their part to act on other plan recommendations, that local jobs in the clean energy sector will grow. Details on best practices are included in the Appendix as is an annotated webliography and bibliography.

Energy Efficiency & Conservation Potential

The Northeast Energy Efficiency Partnerships Inc. (NEEP) has determined that investments in efficiency improvements over a ten-year time period in New England could result in savings of 28 percent of the total peak summer capacity and 37 percent of the capacity represented by plants using fossil fuels. If a 28 percent reduction is possible for all of New England, we believe a comparable reduction is also possible for the Pioneer Valley. The main "reservoirs" of economical efficiency potential are in lighting and



heating in residential, commercial and industrial markets and in transportation efficiencies.

Industry: In the Pioneer Valley we can make our industries more energy efficient through heat recovery, more efficient motors and drives, and the use of cogeneration (also called combined heat and power or CHP) systems that provide both heat and electricity.

Buildings: We can build new buildings that use less energy and improve the energy efficiency of existing buildings through different lighting, weatherization, different use of space, and better efficiency standards for building components and appliances.

Transportation: We can reduce our region's energy use by reducing our driving, making it easier for people to walk or bicycle, using lighter weight vehicles, car-pooling and car-sharing, public transit, improved aerodynamics in vehicles, and more efficient propulsion systems, such as hybrid engines.

Renewable Energy Potential in the Pioneer Valley

Because this is a regional plan that shows a path to a clean energy future for the 69 communities of the Pioneer Valley, we thought at one time that we might be able to identify projects, either planned or imagined, that would meet our clean energy goal of generating 214 million kilowatt hours of clean energy annually, with another 440 million kilowatt hours by 2020. However, due to a variety of factors mentioned previously, most notably home rule in Massachusetts and the fast pace of development in the clean energy sector, we do not presume to identify exactly how the region will meet its clean



energy goal. We have, however, completed the research necessary to reassure Pioneer Valley residents and decision-makers that we do indeed have the renewable energy resources necessary to meet and even exceed our goals.

Wind: Compared to Berkshire, Worcester, and particularly the coastal counties, the three counties along the Connecticut River Valley do not have a plentiful wind resource. However, there are several areas that could host wind power projects, and a few communities are considering community-owned or sponsored wind turbines. In order to get a sense of scale, consider the example of four communities hosting projects of one to five full-scale turbines; in this example, the turbines could produce in the range of 40 million kilowatt hours per year, or about 5,600 households' worth of electricity.³

Landfill Gas: There are seven sites either currently producing or permitted to burn LFG for energy in the Pioneer Valley: two in Chicopee and one in Granby are functioning as of plan release (2007). Four more are in the works in the communities of Northampton, Westfield, Palmer and South Hadley. This means that all large landfills in the region have been (or are being) developed. As technology changes, it may become cost effective to develop the clean energy potential of smaller landfills.

Hydro: According to a 1995 study prepared for the U.S. Department of Energy, "U.S. Hydropower Resource Assessment for Massachusetts", by the Idaho National Engineering Laboratory that used modeling software, there are at least 130 sites in Massachusetts river basins that have the potential to generate hydropower. The basin with the most

undeveloped hydropower potential is the Connecticut River with 68 sites and 84 MW of capacity. The Connecticut River Basin total is driven by three sites that have more than half the basin's total undeveloped potential. Over half of the estimated potential capacity across the entire state comes from sites that are currently undeveloped where impoundments might need to be constructed.

Biomass: The Sustainable Forest Bioenergy Initiative (SFBI) is an effort by the Department of Conservation and Recreation and the Division of Energy Resources to facilitate the development of biomass markets in Massachusetts. Draft results of the SFBI work suggests that roughly 150-200 MW of biomass energy could be developed in the western half of Massachusetts. This biomass build out in Massachusetts and the Pioneer Valley could include large power plants between 25 and 50 MW, combined heat and power plants between 5 and 10 MW, and numerous small 1-5 MMBtu/hr heat-only systems.

Solar PV: The estimated build out of clean energy from solar PV is limited only by the amount of appropriately oriented south-facing roof and other flat space available.

For a copy of the complete plan and appendices, go to www.pvpc.org or www.frcog.org or call Catherine Miller at 413/781-6045.

(Footnotes)

¹ www.pvsustain.com
for more information about regional sustainability efforts

² www.pvsustain.com
has inventory and regulatory barriers assessment

³ To estimate this number, multiply the following assumed numbers: (4 towns) x (average project size: 3 turbines) x (average turbine size: 1,500 kW) x (average capacity factor: 27%) x (availability: 95%) x (8,760 hrs/year) = 40,444,920 kWh/year. Divide that by the average Massachusetts household's annual consumption of 7,200 kWh/year to get the number of households served. For an introduction to the meaning behind these numbers, see RERL's community wind fact sheet "Capacity Factor, Intermittency, and what happens when the wind doesn't blow?" at this address: www.ceere.org/rerl/about_wind/