

**The Pennsylvania Energy
Development Plan**
*Investing in Pennsylvania's Clean
Energy Future*

March 28, 2008



Edward G. Rendell, Governor
Commonwealth of Pennsylvania

Kathleen A. McGinty, Secretary
Department of Environmental Protection &
Chair of the Board

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Introduction

Clean, advanced energy is a top priority for the Commonwealth of Pennsylvania. Rising oil, electricity and natural gas prices, rapidly increasing worldwide demand for energy, growing political tensions associated with foreign energy resources and concerns about the environmental impacts of traditional energy resources require Pennsylvania to take aggressive steps to develop and use our plentiful indigenous energy resources. Such steps will help move Pennsylvania toward energy price stability, a more diverse and secure energy supply and a cleaner environment. In addition, development of a robust, clean, advanced energy sector presents tremendous economic growth opportunities for Pennsylvania. New advanced energy companies and projects will attract new investment to Pennsylvania, create high-tech jobs that are attractive to young people and stimulate technological innovation for Pennsylvania. The Pennsylvania Energy Development Authority (PEDA or the Authority) is one of the commonwealth's most versatile tools to help build this growing sector of the economy.

Among other things, PEDA is charged with developing an Energy Development Plan (Plan), which will serve as an articulation of its own energy policy goals and set out a plan for the allocation and distribution of financial and technical assistance. PEDA also is a part of the commonwealth's broader energy strategy, and the Energy Development Plan must be viewed in that broader context. The Board issued its first Energy Development Plan for public comment on September 26, 1984. After reassessing its mission and objectives, on January 19, 1988, the Board issued an updated Energy Development Plan. Given the length of time that has passed since the preparation of the 1988 Plan, it is appropriate for the newly appointed Board to reassess the Authority's mission, goals and direction. This 2008 Energy Development Plan is the result of that reassessment.

Mission

The Authority's mission is to expand the market for Pennsylvania's clean, indigenous energy resources, to enhance Pennsylvania's energy independence and energy security through greater energy diversity, and to stimulate economic development and job creation in Pennsylvania, all in an environmentally beneficial manner.

Background

Authority Structure and Governance

The Authority is a public corporation exercising public powers of the commonwealth. The Authority is empowered to use a variety of financial tools to provide assistance to clean, advanced energy projects. The Authority may award grants, loans and loan guarantees, issue revenue bonds or notes and enter into contracts to help finance worthwhile projects.

The Authority is governed by a 19-member Board of Directors and managed by an Executive Director and staff. The Authority was created by the Pennsylvania Energy Development Authority and Emergency Powers Act of 1982 (the "Act") for the purpose of providing financial and technical assistance to energy projects within the commonwealth.

Its first board of directors was convened in 1984, and the Authority remained active until 1995. On April 8, 2004, Governor Rendell signed Executive Order 2004-5 revitalizing the inactive Authority and transferring it to the Department of Environmental Protection for staffing. On March 2, 2005, the newly reconstituted board met for the first time to consider draft bylaws and guidelines, elect officers, confirm a new Executive Director, and consider its mission and goals. Since then, the board has made 81 grant and loan awards totaling over \$32 million in four competitive financing solicitations.

The Authority is governed by the Act and its Bylaws as well as several commonwealth laws generally governing authorities and similar entities, including the Adverse Interest Act, 71 P.S. §§ 776.1 *et seq.*; the Ethics Act, 65 P.S. §§ 401 *et seq.*; and the Governor's Code of Conduct, 4 Pa. Code §§ 7.151. *et seq.* In addition, each solicitation may have additional restrictions arising from the source of the funds being offered. Thus, Act 178 of 2004 placed additional limitations on PEDDA's April 2005 solicitation. PEDDA's fall 2005 solicitation was subject to both Act 178 and to the requirements set forth in Act 45 of 2005, known as the Growing Greener II legislation.

The Authority's 19 Board members include nine members appointed by the Governor, four members of the Legislature or their designees (two from the Senate and two from the House) and six *ex-officio* members, including the Secretaries of Environmental Protection, Community and Economic Development, Agriculture, and Banking; the Chairman of the Public Utility Commission; and the Consumer Advocate. The Governor has named the Secretary of Environmental Protection Chairman of the Authority. This Board exercises all powers of the Authority, including the power to award financial assistance to energy projects.

Defining Clean, Advanced Energy

The Authority recognizes that the clean, advanced energy sector consists of many different kinds of companies, fuels and technologies. Although, as discussed below, all of these technologies may not be included in every solicitation, each must be considered a part of this sector and any may be included in some future PEDDA solicitation, subject to funding restrictions and Board approval.

Advanced energy includes Alternative Energy Sources as defined in the Alternative Energy Portfolio Standards Act (AEPS), 73 P.S. §§1648.1 - 1648.8, such as solar energy; wind; low-impact hydropower; geothermal; biomass, biologically derived methane gas, including landfill gas; fuel cells; coal-mine methane; waste coal; coal liquefaction; coal polygeneration; integrated gasification combined cycle (IGCC); and demand management measures, including recycled energy and energy recovery, energy efficiency and load management. In addition, clean, alternative fuels for transportation, including but not limited to bio-diesel, ethanol, hydrogen and electricity, are also part of the advanced energy sector. Companies and technologies that manufacture component parts of the foregoing technologies, universities, colleges and companies that perform research to advance or commercialize these technologies or create new clean energy technologies and companies that install and service these technologies are all part of this sector.

Pennsylvania's Indigenous Resources

Pennsylvania is fortunate to have abundant energy resources within its borders. Yet we export approximately \$30 billion annually to procure energy resources from outside our borders.

Pennsylvania is home to:

- 32 billion tons of known coal reserves¹ – enough to supply Pennsylvania's coal needs for 250 years;
- A significant portion of the 11.5 trillion cubic feet of the Northern Appalachian Coal Basin's supply of coal-bed methane² – enough methane to supply Pennsylvania's industrial gas needs for the next 60 years;
- 5,120 megawatts of potential wind capacity³ -- enough to power more than 4 million Pennsylvania homes;
- Significant opportunities to use landfill gas for industrial off-take and electricity generation;
- Nearly 5,000 megawatts of long-term biomass co-firing potential⁴;
- Significant opportunities for incremental hydropower, combined heat and power and energy efficiency; and
- An 850 MW solar energy requirement, one of the nations' largest.

In determining its investment priorities, PEDAs must consider the likelihood of success, the sustainability and the replicability of each project in light of the availability of those indigenous resources.

Pennsylvania Energy Policy

Financial tools such as PEDAs are important to the development of the clean, advanced energy sector. Ultimately, however, sustainable growth can only be achieved if the overall policy environment in Pennsylvania is favorable to the development of clean, advanced energy. Pennsylvania has already taken several important actions to create such a policy environment. In 2004, Pennsylvania enacted the Alternative Energy Portfolio Standards Act (AEPS), which requires that, within 15 years, 18 percent of Pennsylvania's retail electricity must be generated from alternative energy resources. Eight percent of that total (Tier I) must be met through solar energy, wind power, LIHI certified low-impact hydropower, geothermal energy, biologically derived methane gas fuel cells, biomass energy or coalmine methane. Ten percent of that total (Tier II) must be met through any of the following resources: waste coal; distributed generation systems; demand-side management; large-scale hydropower; MSW; generation from wood byproducts; or IGCC. The AEPS also required promulgation of statewide net-metering and interconnection standards and those standards were further strengthened in the 2007 amendments to the AEPS. Progressive and consistent rules are critical for the development of clean, distributed generation.

¹ Pennsylvania Coal Association, 2000; *see* page 5 of PAGVol35No2.doc.

² U.S. Geological Survey (1996), 1995 U.S. Geological Survey Oil and Gas Resource Assessment.

³ http://www.awea.org/smallwind/pennsylvania_sw.html.

⁴ Black & Veatch, 2004, "Economic Impact of Renewable Energy in Pennsylvania"

In 2000, Pennsylvania became the first state in the nation to purchase a percentage of its own electricity needs from clean, advanced energy resources. In the 2007-08 fiscal year, the Commonwealth purchased 28 percent of its electricity from alternative energy resources. In addition, the Departments of Environmental Protection, Community and Economic Development and Agriculture each have programs that can be used to help finance advanced energy projects. These programs offer various financing options, including low-interest loans, taxable and tax-exempt bond financing and grant programs. These departments meet periodically to coordinate various projects and programs. PEDDA is a participant in those efforts.

PEDDA's Energy Policy

Policy Objectives

The Board of Directors has identified six overarching policy objectives for the Authority. These are the enhancement of energy security and energy diversity in the Commonwealth; the promotion of cleaner, more environmentally beneficial energy production; increased economic growth for the clean energy sector, including the greater utilization of indigenous energy resources; the furtherance of technological innovation in critical areas, the promotion of energy conservation and energy efficiency in all sectors; and the need for increased public confidence in, and support of, clean energy technologies. Each of these policy objectives is discussed below.

First, disruptions in our energy supply caused by extreme weather conditions, such as Hurricane Katrina, as well as potential disruptions from security threats abroad, have clearly demonstrated the vulnerability of the U.S. energy supply. PEDDA seeks to promote increased energy security chiefly through three avenues. First, PEDDA will promote the development of energy resources indigenous to Pennsylvania. The Commonwealth is fortunate to have an abundance of natural resources within its borders, including coal and waste coal found in the Western and Northeastern portions of the Commonwealth and biomass associated with agricultural operations. Exploiting these resources will lessen Pennsylvania's reliance on foreign sources of energy. Second, PEDDA will promote the diversification of energy generation by supporting a broad cross-section of clean energy technologies. Third, PEDDA will encourage the deployment of distributed generation projects for critical public infrastructure around the Commonwealth.

Second, the promotion of cleaner, more environmentally beneficial energy resources and technologies is critically important to protecting the environment and combating the effects of global climate change. Thus, every project seeking PEDDA funding will be required to demonstrate its contribution to energy conservation or renewable energy or its ability to significantly improve upon the environmental performance of more traditional resources. Additionally, every deployment project will be required to provide a one-year Project Results Report, which will include environmental performance data, to help guide future funding decisions.

Third, PEDDA will consider the economic development potential of each proposed project as it fits into the larger context of Pennsylvania's advanced energy market. On the project level,

PEDA will consider the project's potential to create new jobs, retain existing jobs, attract new investment to the commonwealth or result in savings to consumers or revenue generation for other beneficiaries, such as farmers or other landowners. In a broader sense, PEDA's goal is to expand the market for clean, advanced energy technologies, services and fuels. To do so, PEDA will emphasize the following investment priorities:

1. Attracting or expanding clean, advanced energy manufacturing operations in the commonwealth;
2. Deployment of "behind-the-fence" clean, advanced energy projects at manufacturing facilities to enhance their competitiveness; and
3. Deployment of clean, advanced energy systems.

Within the first category – advanced clean energy manufacturing – PEDA believes investment priorities should include solar photovoltaics, small-scale wind, Advanced Coal Gasification and Liquefaction (ACGL), and biofuels. In the second category – behind the fence projects – the priorities should include combined heat and power projects, energy efficiency and demand response projects, waste coal circulating fluidized beds, and landfill gas. In the third category – system deployment – priorities should include solar photovoltaics, biomass projects focused on agricultural applications, low-impact hydropower and utility-scale wind.

Fourth, PEDA will promote the development of technological advances in clean, advanced energy. For example, with respect to solar photovoltaics, advances that enable increased efficiency and lower costs are desperately needed. In the areas of energy efficiency and demand management, technologies that can respond faster and more directly to changing market prices are needed. For fuel cells, advances in the areas of power density and cell efficiency are needed. PEDA has already funded several research projects focused on these technologies and will continue to look for technological and commercial innovation in these and other areas.

Fifth, PEDA will make energy conservation and efficiency technologies and practices a high priority. America's enormous energy appetite simply is not sustainable. Most Americans have not routinely made energy efficiency a part of the purchasing decision-making process. PEDA will seek to invest in projects that showcase the extraordinary financial opportunities energy efficient technologies can present and the potential for significant savings to entities that institute energy efficiency and energy conservation measures. Efficiency considerations must become integrated into our way of thinking about energy in the industrial, commercial and residential areas.

Finally, PEDA recognizes that, in order for this sector to be successful, the public must support, and have confidence in, alternative energy technologies. Although PEDA does not anticipate funding projects designed solely for educational purposes, PEDA will look for projects that are highly visible and have strong potential to demonstrate to significant numbers of Pennsylvanians the reliability and economic benefits of these technologies.

Operational Guiding Principles

The Board has identified flexibility and responsiveness to the energy markets, transparency, maximization of capital, and sound financial decision-making, as guiding principles for all of the Authority's activities.

In order to be responsive to the constantly changing energy marketplace, PEDAs will bring the most flexibility possible to the design of its financing vehicles and to the focus of its solicitations. Financing vehicles such as loan guarantees, insurance products, and flex-loans, which can have delayed repayment schedules or very low interest rates, may be more helpful than traditional financing for some types of projects. Similarly, PEDAs will emphasize flexibility in the focus of its solicitations, which may be broadly targeted to the general advanced energy community or narrowly targeted toward specific areas where market gaps exist. For example, PEDAs may make specific offerings targeted at projects that can help fulfill the ambitious solar requirements of the AEPS or distributed generation projects to ensure that first responders have power in the event of grid failure. Also, PEDAs receive funding from a variety of sources, many of which contain additional restrictions on fund use, which will require PEDAs to adapt its programs to work within those restrictions. Thus, PEDAs recognize that its application criteria and procedures will vary with different solicitations and funding sources. However, each solicitation will be structured to further the policy objectives and operational guidelines set forth in this Plan.

The Board also believes that transparency is critical to the effective functioning of the Authority. By statute, all funding decisions on projects are made by vote of the Board at public meetings, and PEDAs financials will be audited every two years by the Pennsylvania Auditor General. The first such audit was scheduled to commence after the close of the 2006-2007 fiscal year. In addition to those statutory requirements for transparency, PEDAs also intend to offer much of its financing on a competitive basis, through publicly announced solicitations, so that all qualified projects will have a chance to secure funding.

PEDAs will seek to leverage its capital to the maximum extent possible in order to stretch the taxpayers' funds as far as possible. PEDAs intend to do so by working with the investment and developer community to leverage its funds to the extent possible, by requiring significant matching funds for all projects, except in very rare circumstances, when allowable, by investing in projects that are likely to yield significant returns and, in appropriate situations, by requiring successful funding recipients to provide a return on investment to PEDAs. In considering ways to manage and increase its own funding, the Board and staff will explore a variety of potential avenues. Federal grants, private foundation grants and legislative appropriations are all potential avenues for fund raising.

Finally, sound financial decision-making is critical to PEDAs' future. PEDAs intend to leverage all funding to the extent possible by requiring all projects to demonstrate that they have obtained significant matching funds, except in rare cases. Appropriate matching funds can come from federal, state, local, or private sources. PEDAs particularly notes the desirability of a private funding component in evaluating proposed projects since private participation can be a strong indication of economic viability. When evaluating proposed projects, PEDAs will attempt to ascertain whether projects have sufficient funding to enable project completion. In the case of

loans and loan guarantees, PEDDA, in partnership with the Department of Community and Economic Development (DCED), will ensure that the credit of all borrowers is thoroughly evaluated and that all financing is awarded to borrowers who evidence a reasonable likelihood of being able to repay such loans.

Criteria for Evaluating Proposed Projects

As explained above, criteria for specific solicitations will vary to some extent according to a variety of factors, including the restrictions on the funding source. However, the following criteria will generally be considered for all deployment projects:

- Potential to expand the market for Pennsylvania's indigenous energy resources;
- Potential to enhance Pennsylvania's energy independence and energy security through greater energy diversity;
- Ability to demonstrate significant environmental benefits, including mitigation of greenhouse gas emissions;
- Potential either to promote energy conservation or to increase energy production from clean, advanced energy sources;
- Potential economic benefits for the commonwealth, which may be in the form of job creation, new investment, savings to consumers and/or revenue generation for other beneficiaries such as farmers, local governments or other landowners;
- Technical feasibility and cost-effectiveness of the project; and
- Whether any land use decisions by the project are consistent with local zoning and planning and the commonwealth's Keystone Principles.

Similarly, criteria for research projects will necessarily require some flexibility; however, PEDDA will generally consider the following criteria for research projects:

- Potential of the proposed technology to make a significant contribution to alternative energy resource development or use;
- Consistency of research objectives with the goals of PEDDA;
- Potential for significant environmental benefits;
- Potential for the proposed technology to be practically applied;
- Soundness of the research methodology;
- Qualifications of the research project director and staff;
- Potential for the technology to be economically competitive;
- Applicability to commonwealth energy resource development or use;
- Likelihood that the research will lead to greater energy independence and energy security through the development of greater energy diversity in Pennsylvania's energy resources; and
- Favorable comparison of the cost of the research versus the potential benefits.

Procedures for Reevaluation and Updating of Plan

At least once every three years, the Board will undertake a review of the Plan and will make whatever modifications are appropriate to respond to changing times and changing energy markets. The Executive Director will ensure that the Plan is distributed to the Board at the first meeting of every third year, beginning with 2008, or more often, if appropriate. Upon distribution of the Plan, the Executive Director will make any recommendations for additions or changes to the Plan that he or she deems appropriate. In the event that the Board chooses to make any revisions, the revised Plan shall be issued in draft for public comment and all public comments considered before the revised Plan is finalized.

For more information, visit www.depweb.state.pa.us, keyword: PEDA.

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