

Promoting Renewable Energy Production on Contaminated Lands

Wind



**Methane
Capture**



Solar

Biofuels



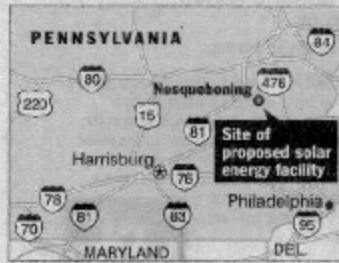
WHY?

- Provides economic reuse value for unattractive properties
 - Institutional controls may limit use options
 - Economically undesirable locations (e.g. mine lands)
- Conserves greenspace (including agricultural)
- Attractive for large-scale land acquisition
- Greenhouse Gas Reductions
 - Clean energy production; reduces reliance on “dirtier” peak power supplies
 - Preserves carbon sinks (land reuse versus developing pristine/undeveloped land)
- Existing infrastructure, closer to existing power structure
- Creates Jobs
- Contributes to national energy independence
- Helps States meet renewable energy portfolio goals

The Renewables Market is Hot

Big coal, here comes the sun

Plan calls for 2d-biggest solar plant in U.S. in Carbon County.



By Sandy Bauers
INQUIRER STAFF WRITER

When John F. Curtis III looks at the heart of Pennsylvania's anthracite country, he doesn't see a blighted landscape or a heyday long gone.

He envisions the second-largest solar power plant in the na-

megawatts of power, enough to increase the state's current solar output by a factor of 10 and provide electricity for 1,450 households.

If he gets the money, Curtis, who founded the Conshohocken renewable-energy development firm

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Some large wind instruments take shape at Gamesa Technology Corp. Inc. in Fairless Hills. Every turbine built here through at least 2010 — about 500 a year — is already sold. As energy prices rise, demand for the wind's free, renewable power is breezing up.

Pa. industry catches the wind

Nine commercial wind farms with a total of 173 turbines have a capacity of 264 megawatts — enough to power 78,000 households. Five more wind farms under construction will double that by year's end.

About 70 more projects are in development.

"Right now, it's the cheapest renewable resource available," said Charlie Young, a spokesman for the state Department of Environmental Protection. "It's on par, in some cases, with traditional sources of energy."

Indeed, as those fuels rise in price, wind remains free.

Once a plant is built, "you know what its costs are going to be for 25 years," said Tom Tuffey, energy expert for the advocacy group PennFuture.

Nationwide, wind provides just 1.2 percent of electricity needs, but that's changing.

That rose with 30 billion

Wind Energy by State

Capacity at the end of 2007, in megawatts.

State	Capacity
1. Texas	4,446
2. California	2,499
3. Minnesota	1,299
4. Iowa	1,271
5. Washington	1,161
6. Colorado	1,067
7. Oregon	882
8. Illinois	699
9. Oklahoma	689
10. New Mexico	496
11. New York	425
12. Kansas	364
13. North Dakota	345
14. Pennsylvania	294

Wind Energy by Country

Capacity at the end of 2007.

New Jersey has focused more on solar power. Wind maps show its biggest winds are offshore, where it's more expensive to build.

Its one big project is a five-turbine, 7.5-megawatt installation inland from Atlantic City.

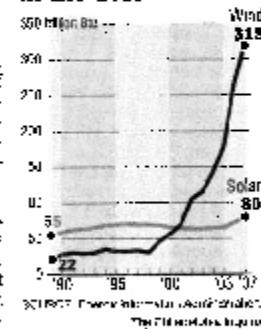
However, the state Board of Public Utilities, with \$19 million in grant money, is evaluating five proposals for an offshore wind pilot project. A decision is expected in August.

Wind still has detractors. Some conservationists don't want to see turbines atop scenic mountain ridges.

Wildlife advocates have not made peace with wind, either, even though they acknowledge pollution from fossil-fuel plants could kill more birds than the blades of the turbines.

The blades now turn more slowly to reduce what some term the "Columb effect," but so many turbines are going up "that we don't know

Wind and Solar Energy Consumption in the U.S.



plant in Bucks County — another is in Western Pennsylvania — is running 24 hours a day, six days a week.

Its 600 employees, many former steelworkers still represented by their old union, staff three shifts.

Winds of change in Pa. power scene

By Sandy Bauers
INQUIRER STAFF WRITER

The year Jim Bauer was born — 1952 — massive steel mill was rising atop a former asparagus farm in Lower Bucks County.

Bauer would spend most of his working life U.S. Steel's Fairless Works — until he was forced to retire in 2002, marking the end of an era.

Now, it's the beginning of another, and Bauer, 56, is part of that, too.

It's about wind.

Every morning at 6, Bauer is back at work one of the old U.S. Steel buildings, heading

"Huge Solar Energy Farm to Be Built at Navy Yard in South Philadelphia"

PHILADELPHIA MEDIA HOLDINGS

8/18/08 Phila Inq

Brownfields Are Best Locations

Washington Post / August 8, 2008

RICHMOND - Miles of mountain ridges hugging the state's western border could hold the key to Virginia's search for alternative energy sources. That is where developers are looking to build more than 100 wind turbines taller than the Statue of Liberty, side by side, on 18 miles of the George Washington National Forest.

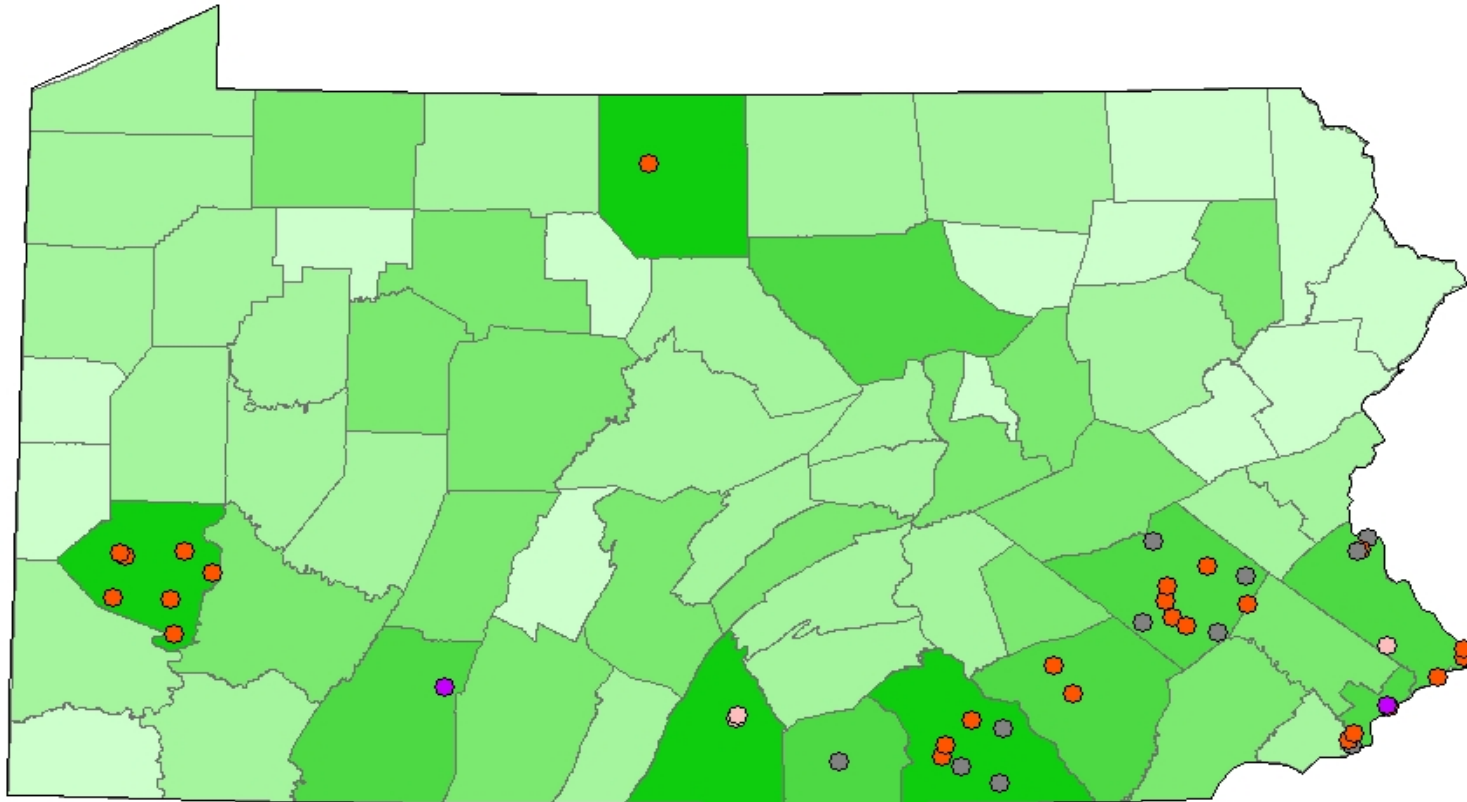
Washington Post / April 13, 2008

Gov. [Martin O'Malley](#) announced yesterday morning that he will bar commercial wind turbines from state-owned land, satisfying Western Maryland opponents of the turbines but disappointing supporters of the wind energy industry.

What's EPA Doing?

- Renewable Energy Maps - showing renewable energy development potential (wind, solar, biomass) on contaminated sites and abandoned mine land.
- State Incentive Fact Sheets – describes the available incentives on a state by state basis
- “How To Guides”
 - *“A Breath of Fresh Air for America’s Abandoned Mine Lands: Alternative Energy Provides a Second Wind”*
 - *“Smart Energy Resource Guide”* for contaminated sites

EPA Tracked Sites in Pennsylvania with Biomass Energy Generation Potential



EPA Tracked Sites

- Brownfield
- RCRA
- Federal Superfund
- Non-Federal Superfund
- Biopower

Total Residue (tonnes/year)

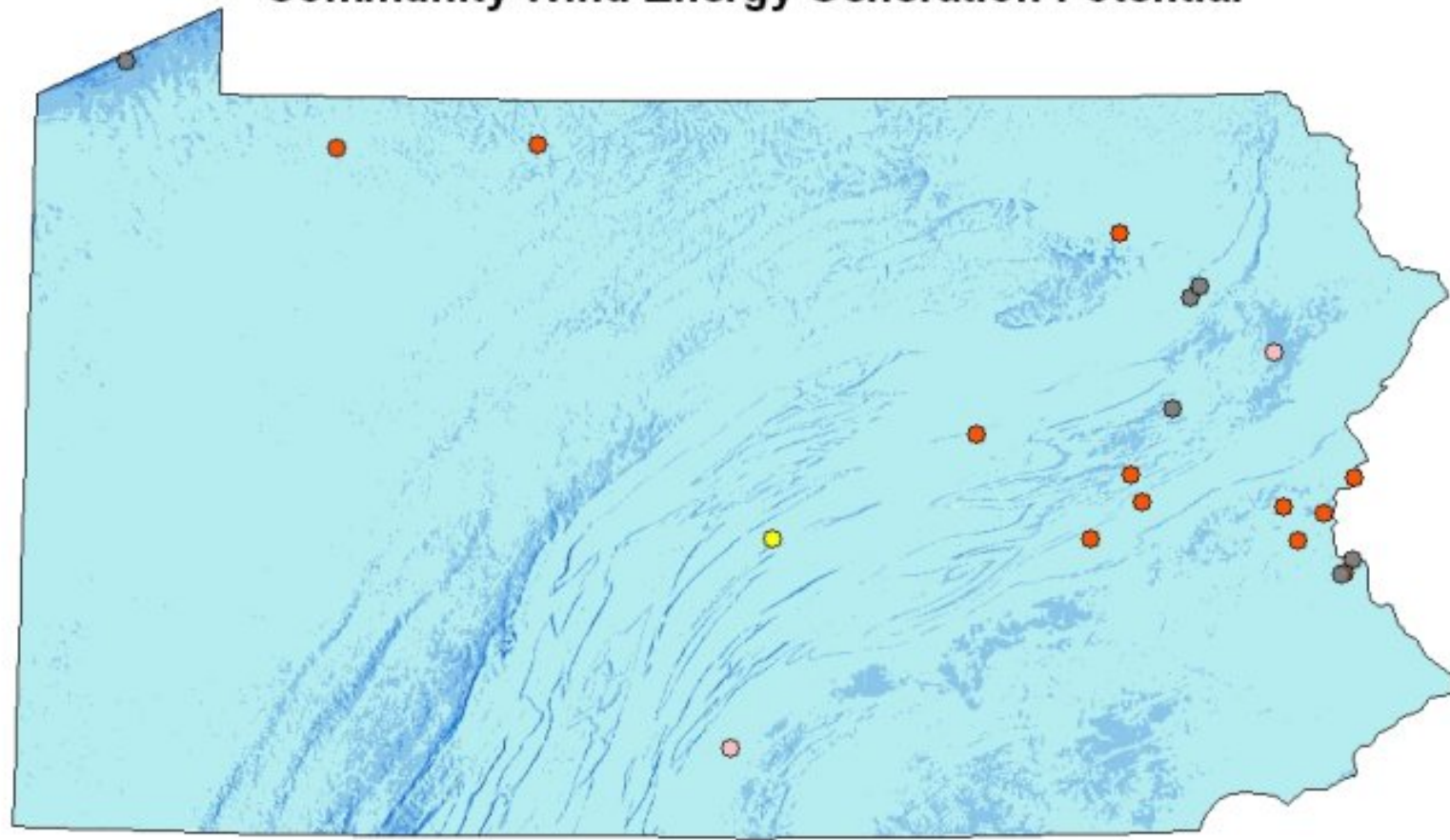
- 9,500 - 49,999
- 50,000 - 99,999
- 100,000 - 149,999
- 150,000 - 199,999
- 200,000 - 299,999

Screening Criteria

- Biopower: cumulative biomass residue of 150,000 tonnes/year or more (includes residues from crops, forests and mills; methane emissions; urban wood waste; and dedicated energy crops)
- Dry mill corn ethanol: crop biomass residue of 100,000 tonnes/year or more
- Distance to electric transmission lines of 10 miles or less
- Property size of 50 acres or more
- Distance to graded roads of 50 miles or less

Developed by SRA International for EPA. Results are based on preliminary site screening. For further information, please see the accompanying data guidelines.

EPA Tracked Sites in Pennsylvania with Community Wind Energy Generation Potential



EPA Tracked Sites

- Abandoned Mine Land
- RCRA
- Federal Superfund
- Non-Federal Superfund

Wind Power Class

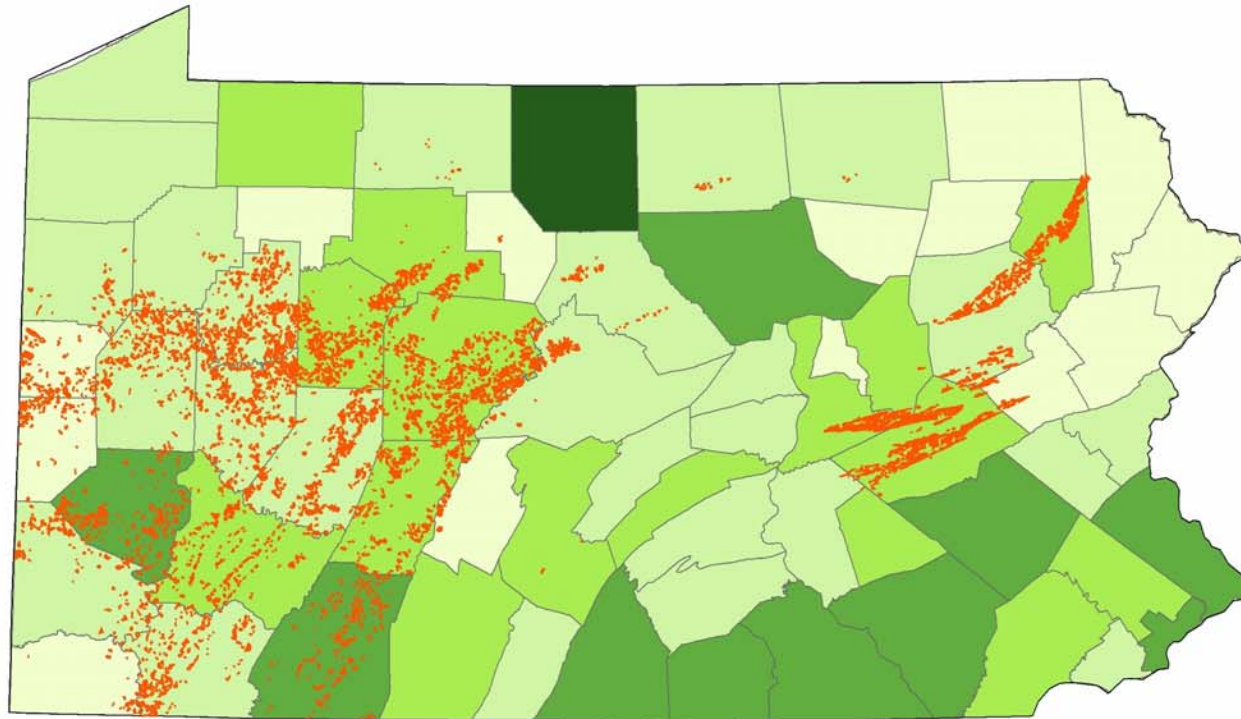
- 1
- 2
- 3
- 4
- 5
- 6
- 7

Screening Criteria

Wind power class of 3 or greater
 Property size between 100 and 1,999 acres
 Distance to graded roads 25 miles or less
 Distance to transmission lines is not a screening criterion.

Developed by SRA International for EPA. Results are based on preliminary site screening. For further information, please see the accompanying data guidelines.

Abandoned Coal Mine Lands in Pennsylvania with Biopower Facility Siting Potential



Biomass Resource

Metric Tons/Year	Resource Potential	
< 50,000	Low	
50,000 - 100,000	Marginal	
100,000 - 150,000	Good	
150,000 - 250,000	Very Good	
250,000 - 500,000	Excellent	
> 500,000	Outstanding	
		Abandoned Coal Mine Lands

Screening Criteria

- Cumulative biomass resources of 140,000 metric tons/year or greater within 50 miles (includes residues from: crops; forests; primary and secondary mills; urban wood waste; and methane emissions from manure management, landfills, and domestic wastewater treatment)
- Distance to electric transmission lines of 10 miles or less
- Property size of 50 acres or more
- Distance to graded roads of 3 miles or less
- Distance to rail lines of 8 miles or less

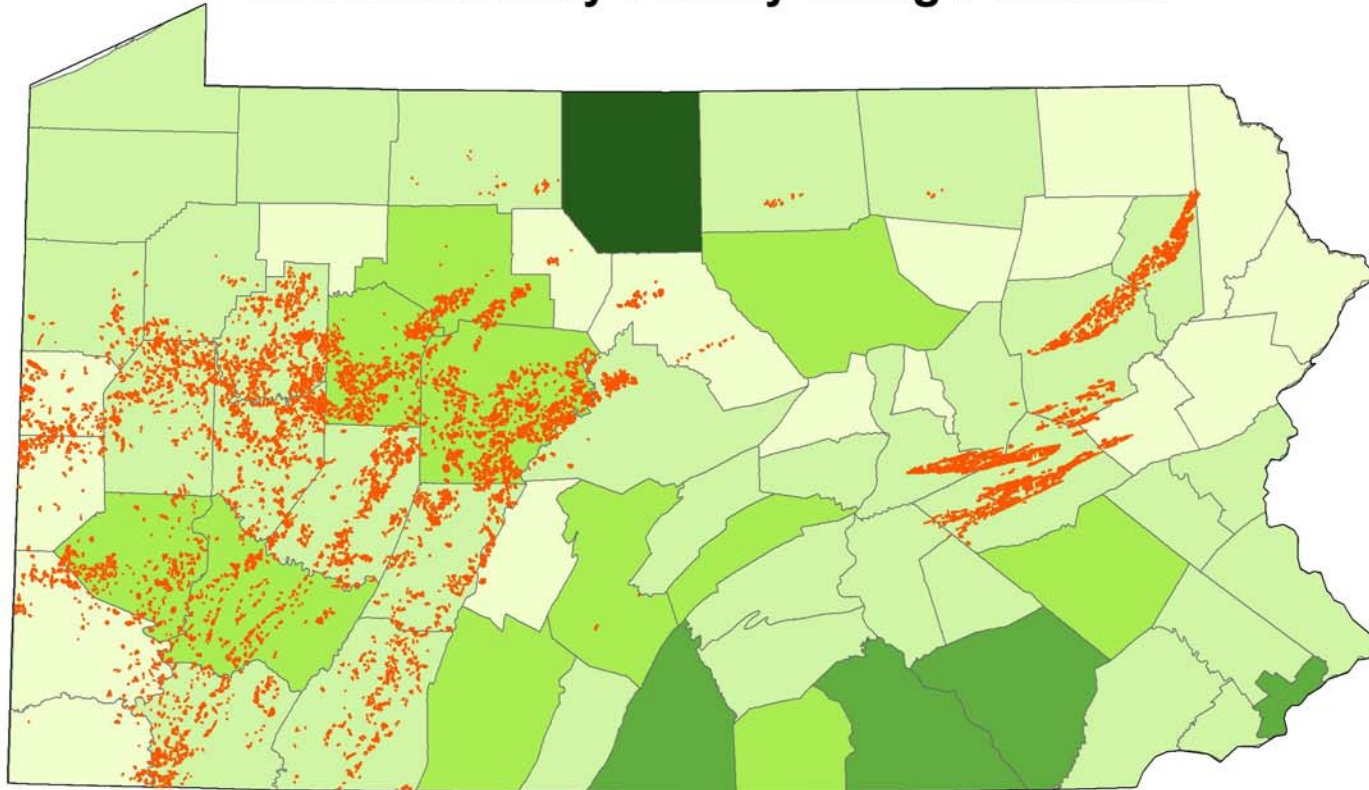


This map was developed by SRA International for the U.S. Environmental Protection Agency (EPA). Results are based on site screening criteria adapted from National Renewable Energy Laboratory (NREL) criteria and GIS data provided by NREL, EPA and the Pennsylvania Department of Environmental Protection. This map and its associated data are intended to provide a general understanding of the renewable energy potential of abandoned coal mine lands in Pennsylvania; additional site specific analysis is required to determine the actual potential of these sites. For further information, please see the accompanying Data Guidelines document, visit http://www.epa.gov/swerrims/ocpa/maps_incentives.htm or contact Gaffney.Kristeen@epamail.epa.gov or cleanenergy@epa.gov.



U.S. EPA OSWER
CENTER FOR PROGRAM ANALYSIS

Abandoned Coal Mine Lands in Pennsylvania with Biorefinery Facility Siting Potential



Biomass Resource

Metric Tons/Year	Resource Potential	
< 50,000	Low	
50,000 - 100,000	Marginal	
100,000 - 150,000	Good	
150,000 - 250,000	Very Good	
250,000 - 500,000	Excellent	
> 500,000	Outstanding	
		■ Abandoned Coal Mine Lands

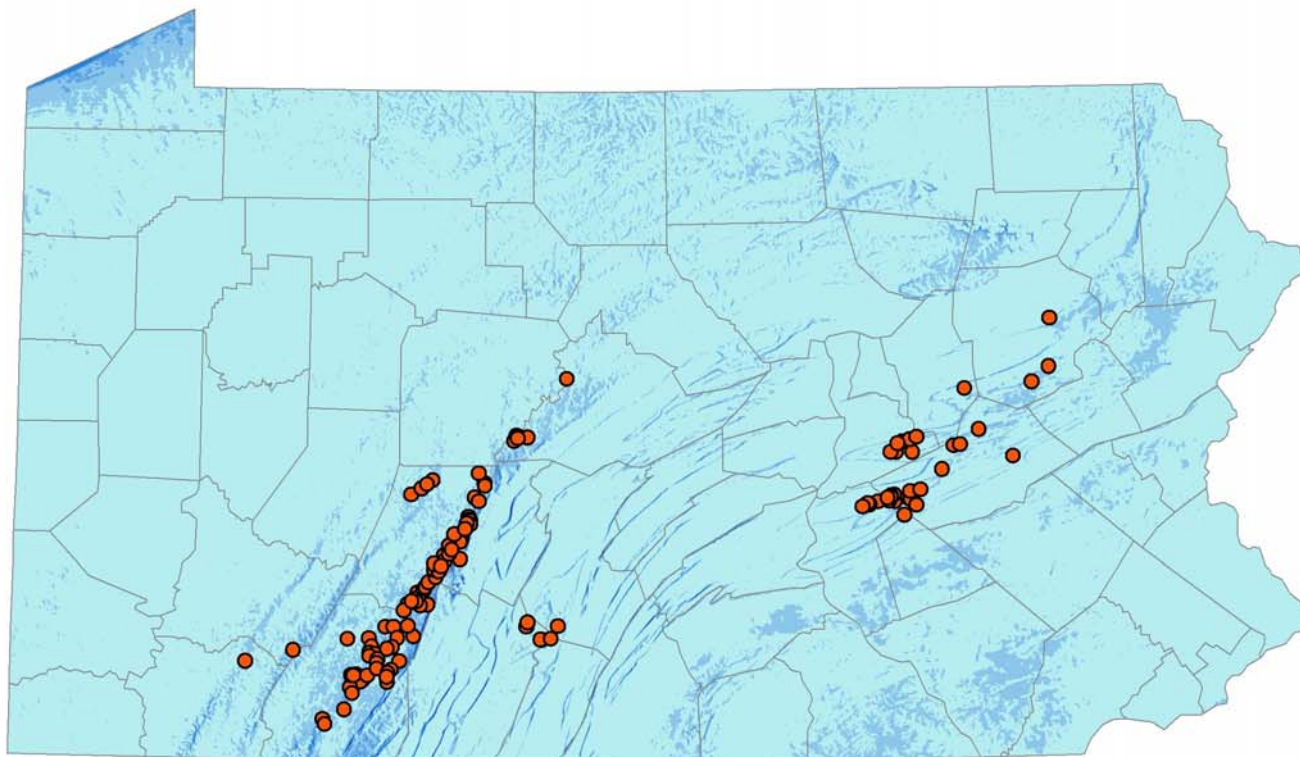
Screening Criteria

- Cumulative crop residues of 330,000 metric tons/year or greater within 50 miles (includes residues from: crops; forests; primary and secondary mills; and urban wood waste)
- Property size of 50 acres or more
- Distance to graded roads of 3 miles or less
- Distance to rail lines of 8 miles or less

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Abandoned Coal Mine Lands in Pennsylvania with Non-Grid Wind Energy Generation Potential



Wind Resource

Power Class	W/m ²	Resource Potential
1	0-200	Poor
2	200-300	Marginal
3	300-400	Fair
4	400-500	Good
5	500-600	Excellent
6	600-800	Outstanding
7	>800	Superb

● Abandoned Coal Mine Lands

Screening Criteria

Wind power class of 3 or greater, measured at 50m above ground
 Property size and distance to transmission lines and graded roads are not screening criteria because energy is generally distributed locally

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State Incentives for Achieving Clean and Renewable Energy Development on Contaminated Lands



The development of clean and renewable energy on formerly used land offers many economic and environmental benefits. Combining clean and renewable energy and contaminated land cleanup incentives can allow investors and communities to create economically viable clean and renewable energy redevelopment projects. This document provides information about incentives in your state that can be leveraged for clean and renewable energy and development of contaminated land.



Incentives for Clean and Renewable Energy

Funding (grants, loans, bonds, etc.)

Pennsylvania Energy Development Authority Funding
www.depweb.state.pa.us/enintech/cwp/view.asp?a=1415&q=504241

Provides grants and loans up to \$1 million and loan guarantees up to \$500,000 for innovative, advanced energy projects, and for alternative-energy manufacturing or production businesses. Projects that reuse or redevelop brownfields and previously developed sites are preferred.

Pennsylvania Energy Harvest Program
www.dep.state.pa.us/grantscenter/ProgramSummary.asp?ID=93

Provides grants averaging \$200,000 for implementation of clean and renewable-energy technologies that have measurable benefits in terms of pollution reduction, environmental quality, and reduced energy use.

Metropolitan Edison Company Sustainable Energy Fund (SEF)

Technical Assistance and Other Incentives

Pennsylvania Wind Working Group
www.pawindenergynow.org/

Encourages wind projects, stimulates markets for generated wind energy; and integrates the wind industry with other Pennsylvania industries.

Technology Clearinghouse Open Funding Solicitations
www.depweb.state.pa.us/enintech/cwp/view.asp?a=1378&q=466203#Open

Provides a comprehensive list of current state and federal funding, and environmental technology verification program solicitation opportunities.

Net Metering

www.puc.state.pa.us

Requires investor-owned utilities to offer net metering to eligible systems

Landfill Methane Outreach Program (LMOP)



- Methane Home
- LMOP Home
- Basic Information
- Accomplishments
- Energy Projects and Candidate Landfills
- Benefits of LFG Energy
- Partners
- Join the Program
- Documents, Tools & Resources
- Workshops/Conferences
- International Activities
- Frequent Questions
- Renewable Power

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[EPA Home](#) > [Climate Change](#) > [Methane](#) > [Voluntary Programs](#) > LMOP

The U.S. EPA's Landfill Methane Outreach Program (LMOP) is a voluntary assistance and partnership program that promotes the use of landfill gas as a renewable, green energy source. Landfill gas is the natural by-product of the decomposition of solid waste in landfills and is comprised primarily of carbon dioxide and methane. By preventing emissions of methane (a powerful greenhouse gas) through the development of landfill gas energy projects, LMOP helps businesses, states, energy providers, and communities protect the environment and build a sustainable future.



The following links provide more information on LMOP:

- [Basic Information](#) – Learn more about methane emissions from landfills and how LMOP is working collaboratively with businesses, states, energy providers, and communities to convert landfill gas to energy.
- [Accomplishments](#) – Learn more about how LMOP has successfully encouraged and facilitated the development of environmentally and economically sound landfill gas energy projects.
- [Benefits of LFG Energy](#) – Learn more about the environmental and economic benefits of landfill gas energy projects.
- [Energy Projects and Candidate Landfills](#) - Learn more about operational landfill gas energy projects and identify landfills that are good candidates for project development.
- [Partners](#) – Find the industry, energy, state, and community partners that are working with EPA to overcome barriers to developing landfill gas energy projects. See information on LMOP's [2007 Partner and Project of the Year Awards](#).
- [Documents, Tools, and Resources](#) – Find technical, promotional, and informational tools as well as support services to assist with the development of landfill gas projects. If you are a current or potential corporate end user of gas, access [corporate resources](#) targeted to you.
- [Workshops/Conferences](#) – Learn more about upcoming events and activities including the annual LMOP Conference and Project Expo.
- [Join the Program](#) – Learn how your organization can join LMOP and begin to enjoy the benefits of this


Recent Additions

[12th LMOP Annual Conference and Project Expo](#)

[Summer 2008 LMOP Gazette](#)

[LMOP Funding Guide Updated](#)

[2007 LMOP Award Winners Press Release \(EPA\) >>](#)

 [International Landfill Database Now Available](#)

[Central America Landfill Gas Model Now Available!](#)

Federal Tax Credits - Corporate

- ✓ **Commercial Building Tax Deduction**
 - ✓ Tax deduction of up to \$1.80 per square foot to owners of new or existing buildings who install energy efficient systems, including on-site renewable energy production
- ✓ **Renewable Electricity Production Tax Credit**
 - ✓ Per kWh tax credit for renewable, available through 2008
- ✓ **Modified Accelerated Cost-Recovery System**
 - ✓ Property depreciation reduction for certain renewable projects
- ✓ **Business Energy Tax Credit**
 - For equipment placed in service through 2008
 - 30% for solar & fuel cells, 10% for wind & geothermal

Federal Tax Credits - Public

- ✓ **Renewable Energy Production Incentive**

- ✓ annual incentive payments of 1.5¢ per kWh payments for electricity produced and sold by new non profit or public renewable energy facilities.

- ✓ **Clean Renewable Energy Bonds**

- ✓ financing mechanism for public sector renewable energy projects. 0% interest rate. The borrower pays back only the principal of the bond and receives federal tax credits in lieu of the traditional bond interest.

Federal Programs for Renewables

- **Appalachian Regional Commission**

- grants for business development and entrepreneurship

- **National Renewable Energy Labs (NREL)**

- Technical Assistance Program for renewable energy projects on state and local public lands

- **DOE** – loan guarantee program

- **USDA**

- Grants (up to 25%) and loan guarantees (up to \$25M) to purchase renewable energy systems and energy efficiency improvements for public, commercial and agricultural sectors

The Future?



Turbines at the Somerset, Pa AML site



Turbines at Bethlehem Steel Superfund site, Lackawanna, NY



Solar panels at Brockton, Ma. Brownfields site

More Information

EPA's Siting Renewable Energy on Contaminated
Land and Mining Sites Initiative

www.epa.gov/renewableenergyland

Smart Energy Resource Guide

<http://www.epa.gov/nrmrl/pubs/600r08049/600r08049.htm>