

# RE-Powering America's Land: Renewable Energy on Contaminated Land and Mining Sites



According to the U.S. Energy Information Administration's *Annual Energy Outlook 2008*, by 2030 U.S. electricity production will need to increase by nearly 30 percent to meet growing demand.<sup>1</sup> It is estimated that the equivalent of more than 320 mid-sized, coal-fired power plants would be needed to increase U.S. electricity production capacity to meet this rising electricity demand by 2030.<sup>2</sup>

As communities become more concerned about the environmental impacts of fossil fuels, clean and renewable energy technologies will play a greater role in meeting future electricity demand. Currently, wind, solar and biomass facilities supply 2.3% of our nation's electricity.<sup>3</sup> While these clean and renewable sources currently make up only a small fraction of energy production, clean and renewable energy production is expected to increase by more than 70% between 2006 and 2030.<sup>4</sup> Identifying and using land located in areas with high quality clean and renewable energy resources will be an essential component of developing more electricity from clean and renewable energy sources.

## Contaminated Lands Can Support Increasing Clean and Renewable Energy Demands

The U.S. Environmental Protection Agency (EPA) estimates that there are approximately 480,000 sites and almost 15 million acres of potentially contaminated properties across the United States that are tracked by EPA.<sup>5</sup> This estimate includes Superfund, Resource Conservation and Recovery Act (RCRA), Brownfields, and abandoned mine lands. Cleanup goals have been achieved and controls put in place to ensure long-term protection for more than 850,000 acres.<sup>6</sup> Through coordination and partnerships among federal, state, tribal and other government agencies, utilities, communities and the private sector, many new clean and renewable energy facilities can be developed on these potentially contaminated properties.

The EPA Office of Solid Waste and Emergency Response (OSWER) Center for Program Analysis (OCPA) is seeking opportunities to facilitate the reuse of contaminated properties and active and abandoned mine sites for clean and renewable energy generation.

These lands are environmentally and economically beneficial for siting clean and renewable energy facilities because they:

- Generally have existing transmission capacity, infrastructure in place and adequate zoning;
- Take the stress off undeveloped lands for construction of new energy facilities, preserving the land carbon sink;
- Provide an economically viable reuse for sites with significant cleanup costs or low real estate development demand; and
- Provide job opportunities in urban and rural communities.

Further, these projects advance cleaner and more cost effective energy technologies, and reduce the environmental impacts of energy systems (e.g., reduce greenhouse gas emissions).



Solar photovoltaic (PV) facility at a former landfill in Fort Carson, CO.

### Potential Partners and Stakeholders

- Clean and renewable energy suppliers, including independent system operators
- Utilities
- Public utility commissions
- Developers
- Investors
- Public and private land owners
- Mining industry
- EPA Regions/Headquarters
- Other Federal agencies (e.g., Department of Agriculture, Department of Energy, Department of the Interior, Department of Defense, Federal Energy Regulatory Commission, and Nuclear Regulatory Commission)
- State entities (e.g., environmental, energy and economic development departments)
- Tribal governments and communities
- Communities, local governments and chambers of commerce
- Environmental organizations
- Other public and private partners



The former Bethlehem Steel plant in Lackawanna, NY, is now home to the Steel Winds wind farm.

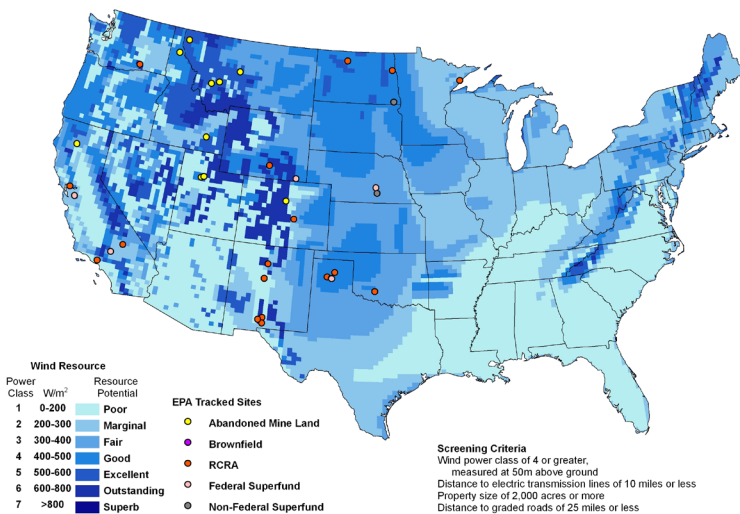


## EPA Initiatives Support Reuse of Contaminated Lands for Clean and Renewable Energy

EPA's *Siting Clean and Renewable Energy on Contaminated Lands and Mining Sites Initiative* takes a multi-pronged approach to site cleanup and clean and renewable energy production facilities on contaminated land, by conducting activities including:

- Working with the Department of Energy's National Renewable Energy Lab (NREL) to identify Brownfields, RCRA, Superfund and mining sites with wind, solar, and biomass development potential;
- Outlining state and federal incentives for developing clean and renewable energy facilities and utilizing contaminated lands;
- Supporting pilot projects that assess potential wind and solar generation potential at EPA contaminated lands and mining sites;
- Estimating the greenhouse gas benefits from siting clean and renewable energy on contaminated lands and mining sites;
- Seeking input from stakeholders to determine the need for additional site redevelopment and reuse tools such as liability release provisions; and
- Conducting outreach to highlight how EPA can support clean and renewable energy development on contaminated properties and mining sites.

### EPA Tracked Sites with Utility Scale Wind Energy Generation Potential



### OSWER-Supported Clean and Renewable Energy Development on Contaminated Land

#### Mine-Scarred Lands Initiative Demonstration Project: Beatty, NV, Solar Facility

- EPA helped the community develop relationships with partners that are integral to energy development decisions
- EPA helped develop an action plan that outlines steps needed to develop a renewable energy power park

#### EPA's Brownfields Sustainability Pilot: Houston, TX, Solar Landfill

- EPA is analyzing the environmental and engineering issues of building a solar plant at the 300 acre former landfill

#### OSWER Innovations Pilot: Brockton, MA, Brightfield

- EPA is a project partner in developing an innovative marketing concept to secure long-term contracts for the renewable energy credits generated by this 1MW solar plant

### Additional Clean and Renewable Energy Development on Contaminated Land

#### Steel Winds Wind Farm, Lackawanna, NY

- Eight wind turbines were installed on an old slag pile at the Bethlehem Steel site
- Produces enough electricity to power 7,000 homes

#### Fort Carson Landfill Solar Development, Fort Carson, CO

- 2MW array built on 12 acres of a former landfill
- Uses thin film photovoltaic technology to generate 3,200 MWh/year

#### Pemaco Superfund Site, Maywood, CA

- Solar-powered system is used for emergency backup battery power

*For more information regarding RE-Powering America's Land: Renewable Energy on Contaminated Land and Mining Sites, please contact:*  
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1. U.S. Department of Energy, Energy Information Administration. *Annual Energy Outlook 2008. Table A8: Electricity Supply, Disposition, Prices, and Emissions.* [www.eia.doe.gov/oi/aeo/pdf/aeo.pdf](http://www.eia.doe.gov/oi/aeo/pdf/aeo.pdf)
2. Estimated using data from: 1) U.S. Department of Energy, Energy Information Administration. *Annual Energy Outlook 2008. Table A8: Electricity Supply, Disposition, Prices, and Emissions.* [www.eia.doe.gov/oi/aeo/pdf/aeo.pdf](http://www.eia.doe.gov/oi/aeo/pdf/aeo.pdf); 2) National Energy Technology Laboratory. *Tracking New Coal-Fired Power Plants.* <http://www.netl.doe.gov/coal/refshelf/ncp.pdf>
3. U.S. Department of Energy, Energy Information Administration. *Renewable and Alternative Fuel, Table 4: 2007 U.S. Electric Net Summer Capacity.* [www.eia.doe.gov/cneaf/alternate/page/renew\\_energy\\_consump/table4.html](http://www.eia.doe.gov/cneaf/alternate/page/renew_energy_consump/table4.html)
4. U.S. Department of Energy, Energy Information Administration. *Annual Energy Outlook 2008. Table A8: Electricity Supply, Disposition, Prices, and Emissions.* [www.eia.doe.gov/oi/aeo/pdf/aeo.pdf](http://www.eia.doe.gov/oi/aeo/pdf/aeo.pdf)
- 5, 6. U.S. EPA OSWER. *Draft Cross-Program Revitalization Measures Report, June 12, 2008.*

