

# RE-Powering America's Land: Renewable Energy on Potentially Contaminated Land and Mine 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, 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 renewable sources currently make up only a small fraction of energy production, 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 renewable energy resources will be an essential component of developing more electricity from renewable energy sources.

## **Contaminated Land Can Support Increasing Renewable Energy Demands**

The U.S. Environmental Protection Agency (EPA) estimates that there are approximately 490,000 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 917,000 acres.<sup>6</sup> Through coordination and partnerships among federal, state, tribal and other government agencies, utilities, communities and the private sector, many new 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 (CPA) is seeking opportunities to facilitate the reuse of contaminated properties and active and abandoned mine sites for renewable energy generation.

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

- Offer thousands of acres of land with few site owners;
- Often have critical infrastructure in place including electric transmission lines, roads and water on-site, and are adequately zoned for such development;
- Provide an economically viable reuse for sites with significant cleanup costs or low real estate development demand;
- Take the stress off undeveloped lands for construction of new energy facilities, preserving the land carbon sink; 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**

- 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



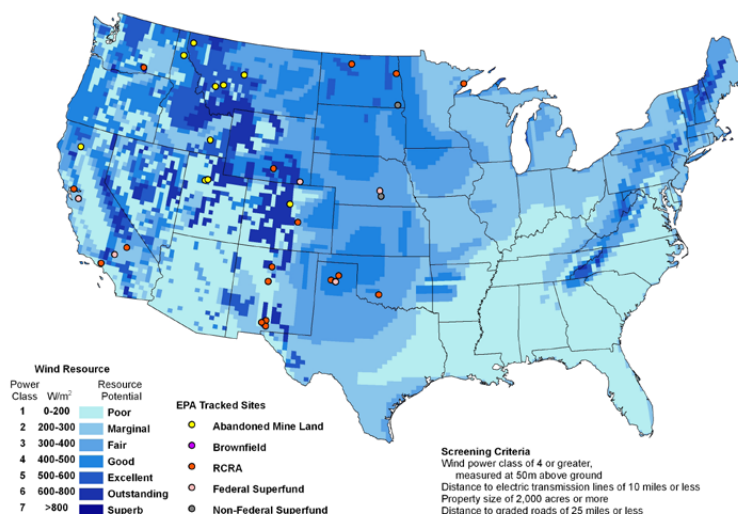
*The former Bethlehem Steel plant in Lackawanna, NY is now home to the Steel Winds wind farm.*

## EPA Initiatives Support Reuse of Contaminated Land for Renewable Energy

EPA's *RE-Powering America's Land: Siting Renewable Energy on Potentially Contaminated Land and Mine Sites* initiative takes a multi-pronged approach to site cleanup and development of 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 abandoned mine lands with wind, solar, biomass and geothermal development potential and identifying sites with landfill gas energy development potential;
- Outlining state and federal incentives for developing renewable energy facilities and utilizing contaminated land;
- Supporting pilot projects that assess potential wind and solar generation potential at EPA tracked contaminated land and mine sites;
- Promoting success stories where renewable energy production facilities have been sited on contaminated land;
- Estimating the greenhouse gas benefits from siting renewable energy on contaminated land and mine 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 renewable energy development on contaminated properties and mine sites.

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



### Renewable Energy Development on Contaminated Land

#### Steel Winds Wind Farm, Lackawanna, NY: Development of Wind Power Facility Helps Revitalize Rust Belt City

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: Former Landfill Becomes Home to the Army's Largest Solar Array

2MW array built on 12 acres of a former landfill

Uses thin film photovoltaic technology to generate 3,200 MWh/year

#### New Rifle Mill Site, Colorado: Solar Energy to Power Wastewater Reclamation at Former Uranium Processing Site

2.3 MW combined PV solar system powers reclamation of contaminated wastewater

Rifle Energy Innovation Center adjacent to the site will foster research and entrepreneurship in solar, biomass and geothermal energy

#### Pemaco Superfund Site, Maywood, CA: Solar PV Powers Soil and Ground Water Treatment System at Superfund Site

Rooftop solar PV panels offset power costs of water pumping and treatment

\$21,000 investment in solar energy saves nearly \$3000 annually

For more information regarding  
*RE-Powering America's Land:  
Renewable Energy on Potentially  
Contaminated Land and Mine Sites*, please  
visit [www.epa.gov/renewableenergyland](http://www.epa.gov/renewableenergyland)  
or contact [cleanenergy@epa.gov](mailto:cleanenergy@epa.gov)

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/oiaf/aeo/pdf/appa.pdf](http://www.eia.doe.gov/oiaf/aeo/pdf/appa.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/oiaf/aeo/pdf/appa.pdf](http://www.eia.doe.gov/oiaf/aeo/pdf/appa.pdf); 2) National Energy Technology Laboratory. Tracking New Coal-Fired Power Plants. <http://www.netl.doe.gov/coal/refshel/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/oiaf/aeo/pdf/appa.pdf](http://www.eia.doe.gov/oiaf/aeo/pdf/appa.pdf)
- 5, 6. U.S. EPA OSWER. Draft Cross-Program Revitalization Measures Report, June 12, 2008.