

What is the RE-Powering America's Land initiative?

Demand for renewable energy is increasing in the United States. However, renewable energy facilities often require large amounts of land and could contribute to energy sprawl if developed on greenfield sites. Through its *RE-Powering America's Land: Siting Renewable Energy on Potentially Contaminated Land and Mine Sites* initiative, the U.S. Environmental Protection Agency (EPA) identified more than 11,000 EPA tracked sites and nearly 15 million acres that have potential for developing solar, wind, biomass and geothermal facilities. Using potentially contaminated land and mine sites to develop renewable energy facilities can preserve greenfields; provide developers with access to existing infrastructure; create jobs; and enable potentially contaminated property to return to a productive and sustainable use.

What is biomass energy?

Biomass energy or "bioenergy" is generated from organic feedstocks. Wood is the largest biomass energy resource; other sources of biomass include food crops, grassy and woody plants, residues from agriculture or forestry and the organic component of municipal and industrial wastes. These feedstocks can be used as a solid fuel, or converted into liquid or gaseous forms, for the production of electric power, heat, chemicals or fuels. Three types of biomass production were evaluated by EPA:

- **Biopower facility** – Burns biomass resources to produce heat, which is used to boil water for a conventional steam-turbine generator to produce electricity. Biopower facilities utilize cumulative biomass resources that can include residues from: crops, forests, primary and secondary mills; urban wood waste; and methane emissions from manure management, landfills and domestic wastewater treatment.
- **Biorefinery facility** – Integrates biomass conversion processes and equipment to produce fuels, power and chemicals from biomass. The technology utilizes cumulative crop residues that can include residues from crops, forests, primary and secondary mills and urban wood waste.
- **Landfill gas energy project** – Uses gas that is created as organic solid waste decomposes in a landfill. This gas consists mostly of methane (the primary component of natural gas) and carbon dioxide. Instead of allowing landfill gas to escape into the air, it is extracted from landfills using a series of wells and a blower/flare (or vacuum) system. The landfill gas is directed to a central point where it can be processed and treated to produce various forms of energy, including electricity, boiler fuel, steam, alternate vehicle fuel and pipeline quality gas.



The McNeil Station biopower facility in Burlington, VT



The Front Range Energy ethanol plant in Windsor, CO



Landfill gas energy project in Alberta, Canada

How much biomass potential exists on contaminated sites?

Biopower facility – 2,431 sites

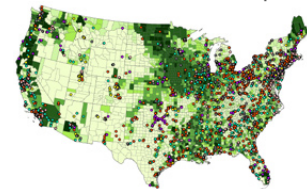
- Cumulative biomass resources \geq 140,000 metric tons per year within 50 miles
- Acreage \geq 50 acres
- Distance to transmission lines \leq 10 miles
- Distance to graded roads \leq 3 miles
- Distance to rail \leq 8 miles

Biorefinery facility – 2,370 sites

- Cumulative crop residues \geq 330,000 metric tons per year within 50 miles
- Acreage \geq 50 acres
- Distance to graded roads \leq 3 miles
- Distance to rail \leq 8 miles

Landfill gas energy project – 1,655 sites

Includes sites that currently have landfill gas energy projects or that EPA's LMOP defines as a candidate or potential site.



EPA tracked sites with biopower potential

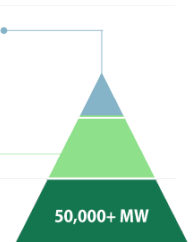
Estimating total technical potential

Biomass technical potential for EPA tracked sites: more than 50,000 MW

Market potential – The portion of the economic potential that could be achieved given current costs, policies and technical constraints.

Economic potential – The portion of the technical potential that is economically viable, but requires additional policies to break down market barriers.

Technical potential – Potential that is technically possible, without consideration of cost or practical feasibility.



For more information:

On biomass technologies, visit: www.nrel.gov/gis/biomass.html

On EPA's Landfill Methane Outreach Program (LMOP) and landfill gas energy technologies, visit: www.epa.gov/landfill

What are some examples of biomass facilities being successfully sited on contaminated land?

The *RE-Powering America's Land* Web site highlights biomass facilities that have been developed on contaminated land. One example is the Operating Industries Landfill in Monterey Park, California. This Superfund site was contaminated with vinyl chloride and other organic and inorganic compounds that, if left untreated, could enter the water table and pose a health risk for the surrounding population. A leachate treatment plant was built onsite to treat liquids from this 190-acre landfill and other surrounding landfills. Since much of the landfill's content is municipal solid waste, it was a prime location to capture landfill gas. Six 70 kilowatt microturbines were installed, generating 80% of the annual energy needs of the landfill's leachate treatment plant.

For more information, visit www.epa.gov/renewableenergyland or contact cleanenergy@epa.gov

