RE-POWERING AMERICA’S LAND:
Siting Renewable Energy on Potentially Contaminated Land, Landfills and Mine Sites
Overview

- RE-Powering America’s Land
  - Renewable Energy as a Reuse Option for Contaminated Lands, Landfills and Mine Sites

- Considerations of Renewable Energy Reuse Within the Cleanup Process

- Modifying Remedy and/or RE Installation

- Upcoming RE-Powering Efforts
RE-Powering America’s Land

Cross – Program Initiative to Promote Renewable Energy on contaminated lands, landfills and mine sites. Potential Contaminated Sites Can Include:

- Superfund Sites
- Other Federal CERCLA Sites
- RCRA Corrective Action Sites
- Federal Facilities
- Mining Sites
- Leaking Underground Storage Tank Sites
- State Voluntary Cleanup Sites
- MSW and Industrial Landfills
- Brownfields Sites
- Etc.
RE-Powering America’s Land: Tools and Resources

• Mapping and Screening Tools
  – RE-Powering Mapper (using Google Earth)
  – Solar and Wind Decision Trees

• Technical Assistance and Support
  – EPA/NREL Feasibility Studies
  – Liability Considerations

• Redevelopment Tools and Resources
  – Handbook on Siting Renewable Energy While Addressing Environmental Issues
  – RE-Powering Financing Fact Sheet and Other Resources
RE-Powering Mapper

Google Earth Overlay

Mapped inventory of 66,000+ EPA and select state tracked sites (over 35 million acres of land)

> 185,000 renewable energy opportunities across all technologies and scales

Incorporates data from:

- EPA Cleanup and Landfill Programs
- National Renewable Energy Lab
  - Wind, Solar, and Biomass Resources
- Southern Methodist University and USGS
  - Geothermal
- Department of Homeland Security
- State Agencies from CA, HI, NJ, NY, OR, PA, VA, and WV
# RE-Powering Mapper

## Sites by Program

<table>
<thead>
<tr>
<th>Program</th>
<th>Sites</th>
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</thead>
<tbody>
<tr>
<td>Abandoned Mine Land</td>
<td>562</td>
</tr>
<tr>
<td>Brownfield Program Sites</td>
<td>18,870</td>
</tr>
<tr>
<td>Superfund</td>
<td>1,614</td>
</tr>
<tr>
<td>Landfills - Landfill Methane Outreach Program</td>
<td>2,008</td>
</tr>
<tr>
<td>RCRA Corrective Action Sites</td>
<td>3,704</td>
</tr>
<tr>
<td>Sites Associated with Federal Programs</td>
<td>26,758</td>
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</tbody>
</table>

| State Abandoned Mine Lands -- PA (5,543); WV (2,103) | 7,646 |
| State Orphaned Mineral Mine Sites – VA              | 5,813 |
| State Identified Sites                              | 26,088 |
| California (7,622), Hawaii (1,180), New Jersey (10,362), New York (2,181), Oregon (4,743) | |
| Federal and State Sites                             | 66,217 |
Re-Powering Mapper
Solar Screening Process

<table>
<thead>
<tr>
<th>Solar Resource (kWh/m²/day)</th>
<th>Utility CSP</th>
<th>Utility Solar PV</th>
<th>PV Policy Driven</th>
<th>Large-Scale Solar PV</th>
<th>Off-Grid Solar</th>
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</thead>
<tbody>
<tr>
<td>Solar Resource (kWh/m²/day)</td>
<td>≥ 5.0</td>
<td>≥ 5.0</td>
<td>≥ 3.5</td>
<td>≥ 3.5</td>
<td>≥ 2.5</td>
</tr>
<tr>
<td>Acreage:</td>
<td>≥ 250*</td>
<td>≥ 40</td>
<td>≥ 40</td>
<td>≥ 2</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>[≥ 40]**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance to Transmission (miles)</td>
<td>≤ 10</td>
<td>≤ 10</td>
<td>≤ 10</td>
<td>≤ 1</td>
<td>--</td>
</tr>
<tr>
<td>Distance to Graded Roads (miles)</td>
<td>≤ 10</td>
<td>≤ 10</td>
<td>≤ 10</td>
<td>≤ 1</td>
<td>--</td>
</tr>
<tr>
<td>Policies</td>
<td>--</td>
<td>--</td>
<td>Renewable Portfolio Standards</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

*CSP: Trough & Power Tower
**CSP: Stirling Engine
Renewable Energy Opportunities from 1,614 Superfund Sites

Source: RE-Powering Screening Dataset (http://www.epa.gov/oswercpa/rd_mapping_tool.htm#tools)

Note: The same site may appear under multiple technologies; therefore, the sum of opportunities will exceed the number of sites.
Goal
To guide stakeholders through a process to screen sites for solar or wind potential

Key Stakeholders
• State & Local Governments
• Renewable Energy Developers
• Cleanup Project Managers

I. Pre-Screening
• Solar or Wind Resource
• Available Area
• Distance to Existing Infrastructure
• Site Topology
• Redevelopment Priorities & Land Use Exclusions

II. Site Screening
• Owner interest
• System Type: Rooftop or Ground Mount
• Electricity Costs
• Energy Demand
• Contaminated Site Considerations, Status, and Readiness

III. Financial Screening
• Policy Considerations
• Federal and State rebates and incentives
• Installation costs
Liability Considerations

Support for RE on Contaminated Lands
- EPA will work to address potential liability issues and help determine whether a property-specific document from EPA may be needed.

Existing Liability Protections
- CERCLA includes a number of liability protections (e.g., BFPP).
- CERCLA generally prohibits federal CERCLA enforcement against parties who are cleaning up lower risk properties in compliance with a state response program that specifically governs cleanups.

Leases & Responsibility
- Not all leases trigger CERCLA liability for lessees. In some cases, lessees can obtain BFPP status to secure protections.
- EPA issued guidance that discusses the potential applicability of the BFPP provision to tenants, as well as the intention to use enforcement discretion to treat certain tenants as BFPPs on potentially contaminated sites.
Liability and Use of Comfort Letters

• Comfort letters issued to facilitate the cleanup and reuse of contaminated properties
  – Providing information that the EPA has about the property
  – Identifying reasonable steps that EPA believes are appropriate at the property and satisfy the reasonable steps criterion discussed in the Revised Tenants Guidance
Best Practices
Handbook on Siting RE Projects

• Goal
  – Emphasize that RE projects may occur during several phases of cleanup
  – Provide key considerations for integrating RE into cleanup processes

• The following tools are included
  – Checklists
  – Maps
  – Solar and wind decision trees
Reuse as Part of the Cleanup Process

• Future Land Uses
  – Important consideration in determining the appropriate extent of remediation
  – Size and types of land use affected by remedy selection decisions
  – Must remain consistent with the site’s remedy and institutional controls to ensure protectiveness
  – Can protect cleanup investment
Renewable Energy Considerations In Cleanup Process - When

• When Considered?
  – Post Cleanup
    • Maywood
  – Post Remedy Implementation
    • Frontier Fertilizer (GR)
  – Pre-Remedy Implementation
    • Tower Road (BF)
  – Post RI/FS
    • Chevron Questa Mine
Renewable Energy Considerations In Cleanup Process - How

• How Considered?
  – Owner / Developer Analysis
  – Community Planning Process
  – Reuse Assessment / Feasibility Studies
  – Explanation of Significant Differences (ESD)
  – Conformity to Restrictive Covenants
  – EPA determination that development not inconsistent with remedy
  – Comfort Letter
Impacts on Remedy / RE Installation

• **RE Installation Tailored to Remedy (e.g., Maywood – Post Cleanup)**
  – No impact on installed remedy including surficial drainage patterns
  – Innovative minimization of soil disturbances

• **RE Installation Integrated with Remedy (e.g., Questa Mine – post RI/FS)**
  – Placement of monitoring wells to avoid PV footprint
  – Demonstration of alternative soil depths for closure
  – Selection of attractive, inactive portion of site
  – Panel foundations specifically designed to account for the geotechnical properties of tailings material

• **RE Installation Powers the Remedy (e.g., Frontier Fertilizer)**
  – Installation of PV both on existing treatment building and ground
  – Offset 100% of electricity needs for pump and treat system
Additional Situations

• Example -- Siting Solar PV on a capped site
  – Place above-ground protrusions (e.g., monitoring stations) around the edges of the anticipated footprint of the array
  – Finish grade of site to be <3 degrees with southern exposure maximized
  – Retain existing infrastructure (in particular transmission and distribution lines)
  – Select compatible vegetative cover
  – Consult with PV developer / consultant

• Example -- Abandoned Mine Site
  – At underground mine sites, openings, mine workings and other subsurface passageways may lead to subsidence or other engineering challenges.
  – Records kept by mining companies on subsurface activities at a site can provide valuable information
Upcoming RE-Powering Efforts

- Mapper Opportunities
  - Region by Region Charts
  - Additional Site Identification / Screening

- Projects
  - Installed
    - RE-Powering’s Tracking Matrix
  - On the Horizon
    - Efforts to Assist Projects Developing Along the Cleanup Pipeline

- Action Plan 2.0
  - 30 day public comment period on draft closed May 30
  - Contains goals, objectives and activities for next 2 years
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