Renewable Energy Potential at Contaminated Lands and Abandoned Mining Sites

ConSoil 2008
June 5, 2008
Milan, Italy
EPA Launched Initiative: Siting Renewable Energy on Contaminated Land and Mining Sites

• Goal: Encourage and facilitate renewable energy development projects on EPA-tracked contaminated lands and mining sites
• EPA is taking a multi-prong approach for this initiative as follows:
  • Developing tools, such as RE and contaminated lands/mining sites mapping, model AOCs and comfort letters for RE development on contaminated lands and mining sites
  • Outreach and education
  • Coordinate with interested parties
  • Identify and work on pilot sites
  • Measure results
• More information will be available on the web this summer
Why Screen Contaminated Lands for RE Production Potential

- Millions of acres of contaminated lands
- Define total potential
- Tool for interested parties
- Starting point for further site-specific screening
### Clean and Renewable Energy Development on Contaminated Lands Mapping

#### Clean and Renewable Energy Sources
- **Biomass: Biopower**
  - Residues from crops, forests and mills; methane; urban wood waste and dedicated energy crops
- **Biomass: Dry-Mill Corn Ethanol**
- **Wind: Non-Grid, Community, and Utility**
- **PV: Non-Grid, Community and Utility**
- **CSP: Community and Utility**
  - Sterling, Trough and Power Tower

#### Preliminary Screening Criteria
- Availability & quality of solar, wind, biomass
- Acreage
- Distance to electric transmission lines
- Distance to graded roads
- Slope and aspect of property
<table>
<thead>
<tr>
<th>What Contaminated Lands?</th>
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<tbody>
<tr>
<td>• RCRA</td>
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<tr>
<td>• Superfund</td>
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<tr>
<td>• Brownfields</td>
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<tr>
<td>• Mining Sites</td>
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</tbody>
</table>
Sites Screened - The Numbers

- **Screened Sites**
  - EPA Brownfields Sites
    - 4,561
  - EPA NPL Sites
    - 1,633
  - RCRA Sites
    - 3,611
  - AML sites
    - 1,000s

- **Other Sites (not yet included in mapping)**
  - State Brownfields and State Cleanup sites
    - 1,000s
### Why Use Contaminated Lands?

- **Productive reuse strategy that provides economic redevelopment value for otherwise unattractive properties**
  - ~80% of federally tracked contaminated lands are in non-urban/remote locations
  - Lower traditional economic redevelopment potential

- **Streamline approach to large-scale land acquisition**

- **Institutional controls that may prohibit other types of redevelopment**

- **Use brownfields not greenfields to produce green energy**
  - Including agricultural land
Why Use Contaminated Lands?

- **GHG reductions**
  - Clean energy production
  - Less energy required to develop land that has existing infrastructure
  - Reduced reliance on “dirtier” peak power supplies

- **Social Benefits**
  - Job creation

- **National energy independence and security**
EPA Tracked Sites in Colorado with Community Wind Energy Generation Potential

- Abandoned Mine Land
- Federal Superfund

Wind Power Class

1. Screening criteria:
   - Wind power class of 3 or greater
   - Property size between 100 and 1,000 acres
   - Distance to grid lines 500 miles or less
   - Distance to transmission lines in or near a screening criteria

Developed by EPA International for EPA. Please see the accompanying data guidelines.
EPA Tracked Sites in California with Utility Scale Photovoltaic (PV) Solar Energy Generation Potential

Screening Criteria:
- CSP with solar class of 5 kWh/m²/day or more
- Distance to electric transmission lines of 10 miles or less
- Property size of 40 acres or more
- Distance to graded roads of 25 miles or less

EPA Tracked Sites:
- Abandoned Mine Land
- Brownfield
- RCRA
- Federal Superfund
- Non-Federal Superfund

Solar Resource (kWh/m²/day):
- 3.41 - 3.99
- 4.00 - 4.99
- 6.00 - 6.99
- 7.00 - 7.99
- 9.00 - 9.31

Developed by SRA International for EPA. Results are based on preliminary site screening. For further information, please see the accompanying guidelines.
EPA Tracked Sites with Utility Scale Concentrated Solar Power (CSP) Energy Generation Potential

Screening Criteria:
- CSP annual solar class of 6 million ft²/day or more
- Distances to electric transmission lines of 10 miles or less
- Siting engine system property size of 40 acres or more
- Trough and power tower systems: property size of 250 acres or more
- Distances to graded roads of 25 miles or less

**EPA Tracked Sites**
- Abandoned Mine Land
- Brownfield
- RCRA
- Federal Superfund
- Non-Federal Superfund
- Stirling Engine System and Trough and Power Tower System
- Trough and Power Tower System

**Solar Resource (kWh/m²/day)**
- Yellow: 2.43 - 3.99
- Light Green: 4.00 - 5.99
- Green: 6.00 - 9.99
- Yellow Orange: 7.00 - 7.99
- Orange: 8.00 - 8.99

Developed by EPA International for EPA. Results are based on preliminary site screening.
For further information, please see the accompanying data guidelines.
EPA Tracked Sites in New Mexico with Utility Scale Concentrated Solar Power (CSP) Energy Generation Potential

Screening Criteria:
- CSP annual solar class of 6 kWh/m²/day or more
- CSP annual solar class of 5 kWh/m²/day or less
- Airports
- Landfills
- Brownfield
- Nuclear Power Plant
- Non-Federal Superfund
- Stirling Engine System and Trough and Power Tower System
- Trough and Power Tower System

EPA Tracked Sites:
- Abandoned Mine Land
- Brownfield
- RCRA
- Federal Superfund
- Non-Federal Superfund
- Stirling Engine System and Trough and Power Tower System
- Trough and Power Tower System

Solar Resource (kWh/m²/day):
- 6.01 - 6.99
- 7.00 - 7.49

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

- Availability & quality of solar, wind, biomass
- Acreage
- Distance to electric transmission lines
- Distance to graded roads
- Slope and aspect
EPA Tracked Sites in Pennsylvania with Biomass Energy Generation Potential

<table>
<thead>
<tr>
<th>EPA Tracked Sites</th>
<th>Total Residue (tonnes/year)</th>
<th>Screening Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brownfield</td>
<td>9,500 - 40,999</td>
<td>Biopower, cumulative biomass residue of 100,000 tonnes/year or more (includes residues from crops, forests, and mills, methane emissions, urban wood waste, and dedicated energy crops)</td>
</tr>
<tr>
<td>RCRA</td>
<td>50,000 - 99,999</td>
<td>Crops with biomass residue of 100,000 tonnes/year or more</td>
</tr>
<tr>
<td>Federal Superfund</td>
<td>100,000 - 149,999</td>
<td>Distance to electric transmission lines of 10 miles or less</td>
</tr>
<tr>
<td>Non-Federal Superfund</td>
<td>150,000 - 199,999</td>
<td>Property size of 50 acres or more</td>
</tr>
<tr>
<td>Biopower</td>
<td>200,000 - 299,999</td>
<td>Distance to graded roads of 0 miles or less</td>
</tr>
</tbody>
</table>

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

• **State Incentives**
  - Grants and Loans
  - Tax abatements, deductions, credits
  - Net metering
  - Other incentives: equipment loan programs for wind production

• **Federal incentives**
  - Production tax credit for renewable energy: $0.95/kWh to $1.95/kWh for sales of electricity for the first 10 years of operation

• **Federal grants and loans**

• **Database of State Incentives for REs and EE**
  - [www.dsireusa.org](http://www.dsireusa.org)
Wind Energy
Bethlehem Steel Superfund Site
Lackawanna, NY

- 8 wind turbines
- 20 MW generation capacity - 7,000 homes
- By 2010 expansion to 18 wind turbines - 45 MW
- Domestically manufactured wind turbines
  (Cedar Rapids, Iowa)
- Local job creation
Potential Projects

- **Summitville Mine Site and Peru Creek/Pennsylvania Mine Site**
  - Possible installation of microhydro generators to produce 100% of electricity needed to power water treatment system

- **Dover Landfill, New Hampshire**
  - Evaluating development of a solar production facility on 50-acre landfill

- **Hassayampa Landfill, Buckeye, AZ**
  - Collaborating with external public and private partners to explore a possible biowaste to energy production facility on a portion of the Hassayampa Landfill Superfund site
  - Potential for multi-megawatt power production
Questions?

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