



# Green Remediation: EPA Progress/Updates

## Federal Remediation Technologies Roundtable

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# What is “Green Remediation”?

*Green Remediation - The practice of considering **all** environmental effects of remedy **implementation** and incorporating options to maximize the **net environmental benefit** of cleanup actions.*





# Is It Our Job?

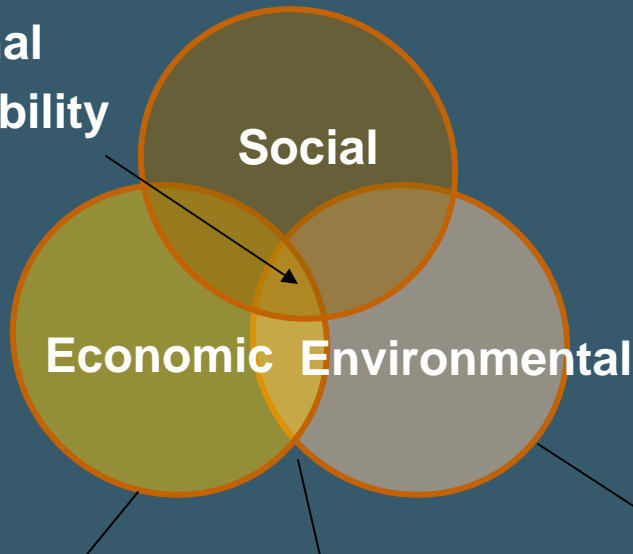
- Energy Policy Act of 2005
- Energy Independence and Security Act of 2007
- Executive Order 13423 (Reducing GHG)
- EPA Strategic Plan





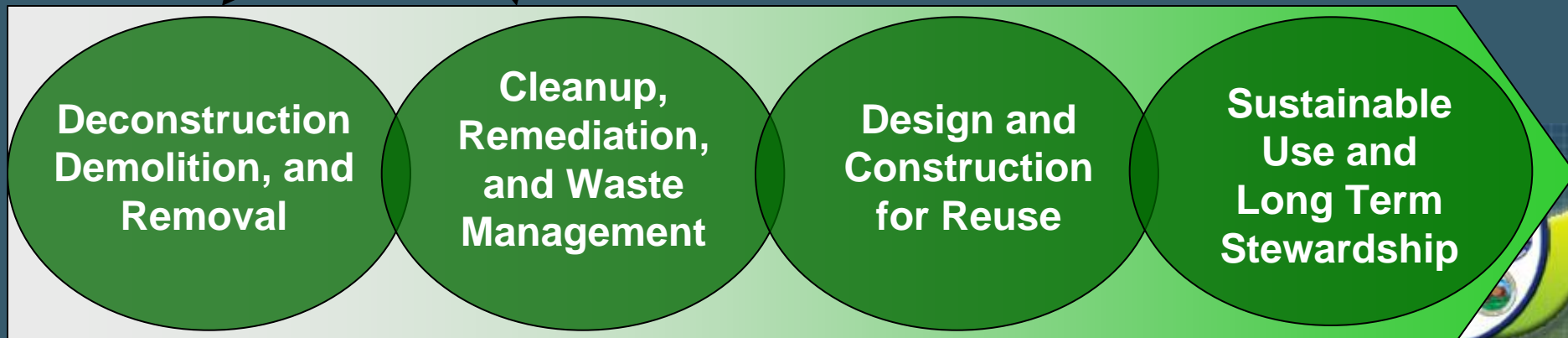
# Finding Sustainable Approaches Throughout the Land Revitalization Process

Optimal Sustainability



Sustainable revitalization is a holistic approach to the cleanup and revitalization of a property. It considers a broad array of environmental factors and community impacts during all phases (demolition, waste remediation, design and construction, reuse), in order to maximize the environmental, social, and economic benefits associated with a project. Adopting green approaches is a key aspect of sustainable revitalization.

**Opportunities to Promote Sustainability Exist in all Phases of Land Revitalization**





# Opportunities to Increase Sustainability

- Apply to all cleanup programs
- Exist throughout site investigation, design, construction, operation, and monitoring
- Address core elements





# Example – Where are the Opportunities? Superfund Energy & Carbon Footprint Flash Analysis Findings<sup>1</sup>

Remedy	Estimated energy use Annual Avg. (kWh*10 <sup>3</sup> )	Total estimated energy use 2008-2030 (kWh*10 <sup>3</sup> )	Estimated CO2 emissions Annual Avg. <sup>2</sup> (metric tons)	Total estimated CO2 emissions 2008– 2030 (metric tons)
Pump & Treat	489,607	11,260,969	323,456	7,439,480
Thermal Desorption	92,919	2,137,126	57,756	1,328,389
Multi-Phase Extraction	18,679	429,625	12,000	276,004
Air Sparging	10,156	233,599	6,499	149,476
Soil Vapor Extraction	6,734	154,890	4,700	108,094
<b>Total</b>	<b>618,095</b>	<b>14,216,209</b>	<b>404,411</b>	<b>9,301,443</b>



# Remedy Selection vs. Remedy Implementation

- Remedy Implementation-Opportunities
  - System design
  - System optimization
  - Capital improvements at long-term systems
  - Project monitoring
  - Effective investigation, characterization, and monitoring
    - Triad
    - Evolving Conceptual Site Model





# Remedy Selection vs. Remedy Implementation

- Remedy selection
  - Opportunities through existing selection criteria
    - NCP
    - RCRA
  - Policy discussions
  - Considerations
    - Balancing protectiveness with green goals
    - Timeframes
    - Perception of “green washing”
    - Over-reliance on energy, carbon vs. other aspects of green







# Advancing Green Remediation Practices: EPA Efforts

- Documenting state-of-the-art BMPs
- Identifying emergent opportunities
- Establishing a community of practitioners
- Developing mechanisms and tools
  - Pilot projects for renewable energy
  - Technical support to project managers (“showcase sites”)
  - Standard contract language for cleanups
  - Self-auditing BMP checklists
  - Automated energy calculators





# Advancing Green Remediation Practices: EPA Efforts

- Shared efforts in tech transfer
- Partnering with state and local agencies/organizations moving forward with green practices
- Exploring options for a green remediation evaluation/verification system
- Baseline analyses, metrics
- MOUs (DOE-NERL, USACE)
- Superfund Green Remediation Work Group





# Superfund Green Remediation Work Group

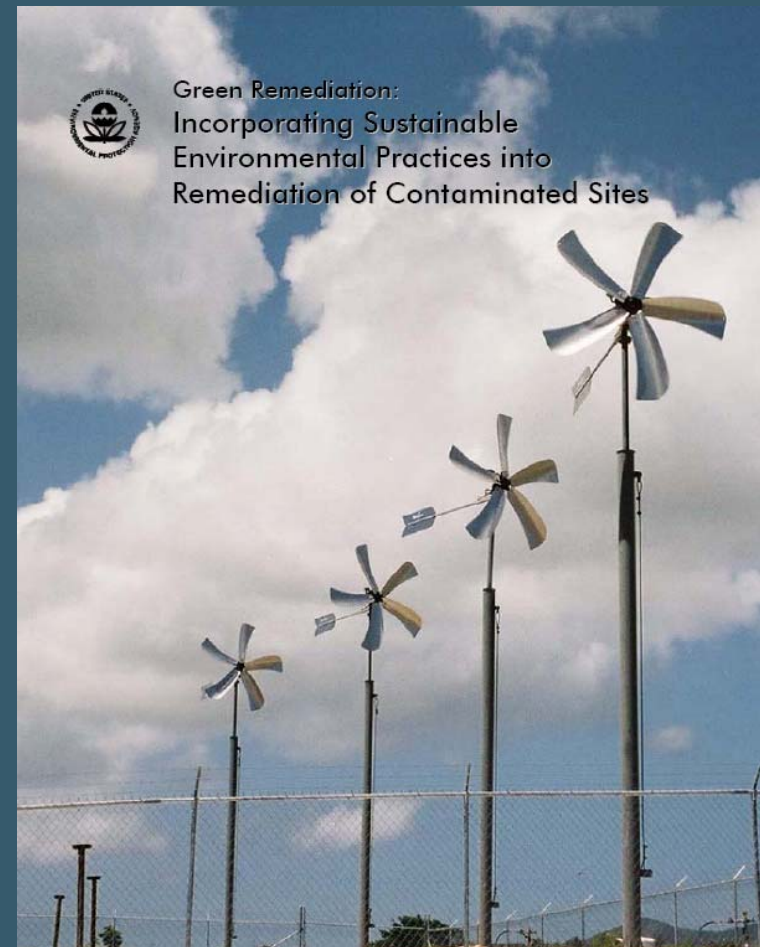
- Established in August 2008
- Includes various HQ organizations (Federal Facilities, Enforcement) and representatives from each Region
- Remedy Selection vs. Implementation
- Goal: Superfund strategy by June 2009
  - Program implementation
  - Program policy and guidance
  - Measures/evaluation
  - Information resources
  - Communications





# Green Remediation Primer

- Released April 22, 2008
- Provides an introduction to GR best practices with examples of how and where they are used
- Focuses on remedy implementation across regulatory frameworks
- Available free online (see next slide)





# Information Resources

- “GR Web” cleanup profiles, technical reports, and links: [www.clu-in.org/greenremediation](http://www.clu-in.org/greenremediation)
- Technical primer, “Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites”



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**Overview**

Technical Information

Profiles of Green Strategies

Sustainability Initiatives

Additional Resources



**Join the Earth Day Green Remediation Panel Session**

**EPA Releases Green Remediation Technical Primer**

EPA is committed to developing and promoting innovative cleanup strategies that restore contaminated sites to productive use, reduce costs, and promote environmental stewardship, while ensuring that cleanups are protective of human health and the environment. In accordance with EPA's strategic plan for compliance and environmental stewardship, the Agency strives for cleanup programs that use natural resources and energy efficiently, reduce negative impacts on the environment, minimize pollution at its source, and reduce waste to the greatest extent possible. EPA supports the adoption of **green remediation as the practice of considering all environmental effects of cleanup actions and incorporating strategies to maximize the net environmental benefit.**

Green remediation results in effective cleanups minimizing the environmental and energy "footprints" of site remediation and revitalization. Sustainable practices emphasize the need to more closely evaluate core elements of a cleanup project.

# Green Remediation Contact Information

<http://cluin.org/greenremediation>

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