



Green and Sustainable Remediation

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What Is Green and Sustainable Remediation (GSR)?



- EPA defines green and sustainable remediation as the “practice of considering all environmental effects of remedy implementation and incorporating options to maximize the net environmental benefit of cleanup actions”
 - Opportunities can be applied to all types of cleanup programs
 - Practices exist for all stages of a project from site investigation to closure and monitoring



(U.S. EPA)



Executive Order 13514: *Federal Leadership in Environmental, Energy, and Economic Performance*



- Establishes GHG emission reductions as energy and environmental performance metrics.
- Establishes new and refined energy and environment goals.
- Specifies that the goals are to be addressed by each agency in its Strategic Sustainability Performance (SSP) Plan.
- Continues use of formal EMS as the management framework to achieve goals.



How Does GSR Fit within DOE's Sustainability Framework?



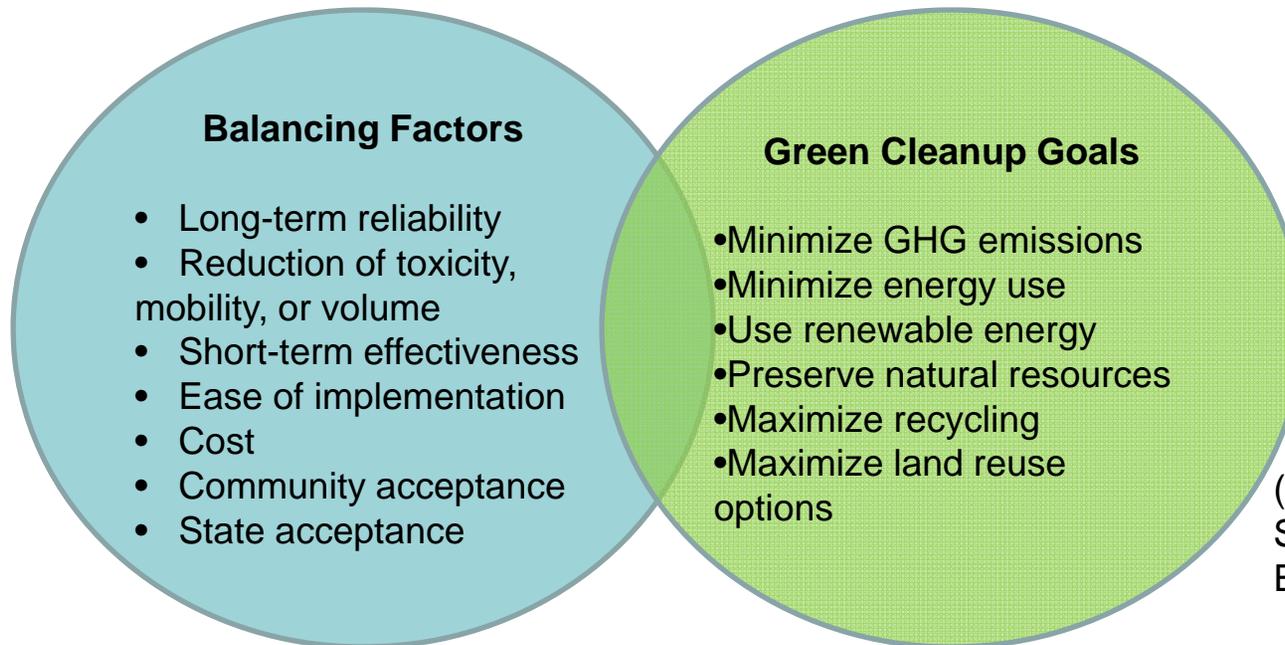
- DOE's SSPP for implementing E.O. 13514 includes the commitment to incorporate **green remediation practices** into its environmental cleanup program
- The GSR work group, with participation by EM, LM, and HSS, prepared a draft statement on *Green and Sustainable Remediation Practices* for use by DOE Elements.
- The draft policy defines GSR to align with and support E.O.13514



What Are GSR Practices?



- Use green products, services and systems (environmentally preferable and energy efficient)
- Reduce greenhouse gas emissions
- Reduce waste generation
- Minimize or eliminate pollution at its source
- Protect and benefit the community at large



(U.S. EPA Technical Support Project Engineering Forum)



Sustainable Practices to Support GSR Activities



- DEAR Acquisition letters require greening actions:
 - Improve efficiencies in the use of energy and water,
 - Reduce the acquisition, use and release of toxic and hazardous chemicals and materials.
- Optimize trips related to clean-up to minimize fuel consumption.
- Supplement peak energy demand with on-site alternative energy.
- Co-locate activities where feasible to minimize transmission losses and to take advantage of waste heat or water.



Benefits of GSR



- Reduce costs and energy consumption
- Reflects best management practices
- Contributes in meeting our GHG goals
- Demonstrates performance in achieving energy and environmental sustainability goals under E.O. 13514 and SSPP



DOE Examples of GSR: Office of Environmental Management



- Project: PCB containment
- Conventional strategy: Remove and dispose of contaminated sediments
- Green strategy: Create barriers and ecosystem to minimize PCB uptake by aquatic biota
- Solution: (1) Cover sediments with clean soil, (2) Replace fish with those that do not bioaccumulate PCBs, (3) Plant to stabilize new soil promote new fish habitat
- Results: Avoided removal of 108,000 cubic yards saving \$8.3M in cleanup and disposal costs



(Vegetation Planting at ETTP Pond)



DOE Examples of GSR: National Nuclear Security Administration



- Project: Remediation of solid waste management units
- Conventional strategy: Treat all soil as low-level waste
- Green strategy: Segregate clean overburden soil
- Solution: (1) Separated and reused clean soil as backfill, (2) Replaced original overburden cover with magnesium chloride, (3) Tested tanks for radiological and hazardous constituents
- Results: (1) Avoided 2,420 cubic yards of low-level waste saving over \$2M; (2) Avoided 60 cubic yards of industrial waste and diverted uncontaminated tank to metal recycler



DOE Examples of GSR Office of Legacy Management



- Project: Powering extraction and treatment plant
- Green Strategy: Solar photovoltaic (PV) and solar thermal
- Solution: 300 170-watt panels (51kW system)
- Results: PV system produces produce about 4% of site's needs and provides power to grid when plant is down. Solar thermal reduced energy consumption by 10%.





GSR Resources



EPA's Green Remediation Focus:
<http://clu.in.org/greenremediation>

Federal Remediation Technology Round Table:
<http://www.frtr.gov/default.htm>

Air Force Center for Engineering and the Environment (AFCEE):
<http://www.afcee.af.mil/resources/technologytransfer/programsandinitiatives/sustainableremediation/index.asp>

US Army Corps of Engineers Environmental and Munitions Center of Expertise (USACE EM CX) :
<http://www.environmental.usace.army.mil/>

Sustainable Remediation Forum (SURF):
<http://www.sustainableremediation.org/>



For Further Information



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