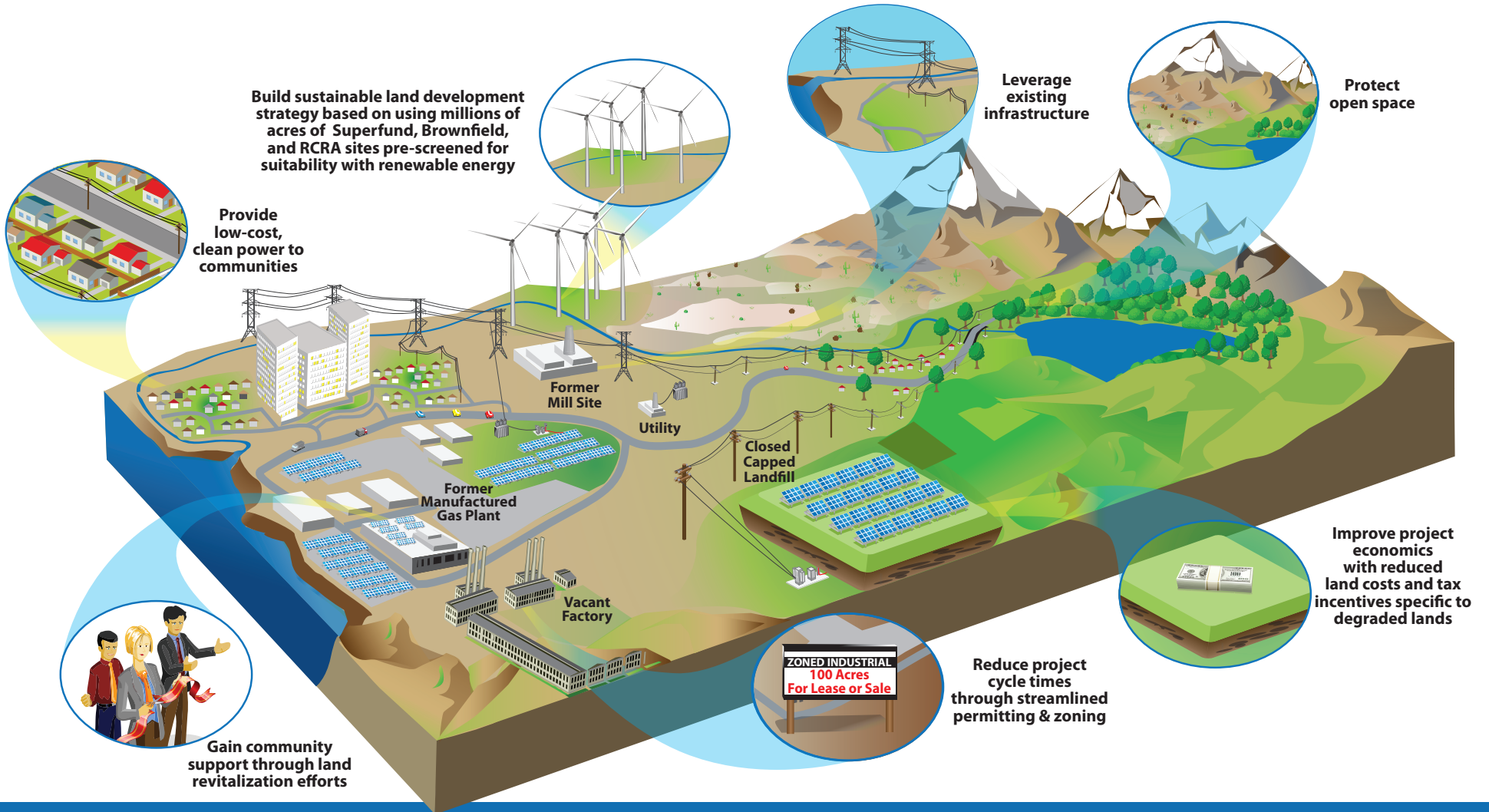


RE-Powering America's Land

Potential Advantages of Reusing Potentially Contaminated Land for Renewable Energy



RE-POWERING AMERICA'S LAND INITIATIVE

Through the RE-Powering America's Land initiative, the U.S. Environmental Protection Agency promotes the reuse of potentially contaminated lands and landfills for renewable energy through a combination of tailored redevelopment tools for communities and developers, as well as site-specific technical support. The initiative aims to revitalize degraded land by promoting renewable energy as a productive end use, when aligned with the community vision for the site.

This strategy creates new markets for potentially contaminated lands, while providing a sustainable land development strategy for renewable energy. RE-Powering aims to turn liabilities into assets for surrounding communities by fostering collaborative networks between the energy and remediation sectors. This fact sheet provides an overview of the potential advantages of this development approach.





POTENTIAL ADVANTAGES OF REUSING CONTAMINATED LANDS FOR RENEWABLE ENERGY

Potentially contaminated land, landfills, and mining sites can offer significant advantages

over other sites, such as open space, for renewable energy development. Some of these sites have unique attributes that can lower development costs and shorten development timeframes.

Potentially contaminated lands, landfills, and mining sites offer developers a unique value proposition for renewable energy deployment:

- **Leverage existing infrastructure**
- Reduce project cycle times through **streamlined permitting and zoning**
- Improve project economics with **reduced land costs and tax incentives**
- Build **sustainable land development strategy** based on using over 15 million acres of Superfund, brownfields, and RCRA sites pre-screened for suitability with renewable energy
- Gain **community support** through land revitalization efforts
- **Protect open space**

Potentially contaminated land includes sites where contamination is suspected but has not been confirmed and sites where contamination has been identified. Targeted sites include brownfields, Superfund sites, RCRA sites, mining sites, and landfills.

The RE-Powering team has facilitated redevelopment efforts to repurpose mine tailings for solar arrays, abandoned industrial sites for wind farms, and landfill caps for solar arrays. These projects generate returns nationwide from Georgia to Massachusetts, New York to California.

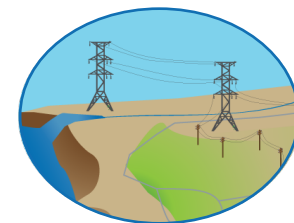
These projects advance cleaner and more cost effective energy technologies and reduce the environmental impacts of energy systems.



LEVERAGE EXISTING INFRASTRUCTURE

Development costs and timelines can be greatly reduced because these sites are often served by existing infrastructure such as transmission lines, substations, roads, water, and rail.

Transmission lines: Due to previous industrial use, many of these sites often have access to or are closer to transmission lines of sufficient capacity, reducing costs for new line construction which can range from \$250,000 to \$3 million per mile. Where line upgrades are needed, costs are still reduced because towers and poles are already in place, also meaning that permitting approval could already have been secured, saving time and money. Even where transmission lines have been removed, rights to the easements necessary for new lines could already be in place and the permits for previous lines may still apply.



Substations: At some sites, substations may already be located on site. This important feature of renewable energy generation sites can cost anywhere from \$500,000 to \$2.5 million to build, yielding significant savings and scheduling advantages if an existing substation can be upgraded or reused.

Roads: These sites are also usually served by roads built for industrial or commercial operations that are well suited to the needs of renewable energy projects. On average, paved road construction costs are \$2-\$3 million per mile in rural areas and \$4-5 million in urban areas¹, so the resulting savings can be significant.

Water: Potentially contaminated sites are more likely than open space to have water infrastructure required for renewable energy facilities such as: concentrating solar power (CSP), biomass and geothermal technologies. In addition, these sites often have legal access or water rights associated with the title, which is especially important for facilities requiring onsite water resources.

Rail: Potentially contaminated land is sometimes served by rail spurs connecting to the broader system of rail transportation, allowing for efficient delivery of raw materials and distribution of fuels or waste streams. For instance, a biomass energy facility requires regular delivery of large quantities of material such as paper mill waste, municipal waste, and lumber mill waste. In addition, developing a new rail spur can range from \$680,000 to \$1.6 million per mile.²

River or ocean port: Some potentially contaminated sites are located in industrial ports and can already have docks (and perhaps cranes) providing access to ships that can service a global marketplace for the delivery of raw material and export of goods such as bio-fuels or other products.

Buildings: Potentially contaminated land often offers existing structures that can be used for operations and maintenance and offices.

“By installing wind turbines or solar technology on former industrial sites, Chevron is able to produce renewable energy that is used to help power nearby facilities and communities. These sites often make sense for renewable energy development because they provide significant land area typically needed for a wind turbine or solar panel installation.”

*Desmond King, President
Chevron Technology Ventures*

¹American Road and Transportation Builders Association <http://www.artba.org/about/faqs-transportation--general-public/faqs/#20>

²RSMeans – CostWorks estimate; Low estimate based on 90 lb relay rail and high estimate based on 110 lb new rail; each from 2009 cost estimates; numbers above are rounded.



GAIN COMMUNITY SUPPORT THROUGH LAND REVITALIZATION EFFORTS

Communities are directly impacted by the negative environmental, economic and even criminal factors associated with unused

potentially contaminated land. Renewable energy facilities are often seen as a positive redevelopment option, since they:

- Address contamination, if present, during redevelopment
- Support surrounding property values
- Increase tax revenue to support public services
- Provide low-cost, clean power to communities

Communities often view the conversion of a potentially contaminated site into a renewable energy facility as a win-win solution for the community and developer given the compounding benefits of such revitalization efforts.

“In 2010, SunPower completed construction of the 10 MW Exelon City Solar project in Chicago, a project that transformed a 41-acre former industrial property that had been vacant for more than 30 years into a source of reliable, emission-free energy and pride for the community. As well as adding renewable energy to the grid at peak demand hours, the project enhanced the neighboring community by creating more than 200 construction jobs, using locally sourced steel tubing and other construction materials, beautifying a brownfield sites, and improving safety for local residents.”

*Tom Werner, CEO
SunPower Corporation*

REDUCE PROJECT CYCLE TIMES THROUGH STREAMLINED PERMITTING & ZONING

Potentially contaminated property often has zoning designations compatible with renewable energy facility needs, greatly

reducing the cost and timeline for land use approvals. In cases where a proposed facility requires special approvals, such as conditional use or variances, it is helpful to have community support. Some developers have seen permitting processes take only a few months as compared with the industry average of 18 to 24 months for open space development.³ Typically, cities and counties encourage the redevelopment of potentially contaminated land and are willing to streamline permitting processes with an understanding of the potential tax revenue generated through reuse of an idle site.³

“Often landfills and brownfields are costly to maintain, visually unappealing, and generally not useful for the community. Utilizing these sites for renewable energy can allow a municipality or site owner to actually generate profits from the rent, forego some, if not all, of their maintenance costs, and potentially create lower cost power for the town. Every project is different, but the low monetary value of these sites can allow the owner to have a great project with comfortable returns.”

*Jon Sarno, Sr. Project Developer
Borrego Solar Systems, Inc.*

IMPROVE PROJECT ECONOMICS WITH REDUCED LAND COSTS & TAX INCENTIVES



Reduced Land Costs

Potentially contaminated land can often be acquired or leased at a lower cost than comparable undeveloped sites. For example, landfills may lease for significantly less per acre when compared to commercial sites. This savings on project costs often improves the viability of the project up front.

Tax Incentives

With the intent of catalyzing the cleanup and reuse of potentially contaminated land and mining sites, incentive programs help bridge financial gaps.

Federal – A federal brownfield tax incentive allows cleanup costs at eligible properties to be fully deductible in the year incurred, rather than capitalized and spread over a period of years. www.epa.gov/brownfields/tax/index.htm#about

State – These incentives vary state to state but generally offer reductions in the assessed value of land and improvements. Many states offer incentives. Examples include but are not limited to:

New Jersey manages programs providing a variety of incentives that allow for partial reimbursement of remediation costs, and grant and loan packages to help pay for assessment and cleanup. www.state.nj.us/dep/srp/brownfields/obr

Colorado offers up to \$100,000 of income tax credits for eligible entities bringing contaminated land back to productive reuse. www.coloradobrownfields.org/index.php/resourcecenter/funding

Minnesota provides property tax reductions on a graduated scale by the cost of remediation allowing the property owner and/or developer to direct their financial resources toward site improvement that results in activating previously derelict land. www.revenue.state.mn.us/local_gov/contamination/Pages/Tax-Information.aspx

It is important to note that each state and incentive maintains their own eligibility requirements. A summary of state programs can be found here: www.epa.gov/swerosps/bf/partners/bf_fin_state.htm

³U.S. EPA interviews with developers that have installed renewable energy on contaminated land. Interviews conducted January-February 2009

BUILD SUSTAINABLE LAND DEVELOPMENT STRATEGY

Based on using millions of Superfund, Brownfields, and RCRA sites

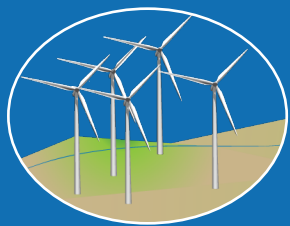
EPA sees the potential in coupling renewable energy deployment with environmental remediation and open space preservation. RE-Powering seizes the opportunity to address contamination and support renewable energy implementation to achieve economic and environmental benefits that come with it. Linking these priorities turns these blighted properties into community assets by enabling productive and sustainable use. These projects advance cleaner and more cost effective energy technologies and reduce the environmental impacts of energy systems.

Over 55 renewable energy installations have been deployed on contaminated sites or landfills, with an additional 30 currently tracked by RE-Powering. These early projects represent over 180 MW of installed capacity and provide a foundation for future development as demonstrations of the latest technologies.

PROTECT OPEN SPACE

Since 2000, installed renewable energy capacity nearly tripled in the United States. While a relatively small portion of our nation's energy profile, this growth represents considerable job growth, lays the groundwork for energy independence, and reduces carbon emissions, thereby providing significant benefits to human health and the environment. However, this growth puts pressure on open space due to the increasing land requirements.

EPA estimates that there are approximately 13,000 sites and nearly 22 million acres of EPA-tracked potentially contaminated and underutilized properties nationwide. The RE-Powering approach creates a new market for these lands to address contamination and revitalize communities, while providing a sustainable land development strategy for renewables.



"Reducing Fort Carson's reliance on fossil fuels helps us build a sustainable energy future that is good for our bottom line, the environment, and national security.

A closed landfill cannot be used for anything else. It's just used up land. Using the space to capture solar energy is the most sustainable way to continue to use the resource. Utilizing landfills to help address our nation's energy challenges makes sense."

**Vince Guthrie, Utilities Manager
U.S. Army Fort Carson**



GET STARTED WITH RE-POWERING

RE-Powering America's Land Initiative developed a multi-pronged approach to combine cleanup and redevelopment with renewables on contaminated land, with community and stakeholder engagement at its core. RE-Powering aims to turn liabilities into assets for surrounding communities by fostering an unconventional, collaborative network between the energy and remediation sectors.

Targeting Potentially Contaminated Sites and Landfills for Renewable Energy

RE-Powering developed a unique partnership with the National Renewable Energy Lab (NREL) to leverage federal renewable energy expertise to expand renewable energy development in a more sustainable way. Early on, EPA released a publically-available overlay for Google Earth that shows renewable energy potential on over 11,000 EPA-tracked sites. This database is continuing to expand as state-tracked sites are added. www.epa.gov/renewableenergyland/mapping_tool.htm

Addressing Risk Management

Liability risk is a manageable factor for potentially contaminated land and mining sites. To facilitate the implementation of these types of reuse projects, the EPA developed a primer on liability considerations for redevelopment of potentially contaminated sites. The factsheet also serves as an introduction to the many available resources and policy tools already in place to provide liability protections.

For a more comprehensive overview of liability considerations and additional

links to key EPA documents and other tools, please review EPA Report No. EPA-330-F-11-001, "Siting Renewable Energy on Contaminated Properties: Addressing Liability Concerns." www.epa.gov/compliance/resources/publications/cleanup/brownfields/re-liability.pdf

Leveraging Additional RE-Powering Tools

Based on stakeholder input, RE-Powering collaborated with NREL to create decision trees to screen sites for solar PV and wind energy potential.

Also available on the RE-Powering site, project case studies provide details on successful implementation of renewable energy projects on potentially contaminated sites, as well as results of feasibility studies for future deployments.

The RE-Powering America's Land Initiative website provides links to these tools and other resources at: www.epa.gov/renewableenergyland

"A pro-active environmental policy is universally recognized as a sign of a good corporate citizenship. Responsible reuse of industrial wastelands will assure stockholders and stakeholders alike that this property will create value for the community as well as profits for the corporation. Remediating all or part of a corporate brownfield and taking the extra step to construct a solar brightfield on the property is responsible, ethical, and, over the long term, a very profitable decision for both the company and the community."

**John Hanselman, Managing Principal
Brightfields Development & Renova**

