Redeveloping Coal Power Plants: Wind + Storage

Retired or retiring coal power plants provide a ready opportunity for redevelopment to clean energy infrastructure, including new wind and storage projects. Existing land and factilities at the power plant site can be repurposed, including disturbed lands for wind turbines and electricity infrastructure for connections to the grid. Combining site features with financial incentives from federal or state and local authorities can make projects at these locations more competitive compared to greenfield clean energy projects.

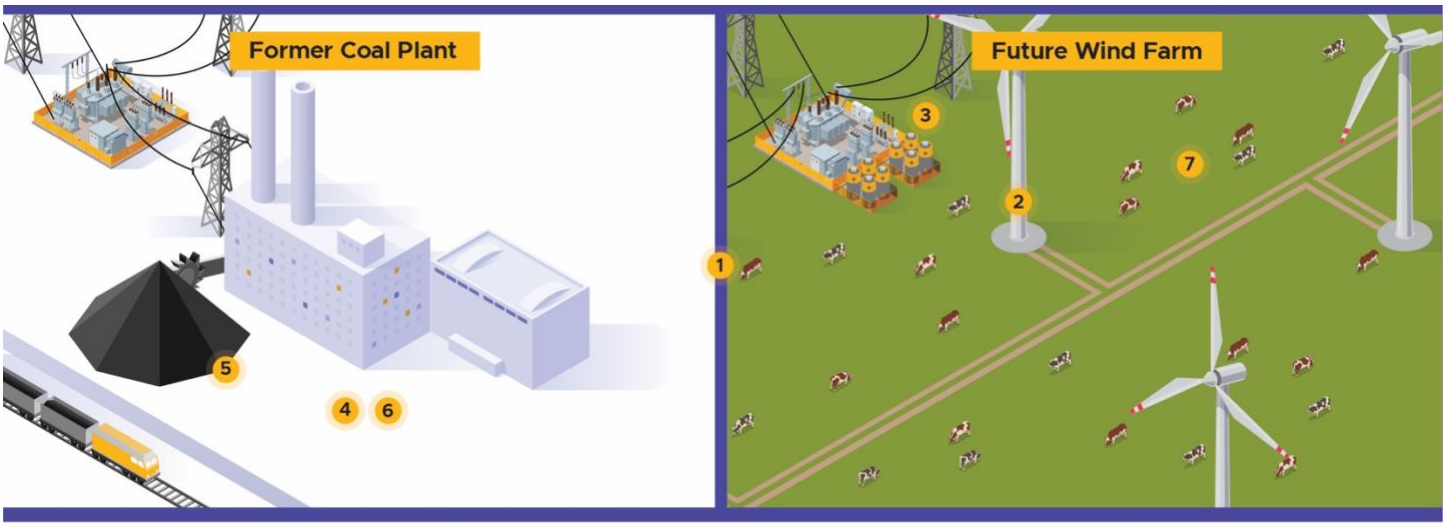
Repurposing former coal plants can bring economic revitaliztion to hard-hit energy communities. To be successful, it requires the input of developers, communities, local governments, nonprofits, and utilities. These groups can work together to preserve the workforce and economic benefits to communities, as well as maximize utilitzation of existing equipment, infrastructure, and permits to create new uses and value streams. This fact sheet summarizes key considerations and approaches to support communities and developers in repurposing coal power plants to wind and storage facilities.

What are key considerations for coal to wind plus storage redevelopment?

Every coal power plant redevelopment project has its own characteristics. A site assessment will determine what can be done in terms of resource quality, environmental and siting regulations, and onsite infrastructure. When considering redevelopment, it is good practice to consider multiple potential uses, like combining energy-related redevelopment with habitat restoration or recreation.

Considerations for wind and storage include:

- **Wind resource quality:** Wind power needs a high-quality wind resource. For large wind turbines (greater than 1 MW), an annual average wind speed of at least 14.5 mph (6.5 m/s) at about a 250 ft height is recommended.
- **Financial support:** Wind energy can be eligible for a federal investment tax credit (ITC) or production tax credit (PTC). Energy storage, alone or paired with wind energy, can also be eligible for a federal investment tax credit. Communities with coal-generating units that have retired since 2010 likely qualify as energy communities, which opens up an additional federal tax credit bonus for local clean energy development. Department of Energy (DOE) loans for Energy Infrastructure Reinvestment (EIR) can further support redevelopment and associated remediation. EIR can also support upgrading or uprating existing wind farms. Electric cooperatives and certain other tax-exempt organizations such as local governments, tribes, and U.S. territories can now access Inflation Reduction Act (IRA) tax incentives through elective pay. There also may be federal and state government incentives for brownfields redevelopment.
- **Point of interconnection:** A coal power plant's interconnection facilities with the bulk electric system might be reusable for wind and storage development, providing significant time and cost savings, as long interconnection queues are a significant hurdle to renewable energy projects elsewhere.
- **Land:** Wind turbines have been successfully installed on environmentally disturbed areas, including former mine lands, that might otherwise go unused. Wind turbines can also be deployed in wind-rich areas surrounding former coal plant sites, where existing interconnection infrastructure can be leveraged for clean energy redevelopment. The average total area requirement of wind farms is



1 **Energy Infrastructure Reinvestment (EIR)** loan guarantees from Department of Energy.
- To "retool, repower, repurpose, or replace energy infrastructure" to clean uses.
- Remediation and redevelopment can be covered in a single transaction.
- Commitment deadlines: September 2026.
- EIR can also be used to upgrade existing wind farms.

2 **Wind IRA tax credits**: ITC (§48, §48E) or PTC (§45, §45Y)

3 **Energy storage IRA tax credits**: ITC (§48, §48E).Storage can be standalone (not necessarily paired with renewable generation).

4 **Energy community bonus** for certain IRA tax credits for siting clean energy in qualifying areas where a coal-powered generating unit has retired since 2010.

5 **Brownfields grants** from the Environmental Protection Agency to assess or clean up sites with real or potential contamination. Grants also available for related job development. DOE EIR can also finance environmental remediation as part of a redevelopment project.

6 **Cooperative and certain other non-profits:** IRA tax credits now available through elective pay mechanism.

7 **Potential local incentives** for clean energy, remediation, or brownfield redevelopment.

roughly 25-125 acres per megawatt of capacity, but the direct footprint occupied by equipment is much smaller, at about one acre per megawatt of capacity. Wind energy is therefore often compatible with other land uses, like livestock grazing. There may be federal resources available to clean up brownfields and engage the local community and workers in consensus building planning activities that can de-risk project implmentation.

- **Transportation logistics:** Due to the size of components, wind farm development may require the construction or modification of access roads and logistics areas, some of which can be removed and remediated after the wind farm is constructed.
- **Human-environment interactions:** It may be necessary to mitigate impacts from sound emissions, shadow flicker, and ice throw and fall. Modern turbines have sound-dampening features, and siting turbines with proper setbacks from nearby residences can reduce noise. Shadow flicker can also be mitigated with proper setback distances. For cold weather climates, proper siting, installation of fences around turbines, and ice monitoring sensors can be deployed to lessen potential ice risks.
- **Permitting and zoning:** Permitting for utility-scale wind installations can be required by federal, state, and/or local laws and regulations. A Federal Aviation Administration or Department of Defense Siting Clearinghouse project review may be required for projects using tall turbines. There may also be local regulations dictating height limits and setback requirements.
- **Workforce:** Coal and wind facilities have different staffing and skill requirements. Plans should engage workers, unions, and other local community groups to evaluate opportunities for incumbent workers to contribute to remediation and new energy infrastructure construction and operation where possible (e.g., through Community Benefits Agreements). For new construction, projects that pay prevailing wages and employ apprentices from registered apprenticeship programs can increase the value of their tax credit fivefold.

Getting started on redevelopment

All stakeholders can:

- ✓ Engage with the local utility to understand the timing of coal retirements and consideration of replacement resources (e.g., through the utility integrated resource planning (IRP) process).
- ✓ Raise awareness of key federal incentives:
  - Renewable energy cost assessments conducted before the IRA (August 2022) should be updated to reflect latest costs and incentives. IRA clean energy tax credits are

expected to create a decade-long window of opportunity.
  - Some retiring coal plants can qualify for an energy community tax credit bonus for local clean energy development.
  - EIR loan financing through DOE can support clean redevelopments; project development should start now to allow loan commitments by September 2026.

There may also be specific roles for certain stakeholders. Considerations may include:

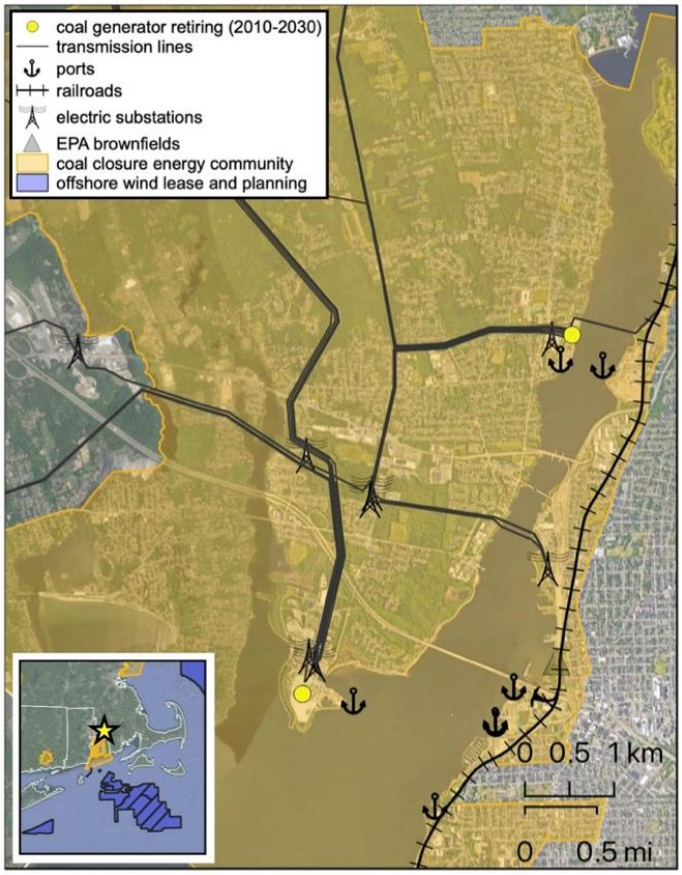
- **Owner of retiring coal power plant:** Develop a request for information or request for proposals for redevelopment in anticipation of a closure.
- **Energy regulator:** Ensure that federal and state financial support are included in assessment of redevelopment options (e.g., IRA inclusion in IRP).
- **Electric reliability balancing area authority:** Engages with the coal plant owner regarding timing of plant closure and with the developer of the clean energy resource on the capacity and reliability profile of replacement resource.
- **Local authority (e.g., state, municipal, and county governments):** Engage with plant owner to understand effects of redevelopment on local tax revenues and employment. Solicit public feedback to capture and mitigate potential concerns in advance of redevelopment, as well as desired community outcomes from project implementation.
- **Community organizations:** Promote and facilitate participation in public engagement processes (e.g., environmental review and permitting process).
- **Educators (e.g., community colleges and apprenticeship programs):** Identify future workforce needs and tailor curricula accordingly.
- **Unions:** To ensure job quality and workforce continuity, workers and their representatives should be engaged in every step of the redevelopment process. Unions should contribute to workforce transition plans for coal facility workers, whether that be pathways to retirement or re-employment within the utlity or energy sector. Joint labor-management programs support continuing workforce training and education for wind construction, operations, and maintenance.

Offshore Wind

The IRA clean energy tax credits are also available for offshore wind. The energy community tax credit bonus may also be available for offshore wind if more than 50% of the nameplate capacity is in an energy community, or if the project's land-based power conditioning equipment (like a substation) that is closest to the point of interconnection is in an energy community.

A former coal plant's on-site access to seaports and electricity transmission provides immediate redevelopment opportunities for the growing offshore wind industry. For example, at the former Brayton Point coal plant in Somerset, Massachusetts, there are active efforts to redevelop the site to a hub for connecting offshore wind power to the electric grid. The site redevelopment will also generate 200 new jobs at a new manufacturing facility producing electric transmission cables for the offshore wind industry. Retired/retiring coal power plants farther inland may also serve as valuable points of interconnection for offshore wind. The high-power capacity of offshore wind farms is also well matched with the scale of these points of interconnection.

Former Coal Plants Enable Offshore Wind



Relevant data and information for coal power plant redevelopment

Redevelopment options can be informed by national and local datasets (visit the Coal Power Plant Redevelopment Visualization Tool for a publicly accessible database and map). Site-specific assessments can help further refine options.

Relevant metrics include:

People and Environment: CDC Social Vulnerability Index, percentage working in coal or fossil energy, income, poverty status, internet access, vehicle access, vulnerability to climate change, health burdens, clean water, wastewater infrastructure, legacy pollution, energy burden, population within a 10-mile radius, apprenticeship programs.

Supporting Infrastructure (proximity and details): Electricity transmission, electricity substations, rail lines, pipelines, location and closure status of surrounding coal ash basins, planned electric generation and transmission, navigable waterways, ports, marine freight facilities, electric reliability entity, nearest other power plant.

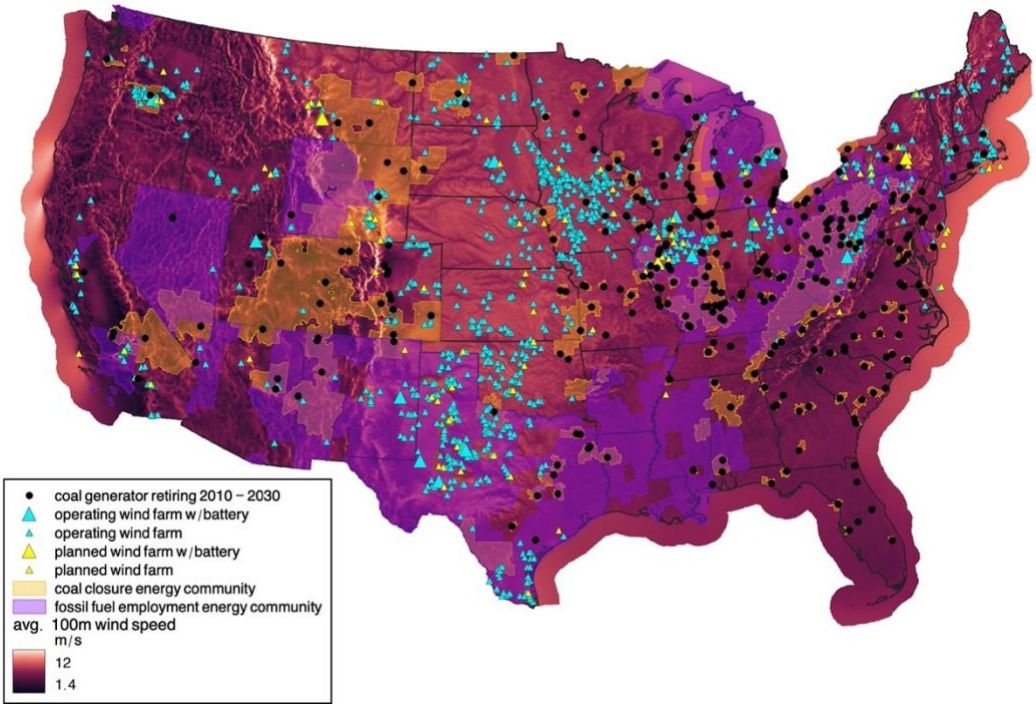
Site-specific Assessments: Retiring power plant (mix of technologies, installed capacity, build date, last planned retirement, partial or full retirement), local economic development contact, retail electric service territory (name and address, customer quantity, summer/winter/net electricity generation (MWh/month), retail and wholesale generation (MWh/month)). Also adjacent or nearby land uses such as ridgelines or former mines for wind siting.

Additional Considerations: National incentives and funding/financing opportunities, future electric reliability requirements (and options) in the balancing area or control area (ISO/RTO, regulated/re-structured), environmental and siting regulations, ratepayer impact assessment, resource complementarity assessment, setbacks and local zoning ordinances.

Technical assistance and planning support may be available from the Economic Development Administration, the Appalachian Regional Commission, DOE's Local Energy Action Program, and funding opportunities through DOE's Office of Fossil Energy and Carbon Management. For more data and information, visit: energycommunities.gov/

Wind plus Storage Redevelopment Opportunities on Retired Coal Power Plant Sites

There is high potential for wind (onshore and offshore) in energy communities

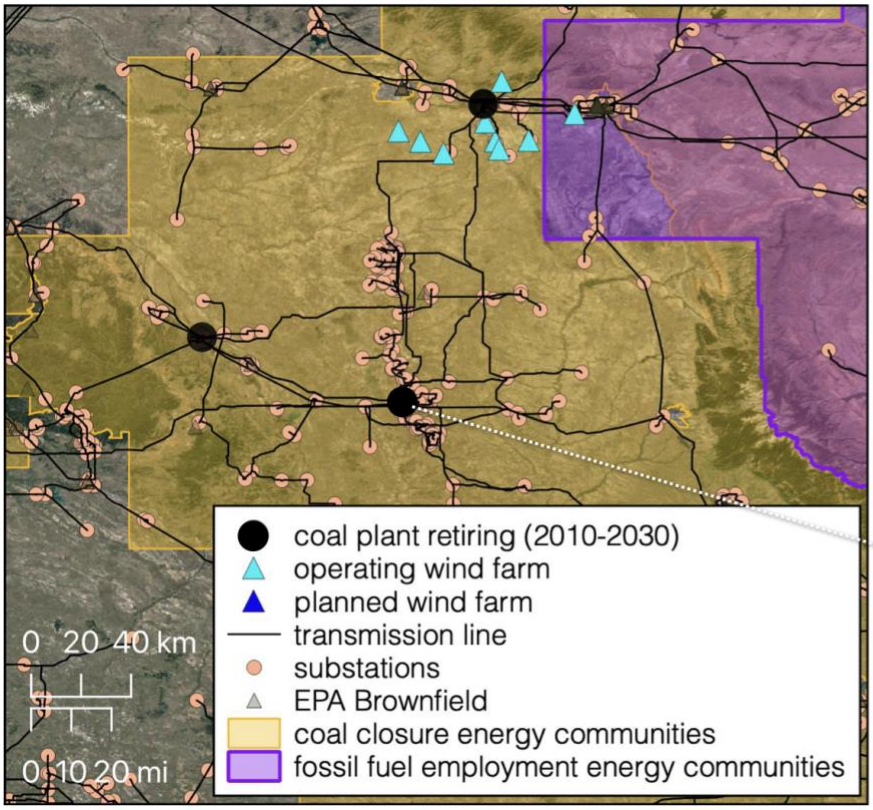


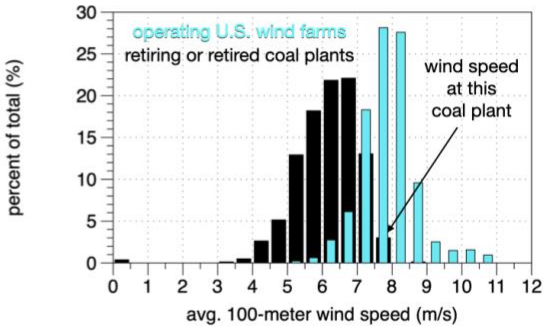
Coal electricity generators retiring between 2010-2030 according to the EIA, as well as tax incentive areas and wind-related electricity generation. Not all coal closure areas are co-located with retiring coal generators because the IRS identified only areas that already experienced a closure; future retirements before the end of 2030 are expected to result in new coal closure energy communities.

Hypothetical example: Coal to wind plus storage site redevelopment

This smaller, more rural 23-MW coal power plant reflects many older power plants in the American West, coming online in 1960 and retiring in 2014. The map shows several coal plants in the area retiring between 2010 and 2030, and operational wind farms in the region but not within about 60 miles of this particular location. This shift from coal to wind in the area is also supported by the site's 7.6-m/s average wind speed at 100 m, very high wind with respect to retired or retiring coal plants but about average for operating U.S. wind farms. A rail line and 60-kV transmission line is on-site. Three electrician apprenticeship programs are also within 100 miles, but there are no industrial mechanic or crane operator programs, a possible development opportunity for some of the 4,000 students at the nearby university. Finally, according to the Energy Information Administration, there are no future wind farms planned in the area, though as the site is within an official coal closure energy community, clean energy developments in this area could qualify for additional tax credit bonuses.

Coal to Wind + Storage Example





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Visit the Coal Redevelopment project website for additional resources.