

Advancing the Growth of the U.S. Wind Industry: Federal Incentives, Funding, and Partnership Opportunities

Wind power is a burgeoning power source in the U.S. electricity portfolio, supplying more than 10% of U.S. electricity generation.

The U.S. Department of Energy's (DOE's) Wind Energy Technologies Office (WETO) focuses on enabling industry growth and U.S. competitiveness by supporting early-stage research on technologies that enhance energy affordability, reliability, and resilience and strengthen U.S. energy security, economic growth, and environmental quality. Outlined below are the primary federal incentives for developing and investing in wind power, resources for funding wind power, and opportunities to partner with DOE and other federal agencies on efforts to move the U.S. wind energy industry forward.

Incentives for Project Developers and Investors

To stimulate the deployment of renewable energy technologies, including wind energy, the federal government provides incentives for private investment, including tax credits and financing mechanisms such as tax-exempt bonds, loan guarantee programs, and low-interest loans.

Tax Credits

The **Inflation Reduction Act (IRA)**, which became law on August 16, 2022, extends and increases tax credits for wind energy projects that begin construction prior to January 1, 2025.

Starting in 2025, the IRA converts energy tax credits into emissions-based, technology-neutral tax credits available to all types of power facilities with zero or net-negative carbon emissions. The IRA begins phasing out either in 2032 or when total greenhouse gas emissions in the power sector decline to at least 75% below 2022 levels—whichever comes last.

To receive the increased credit amount, projects that began construction on or after January 29, 2023 must satisfy [apprenticeship and prevailing wage requirements](#). A full exception to this applies to small facilities, which must either meet the prevailing wage and apprenticeship requirements or have a maximum net output of less than 1 megawatt to receive the increased credit amount. The base credit amount



The Block Island Wind Farm, the first U.S. offshore wind farm, represents the launch of an industry that has the potential to contribute significantly to a reliable, stable, and affordable energy mix. Photo by Dennis Schroeder, NREL 41193

for large projects that do not meet the wage and apprenticeship requirements is 20% of the full credit amount.

Additionally, under the IRA, projects can receive stackable bonus credits¹ for any or all of the following:

- 10% for meeting the following [domestic content thresholds](#)²:
 - 100% of applicable iron and steel components are domestically manufactured, and
 - 40% of costs³ for manufactured products and components for land-based wind are domestically manufactured
 - 20% of costs⁴ for manufactured products and components for offshore wind are domestically manufactured
- 10% for locating facilities in [fossil-fuel-powered energy communities or brownfield sites](#)⁵
- 10% for locating projects less than 5 megawatts in [low-income communities](#)⁶ or on tribal lands, or 20% for a low-income residential building or economic benefit project.⁷

Finally, for some projects, the IRA allows entities to [transfer](#)⁸ credits to another taxpayer and authorizes [direct payments](#)⁹ for tax-exempt entities such as nonprofit organizations, electric cooperatives, and tribes.

¹ 10% for the Production Tax Credit and 10 percentage points for the Investment Tax Credit

² www.irs.gov/pub/irs-drop/n-23-38.pdf

³ For projects that begin construction through the end of 2024. Domestically-manufactured component requirements for land-based wind grow to 45% in 2025, 50% in 2026, and 55% in 2027.

⁴ For projects that begin construction through the end of 2024. Domestically-manufactured component requirements for offshore wind grow to 27.5% in 2025, 35% in 2026, 45% in 2027, and 55% in 2028.

⁵ www.irs.gov/pub/irs-drop/n-23-29.pdf

⁶ <https://www.energy.gov/justice/low-income-communities-bonus-credit-program>

⁷ For facilities under 5 MW, 1.8 gigawatts per year of additional allocated environmental justice bonus credits are available for:

- Locating facilities in low-income communities (10 percentage points)
- Locating facilities on tribal lands (10 percentage points)
- Locating facilities as part of a low-income residential building project (20 percentage points)
- Locating facilities as part of a low-income economic benefit project (20 percentage points).
- The environmental justice bonus credits are stackable with the other domestic content and energy community bonuses noted above but are not stackable with each other.

⁸ <https://public-inspection.federalregister.gov/2023-12799.pdf>

⁹ <https://www.whitehouse.gov/cleanenergy/directpay/>

Renewable Electricity Production Tax Credit (PTC)—The PTC allows owners and developers of wind energy facilities (land based and offshore) to claim a federal income tax credit on every kilowatt-hour (kWh) of electricity supplied to the power grid annually for a period of 10 years after a facility is placed into service.

The IRA extends through 2024 the PTC, which previously expired for wind at the end of 2021. Wind projects placed in service after 2024 are eligible for a technology-neutral clean energy PTC of the same value.

Utility-scale wind projects placed into service after Dec. 31, 2021, that satisfy the new wage and apprenticeship requirements will receive an inflation-adjusted credit of 2.6 cents per kWh for the first 10 years of electricity generation.

Projects placed into service on or before Dec. 31, 2021, remain subject to the prior PTC phase-out.

Construction Start Date	The estimated allowable tax credit is...
After Dec. 31, 2016	1.9 cents/kWh
By Dec. 31, 2017	1.8 cents/kWh
By Dec. 31, 2018	1.4 cents/kWh
By Dec. 31, 2019	1 cent/kWh
By Dec. 31, 2021	1.5 cents/kWh
By Dec. 31, 2024	2.6 cents/kWh*

*Projects >1 megawatt that began construction on or after Jan. 29, 2023 must meet apprenticeship and prevailing wage requirements to receive the full allowable credit amount. For large projects that do not meet apprenticeship and prevailing wage requirements, the allowable tax credit is 20% of the full value (e.g. 0.52 cents/kWh for projects that begin construction by 2024). Values may be adjusted for inflation in future years. Additionally, the IRA adds 10% bonus credits for meeting domestic manufacturing thresholds and for locating facilities in fossil-fuel-powered communities, low-income communities, or on Tribal lands.

After commencing construction by the deadlines noted in the table, projects have four years to begin producing electricity.

Starting in 2025, the IRA converts energy tax credits into emissions-based, technology-neutral tax credits.

Additionally, the IRA adds stackable 10% increases in the PTC value for projects placed in service after Dec. 31, 2022, that meet [domestic manufacturing thresholds](#) or site facilities in [energy communities](#), [low-income communities](#), or on tribal lands.

[programs.dsireusa.org/system/program/detail/734](https://www.dsireusa.org/system/program/detail/734)

¹⁰ <https://public-inspection.federalregister.gov/2023-25539.pdf>

Business Energy Investment Tax Credit (ITC)—The ITC is a federal income tax credit for capital investments in renewable energy projects. Unlike the PTC, this one-time credit is based on the dollar amount of the investment and earned when the [equipment](#)¹⁰ is placed into service. Owners and developers of large wind energy facilities that break ground (or, in the case of developers, commence construction) can elect to claim the ITC instead of the PTC; however, the value of the credit depends on when the facility starts construction.

For large projects, the IRA sets the ITC at 6% or 30% of the cost of installed equipment, depending on project size and labor factors; projects over 1 megawatt must satisfy new apprenticeship and prevailing wage requirements to receive the 30% ITC. For small wind projects (turbines up to 100 kilowatts) that began construction after 2019 and were placed into service by December 31, 2021, the ITC is 26%.

For land-based wind		
If construction begins by...	The credit for large wind turbines is...	The credit for small wind turbines is...
Dec. 31, 2018	18% of expenditures	30% of expenditures
Dec. 31, 2019	12% of expenditures	30% of expenditures
Dec. 31, 2020	18% of expenditures	26% of expenditures
Dec. 31, 2021	18% of expenditures	26% of expenditures
Dec. 31, 2022	6% or 30% of expenditures	30% of expenditures
Dec. 31, 2023	6% or 30% of expenditures	30% of expenditures
Dec. 31, 2024	6% or 30% of expenditures	30% of expenditures

For offshore wind	
If construction begins by...	The credit for offshore wind turbines is...
Dec. 31, 2022	30% of expenditures
Dec. 31, 2024	6% or 30% of expenditures

Starting in 2025, the IRA converts energy tax credits into emissions-based, technology-neutral tax credits.

Additionally, the IRA adds stackable bonus credits of ten percentage points for projects placed in service after Dec. 31, 2022, that meet [domestic manufacturing thresholds](#) or site facilities in [energy communities](#), [low-income communities](#), or on tribal lands.

[programs.dsireusa.org/system/program/detail/658](https://www.dsireusa.org/system/program/detail/658)

Advanced Manufacturing Production Tax Credit—

The IRA also creates new advanced manufacturing production credits for companies that domestically manufacture and sell clean energy equipment in the United States between December 31, 2022, and December 31, 2032.

For wind turbine components, the amount of the credit varies depending on the component type and is multiplied by the rated capacity of the turbine (in watts).

- Blades: 2 cents times rated capacity
 - Nacelle: 5 cents times rated capacity
 - Tower: 3 cents times rated capacity
 - Fixed-bottom offshore wind platform: 2 cents times rated capacity
 - Floating offshore wind platform: 4 cents times rated capacity
 - Distributed wind inverters: 11 cents times rated capacity.
- For critical minerals, the credit is 10% of the cost incurred to produce the mineral.
 - For offshore wind vessels, the credit is 10% of the vessel’s sale price.

Beginning in 2030, the advanced manufacturing production credit will be reduced by 25% each year and eliminated for components sold after 2032.

Advanced Manufacturing Investment Tax Credit—The IRA reestablishes the Advanced Manufacturing Tax Credit (commonly referred to as 48C), which supports investment in domestic clean energy manufacturing facilities through a competitively awarded investment tax credit of 6%, or 30% if apprenticeship and prevailing wage requirements are met. Qualified facilities¹¹ include property designed to produce or recycle wind energy components, including both facilities and major tooling. The IRA provides for \$10 billion to be competitively awarded for these projects, with at least \$4 billion awarded to investments in [energy communities](#). Facilities that begin construction by Dec. 31, 2024 can choose either the Advanced Manufacturing PTC or Advanced Manufacturing ITC.

energy.gov/infrastructure/qualifying-advanced-energy-project-credit-48c-program

Residential Renewable Energy Tax Credit—Taxpayers who purchase and install a qualifying residential small wind electric system (100 kilowatts or less) may claim the Residential Renewable Energy Tax Credit for qualified expenditures on systems placed into service on or before Dec. 31, 2034. The law provides for a phase-down of this credit, as outlined below. Qualified expenditures include labor costs for on-site preparation, assembly, or original system installation, and for piping or wiring to interconnect a system to the home. The credit applies to existing homes, newly constructed homes, principal residences, and second homes but not rental properties. There is no maximum credit.

programs.dsireusa.org/system/program/detail/1235

For residential wind	
If system is placed in service...	The estimated allowable tax credit is...
By Dec. 31, 2019	30% of qualified expenditures
In 2020 or 2021	26% of qualified expenditures
In 2022–2032	30% of qualified expenditures
In 2033	26% of qualified expenditures
In 2034	22% of qualified expenditures
Future years	N/A

New Markets Tax Credit (NMTC)—The NMTC Program incentivizes community development, job creation, and economic growth by attracting private investment to underserved communities. The program allows individual and corporate taxpayers to receive federal income tax credits in exchange for making equity investments in vehicles certified as Community Development Entities (CDEs) by the Treasury Department’s Community Development Financial Institutions Fund. CDEs that receive tax credit allocation authority under the program are domestic corporations or partnerships that provide loans, investments, or financial counseling in low-income urban and rural communities. An investor in a CDE will benefit from a tax credit equal to 39% of their original investment over a 7-year period, in addition to the returns on the investment. The CDEs, in turn, use the capital raised to provide flexible, affordable financing for environmentally sustainable projects in low-income communities. The NMTC Program has helped support renewable energy projects, including the Coastal Energy Project, a 6-megawatt wind farm in Grayland, Washington.

cdfifund.gov/programs-training/programs/new-markets-tax-credit

¹¹ <https://www.irs.gov/pub/irs-drop/n-23-44.pdf>
Eligible projects include: clean energy and grid manufacturing and recycling projects; industrial greenhouse gas emission reduction projects; and [critical material](#) processing, recycling, and refining projects.

Financing Mechanisms

Rural Energy for America Program (REAP) Renewable Energy Systems & Energy Efficiency Improvement Loans & Grants—Through REAP, the U.S. Department of Agriculture provides agricultural producers and rural small businesses with guarantees on loans for energy efficiency improvements and renewable energy systems, including small and large wind generation projects. REAP provides guarantees on loans for up to 75% of total eligible project costs. Applicants must provide at least 25% of the project cost and demonstrate sufficient revenue to repay the loan and cover any operation and maintenance expenses. Established through the 2002 Farm Bill, REAP was reauthorized in the 2014 Farm Bill because of its demonstrated success in helping to increase American energy independence and, over time, lower the cost of energy for farmers, ranchers, and rural small business owners. Since 2009, REAP has supported more than 340 wind energy projects nationwide.

rd.usda.gov/programs-services/energy-programs/rural-energy-america-program-renewable-energy-systems-energy-efficiency-improvement-guaranteed-loans



Small and large wind generation projects can benefit from the U.S. Department of Agriculture's Rural Energy for America Program Renewable Energy Systems & Energy Efficiency Improvement Loans & Grants. Photo from NREL, 11919

Title 17 Innovative Clean Energy Loan Guarantee Program—

Established as part of the Energy Policy Act of 2005, this program helps stimulate the financing of groundbreaking energy efficiency, renewable energy, environmental remediation, greenhouse gas reduction and sequestration, and advanced transmission and distribution projects. Designed to accelerate the deployment of innovative clean energy technology, the Title 17 loan program authorizes the DOE Loan Programs Office to guarantee the debt on energy production or manufacturing facilities associated with a broad spectrum of energy technologies, including renewables. The government guarantee on the debt lowers the risk associated with funding wind and other clean energy projects, making more capital available to the industry. For each loan guarantee awarded, the government sets aside a credit subsidy—a sum of money that serves as insurance in case the project fails.

energy.gov/lpo/innovative-clean-energy-loan-guarantees

Sources of Funding for Renewable Energy Research, Development, Demonstration, and Deployment

A number of federal government agencies also provide funding to support renewable energy research and development (R&D), demonstration, commercialization, and deployment through grants or cooperative research and development agreements (CRADAs). Some of the leading funding organizations and associated programs are listed in upcoming sections. These funding opportunities are available through federal agencies that are subject to annual Congressional appropriations, so availability of funds may vary over time.

R&D Grants and Cooperative Agreements

DOE Wind Energy Technologies Office—WETO works with businesses, industry, universities, and other organizations that focus on technological developments to improve the reliability and affordability of wind energy and address barriers to deployment. One way WETO encourages the growth of these technologies is by offering competitive Funding Opportunity Announcements for technology development and demonstration. WETO supports high-impact projects that can significantly advance its mission to help industry develop more efficient wind-energy technologies that help America lower the cost of wind energy.

energy.gov/eere/wind/wind-energy-funding-opportunities

DOE Office of Energy Efficiency and Renewable Energy (EERE)—Through funding opportunities offered by various office programs (including WETO), EERE offers financial assistance to businesses, industry, universities, and other organizations to encourage the development and demonstration of renewable energy and energy efficiency technologies with the goal of increasing their adoption.

energy.gov/eere/funding/eere-funding-opportunities



DOE's Advanced Research Projects Agency-Energy (ARPA-E) Aerodynamic Turbines Lighter and Afloat with Nautical Technologies and Integrated Servo-control program funded a variety projects to enable the next generation of efficient and cost-optimized floating turbine designs. *Photo by Senu Simivas, NREL 27582*

DOE Office of Clean Energy Demonstrations (OCED)—

Established in 2021 as part of the Bipartisan Infrastructure Law to accelerate clean energy technologies from the lab to the market, OCED delivers clean energy demonstration projects at scale in partnership with the private sector to accelerate deployment, market adoption, and the equitable transition to a decarbonized energy system.

energy.gov/oced/office-clean-energy-demonstrations

DOE Advanced Research Projects Agency-Energy (ARPA-E)—ARPA-E funds short-term, technology-focused, applied R&D aimed at creating real-world solutions to important problems in energy creation, distribution, and use. The agency's focus is advancing high-impact energy technologies that are too early for private-sector investment but have the potential to radically improve U.S. economic security, national security, and environmental well-being.

arpa-e.energy.gov/about/apply-for-funding

Small Business Innovation Research (SBIR) program—The Small Business Administration's SBIR program encourages U.S. small businesses to engage in federal R&D that has potential for commercialization. Its mission is to support scientific excellence and technological innovation through the investment of federal research funds in critical American priorities to build a strong national economy. Eleven federal agencies, including DOE, participate in the program, soliciting grant proposals from small businesses and making awards on a competitive basis.

energy.gov/science/sbir | sbir.gov

Technology Deployment Grants

DOE Office of Indian Energy—The Office of Indian Energy provides financial assistance, including grants and technical assistance, to federally recognized tribal governments and Alaska Native corporations to develop and deploy renewable energy projects on tribal lands. In addition, the Office of Indian Energy's Energy Development Assistance Tool provides information for tribes about federal grant, loan, and technical assistance programs available from more than 10 federal agencies to support energy development and deployment in Indian Country and Alaska Native villages.

energy.gov/indianenergy/funding

DOE Office of Technology Transitions Technology Commercialization Fund (TCF)—The TCF leverages the R&D funding in DOE's applied energy programs to advance energy technologies with the potential for high impact. It uses 0.9% of the funding for DOE's applied energy research, development, demonstration, and commercial application budget for each fiscal year from the Office of Electricity, EERE, Office of Fossil Energy, and Office of Nuclear Energy. These funds are matched with funds from private partners to promote promising energy technologies with the goal of increasing the commercialization and economic impact of energy technologies developed at DOE's national labs.

energy.gov/technologytransitions/technology-commercialization-fund

Rural Energy for America Program (REAP) Renewable Energy Systems & Energy Efficiency Improvement Loans & Grants—In addition to loan guarantees, REAP provides grant funding to agricultural producers and rural small businesses to install renewable energy systems or make energy efficiency improvements. These renewable energy system grants, which range between \$2,500 and \$250,000, can be used to fund up to 25% of total eligible project costs and can be combined with loan guarantee funding to fund up to 75% of total eligible project costs.

rd.usda.gov/programs-services/energy-programs/rural-energy-america-program-renewable-energy-systems-energy-efficiency-improvement-guaranteed-loans

Small Business Technology Transfer (STTR) program—The Small Business Administration's STTR program funds collaborative efforts between small businesses and research institutions with the goal of transferring technologies and products from the laboratory to the marketplace. STTR's focus

is on bridging the gap between the performance of basic science and the commercialization of resulting innovations. Five federal agencies, including DOE, participate in the program, soliciting grant proposals from small businesses and making awards on a competitive basis.

energy.gov/science/sbir | sbir.gov

State Energy Competitive Financial Assistance Program—DOE's EERE offers competitive grants through its State Energy Program. Designed to meet DOE's nationally focused energy initiatives, the funding provides states and territories with opportunities to develop public and private partnerships to deploy energy efficiency and renewable energy technologies and programs with high potential for regional and local economic impact.

energy.gov/eere/wipo/state-energy-program-competitive-financial-assistance-program



The Lakota Nation installed a 65-kW Nordtank turbine that annually supplies 120 MWh of power to KILI, the Pine Ridge Reservation radio station known as the voice of the Lakota Nation in South Dakota. Photo by Bob Gough, NREL 16258

Partnership Opportunities with DOE National Laboratories

In addition to offering a wide range of financial incentives and resources designed to spur wind energy technology development and deployment, the federal government actively seeks opportunities to collaborate with industry, government agencies, academia, small businesses, international organizations,

and nonprofits to advance the development and deployment of wind energy. This collaboration is possible through DOE's national laboratories—facilities where partners can access technical expertise and highly specialized commercialization and deployment capabilities.

Agreement Type	Definition	Cost	Estimated Timeline*	Benefits
Cooperative Research and Development Agreement (CRADA)	Collaboration between a lab and one or more partners outside the federal government (usually from industry, nonprofit organizations, or academia, domestic or foreign) to collaborate and share the results of a jointly conducted R&D project.	Lab and participant may share costs or participant pays 100% funds-in.	One month	• Leverage and optimize resources • Share technical expertise in a protected environment • Option to obtain license to the lab CRADA-generated intellectual property (IP) on agreed-upon terms and conditions • Five-year data protection • Each partner may take title to its own CRADA-generated IP
Agreement for Commercializing Technology (ACT)	ACT is an agreement type allowed by DOE for its laboratory contractors to use third-party terms and conditions for work performed with or for that third party. DOE IP provisions are required. ACT permits a more flexible cost structure to enable the laboratory contractor to cover certain costs, such as insurance, associated with project risks.	Varies, depending on circumstance. Participant pays 100% for laboratory contractor's cost of work. Example: lab and participant may share costs or participant pays 100% funds-in.	Two to four months to establish, depending on U.S. or foreign ownership and length of terms negotiations (about the same as other agreement types)	• Leverage and optimize existing capabilities at lab, freedom to negotiate as lab, releasing DOE from obligation • Option to work at the speed and style of industry partners: operating more like a business • Terms flexibility provides room to modularize each aspect of the agreement and to explore more thoroughly the risks (financial, performance, funding, resources/skills) • Allows lab to engage in more relevant, impactful work, such as accepting funds from foundations
Strategic Partnership Project	Labs conduct work for non-DOE entities such as industry, small businesses, or other federal agencies and may utilize DOE facilities.	Participant pays full cost of the lab's effort.	One month	• Access to unique facilities, services, and/or technical expertise • Flexible terms for IP and licensing rights
User Facility Agreement	Users may access facilities, specialized equipment, instrumentation, personnel, etc., to conduct proprietary or nonproprietary research.	User pays approved user rate or each party covers its own cost.	Two weeks	• Generated data treated as proprietary (if proprietary user facility agreement) • Access to unique facilities and equipment to validate or improve user technology

Agreement Type	Definition	Cost	Estimated Timeline*	Benefits
Technical Service Agreement	Lab staff provide short-term technical assistance to organizations with technical problems requiring expertise that is not available commercially.	Participant pays full cost of the lab's effort.	Five to 10 business days	• Access to expertise of lab scientists and engineers
Licenses	Companies acquire IP rights (such as patents, copyrights, and trademarks) to commercialize technology developed by the lab.	Payment (in the form of issue fees, royalties on sales, equity in company, etc.) is nonrefundable and provided by the licensee.	One month or more depending on the license	• Leverage cutting-edge inventions to drive technology commercialization • Licenses may be nonexclusive or exclusive • Opportunity available to small and large businesses
University Partnerships	In partnering with universities and colleges, national laboratories combine scientific knowledge and state-of-the-art facilities to research and deploy renewable energy and energy efficiency technologies.	Varies, depending on circumstance.	One month or more	• Enhance research collaboration • Foster the exchange of ideas • Attract rising stars in scientific and engineering disciplines • Create pathways for graduate and undergraduate students—as well as postdoctoral researchers • Explore new ways to engage with a range of educational institutions

Note that this table does not capture all partnering mechanisms, and there might be differences among each of the national laboratories. Please contact the potential laboratory partner being considered for additional information.

*The exact timeline for completing agreements is determined on a case-by-case basis (the estimated timelines above reflect time to complete agreements after the statement of work and funding have been agreed upon). Agreements with non-U.S. entities take longer.

Working Together To Move the Wind Industry Forward

For additional information on the unique partnering opportunities available at each national laboratory, visit their partnering, technology transfer, and commercialization web pages.

Argonne National Laboratory
anl.gov/work-with-us

Idaho National Laboratory
inl.gov/inl-initiatives

Lawrence Berkeley National Laboratory
ipo.lbl.gov

Lawrence Livermore National Laboratory
llnl.gov/doing-business

Los Alamos National Laboratory
collaboration.lanl.gov

National Renewable Energy Laboratory
nrel.gov/wind/work-with-us.html

Oak Ridge National Laboratory
ornl.gov/partnerships

Pacific Northwest National Laboratory
pnnl.gov/industry-partnerships

Sandia National Laboratories
sandia.gov/working-with-sandia

This fact sheet focuses on federal government support for wind energy. For information on state-level policies and incentives, see dsireusa.org.



For more information, visit:
energy.gov/eere/wind

DOE/GO-102022-5832 • December 2023