

About the Carbon-Free Technology Initiative

The Carbon-Free Technology Initiative (CFTI) aims to achieve net-zero emissions in the U.S. electricity sector by promoting policies to ensure the commercial availability of affordable, carbon-free, 24/7 power technologies by the early 2030s. Participants in the CFTI include the Edison Electric Institute (EEI) and its member companies, Clean Air Task Force, Bipartisan Policy Center, Center for Climate and Energy Solutions, ClearPath, Great Plains Institute, Information Technology & Innovation Foundation, Nuclear Energy Institute, and Third Way.

The CFTI focuses on policy recommendations to advance key technology areas:

- Advanced wind and solar energy systems;
- Long-duration storage and advanced demand efficiency;
- Advanced, dispatchable, and renewable super hot rock deep geothermal;
- Zero-carbon fuels, such as hydrogen;
- Advanced nuclear energy (both fission and fusion); and
- Carbon capture, utilization, and storage.

The CFTI partners have identified detailed policy proposals for each of these five technology areas, which are at various stages of research, development, demonstration, and deployment (RDD&D) in the marketplace. Enacting these policy proposals and ensuring the RDD&D is funded will be a multi-year effort involving the annual appropriations process, program reauthorizations, and tax policy.

While encompassing a broad range of ideas, many of the proposals across all five technologies can be grouped into four areas:

- **Research and Development (R&D)** – activities ranging from laboratory work involving innovative technologies up to pilot-scale (but not commercial-scale) testing.
- **Demonstration** – the development of first-of-a-kind (FOAK) through Nth-of-a-kind (NOAK) projects that can provide enough certainty about the performance of a technology that lenders, plant owners, and customers consider it to be sufficiently de-risked for commercial use. (The value for “N” varies across technologies.)
- **Deployment** – moving beyond initial commercial-scale demonstrations toward achieving the full commercialization and competitiveness of a given technology in the marketplace.
- **Ecosystem** – independent of the maturation of a given technology, “ecosystem” issues refer to aspects of the marketplace that have an indirect impact on the cost or performance of a technology and otherwise limit broader uptake, such as siting and permitting.

Most federal support for clean energy R&D occurs through the Department of Energy (DOE). Regarding R&D for carbon-free technologies, proposed CFTI policy recommendations would, among other things:

- Significantly increase funding for energy innovation R&D programs at DOE over the next five years, including through ARPA-E and the national laboratories. Such funding should continue to increase after the initial five-year period.
- Create dedicated programs and initiatives at DOE focused on each of the technology areas to accelerate their development and establish new mechanisms for public- and private-sector collaboration, including with state and local entities.

Enabling projects to move quickly from R&D and pilot demonstrations toward commercial-scale demonstration is essential. Demonstration projects face several hurdles, including limited appetite by private investors and federal efforts that suffer from limited funding and limited risk appetite. To overcome these hurdles, proposed CFTI policy recommendations would:

- Establish a dedicated program to guide and support the demonstration of the priority technologies noted above.
- Establish consortia with collaboration and knowledge-sharing across federal agencies, the national labs, and non-governmental and other entities with informative expertise.
- Adopt several measures to reduce barriers to using loan guarantees offered by the DOE Loan Program Office.
- Establish alternative cost-share formulas for demonstration projects not necessarily tied to a 50/50 split (e.g., for early-stage project development, an 80/20 cost-share grant program would be appropriate).
- Increase appropriations to support commercial-scale demonstration projects involving first-of-a-kind and Nth-of-a-kind technologies.

A range of mechanisms is needed to support carbon-free technologies in moving from the demonstration stage to achieving technical maturation at a commercial scale and relative competitiveness in the marketplace. Proposed CFTI policy recommendations with respect to the deployment of carbon-free technologies would:

- Provide financial incentives for investing in deployment of these technologies, including production or investment tax credits (with monetization), loan guarantees, and grants.
- Extend and expand existing tax credits, such as 45Q for carbon sequestration.
- Develop a technology-inclusive tax credit to incentivize deployment of new carbon-free technologies.
- Authorize the federal government to offer a contract-for-differences mechanism that buffers the technology against downside market risk while sharing upside profits with taxpayers.
- Utilize federal government virtual power purchase agreements of 10-30 years for some carbon-free energy technologies.
- Establish enterprise zones for power plant sites that are closing to encourage deployment of new carbon-free energy technologies in those zones.
- Establish a federal clean energy fund that would invest in, as well as spur private investment in, carbon-free energy technologies.

Achieving net-zero carbon emissions from the electric power sector will require substantial infrastructure investments. This will require both the ability to permit and site (1) generating facilities and (2) the supporting infrastructure, such as transmission, natural gas pipelines, and storage sites, that enables their operation. Proposed CFTI policy recommendations to address these “ecosystem” issues would:

- Address siting barriers to construction of clean energy generation, transmission, and carbon dioxide (CO₂) pipelines.
- Reform siting and permitting on federal lands.
- Provide federal support mechanisms for licensing carbon-free energy technologies, such as advanced nuclear facilities by the Nuclear Regulatory Commission.
- Establish industry consortia for broader deployment and use of carbon-free energy technologies across industries.

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