

PNNL's **NZERO** Initiative

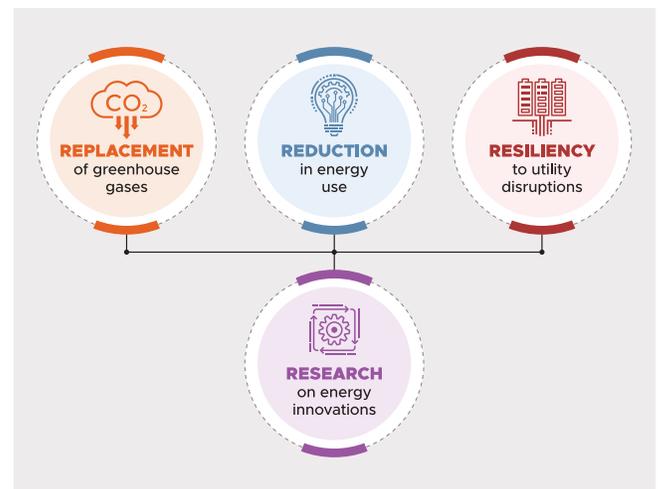
Transitioning to Net-Zero Emissions and Resilient Operations

Meeting the nation's ambitious climate and energy goals will require new technologies, real-world demonstrations of solutions, and partnerships with industry and communities.

PACIFIC NORTHWEST NATIONAL LABORATORY (PNNL) applies its scientific and technological knowledge to create solutions for reducing greenhouse gas emissions and achieving a net-zero economy. Government and industry rely on our research and development capabilities—and now we're putting that same expertise to work on our own campus. Known as NZERO, PNNL's initiative to achieve net-zero emissions and energy-resilient operations by 2030 will demonstrate how innovative technologies and energy management approaches, combined with strong partnerships, can achieve bold goals.

As part of DOE's Net Zero Labs (NZL) pilot project, PNNL is striving to be among the first federal facilities to achieve net-zero emissions, while optimizing our resources and operations to achieve 24/7 carbon-free energy and mitigate the impacts of utility disruptions. Through NZL and our own NZERO initiative, PNNL is helping the transition to net-zero emissions and decarbonization, delivering results that can be replicated to benefit the entire nation.

Along the way, we will use our campuses as a living laboratory—testing new technologies and approaches and using the knowledge we gain to shape a model for others.



We have set interim targets for meeting our NZERO goal. For example, reducing emissions by 50 percent within three years and reaching a 75 percent reduction within five.

Through our strategy for directly reducing emissions and on-site energy use, we can reach 80 percent of our net-zero emissions goal. The final 20 percent will be achieved through efforts to create community offsets in our utility service areas, with the goal of increasing local access, capacity, and interest in decarbonization.

PNNL's NZERO initiative provides exciting opportunities to integrate our research strengths in energy systems with our campus operations, while partnering with other national laboratories and industry to showcase a path toward a cleaner, more resilient energy future.

PNNL's approach to NZERO centers on four core elements.



REPLACEMENT

Our first step is to replace greenhouse gas sources with cleaner systems and processes. This includes electrifying our buildings, vehicles, and equipment. We'll also look for ways to capture and reuse high-impact greenhouse gases, such as those released when servicing our electron microscopes.



REDUCTION

Reducing energy use through efficiency upgrades and operational changes will further reduce emissions. We'll improve the way we heat and cool our buildings by using district energy systems and capturing waste heat, like that from our supercomputers, to heat other buildings on campus. We will continue to embrace opportunities to make reducing and optimizing energy use part of our DNA through net-zero building design standards, procurement specifications, data-driven building control approaches, and employee engagement.



RESILIENCE

PNNL conducts important research for the nation, and disruptions to some campus operations can severely impact safety, security, operating costs, and research integrity. On-site distributed energy resources, such as photovoltaics and batteries, will be deployed to enable real-time load management along with emission-reduction benefits while enhancing resilience to potential electricity disruptions.



RESEARCH

Research and development will underpin NZERO. We will leverage our successes and strengths in energy efficiency, grid architecture, optimization and control, energy storage, and energy systems integration to advance solutions for a net-zero future. And as we demonstrate these technologies, we will share our progress and results so others can learn from them to advance their efforts.

Partnerships

Strong regional partners will be critical to our success. We are looking for collaborators from utilities, industry, city and state governments, research institutions, and community organizations to both contribute to NZERO demonstrations and share in our learning. For example, the State of Washington has invested in a renewable energy demonstration that will help begin the NZERO transition at [PNNL-Sequim](#). Together, we can strengthen the capacity of our region to design, build, and operate resilient, affordable, low-emissions industries and communities of the future.

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