

RENEWABLE ENERGY CAPABILITIES

Sandia National Laboratories applies world-class science and engineering capabilities and expertise to accelerate the development and deployment of next-generation renewable energy technologies. We partner with large and small businesses, universities, government agencies, and community stakeholders to maximize impact.



SANDIA WAVE ENERGY POWER TAKE-OFF (SWEPT) LAB

The Sandia Wave Energy Power Take-off (SWEPT) Laboratory offers mobile, specialized testing for systems that produce power from wave energy. SWEPT is used to test wave energy converter (WEC) power take-off (PTO) systems. WECs convert the oscillatory mechanical energy from ocean waves to generate electricity, which differentiates them from other technologies that harness a relatively steady input of mechanical energy (e.g., wind turbines or hydroelectric power technologies).

Sandia also has capabilities at the Water Impact Facility to conduct testing of WEC mooring systems and umbilical cords. This capability provides a controlled environment for high velocity water impact, gravity-assisted drop, and underwater testing.

RELATED CAPABILITIES

- Code Development
- Dynamic and Controls
- Environmental Analysis
- Testing and Instrumentation
- Hydropower
- Materials and Coatings
- Powering the Blue Economy
- Resource Characterization
- Simulation and Analysis
- Techno-Economics

Read more about Sandia's water power program at waterpower.sandia.gov.

Contact: Peter Kobos, pkobos@sandia.gov



SCALED WIND FARM TECHNOLOGY (SWIFT) LABORATORY

At the Scaled Wind Farm Technology Facility (SWiFT) in Lubbock, Texas, Sandians partner with other researchers to study the interaction of multiple wind turbines in a wind farm. SWiFT allows for rapid, cost-efficient testing and development of transformative wind energy technology, with emphasis on improving wind plant performance. SWiFT is partially funded through the Department of Energy's Wind Energy Technologies Office.

Advanced testing and monitoring at SWiFT will help researchers evaluate how larger wind turbines and wind power plants can be more efficient, reliable, and cost-effective. The site includes three V27 research turbines that are fully controlled by Sandia. The Sandia wind team is focused on facilitating user needs and providing a secure and unobstructed location for collaborative projects with industry, academia, and other national laboratories as a world-class test bed.

RELATED CAPABILITIES

- Rotor Innovation
- Wind Plant Data Science and AI
- High-fidelity Simulation, Codes, and Tools
- National Security (radar interference)
- Power Systems Integration
- Offshore Design Optimization

Read more about Sandia's wind power program at wind.sandia.gov.

Contact: Nick Johnson, najohns@sandia.gov



NATIONAL SOLAR THERMAL TEST FACILITY (NSTTF)

Operated by Sandia for the U.S. Department of Energy (DOE), the National Solar Thermal Test Facility (NSTTF) is the only large-scale concentrating solar power (CSP) and solar thermal test facility in the United States. The primary goal of the NSTTF is to provide experimental facilities, equipment, and personnel for testing, validating, and improving new concentrating solar thermal components and systems for customers. The facility partners with the DOE, local, and international collaborators on solar thermal technologies and thermal energy storage on an ongoing basis. The NSTTF also partners with the U.S. Department of Defense, the DOE National Nuclear Security Administration (NNSA), and NASA to perform materials testing under extremely high flux and shear forces.

RELATED CAPABILITIES

- Solar Tower
- Solar Furnace
- Molten Salt Testing Facilities
- Solar Simulator
- Optics Lab
- Computational Modeling
- Thermo-Chemistry
- CSP Design
- Mechanical Fabrication
- Coatings
- Heat Exchanger Test Stand
- Hi-flow Hot Particle Recirculation Loop

Read more about Sandia's concentrating solar power program at csp.sandia.gov.

Contact: Margaret Gordon, megord@sandia.gov



PV SYSTEMS EVALUATION LABORATORY (PSEL)

Sandia's Photovoltaic Systems Evaluation Laboratory (PSEL) enables performance characterization of photovoltaic (PV) cells, modules, and systems. PSEL research is conducted on behalf of the Department of Energy (DOE) and other government sponsors, in direct collaboration with industry and academic partners.

PSEL is part of a larger, national network of Regional Test Centers (RTCs), which demonstrate the performance, reliability, and safety of new PV technologies across different climate zones. The program has operations in New Mexico, Colorado, Nevada, Florida, and Michigan. Collectively, the RTC sites validate performance to support the bankability and deployment of PV technologies. PV CAMPER is a multinational version of the RTCs.

RELATED CAPABILITIES AND COLLABORATIONS

- PV Performance Modeling Collaborative (PVP MC)
- Perovskites PV (PACT)
- Materials for Reliability and Longevity (DURAMAT)
- Balance of Systems Reliability (Connectors, etc.)
- Analytical Chemistry and Materials for Energy Storage
- PV Emerging Technologies Evaluations

Read more about Sandia's photovoltaic solar energy program at pv.sandia.gov.

Contact: Anthony Martino, martino@sandia.gov