

Grid Research Integration and Deployment Center

Integrated Electrification
Research





Advancing the Integrated, Modern Grid

The Grid Research Integration and Deployment Center (GRID-C) at Oak Ridge National Laboratory combines multiple electrification research activities across the utility, buildings, and vehicle space into one 52,000 sq. ft. facility. The combination of innovative research and development in power and energy systems, vehicle and buildings science, power electronics, energy storage, sensors and controls, data science and modeling, and cybersecurity enables breakthroughs to support a resilient and secure power grid.

ORNL's mission at GRID-C is to develop technological solutions from materials to devices to systems in order to advance the dynamic and efficient interaction of the electric grid, buildings, and vehicles. The unique, multipurpose research environment at GRID-C is available to industry, academic, and government partners who wish to access its state-of-the-art capabilities and world-class expertise to mutually develop innovative technologies for grid security, resilience, and reliability. Across its energy science and technology user facilities, ORNL delivers breakthroughs from generation to distribution and storage to end use, accelerating America's transformation to a clean, efficient, flexible, and secure energy future.



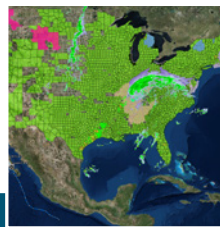
Advanced Devices and Components

Developing and evaluating hardware and software, including advanced power electronics, low-cost, high-fidelity sensors, protective relays and advanced packaging solutions.



Data Analytics and Controls

Creating and deploying cybersecurity advanced algorithms to analyze data from sensors and other grid-connected devices to monitor and manage systems such as microgrid networks for the intelligent grid of the future.



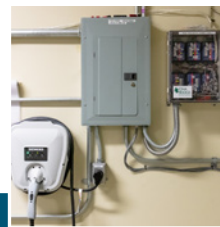
Modeling and Simulation

Developing national power system models and simulations for situational awareness, testing of integrated hardware and software, and planning for a secure and resilient grid system.



Energy Storage

Developing advanced materials, manufacturing and recycling processes for vehicle and grid-scale batteries, as well as novel control systems to accelerate energy storage solutions.



Integrated Systems

Developing and testing components and controls for the grid, buildings and vehicles, including transactive energy controls, wireless vehicle charging and secure communications architecture to support an integrated, clean and efficient power system.



At-Scale Testing and Evaluation

Providing at-scale testing of integrated technologies across the grid, vehicles and buildings space to realistically evaluate hardware and software innovations for an efficient, clean, secure and resilient grid.

Cyber Security Research

Secure, resilient grid communications architecture.

Advanced Sensors

Sensors integration and wide area monitoring systems.

Real Time Grid Simulation

Controls hardware with real-time systems, software platform integration, large-scale system emulation and protection.

Distribution Scale Grid Research

Power electronics-based grid research, distributed energy resources, energy storage.

Second Floor

Center for Alternate Synchronization and Timing/GOAL Lab

Visualization and analytics infrastructure, computing, software engines, and analysis for wide-area situational awareness and monitoring.

First Floor

Vehicle Systems Integration and Electric Drivetrain Evaluation

Drivetrain evaluation for all vehicle classes.

Critical Materials

Critical materials recovery and reuse.

Battery Manufacturing Facility

Open-access DOE lab featuring materials synthesis, scale-up, roll-to-roll manufacturing, and prototyping vehicle and grid-level battery systems.

Residential Scale Grid

Home and neighborhood emulation, transactive controls, and grid integration test beds.

Roll-to-roll Manufacturing

Vehicle-to-grid Charging and Systems Integration

Extreme-fast wired and wireless vehicle charging ecosystem and grid integration test bed.

High Voltage Research

Medium-voltage PE interfaces, MV DC test beds, high-voltage component evaluation and transmission test beds.

Advanced Component Development


Sensors R&D platform, high-voltage semiconductors packaging and process development.

Working with ORNL

More than 100 industry partners and 17 universities annually work with ORNL to advance and commercialize power grid technologies. Industry and academic partners can leverage ORNL's world-class grid research, development, and testing capabilities through user agreements and collaborations approved by DOE. For more information on how to work with ORNL, visit www.ornl.gov/partnerships.

DOE's GRID-C

The Grid Research Integration and Deployment Center at ORNL combines electrification research activities across the utility, vehicles, and buildings areas into one 52,000 sq. ft. facility. This multidisciplinary environment enables the most impactful innovation across the electric ecosystem.



For more information, contact

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