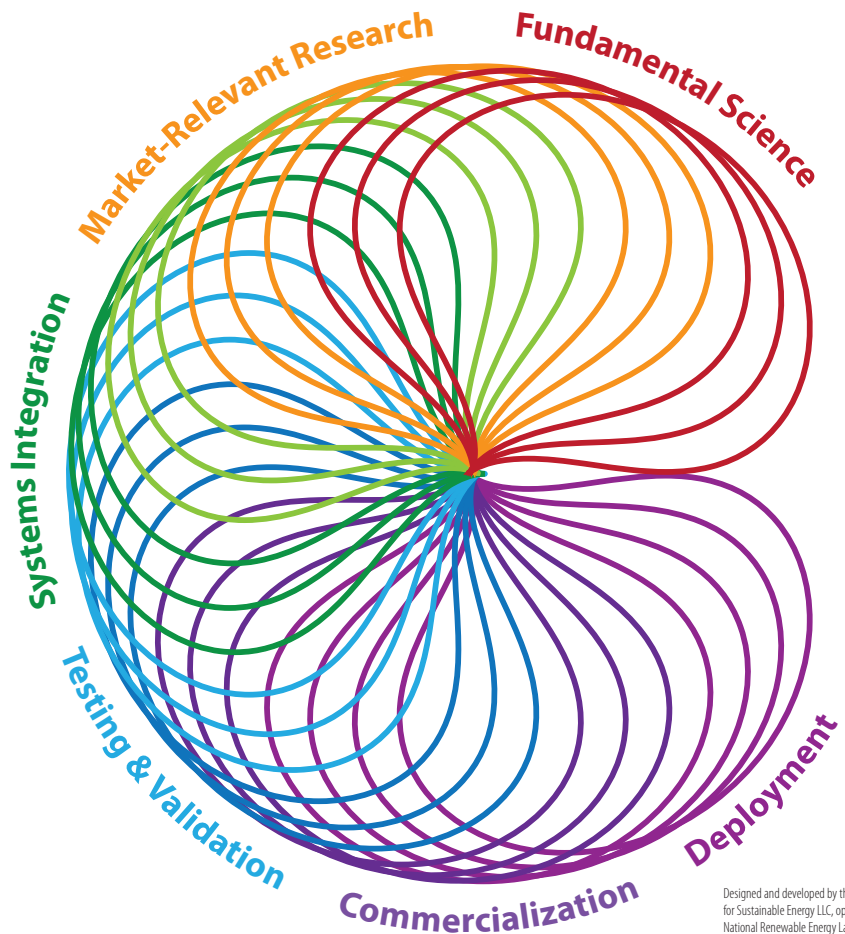


The Spectrum of Clean Energy Innovation

For more than 30 years, the National Renewable Energy Laboratory (NREL) has advanced the science of renewable energy and energy-efficiency technologies while building the capabilities to guide rapid deployment of commercial applications. Transforming our energy systems to achieve the nation's aggressive economic, environmental, and security goals requires a comprehensive approach. Today, NREL is at the epicenter of this transformation—enabling a future of sustainable energy systems based on clean, cost-effective, and secure resources.



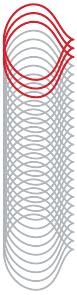
Designed and developed by the Alliance for Sustainable Energy LLC, operator of the National Renewable Energy Laboratory

The NREL Innovation Spectrum

The scope of NREL's capabilities emulates the nature of the innovation process itself. Shepherding new technologies from initial concept to commercial application requires a breadth of expertise across the innovation spectrum, from fundamental science and market-relevant research to systems integration, testing and validation; and through commercialization and deployment. The process is interdependent and iterative, building upon itself and looping back for validation and refinement.

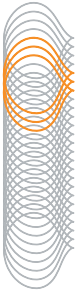
The NREL innovation spectrum is highly interactive within the laboratory and across other research institutions, and closely connected to private industry. Enabling close collaboration among scientists, analysts, policy makers, entrepreneurs, and venture capitalists results in market-relevant technologies and competitive clean energy products and services.

NREL provides the scientific and analytical leadership to guide the innovation process, while contributing its knowledge and expertise at each stage to accelerate adoption of renewable energy and energy-efficiency technologies and systems.



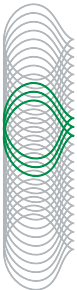
Fundamental Science

NREL scientists focus on unlocking the secrets of energy-related physical and biological materials at the atomic and cellular levels—with the goal of discovering tomorrow’s clean energy solutions. Renewable energy and efficiency research theory and experimentation encompass biomolecular, chemical, computational, and nanoscience; as well as optoelectronics, superconductivity, and solid-state physics.



Market-Relevant Research

NREL researchers couple scientific discovery with market need, focusing on next-generation technologies with the greatest potential for transformative solutions. Inventions resulting from NREL research reduce the cost and increase the performance and reliability of solar, wind, biomass, and geothermal systems; building and vehicle technologies; and manufacturing processes.



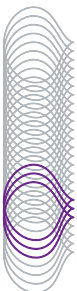
Systems Integration

To increase penetration of renewable energy and energy-efficiency technologies, NREL systems integration experts validate data and provide analysis and techniques to support deployment and integration into the existing energy infrastructure. NREL capabilities include the development of advanced vehicles and fuels, energy-efficient building design, systems modeling and simulation, and distributed energy testing and validation, including interconnection standards and controls.



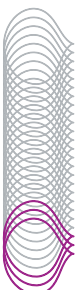
Testing and Validation

Transitioning products rapidly from development into full production requires demonstrating and validating the performance of working prototypes and systems, and improving their reliability and operation. NREL combines systems engineering, simulation models, and analysis with unique testing facilities to evaluate the performance of its own prototypes as well as those from private industry.



Commercialization

Sponsored research and development agreements and licenses with private industry are crucial to incorporating promising new technologies into cost-competitive products for the marketplace. NREL has a long history of close interaction with companies seeking to capitalize on its research to develop commercial products, from entrepreneurial clean energy start-ups to large multinational corporations.



Deployment

To catalyze the large-scale adoption of proven renewable energy and energy-efficiency products and technologies, NREL consults with standards organizations, utilities, builders, consumers, and state and federal agencies. NREL provides information and tools to help communities, industry, and government select the most impactful technologies to reduce their fossil energy use.



National Renewable Energy Laboratory

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