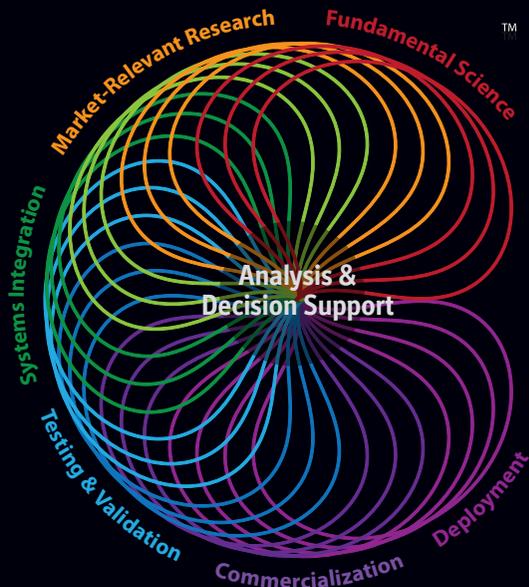
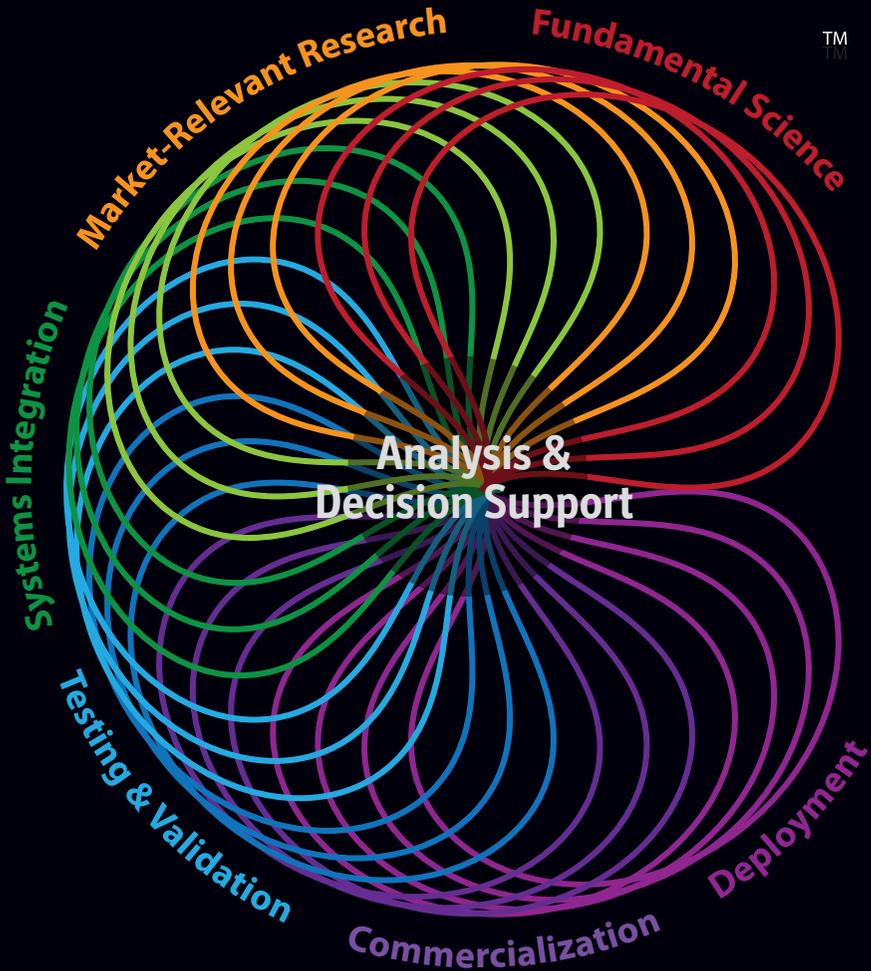


The NREL Spectrum of Clean Energy Innovation



NREL is a national laboratory of the U.S. Department of Energy,
Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.

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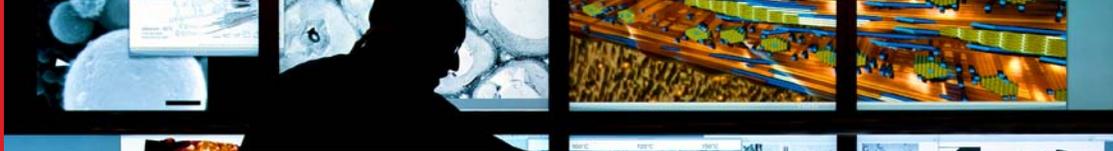
The NREL Spectrum of Clean Energy Innovation

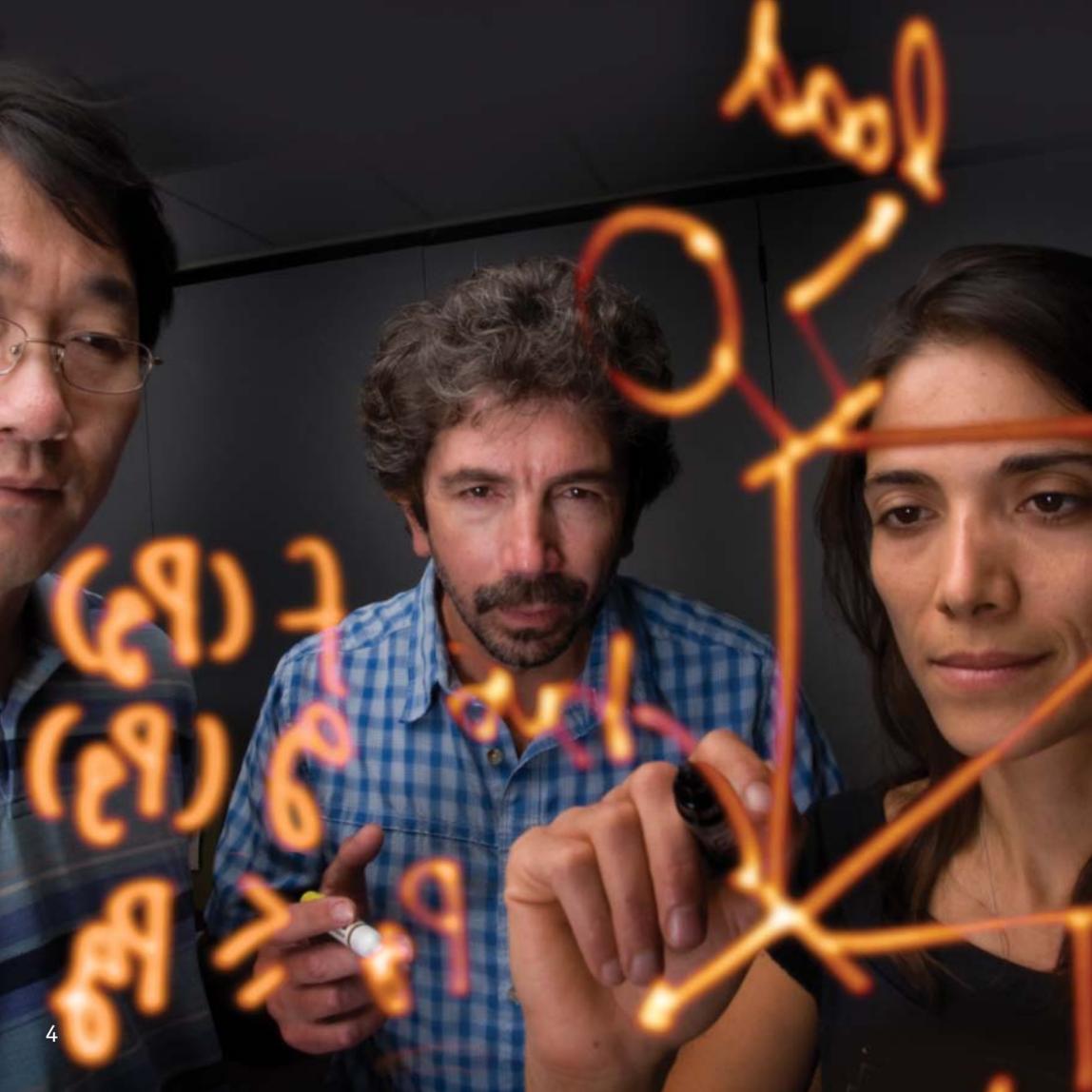
Through deep technical expertise and an unmatched breadth of capabilities, the National Renewable Energy Laboratory (NREL) leads an integrated approach across the spectrum of renewable energy innovation.

From scientific discovery to accelerating market deployment, NREL works in partnership with private industry to drive the transformation of our nation's energy systems.

NREL integrates the entire spectrum of innovation, including fundamental science, market relevant research, systems integration, testing and validation, commercialization, and deployment. Our world-class analysis and decision support informs every point on the spectrum.

The innovation process at NREL is inter-dependent and iterative. Many scientific breakthroughs begin in our own laboratories, but new ideas and technologies may come to NREL at any point along the innovation spectrum to be validated and refined for commercial use.

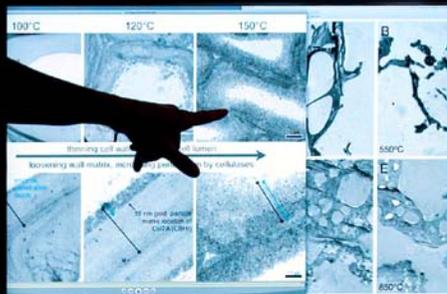
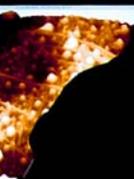
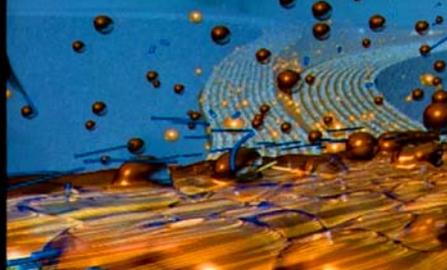


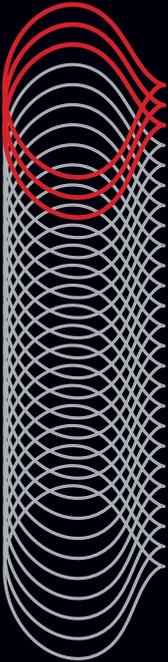


Analysis and Decision Support

NREL's analysis and decision-support capabilities enhance innovation across the spectrum by increasing the understanding of the current and future interactions and roles of energy policies, markets, resources, technologies, environmental impacts, and infrastructure.

NREL analyses are used to inform decisions as energy-efficient and renewable energy technologies advance from concept to commercialization, and to lead the way for integration of renewables into future energy systems.

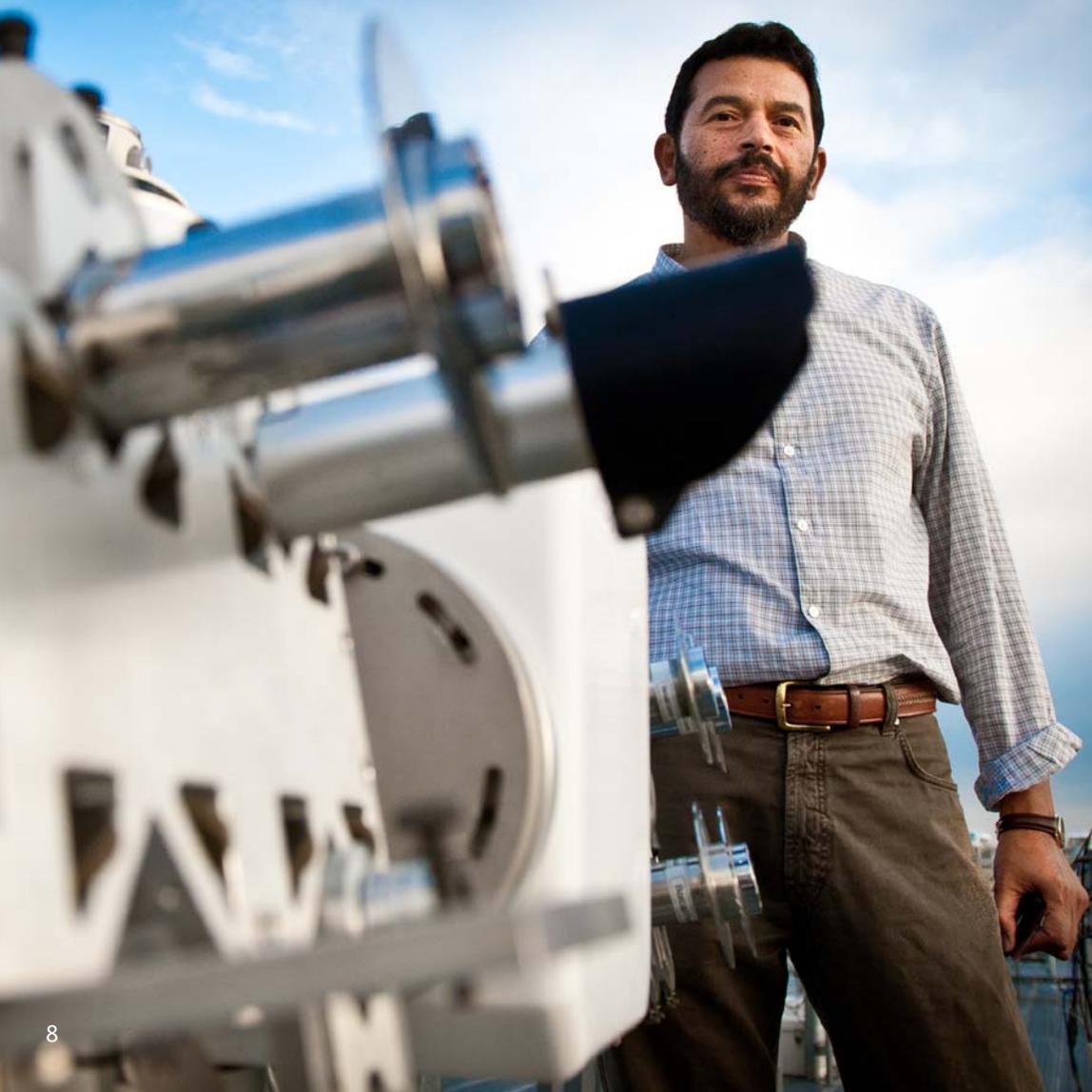




Fundamental Science

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.

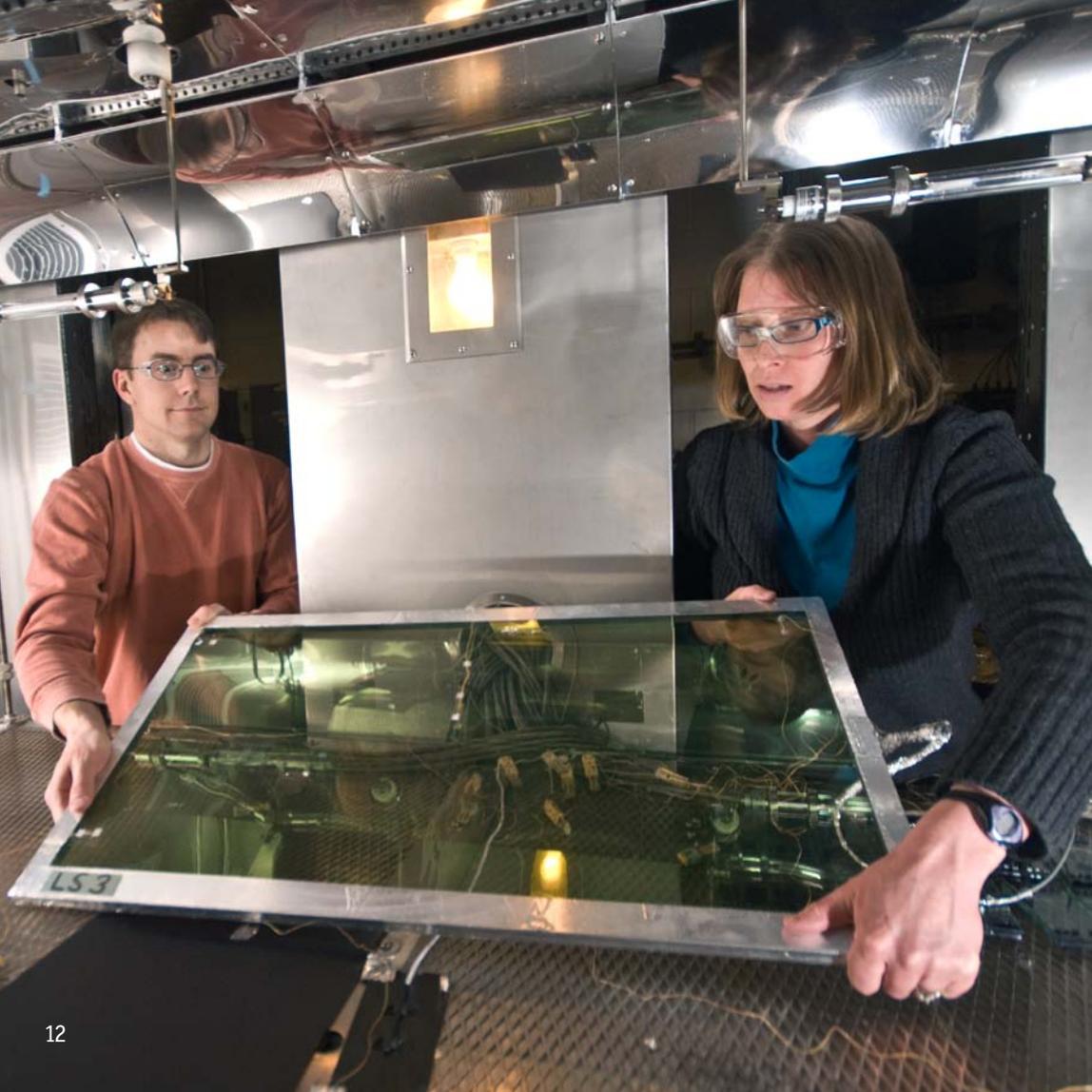




Systems Integration

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 & 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.



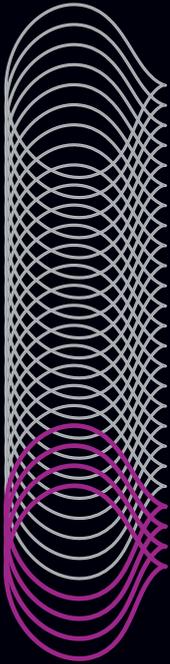


Commercialization

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.

Laboratory of the Future



NREL's state-of-the-art Laboratory of the Future in Golden, Colorado, is a model of sustainability, demonstrating the effectiveness and value of cutting-edge technologies.



These one-of-a-kind, world-class research facilities are designed to meet the nation's crucial research objectives for clean energy technologies.

Transforming our energy systems requires an integrated, market-oriented approach. NREL is at the center of this transformation, leading across the spectrum of clean energy innovation to advance a future of cost effective, secure, and sustainable energy systems.

Learn more about the NREL Spectrum of Clean Energy Innovation, watch the video, and read case studies at www.nrel.gov/innovation.

The NREL Spectrum of Clean Energy Innovation

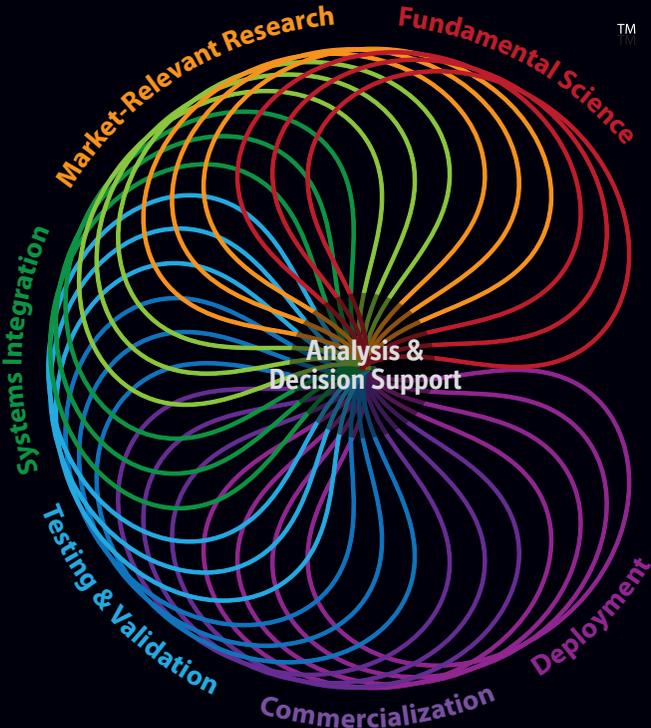


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National Renewable Energy Laboratory

1617 Cole Boulevard, Golden, Colorado 80401-3305

303-275-3000 • www.nrel.gov

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