



A Joint Institute between the University of Colorado Boulder (CU Boulder) and the National Renewable Energy Laboratory (NREL)



Creating Solutions for a Just and Sustainable Future

The Renewable And Sustainable Energy Institute (RASEI) brings together authorities from the social and physical scientists to develop **just and sustainable energy solutions** to address the impacts of climate change. Integration of justice and equality throughout our design and innovation processes, from fundamental basic energy science discoveries to applied engineering, ensures that the solutions developed can broadly benefit **the communities most in need**.

We all need energy, but we can't keep burning carbon to get it. We need to do better.

Our addiction and consumption of fossil fuels, in energy generation and transport, is an undisputed driving force of global warming, and we are at the start of understanding the devastating impact that altering our climate will have on the Earth's population. Climate change and the extremes of **heat and drought, driving wildfire, flood, and sea-level rise** are going to **fundamentally change the way we live**, in the very near future. The impact is global, but the price is being paid on national level, and many of the **communities most affected cannot afford it**.



The global population is at a potentially exciting transition.

An **intentional and considered transition** to a modern, efficient, renewable, and clean energy economy would benefit the entire population. **Energy inequality has long been a driver of socioeconomic and health poverty**. Our transition to a sustainable energy economy must **provide access for all** for it to be effective. We need to act now, and move forward in a decisive and deliberate fashion.

Be Boulder.

rasei.colorado.edu

The RASEI Community brings together over 100 researchers from across CU Boulder and NREL. Working together the team leverages the interdisciplinary expertise on a number of different foci, from economics and policy change, to materials research and the development of better, more energy efficient buildings. This collaborative forum fosters cross-pollination of ideas, principles, and insights. We believe that the only effective path to a global clean energy economy is by putting the needs of those most impacted by Climate Change first. Some of the research areas are highlighted below, visit our website to find out more.

Renewable Energy

Fundamental Discoveries | Improving Existing Technologies



RASEI collaborative research advances basic and applied energy science, discovering new approaches to renewable energy generation and storage and enhancing existing energy harvesting technologies.

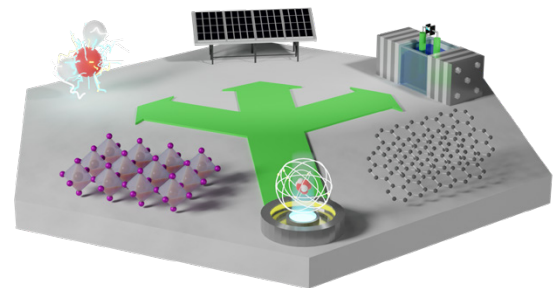
- Basic research on more robust, scalable, and affordable solar and wind harvesting systems.
- Using big data and weather simulations to guide installation of wind and solar farms.

Advanced Materials

Atomic-Level Understanding and Control | Integrating with Existing Technologies

RASEI teams focus on developing fundamental understanding of existing advanced materials which informs the design of the next generation of more efficient and functional materials.

- Research on perovskites that offer excellent light absorption and charge-carrier mobilities, that can be used to enhance the efficiency of existing silicon-based devices and lead the design for next generation devices.
- Investigation of the specific nature and properties of material surfaces and interfaces enables improved control, with applications in new battery technologies, solution separations and water splitting for hydrogen generation.



Grid Innovation

Data-Driven Control & Regulation | Repurpose Existing Infrastructure



RASEI researchers drive innovation in the development of smart grid solutions that repurpose and expand on existing infrastructure to deliver clean and store clean energy in a controlled and highly efficient manner.

- Engineering new systems, hardware, and infrastructure for smart grid applications
- Modeling and development of computer-controlled strategies for clean energy generation, storage and reliable around the clock delivery.
- Development of house-scale strategies to enhance end-user energy efficiency.

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