

# Education to Improve our Energy and Environment



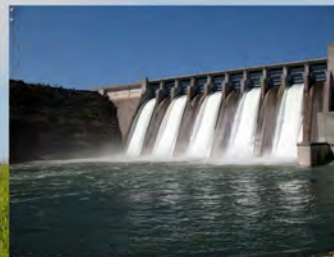
## Solar Energy

Harnessing the sun to power our cities - enough energy hits the Earth every hour to meet world power demand for a year. How can we capture it?



## Smart Electrical Grids

Imagine a future where every home collects solar and wind power, feeding any excess back into the grid. How can we prepare for that reality?



## Hydroelectric Power

Re-imagining centuries-old technology: hydroelectric power is the most efficient form of energy production. How can we improve upon it?



## Electric Cars

Improved battery and recharging technologies are necessary to increase usage of electric cars. How can we build a better battery?



## Wind Power

Within the U.S. we produce only 1% of our power through wind, far below many other countries. How can we become a world leader?



# Renewable Electric Energy Systems

## REES Undergraduate Concentration

The Department of Electrical and Computer Engineering offers an undergraduate concentration in Renewable Electric Energy in Systems (REES) within the Bachelor of Science Electrical Engineering degree program. It is widely recognized by both the electric utilities and policy makers that the current national power grid must be revised to support newer, "smarter," electrical power systems.

This concentration addresses the need to develop technologies that can efficiently harvest geographically-distributed renewable energy, such as solar and wind; the need to create a national power system capable of integrating these sources; and the need for advanced storage systems that must be developed to facilitate the distribution of these resources for consumer usage, such as electric vehicles.

At NC State University, we recognize a growing need for talented engineers with an education grounded in renewable energy concepts and technology. The concentration aims to create a new generation of engineers who employ a broader range of interdisciplinary knowledge in a team-based environment for the renewable energy-based electric power systems field.

Students enrolled in the REES undergraduate concentration receive training in the following areas: Renewable Electric Energy Systems, Power System Analysis, Power Electronics, and Design of Electromechanical Systems.



FOR MORE INFORMATION, VISIT <http://www.ece.ncsu.edu>

NC State University is dedicated to equality of opportunity. The University does not condone discrimination against students, employees, or applicants in any form. NC State commits itself to positive action to secure equal opportunity regardless of race, color, creed, national origin, religion, sex, age, or disability. In addition, NC State welcomes all persons without regard to sexual orientation. 1200 copies of this public document were printed at a cost of 23.9¢ per copy.

## REES Graduate Certificate Program

The Department of Electrical and Computer Engineering, working in conjunction with the Future Renewable Electric Energy Delivery and Management (FREEDM) Systems Center, offers a Renewable Electric Energy Systems (REES) graduate-level certificate program open to both degree and non-degree students.



The Graduate Certificate in REES helps students to develop expertise in renewable electric energy systems and advanced power grid technology in addition to their major area of study.

To earn the REES Graduate Certificate, a minimum of 12 hours of coursework must be completed. All students are required to take the Renewable Electric Energy Systems course that focuses on the principles of renewable-based generation technologies such as solar, wind and fuel cells and their integration into the power grid.

Following the completion of this course, students must complete an additional three courses chosen from the REES curriculum. Building upon the themes covered within the core course, these classes focus on topics including: Power Electronics; Advanced Power Plants; Power System Protection; Solar Thermal; Power System Stability; Electric Vehicle Systems; and Electromechanical Systems Design.

For those wishing to pursue an advanced degree, the REES certificate program can provide a strong foundation for a master's degree which addresses broader aspects of renewable energy such as systems theory, semiconductor power devices, distributed grid intelligence, secured communications, power electronics for high frequency and high voltage power conversion, and distributed energy storage devices.



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