

# The University of Maryland Energy Research Center

## Join Us in Building a Sustainable Energy Future

### THE NEED

Our quality of life, standard of living and national security depend on energy. A strong, balanced energy research program, based on making the most efficient use of our natural resources while minimizing our dependence on imported energy, is critical to our future.

### ADDRESSING THE NEED

The center brings together the research capabilities necessary to create a sustainable energy future, with faculty expertise in both energy technology and policy.

### MISSION

- Develop energy-efficient and environmentally sustainable technologies and practices
- Educate the public about energy and environmental technologies
- Inform the larger policy debate on urgent, global issues of sustainable energy and the environment
- Improve U.S. energy security by developing indigenous and environmentally sustainable energy resources while promoting energy policies that have a positive impact on the environment.

### GOALS

- Promote integrated, interdisciplinary energy research and education programs
- Expedite transition of research results into marketable products
- Provide energy technology and policy leadership to the state, the nation, and the world.

## The University of Maryland Energy Research Center

The University of Maryland Energy Research Center is a campus-wide interdisciplinary initiative administered by the A. James Clark School of Engineering and involving faculty from that school, the College of Computer, Mathematical and Physical Sciences, the College of Chemical and Life Sciences, the College of Agriculture and Natural Resources, and the School of Public Policy.

### For more information, contact:

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*Creating Sustainable Energy  
Technology and Policy for a  
Carbon-Constrained World*



# The University of Maryland Energy Research Center

*An interdisciplinary initiative that develops  
technology and policy for a clean, secure, and sustainable future*

## RENEWABLE ENERGY

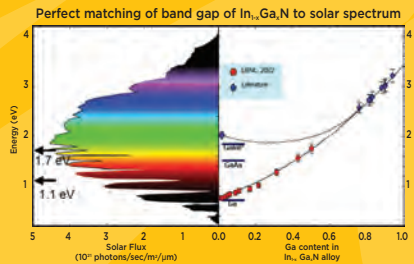
### Wind Energy Research

Center researchers associated with the university's Alfred Gessow Rotorcraft Center apply world-leading helicopter rotor technology to develop advanced off-shore and on-shore wind turbines.



### Solar Energy

Center faculty from multiple departments develop advanced materials and devices to capture more of the solar energy spectrum.



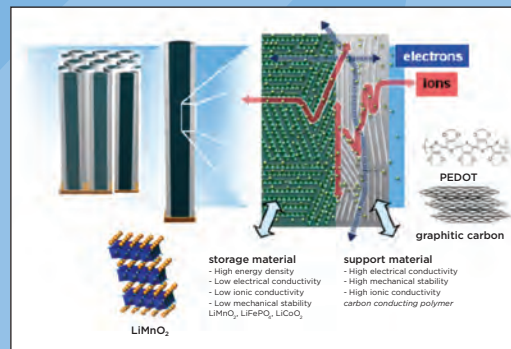
### Biomass Energy

Center researchers are creating new enzymes and processes to convert cellulosic and waste materials to biofuels and electric power.

## ELECTROCHEMICAL ENERGY CONVERSION AND STORAGE

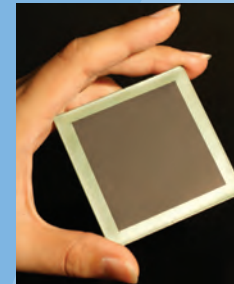
### Batteries

Fluctuations in renewable energy supply make new storage technologies crucial. The university's DOE-sponsored Energy Frontier Research Center applies nano-technology to create advanced batteries and supercapacitors.



### Fuel Cells

Fuel-flexible Solid Oxide Fuel Cell technology developed by center researchers operates on natural gas, biofuel, gasoline, and even hydrogen, and has achieved record power densities of 2 W/cm<sup>2</sup>.



Working with Redox Power Systems LLC, center researchers are developing fuel cell technology that can provide safe, reliable, continuous electricity on site at about one-tenth the cost and size, and at 10 times the power density of current commercial fuel cells.



## ENERGY EFFICIENCY

The university's Center for Environmental Energy Engineering works with industry to increase the efficiency of Heating, Ventilation, and Air Conditioning systems and Combined Heat and Power systems.

Combining distinctive architectural design and an array of advanced energy efficiency technologies, the University of Maryland's Watershed House won the 2011 DOE Solar Decathlon.



The university's campus is a living laboratory of "smartgrid" technology, implementing renewable energy generation, state of the art controls, vehicle charging stations, and a fleet of electric vehicles in its 50 megawatt microgrid.

## NUCLEAR ENERGY

Nuclear energy plays a vital role in large-scale, carbon-free electric power generation. Using its on-campus reactor, the university develops next-generation reactor technology and trains a new generation of operators. Combining expertise in technology and policy, university researchers and scholars work to resolve proliferation and waste issues.



## CARBON CAPTURE

Today, fossil fuels are the primary source of America's electric power. To minimize their environmental impact, the university is developing carbon-capture technologies and processes to convert carbon dioxide back to a usable fuel.

## ENERGY POLICY AND THE ENVIRONMENT

The Joint Global Change Research Institute brings together experts on science, technology, economics, and policy from the Pacific Northwest National Laboratory and the University of Maryland to understand the problems of global climate change and their potential solutions.

## ENERGY ENTREPRENEURSHIP

Center researchers draw on the expertise and resources of the university's Maryland Technology Enterprise Institute to launch new companies and market products.