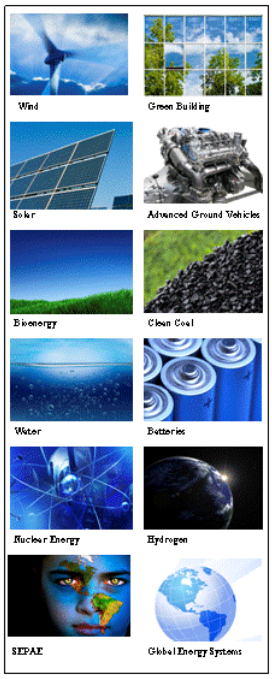
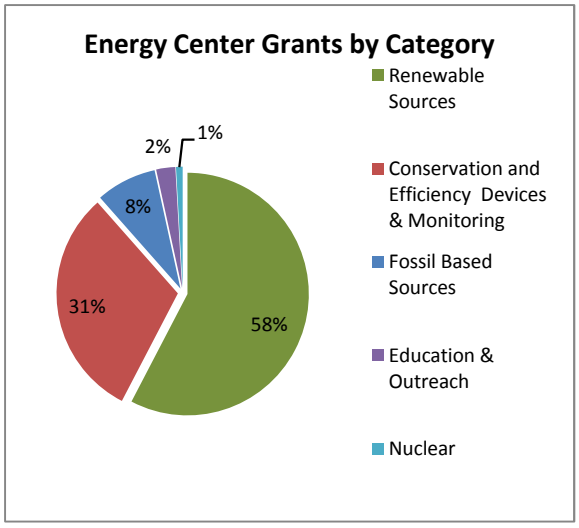
## PURDUE UNIVERSITY LEADERSHIP IN ENERGY RESEARCH

Recognizing the grand-challenge problems of global energy demands with evidence of climate change and broader environmental impacts, Purdue is building on a rich history of research, education and outreach activities. The Purdue activities span all sources of energy including fossil fuels, nuclear, solar, wind and bioenergy. The activities incorporate socio-economic and political aspects of energy; cover a broad range of disciplines including agriculture, science, technology and engineering; draw on the strengths at our Calumet, Indianapolis (IUPUI), and West Lafayette campuses; include strong collaborations with Indiana University, Notre Dame University as well as Indiana State Government, USDOE Laboratories, and global corporations, such as ADM, BP, Cummins, General Atomics, GM, Rolls Royce, and others, including global academic institutions.




### RESEARCH HIGHLIGHTS

Large interdisciplinary Centers and many awards from Federal and State agencies and from corporations make energy one of the key fields of research, education and outreach at Purdue. The energy research grants at Purdue University are focused on renewable and energy conservation and efficiency as shown in the graphic to the right.




Purdue energy research is inherently multidisciplinary, including major grants summarized as:

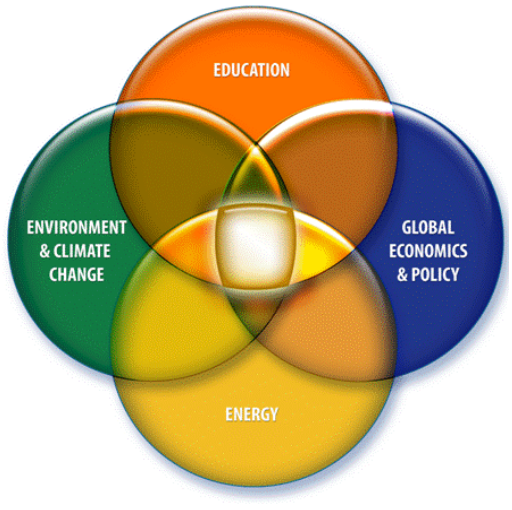
- US DOE has provided $20 million to create $C^3$Bio, the Center for Catalytic Conversion of Biomass to Bioenergy (Maureen McCann, Biological Sciences/College of Science, et al).
- DOD has funded a $6.2 million, Purdue led, Multi University Research Initiative (MURI) to develop unique high energy fuels (Stephen Heister, Aeronautics and Astronautics/College of Engineering, et al).
- A team of researchers from Purdue has been awarded $17.5M for a Predictive Science Academic Alliance Partnerships (PSAAP) by the DOE NNSA for design of Micro Electro Mechanical Systems or MEMS (Jayathi Murthy, Mechanical Engineering/College of Engineering, et al).
- The Energy Center's Hydrogen Systems Laboratory has received DOE and GM support approaching $5M over three years to establish experiments for advanced chemical and metal hydride based storage (Jay Gore, Tim Fisher, Mechanical Engineering/College of Engineering, et al).
- NSF has funded a $3.1 million Solar Economy IGERT to train the next generation of solar power scientists with a systems level perspective for new solar power technologies that includes economics, environmental impacts, and infrastructure requirements (Rakesh Agrawal, Chemical Engineering/College of Engineering, et al).
- Purdue's Zucrow Laboratory hosts the Rolls Royce University Technology Center (UTC) in North America (Stephen Heister, Aeronautics and Astronautics/College of Engineering, et al).
- The USDOE has funded Purdue's multi-million dollar activities in Catalyst Design by Discovery Informatics (Nick Delgass, James Caruthers, Chemical Engineering/College of Engineering, et al).

- The Purdue yeast for ethanol production from cellulose has received a $5M USDOE award in collaboration with the Archer Daniels Midland Corporation (Nancy Ho, Laboratory of Renewable Resource Engineering (LORRE) and Chemical Engineering/College of Engineering, et al).
- $1.6 million was awarded by NSF and US DOE for socio economic and policy aspects of energy use (Wally Tyner, Agricultural Economics/College of Agriculture, Duane Wegner, Psychological Sciences/College of Liberal Arts, et al).
- The Laboratory of Renewable Resource Engineering (LORRE) has many patents and inventions that are having an impact in the cellulose based ethanol production industry. LORRE recently celebrated its 30$^{th}$ anniversary (Michael Ladisch, Agricultural and Biological Engineering/College of Agriculture).
- Multi-million dollar USDOE and BP supported research at Purdue University Calumet is helping North West Indiana steel and petroleum industry improve efficiency, the local economy and the great lakes water quality (George Nanna, Mechanical Engineering/Purdue Calumet School of Engineering, Mathematics, and Science).

## READY FOR GROWTH

Purdue University is positioned to expand its campus wide energy, environment, and climate change research through the use of $350+ million bio, nano, information technology and entrepreneurship facilities at Discovery Park, through planned modernization of agricultural research facilities, by planned strengthening of transportation and propulsion research facilities, and by establishing strong interactions between Purdue campuses and other academic institutions, government laboratories and industry. Over two hundred Purdue faculty including a national medal of technology winner and many members of the National Academies are affiliated with the campus energy, environment and climate change activities guiding hundreds of students. Purdue donors have endowed multiple Chair Professorships in Energy. Some of the emerging ideas include: an energy futuristic crops greenhouse for $CO_2$ sequestration; application of nano, bio and info technologies in an integrated manner to future vehicle systems; an energy markets, security and systems analysis center; an advanced nano-electronics based lighting, computer chips, and energy recovery center; and an energy literacy, education, and global outreach program. Led by President France A. Córdova, a former NASA Chief Scientist, and a winner of NASA's Distinguished Service Medal, Purdue is poised to embrace future challenges in energy, environment and climate change.

## THE PATH FORWARD




Purdue is working to develop sustainable solutions to the multiple challenges faced by our nation and the world. Simultaneous consideration of climate, environment, and economics is crucial to developing technologies that will both work in the marketplace and be acceptable for implementation across the world.