



*Established in 2005 and housed in the College of Engineering, the goals of the Notre Dame Energy Center are to play a key role in energy education and literacy,*

*contribute to the development of energy policy, and explore the ethical implications associated with energy. Although a young center, participating researchers have a proven track record in energy related research, developing collaborative projects in a variety of areas and garnering funding from numerous sources.*

*Through the integration of research and teaching (highlighting the social, political, and moral aspects of energy), faculty in the center are seeking to better understand energy ... how it is utilized and incorporated into daily life and how it impacts everything ... now and for future generations.*

## **Notre Dame Energy Center**

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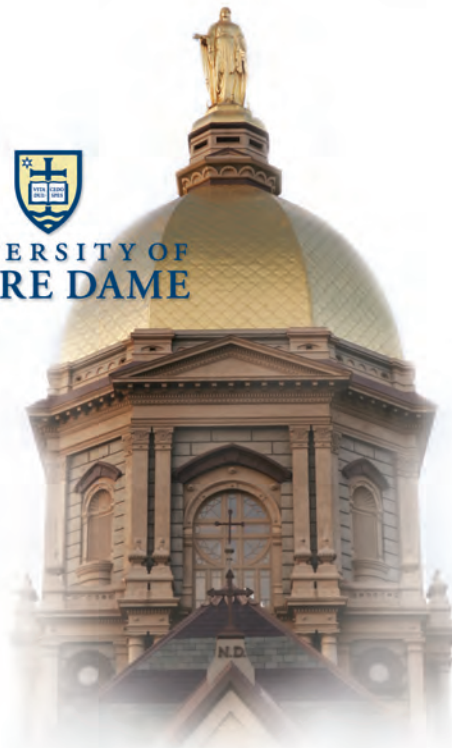
## **About the University**

Founded in 1842, the University of Notre Dame is one of a handful of truly national universities, with a student body drawn from across the United States and 100 countries. Current enrollment exceeds 11,400 graduates and undergraduates, including more than 1,500 professional students. Adjacent to South Bend, Ind., a city of more than 100,000, Notre Dame is within driving distance to major metropolitan areas — less than 100 miles from Chicago, 130 miles from Indianapolis, and 170 miles from Detroit.

The spirit at the University is unique and dedicated as much to tradition as it is to discovery. Today, as in the past, University researchers are achieving breakthroughs in a variety of fields, such as laser technology, semiconductor materials, radiation chemistry, and water quality. At Notre Dame world-class faculty and students take full advantage of state-of-the-art facilities in helping to build a better world through research.



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**ENERGY CENTER**

# Helping to build a better environment with energy research



Because of its size in relation to the size of the “energy challenge,” the Notre Dame Energy Center focuses on five areas in which University researchers have expertise:

## Energy Efficiency



The global energy challenge cannot be solved by improvements in energy efficiency alone, although major advances in this area are vital in both the short and long-term. Development of fuel cells and catalysts (a project funded by the U.S. Army and the state of Indiana) and a project to use the heat generated by industrial combustion power cycles for cooling (funded by the Department of Energy) are two of the efforts in this area.

## CO<sub>2</sub> Separation, Storage, Sequestration, and Use



Responsible use of fossil fuels requires the capture and storage of CO<sub>2</sub>. Researchers in the center are developing processes to remove CO<sub>2</sub> from flue gas emitted from conventional power plants

and other power-generating facilities. Much of this work employs ionic liquids for gas separations and other energy-related applications. Notre Dame is a pioneer in the use of these non-volatile solvents.

## Clean Coal Utilization



Burning coal in power plants causes the formation of NO<sub>x</sub> and SO<sub>x</sub>, which result in acid rain if released to the atmosphere. Due to its abundance, however, it is probable that coal will become the energy resource of choice in the coming decades to power nations and their economies. The key is developing technologies for clean coal utilization, reducing atmospheric emissions, and separating and storing CO<sub>2</sub>.

## Safe Nuclear Waste Storage



Although other countries in the world embrace nuclear fission, the key to widespread use of nuclear energy, especially in the United States, is the development of safe methods with

which to store nuclear waste. University researchers have pioneered the identification of new compounds of uranium and other radioactive nuclides, which are being used to predict the mobility of these compounds in the environment and develop storage options. Much of this work is funded by the National Science Foundation and the Department of Energy.

## Solar and Other Renewables



The most abundant source of renewable energy is solar power. Other renewable energy resources include biomass, wind, hydroelectric, wave, tide, and geothermal. Building on the expertise of faculty in the Notre Dame Radiation Laboratory, the center has made research in renewables a focus.

## Energy in Academics

To help students better understand the energy challenges they will face, introduce them to the role that energy plays in the economy, and integrate their faith with decisions concerning energy utilization and development, the center offers comprehensive technical courses on energy-related issues.

## Fellowships and Funding

In addition to helping secure funding for faculty research projects, the center offers fellowships for students, such as the Vincent P. Slatt Undergraduate Research Fellowship, which is awarded to students performing research in the field of energy systems and processes. Recent projects highlighted a wide range of topics from identifying factors impacting the release of radioactive materials from a nuclear repository to studying the equilibrium solubilities of different mixtures of gases in ionic liquids.

