



# University of Notre Dame Energy Center Student Advisory Board Meeting

January 26, 2010



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# Agenda

- |                              |                    |
|------------------------------|--------------------|
| 1. Welcome and Introductions | Joan Brennecke/All |
| 2. Overview of NDEC          | Patrick Murphy     |
| 3. Future Initiatives        | All                |
| 4. Officer Elections         | Barbara Villarosa  |
| 5. Next Meeting              | All                |

# NDEC Reclassification



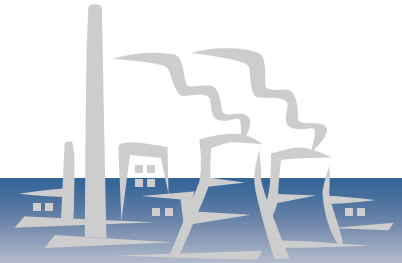
# Notre Dame Energy Center Institute



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<http://energycenter.nd.edu>

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# ND Energy Center Mission

Established in 2005, the Notre Dame Energy Center works to develop new technologies to meet the global energy challenge. Housed in the College of Engineering, the center focuses on five areas of expertise:

- energy efficiency;
- safe nuclear waste storage;
- clean coal utilization;
- carbon dioxide separation, storage, sequestration, and use; and
- solar and other renewable resources.

The center is also committed to playing key roles in energy education and literacy, the development of energy policy, and the exploration of the ethical implications associated with energy.

For more information, visit <http://energycenter.nd.edu>

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# NDEC Administration

- Joan Brennecke, Director (631-5847; [jfb@nd.edu](mailto:jfb@nd.edu))
  - Oversees strategic direction of energy related scholarly initiatives and research programs
- Patrick Murphy, Managing Director (631-1425; [pmurphy8@nd.edu](mailto:pmurphy8@nd.edu))
  - Coordinates energy related research efforts; organize and support competitive proposals from faculty
  - Represents Notre Dame on energy policies and issues
- Barbara Villarosa, Programs and Research Specialist (631-4776; [villarosa.2@nd.edu](mailto:villarosa.2@nd.edu))
  - Manages and performs administrative functions
  - Key contact for SAB events and logistical information

# Industrial Advisory Board

- Provides advice and counsel to the Center Director and Managing Director in support of the mission
- IAB members are on the College of Engineering Advisory Board and have energy interests. They are:
  - Tom Degnan, ExxonMobil
  - Anthony Earley, DTE Energy
  - Patrick Eilers, Madison Dearborn Partners
  - Mike O'Sullivan, Florida Power and Light

# Student Advisory Board

- Began in January 2007 with 13 members
- Grew to 23-25 members in 2008, 2009, and 2010
- In 2009, the positions of Chairperson, Vice Chairperson and Secretary were established
  - Nominations and elections will occur before the next meeting
- Student representation:
  - GreeND <http://gogreen.nd.edu/>
  - SEA (Students for Environmental Action) <http://www.nd.edu/~sea/>
  - Green Architecture  
[http://architecture.nd.edu/inside\\_the\\_school/green\\_architecture.shtml](http://architecture.nd.edu/inside_the_school/green_architecture.shtml)
  - Office of Sustainability and the Energy and Environmental Issues Committee (University-sponsored) <http://green.nd.edu/>
  - Other affiliations on or off campus?

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# Strategic Partnerships

## Strategic Partnerships in Energy Education and Research:

- Indiana Consortium for Research in Energy Systems and Policy (CRESP)
  - **IU:** Center for Research in Energy and the Environment (CREE).
  - **Purdue University:** expertise in agricultural economics and agricultural engineering; also the Center for Coal Technology Research, Energy Center.
  - **IUPUI:** Richard G. Lugar Center for Renewable Energy and the School of Public and Environmental Affairs.
- George Washington University
  - The Center for International Science and Technology Policy (CISTP) in the Elliot School of International Affairs provides expertise in international and national policy and economics that impact energy and environmental science and technology.
  - The Department of Engineering Management and Systems Engineering (EMSE) in the School of Engineering and Applied Science provides expertise in risk management, cost uncertainty analysis, engineering economics, and environmental impact analysis for new alternative and renewable energy systems.



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# Stinson-Remick Facilities

- Shared Energy Center labs on 1<sup>st</sup> floor – Rooms 116 and 120
  - Space for energy-related collaborative projects
- Energy Center offices on 1<sup>st</sup> floor – Room 115
  - Managing Director and Programs & Research Specialist
  - Space for 9 RAPs and graduate students, plus a student helper
- Analytical lab on 3<sup>rd</sup> floor – Room 314
- ~5000 ft<sup>2</sup> lab space
- Solar panels on roof: \$500k gift from GE; 50 kW unit; monitored and used for student experimentation and research
- Natural gas microturbine: \$30k gift from NiSource; runs continuously; waste heat for hot water; monitored and used for student experimentation and research

# \$10MM UND Investment in Energy Research and Education



- Facilities
  - Materials characterization; Cleaner fossil; Transformative solar; Safer nuclear; Computational
  - 5000+ sq ft of shared laboratory and office space in Stinson-Remick Hall of Engineering
- People
  - 3 RAPs, 30 postdocs and grad students; education/outreach coordinator; student helper
  - Six new faculty lines in energy materials (3 Engineering plus 3 Science)
- Seminars/conferences/outreach

# Research Overview

- Interactions with 45+ faculty in the Colleges of Science, Engineering, Arts & Letters, and Business and the Schools of Law and Architecture
- \$9.5MM in new research grants in 2008-2009
- EFRC: Materials Science of Actinides, \$18.5MM over 5 years
- SAPC: Sustainable Energy Initiative, \$10MM over 3 years
- Energy Seed Fund Program, up to \$200K in grants
- The Vincent P. Slatt Fellowships for Undergraduate Research in Energy Systems and Processes, up to ~\$20K annually
- The Forgash Fellowship for Undergraduate Research in Solar Energy, \$2K annually
- Student projects (e.g. Lightning Riders, C2K, Memorial Hospital energy audits)

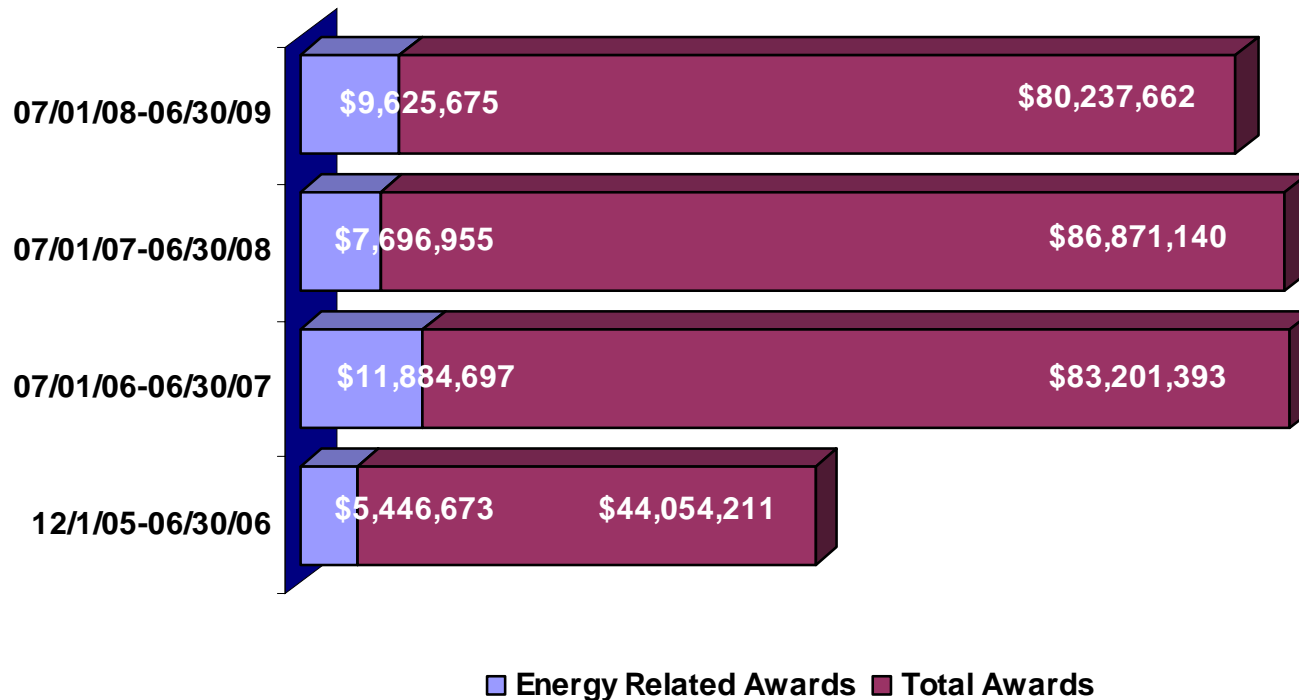
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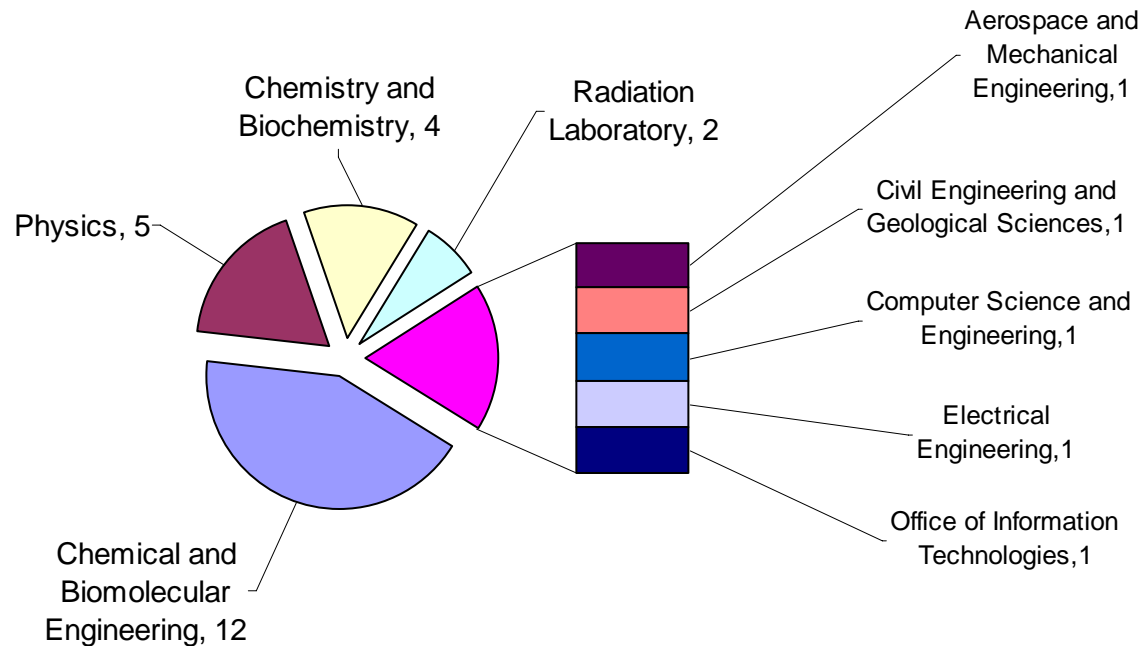
# Research Overview continued

## Energy Related Research Awards and Total Awards Received Since the Inception of the Notre Dame Energy Center



# Research Overview continued

## Number of Energy Related Awards by Department for FY2008-2009



# Education Overview

## Education Courses in Energy (see updated handout)

UND offers 14 unique energy focused courses in 4 Colleges (Engineering, Science, Arts & Letters, and Business). There are 91 total energy focused and energy related courses offered in 6 colleges by 46 faculty (Engineering, Science, Arts & Letters, Business, Architecture, and Law)

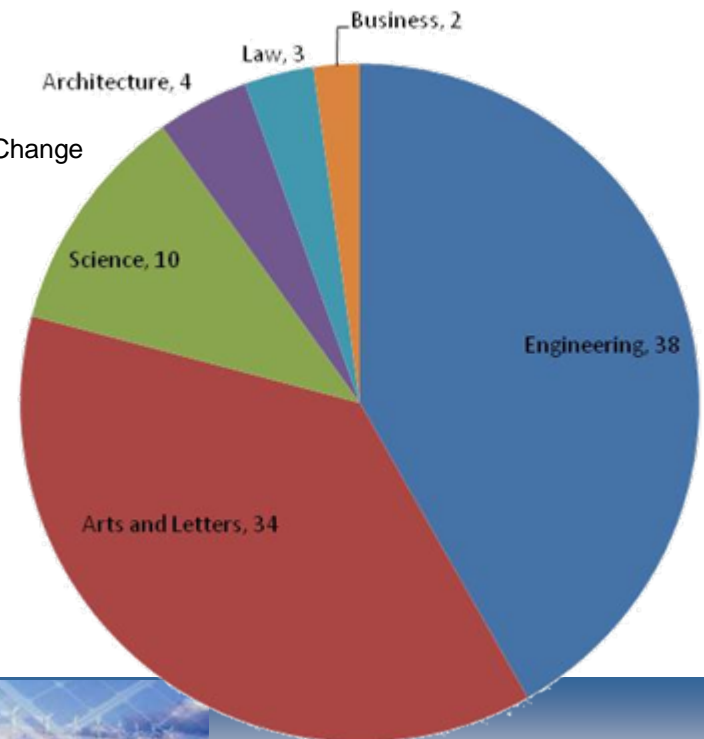
### **Energy Focuses Courses**

- Ethics of Energy Conservation
- Energy and Society
- Energy and Environment: Current Policy Issues
- Future of Energy/Energy and Society
- Energy and Climate
- Energy Systems
- Alternative Energy Devices and Materials
- Directed Readings in Sustainable Energy
- Economic and Environmental Sustainability Biofuels
- Special Studies in Energy Systems
- Electrical Machinery and Power Systems
- Electric and Hybrid Vehicles
- Electrical Energy Extraction
- Energy-Constrained Devices and Circuits
- Energy Technology and Policy
- Energy Law

### **Energy Related Courses**

- Deciding to be Green
- Environmental Politics
- Self, Society, and Environmental
- Is There an Environmental Crisis?
- Environmental Justice
- Energy Policy: Environment and Social Change
- Ecology, Ethics, and Economics
- Global Issues and the United Nations
- Environmental Law
- Environmental Chemistry
- Environmental Microbiology
- Environmental Biotechnology
- Environmental Justice
- Environmental Systems
- Globalization and Corporate Responsibility
- United Nations Global Impact

### Energy and Energy Related Courses



# Education Overview continued

## Minor in Energy Engineering

- Undergraduate minor; open to all engineering majors
- Five, 3-credit courses from list of energy courses offered in AME, EE and CBE
- Enables students to get a stronger background and better preparation for professional jobs or higher studies in energy technology

# Education Overview continued

## Energy Studies Minor (*proposed program*)

- Undergraduate minor; open to all majors on campus
- Two required 3-hour courses, 1-hour seminar, three 3-hour courses from technical or non-technical list
  - ENER 0101: fundamental technical skills needed to understand energy systems (taught by Physics)
  - ENER 0202: survey of energy resources, global climate change, basics of energy business and finance, energy economics, national and global energy policy, the psychology and ethics of energy consumption and behavior, and new urbanism (organized out of College of Business)
  - CSC Washington, DC energy policy immersion seminar
  - Choose three 3-hour courses from technical or non-technical lists

# Education Overview continued

## Indiana Advanced Electric Vehicle Training and Education Consortium (I-AEVtec)

- Purdue University (lead); Notre Dame (McGinn + Bauer); Indiana University Purdue University – Indianapolis; Purdue University – Calumet ; Indiana University - Northwest; Ivy Tech Community College + 9 companies, 2 public utilities, Crane (DOD)
- Develop and offer Certificates as well as Associate degrees for training vehicle technicians; BS and MS degree programs for design and manufacturing engineers in the electric vehicle industry; Certificate program in electric vehicle safety for emergency responders
- At ND - an *Electric Vehicle Concentration*  
EE 47007 - Electric and Hybrid Vehicles, (Prof. Peter Bauer )  
CBE 40911 – Electrochemical Energy Conversion and Storage (Prof. Paul McGinn)  
EE 30372 - Electric Machinery and Power Systems (Prof. Ken Sauer)

# Education Overview continued

## Sampling of Lectures

- **Future Automobile Fuels: Fill Up or Plug In?, December 3, 2009**, Michael Desmond, Distinguished Advisor, Conversion Technology, BP America, Inc.
- **Energy Policy Forum**, November 20, 2009, Guy Caruso, Senior Advisor, Energy and National Security Program, Center for Strategic and International Studies; Dr. Raymond Scheppach, Executive Director, National Governors Association; Tom Gresik, Professor of Economics and Econometrics, University of Notre Dame
- **Carbon Capture and Sequestration: Progress, Challenges, and Opportunities**, October 15, 2009, Dan Connell, Research and Development Engineer, CONSOL Energy, Inc.
- **Grim Fairy Tales: Myths That Enable Our Addiction to Coal**, October 5, 2009, Michael Hogan, Power Programme Director, European Climate Foundation
- **Spain: Bringing Renewable Energy to the U.S. and Beyond**, September 17, 2009, Enrique Alejo, Economic and Commercial Counselor of Spain for the Midwest, Trade Commission of Spain (TCS)
- **Market Incentives for Sustainability**, April 22, 2009, Thomas Cushing, Senior Vice President of Membership and Business Development, Chicago Climate Exchange (CCX)
- **Forum on the Future of Electric Power**, February 25, 2009, Anthony Earley Jr., Chairman and CEO of DTE Energy; Patrick Eilers, Managing Director of Madison Dearborn Partners; William Hederman, Special Advisor to Congress; Michael O'Sullivan, Senior VP for Development at FPL Energy; moderated by Joan F. Brennecke, Keating-Crawford Professor of Chemical and Biomolecular Engineering and the Director of the Notre Dame Energy Center
- **Balancing the Environment and the Economy**, February 23, 2009, Dr. Amitava Dutt and Dr. Frank Incropera, University of Notre Dame

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# Future Initiatives

- Fact Sheet: Energy Generation; Energy Conservation; Energy Policy
- Elementary Education Outreach Program in Energy (in collaboration with GreeND)
- Contemporary Topics
- Earth Day Outreach Program
- Collegiate Energy Association (<http://collegeenergy.org/>)
- Energy Week 2010

# Energy Week 2010

- Date: ????
- Tentative Planning Committees:
  - Theme and Mission Statement (All)
    - Past themes: Get Your Green On; Be Enlightened; Green is the New Black
  - T-shirt Design and Sales
  - Quad Display
  - Career Luncheon
  - Seminars, Workshops, Tours, etc.
  - Film Screenings
  - Mass or Prayer Service
  - Campus-wide Involvement and Marketing/Advertising/Communications
- Action Plan due in April

# Board Officer Elections

- Board Officer Positions
  - Chairperson
  - Vice Chairperson
  - Secretary
- Nominations due February 1<sup>st</sup>
  - 2 for each position (self and/or others)
- Elections via online ballot by February 4<sup>th</sup>