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Indiana Consortium for Research in Energy Systems and Policy

The Consortium is a recently formed, multi-disciplinary, multi-campus organization of research centers designed to promote collaborative investigations among researchers at

Purdue University-West Lafayette
Indiana University Purdue University-Indianapolis
Indiana University-Bloomington

The University of Notre Dame is a possible new member

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Indiana Consortium for Research in Energy Systems and Policy

The Consortium has five primary goals:

- To develop a multi-institutional organization to mobilize faculty expertise across all disciplines relevant to these issues.
- To facilitate the formation of interdisciplinary research teams and to match those teams with the resources to conduct that research.
- To use an energy-systems approach to address current and anticipated future energy issues with a solutions-oriented research program.
- To identify potential sponsors, prepare proposals, and secure funding for a variety of research projects of interest to these interdisciplinary teams.
- To conduct sound, objective research focused upon meaningful solutions to the complex challenges resulting from increased demands for energy resources.

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Indiana Consortium for Research in Energy Systems and Policy

Current Consortium Centers:

- Center for Energy Systems and Policy
  Purdue University
  Wally Tyner, Director

- Richard G. Lugar Center for Renewable Energy
  IUPUI
  Andrew Hsu, Director

- Center for Research in Energy and the Environment
  Indiana University-Bloomington
  J.C. Randolph, Director

Energy and Environment Research Landscape
Indiana University, Bloomington

Participating Units:

Departments in the College of Arts and Sciences:

- Anthropology
- Biology
- Chemistry
- Geography
- Geological Sciences
- Physics

School of Public and Environmental Affairs
School of Law
Kelley School of Business
School of Medicine (Medical Sciences)

Campus-wide Research Centers:

- Indiana Geological Survey (IGS)
- Center for Research in Environmental Science (CRES)
- Center for Research in Energy and the Environment (CREE)
- Center for research in Institutions, Population, and Environmental Change (CIPEC)

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Recent Investments

Environmental science, a new priority for IUB:

Capital investment in new research space
and new research centers:

Center for Research in Environmental Science

Center for Research in Energy and Environment

Field Research Building:
Supports instruction and research
at the IU Teaching and Research Preserve.
Opens Summer 2009

MSB II: 130,000 ft^2; environmental science, biogeochemistry and neuroscience. Opens Summer 2009

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Center for Research in Environmental Science (CRES)

Goal: To facilitate multidisciplinary research in environmental sciences across IU (College of Arts and Sciences, School of Public and Environmental Affairs, School of Medicine), the state and the Midwest.

Framework: Environmental Sustainability

Core research Areas:

Environmental Chemistry, Toxicology and Genomics
Environmental Microbiology
Human Alteration of Ecosystems and Global Processes
Human/Environment Interactions
Renewable Energy Systems and Carbon Management

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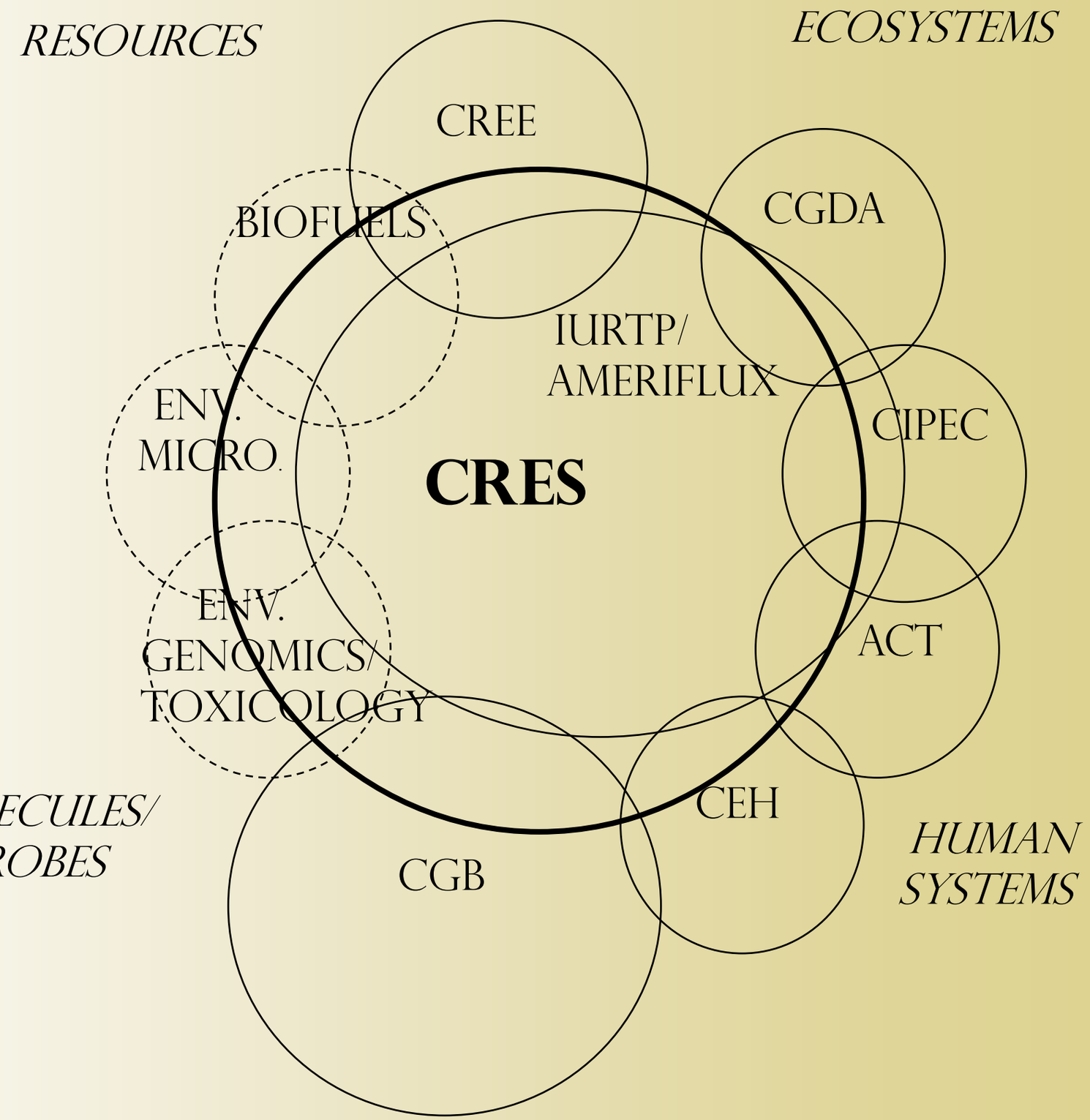
CRES as Umbrella Center



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Examples of Earlier Research Interests in Energy and the Environment

Ohio River Basin Energy Study (ORBES): IUB was one of seven universities participating in this multi-disciplinary integrated assessment of energy facility siting and operation.

Midwest Universities Energy Consortium (MUEC): IUB was a founding member of this consortium which at its peak involved 32 universities and Argonne National Laboratory.

State Utility Forecasting Group (SUFG): IUB was an participant in the initial years of this activity, working with Purdue University.

National Institute for Global Environmental Change (NIGEC): IUB was a founding member and operated one of six regional centers of this institute.

Climate Change Impacts on Midwestern Agriculture: IUB, Purdue University, and the University of Illinois, Urbana-Champaign were collaborators in this integrated assessment.

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Examples of Current and Developing Research Interests

Basic Energy Sciences

U.S. Department of Energy:

Energy Frontiers Centers Research Program

Proposal for Center for Intelligent Multi-scale Energy Systems

Involving 27 faculty members from IUB, 3 from IUPUI, and 4 researchers from National Laboratories and other universities.

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Energy Frontiers Center Research Program

Proposed research activities are:

•Catalysis – Focusing on the design and controlled synthesis of catalysts to achieve CO_2 reduction by using metal/metal or metal/redox-active ligand combinations.

•Hydrogen Economy – Focusing on both the development of catalysts for the effective dehydrogenation of alkanes and the storage of hydrogen using transition metal complexes or novel nanomaterials to promote the formation of metal hydrides.

•Electrical Energy Storage – Focusing on developing high power density nanostructured lithium-based polymer batteries.

•Solar Energy – Focusing on the development of solar electricity sources using liquid crystals, self-assembled multi-chromophore arrays and IR-adsorbing dyes to improve the efficiency and on the photocatalytic splitting of water using nanocrystal junctions.

Examples of Current and Developing Research Interests

Renewable Energy Resources:

Most interests focus on biofuels and related aspects of transportation fuels.

Considerable interests in wind, both from a meteorological and climatological perspective, as well as technological and siting aspects of wind turbines.

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Examples of Current and Developing Research Interests

Fossil Energy:

Long-time area of excellence of the Indiana Geological Survey.

Most interests focus on coal mining, coal use, and clean coal technologies

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Examples of Current and Developing Research Interests

Electricity:

Most interests focus on fuel choices
and clean coal technologies for electricity generation.

Strong interests in siting of generating facilities.

Some interests in electricity pricing.

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Examples of Current and Developing Research Interests

Electrical Vehicle Systems and Related Technologies:

Because IUB does not have a School of Engineering, these interests appear primarily focused upon basic energy science of the technologies, as well as interests in transportation uses, energy efficiency, and emissions.

Most interests focus on plug-in vehicles.

Strong interests in hydrogen and fuel cells.

Some interests in advanced materials.

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Examples of Current and Developing Research Interests

Carbon Management and Sequestration:

Much interest in terrestrial carbon sequestration. IUB has operated an AmeriFlux site in Morgan-Monroe State Forest for over 10 years studying terrestrial carbon dynamics, with a focus on Midwestern forests.

Much interest in geological carbon sequestration. The Indiana Geological Survey is a leader of the evaluation of geological carbon sequestration. IUB was a major participant in a recent conference on carbon capture and sequestration.

Also interests in the economic, policy, and legal aspects of both terrestrial and geological carbon sequestration.

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Examples of Current and Developing Research Interests

Environment Aspects of Energy Production:

Environmental aspects of energy encompasses the interests from the greatest number of faculty at IUB.

Interests include several research groups working in each of the areas of:

- Air Quality
- Water Quality
- Land-use Change
- Climate Change

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Examples of Current and Developing Research Interests

Energy and Environment Policy:

Energy and environmental policy also are areas of considerable interests from IUB faculty.

Interests include:

- Energy Policy
- Regulatory Aspects of Energy
- Energy Conservation

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Center for Research in Energy and the Environment (CREE)

GOALS:

- To promote sound, objective research to achieve meaningful solutions to the complex challenges resulting from increased demands for energy resources.

- To facilitate the formation of interdisciplinary research teams and to match those teams with the resources to conduct outstanding research related to energy and the environment.

- To identify potential sponsors, prepare proposals, and secure funding for a diversity of research projects of interest to these interdisciplinary teams.

- To operate the Center as member of the Center for Research in Environmental Science, a group of Indiana University, Bloomington centers organized in the Office of the Vice Provost

- To operate the Center as a member of a multi-institutional organization, the Indiana Consortium for Research on Energy Systems and Policy.

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Center for Research in Energy and the Environment (CREE)

RESEARCH FOCI:

- **Carbon dynamics and sequestration**. Projects that achieve a better understanding of the global carbon cycle; particularly local to regional scales.

- **Environmental consequences of energy production, distribution, and use.** Projects that provide analysis of mitigation and adaptation strategies to global climate change. Will also consider other environmental and natural resource effects; localized air and water pollution and environmental consequences of energy extraction.

- **Renewable energy resources.** Projects that tackle scientific and policy constraints associated with the development and use of renewable energy resources, particularly those related to biofuels.

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CREE Activities

•Identify suitable funding opportunities, organize teams of interested researchers, provide staff support for preparation of proposals, and assist in project management as requested.

•Work with the Consortium to convene an annual workshop to promote interdisciplinary collaboration and encourage involvement across the three campuses.

•Organize a workshop for faculty, staff and students at Indiana University, Bloomington to formulate the topical areas that guide the activities of the Center.

•Encourage and support scientific and policy-based working papers, technical reports, and peer- reviewed research publications on relevant topics.

•Support educational activities by involving graduate students in various research projects, by offering energy-related courses, and sponsoring thesis and dissertation research.

•Provide public service by maintaining an educational website, providing advice to state and federal government officials, and providing speakers for outreach via public forums.

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CREE Organization

The Center for Research in Energy and the Environment (CREE) is administered by the School of Public and Environmental Affairs (SPEA) in cooperation with the Office of the Vice Provost for Research (OVPR), Bloomington campus.

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