

Rice launches sweeping Energy and Environment Initiative

September 20 2012



Rice University's Energy and Environment Initiative will engage researchers and scholars from every corner of campus to address the complex challenges of energy in the 21st century. CREDIT: Rice University

Rice University today announced the Energy and Environment Initiative (E2I), a sweeping plan to support interdisciplinary research that will draw experts from every corner of the university to work with Houston's energy industry to overcome barriers to the sustainable development and use of current and alternative forms of energy.

"One of the most critical global issues of our time is the challenge of meeting the [world population](#)'s escalating need for energy and simultaneously safeguarding the environment," said Rice President David Leebron. "Rice's location in Houston, the [global energy](#) capital, uniquely positions us to serve both our city and our world by offering

rich insights and practical but innovative solutions to this daunting challenge. Not only will we explore issues related to the safe harvesting and use of traditional hydrocarbons, but also advance the next generation of energy sources, from biofuels to solar. These efforts will draw on our deep strengths and capabilities from across the university, including in basic science, engineering, nanotechnology, informatics, social sciences, humanities and public policy."

Rice Provost George McLendon said E2I is unique among university activities in this space because it recognizes that addressing challenges in energy requires more than just technological solutions. Building on a strong foundation, E2I researchers will study energy policy and markets, finance and management, as well as the cultural and societal values that underpin and sometimes undermine public discussion about energy and the environment. Rice's James A. Baker III Institute for Public Policy is already an internationally recognized leader in energy economics and policy. Rice laboratories conduct about \$40 million in energy-related research each year, and McLendon said Rice will invest about \$1 million this fiscal year to start E2I seed-funding programs and establish an infrastructure to link existing activities across departments and schools. Future investments will be linked to research growth.

"E2I sprang partly from a realization that Rice is already doing excellent energy-related research and education," McLendon said. "We have significant federal support for research on topics as diverse as enhanced oil recovery, carbon sequestration and next-generation solar power. Rice's research in energy economics and energy policy is globally recognized. Our top-ranked Jones Graduate School of Business serves the energy industry through its MBA concentration in energy and its executive education program. We have existing relationships with companies such as Shell, Chevron, ExxonMobil, BP, Total, Baker Hughes, Schlumberger and Apache. Finally, Rice partnered with the Mellon Foundation last year to pioneer the field of 'energy humanities'

research."

McLendon said a central focus of E2I will be the diverse issues associated with managing society's current reliance on hydrocarbons while also preparing for a future where conventional and alternative sources of energy coexist.

"This is about building a bridge from today's fossil fuel economy to an all-of-the-above energy future in which all sources of energy are used in concert," he said. "Building this bridge is as much a political, economic and social challenge as a technical one."

E2I will be led by a committee chaired by Pedro Alvarez, Rice's George R. Brown Professor and chair of the Civil and Environmental Engineering Department. The committee members are Ken Medlock, the James A. Baker III and Susan G. Baker Fellow in Energy and Resource Economics at the Baker Institute and adjunct assistant professor in economics; Alan Levander, Rice's Carey Croneis Professor of Earth Science and director of Rice's data analysis and visualization cyberinfrastructure (DAVinCI) project; Dominic Boyer, associate professor of anthropology; and William Arnold, professor in the practice of energy management at the Jones School. A national search for a permanent faculty director will begin in 2013.

Medlock said balancing the goals of energy security and sustainability is critical to ensuring the welfare of future generations.

"Energy demands and the environmental impacts of energy development and use are now a central theme in policy discourse, largely due to the rapid growth of domestic shale gas and shale oil production," Medlock said. "Understanding the consequence of actions taken today on future generations is critical to understanding the direction of energy prices, fuel choice and environmental impact, all of which are vital to

formulating informed policy."

Alvarez said part of E2I's initial focus will include the enhanced discovery and recovery of conventional hydrocarbons as well as the responsible development of shale gas and unconventional hydrocarbons. In all of these areas, innovative technologies that increase the efficiency and performance of both hydrocarbons and water processing are vital—a broad topic termed the "water-energy nexus."

"Water is used either directly or indirectly in virtually every form of energy production and generation, and a significant fraction of urban energy demand relates to treating and moving water," said Alvarez, an award-winning environmental engineer and member of the Environmental Protection Agency's Science Advisory Board. "We can significantly change the impact of energy production and use by applying the latest developments in biotechnology, adaptation and nanotechnology to the problems of water."

E2I will also spur new technical research in fields as diverse as nanotechnology, geophysics and computer science.

"The search for oil and gas relies heavily on supercomputers, and Rice's faculty have long been at the forefront of computational geophysics and computer science," said Levander, faculty director of the DAVinCI project's new Chevron Visualization Laboratory, a 3-D visualization studio that is connected to one of Rice's newest and fastest high performance computers (HPC). Levander said E2I will allow Rice to initiate new lines of computationally based energy-related research from seismic imaging to modeling fluid flow in oil reservoirs. It will also allow Rice to expand programs like the Ken Kennedy Institute for Information Technology's Rice Oil and Gas HPC Workshop, which has doubled in attendance in less than five years.

E2I will also allow Rice to grow its energy humanities program, a new field Rice helped launch during the past year with the Cultures of Energy Initiative supported by the Mellon Foundation.

"As much as understanding our energy landscape today and planning for a better tomorrow are about developing excellent science, engineering and policy, it is also vital to understand the values, choices, meanings and institutions that help explain how humans use energy and why," said Boyer, a founding member of the Cultures of Energy Initiative. "E2I is the only energy and environmental initiative in the world that truly takes the skills and input of the humanities and social sciences seriously, and that input is much needed because it helps us answer a number of important questions: What makes one form of energy seem 'dirty' and another 'clean'? How do our desires and self-image translate into certain kinds of environmental action or inaction? How do culture and power contribute to the challenges of developing international responses to global warming?"

McLendon said building the bridge from today to tomorrow's energy future will require all of the resources that universities can bring to bear.

"E2I is visionary because it is the first initiative in energy research that truly leverages all the intellectual resources of a university," he said. "E2I will engage government, the corporate world and everyday citizens in its efforts to better understand how we use [energy](#) today and how we are going to use it tomorrow."

Provided by Rice University

Citation: Rice launches sweeping Energy and Environment Initiative (2012, September 20) retrieved 19 April 2024 from <https://phys.org/news/2012-09-rice-energy-environment.html>

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