



CAES, research centers address nation's energy needs

Groundbreaking for the Center for Advanced Energy Studies (CAES) research laboratory Feb. 20 marked the latest tangible step in collaborative efforts to address science, engineering and technology development critical to U.S. and global energy needs.

CAES is part of Idaho National Laboratory's transformation into an institution where American and international leaders come to seek solutions to energy demand issues.

Created as a public/private partnership among Boise State University, Idaho State University, the University of Idaho and INL, CAES is expanding R&D opportunities in biotechnology, chemical science, nuclear engineering, materials science, advanced modeling and simulation, environmental stewardship and public policy.

"CAES is designed to help INL accomplish its missions in energy and advance the three partner universities," says Harold Blackman, CAES interim director. "This requires CAES to build strong, trusting relationships among the partners, while keeping an eye on the swirl of issues in an energy-hungry world."

Located on state property near University Place on the banks of the Snake River – and slated for completion in 2008 – the state-of-Idaho-owned building will be a premier international user facility. This new high-performance facility will provide the necessary laboratories, offices and collaborative space for the CAES research teams to accomplish their nuclear, renewable and fossil energy research and educational mission.

Research centers

Through the collaborative leadership of the National University Consortium (NUC) and the Idaho University Consortium (IUC), advanced nuclear energy research is being conducted at INL and at leading universities around the nation. Four INL nuclear research centers will be located within the CAES facility to leverage the expertise of its member institutions and expand research capabilities.

Center for Advanced Modeling and Simulation

The Center for Advanced Modeling and Simulation (CAMS) will bring together resources of INL, NUC and IUC to build a world-class capability in modeling and simulation of advanced energy systems.

CAMS supports INL's goal of becoming the pre-eminent national nuclear energy laboratory by providing the best possible human resources, hardware, software, communication and collaborations. It will enable the use of state-of-the-art computational tools in the development of advanced energy systems – particularly advanced nuclear energy systems such as the Next Generation Nuclear Plant and the Fourth Generation Nuclear Plant (Gen IV).

"This center will enable the lab as a whole to use high-performance computing in the most effective way possible, to support the research and engineering objectives of the lab," said Paul Meakin, CAMS director.

CAMS presentation: http://ihome.inel.gov/iNotes/Attachments/03.12.07_CAMS.ppt

Center for Nuclear Systems Design and Analysis

INL joined forces with international engineering firm Burns & Roe and nuclear fuels analysis software leader Studsvik Scandpower to establish the Center for Nuclear Systems Design and Analysis (CNSDA) at INL in October 2006.

CNSDA works with industry and universities to select and develop forward-looking engineering, design, construction and project management capabilities applicable to advanced nuclear power. The center will serve as a research, design and development resource where scientists will use cutting-edge technology to develop advanced nuclear fuel cycle and reactor concepts and designs. It's expected to perform a vital role in helping new nuclear reactor technology make the transition from blueprint to working product. Burns & Roe has appointed David Hebditch to direct CNSDA, with Kord Smith of Studsvik Scandpower serving as deputy director.

"Working with industry to assist INL in its goal of becoming the pre-eminent nuclear energy laboratory, CNSDA will seek a flow of nuclear design and analysis work supporting its niche expertise of fuel cycle design and reactor core modeling," said Hebditch. CNSDA will organize projects for which the planned CAES virtual reality environment laboratory brings great advancement of facility lifecycle delivery, by helping to integrate plant procurement, construction, operation, maintenance and decommissioning planning into the design process.

CNSDA presentation: http://ihome.inel.gov/iNotes/Attachments/03.13.07_CNSDA.Way.Forward.ppt

Center for Nuclear Fuels and Materials Research

The Center for Nuclear Fuels and Materials Research (CNFMR) is the laboratory's focal point for development and evaluation of fuels and materials for nuclear reactor systems, including fast reactors for transmutation, gas-cooled reactors, research reactors and commercial light-water reactors. Special emphasis is placed on increasing INL's capacity and capabilities for commercial fuels and materials examination. Key work performed to date includes an ongoing commercial light-water-reactor fuel "pilot" exam program, an examination of a boiling water reactor (BWR) control blade now under way, and recently completed characterization of BWR "crud" deposits.

Current and expected sponsors include the U.S. Department of Energy – for programs in nuclear energy, national security and space reactors – and industry, primarily for work with light-water reactors and new advanced light-water reactors. The CNFMR was established within the Nuclear Programs Directorate in September 2005, with additional reporting provided to the INL Technology Partnerships director. Rosa Yang of the Electric Power Research Institute leads the center, and Doug Crawford is the deputy director.

Center for Space Nuclear Research

The Center for Space Nuclear Research (CSNR) engages university scientists and INL staff in research and development of advanced space reactor and radioisotope power systems. The space research assets of NUC member University of New Mexico will be a major contributor. INL, slated to be the site for the nation's space nuclear power systems research and production, produces radioisotope thermal generators – including the one used on NASA's New Horizons mission to explore Pluto and its moon, Charon.

The Universities Space Research Association established the CSNR at INL in late 2005 to advance research in space exploration. Research focuses on applications of space power systems, nuclear electric and thermal propulsion systems and radioisotope power generators for future missions.

CSNR supports the space nuclear research and educational mission needs of INL, and reinvigorates research and education in space nuclear engineering within U.S. universities.

The CSNR will be the hub where universities and students can approach the Department of Energy and industry for summer jobs, and CSNR will "mix and match" students with the hands-on experience they need. CSNR also will help in drawing students to get hooked on space. "Space is the draw," said Steve Howe, CSNR director. "We need to get students hooked on space research and we need to catch them early."

CSNR presentation: http://ihome.inel.gov/iNotes/Attachments/03.27.07_CSNR.ppt

Scientific innovation

At the CAES groundbreaking ceremony, Assistant Secretary for Nuclear Energy Dennis Spurgeon said, "Work conducted at the CAES facility will contribute to the administration's effort to continue to aggressively pursue the goal of reducing our dependence on foreign oil while encouraging scientific innovation and discovery."