Over the last 11-plus years, the Center for Advanced Energy Studies (CAES) has gone from concept to concrete. Although based out of the CAES facility in Idaho Falls, CAES reaches beyond those walls and is located anywhere partner collaboration takes place.

As fields of research and specialties change, and as priorities shift to stay current with the needs of customers and potential customers, organizations need to change. As we look forward to the year ahead, looking back gives us an opportunity to take stock of how far we’ve come, lessons learned and goals brought into focus.

Here, in words and pictures, is a brief history of CAES.

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**2005**

CAES announced as an initiative by new prime contractor Battelle Energy Alliance who will manage Idaho National Laboratory (INL) for the U.S. Department of Energy

“This center will bring academia into the life of the laboratory … and provide students and professors access to the laboratory’s unique capabilities.” – DOE news release

**2007**

Ground broken on 55,000-square-foot building at 995 University Boulevard, Idaho Falls, including eight laboratories and 154 office spaces

**2008**

Idaho lawmakers appropriate $1.6M for CAES

**2009**

CAES building dedication

CAES begins hosting the annual My Amazing Future event, one of many ongoing efforts to encourage student interest in STEM fields

CAES building is certified LEED Gold, only the third LEED gold building in Idaho

**2010**

CAES Energy Efficiency Research Institute (CEERI) established by gubernatorial proclamation

Computer-Assisted Virtual Environment (CAVE) and Local Electrode Atom Probe (LEAP) added


**2011**

Governor announces new Idaho Global Entrepreneurial Mission (IGEM) to foster industry collaboration with CAES universities

DOE-sponsored Industry Assessment Center established at Boise State University

**2012**

University of Wyoming joins CAES, becomes the first university member outside of Idaho

**2013**

CAES Industry Advisory Board established with board members from eight companies

Idaho Department of Commerce, INL and CAES establish the Autonomous Systems Center of Excellence (ASCE)

First Temporal Analysis of Products (TAP) reactor installed in CAES

**2014**

DOE announces effort to build Regional Clean Energy Innovation Partnerships, based partly on the CAES collaboration model

New mobile-responsive CAES website launched

**2015**

CAES receives external funding for advanced visualization projects in the Applied Visualization Laboratory. Dr. James Money named new Applied Visualization Lead

Second TAP reactor installed, making CAES home to two of only three in the United States. Research led by Dr. Rebecca Fushimi receives money from DOE Advanced Manufacturing Office to establish a user portal

**2016**

PBS NOVA films footage in CAES for documentary on advanced reactors
In 2016 CAES increased its work with industry and performed exciting research in many areas including bioenergy, resource extraction, food processing and semiconductor manufacturing. Engagement from Idaho National Laboratory and the four CAES universities – Boise State University (BSU), Idaho State University (ISU), University of Idaho (UI) and University of Wyoming (UW) – took on a variety of forms, reflecting the imagination and expertise of researchers in a truly collaborative environment.

CAES partners INL and UI are assisting Avista, which operates natural gas, hydroelectric, coal and wood-waste combustion power plants in five western states, with energy-saving analysis at two of its sites. They are also working with Avista and the Northwest Food Processors Association (NWFPBA) on a proposal for selecting technologies that offer the greatest potential for saving significant amounts of energy and water at food processing plants, and possibly developing a template to be used at other NWFPBA member facilities.

In June, the U.S. Department of Energy announced a CAES project involving INL, UW’s Carbon Management Institute and the U.S. Geological Survey to develop new methodologies to analyze trace elements in high-salinity brines. The object is to determine if rare earth elements and critical materials can be found in quantities that might lessen the United States’ dependence on foreign sources.

CAES researcher, Dr. Haiming Wen from ISU, received a $500,000 NEUP grant to improve the strength and irradiation resistance of metals used in nuclear reactors. Wen and three ISU graduate students have been developing nanostructures that could improve the performance of materials conventionally used in building reactors. INL scientists and engineers are helping with neutron irradiation testing.

BSU students collaborated with researchers at INL to develop a program that allows visualization of scientific datasets using augmented reality (AR) through the Unity game engine. With AR, a user interacts and explores a 3-D model through a mobile device. One visualization was created to show density distribution in a graphite billet. Graphite billets have extensive individual data sets that are pooled to determine distinct trends in material properties. Another visualization involved electric vehicle charging patterns in the Pacific Northwest’s I-5 corridor. The augmented environment promotes natural human interaction, providing understanding of data that are difficult to achieve with traditional static figures.

Bring on the New Year

With the end of 2016 approaching, the Center for Advanced Energy Studies can look back upon a year of transition and growth. The fiscal year, which ended Sept. 30, showed movement toward larger, sustainable initiatives that aligned closely with strategic goals. To build on those goals CAES brought on several new strategic hires:

- Bob Borrelli (UI), assistant professor, nuclear engineering
- Richard Christensen (UI), professor, nuclear engineering
- Michael Haney (UI), assistant professor, computer science
- Leslie Kerby (ISU), assistant professor, nuclear engineering & health physics
- James Money (INL), applied visualization lead
- Haiming Wen (ISU), research assistant professor, nuclear engineering & health physics

About CAES

The Center for Advanced Energy Studies (CAES), a consortium of Idaho National Laboratory, Boise State University, Idaho State University, University of Idaho, and University of Wyoming, is a public/private research center that provides research capabilities, energy-related educational opportunities and industry assistance to fuel economic growth.