

The logo for the Center for Advanced Energy Studies (CAES) features the letters 'CAES' in a bold, white, sans-serif font. The letters are set against a dark blue background that has a subtle, grid-like pattern of light blue lines.

Center for Advanced
Energy Studies

*A research
partnership between
Boise State University,
Idaho National
Laboratory, Idaho
State University and
University of Idaho.*

Center for Advanced Energy Studies

Bill Rogers

Director

July 18, 2011



Center for Advanced Energy Studies

A public/private partnership - BSU, ISU, INL, UI

- Energy research
- Education
- Policy studies

Maximize the utilization of resources

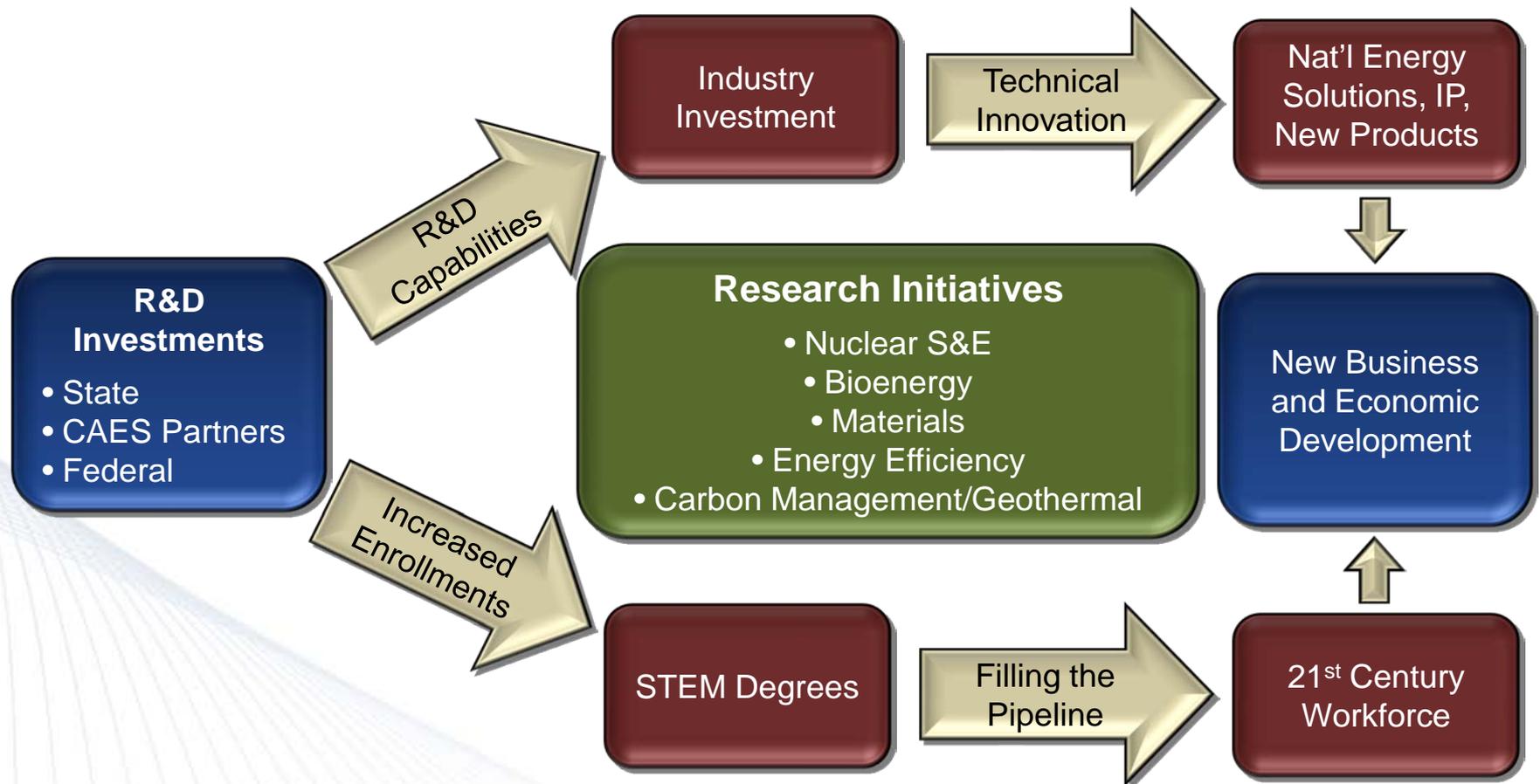
- Expand researcher-to-researcher collaborations
- Improve access to research facilities & equipment
- Enhance student educational opportunities

Foster technology-based economic development

- Facilitate government, university, and industry collaboration

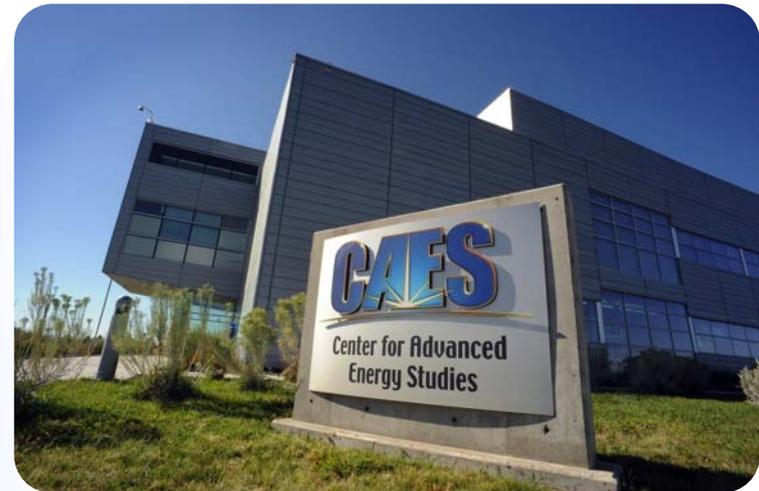
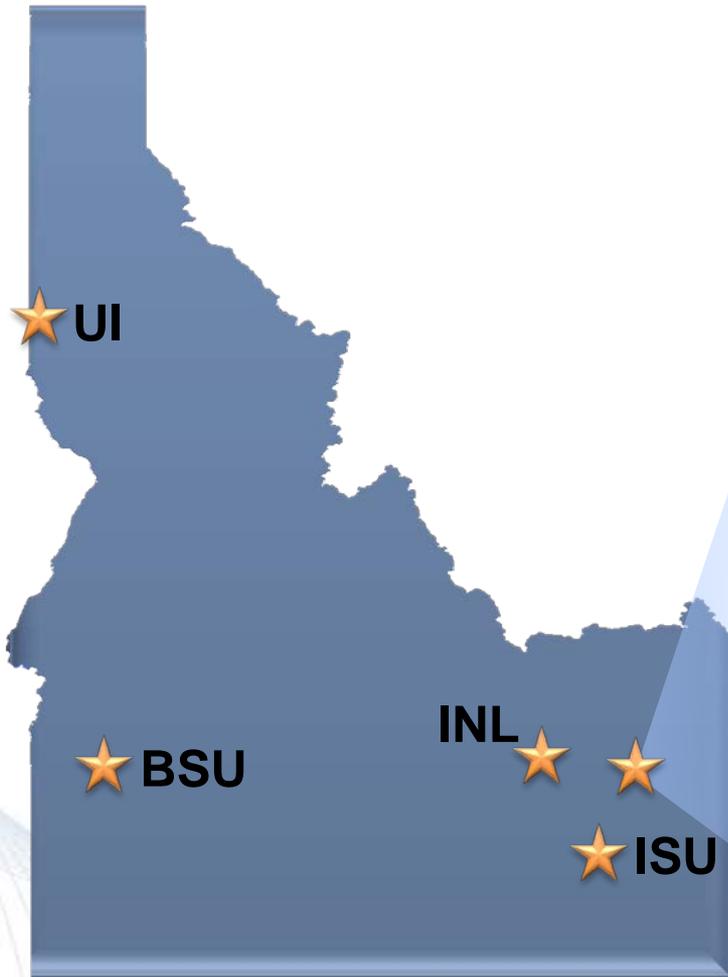


Vision: Secure Energy Solutions in a Carbon-Constrained Environment



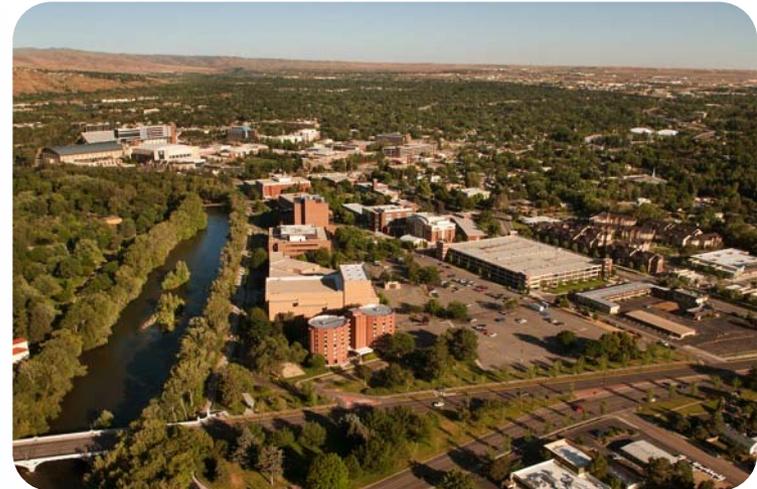
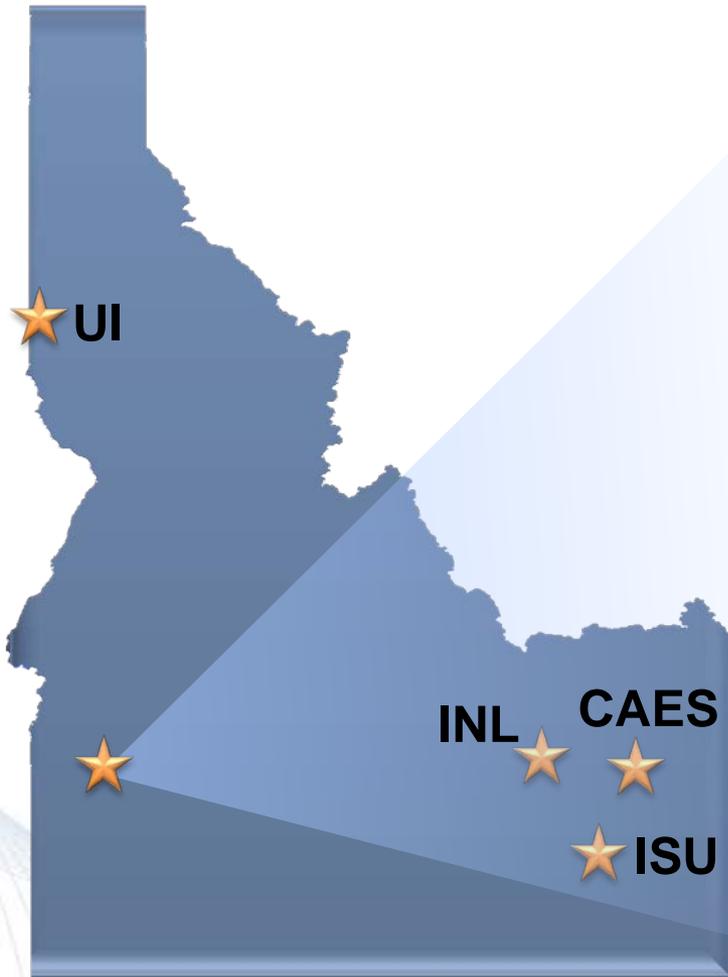


Mission: Grow partner's R&D portfolio; educate next generation of scientists, engineers, and technicians; and generate technology-based economic development



CAES

- 55,000 sq/ft LEED Gold
- 6 Labs (4 radiological capabilities)
- 4-wall virtual reality CAVE
- Advanced Modeling, Simulation and Visualization
- Material Analysis and Characterization



Boise State University

Leads Materials, Energy Policy and Energy Efficiency initiatives

Key Infrastructure

- Advanced material fabrication and testing
- Center for Materials Characterization
- New Product Development Laboratory



Idaho State University

Leads Nuclear Science and Engineering Initiative

Key Infrastructure

- Research Reactor/Health Physics
- Accelerator Center
- Nuclear Engineering Laboratory



University of Idaho

Leads Carbon Management initiative, biodiesel, radiochemistry capabilities

Key Infrastructure

- Agriculture Research and Extension Centers
- Integrated Design Laboratory
- Idaho Water Research Institute



Idaho National Laboratory

Leads Bioenergy and Modeling and Simulation initiatives

Key Infrastructure

- Advanced Test Reactor
- World class energy research facilities
- One of a kind radiological research facilities
- “Fission” Supercomputing facilities

Providing state-of-the-art tools to students and researchers



Local Electrode Atom Probe

Creates 3-D images of atoms in solids



Atomic Force Microscope

Measures mechanical properties on very small scale samples



Focused Ion Beam

Sections materials at micro- and nano-scales for TEM and LEAP microscopy.



Automated Hardness Tester

Measures and evaluates the micro-hardness of materials



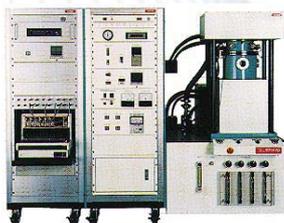
Transmission Electron Microscope

Images nano-scale material structures



Scanning Electron Microscope

Images material surfaces at the nano-scale



Spark Plasma Sintering

Creates fully dense metals, ceramics and metal-ceramic composites

Fabricate novel metals, ceramics and composites optimized for energy applications including fuels, vessels, piping, cladding, cellular solids and waste forms

Condition materials with mechanical stress, heat and radiation (ATR)

Test material properties by destructive and nondestructive means

Characterize materials with state-of-the-art microscopy

Center for Advanced Modeling & Simulation

- CAES has a four-wall 3D virtual system known as a computer-assisted virtual environment or CAVE
 - Used by multiple research teams to examine data, including the Advanced Test Reactor life extension team, carbon management, others.
 - New partnerships are being developed including Idaho Falls Power.
- Smaller 3D virtual systems have been deployed to each CAES partner



CAES Collaboration Opportunities

Joint Appointments

CAES Affiliate Program

Student Internship Program

Faculty Fellowship Program

Program Development Funds

Postgraduate Internship Programs

Laboratory Directed Research and Development



www.caesenergy.org

CAES Research Initiatives



Energy Efficiency



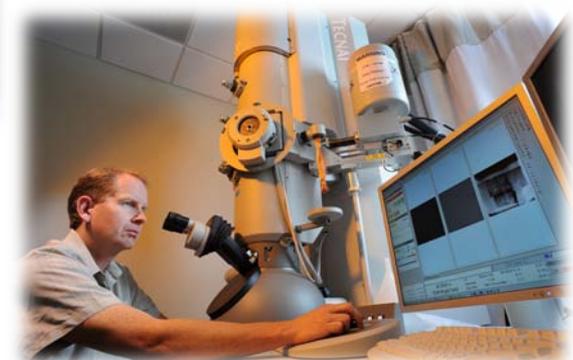
Carbon Management/Geothermal



Bioenergy



Nuclear Science & Engineering

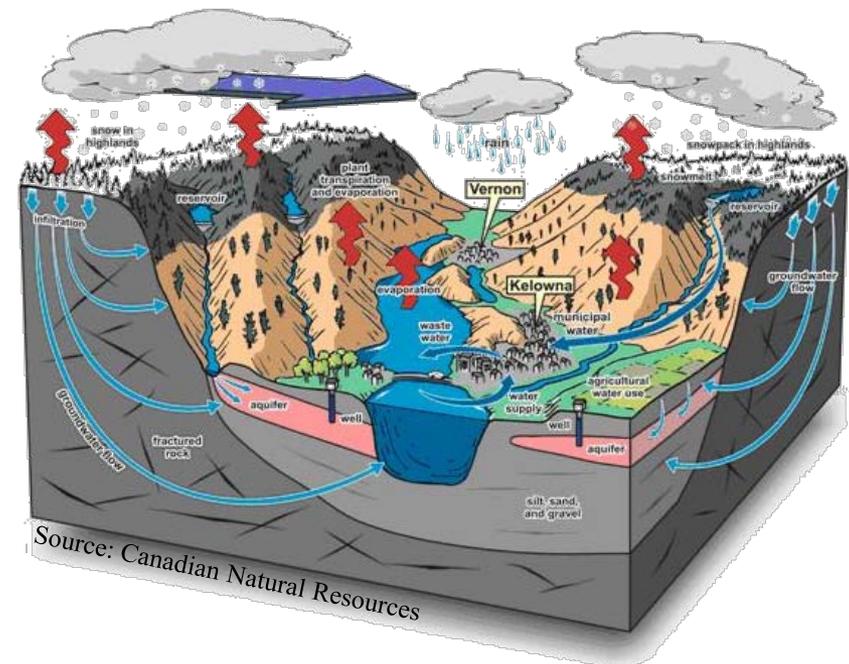


Advanced Materials

Water: The Challenge

Competing interests face decreasing water availability due to population growth and large scale climate variability. Serious constraints on available water quantity and quality have implications for:

- Energy
- Agriculture
- Public health
- Ecosystem integrity
- Economic development
- Regional vulnerability of water & energy infrastructure



Advances in science and technology can play a major role in meeting these challenges.

Mountain West Water Institute

A regional resource for addressing the science and engineering challenges of water management in the Mountain West

- Apply capabilities and technology developed under Federal (DOE+) programs to distributed water data to provide new information, applications and insight for water resources
- Provide scientific basis for improved water management and energy resource development
- Enhance Federal/State collaborative R&D in the Mountain West

