

# The Idaho National Laboratory

www.inl.gov  
**INL**  
 Idaho National  
 Laboratory



## INL – The Laboratory and the “Site”

### The Laboratory

**Battelle**

**B&W**  
 The Babcock & Wilcox Company

**URS**  
 Washington Division

**EPRI**

**Simultaneous Excellence**  
 Science & Technology  
 Laboratory Operations  
 Community Service

**Nuclear University Consortia**

**Mit** Massachusetts Institute of Technology

**OSU** Oregon State University

**OHIO STATE UNIVERSITY**

**NC STATE UNIVERSITY**

**UNM** UNM

**BOISE STATE** Boise State University

**CAES** University of Idaho

### The Site

 Idaho National Laboratory 4,250 Employees	 Idaho Cleanup Project 1,450 Employees	 AMWTP 630 Employees	Naval Reactors Facility 1,400 Employees
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## Our Identity – INL, The National Nuclear Laboratory



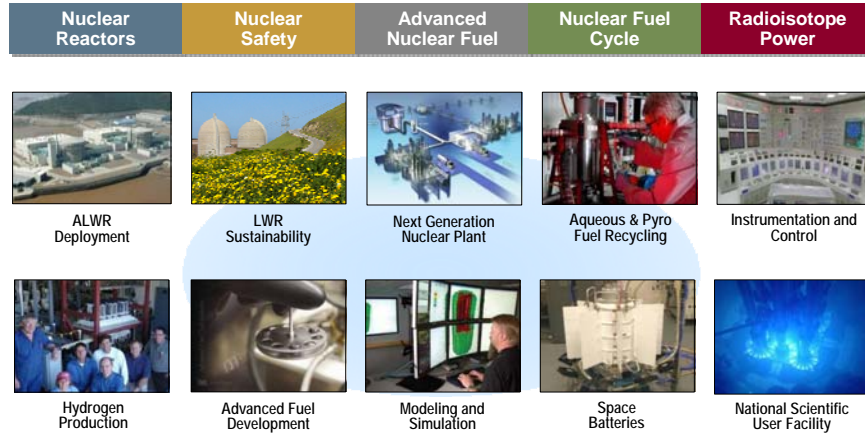
*Research – Development – Demonstration – Deployment*

## Our Business – Research Programs of National Importance and Regional Relevance



*Delivering technologies that benefit our communities, state, region, country and the world*

## Nuclear Programs and Capabilities



Technical Integration

## Nuclear Research

- Mars Curiosity launch (Nov 26, 2011)
- INL fuel performance codes (MOOSE, BISON): *User-base and applications growing rapidly!*
- DRAFT Roadmap for LWR Fuels with Enhanced Accident Tolerance submitted to DOE-NE
- DRAFT Used Fuel Storage and Transportation RD&D plan submitted to DOE
- Phase I of joint fuel cycle feasibility study with Republic of South Korea is initiated (*lab-scale testing of pyro-processing and metallic fuels*)
- LWRS – Integrated Program Plan was well-received by the industry

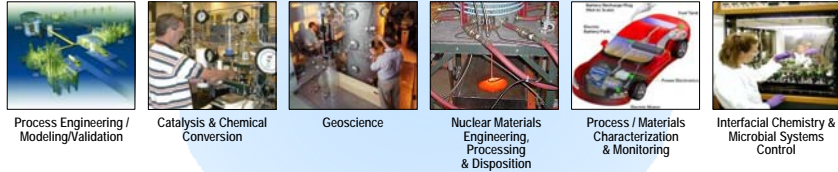


## Energy & Environment Programs and Capabilities

### Markets

Energy Systems	Energy Efficiency	Natural Resources Management	Environmental Surveillance	Environmental Surety
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### Focused Capabilities



### Unique Facilities



## Energy & Environment Research

- **INL continues to advance hybrid energy systems:**
  - Wyoming House and Senate passed bills to conduct hybrid energy systems design studies
  - INL is supporting the DOE-China Academy of Sciences Protocol, and one area of collaborative R&D is nuclear hybrid energy systems
  - INL and NREL are co-hosting an international workshop on hybrid systems
- **Regional Leadership**
  - INL supported the Idaho Legislature in their development of the new Idaho Energy Plan
- **Continuing to advance clean energy solutions**





## National & Homeland Security Programs and Capabilities



### Focus Areas



SCADA / Cyber/  
Power Grid



Wireless  
Technology



Explosives  
Detection & Testing



Armor  
Development



Nonproliferation /  
Safeguards & Security

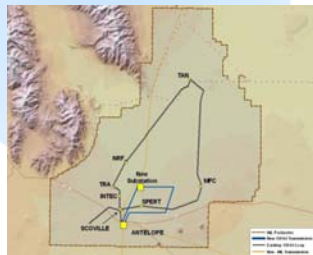


Unmanned  
Systems



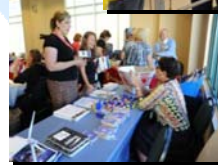
## National and Homeland Security Research

- **Global Threat Reduction**
  - Provided new fuel elements and analysis to the National Institute for Nuclear Research (Mexico), converting from HEU to LEU fuel
  - Prepared for shipments of HEU spent nuclear fuel from Uzbekistan, Poland, the Czech Republic, and Kazakhstan
- **Government-industry coordination in grid protection**
  - Hosted first national Intelligence workshop, “Protecting the Nation’s Power & Distribution System from Emerging Threats,”
- **Wireless communications research – developed a method for Dynamic Spectrum Access**
- **National power grid security - developed a new & innovative control systems cyber security tool (SOPHIA) and delivered to DOE and industry**



## Education Programs

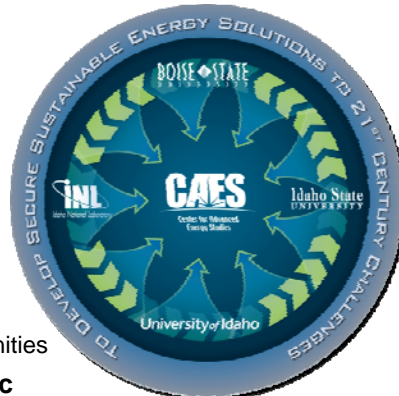
- **\$373K invested in K-20 education in FY-2012**
- **Center for Advanced Energy Studies (CAES)**
  - CAES received a vote of confidence from Idaho, \$2M recurring funding planned in the FY2013 budget
  - IGEM - an initiative to commercialize technologies to strengthen Idaho's economy is being launched with CAES as a collaborator
- **Internship Program**
  - Approximately 200 interns from high school through post-doctoral
  - Nationally recognized in Vault Guide to Top Internships for 3<sup>rd</sup> year
- **ESTEC**
  - Enrollment at full capacity in 2012
  - 1<sup>st</sup> year feeder program started at Eastern Idaho Technical College (EITC)
  - 1<sup>st</sup> cohort of nuclear operations students started
- **i-STEM**
  - Summer 2012 will have four institutes with over 700 educators participating across Idaho



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## Center for Advanced Energy Studies

- **A public/private collaboration – BSU, ISU, INL, UI**
  - Energy research
  - Education
  - Policy studies
- **Maximize the utilization of resources**
  - Expand researcher-to-researcher collaborations
  - Improve access to research facilities and equipment
  - Enhance student educational opportunities
- **Foster technology-based economic development**
  - Facilitate government, university, and industry collaboration (includes international)



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## CAES Research

### Geofluids Energy Science

- Carbon Sequestration
- Geothermal
- Groundwater Resources

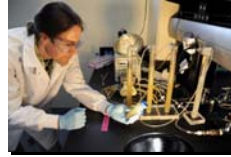


### Energy Efficiency

- Industrial Assessments
- INL bus fleet efficiency
- Energy management toolsets

### Advanced Materials

- Advanced Nuclear Fuels
- Advanced Alloys
- Radiation /Corrosion Sensors



### Bioenergy

- Life Cycle Analyses
- Agriculture waste
- Oilseeds



### Nuclear Science & Engineering

- Producing radionuclides
- Waste separation
- Life extension of current reactors
- Recovering uranium from seawater

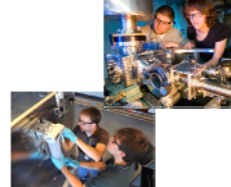
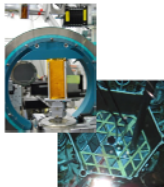
## ATR National Scientific User Facility

Prototyping the Laboratory of the Future

### Discovery through Collaboration



### Capability through Collaboration



### Support through Infrastructure

### Development through Learning

*Focal Point for Innovation  
Stewards of the National Nuclear Capability*

## ***Establishing Lab-University-Industry Partnership*** Coupling Nuclear Engineering to High Performance Computing

- **Through the Consortia for Advanced Simulation of Light Water Reactors DOE-NE leverages capabilities at national labs to achieve mission objectives**
- **CASL is a U.S. team focused on U.S. leadership in nuclear energy**
  - Leverage and pair partner strengths
  - A distinguished record of LWR regulatory and design accomplishments
- **Industry partners are embedded to assure relevance and focus**
  - Representing the entire U.S. nuclear industry landscape: Vendors, owner-operators, R&D for nuclear utilities
- **Unparalleled collective institutional knowledge and nuclear science and engineering talent**
  - Lead DOE labs in science, nuclear energy, and national security
  - Preeminent university nuclear engineering programs
  - Unmatched expertise in materials science, chemistry, nuclear engineering and multi-scale/multi-physics computational science



## ***Upcoming Legal Issues for INL***

- **Settlement Agreement**
  - Blue Ribbon Commission impacts
  - Idaho LINE Commission
- **Independence for CAES**
- **Increasing international work**
  - E.g. Fukushima support
- **Knowledge management**
- **Integration /transitions with other contractors**





## ***Final Thoughts***

- **INL is a national asset**
  - Continue expanding User Facilities
- **INL is the lead lab for Nuclear Energy**
  - INL is the only NE lab
  - INL will continue to coordinate DOE responses (e.g. Fukushima)
- **BEA is a non-profit company**
  - Community and Educational support
  - Regional impact
  - Industry collaborations

