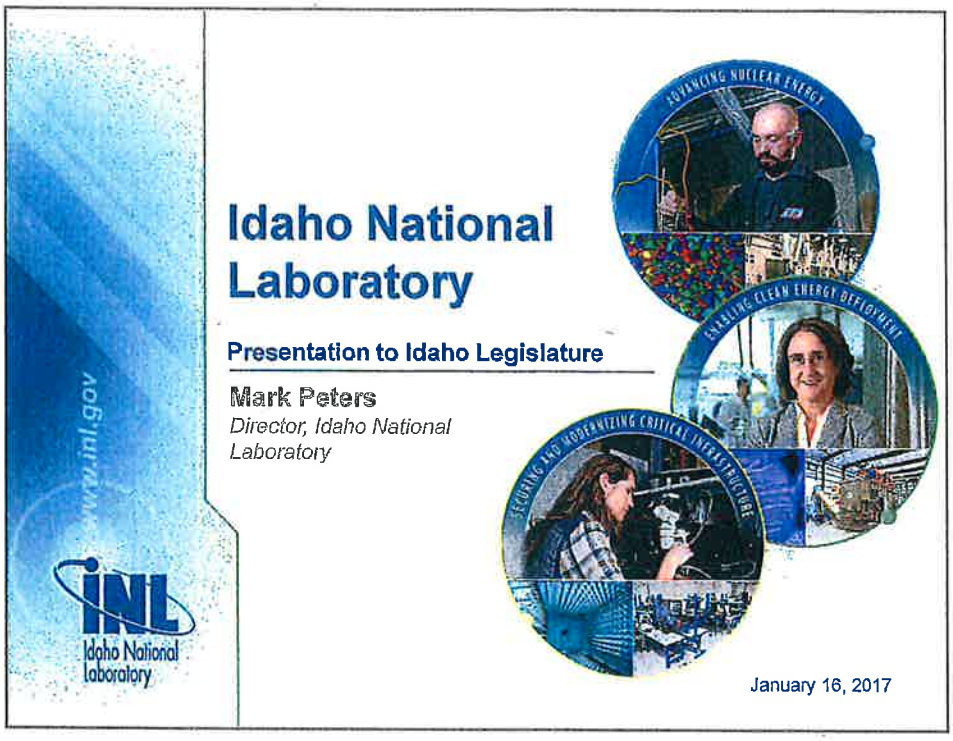
Joint Committee Meeting of the Idaho Legislature
January 16, 2017

Attachment 1



Idaho National Laboratory

INL Maturing as a Multi-program National Laboratory

Research and Education Campus (REC) – before and after

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INL by the Numbers

- Average base salary of an INL employee in **FY 2016** was **$92,660 annually** *(FY'15 - $88,635)*
- INL **directly employed an average of 4,211 workers in Idaho**; secondary impacts in Idaho accounted for an additional 7,199 jobs for a total of 11,276 jobs – a **21.3% increase from FY 2015.**
- **482 new employees** *(FY'16)*
- **331 interns and 41 post docs** *(FY'16)*
- **13,000 visitors** to INL *(FY'16)*
- BEA subcontracted more than **$136 million to Idaho subcontractors.**
- BEA corporate office contributed **$623,454 to charitable giving**

INL is the 6th largest private employer in Idaho – providing high-tech, high paying jobs

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INL FY16 Economic Summary

- When combined with indirect and induced impacts, INL operations add **$1.9 billion** to Idaho's total output.
- INL's total output impact increased by nearly $324 million between FY 2015 and FY 2016 – a **20.4% increase**.
- The total employment impact of INL operations accounts for **1.5% of Idaho's employment.**
- INL brought money into Idaho and generated **value-added output** of more than **$1.08 billion**.
- INL accounted for more than **2.9% of statewide economic output**, up from 2.5% in FY 2015.
- More than **$874 million of economic output** was generated through INL suppliers and employee household spending.
- INL **increased personal income** in the state by **$795 million**.
- INL economic impacts accounted for **1.3% of all personal income** in the state.
- INL impacts resulted in an estimated **$65 million in state and local tax** revenues.
- Taxes generated by INL operations account for **1.7% of total state and local tax revenue** *(based on FY 2015 state tax revenues)*.

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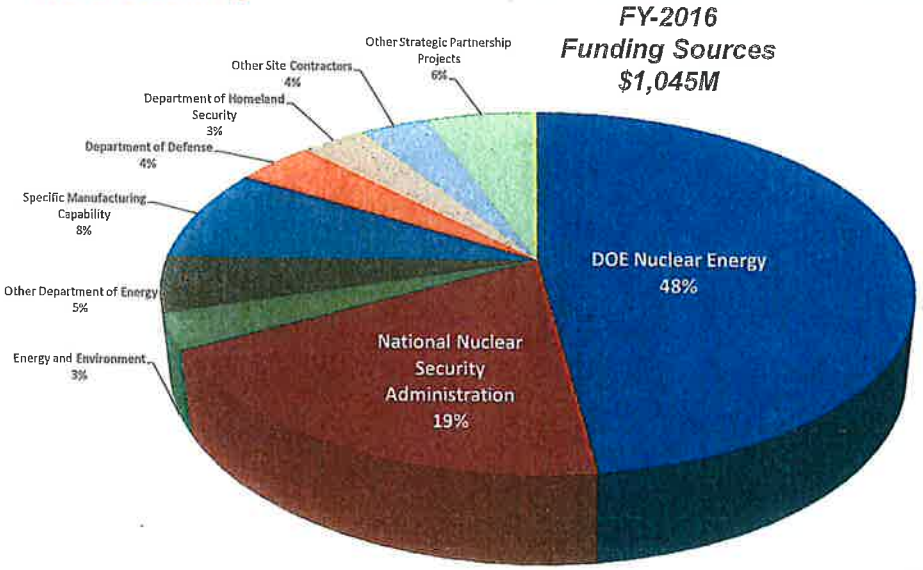
INL Funding



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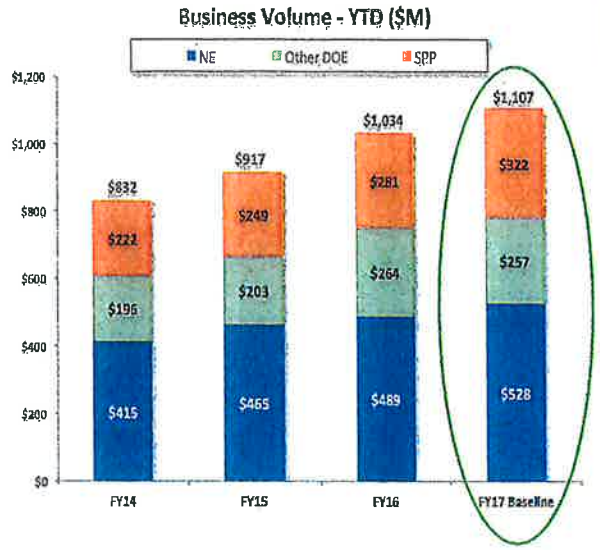
FY-2017 Financial Projections



- **FY16 BV: $41M above target and $117M above FY15**
- **Exceeding $1B for first time since FY10**
- **Growth across the board, with notable increases in:**
  - NE Infrastructure (+$28M);
  - NNSA Materials Management Minimization program (+$43M);
  - DoD Specific Manufacturing Capability (SMC) program (+$16M)
- **Forecasting $73M increase in FY17, including:**
  - NE Infrastructure (+$29M);
  - NE Enabling Technologies (+$26M);
  - SMC (+$10M)

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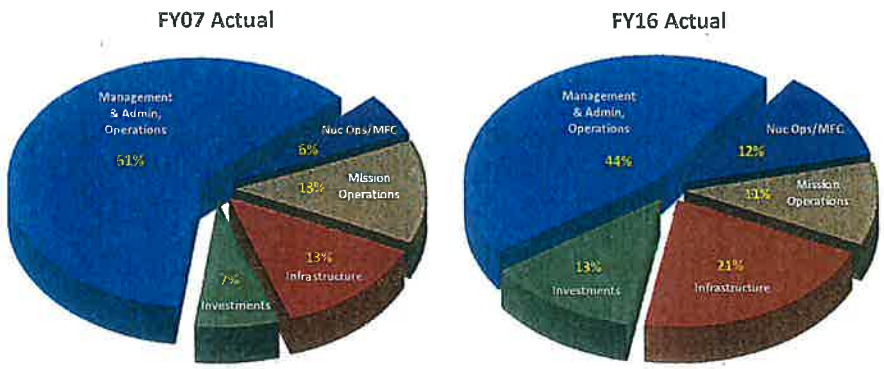
We are Using the Taxpayers Dollars Wisely



Indirect budgets reflect two primary drivers: market forces influencing fringe benefit costs, and the need to build intellectual and physical mission-related capability

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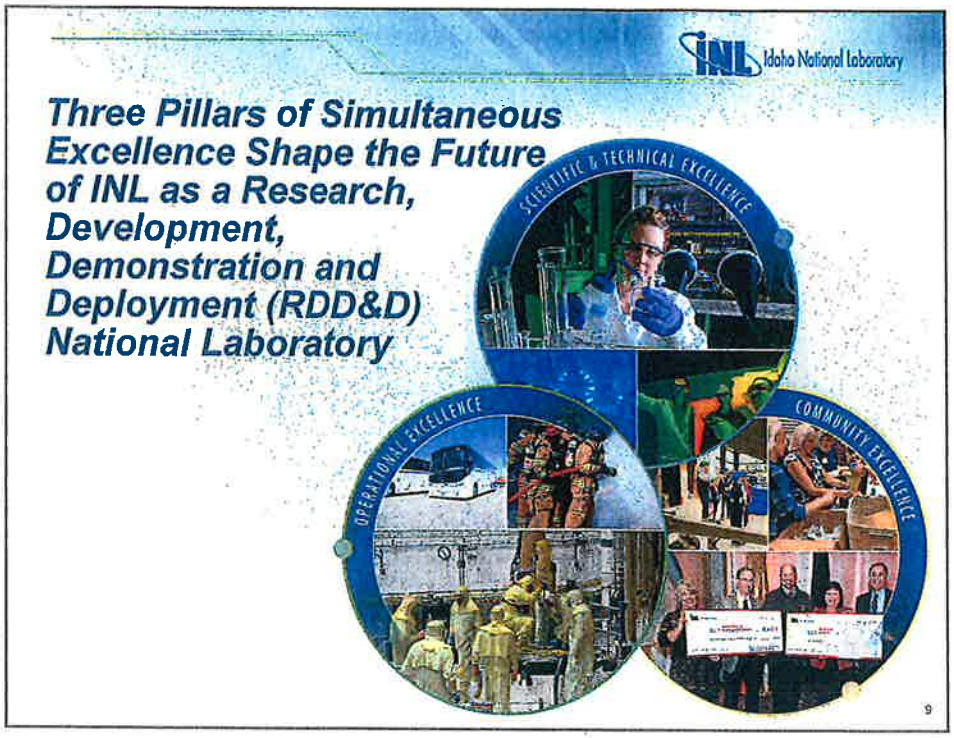
Idaho National Laboratory
Three Pillars of Simultaneous Excellence Shape the Future of INL as a Research, Development, Demonstration and Deployment (RDD&D) National Laboratory
SCIENTIFIC & TECHNICAL EXCELLENCE
OPERATIONAL EXCELLENCE
COMMUNITY EXCELLENCE
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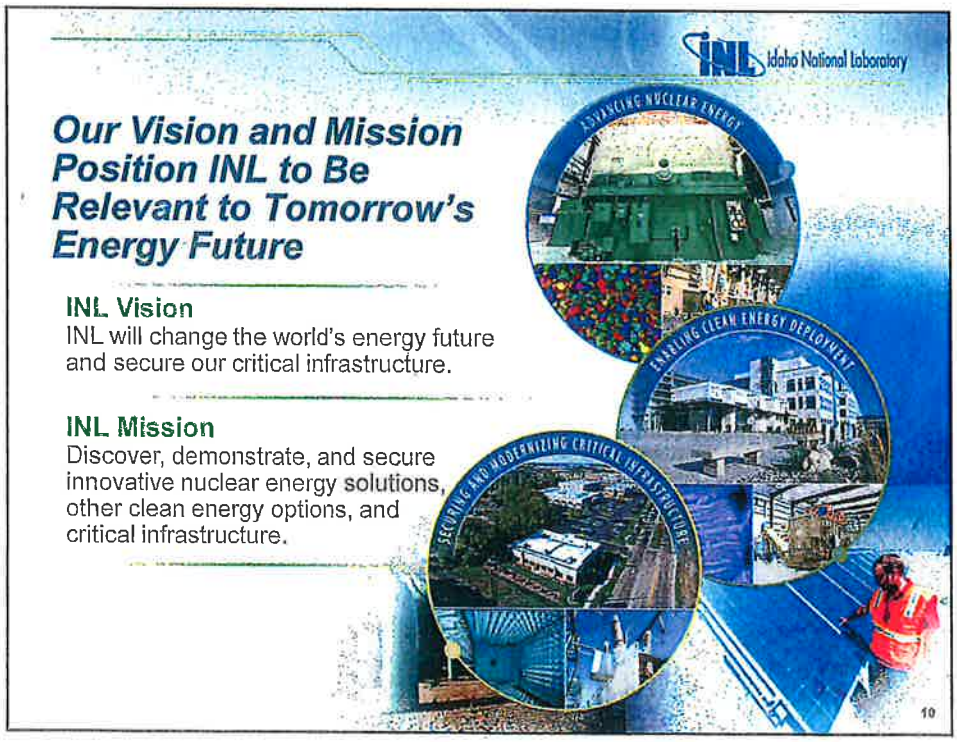
Idaho National Laboratory
Our Vision and Mission Position INL to Be Relevant to Tomorrow's Energy Future
INL Vision
INL will change the world's energy future and secure our critical infrastructure.
INL Mission
Discover, demonstrate, and secure innovative nuclear energy solutions, other clean energy options, and critical infrastructure.
ADVANCING NUCLEAR ENERGY
ENABLING CLEAN ENERGY DEPLOYMENT
SECURING AND MODERNIZING CRITICAL INFRASTRUCTURE
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Idaho National Laboratory
Enabling Science and Innovation through Partnerships and Collaboration
Enhance core capabilities, talent, S&T infrastructure, programs, and partnerships
Nuclear energy competitiveness and leadership
Integrated nuclear fuel cycle solutions
Regional clean energy systems
Cyber & physical security organized around Cybercore Integration Center
Research, Development, Demonstration, and Deployment
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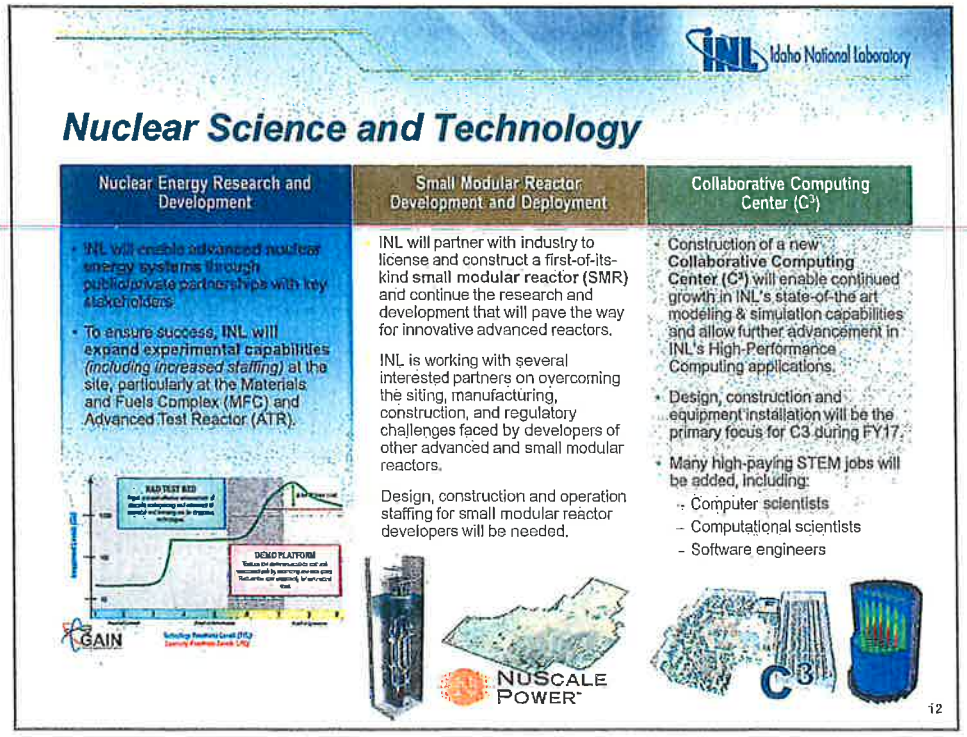
Idaho National Laboratory
Nuclear Science and Technology
Nuclear Energy Research and Development
INL will enable advanced nuclear energy systems through public/private partnerships with key stakeholders
To ensure success, INL will expand experimental capabilities (including increased staffing) at the site, particularly at the Materials and Fuels Complex (MFC) and Advanced Test Reactor (ATR).
GAIN
Small Modular Reactor Development and Deployment
INL will partner with industry to license and construct a first-of-its-kind small modular reactor (SMR) and continue the research and development that will pave the way for innovative advanced reactors.
INL is working with several interested partners on overcoming the siting, manufacturing, construction, and regulatory challenges faced by developers of other advanced and small modular reactors.
Design, construction and operation staffing for small modular reactor developers will be needed.
NUSCALE POWER
Collaborative Computing Center (C³)
Construction of a new Collaborative Computing Center (C³) will enable continued growth in INL's state-of-the art modeling & simulation capabilities and allow further advancement in INL's High-Performance Computing applications.
Design, construction and equipment installation will be the primary focus for C3 during FY17.
Many high-paying STEM jobs will be added, including:
- Computer scientists
- Computational scientists
- Software engineers
C3
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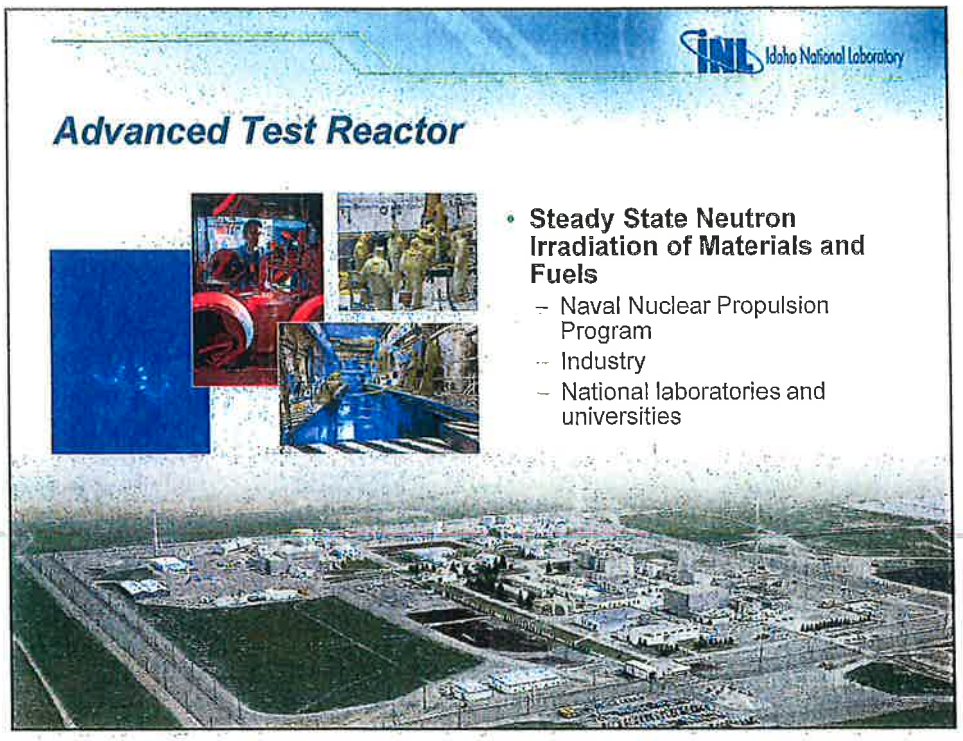
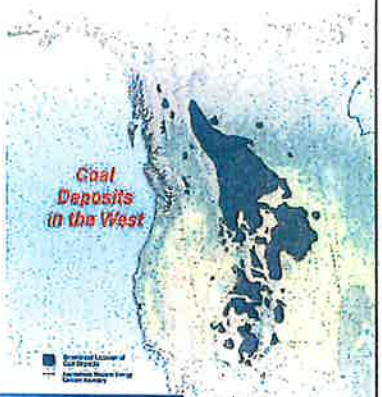

Idaho National Laboratory
Advanced Test Reactor
Steady State Neutron Irradiation of Materials and Fuels
– Naval Nuclear Propulsion Program
– Industry
– National laboratories and universities

Idaho National Laboratory
Materials and Fuels Complex
Transient Testing
Analytical Laboratories
Post-Irradiation Examination
Advanced Characterization
Fuel Fabrication
Space Nuclear Power and Isotope Technologies

Idaho National Laboratory

Regional Innovation in Energy Systems

- INL is located within a part of North America that contains abundant energy resources and critical energy infrastructure strategic to long-term U.S. energy security and its economy.
- INL is working with its partners to address the many grand S&T challenges associated with development, delivery and use of these energy resources.
- INL has been engaged in regional energy R&D for several years, including as a member of the Center for Advanced Energy Studies, which also includes BSU, ISU, UI and UW as members.
- INL's Biomass Feedstock National User Facility is partnering with the State Department of Agriculture to address Methyl Bromide contamination of hay in Eastern Idaho



Significant regional energy transitions are in play given the changing regulatory, technological and economic landscape

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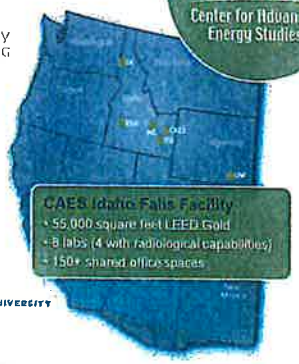
Center for Advanced Energy Studies (CAES)

Collaborative Energy Research

Explore: Energy & Environmental Research
Educate: Energy & Environmental Education
Engage: Apply Knowledge to Industry
Enable: Energy Transitions and Economic Development

University of Wyoming
Idaho National Laboratory
University of Idaho
Idaho State University
Boise State University

CAES
Center for Advanced Energy Studies



Core Capabilities

- Energy Systems Design and Analyses
- Nuclear Science and Engineering
- Materials Science and Engineering
- Environmental and Resource Sustainability
- Fossil Carbon Conversion
- Geological Systems and Applications
- Energy Policy

CAES by the Numbers

FY2016:

$24.6 M	Research and other funding won by CAES universities
2734	Number of visitors who experienced the 3-D Computer-Assisted Virtual Environment (CAVE)
215	Number of publications, presentations, and proceedings CAES researchers produced

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Idaho National Laboratory
Cybercore Integration Center –
Integrated Missions, Assets, and R&D Focus
Virtual Research Park
CYBERcORE
Applying Multidisciplinary Teams Across Core Capabilities
Urgent Mitigation
Large Scale Validation
Long-Term R&D Challenges
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Idaho National Laboratory
Specific Manufacturing Capability
• Abrams Armor Center of Excellence
• Production of M1A2 SEP V3 Abrams Tank Armor
Deliver, sustain and modernize the Abrams Tank to ensure ground combat superiority
Deliver capabilities to the Warfighter
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Idaho National Laboratory
Planned Campus/Complex Modifications
REC
ATR
MFC
Maintenance Support Building
RHLLW Facility
ATR Five-Year Plan
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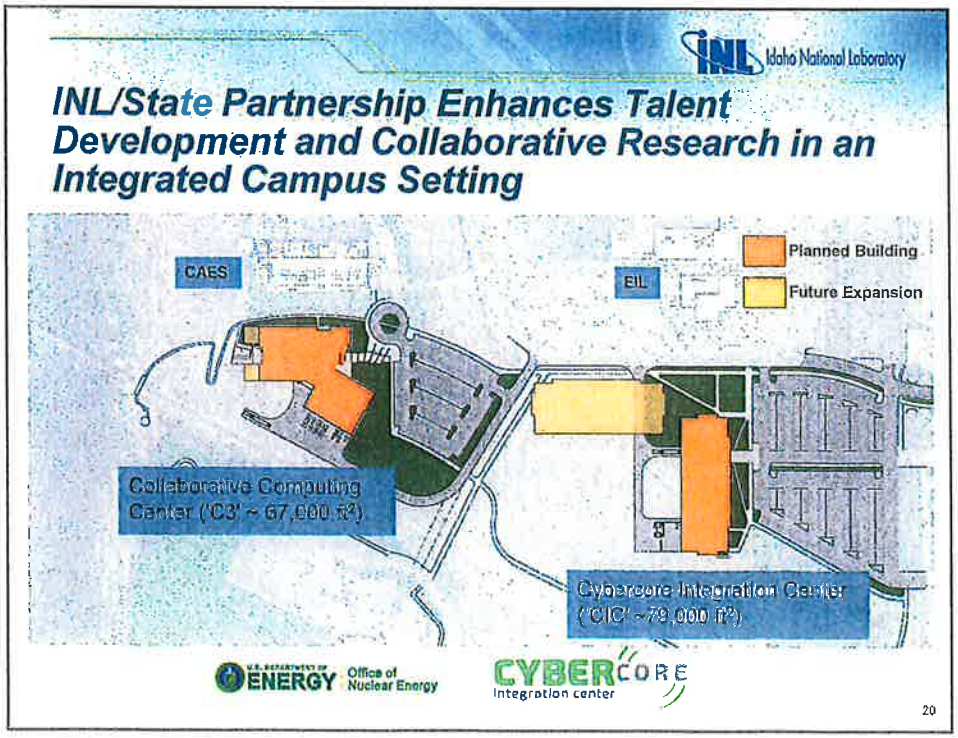
Idaho National Laboratory
INL/State Partnership Enhances Talent Development and Collaborative Research in an Integrated Campus Setting
CAES
EIL
Planned Building
Future Expansion
Collaborative Computing Center ('C3' ~ 67,000 ft²)
Cybercore Integration Center ('CIC' ~ 79,000 ft²)
ENERGY Office of Nuclear Energy
CYBERCORE Integration center
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Leadership in National Security Requires Specific Facility Attributes Not Achievable with the Current Footprint

- **Cybercore Integration Center (CIC) Proposed**
  - Unifies and integrates resources for high-consequence and urgent control systems security challenges in a virtual research park setting
  - Provides a holistic approach to people, partnerships and technology to ensure progress on challenges with expert support across multiple agency missions
  - Facilitates an elite talent pipeline for a unique interdisciplinary domain within cybersecurity
  - Space needed to conduct programmatic work is at capacity

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Idaho National Laboratory

Growth in Nuclear Energy R&D Programs Requires New Footprint to Address Gaps in Mission Occupancy Needs

Collaborative Computing Center (C3) Proposed

- Current High Performance Computing capability is at capacity
- Provides researcher-focused environment:
  - Computational sciences
  - Modeling
  - Simulation
  - Visualization
  - Big data analytics
- Enables nuclear set which requires modeling and simulation to advance development and deployment of nuclear reactor technology
- Hosts the next generation high performance computing systems, high speed networking equipment and visualization resources for the laboratory, academia, and regional industry

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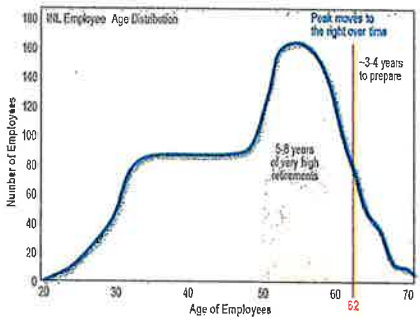
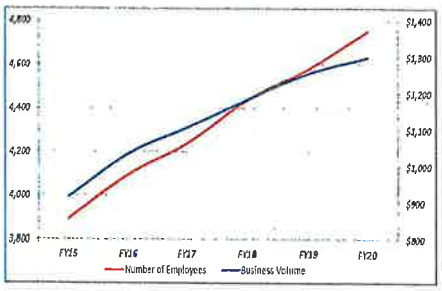
Talent Pipeline Need is Imperative to INL Future Success





- Those eligible to retire is growing as Laboratory is growing
- National STEM hiring crisis
- Local competition for talent
- Educational curriculum needs to evolve to match hiring needs

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Initiatives to Increase Talent Attraction and Engagement

- **Increased pace of hiring and recruiting**
  - Recruiting and staffing team has doubled in past two years
- **Partnering with universities, community colleges, and technical colleges for talent and research collaboration**
- **Partnered with Idaho STEM Action Center**
  - Aligned INL K-12 STEM Program strategy to STEM AC
    - Transforming K-12 STEM into a driver for innovation in Eastern Idaho
  - Investing INL resources to match STEM AC goals
    - Empowering *teachers through professional development* – **Reached 8,000 teachers in FY2016**
    - Motivating *students* through STEM outreach – **Reached 70,000 students in FY 2016**
    - Collaborating with *families* and *communities* to explore STEM careers and develop STEM Literacy
    - Providing *STEM grants* – **Grants over $300,000 on annual basis**
  - Targeted rural and underrepresented, underserved, first generation populations

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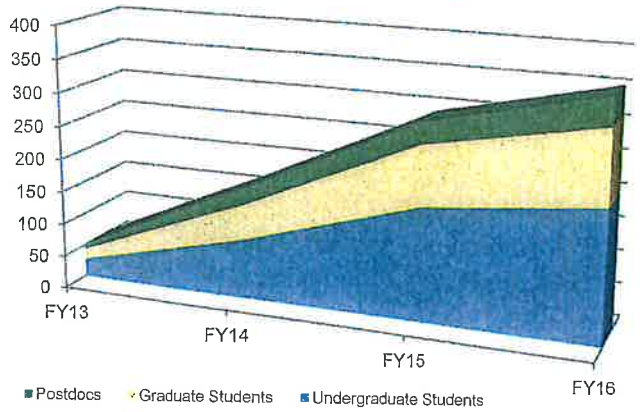
INL Building Pipeline Programs



- **Postdoc hiring has increased since FY13 across all mission areas**
- **Internship program feeds pipeline**
- **Need to increase conversion of interns to regular hires**

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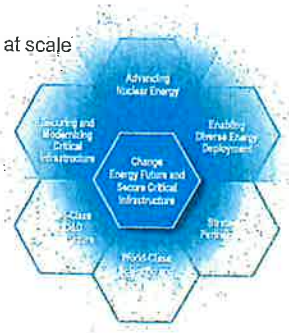
INL has an Important Mission and a Grand Vision, our Sound Strategic Plan will Help us Reach our Goals

- **Enhance and build our broad core capabilities to deliver our mission and achieve our vision**
- **Focus on four critical outcomes**
  - Ensure nuclear energy competitiveness, and leadership by expanding testbed capabilities at MFC and ATR, serve as a demonstration platform in partnership with industry
  - Deliver integrated nuclear fuel cycle solutions
  - Advance and demonstrate energy and environmental systems at scale through regional innovation and demonstration
  - Develop cyber-physical innovation capabilities, advance cyber-science and engineering, and establish Cybercore Integration Center
- **Achieve excellence in safety, security, and operations**
  - Develop our talent pipeline
  - Cultivate positive and enduring partnerships at all levels with industry, national laboratories, universities, policymakers
  - Operate reliably, efficiently, and effectively – protect environment, ensure safety and health of staff, visitors, public



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INL
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Collaborative Computing Center (C3)
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