Strategies for Success at the U.S. Department of Energy

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Iowa State University
November 8, 2012

Learn. Adapt. Compete. Repeat...
Welcome

Agenda:
- 2:00 pm: Introductions & Overview & Workshop Goals
- 2:10 pm: Understanding DOE & Where ISU sits
- 3:05pm: Understanding the Federal Landscape & DOE
- 3:30 pm: Tools for Success & Strategy Building
- 4:15 pm: Resources & Next Steps
- 4:30 pm: Questions and Answer
- 5:00 pm: Closing Remarks
- Adjourn
Welcome

• We want your feedback.

• Discussion times are fluid and will be adjusted as needed.

• Questions & Comments will be collected in person and discussed at workshop.

• Hand outs available through Iowa State University Office of Research and Economic Development.
Who We are

KB Science, LLC
- 20+ years at DOE
  - PhD Berkeley via LLNL, LANL, ANL, & NIST
  - Big Tools/Big Data

- Technical Staff Member at Los Alamos
  - NNSA/ IGPP Neutron Scattering

- Program Manager at DOE Office of Science
  - Building the > $500 million NSRCs/NNI
  - EPSCOR & SING NNI

- VP Federal Relations Firm/CEO KB Science
  - Technical Expert & Consultant to DOE HQ & DOE Labs
  - University-Industry-Government Lab Teams - Business Strategy Development
DOE Nanoscale Science

Center for Functional Nanomaterials
(Brookhaven National Laboratory)

Center for Nanoscale Materials
(Argonne National Laboratory)

Molecular Foundry
(Lawrence Berkeley National Laboratory)

Center for Nanophase Materials Sciences
(Oak Ridge National Laboratory)

Center for Integrated Nanotechnologies
(Sandia & Los Alamos National Labs)

(2001-2008)
Workshop Goals

• Master the fundamentals of how your research, science, and emerging technology works at DOE.

• Gain valuable knowledge and insights for success in the federal energy market space.

• Learn how to make wise investments of your value time in DOE activities (multiple options), and why.
The Maze

Learn from KB Science/Federal Relations Consultants.
Adapt to new opportunities. Compete with the best in your field. Repeat.
Workshop Outline

I. Understanding DOE
   – Expanding ISU’s role?

II. The Federal Landscape & DOE
   – What is happening DC
   – Why, what, where, how does it impact ISU?

III. Tools for Success at DOE
   – Your ‘Tool Box’ & ‘Tricks of the Trade
   – (Grantspersonship)
Inside DOE HQ FORS (Forrestal)

DOE supports multiple and very diverse research (and education) across Basic & Applied Research, Innovation, Commercialization, & Training Programs
While DOE is a mission agency, its research domain covers a spectrum of basic and applied research, R & D, D & D to universities and offers its 17 National Laboratories and its Field Sites...
DOE’s Office of Science (SC)’s Basic Energy Sciences Program (BES) ...

☑ ... is one of the Nation's largest sponsors of basic research;

☑ ... supports research in more than 150 academic institutions and 13 DOE laboratories;

☑ ... supports world-class scientific user facilities; and

☑ ... is uniquely responsible in the Federal government for supporting fundamental research in materials sciences, chemistry, geosciences, and aspects of biosciences related to energy resources, production, conversion, efficiency, and use.
DOE’s Office of Science
2012 Research Highlights

A TRADITION OF SCIENCE WITH PRACTICE
The Morrill Act at 150

Who you are

26 Postdocs; 21 Grad students; 33 Faculty; 13 P&S Technical; 4 P&S Non-Technical (Ames: 9 Postdocs, 1 Grad Student, 5 Faculty, 1 P&S Technical (Ames/Dual).
ISU nearly doubled its Federal R & D funds from 2007 to 2012, but...
You are tapping only 2.6% of your FORD from DOE.
• Total FY Congressional Action on R & D & FY 2013 (CR) $ 139.4 Billion
• Defense R & D $ 77.1 Billion – Nondefense R & D $63.7 Billion
• FY 2013 Presidential Request -Total DOE $11.9 Billion/NSF $ 5.8 Billion
• ISU FY 2012 $208 million: USDA>HHS>DOD>NSF>DOE

UNTAPPED POTENTIAL AT DOE
I. UNDERSTANDING DOE

• Expanding ISU’s opportunities
• DOE $11.9 Billion FY 13 Request
• NSF $5.9 Billion FY 13
DOE is a Mission-Based Agency

The mission of the Energy Department is to ensure America’s security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions.
DOE’s Mission supports

**Energy** - Catalyze the timely, material, and efficient transformation of the nation’s energy system and secure U.S. leadership in clean energy technologies.

**Science and Innovation** - Maintain a vibrant U.S. effort in science and engineering as a cornerstone of our economic prosperity with clear leadership in strategic areas.

**Nuclear Safety and Security** - Enhance nuclear security through defense, nonproliferation, and environmental efforts.

**Management and Organization** - Establish an operational and adaptable framework that combines the best wisdom of all Department stakeholders to maximize mission success.
• As an agency, DOE has a multidisciplinary highly diverse set of research, development, deployment, commercialization and education/workforce investments, ranging from genomics, proteomics, advanced scientific computing, fusion energy science, high energy physics, biorefineries & algae research, oil and gas, to 4th generation nuclear power plants.

• While DOE is a mission–based agency, grants cover research, development, applied to basic to high–risk innovative research, including commercialization.

• Like any large agency with broad scope of investments (NIH, DOD and NSF), DOE may broken down easily into organizationally manageable components.
DEPARTMENT OF ENERGY

Office of the Secretary
Dr. Steven Chu, Secretary
Daniel B. Poneman,
Deputy Secretary*
Melvin G. Williams Jr
Associate Deputy Secretary

Federal Energy Regulatory Commission

Chief of Staff
Technology Transfer Coordinator

Assistant Secretary for Policy & International Affairs
Assistant Secretary for Congressional & Intergovernmental Affairs
General Counsel
Chief Financial Officer
Chief Human Capital Officer
Economic Impact & Diversity
Chief Information Officer
Intelligence & Counterintelligence
Public Affairs

U.S. Energy Information Administration
Bonneville Power Administration
Southeastern Power Administration
Western Area Power Administration

Office of the Under Secretary for Nuclear Security
Thomas P. D’Agostino
Under Secretary for Nuclear Security

National Nuclear Security Administration
Deputy Administrator for Defense Nuclear Nonproliferation
Deputy Administrator for Naval Reactors
Associate Administrator for Defense Nuclear Security
Associate Administrator for External Affairs
Associate Administrator for Management & Budget
Associate Administrator for Safety & Health

Office of the Under Secretary for Science
Vacant
Under Secretary for Science

Office of the Under Secretary
Vacant
Under Secretary

Assistant Secretary for Environmental Management
Legacy Management

Assistant Secretary for Energy Efficiency And Renewable Energy

Advanced Scientific Computing Research
Basic Energy Sciences
Biological & Environmental Research
Fusion Energy Science
High Energy Physics
Nuclear Physics
Workforce Development for Teachers & Scientists

Assistant Secretary for Fossil Energy
Assistant Secretary for Electricity Delivery and Energy Reliability
Assistant Secretary for Nuclear Energy
Indian Energy Policy and Programs

Office of Science

Assistant Secretary for Defense Programs
Deputy Under Secretary for Counter-terrorism
Deputy Administrator for Acquisition & Project Management
Associate Administrator for Information Management & Chief Information Officer
Office of General Counsel

Assistant Secretary for External Affairs

Assistant Secretary for Defense Programs
Deputy Under Secretary for Counter-terrorism
Deputy Administrator for Acquisition & Project Management
Associate Administrator for Information Management & Chief Information Officer
Office of General Counsel

* The Deputy Secretary also serves as the Chief Operating Officer

25 Jul 12
The ‘Maze’ made simple
Crosscut by the 17 DOE National Laboratories; Other DOE Programs; Interagency Opportunities
Nuclear Safety and Security
Defense Programs

NNSA - 6 Program Offices +
Education and Training
(SBIR/STTR)

Driven by: Strategic Plan

http://nnsa.energy.gov

Office of Science

Basic & Fundamental
Research

SC - 6 Program Office +
Workforce and Education
(SBIR/STTR)

Driven by: Basic Research
Needs Reports (BRNs)

http://science.energy.gov

Applied Offices

Performance Driven R& D/D & D&D

5 Program Offices +
Education
(SBIR/STTR)

Driven by Roadmaps and
Milestone Charts

http://energy.gov/science-innovation/innovation
Innovation, Transformational, High-Risk Reward R & D, D & D, Commercialization

Driven by Aggressive Milestones Tables

http://arpa-e.energy.gov
The 17 DOE National Laboratories
(SC, DP, NE, FE, EE)
Ames Laboratory

10 acres and 12 buildings
308 Full Time Employees
198 Students
152 Visiting Scientists

Core Competencies

• Condensed Matter Physics and Materials Science
• Chemical and Molecular Science
• Applied Materials Science and Engineering

Office of Science User Facilities
Materials Preparation Center

http://www.ameslab.gov/
The NNSA plays a critical role in ensuring the security of our Nation by maintaining the safety, security, and effectiveness of the U.S. nuclear weapons stockpile without nuclear testing; reducing the global danger from the proliferation of nuclear weapons and materials; providing the U.S. Navy with safe and effective nuclear propulsion; and providing the Nation with an effective nuclear counterterrorism and incident response capability.

$7.58 Billion w/ DOD for FY 13 (request)
Office of Sciences (SC)

- Lead federal agency supporting fundamental scientific research for energy and the Nation’s largest supporter of basic research in the physical sciences.

- Two principal thrusts: direct support of scientific research and direct support of the development, construction, and operation of unique, open-access scientific user facilities.

- Supports research in more than 300 universities and institutions of higher learning nationwide a

- 10 National Laboratories

Program Offices

- Office of Basic Energy Sciences (BES)
- Office of Biological and Environmental Research (BER)
- Office of Advanced Scientific Computing (ASCR)
- Office of High Energy Physics
- Office of Nuclear Physics (NP)
- Office to Fusion Energy Sciences
- Office of Workforce Development for Scientists and Teachers (WDTS)
DOE SC BES Strategic Planning Activities

- **Science for Discovery**
- **Science for National Needs**
- **National Scientific User Facilities, the 21st century tools of science**
The Scale of Things -- Nanometers and More

**Things Natural**
- Ant ~ 5 mm
- Dust mite ~ 200 µm
- Human hair ~ 10-50 µm wide
- Fly ash ~ 10-20 µm
- Red blood cells with white cell ~ 2-5 µm
- DNA ~2-1/2 nm diameter
- Atoms of silicon spacing ~tens of nm

**Things Manmade**
- Head of a pin 1-2 mm
- MicroElectroMechanical devices 10-100 µm wide
- Red blood cells Pollen grain
- Zone plate x-ray “lens” Outermost ring spacing ~35 nm
- Nanotube electrode
- Nanotube transistor
- Quantum corral of 48 iron atoms on copper surface positioned one at a time with an STM tip Corral diameter 14 nm
- Carbon nanotube ~2 nm diameter

21st Century Challenge
Combine nanoscale building blocks to make novel functional devices, e.g., a photosynthetic reaction center with integral semiconductor storage

Realizing the nanoscale revolution: Tailoring materials one atom at a time
The Office of Science supports:
- 27,000 Ph.D.s, graduate students, undergraduates, engineers, and technicians
- 26,000 users of open-access facilities
- 300 leading academic institutions
- 17 DOE laboratories
DOE SC supports world-leading open access scientific user facilities.

User numbers continue to increase with more than 26,000 users expected in FY 2011.

Breakdown of the expected users in FY 2011 by facility.
Co-location of NSRCs with leveraged BES X-ray and Neutron Scattering Facilities

- National Synchrotron Light Source
- Stanford Synchrotron Radiation Laboratory
- Advanced Photon Source
- Linac Coherent Light Source
- Advanced Light Source
- Spallation Neutron Source
- Intense Pulsed Neutron Source
- Manuel Lujan Jr. Neutron Scattering Center
- High-Flux Isotope Reactor

Co-located facilities provide integrated access to advanced light and neutron scattering capabilities.
FY 2013 BES Budget Request

- **Research programs**
  - Energy Innovation Hubs (+$5M)
  - Energy Frontier Research Centers
    - Joint EERE R&D (+$20M)
  - Core Research
    - Materials and Chemistry by Design (+$20M)
    - Science for Clean Energy (+$42M)

- **Scientific user facilities operations**
  - Near optimum operations of all facilities (+$42M)
    - Synchrotron light sources
    - Neutron scattering facilities
    - Nanoscale Science Research Centers
  - Instrumentation for clean energy, joint with EERE (+$15M)
  - NSLS-II Early Operations (+$22M)

- **Construction and instrumentation**
  - National Synchrotron Light Source-II
  - NSLS-II instrumentation (NEXT) ($12M)
  - Advanced Photon Source upgrade ($20M)
  - Linac Coherent Light Source-II ($64M)
29 BES Early Career Awards in FY12

Office of Science Early Career Research Program – Started in FY10

- **Purpose:** To support individual research programs of outstanding scientists early in their careers and to stimulate research careers in the disciplines supported by the Office of Science
- **Eligibility:** Within 10 years of receiving a Ph.D., either untenured academic assistant or associate professors on the tenure track or full-time DOE national lab employees
- **5-Yr Awards:** University grants $150,000/yr, National lab awards $500,000/yr min

FY12 Program
- 24 Program Areas in BES
- ~850 SC proposals received
- 29 BES Awards out of 68 total for SC
  - 21 Universities, 8 National Labs
- 3-Yr Total = 86 BES Early Career Awards is ~40% of all 206 SC Awards

FY 13 Early Career Program Announced on July 20, 2012
http://science.energy.gov/early-career/
Applied Offices

- **EERE** accelerates development and facilitates deployment of energy efficiency and renewable energy technologies and market-based solutions that strengthen U.S. energy security, environmental quality, and economic vitality.

- **OE** provides national leadership to ensure that the Nation’s energy delivery system is secure, resilient and reliable and works to develop new technologies to improve the infrastructure that brings electricity into our homes, offices, and factories, and the federal and state electricity policies and programs that shape electricity system planning and market operations.

- **FE** ensures clean, affordable energy from our traditional fuel resources that supply 85% of the nation's energy, working on pollution-free coal plants, more productive oil and gas fields, and the continuing readiness of federal emergency oil stockpiles.

- **NE** promotes nuclear power as a resource capable of meeting the Nation's energy, environmental and national security needs by resolving technical and regulatory barriers through research, development and demonstration.

- **EM** completes the safe cleanup of the environmental legacy brought about from five decades of nuclear weapons development and government-sponsored nuclear energy research.

Program Offices

- Office of Energy Efficiency and Renewable Energy (EERE)
- Office of Electricity Delivery and Reliability (OE)
- Office of Fossil Energy (FE)
- Office of Nuclear Energy (NE)
- Office of Environmental Management (EM)
# EERE- Energy Efficiency and Renewable Energy

<table>
<thead>
<tr>
<th>Efficiency</th>
<th>Renewables</th>
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<tbody>
<tr>
<td>AMO- Advanced Manufacturing</td>
<td>OBP- Biomass</td>
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<tr>
<td>BTP-Building Technologies</td>
<td>GTP- Geothermal</td>
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<tr>
<td>VTP- Vehicle Technologies</td>
<td>STP- Solar Technologies</td>
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<tr>
<td>WIP- Weatherization &amp; Intergovernmental</td>
<td>WWP- Wind &amp; Water</td>
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DOE EERE Administration Goals

EPACT 2007

Transport

• Reduce oil imports by 1/3 by 2025.
• Put 1 million electric vehicles on the road by 2015.

Buildings and Manufacturing

• Make non-residential buildings 20 percent more energy-efficient by 2020.

Clean Generation

• By 2035, generate 80 percent of electricity from a diverse set of clean energy sources.

Environmental

• Cut GHG emissions in the range of 17 percent below 2005 levels by 2020, and 83 percent by 2050.

Security:

• Advance domestic energy resources.
• Diverse supplies.

Environment:

• Achieve 80 percent reduction Greenhouse Gas Emissions.
• Improve water and air quality (indoor and outdoor).

Economy:

• Low cost energy services.
• Competitiveness.
• Clean energy business opportunities.
• Clean energy jobs.

c/o Henry Kelly
EERE Milestones

Buildings
- Improve building energy efficiency 50 percent, in a cost-effective manner, by 2030.
- 1 million homes weatherized by 2013.

Industry
- Reduce energy consumption of manufactured goods across targeted product life-cycles by 50 percent or more.

Federal Sustainability
- Reduce federal energy demand by 30 percent by 2015 (2003 base).

Transportation
- Reduce oil imports 1/3rd by 2025 and diversify fuel mix:
  - Biomass – Less than $3/gallon (GGE) for drop-in fuels such as renewable gasoline, diesel, and jet fuel.
  - Cars able to achieve fuel economy >60mpg by 2025.
  - Batteries 1/2 today's price in 2015, 1/4 today's price in 2020.
  - Fuel cells for vehicles $30/kW; 5000 hour duration.

Clean Electricity: 80 percent by 2035
- Renewable electricity competitive with conventional sources without subsidies in:
  - Solar (SunShot initiative).
  - Wind - Offshore and Land Utility wind to contribute 20 percent by 2030 (300GW).
  - Water - Cost-competitive conventional hydropower and marine and hydrokinetic water power.
  - Geothermal.
Vehicle Technologies Program: Goals, Strategies, and Top Accomplishments

The U.S. economy and the American way of life rely on transportation—especially the nation’s vast fleet of cars, trucks, and buses. And this transportation depends almost entirely on oil. In 2009, the movement of goods and people in the United States consumed 13 million barrels of oil per day, representing 70% of total U.S. oil consumption and more than twice the amount of crude oil produced domestically. This oil dependence makes the nation vulnerable to supply disruptions and economically harmful price shocks, while petroleum-powered transportation generates air pollution and one third of U.S. greenhouse gas emissions. Reducing transportation’s dependence on oil is vital for achieving leaders, national laboratories, universities, state and local governments, and other stakeholders—harnessing a vast resource of expertise to help technologies developed in the laboratory make the transition to commercially successful products.

Ultimately, the widespread commer-

Lubricants; Materials Technologies; and Outreach, Deployment, and Analysis (including Clean Cities).

Hybrid Electric Systems
Widespread use of advanced electric-drive vehicles—including hybrid electric vehicles (HEVs), electric vehicles (EVs),
EERE- Vehicles Technology Program (VTP)

Goals

- By 2014, reduce the production cost of market-ready, high-energy, high-power batteries by 70% from 2009 costs.
- By 2015, reduce the cost of a market-ready advanced electric propulsion system by at least 35%.

Program areas:

- Hybrid & Vehicle Systems (HVS)
- Energy Storage (ESS)
- Power Electronics & Electrical Machines (PE)
- Advanced Combustion Engines (ACE)
- Fuels & Lubricants (FL)
- Materials Technologies (MT)
- Analysis & Tools
- EPAct Transportation Regulatory Activities
- Clean Cities
- Research Partnerships

Goals, Strategies, and Top Accomplishments - Fact Sheets & Roadmaps

- Vehicle Technologies Program
- Advanced Combustion Engine R&D
- Fuel Technologies
- Hybrid Electric Systems
- Materials Technologies
- Clean Cities
**DOE ARPA-E**

ARPA-E’s mission is to fund projects that will develop transformational technologies that reduce America’s dependence on foreign energy imports; reduce U.S. energy related emissions (including greenhouse gasses); improve energy efficiency across all sectors of the U.S. economy and ensure that the U.S. maintains its leadership in developing and deploying advanced energy technologies.

ARPA-E’s mission is to overcome the high-risk technological barriers facing energy technologies

(A) **promoting revolutionary advances in fundamental sciences**

(B) **translating scientific discoveries into technological innovations**

(C) **accelerating transformational technological advances in areas that industry by itself is not likely to undertake**

2009 - $400 million
2011 - $180 million
2012- $250 million
ARPA-E created 11 focused programs during the last two years

**Transportation**
- Electrofuels
- BEEST
- PETRO

**End-Use Efficiency**
- HEATS
- BEETIT

**Stationary Power**
- IMPACCT
- ADEPT
- GRIDS
- Solar ADEPT
- GENI
- REACT

http://arpa-e.energy.gov/About/Team.asp
ARPA-E BEEST

BATTERIES FOR ELECTRICAL ENERGY STORAGE IN TRANSPORTATION (BEEST)

The U.S. spends nearly a $1 billion per day to import petroleum, but we need dramatically better batteries for electric and plug-in hybrid vehicles (EV/PHEV) to truly compete with gasoline-powered cars. The 10 projects in ARPA-E’s BEEST program, short for “Batteries for Electrical Energy Storage in Transportation,” could make that happen by developing a variety of rechargeable battery technologies that would enable EV/PHEVs to meet or beat the price and performance of gasoline-powered cars, and enable mass production of electric vehicles that people will be excited to drive.
Principal Cross Cutting Program Offices

- SBIR/STTR- Small Business Innovation Research
- ARPA-E- Advanced Research Program Agency –Energy
- WDTS- Workforce Development for Scientists and Teachers
- EPSCoR – Experimental Program to Stimulate Competitive Research
- OIA- Office of Science Policy an International Affairs
- Energy Innovator Challenge

DOE ‘Maze’ Summary

NNSA
- NA-10
- NA-20
- NA-30

Science
- BES
- BES
- ASCR
- HEP
- FES
- NP
- WDTS
- SBIR

Applied
- EERE
- OE
- FE
- NE
- EM
Programmatic Relationships

*Scientific Understanding Produces Improved or New Technologies*

- **Basic Science Research**
- **Feasibility Research**
- **Technology Development**
- **Technology Demonstration**
- **Small Scale Deployment**
- **Large Scale Deployment**

**High Risk, High Payoff**

- **Office of Science**
- **ARPA-E**
- **EFRCs**
- **Energy Innovation Hubs**
- **Venture Capital & Small Businesses**
- **Loan Guarantee Program**
- **Private Equity/Capital & Large Corporations**
- **Govt. Procurement**

**Overcoming Technological Barriers Needs New Scientific Understanding**

**Scale up of Business-Ready Technologies by Private Industry**

Energy Efficiency & Renewable Energy
Energy Innovator Challenge—America’s Next Top Energy Innovator

Using gas atomization technology developed at the Ames Lab IPAT will be able to make titanium powder 10 times more efficiently than traditional powder-making methods. Above right, 1.8 grams of gas atomized titanium powder makes a finished 1.8 gram titanium bolt. | Image Courtesy of IPAT

Ames Lab post-doc research associates -- Joel Rieken and Andrew Heidloff
Other DOE Programs - Technology

Energy Department Technology Transfer Programs

- 2010, 13,500 Tech Transfers
- Ames Leading IP
- $22 in sale for $1 federal

SBIR/STTR
DOE EPSCoR

Experimental Program to Stimulate Competitive Research

- DOE EPSCoR is a federal-state partnership program designed to enhance the capabilities of designated states and territories to conduct sustainable and nationally competitive energy-related research.

- A jurisdiction is eligible to participate in the NSF/DOE EPSCoR if their most recent 3-year level of NSF research support is equal to or less than 0.75%.

- $8.2 million Presidential Request

Two Programs

- Implementation Awards
  Multi-investigator awards building infrastructure and capacity up to $2.5 million for 3 years

- Lab-State Partnerships
  Single Investigator $200k/yr for 3 years

- Crosscuts Applied & Science offices
Iowa State Builds Algal Production Facility

- First facility at Iowa State that can produce large amounts of algal biomass.
- Production systems to quickly grow algal biomass for various research purposes including the production of renewable fuels, food, or animal feed.

The algal production facility is a 720 square-foot greenhouse. It will be equipped with two raceway pond systems, four large flat panel photobioreactors, and one custom-made revolving attachment-based photobioreactor.
Other Program Opportunities

- Other Programs
  - WDTS- Workforce Development for Teachers and Scientists
  - DOE CAREER AWARDS
  - IPA- Visiting Researcher at DOE- HQ or a DOE Lab
- DOE Laboratory FOAs (RFPs)
- Interagency Initiatives
New materials and manufacturing methods can change the landscape of energy solutions.

In 1884, the price of aluminum was $1/oz and the price of gold was $20/oz. The highest skilled craftsman working on the Washington Monument was paid $2/day.

Today’s prices:  
Al = 6¢/oz  
Au ~ $1776/oz.

Steve Chu, DOE, 2012
Partnership for a US Manufacturing Renaissance

"Today, I'm calling for all of us to come together- private sector industry, universities, and the government- to spark a renaissance in American manufacturing and help our manufacturers develop the cutting-edge tools they need to compete with anyone in the world...

With these key investments, we can ensure that the United States remains a nation that 'invents it here and manufactures it here' and creates high-quality, good paying jobs for American workers."

President Obama,
on establishing Advanced Manufacturing Partnership
June 24, 2011.
Programmatic Relationships

- DOE-USDA-NSF - BDRI
- DOE-DOD MOA -
- AMNPO- NNMI + $1 Billion
- MGI-
- Blueprint-
Intentionally Blank
What is happening in Washington
Why, what, where of Budget & Policy
How does it impact ISU?

II. THE FEDERAL LANDSCAPE
Budget Issues

- Presidential Election Results
- No Budget Resolution: FY 13 & Next Steps
- Continuing Resolution
  - Funding Government Through March 2013
- Sequestration
  - Would cut R&D-relevant discretionary spending by roughly $90 billion per year (~8 or 9%)
- Lame Duck
- Commerce Reorg?
November 6, 2012

- President Barack Obama - 50%
  – Electoral Votes (303)

- Control of the House – Republicans 218

- Control of the Senate – Democrats 50
“… I will not walk away from the promise of clean energy. I will not walk away from workers … I will not cede the wind or solar or battery industry … It’s time … to double down on a clean energy industry that has never been more promising.”

- President Obama, State of the Union, 24 January 2012
The President in Iowa

Des Moines Register, October 24, 2012

• Number three, controlling our own energy. This obviously is of interest to Iowa. Our support of biofuels, our support of wind energy has created thousands of jobs in Iowa. But even more importantly, this is going to be the race to the future. The country that controls new sources of energy, not just the traditional sources, is going to have a huge competitive advantage 10 years from now, 20 years from now, 30 years from now.

• So in addition to doubling our fuel-efficiency standards on cars and trucks, what we want to do is make sure that we're producing new technologies here -- long-lasting batteries, making sure that we are developing the wind and solar and other energy sources that may provide us a breakthrough. In the meantime, we're still producing oil and natural gas at a record pace, but we've got to start preparing for the future. And as I said, it creates jobs right now in Iowa.
Iowa Legislature
112th Congress

• House
  – Tom Latham – 52% (Approps)- R
  – Steve King – 53.2 % (Ag/ SB)- R
  – Dave Loebsack – 55.4% (AS)-D
  – Bruce Braley – 56% - D

• Senate
  – Tom Greeley (R)
  – Tom Harkin (D)
Senators

Greeley
- Committee on the Judiciary
- Committee on Finance.
- Committee on Agriculture, Nutrition and Forestry.
- Committee on the Budget.

Harkin
- Labor, Health and Human Services, and Education (Chairman)
- Agriculture, Rural Development, FDA
- Energy and Water Development
- Defense
- State, Foreign Operations
- Transportation, Treasury, the Judiciary, HUD, and Related Agencies
The Federal Budget Cycle

- Discussions within agencies among upper management about possible priorities and initiatives
The Federal Budget Cycle

- Agencies are working on 3 budgets at any given time
Total R&D by Agency, FY 2013

budget authority in billions of dollars

Total R&D = $142.2 billion

DOD, $72.6
HHS (NIH), $31.4
DOE, $11.9
NASA, $9.6
NSF, $5.9
USDA, $2.3
Commerce, $2.6
All Other, $6.0

Source: OMB R&D data, agency budget justifications, and other agency documents. R&D includes conduct of R&D and R&D facilities.
R&D in the FY 2013 Budget
percent change from FY 2012

- NIST: 238.8%
- DHS: 26.3%
- Other HHS: 21.9%
- DOT: 17.0%
- DOE Energy: 16.2%
- DOE Defense: 9.6%
- USGS: 7.6%
- NSF: 4.6%
- DOE Science: 2.4%
- NASA: 2.2%
- EPA: 2.1%
- VA: 0.2%
- NIH: 0.0%
- USDA: -1.5%
- DOD Other: -1.5%
- NOAA: -3.8%
- DOD S&T: -7.4%
- TOTAL: 1.2%

Source: OMB R&D data, agency budget justifications, and other agency documents.
R&D in the FY 2013 Budget

percent change from FY 2012

- NIST: 238.8%
- DHS: 26.3%
- Other HHS: 21.9%
- DOT: 17.0%
- DOE Energy: 16.2%
- DOE Defense: 9.6%
- USGS: 7.6%
- NSF: 4.6%
- DOE Science: 2.4%
- NASA: 2.2%
- EPA: 2.1%
- VA: 0.2%
- NIH: 0.0%
- USDA: -1.5%
- DOD Other: -1.5%
- NOAA: -3.8%
- DOD S&T: -7.4%
- TOTAL: 1.2%

Source: OMB R&D data, agency budget justifications, and other agency documents.

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Budgets

Department of Energy
FY 2013 Congressional Budget Request

http://www.cfo.doe.gov/budget/13budget/Content/Highlights.pdf
### Office of Science FY 13 Budget

#### Appropriation Summary by Program

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<td>Advanced Scientific Computing Research</td>
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<td>394,000</td>
<td>420,000</td>
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<td>Basic Energy Sciences</td>
<td>1,535,765</td>
<td>+555,406</td>
<td>1,636,500</td>
<td>1,835,000</td>
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<td>Biological and Environmental Research</td>
<td>585,176</td>
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<td>604,182</td>
<td>626,900</td>
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<td>Fusion Energy Sciences</td>
<td>394,518</td>
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<td>426,000</td>
<td>380,000</td>
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<td>High Energy Physics</td>
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<td>+232,390</td>
<td>810,483</td>
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<td>Nuclear Physics</td>
<td>500,307</td>
<td>+154,800</td>
<td>535,000</td>
<td>562,000</td>
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<td>Workforce Development for Teachers and Scientists</td>
<td>13,583</td>
<td>+12,500</td>
<td>20,678</td>
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<td>Science Laboratories Infrastructure</td>
<td>145,380</td>
<td>+198,114</td>
<td>127,600</td>
<td>126,000</td>
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<td>Safeguards and Security</td>
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<td>83,000</td>
<td>86,500</td>
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<td>Science Program Directions</td>
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<td>Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) (SC funding)</td>
<td>104,903^a</td>
<td>-18,719^b</td>
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</table>

^a SC funding

^b Total change
Office of Science BES

**FY13 BES HEWD Mark**

- The Committee recommends $1,657,146,000 for Basic Energy Sciences, $36,854,000 below fiscal year 2012 and $142,446,000 below the request.

- The Committee provides no funds, $8,520,000 below fiscal year 2012 and the request, for the Experimental Program to Stimulate Competitive Research.

- The recommendation includes $24,237,000 for the fourth year of the Fuels from Sunlight Energy Innovation Hub, the same as the request; $24,237,000 for the second year of the Batteries and Energy Storage Energy Innovation Hub, the same as the request; and $100,000,000 for Energy Frontier Research Centers (EFRC’s), $20,000,000 below the request.

**FY13 BES SEWD Mark**

- The Committee recommends $1,712,091,000, a decrease of $87,501,000 below the budget request, for Basic Energy Sciences.

- The Committee encourages DOE to continue research and development activities that will lead to even more powerful light source facilities, which are a key part of the nation’s innovation ecosystem and critical to America’s international economic competitiveness.

- ... up to $100,000,000 to support the 46 Energy Frontier Research Centers, $24,237,000 for the Fuels from Sunlight Hub, and $24,237,000 for the Batteries and Energy Storage Hub. $20,000,000 for EPSCoR.
Research programs
- Energy Innovation Hubs (+$5M)
- Energy Frontier Research Centers
  - Joint EERE R&D (+$20M)
- Core Research
  - Materials and Chemistry by Design (+$20M)
  - Science for Clean Energy (+$42M)

Scientific user facilities operations
- Near optimum operations of all facilities (+$42M)
  - Synchrotron light sources
  - Neutron scattering facilities
  - Nanoscale Science Research Centers
- Instrumentation for clean energy, joint with EERE (+$15M)
- NSLS-II Early Operations (+$22M)

Construction and instrumentation
- National Synchrotron Light Source-II
- NSLS-II instrumentation (NEXT) ($12M)

Advanced Photon Source upgrade ($20M)
Linac Coherent Light Source-II ($64M)
Sequestration

Federal Nondefense R&D Under BCA Caps With and Without Sequestration
In billions of constant FY 2012 dollars

Source: Based on AAAS estimates of R&D funding and the FY 2013 budget, and CBO analyses of the Budget Control Act.
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January 2013-2012; >$100 billion /Yr Mandatory Cuts; 17.3% NDD cuts/5 years
~$3.9 Billion or $777 million per yr to DOE Office of Science.
Budget Issues

• Presidential Election Results
• No Budget Resolution: FY 13 & Next Steps
• Continuing Resolution
  – Funding Government Through March 2013
• Sequestration
  – Would cut R&D-relevant discretionary spending by roughly $90 billion per year (~8 or 9%)
• Lame Duck
• Commerce Reorg?
Budget Factors

Issues

• Partisanship
• Economy & Jobs
• Foreign vs. domestic initiatives
• Agency stovepipes – duplicate programs
• Deficit reduction
• Mandatory vs. discretionary

Threats

• U.S. falling behind globally
• STEM learning/prepared workforce declining
• Competition is intense
• States cutting budgets and services
• “Gaps” on multiple levels for underrepresented groups
• Strong Bi-partisan DC
• Sequestration
Intentionally Blank
III. TOOLBOX FOR SUCCESS AT DOE
Know your research

• Know your Agency
• Know its Mission, Goals, Milestones
• Know your Program Office (Applied vs. Science v.s ARPA-E)
• Goals, Annual Reports, BRNs
• Know your Program Manager

• How does your research align with the DOE Mission?
• Is your research Basic, Applied, Both, High Risk, Innovative?
• Who is your Program Manager?
• What are their relevant Reports, Roadmaps, Initiatives?
Is Your Work Applied (EERE/OE) or Basic Research (Science)?

• **Applied**
  – Performance Driven
  – Roadmaps & Milestones
  – Technology Readiness Levels, Stage Gate, Go-no Go
  – Set /Staged FOA’s, Hubs, Facilities

• **Science**
  – Fundamental
  – Basic Research Needs Reports
  – Rolling FOA’s, Hubs, Facilities, Centers
  – EPSCoR & SBIR/STTR
  – Merit reviews
Applied - EERE
Realignment of Budget Structure

**Budget Structure**

**Innovations**
RD&D initiatives to identify innovative breakthrough technical concepts in energy technology.

**Emerging Technologies**
RD&D initiatives to convert innovations into practical technologies and products.

**Systems Integration**
RD&D initiatives to integrate technologies into functional and efficient energy systems.

**Market Barriers**
RD&D initiatives to accelerate the adoption of energy technologies into the market (codes and standards; streamlined regulations).

**Technology Readiness Level (TRL)**

- **Innovations (TRL 2-3)**: 27%
- **Emerging Technologies (TRL 3-6)**: 34%
- **Systems Integration (TRL 6-8)**: 23%
- **Market Barriers (TRL 8-10)**: 16%

* Does not include EERE Corporate Programs or Weatherization and Intergovernmental Activities
Know your Merit/Review Criteria
Science - SC

Merit Review

1. **Scientific and/or technical merit of the project;**
   for example, the influence that the results might have on the
direction, progress, and thinking in relevant scientific fields of
research; the likelihood of achieving valuable results; and the
scientific innovation and originality indicated in the proposed
research.

2. **Appropriateness of the proposed method or approach;**
   for example, the logic and feasibility of the research approaches and
the soundness of the conduct of the research.

3. **Competency of the personnel and adequacy of proposed resources;**
   and
   for example, the background, past performance, and potential of the
investigator(s); and the research environment and facilities for
performing the research.

4. **Reasonableness and appropriateness of the proposed budget.**
Know your Federal Initiatives

• Materials Genome Initiatives
• Advanced Manufacturing
  – Wide Band Gap
  – Additive Manufacturing
  – Jet Fuels
• Energy Innovation ‘Hubs’ (OE), Pilot Centers, MDFs (Manufacturing Demonstration)
• STEM, Workforce Development and Training
Know your Program Manager

Join the DOE ‘Club’ Activities
• Single Investigator
• Multi-investigator
• EPSCoR
• WDTS
• Energy Centers/Hub
• Interagency FOAs/RFPs

Automatic (nearly) to the Elite Social Club
• The 17 DOE Labs
  – Ames
  – 10 SC

Immersion
• Send your CV to DOE HQ
  – Serve as an external reviewer or panel reviewer
  – Request to participate in a BRN or Roadmap
  – NNI, EV Everywhere, Etc.
• Find an ‘SC’ mentor
• Find an Applied mentor or ‘partner’
Work your budgets & Know your Dependencies and Resources
Summary

YOU

THEM
Summary of Tool Box

• Know you Value-Add
• Know your Program Managers
• Serve as a Reviewer, Panel Member, Workshop Player or Chair
• Consider working with DOE Labs, via tools, data, user facilities, centers, student (GRA and UGS) opportunities, postdocs
• Send Office of Science your ‘White’ Papers & Meet your Program Managers.
• Join your advocacy group to follow the ‘game’ in town –
  – Washington ‘right now’ (AMO, NNMI, MGI (NNI), etc)
• Follow your Budgets
• Use Federal Relations & Your Office of Research
• Dedicate time to mission understanding, alignment and grantspersonship
• Learn, Apply, Compete, Repeat.
Learn. Adapt. Compete. Repeat.
Top Five Web Addresses

- [http://energy.gov/offices](http://energy.gov/offices)
- [http://energy.gov/about-us/contact-us](http://energy.gov/about-us/contact-us)

Your Budget

- [http://science.energy.gov/budget/](http://science.energy.gov/budget/)
“No amount of grantsmanship will turn a bad idea into a fundable one...but there are many outstanding ideas that are masked by poor grantsmanship”

-NIH Staff Member

APPENDIX- GRANTSPERSONSHIP
How to look for Federal funding

NSF Home Page

Navigate from NSF’s home page to find funding opportunities.
Other Ways to Find Funding

Consult the alphabetical listing of funding opportunities.
Top 10 Career Attributes That Also Count In Grantspersonship

10. Preparation
9. Opportunity / Awareness / Alignment
8. Collaboration / Teaming
7. Risk Taking / Transformative / Breakthrough / Fundamental
6. Mentorship
5. Communication / Marketing
4. Persistence / Patience
3. Diversification
2. Work Ethic

**No. 1** – Time Management
Grantspersonship

• Assists
• Management
• Outreach & Workforce Development
• Boxes / Tools / Bullets / Chart
• Organization & Management
• Documentation of Success
• Tables to enhance/ clarify
• Boxes to attract attention / highlight
• Graphics to visualize
• Mission/ Milestones
• Outreach & Workforce Development
• Project Management a must!
A beginning...

State Support and Institutional Support for R&D. The state government, led by Governor Chet Culver, in the past few years, has focused and encouraged the growth of renewable energy in Iowa. In 2007, it established research, education, and workforce for the future economic prosperity with the State EPSCoR committee creation stimulating lead collaboration. In Iowa’s Energy Independence Plan, Governor Culver stated, “We are in a period of historic change in the way energy is produced and used; we can ensure our successful future by making ‘Made in Iowa’ energy synonymous with economic prosperity.” The Office of Energy Independence to provide strategic direction and leadership for a sustainable energy future through education, research, planning, and investment, and the Iowa Power Fund was subsequently created to 1. Promote the goals of Iowa energy independence 2. Accelerate R&D by providing financial assistance to various entities; 3. Encourage innovation and knowledge transfer. 4. Illustrate the state’s economic competitiveness in the renewable energy sector.

Since 2007, the Power Fund has invested $37M in 29 competitive projects, focused primarily on R&D and early stage commercialization. It has also leveraged an additional more than $261M to promote the accelerate R&D. Recognizing the long-standing role university research has played in developing and analyzing pathways to economical and environmentally renewable energy and the fact that the state is uniquely positioned to provide some of the best knowledge infrastructure for the growing renewable energy industry, the IA EPSCoR Statewide Committee, comprised of government, academic and industry leaders, targeted bioenergy, wind energy, energy utilization, and energy policy as the focal point for jurisdiction’s development. Significantly, additional, in support of this RII, the Power Fund has committed $2M to match the University’s collective commitment of $2M in cost share. This commitment is on top of state investments made in the last five years in new and renovated research facilities at ISU and UI in the last 5 years, totaling $653M in FY 2008 and $53M in FY 2009 – an investment even more significant given the difficult economic climate. The state has also initiated a number of workforce development initiatives to spur the energy economy and job creation through the Green Jobs Taskforce, and is providing $5M in competitive funding for Green Jobs retention/creation. The present proposal is aligned with the XX.

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We have a period of historic change in the way energy is produced and used; we can ensure our successful future by making “Made in Iowa” energy synonymous with economic prosperity.” – Governor Culver

Strengths, Opportunities, and Barriers, and Opportunities, Challenges. Multiple state agencies and the universities have engaged in strategic assessment and planning to determine our strengths and barriers to enhance Iowa’s leadership position in renewable energy and those discussions have informed our decision to focus on BioEnergy, Wind Energy, and Energy Efficiency, for this RII.

Strengths, Opportunities – Iowa has strong advantages, particularly in the renewable energy platform. The Board of Regents has identified ISU, UI, and UNI to establish strong, interdisciplinary research and collaborative efforts and set the stage for “Made in Iowa” energy leadership in this area. Renewal energy including ISU has the establishment of the nationally recognized Bio-technology Institute (BEI), which integrates plant sciences, production, processing and engineering, and bioenergy research.
Learn. Adapt. Apply. Repeat
End