Understanding the Science, Engineering and Technology Policy Budget Process

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Program Examiner
Office of Management & Budget
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Complicated Decision-making Process

- National Academy of Science
- The Agency
  - Bureau
  - Bureau
  - R&D
- The White House
  - OMB
  - OSTP
  - NSC
  - NEC
- Congress
  - Approps Committees
  - Auth. Committees
- Research Community
The Budget Process
OMB “Budget Season”: September – January

Department of Energy

- Science
- Fossil Energy
- NNSA

The White House

(1) Budget Request

(2) Passback

(3) Appeal

Enacted

BA $  

Guidance  

Agency Request  

Target  

Passback  

Request

FY09  

FY09  

FY08  

FY09  

FY09  

FY09

Earmarks & “above request” funds
The Budget Process

Appropriations: February – October or >>

**Department of Energy**
- Science
- Fossil Energy
- NNSA

**The White House**
- OMB
- Hearings
- SAPs

**Congress**
- House
  - Appropriations
  - Subcommittee Markup
  - Committee Markup
  - Floor Vote
  - Conference
- Senate
  - Appropriations
  - Subcommittee Markup
  - Committee Markup
  - Floor Vote
  - Conference

**President’s Budget Request**

**Government Services**

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- Budget Resolution
  - Top Line & Function
- 302(b) Allocation
  - To Appropriations Subcommittees
- Subcommittee Markup
- Committee Markup
- Floor Vote
- Conference

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**BUDGET**

OF THE UNITED STATES GOVERNMENT

Fiscal Year 2006
**Remember: Three Years of Budgets are Underway at Any Time**

YOU ARE HERE!

May, 2008.

<table>
<thead>
<tr>
<th>FY 2009</th>
<th>FY 2008</th>
<th>FY 2010</th>
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**CURRENT YEAR**

<table>
<thead>
<tr>
<th>Congressional Appropriation</th>
<th>Monthly AFP Changes</th>
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**CURRENT YEAR + 1**

<table>
<thead>
<tr>
<th>OMB Budget Prep/Defense</th>
<th>Congressional Bud Prep</th>
<th>Budget Delivered to Congress</th>
<th>Congressional Hearings, ...</th>
<th>Congressional Appropriation</th>
<th>Initial AFP</th>
<th>Monthly AFP Changes</th>
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**CURRENT YEAR + 2**

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<tr>
<th>Issuance of Uncall</th>
<th>FTPs Received</th>
<th>CRB Preparation</th>
<th>OMB Budget Prep/Defense</th>
<th>Congressional Bud Prep</th>
<th>Budget Delivered to Congress</th>
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- Current Year: FY 2008
- FY 2009 Year-long CR?
- FY 2009 Hearings underway
- FY 2009

- FY 2010
- End of term & transition
- Prep for End of term & transition
- Received
- Budget Prep/Defense
- OMB Budget Prep/Defense
- Congressional Appropriation
- CRP
- CRB Preparation
- FTPs Received
- Initial AFP
- Congressional Hearings, ...
- Current Year + 1
- Current Year + 2

- FY 2008 Omnibus in force.
So, how do we approach making a case for investment?
Presidential Priorities
w/ Direct S&T Coupling

• Winning the War on Terrorism
• Securing the Homeland
• Strengthening the Economy
• A National Energy Strategy
• Improving Government: President’s Management Agenda
  (R&D Investment Criteria, PART Analysis)
Federal R&D Priorities
(obligations, in 1996 constant dollars)

Source: National Science Foundation
FY 2008 OSTP/OMB Priorities Memo

1.) American Competitiveness Initiative
2.) Homeland Security
3.) Energy Security / Advanced Energy Initiative
4.) Advanced Networking and High End Computing
5.) National Nanotechnology Initiative
6.) Understanding Complex Biology
   • non-biomedical biology: plant genomics, animal genomics
7.) Environment
   • Climate Change Science and Technology
   • Earth Observation Systems
Putting It in the Agency Context

NAS Study called for:

- A 6 GeV synchrotron light source
- An advanced steady state neutron source
- A 1-2 GeV synchrotron light source
- A high-intensity pulsed neutron source
The “Trivelpiece Plan”

In 1986, Director of Energy Research crafts a solution:

- Relativistic Heavy Ion Collider (RHIC)
- A 1-2 GeV synchrotron light source (ALS)
- A 6 GeV synchrotron light source (APS)
- An advanced steady state neutron source (ANS)
  - A high-intensity pulsed neutron source (SNS) was eventually substituted
Highly Productive Suite of DOE Light Sources

SSRL, NSLS: pre-existing
APS, ALS: “Trivelpiece Plan”
...With Systematic Evaluation

Birgeneau-Shen, 1997
• ALS in trouble

Petroff report, 2000
• ALS fixed
Know Who You Are.
Know Your Audience.
Know Who You Are

- Technical Expert
- Science Policy Expert/Community Leader
- Constituent of a Member or Constituent of a Program
Know Your “Benefits” Footprint
(It’s more than $$$)
Know Your Audience

- **Colleagues in your field**
  - includes program managers

- **Scientists outside your field**
  - includes other agency staff

- **Science policy shops**
  - OMB, OSTP, Authorizing Committee staff, Appropriations Committee Staff

- **Non-scientists**
  - most policy officials, politicians, personal office staff, and the public
More than preparing for “Obvious” Questions

**Political Level (President, Congress)**
- How does the science benefit society? (jobs, economy, defense,...)
- How does this alleviate/placate constituent concerns? (budget growth!)
- How has the program been managing and performing?
- What have we gotten for our investment to date?

**Agency Head/Department Secretary Level**
- How does the agency mission address administration priorities?
- How does the science further the mission of the agency?
- How does the science impact or strengthen other programs or related activities across the Government?
- How has the program been managing and performing?
- What have we gotten for our investment to date?

**Program Level**
- How does the program further agency mission and administration priorities?
- How does science advance the program’s objectives?
- How does the science impact or strengthen other programs or related activities across the Government?
- How has the program been managing and performing?
- What have we gotten for our investment to date?

**Project Level: Quality & Relevance**
Know Your Audience’s Role

White House Office
(Homeland Security Council, Office of Faith-Based Initiatives, Freedom Corps)

- Office of Management & Budget (OMB)
- US Trade Representative (USTR)
- Office of Administration
- Office of the Vice President
- Domestic Policy Council
  Nat’l Economic Council
  Nat’l AIDS Policy
- Council of Environmental Quality (CEQ)
- Council of Economic Advisors (CEA)
- President’s Foreign Intelligence Advisory Board
- National Security Council (NSC)
- Office of National Drug Control Policy
- Office of Science & Technology Policy (OSTP)

- Primarily career staff
- Primarily political staff
- Mix of detailees, career, political
Now that I’m back at OMB...

**Materials Sciences and Engineering**
- Catalysis
- Ceramics
- Condensed Matter Physics
- Corrosion
- Electronic Properties of Materials
- Experimental Techniques & Instrument Devel.
- Fluid Dynamics and Heat Flow
- Intermetallic Alloys
- Magnetism and Magnetic Materials
- Materials Physics and Chemistry
- Mechanical, Physical, and Structural Properties
- Metallic Glasses
- Metallurgy, Metal Forming, Welding & Joining
- Nano- and Microsystems Engineering
- Neutron and Photon Scattering
- Nondestructive Evaluation
- Photovoltaics
- Polymer Science
- Radiation Effects
- Superconductivity
- Surface Science
- Synthesis and Processing Science
- Theory, Modeling, & Computer Simulation

**Geosciences**
- Geochemistry of Mineral-fluid Interactions
- Geophysical Interrogation of Earth’s Crust
- Rock-fluid Dynamics
- Biogeochemistry

**Biosciences**
- Natural Photosynthetic Mechanisms
- Complex Hydrocarbons and Carbohydrates
- Carbon Fixation and Carbon Energy Storage
- Biochemistry, Biocatalysis, Bioenergetics, Biomolecular Materials, and Biophysics

**Chemical Sciences**
- Analytical Chemistry
- Atomic, Molecular & Optical
- Chemical Kinetics
- Chemical Physics
- Catalysis
- Combustion Dynamics
- Electrochemistry
- Heavy Element Chemistry
- Interfacial Chemistry
- Organometallic Chemistry
- Photochemistry
- Photosynthetic Mechanisms
- Radiation Chemistry
- Separations Science
- Solar Energy Conversion
- Theory, Modeling, & Simulation
- Thermophysical Properties

**Particle & Nuclear Physics**
- High Energy and Particle Physics
- Heavy Ion & Medium Energy Nuclear Physics
- Accelerator and Detector R&D
- Particle Astrophysics
- Physics Theory

**Fusion Sciences**
- Experimental Plasma Physics
- Theory, modeling, and simulation
- Accelerator Physics
- Plasma Diagnostics R&D
- Specialized Materials Science
- Tritium Science
- Microwave Systems R&D
- Integrated Fusion Systems

**Life Sciences**
- Human Genome
- Structural Biology
- Microbial Genome
- Low Dose Radiation Research
- Functional Genomics
- Human Subjects in Research
- Structural Biology Facilities
- Genome Instrumentation
- Computational & Structural Biology

**Medical Sciences**
- Radiopharmaceutical Development
- Boron Neutron Capture Therapy
- Molecular Nuclear Medical Imaging
- Imaging Gene Expression
- Biomedical Engineering

**Environmental Sciences**
- Decade to Century Climate Modeling
- Atmospheric Radiation Measurement (ARM)
- Atmospheric Science & Chemistry
- Carbon Cycle Research
- Ocean Sciences
- Ecosystem Function and Response
- Information & Integration
- Integrated Assessment of Climate Change
- Bioremediation of Metals & Radionuclides
- Environmental Molecular Sciences Lab

**Mathematics and Advanced Computing**
- Linear Algebra Libraries
- Scientific Computing & Network Testbeds
- Advanced Computer Science
- Applied Mathematics
- Advanced Computing Facilities
- Advanced Computing Software
When I was at OSTP....
DC Sees Things Differently

Society

Political (Macro)

Agency (Corporate)

Research Program (Competitive)

Disciplines

Scientific Opportunities
AMO, bio, nano, NP, EPP, Astro cosmology

MERIT

Societal Demands
Defense
Energy
Economic Security
Health
Environment
Food/Water
Discovery
Know Your Competitive Environment: White House

**OMB DIRECTOR**

4 Resource Management Offices (RMOs)

- **Natural Resource Programs**
  - DOE, NSF
  - NASA, USDA
  - USGS, EPA
  - Smithsonian
  - **vs.**
    - National Parks, Forest Service, Army Corps, crop insurance

- **Human Resource Programs**
  - NIH, Ed
  - **vs.**
    - Social Security, Medicare, Medicaid, HHS/PHS, Student Loans, Labor Education

- **General Government Programs**
  - NIST, NOAA
  - DOT, DHS
  - **vs.**
    - Justice, HUD, Treasury, FDIC, Transportation, GSA

- **National Security Programs**
  - 6.1, 6.2, NNSA, VA
  - **vs.**
    - Army, Navy, Air Force, Marines, Intel, State Dept., USAID, VA
Are You a Big Part of Someone’s Business Line?

OMB PAD's Total* Funds Spent on R&D

<table>
<thead>
<tr>
<th>Category</th>
<th>Mandatory + Discretionary</th>
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<tbody>
<tr>
<td>Nat. Res.</td>
<td>$140B</td>
</tr>
<tr>
<td>Hum. Res.</td>
<td>$1,250B</td>
</tr>
<tr>
<td>Gen. Govt.</td>
<td>$310B</td>
</tr>
<tr>
<td>Natl. Sec.</td>
<td>$580B</td>
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* Mandatory + Discretionary

F S&T  "D"  Non-R&D
Know Your Competitive Environment: Approps

House & Senate Appropriations Committees

12 Appropriation Subcommittees each

Energy & Water
- SC, FE, EERE, NE
  vs.
  - NNSA, Army Corps, Bureau of Reclamation, Yucca Mtn, NRC, Environmental Mgmt.

Labor/HHS
- NIH, Ed
  vs.
  - Pell Grants, JobCorps, Vocational Rehab, Foster Care, Head Start, CDC, Ryan White & Block Grants

Commerce, Justice, Science
- NASA, NSF, NIST, NOAA
  vs.
  - US Attorneys, FBI, DEA, State & Local Law Enforcement, Prisons, PTO

Defense
- 6.1, 6.2
  vs.
  - Army, Navy, Air Force, Marines, Weapons Systems Procurement, Intelligence
This is not a data slide.

Nor, is it just a pretty picture!
You can see more from the top of this hill. 
Look! Do you see that house? 
That is the moon house. 
That is where you will live on the moon.
FESAC Priorities & Balance

- Fusion Energy Development
- Performance Extension
- Proof of Principle
- Conceptual Exploration
- Stellarator
- Advanced Stellarator
- Advanced Tokamak
- Spherical Torus
- Spheromak

Cost

 ITER
FESAC Priorities Panel:
A scientific and technical presentation of the program

- Macroscopic plasma behavior
- Multi-scale transport behavior
- Plasma boundary interfaces
- Waves and energetic particles
- Fusion engineering science
- High-energy density implosion physics

These questions now form the basis for a discussion of priorities, e.g., emphasize fusion engineering science after burning plasmas have been created and controlled.

You can explain how any machine will address these central challenges.
Summary

• **DO** tell a good story
  – Focus on the opportunities for discovery

• **DO** craft your message for the various audiences you’ll encounter.
  – Messages must be self-consistent

• **DO** avoid jargon. **DON’T** dumb it down
  – Focus on relationships between ideas and measurement, don’t bury us in data slides

• **DON’T** sell your project by trashing the competitor’s

• **DO** beat up on us if you’ve got a concern. **DO** sell us good ideas. **DON’T** do both *in the same meeting*.
  – Focus on building a relationship, serving as a resource
Finally

• **DO** have a strategy. **DON’T** ask the question in DC if the answer might be “No.”
Do Your Homework

**AAAS for R&D Budget Analysis**
www.aaas.org/spp/rd/

**OSTP for Policy Direction**
www.ostp.gov

**OMB for Budget & PART Analyses**
www.whitehouse.gov/omb

**Authorizing Committees: Hearings, Press Releases**
e.g., science.house.gov

**THOMAS for Bills & Reports: Approps & Authorizations**
thomas.loc.gov

**Your professional societies**
FYI for the AIP Bulletin of Science Policy News
http://www.aip.org/gov/