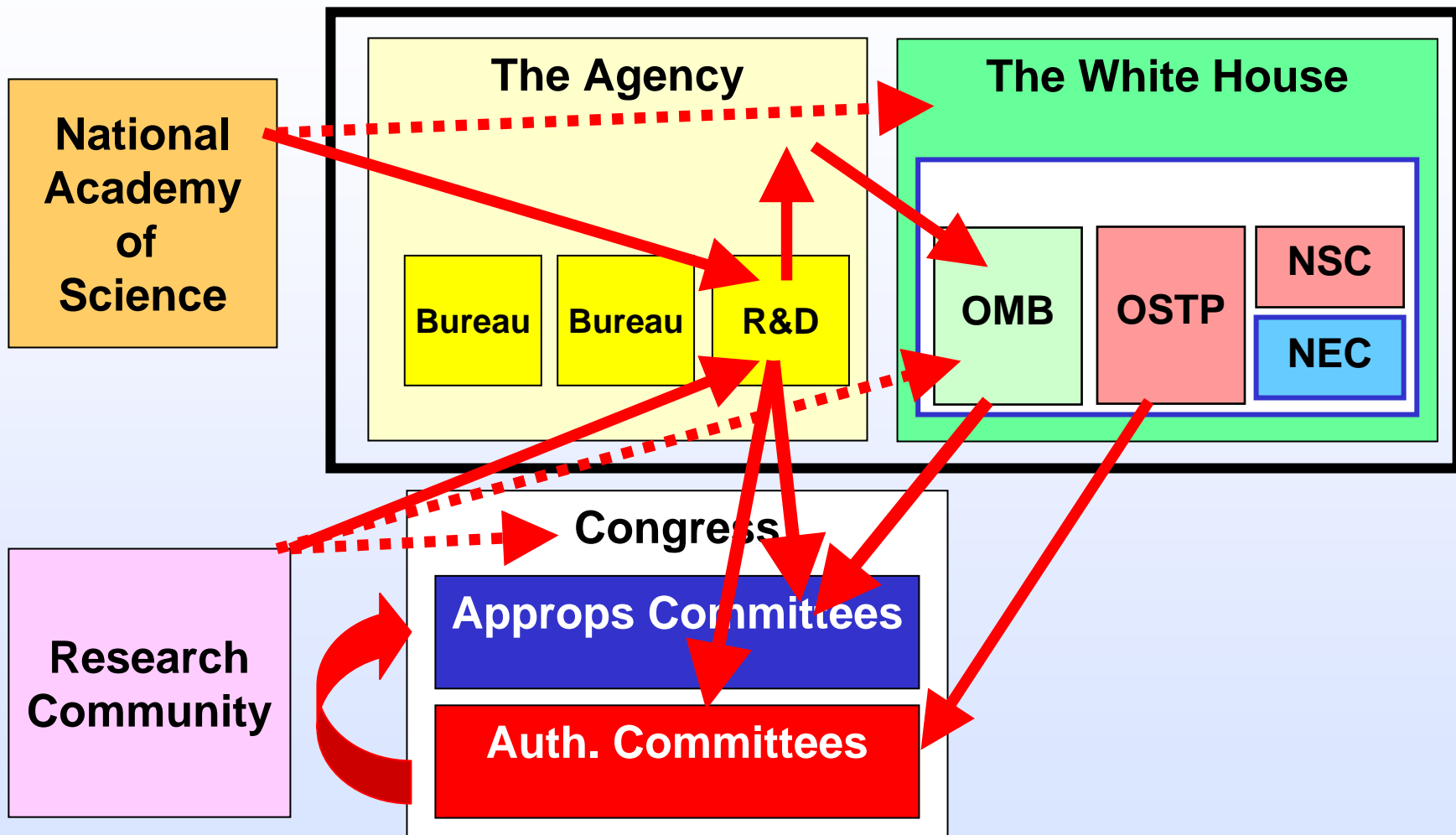




Understanding the Science, Engineering and Technology Policy Budget Process

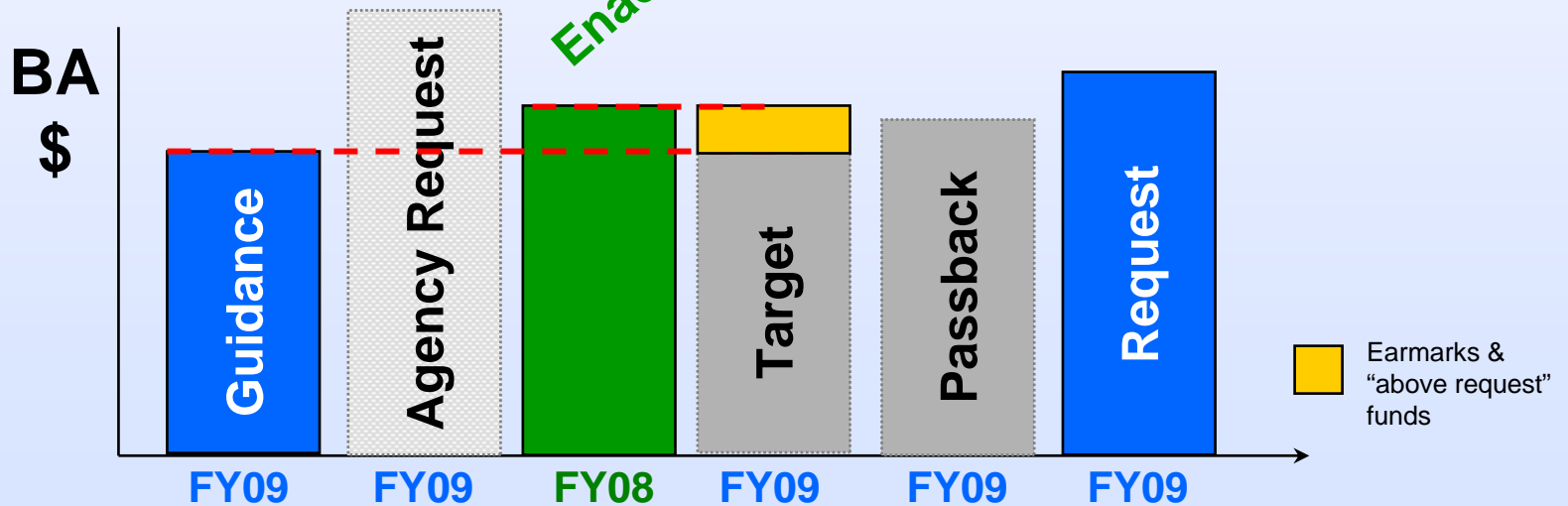
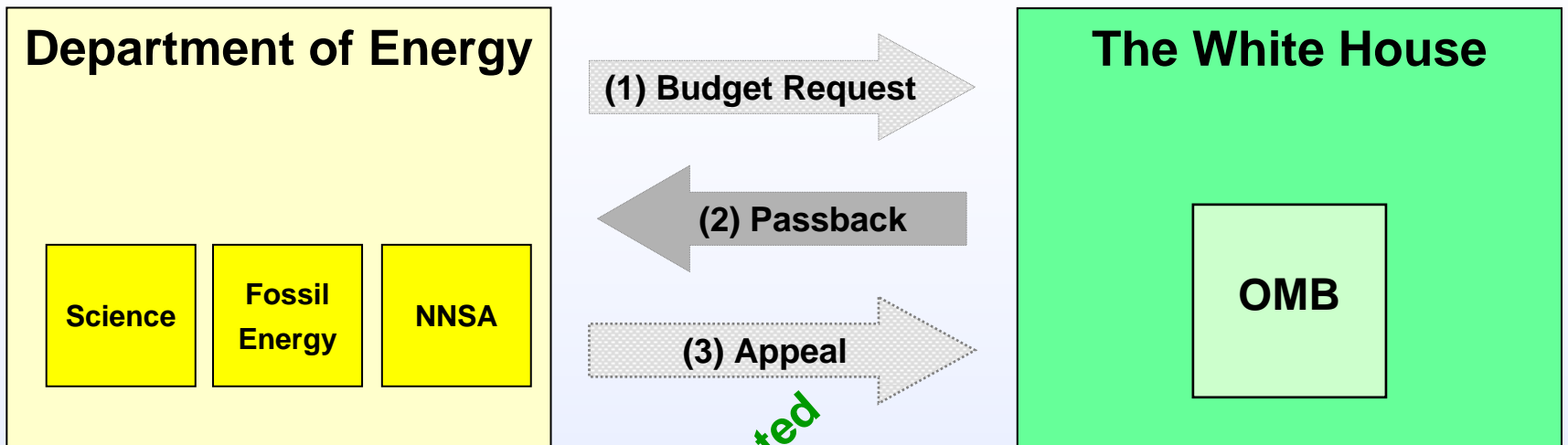
**Michael Holland
Program Examiner
Office of Management & Budget
May 6, 2008**

Complicated Decision-making Process



The Budget Process

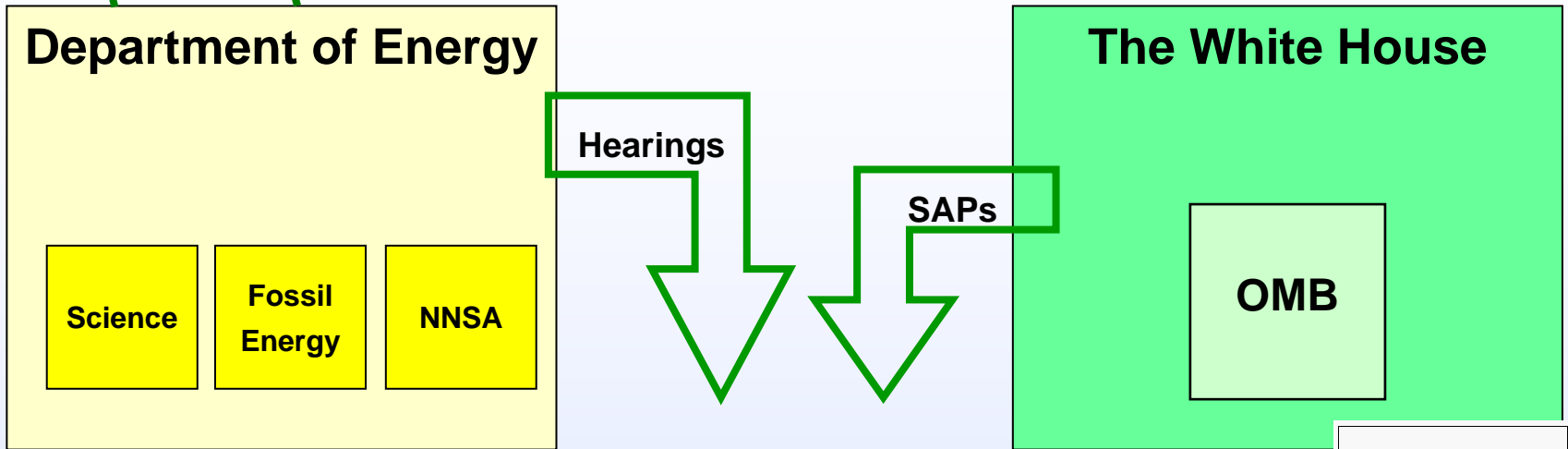
OMB "Budget Season": September – January



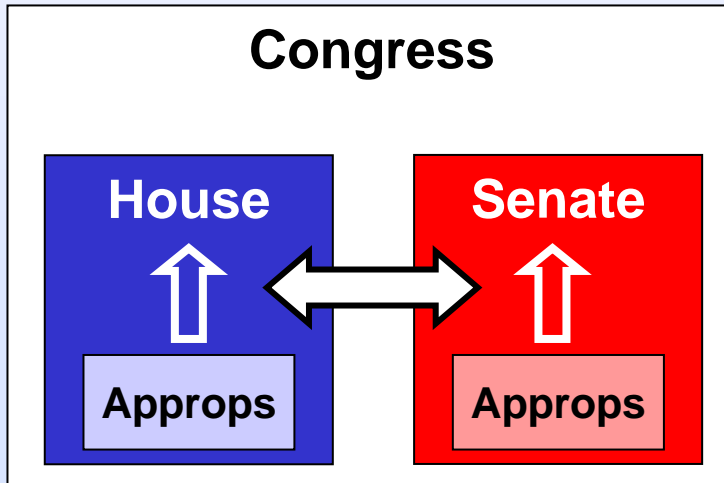
\$\$\$ Government Services

The Budget Process

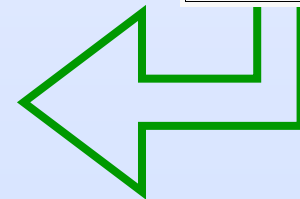
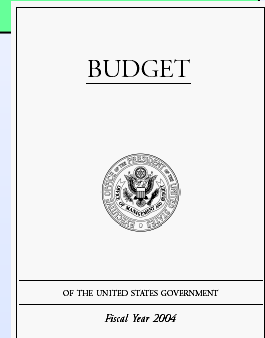
Appropriations: February – October or >>



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



President's Budget Request



So, how do we approach
making a case for investment?

Presidential Priorities

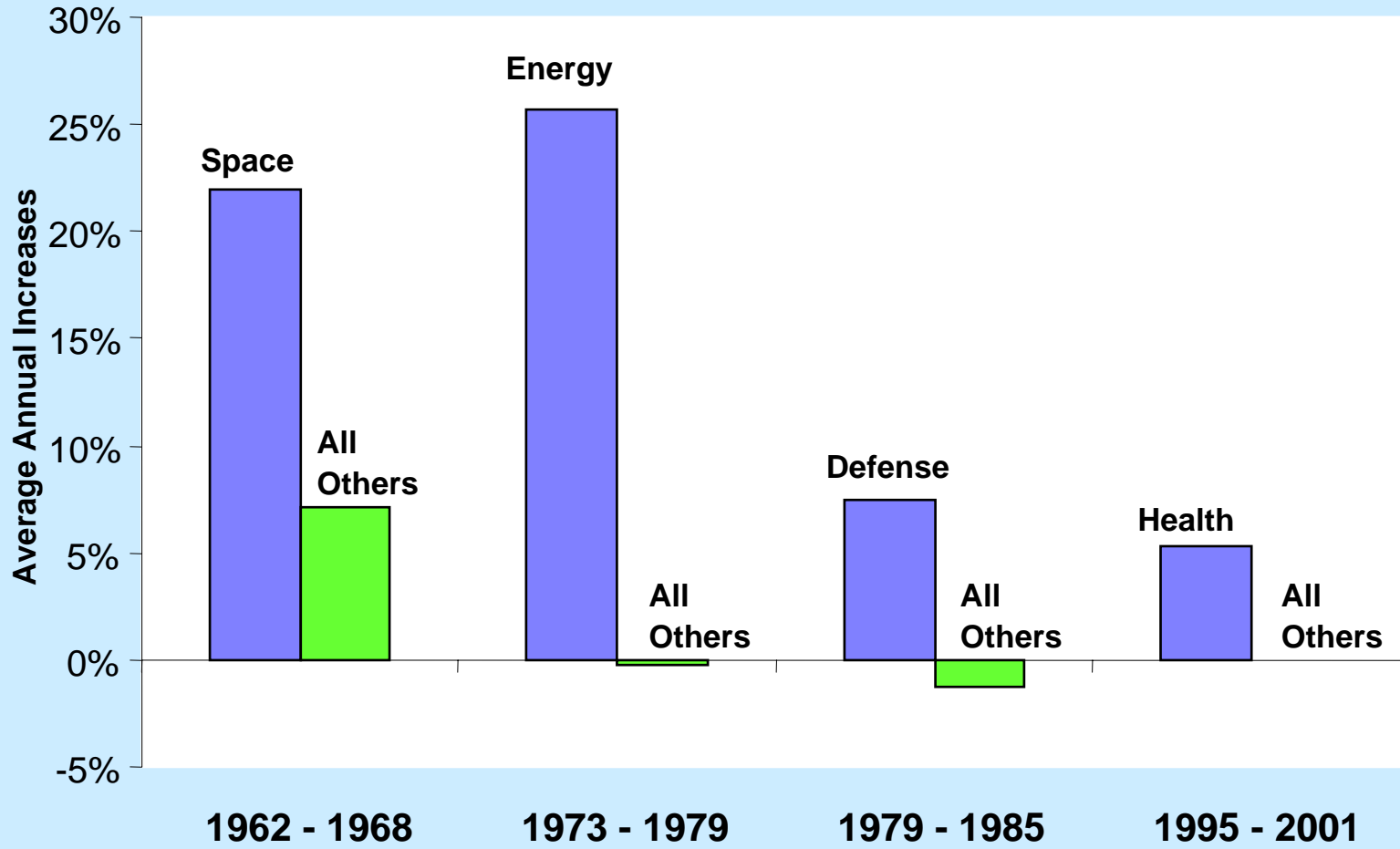
w/ Direct S&T Coupling



- 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

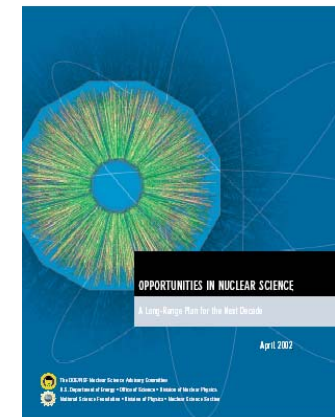
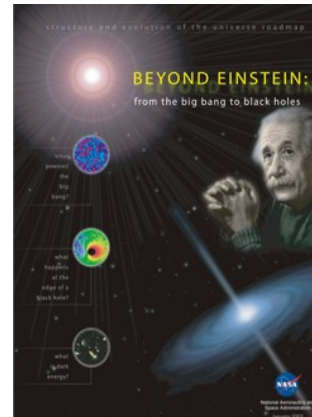
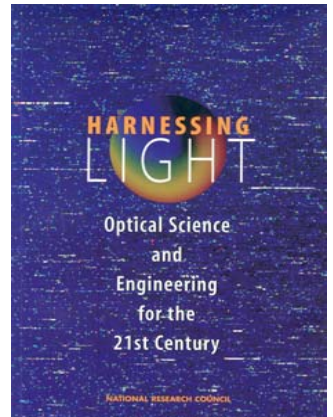
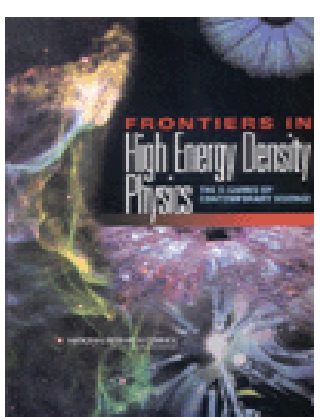
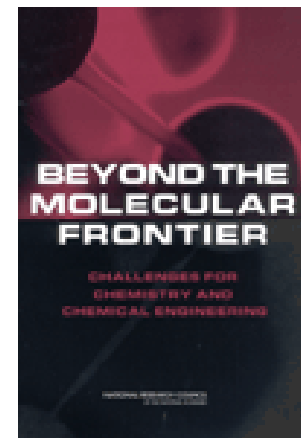
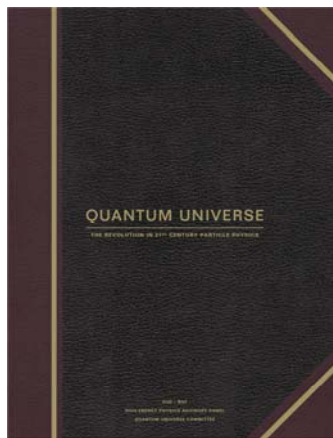
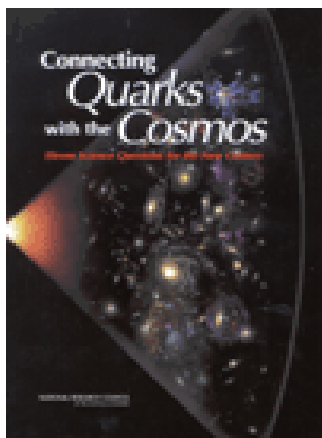
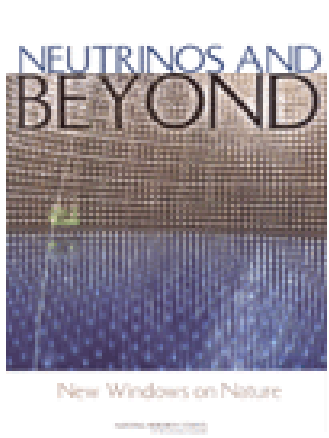
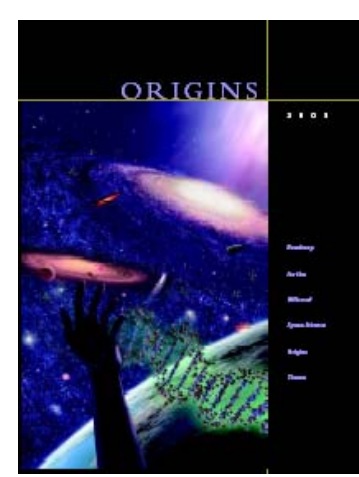
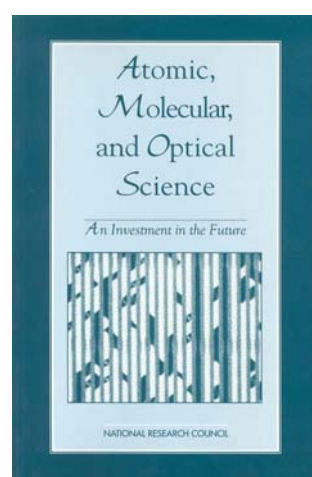
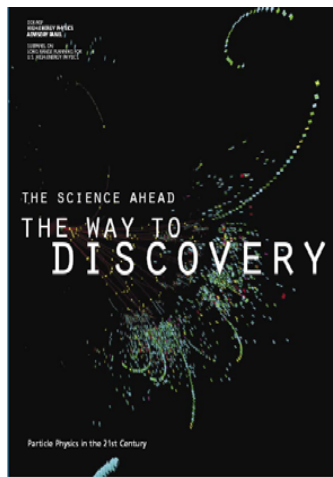
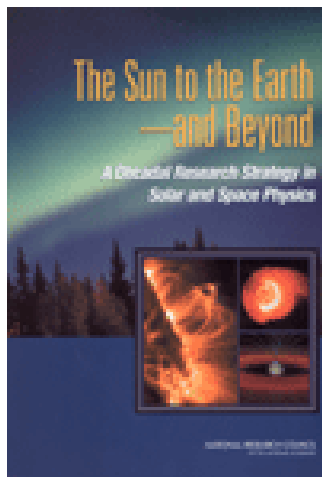
(obligations, in 1996 constant dollars)



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

Major Facilities for Materials Research and Related Disciplines

Major Materials Facilities Committee
Commission on Physical Sciences, Mathematics, and Resources
National Research Council

NATIONAL ACADEMY PRESS
Washington, DC 1984

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

Seitz-Eastman, 1984

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

United States Government Department of Energy

memorandum


DATE: January 22, 1986
REPLY TO: MA-22
ATTN OF: MA-22
SUBJECT: Secretarial Site Selection Decisions on Specific Energy Research Projects

TO: The Record

My memorandum of October 21, 1985, prescribes the procedures for Secretarial site selection decisions.

As part of the Internal Review Budget process for FY 1987, as an exception, and in accordance with the Scientific Facilities Initiative, four specific Energy Research projects were sited. These senior management site decisions were made to maintain the technical viability among the Department of Energy laboratories. They are:

- o Relativistic Heavy Ion Collider, Brookhaven National Laboratory, Total Estimated Cost (TEC) (FY 1984 dollars): \$120-\$150 million.
- o One to Two GeV Synchrotron Radiation Source, Lawrence Berkeley Laboratory, TEC: \$80-\$90 million.
- o Six GeV Synchrotron Radiation Source, Argonne National Laboratory, TEC: \$200-\$250 million.
- o Advanced Steady State Research Reactor, Oak Ridge National Laboratory, TEC: \$250-\$350 million.


J. F. Salgado
Under Secretary

JAS PROGRESS
SECRET

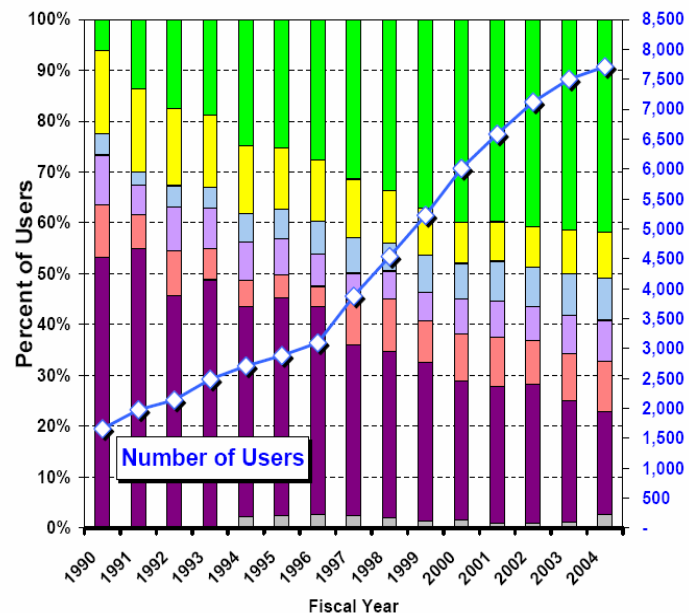
cc:
Assistant Secretary, Management and Administration
Assistant Secretary for Environment, Safety and Health
Director of Energy Research
Director of Administration
Director of Project and Facilities Management

860069

Highly Productive Suite of DOE Light Sources



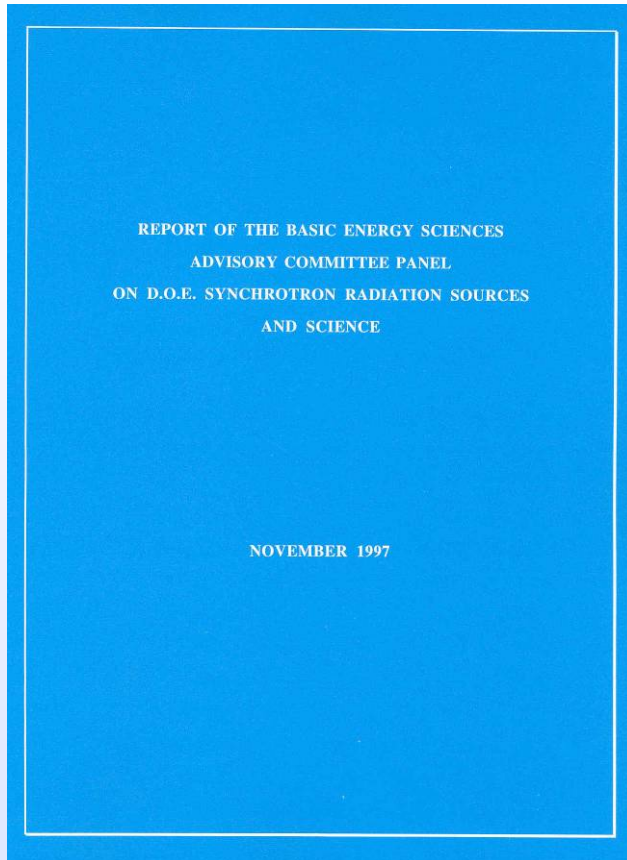
User Profile by Discipline of Experiments



- Life Sciences
- Materials Sciences
- Optical/General Physics
- Chemical Sciences
- Geosciences & Ecology
- Applied Science/Engineering
- Other

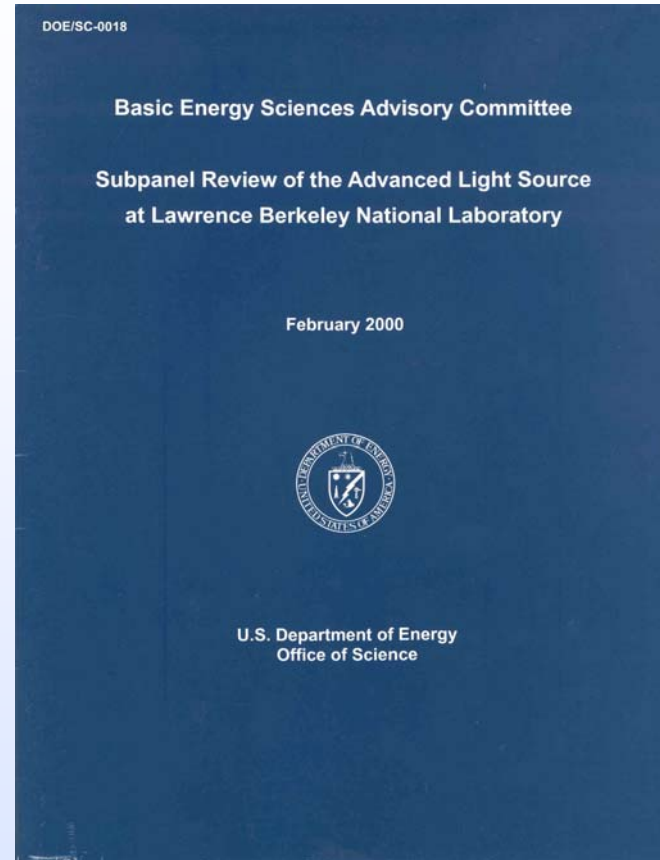
SSRL, NSLS: pre-existing
 APS, ALS: “Trivelpiece Plan”

...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 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

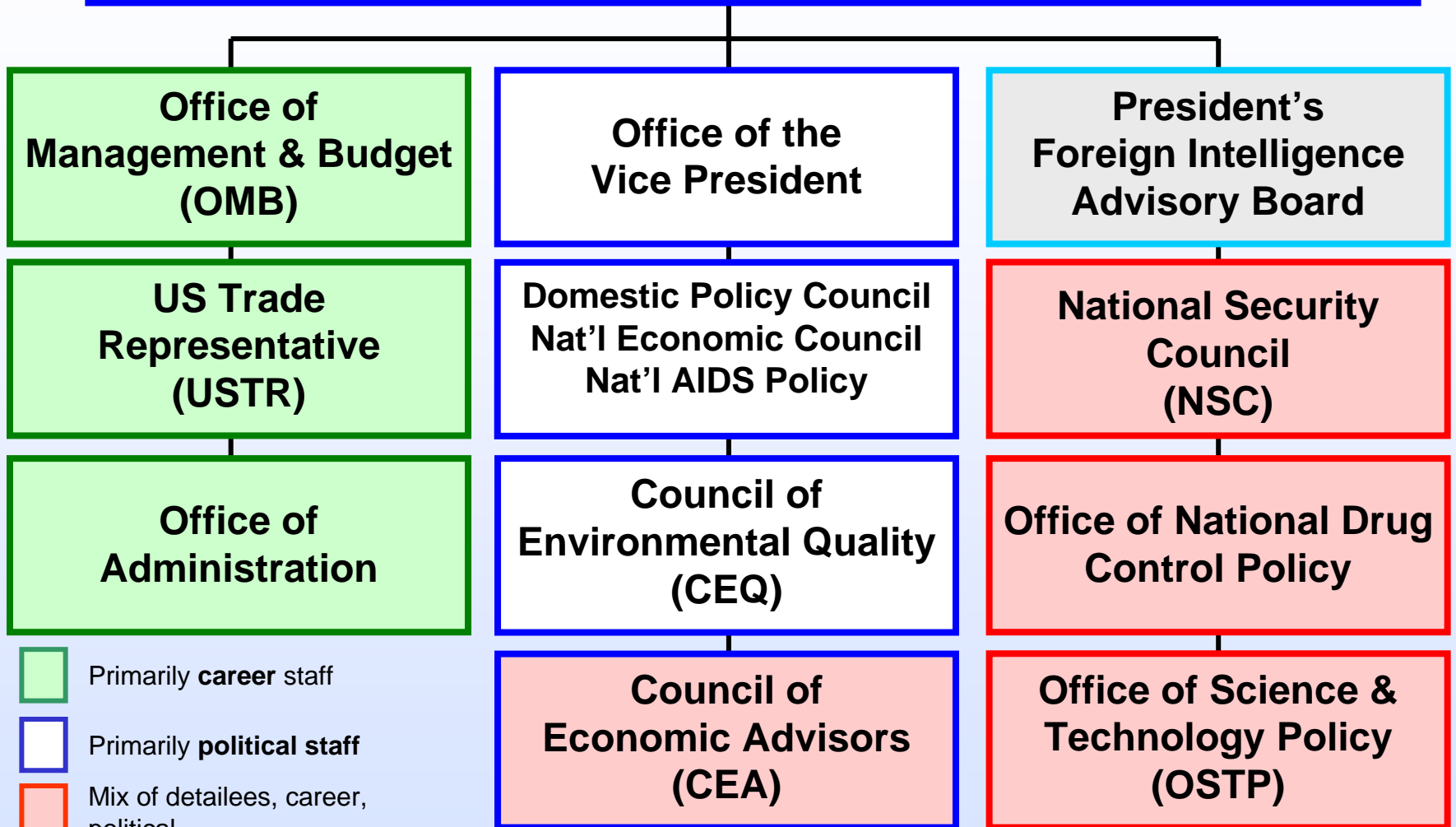
- How does the program further agency mission and administration priorities?
- How does science advance the program’s objectives?
- How does the science impact or strengthen other programs or related activities across the Government?
- How has the program been managing and performing?
- What have we 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)



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

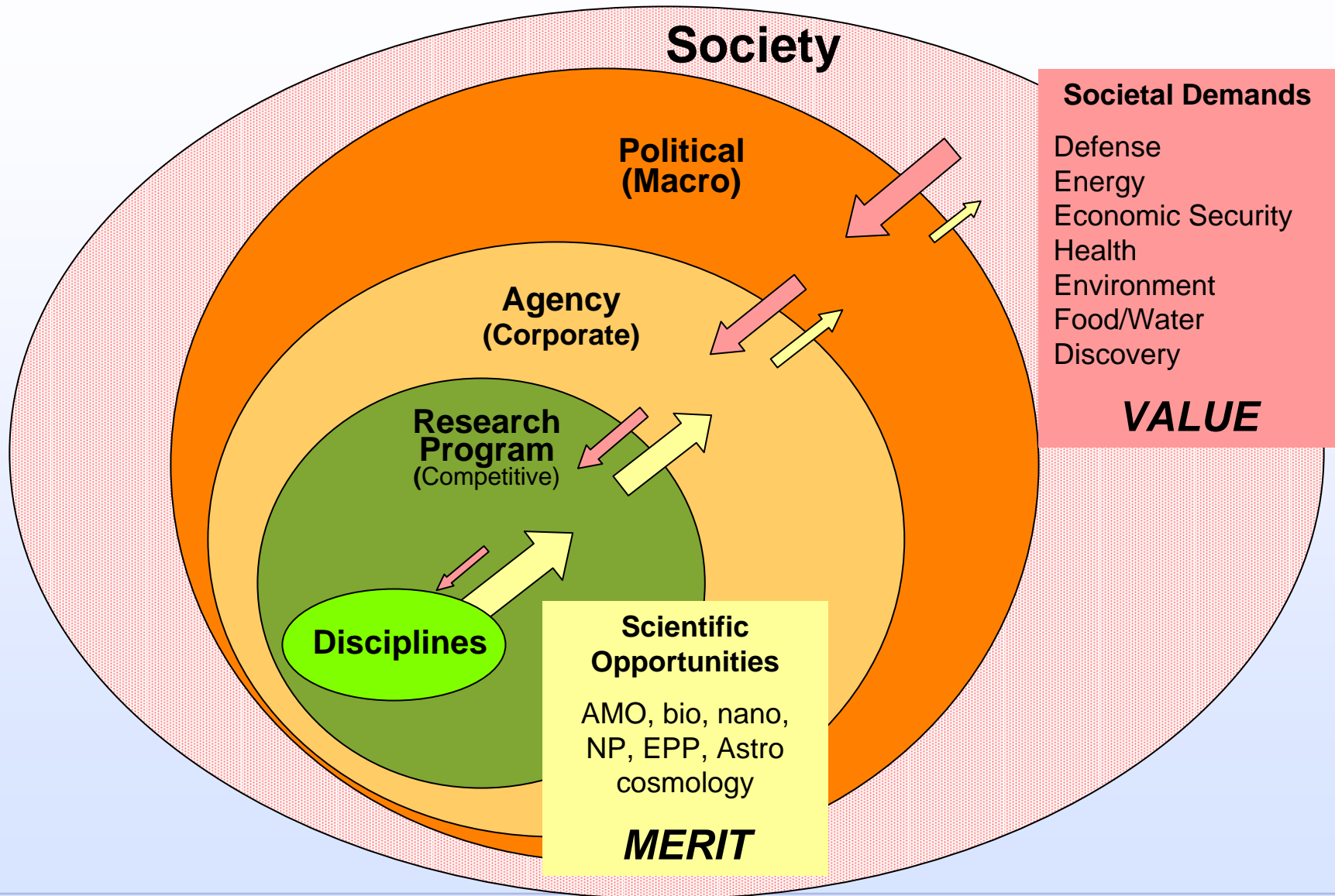
- ◆ Linear Algebra Libraries
- ◆ Scientific Computing & Network Testbeds
- ◆ Advanced Computer Science
- ◆ Applied Mathematics
- ◆ Advanced Computing Facilities
- ◆ Advanced Computing Software

My degree

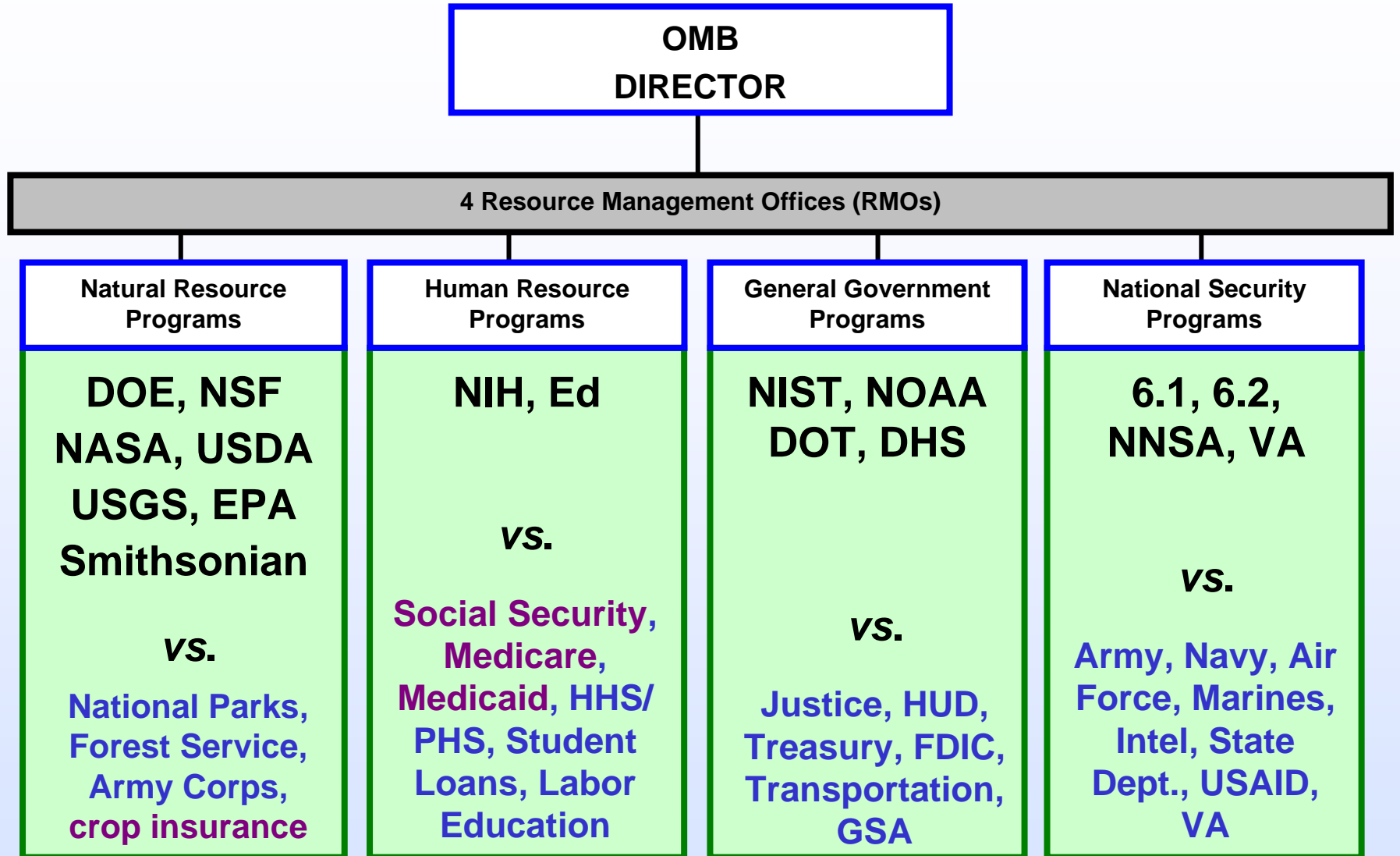
When I was at OSTP....



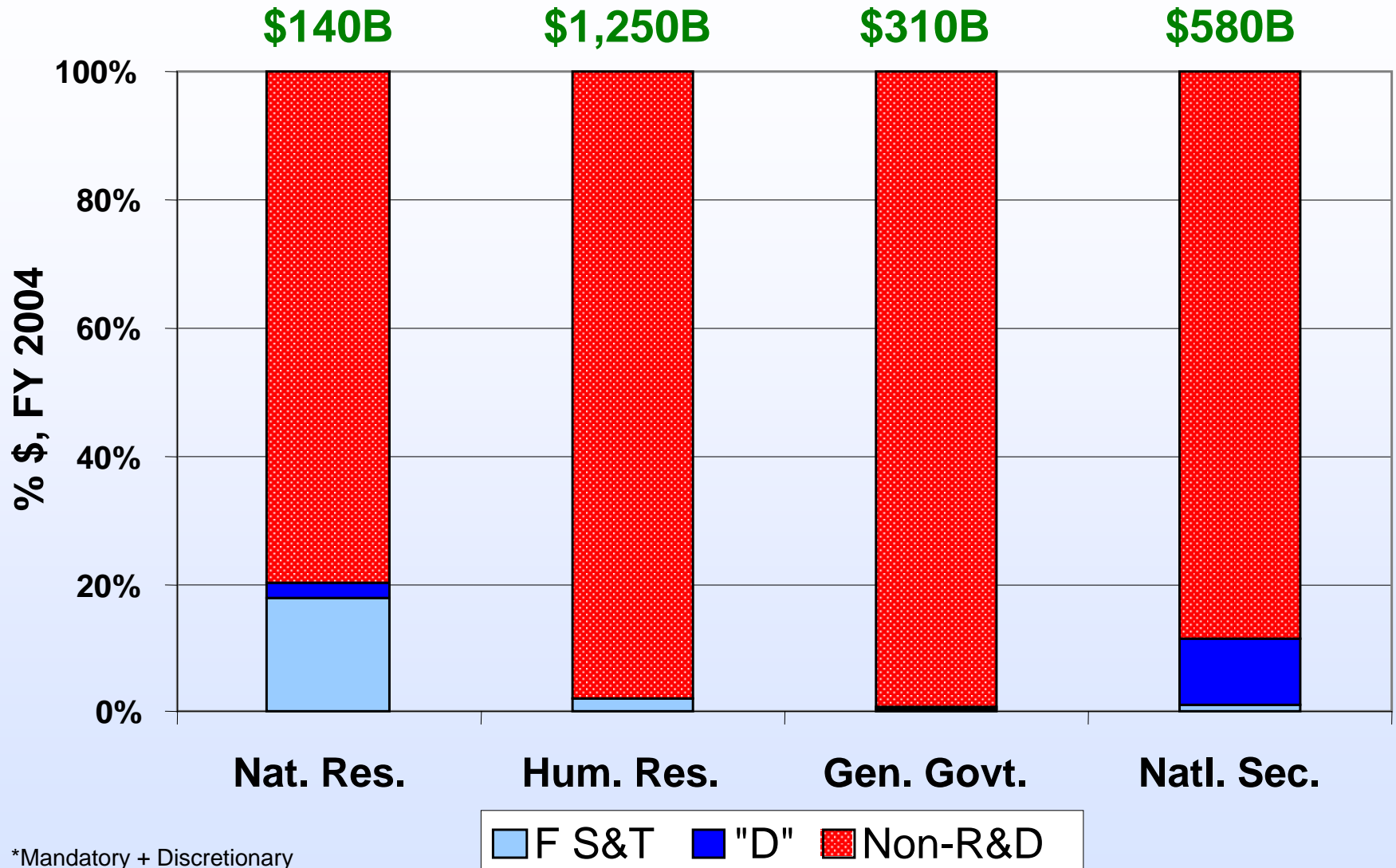
DC Sees Things Differently



Know Your Competitive Environment: White House



Are You a Big Part of Someone's Business Line? OMB PAD's *Total** Funds Spent on R&D



*Mandatory + Discretionary

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**

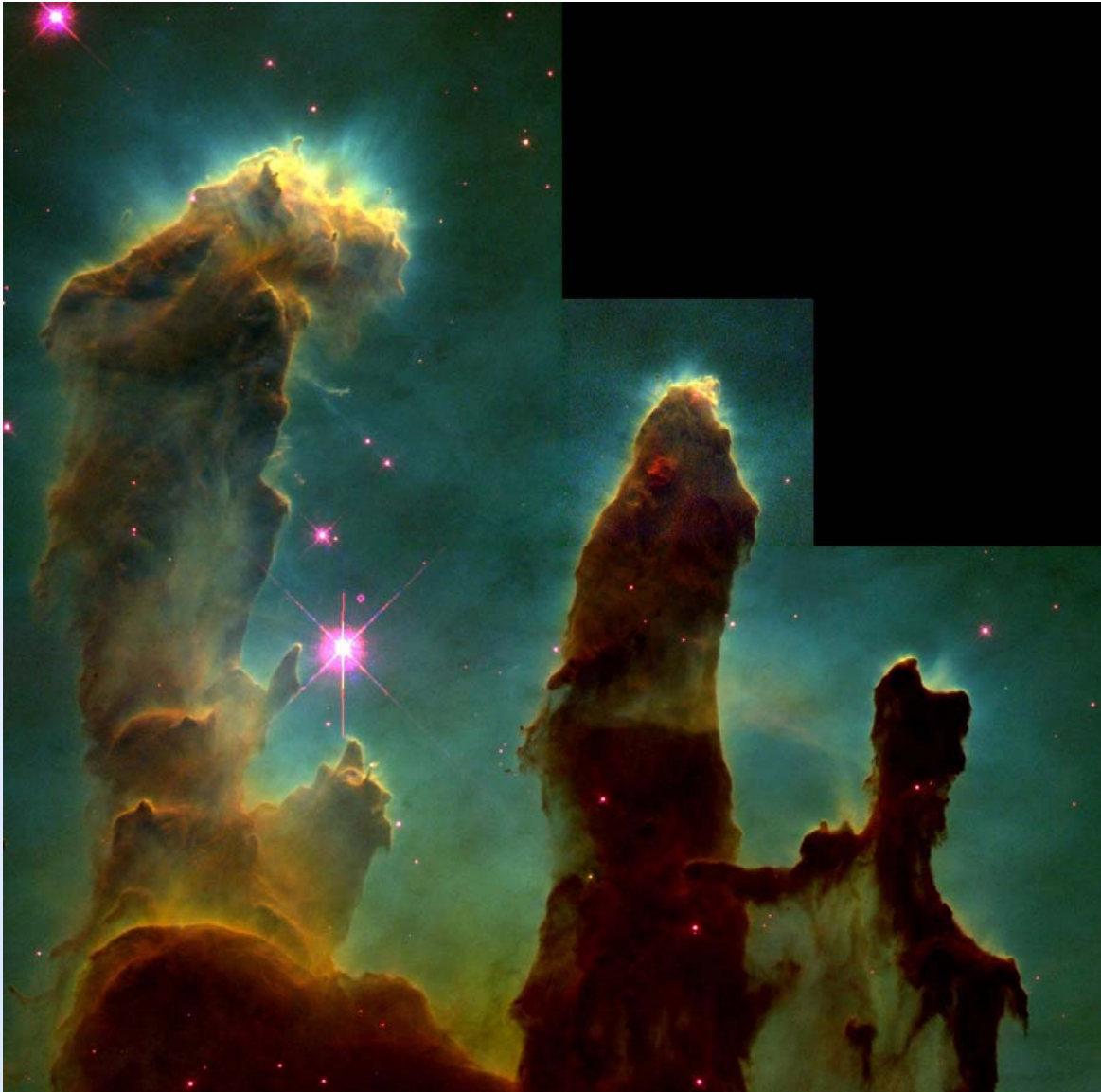
Defense

6.1, 6.2

VS.

**Army, Navy, Air
Force, Marines,
Weapons
Systems
Procurement,
Intelligence**

Craft a Compelling Story That Tells Us How to Think



**This is not a
data slide.**

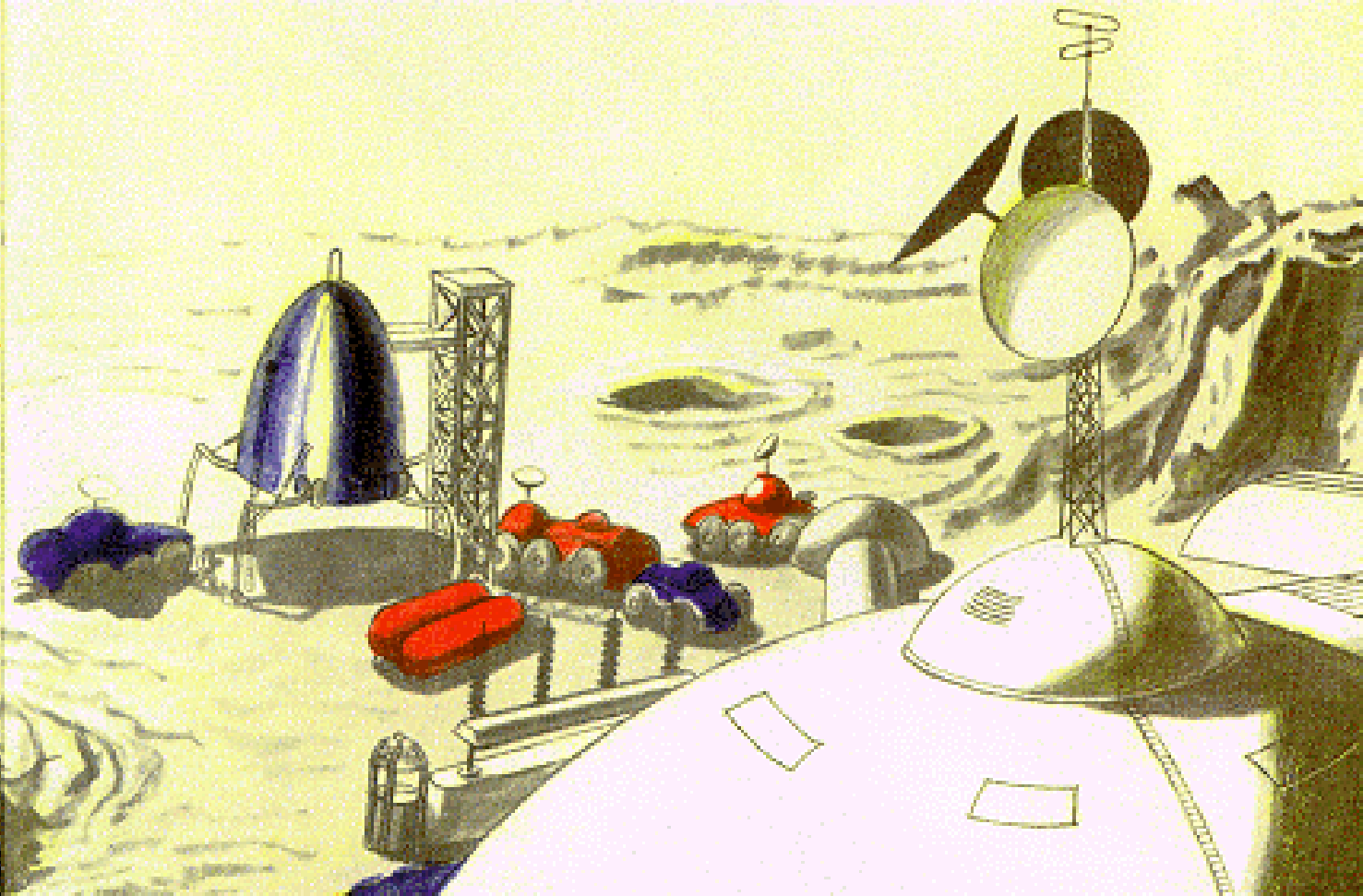
**Nor, is it
just a pretty
picture!**

You can see more from the top of this hill.

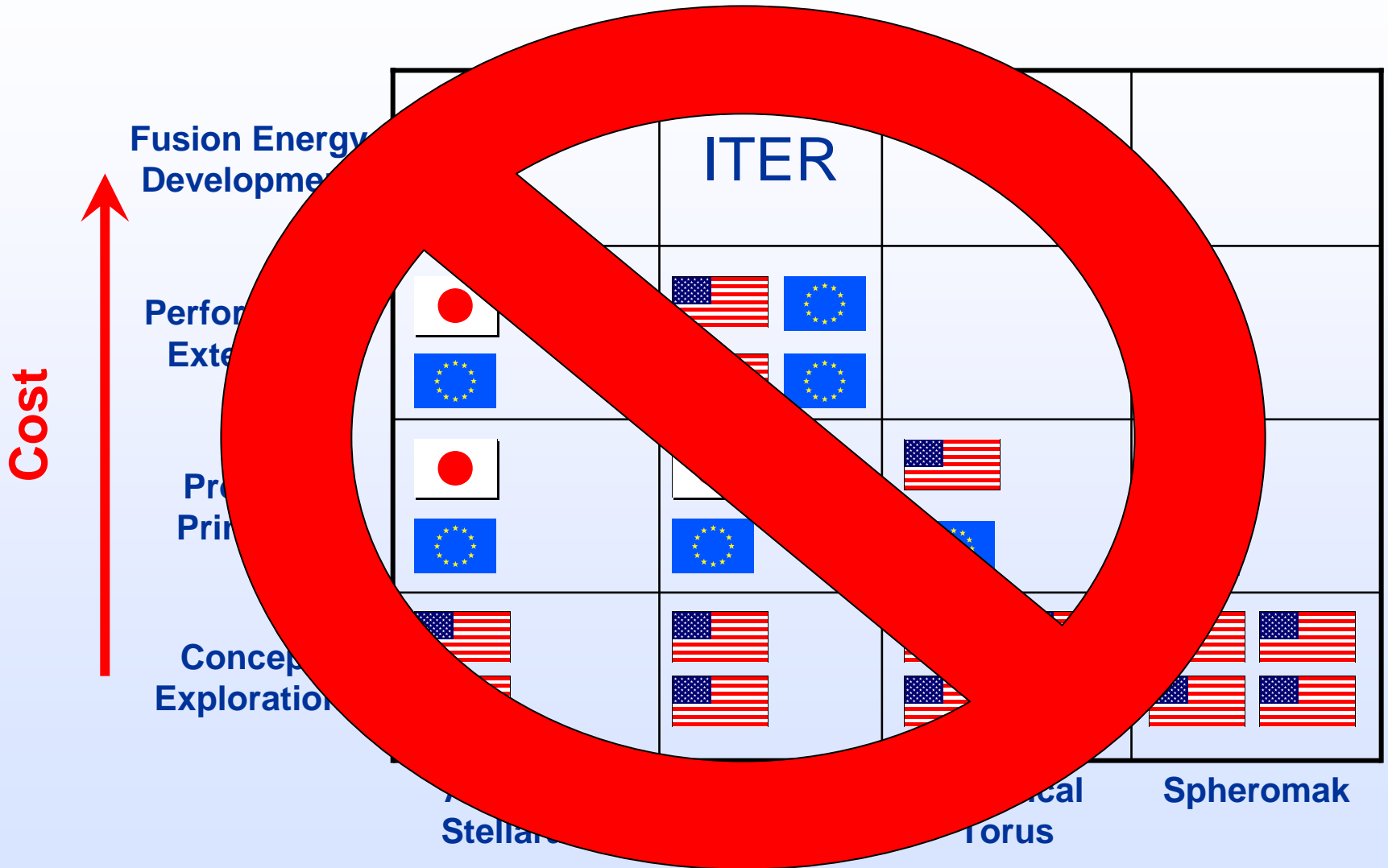
Look! Do you see that house?

That is the moon house.

That is where you will live on the moon.



FESAC *Priorities & Balance*



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

You can explain how any machine will address these central challenges

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

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/>