



U.S. DEPARTMENT OF
ENERGY

Office of
Science

HEP and the Federal Budget Process

June 6, 2017
HEPAP Meeting

Glen Crawford
Director, Research and Technology R&D
Office of High Energy Physics
U.S. Department of Energy, Office of Science

HEP Civics: The Federal Budget Process

- **This talk will “follow the money” in an aim to illuminate the DOE/HEP role in the Federal budget process**
 - Three phases of the budget process
 - DOE/HEP role in each phase
 - Lab/university/community roles in overall program
- **Along the way, highlight how the P5 report is having a significant impact in all phases of this process**
- **Aim is to give a useful overview, but it is not possible to capture the full details or history of each item discussed!**



BUDGET OF THE U.S. GOVERNMENT
*A New Foundation For
American Greatness*
Fiscal Year 2018

BUDGET OF THE U.S. GOVERNMENT
*A New Foundation For
American Greatness*
Fiscal Year 2018

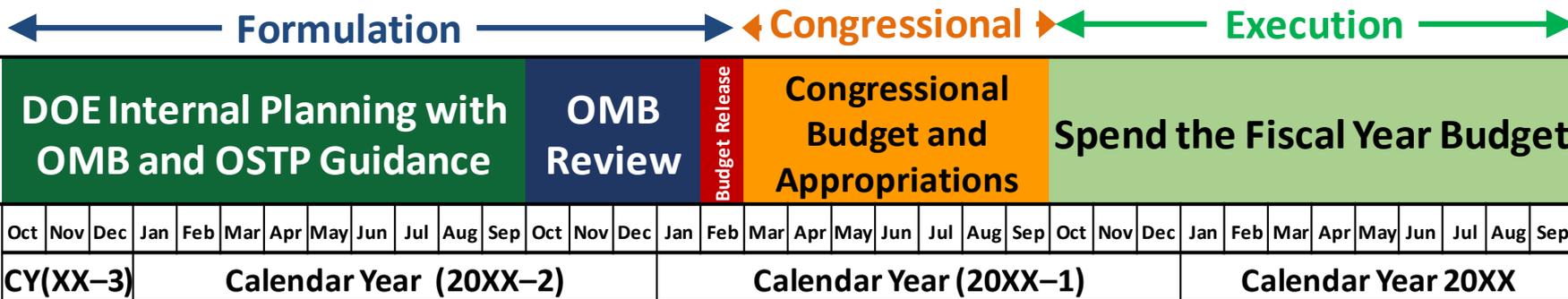


U.S. BUDGET PROCESS

Office of Management and Budget

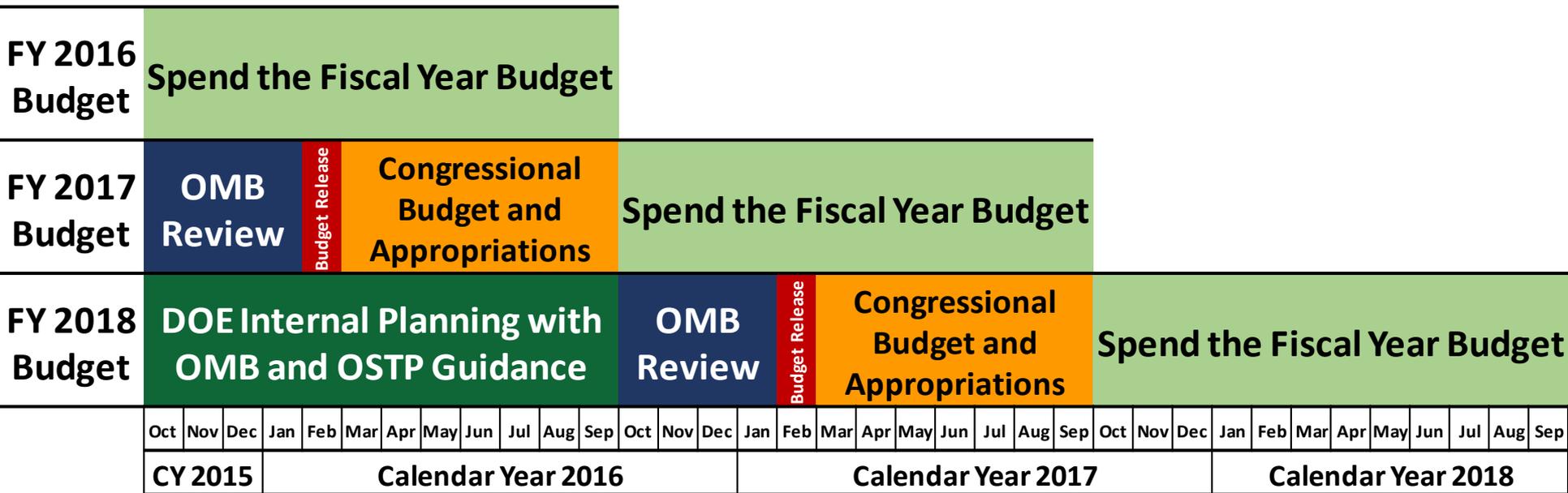
Three Phases of Budget Process

- **Formulation: Executive branch prepares the President's Budget Request**
 - White House Office of Management and Budget (OMB) controls this process, providing guidance to Executive branch agencies
- **Congressional: Enacts laws that control spending and receipts**
 - Congress considers the President's Budget proposals, passes a budget resolution, and enacts the regular appropriations acts and other laws that control spending and receipts
- **Execution: Executive branch agencies carry out program**
 - OMB apportions funds to Executive Branch agencies, which obligate and disperse funding to carry out their programs, projects, and activities



The U.S. Federal Budget Cycle

- Typically, three budgets are being worked on at any given time
 - Executing current Fiscal Year (FY; October 1 – September 30)
 - White House Office of Management and Budget (OMB) review and Congressional Appropriation for coming FY
 - Agency internal planning for the second FY from now

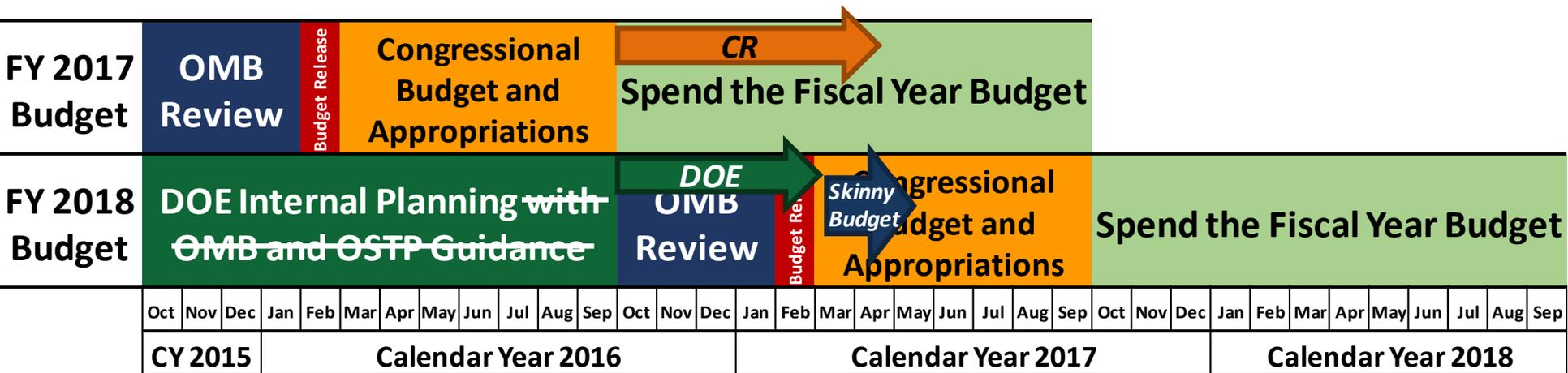


 *You are here*



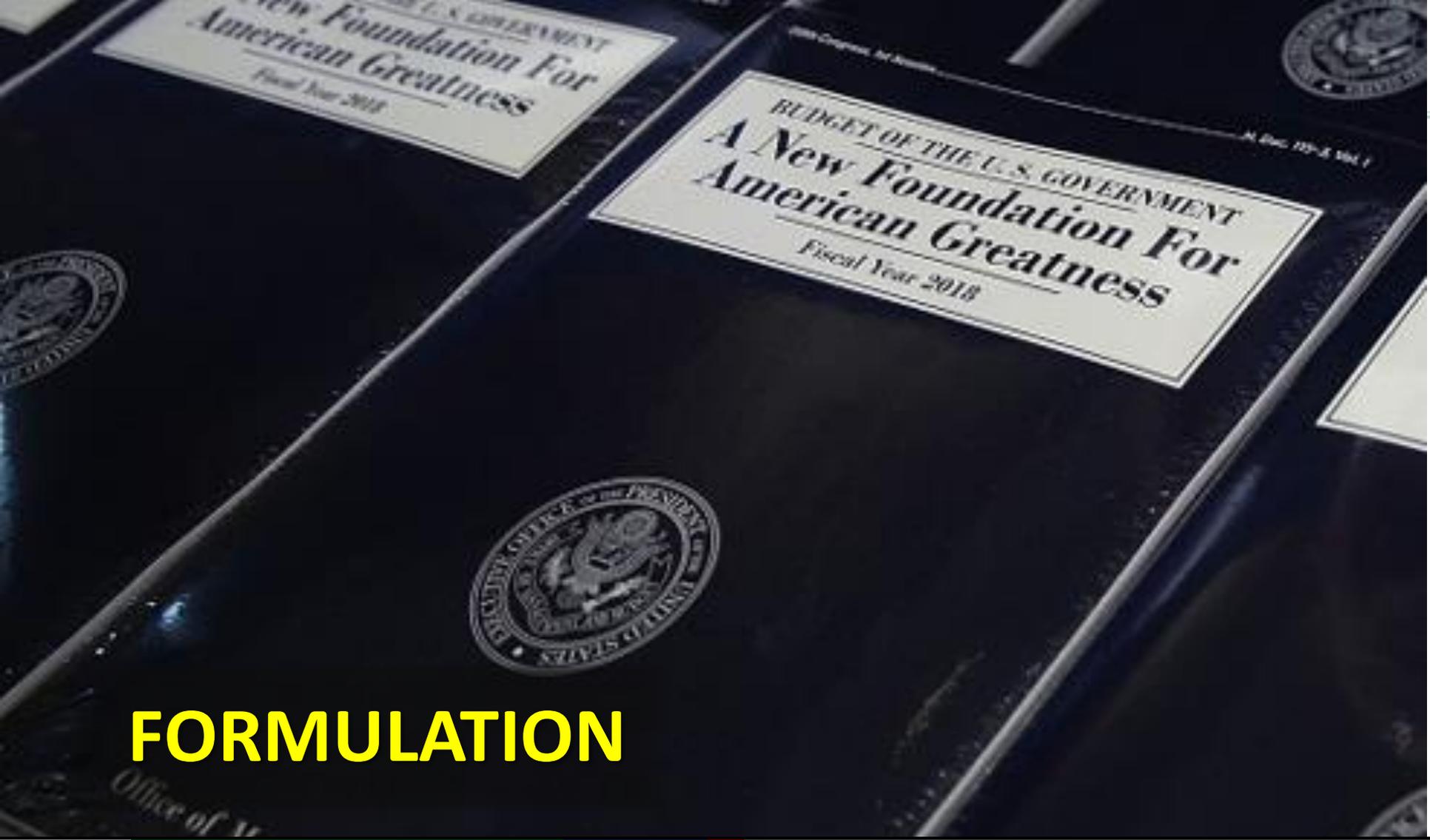
The U.S. Federal Budget Cycle

- This year's cycle is not "typical"
 - Congress used **Continuing Resolutions (CRs)** until passing an appropriation on May 5
 - White House released the **"skinny budget"** on March 13, guiding the budget formulation
 - FY 2018 **President's Budget Request** released on May 23
 - DOE planning for FY2019 not yet begun



 *You are here*





FORMULATION

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|-----------------------------------------------------|-----|------------------------|-----|-----|-----|-----|-----|-----|-----|---------------|-----|-----|----------------|-----------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| FY 20XX Budget | DOE Internal Planning with OMB and OSTP Guidance | | | | | | | | | | OMB Review | | | Budget Release | Congressional Budget and Appropriations | | | | | | | | | | | | Spend the Fiscal Year Budget | | | | | | | | |
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul |
| CY(XX-3) | | | Calendar Year (20XX-2) | | | | | | | | | | | | Calendar Year (20XX-1) | | | | | | | | | | | | Calendar Year 20XX | | | | | | | | |

Overview of Budget Formulation Process

- **OMB provides policy guidance for Executive branch agency budget requests**
 - Absent more specific guidance, agencies start with outyear estimates from previous budget
- **OMB works with agencies**
 - Identify major issues, develop plans for fall review, plan analysis of issues that will require decisions
- **OMB provides detailed instructions for submitting budget material**
- **Agencies submit budgets to OMB**
- **OMB reviews budget proposals**
 - Considers Presidential priorities, program performance, budget constraints
- **OMB provides recommended budget proposal to President and provides passback to agencies**
- **December: Agencies may appeal to OMB and the President**
- **January: Agencies prepare and OMB reviews final congressional budget justification materials**
- **February: President transmits budget to Congress**



Spring
Spring & Summer
June
Sept.
Fall
Late Nov.
Dec.
Jan.

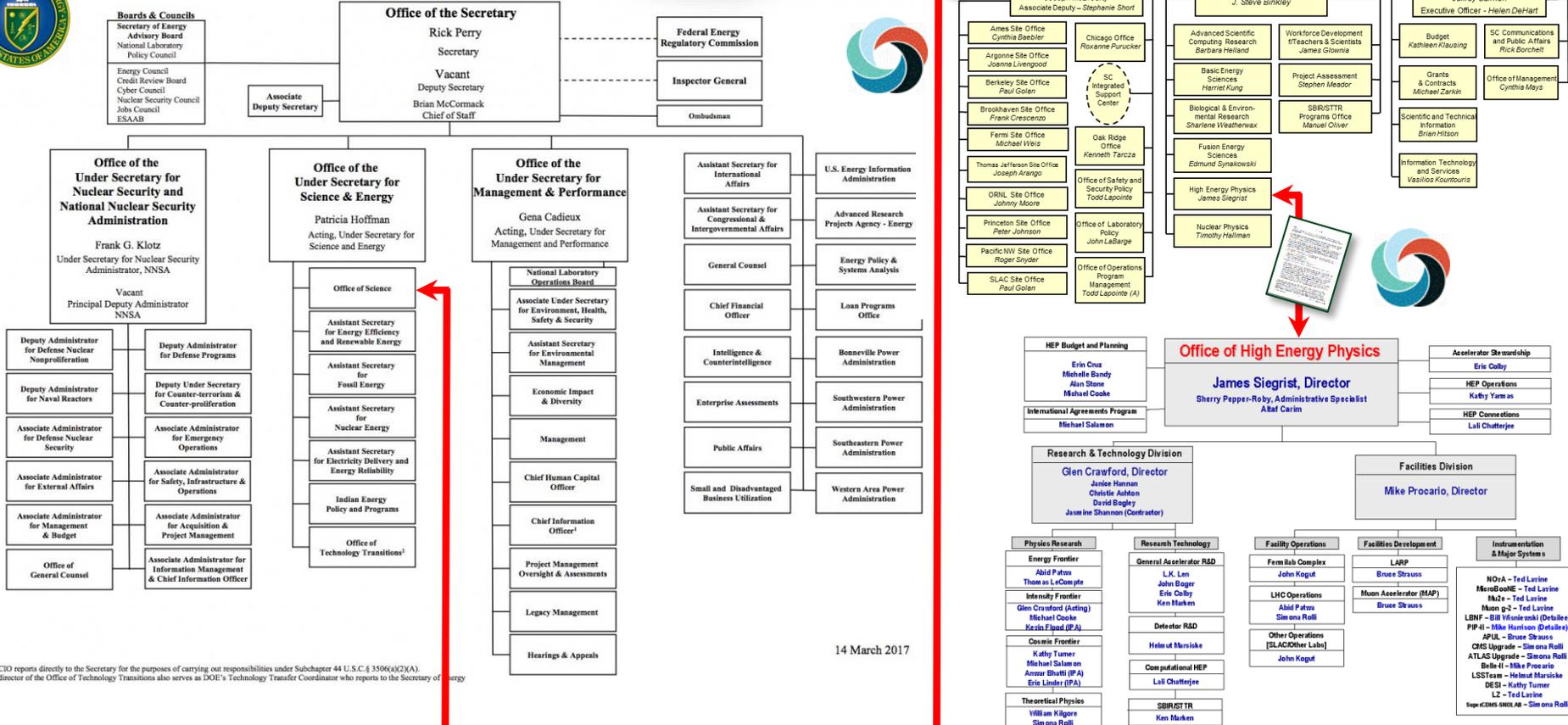


Path to the President's Budget Request



DEPARTMENT OF ENERGY

U.S. DEPARTMENT OF ENERGY Office of Science



¹The CIO reports directly to the Secretary for the purposes of carrying out responsibilities under Subchapter 44 U.S.C. § 3506(a)(2)(A).
²The director of the Office of Technology Transitions also serves as DOE's Technology Transfer Coordinator who reports to the Secretary of Energy.



U.S. DEPARTMENT OF ENERGY

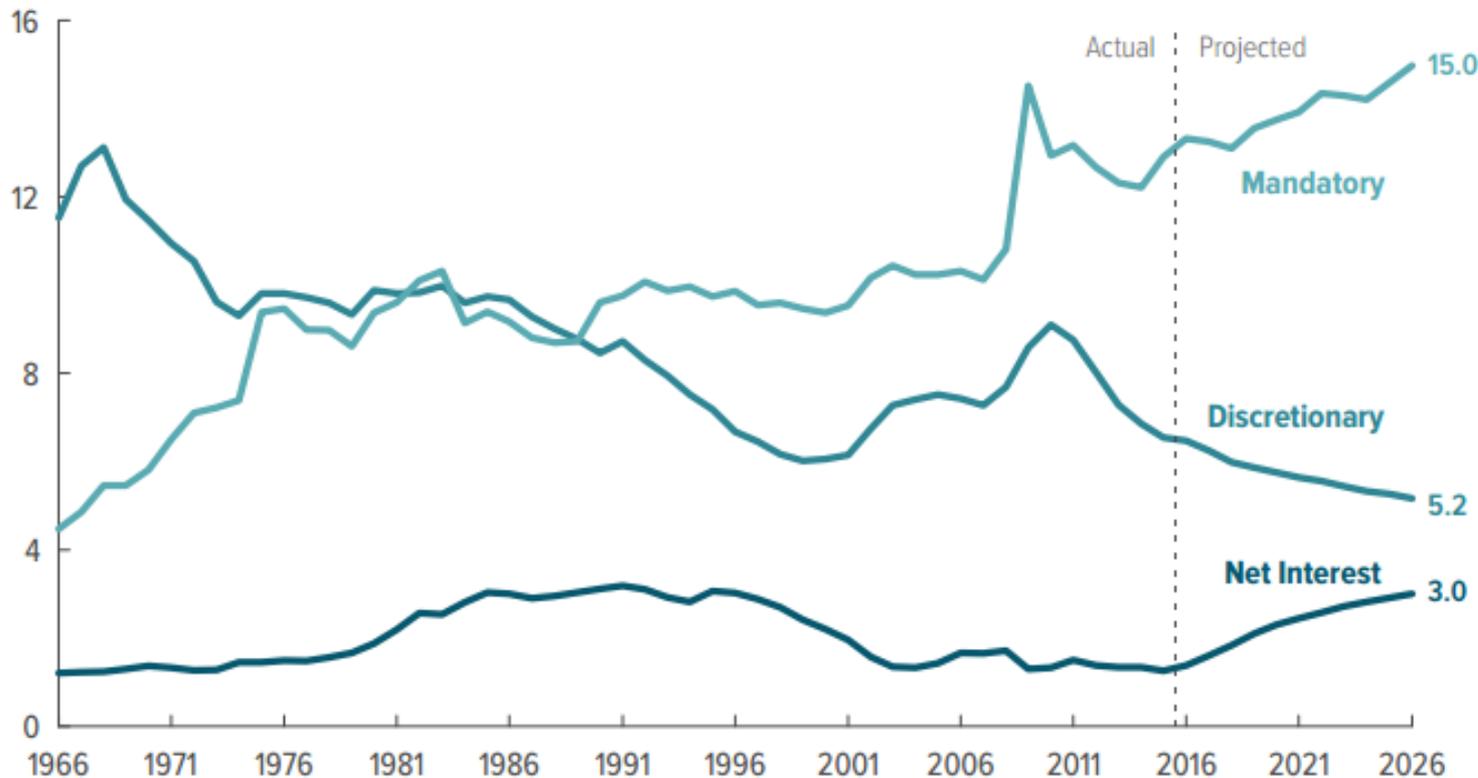
Office of Science

Congressional Budget Office Outlook

Outlays, by Type of Spending

Chart produced January 2015

Percentage of Gross Domestic Product



Under current law, rising spending for Social Security and Medicare would boost mandatory outlays.

Total discretionary spending is projected to fall relative to GDP as funding grows modestly in nominal terms.

At the same time, higher interest rates and growing debt are projected to push up net interest payments.





CONGRESSIONAL

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|-----------------------------------------------------|-----|------------------------|-----|-----|-----|-----|-----|-----|-----|---------------|-----|------------------------|-----|-----|-----------------------------------------------|-----|-----|-----|-----|------------------------------|-----|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| FY 20XX Budget | DOE Internal Planning with OMB and OSTP Guidance | | | | | | | | | | OMB Review | | | | | Congressional Budget and Appropriations | | | | | Spend the Fiscal Year Budget | | | | | | | | | | | | | | |
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug |
| CY(XX-3) | | | Calendar Year (20XX-2) | | | | | | | | | | Calendar Year (20XX-1) | | | | | | | | | | Calendar Year 20XX | | | | | | | | | | | | |

U.S. Budget and Appropriations Process



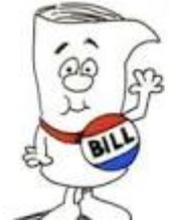
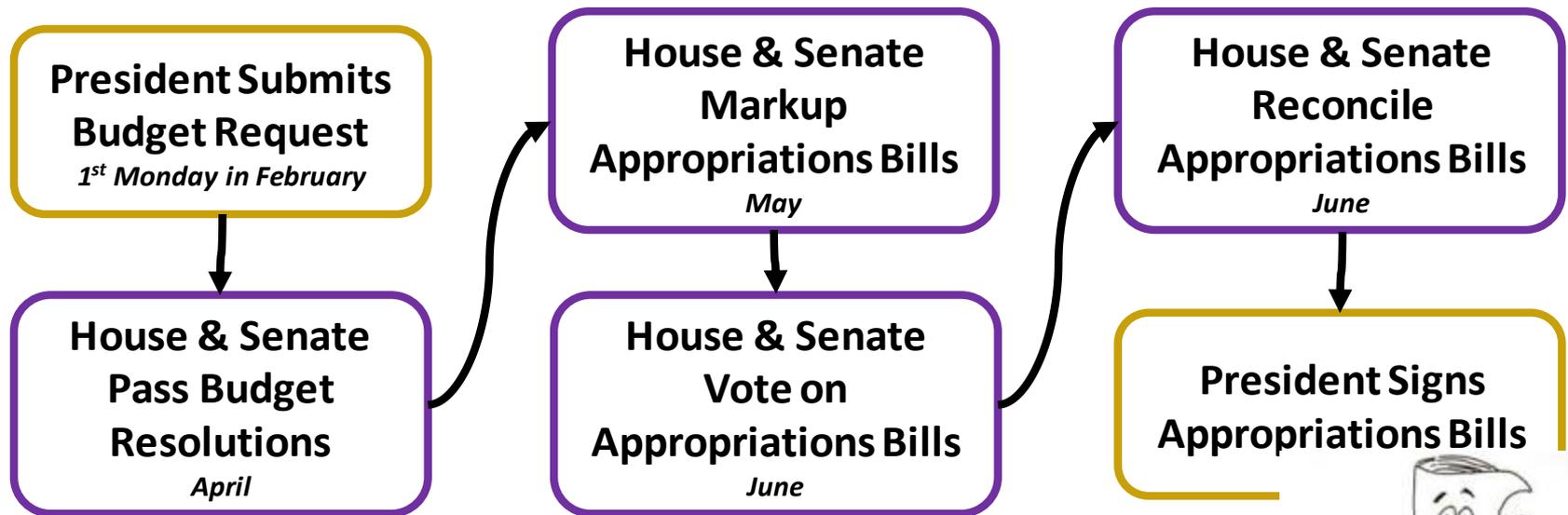
- President requests, but Congress “holds the purse”
- Congressional activity in this phase is a complex process!
- *Congressional Budget and Impoundment Control Act of 1974* establishes timetable for the budget process

| On or Before: | Action to be completed: |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 1 st Mon. in Feb. <6 weeks after PBR submitted | President submits his budget Committees submit views and estimates to Budget Committees |
| April 15 | Congress completes action on the concurrent resolution on the budget |
| May 15 | Annual appropriation bills may be considered in House |
| June 10 | House Appropriations Committee reports last annual appropriation bill |
| June 15 | Congress completes reconciliation |
| June 30 | House completes action on bills |
| October 1 | Fiscal year begins |



Congressional Budget Process

- **Budget Resolution**
 - Overall appropriation committee sets each subcommittee's allocation of spending authority for the next fiscal year and aggregate spending and revenue levels for 5 years
- **Authorization legislation**
 - May create or continue agencies, programs, or activities as well as authorize and recommend funding levels for the subsequent enactment of appropriations
- **Appropriation bills (must originate in House)**
 - 12 bills define discretionary spending and provide the funding for authorized agencies, programs, or activities
 - Energy and Water Development Subcommittee has jurisdiction over DOE



Appropriations Subcommittees

- **Agriculture, Rural Development, Food and Drug Administration, and Related Agencies**
- **Commerce, Justice, Science, and Related Agencies**
 - National Aeronautics and Space Administration
 - National Science Foundation
- **Defense**
- **Energy and Water Development**
 - Department of Energy
- **Financial Services and General Government**
- **Homeland Security**
- **Interior, Environment, and Related Agencies**
 - Specific portions of Department of Health and Human Services
- **Labor, Health and Human Services, Education, and Related Agencies**
 - Department of Health and Human Services (with above exceptions)
- **Legislative Branch**
- **Military Construction, Veterans Affairs, and Related Agencies**
- **State, Foreign Operations, and Related Programs**
- **Transportation, Housing and Urban Development, and Related Agencies**



HEP Role in Congressional Process

- **The budget narrative provides the justification for the level of support in the President's Budget Request** 
 - Narrative provides overview of the HEP program, highlights from the past year, and discussion of:
 - Line Item Construction, Major Items of Equipment, New Initiatives or New Starts, Facilities Operations, and Research program plans
 - Tables with detailed breakdown of funding for past year vs. current year vs. budget request
 - Explanation of changes for each line of budget table
- **Agencies usually invited to brief Congress on their budget request**
 - Opportunity to reinforce overall strategy and highlight key elements of the request
 - Recall that Congress must individually approve each DOE project >\$10M
 - Informational request for additional detail
 - Respond to requests regarding impact of alternative funding decisions



Department of Energy Research and Innovation Act

- Passed House under unanimous consent (voice vote) on January 24, 2017
- **SEC. 305. HIGH-ENERGY PHYSICS.**
 - (a) Sense Of Congress.—It is the sense of Congress that—
 - (1) the Director should incorporate the findings and recommendations of the report of the **Particle Physics Project Prioritization Panel entitled “Building for Discovery: Strategic Plan for U.S. Particle Physics in the Global Context”** into the planning process of the Department; and
 - (2) the **nations that lead in particle physics** by hosting international teams dedicated to a common scientific goal attract the world’s best talent and inspire future generations of physicists and technologists.
 - (b) International Collaboration.—The Director, as practicable and in coordination with other appropriate Federal agencies as necessary, shall ensure the access of United States researchers to the most advanced accelerator facilities and research capabilities in the world, including the **Large Hadron Collider**.
 - (c) **Neutrino Research**.—The Director shall carry out research activities on rare decay processes and the nature of the neutrino, which may include collaborations with the National Science Foundation or international collaborations.
 - (d) **Dark Energy And Dark Matter Research**.—The Director shall carry out research activities on the nature of dark energy and dark matter, which may include collaborations with the National Aeronautics and Space Administration or the National Science Foundation; or international collaborations.



Report Language Matters!

- Congress will usually specify top-line budget for a program and sometimes direct specific project or subprogram budget levels.
 - It is up to program management to make it work “*within available funds*”.
- **Example: HEP received \$825M in the FY 2017 Congressional Appropriation, about \$7M above the FY 2017 President’s Budget Request**
 - Congressional direction increased funding for specific MIEs/projects by \$9.9M
 - Difference (\$9.9M - \$7M = \$2.9M) has to come out of the rest of the program

DEPARTMENT OF ENERGY
(Amounts in thousands)

| | FY 2016 Enacted | FY 2017 Request | Final Bill |
|-----------------------------------------------------------------------------------------------|--------------------|--------------------|------------|
| ----- | | | |
| High energy physics: | | | |
| Research..... | 728,900 | 729,476 | 731,500 |
| Construction: | | | |
| 11-SC-40 Long baseline neutrino facility / deep underground neutrino experiment, FNAL..... | 26,000 | 45,021 | 50,000 |
| 11-SC-41 Muon to electron conversion experiment, FNAL..... | 40,100 | 43,500 | 43,500 |
| Subtotal, Construction..... | 66,100 | 88,521 | 93,500 |
| Subtotal, High energy physics..... | 795,000 | 817,997 | 825,000 |

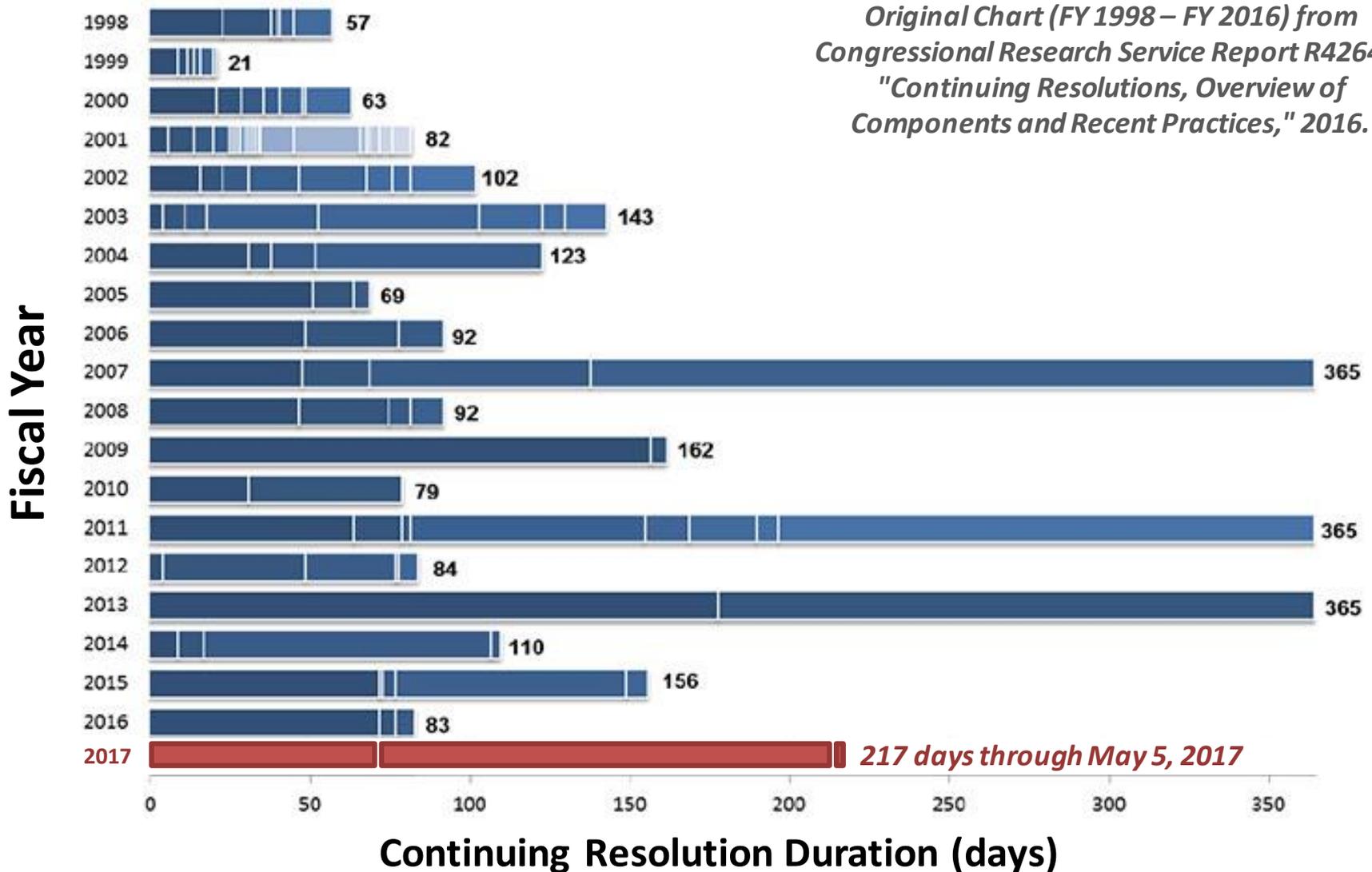


Breaking the Cycle: Continuing Resolution

- **If the U.S. Congress and the President have not passed all appropriations bills by September 30, a Continuing Resolution (CR) may be passed to avoid a U.S. Government shutdown**
 - Must pass some level of appropriations to have legal authority to spend money!
 - CRs typically extend level of funding from the previous year for a set amount of time *with no significant programmatic changes* (a.k.a. “no new starts”)
- **Therefore, a CR may impede the start of new projects**
 - Projects with total cost >\$10M must be approved by Congress in an appropriations bill before funding can begin
 - It is possible, though not typical, for CRs to include “anomalies” that would allow new starts
- **A CR may also impact the ramp-up of new projects**
 - DOE is committed to the successful execution of projects that have reached CD-2 and aims to provide the baseline funding profile
 - Projects that have not reached CD-2 are most likely to be impacted under a CR
- **A CR may also impact future-year planning through such effects...**



Duration of CRs: FY 1998 – FY 2017





EXECUTION

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|-----------------------------------------------------|-----|-----|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------------------------|-----|-----|-----|----------------|-----------------------------------------------|--------------------|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| FY 20XX Budget | DOE Internal Planning with OMB and OSTP Guidance | | | | | | | | | | | | OMB Review | | | | Budget Release | Congressional Budget and Appropriations | | | | | | Spend the Fiscal Year Budget | | | | | | | | | | | |
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul |
| | CY(XX-3) | | | Calendar Year (20XX-2) | | | | | | | | | Calendar Year (20XX-1) | | | | | | Calendar Year 20XX | | | | | | | | | | | | | | | | |

Budget Execution

- **Start from the general plan laid out in budget formulation, modified by the actual appropriation, taking into account:**
 - Strategic plan for program 
 - Available funding vehicles
 - Stewardship of DOE National Laboratories
 - Support for projects
 - Coordination with partners
- **Note that it typically takes some time to translate Congressional Appropriation into detailed agency-level budgets:**
 - Appropriations bills are long and detailed
 - If in a CR, have to resolve current spending level versus final Appropriation
 - Often there are “rescissions” and/or recovery of prior year balances
 - Occasionally there are internal contradictions or errors
 - Agency CFOs have to resolve all this and get agreement with OMB before issuing current FY “allotments” of budget authority



Funding Vehicles

- **DOE National Laboratories**

- Most are Government Owned/Contractor Operated (GOCO) Federally Funded Research and Development Centers (FFRDCs) and operate under Management and Operating (M&O) contracts
- Laboratory research is mission driven and funded through Field Work Proposals (FWPs)
 - Comparative reviews of the Lab Research programs held every 3-4 years
- **Laboratories propose yearly financial plans based on DOE guidance**
 - Mechanisms exist to tune funding each month

- **Universities**

- **Submit grant proposals in response to a Funding Opportunity Announcements (FOAs)**
 - Independent peer review informs the selection of awards
- Award is ~fixed once made, with typical funding cycle of 3 years
 - Funding adjustments (downward) are possible if circumstances change
 - Changes are also possible through submission of supplementary proposals



Typical FOAs & New Initiatives

- In recent years, there is one “continual” FOA (DOE/SC Open Solicitation) and these annual FOAs:
 - Research Opportunities in HEP (a.k.a. Comparative Review FOA)
 - Early Career
 - Accelerator Stewardship
- FOAs that launch new initiatives are informed through:
 - Strategic plans 
 - Whitepapers
 - Roundtables
 - Workshops or working groups



Coordination with Partners

- **Many HEP efforts are collaborative and mechanisms exist to make sure that this process goes smoothly and obligations are met**
 - Contributions between partners are typically in-kind
- **The White House Office of Science and Technology Policy (OSTP) ensures that the scientific and technical work of the Executive Branch is properly coordinated**
 - With oversight from OSTP, DOE/HEP coordinates closely with partner agencies, including NASA and NSF, through:
 - Memoranda of Understanding (MOU)
 - Joint Oversight Groups (JOGs)
 - Advisory panels
- **The U.S. State Department can authorize DOE to establish the framework necessary to work with international partners through:**
 - **Science and Technology Agreements (S&TA):** nation-to-nation agreements that acts as legal umbrellas for subsidiary agreements
 - **Implementing Arrangements (IAs):** agency-to-agency agreements for cooperation in broad areas of S&T
 - **Project Annexes (PAs):** Annexes to IAs are agreements that cover project- or subfield-specific cooperative activities



BUDGET OF THE U.S. GOVERNMENT
*A New Foundation For
American Greatness*
Fiscal Year 2018

BUDGET OF THE U.S. GOVERNMENT
*A New Foundation For
American Greatness*
Fiscal Year 2018



FOOTNOTES

Office of Management and Budget
U.S. GOVERNMENT PRINTING OFFICE: 2017

DOE Roles and Responsibilities

- **Certain functions are considered “inherently governmental” and reserved for Federal staff, including:**
 - Determination of agency policy, such as determining the content and application of regulations, among other things
 - Determination of Federal program priorities for budget requests
 - Determination of budget policy, guidance, and strategy
 - Approving, awarding and administering government prime contracts
 - Including determining what supplies or services are to be acquired with government funds
- **Moreover, since Federal staff are normally hired following civil service laws, there is a strong precept that contractors must not act as Federal staff and vice versa, e.g.:**
 - Government employees do not directly supervise contractors
 - Federal staff are generally not involved in contractor personnel decisions
- **For all intents and purposes, DOE labs are *prime contractors* and lab employees are *contractor employees***



Federal Employee Restrictions

- **Lobbying** (<http://energy.gov/management/lobbying>)
 - Generally prohibited from contacting or encouraging others to contact a state or federal legislator or executive branch official in an attempt to influence the enactment or modification of legislation or other specified activities
- **Partisan Political Activity** (<https://osc.gov/Pages/HatchAct.aspx>)
 - In general, executive branch federal employees may not:
 - Use official authority or influence to interfere with an election
 - Solicit or discourage political activity of anyone with business before their agency
 - Solicit or receive political contributions (may be done in certain limited situations by federal labor or other employee organizations)
 - Be candidates for public office in partisan elections
 - Engage in political activity while: on duty, in a government office, wearing an official uniform, or using a government vehicle
 - Wear partisan political buttons on duty
 - Certain employees (incl. Senior Executive Service) are further restricted!
- ***(And more...)***



DOE Lab Roles and Responsibilities

- **Facility Operations and Construction**

- Performance judged against specified metrics (e.g. pb^{-1} ; EVMS)
- Includes maintenance, upgrades, planning for new facilities
- User support

- **HEP Research and Technology R&D**

- Nurture and support HEP research collaborations to enable discovery science
- Participation in all phases – from design, construction, operations & analysis
- Particular emphasis on:
 - Management, design, construction and operation of HEP experiments
 - Integration of cross-cutting activities, *e.g.*: computation, simulation and theoretical research, in support of HEP program
 - Exploiting lab infrastructure and resources to develop next-generation particle accelerator and detector technologies for the advancement of HEP and science more broadly



University Roles and Responsibilities (DOE Perspective)

- **HEP Research and Technology R&D**
 - Contribute significantly to HEP research collaborations to enable discovery science
 - Participation in all phases – from design, construction, operations & analysis
 - Particular emphasis on:
 - Advanced training of students and postdocs
 - Data analysis and comparison with theoretical models
 - Vision and theoretical framework for understanding the Standard Model and beyond
 - Novel and innovative concepts and approaches
 - Design of future HEP experiments

HEPAP Roles (from Charter)

3. **Objectives and Scope of Activities.** The High Energy Physics Advisory Panel provides advice and recommendations to the Director, Office of Science (DOE), and the Assistant Director, Mathematical & Physical Sciences Directorate (NSF), on the national high energy physics program, which encompasses the conduct of experimental and theoretical high energy physics research and accelerator R&D. The Panel activities include:
 - a. periodic reviews of the program and recommendations of any changes considered desirable on the basis of scientific and technological advances or other factors such as current projected budgets and status of other international high energy physics efforts;
 - b. advice on competing long-range plans, priorities, and strategies for the national high energy physics program;
 - c. advice on recommended appropriate levels of funding to assure a world leadership position and to help maintain appropriate balance among the various elements of the program; and
 - d. advice on any issues relating to the program as requested by the Director, Office of Science (DOE), and the Assistant Director, Mathematical & Physical Sciences Directorate (NSF).
4. **Description of Duties.** The duties of the Panel are solely advisory in nature.



50 Years Ago...

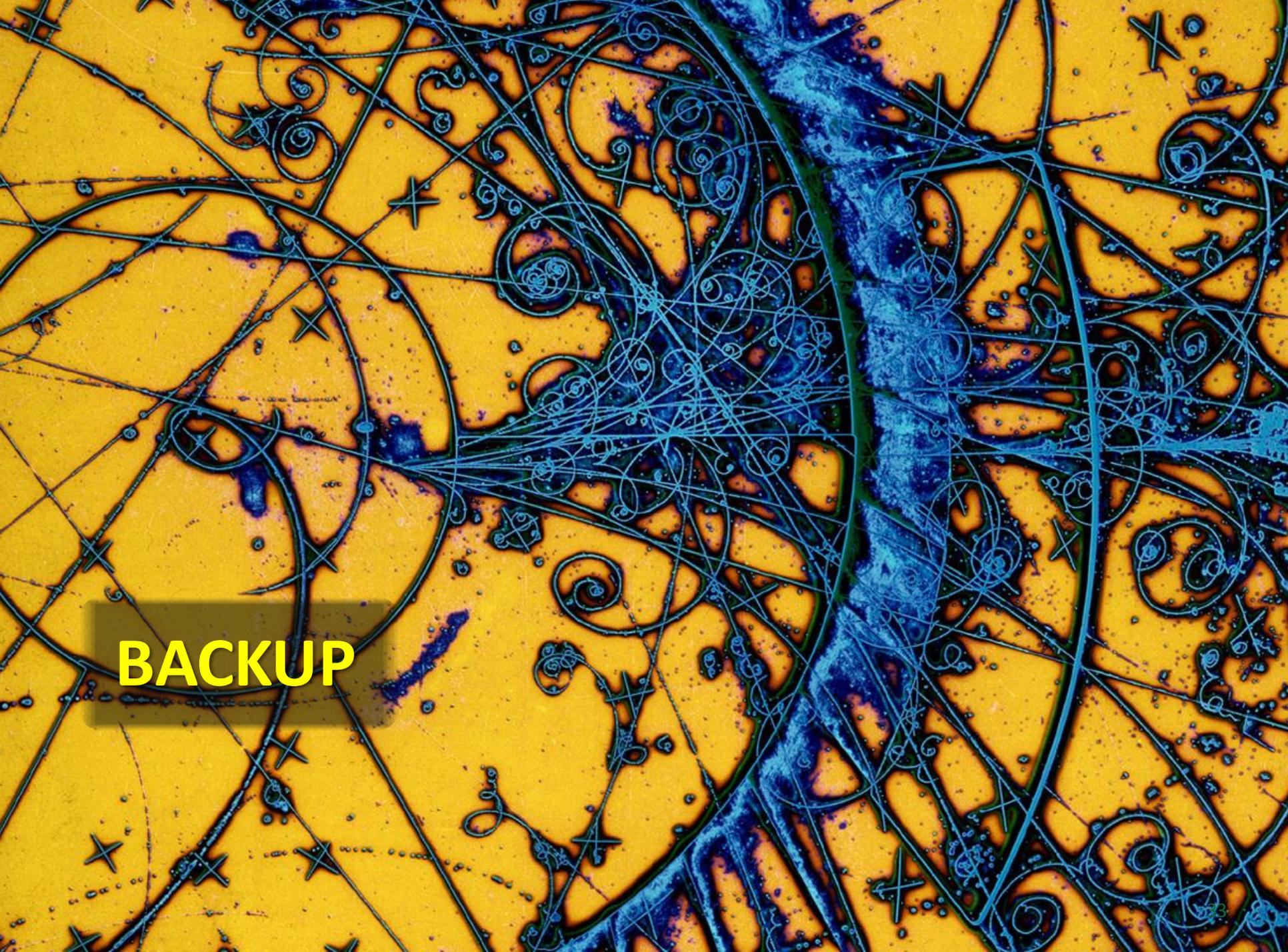
- **The First HEPAP meeting was Jan 29, 1967 (predates DOE!)**
- **The original HEPAP members:**
 - V. Weisskopf (Chair)
 - R. Cool
 - E. Fowler
 - L. Lederman
 - E. J. Lofgren
 - G. Pake
 - W. Panofsky
 - R. Sachs
 - K. Symon
 - R. Walker
 - R. R. Wilson
 - C. N. Yang
- **Always hard to live up to the original....**



Summary: Implementing the P5 Vision

- **The annual Federal budget process is long and complex**
 - Excursions from “standard order” are possible
 - The community-driven P5 strategy plays an important role in all phases of the process.
- **The process is continuous, but the response time to stimulus can be long**
 - In May 2014 (at time of P5 Report), the FY 2015 budget was already in Congress and the FY 2016 budget was being formulated.
 - Arguable the effects (success!) of the P5 plan were not fully seen until FY 2017 and are still in process
 - Conversely, it will take some time for impacts of eventual FY 2018+ budgets to play out in execution of the P5 plan
- **Community continues to play an important role in this process**
 - A long-term view is necessary to provide feedback in a context that is most helpful
 - HEPAP has a key role as federal advisory committee





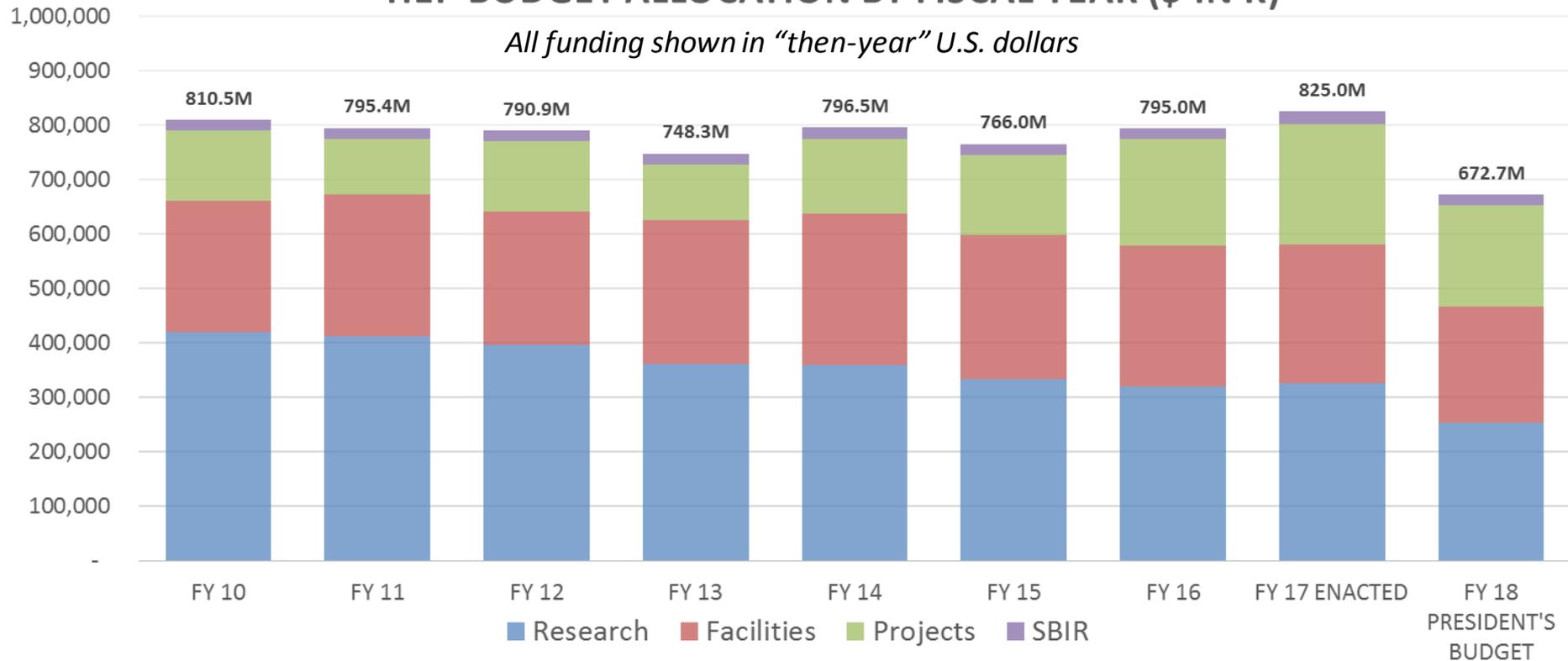
BACKUP

Overall HEP Budget Trend

- Enabling science results is typically a process that spans many years
- For a given experiment:
 - R&D (Research) → Project → Operations → Research

HEP BUDGET ALLOCATION BY FISCAL YEAR (\$ IN K)

All funding shown in "then-year" U.S. dollars



Creating the DOE HEP Budget Request

Top-down and bottom-up influences to the DOE HEP budget

