



U.S. DEPARTMENT OF
ENERGY

Office of
Science

Perspectives from the Office of Science

NSAC Meeting
16 July 2015

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Acting Director, Office of Science

Office of Science FY 2016 Budget Request to Congress

(Dollars in thousands)

	FY 2015		FY 2016		
	President's Request	Enacted Approp.	President's Request	House Mark	Senate Mark
SCIENCE					
Advanced Scientific Computing Research.....	541,000	541,000	620,994	537,539	620,994
Basic Energy Sciences.....	1,806,500	1,733,200	1,849,300	1,770,306	1,844,300
Biological and Environmental Research.....	628,000	592,000	612,400	538,000	610,000
Fusion Energy Sciences.....	416,000	467,500	420,000	467,600	270,168
High Energy Physics.....	744,000	766,000	788,000	776,000	788,100
Nuclear Physics.....	593,573	595,500	624,600	616,165	591,500
Workforce Development for Teachers and Scientists.....	19,500	19,500	20,500	20,500	19,500
Science Laboratory Infrastructure.....	79,189	79,600	113,600	89,890	113,600
Safeguards and Security.....	94,000	93,000	103,000	103,000	100,715
Program Direction.....	189,393	183,700	187,400	181,000	185,000
Subtotal, Science.....	5,111,155	5,071,000	5,339,794	5,100,000	5,143,877
Rescission of Prior Year Balances.....	-3,262	-4,717	-4,717
Total, Science Approp.....	5,111,155	5,067,738	5,339,794	5,095,283	5,139,160



HEWD

- *Nuclear Physics* (\$616.2M, \$20.7M above FY15 and \$8.4M below the request)
 - \$98M for construction of the Facility for Rare Isotope Beams at MSU, \$2M below the request and \$8M above FY15.
 - *Operations:*
 - \$100.17M for the 12GeV CEBAF Upgrade at TJNAF, same as the request
 - \$168.5M for RHIC operations at Brookhaven, \$2M above FY15 and \$6.4M below the request.

SEWD

- *Nuclear Physics* (\$591.5M, \$4M below FY15 and \$33M below the request)
 - \$95M for construction of the Facility for Rare Isotope Beams at MSU, \$5M below the request and \$5M above FY15.
 - *Operations:*
 - \$174.9M for RHIC operations at Brookhaven, \$8.4M above FY15 and \$2M above the request.



Program Planning in SC

Mission Need

- Executive branch priorities
 - Administration priorities
 - National Science and Technology Council (and WGs)
 - Office of Science and Technology Policy (and WGs)
 - Other Administration convened ad hoc WGs
 - Interagency coordination
 - Departmental priorities
 - DOE and program strategic plans
 - Quadrennial Technology Review/Quadrennial Energy Review
- Congressional branch priorities
 - Legislative authorities and annual appropriations

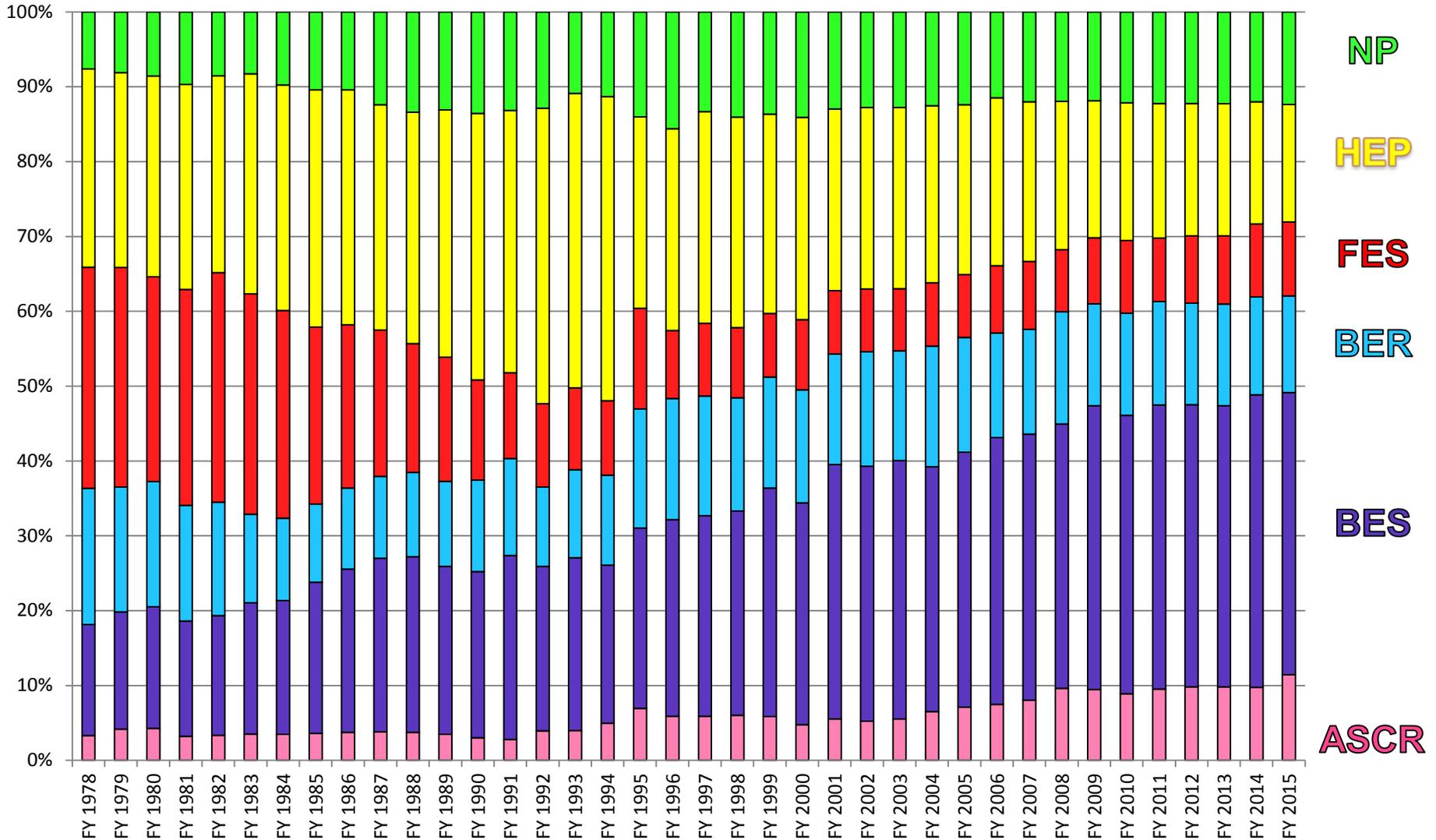
Scientific Opportunity

- Program priorities, via engagement of community experts and stakeholders
 - **Federal Advisory Committees***
 - DOE sponsored scientific and technical workshops/reports
 - Non-DOE (NRC, JASONS, ...) sponsored scientific and technical workshops/reports

** Virtually all major facilities and research programs in SC have roots in Federal Advisory Committee reports and recommendations.*



Major SC Program Funding (% of total) FY 1978-2015



Charges/Reports: ASCAC, 2013-present

Excludes COVs and special topics, e.g., workforce development

- 1. Determine potential synergies between the challenges of data-intensive science and exascale computing.** (Charge given July 25, 2012; *“Synergistic Challenges in Data-Intensive Science and Exascale Computing”* delivered March 2013).
- 2. Determine the 10 principal research challenges and the technical approaches (hardware and software) required to develop a practical exascale computing system.** (Charge given July 29, 2013; *“The Top Ten Exascale Research Challenges”* delivered February 10, 2014).
- 3. Review the Department's draft preliminary conceptual design for the Exascale Computing Initiative.** Specifically, determine whether there are gaps in DOE's plans or areas that need to be given priority or extra management attention. (Charge given November 19, 2014; preliminary report due March 30, 2015; final report due September 30, 2015).



Charges/Reports: BESAC, 2013-present

Excludes COVs and special topics, e.g., workforce development

1. Provide advice on the future of photon sources and science, considering both new science opportunities and new photon source technologies in parallel.

- Assessment of the grand science challenges that could best be explored with current and possible future SC light sources. The assessment should cover the disciplines supported by Basic Energy Sciences (BES) and other fields that benefit from intense light sources.
- Evaluation of the effectiveness of the present SC light source portfolio to meet these grand science challenges.
- Enumeration of future light source performance specifications that would maximize the impact on grand science challenges.
- Prioritized recommendations on which future light source concepts and the technology behind them are best suited to achieve these performance specifications.
- Identification of prioritized research and development initiatives to accelerate the realization of these future light source facilities in a cost effective manner.

(Charge given January 2, 2013; *“Report of the BESAC Subcommittee on Future X-ray Light Sources”* delivered July 25, 2013).

2. Revisit the BESAC 2007 “Challenges” Report (*“Five Challenges for Science and the Imagination”*) considering progress achieved, impact of the challenges on energy sciences, funding modalities, and new areas of basic research not described in the original report. (Charge given February 11, 2014; report requested in 2015.)



Charges/Reports: BERAC, 2013-present

Excludes COVs and special topics, e.g., workforce development

- 1. Recommend initiatives for field-based research (the so-called Integrated Field Laboratory) that capture a multi-disciplinary approach and build on observations and modeling: (1) define the criteria for selecting sites for future BER field-based research and (2) prioritize the sites identified or described.** As described by BERAC in 2013, the IFLs are highly instrumented laboratories that build on existing BER observational and modeling capabilities that serve to integrate and expand vertically (from the bedrock to the atmosphere) and geographically (across key geographic regions).

(Charge given September 23, 2014; draft report presented February 19, 2015; final report due fall 2015. This charge continues earlier BERAC charges that resulted in: *“Grand Challenges for Biological and Environmental Research: A Long-Term Vision”* December 2010; *“BER Virtual Laboratory: Innovative Framework for Biological and Environmental Grand Challenges”* February 2013)

Charges/Reports: FESAC, 2013-present

Excludes COVs and special topics, e.g., workforce development

- 1. Assess priorities among and within the elements of the magnetic fusion energy science program.** (Charge given April 13, 2012; “Report of the FESAC Subcommittee on the Priorities of the Magnetic Fusion Energy Science Program” delivered March 2013).
- 2. Develop a strategic plan for the Fusion Energy Sciences program** assuming several different funding scenarios that will ensure long-term U.S. leadership in the foundations of burning plasma science (the science of prediction and control of burning plasmas); long-pulse burning plasma science (the science of fusion plasmas and materials approaching and beyond ITER); and discovery plasma science (the science of laboratory plasmas and the high energy density state). (Charge given April 8, 2014; “*Report on Strategic Planning: Priorities Assessment and Budget Scenarios*” delivered December 2014).
- 3. Assess connections between research supported by the Fusion Energy Sciences program and other scientific disciplines and technological applications.** (Charge given February 4, 2015; report requested in 2015.)



Charges/Reports: HEPAP, 2013-present

Excludes COVs and special topics, e.g., workforce development

- 1. HEPAP via the P5 panel (i.e, the Particle Physics Project Prioritization Panel) should develop an updated strategic plan for U.S. high energy physics that can be executed over a 10-year timescale in the context of a 20-year global vision for the field.** Consider the recent discovery of the long-sought Higgs boson, the observation of missing among all three known neutrino types at unexpectedly large rates, and budgets that are more stringent than those considered by the previous P5 panel (2008). (Charge given September 2013; *“Building for Discovery: Strategic Plan for U.S. Particle Physics in the Global Context”* delivered May 22, 2014.)
- 2. Assess the accelerator R&D effort supported by the High Energy Physics program.** (Charge given June 10, 2014; *“Accelerating Discovery: A Strategic Plan for Accelerator R&D in the U.S.”* delivered May 18, 2015.)



Charges/Reports: NSAC, 2011-present

2015

-  Neutrinoless Double Beta Decay (NLDBD) Charge Letter ([March 30, 2015](#) ) (395KB))
-  Molybdenum-99 Annual Charge Letter ([March 10, 2015](#) ) (323KB))

2014

-  Isotope Research and Production Opportunities and Priorities Charge Letter ([April 23, 2014](#) ) (370KB))
-  Nuclear Physics Research Opportunities and Priorities Long Range Plan Charge Letter ([April 23, 2014](#) ) (459KB))
- Assessment of Workforce Development Needs Charge Letter ([February 2014](#) ) (236KB))
 - NSAC Workforce Report ([Jul 18, 2014](#) ) (1.2MB))
 - NSAC Workforce Transmittal Letter ([Jul 18, 2014](#) ) (70KB))
-  Molybdenum-99 Charge Letter ([December 2013](#) ) (469KB))
 - Molybdenum-99 Report ([May 8, 2014](#) ) (1.4MB))
 - Molybdenum-99 Transmittal Letter ([May 8, 2014](#) ) (104KB))
-  Neutrino-less Double Beta Decay Charge Letter ([December 2013](#) ) (466KB))
 - Neutrinoless Double Beta Decay Report ([April 24, 2014](#) ) (1.6MB))
 - Neutrinoless Double Beta Decay Report Transmittal Letter([May 6, 2014](#) ) (63KB))

2013

- Report to NSAC on Scientific Facilities ([March 2013](#) ) (850KB)) (Major Nuclear Physics Facilities for the Next Decade)
 - Transmittal Letter ([March 2013](#) ) (171KB))
-  Letter to the Facilities Charge ([December 2012](#) ) (790KB))
- Report to NSAC on the Committee of Visitors ([March 2013](#) ) (1.8MB))
 - Transmittal Letter ([March 2013](#) ) (61KB))
 - Committee of Visitors Charge Letter ([July 2012](#) ) (323KB))

Charges/Reports: NSAC, 2011-present

2012

Report to NSAC on Implementing the 2007 Long Range Plan ([January 2013](#)  (4.2MB))

Transmittal Letter ([February 2013](#)  (91KB))

Implementation of the Long Range Plan Charge Letter ([April 2012](#)  (1.2MB))

2011

Neutron Charge Letter ([PDF](#)  (439KB))

Transmittal Letter ([December 2011](#)  (169KB))

Report to NSAC of the Subcommittee on Fundamental Physics with Neutrons ([December 2011](#)  (1.4MB))

Public Access to Research Results Charge Letter ([Feb 2011](#)  (1.3MB))

Transmittal letter ([July 2011](#)  (147KB))

Report on Public Access to Research Results ([July 2011](#)  (323KB))

2010

COV Charge Letter ([July 2009](#)  (79KB))

Transmittal Letter ([March 2010](#)  (128KB))

Report of the Committee of Visitors of the Office of Nuclear Physics to the Nuclear Science Advisory Committee
([February 2010](#)  (410KB))

