U.S. DEPARTMENT OF ENERGY

OFFICE OF SCIENCE

Office of High Energy Physics
Budget Status

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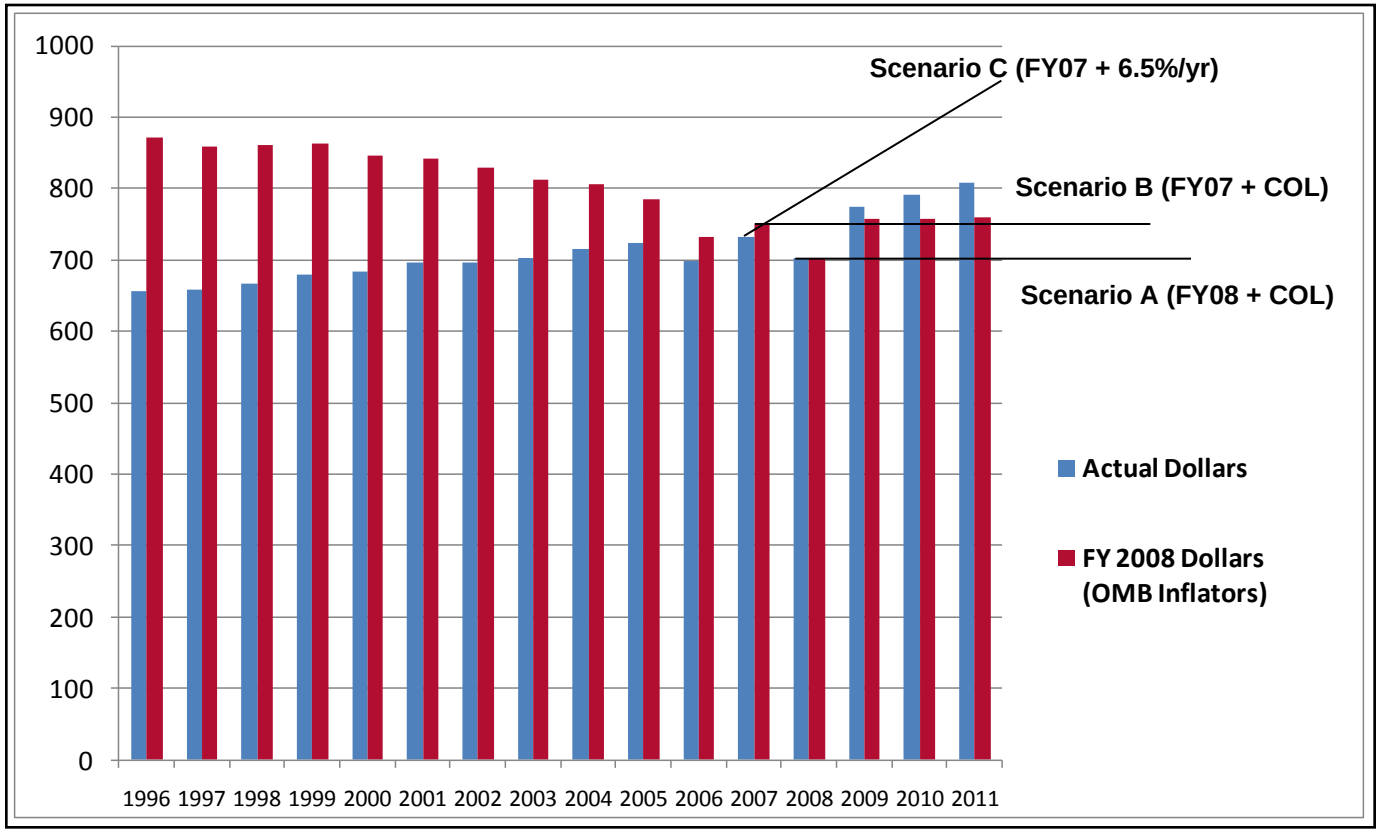
Dennis Kovar
Office of High Energy Physics
Office of Science, U.S. Department of Energy

FY 2009-2010 and FY 2011 Request change trend but need for above COL to implement the Plan

- HEP funding has been eroded by inflation: FY 2008 / FY 1996 ~ 20 % (OMB COL)

- HEP FY 2009 funding was +10 % compared to FY 2008 and above OMB Cost-of-Living (COL) from FY 2007
- HEP received 220.0 million in Recovery Act funding (additional $16.5 million Early Career)
- HEP FY 2011 Request is above OMB COL (+2.3 %) compared to FY 2010

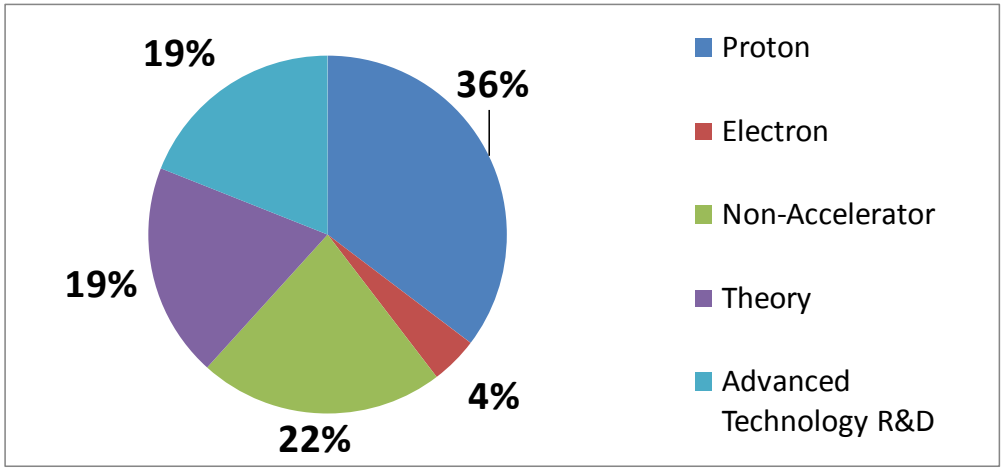


HEP FY 2010 Funding

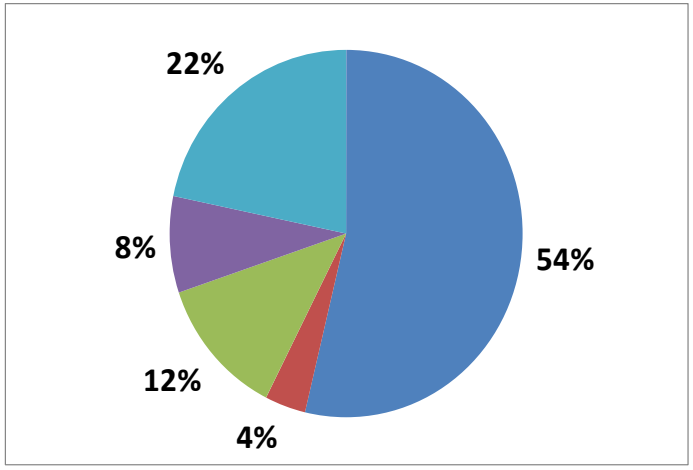
Budget Categories

Budget Categories	FY 2010 HEP Research		FY 2010 HEP Research, Projects and Operations	
Proton Accelerator-Based Physics	126.0	35%	435.4	54%
Electron Accelerator-Based Physics	15.3	4%	30.2	4%
Non-Accelerator Physics	78.8	22%	99.9	12%
Theoretical Physics	68.9	19%	68.9	9%
Advanced Technology R&D	67.6	19%	176.0	22%
High Energy Physics	356.6		810.4	
	44.0%			

Research Funding



Program Funding



HEP FY 2011 Budget Request

FY 2011 Request is a +2.3% increase compared to FY 2010 Appropriation

FY 2010 Appropriations were a +1.9% increase over FY 2009 Appropriations

(dollars in thousands)

	FY 2009 Current Appropriation	FY 2009 ** Current Recovery Act Appropriations	FY 2010 Current Appropriations	Delta	FY 2011 Request	Percent
High Energy Physics						
Proton Accelerator Based Physics	401,368	107,990	434,167	5,095	439,262	1.2%
Electron Accelerator Based Physics	32,030	1,400	27,427	-2,720	24,707	-9.9%
Non Accelerator Based Physics	101,138	4,445	99,625	-11,086	88,539	-11.1%
Theoretical Physics	66,148	5,975	66,962	2,562	69,524	3.8%
Adavanced Technolgy R&D	195,042 *	112,580	182,302	7,666	189,968	4.2%
Subtotal, High Energy Physics	795,726	232,390	810,483	1,517	812,000	0.2%
Construction	0	0	0	17,000	17,000	
Total, High Energy Physics	795,726 *	232,390	810,483	18,517	829,000	2.3%
			1.90%			

** The Recovery Act Current Appropriation column reflects the allocation of funding as of September 30, 2009.

* Total is reduced by $19,858,000: $17,730,000 of which was transferred to the Small Business Innovation Research (SBIR) program and $2,128,000 of which was transferred to the Small Business Technology Transfer (STTR) program.

FY 2011 Budget

Overview

HEP Functional Categories	millions of dollars FY 2009	FY 2010 Aug AFP	Delta	FY 2011 Request	vs FY10
Fermilab Accelerator Complex Operations	162.8	145.5	9.6	155.1	6.6%
LHC Detector Support/Operations	69.4	71.8	3.0	74.8	4.2%
SLAC Accelerator Complex Operations	15.3	15.0	-5.2	9.8	-34.8%
Facility Operations	**247.5**	**232.3**	7.3	**239.6**	3.2%
EPP Research	284.5	289.1	8.0	297.1	2.8%
Advanced Technology R&D	167.2	156.3	10.4	166.7	6.7%
Core Research	**451.7**	**445.4**	18.5	**463.9**	4.1%
Intensity Frontier Projects	47.7	86.0	-7.7	78.3	-9.0%
Energy Frontier Projects	2.5	9.0	0.3	9.3	2.8%
Cosmic Frontier Projects	10.9	10.1	-6.1	4.0	-60.4%
Technology Projects	8.0	0.0	3.2	3.2	
Projects	**69.1**	**105.1**	-10.4	**94.7**	-9.9%
Other (GPE/SBIR/STTR/other)	**27.5**	**27.7**	3.0	**30.8**	11.0%
High Energy Physics	**795.7**	**810.5**	18.5	**829.0**	2.3%

* Before SBIR/STTR removed

FY 2011 Budget Request

Congressional Action

House Mark is a directed $12.5M reduction

Senate Mark is a $8.915M reduction

(dollars in thousands)

	FY 2010*** Current Appropriation		Delta	Percent	FY 2011 Request	FY 2011 House Mark	FY 2011 Senate Mark
High Energy Physics							
Proton Accelerator Based Physics	435,392		3,870	0.9%	439,262	436,262	430,347
Electron Accelerator Based Physics	30,208		-5,501	-18.2%	24,707	24,707	24,707
Non Accelerator Based Physics	99,914		-11,375	-11.4%	88,539	88,539	88,539
Theoretical Physics	68,934		590	0.9%	69,524	68,024	69,524
Adavanced Technolgy R&D	176,035 *		13,933	7.9%	189,968	181,968	189,968
Subtotal, High Energy Physics	810,483		1,517	0.2%	812,000	799,500	803,085
Construction	0		17,000		17,000	17,000	17,000
Total, High Energy Physics	810,483 *		18,517	2.3%	829,000	816,500	820,085

** * Allocation as of August, 2010

* Total in FY 2010 includes $19,672,000 that was transferred to SBIR and STTR programs

FY 2011 Program

Highlights

- Tevatron will operate in FY 2011 with possibility of discovery or ruling out a significant fraction of the allowed mass region for the Higgs boson in the Standard Model at the 95% confidence level
- U.S. LHC program is supported at a level that will allow U.S. researchers to play an leading role in extracting physics from the data obtained and in planned upgrades to the detectors
- On-going MIE projects are supported on planned schedules to address physics at the Intensity Frontier (NOvA and Daya Bay), and Cosmic Frontier (DES)
- First investments (MicroBooNE, Mu2e and LBNE) are made to secure a U.S. leadership program at the Intensity Frontier
- Research program is supported at a level that will maintain scientific workforce and the ability to be productive
- Projects/Construction are down slightly overall as NOvA profile starts to roll off and new Intensity Frontier projects begin to ramp up
- Advanced Technology R&D is continuing to support high risk, high impact initiatives as well as developing infrastructure and maintaining core competencies important for the U.S.

FY 2011 Program

Facility Operations and Core Research

Facility Operations

- **Tevatron Collider operates and should conclude with an integrated luminosity of ~12 fb^{-1}**
  - The experiments should have a good chance at ruling out over a significant fraction of the allowed mass region for the Higgs boson in the Standard Model at the 95% confidence level
  - FY 2011 funding level supports NuMI (neutrino beam) operations and maintains existing workforce

- **Analysis of SLAC B-factory data should be nearly completed**
  - Decommissioning and decontamination of the Babar detector will be largely completed.
  - Final disposition of some of the detector and accelerator elements awaits a decision
    - By Italy on a proposal to build a "Super B-factory" in Italy, re-using many components from SLAC
  - Proposals have been received for U.S. participation in Super-B (Italy) and KEKB (Japan)
    - Based on review HEP is requesting support in Over Target FY 2012 for participation in BELLE II at KEKB

- **The funding supports U.S. ATLAS/CMS operating/analysis costs**

Core Research

- Funding for core Particle Physics (EPP) Research increases by about $8.0M (+2.8%)
- Funding for Proton Accelerator-Based, Non-Accelerator and Theoretical Physics increase by about +2-3% compared to FY 2010 and Electron Accelerator-Based Physics is decreases
- Almost one third of the increase (e.g.; $3.2M) is directed to Early Career Awards, so the remainder of core program will have about +1.6% increase (less than COL).

FY 2011 Program

Projects

Projects:

- **Intensity Frontier:**
  - The on-going Daya Bay and NOvA MIEs are supported at planned funding levels
  - The Minerva project was completed in FY 2010 ahead of schedule and at less cost
  - One new MIE integral to the planned U.S. Intensity Frontier program is started in FY 2011
    - MicroBooNE (CD-0 in FY 2009 so operating costs in FY 2010)
  - Two new construction projects started – PED funds requested in FY 2011
    - Mu2e (CD-0 in FY 2009 so operating costs in FY 2010)
    - LBNE (CD-0 in early FY 2010 so operating costs in FY 2010)

- **Energy Frontier:**
  - The APUL project is in the process of being de-scoped to be compatible with LHC revised schedule Funding in FY 2009-2010 cover most of the costs and FY 2011 funding will complete the project

- **Cosmic Frontier:**
  - The on-going DES MIE project will be completed and starts operation in FY 2012.
  - No funds requested in FY 2011 for Cosmic Frontier projects
  - R&D funding for dark matter and dark energy efforts planned

- **Advanced Technology R&D**
  - Electron Beam Welder MIE for SRF infrastructure at Fermilab

FY 2011 Budget

Projects

HEP Projects (MIEs and Construction)	FY 2009	FY 2010 Aug AFP	Delta	FY 2011 Request	vs FY10
Project - NOvA - MIE	27.8	59.0	-12.8	46.2	-21.7%
Project - Minerva - MIE	4.9	0.0	0.0	0.0	
Project - MicroBooNE - MIE	0.0	2.0	6.0	8.0	291.6%
Project - Mu2e - Construction (Ops & TEC)	**0.0**	**4.8**	**5.2**	**10.0**	108.3%
Project - LBNE - Construction (Ops & TEC)	**0.0**	**9.2**	**2.8**	**12.0**	30.7%
Project - T2K - MIE	1.0	0.0	0.0	0.0	
Daya Bay - MIE	14.0	11.0	-8.9	2.1	-81.3%
Intensity Frontier Projects	**47.7**	**86.0**	-7.7	**78.3**	-9.0%
LHC Accelerator Upgrade - APUL - MIE	2.5	9.0	0.3	9.3	
Energy Frontier Projects	**2.5**	**9.0**	0.3	**9.3**	2.8%
Project - DES - MIE	9.9	8.6	-4.6	4.0	
Project - Super CDMS - MIE	1.0	1.5	-1.5	0.0	
Cosmic Frontier Projects	**10.9**	**10.1**	-6.1	**4.0**	-60.4%
FACET MIE	0.0	0.0	0.0	0.0	
Project - SRF Electron Beam Welder - MIE	0.0	0.0	3.2	3.2	
Project - BELLA - MIE	8.0	**0.0**	0.0	0.0	
Technology Projects	**8.0**	**0.0**	3.2	3.2	
Total, HEP Projects	**69.1**	**105.1**	-10.4	**94.7**	-9.9%