
DOE HEP Budget Fiscal Years 2005-6

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HEPAP

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DOE HEP FY05 Budget

- House passed FY 2005 Energy and Water bill in late June, **+\$16M for HEP over Pres. Request**
- Senate never passed an FY05 Energy and Water bill
- Oct 2004: Serious electrical accident at SLAC
- Gov't on Continuing Resolution thru December 2004
- Congress passed Omnibus budget bill Dec 04:
 - **+\$5M for HEP over Pres. Request**
 - +\$5M xfer from Science Lab Infrastructure (SLI) account to SLAC research (in language, not in budget tables)
 - **-\$6M rescission**
 - **Net: HEP FY05 \$-1M from Pres. Request**
- Subsequently, HEWD staff clarified Omnibus report language
- FY06 SLI budget submission recognizes possible request from DOE to reprogram from SLI to HEP in FY05 after SLAC re-starts B-factory operations, and holds aside \$5M for this purpose

Recent Appropriations History (B/A in Millions)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Congressional Budget Request	\$ 725.0	\$ 738.0	\$ 737.4
House Appropriations Bill	\$ 725.0	\$ 748.0	\$ 753.4
General Reduction (HEP share)	<u>-5.7</u>	<u>-0.2</u>	<u>---</u>
Net	\$ 719.3	\$ 747.8	\$ 753.4
Senate Appropriations Bill	\$ 730.0	\$ 738.0	n/a
General Reduction (HEP share)	<u>-4.6</u>	<u>--</u>	
Net	\$ 725.4	\$ 738.0	
Conference Committee	\$ 727.0	\$ 738.0	\$ 742.4
General Reduction (HEP share)	-4.4	**	---
Rescission (HEP share)	<u>-4.7</u>	<u>-4.3</u>	<u>-5.9</u>
Net	\$ 717.9	\$ 733.6	\$ 736.4
Appropriations after reductions	\$ 717.9	\$ 733.6*	\$ 736.4
SBIR & STTR	<u>-15.9</u>	<u>-17.5</u>	<u>-17.9</u>
Net funding available	\$ 702.0	\$ 716.2	\$ 718.6

* Includes \$1.2M of prior year balances

** HEP share of FY04 general reduction was addressed using prior year balances

FY 2004/05 HEP Budget

(B/A in Millions)

	<u>FY 2004</u>	<u>FY 2005</u>	<u>Change</u>
Proton Accelerator-based Physics			
<i>Research</i>	\$ 76.4	\$ 75.7	
<i>Facilities (other than LHC)</i>	241.9	263.6	
<i>LHC Project</i>	48.8	32.5	
<i>LHC Support</i>	<u>15.6</u>	<u>29.4</u>	
Subtotal	\$382.6	\$ 401.1	+4.8%
Electron Accelerator-based Physics			
<i>Research</i>	\$ 27.0	25.5	
<i>Facilities</i>	<u>117.9</u>	<u>118.4</u>	
Subtotal	\$145.0	\$ 143.9	-0.1%
Non-Accelerator-based Physics	\$ 47.3	\$ 46.9	-0.1%
Theoretical Physics	\$ 49.4	\$ 49.0	-0.1%
Advanced Technology R&D	\$ 96.8	\$ 94.7	-2.2%
Construction/NuMI	<u>\$ 12.4</u>	<u>\$ 0.8</u>	
TOTAL HEP Budget	\$733.6	\$ 736.4	+0.4%
SBIR & STTR (included in Advanced Tech R&D)	\$ (17.5)	\$ (17.9)	

FY05 Budget Highlights

- This is a tight budget year (+0.4% growth). Workforce reductions expected (est. ~150 FTEs across program)
- Successful completion of:
 - NuMI/MINOS: first events already seen in near detector
 - Run IIb Detectors: will complete in FY05
 - GLAST : planned re-baseline but will complete DOE contribution in FY05
 - US LHC Accelerator Project: will complete in FY05
- Unfortunately these do not free up nearly enough resources in the out-years (FY06+) if budgets stay flat
 - Total FY05 funding for NuMI , Run IIb, GLAST is ~\$14M
 - Based on experience, annual average cost growth in the HEP program is ~\$20-25M
 - Plus directed increases for infrastructure maintenance

HEP FY05 Plan

- Operate HEP facilities (Tevatron, NuMI, B-factory) as much as possible given technical constraints
 - Tevatron and NuMI FY05 running is “optimal”
 - Under current budget allocation (without SLI reprogramming), B-factory run is ~ 4 months
 - Once SLAC safety re-start plan is agreed to, will consider reprogramming request to extend run +3 months (7 total)
- Ramp-up preparations for LHC start-up
- Modest growth in LC R&D (\$20M → \$23M)
- Complete commitments to existing projects
- Begin to develop a future program that:
 - Is scientifically compelling
 - We can afford

HEP PART Scorecard

Program: *High Energy
Physics*

Agency: *Department of Energy*

Bureau: *Office of Science*

Rating: *Moderately Effective*

Program Type: *Research and Development Competitive
Grant, Capital Assets and*

Last Assessed: *1 year ago*

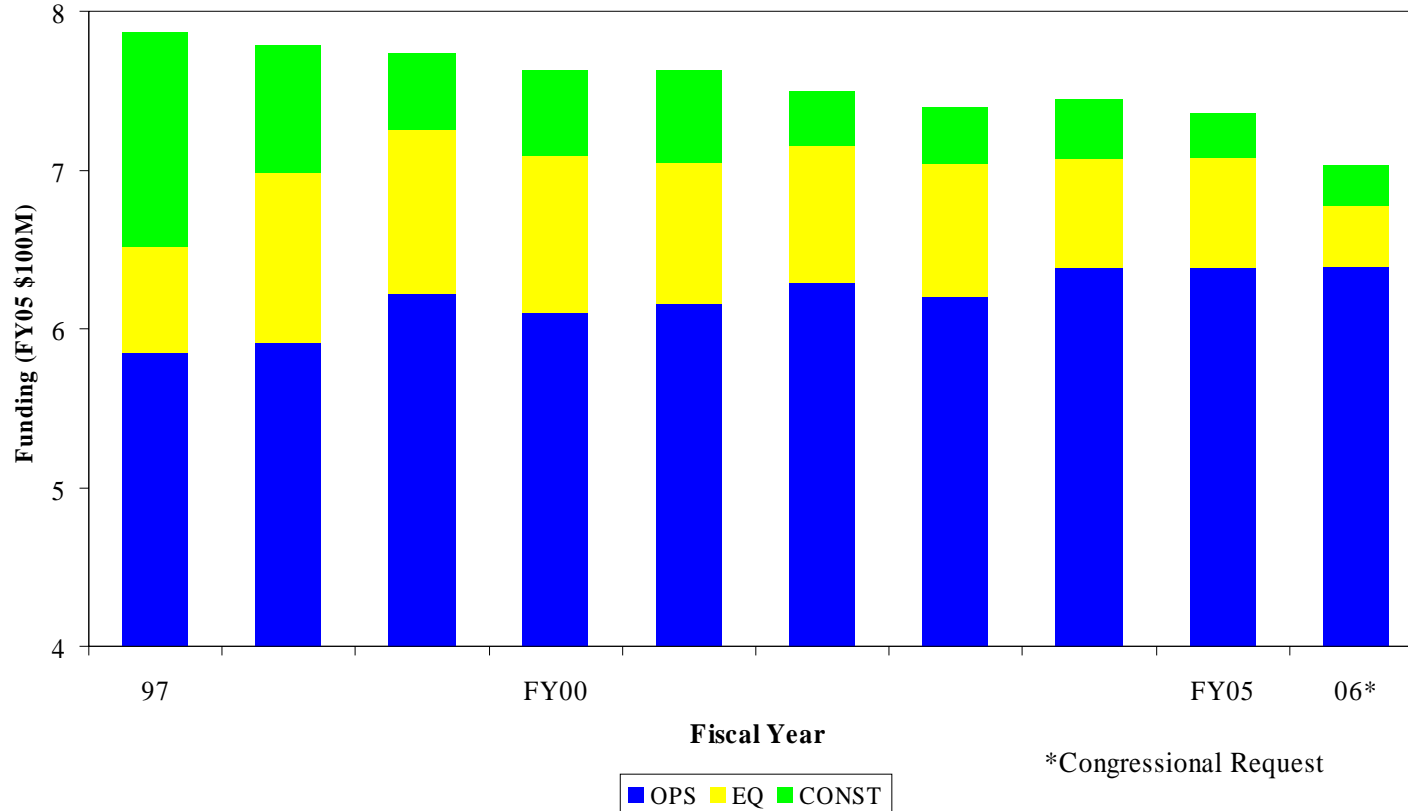
<i>Key Performance Measures from Latest PART</i>	<i>Year</i>	<i>Target</i>	<i>Actual</i>	<i>Recommended Follow-up Actions</i>	<i>Status</i>
Long-term Measure: Progress (excellent, adequate, poor) in measuring the properties and interactions of the heaviest known particle (the top quark) in order to understand its particular role in the so-called "Standard Model" of particle physics. An independent expert panel will conduct a review and rate progress (excellent, adequate, poor) on a triennial basis.	2006	Excellent		The Department will develop an appropriate action plan in response to the findings and recommendations of the Committee of Visitors within 30 days of receipt of the report.	Completed
	2009	Excellent			
	2012	Excellent			
	2015	Excellent			
Annual Measure: Total integrated amount of data (within 20%; measured in inverse picobarns) delivered to the CDF and D-Zero detectors at the Tevatron. (Targets are set in part by the funding requested/appropriated during that fiscal year. The ambitiousness of the target error bar of 20% is currently under review by OMB.)	2003	225	240	The Department will work with its advisory committee to develop research milestones [by September, 2004] against which future outside panels may judge interim progress toward achieving the long-term goals of the program.	Action taken, but not completed
	2004	240	331		
	2005	390			
	2006	450			
Annual Measure: Total integrated amount of data (within 20%; measured in inverse femtobarns) delivered to the BABAR detector at the SLAC B-factory. (Targets are set in part by the funding requested/appropriated during that fiscal year. The ambitiousness of the target error bar of 20% is currently under review by OMB.)	2003	45	40		
	2004	45	117		
	2005	50			
	2006	100			

Update on Follow-up Actions:

(1) DOE's (late) action plan in response to the Committee of Visitors report on the entire HEP program was thorough. (2) The Tevatron project plan was delivered to OMB on June 4, 2004. (3) The program's research milestones--as expressed in the new DOE program plans--were produced and reflect the strategic goals of the program. The advisory committee chair provided comments and suggested changes for the milestones, but the committee as a whole was not involved.

High Energy Physics Funding History

10 yr. HEP Total Budget, Constant Dollars



FY2006 HEP Budget

- FY06 DOE HEP Budget is \$713.9M
 - Down \$22.5M (-3.1%) from FY05.
- Also, the impact of the decrease is offset by additional funding (thru BES) to pay for SLAC linac operations.
 - This is **not** a transfer of funds from HEP, rather a transfer of responsibility
 - Increasing role for BES at SLAC as LCLS ramps-up
- Still, **even if** one “includes” BES funding for SLAC linac, the HEP budget is ~flat-flat and most program costs (people, power, other M&S) are increasing
- Therefore, we have to make decisions on priorities

Office of Science

FY 2006 Congressional Budget Request

- **FY 2006 Request is 3.9% below FY 2005 Appropriation**
- **The budget forces us to make tough choices.**
 - **No new starts in FY 2006**
 - **Prioritizing ongoing programs**

(\$M)

	FY 2004 Comparable Approp.	FY 2005 Comparable Approp.	FY 2006 President's Request	FY 2006 Request vs FY 2005 Appropriation	
Basic Energy Sciences	991	1,105	1,146	+41	+3.7%
Advanced Scientific Computing Res.	197	232	207	-25	-10.9%
Biological & Environmental Research	624	582	456	-126	-21.7%
High Energy Physics	716	736	714	-23	-3.1%
Nuclear Physics	380	405	371	-34	-8.4%
Fusion Energy Sciences	256	274	291	+17	+6.1%
Other	384	270	279	+8	+3.1%
Total, Science	3,548	3,605	3,463	-142	-3.9%

FY 2005/06 HEP Budget

(B/A in Millions)

	<u>FY 2005</u>	<u>FY 2006</u>	<u>Change</u>
Proton Accelerator-based Physics			
<i>Research</i>	\$ 75.7	\$ 75.4	
<i>Facilities (other than LHC)</i>	263.6	251.6	
<i>LHC Project</i>	32.5	7.4	
<i>LHC Support</i>	<u>29.4</u>	<u>52.6</u>	
Subtotal	\$401.1	\$ 387.1	-3.5%
Electron Accelerator-based Physics			
<i>Research</i>	\$ 25.5	24.9	
<i>Facilities</i>	<u>118.4</u>	<u>108.0</u>	
Subtotal	\$143.9	\$ 132.8	-7.7%
Non-Accelerator-based Physics	\$ 46.9	\$ 38.6	-17.8%
Theoretical Physics	\$ 49.0	\$ 49.1	+0.2%
Advanced Technology R&D	\$ 94.7	\$ 106.3	+12.3%
Construction/NuMI	<u>\$ 0.8</u>	<u>\$ 0</u>	
TOTAL HEP Budget	\$736.4	\$ 713.9	-3.1%
SBIR & STTR (included in Advanced Tech R&D)	\$ (17.9)	\$ (18.2)	

HEP Budget Axioms

Assuming:

- We maintain current HEP facility operations as long as they are
 - Producing cutting-edge, compelling science
 - Providing significantly improved results
- We meet our existing commitments (e.g., LHC)
- We move forward on the highest future priorities (LC, dark energy, neutrinos)
- We continue to receive flat-flat budgets

Axiom I: We cannot start any significant new activities as long as these assumptions hold.

- They hold in 2006. Therefore we cannot move forward on BTeV.

HEP Budget Axioms, cont'd

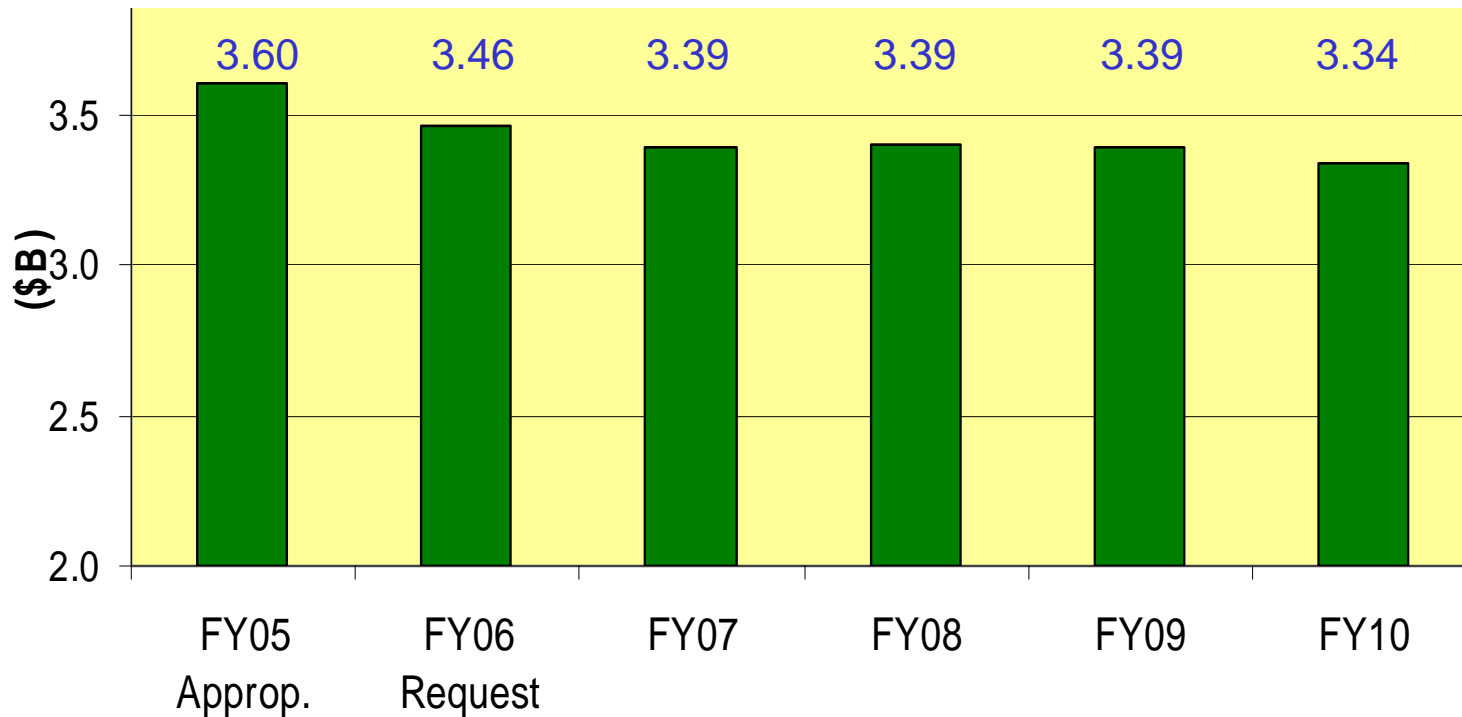
We have to start significant new activities to ensure a healthy future for the US HEP program after ~2010.

Axiom II: Something has to give in the out-years.

- **B-Factory operations end by 2008 at the latest.**
 - **This is explicitly stated in the FY2006 President's Request**
- **If we want the future to arrive sooner, we will need to balance current operating program and commitments with investments for the future**

FY2007 budget planning process begins next month, with "real" 5-year budget projections. These will flow from overall SC budget.

Office of Science Planning Profile



\$127M (~3.7%) decrease over 5 years

Other FY2006 highlights

- LC R&D increases (to \$25M) to support the international effort and a continued leadership role for the U.S.
 - We need a revised R&D plan and management structure in the wake of the ITRP decision
 - FY2006 will be the first year under this new plan
- In order to provide for a diverse future scientific program, R&D focused on neutrino physics will increase
 - \$4M dedicated (as yet undistributed) in FY06
 - Plus redirections from within the program
- IT investment in Lattice QCD to follow on from the QCDOC prototype
 - Joint project of HEP and NP; managed by BNL, FNAL and TJNAF
 - Expect ~20 Teraflops of dedicated computing resources for the U.S. LQCD community by ~2009.
- R&D for SNAP/JDEM continues, but funding and timeline for a space-based dark energy mission to be determined

Summary

- **FY05 HEP budget is tight but we will:**
 - Operate Tevatron, NuMI and B-factory at near “optimal” level
 - Continue to ramp-up preparations for LHC physics
 - Complete commitments to existing projects
 - “Jump start” R&D for the future
- **FY06 HEP budget is much the same:**
 - Maintain facility operations, LHC at needed levels
 - Ramping up LC R&D slowly
 - Research and generic R&D programs ~ flat
 - We will not start BTeV
 - We will start a program focused on R&D for neutrino physics
- **The outyears will not get easier. We will face hard choices:**
 - How much longer to operate existing facilities
 - Right balance of research/generic R&D/new facilities
 - Which new facilities to support
- **We are starting to put together processes to address these issues**
 - See talks by Robin and Michael tomorrow