U.S. Department of Energy's

Office of Science

Fusion Energy Sciences Program Update

Fusion Energy Sciences Advisory Committee

Office of Fusion Energy Sciences

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FY 2008 Fusion Energy Sciences Congressional Budget Request

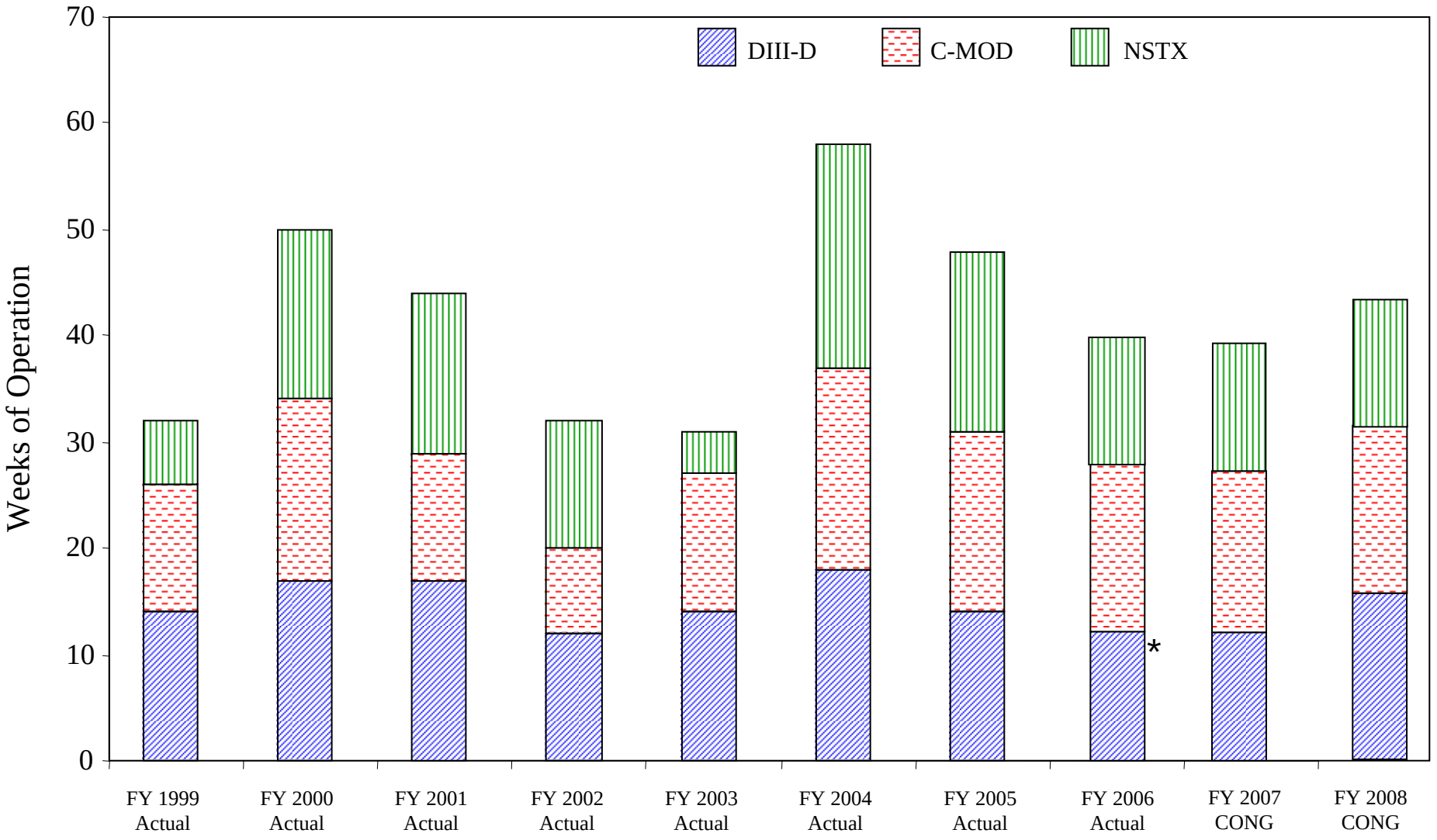
($ Millions)

	FY 2006 Actual	FY 2007 CONG	FY 2008 CONG
Science	148.7	154.2	159.6
Facility Operations	104.2	121.6	237.0
Enabling R&D	27.8	43.2	31.3
OFES Total	**280.7**	**319.0**	**427.9**
DIII-D	55.1	56.7	59.7
C-Mod	21.5	22.8	23.5
NSTX	34.2	35.1	36.1
NCSX	17.8	16.6	16.6
ITER	24.6	60.0	160.0
Non-ITER	256.1	259.0	267.9

FY 2008 Fusion Program Highlights

- Continue U.S. ITER MIE Project ($160.0M, +$100.0M)
  - $149.5M for Total Estimated Cost funding
  - $10.5M for Other Project Costs funding (R&D support)
- Increase Major Facility operations and research (+$4.6M, + 3 weeks operations)
  - 15 weeks on DIII-D, 15 weeks on C-Mod, 12 weeks on NSTX
- Most remaining program elements receive ~ 2.7% increase

Major Fusion Facilities Operating Times



*The 12 weeks of runtime in FY 2006 for DIII-D includes 5 weeks of run-time funded from the recovery of prior year balances.

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FY2008 Provides for Third Year Funding for the U.S. Contribution to ITER Project – Total of $160M

	FY 2006	FY 2007	FY 2008
ITER Preparations	$5.3M	$0.0M	$0.0M
ITER Major Item of Equipment (MIE) Project			
Total Estimated Cost (TEC) Funding	15.9M	37.0M	$149.5M
Other Project Costs (OPC) Funding	3.4M	23.0M	$10.5M
Total	**$24.6M**	**$60.0M**	**$160.0M**

- Preparations funding ended in FY 2006 as the U.S. Contributions to ITER MIE project began. Funding was provided for transitional activities such as safety, licensing, project management, preparation of specifications and system integration.

Major Item of Equipment

- In FY 2008, funding for the U.S. Contributions to ITER MIE project is identified as TEC in the Facility Operations subprogram and OPC in the Enabling R&D subprogram.
- TEC funding provides for the U.S. “in-kind” equipment contributions, U.S. personnel to work at the ITER site, cash for the U.S. share of common expenses such as infrastructure, hardware assembly and installation, and contingency for the International ITER Organization.
- OPC funding is provided for R&D in support of equipment—mainly magnets, first wall/shield modules, tritium processing, fueling and pumping, heating systems, and diagnostics, which would be provided by the U.S. to ITER.

ITER Funding Profile

U.S. Contributions to ITER - Annual Profile

($ in Thousands – in as spent dollars)

Fiscal Year	Total Estimated Cost (TEC)	Other Project Costs (OPC)	Total Project Cost (TPC)
2006	15,866	3,449	19,315
2007	37,000	23,000	60,000
2008	149,500	10,500	160,000
2009	208,500	6,000	214,500
2010	208,500	821	209,321
2011	181,964	—	181,964
2012	130,000	—	130,000
2013	116,900	—	116,900
2014	30,000	—	30,000
Total	**1,078,230**	**43,770**	**1,122,000**

Fusion Energy Sciences Budget by Institution

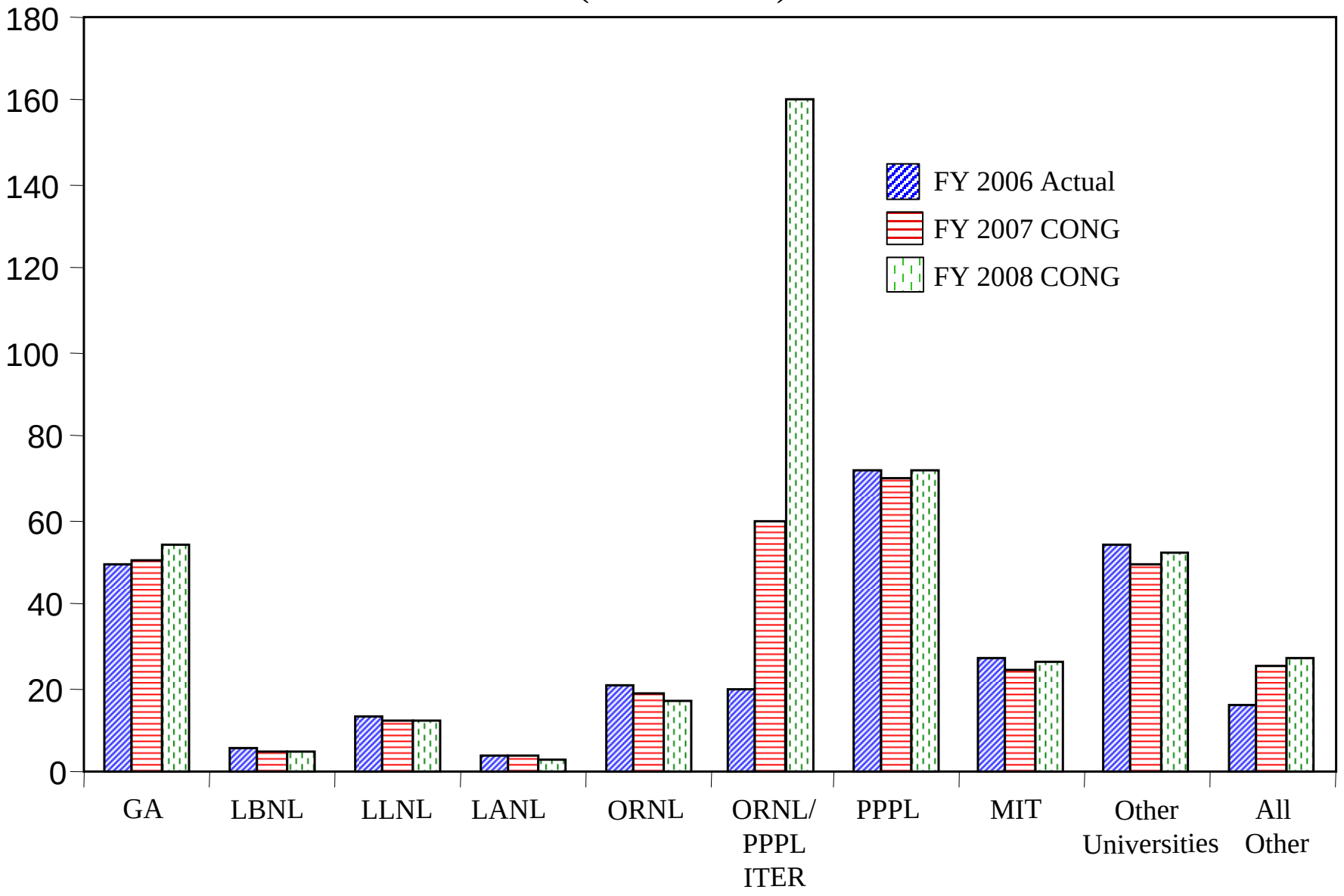
($ in Millions)

Institution	FY 2006 Actual	FY 2007 CONG	FY 2008 CONG
General Atomics	49.7	50.7	53.7
Lawrence Berkeley National Laboratory	5.3	4.9	4.9
Lawrence Livermore National Laboratory	13.4	12.0	12.0
Los Alamos National Laboratory	4.0	3.4	3.0
Oak Ridge National Laboratory	20.8	18.7	17.2
ORNL/PPPL ITER	19.3	60.0	160.0
Princeton Plasma Physics Laboratory	71.7	70.0	71.6
Massachusetts Institute of Technology	27.2	24.6	25.9
Other Universities	53.8	49.5	52.3
All Other	15.5	25.2	27.3
Total	**280.7***	**319.0**	**427.9**

*SBIR/STTR not included

Fusion Energy Sciences Funding by Institution

($ in Millions)



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Summary of Fusion Energy Sciences FY 2008 Program

Science ($159.6M, +$5.4M)

- Increase research at major facilities (+ $0.6 M)
- Increase General Plasma Science (+$0.7M)
  - UCLA research at the Basic Plasma Science Device (+$0.3M)
  - Remainder of program (GPS) up ~2.7%
- All other elements increase ~2.7%

Facility Operations ($237.0M, +$115.4M)

- Continue ITER MIE (+ $112.5)
- Continue NCSX MIE (no change)
- Add 3 weeks of operations at DIII-D (+ $2.0M)
- No change in operating weeks at C-Mod (15 weeks) or NSTX (12 weeks)

Enabling R&D ($31.3M, -$11.9M)

- Reduce funding for ITER Other Project Costs (- $12.5M)
- Increase Plasma Technologies ~4% (+ $0.5M)
- No Change for Advanced Design
- Materials research up ~2.7% (+ $0.1M)

Fusion Energy Sciences

($ in thousands)

	FY 2006 Actuals	FY 2007 CONG	FY 2008 CONG
Science			
DIII-D Research	24,274	24,300	25,264
C-MOD Research	8,490	8,890	9,133
International Collaborations	4,951	5,064	5,202
Diagnostics	3,763	3,854	3,959
Other	4,223	10,992	12,893
HBCU, Education, Outreach Reserves	(4,223)	(3,730)	(5,700)
SBIR/STTR (science)	0	(7,262)	(7,193)
Subtotal Tokamaks	45,701	53,100	56,451
NSTX Research	15,539	16,696	16,106
Experimental Plasma Research	21,389	19,990	20,638
HEDP	15,470	11,949	12,281
MST Research	6,445	6,970	6,970
NCSX Research	751	697	716
Subtotal Alternates Research	59,594	56,302	56,711
Theory	24,947	23,900	24,552
Advanced Computer/SciDAC	4,220	6,970	7,160
General Plasma Science	14,180	13,941	14,655
Science Total	148,642	154,213	159,529
Facility Operations			
DIII-D	30,780	32,362	34,405
Alcator C-Mod	13,032	13,941	14,322
NSTX	18,681	18,422	19,972
NCSX			
ITER			
Facility Ops times in weeks	7/14/11	12/15/12/0	15/15/12/0
NCSX MIE	17,019	15,900	15,900
GPP/GPE/ORNL Move	3,538	3,930	2,905
ACX			
ITER Preparation	5,294		
ITER MIE TEC Costs	15,866	37,000	149,500
Facility Operations Total	104,210	121,555	237,004

	FY 2006 Actuals	FY 2007 CONG	FY 2008 CONG
Enabling R&D			
Plasma Technologies	14,787	12,945	13,452
Advanced Design	2,529	2,550	2,550
Materials Research	7,066	4,687	4,815
ITER MIE OPC	3,449	23,000	10,500
Enabling R&D Total	27,831	43,182	31,317
Total Fusion Energy Sciences	280,683	318,950	427,850

Recap			
DIII-D Res+Ops	55,054	56,662	59,669
C-Mod Res+Ops	21,522	22,831	23,455
NSTX Res+Ops	34,220	35,118	36,078
NCSX Res+Ops			716
ITER Res+Ops			
Facility Res+Ops Total	110,796	114,611	119,918
ITER TPC	19,315	60,000	160,000
Total, Core R&D Total	261,368	258,950	267,850