

# U.S. Fusion Energy Sciences Program

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## Fusion Program Leaders FY 2008 Budget Conference Call



[www.ofes.fusion.doe.gov](http://www.ofes.fusion.doe.gov)

February 5, 2007  
2:00 p.m.

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Excellent Science in Support of Attractive Energy

# FY 2008 Fusion Energy Sciences Congressional Budget Request

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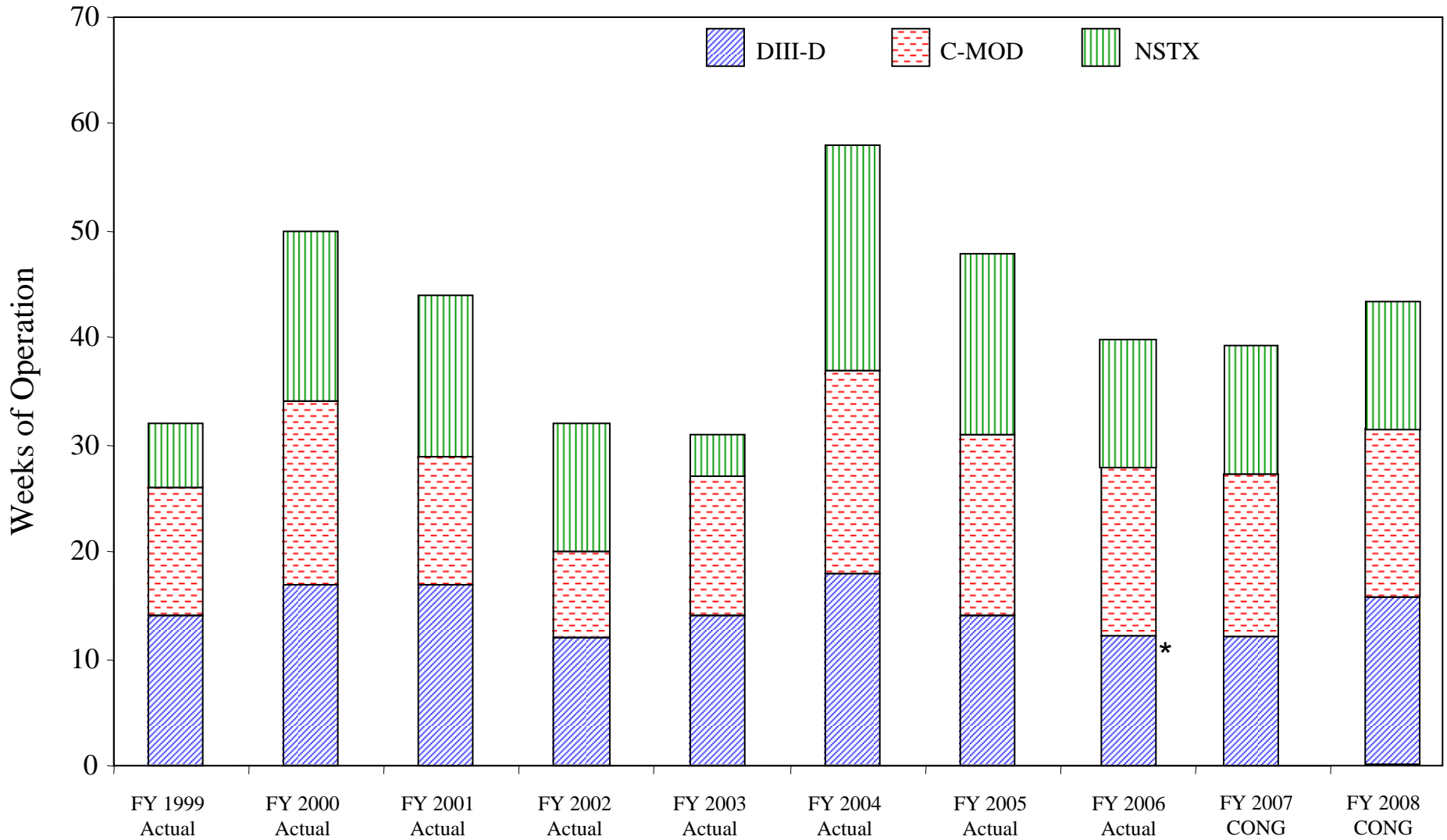
	(\$ Millions)		
	FY 2006	FY 2007	FY 2008
	<u>Actual</u>	<u>CONG</u>	<u>CONG</u>
Science	148.7	154.2	159.6
Facility Operations	104.2	121.6	237.0
Enabling R&D	<u>27.8</u>	<u>43.2</u>	<u>31.3</u>
<b>OFES Total</b>	<b>280.7</b>	<b>319.0</b>	<b>427.9</b>
DIII-D	55.1	56.7	59.7
C-Mod	21.5	22.8	23.5
NSTX	34.2	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

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- o 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)
- o 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
- o 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.

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

	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>
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
<b>Total</b>	<b>\$24.6M</b>	<b>\$60.0M</b>	<b>\$160.0M</b>

- 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.
- 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.

Major Item of Equipment

# ITER Funding Profile

U.S. Contributions to ITER - Annual Profile  
(\$ in Thousands – in as spent dollars)

<u>Fiscal Year</u>	<u>Total Estimated Cost (TEC)</u>	<u>Other Project Costs (OPC)</u>	<u>Total Project Cost (TPC)</u>
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
<b>Total</b>	<b>1,078,230</b>	<b>43,770</b>	<b>1,122,000</b>

# Fusion Energy Sciences Budget by Institution

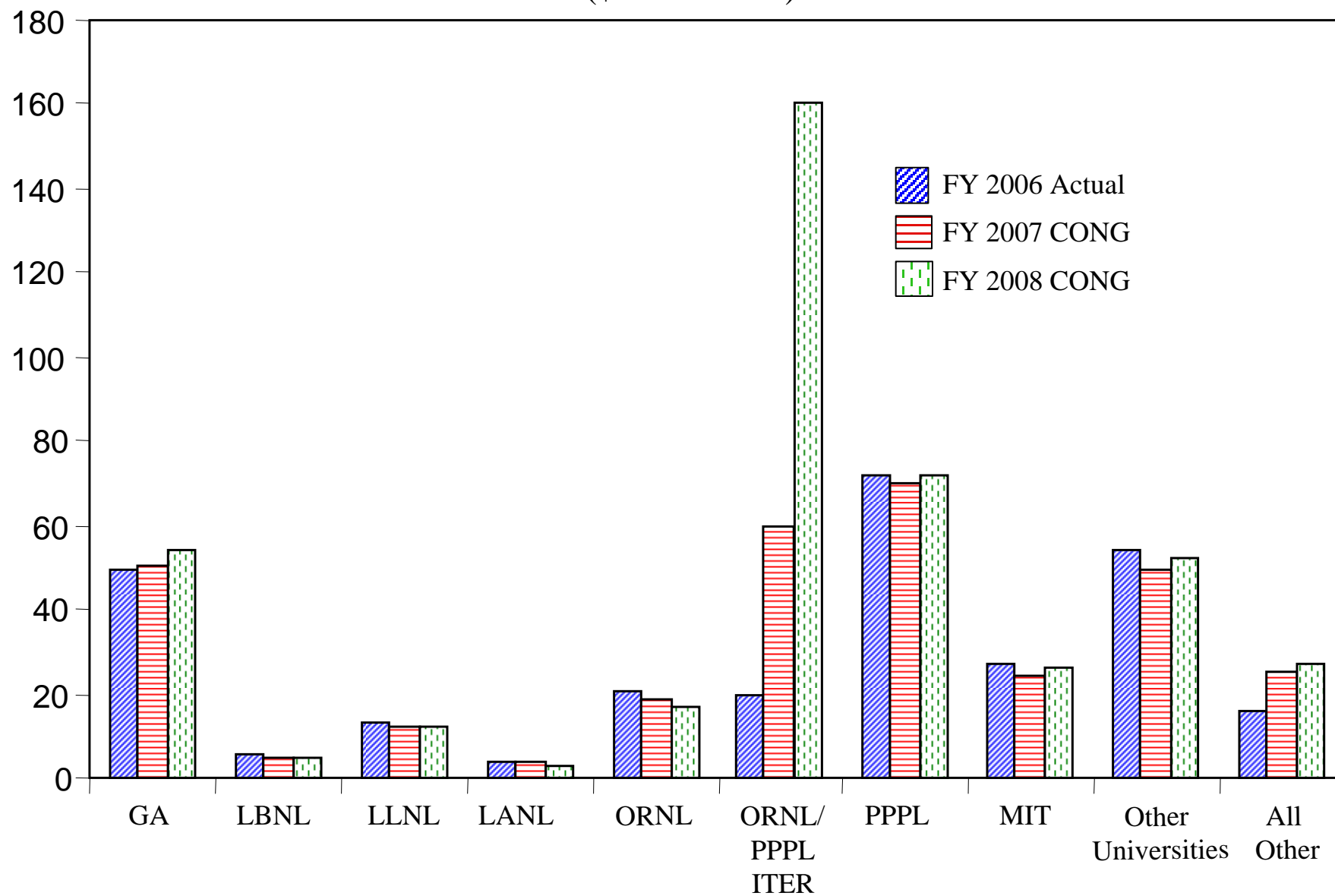
(\$ in Millions)

<u>Institution</u>	FY 2006 <u>Actual</u>	FY 2007 <u>CONG</u>	FY 2008 <u>CONG</u>
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	<u>15.5</u>	<u>25.2</u>	<u>27.3</u>
<b>Total</b>	<b>280.7*</b>	<b>319.0</b>	<b>427.9</b>

\*SBIR/STTR not included

# Fusion Energy Sciences Funding by Institution

(\$ in Millions)





# **Summary of Fusion Energy Sciences FY 2008 Program**

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## **Science** (\$159.6M, +\$5.4M)

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

## **Facility Operations** (\$237.0M, +\$115.4M)

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

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

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

# Fusion Energy Sciences

(\$ in thousands)

	<b>FY 2006</b>	<b>FY 2007</b>	<b>FY 2008</b>		<b>FY 2006</b>	<b>FY 2007</b>	<b>FY 2008</b>
	<b><u>Actuals</u></b>	<b><u>CONG</u></b>	<b><u>CONG</u></b>		<b><u>Actuals</u></b>	<b><u>CONG</u></b>	<b><u>CONG</u></b>
<b>Science</b>				<b>Enabling R&amp;D</b>			
DIII-D Research	24,274	24,300	25,264	Plasma Technologies	14,787	12,945	13,452
C-MOD Research	8,490	8,890	9,133	Advanced Design	2,529	2,550	2,550
International Collaborations	4,951	5,064	5,202	Materials Research	7,066	4,687	4,815
Diagnostics	3,763	3,854	3,959	ITER MIE OPC	<u>3,449</u>	<u>23,000</u>	<u>10,500</u>
Other	4,223	10,992	12,893	<b>Enabling R&amp;D Total</b>	<b>27,831</b>	<b>43,182</b>	<b>31,317</b>
HBCU, Education, Outreach Reserves	(4,223)	(3,730)	(5,700)				
SBIR/STTR (science)	<u>0</u>	<u>(7,262)</u>	<u>(7,193)</u>	<b>Total Fusion Energy Sciences</b>	<b>280,683</b>	<b>318,950</b>	<b>427,850</b>
<b>Subtotal Tokamaks</b>	<b>45,701</b>	<b>53,100</b>	<b>56,451</b>				
				<b>Recap</b>			
NXTX Research	15,539	16,696	16,106	DIII-D Res+Ops	55,054	56,662	59,669
Experimental Plasma Research	21,389	19,990	20,638	C-Mod Res+Ops	21,522	22,831	23,455
HEDP	15,470	11,949	12,281	NSTX Res+Ops	34,220	35,118	36,078
MST Research	6,445	6,970	6,970	NCSX Res+Ops			716
NCSX Research	<u>751</u>	<u>697</u>	<u>716</u>	ITER Res+Ops			
<b>Subtotal Alternates Research</b>	<b>59,594</b>	<b>56,302</b>	<b>56,711</b>	<b>Facility Res+Ops Total</b>	<b>110,796</b>	<b>114,611</b>	<b>119,918</b>
<b>Theory</b>	24,947	23,900	24,552	<b>ITER TPC</b>	<b>19,315</b>	<b>60,000</b>	<b>160,000</b>
<b>Advanced Computer/SciDAC</b>	4,220	6,970	7,160	<b>Total, Core R&amp;D Total</b>	<b>261,368</b>	<b>258,950</b>	<b>267,850</b>
<b>General Plasma Science</b>	<u>14,180</u>	<u>13,941</u>	<u>14,655</u>				
<b>Science Total</b>	<b>148,642</b>	<b>154,213</b>	<b>159,529</b>				
<b>Facility Operations</b>							
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	<u>15,866</u>	<u>37,000</u>	<u>149,500</u>				
<b>Facility Operations Total</b>	<b>104,210</b>	<b>121,555</b>	<b>237,004</b>				