U.S. Fusion Energy Sciences Program

Fusion Program Leaders Conference Call

www.ofes.fusion.doe.gov

February 6, 2006

Excellent Science in Support of Attractive Energy

U.S. Department of Energy

Office of Science

Office of Science
FY 2007 Congressional Budget Request

(dollars in thousands)

	FY 2005 Approp.	FY 2006 Approp.	FY 2007 President's Request	FY 2007 vs. FY 2006
Basic Energy Sciences	1,083,616	1,134,557	1,420,980	+286,423
Advanced Scientific Computing Research	226,180	234,684	318,654	+83,970
Biological and Environmental Research				
Base program	487,474	451,131	510,263	+59,132
Congressional -directed projects	79,123	128,700	----	-128,700
Total , Biological and Environmental Research	566,597	579,831	510,263	-69,568
High Energy Physics	722,906	716,694	775,099	+58,405
Nuclear Physics	394,549	367,034	454,060	+87,026
Fusion Energy Sciences	266,947	287,644	318,950	+31,306
Science Laboratories Infrastructure	37,498	41,684	50,888	+9,204
Science Program Direction	154,031	159,118	170,877	+11,759
Workforce Development for Teachers and Scientists	7,599	7,120	10,952	+3,832
Small Business Innovation Research /Technology Transfer	113,621	----	----	----
Safeguards and Security	67,168	68,025	70,987	+2,962
Subtotal , Science	3,640,712	3,596,391	4,101,710	+505,319
Use of prior year balances	-5,062	----	----	----
Total , Science	**3,635,650**	**3,596,391**	**4,101,710**	**+505,319**

FY 2006 Fusion Energy Sciences Congressional Budget Request

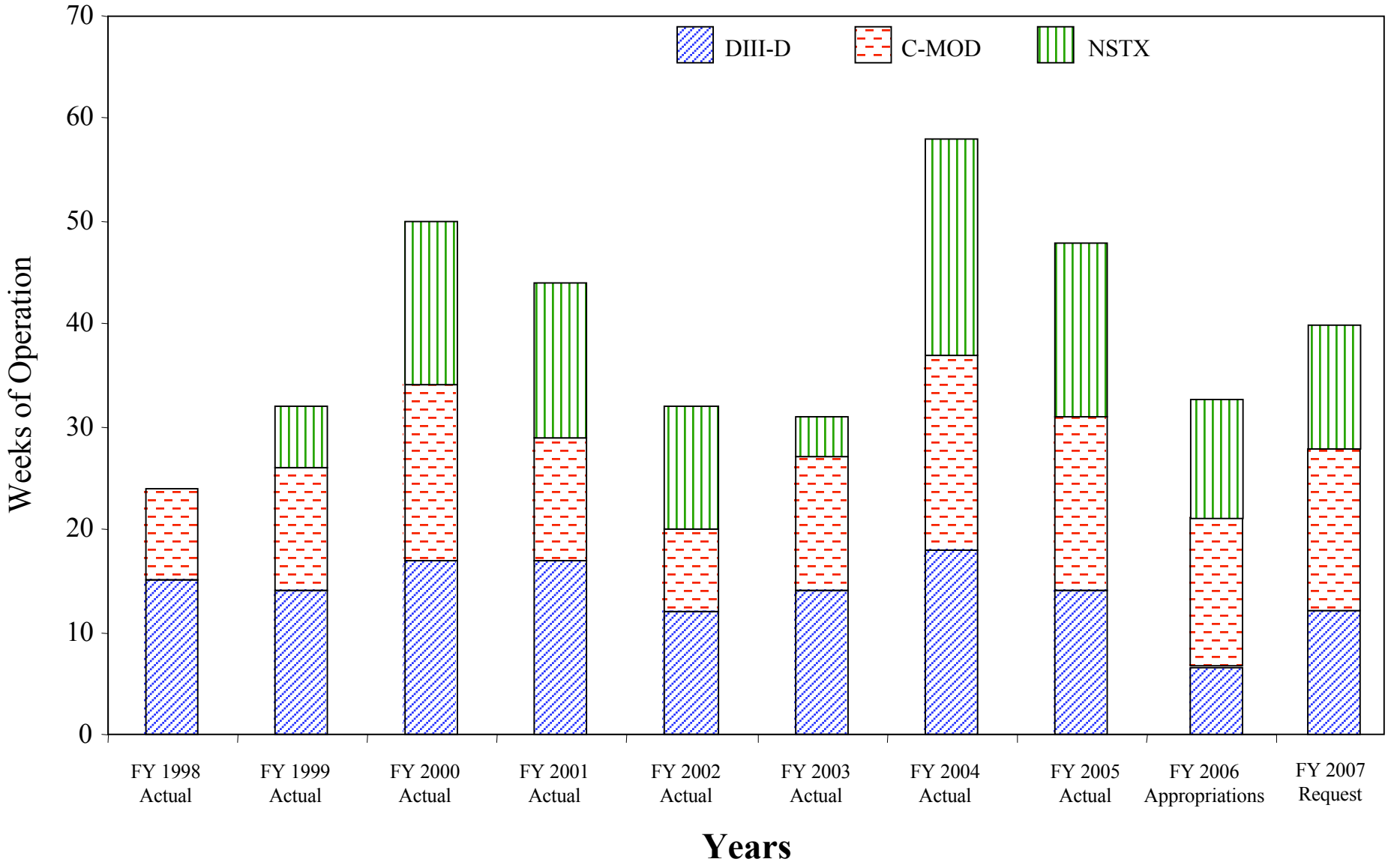
($ Millions)

	FY 2005 Actual	FY 2006 Appropriations	FY 2007 Request
Science	148.5	156.9	154.2
Facility Operations	89.7	103.5	121.6
Enabling R&D	28.7	27.2	43.2
OFES Total	**266.9**	**287.6**	**319.0**
DIII-D	55.8	54.7	56.7
C-Mod	22.0	21.7	22.8
NSTX	34.5	34.0	35.1
NCSX	18.3	17.8	16.6
ITER	5.4	25.1	60.0
Non-ITER	261.5	262.5	259.0

FY 2007 Fusion Program Highlights

- Continue U.S. ITER Fabrication Effort ($60.0M, +$34.9M)
  - $37.0M for MIE Project (Total Estimated Cost funding)
  - $23.0M for R&D support (Other Project Costs funding)
- Increase Major Facility operations and research (+$4.2M)
  - 12 weeks on DIII-D, 15 weeks on C-Mod, 12 weeks on NSTX
- Increase SciDAC (+$2.7M)
  - Includes two additional SciDAC projects
- Reduce HEDP research (-$3.9M)
- Reduce fusion materials science research (-$2.4M)
- Reduce Innovative Confinement Concepts research (-$1.8M)
- Reduce Plasma Technologies to focus on ITER specifics (-$1.3M)
- Reduce NCSX funding per baseline plan (-$1.1M)
- Reduce Theory (-$1.0M)

Major Fusion Facilities Operating Times



01/31/06

FY2007 Provides for Second Year Funding for the U.S. Contribution to ITER Project – Total of $60 M

	FY 2005	FY 2006	FY 2007
ITER Preparations	$5.4M	$5.8M	$0.0M
ITER Major Item of Equipment Project			
Annual Total Estimated Cost (TEC) Funding	0	15.9M	$37.0M
Annual Other Project Cost (OPC) Funding	0	3.4M	$23.0M
Total	**$5.4M**	**$25.1M**	**$60.0M**

- Preparations funding – transition to MIE Project ends in FY 2006. Activities included analyses of various transitional issues including safety, licensing, project management, preparation of specifications and system integration and for the continuation of various technical activities of the U.S. scientists and engineers in laboratories, universities, and industry.

Major Item of Equipment

- TEC funding - procurement, fabrication and delivery of medium- and high-technology components, assignment of U.S. personnel to the ITER Organization abroad, a provision of cash for the U.S. share of common costs at the ITER site for installation and testing, and contingency for the ITER Organization.
- OPC funding - R&D and design in support of magnets, plasma facing components, tritium processing, fueling and pumping, heating and current drive, materials, and diagnostics.

ITER Outyear Funding Profile

U.S. Contributions to ITER - Annual Profile

($ in Millions – in as spent dollars)

Fiscal Year	Total Estimated Costs (TEC)	Other Project Costs (OPC)	Total Project Costs (TPC)
2006	15.9	3.4	19.3
2007	37.0	23.0	60.0
2008	149.5	10.5	160.0
2009	208.5	6.0	214.5
2010	208.5	1.5	210.0
2011	180.8	.5	181.3
2012	130.0	0	130.0
2013	116.9	0	116.9
2014	30.0	0	30.0
Total	**1,077.1**	**44.9**	**1,122.0**

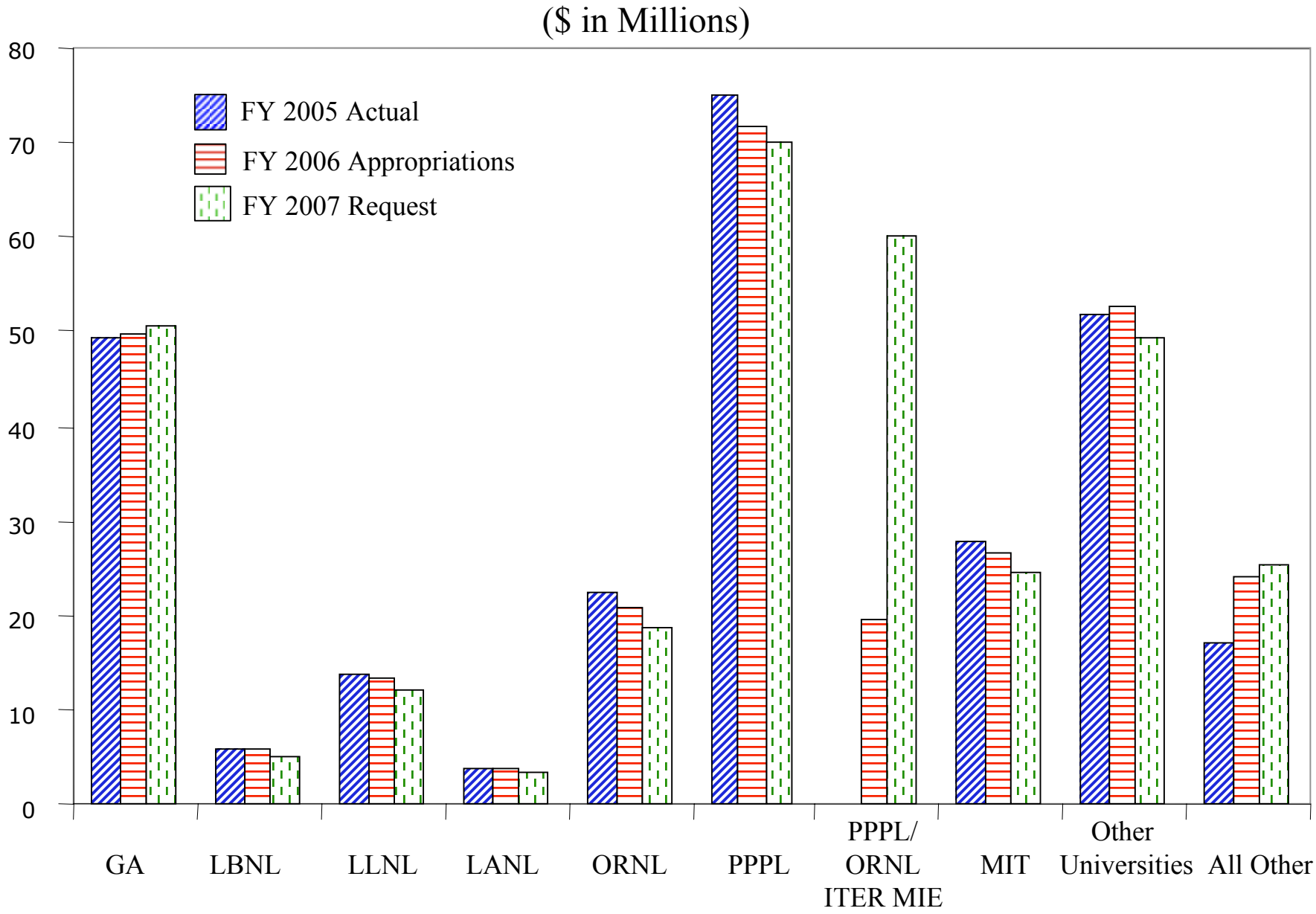
Fusion Energy Sciences Budget by Institution

($ in Millions)

Institution	FY 2005 Actual (noncomparable)	FY 2006 Appropriations	FY 2007 Request
General Atomics	49.4	49.9	50.7
Lawrence Berkeley National Laboratory	6.0	5.7	4.9
Lawrence Livermore National Laboratory	13.8	13.3	12.0
Los Alamos National Laboratory	3.8	3.9	3.4
Oak Ridge National Laboratory	22.3	20.6	18.7
Princeton Plasma Physics Laboratory	75.0	71.6	70.0
PPPL/ORNL—ITER MIE	0.0	19.3	60.0
Massachusetts Institute of Technology	27.8	26.5	24.6
Other Universities	51.9	52.7	49.5
All Other	16.9	24.1	25.2
Total	**266.9***	**287.6**	**319.0**

*SBIR/STTR not included

Fusion Energy Sciences Funding by Institution



01/31/06

Representative Sherwood Boehlert (R-NY)
During House Debate on 11/9/05

"I want to make clear to everyone concerned that I will do everything in my power to kill the ITER project if there is not an agreement by March that the domestic fusion program has to be scaled back to pay for ITER. I am not going to allow the U.S. to enter into an international commitment that it cannot afford. I would rather kill the ITER project. The fusion community will have to be realistic. It cannot have all its current projects and ITER. And it will not."

Summary of Fusion Energy Sciences FY 2007 Program

Science ($154.2M, -$2.7M)

- Increase SciDAC research (+$2.7M)
- Increase research at major facilities (+$1.1M)
- Increase Madison Symmetric Torus research (+$0.7M)
- Increase General Plasma Science and International Collaborations (+$0.4M)
- Reduce High Energy Density Physics research (-$3.9M)
- Reduce Innovative Confinement Concepts research (-$1.8M)
- Reduce funding for reserves, IPAs, etc. (-$1.2M)
- Reduce theory research (-$1.0M)
- Fund SBIR/STTR at mandated level (+$0.3M)
- Fund remaining elements at FY 2006 level

Facility Operations ($121.6M, +$18.0M)

- Increase funding for international ITER project (+$15.3M)
- Increase operations at DIII-D (to 12 weeks), C-Mod (to 15 weeks), NSTX (to 12 weeks) (+$3.1M)
- Increase funding for GPP/GPE, other (+$0.7M)
- Reduce funding for NCSX MIE per baseline profile – completion in July 2009, TEC of $92.4M (-$1.1M)

Enabling R&D ($43.2M, +$16.0M)

- Increase funding for international ITER project (+$19.6M)
- Reduce Materials Science research (-$2.4M)
- Reduce Plasma Technologies research (-$1.3M)
- Advanced design and analysis (+$0.1M)

Fusion Energy Sciences

($ in thousands)

	FY 2005 Sept AFP	FY 2006 Appropriations	FY 2007 Request
Science			
DIII-D Research	24,042	24,412	24,300
C-MOD Research	8,636	8,510	8,890
International Collaborations	5,116	4,826	5,064
Diagnostics	3,894	3,763	3,854
Other	5,364	5,006	3,730
SBIR/STTR (science)	0	6,945	7,262
Subtotal Tokamaks	**47,052**	**53,462**	**53,100**
NSTX Research	15,992	15,845	16,696
Experimental Plasma Research	21,656	21,778	19,990
IFE/HEDP	14,640	15,856	11,949
ATLAS	(0)	(990)	(0)
MST Research	6,423	6,320	6,970
NCSX Research	773	751	697
Subtotal Alternates Research	**59,484**	**60,550**	**56,302**
Theory	**25,749**	**24,928**	**23,900**
Advanced Computing/SciDAC	**4,033**	**4,222**	**6,970**
General Plasma Science	**12,176**	**13,760**	**13,941**
Science Total	**148,494**	**156,922**	**154,213**
Facility Operation			
DIII-D	31,709	30,280	32,362
Alcator C-Mod	13,402	13,207	13,941
NSTX	18,495	18,140	18,422
NCSX	17,500	17,019	15,900
Facility Ops times in weeks	16/18/18	7/14/11	12/15/12
Other	1,433	1,298	2,020
GPE	100	100	100
GPP	1,643	1,791	1,810
ITER Preparations	5,451	5,835	0
U.S. Contributions to ITER (MIE)	0	15,866	37,000
Facility Operations Total	**89,733**	**103,536**	**121,555**
Enabling R&D			
Engineering Research			
Plasma Technologies (MFE)	18,403	14,205	12,945
Advanced Design & Analysis (MFE)	2,979	2,489	2,550
Enabling R&D for ITER	0	3,449	23,000
Materials Research (MFE	7,338	7,043	4,687
Enabling R&D Total	**28,720**	**27,186**	**43,182**
Total Fusion Energy Sciences	**266,947**	**287,644**	**318,950**
DIII-D	55,751	54,692	56,662
Alcator C-Mod	22,038	21,717	22,831
NSTX	34,387	33,985	35,118
NCSX	18,273	17,770	16,597
ITER (Operating & MIE	5,451	25,150	60,000
Non-ITER	261,496	262,494	258,950