

FES FY 2012 Congressional Budget Request Rollout

Briefing on the Administration's Proposed Funding Levels for FES in FY 2012

Presented by:

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U.S. DEPARTMENT OF
ENERGY

Office of
Science

For 2012, the Administration proposes to make sacrifices in many areas of science and energy

From Secretary Chu, regarding sacrifice:

“In the Office of Energy Efficiency and Renewable Energy, the Department is reducing funding for the hydrogen technology program by more than 41 percent, or almost \$70 million, in order to focus on technologies deployable at large scale in the near term.

“In January, the Department decided to end operation of the Tevatron at Fermi National Laboratory rather than extend it through FY 2014, which will save taxpayers a projected \$35 million for FY 2012.

“The Department is reducing the budget for the Office of Fossil Energy by 45 percent, or \$418 million. This includes zeroing out the Fuels Program, the Fuel Cells Program, the Oil and Gas Research and Development Program, and the Unconventional Fossil Technology Program.

“Additionally, current law provides a number of credits and deductions that are targeted towards certain oil, gas and coal activities. In accordance with the President's agreement at the G-20 Summit in Pittsburgh to phase out subsidies for fossil fuels so that the country can transition to a 21st century energy economy, the Administration proposes to repeal a number of tax preferences available for fossil fuels. Repeal of these preferences will save the taxpayer approximately \$3.6 billion in FY 2012. The ten-year estimate (FY2012 to FY2021) is \$46.2 billion.

“The FY 2012 budget request closes the Holifield Radioactive Ion Beam Facility at the Oak Ridge National Laboratory, which will save \$10.3 million.”

*The FES funding request increase, as compared to the '11 request, with an increase in ITER project funding compared to '11, is notable and important. This is especially true with fusion seen as a long-term venture. **We need to support this.***

The Administration is committed to targeted science investments with near-term payoffs

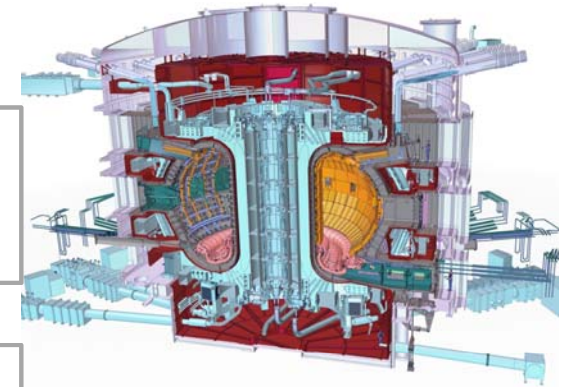
- In the Office of Science, the Department requests \$5.4 billion, a 9.1 percent or \$452 million increase over the FY 2010 current appropriation levels, and a 4.6% increase over the FY 2011 request, to advance U.S. leadership in basic and applied science and to support targeted investments in basic research relevant to new clean energy technologies
- The focus is on investments that have the promise of paying off in the marketplace in the near term. BES's Energy Hubs are an example of this. It is as measured with these priorities that this fusion research program is being developed and executed.
- Fusion's request of \$399.7M represents a 6% decrease compared to the FY 2010 appropriation and a 5.1% increase over the FY 2011 request.

Science overall does comparatively well in this budget while other federal discretionary endeavors are challenged. With this in mind, fusion will be the envy of many.

The notable progress in constructing ITER is being duly noted in the SC rollout, and is influencing the conversation in Washington

This past year, the U.S. led a series of initiatives to put in place a world-leading management team essential for the construction phase of ITER, and to establish a credible schedule and cost basis.

We would be confronting a very different situation were it not for these efforts. The community needs to stay strongly behind this work carried out in support of ITER.



The ITER Device

Site construction and strong management has been emphasized in Washington discussions and the SC rollout



Director General Motojima

FES priorities govern the choices we've made in the face of budget pressures

- **ITER project and future program** → This past year was marked by an outstanding effort by SC leadership in addressing critical issues. Our ITER future drives the demand for continued or growing major facility operations, 3D physics, careful consideration for how we proceed with validated simulation, and growth of international research. The ITER project and related physics requires continued strong community support
- **Plasma control science** → Major facility operations and upgrades need to be sustained or grown. International research needs to be developed and strengthened. FNSF-scenario-relevant and burning plasma research needs to be focused and strengthened.
- **Materials science/fusion nuclear science** → Materials science investment required in experiment as well as computation. Also places emphasis on major facility operations.
- **The Plasma 2010 call for a federal home for plasma science** → need to grow Discovery Science to provide opportunity for non-BP-related experiments to compete, especially where we have opportunities for leverage
- **Budgetary constraints and implications for how we govern our science** → careful consideration of the Fusion Simulation Program is in order after completion of planning activity in FY'11
- **HEDLP science to inform IFE and for discovery, maximizing leverage with other agencies and laboratories, priority for near-term results, and capturing our ARRA investments** → FES will reconfigure some of our HEDLP research portfolio, through solicitation, review, and assessment by this office

Fusion Energy Sciences FY 2012 Budget Request

Dollars in Millions

	<u>FY 2010*</u>	<u>FY 2011 Cong Req.</u>	<u>FY 2012 Cong. Req.</u>
<u>Funding by Subcategory</u>			
Science	177.4	185.9	177.8
Facility Operations	223.0	170.0	195.9
Enabling Research and Development	25.6	24.0	26.0
TOTAL	426.0	380.0	399.7
<u>Funding by Facility</u>			
DIII-D	65.1	66.4	68.6
C-Mod	26.5	27.5	28.5
NSTX**	47.1	47.3	49.7
<u>Funding of Base and ITER</u>			
Non-ITER	291.0	300.0	294.7
ITER	135.0	80.0	105.0

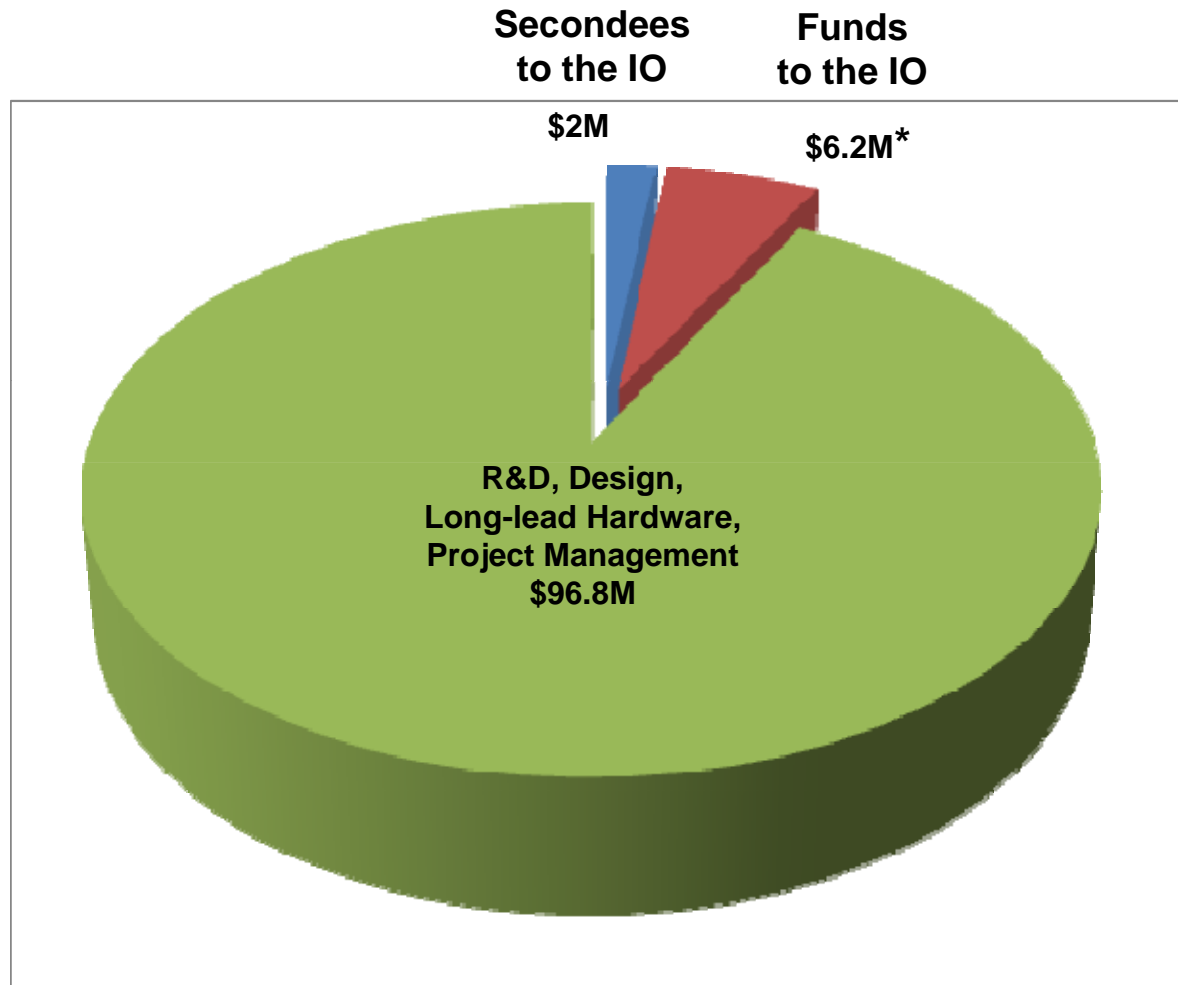
*Recovery Act Funding is not included.

**Includes NSTX MIE for upgrades.

ITER Funding Situation and Impact

- The \$105M request for the U.S. ITER Project reflects the increased pace of the international project after agreement on an integrated project schedule and the appointment of a new, highly qualified construction management team at the ITER Organization in 2010. Compare to the FY'11 request for \$80M.
- These positive developments increase our confidence that ITER can be built successfully. The project is now transitioning into the construction phase.
- The US ITER Project funding provides for a prudent and cautious approach to industrial design and procurement of long-lead items in its two costliest systems – the Tokamak Cooling Water System, and the Central Solenoid Magnets and Structure. The emphasis will continue to be on value engineering and schedule/cost risk-minimization.

FY 2012 Congressional Funding for ITER is \$105M



* The U.S. contribution is reduced by prior, credited work by the U.S. for the IO

FY 2012: Fusion Program Budget Increases

- NSTX Upgrade (+\$5.7M, to \$14.6M in FY'12)
 - Funding profile consistent with project baseline of \$94.3M, with completion in September 2015
 - Upgrade will pave the way for a possible future device for our nuclear science initiative
- DIII-D (+\$3.5M, to \$68.6M) and C-Mod (+\$2M, to \$28.5M)
 - Increase will maintain run weeks. Focus will remain on addressing ITER design and operational scenario development, and attention to fusion nuclear science-specific research needs will increase.
- International Research (+\$2.4M, to \$.7.4M)
 - Enhance our collaborative activities to take full advantage of emergent opportunities in overseas facilities with state-of-the-art capabilities in both plasma control and materials.

FY 2012: Fusion Program Budget Increases

- **General Plasma Science (+\$2.3M, to \$16.8M in FY'12)**
 - Prepare for new proposals in discovery science that lever cross-agency and international partnership
 - Provide funding for the third Plasma Science Center which was initially funded by the Recovery Act
- **Materials Research (+\$1.2M, to \$7.7M)**
 - Increase will enable an initial response to the ongoing FNS Pathways Assessment
- **SciDAC (+\$1.1M, to \$8.3M)**
 - Initiate a new computational materials project that will address the interactions of different materials that will be located in and around the fusion chamber

FY 2012: Some Comments on Fusion Program Budget Decreases

- ICC (-\$6.5M, to \$11M in FY'12)

The number of research elements was reduced for FY'11, following redirection. Budget levels will likely have to be reduced compared to those planned for FY'11. Also, some research will be encouraged to compete in the arena of General Plasma Science

- FSP (-\$4M, to 0)

Introduce a pause after completion of the planning in FY'11. This will enable this office to assess the planned approach and the implications of such a program on computational research governance in the face of mounting budget pressures

- NSTX Operations and Research (-\$3.1M, to \$35M)

Reflects shift to upgrade activities

FY 2012: Fusion Program Budget Decreases

- GPE/GPP/Infrastructure (-\$1.5M, to \$0.5M in FY'12): reflects budget pressures and recent ARRA investments
- MST (-\$1.0M, to \$6M): reflects budget pressures
- Plasma Tech (-\$1.87M to \$13.9M): this area had received increase from additional Congressional \$5M appropriation in FY'10

On IFE...

- Any new initiative will depend on the output of the NAS study, ignition on NIF, and available budget authority

We will be contacting you with more detailed guidance with the upcoming FWP's in mind

- If you wish to follow up with discussion prior to this guidance, please call Shahida Afzal (301-903-4941) or Marty Carlin (301-903-4096) and we will set up a time.
- ITER John.Glowienka@science.doe.gov
- DIII-D Mark.Foster@science.doe.gov
- C-Mod Mark.Foster@science.doe.gov
- International Steve.Eckstrand@science.doe.gov
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- SBIR/STTR Barry.Sullivan@science.doe.gov
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- HEDLP Mark.Koepke@science.doe.gov
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- Theory/Modeling John.Mandrekas@science.doe.gov
- SciDAC John.Mandrekas@science.doe.gov
- FSP John.Mandrekas@science.doe.gov
- Gen. Plasma Sci. Mark.Koepke@science.doe.gov
- Enabling R&D Gene.Nardella@science.doe.gov (Pl. Tech, Adv. Design Studies, Materials)

FY 2012 Budget Request Reflects Commitments to Burning Plasma Science, Recently Identified Gaps and Opportunities, and Discovery Science

- High priorities: support of ITER and supporting activities, including developing its research scenarios, and reaching towards fusion nuclear science and materials science
- These choices are driven by the need to establish fusion's credibility. Also, FES remains committed to being a home for discovery science. The choices made reflect challenges of making programmatic moves to reinforce these priorities in an extraordinary budgetary environment.
- This office looks forward to working with, labs, universities, and private industry to ensure ongoing efforts and initiatives in plasma control and materials science reflect the strongest scientific endeavors this country can develop

Fusion Energy Sciences
FY 2012 CONGRESSIONAL Budget
(Budget Authority in thousands)

	FY 2010	FY 2012
	Approp (Sept AFP)	CONG
Science		
DIII-D Research	27,255	28,888
C-Mod Research	9,035	10,454
International Research	5,075	7,435
Diagnostics	3,911	3,519
OTHER: HBCU, Education, Outreach, Reserves	7,105	10,604
SBIR/STTR	8,350	8,186
Subtotal Tokamak Research	60,731	69,086
NSTX Research	16,868	17,549
Experimental Plasma Research	17,494	11,000
High Energy Density Lab Plasmas	24,538	24,741
MST Research	7,042	6,000
Subtotal Alternates Research	65,942	59,290
Theory and Modeling	25,105	24,348
SciDAC	7,182	8,312
Fusion Simulation Program	4,000	0
General Plasma Science Research	14,435	16,780
Total, Science Research	177,395	177,816

	FY 2010	FY 2012
	Approp (Sept AFP)	CONG
Facilities Operations		
DIII-D Operations	37,830	39,731
C-Mod Operations	17,424	18,042
NSTX Operations	21,320	17,504
NSTX Upgrade MIE (sum TEC & OPC)	8,950	14,630
OTHER - Infrastructure	495	400
ITER Preparations		
OTHER - GPE	490	110
OTHER - GPP	1,493	465
OTHER - Strategic Planning Initiative (Materials)	0	0
ITER MIE OPC	20,000	15,000
ITER MIE TEC	115,000	90,000
Total, Facility Operations	223,002	195,882
Enabling R&D		
Plasma Technology	15,772	13,906
Advanced Design Studies	3,364	4,367
Materials Research	6,467	7,729
Total, Enabling R&D	25,603	26,002
Total, Fusion Energy Sciences	426,000	399,700