

Fusion Energy Sciences Program Update

Presented to the

Fusion Energy Sciences Advisory Committee

By

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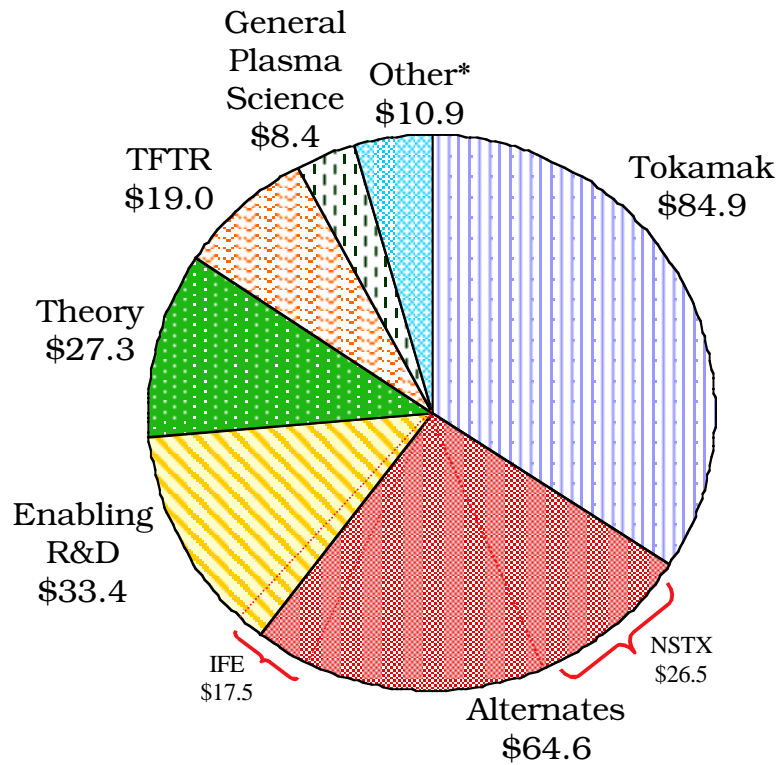
Fusion Energy Sciences Program FY 2002 Congressional Request

Summary

- o Request -- **\$248.5M**
- o Level with respect to FY 2001 Appropriation -- no cost of living
- o TFTR D&D no planned \$2M increase -- 9/02 completion
- o TSTA increased \$1M for cleanup (no Japanese funding)
- o Materials held constant by taxing Enabling R&D
- o Impact of no cost of living is loss of 100 positions

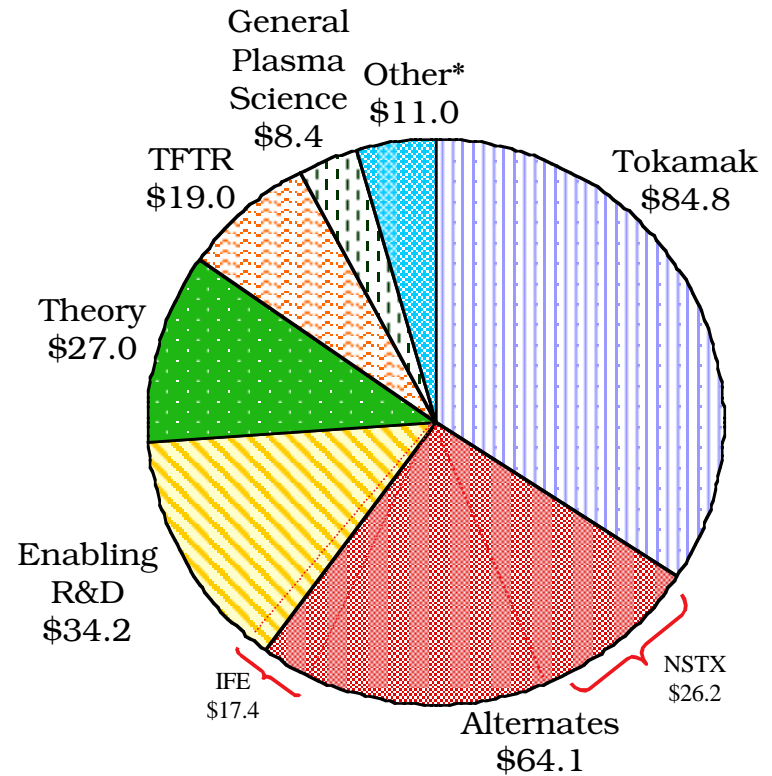
Fusion Energy Sciences Budget

FY 2001
Appropriations



\$248.5 M

FY 2002
Congressional Request



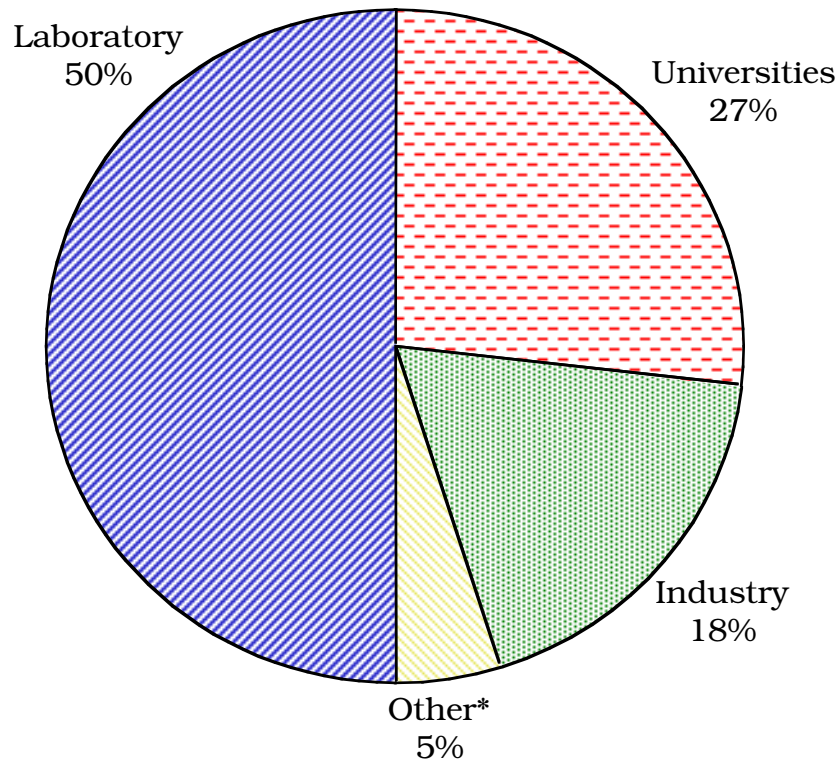
\$248.5 M

*Waste Management
SBIR/STTR
GPP/GPE

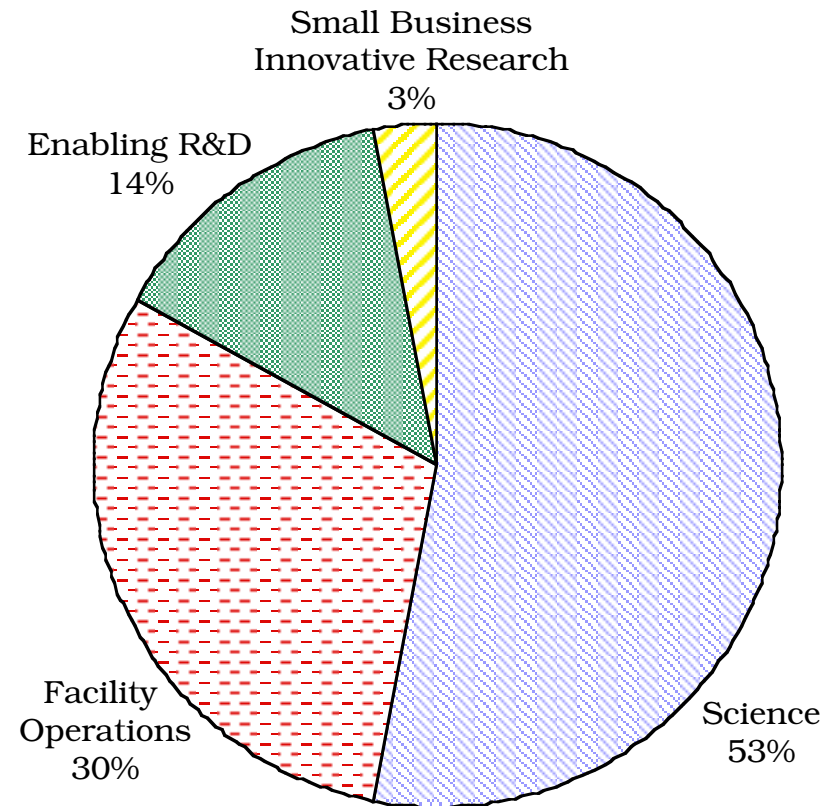
Fusion Energy Sciences Funding Distribution

FY 2002 Request

Institution Types



Functions

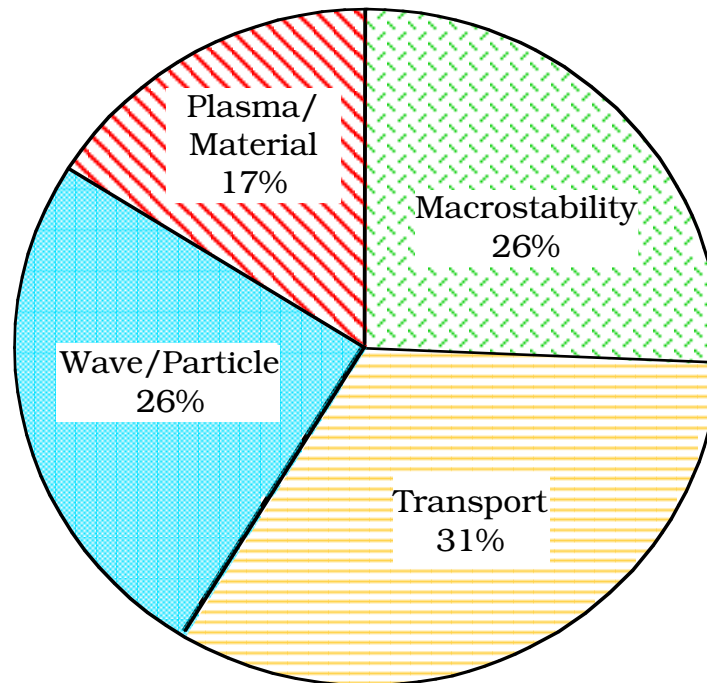


*NIST/NSF/NAS/AF
SBIR/STTR
Undesignated

Fusion Energy Sciences Budget

FY 2002 Request

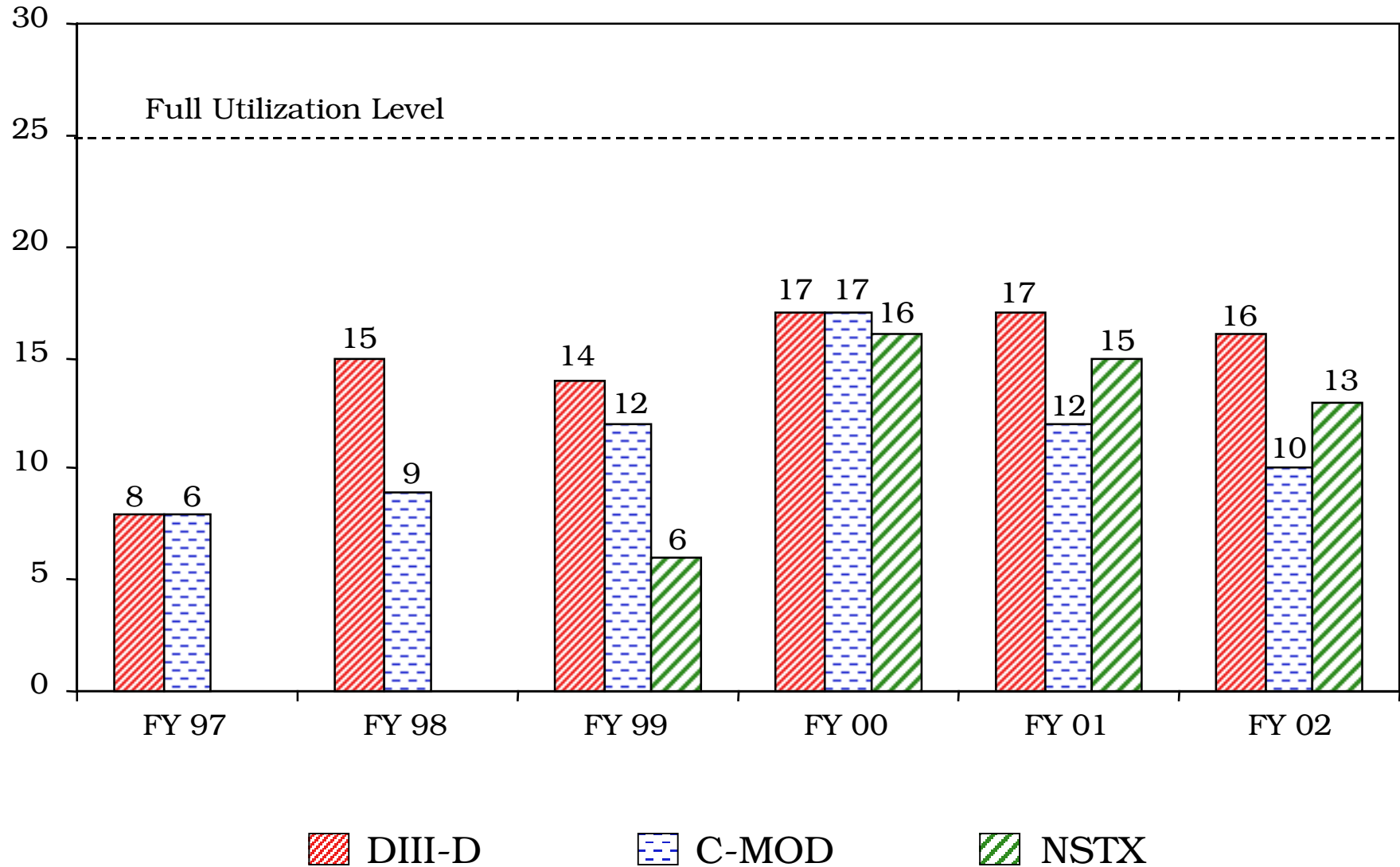
Science Issues



Includes science sub-elements only,
Does not include facility operations.

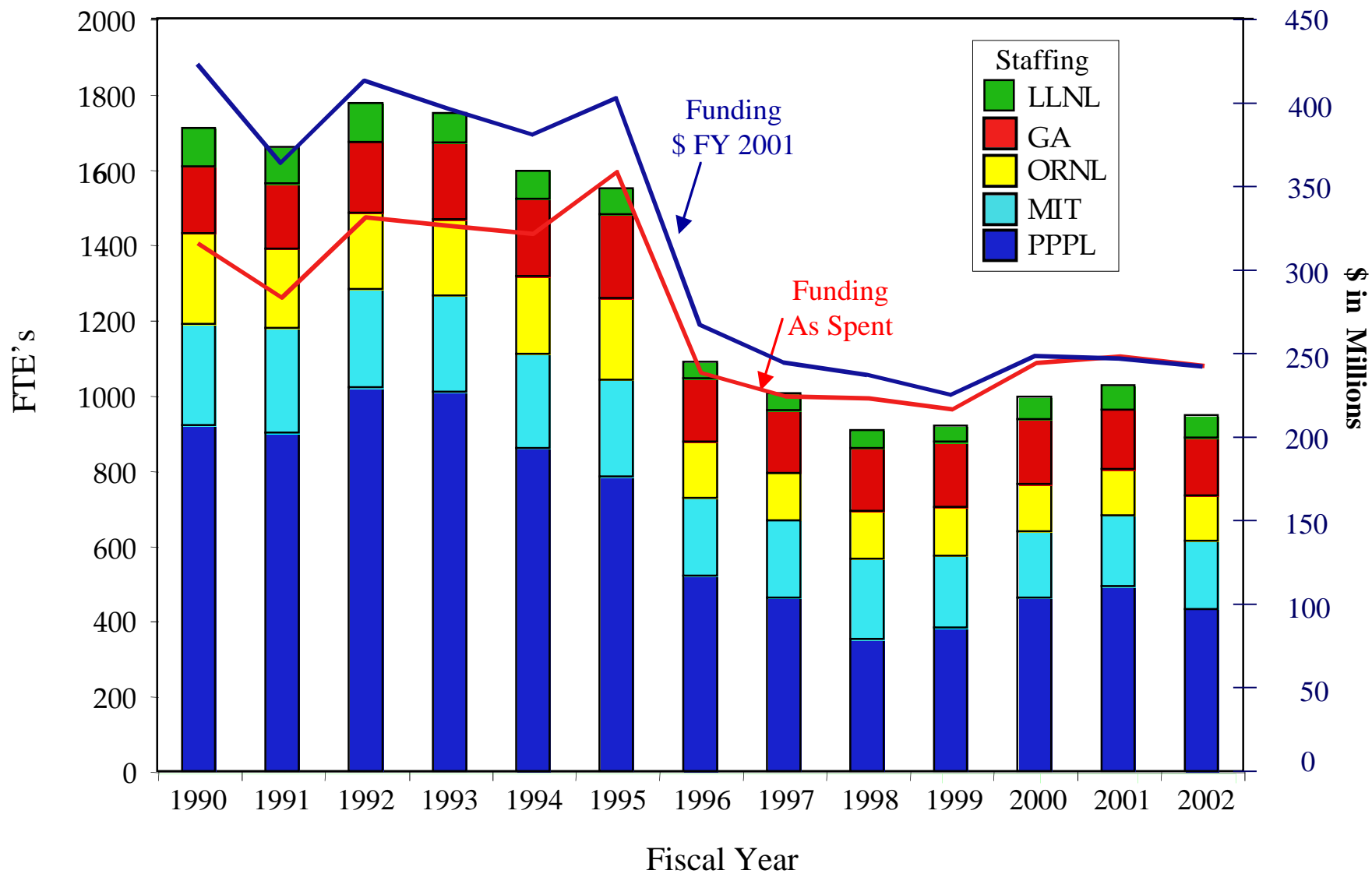
Major Fusion Facility Use

Based on \$248.5M



Staffing Trends at Major Fusion Contractors

Based on \$248.5M



Scientific Discovery Through Advanced Computing -- SciDAC

Notice 01-10 and Lab Announcement 01-10

- o Scientific Simulation codes needed to **address complex problems in fusion energy science**
 - Six topical areas that require capabilities of terascale computers

20 Preproposals → **13 Proposals**

- o Two part peer review (mail and panel) **completed April 24**
- o **43 mail reviews** were carried out by 33 reviewers
- o **Excellent Proposals** - 6 rated 8.33 or higher on 10 point scale

SciDAC Evaluation Process

- **Three or four mail reviews carried out for each proposal**
 - Reviewers included fusion plasma scientists both from within and without the US, scientists from related disciplines and scientists with computational expertise
- **12 Panel members chosen from among the mail reviewers**
 - Each proposal had been reviewed by at least one Panel member
 - Panel members had access to all the submitted reviews (mail reviewer name were not disclosed)
- **Panel member discussed each of the proposals in detail**
 - Some proposals eliminated from further consideration
- **Remaining proposals reviewed by one or two panel members who had not previously reviewed the proposal**
 - Reviews carried out during a 1.5 hour break
- **Further discussion of the remaining proposals resulted in the Panel's recommendations to OFES**
- **Panel's final rating of proposals along with OFES programmatic considerations led to the OFES decisions regarding the award of SciDAC funds.**

Solicitation Response Summary

	<u>Proposals</u>	<u>Joint Lab/Univ.</u>	<u>Univ.</u>	<u>Lab</u>
Turbulence	1	1		
MHD	3	2		1
Magnetic Reconnect	2		2	
Wave/Particle Inter.	1	1		
Boundary Layer	4	2	1	1
Inertial Fusion Energy	2	2		

The **13 applications/proposals** are generally collaborative involving on average **4 institutions**. More than of **14 universities**, **6 companies**, and **7 National laboratories** were involved in the proposals submitted

Results of Fusion SciDAC Evaluation Process

Three Proposals Fully Funded

- o **Magnetic Reconnection Code** (Bhattacharjee)
University of Iowa, University of Chicago, U. Texas
- o **Terascale Atomic Physics** (Pindzola)
Auburn U., Rollins College, ORNL
- o **Computation of Wave Plasma Interactions** (Batchelor)
ORNL, PPPL, MIT, Lodestar, CompX

Two Pilot Projects Continued

- o **Extended MHD Modeling** (Jardin)
PPPL, SAIC, U. Wisconsin, NYU, U. Colorado,
MIT, Utah State U., GA, LANL, U. Texas
- o **Plasma Microturbulence** (Nevins)
LLNL, GA, PPPL, U. Maryland, U. Texas, U. Colorado, UCLA

Competitive Review of Advanced Diagnostics Development Program

- o Looking to revitalize the program in flat budget scenario
 - **No new money**
- o Seeking proposals to **develop new** measurement capabilities in a given class of magnetic fusion devices
- o Entire existing diagnostics program is being competed for FY 2002
- o New submissions are encouraged

Status of Diagnostics Review

- o Federal Register Notice for Grant **submissions published April 23, 2001**
- o Announcement for lab submissions (and Grants) on the **Office of Science Grants and Contracts Web site**
- o Letter of intent **due June 28, 2001**
- o Proposals **due August 1, 2001**

TFTR D&D Status

- o DOE (Lehman Review) conducted a **major cost and schedule review in December 2000**
 - TFTR D&D Project, which began in October 1999, is proceeding very well
 - Project is on cost (\$40.3M*) and schedule (9/02)
- o The most significant technical activity of this project, **filling the vessel with concrete** and **cutting**, removing and **transporting the vessel segments** to a DOE waste repository, will begin this summer.

*Does not include ~ \$3.5M/year of caretaking or DOE management reserve

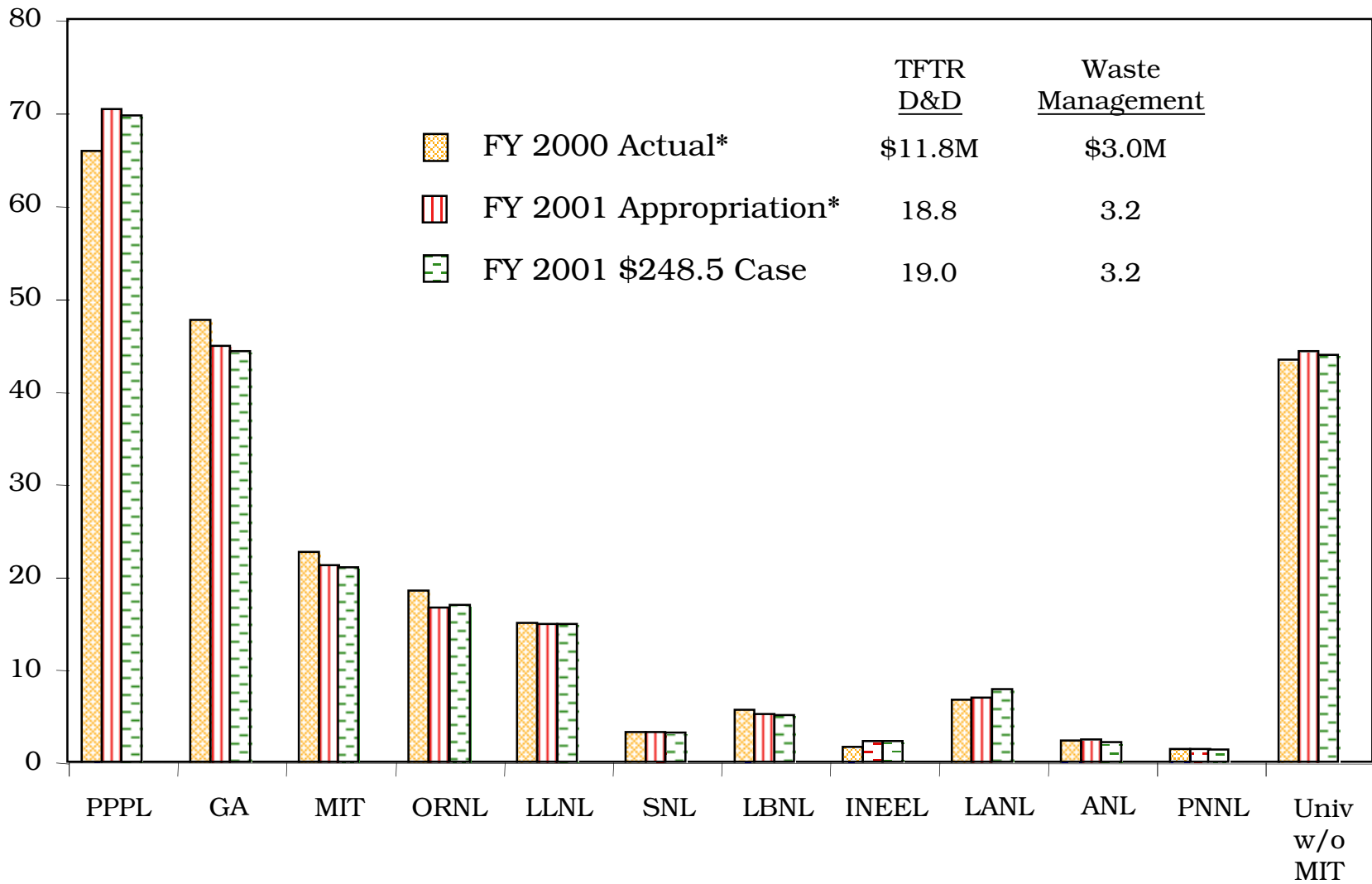
European and Japanese Fusion Policy

- o “Towards a European Strategy for the Security of Energy Supply” -- Commission of the European Communities, 11/29/00
 - First priority for nuclear energy:
 - “Supporting research into the reactors of the future, notably nuclear fusion, and continuing and stepping up research into irradiated fuel management and waste storage.”
- o Draft Report of Japanese “Special Committee on ITER Project” -- approved by Japan Atomic Energy Commission, 4/3/01
 - “...the Committee has concluded that hosting the ITER in our country is of great significance for our country as well as taking a main role in the ITER project.”

Background

Fusion Energy Sciences Funding by Institution

(\$ in Millions)



*SBIR/STTR not in FY 2000 and FY 2001

The NSF/DOE Partnership in Basic Plasma Science and Engineering

- o The **partnership grew** out of the **restructuring of the fusion energy program** and the **initiation of a general plasma science program** within OFES
 - Five year memo of understanding signed in late 1996
 - Major announcements of opportunity in FY 1997 and FY 2000
 - In “off” years, NSF and DOE jointly review basic plasma science proposals submitted to NSF Physics and other Divisions
 - Since 1997, almost 500 proposals have been reviewed under the partnership
 - OFES total funds in this time (through FY 2001) more than \$16M
 - OFES has funded or jointly funded with NSF more than 55 proposals
 - Negotiations to renew the Partnership will begin this summer
 - Joint funding of plasma science centers will be a part of the discussions

NRC Executive Summary Primary Recommendations

1. Increasing scientific understanding of fusion-relevant plasmas should become a central goal of the U.S. fusion energy program on a par with the goal of developing fusion energy technology, and decision-making should reflect these dual and related goals.
2. A systematic effort to reduce the scientific isolation of the fusion research community from the rest of the scientific community is urgently needed.
3. The fusion science program should be broadened in terms of both its institutional base and its reach into the wider scientific community; it should also be open to evolution in its content and structure as it strengthens its research portfolio.
4. Several new centers, selected through a competitive, peer-review process and devoted to exploring the frontiers of fusion science, are needed for both scientific and institutional reasons.
5. Solid support should be developed within the broad scientific community for U.S. investment in a fusion burning experiment.
6. The National Science Foundation should play a role in extending the reach of fusion science, as well as sponsoring general plasma science.
7. There should be continuing broad assessments of the outlook for fusion energy and periodic external reviews of fusion energy science.

Theory Funding

