

# OFES Perspective

Presentation to FESAC  
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U.S. DEPARTMENT OF  
**ENERGY**

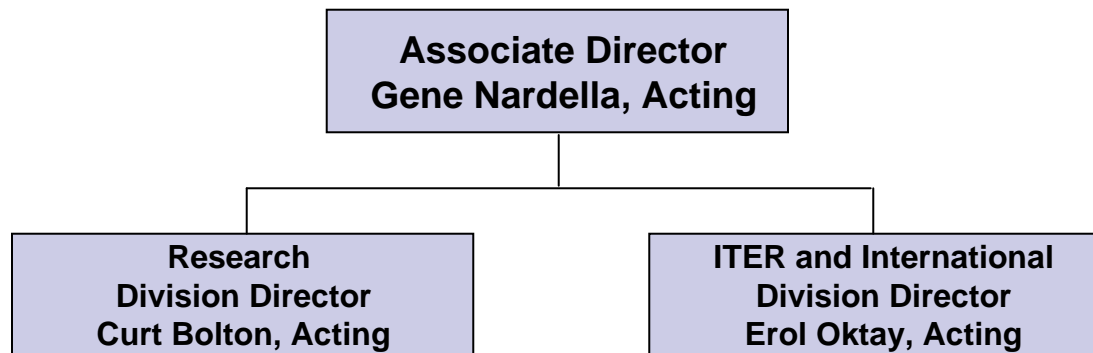
Office of  
Science

# Outline

- OFES Staffing Issues
- FY 2009 Budget
- Stellarators
- NSTX Upgrades
- ITER
- Solicitation Status and Schedule
- Strategic Planning Activities

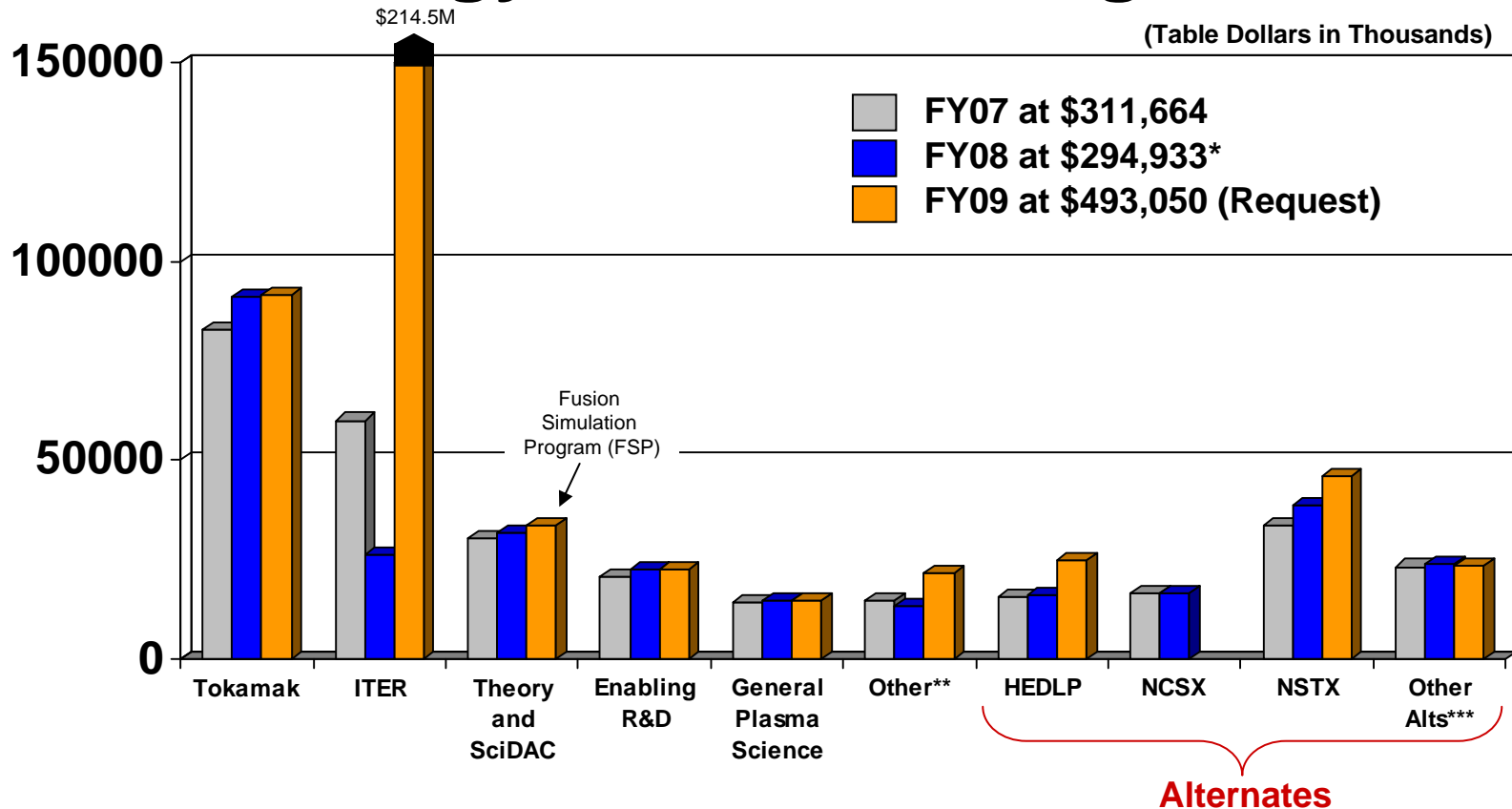
# Staffing Issues

- Management and Division Structure remain unchanged.
- Management roles continue to be filled with Acting Associate Director (AD) and Division Directors (DD).



- Announcement for New AD position closed on October 22, 2008.
- Postings for DD positions and OFES reorganization are delayed until New AD is selected and on board.
- Hutch Neilson (PPPL) is serving as detailee to assist with strategic planning and MFE-related Research Needs Workshop. Effective October 2008.
- Appointment of an IPA is expected in January 2009 to assist with strategic planning for basic plasma science area including High Energy Density Laboratory Plasmas (HEDLP), as a follow-up to NRC 2010 Decadal Study and FESAC HEDLP Panel.

# Fusion Energy Sciences Budget



- **FY 2008 National Compact Stellarator Experiment (NCSX) Terminated.**
- **FY 2009 Request for NCSX reallocated; FY 2009 details include:**
  - Full funding for ITER
  - Increase in facilities operations including planning for proposed upgrades for NSTX
  - Increase for two initiatives -- FSP and HEDLP
  - Continuing Resolution (CR) in place until March 6, 2009

\*Includes \$15.4M in Supplemental funding for ITER

\*\*Includes: International, HBCU, Education, IPA/Detailees, SBIR/STTR, GPP/GPE, Env. Monitoring

\*\*\*Includes: Experimental Plasma Research and Madison Symmetrical Torus

# Stellarators

- NCSX closeout costs were provided for in FY 2008.
- FY 2009 funding (\$20.25M) planned for NCSX has been redirected as follows:
  - Increases in Operations for all three major facilities including planning for proposed upgrades for NSTX } +16.85M
  - Enhanced stellarator research } +3.4M
- The Stellarator community is preparing a plan for OFES review with the key objective being the pursuit of the benefits of quasi-symmetry.

# Plans for the National Spherical Torus Experiment (NSTX)

- **In FY 2009, funding redirection will provide for increases in facilities operations including planning for proposed upgrades for NSTX.**
  1. New center stack magnet assembly that will double the magnetic field
  2. A second neutral beam (NB) line that will double the NB power into heating the plasma
- **The upgrades are aimed at maintaining NSTX as a world leader in research on the spherical torus concept.**
- **The proposed funding and schedule for the upgrades must be better defined before proceeding.**

# ITER from a Program Perspective

- In January 2008, DOE approved Critical Decision 1 (Approve Alternative Selection and Cost Range) which sets the Total Project Cost (TPC) range at \$1.45 to \$2.2 billion (as spent) and the schedule range for U.S. ITER Project completion (Critical Decision 4) at FY 2014 – 2017.
  - CD-1 approval preceded the significant funding cut contained in the FY 2008 Omnibus Appropriation; impacts on the cost and schedule ranges are likely.
  - The FY 2009 Appropriation will determine the extent that the project can resume fulfilling its commitments to design and R&D, long-lead procurements, and funding contributions to the ITER Organization. A year-long CR could be problematic depending on specific guidance.
- Despite the funding problems, the U.S. has remained fully engaged in ITER activities at the international level, including those subsidiary bodies associated with its governance. The Export Control Working Group is the newest, established in FY 2008.
- The most urgent tasks at present are to complete work on the overall ITER design and systems engineering and establish realistic schedule and cost baselines.

# OFES Solicitation Status and Schedule

OFES-NNSA Joint Solicitation in HEDLP	Closed 09/11/2008 45 Lab Proposals / 84 University Proposals S. Barish
NSTX Diagnostics Collaborations	Closed 09/25/2008 11 Proposals Received & Under Review S. Eckstrand
NSF/DOE Partnership	Closed 10/22/2008 144 Proposals Received M. Crisp
Fusion Simulation Program	Proposals Due 12/10/2008 J. Mandrekas
Plasma Science Centers	7 Pre-proposals Under Review Full Proposal Due 01/30/2009 M. Crisp
Innovative Confinement Concepts	To be issued in Winter of 2009 S. Barish
NSTX Laboratory Only	Planned for Fall 2009 S. Eckstrand



# OFES Strategic Planning

## (Near-Term & Long-Range Activities)

### ■ Why?

- OFES Program is entering into the ITER/Burning Plasma era.
- Congress directed DOE to provide a report that describes a credible plan for a world-leading U.S. fusion program by March 1, 2009.

← **Near-Term**

### ■ How?

- OFES is developing a Strategic Plan Overview for the entire fusion program to respond to the Congressional Request.
- Draw upon recent and soon-to-be-completed reports and studies.

FY 07 { – The National Research Council (NRC) report, “Plasma Science - Advancing Knowledge in the National Interest”, May 2007

FY 08 { – “Priorities, Gaps and Opportunities”, October 2007 (Greenwald Panel)

FY 09 { – Toroidal Alternates Panel, November 2008 (Hill Panel)  
– HEDLP Panel, January 2009 (Betti Panel)

- Conduct a series of Research Needs Workshops (ReNeWs) to obtain input for the detailed Strategic Plan(s).

← **Long-Range**

# Completing the Near-Term Activity

- The Outline of the Strategic Plan Overview is being presented to you today.
  - Following today's discussion and feedback, DOE will complete a draft of the Plan.
  - FESAC will receive a draft of the Strategic Plan Overview in the late November/early December 2008 timeframe for review and comment.
  - FESAC should present a single set of comments at the January 13-14, 2009 FESAC Meeting, with the final set to DOE by January 20, 2009.
  - DOE will consider the FESAC input in developing the final version of the Strategic Plan Overview.

# Follow-up with the Long-Range Activity

- **The two letters to the community described the intentions of the Near-Term and Long-Range activities (Letters of September 19 and October 16 from Gene Nardella)**
- **OFES will use workshop reports as basis for a Long-Range Strategic Plan.**
- **Conduct the Magnetic Fusion Energy Sciences (MFES) workshop first with a current schedule to complete the MFES Strategic Plan by March 2010.**
- **Conduct similar workshop(s) for the Plasma Science and HEDLP elements of the program to provide input into the Plasma Science/HEDLP Strategic Plan(s).**

# MFES Research Needs Workshop

## June 8-12, 2009, North Bethesda, MD

### ■ Themes:

- Producing High-Performance Plasmas (Greenwald)
  - Taming the Plasma-Materials Interface (Greenwald)
  - Harnessing Fusion Power (Greenwald)
  - Understanding the Burning Plasma State
  - Optimizing the Magnetic Configuration (Hill)
- **Will require extensive preparation and community participation**
- **Attendance at workshop will be by invitation only**

# Workshop Structure, Leadership and OFES Champions

Magnetic Fusion Energy Sciences Program

Workshop Leadership  
**Richard Hazeltine, Chair**  
**David Hill, Vice Chair**  
**Hutch Neilson, PPPL\***  
**Al Opdenaker, OFES\*\***

**Burning Plasma State**

**Jim Van Dam, Chair**  
**Mickey Wade, V.Chair**  
**John Mandrekas OFES\*\***

**High-Performance Steady-State Plasmas**

**Amanda Hubbard, Chair**  
**Chuck Greenfield, V.Chair**  
**Mark Foster OFES\*\***

**Plasma Material Interface**

**Mike Ulrickson, Chair**  
**Rajesh Maingi, V.Chair**  
**Rostom Dagazian OFES\*\***

**Harnessing Fusion Power**

**Wayne Meier, Chair**  
**Rene Raffray, V.Chair**  
**Barry Sullivan OFES\*\***

**Optimizing the Magnetic Configuration**

**John Sarff, Chair**  
**Mike Zarnstorff, V.Chair**  
**Sam Barish OFES\*\***

- Alpha particles
- Size scaling
- Thermonuclear environment
- High performance and burn control
- Self-organized profiles
- Non-linear coupling and integration

- Measurement
- Integration
- Validated Predictive Modeling
- Control
- Off-Normal Plasma Events
- Plasma Modification by Auxiliary Systems
- Magnets

- Plasma-Wall Interactions
- Plasma-Facing Components
- Internal Components

- Fuel Cycle
- Power Extraction
- Materials Science
- Safety
- RAMI

- Stellarator
- Spherical Torus
- Reversed Field Pinch
- Compact Toroids

**Notes:**  
**\* Hutch Neilson (PPPL) is on detail to OFES to assist with the MFE strategic planning activities.**  
**\*\*OFES staff members listed will serve as OFES Champions to assist in all related activities.**

# Challenges and Changes Ahead

- **Receive and Respond to the FY 2009 Appropriation**
- **Transition to a New Administration**
- **Fulfill Near-Term and Longer-Term ITER Commitments**
- **Enhance OFES Leadership**
- **Complete and Implement Strategic Planning Activities and Results**