

# FES Update and Considerations for Strategic Planning

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*DOE is developing a high level plan to report to Congress, and a process for continued community input*

- **Moving forward: DOE is considering the FESAC report, past FESAC advice, community input, and other considerations as we construct a report for Congress**
- **We will launch a series of workshops in the new year to obtain further input for planning in four research areas**



# ***FY 2015 Budget Language and Comments***

***Strategic Planning: DOE  
considerations and community  
workshops***

***ITER***



## FY 2015 budget, high level

- The non-ITER part of the budget will increase compared to FY 2014 (by \$12,323,000 = 4%)
- The ITER construction part of the budget will be reduced (by \$49,500,000 = 25%)
- Congress was generous as compared to the President's request



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# Regarding the Congressional language (1)

- **Scientific discovery report requested**

- “The agreement further directs the Office of Science to submit to the Committees on Appropriations of the House of Representatives and the Senate not later than 180 days after enactment of this Act a report on the contribution of fusion energy sciences to scientific discovery and the development and deployment of new technologies beyond possible applications in fusion energy.”

- ***This is a likely FESAC activity***

- **On ITER**

- “*Provided further*, That no funding may be made available for United States cash contributions to the International Thermonuclear Experimental Reactor project until its governing Council implements the recommendations of the Third Biennial International Organization Management Assessment Report: *Provided further*, That the Secretary of Energy may waive this requirement upon submission to the Committees on Appropriations of the House of Representatives and the Senate a determination that the Council is making satisfactory progress towards implementation of such recommendations.”

- ***DOE and the Administration are monitoring this closely***



# Regarding the Congressional language (2)

- **Community engagement workshops**
  - The Office of Science is further directed to seek community engagement on the strategic planning and priorities report through a series of scientific workshops on research topics that would benefit from a review of recent progress, would have potential for broadening connections between the fusion energy sciences portfolio and related fields, and would identify scientific research opportunities.
  - The Department is directed to submit to the Committees on Appropriations of the House of Representatives and the Senate not later than 180 days after enactment of this Act a report on its community engagement efforts.

***Planning and community discussions are underway. More on this later***



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# ***FES Strategic Plan Development***



## **DOE considerations for planning and a path forward were discussed in a UFA Town Hall meeting at APS-DPP in October**

**In the discussion, I aimed to address questions of how we will proceed after receipt of FESAC's report on strategic priorities, given great community interest and concerns**

**Thanks to the University Fusion Associates for offering this forum**

**DOE is considering the FESAC report, past FESAC advice, community input, and other considerations in constructing a report for Congress**

**A question many have: what do next steps look like?**





- **FESAC deserves credit for having:**
  - Addressed the charge fully—making tough choices for priorities, within constrained budget scenarios
  - Invested enormous effort by the Subcommittee
  - Solicited community input
  - Succeeded in mapping priorities into the proposed new FES budget structure



## Regarding the DOE plan

- **Science:**
  - It will articulate the highly scientific nature of the fusion/plasma enterprise
- **Structure:**
  - It will be expressed along the new programmatic lines (i.e., Foundations, Long Pulse, High Power, & Discovery)
- **Leverage:**
  - It will emphasize need for and benefits from sensible intra/inter-agency leveraging
- **Pedigree:**
  - It will embrace initiatives that are grounded in previous community studies



# Regarding the priorities that will be in the DOE plan

- **Many of the scientific priorities indicated in the FESAC SP Report will be included in the DOE plan because:**
  - They demand great science
  - They have a strong, vetted pedigree
  - They take advantage of U.S. strengths
  - They represent potential show-stoppers for fusion
  - They are broadly important



# The DOE plan will support initiatives in the areas identified, with some changes

Recommendation	Comments
<b><i>Control of deleterious transient events</i></b>	<b>Critical, show-stopper issue</b>
<b><i>Taming the plasma-material interface</i></b>	<b>Critical, show-stopper issue.</b> Any new PMI facilities should serve the scientific needs. Affordability critical
<b><i>Experimentally validated integrated predictive capabilities</i></b>	<b>Should be equally high priority,</b> not Tier 2. It is critical for Transients and PMI, but more broadly as well. Great leverage opportunity
<b><i>A fusion nuclear science subprogram and facility</i></b>	<b>DOE plan will not be framed around an FNSF.</b> No SC office is being supporting in planning towards a facility of such a scale. However, the existing program of fusion nuclear science will be continued and should grow



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**Validated predictive capability is  
needed as much as progress in any  
single technical issue**

*In concert with our domestic facilities, validated computing is at the heart of our foundational scientific work*

*Predictive capability provides a metric for how well our science has been established. Fusion will not advance if predictive capability does not advance*

*FES relationship with ASCR is important and a great opportunity. Administration's efforts towards exascale should be captured by FES/ASCR partnership*



# Role of facilities in the DOE plan

- **New/upgraded facilities:**
  - Under the budget assumptions we have been given for planning purposes, a start for new major construction for a facility of the scale of our present confinement facilities is highly unlikely
  - Upgrade possibilities will be emphasized in the DOE plan
  - The general concepts and motivations behind any other facilities will have a strong pedigree grounded in past community studies.
- **Regarding a fusion nuclear science facility:**
  - The DOE plan will not be framed around a drive toward such a facility
  - In the 2013 SC facilities prioritization, no program office was supported in advocating a facility demanding resources of this order
  - Still, fusion nuclear science will have an important place in the DOE plan



# Will the DOE plan have a late-decade decision point?

- **Likely, yes. But it will be multi-faceted. Such a decision point would be informed by the science, community input, and funding environment at that time**
- **What might the science tell us by that time? Examples:**
  - We may decide that the science and political support allow for a move forward even more vigorously in fusion nuclear science (but we don't know that yet)
  - We may learn that it is too risky to assume mastery of disruption prediction/avoidance/mitigation. If our international and university-scale stellarator research is successful, we might conclude that invigorated investment in this area is warranted
  - In PMI, we might learn that liquid metal divertor research results warrant moving further with this approach



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# Moving forward: community engagement workshops





# Community engagement workshops

- **The plan in January 2015 will be a high level snapshot of our priorities and intentions. Our plans need to be better informed by the community to obtain the best ideas.**
- **To promote this, workshops will be held in the spring, with preparations starting early in the new year**
  - As indicated in my UFA talk at the APS-DPP Meeting, FES is prepared to sponsor a series of community-led workshops in CY 2015 to update information about scientific issues and describe options for addressing them
  - New dimensions compared to past ReNeW activities include
    - Updating: in some areas, quite a lot has happened since 2009
    - Urgency and readiness will be emphasized
  - Discussions were held with community leaders and reps from NSF and NNSA on Monday regarding the Workshop structure and goals
- **Major areas for community input now:**
  - Integrated modeling, Transients, Plasma science frontiers, Plasma-materials interaction



## The Workshops will have a largely common organizational structure

- **Workshop structure**

- The workshop will be set up following the format of the SC Basic Research Needs series of workshops.
- FES (and in the case of computing, with ASCR) will select chair and co-chair(s) who will define the various workshop panels and sub-panels (including any crosscutting panels) and select the panel leads.
- The chair, co-chair(s) and panel leads make up the executive group of the workshop.
- The workshop report is written by the chair, the co-chair(s), the panel leads, and by select panelists designated as writers.
- Input from the entire community will be solicited during the preparation for the workshop and participation will be open. The total number of attendees will be limited to preserve the “working meeting” character of the workshop.
- **A substantial amount of work via teleconferences and other means will be done prior to the workshop**, to allow the preparation of a draft report during the last day of the workshop



# ITER recent developments

- **New Director-General nominated:**
  - Dr. Bernard Bigot was nominated as the new Director-General at the Nov 19-20 ITER Council meeting
  - An extraordinary Council meeting is being scheduled in early 2015 for the official appointment of the new Director-General
- **Project schedule:**
  - The ITER Organization and seven Domestic Agencies are engaged in constructing a realistic construction schedule
- **Management Assessment responses:**
  - Corrective action plans have been developed and are being implemented for the recommendations of the 2013 Management Assessment report
- **The Administration is fully engaged and is monitoring the progress of these activities closely**

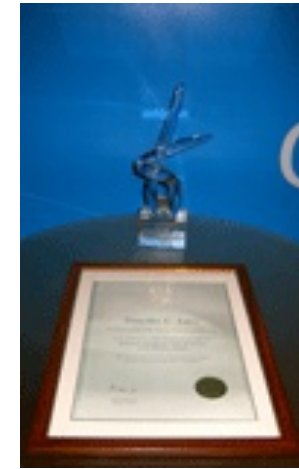


***Bernard Bigot***

Currently Administrator-General of the French Atomic and Alternative Energies Authority (CEA)



# Nuclear Fusion Prizes



- **Most recent awardees**

- 2013: Dennis Whyte (US)
- 2014: Phil Snyder (US)

Since the inception of this Prize, US scientists have received 7 of the 9 awards

- **Past awardees**

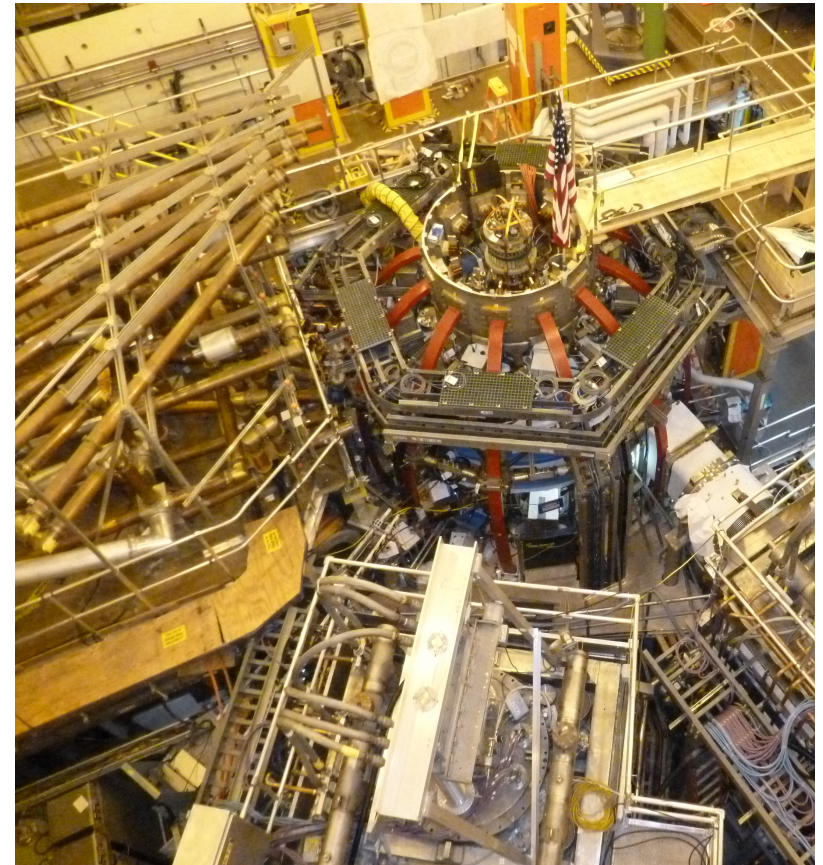
- 2006: Tim Luce (US)
- 2007: Clemente Angioni (EU)
- 2008: Todd Evans (US)
- 2009: Steve Sabbagh (US)
- 2010: John Rice (US)
- 2011: Hajima Urano (JA)
- 2012: Patrick Diamond (US)





# NSTX Upgrade project is on target to be completed in March 2015

- **Late November:** Machine pump-down; start-up of neutral beam He refrigerators
- **Early December:** Operational Readiness Assessment meeting
- **January:** Install TF lead extensions and flex bus
- **February:** Install new umbrella lids; install umbrella lid support rings
- **March:** Bake out, CD-4 review





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***Thank you***