

Perspectives on the U.S. Fusion Program

What's Past is Prologue

Basic OMB structure: Find Joel

- Political (make decisions)
 - Director → Bolten
 - Program Associate Director → Peacock
- Career (make recommendations)
 - Deputy Associate Director → Weatherly
 - Branch Chief → Mertens
 - Program Examiner → Me (i.e., the bottom of the ladder)

There's no looking back

- The community's political push for ITER, and the President's ultimate decision to reenter negotiations, irrevocably changed the context for the U.S. fusion program within the Executive Branch.
- The Administration is attempting to ensure a successful conclusion to the negotiations, but this change in context will remain no matter the outcome.
- Interest in ITER does not necessarily imply interest in FIRE or other fusion projects.

Perspectives can differ

- Congress: “The conferees strongly caution the Department against submitting any future budget requests for ITER that are funded at the expense of domestic research.” (FY04 E&W Conference Report)
- Me: Comparing ITER with “domestic research” is a distinction without a difference. There’s ONE internationally-aware scientific program, with burning plasma physics issues as the top priority.
 - By the way, using words like “new money” and “base funding” implies an entitlement.

FESAC priorities study

- Do not underestimate the importance of this effort. You have been given a viable, credible, but extremely difficult path forward.
- The community has not done this before.
- This is a ground-up effort on the scale of the astronomy decadal surveys, but in the mode of the “quarks to cosmos” report.
- The scope of this effort goes way beyond what even the astronomers have been doing for 40 years: they **implicitly** prioritize the science by ranking **new projects**, but this study should **explicitly** prioritize the science by ranking **questions** that you want to answer, not machines you already have or want to build.
- Take your time and do it right, and get regular reality checks from colleagues outside fusion.

The path forward

- Formulating the technical arguments and drivers is the job of the community, not formulating budgets and timelines.
- If this FESAC study is done properly, you will have provided OFES with the tools to build a science-based case with true budget and performance integration.
- Within the prioritization framework of the community, OFES should be able to explain the “costs,” in both scientific and monetary terms, of a decision that someone in the Administration or Congress might make.

The path forward (con't)

- In other words, OFES should be able to answer questions such as:
 - How much would it cost (in grants, facility operations, new experiments, etc.) to attempt to address these priority turbulence [or confinement, or stability, or alpha heating, or edge effect, or...] issues within the next decade? OK, so how much would the program need next year and the year after that to start down the specific path toward answering those questions?
 - If your budget was to go up/down \$N million next year, what science questions will you or won't you be able to fund people to work on?

Miscellany

- It is not credible to promise date-certain delivery of commercial fusion power.
- This is a basic research (Function 250) program, not an energy development (Function 270) program. An energy development fusion program would need to compete directly with fission, renewable, and fossil fuel options: is fusion ready to hold that competition today?
- The demographics of the field are a concern, both for 10 years from now when ITER is [hopefully] coming on line, and right now for addressing critical engineering problems as they arise (e.g., NSTX coil failure).
- High-energy density physics (not energy delivery) should be the driver for IFE investments, and public in-fighting with MFE on which technology can get to fusion power sooner/cheaper is not a fruitful path to follow.