

National Academies Study on a Strategic Plan for U.S. Burning Plasma Research

Fusion Energy Sciences Advisory Committee Meeting

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Gaithersburg Marriott Washingtonian Center

Gaithersburg, MD 20878

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Burning Plasma Study Background

- May 2016 – DOE released the report “U.S. Participation in the ITER Project”
 - Reviews the project, recommends U.S. continues to participate in ITER so long as reforms are continued, additional measures are taken.
 - Recommends revisiting this recommendation as part of the FY 2019 budget process.
 - Indicates that DOE will ask the Academies to conduct a study
 - How best to “advance the fusion energy sciences in the U.S., given the developments in the field since the last Academy studies in 2004, the specific international investments in fusion science and technology, and the priorities for the next ten years developed by the community and FES that were recently reported to Congress.”
 - Will also “address the scientific justification and needs for strengthening the foundations for realizing fusion energy given a potential choice of U.S. participation or not in the ITER project, and will develop future scenarios in either case.”

Study Development

- Worked with Plasma Science Committee (PLSC), BPA members from plasma science community
- Prepared white paper, held several rounds of discussion with DOE
- Proposal submitted – August 2016
- Project Funded – December 2016

Burning Plasma Work Plan

- Committee of about 15 experts – plasma and fusion science and engineering communities; other physics disciplines; policy experts, international researchers;
- Meet ~6 times over 20 months;
- Significant engagement of domestic and international plasma science and fusion research communities – site visits, town halls.

Statement of Task

A committee of the National Academies will be formed **to study the state and potential of magnetic confinement-based fusion research in the United States and provide guidance on a long-term strategy for the field.** The study **will focus on research** that supports understanding the magnetically confined burning plasma state but **will take a broad view** beyond plasma confinement science, and as such consider capabilities such as simulation and materials. Specifically, the committee will prepare **an interim report** that will:

- Describe and assess the **current status of U.S. research** that supports burning plasma science, including current and planned participation in international activities, and describe international research activities broadly.
- Assess the **importance of U.S. burning plasma research to the development of fusion energy** as well as to plasma science and other science and engineering disciplines.

Statement of Task (cont'd)

The committee will also prepare a **final report**, building on the interim report, which will:

- Consider the scientific and engineering **challenges and opportunities** associated with advancing magnetic confinement fusion as an energy source, including the scientific and technical developments since the 2004 NAS study on burning plasma research.
- In **two separate scenarios** in which, after 2018, (1) the United States is a partner in ITER, and (2) the United States is not a partner in ITER: **provide guidance on a long-term strategic plan (covering the next several decades) for a national program of burning plasma science and technology research** which includes supporting capabilities and which may include participation in international activities, given the U.S. strategic interest in realizing economical fusion energy in the long term.

Factors to consider

- The priorities for the next ten years developed by the community and FES that were recently reported to Congress.
- The current level of participation by U.S. scientists in international activities as well as what role international collaboration should play over the next 20 years.
- The health of the domestic fusion research sectors (universities, national labs, industry).
- Prior work of the Academies, FESAC and the domestic and foreign communities.
- The committee is not to compare fusion as an energy source against other current or potential energy sources.
- Any strategic plan should ensure that the U.S. maintains a leadership role in this field.
- The committee will consider the budget implications of its guidance but will not make recommendations about the budget for burning plasma research itself.
- Only magnetically confined burning plasma research is within the study's purview.
- The committee may make recommendations or offer comments on organizational structure and program balance, with accompanying supporting discussion of the evidentiary bases.
- The committee may assume that economical fusion energy within the next several decades is a U.S. strategic interest.
- The committee may take into account how unanticipated events or innovations may necessitate mid-course re-directions.

Any Questions?

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