



Department of Energy
Office of Science
Washington, DC 20585

Office of the Director

April 8, 2014

Professor Mark Koepke
Chair
Fusion Energy Sciences Advisory Committee
Department of Physics – White Hall 203
West Virginia University
1315 Willey Street
Morgantown, WV 26506

Dear Professor Koepke:

First, let me thank you for accepting the task of chairing the Fusion Energy Sciences Advisory Committee (FESAC) at this important time for the Fusion Energy Sciences (FES) program. We have considerable work ahead that will require thoughtful, informed advice regarding the future of fusion and plasma sciences in the United States.

The FY 2014 Omnibus Appropriations Act requires the Department to submit a strategic plan for the FES program by January 2015 with the following guidance:

“The ten-year plan should assume U.S. participation in ITER and assess priorities for the domestic fusion program based on three funding scenarios with the fiscal year 2014 enacted level as the funding baseline: (1) modest growth, (2) budget growth based only on a cost-of-living-adjusted fiscal year 2014 budget, and (3) flat funding. The January 2013 Nuclear Science Advisory Committee report on priorities for nuclear physics used similar funding scenarios and should serve as a model for assessing priorities for the fusion program.”

Based on this direction, we are asking FESAC to address the following three scenarios with the FY 2014 appropriation for the domestic program as the baseline (\$305M):

- (1) Modest growth (use +2.0 percentage points above the published OMB inflators for FY 2015 through FY 2024)
- (2) Cost of living (use the published OMB inflators for FY 2015 through FY 2024)
- (3) Flat funding

We are also asking FESAC to consider a fourth scenario with the FY 2015 President’s Request for the domestic program as the baseline (\$266M):

- (4) Cost of living (use the published OMB inflators for FY 2015 through FY 2024)



We ask FESAC to assess the priorities among continuing and potential new FES program investments required to ensure that the U.S. is in a position to exert long term leadership roles within and among each of the following areas:

- Burning Plasma Science: Foundations – the science of prediction and control of burning plasmas ranging from the strongly driven to the self-heated state;
- Burning Plasma Science: Long Pulse – the science of fusion plasmas and materials approaching and beyond ITER-relevant heat fluxes, neutron fluences, and pulse lengths;
- Discovery Plasma Science – the study of laboratory plasmas and the high energy density state relevant to astrophysical phenomena, the development of advanced measurement for validation, and the science of plasma control important to industrial applications.

You are to prioritize between the program elements defined for you by FES; your report may also include your views on new facilities, new research initiatives, and facility closures. FES interest in the study of driven as well as self-heated burning plasmas is motivated by the need to establish the scientific basis for advancing fusion nuclear science. Include in your report an assessment of the potential for strengthened or new partnerships with other federal and international research programs that may foster important scientific opportunities otherwise unavailable to U.S. fusion scientists. These may include partnerships to enable research in equilibrium sustainment of long pulses (hundreds of seconds and more), fusion neutron materials science, and multi-scale computing.

Your subcommittee should make use of prior studies. For example, the FESAC report, "Priorities, Gaps, and Opportunities," issued in 2007, identified gaps in the world's magnetic confinement fusion research program and potential initiatives the U.S. might undertake to assert leadership in select areas. The 2009 report, "Research Needs for Magnetic Fusion Energy Sciences," built on this analysis. In the area of Discovery Plasma Science, the National Academies undertook a decadal study of the field (2007), and identified research needs and opportunities for the U.S. to extend its leadership in this class of research. Since that time there have been other FESAC studies identifying research needs in the plasma sciences, in materials research, and also regarding international research opportunities.

Your report will be used as the Office of Science develops a FES strategic plan for submission to Congress by the January 2015 deadline. I therefore request that you submit your report to me by October 1, 2014.

Sincerely,



Patricia M. Dehmer
Acting Director, Office of Science