



Department of Energy
Office of Science
Washington, DC 20585

Office of the Director

JAN 30 2017

Dr. Donald Rej
Program Director
Office of Science Programs at LANL
Los Alamos National Laboratory, MS-A121
Los Alamos, NM 87545

Dear Dr. Rej:

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 program. We have considerable work ahead that will require thoughtful, informed advice regarding the future of fusion and plasma sciences in the United States.

It is necessary that the U.S. program be in the best position possible to lever the science and technology that will be advanced through burning plasma research on ITER. It will be important that we are involved in pursuits that give us the best chance of enabling the knowledge gained through ITER research to be effectively levered towards attractive fusion energy.

I am asking FESAC to identify the most promising transformative enabling capabilities for the U.S. to pursue that could promote efficient advance towards fusion energy, building on burning plasma science and technology. Your considerations should be broad, addressing advances that may occur in areas of engineering, technology, and science. Examples of focus areas could include liquid metals, additive manufacturing, high critical-temperature superconductors, exascale computing, materials by design, machine learning and artificial intelligence, and novel measurements. Please comment on the promise, level of maturity, development requirements, risks and uncertainties, and time horizon for each. Please consider global strengths and gaps in identifying areas of particular opportunity for the U.S.

We particularly seek examination of developments that can bring the tokamak and stellarator concepts closer to producing fusion power practically. Identification of R&D that may have general impact that both includes and extends beyond these concepts is welcome, but an assessment of various types of magnetic confinement devices is not to be performed.



The subcommittee you establish to address this charge might find it useful to review prior studies. For example, the 2015 DOE report entitled: "The Office of Fusion Energy Sciences Program: A Ten Year Perspective" highlighted five areas of critical importance for the U.S. fusion energy sciences enterprise over the next decade. The FESAC report "Priorities, Gaps, and Opportunities," issued in 2007, identified gaps in the world's magnetic confinement fusion program and potential initiatives the U.S. might undertake to assert leadership in select areas. The 2009 ReNeW report built on this analysis.

Please submit your report to the Director of the Office of Science by October 1, 2017.

Sincerely,



J. Stephen Binkley
Acting Director
Office of Science