



Department of Energy
Office of Science
Washington, DC 20585

March 3, 2016

Dr. Gary Stacey
Endowed Professor of Plant Science
Divisions of Plant Sciences and Biochemistry
271E Christopher S. Bond Life Sciences Center
University of Missouri
Columbia, Missouri 65211

Dear Dr. Stacey:

The Office of Biological and Environmental Research (BER) science programs continue to be driven by The Department of Energy's (DOE) basic science, energy, and environmental mission needs. BER increasingly uses a complex systems science approach to advance these science missions. This involves studying complex biological and environmental processes that range from molecular to global scales over time horizons of nanoseconds to centuries and beyond. Our goal is to obtain a holistic and predictive understanding of key biological and environmental systems to address DOE's scientific challenges of the future.

In 2009, the Biological and Environmental Research Advisory Committee (BERAC) was charged to develop a long-term, strategic vision for BER, identifying scientific opportunities and grand challenges for BER in the coming decades. The BERAC response culminated in the 2010 report (DOE/SC-0135), "Grand Challenges for Biological and Environmental Research: A Long-Term Vision." Given the breadth of scientific and technological advances that have occurred since the issuance of that report, and the scientific workshops held addressing targeted research needs and opportunities across the BER portfolio, I charge you to revisit that report and provide an updated assessment of the grand challenges for BER. Your report will advise BER in its future development of focused, effective research strategies for sustained U.S. leadership in science innovation and energy and environmental research.

I ask BERAC to consider the following questions in formulating the assessment of past and future grand challenges:

- To what extent has DOE BER successfully met, or positioned itself to meet, challenges outlined in the 2010 report that are within mission objectives of the Office of Science?
- To the extent that such predictions can be made, what are the greatest scientific challenges that DOE will be facing in the long term (20 year horizon) and for which of these should BER take primary responsibility?



- How should we position BER to address those challenges? For example, what continued or new disciplines of BER-relevant science are needed to achieve its future mission challenges?
- What new tools should be developed to integrate and analyze data from different disciplines, including the advancement of system science?
- What unique opportunities exist to partner with, or leverage assets from other programs within the Office of Science, or with other federal programs?
- What scientific and technical advances are needed to train the workforce of the future in integrative science, including complex system science?

With these questions in mind and others that may occur to you, we request that BERAC establish a subcommittee to develop an updated, overall strategy for drafting an assessment of future capabilities for BER. The BERAC subcommittee should exercise the full range of options in preparing this updated report, including discussions to determine the extent to which an update is necessary, and coordinating workshop(s) to discuss specific topics in more detail. This updated strategic assessment will support the evolution and sustained development of leading edge, transformational science programs in bioenergy, climate, and the environment.

I would like to receive a progress report on this charge at the fall 2016 meeting and an updated strategic plan by the fall 2017 meeting. Many thanks for your contributions to this important effort.

Sincerely,



C. A. Murray
Director, Office of Science

cc: Sharlene Weatherwax