OBAMA-BIDEN TRANSITION PROJECT

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Council for Photovoltaic Research

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Dear Mr. Hayes:

Attached is a white paper, *U.S. PV R&D Program: A University Perspective*, prepared by the Council for Photovoltaic Research, an organization of university faculty started in 1989 to promote and support photovoltaic research by working closely with DOE, NREL, industry, universities and Congress. In this white paper, we express our concerns with the present photovoltaics R&D program and make recommendations for how to restructure the program.

We would be happy to meet with you and your team to elaborate on these concerns and recommendations or you should feel free to contact members of the Executive Committee or Steering Committee directly. Below is contact information for members of both committees.

We hope the white paper will be helpful to your transition team in formulating a successful renewable energy plan.

Sincerely,

Robert W. Birkmire
Executive Director

Cc Elgie Holstein
Sue Tierney
Heather Zichal

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U.S. Photovoltaic R&D Program: A University Perspective

Council for Photovoltaic Research

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U.S. universities historically have played a critical role in the development of photovoltaics (PV) science and technology. Federal investments, primarily through DOE, in University PV programs have underpinned the U.S. PV industry, providing the scientific basis, technical innovation, and personnel. Through the 1990's the U.S. was the leader in advancing PV technology, providing much of the innovation that has spawned the worldwide expansion of solar cell deployment. Currently, the U.S. has lost its leadership role in silicon-based technology development and is struggling to advance thin-film technologies as a result of the focus and extent of university funding through the Office of Science's Basic Energy Sciences program (BES) and the Office of Energy Efficiency and Renewable Energy (EERE). Under the Solar America Initiative, the bulk of support for EERE-sponsored PV R&D is directed to industrial programs and towards meeting DOE's 2015 goals. Universities and national laboratories have been relegated to "service oriented" activity to support industry, which is not conducive to providing the innovation, science, engineering and training of students needed to advance PV technology. At the same time, BES PV programs, which focus on "over the horizon" PV technologies with a very long time to practical applications, have been under funded.[1] Recent efforts to coordinate the programs of EERE and BES and provide a continuum from basic science through technology development have further polarized the two DOE divisions, which have historically had a contentious relationship.[2] The resulting gap between the programs leaves a significant lack of R&D support for basic research for future generation technologies and for applied research to support improvements of current technologies critical to the competitiveness of the U.S. PV industry. As a consequence, the independence of PV research in the U.S., the intellectual vitality of the community, and the number of graduate students doing PhD work in the field have been declining. The latter problem is particularly acute for PV industries that are having difficulties filling critical technical positions.

The Council for Photovoltaic Research (Council), is an organization of university faculty with research programs supported by DOE started in 1989 to promote and support photovoltaic research by working closely with DOE, NREL, industry, universities and Congress. The Council is providing the following comments and recommendations as to ways that the U.S. PV programs can be restructured to effectively support the development of PV technologies by coordinating and enhancing programs between industry, universities and national laboratories.

Comments: University Research Roles

1. The essence of a research university is its intellectual vitality. The current success of the U.S. PV program is in part the result of the science and engineering developed at universities where researchers tend to be highly creative, well versed in the published literature, and collaborate extensively with colleagues. They question conventional wisdom and, in the process, often develop a higher level of understanding of both basic mechanisms and practical technological approaches.

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2. A primary responsibility of universities is to train the next generation of scientists and engineers. The current technical leaders in the U.S. PV industry are the product of a once-strong, largely federally funded, university research program portfolio. Vibrant undergraduate and graduate-level programs are required to provide the future leaders, and it is critically important that we continue to meet this demand with both quality and numbers.

3. University researchers have assembled, and are continuing to build, a large number of unique and highly valuable tools for PV fabrication, measurement, and analysis. These capabilities have been an important complement to those at national laboratories, and in many cases, they have been replicated at U.S. industries or transferred indirectly through graduating students.

4. University researchers have a history of providing leadership for collaborative research programs, often involving diverse groups of colleagues from industry, government, and other universities. The universities bring a sizeable investment in equipment and research manpower including researchers with international reputations. Thus, universities are well positioned to drive innovation into the marketplace.

5. University PV researchers in many cases are the same people who teach the principles of PV to a broader range of students and are dedicated to explaining the breadth of PV possibilities to the general public.

Recommendations

The Council recommends that the federal PV R&D programs be consolidated under a single program office that has a clear responsibility for the fundamental science, applied research, technology development and transfer, and the interconnections necessary for a successful national PV program. Specifically, the resulting program should encompass:

1. A competitive process to provide stable base funding for university PV research that is tied to mid- and long-term industrial success, but not to specific companies.

2. A level of university multi-year base funding in PV sufficient to maintain a critical mass of effort and infrastructure in key technologies, including appropriate collaborative efforts among universities and national laboratories.

3. A policy that graduate-level student training be an explicit part of federal base-funding competition, that the resulting student research be published without restriction, and that the time period of base funding be well-matched to PhD thesis completion.

4. The inclusion of mechanisms that encourage intellectual exchange and collaborative utilization of experimental facilities at universities and other laboratories.

5. Funding for university laboratory modernization through capital equipment acquisition.

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6. A planning process that is assisted by an advisory committee of industrial, university and national-laboratory PV leaders that provides in-depth annual feedback to federal program management.

[1] For example, a major 2007 BES renewable energy initiative received over 300 proposals and underwent a full peer review process, representing a significant amount of effort from the scientific community, but no awards were ever made because funds were never appropriated.

[2] A 2008 report by the American Physical Society *Energy Future: Think Efficiency* (www.aps.org/energyefficiencyreport) noted a gap between programs at the Office of Science and EERE in funding long range applied research and recommended that: "DOE should fully comply with the 2005 Energy Policy Act mandate to improve the coordination between its basic and applied research activities. Congressional oversight committees should ensure that DOE fulfills its obligation."