POSSIBLE STIMULUS BILL ELEMENTS RELATED TO ENERGY R&D

Overall: stimulus legislation should not simply place additional consumer funding in circulation through short term impermanent job creation, as have past stimulus bills; rather, it should begin to put the country on the path of innovation-based growth, which is the only real way out of a serious economic downturn. Because we are on the verge of an energy technology revolution, which the country needs for economic, geopolitical and environmental reasons, a particular focus along these lines in a stimulus bill could be placed on energy R&D and technologies that could accelerate this transformation.

Rather than specify exact funding categories at this stage, an agency-run process for the most promising proposals led by the relevant federal R&D agencies could be created, to ensure that the most productive applications in the areas below are funded. Such a program could include the following (the program rationale is below the program element):

1) **Stand-Up Energy Frontier Research Centers promptly**

   DOE has received over 270 applications from universities for several energy frontier research centers. These centers promise R&D acceleration for energy technology advances; standing them up now in larger numbers for five year programs in the most promising fields could provide new talent in the energy sectors we need and corresponding technology advances, as well as new employment in priority areas. DOE has received applications for $1 billion, while the request totaled $100 million and was funded by the House Appropriations subcommittees in their FY09 bills.

2) **Fund critical later stage R&D in energy technologies that are approaching implementation around "grand challenges."**

   We are on the verge of a series of breakthroughs that could produce important new energy technologies and advances, in such areas as solar, wind, geothermal, cellulosic biofuels and carbon capture and sequestration. Critical "grand challenges" would be identified for new energy technologies nearing readiness. These could be supported to accelerate the advance and economic entry of these technologies, and enable the U.S. to recapture leadership of this field, likely the next technology innovation wave.

3) **Fund university research lab equipment and infrastructure -**

   a. Private sector technology equipment will likely receive accelerated tax depreciation treatment, yet university research labs are playing an increasingly critical role in the innovation process. This research infrastructure could receive funding for vital equipment and technology infrastructure renewal. It is an area where government research funding has been failing; many university labs are now nick-named "the research rust belt" compared to more up-to-date foreign lab counterparts. A focus on advanced new equipment in the most critical science and technology fields could be a critical enabler for innovation advances across science, including in energy.
   b. The Major Research Instrumentation program at NSF is an established program and could be promptly ramped up to receive increased funds.

4) **Cultivate "Green Technology" Training -**

   We will need greatly expanded numbers of new trained technologists and researchers if we are to implement an energy technology transformation. This talent could be trained in new focused programs at both universities and community colleges in the expanding fields of new

energy technologies, as well as in energy efficiency. The existing energy sector has an average worker age 10 years over the economy's other sectors – this is a baby-boom-heavy group that will be retiring soon. This means job openings to be filled now, to provide a floor and allow startup timing for evolving "green jobs" in new energy sectors.

5) **Stand-up the Smart Grid -**
   Across the country the electrical grid is increasingly obsolete and vulnerable to disruptions. Yet a modernized grid, using the latest IT advances, will be needed to implement new energy technologies and efficiencies. A program coordinated between utilities, university engineering researchers, and IT firms could start to implement and accelerate the advances in the grid we will need. Both new transmission facilities in rural areas with renewables access, and new IT technology for efficiency and conservation likely to most in demand in urbanized areas, are in order.

6) **Support energy technology demonstrations -**
   Numerous new energy technologies are ready for the demonstration stage in order to assure their prompt commercialization; Congress could accelerate their implementation if it undertook now critical technology demonstrations at scale to prove new technology concepts for new technologies. These could be implemented for promising new technologies in such areas as carbon capture and sequestration (CCS), enhanced geothermal (EGS), wind and solar.

7) **Finance new nuclear power -**
   The nuclear industry recently identified a major financing shortage, with federal financing programs available to fund less than 20% of the financing applied for, for projects that could be undertaken in the relatively near term. Since nuclear power is the only carbon-free technology now available, its implementation could be accelerated if additional loan guarantee financing were made available, particularly at sites that already house operating plants.

8) **DOE User Facilities -**
   DOE user facilities, including those at universities, could be funded at their full utilization level, yielding both research advances and new employment at these facilities.