Response to Quadrennial Technology Review Framing Document
and Request for Public Comment

Submitted by: Natel Energy, Inc.
2175 Monarch St.
Alameda, CA 94501

Gia Schneider - CEO
510.984.3644
gia@natelenergy.com

Natel Energy, Inc. (Natel) welcomes the opportunity to participate in public dialogue concerning the Department of Energy's Quadrennial Technology Review Framing Document (Framing Document). We would like to preface our response to a selection of the questions outlined in the Notice of Availability and Request for Public Comment by first addressing the assumptions inherent in Section 6.2.3 of the Framing Document, "Adoption and Deployment of Clean Electricity Supply".

H. Technologies and Resources. The framing document published in association with this announcement describes each of the six strategies just mentioned in greater detail, and highlights several technologies that could contribute to success in each strategy. For each technology or set of technologies, the framing document provides a non-exclusive list of resources that we intend to draw upon as we develop the DOE–QTR.

Section 6.2.3 of the Framing Document, "Adoption and Deployment of Clean Electricity Supply", provides overviews and bibliographies of resources for nuclear, wind, CSP, PV, and CCS technologies, while a discussion of hydroelectric, marine, and geothermal technologies is confined to the one-paragraph "Other Clean Electricity Supply Technologies" section which concludes the Framing Document.

We suggest that the assumptions inherent in this structure require reexamination. Nuclear, wind, and solar power technologies are presented as notable features in the "national energy landscape" -- a phrase taken from page two of the Framing Document -- as "other" disparate technologies are grouped together as a background element. The Framing Document's failure to distinguish between the hydroelectric, marine, and geothermal technologies in a significant way demonstrates a lack of awareness not only of recent innovations in these areas, but of the bodies of existing literature and research unique to each.

As a startup working to commercialize a new low-head hydropower technology, we are representative of a number of small cleantech businesses engaged in exactly the kind of work the Department of Energy purports to encourage, who will be marginalized by this vision of the national energy landscape. We suggest creating a new taxonomy which demonstrates awareness of and interest in the separate scientific discourses around hydroelectric, marine, and geothermal technologies equal to the awareness and interest demonstrated in the discussions of nuclear, wind, and solar power.

Conventional hydropower supplies more than 7% of the current annual electricity supply in the U.S. In addition to basic service of generating kWh, hydropower is a flexible, dispatchable generation source that provides valuable regulation to help stabilize the grid. Both the U.S. hydropower industry and the Department of Energy see significant potential for new capacity development of conventional hydropower in:

- low-head settings (primarily at weirs and drops on the more than 110,000 miles of constructed waterways and conduits, and at the more than 40,000 existing non-power dams under 25-feet tall)
- capacity upgrades at existing hydropower facilities
- new closed loop pump storage
- further development of the more than 80,000 existing dams in the U.S., less than 3% of which currently produce electricity

For information about hydropower technologies and the potential for small-scale conventional hydropower in the United States, we recommend the following resources as a starting point.

- Testimony provided to the Senate Energy and Natural Resources Committee on March 31, 2011:
    - Mr. Steven G. Chalk - Chief Operating Officer and Acting Deputy Assistant Secretary , U.S Department of Energy – http://energy.senate.gov/public/_files/33111FinalTestimonyChalk.pdf
    - The Honorable Michael Connor - Commissioner, Bureau of Reclamation, U.S. Department of the Interior – http://energy.senate.gov/public/_files/ConnorTestimonyS6290331110.pdf
    - Mr. Jeff C. Wright - Director Office of Energy Projects, Federal Energy Regulatory Commission – http://energy.senate.gov/public/_files/Wrighttestimony331110.pdf
- Small Hydropower Technology and Market Assessment Report submitted to Energy Trust of Oregon – http://www.oregon.gov/ENERGY/RENEW/Hydro/docs/SmallHydropowerTechnology-and-Market_Assessment.pdf?ga=t
- Job Creation Opportunities in Hydropower – http://hydro.org/wp-content/uploads/2010/12/NHA_JobsStudy_FinalReport.pdf
- Hydropower Resource Assessment, Idaho National Lab – http://hydropower.inel.gov/resourceassessment/index.shtml
- California Small Hydropower and Ocean Wave Energy Resources – http://www.energy.ca.gov/2005publications/CEC-500-2005-074/CEC-500-2005-074.PDF

A. DOE Energy Technology Mission. Is the mission statement, "[t]o facilitate the invention, refinement, and early deployment of meaningful technologies that enable options for scaling by the private sector toward national energy goals," appropriate for energy technology development and deployment programs of the Department?

Yes, the Department of Energy can and should focus efforts on facilitating innovation and enabling commercialization at scale by supporting early deployment. Focusing only on

innovation, without a complementary undertaking on deployment hamstrings the effectiveness of the Department's efforts to achieve the large-scale commercialization of the most impactful energy innovations.

C. Clean Energy Leadership. How can DOE activities best support leadership in clean energy innovation? In clean energy manufacturing? In clean energy deployment? How do we balance international competitiveness against international cooperation?

The DOE can best support leadership in clean energy innovation by:

- Being aware of and supporting new technologies, both directly through funding, and indirectly by working with other federal agencies to address non-monetary market barriers
- Supporting policies that give financial incentives to investing in and developing innovative energy technologies
- Helping companies developing new technologies build partnerships with national labs working in relevant and complementary areas
- Fostering competition among technologies for funding

The DOE can best support leadership in clean energy manufacturing by:

- Funding research to improve manufacturing processes
- Supporting policies that positively impact competitiveness of the manufacturing sector

The DOE can best support leadership in clean energy deployment by:

- Funding renewable energy demonstration projects
- Assisting companies, particularly startups, in building connections to other agencies such as the Ex-Im Bank and OPIC that can help scale deployment abroad
- Assisting companies, again particularly startups, to understand ways to protect intellectual property in projects deployed abroad
- Complementing the loan guaranty program with support for warranties of new, innovative technologies

D. Program Definition and Management. What principles should the Department follow for allocating resources among technologies of disparate maturity and potential time to impact? How many technology options should the Department provide for the private sector, and how should the value of that diversity be weighed against timeliness, scale, and cost-effectiveness? What should the threshold be for entry of a technology into the DOE portfolio? Does every technology deserve a program? … How can DOE be more effective at each stage of the innovation chain?

We suggest that the Department evaluate programs and technologies through the lens of cost – both upfront cost per kW and ongoing delivered cost of energy (per kWh). Different sectors have different concentrations of technologies earlier or later in the development curve, all of which could be deserving of support, if the potential for driving costs down, while bringing significant, new, low-carbon energy online (or reducing energy consumption) exists.

F. Technology Demonstration. How close to commercial viability does a demonstration have to be? What are the optimal cost sharing arrangements? How might demonstrations be

coordinated with DOE financing activities? How can demonstration projects better benefit all stakeholders beyond the immediate participants? How are lessons-learned best captured and promoted, and how is intellectual property best handled? How should DOE determine the number of demonstrations needed to address technical and operation risk? How do we think about failure in the demonstration phase?

The Department plays a crucial role in helping to fund demonstration projects of new technologies. The SBIR (Small Business Innovation Research) program illustrates one very productive approach to sequencing DOE's financing efforts by first funding small feasibility analyses before moving funding larger amounts associated with commercialization and demonstration. While certain aspects of any demonstration of commercializing technology will likely be proprietary to the specific company involved, other aspects, such as licensing and interconnect, can serve as useful case studies to inform the rest of the industry.

G. Non-Technical Barriers. A number of non-technical barriers – including Federal, state, and local regulations, market failures, and non-technical risks – impact the rate of deployment of energy technologies. What, if any, role should the Department have in addressing these barriers?

The Department should develop a working understanding of the non-technical barriers to deployment and then coordinate outreach efforts, possibly with an entity such as the White House Council on Environmental Quality. The DOE brings valuable technical expertise and understanding to tackle certain non-technical market barriers, for example, interconnection of distributed renewable generators. The interconnection, and subsequent distribution, process is different in each state, and in many cases, across utilities in a single state. To the extent that the processes can be normalized with respect to certain common technical indicators such as installation size, intermittency and dispatchability, that would greatly benefit the private sector.

Other Comments

Section 3.3 Environmental Impacts.

We suggest that the tone and content of Section 3.3 of the Framing Document be revised to show recognition that the environmental impacts of renewable energy technologies are not necessarily exclusively negative, and that in some cases installations of such technologies can improve the health of the surrounding ecosystem. For example, installation of low-head hydropower at an existing weir in a man-made canal incurs minimal environmental impact to the already modified site. Indeed, the revenue from such a project can help pay for other canal improvements, such as lining, which can reduce canal water loss and put the saved water back into streams for fish habitat.