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Natel Energy, Inc. Comments: IEPR 2015

Attached is commentary on the 2015 Integrated Energy Policy Report, submitted by Natel Energy, Inc.

Additional submitted attachment is included below.

Comments by Natel Energy, Inc., on the 2015 Draft Integrated Energy Policy Report Renewable Energy Docket (Docket No. 15-IEPR-06)

Natel Energy, Inc., is taking this opportunity to comment on the released 2015 Draft Integrated Energy Policy Report Renewable Energy Docket, 15-IEPR-06. We first want to thank the CEC for the thoroughness of the IEPR, and for the opportunity for public comment.

Natel Energy is a privately held company located in Alameda, California. Natel manufactures and sells proprietary hydroelectric turbines called hydroEngines™ that are suitable for low-head, high-flow settings, and range from 50kW to 1 MW of capacity per unit. Natel is focused on offering a competitive turbine product for small hydro installations that drives down the cost of project development. This new approach of distributed low head projects, called EcoSmartHydro™, offers an alternative to large-dam hydropower. EcoSmartHydro™ combines a watershed management platform - watershedOS™ - with Natel's proprietary hardware to optimize the generation of hydropower in conjunction with human and ecosystem needs. Specific for projects in California, we use watershedOS™ to screen projects to deliver both energy (baseload, renewable) and water (eg, increased surface to groundwater transport) value, with the goal of increasing the resiliency of California's watersheds by delivering improved water and energy efficiency with the added co-benefits of groundwater recharge, wetland habitat restoration, and more. More information can be found on our website at www.natelenergy.com

Our comments will focus on the Draft IEPR "Decarbonizing the Electric Grid" section, and the Renewable Energy Docket. We hope to provide useful insight into approaches by the CEC in;

1. Identifying areas for renewable energy portfolio diversification and helping advance flexible generation capacity in the face of intermittency of some renewable resources.
2. Addressing climate resiliency, and the ways in which the CEC can tackle both GHG reduction goals while simultaneously advancing climate protection measures.
3. Guiding decisions and goals for the Renewable Action Plan and relevant EPIC funding decision-making.
4. Proposing funding allocations within the Water Energy Technology Program that meet the program's stated goals.

1. Renewable Energy Portfolio Diversification

In the IEPR Draft Section, "Decarbonizing the Electric Grid", the CEC identifies a more diversified portfolio of renewable resources as crucial in addressing the issues that can arise from the intermittent nature of wind and solar. Helping advance flexible generation, the report states, to fill these gaps and maintain grid security and flexibility is essential for advancing renewable technology. However, the report then lists only geothermal and biomass as options for delivering the needed baseload resources. At Natel, we believe that small hydro plays, and should advance in playing, an essential role in meeting the demand to deliver baseload renewable energy.

Innovation in the field of small hydropower technology plays a critical role in the development of an alternative renewable energy resource that can provide reliable and flexible baseload generation, while also providing potential co-benefits of watershed restoration, groundwater recharge, and more. All of this is possible without the environmental consequence, social impact, or potential carbon footprint of large conventional hydropower plants, if new and cutting edge technology and development in the small

hydropower field is advanced and supported. In this vein, we believe that the small hydropower sector should be increasingly highlighted and focused on as an area of potential growth and opportunity for the California Energy Commission in moving forward with GHG reduction goals and renewable energy portfolio diversification past 2015.

In particular, we consider the new way of developing hydropower embodied through low-head technology as being less defined by size alone and instead defined by its distributed, networked, and flexible nature. In this light, project design is focused on maximizing outputs (kWh, acre-feet groundwater recharge, acres of watershed habitat restored) while minimizing impact footprint (concrete and other materials of construction, excavation and concomitant sediment release, habitat loss, productive land use loss, etc.). Similarly as is taking place across the electricity industry, technological advancements, particularly in data and communications, are enabling distributed project development to scale efficiently. This progress facilitates combining the flexibility and resource-efficiency of distributed projects with the economies of scale of a networked, utility-scale system.

2. Climate Resiliency

In the same “Decarbonizing the Electric Grid” category of the 2015 IEPR, the CEC calls for the pursuit of reduced GHG emissions through increased climate resilience and climate preparedness in the face of drought and extreme precipitation events. These goals solicit the prioritization of actions that simultaneously build climate preparedness and reduce GHG emissions, as well as the prioritization of natural infrastructure solutions that protect needed habitat and wetlands while also providing flood and storm surge protection measures. At Natel Energy, we believe that the simultaneous pursuit of GHG reductions and increased climate resilience can be achieved through innovation in the small hydropower sector. In the face of drought, Natel sees opportunity for projects that meet increasing energy demands while also delivering much needed co-benefits of groundwater recharge, wetland restoration, and more.

Climate change is increasing the frequency and severity of droughts in California, and shifting precipitation from snow to rain. In addition, to supplement water supplies, California has increasingly resorted to tapping groundwater, particularly in drought years. As a result of these pumping trends, USGS has calculated that nearly 80 million acre-feet of groundwater have been lost since 1962 levels. The DWR has recorded that ~40% of recharge wells have detected a decrease in groundwater levels of 2.5 feet or more. This is resulting in land subsidence that can be as great as 2 inches a month in 2015.

Groundwater pumping is both an energy issue as well as a water issue. The city of Fresno spent \$9 million on electricity to pump groundwater in 2011 in response to decreasing surface water availability. With the right investment in software systems and data, we believe that opportunity exists to identify basins where distributed hydropower projects could improve water capture to facilitate groundwater recharge for high priority watersheds, while also harnessing that water flow for energy needs. Natel Energy has started doing this kind of analysis using the watershedOS analytics platform, and aims to have several pilot projects with irrigation districts identified in the near-term. These pilot projects are an example of projects that Natel believes should be supported with the goal of achieving both decarbonization (generating new, reliable renewable energy) and climate resilience (increasing groundwater recharge to support stable water supplies for an irrigation district).

Such an approach would deliver on the goal of increased climate resilience in multiple ways, by increasing the amount of baseload, renewable energy generated, while simultaneously recharging California’s depleted aquifers and taking steps to reduce the effects of land subsidence, and providing the mechanisms for wetland restoration efforts.

3. Renewable Action Plan

Within the CEC's discussion of the potential funding allocations of the \$200 million in awards available for the Renewable Action Plan, we believe that there are multiple areas where funding goals can align themselves with the prioritization of projects that provide co-benefits of renewable energy generation and innovation alongside other important climate-related goals of the state of California.

The first area of focus identified by the CEC, for a recommended \$70 million in awards, is in the support of existing and co-located renewable technologies. This includes projects that reduce installation and maintenance costs, improve reliability, and more, while also calling for examination of opportunities for synergies from combining renewable technologies. In this category, we believe that an emphasis should be placed on the opportunities that exist for the co-location of renewable energy technology that can deliver on demands for generation flexibility and grid stability in the face of intermittent resources, such as combining distributed hydro projects with solar projects within an irrigation district. Additionally, beyond the grouping of renewable technologies, this category has the potential to serve well in supporting the co-location of renewable energy technology with other environmental and climate resiliency strategies, such as reservoirs for groundwater recharge and wetland habitat restoration.

The second area of focus recommends \$20 million to bring innovative technologies closer to commercialization, develop tools to facilitate market efforts, to verify performance of new technologies, and more. This allocation proposes the support of innovation in the areas of biomass, offshore wind, concentrating solar power, small hydro, and geothermal. We would like to show our support for the continued funding assistance to new innovation in the small hydropower sector, where we believe Natel Energy, amongst others, is on the cutting edge of providing solutions to California's energy and climate needs.

4. The California Drought and the CEC's Water Energy Technology Program

Alongside DWR and the SWRCD, the Energy Commission has described in its 2015 IEPR plans for the implementation of the Water Energy Technology (WET) Program to fund innovative technologies that address issues with the water-energy nexus. Within the Proposed WET budget, Phase 2 plans for up to \$16 million in competitive grants within the commercial, industrial, and residential sectors. Examples mentioned include the installation of innovative water-savings technologies, use of waste heat recovery and water reuse projects, and use of no- or low-water using systems that have energy-saving benefits. Finally, in the section's additional recommendations, the CEC claims that the WET program hopes to support the diversification of water resources, integrated water management practices, for example by using agricultural land as a means for stormwater capture and groundwater recharge. While funding for the program has been suspended, the renewal of the program, and its designated goals focusing on the water-energy nexus, is critical for meeting California's climate and energy demands.

We believe that there is much more that can be included in the scope of the WET program scheme, drawing from innovation in both fields to provide not just independent water or energy savings, but to support projects that deliver on both fronts. Projects that we have described previously, in the small hydro field, have the potential to deliver on both needs. Such distributed hydro projects help reduce the amount of water needed in the deployment of energy as is needed in other energy sectors, while also providing the opportunity to deliver on increased water efficiency and sustainability through groundwater recharge efforts. Therefore, less water is used in the delivery of electricity to the grid, and less energy is needed for groundwater pumping demands, which have increased dramatically in the face of drought

conditions. The WET program has the opportunity to advance such projects and provide the support needed for commercialization of relevant new technology.

Finally, in addition to supporting the development and commercialization of technologies that sit at the water-energy nexus, another area where support will assist accelerating results is in data and analytics. Better and more accessible data combined with fast, user-friendly analytics will help water managers, water users, energy producers, and energy consumers make better decisions.

We look forward to further conversation about the goals and trajectory of the IEPR, and of the relevant programming and state actions.

Respectfully,

Meghan Harwood
Commercial Associate

Natel Energy, Inc.
November 9th, 2015