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TESTIMONY OF CARLITO P. CALIBOSO
CHAIRMAN, PUBLIC UTILITIES COMMISSION
DEPARTMENT OF BUDGET AND FINANCE
STATE OF HAWAII
TO THE
HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION
MARCH 31, 2009

MEASURE: H.C.R. No. 260
TITLE: REQUESTING THE PUBLIC UTILITIES COMMISSION TO ALLOW HAWAII ELECTRIC AND LIGHT COMPANY TO CONTINUE ITS NEGOTIATIONS WITH KAHUA RANCH AND NA MAKANI MOA E KU, LLC, ON THE KAHUA FAST-RESPONSE HYDRO PROJECT.

Chair Morita and Members of the Committee:

DESCRIPTION:

This House concurrent resolution requests the Public Utilities Commission ("Commission") to allow the Hawaii Electric and Light Company ("HELCO") to continue negotiations with Kahua Ranch and Na Makani Moe e Ku, LLC, to implement the Kahua Fast-Response Hydro Project as a pilot project to prove the efficacy of using pumped hydro as a reliable method of energy storage.

POSITION:

The Commission takes no position on this measure, but offers the following comments.

COMMENTS:

- The project, to which this concurrent resolution refers, was one of several that were "grandfathered" when the Commission issued its framework on competitive bidding in December, 2006. At that time, those grandfathered projects were already negotiating with the utilities, and were allowed by the Commission to continue those discussions outside the competitive bidding framework.

- The Commission, in an attempt to spur those negotiations on to fruition, set deadlines for their conclusion and, after having extended the deadline for the Kahua Ranch Na Makani project once, declined to extend the deadline further.

- The fact that the HELCO/Na Makani project deadline for status as grandfathered from the competitive bidding process passed does not preclude HELCO from reinstituting negotiations on the project as a pilot. The competitive bidding framework allows for the waiver of the process for specific projects at the request of the utilities under certain circumstances. Among the circumstances allowing for waiver is when competitive bidding would impede a project, or create a disincentive for achievement of the State's renewable portfolio standards, or other government policies and objectives.

- On the other hand, the Na Makani project could choose to participate in the competitive bidding process. Just last month, HELCO informed the Commission that it had begun developing an RFP for as-available renewable energy generation resources on the Big Island, and has estimated that the entire RFP process will require more than two-years to complete.

- So, as the committee can see, there are several different avenues available to HELCO and Kahua Ranch and Na Makani Moe e Ku, LLC, to pursue in their efforts to further the integration of renewable generation into the Big Island infrastructure.

Thank you for the opportunity to testify and provide comments.

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March 30, 2009

House Speaker Calvin K.Y. Say and Members
Hawaii State Capitol
Honolulu, HI 96813

By: Herbert M. "Monty" Richards, Jr.

My name is Herbert M. "Monty" Richards, Jr., Chairman of the Board of Kahua Ranch Ltd.

I wish to speak in favor of House Resolution #231 and House Concurrent Resolution #260. I have attached my testimony to each of these letters, the title of which is the Kahua Fast Response Hydro Project. Kahua Ranch and Na Makani Moa e Ku have been dealing with HELCO/HECO for over three years of negotiation and appears to be bottled up somewhere in the Public Utilities Commission (PUC).

Thank you for giving me the opportunity to appear before you today.

Kahua Ranch / Na Makani

The Kahua Fast Response Hydro Project

22 February 2009

The Pilot Project – 2 Megawatts (MW) of pump hydro 7.5 MW of wind

For three years, Kahua Ranch ("Kahua") and Na Makani Moa e Ku ("Na Makani") have been working with Hilo Electric Light Company (HELCO) in connection with a proposed fast response hydro electric facility to be located on Kahua property (the Kahua Project). The project is envisioned as having two phases. Phase I the Pilot Project, and Phase II the Project.

The Kahua Project will be the first renewable power project in the world that uses fast response hydro electric / pumped storage facilities to integrate renewable energy on an islanded grid. The Kahua Project will address the problems encountered by HELCO in its efforts to integrate renewable energy into the Big Island grid.

Background:
3 years of research and negotiations with HELCO/HECO jeopardized by the PUC
The Kahua Project is specifically designed to address serious grid integration issues that HELCO is encountering. The Project is located on property that is uniquely suited to the technical requirements of a project of this nature. Negotiations with HELCO commenced in mid 2006. A Non Utility Generation (NUG) was filed with HECO in October of 2006. Na Makani and its engineers proposed a fast response pump hydro facility that all parties thought would be an excellent solution to the grid integration problem. A graph showing the intermittent nature of wind and the smoothing effect of the fast response hydro is attached to this memo. (See graph).

From 2006 through the end of 2008 the parties worked closely together on the problems of grid integration. In January 2009, the Hawaii PUC in an effort to implement competitive bidding, ordered the parties to stop negotiations on the Kahua Project. In so doing, the PUC jeopardized a project that could be of great importance.

The opportunity:
Big Island renewable energy sources
The Big Island enjoys an abundance of renewable energy resources. Renewable generation facilities include wind, geothermal, solar and run of the river hydro. Existing irrigation infrastructure in the Kohala Mountains where Kahua is located can be quickly adapted for the collection and storage of water to be used to generate hydro electric power. Heavy rainfall (up to 200 inches annually) insure sufficient a water supply for a pump hydro facility of up to 30 Megawatts (MW).

The problem:
HELCO's difficulties integrating intermittent renewable energy on an islanded grid

In 2008 HELCO reported that 30% of its electrical generation came from renewable sources. HELCO has become a world leader in the problem of integrating renewable energy into an islanded grid. However, HELCO insists that it cannot accept any more new sources of intermittent renewable energy because of the difficulties that these generating facilities pose in maintaining grid stability. Most fossil fuel plants are not designed to be turned off and on quickly. Accordingly, HELCO states that for every MW of new intermittent resources, it must maintain an equal amount of "spinning reserve." In order to add an intermittent source of energy, therefore, that intermittent source must be accompanied by stored quick response energy that will not only smooth power, but will provide HELCO adequate time to start its fossil fuel plants if necessary.

Power "smoothing" "ramp rates" frequency stabilization

Renewable energy sources like wind and solar produce power that fluctuates. HELCO's responsibility to its customers is to provide "smooth" power that fluctuates only within narrow parameters. Accordingly, HELCO has established "ramp rates." Additionally, HELCO must maintain the frequency of the grid within very tight limits. HELCO has to maintain grid stability regardless of increases or decreases in electrical load. Intermittent sources of generation that are unpredictable make this task much more difficult. Pump hydro is the only known energy storage system that is large enough to provide an extended notification period for a utility to enable that utility start its reserve generation facilities.

Spinning reserve, standby reserve

HELCO needs adequate "spinning reserve" i.e. power generation it can call on immediately, in order to meet a surge in demand or to meet a sudden drop in power from intermittent sources of generation. As discussed in the Hawaii Clean Energy Initiative, (HCEI) if an intermittent energy generator is coupled with sufficient energy storage to ameliorate the sudden drop of power, a utility does not need to maintain the one to one spinning reserve ratio but can rely on this "standby reserve."

Stored energy

Energy can be stored in flywheels, batteries, or fossil fuels. It can also be stored in pump storage hydro electric facilities. Batteries and flywheels offer limited amounts of storage. Pump hydro on the other hand can store large amounts of power.

The solution: The Kahua Project – fast response pump hydro

Fast response hydro

The Kahua Project is unique, because it proposes the use of hydro electric power to address all of the grid integration issues outlined above. As long as there is water in an upper reservoir, hydro power is dispatchable. It can be turned on or off very quickly. The flow of water can be increased or decreased in a matter of seconds. The hydro facility can be linked to a wind farm by electronic controls to smooth out the intermittent nature of the power generated by the wind farm. The water in the upper reservoir represents hours of stored energy so there are predictable amounts of energy available to compensate for drop off in wind. The large quantity of energy stored eliminates the necessity of keeping a one for one ratio of fossil fuel spinning reserve to intermittent energy source.

Fast response hydro and load following

The engineers employed by the Kahua Project believe that fast response hydro can also be used to "load follow" i.e. a hydro facility at Kahua Ranch equipped with the proper controls could be used to smooth power on a remote part of the island. Thus a large hydro facility has the advantage of allowing the use of more renewable generation.