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Hawaii Island Energy Cooperative Alternative Power Generation Plan

HIEC is a locally-governed, -owned and -operated cooperative, in contrast to being a subsidiary of an off-island, or out-of-state investor-owned utility. Since HIEC is not burdened by the expectations of the Hawaiian Electric companies and its shareholders, it is able to develop an alternative power generation plan (APGP) focused *solely* on the needs of Hawaii Island.

These two basic realities help to shape a generation plan that is different from the Hawaii Electric Light Company power supply improvement plan by being more nimble, by focusing on the unique challenges and opportunities for Hawaii Island and by addressing the Hawaii Public Utilities Commission's previously stated concerns. The result is better value and less risk for Hawaii Island ratepayers while meeting state renewable energy mandates well before the 2045 target date.

The foundation of HIEC's plan is built on flexibility and efficiency, focusing on cost reductions and continuous development of right-sized, right-sited, and right-priced non-fossil generation projects. The result will be a portfolio approach that consistently rolls in newer, better, lower-priced resources in order to prevent volatility incurred by static planning methods that predictably add or retire large resources every 10 years or so.

HIEC's plan does not include bringing liquefied natural gas to Hawaii Island, but will preserve the possibility of "drop-in" fuel-switching opportunities (such as propane or biodiesel), as long as the savings are known, quantifiable, and quickly realized. HIEC would only pursue a fuel-switch if it could bring immediate value to ratepayers without burdening them with significant, up-front infrastructure costs.

HIEC believes that the lowest cost renewable option near term will continue to be utility-scale solar, and with the recent extension of the Federal Investment Tax Credit, HIEC intends to move quickly to take advantage of the significant cost savings for projects that are in construction before the end of 2020. Wind and hydro may also be cost-effective, but the Federal Production Tax Credit for those resources begins ramping down in 2017, leaving less time to develop new projects.

HIEC proposes to focus on utility-scale solar PV, utilizing storage as part of the new projects in order to prevent curtailment issues that have affected Maui and Hawaii Island. These large storage resources can also provide grid support, but will be financed through the accompanying renewable projects, which will be cheaper than the oil generation that they offset. Since utility-scale renewable projects require significant space, HIEC will work with large landowners to determine the best development sites.

HIEC will also work with Kauai Island Utility Cooperative's development team, which has been responsible for self-developing the two largest solar PV projects in the state. KIUC also recently negotiated a ground-breaking dispatchable solar project with SolarCity, which, pending regulatory approval, will deliver solar energy to the grid during the evening peak for less than \$140 per megawatt-hour by the end of 2016. KIUC's development team has successfully

transitioned its energy mix from eight percent renewable energy in 2010 to 40 percent in 2016 through a portfolio approach that would also suit Hawaii Island.

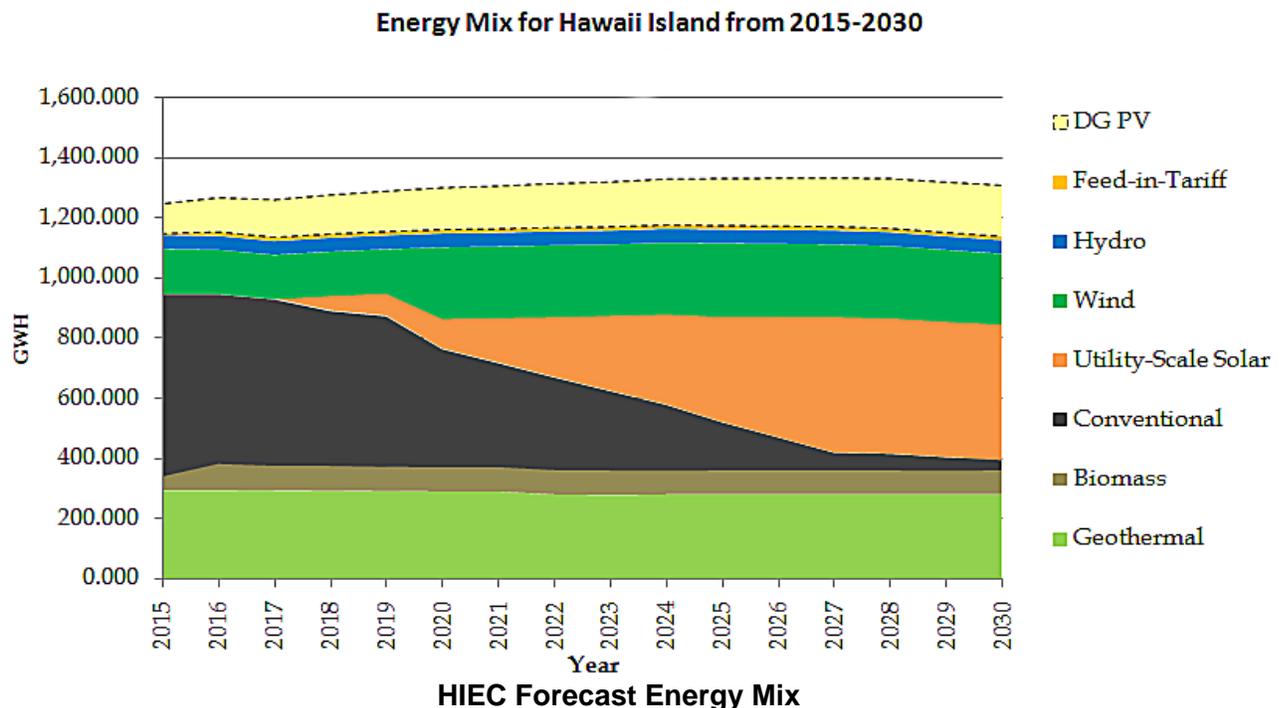
With respect to retiring older generation, HIEC believes it may be more advantageous to maintain these facilities to provide ancillary services such as fast-start, black-start, outage recovery and synchronous condensing. These units typically require very little operational and maintenance expense to maintain in a ready-state, even though they provide little energy due to high economic dispatch costs. Keeping these plants as firm capacity, albeit solely acting in a grid support role, will help prevent the need for significant and costly battery energy storage installations or new fossil fuel generating units.

HIEC would leverage the experience of the KIUC staff to improve the operational flexibility of the Hawaii Island conventional resources through air permit modifications that would allow the units to operate down to zero percent load, as is being done on Kauai. Engineers would also review protective relay settings and governor tuning in order to ensure the conventional resources are able to complement extremely high levels of intermittent renewable resources, as has also been done on Kauai.

Hawaii Island's needs for battery storage will track with future development of utility-scale intermittent generators (solar and wind), assuming the projects developed do not include their own storage. As was previously noted, pricing for solar PV projects that include their own storage are now becoming competitive with fossil generation prices.

The result of HIEC's APGP is the proposed energy mix shown below, which achieves a 97 percent renewable portfolio by 2030, with much less capital investment and risk to ratepayers.

HIEC will remain open to distributed roof-top solar and an improved feed-in tariff program providing a larger share of the mix than is projected below assuming the pricing results in similar ratepayer value.



Regarding geothermal power generation, HIEC recognizes the potential for adding cost-effective geothermal capacity on the island as well as the sensitivities over the use of this indigenous power source. To what extent, if any, further geothermal capacity is developed on Hawaii Island will be a decision to be made by a fully operational HIEC membership and democratically-elected board of directors.

Conclusion

Hawaii Island Energy Cooperative will be better able to ensure a lower cost, more balanced power supply portfolio because:

- 1) It would not be burdened by the shareholder and corporate needs of an investor-owned utility
- 2) It would be able to determine what, if any, fuel switch may make sense for Hawaii Island in the near-term while the island continues its transition toward state renewable energy mandates in contrast to pursuing the questionable and controversial LNG path
- 3) It would build on the successes achieved at KIUC to successfully integrate high levels of low-cost solar into the system while adding just the right amount of storage to ensure reliability levels remain the same or improve.