Exhibit A:
Commission's Inclinations on the Future of Hawaii's Electric Utilities

Aligning the Utility Business Model with Customer Interests and Public Policy Goals

The Commission is compelled to offer the following perspectives on the vision, business strategies and regulatory policy changes required to align the HECO Companies' business model with customers' interests and the state's public policy goals. The Commission is compelled because the HECO Companies failed to articulate a sustainable business model in the intervening time period since this directive was set forth by the Commission almost one year ago in Order No. 31288.

As the Commission noted last year, the nature of the electric utility business is evolving rapidly in light of technical, market, and public policy changes that have and will continue to occur in Hawaii. The Commission observed that:

> "... the HECO Companies appear to lack movement to a sustainable business model to address technological advancements and increasing customer expectations. The commission observes that some mainland electric utilities have begun to define, articulate and implement the vision for the "electric utility of the future." Without such a long-term, customer focused business strategy, it is difficult to ascertain whether HECO Companies' increasing capital investments are strategic investments or simply a series of unrelated capital projects to expand utility rate base and increase profits appearing to provide little or limited long-term customer value."[1]

The IRP Action Plan appeared to be, in part, a series of unrelated capital projects without strategic focus on the clear issues facing the utility, and did not indicate further progress towards a sustainable business model. More recently, the HECO Companies' proposed 2014 capital expenditure program also appeared to be comprised of unrelated capital projects without strategic focus and of questionable long-term customer value.

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[1]See Docket No. 2011-0092, Order No. 31288, Exhibit C at 3.

Given this continuing void in developing a sustainable business model and strategic vision, the Commission is obligated to reiterate the regulatory oversight direction that was articulated last year:

> "The extent of the HECO Companies' own volition to achieve high performance, provide excellent customer service and affordable rates will determine the appropriate amount of regulatory oversight required. Otherwise, the commission would be forced to employ arduous regulatory scrutiny and oversight of utility expenditures, operations and investments to attempt to achieve the desired performance levels and customer satisfaction. The commission prefers the former but unfortunately, at the present time, *believes* the lack of a strategic and sustainable business model would require more of the latter until there is evidence of an acceptable course correction."[2]

The Commission has not observed an "acceptable course correction" and there is not sufficient evidence, at this time, of progress by the HECO Companies towards developing and implementing a sustainable business model. By contrast, the Commission does note that the state's other electric utility has clearly articulated a strategic vision and made substantial progress in achieving their goals over the same time period.[3]

In the meantime, Hawaii's electricity customers continue to endure the highest electricity prices in the country, and the high cost of this essential service imposes substantial burdens on Hawaii's households and businesses. Unlike many jurisdictions where public policy goals to reduce harmful emissions from fossil-based electricity generation and increase use of renewable energy may conflict with economic goals to lower the cost of electricity, Hawaii has already entered a new paradigm where the best path to lower electricity costs includes an aggressive pursuit of new clean energy sources.[4] By embracing cost-effective clean energy opportunities that displace today's high-cost oil-fired generation, Hawaii's electric utilities can

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[2]Order No. 31288, Exhibit C at 5-6 (emphasis added).

[3]See Kauai Island Utility Cooperative Strategic Plan on website homepage, accessible at-http://website.kiuc.coop/content/strategic-plan. Moreover, KIUC has been able to manage utility operations over the last decade with far fewer, and substantially less, base rate increases than each of the HECO Companies.

[4]See *Application for Approval of Additional Waivers from the Framework for Competitive Bidding*, filed Nov. 4, 2013 in Docket No. 2013-0381, at 18. According to HECO, the average levelized price of the utility-scale solar PV projects included in the Application is 15.576 cents per kWh (calculated without state tax credits), which is significantly lower than HECO's avoided cost of generation (22.697 cents per kWh at the time of filing).

stabilize and lower customer bills while expanding choices for customers to manage their energy use.

The Commission views the objectives of lower, more stable electric bills and expanding customer energy options, while maintaining reliable energy service in a rapidly changing system operating environment, as essential principles that are the foundation for the future strategic business direction of the HECO Companies. By extension, these principles are also important criteria in the review and approval of future utility capital investment projects and programs.

To clarify these fundamental principles and to better align the HECO Companies' business model with customers' interests and the state's public policy goals, the Commission provides guidance for future business strategy, energy resource planning and project review in three separate sections:

- *Creating a 21st Century Generation System* – Hawaii has unique challenges and opportunities requiring the State to leap ahead of many other jurisdictions by modernizing the electricity generation system to integrate clean energy resources that cost less than today's oil-fired generation. With the high cost of today's system and long lead times required to implement projects in this sector, the electric utilities need to move with urgency to modernize the generation system on each island grid as delays are lost savings opportunities.

- *Creating Modern Transmission and Distribution Grids* – outlines priorities in order to transform each island's transmission and distribution grids into modern, advanced electrical networks that are capable of integrating greater quantities of customer-sited distributed energy resources and expand the array of energy options for customers to manage their energy usage.

- *Policy and Regulatory Reforms to Achieve Hawaii's Clean Energy Future* – sets forth high priority changes to existing electric utility regulatory policy and rate structures the Commission believes are necessary to achieve Hawaii's clean energy future consistent with the fundamental guiding principles discussed above.

Section 1: Creating a 21st Century Generation System

The costs of fuel and purchased power constitute the largest components in today's high bills for electricity customers and represent a major strategic opportunity for lowering electric rates. While the HECO Companies have progressed significantly in integrating renewable energy, the cost of utility-scale renewable technologies continues to decline markedly to the point where new renewable projects can cost substantially less than the cost of oil-derived fuels utilized in

today's existing plants. Therefore, to further stabilize and lower the costs of generation, the HECO Companies should expeditiously:

- Seek high penetrations of lower-cost, new utility-scale renewable resources
- Modernize the generation system to achieve a future with high penetrations of renewable resources
- Exhaust all opportunities to achieve operational efficiencies in existing power plants
- Pursue opportunities to lower fuel costs in existing power plants

In carrying out these goals, the Commission puts forward the following guidelines for the review of future generation-related projects in each of these areas.

Aggressively Seek Lower-Cost, New Utility-Scale Renewable Resources

As noted earlier, a paradigm shift has occurred in Hawaii where new utility-scale renewable resources now cost less, sometimes considerably, than utilizing oil-derived fuels in existing older, less-efficient power plants. With this shift, the focus of future utility resource planning and acquisition efforts should be on integrating the maximum level of cost-effective renewable resources while maintaining adequate reliability of the electricity grid.

New generation resources should lower system costs and maximize use of cost-effective renewable resources – Existing renewable energy projects have yielded significant customer savings compared to today's high cost of oil.[5] Recent solicitations for new renewable projects on Oahu indicate potentially larger savings are available in the future.[6] The HECO Companies should continue to solicit and acquire projects that can stabilize and lower the overall cost of energy consistent with the State's energy policy goal of a balanced and diversified portfolio of renewable resources. However, in spite of the recent decline in the cost of renewable energy projects in Hawaii, the Commission notes that these costs remain appreciably higher than corresponding costs of similar utility-scale renewable energy projects on the mainland. The

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[5]See *Report to the 2014 Legislature on the Public Utilities Commission Review of Hawaii's Renewable Portfolio Standards*, December 2013, at 17 (http://puc.hawaii.gov/wp-content/uploads/2013/04/2013-PUC-RPS-Report_FINAL-w-Appnds.pdf); See also Maui Electric Co. estimates of savings from purchased wind energy (http://www.mauielectric.com/meco/Clean-Energy/Latest-Clean-Energy-News/Understanding-Renewable-Energy-and-Wind-Energy-Integration?cpsextcurrchannel=1).

[6]See Docket Nos. 2013-0156, 2013-0381, and 2013-0423.

HECO Companies should continue to pursue alternative procurement strategies to ensure that the lowest cost utility-scale renewable energy projects are acquired.[7]

Furthermore, long-term planning efforts should focus on the required changes and investments in the utility system that can allow the island systems to reliably integrate the maximum level of cost-effective renewable resources, taking into account integration costs. Consistent with the recommendations of the Reliability Standards Working Group ("RSWG"), unless there is a compelling reason otherwise, the utilities' planning efforts should remain technology agnostic and neutral to ownership of assets[8]. Therefore, it is necessary that the Commission prioritize the review and approval of projects that exhibit preferred characteristics that are beneficial to the system. Additionally, the Commission is willing to consider proposals with innovative shared-savings incentive mechanisms consistent with Act 37 passed during the 2013 Legislative Session[9].

Pursue a balanced portfolio of new energy resources – There is clear evidence that pursuing a diverse portfolio of renewable energy resources provides the best long-term strategy to maximize the use of renewables to achieve public policy goals. Project development and system integration costs may rise as higher levels of renewable resources are added to each grid and higher levels of any single energy resource will increase the challenge of adding new projects. Furthermore, as communities with the most abundant indigenous renewable resources are increasingly asked to host energy infrastructure, these communities are understandably concerned with the impacts of these projects and have voiced their opposition in several instances. For these reasons, the Commission supports a balanced and diverse portfolio of energy resources as the best long-term strategy to achieve the state's energy goals. This principle overarches a wide spectrum of issues, such as firm versus variable resources, types of renewable resources (e.g., wind, solar, biomass, hydro, geothermal, and waste to energy, etc.), geographic location, and utility-scale versus distributed resources.

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[7]The Commission observes that utility-scale solar PV projects have been announced in Texas and California priced at less than five cents per kWh. In other words, the solar PV projects included in HECO's application in Docket No. 2013-0381, while representing a significant savings over HECO's avoided cost, are still priced more than three times greater than recent mainland projects.

[8]See Reliability Standards Working Group, Independent Facilitator's Final Report, Minimum Load and Curtailment Subgroup Recommendations at 3a-1, filed Mar. 25, 2013 in Docket No. 2011-0206.

[9]See Act 37, 2013 Session Laws of Hawaii.

Modernize the Generation System to Achieve a Future with High Penetrations of Renewable Resources

Under traditional resource planning, utilities would typically seek to build new generation units when the total electricity demand was anticipated to outgrow the capacity of existing generation along with the need to maintain adequate reserves to deal with emergency situations. Today, utility energy sales have declined due to successful energy efficiency efforts, conservation by customers, and the rapid growth of customer-sited photovoltaic (PV) systems. In combination with the significant additions of other variable renewable energy sources, new needs have emerged on Hawaii's electricity grids where traditional utility planning is not sufficient to address these aforementioned trends. Innovative planning efforts are required to anticipate a future grid with high penetrations of renewable resources and to achieve significant energy cost reductions. The Commission articulates several guidelines in this area.

Investments in Grid Flexibility – With the growth of utility-scale and distributed renewable resources, Hawaii's electricity system is changing at an unprecedented pace and scale. Recent integration studies and planning efforts show that integrating high levels of renewable resources will require grids that can accommodate the new demand patterns and the variability of renewable resources.[10] These studies also indicate that Hawaii's grids will require new tools to achieve higher penetrations of renewable resources and to maintain grid stability. For these reasons, the Commission is generally supportive of the utilities' efforts to cost-effectively upgrade the generation system to enable integration of renewables, which could include investments to improve the flexibility of existing generation and the addition of new units which have characteristics to accommodate substantial additional renewable energy in the future. However, these efforts must also utilize new tools, such energy storage, demand response, and other load management techniques,[11] on an equivalent basis to traditional generation assets, which is consistent with a vision of an "Integrated Grid" of the future articulated by some industry analysts.[12] Future resource plans for each island grid need to demonstrate the optimal mix of existing and new resources to meet operational needs efficiently and cost-effectively. Consistent with this guideline, the Commission has required

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[10]See, e.g., the Hawaii Solar Integration Study prepared for Oahu and Maui (http://www.hnei.hawaii.edu/research/grid-systems/grid-modeling-and-analysis), and the Energy Storage RFP released by KIUC (http://website.kiuc.coop/content/rfp-energy-storage-dispatchable-renewable-energy).

[11]See, e.g., J. Lazar. Teaching the Duck to Fly. Regulatory Assistance Project. January 2014.

[12]See, e.g., the recent research initiative started by the Electric Power Research Institute (EPRI) http://www.epri.com/Our-Work/Pages/Integrated-Grid.aspx

each of the HECO Companies to file "Power Supply Improvement Plans" to identify strategies, action plans and schedules to expeditiously achieve the results contemplated in the guidelines set forth in Section 1.[13]

Pursue cost-effective retirements expeditiously – Many of the utilities' existing generating plants have exceeded their original design lives. Typically, on each island grid, these plants are the most expensive to operate, having substantially higher heat rates, overall fuel expense, staffing levels, and on-going maintenance expense and capital expenditures, and in many cases these older plants are the least "flexible" units contributing to the uneconomic curtailment of renewable resources and/or out-of-merit uneconomic dispatch. The HECO Companies should continue to evaluate opportunities to retire and replace older, high-cost plants with new resources with valuable characteristics that provide required support services cost-effectively to maintain a reliable electricity grid with high levels of renewable resources.

All generation resources should contribute to system stability –Traditionally, utility-owned generation provided most of the grid support services required to maintain system stability. On island systems with rapidly growing utility-scale and distributed variable resources, individual utility-scale projects and, in aggregate, distributed resources can have a significant impact on system stability. Consistent with meeting the future needs of Hawaii's island grids, the electric systems should evolve such that all generation resources, whether utility, IPP or customer-owned, will contribute to maintaining system stability. Therefore, to maximize the integration of variable renewable energy resources, the Commission expects the HECO Companies to require all generators to address and support system stability consistent with their resource characteristics and state-of-art technical capabilities.

Exhaust All Opportunities to Achieve Efficiencies in Existing Plants

The Commission articulates further guidance in this area. The HECO Companies' generating units realize a wide range of operating efficiencies, depending in part on each unit's age, technology, and mode of operation. In many cases, utility-owned generation is significantly less efficient than IPP-owned generation, suggesting there is an opportunity to reduce costs to customers by improving the efficiency of the utility's existing generation fleet.

Greater visibility into and accountability for economic dispatch of generation – The HECO Companies operate the island grids with numerous generating units designated under "must run" status to provide certain services to maintain the reliability of the grid. In effect, these

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[13]Requirements to prepare Power Supply Improvement Plans are found in Order No. 32055, filed April 28, 2014 in Docket No. 2011-0092; Decision and Order No. 31758, filed Dec. 20, 2013 in Docket No. 2012-0212; and Decision and Order No. 32053, filed April 28, 2014 in Docket No. 2011-0206. The Commission has also issued a Policy Statement related to demand response programs in Order No. 32054, filed April 28, 2014 in Docket No. 2007-0341.

operating rules require high-cost generation units to remain online continuously, resulting, at times, in the curtailment of renewable energy sources or displacement of generation from other lower-cost units. Significant advances in technologies such as power electronics, demand response and energy storage can provide similar grid services and the potential to deliver these services from non-utility owned renewable energy generation cost-effectively. Therefore, in the Power Supply Improvement Plans, the HECO Companies are expected to include the utilization of the most cost-effective resources to provide grid services including alternatives to operating older, less efficient generation units under a "must run" designation.

Unbundle provision of essential grid (ancillary) services – As a corollary to the prior point and to further promote lower costs in the generation sector, the Commission will be pursuing opportunities to "unbundle" the provision of essential grid services to allow independent producers to offer these services through non-traditional technologies, such as demand response and energy storage systems, or non-utility owned generation, when more cost-effective. In short, as technologies evolve and the needs of the grid change over time, the HECO Companies must be amenable to implementing all potential alternatives that can maintain essential grid services and lower costs to customers.

Expeditiously Seek Alternatives to Lower Fuel Costs in Existing Power Plants

Even with the rapid growth of renewable resources, the HECO Companies continue to rely heavily on imported oil-derived fuels, passing the high costs to their customers. To stabilize and lower customer bills, the HECO Companies need to expeditiously develop and implement opportunities to reduce fuel costs in existing power plants.

Transparently seek opportunities to import liquefied natural gas (LNG) consistent with Hawaii's clean energy policy goals – Recent analyses have indicated that Hawaii may have an opportunity to reduce fuel costs by importing LNG.[14] The Commission recognizes that substituting another fossil fuel for oil raises a number of concerns from some stakeholders in Hawaii's energy policy discussions. The Commission notes that the "default" fuel to meet environmental requirements for most non-renewable electricity generation in the near future will be diesel fuel. In the absence of an alternative to diesel, customers will continue paying for a fuel that is expected to remain costly and subject to volatile price swings.

The Commission notes that persistently high electricity bills have a direct economic impact on all Hawaii residents and businesses. High energy prices translate into higher costs and reduced

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[14]See *Liquefied Natural Gas Report* prepared under contract to the Hawaii Natural Energy Institute (http://www.hnei.hawaii.edu/publications/liquified-natural-gas) and the *LNG Imports Study* prepared under contract to HECO (http://www.hawaiianelectric.com/vcmcontent/IntegratedResource/IRP/PDF/IRP-2013-App-N-LNG-Imports-Study-062813-Filed.pdf).

disposable income for residents paying high electricity bills, resulting in the purchase of fewer goods and services overall. Whether directly through higher electricity bills or indirectly by paying higher prices for goods and services, all of Hawaii's residents, businesses, and visitors pay a significant price for continued reliance on high-cost fuels. From an economic perspective, if diesel fuel remains a significant portion of the energy mix Hawaii's customers are likely to continue paying high electricity bills even with fuel savings from the addition of renewable resources. From an environmental standpoint, the importation of petroleum products still contributes to the state's carbon footprint and poses a substantial risk for a major oil spill. A fuel switch from oil to LNG would help the HECO Companies reduce criteria pollutant emissions from existing power plants to meet EPA air quality regulations and, at current prices, may also help lower fuel costs.

Noting that remaining dependent on diesel fuel has the potential to be a persistent drag on the state's economy and pose significant risks to the environment, the Commission believes the HECO Companies must expeditiously seek alternatives and that the importation of LNG could be consistent with the state's clean energy policies under several guiding principles. These include:

- *Achieve significant fuel cost savings* – New fuel infrastructure will likely require large capital investments and the savings delivered to electricity customers should be commensurate with the risk of the investments.

- *Support and enhance opportunities to meet and/or exceed clean energy goals* – Proposed plans to utilize LNG need to articulate a convincing strategy that LNG is consistent with and will enhance the opportunity to meet and/or exceed the State's RPS and EEPS policies cost-effectively, and support clean energy transportation goals, where feasible.

- *Expedite the retirement of inefficient and inflexible generation* – In evaluating older units that will require emissions reduction modifications, the HECO Companies need to use this opportunity to consider an expedited retirement schedule to replace old units with cost-effective, flexible alternatives with characteristics that are better suited to integrate variable renewable energy sources.

- *Diversify risks with a portfolio of fuel supplies* – The global LNG market has evolved to provide new options to the long-term supply contracts that characterized the market traditionally. While Hawaii's demand will always remain limited on the global scale, buyers now have opportunities to purchase LNG on spot markets, short-term and long-term contracts, and utilize different price indices. With a portfolio of supply options, the utilities can and should diversify some of the price risks associated with this fossil fuel.

- *Utilize transparent, competitive processes to solicit potential suppliers* – the Commission strongly believes customers and Hawaii's citizens will be best served by utilizing transparent, competitive processes, customized to Hawaii's unique market, in the development of any new fuel supply options.

The Commission believes there are long-term implications associated with the decision to import another fossil fuel into our state that need to be carefully considered. For example, the term and volume of imported LNG should reflect that use of renewable energy resources will continue to expand and thus the need for LNG for power generation would decline over time. Furthermore, the proposed savings estimated in the LNG studies conducted to date have yet to materialize in any proposal that has been submitted for regulatory approval. When such proposals are submitted, the Commission intends to exercise careful review and scrutiny to ensure a proposed project delivers promised benefits to customers with minimum risks.

Seek all cost-effective renewable fuels to displace fossil fuels in firm generation – For the reasons noted above, and as evidenced by several recent decisions[15], the Commission strongly supports a concerted effort to displace fossil fuel supplies in firm generation with the development of cost-effective, locally-produced renewable fuels. The Commission understands that renewable fuels can provide many new and important economic opportunities and can potentially displace fossil fuels in the transportation sector. However, it is difficult for the Commission to justify having customers bear unreasonable cost premiums in today's high customer bill environment. As new fuel contracts come before the Commission for approval, cost-effective proposals that can offer customer savings and that can clearly quantify local economic benefits will be viewed more favorably.

Section 2: Creating Modern Transmission & Distribution Grids

The transmission and distribution grids on each island are comprised of a network of critical energy infrastructure required to deliver electricity supply and provide essential grid support services for all customers to enable electricity to be used efficiently, reliably and safely. Increasingly, this network also accepts renewable energy from distributed energy resources (DER) and other grid support services customers may choose to supply to the grid.

Traditionally, the utility focused on maintaining the system networks and the planning necessary to upgrade the transmission and distribution infrastructure to support growing energy demand. However, looking towards the future, the Commission believes Hawaii should

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[15]See Decision and Order No. 31758, filed Dec. 20, 2013 in Docket No. 2012-0212; Decision and Order No. 31487, filed Oct. 11, 2013 in Docket No. 2011-0369; Decision and Order No. 30950, filed Jan. 17, 2013 in Docket No. 2012-0129; and Decision and Order No. 30895, filed Dec. 13, 2012 in Docket No. 2011-0368.

be poised to lead the world in the development of advanced grids that can interlink a bulk power system that has a high level of renewable generation with the profusion of DER. With appropriate and mutually beneficial investments in the transmission-and-distribution grids, the HECO Companies should be prepared to anticipate and enable the energy choices that customers will demand and integrate customer-side resources into the broader electric system in an effort to provide benefits to all system users.

The Commission also recognizes a growing role for non-utility energy service providers that can intermediate the relationship between the utility and customer by aggregating distributed, customer-side energy resources into controllable resources with technical characteristics that are similar to conventional generation resources, described sometimes as "virtual power plants".[16] Virtual power plants combine DER to provide seamless, controllable, responsive energy and ancillary services to the grid, much as the utility's existing power plants do today. Hawaii's utilities should take action now to enable incorporation of virtual power plants and integrated energy districts (further discussed below) into power system design and operation.

With approximately 10% of residential customers already operating rooftop PV systems, Hawaii is a frontrunner in the initial growth stage of DER. Therefore, it is incumbent upon the HECO Companies to plan for and address DER interconnection challenges and simultaneously move forward aggressively to develop and garner stakeholder support for the modernization of its transmission-and-distribution grids to further enable integration of DER and to provide customers with critical information to make sound energy choices. Accordingly, the Commission has recently required the HECO Companies to develop and file a distributed generation interconnection plan (DGIP).[17] The Commission puts forward the following guidelines for the review of future transmission-and-distribution system projects and programs.

Creating Hawaii's Modern, Integrated Transmission System

Hawaii's high-voltage transmission networks interconnect geographically dispersed utility-scale fossil and renewable energy supply resources with major population or load centers on each island. The transmission network enables multiple generation resources to be dispatched in an economic manner as well as respond to generation unit or transmission line outages by automatically and instantaneously redirecting power flows. The Commission articulates the following guidance with regard to transmission planning and the future development of new transmission system projects on Hawaii's grids:

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[16]See e.g., A. Zurborg. *Unlocking Customer Value: The Virtual Power Plant.* Power World 2010. ABB/Ventyx, accessible at http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/ABB_Attachment.pdf

[17]See Order No. 32053, filed on April 28, 2014, in Docket No. 2011-0206 at 49.

New transmission projects must consider non-transmission alternatives - New, replacement or upgrade high-voltage transmission projects generally represent significant, lumpy capital investments that will be given careful scrutiny. Non-transmission alternatives (NTAs) such as local peaking or back-up generators, energy storage, demand response and smart grid resources are technically and commercially viable alternatives and must be evaluated as part of any economic justification for new transmission system projects.

New utility-scale combustion-technology generation projects should be located at existing utility or IPP generating plant sites - Utilizing existing sites, to the extent possible, will minimize the need for future geographical expansion of the transmission grid solely to interconnect new projects, access existing fuel supply infrastructure and minimize or eliminate the need for new land use permitting. While acknowledging that siting these new projects on existing plant sites is a sound planning principle, the Commission does recognize that new plant sites may need to be proposed as part of future microgrid projects. In these cases, the Commission will weigh the need to expand and upgrade the transmission grid with other key objectives in utility planning, such as energy security and grid resiliency.

Interconnection of large-scale renewable energy projects - Locating large-scale renewable energy projects in remote geographic areas to harness world-class renewable energy regimes needs to be balanced with cost of transmission system upgrades required to deliver these remote power supplies to major load centers cost-effectively.

Interconnection of island grids – In Docket No. 2013-0156, parties have stated that the inter-island connection of individual island utility grids (grid-tie connection) may have intrinsic technical, operational and economic benefits, particularly as it relates to integration of large quantities of variable renewable energy resources that could potentially support the installation of undersea inter-island transmission cables, assuming projects are cost-effective and environmentally sound. The Commission's investigation to determine if an interconnection of the Oahu and Maui grids may be in the public interest is ongoing.

Development of Integrated Energy Districts – Technological innovation is supporting the development of integrated energy districts that aggregate pockets of load and generation resources, which can disconnect and reconnect to the main grid in times of emergency. A subset of this aggregation concept is sometimes described as a microgrid.[18] Several microgrid demonstration projects are underway in Hawaii and large energy customers are investigating the development of these systems to meet their energy needs. As the island electric systems

[18]The concept of an "integrated energy district" was recently described in detail in a presentation by Ken Geisler at the Maui energy conference, "Energy Utilities: The Future is Not What It Used to Be."

evolve, the utilities' transmission system planning needs to address the potential development of integrated energy districts and, as the technology matures, these systems will need to be evaluated as potential non-transmission alternatives to expansion of the transmission system. There are examples of integrated energy districts already operating in Hawaii, including the more common examples of large customers with campus-type facility layouts and independent distribution systems (such as those owned and operated at various university facilities throughout the state)[19], as well as more sophisticated and truly integrated systems such as the HC&S plantation and irrigation system on Maui or those at military installations on Oahu, such as at Joint Base Pearl Harbor-Hickam and in development at Camp Smith.

In summary, the Commission notes that future transmission system projects submitted for review and approval will need to clearly demonstrate how such a proposed project will comport with the transmission system guidelines set forth herein, help to maintain safe and reliable electricity service, support the state's clean energy goals, and provide the most cost-effective option among competing alternatives.

Developing a State-of-the-Art Distribution System to Enable Clean Energy

Hawaii's electric distribution systems physically interconnect a customer's premise to deliver grid-supplied power, as well as to accept customer-supplied power. Effectively, this opens the opportunity for the DER-equipped customer to become a "prosumer", that is a customer who both consumes or uses utility services and may also provide services to the utility. With significant penetration of renewable DER opening new opportunities for customer choice, the distribution system will need to function more like a multi-path transmission network rather than a radial delivery system of the past. The widespread adoption of DER combined with utility-scale resources to create a portfolio of renewable generation and grid services is a critical example of the kind of expertise a utility looking towards the future must have to evolve as a network systems integrator and operator to meet the expectations of its customers, achieve the state's clean energy goals and provide safe, reliable and affordable electricity.

The Commission believes the HECO Companies will need to move promptly with plans to upgrade the utilities' distribution systems to enable new clean energy technologies and improve customer service. New demands on the distribution system will require investments in advanced distribution system technologies, which is currently an area of significant innovation within the electric utility industry. Accordingly, the Commission has ordered the HECO Companies to develop and submit a distributed generation interconnection plan (DGIP) to provide a coherent strategy to modernize each island's distribution system and justify that the

[19]While many independently-owned electrical distribution systems may not currently be operating as a true integrated energy district, this option may become more appealing for customers in the future for energy security, resilience, and cost management reasons.

large capital expenditures required to improve distribution systems are prudent investments that warrant Commission approval. The Commission provides the following broad guidance in the future development of the Companies' distribution systems:

Adopt Advanced Distribution System Technologies and Planning to Cost-Effectively Integrate Renewables and Improve Customer Service - An advanced distribution system is a condition precedent for high penetration of distributed generation, supporting other new customer energy options such as electric vehicles (EV), and improving customer service through enhanced outage detection and timely restoration. These investments would allow a transition from today's one-direction distribution network into a smart distribution system where distribution circuits and substations are capable of bi-directional power flows. The future distribution system must have the capability to act both as a delivery service and an aggregator of customer-sited distributed energy resources to benefit the customer and the grid. The Commission also notes that long-term distribution system planning should include:

- Incorporation of potential opportunities to create microgrids into transmission and distribution grid-planning processes. As discussed above, customers with large critical loads, groups of buildings or neighborhood groups should have the option to develop self-generation resources capable of meeting some level of their own power needs by "islanding", or disconnecting from the grid, when grid supplied electricity is interrupted, constituting a microgrid for purposes of reliability and resiliency.

- Utilization of an Integrated Distribution Planning process, with stakeholder participation, to ensure that grid is capable of integrating DER and potentially reduce future transmission and distribution costs. This planning process should include transparent criteria to prioritize circuit upgrades and set timelines for implementing the recommended changes.

Develop Customer-Focused Advanced Metering Infrastructure Program - The HECO Companies have proposed a smart grid program to include advanced metering infrastructure. Although the Commission believes advanced metering technologies are the key foundational infrastructure for an advanced distribution system, the Companies will need to provide strong supporting evidence and justification that this major investment will improve customer service and system efficiencies from the outset and complement broader efforts to upgrade their distribution systems. For this reason, the Commission offers the following guidelines in the development and implementation of smart grid and advanced metering infrastructure programs:

- Focus on delivering immediate value and benefits to customers with installation of smart grid infrastructure. Examples would include offering web portals for customers to

access and view energy consumption data; improving outage response and power quality; and supporting rapid adoption of innovative rate structures.

- Enable customer-sited distributed energy resources, including broader use of demand response technologies, electric vehicle charging networks, distributed generation, and energy storage systems.

- Work with third party service providers, such as Hawaii Energy, to maximize benefits to customers as the Companies expand smart grid programs in all service territories.

- Develop data privacy policies prior to widespread rollout of smart grid infrastructure and ensure continual reassessment and updating of such policies.

Harness Distributed Energy Resources (DER) to Benefit System and Customers - In recent years, Hawaii has seen exponential growth in rooftop photovoltaic (PV) systems. Coupled with continued innovation in other distributed energy resources, such as electric vehicles and distributed energy storage, the utilities will need to plan proactively for future additions of DER. The rapid adoption of these technologies will require the utilities to design programs and develop distribution system infrastructure to optimize the system and maximize customer benefits. In addition, the Commission believes supporting these programs could provide the utilities' new revenue-earning opportunities through activities such as enabling electric vehicle charging networks and aggregating DER.[20] Accordingly, the Commission has recently ordered the Companies to develop and file a distributed generation interconnection plan (DGIP) that will include stakeholder input and review. A critical component of the overall DGIP is an Advanced DER Technology Utilization Plan that identifies how customers will install, and the utilities will utilize as an integrated DER portfolio, advanced inverters, distributed energy storage, demand response, and electric vehicles to mitigate adverse grid impacts on utility distribution circuits and the system as a whole.[21] At a minimum, these plans should address the following:

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[20]In some cases, these services may constitute so-called "below the line" services or non-utility business activity more appropriately provided by a utility-affiliate.

[21]The U.S. Department of Energy has funded a number of demonstration projects that include energy storage and integration of distributed energy resources, including projects in Hawaii. For more information, see project summaries at https://www.smartgrid.gov/recovery_act/overview/smart_grid_demonstration_program. Japan's New Energy and Industrial Technology Development Organization (NEDO) has also funded the "JUMPSmart Maui" project to demonstrate integration of advanced DER technologies with the Maui grid. Given the preponderance of these demonstration and pilot projects, the Commission believes the HECO Companies should be prepared to accommodate widespread adoption of DER technologies.

- The utilization of grid support functionality embedded in advanced inverters, customer-sited energy storage, and energy management systems to provide ancillary services;
- Enabling two-way communications with customer-sited DER to enable real-time monitoring and active utility management;
- The utilization of technical capabilities of advanced inverters, energy management control systems and customer energy storage systems to develop a non-export option for distributed generators, and the development of appropriate tariff provisions to accommodate this choice; and
- The utilization of distributed energy storage sited on utility distribution infrastructure or behind the meter to mitigate the impacts of high penetration solar PV systems.

Develop and Maintain Cyber-security Requirements for New Distribution System Technologies – With the addition of new information technology and two-way communications systems into utility distribution networks and operations, the HECO Companies will need to develop and maintain cyber-security requirements that protect customer's privacy and the electric system's security. These requirements are not static, and will need to evolve with ongoing changes in technology and customer needs and will be reviewed by the Commission to meet acceptable standards and practices.

Section 3: Policy and Regulatory Reforms to Achieve Hawaii's Clean Energy Future

The utility's traditional role in power supply is changing with high penetrations of renewable energy resources, the retirement of existing fossil generators and the need to incorporate new smaller, more flexible and efficient generators. The utility's role in energy delivery is also evolving to effectively become that of a network systems integrator and operator. With more distributed energy resource options, as discussed above, a customer's role has the potential to evolve to effectively become a "prosumer", that is one who consumes utility power supply and utilizes grid services as well as provides power supply and grid support services to the utility.

As a consequence of these changes, the Commission notes that Hawaii's electric utilities will increasingly be required to:

- Integrate large quantities of utility-scale, primarily variable renewable energy resources onto the transmission system;
- Add increasing amounts of customer-sited distributed generation onto the distribution system;

- Implement power supply improvement plans to systematically retire old, inefficient fossil generators, acquire new flexible generation resources and utilize technologies such as energy storage and demand response to reduce costly must-run generation;
- Incorporate and dispatch an expanding portfolio of utility-scale and distributed renewable resources in conjunction with a declining fossil power supply portfolio to maximize renewable energy and minimize energy and ancillary service costs;
- Procure and manage a diverse commercial portfolio of fossil fuel supply contracts and renewable energy power purchase agreements to increase cost-effective renewable energy utilization, lower total energy costs and minimize and mitigate energy commodity price volatility;
- Integrate demand response (DR) technologies and dynamic pricing rate structures to manage and shift customer loads on a real-time basis to better accommodate as-available renewable energy supplies;
- Utilize smart meter, communication network and data management technologies to empower customers to better manage their energy usage and access other energy management options; and
- Employ diverse smart grid technologies including energy storage, smart inverters, electric vehicles and smart grid control devices into a seamless, integrated operating system.

The aforementioned strategic initiatives must be assimilated in a cohesive, integrated manner to address rapidly changing customer, technical and economic requirements. Therefore, Hawaii's electric utilities will need to transform their business models accordingly, particularly in the power generation and energy delivery functions. This section provides perspectives to achieve this transformation in these key business functions. To accomplish this in a timely manner, a fundamental challenge for the HECO Companies will be the commitment to devote sufficient senior management attention and corporate resources to effectuate this transformation.

New Business Model to Become World-Leading Operator of High Renewables Grids

As set forth in *Section 1: Creating a 21st Century Generation System*, the HECO Companies need to plan for and seek high penetrations of lower-cost, new utility-scale renewable energy resources, exhaust all opportunities to achieve operational efficiency and lower fuel cost in existing plants, retire old, inefficient fossil generation and replace inflexible generators with new, smaller, highly flexible, efficient generators. Consequently, power supply improvement plans must be developed and implemented to strategically integrate additional renewable

energy resources as well as modernize the existing fleet of fossil generation in order to lower fuel and operating costs.

However, the Commission notes several elements of the utility's current business model for power supply that may impede this transition, which are further described below:

- *Continued utility ownership of generation* – Utility-owned generation creates inherent financial conflicts that can complicate, and in some cases impede, development of independent (IPP) generation projects. This creates regulatory challenges for the Commission, as well as a public distrust about investor-owned utility motives. It is difficult to ascertain whether project development delays, contractual disputes with independent developers or utility reluctance to quickly embrace change are predicated upon legitimate technical reasons or driven by existing and future utility generation rate base investment concerns and traditional utility business practices. The future role of the HECO Companies in power generation needs to be redefined in light of these conflicts.

- *Retirement of fossil-fueled generation* - The amount of fossil generation in service in Hawaii will, by necessity, decline over time due to continued integration of renewable energy resources begging the question of whether utility or IPP fossil generation should be retired. Significant IPP fossil generation capacity exists on Oahu and Hawaii Island, which are newer, more efficient and lower cost to operate than existing utility fossil generation. It is reasonable to believe continued operation of IPP generation is in both the customer and public interest, provided power purchase agreements contain reasonable pricing terms and conditions.[22]

It is further reasonable to assume that the HECO Companies' traditional role as owner and operator of a fleet of fossil generation units will diminish over time as old, inefficient utility generation is retired and if new renewable and fossil generation is developed solely by IPPs. Stated differently, the HECO Companies' generation portfolio will diminish over time in terms of the total number of generating units operated, aggregate amount of capacity in-service, annual generation output and net depreciated plant investment, in response to retirements of utility fossil generation and assuming HECO does not acquire ownership of new generation. With appropriate economic and regulatory incentives to hasten retirements of utility fossil generation (and perhaps penalties for retirement delays), the HECO Companies' role with respect to existing fossil generation could decline at an accelerated pace.

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[22]The Commission expects that the HECO Companies will fully investigate all legal opportunities to re-negotiate, modify, or terminate high-priced IPP contracts for the benefit of their customers consistent with their public interest obligations.

The role of the HECO Companies with respect to ownership of new generation is the critical policy issue with respect to the future generation fleet on each island grid. In this regard, the HECO Companies have not demonstrated with recent utility generation plant additions that they can be cost competitive with IPPs, nor has the company demonstrated inherent skills and expertise in developing and managing renewable energy projects. The Commission will consider whether it is reasonable and in the public interest to preclude the HECO Companies, as a matter of regulatory and public policy, from ownership of new generation and incent accelerated retirement of old, inefficient fossil generation in order to further diminish inherent financial conflicts with utility ownership of generation.

The Commission further articulates several essential functions of Hawaii's electric utilities:

Key Business Function #1 - System Planner and Operator of High Renewables Grids

Notwithstanding the foregoing, the HECO Companies have a critical role to perform in the future regarding Hawaii's power supply function. The HECO Companies are the logical entity to develop and implement power supply improvement plans that are necessary to create the 21st Century Generation System. The HECO Companies uniquely possess the institutional expertise and knowledge of the current generation portfolio and operation of the bulk power grid. This suggests the utility will continue to be the incumbent utility power supplier even as an increasing share of the electricity supplied to customers is procured from IPPs pursuant to PPAs. More importantly, the HECO Companies would no longer have a financial interest in the outcomes of future power generation development and investment decisions.

The Commission also notes several potential elements of a potential new business model for the power generation sector:

- *Integrated grid operation and fuel procurement* - An integrated approach to fossil fuel procurement, fuel switching and environmental emission controls may result in lower overall fuel and purchased power expense benefiting utility customers.[23] It may also become increasingly more difficult for IPPs to make competitive commercial arrangements for fossil fuel supply given uncertainties as to future quantities of renewable energy availability and power supply operational requirements. The HECO Companies have considerably greater information about future fossil power supply requirements than do individual IPPs and are logically well-positioned to aggregate and manage consolidated IPP and utility fossil fuel supply requirements and fuel supply delivery infrastructure.

[23]This would be applicable to IPPs who currently utilize liquid fossil fuels and could switch to LNG. It would not be applicable to the AES Coal plant.

- *IPP "tolling" model for new generation* – Third party-owned generation that is operated under a tolling model would enable the HECO Companies to procure fuel supply requirements for use in third-party generators, and also dispatch these units as required to meet system load in a least-cost manner. Under a tolling model, IPPs would develop, own, operate and maintain generating plants. The HECO Companies would not have any financial interest in a facility or its operation. The utility would effectively rent generation capacity and have a contractual right to convert utility-supplied fuel into electricity. Contractual specifications could be defined by plant availability, heat rate and other key operational parameters. Moving to a tolling model may re-focus IPP contract negotiations on securing power supply at actual plant costs, not avoided energy cost.

Under this alternative business model, the HECO Companies would effectively over time become the "independent" power supply integrator and operator of Hawaii's power supply system similar to the roles performed by mainland Independent System Operators (ISOs) who independently dispatch generation and operate the bulk power system to minimize energy costs while maintaining reliability. ISOs typically plan and operate portfolios of generation and transmission assets owned by (or contractually controlled by) IPPs, electric utilities and power marketers.

In summary, the HECO Companies' future role in power generation could evolve to include generation resource planning, third-party generation capacity procurement, fuel supply management and procurement, and power supply dispatch and operational optimization. These are critical planning, technical, operational and commercial functions that will determine in large part the amount of renewable energy integration and the overall cost of power supply in Hawaii. However, the regulatory model under which the HECO Companies are compensated for performing these functions needs to be redefined. Capital investment (rate base) as the sole driver of utility profits would need to be replaced with a regulatory model that incentivizes and rewards the HECO Companies for success in managing the overall cost and reliability of power supply from the perspective of customers. An examination of potential changes in the regulatory model affecting the HECO Companies' power supply function is explained below.

Key Business Function #2 - Modern Transmission-and-Distribution System Integrator

The modernization of the island grid infrastructures is essential to enable Hawaii's electric utilities to integrate greater amounts of both utility-scale and distributed renewable energy resources. It could also facilitate the development of regional and strategically located integrated energy districts that could improve grid reliability and provide greater resiliency. Hawaii's electric utilities, by virtue of becoming "network systems integrators and operators",

will have to adjust their business model relative to transmission-and-distribution functional activities. A business strategy focused on energy delivery would enable the HECO Companies to concentrate on developing a world-class, modern island grid infrastructure to accommodate and deliver substantial quantities of clean energy resources. This is a functional area where many new technological advances are occurring, and new revenue-earning opportunities are emerging, including deployment of advanced metering infrastructure, smart grid devices, smart inverters, energy storage, and electric vehicles.

Under this strategy, new investment in transmission-and-distribution infrastructure will grow at a faster pace in the future due to grid modernization and smart meter investments, which could offset loss of largely depreciated generation rate base investments as old, inefficient utility fossil generation is retired. An already significant portion of HECO's current utility net plant in service (rate base) is comprised of energy delivery, not generation, capital investments; consequently, the major portion of HECO's total authorized common equity net income is already being derived from the energy delivery function.

Regulatory Policies and Energy Pricing Should Reflect New Business Models

The Commission observes that the current regulatory cost-recovery model for the HECO Companies may be increasingly at odds with major public policy goals to reduce electric rates and increase renewable energy utilization. More specifically, the Commission is concerned that the HECO Companies may not currently have the appropriate financial incentives to encourage timely and full implementation of the required actions set forth in *Section 1: Creating a 21st Century Generation System*.

The current regulatory cost-recovery model for power supply in Hawaii includes different regulatory mechanisms and processes to provide the HECO Companies with the opportunity to fully recover the total cost of the power supply function. The principal regulatory mechanisms and processes for power supply cost recovery include:

- *Base electric rates recover utility power plant fixed costs* – Power plant fixed costs include: plant operation and maintenance expenses, annual plant depreciation expense (recovery of plant investment), taxes and allowed return on utility plant investment. Commission authorized profit on utility generation is governed by the level of utility capital investment in power plants and fuel supply infrastructure. Base rates are adjusted periodically in rate cases, which are currently on a three-year rate case cycle.

- *Energy Cost Adjustment Clause (ECAC) recovers utility generation fuel expenses and costs of energy purchased from IPPs* - The ECAC mechanism is an automatic cost pass through rate recovery mechanism that enables the HECO Companies to adjust the ECAC surcharge up or down monthly to reflect changes in energy prices from the base level

established in the most recent rate case.[24] The ECAC mechanism is reconciled quarterly to ensure that recorded ECAC revenues match allowed ECAC expenses to ensure full recovery in light of changes in electric sales.

- *Purchased Power Adjustment Clause (PPAC) recovers capacity and other fixed contractual payments payable to IPPs* - These payments typically include annual contractual price adjustments to reflect changes in inflation. The PPAC surcharge is adjusted quarterly to reflect changes in fixed cost obligations and also to reconcile PPAC revenues with applicable PPAC expenses to ensure full recovery in light of changes in electric sales. The PPAC, in conjunction with the ECAC cost recovery mechanism, ensure that the total costs of purchased power from IPPs are fully recovered from customers.[25]

The HECO Companies essentially do not earn a profit or experience a loss due to changes in fuel prices. These expenses represent 80 - 85% of total power supply functional costs and 60 - 65% of total utility cost of service.[26] However, the current ECAC does contain a utility generation heat rate mechanism, which is intended to incentivize the HECO Companies to operate utility generation efficiently.[27]

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[24]Although the ECAC mechanisms are intended to recover changes in fuel and purchased energy expenses from levels established in last rate case, this mechanism can result in the recovery of hundreds of millions of dollars of energy costs if oil prices escalate significantly between rate cases or before the ECAC base level is reset to reflect current oil prices.

[25]Bond rating agencies consider the fixed payment provisions in IPP contracts to be equivalent to long-term debt. The PPAC mechanism reduces the financial risks to the utility associated with the cost recovery of PPA fixed payments and therefore reduce the concern that the HECO Companies will not be able to recover these costs in a timely manner.

[26]In spite of the fact that fuel expenses constitute the single largest expense category for each of the HECO Companies, the ECAC mechanism has not received a high level of regulatory scrutiny in the past. The Commission has initiated an investigation into the HECO Companies generation dispatch practices and protocols as part of the Power Supply Improvement Plans HECO, HELCO and MECO are required to file with Commission.

[27]ECAC heat rate deadbands were implemented in conjunction with sales decoupling to adjust for changes in utility power plant heat rates due to integration of renewable energy resources. The increased penetration of intermittent renewable energy resources has precipitated the need to modify utility power plant operations in order to accommodate these resources which in turn has adversely affected power plant heat rates. The HECO Companies have realized small annual pre-tax gains and losses due to actual versus target heat rate performance at utility power plants. However, these annual gains and losses have paled in comparison to rate increases experienced by customers due to increases in oil prices.

The Commission is concerned that under the current regulatory cost-recovery model for power supply the utilities lack correct incentives to control power supply costs, aggressively pursue long-term contracts with IPPs for new renewable energy projects, and expeditiously retire old, inefficient generation units. The Commission notes the following concerns with the current regulatory cost-recovery model:

- *Lack of correct incentives to control power supply costs* – Under the cost pass-through structure of the ECAC mechanism, the HECO Companies have no direct financial incentive -- reward or penalty – to stabilize and reduce power supply fuel costs, minimize curtailment of low-cost renewable energy, or maximize use of cost-effective renewable energy sources. Simply stated, the utility is insulated and has no direct financial "skin in the game" as to whether fuel costs, and by extension, the ECAC surcharges increase or decrease. Yet, this is the single largest category of utility costs.[28]

- *No direct financial incentive to pursue independent, third-party IPP clean energy projects* - Long-term utility power generation profits are tied solely to level of capital investment in utility generation assets (rate base). Utilities do not profit from implementation of customer-owned and utility-scale IPP renewable energy projects since utility capital investments opportunities are avoided or made by independent entities, respectively. Simply stated, the HECO Companies do not have any financial incentive to contract with IPPs for additional power supply resources.[29]

- *No direct financial incentives to accelerate retirement of fossil generating units* – A key goal of Hawaii's clean energy transformation is to substantially displace existing fossil generation. A utility generation plant must be "used or useful" to be included in rate base.[30] Retirement of existing utility fossil generation could cause undepreciated utility

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[28]Act 162 (2006 Session) sets forth requirements for automatic fuel rate adjustment clauses which states, in relevant part, that such clauses should (1) [f]airly share the risk of fuel cost changes between the public utility and its customers; and (2) [p]rovide the public utility with sufficient incentive to reasonably manage or lower its fuel costs and encourage greater use of renewable energy. Circumstances have changed substantially since the passage of Act 162 , such that a re-examination of the existing ECAC mechanism may be warranted.

[29]While the Commission has established a penalty mechanism in the event a utility fails to comply with RPS requirements, this mechanism does not provide economic incentive to contract with IPPs for additional renewable energy projects. The HECO Companies, for example, could comply with RPS requirements by utilizing liquid biofuels in existing utility power plants to the extent necessary and thereby would not need additional IPP contracts.

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plant capital investment to be removed from rate base since "retired" utility generation plant would no longer be in service, thus reducing future utility profits. Whether a utility would be eligible to recover the remainder of plant costs from customers creates potential "stranded cost" uncertainties for the utilities. It is unclear whether the HECO Companies' proposed fuel switching strategies for old, inefficient fossil generators is guided to an unreasonable extent by the desire to avoid potential fossil generation stranded costs. Modernization of Hawaii's existing generation fleet will require acceleration of utility generating plant retirements.[31]

- Lack of transparent price signals to evaluate the supply of ancillary services – The cost of utility generation, including provision of individual ancillary services, has not been unbundled to provide appropriate price signals. The lack of transparent ancillary service price signals in Hawaii hampers development of non-fossil generation resources to provide ancillary services such as energy storage or demand response.

New Regulatory Incentives to Achieve Hawaii's Clean Energy Future

Hawaii's existing electric utilities represent the sole wholesale purchaser of fossil and renewable energy and ancillary services on each island's electric grid. The HECO Companies manage the price and terms and conditions under which energy projects are developed through control of PPA negotiation and competitive procurement processes. As a consequence, the HECO Companies determine when, and at what pace, utility-scale renewable energy projects, as well as new technologies to accommodate additional renewable generation (e.g., DR and storage), are developed in Hawaii, and the terms and conditions under which development can occur. It is essential that properly structured power generation cost recovery and financial incentive mechanisms are in place to guide and reward the HECO Companies for implementing strategies and actions set forth in *Section 1: Creating a 21st Century Generation System* and *Section 2: Creating Modern Transmission and Distribution Grids*.[32]

A number of potential regulatory solutions are available to incentivize the utilities to better manage their power supply costs and achieve public policy goals. These include:

- Incentive mechanisms to increase renewable energy, minimize power supply energy costs, reduce emissions and maintain bulk power supply reliability (Acts 37 and 162 frameworks);

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[31]Potential exists for new highly efficient, flexible generators to be less expensive than continued operation of existing utility generation.

[32]Act 37 (2013 Session) and Act 162 (2006 Session) provide legislative guidance for addressing many of the generation cost recovery and incentive regulatory issues identified here.

- Fossil generation retirement incentive mechanism to encourage acceleration of utility generating unit retirements, including potential use of securitization to allow the utilities to exit the generation business financially;

- A prohibition on developing new generation resources or undertaking major modifications to existing utility generating units by the HECO Companies;

- Unbundling ancillary services to provide price signals for alternative sources of supply; and

- Incentive mechanisms to invest in transmission-and-distribution grids consistent with the framework established by Act 37.

With new incentive mechanisms that better align utility performance with customers' interests and public policy, a financially healthy utility can be synonymous with achieving Hawaii's clean energy future.

Pricing of Utility Services Should Reflect New Business and Technical Realities

Current electric utility rate structures in Hawaii are not well suited for a future environment where there are significant quantities of variable renewable energy, customer-sited distributed energy resources and increasingly smart grid technologies. Existing utility rate and pricing structures need to be reconsidered to better respond to customer and technological changes. In addition, current rate structures do not provide the correct market signals to customers and market actors to address periods with an excess supply of energy to the grid. In this area, the Commission offers the following perspectives for consideration:

"Unbundled" rate structures could more appropriately fit customer preferences for varying levels of electricity service - Today, typical electric rate tariffs contain a bundled rate (price) to recover the cost of providing both utility electricity supply and energy delivery services. Unbundled rates that separate power supply, ancillary services, and energy delivery costs could more properly account for utilizing different mixes and quantities of various utility services where each customer would be charged accordingly. Customers with distributed generation are likely to utilize different combinations of utility-supplied electricity and grid-delivery services than customers without distributed generation. Under this structure, DER customers would pay for grid services they *utilize* and receive compensation for various grid support services they *provide*. An unbundled rate structure could also prevent shifting utility fixed costs from customers with distributed generation to customers without distributed generation, consistent with cost causation principles.

Greater utilization of capacity-based, fixed-cost based pricing – Most residential rate structures recover fixed and variable costs of electricity service primarily through charges based

on volumetric usage (per kWh). With increasing amounts of distributed energy resources where customers utilize grid infrastructure and backup capacity to varying degrees, rate structures may need to increasingly utilize pricing that more accurately reflects the different levels of service customers require from the utility. These changes could include recovery of utility fixed costs from residential and small business customers through capacity-based or fixed charges.

Time-of-use and dynamic pricing structures can help customer demand better match renewable energy supply - Non-time differentiated pricing structures are utilized predominately in Hawaii and hence rates do not vary by daily time periods or with changing electric system operational costs. With increasing utilization of low- cost renewable energy resources, it is appropriate to financially encourage customers to shift their electricity usage to time periods when excess supplies of lower-cost, variable renewable energy are available rather than curtail that lower-cost energy due to over-generation.

New incentives to reduce curtailment of renewable resources – As noted in recent regulatory decisions,[33] the continued growth of variable renewable resources (both utility-scale and customer-sited) is contributing to "network congestion" on each island grid where the total amount of variable renewable resources can exceed the capacity of the system, under current technical constraints, to accept additional variable renewable resources. The Commission is increasingly concerned about situations of "over-generation" during daytime hours where continued growth of presently uncontrollable export of energy from distributed generation could displace other low-cost, utility-scale renewables. This situation raises the cost of energy for customers without rooftop PV and does not achieve the state's policy goals to reduce fossil fuel use when one form of renewable energy displaces another. The Commission has ordered the HECO Companies to develop and file Power Supply Improvement Plans (PSIPs) and a Distributed Generation Interconnection Plan (DGIP) that will identify and prioritize system- and distribution-level technical improvements on each island to accept further renewable energy. However, the Commission notes that moving into the future, new technical measures and economic incentives may be necessary to allocate the grid's finite capacity to integrate variable renewable energy.

Supplemental power supply pricing structure – With increasing customer use of distributed energy resources, it may be appropriate to implement a supplemental power service tariff. This tariff offering would be structured to meet the needs of customers with distributed generator and /or energy storage, who may rely upon the utility to provide only a portion of total power

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[33]See Order No. 32055, filed April 28, 2014 in Docket No. 2011-0092; Decision and Order No. 31758 filed December 20, 2013 in Docket No. 2012-0046; Decision and Order No. 31758, filed Dec. 20, 2013 in Docket No. 2012-0212; and Decision and Order No. 32053, filed April 28, 2014 in Docket No. 2011-0206.

supply requirements, either due to customer choice or meteorological conditions. Current utility tariff structures are designed to recover fixed costs of generation from a customer predicated upon customers taking their entire electricity requirements from the utility.

By establishing pricing that more accurately reflects the economic costs of grid operations, the electric utilities can recover the costs of grid investments that benefit all customers, third party energy service providers could develop new offerings to meet customer energy needs and support grid operations, and customers would have a growing array of options better suited to the changing demands of their homes and businesses.

Existing Utility-Customer Regulatory Compact May Need to be Modified

Investor-owned electric utilities in Hawaii, and in most U.S. mainland states, operate under a utility-customer regulatory compact that has existed for a century and requires the utility to fulfill public interest obligations, and in return, receive certain financial compensation. These obligations and benefits stem from legal and regulatory determinations that an electric utility is a business that is necessary and exists to serve the public interest. Electric utilities provide an essential service to society, are highly capital-intensive business enterprises and operate as a monopoly in order to achieve scale economies and avoid duplication of delivery infrastructure. The two basic tenets of the regulatory compact are as follows:

- An electric utility monopoly has an obligation to serve all customers at just and reasonable rates, established by regulatory commission, and in return, the utility is afforded an opportunity to earn a reasonable return on capital invested in utility plant and equipment necessary to fulfill the obligation to serve. This portion of the regulatory compact is more widely recognized.

- Consumers are protected by paying just and reasonable regulated rates for essential services supplied by a monopoly electric utility and in return, are expected to take electric service only from the incumbent electric utility. The latter provides an electric utility with reasonable assurances that capital invested in utility plant to be operated for many decades will be repaid over the plant's useful life. This portion of the regulatory compact is often overlooked yet is fundamental to utility's ability to attract capital on reasonable terms to invest in utility plant assets without unreasonable financial risk that these investments will eventually be recovered from utility customers. Customers' obligation to take and pay for utility service is an essential corollary to a utility's obligation to serve.

However, fundamental tenets of the long-standing regulatory compact were challenged by the introduction of customer choice on the mainland in the 1990s. Currently, they are being challenged in Hawaii with the emergence of customer choice to install distributed generation.

Customer choice modifies the second tenet of the regulatory compact. Utility customers are no longer obligated to take electrical supply from the incumbent utility under a customer choice paradigm. When this occurs, an electric utility is no longer assured a revenue stream that would provide a reasonable opportunity to recover and earn a fair return on utility plant investment devoted to public service. Without an expectation of earning a reasonable return on capital devoted to public use, because customers are no longer obligated to purchase electricity supply from the incumbent utility, the other major regulatory compact tenet (obligation to serve) is effectively broken as well. With potential uncertain future customer energy supply requirements and revenue base, it is difficult for a utility to ascertain its long-term supply obligations and hence generation requirements that would not be stranded at some future point.

The traditional obligation to serve for a vertically-integrated electric utility consists of the collective obligations to interconnect new customers to the grid, generate electrical power and deliver the power to customers over the T&D grid. Utility regulators were forced to redefine the obligation to serve framework for mainland electric utilities in those states where retail customer choice was implemented. Customer choice was predicated upon a competitive electric generation market and therefore utility generation was deregulated. Utility generation was forced to be cost-competitive and compete against different power supply alternatives in large regional competitive wholesale power markets. In many customer choice states, incumbent vertically-integrated electric utilities were required to divest generation and thereby become T&D only regulated electric utilities.

T&D electric utilities by definition could not have an obligation to supply since they no longer owned generation assets with which to provide power supply.[34] The obligation to serve for T&D only electric utilities became the obligation to deliver power from competitive alternative electricity suppliers to utility customers. In some cases, T&D utilities were also required to be the supplier of last resort in the event competitive alternative electricity suppliers defaulted or customer did not participate in competitive market. In these cases, the supplier of last resort obligation was accomplished by procuring power supply, as necessary, from wholesale power markets or IPPs.

Hawaii's customer choice situation is different and more complex than customer choice on the mainland. Mainland competitive alternative electricity suppliers are required to supply a customer's full electricity supply requirements across all hours of the year. Competitive alternative electricity suppliers effectively assume the obligation to supply but do so pursuant to private contract terms. To accomplish this, the competitive suppliers secure through

[34]A similar policy situation could arise in Hawaii with respect to utility's obligation to provide power supply depending upon the HECO Companies' future ownership of power generation.

contracts sufficient generation capacity plus applicable reserve margins to serve their portfolio of competitive customer load. Customers' load profiles and use of the T&D system remains the same regardless of whether they receive default power supply from T&D electric utility or competitive market power.

Customer choice is emerging in Hawaii by virtue of utility customers being able to install customer-owned generation and thus no longer obtain a portion of their electricity supply from the incumbent electric utility. Customers using their own generators continue to be interconnected, and in most cases, continue to utilize the electric grid. To-date, customer-owned generation in Hawaii consists almost entirely of solar PV systems which are not capable of supplying customers' full electricity supply requirements across all hours of the year without relying upon utility generation to effectively serve as a storage device.

In spite of significant penetration of customer-owned generation, the HECO Companies continue to invest substantial capital in utility plant assets. The amount of utility plant investment has increased, not decreased, as more residential customers have installed solar PV systems and financially leave the system. The existing sales decoupling mechanism effectively guarantees a revenue stream for the HECO Companies and mitigates the loss of utility revenue due to customer choice in the near-term. However, the sales decoupling mechanism was never intended to be a substitute for the long-term utility-customer regulatory compact.

The long-term obligation for Hawaii's electric utilities to interconnect customer-owned generation, to supply distributed generation customers with supplemental or back-up power supply and to provide grid capacity to enable power exports has not been defined. The Commission intends to examine the utility-customer obligation to serve policy issue as part of its forthcoming larger examination of the technical, economic and regulatory issues associated with distributed energy resources.

Conclusion

In this statement of inclinations, the Commission has discussed key technical, market, and public policy changes that will continue to shape the electric utility business in the future. To date, the Commission has not observed sufficient urgency by the utility in addressing this rapidly changing business environment and was compelled to offer this guidance to better align the HECO Companies' business model with customers' interests and public policy goals. By providing direction on future business strategy, energy resource planning, and project review in the three sections of this document, the Commission has outlined broad strategic focus in key areas of the electric utility business and potential regulatory reforms. It is now incumbent on the HECO Companies to utilize this guidance in developing a sustainable business model that

explicitly governs the Companies' capital expenditure plans, major programs, and projects submitted for regulatory review and approval.