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**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF HAWAII**

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PUBLIC UTILITIES  
COMMISSION

---- In the Matter of ----

PUBLIC UTILITIES COMMISSION

Instituting a Proceeding to  
Investigate Distributed Energy  
Resource Policies.

Docket No. 2014-0192

**COMMENTS OF THE  
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT, AND TOURISM  
ON THE HEI COMPANIES'  
DISTRIBUTED GENERATION INTERCONNECTION PLAN**

**AND**

**CERTIFICATE OF SERVICE**

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**COMMENTS OF THE  
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT, AND TOURISM  
ON THE HEI COMPANIES'  
DISTRIBUTED GENERATION INTERCONNECTION PLAN**

In accordance with the Hawaii Public Utilities Commission's ("Commission") September 12, 2014 Order Inviting Comment,<sup>1</sup> the Hawaii Department of Business, Economic Development, and Tourism ("DBEDT"), by and through its Director in his capacity as Energy Resources Coordinator, through the undersigned Deputy Attorney General, respectfully submits the following Comments addressing the HEI Companies'<sup>2</sup> Distributed Generation Interconnection Plan ("DGIP").<sup>3</sup> In support of its Comments, DBEDT states as follows:

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<sup>1</sup> *Instituting a Proceeding to Investigate Distributed Energy Resource Policies*, Docket No. 2014-0192, Order No. 32293, Inviting Public Comment on the HECO Companies' Distributed Generation Interconnection Plan (filed September 12, 2014) ("Order No. 32293").

<sup>2</sup> The "HEI Companies" and "Companies" as stated herein are the Hawaiian Electric Company, Inc. ("HECO"), the Hawaii Electric Light Company, Inc. ("HELCO"), and the Maui Electric Company, Limited ("MECO").

<sup>3</sup> Hawaiian Electric Companies' Distributed Generation Interconnection Plan in Response to Hawaii Public Utilities Commission Order No. 32053, Docket No. 2011-0206 (filed August 26, 2014). See *Instituting a Proceeding to Investigate the Implementation of Reliability Standards for Hawaiian Electric Company, Inc., Hawaii Electric Light Company, Inc., and Maui Electric Company, Limited*, Decision and Order No. 32053, Docket No. 2011-0206 (filed Apr. 28, 2014) ("Order No. 32053") at 50-57 (ordering the HEI Companies to file a DGIP).

## I. EXECUTIVE SUMMARY

### A. **The DGIP Must Be Comprehensively Reviewed to Ensure it is Consistent With and Advances the State's Energy Policy Directives**

DBEDT's Comments address whether the DGIP provides clear actionable strategies to: (1) increase options for customers to manage energy use; (2) increase distribution circuit capacity to safely, reliably, and economically interconnect distributed generation ("DG") resources; (3) utilize advanced distributed energy technologies to mitigate adverse grid impacts; and (4) contain appropriate strategies and timely action plans, supported by well-reasoned and compelling analyses, to achieve these goals on each island.<sup>4</sup> At the macro level, DBEDT's analysis of the HEI Companies' relative compliance with these Commission requirements is conducted within the context of the State's energy policy directives. Fundamental to the State's energy policy is the State's commitment to maximize the deployment of cost-effective investments in clean energy production and management for the purpose of promoting Hawaii's energy security and well-being. More specifically, the State's energy policy directives include: (1) diversifying our energy portfolio by cost-effectively maximizing indigenous renewable sources; (2) connecting the islands through integrated, modernized grids; (3) balancing technical, economic, environmental, and cultural considerations; (4) leveraging our position as a test bed to launch an energy innovation cluster to drive economic development and job creation; and (5) supporting market-led investments and pricing structures that align with the State's energy policy and economic goals.

In addition, DBEDT believes that consideration of the DGIP should not be undertaken by the Commission in a vacuum. Rather, these components must be holistically analyzed as part of a comprehensive review process to ensure that any actions taken in this proceeding will be in

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<sup>4</sup> Order No. 32293 at 3.

harmony with the other parallel efforts underway, including the Power Supply Improvement Plans (“PSIPs”) proceeding.<sup>5</sup> The DGIP is part of the larger Distributed Energy Resource Policies proceeding that the Commission has commenced in this docket and DBEDT understands that further processes and procedures will be established to fully explore the issues raised in the DGIP. In addition, the DGIP implicates issues raised in other ongoing proceedings, such as the Integrated Demand Response Portfolio Plan (Docket No. 2007-0341), the Modifications to Rule 14H proceeding (Docket No. 2014-0130), the Reliability Standards Working Group’s (“RSWG”) Photovoltaic (“PV”)-DG Subgroup (“PV-DG Subgroup”) Stipulations in the RSWG proceeding (Docket No. 2011-0206), the Inter-Island Cable Investigation (Docket No. 2013-0169), and the HEI Companies’ March 17, 2014 Smart Grid Roadmap and Business Case,<sup>6</sup> among others. DBEDT attaches hereto as Appendix 1 a “Utility Planning Map” that identifies these related efforts and illustrates the contours of the comprehensive review that DBEDT envisions.

As an example of the need for holistic review of these parallel and related processes, the HEI Companies cite in the DGIP to the limitations of operating within small and isolated island systems and the associated reliability constraints. The DGIP fails to consider any of the reliability benefits or possible mitigation abilities that an inter-island grid tie may have in assisting the HEI Companies in adding greater levels of DG PV on their systems. This omission is important as the inter-island grid tie under consideration in Docket No. 2013-0169 may provide solutions to the issues the HEI Companies face since they will be increasingly required to “incorporate and

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<sup>5</sup> *Instituting a Proceeding to Review the Power Supply Improvement Plans for Hawaiian Electric Company, Inc., Hawaii Electric Light Company, Inc., and Maui Electric Company, Limited.*, Docket No. 2014-0183, Order No. 32294, Inviting Public Comment on the HECO Companies’ Power Supply Improvement Plans (filed September 12, 2014). (“Order No. 32294”). See DBEDT’s concurrently filed Comments in Docket No. 2014-0183 addressing the HEI Companies’ PSIPs for a detailed discussion of the related proceedings.

<sup>6</sup> The HEI Companies’ March 17, 2014 Smart Grid Roadmap & Business Case was filed in accordance with the Order Closing Docket (filed July 26, 2010) in Docket No. 2008-0303.

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.”<sup>7</sup> The inter-island, undersea grid tie proposal has the ability to expand renewables on Maui (including PV, wind, etc.) and strengthen reliability and diversity. Additionally, analysis conducted and previously submitted to the Commission by DBEDT has shown that the grid tie would be cost-effective and advance the State’s energy policy directive. Accordingly, DBEDT supports comprehensive review of the Companies’ DGIP, PSIPs, and other on-going proceedings to ensure that the proposed strategies and potential mitigation measures proposed in the DGIP will be in harmony with the other parallel efforts underway. Comprehensive review is also warranted to ensure the HEI Companies have selected the best path forward to meeting the State’s energy policy directives. As mentioned above, the attached Utility Planning Map details the contours of that comprehensive review.

**B. DBEDT Cannot Conclude that the DGIP, As a Whole, Is Consistent With the State’s Energy Policy**

The HEI Companies have certainly provided an extensive response to the Commission’s directives, but have suggested nothing that, in reality, would immediately reduce the interconnection queue. The length of the interconnection queue is stifling the creation of jobs, preventing the introduction of more solar PV units, and appears to be pursued by the HEI Companies simply to enhance their business position, all while failing the citizens of the State of Hawaii. The HEI Companies appeared to have obfuscated the Commission’s directives to offer concrete and actionable plans to address this issue. The only remedy to avoid unwarranted delays and the further draining of jobs from the State is to create a rebuttable presumption in favor of the

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<sup>7</sup> *Regarding Integrated Resource Planning*, Docket No. 2012-0036, Order No. 32052, Exhibit A: Commission’s Inclinations on the Future of Hawaii’s Electric Utilities, at 16-17 (filed April 28, 2014).

interconnection of DG PV. This action needs to be imposed quickly by the Commission in order to avoid further economic damage to important businesses in the State, the State's need for jobs, and to the State's citizens who have waited and waited to interconnect without justification for the substantial delays. The interconnection process, and the interconnection queue, was never intended by the Commission to be the place where good projects go to perish. An immediate remedy is thus necessary and time is of the essence for the HEI Companies to expeditiously relieve the growing wait time to interconnect.

The HEI Companies also failed in another way in the DGIP. They have not clearly conceptualized if they will remain vertically integrated or will move substantially towards the transmission and distribution side improvements that will move the electric utility forward consistent with State policy. While the Commission did not expressly direct the HEI Companies to explain their business model of the future within the DGIP, it is undeniable that the Commission took coordinated actions on April 28, 2014—one of which was the issuance of the "Commission's Inclinations" demanding the HEI Companies to develop a sustainable business model, and another was the requirement to develop the DGIP. Unfortunately, the DGIP appears to reflect the HEI Companies' view that the requirement to develop the DGIP was an isolated act.

The HEI Companies could have developed a DGIP that demonstrated that the State's goals and public policy objectives can be met through a transformational process that includes a continuing, important, dynamic, and profitable role for the HEI Companies. Such an approach would have demonstrated the HEI Companies' commitment to Hawaii's energy future by establishing their role as a transformational player. Rather than using the DGIP as a means of achieving transformational change, the DGIP appears to be the result or a component of the flawed PSIPs, which merely propose incremental changes that, without strategic focus, serve the HEI

Companies' position as vertically integrated utilities. Proposing incremental improvements to a business model that has inadequately aligned the HEI Companies' interests with the public interest has not been shown to substantially increase the levels of DG PV that can be integrated on their systems. This concern is demonstrated by considering the relationship between the DG 2.0 structure and the heavy reliance on liquefied natural gas in the Preferred Plans proposed in the PSIPs. Without presenting and justifying a future business case that better aligns the public and the HEI Companies' interests, DBEDT submits that there will continue to be a disconnect in the motivations underlying the DGIP relative to the State's energy policy directives. Further, DBEDT cannot avoid the conclusion that the studies and analyses provided by the HEI Companies were provided principally to support their narrow interests as traditional vertically integrated utilities. As is expressed below, that overarching concern permeates throughout DBEDT's Comments.

**i. The Distributed Generation Interconnection Capacity Plan Is Not Fully Consistent With the State's Policy Goals Related to Modernizing the Electric Grid, Facilitating an Energy Test Bed, and Increasing Energy Options to Customers.**

The DGIP includes potential capacity upgrades and proposed strategies that could be implemented to mitigate the purported adverse impacts of DG. However, DBEDT believes that the proposed prioritization of potential mitigation measures do not fully accomplish all of the above-noted State energy objectives or the Commission's objectives of providing action plans that can be implemented expeditiously to increase options for customers to manage energy use, increase distribution circuit capacity, and utilize advanced distributed energy technologies to mitigate adverse grid impacts.<sup>8</sup> These failures appear to stem in part from the HEI Companies'

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<sup>8</sup> Order No. 32293 at 3.

view that “DG supplants conventional generation without providing equivalent system benefits.”<sup>9</sup> This is an unfortunate vision of DG and one that does not embrace the State’s energy policy directive of working to ensure Hawaii’s position as a test bed to launch energy innovation. This vision also reflects an intent to retain the HEI Companies’ vertically-integrated structure.

DBEDT acknowledges that full deployment of a completely modernized grid will take some time, but also points out that in less than three years, EPB (formally known as the Electric Power Board of Chattanooga), a Tennessee publicly owned utility, deployed approximately 170,000 smart meters, providing advanced metering infrastructure (“AMI”) coverage for all of its customers.<sup>10</sup> The utility also developed and offered a Time of Use residential rate program to give customers more choices and greater control over their electricity costs. Other upgrades included automated feeder switches and sensor equipment on 171 distribution circuits in its service territory and automated existing motor-operated switches on 61 sub-transmission circuits for improved system reliability. Supervisory control and data acquisition (“SCADA”) system upgrades leveraged an Internet protocol-based fiber optic communications infrastructure to support expanded automation equipment installations and provided improved situational awareness for dispatch operators. Likewise, there are existing utility operations that can be revised and technologies available that the HEI Companies could utilize sooner (as well as new technologies that can be explored) to safely and reliably increase DG penetration while at the same time mitigating the purported adverse impacts DG penetration currently may impose on the HEI

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<sup>9</sup> *See, e.g.*, DGIP at ES-5 (“DG supplants conventional generation without providing equivalent system benefits, overall system reliability may be compromised.”); DGIP at 2-3 (stating DG does not provide any of the attributes that conventional units provide such as reducing overall system inertia, frequency response, and short-circuit strength).

<sup>10</sup> <https://www.smartgrid.gov/sites/default/files/doc/files/EPB%20Final%20Project%20Description%20-%2020140422.pdf>.

Companies' systems. Thus, DBEDT is optimistic that the grid can be modernized at a faster pace with aggressive action and motivation.

Another concern with the DGIP is that it does not fully accomplish the Commission's objective of understanding the appropriateness of the current interconnection screening criteria, or the *de facto* circuit interconnection limits with a technical-based progression to increase circuit penetrations.<sup>11</sup> The DGIP certainly contains voluminous technical analyses on the existing and potential reliability impacts of accommodating more DG on the HEI Companies' grids based on information extrapolated from certain representative circuits and cluster studies. However, the DGIP does not fully address how much additional DG can be accommodated on each circuit of the HEI Companies' systems either currently or upon implementation of actions and strategies that would be designed to promote the use of DG as an ancillary service and a demand response option, while mitigating any adverse reliability and safety impacts that currently exist on each circuit. As such, DBEDT submits that the Commission should not assume that the information drawn from HEI Companies' representative circuit and cluster studies should enjoy a presumption of conclusiveness as to circuit penetration capability on their systems.

In addition, as discussed more fully below, DBEDT submits that the Commission should impose a rebuttable presumption to assist in the clearing of the HEI Companies' backlogged interconnection queue and consider penalties as an incentive to the HEI Companies to accelerate their grid improvement projects, while balancing the need for a safe and reliable grid.

ii. **The Strategies and Associated Costs Proposed in Response to the Distribution Circuit Improvement Implementation Plan Directives Have Not Been Shown to be Fully Consistent With the State's Policy Goals Related to Resource Diversification**

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<sup>11</sup> Order No. 32053 at 37, 52.

**and Cost-Effectively Maximizing Hawaii's Indigenous Renewable Sources.**

The Distribution Circuit Improvement Implementation Plan (“DCIIP”) does not fully accomplish the Commission’s objective of ensuring that the DGIP provides appropriate strategies and timely action plans to increase options for customers to manage energy use, increase distribution circuit capacity, and utilize advanced distributed energy technologies to mitigate adverse grid impacts. The DGIP does not contain sufficient cost-benefit analyses to allow for a comprehensive review of various strategies and mitigation options discussed in the DGIP to ensure that they are headed on a timely and reasonable track towards meeting the State’s objectives. DBEDT recognizes that the lack of concrete and methodological action plans is due in part to the need for further proceedings, stakeholder processes, testing, and improvements. DBEDT supports a comprehensive review of the strategies and mitigation options to ensure that decisions on these issues are consistent with the State’s policy directives of ensuring a diverse energy portfolio that maximizes use of renewable resources, including DG, and balancing considerations such as technical and economic issues and promoting innovation and market participation.

The HEI Companies’ proposal to offer a non-export option could be beneficial in providing customers another option for utilizing DG. However, this option should not serve as a mechanism to exacerbate inefficient resource portfolio and operational decisions or untimely implementation of grid support and modernization functionality. Nor should it serve to unjustifiably prevent greater DG penetration.

By focusing their proposed action plans, strategies and proposed cost allocations on avoiding cost shifts between different types of customers, the DGIP does not reflect the broader perspective on how the Companies’ operational practices and business decisions can be improved to ensure the best path forward to meeting the State’s energy policy directives. As such, the

proposal to transition away from the current net energy metering (“NEM”) program and to move towards proposed “DG 2.0” tariff structures, must be considered within the context of their intended comprehensive future business plans. DBEDT does not oppose consideration of modifications to programs, rates and tariff structures to facilitate fair allocation of grid capacity and enhance customer choice, but the modifications must be justified and appropriately developed within the context of a forward looking business case and in a manner consistent with the State’s and Commission’s objectives of cost-effectively maximizing indigenous renewable sources. In addition, the DGIP currently does not include sufficient justification to determine these vital program, tariff and pricing issues for existing or new DG customers. These program, tariff and pricing issues would need to be fully vetted within the context of a comprehensive review of the HEI Companies’ business model of the future and the State’s energy objectives of promoting a diversified energy portfolio that maximizes the benefits that DG can provide to customers and the overall electric systems.

**iii. The Advanced Distributed Energy Resource Technology Utilization Plan is Not Fully Consistent with the State’s Policy Goals Related to Job Creation, Generation Diversification, and the Need for a Modernized and Interconnected Grid.**

DBEDT has identified multiple concerns with the DGIP relating to the HEI Companies’ proposals to utilize advanced technologies in the near, medium, and long-term. Most significantly, the DGIP lacks a full assessment of how storage (particularly utility scale storage) can provide ancillary services to alleviate some of the HEI Companies’ concerns with DG utilization. The DGIP includes references to storage, proposes that customer-side storage could serve as a potential mitigation measure to be implemented in the short term, and that utility side energy storage could serve as a mitigation measure in the medium term. However, DBEDT believes that the DGIP does not fully address how utilization of storage as a strategy could mitigate the impacts that DG

currently has on the existing systems and provide auxiliary services to more efficiently operate their grids. This inadequacy reflects a missed opportunity to advance the State's goals of technological innovation, job creation and economic growth. For example, DG can currently assist in providing ancillary services and those opportunities could be further incorporated into the HEI Companies' plan, particularly as it relates to spinning reserve, permitting the HEI Companies to replace use of fossil fuel peaking resources with storage facilities to provide that same ancillary service.

Beyond storage, DBEDT identifies other concerns and provides suggestions related to the HEI Companies' implementation of advanced technologies including an inter-island, undersea grid tie, electric vehicles, AMI, and advanced inverters. For instance, DBEDT asserts that the HEI Companies' proposals in the DGIP regarding electric vehicles ("EV") are misguided due to the HEI Companies' reliance on assumed and incorrect technical barriers to the incorporation of EV infrastructure, which prevents widespread adoption of this technology. In addition, because the HEI Companies' proposal to require advanced inverter certification requirements may contribute to more roadblocks to DG integration, DBEDT requests the Commission carefully review this proposal.

DBEDT submits that there are larger, underlying issues related to the HEI Companies proposals stemming from the HEI Companies' current business model. Because the HEI Companies have each played the role of a traditional utility, they have had no incentive to develop advanced technologies, such as those discussed above, that would increase the options of consumers in selecting their energy resources. Further, since the HEI Companies have not substantially proposed to move away from their traditional role, they will have no incentive going

forward to ensure that the technologies supported by the State's energy policy directives are implemented in a timely and low-cost manner. DBEDT's comments reflect this inherent conflict.

DBEDT further advises the Commission to utilize where practical the PV-DG Subgroup and the Distributed Energy Resource ("DER") – Technical Working Group ("TWG") to review the technical issues involved in the DGIP. The TWG and the PV-DG Subgroup members may help the Commission ensure that the advanced distribution energy resources proposed in the DGIP are deployed efficiently, and in a timely and cost-effective manner consistent with the State's objectives.

## **II. BACKGROUND**

In the interest of avoiding duplication, DBEDT refers the Commission to its summary of the relevant background of the DGIP and PSIPs proceedings in DBEDT's concurrent comments submitted in the PSIPs proceeding.<sup>12</sup>

## **III. COMMENTS**

In response to the Commission's DGIP directives, the HEI Companies articulated their "DG vision of the future," with their "key strategic initiatives to enable DG growth."<sup>13</sup> These strategic initiatives include in the short term (i.e., 2014-2016) the following operational initiatives: (1) address circuit-level thermal constraints on interconnections; (2) increase Gross Daytime Minimum Load ("GDML") limits to a target of 150% as the Companies and industry work to test inverters; and (3) interconnect DG "as circuit and system constraints permit."<sup>14</sup> The HEI Companies' short-term regulation and policy strategy is to: (1) close the existing NEM queue and

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<sup>12</sup> See DBEDT's concurrently filed Comments in Docket No. 2014-0183 in response to the HEI Companies' PSIPs, at Section II.

<sup>13</sup> DGIP at 1-5 to 1-6.

<sup>14</sup> DGIP at 1-6, Figure 1-1, Key Strategic Initiatives to Enable DG Growth.

“interconnect as many queued customers as possible;” (2) for new applicants on unconstrained circuits, offer a modified “Schedule Q” tariff and non-export options; and (3) begin “DG 2.0 rate discussions as part of Order No. 32269.”<sup>15</sup> This short term strategy also includes offering the non-export DG alternative “to increase DG opportunities.”<sup>16</sup>

In the medium term (i.e., 2017-2020), the HEI Companies propose to: (1) proactively remove circuit- and system-level constraints through upgrades and new technologies (i.e., batteries, grid modernization, advanced inverters, etc.); (2) offer DG options under revised tariff structures, namely non-export DG, export DG, and for “constrained circuits, offer preferential treatment to non-export systems.”<sup>17</sup> They also plan to explore in the medium term options to mitigate DG downsides while capturing upsides (e.g., EVs, community solar, etc.) and explore the “role of DG in the broader customer service offerings.”<sup>18</sup> Over the long term (i.e., 2021-2030), they propose eliminating daytime minimum load “as circuit, and system-level studies permit,” offer export, non-export and community solar options, and for constrained circuits, offer preferential treatments to community solar and non-export systems. They also propose as a long-term product and service to enable DG contributions to the grids through distributed storage.<sup>19</sup>

DBEDT discusses some of these strategies below as they have been proposed by the HEI Companies within the framework of the three major components of the Commission-directed DGIP. DBEDT explains why it cannot conclude that all the proposed strategies are consistent

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<sup>15</sup> DGIP at 1-6, Figure 1-1, Key Strategic Initiatives to Enable DG Growth.

<sup>16</sup> DGIP at 1-6, Figure 1-1, Key Strategic Initiatives to Enable DG Growth.

<sup>17</sup> DGIP at 1-6, Figure 1-1, Key Strategic Initiatives to Enable DG Growth.

<sup>18</sup> DGIP at 1-6.

<sup>19</sup> DGIP at 1-6, Figure 1-1, Key Strategic Initiatives to Enable DG Growth.

with the State's energy policy directives. DBEDT also recommends specific actions that the Commission should direct.

**A. Distributed Generation Interconnection Capacity Analysis**

The Commission was prompted to direct the HEI Companies to develop the DGIP, in part, because the "HECO Companies [failed to previously] provide any formal reports or studies that set forth the technical basis and engineering support for current interconnection screening criteria, or the *de facto* circuit interconnection limits."<sup>20</sup> Based on this concern, the Commission included the Distributed Generation Interconnection Capacity Analysis ("DGICA") as a component of the DGIP, directing the HEI Companies to proactively identify distribution circuit capacity to interconnect DG resources and the system upgrades necessary to increase circuit interconnection capability. The DGICA was also to identify circuit penetration limits that would represent a sound, technical-based progression to increase circuit penetrations including timelines on when those increasing limits would be implemented.<sup>21</sup>

It is important to examine the HEI Companies' response to the DGICA within the context of the Commission's request for comments on whether the DGIP provides a clear actionable strategy to increase distribution circuit capacity to safely, reliably, and economically interconnect distributed generation resources. Further, the Commission is interested in assessing whether the DGIP proposes to increase options for customers to manage energy use.<sup>22</sup> The State's energy policy directives also inform consideration of the DGICA as the State's interest in modernizing the grid is paramount, and the State seeks methods to diversify its energy portfolio through cost-

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<sup>20</sup> Order No. 32053 at 37.

<sup>21</sup> Order No. 32053 at 51-52.

<sup>22</sup> Order No. 32293 at 3.

effective means. When viewed under these overlapping considerations, the HEI Companies' DGICA fails in certain notable respects to advance the Commission's and the State's goals.

To address the Commission's directives, the HEI Companies have identified technical issues that constrain high levels of DG penetration on certain circuits in their systems which they extrapolate to the rest of their systems.<sup>23</sup> Specifically, in the DGICA, the HEI Companies provided several studies analyzing the effects of interconnecting DG on different subsections of their systems. These studies included: (1) the Hawaii Grid Cluster Evaluation, which was intended to implement the Proactive Approach and included "steady-state simulations of clusters of circuits and the impact on the circuits as well as the 46-kV subtransmission system and substations serving them"<sup>24</sup> (Attachment A); (2) MECO's curtailment reduction plan as it relates to transient events on the MECO system, in which the HEI Companies purportedly identified system challenges<sup>25</sup> (Attachment B); (3) the effects of differing penetration levels of DG PV on distribution circuits in HELCO's system during transient events, which purportedly found significant impacts of roof-top PV during transient events and identified protective measures to mitigate impacts of increasing levels of PV<sup>26</sup> (Attachment C); (4) the effects of PV penetrations on feeder WF1 (Attachment D),<sup>27</sup> and (5) the capabilities of several individual circuits in incorporating PV (Attachment E). Attachment G does not contain any descriptive analysis, but purports to include a summary of backbone circuit capacity, substation transformer capacity, projected load growth, and projected

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<sup>23</sup> DGIP at Section 2.

<sup>24</sup> See DGIP at 2-4.

<sup>25</sup> DGIP at 2-4.

<sup>26</sup> DGIP at Attachment C, page 5.

<sup>27</sup> See DGIP at 2-4.

DG growth for each of the three companies to base the HEI Companies' observations related to reaching capacity limits and GDML.<sup>28</sup>

While the DGICA includes voluminous reports of the studies the HEI Companies have conducted, the DGICA does not provide a sound explanation as to whether these studies are a sufficient proxy for extrapolating the results to their entire systems. This is a threshold deficiency that calls into question the remainder of the analysis. Moreover, the HEI Companies have not shown that their proposed roadmap for mitigating the effects of DG PV on their systems is the optimal means of achieving the Commission's and the State's policy goals. In addition, because the HEI Companies have not proposed a credible method of clearing their excessive interconnection queue, DBEDT offers an immediate recommendation to cure this problem.

**i. The Commission Must Question Whether the HEI Companies' Studies Are a Sufficient Proxy For Their Entire Systems.**

First, the HEI Companies' "representative circuit penetration studies" must be questioned for their ability to fully represent the entirety of the HEI Companies' circuits. The HEI Companies state the circuits they analyzed and studied have varying amounts of DG penetration, and as such, the mitigation measures to assist the interconnection of additional DG available to these feeders should be applied across their entire systems.<sup>29</sup> DBEDT agrees that the feeders the HEI Companies studied have varying degrees of the percent of generation relative to GDML.<sup>30</sup> Yet, it is not certain whether there are countervailing factors skewing the circuit sample they chose or whether the HEI Companies' operational mechanisms are maximized to permit the incorporation of additional DG

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<sup>28</sup> DGIP at 2-14 to 2-15 (which appears to incorrectly reference Attachment F instead of Attachment G on this listing). Tables 2-7 through 2-10 are purported to include a summary of the findings of this circuit and substation analysis. DGIP at 2-15. These conclusory tables and charts lack detailed analytical support rendering it difficult to evaluate the HEI Companies' underlying data, assumptions, and models.

<sup>29</sup> DGIP at 2-6, 2-19.

<sup>30</sup> DGIP at 2-6.

on these representative feeders. Thus, it remains unclear if the few circuit penetration studies are truly representative of the penetration levels of all the other circuits on all the other island grids, and consequently whether the proposed mitigation measures should likewise be required across their systems. Given that the HEI Companies have not yet provided results of several more diverse circuit penetration studies on each island grid to ensure they are adopting the best interconnection, circuit improvement, and PV exporting plans, the assumptions stemming from these representative studies should not be assumed to definitively apply to the rest of their systems.

In addition, for the Proactive Approach contained in Attachment A, DBEDT appreciates the efforts undertaken. However, it is DBEDT's understanding that full implementation of the approach is still pending and has not kept pace with the originally committed dates under the PV-DG Subgroup's proposed timeline for the Proactive Approach review.<sup>31</sup> For example, the three electrical cluster studies conducted under the Proactive Approach reports provided in Attachment A of the DGIP represent a minority of the overall number of electrical clusters in Oahu. DBEDT understands that the remaining number of electrical clusters in the MECO and HELCO territories have not yet been completed. Further, DBEDT is unclear of the HEI Companies' plans to complete the Proactive Approach cluster studies, institutionalize the approach as part of their utility planning operations, and make public the results of the remaining cluster studies to increase greater interconnection transparency. We also note that the approach, including underlying modeling, may need further refining. For example, the electrical cluster studies conducted under the Proactive Approach study use peak load instead of the GDML as proposed under Rule 14H to

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<sup>31</sup> Per the RSWG's PV-DG Subgroup Proposal, the proactive review should have been completed by the 3<sup>rd</sup> quarter of 2013 for all HECO clusters, by the 2<sup>nd</sup> quarter of 2014 for all clusters on Maui, and by 1<sup>st</sup> quarter of 2013 for 1-2 high demand feeders on Hawaii island. See Reliability Standards Working Group Independent Facilitator's Submittal, Final Report and Certificate of Service, Document 4b-7 (Summary of Proposal for Proactive Review Approach) at 6-7 (filed March 17, 2013).

evaluate PV circuit penetration levels. For the aforementioned reasons, DBEDT suggests careful review through the PV-DG Subgroup and the TWG to ensure that the Proactive Approach methodology is supported by well-reasoned and compelling analyses and is effective in informing the queuing process of DG applications and the resulting costs and procedures imposed on the DG applicants.<sup>32</sup> Further, the PV-DG Subgroup and the TWG could also be helpful in ensuring that the several studies analyzing the effects of interconnecting DG on different sections of the systems appropriately inform and complement one another toward a clear, transparent, and timely DG interconnection process. Such a process would be consistent with the State's policy of holistically examining the HEI Companies' activities.

Based on these studies, but without any specific citations linking their assertions to any demonstrated support, the HEI Companies claim that the essential barriers at the distribution circuit level to integrate DG PV relates to the Transient Over Voltage ("TrOV") threshold and the ability of circuits to accommodate load from adjustment circuits due to switching actions or contingency situations.<sup>33</sup> The HEI Companies currently use a threshold of 120% GDML to limit occurrences of TrOV.<sup>34</sup> Although the HEI Companies assert that their own studies support a maximum level of DG PV integration of 130% GDML to avoid a TrOV concern,<sup>35</sup> the HEI Companies do not intend to deviate from their current threshold of 120% GDML until after they: (1) engage in technical discussions with PV inverter manufactures to explore advances in inverter

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<sup>32</sup> See DGIP at 3-20 ("applications for DG interconnection will be tracked against circuit and system constraints" that were determined through Proactive Approach).

<sup>33</sup> DGIP at 2-1.

<sup>34</sup> DGIP at 2-12.

<sup>35</sup> DGIP at 2-11.

features;<sup>36</sup> and (2) complete projects with Electric Power Research Institute (“EPRI”), National Renewable Energy Laboratory (“NREL”), and Solar City in 2014 or 2015 to test advanced inverter functionality.<sup>37</sup> In addition, in regard to actions needed to mitigate switching issues, the HEI Companies state that they will make certain upgrades and limit backfeed through substation transformers and primary lines to 50% of capacity.<sup>38</sup> The HEI Companies propose that these upgrades would be implemented starting in 2016, but that these investments would continue to take place all the way up to 2030.<sup>39</sup>

Besides these preliminary technological barriers, based on their assessments, the HEI Companies propose other purportedly essential mitigation activities to curb the effects of DG on their systems. These measures include: (1) upgrading Load Tap Changer (“LTC”) controls; (2) upgrading voltage regulator controls; (3) upgrading line equipment capacity; (4) adding grounding transformers on circuits and 46-kV lines; and (5) upgrading distribution transformer capacity.<sup>40</sup> The HEI Companies also list, without explanation, other available mitigation actions, such as modifying inverter controls, installing line capacitors, implementing demand response options, and requiring direct transfer trip.<sup>41</sup>

**ii. The HEI Companies Have Failed to Show That Their Roadmap for Mitigating DG PV Effects is an Optimal Approach for Achieving the State’s Energy Policy.**

DBEDT supports the HEI Companies’ general attempts to recognize mitigation measures to assist in the further incorporation of DG PV resources. DBEDT agrees that there are certain

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<sup>36</sup> DGIP at 2-1.

<sup>37</sup> DGIP at 2-12.

<sup>38</sup> DGIP at 2-5.

<sup>39</sup> DGIP at 3-12.

<sup>40</sup> DGIP at 2-19.

<sup>41</sup> DGIP at 3-13, 3-14.

technical challenges involved in the maximization of DG PV resources on the HEI Companies' systems, and that the challenges may increase in the future with the addition of higher penetration levels of DG PV. However, and as DBEDT stresses throughout these Comments, the HEI Companies' failure to present any sustainable business case to support their mitigation efforts renders it difficult to determine whether the goals the HEI Companies are working towards are appropriate. Moreover, without an articulated and revised business case that has been shown to be consistent with the State's directives, DBEDT is concerned that the HEI Companies may lack proper incentives to actually mitigate the effects of DG PV on their systems. For example, continuation or expansion of the vertically integrated structure does not resolve inherent conflicts between third party DG and the HEI Companies' generation. Though DBEDT cannot find the HEI Companies' proposals consistent with the State's energy policy directives, it provides suggestions to improve and more clearly prioritize the HEI Companies' roadmap to better reflect the Commission's and the State's goals.

To start, the HEI Companies' proposed mitigation measures excessively rely on capital upgrades over cost-effective operational practices. Unlike the attention and study that the HEI Companies give to infrastructure-based mitigation measures that can assist in incorporating additional DG, the HEI Companies provide less detailed explanation regarding available operational practices as mitigation measures. These measures include operating distribution circuits in tighter voltage bands, lengthening the reclosing time of circuit breakers and reclosers to at least a 5-second delay, and monitoring voltage and power flow of distribution circuits in real-time. Included in their lists of recommendations to assist the incorporation of additional DG is also a recommendation to prevent the full functionality of DG by limiting the reverse flow due to

DG to 50% of substation transformer or conductor thermal ratings.<sup>42</sup> Because the use of operational best practices may directly limit the need for infrastructure investments, the Commission should require the HEI Companies to give greater consideration to these practices in the prioritization of actionable strategies to increase distribution circuit capacity to safely, reliably, and economically interconnect distributed generation resources.

Another shortcoming of the DGICA is the lack of assessment of the specific and tangible benefits of the HEI Companies' planned mitigation measures (i.e., capital expenditures) and operational practices to support the incorporation of additional DG PV. The DGICA includes an extremely general summary of the effect of their mitigation measures on the overall ability of their systems to handle additional DG PV.<sup>43</sup> Critically, however, it fails to explain what precise additional amounts of DG PV may be incorporated on the HEI Companies' systems with these infrastructure investments based on the existing capability of their systems. Rather, citing to the lack of new inverters to address TrOV issues, which they state is the main barrier to incorporating new DG PV,<sup>44</sup> the HEI Companies simply conclude that their infrastructure modernization proposals will enable "additional DG [to] be added to the various island grids."<sup>45</sup> DBEDT is concerned with the lack of detailed explanation for the amount of actual, additional DG PV that may be incorporated with the HEI Companies' proposed capital expenditures. This omission does not permit a clear understanding of a clear and actionable roadmap to address DG related issues and rather permits the HEI Companies to defer into an uncertain future the issue of how much DG

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<sup>42</sup> DGIP at 3-19.

<sup>43</sup> DGIP at 3-14.

<sup>44</sup> "Inverters must have fast-trip or other features to address TrOV. Lacking these abilities, a limit of 120% gross daytime minimum load (GDML) may be required, which will not allow the projected DG growth." DGIP at 8-3.

<sup>45</sup> DGIP at 8-4.

PV they intend to permit on their systems, despite proposing investments equating to an estimated \$194.5 million by 2030.<sup>46</sup>

Relatedly, DBEDT notes that there is a lack of complete analysis to ensure that the HEI Companies are not improperly front-loading certain of their mitigation investments, including LTC controller upgrades and voltage regulator controller upgrades.<sup>47</sup> DBEDT is concerned that cost front-loading may preclude consideration of other lower-cost mitigation measures that may arise in the future due to previous decisions to invest in expensive, long-lived assets. Further, as the HEI Companies have not provided any comparative analysis of the benefits of other low-cost investments to mitigate the issues they have identified or linked the amounts of additional DG PV they may integrate with their proposed investments, the Commission must question whether these investments would be prudent expenses on behalf of the HEI Companies' ratepayers.

The Commission directed the HEI Companies to provide their proposed circuit upgrade requirements to *increase* circuit penetration limits via a step-by-step process.<sup>48</sup> In response, the HEI Companies provided an analysis and study of the existing capacity of their substations,<sup>49</sup> their predictions of the capacity of their substations in the future,<sup>50</sup> a list of the mitigation measures they propose to undertake,<sup>51</sup> their short-term plans, which most notably includes imposing a limit of 120% of GDML and completing experimental projects to test advanced inverter functionality,<sup>52</sup>

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<sup>46</sup> DGIP at 3-16.

<sup>47</sup> DGIP at 3-12.

<sup>48</sup> Order No. 32053 at 52.

<sup>49</sup> DGIP at 2-15.

<sup>50</sup> DGIP at 2-17, 2-18.

<sup>51</sup> DGIP at 2-19.

<sup>52</sup> DGIP at 2-1, 8-3.

their expected timeframe for undertaking mitigation measures up through 2030,<sup>53</sup> and the associated costs over time of these investments.<sup>54</sup> DBEDT appreciates the HEI Companies' attempt to comply with the Commission's directive by providing their plans for addressing DG related issues. However, these assessments fail to provide concrete and actionable steps for the immediate increase of circuit penetration limits as the Commission directed. In regard to the short-term, and as previously explained, the HEI Companies have identified initial barriers related to TrOV and switching issues that they state will not be fully understood until next year at the earliest when they assess advanced inverter functionalities and finish discussions with inverter manufacturers.<sup>55</sup> Important here, the HEI Companies do not explain if they can overcome these initial barriers, but that they are continuing to undergo the testing of such possibilities. Thus, when viewed comprehensively, the HEI Companies proposal essentially breaks down into the recognition of purported short-term barriers to the incorporation of additional DG PV without precise recommendations or timeframes for overcoming such barriers coupled with a long-term plan of investing in additional mitigation measures that are not specifically linked to estimates of additional DG PV that may be incorporated thereby.

**iii. The Commission Should Impose a Rebuttable Presumption to Assist in the Clearing of the Interconnection Queue.**

The lack of actionable plans to increase penetration limits has a direct effect on the HEI Companies' already excessive, backlogged interconnection queue.<sup>56</sup> To address this issue, the

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<sup>53</sup> DGIP at 3-12.

<sup>54</sup> DGIP at 8-5.

<sup>55</sup> DGIP at 2-1, 2-12.

<sup>56</sup> "As of June 2014, there were more than 2,800 requests for connection awaiting completion of an Interconnection Requirements Study (IRS) and more than 700 additional requests awaiting mitigations." DGIP at 1-8.

HEI Companies claim that the results of their representative circuit studies and the Proactive Approach will assist in the avoidance of the need for future interconnection request studies for the majority of current and future interconnection requests. Yet, at the same time, the HEI Companies readily admit that interconnection request studies may still be needed for interconnection applicants.<sup>57</sup> DBEDT submits that the current delay in the interconnection queue process is simply unacceptable, and that the delay is a likely byproduct of the HEI Companies traditional business model, which fails to include any incentives for the incorporation of additional DG PV. Simply put, interconnection customers should not have to bear the burden of the HEI Companies lack of progress in assessing their own systems.

For these reasons, DBEDT suggests the Commission view the HEI Companies' proposal as yet another attempt to stifle the interconnection of DG PV on their systems in favor of their control and operation of utility owned generation sources. Therefore, DBEDT requests the Commission impose an immediate measure on the HEI Companies providing significant encouragement to the HEI Companies to take immediate steps to assist in the clearing of their excessive interconnection queue, assist with grid-modernization issues, while also respecting to an appropriate degree the analysis the HEI Companies has provided thus far. DBEDT recommends such a measure below.<sup>58</sup>

The Commission should adopt a measure taking the form of a rebuttable presumption in which the HEI Companies must approve DG systems of 10 kW or lower for circuits in which they have not specifically identified that further penetration cannot be accommodated in the near term.

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<sup>57</sup> DGIP at 6-2.

<sup>58</sup> DBEDT introduced the concept of such a rebuttable presumption in its Statement of Position in Docket No. 2014-0130, and more fully explains its rebuttable presumption recommendation in its Comments herein. DBEDT's Statement of Position in Response to Stipulated Procedural Order No. 32256, Docket No. 2014-0130 (filed October 2, 2014) at 5.

In order for the HEI Companies to overturn the presumption, they should be required to show the substantial likelihood, through an independent third party, of the following near-term issues on a specific circuit-by-circuit basis: (1) a health or safety danger; or (2) danger of a localized brownout/black out. Alternatively, given the Commission's assertion that it intends to hire an independent contractor to perform a baseline reliability assessment for each of Hawaii's electrical grids,<sup>59</sup> and is in discussions with the United States Department of Energy ("DOE") staff to address the fact that there does not appear to be a Hawaii-specific distribution system study performed by DOE NREL or by nationally recognized engineering firms to evaluate the impact of high solar PV circuit penetration on reliability and safety,<sup>60</sup> the Commission may want to impose the rebuttable presumption until any such studies prove that that it is contrary to public safety and reliability.

The presumption would greatly assist in clearing the interconnection queue of certain DG PV resources up to safe levels not imposing adverse impacts to the grids. As an example of how the presumption may work in practice, if the HEI Companies believe that the representative circuit studies attached to the DGIP currently demonstrate that for those certain circuits it has been shown that increasing the amount of DG PV on those circuits would cause a near-term health/safety danger or danger of a localized brownout/black out, then the HEI Companies could submit the narrative analysis supporting their findings and the relevant studies to the Commission to meet their burden under the presumption. DBEDT does not take a position at this time whether or not the HEI Companies representative circuit or cluster studies would meet the HEI Companies' burden under the presumption as the HEI Companies have not been given an opportunity to address

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<sup>59</sup> See Order No. 32053 at 113-114 (noting that the Commission will hire an independent contractor who can design and conduct reliability assessments, for each of Hawaii's electrical systems, and that an independent contractor will perform a study to define the characteristics, and associated metrics, that define what constitutes adequate levels of reliability for each island electric grid).

<sup>60</sup> Order No. 32053 at 39.

this issue. DBEDT also notes that the presumption could be formulated in many different ways, and DBEDT supports those other formulations as long as they allow for the current interconnection queue to be cleared while also respecting the need for a safe and reliable electrical system. In this regard, DBEDT recommends that the Commission should also consider penalties as an incentive to the HEI Companies to accelerate their grid improvement projects, while balancing the need for a safe and reliable grid.

This measure would be consistent with the Commission's and the State's policy objectives. The Commission desires an actionable strategy to increase distribution circuit capacity to safely, reliably, and economically interconnect distributed generation resources. The Commission also is interested in increasing options for customers to manage energy use. In addition, the State is interested in modernizing the grid and diversifying the State's energy portfolio. Consistent with these considerations, the presumption would assist the objectives by clearing the existing interconnection queue, permitting the maximum incorporation of DG resources up to a point where there could be near-term concrete and negative impacts, and providing an incentive to the HEI Companies to maximize their use of operational methods and technological investments to maximize the efficiency of their systems. In addition, because the presumption would result in the incorporation of DG resources where the HEI Companies have not shown that such incorporation has safety or reliability impacts, the HEI Companies would be incentivized to optimize their systems through operational mechanisms and upgrades to mitigate any possible issues associated with higher penetration levels of DG PV.

In conclusion, the DGICA relies upon information extrapolated from only a certain representative circuits and cluster studies, and while they have provided tables indicating the

number of existing transformer substations with DG greater than GDML (a total of 66),<sup>61</sup> and number of existing circuits with DG exceeding GDML (a total of 137),<sup>62</sup> the DGICA does not provide clear demonstrations of how much DG can still be accommodated in each circuit of the HEI Companies' systems. The DGICA's short-term and long-term plans also contain inconsistencies and fail to offer the Commission concrete and appropriately prioritized actionable plans. Thus, the Commission should examine the DGICA with a focus on the concerns articulated by DBEDT and while considering both the Commission's and the State's energy perspectives. Finally, because further action is needed to clear the existing interconnection queue and incentivize the HEI Companies to maximize the efficient workings of their systems, DBEDT requests the Commission consider its recommendation to impose a rebuttable presumption that will assist in clearing the interconnection queue for small DG resources and will also balance the need for a safe and reliable network.

#### **B. Distribution Circuit Improvement Implementation Plan**

The Commission directed the HEI Companies to include in the DGIP a Distribution Circuit Improvement Implementation Plan that addresses the "specific strategies and action plans, including associated costs and schedule to implement circuit upgrades and other mitigation measures to increase capacity of electrical grids to interconnect additional distributed generation."<sup>63</sup> The DCIIP was to consider: (1) prioritization of proposed mitigation actions to focus on the immediate binding constraints for interconnection; (2) an analysis of the cost and benefits of the proposed mitigation strategies and action plans; (3) a discussion of how distribution

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<sup>61</sup> DGIP at 2-15, Table 2-7 Existing Capacity Study Results – Substation Transformers.

<sup>62</sup> DGIP at 2-17, Table 2-9 Existing Capacity Study Results – Circuits.

<sup>63</sup> Order No. 32053 at 54-55.

system design criteria and operational practices, could be modified to enable greater interconnection of distributed generation systems; and (4) proposals for addressing the cost allocation issues associated with who bears responsibility for system upgrade costs.<sup>64</sup>

The DGIP certainly includes discussion on each of these components of the Commission's directive. However, the lack of a clearly articulated business case renders it difficult to determine whether the HEI Companies' proposed actions, analyses, and cost allocation proposals are the optimal ways to develop a DCIIP that meets the State's energy policy. Thus, with respect to the DCIIP-related directives, DBEDT cannot conclude that the DGIP fully accomplishes the Commission's objectives of ensuring that the DGIP provides appropriate strategies and timely action plans to increase options for customers to manage energy use, increase distribution circuit capacity, and utilize advanced distributed energy technologies to mitigate adverse grid impacts.<sup>65</sup> Without a clear business case, some of the strategies and associated cost allocation methodologies proposed may actually hinder the State's energy policy objectives of promoting a diversified energy portfolio that maximizes renewable sources, promoting technological innovation, and providing a sound investment climate to drive private market participation and ensure resources are deployed in the most cost-effective manner. This is because the DGIP is premised on incremental changes to the vertically integrated business model that gave rise to problems in the first instance.

For example, the overall strategy proposed by the HEI Companies to address the DCIIP-related directives is based on the Companies' view that their focus should be on preventing cost

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<sup>64</sup> Order No. 32053 at 55.

<sup>65</sup> Order No. 32293 at 3.

shifts and cross-subsidization between DG and non-DG customers<sup>66</sup> and that DG prevents utilization of utility-scale renewables.<sup>67</sup> DBEDT recognizes, and the Commission has also acknowledged, that grid fixed costs are increasingly being shifted to non-solar PV customers,<sup>68</sup> and that there are curtailment risks for other renewable energy projects due to grid limitations.<sup>69</sup>

There is certainly merit to ensuring that principles of cost causation are adhered to and in ensuring the best mix of renewable resources is utilized to achieve the State's objectives of achieving a diversified resource portfolio that maximizes use of indigenous renewable resources at the lowest costs. However, there is no basis for simply assuming that making incremental changes to the vertically integrated business model is the best way to address these issues. As indicated above, expanding the vertically integrated model continues inherent conflicts between DG and utility-owned generation and may actually prohibit achievement of the State's energy policy directives.

Moreover, the manner in which the HEI Companies have proposed to achieve the objectives of preventing cost-subsidization and curtailment of utility-scale renewable resources deflect from the fact that the HEI Companies' operational practices and business decisions have contributed to the level of inequities that they now purportedly seek to address via the DGIP. More timely actions on the HEI Companies' part, including to: (1) better understand circuit constraints and associated mitigations to accommodate greater levels of DG, (2) evolve their power supply decisions to those that accommodate greater renewable energy options, and (3) implement and

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<sup>66</sup> DGIP at ES-28, 6-10.

<sup>67</sup> *See, e.g.*, DGIP at 6-8 ("The levels of DG are so high in Hawai'i that this resource is essentially squeezing out room on the Companies' grids for other lower cost utility-scale projects that provide the same environmental benefits but have increased economic benefits for all customers.").

<sup>68</sup> Order No. 32053 at 49.

<sup>69</sup> Order No. 32053 at 41.

facilitate greater use of advanced technologies, demand response, storage, smart grid, ancillary services and other measures to enhance the manner in which their systems operate, would have likely mitigated some of these cost-shift and renewable mix concerns. As such, comprehensive review of the HEI Companies' business case decisions as set forth in the PSIPs, DGIP and other related on-going proceedings is warranted to ensure that the HEI Companies have selected the best path forward to meeting the State's energy policy directives.

In sum, rather than meet the HEI Companies' stated objectives of achieving equity in rate design,<sup>70</sup> some strategies appear to solidify their role as vertically integrated utilities. While this role may be justified, the HEI Companies' failure to articulate their vision of how they should operate in the future prohibits DBEDT from reaching this conclusion. Other proposals may have merit but must be tailored in the manner in which they are used to ensure that they do not serve to limit customer choice and the State's objectives of cost-effectively maximizing the use of indigenous renewable resources. In the absence of a clearly articulated business case, DBEDT presents its view of certain strategies proposed in response to the DCIIP directives that are of concern below.

**i. The Proposed Capital Investments Have Not Been Shown to be Reasonable and Must be Considered with Other Mitigation Measures to Ensure Cost Effective and Appropriately Prioritized Strategies and Action Plans.**

The HEI Companies have developed a base-case cost model to estimate the cumulative impact of projected DG customers on circuits and discussed specific circuit upgrades and mitigation measures that they purport will increase the grid capacity and enable the interconnection

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<sup>70</sup> DGIP at 6-13.

of additional DG.<sup>71</sup> The capital investments include LTC controller replacements, circuit-upgrade programs, and substation transformer upgrades that are expected to relieve constraints on reverse power flow due to DG on circuits and substations.<sup>72</sup> The HEI Companies estimate the costs of these and other capital investments would amount to \$194.5 million by 2030.<sup>73</sup> The HEI Companies used this estimate to further estimate the potential one-time interconnection charges that the HEI Companies propose would be assessed to new DG customers related to “capital requirements from DG customers.”<sup>74</sup>

DBEDT first notes that this base-case model was not compared to other models in which different levels of infrastructure-based mitigation measures are evaluated. In addition, except for a comparison to a scenario adopting a 100% non-export option,<sup>75</sup> the DGIP does not provide a cost-benefit analysis of undertaking these costs as opposed to other alternative, or lower cost, alternative mitigation measures.<sup>76</sup> As such, the DGIP does not explain why alternative investment levels will not be equally effective in incorporating additional DG or at least effective relative to the lower cost of needed infrastructure investments. In this regard, DBEDT is concerned with the HEI Companies’ view that the “most significant way to reducing circuit improvement costs is to

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<sup>71</sup> DGIP at 3-3 to 3-7.

<sup>72</sup> DGIP at 6-2.

<sup>73</sup> DGIP at 6-3.

<sup>74</sup> DGIP at 6-3. The one-time interconnection fee for DG customers is proposed to recover the costs of potential future interconnection request studies (“IRS”). DGIP at 6-2. The Interconnection Charge identified for HECO, MECO and HELCO, respectively is \$337/kW, \$60/kW and \$55/kW. DGIP at 6-5 to 6-6.

<sup>75</sup> DGIP at ES-16.

<sup>76</sup> The Commission’s directives require an “analysis of the cost and benefits of proposed mitigation strategies and action plans.” Order No. 32053 at 54-55.

limit the DG capacity on a given circuit.”<sup>77</sup> The failure to be proactive in resolving interconnection issues<sup>78</sup> should not result in creating unreasonable barriers to integration of DG.

The DCIIP also identifies operational practices that could harden the distribution system to accommodate high penetrations of DG, including smart grid efforts, limiting reverse flow to 50% of substation transformer ratings, islanding protection through inverters, reclosers, using SCADA to monitor voltage regulator tap operations, and deploying SCADA at a majority of distribution substations.<sup>79</sup> These operational practices need to be considered in conjunction with the upgrades and other mitigation options proposed in order to ensure that the combination of measures are timely and cost effective.<sup>80</sup>

The DCIIP further indicates that AMI, improved data collection, advanced inverter features, demand response and customer load incentive programs such as time of use rates may make it possible to eliminate the need for some circuit improvements.<sup>81</sup> DBEDT appreciates that the HEI Companies have incorporated these distributed energy technologies into their considerations on how to mitigate adverse grid impacts. DBEDT supports deployment of advanced metering infrastructure, smart grid devices, and other technologies in an effort to strengthen the objective of enhancing the State’s position as a test bed to launch energy innovation and to promote a clean energy infrastructure. However, there is not a concrete actionable strategy and timeline proposed for implementing these measures as soon as is reasonably possible. Instead,

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<sup>77</sup> DGIP at 8-10.

<sup>78</sup> See Order No. 32053 at 33 (“In short, HECO Companies have, until very recently, been playing catch-up in managing distributed generation interconnection technical challenges or processing interconnection applications.”).

<sup>79</sup> DGIP at 3-18 to 3-19.

<sup>80</sup> As discussed in Section III.A(ii), above, the appropriate mix of infrastructure investments versus change to operational practices must be examined.

<sup>81</sup> DGIP at 3-15 to 3-16.

the HEI Companies assert that the cost-benefit analysis of engaging in investments on circuits that might lead only to incremental increases in DG will be evaluated with stakeholders.<sup>82</sup>

DBEDT recognizes that the lack of concrete and methodological action plans is due in part to the need for further proceedings, stakeholder processes, testing, and improvements.<sup>83</sup> The HEI Companies have also cited to the circuit configuration, customer mix, and DG penetration as impacting these determinations.<sup>84</sup> DBEDT is disappointed that the Companies have not made greater progress on DG integration issues despite the fact that they have been on the Companies' radar for several years now. Looking forward, DBEDT supports a comprehensive review of the strategies and mitigation options to ensure that decisions on the relative costs, benefits and prioritization of the mitigation measures, as well as on investments and operational strategies, are headed on a timely and reasonable track towards meeting the State's objectives of diversifying our energy portfolio by cost-effectively maximizing indigenous renewable sources and promoting technological innovation and economic development. Moreover, DBEDT stresses that the need, meritorious or otherwise, for future processes must not serve as cause to delay achievement of the State's energy policy.

**ii. The Proposed Elimination of the Current NEM and Move Towards DG 2.0 Tariff Structures May Serve to Impede the State's Energy Policy Directives.**

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<sup>82</sup> DGIP at 3-15.

<sup>83</sup> *See e.g.*, DGIP at 3-14 to 3-15 (noting that other mitigations measures may be more cost-effective than circuit or substation improvements identified in the base case cost model); DGIP at 3-2 (noting that the HEI Companies expect more testing and system monitoring to provide further insights on modifications to Rule 14H and development of new solutions); DGIP at 3-2 (recommending that the PV-DG Subgroup be allowed to continue their collaborative efforts to discuss system-level studies and submit further stipulations); DGIP at 3-12, 3-20 (noting that the Proactive Approach will be used to evaluate the most cost-effective measures and to determine which upgrades to deploy and that the associated studies can be used to assess expansion needs and evaluate broader mitigation measures, as the grid modernizes and changes).

<sup>84</sup> DGIP at 3-13.

In addition to undertaking capital investments, the HEI Companies' proposed strategy in response to the DCIIP directives is to transition from the current NEM program and to adopt some type of "DG 2.0" program.<sup>85</sup> The Companies' preference is to move towards some form of a "Gross Export Purchase" program, which includes some combination of interconnection and grid services charges.<sup>86</sup> To implement this transition, the Companies would "seek re-instatement of the NEM program cap based on percentage of system peak demand or otherwise obtain permission to close the NEM program to new customers, and would seek to modify the Schedule Q tariff to specifically include DG customers and credit them for their exported energy, while continuing to recover the cost of DG energy in rates."<sup>87</sup>

As an initial matter, DBEDT notes that the HEI Companies fail to explain what is to happen to NEM projects that are currently on-line. The Companies' failure to provide a detailed explanation as to what is to happen to those entities that are currently under NEM agreements or have already applied to participate, is a fundamental deficiency with their proposal. Given the existing backlog and delays in processing the applications in the queue, DBEDT is concerned that this proposal to "interconnect as many queued customers as possible"<sup>88</sup> is not entirely promising, and the rebuttable presumption discussed below is warranted in the immediate term.

Moreover, the HEI Companies note only that there will be "[c]onsideration of fair and appropriate 'grandfathering' policies regarding existing and potential DG customers who are currently participating or have applied for inclusion in the NEM program."<sup>89</sup> They caution that as

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<sup>85</sup> DGIP at 6-14.

<sup>86</sup> DGIP at 6-15.

<sup>87</sup> DGIP at 6-15.

<sup>88</sup> DGIP at 1-6.

<sup>89</sup> DGIP at 6-16.

part of this process “future DG customers may need to acknowledge that the rules . . . are subject to future modification and that such modifications may positively or negatively affect potential savings or the expected value of their DG system.”<sup>90</sup> The determinations arising out of this proceeding should ensure that DG policy is designed to offer viable and cost-effective options for customers to participate in DG integration, consistent with the State’s objectives of maximizing the integration of a diversified portfolio of indigenous renewable resources.

With respect to DG 2.0, the HEI Companies propose to explore various tariff and rate options.<sup>91</sup> The DG 2.0 model that was used to develop the base case in Appendix B of the DGIP was described as including: (1) a fixed charge applied to all customers to allocate fixed customer service and demand costs; (2) a fixed monthly charge applied only to DG customers to account for additional standby generation and capacity requirements provided by the Companies; and (3) a “Gross Export Purchase model” for export DG whereby customers would sell excess electricity near wholesale rates and buy additional electricity at variable rates.<sup>92</sup> The proposed strategy of transitioning away from the current NEM program to a DG 2.0 tariff alternative that is closer to a “Gross Export Purchase” model, and which includes some combination of interconnection and grid service charges,<sup>93</sup> needs to be carefully reviewed in the context of a business case that is designed to achieve a desired end state.<sup>94</sup> Such a review is particularly relevant given that the HEI

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<sup>90</sup> DGIP at 6-16.

<sup>91</sup> DGIP at 6-14 to 6-16.

<sup>92</sup> DGIP at Appendix B, page 2.

<sup>93</sup> DGIP at 6-15.

<sup>94</sup> In support of their proposal to potentially develop community solar projects (DGIP at 6-21) or potentially become the owner and installed of rooftop PV systems on individual customer facilities (DGIP at 6-22), the HEI Companies assert that they “envision a strong, collaborative utility of the future; one in which the traditional lines of utility-owned generation and customer-purchased energy have become blurred or perhaps eliminated.” DGIP at 6-22. The merit of these specific proposals cannot be determined without a holistic review and a comprehensive plan for a future business model.

Companies' interests in revising the NEM payment structure appear to be premised in part on ensuring that the structure is "more in line" with their "marginal cost of generating energy for the system."<sup>95</sup>

DBEDT is not opposed to consideration of an appropriate phase-in of rate and tariff structures that are intended to ensure greater customer choice and promote viable and fair opportunities for grid access for all market players and customers. However, the need for any such modifications to the rate and tariff structures should be fully supported with technical and economic analyses, and should not serve to unduly restrict customer participation in DG, support an ineffective future business case or otherwise impede the State's policy goals of ensuring a diverse energy portfolio by cost-effectively maximizing use of indigenous renewable resources.

In addition to the broader concerns noted above, DBEDT is concerned that the potential costs proposed to arise out of these structures would create significant rate shock to customers and may serve to harm customer incentives to participate in DG. For instance, the HEI Companies used the DG 2.0 base case tariff assumptions to develop hypothetical DG residential monthly fixed charges that would apply to all households of \$55/month on Oahu; \$61/month on Hawaii; and \$50/month on Maui.<sup>96</sup> In addition, these assumed tariff structures derived hypothetical monthly fixed charges that would be assessed to DG customers only, of \$16 on Oahu and Hawaii and \$12/month on Maui.<sup>97</sup> These costs appear unreasonably high and have not been fully explained. The HEI Companies assert only that the fixed demand charge applicable to all customers

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<sup>95</sup> See HECO PSIP at 5-35 to 5-36 ("If the NEM arrangement is modified or eliminated and replaced with an arrangement that compensates customers based on a price that is more in line with the Company's marginal cost of generating energy for the system, then customers will have specific price signals that they can use to evaluate the benefits of installing their own storage.").

<sup>96</sup> DGIP at Appendix B, page 3.

<sup>97</sup> DGIP at Appendix B, page 3.

represents: (1) the capacity requirement needed for all of their customers, which they also state minimizes costs shifts to low-usage customers; and (2) the fixed costs of meeting this capacity requirement.<sup>98</sup> For the additional demand charge applicable only to new DG 2.0 customers (i.e., DG customers taking service starting in 2017), the HEI Companies simply state that this amount is needed because of the higher peak capacity requirements that DG customers have.<sup>99</sup> Accordingly, without a detailed assessment of these rate structures and associated potential high costs, DBEDT is concerned that these proposals may simply serve to enhance the Companies' bottom line, serve to disincentivize customers from investing in DG systems, or lead to policies that unduly restrict DG integration options. Based on the overall 2017 to 2030 plan in the DGIP and the related plans in the PSIPs, DBEDT reasonably believes these disincentives will be present.

**iii. The Non-Export Option Could be a Beneficial Option Under a Well-Designed Business Case and Must Not Serve to Deter Operational Advancements or to Impose Unjustified Limits to Greater DG Penetration.**

One of the mitigation measures proposed in the DCIIP,<sup>100</sup> and one that is discussed throughout the DGIP as part of the Companies' strategy to enable DG growth,<sup>101</sup> is to incorporate a non-export DG option. The DGIP purports that a non-export option will allow reductions in infrastructure capital expenditures,<sup>102</sup> and will allow (through the use of the associated energy systems), grid support services such as frequency regulation and voltage support.<sup>103</sup>

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<sup>98</sup> DGIP at Appendix B, page 2.

<sup>99</sup> DGIP at Appendix B, page 3.

<sup>100</sup> *See, e.g.*, DGIP at 3-14, Table 3-9 List of Potential Mitigation Measures.

<sup>101</sup> *See, e.g.*, DGIP at 8-9 ("The use of non-export DG may allow for greater adoption of DG."); DGIP at 1-6, Figure 1-1 (citing the non-export DG option as a key strategic initiative to enable DG growth).

<sup>102</sup> DGIP at 5-17.

<sup>103</sup> DGIP at 5-8. The Commission also noted that limiting or precluding the export of excess energy "could be an effective, and perhaps significant, mitigation measure," including to provide customers the incentive to select any desired combination of solar and grid energy to meet their total electric needs and to avoid impacts to retail electric rates, and to minimize the impact on the electric grid. Order No. 32053 at 46-47.

DBEDT supports consideration of the non-export option to permit greater customer choice in managing energy use and to further the State's objectives of having a cost-effective diversified energy portfolio that maximizes uses of indigenous renewable resources. However, non-export DG should be one of many options to advance DG penetration with clear strategic focus. When considered in conjunction with the rest of the proposals in the DGIP and PSIPs, DBEDT is concerned that the non-export option may be used as a mechanism to impose unjustified limits to DG integration, exacerbate inefficient resource portfolio and operational decisions or untimely implementation of grid support and modernization functionality. One way of protecting against that concern is through a business case that demonstrates how the portfolio of options works together to achieve the desired end state.

### **C. Advanced Distributed Energy Resource Technology Utilization Plan**

The Commission directed the HEI Companies to develop time-based plans for the implementation of the following advanced technologies: energy storage, inverters, demand response, and electric vehicles.<sup>104</sup> In particular, the Commission requested plans by the HEI Companies to utilize storage (both customer- and utility-based storage) to mitigate PV impacts and to provide ancillary services, plans to utilize advanced inverters with autonomous controls and two-way communication, and plans to enable such two-way communications with advanced equipment using AMI.<sup>105</sup>

In response, the HEI Companies prepared the Advanced DER Technology Utilization Plan ("ADERTUP"). In reviewing the HEI Companies' ADERTUP, DBEDT focused on the Commission's stated requests for comments and the State of Hawaii's over-reaching policy

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<sup>104</sup> Order No. 32053 at 53 to 54.

<sup>105</sup> Order No. 32053 at 53 to 54.

directives. The Commission specifically inquired whether the ADERTUP proposes to utilize advanced distributed energy technologies to mitigate adverse grid impacts, and whether it contains appropriate strategies and timely action plans to achieve stated goals. DBEDT answers these questions in light of the State of Hawaii's energy policy directives supporting the development of technological platforms leading to job creation, the need for a modernized and integrated grid, and the increased diversification of Hawaii's energy portfolio by cost-effectively maximizing local renewable resources.

Applying these criteria, DBEDT stresses how these components must be holistically analyzed as part of a comprehensive review process to ensure that any actions taken in this proceeding will be in harmony with the other parallel efforts underway, including the PSIPs proceeding. A holistic approach to planning for the future of interconnection of distributed generation at each HEI Company should necessarily include, among other things, each Company's: (1) smart grid deployment plan; (2) Integrated Demand Response Portfolio Plan ("IDRPP"); (3) EV charging tariffs; and (4) the PSIPs—especially their analysis concerning utility-scale storage, the inter-island cable, and the proposal to utilize liquefied natural gas as a baseload fuel. A holistic approach to reviewing the DGIP and these other ongoing processes will assist the Commission in ensuring that the State's clean energy goals are met in the lowest-cost, most efficient manner.

Beyond the pivotal need for holistic review of the DGIP, the ADERTUP, and other parallel processes, DBEDT again brings to the Commission's attention the underlying disincentive the HEI Companies have in transitioning their traditional grid to that of one of the future. As stressed in these Comments, the DGIP appears to take certain marginal steps in the right direction. However, it falls short of proposing any type of business case that can align the HEI Companies' own

interests with those of the State. As such, the HEI Companies current lack of progress in implementing advanced technologies has resulted in delayed implementation of these investments, and, as we describe below, this is continuing even with the Commission's direction.

With these considerations in mind, DBEDT has identified certain concerns regarding the HEI Companies' proposals for the integration of advanced technologies. DBEDT limits its comments to the following technologies in the ADERTUP: (1) energy storage resources; (2) the inter-island grid tie; (3) EV charging infrastructure; (4) AMI; and (5) advanced inverters.

First, in regard to energy storage, DBEDT stresses that components of this technological resource should already have been incorporated into the HEI Companies' systems, and therefore, the HEI Companies' proposal to continue to implement several utility scale energy storage pilot projects in the near-term is a positive development, albeit belated at best.<sup>106</sup> Beyond these test projects, the HEI Companies state that they do not intend to invest in additional storage facilities until battery storage technologies become economically viable.<sup>107</sup> Although DBEDT certainly agrees with the HEI Companies that infrastructure investments should reflect economic concerns while also balancing other related State concerns such as environmental and cultural, the HEI Companies' assumptions regarding the economic viability of battery storage should be thoroughly vetted by the Commission.

DBEDT's requested "hard look" of the HEI Companies' position on storage is supported by the HEI Companies' own statements that storage technologies can be used to address issues associated with the incorporation of high penetration levels of PV, including reliability issues, frequency issues, capacity-related issues, ramping issues, circuit constraints, flicker issues, and

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<sup>106</sup> See DGIP at 4-69 (describing the HEI Companies' technology implementation roadmap).

<sup>107</sup> DGIP at 3-13.

peaking capability needs.<sup>108</sup> Surprisingly missing from the HEI Companies' analysis of energy-storage benefits to their systems is the possible ancillary services that storage facilities may provide to alleviate issues related to PV utilization. The assessment of ancillary benefits of storage was a precise Commission directive of the ADERTUP,<sup>109</sup> and the HEI Companies appear to have only addressed the provision of ancillary services from storage facilities as related to customer-sited storage under their non-export option.<sup>110</sup> The HEI Companies' singular assessment of the ancillary benefits of customer-sited storage as part of a non-export option renders much of their storage analysis woefully inadequate. This inadequacy reflects a missed opportunity to advance the State's goals of technological innovation, job creation and economic growth. DG can currently assist in providing ancillary services and those opportunities could be further incorporated into the HEI Companies' plan, particularly as it relates to spinning reserve, permitting the HEI Companies to replace use of fossil fuel peaking resources with storage facilities to provide that same ancillary service, which DBEDT further discusses in comments on HEI Companies' parallel PSIPs proceeding.

Additionally, related to storage costs, it appears the ADERTUP does not include any analysis comparing the costs of their proposed circuit penetration upgrades against currently available storage solutions. Also, the recent projects undertaken by the Kauai Island Utility Cooperative ("KIUC") weigh against the HEI Companies' cost assumptions. The KIUC has recently installed dozens of megawatts ("MW") of large solar projects that are coupled with energy

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<sup>108</sup> See DGIP at ES-31, 1-13, 2-9, 3-13, 3-14, and 3-15, and 4-32.

<sup>109</sup> Order No. 32053 at 54.

<sup>110</sup> See, e.g., DGIP at 4-31 ("Customer-side storage with utility control also can provide ancillary services, such as frequency and voltage regulation, load shifting, and spinning reserve capacity.").

storage systems, which demonstrates how storage facilities can act as cost-effective compliments to generation facilities.<sup>111</sup>

Moreover, the HEI Companies claim, without support, that space restrictions preclude the ability of distributed storage to relieve circuit congestion.<sup>112</sup> However, DBEDT notes that the KIUC has also installed many MWs of additional storage on the customer side of the circuit substation to enable customer-generated distributed generation and to reduce associated interconnection costs. This fact further undercuts HEI Companies' position that they should delay the implementation of these projects until some unspecified and uncertain date.

DBEDT encourages the HEI Companies and the Commission to advance storage projects such as one recently undertaken and one proposed by HECO. HECO recently announced a 1 MW storage installation on Oahu,<sup>113</sup> and has a pending request for proposal for a 200 MW system.<sup>114</sup> However, HECO has not yet announced the details of the potentially 200 MW system and neither does it have any utility-scale storage projects in the works for Maui or the Big Island. HECO's recent energy-storage project proposals are a welcomed, albeit late, development. DBEDT encourages similar proposals by the rest of the HEI Companies.

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<sup>111</sup> Laurie Cicotello, *The Garden Island*, *KIUC plans \$40M solar project* (Oct. 19, 2012), available at: [http://thegardenisland.com/news/local/kiuc-plans-m-solar-project/article\\_0c4bcb4a-19cc-11e2-9c0d-0019bb2963f4.html](http://thegardenisland.com/news/local/kiuc-plans-m-solar-project/article_0c4bcb4a-19cc-11e2-9c0d-0019bb2963f4.html).

<sup>112</sup> See DGIP at 4-32 ("Given the limits on storage capacity in neighborhoods because of space restrictions, distributing storage would not relieve circuit congestion, because the battery could become fully charged and no longer provide enough load to limit power output to the grid.").

<sup>113</sup> Zoe Fishman, *Stem*, *Stem Strengthens Grid Response for Hawaiian Electric Company*, (Sept. 11, 2014), available at: <http://www.stem.com/archives/11295>.

<sup>114</sup> HECO announced its storage contract search has been limited to three unidentified companies. Richard A. Kessler, *RechargeNews.com*, *HECO Narrows RE Storage Search* (Sept. 30, 2014).

Second, while HEI Companies cited the challenges of operating power grids on non-connected small island systems,<sup>115</sup> DBEDT notes and stresses how an inter-island grid tie could be used to address many of the immediate and long-term issues facing the Maui and Oahu grids.<sup>116</sup> While not a specific component of the ADERTUP, DBEDT views the Oahu-Maui Grid Tie as a critical part of a planning initiative. Therefore, as we recommend in the PSIPs proceeding, the Commission should issue its ruling in Docket No. 2013-0169 and begin the procurement process for the Oahu-Maui Grid Tie.

Third, and as explained in DBEDT's Protest/Comments on HEI Companies' proposal to offer as standard rates the currently effective EV Pilot Rates through 2020,<sup>117</sup> there are immediate actions the Commission may take to further align the HEI Companies' EV proposals with the Commission's and the State's objectives. Similar to the EV Tariffs Filing, in the ADERTUP, the HEI Companies outline the benefits of and the barriers to the full integration of EVs, but they do not provide an actionable roadmap to develop this technology. Rather, the HEI Companies' position appears to be that they do not intend to expand EV charging infrastructure until the popularity of EVs grows and new innovative technologies are developed.<sup>118</sup> The problem is, however, that the popularity of EVs will certainly never grow until EV charging infrastructure is expanded, which is reminiscent of the "chicken and the egg" dilemma. DBEDT believes a

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<sup>115</sup> DGIP at ES-2 to ES-3. *See also, e.g.*, DGIP at 1-9 ("The reserve capacity for dealing with changes in demand is limited to the resources on the islands – the systems cannot have short-term reliance on neighboring systems as is done on the mainland interconnections."); DGIP at 1-13 ("The energy produced on an island system must be used on the island; therefore, it is necessary to balance power production with the use of power. This means that the power produced by DG will displace power from other sources, forcing power generation offline").

<sup>116</sup> DBEDT discusses these issues further in our concurrently filed Comments in Docket No. 2014-0183 on the HEI Companies' PSIPs.

<sup>117</sup> The HEI Companies' Transmittal 14-07, For Approval to Establish Schedule TOU EV Residential Time-of-Use Service with Electric Vehicle, Schedule EV-R Residential Electric Vehicle Charging Service, and Schedule EV-C Commercial Electric Vehicle Charging Service, filed July 31, 2014 ("EV Tariffs Filing").

<sup>118</sup> DGIP at 4-55.

successful implementation of EVs as a “Vehicle-to-Grid” DR resource has the potential to: promote EV driver “range confidence,” thereby increasing EV adoption and stimulating the installation of additional public charging facilities; attracting EV-related economic development and jobs; and increasing the opportunities for multi-unit dwelling residents to receive EV charging facilities.

Just as in the EV Tariffs Filing, DBEDT believes that the HEI Companies’ view of EVs is influenced by their concern that this technology has the potential to jeopardize grid stability if it undergoes significant load growth.<sup>119</sup> Because DBEDT views EVs as an opportunity to potentially compliment PV deployment and work coincidentally therewith, DBEDT is concerned that the HEI Companies’ proposal to wait until the medium and long term to develop adequate EV charging facilities improperly delays implementation of this beneficial technology. DBEDT’s position is that EVs could potentially be used to assist in grid stability and to possibly facilitate the addition of more variable generation to the grid via a Vehicle-to-Grid DR resource. Therefore, the Commission should take actions to accelerate the HEI Companies’ immediate plans to develop EV charging infrastructure. Further, as DBEDT stated in the EV Tariffs Filing, the Commission should not permit the HEI Companies to extend the current EV rate proposal until mid-2020, as they proposed. Instead the Commission should adopt DBEDT’s recommendations in that proceeding, including requiring the HEI Companies to immediately develop and implement a daytime EV time-of-use pilot program and ensure that review of the HEI Companies’ EV

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<sup>119</sup> See DGIP at 4-50 (“The EV industry is still in its infancy, with the potential for significant load growth that could adversely affect the Companies’ grid reliability if left unmanaged.”); HEI Companies’ Electric Vehicle Pilot Rates Final Report in Transmittal No. 10-05 at 39 (July 31, 2014) (EVs have “the potential to overload existing distribution equipment and jeopardize grid stability if charging occurs during the priority-peak periods, when generation and distribution systems may be near capacity.”).

proposals is consistent with and included in the 2015 time-of-use rate program review identified in the IDRPP.<sup>120</sup>

Fourth, in terms of AMI, DBEDT believes that two-way communications capabilities are essential to move the existing grid towards the grid of the future. AMI enables myriad other technological capabilities to be deployed in the effort to modernize the grid, empower customers to control their own electricity usage, increase generation and load visibility, balance grid service requirements, maintain reliability and reduce greenhouse gas emissions. For example, smart meters are a proven technology used by many other utilities,<sup>121</sup> which can provide significant value to the HEI Companies in achieving the State's renewable energy goals.

In the ADERTUP, the HEI Companies offer a two-phase process for implementing various AMI and smart-grid related technologies: initial phase and full implementation. For the initial phase, the HEI Companies state they will limit demonstration of various smart-grid applications, including AMI, automated meter reading, and Volt/VAR Optimization, to the six circuits in Oahu which currently have AMI until 2016.<sup>122</sup> The HEI Companies claim they need to study some of the "critical capabilities" of advanced meters because of the uniqueness of the HEI Companies' grids.<sup>123</sup> The HEI Companies do not elaborate on the issues making their systems so unique such that an initial phase of implementation is necessary.

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<sup>120</sup> See DBEDT's Protest/Comments to the HEI Companies' EV Tariffs Filing, Transmittal No. 14-07 (filed September 15, 2014) at 10-12.

<sup>121</sup> To see current levels of smart meter deployment nationally, visit the US Department of Energy's Smart Grid website, available at: [https://www.smartgrid.gov/recovery\\_act/deployment\\_status/ami\\_and\\_customer\\_systems##SmartMetersDeployed](https://www.smartgrid.gov/recovery_act/deployment_status/ami_and_customer_systems##SmartMetersDeployed).

<sup>122</sup> DGIP at 4-17.

<sup>123</sup> DGIP at 4-17.

For full implementation, the HEI Companies claim that steps are slated to begin in 2016 that will entail the installation of smart grid technologies and devices to all customers, individualized for each island.<sup>124</sup> The HEI Companies expect to complete full implementation for MECO and HELCO in 2017 and for HECO in 2018.<sup>125</sup> The HEI Companies refer to their Smart Grid Roadmap & Business Case for the full details of their full implementation plan.<sup>126</sup> However, that Docket is closed and DBEDT has not been afforded an opportunity to sufficiently comment on the details of the steps of this longer-term implementation strategy.<sup>127</sup>

Overall, the HEI Companies' two-phase implementation process may be further refined to the State's interests. Specifically, the HEI Companies' plan to delay full implementation of smart grid technologies until 2018 is an untimely proposal. Similar to the MECO and HELCO proposals, the Commission should at a minimum require full implementation of smart-grid technologies by HECO by 2017. Though DBEDT understands the need for the HEI Companies development of a smart-grid project application filing,<sup>128</sup> DBEDT asserts the Commission should be able to address the costs and benefits of advanced meter deployment in this proceeding, since most smart grid technologies enable greater distributed generation interconnection. In addition, in regard to the HEI Companies' actual deployment of smart grid and AMI technologies, DBEDT notes that the HEI Companies' three-year proposed process starting in 2016 should be carefully examined as

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<sup>124</sup> DGIP at 4-16 to 4-17.

<sup>125</sup> DGIP at 4-18.

<sup>126</sup> Hawaiian Electric Companies' Smart Grid Roadmap & Business Case, Docket No. 2008-0303 (filed March 17, 2014).

<sup>127</sup> Order Closing Docket, Docket 2008-0303, For Approval of the Advanced Metering Infrastructure (AMI) Project and Request to Commit Capital Funds, to Defer and Amortize Software Development Costs, to Begin Installation of Meters and Implement Time-of-Use Rates, for Approval of Accounting and Ratemaking Treatment, and Other Matters (filed July 26, 2010).

<sup>128</sup> DGIP at 4-18 ("While conducting the Initial Phase demonstration, Hawaiian Electric will develop a smart-grid project application filing that encompasses the three operating utilities across five islands.").

other utilities have managed to deploy such technologies on a more rapid basis.<sup>129</sup> For instance, the Sacramento Municipal Utility District finished its full deployment of similar technologies by installing more than 600,000 smart meters in less than one year.<sup>130</sup>

Fifth, related to advanced inverters, the HEI Companies have proposed to require that new DG systems be required to include advanced inverter capabilities by 2016.<sup>131</sup> The HEI Companies do not readily propose to require advanced inverters because many of the advanced features of these inverters “have yet to be incorporated, piloted, or implemented . . . .”<sup>132</sup> Similar to the Commission’s directives,<sup>133</sup> advanced inverters with voltage and frequency ride-through, standard communications capabilities, fixed power factor settings adjustments, the ability to manage inverter output, and longer-term features such as fixed power factor controls are important to the State because they are essential for the reliable integration of variable renewable generation resources. Though advanced inverters are needed to better integrate PV reliably, DBEDT recognizes the HEI Companies’ need to wait for technological development and certification for some of the most advanced inverter functions. In the meantime, DBEDT supports the immediate integration of available advanced inverter capabilities that allow for greater power flow and quality regulation in an effort to facilitate the most amount of DG PV possible.

DBEDT requests the Commission promptly determine whether the HEI Companies have proposed legitimate inverter certification requirements, or whether the proposal creates more

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<sup>129</sup> Indeed, even HECO finished installing 5,200 smart meters on the six pilot circuits between mid-April, 2014 and September, 2014. See Darren Pai, *Hawaiian Electric Completes First Phase of Smart Grid Installation* (Sept. 24, 2014); HECO’s Smart Meter Website FAQ, available here: <http://www.hawaiianelectric.com/heco/Clean-Energy/Smart-Grid-and-Smart-Meters/FAQs#a30>.

<sup>130</sup> The Sacramento Observer, *SMUD Completes Installation of Smart Meters* (April 17, 2012), available at: <http://sacobserver.com/2012/04/smud-completes-installation-of-smart-meters/>.

<sup>131</sup> DGIP at 4-24.

<sup>132</sup> DGIP at 4-25.

<sup>133</sup> DGIP at 4-23.

roadblocks to successful DG integration. DBEDT also suggests the Commission utilize the TWG and the PV-DG Subgroup to provide valuable input on these unresolved technical matters. As an example of the benefits of using these working groups in the determination of unresolved technical issues, in Commission Docket No. 2011-0206, work undertaken by the PV-DG Subgroup on certain frequency and voltage ride through issues has led to discussions between solar industry experts and the HEI Companies regarding revised advanced inverter settings. That specific process has encouraged further refinements to the voltage and frequency settings that were originally proposed in an open, transparent, and technically-based process for which the Commission could further use for the issues involved in this proceeding, including, but not limited to, advanced inverter technologies.

Once the HEI Companies are ready to deploy smart meters, advanced inverters, energy storage resources, and EV charging infrastructure, they should be sure to coordinate with the various vendors with whom they engage to be sure they maintain interoperability across all the various devices on every grid. The HEI Companies do indicate they intend to utilize nationally accepted interoperability standards.<sup>134</sup> The proposal to utilize nationally recognized and adopted interoperability standards is beneficial to technology deployment and innovation in Hawaii. As an example, Duke Energy has been leading a similar industry push to provide “open source” coding

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<sup>134</sup> DBEDT notes the National Institutes of Standards and Technology (“NIST”) recently released its most current “Framework and Roadmap for Smart Grid Interoperability Standards (Release 3.0) in September, 2014.” The open-source document provides interoperability standards that reflect recent advances in smart grid technologies and developments from collaborative work between the federal government and industry stakeholders. The NIST framework includes “both standards and guidelines from smart grid areas including smart metering, substation automation, electric vehicle grid integration, internet and wireless protocol usage, precision time synchronization, synchrophasors, customer energy usage (e.g., Green Button), cybersecurity, calendaring/scheduling models, and pricing models.” Release 3.0 at 50.

for its smart grid technologies with tremendous job-creating results.<sup>135</sup> Should the Commission choose to adopt interoperability or other technical standards for Hawaii, it should encourage vendors to collaborate with the HEI Companies on “standards-based, open-source field message bus with distributed applications to increase security, reduce latencies, compress data traffic and reduce costs.”<sup>136</sup>

If Hawaii adopts unique standards, manufacturers will be forced to create Hawaii-specific versions of products and services. This would make the cost of conducting business in Hawaii higher than on the mainland and could altogether deter smart grid and clean technology vendors from entering the Hawaii markets. Of course, where exceptions are justified, they should be approved. While interoperability is extremely important to ensure the prudence of investments made now, it should not become a barrier to technology deployment. Standards should be developed to enable market participation, not delay deployment.

Just as important as the HEI Companies’ proposals for developing and implementing advanced interoperable technologies, devices, and programs is appropriate oversight by the Commission to ensure that the HEI Companies follow through with any Commission approval of its implementation proposals. DBEDT thus recommends that for any of these proposals that the Commission may ultimately approve, the Commission include with such approval appropriate requirements to ensure the HEI Companies reach the specific milestones they have proposed and the Commission has approved. Stated another way, the HEI Companies require appropriate

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<sup>135</sup> Jeff St. John, Can This Coalition Do for Grid Devices What Android Did for the Smartphone?, greentechgrid: (March 4, 2012), available at: <http://www.greentechmedia.com/articles/read/duke-energy-and-the-coalition-of-the-willing>.

<sup>136</sup> Raiford L. Smith, Duke Energy & Wade P. Malcolm, Accenture, *A Platform For Success: Duke Energy leads industry Collaboration On Interoperability and Distributed Intelligence*, Transmission & Distribution World at 30 (April 2014).

Commission-imposed repercussions for possible failures to follow any Commission-approved plans resulting from this proceeding.

#### **IV. DBEDT'S SPECIFIC RECOMMENDATIONS FOR THE DGIP**

##### **A. Direct the HEI Companies to Articulate a Sustainable Business Case for the Future**

Traditionally, the HEI Companies' approach has been to react slowly to change. It is easy to view this reaction as indifference, passive opposition, or active obstruction to change. Regardless of the motivation for this reaction, however, the DGIP and PSIPs presented the HEI Companies with the unique opportunity to take leadership by clearly articulating a future business case that will result in the optimal alignment of customer interests, the HEI Companies' interests, and the State's energy policy directives. DBEDT has articulated the HEI Companies' missed opportunities throughout its analysis of the DGIP and it has done likewise in its comments on the PSIPs.

Based on the HEI Companies' failure to articulate their intended business case, DBEDT thus recommends the Commission require the HEI Companies to develop, file, and support a vision detailing their future business case, including key milestone dates. In this regard, DBEDT notes that it is the responsibility of the HEI Companies to present a clearly defined business case to serve as a baseline for their future investment and actions. While it need not be overly prescriptive, the business case should clearly demonstrate the ability to achieve a desired end-state objective (i.e., 60% RPS by 2030 at a certain discounted rate to a set baseline), articulate a decision framework, and identify assumptions and a timeline for actions. The most fundamental question the Commission should require the HEI Companies to answer in developing this business case is, "To what degree should the HEI Companies remain vertically-integrated utilities, or should they transition to a performance based regulation model focused on returning a profit based on the

transmission and distribution level services they provide to customers in an efficient modern grid network?” While the DGIP and PSIPs lay out new generation needs and infrastructure upgrades across the board, they are premised on making incremental changes to the traditional rate of return regulatory model which appear to retain, if not expand, the HEI Companies’ vertically-integrated structure.

Even though it is necessary for the HEI Companies to develop a sustainable business case, that fact cannot be used to delay efforts to advance the State’s energy policy. Thus, even without a clearly articulated business case, the Commission should promptly take the additional actions identified below. The Commission should require that any business case the HEI Companies develop must reflect, account for, and be consistent with DBEDT’s recommended actions.

**B. Direct the HEI Companies to Clear Their Interconnection Queue**

As discussed more fully in Section III.A(iii) above, the Commission should adopt a measure taking the form of a rebuttable presumption in that the HEI Companies must approve DG systems of 10 kW or less for circuits in which the HEI Companies have not specifically identified that further penetration cannot be accommodated in the near term. In order for the HEI Companies to overturn the presumption, they should be required to show the substantial likelihood, through an independent third party, of the following near-term issues on a specific circuit-by-circuit basis: (1) a health or safety danger; or (2) danger of a localized brownout/black out. Alternatively, given the Commission’s assertion that it intends to hire an independent contractor to perform a baseline reliability assessment for each of Hawaii’s electrical grids,<sup>137</sup> and is in discussions with the DOE staff to address the fact that there does not appear to be a Hawaii-specific distribution system study

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<sup>137</sup> Order No. 32053 at 113.

performed by DOE NREL or by nationally recognized engineering firms to evaluate the impact of high solar PV circuit penetration on reliability and safety,<sup>138</sup> the Commission may impose the rebuttable presumption until any such studies prove that that it is contrary to public safety and reliability. DBEDT recommends that the Commission should also consider penalties as an incentive to the HEI Companies to accelerate their grid improvement projects, while balancing the need for a safe and reliable grid.

**C. Direct Additional Circuit Penetration Studies on Each Island Grid to be Conducted on an Expedited Basis**

The HEI Companies' assumptions about the ability to adopt exporting PV and the levels of circuit upgrades necessary based on various exporting scenarios are based on only a few circuit penetration analyses and which reflect already-existing high penetration amounts.<sup>139</sup> As explained above, it remains unclear if the few circuit penetration studies are truly representative of the penetration levels of all the other circuits on all the other island grids. In addition, in regard to the Proactive Approach, the HEI Companies are still implementing this approach, they have not met pace with the originally committed dates for completion of this analysis, and yet the HEI Companies propose to integrate the Proactive Approach into the queuing process for DG applications. Given that the HEI Companies have not yet provided results of several more diverse circuit penetration studies on each island grid to ensure they are adopting the best interconnection, circuit improvement and PV exporting plans; that the Proactive Approach is not close to completion; and that other parallel proceedings will further inform these issues; the assumptions underlying the DGIP should not be given a presumption of accuracy or conclusiveness for all

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<sup>138</sup> Order No. 32053 at 39.

<sup>139</sup> See DGIP Attachment A (modeling maximum daytime load on the distribution level on groups of circuits in three high penetration "clusters"); and Attachment E (modeling maximum daytime load on the distribution level on only a few selected high penetration circuits -feeders/substations).

circuits. Rather, the Commission should reserve judgment on the findings contained in these studies until the HEI Companies present and explain a business case consistent with the State's energy policy, and the findings are substantiated with additional studies addressing the issues DBEDT has raised in this proceeding on circuits for which the HEI Companies have not yet undertaken specific analysis.

**D. Give Specific Direction to the Technical Working Group and the PV-DG Subgroup Regarding Technical Capabilities and Feasibility**

In any determination relating to the technical components of the DGIP, DBEDT recommends the Commission maximize its use of the TWG and the PV-DG Subgroup. This recommendation will assist the Commission as the HEI Companies make many of their assumptions about the possibility of certain actions and investments based on the relative technological infeasibility and unavailability of several different technologies and policies. For example, the HEI Companies claim that because "new innovative technologies" must be developed, advanced metering infrastructure for EVs is not possible until 2020.<sup>140</sup> In many states, electric vehicle charging stations are already capable of being installed with a smart meter attached so that the EV charging station appears as its own load. That technological capability is not only already available, it is widely used. Additionally, it was recently reported that EPRI is collaboratively creating smart charging standards.<sup>141</sup> SAE International is also developing smart

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<sup>140</sup> DGIP at 4-55.

<sup>141</sup> Jesse Berst, SmartGridNews.com, *At Long Last, A Standard For Smart Charging* (Aug 12, 2014) available at [http://www.smartgridnews.com/artman/publish/Technologies\\_Standards/At-long-last-a-standard-for-smart-charging-6689.html/#.VBMvPRZsEae](http://www.smartgridnews.com/artman/publish/Technologies_Standards/At-long-last-a-standard-for-smart-charging-6689.html/#.VBMvPRZsEae).

charging standards.<sup>142</sup> Standards development usually takes a few years, which would make these standards available long before the 2020 timeline provided by the HEI Companies.

Another example where the TWG and PV-DG Subgroup could provide valuable input is on the HEI Companies' assertion that UL Certification and IEEE Standards must be created for advanced inverters, some of which are not expected to be completed until April 2016.<sup>143</sup> The HEI Companies assert that these yet-undeveloped standards for multimode inverters (which are capable of both exporting and non-exporting capabilities) will be required to be integrated into future PV system installations.<sup>144</sup> There is a strong possibility that this plan will keep many residents in the interconnection queue in limbo well into the future. The TWG and PV-DG Subgroup should thus help provide guidance to the Commission and the HEI Companies about the relative availability, capability, and forecast on the different technologies the HEI Companies plans to deploy and whether the HEI Companies have proposed legitimate inverter certification requirements, or whether the proposal creates more roadblocks to successful DG integration.

Additionally, in regard to the ongoing Proactive Approach, the PV-DG Subgroup and the TWG should be utilized by the Commission to ensure that the Proactive Approach methodology is supported by well-reasoned and compelling analyses and is effective in informing the queuing process of DG applications, including the costs and procedures imposed on DG applicants.

## V. CONCLUSION

Without a reformation of the HEI Companies' business case, the HEI Companies lack the motivations needed to transform into utilities of the future. The DGIP presented the HEI

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<sup>142</sup> PowerPoint Presentation re: SAE Ground Vehicle Standards Status of work – PHEV + (SAE 2010), available at: <http://www.sae.org/smartgrid/sae-standards-activities-phev.pdf>.

<sup>143</sup> DGIP at 4-28.

<sup>144</sup> DGIP at 5-7.

Companies a unique opportunity to present the technical refinements to their systems by which they could begin the dismantling of their vertically integrated structure and begin the adoption of a customer-choice driven model. Unfortunately, rather than articulating a comprehensive business case or presenting a step-by-step actionable plan to convert into Utilities 2.0, the HEI Companies have submitted strategies and plans that strenuously focus on the limitations of their systems and available technologies, and suggest taking small and incremental steps that fail to align with the State's energy policy directives.

The Commission has tools before it to alter the current utility-dominated energy landscape in Hawaii. As suggested in this proceeding, the PSIPs proceeding, and other ongoing parallel proceedings that the Commission should view comprehensively, DBEDT has offered to the Commission solution-driven recommendations that are consistent with the State's energy policy directives. Analyzing DBEDT's proposals in light of the State's energy policy directives is essential to ensure the State of Hawaii has utilities that serve the interests of its ratepayers, rather than the interests of the utilities themselves. For these reasons, DBEDT implores the Commission to adopt the recommendations and suggestions presented herein.

**WHEREFORE**, the Hawaii Department of Business, Economic Development, and Tourism respectfully requests the Commission consider the foregoing comments in ruling on the Hawaii Electric Companies' Distributed Generation Interconnection Plan.

Respectfully submitted,

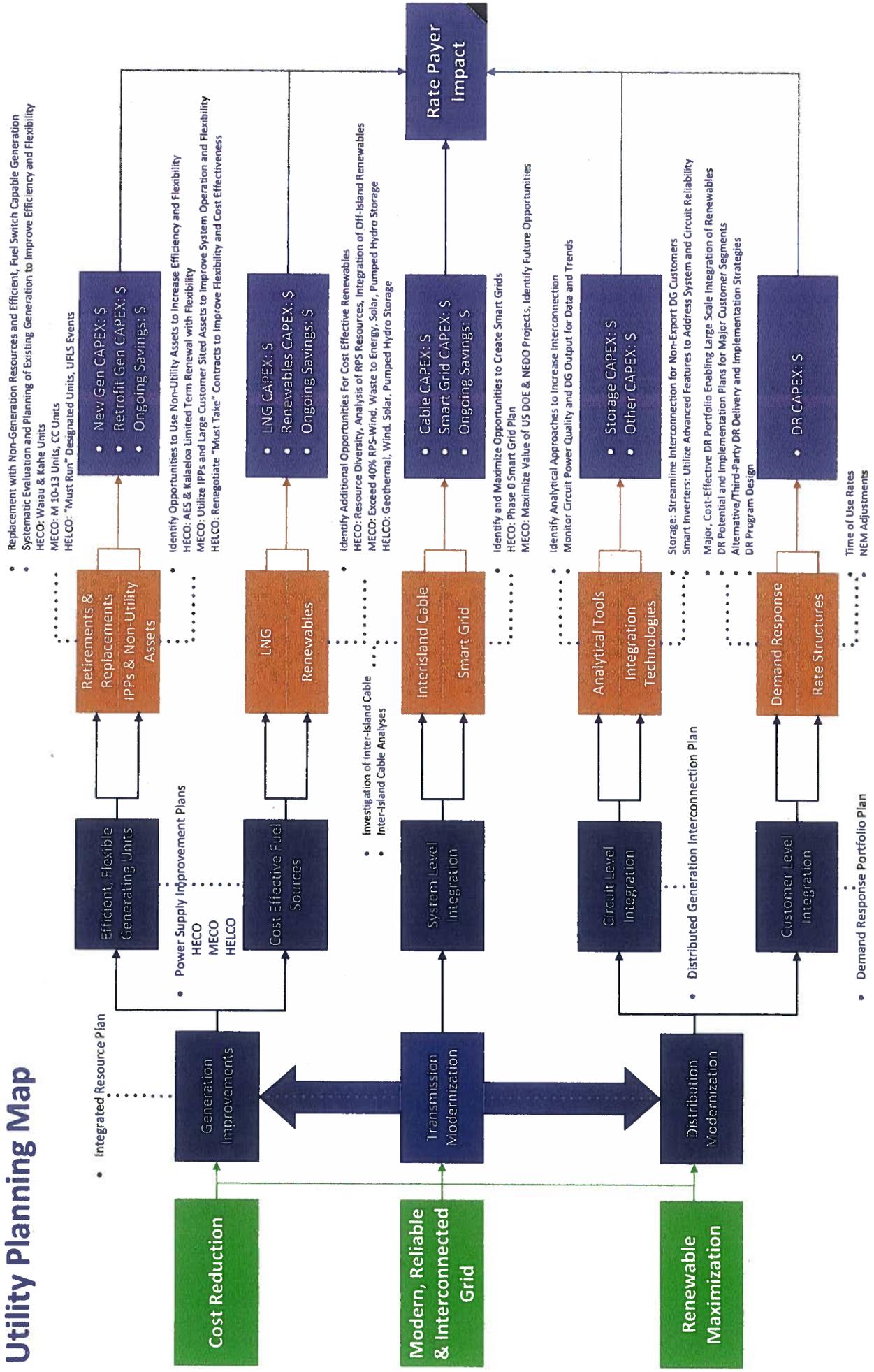


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**APPENDIX 1: Utility Planning Map**

# Utility Planning Map



**CERTIFICATE OF SERVICE**

I hereby certify that I have this date served a copy of the foregoing Comments, together with this Certificate of Service, by making personal delivery to the Commission, the Consumer Advocate, and the HEI Companies, and by causing a copy to be electronically mailed, to each other such party:

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