

REBUTTAL TESTIMONY OF

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Subject: Need for Utility Combined Heat and
 Power Capacity,
 Virtual Power Plant Concept, and
 Distributed Generation/Combined
 Heat and Power and Integrated
 Resource Planning

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INTRODUCTION

- Q. Please state your name and business address.
- A. My name is Ross Sakuda and my business address is 820 Ward Avenue, Honolulu, Hawaii.
- Q. Have you previously submitted testimony in this proceeding?
- A. Yes. I submitted written direct testimony and exhibits as HECO T-3.
- Q. What is the scope of your rebuttal testimony in HECO RT-3?
- A. My rebuttal testimony will cover:
- 1) the need for Utility Combined Heat and Power capacity,
 - 2) the Virtual Power Plant Concept, as described by the County of Maui in their written direct testimonies, and
 - 3) Distributed Generation (“DG”)/Combined Heat & Power (“CHP”) and Integrated Resource Planning (“IRP”).
- Q. On whose behalf is your testimony submitted?
- A. My testimony is submitted on behalf of Hawaiian Electric Company, Inc. (“HECO”), Hawaii Electric Light Company, Inc. (“HELCO”) and Maui Electric Company, Limited (“MECO”), collectively referred to as the HECO Utilities.

NEED FOR UTILITY CHP CAPACITY

- Q. You covered the need for Utility CHP capacity in your direct testimony in HECO T-3, on pages 7 through 10. Do you have additional information to provide?
- A. As I stated in my direct testimony in HECO T-3, page 7, line 6, to page 8, line 5, HECO has an urgent need for firm generating capacity. HECO also indicated in its March 31, 2004 Adequacy of Supply letter to the PUC on page 8, last paragraph, that “With the new, higher [February 2004] forecast for peak demand,

1 the next generating unit would be needed in 2006 if other measures, such as DSM,
2 distributed generation, CHP or other supply-side resources, including renewable
3 resources, are not sufficient to reduce demand or increase supply to maintain
4 generating system reliability at or above the 4.5 years per day threshold.
5 However, given the long lead time to install the next generating unit, it is not
6 possible to have the unit installed and operating by 2006.” HECO further
7 indicated in the letter on page 9, last paragraph, that “Since the next generating
8 unit cannot be installed by 2006, it is important that the regulatory proceedings for
9 HECO’s proposed load management programs and any proposed individual CHP
10 projects move as quickly as possible (footnote omitted). Expeditious approval of
11 these initiatives will enable HECO to begin its implementation efforts to begin
12 acquiring the peak reduction benefits of these initiatives in order to mitigate the
13 effect of the higher peak forecast on generating system reliability.”

14 Demand for electricity on Oahu (as well as on Maui and Hawaii) continues
15 to increase. For example, on Oahu peak demand has been higher than what was
16 included in the February 2004 forecast. An all-time peak demand of 1,327 MW
17 (gross) was recorded on October 12, 2004. This was 43 MW higher than the
18 1,284 MW (gross) peak recorded in 2003. When adjusted for the contributions of
19 Chevron and Tesoro generating units, the 1,327 MW (gross) peak was
20 approximately 33 MW higher than the projected peak for 2004 in the August 2002
21 forecast, and approximately 14 MW higher than the projected peak for 2004 in the
22 February 2004 forecast. On October 13, 2004, HECO asked Oahu customers to
23 conserve electricity until after 9 p.m. to help avoid a power outage on the island.
24 Oahu’s reserves of power generation were very tight that day due to the hot
25 weather and the reduced power generation available. Two HECO generators were

1 not available due to unscheduled maintenance and a generating unit operated by
2 an independent power producer that sells power to HECO was also unavailable.
3 These events clearly illustrate HECO's increasing need for additional capacity.

4 Q. In the HECO Utilities' CHP Program application to the Commission, filed on
5 October 10, 2003, in Docket No. 03-0366, what amount of utility CHP capacity
6 was estimated could be installed in 2004 on Oahu?

7 A. It was estimated that about 2.7 MW (at the equivalent system level) could be
8 installed in 2004. It was also estimated that increasing amounts of utility CHP
9 capacity could be installed in subsequent years. Docket No. 03-0366 was
10 suspended on March 2, 2004 by the Commission's Order No. 20831, and no
11 utility CHP capacity will be installed in 2004. In addition, HECO knows of no
12 non-utility CHP system projects that have been installed on Oahu in 2004. HECO
13 needs to be able to proceed with its CHP Program and/or to proceed with CHP
14 system installations under Commission approved Rule 4 contracts, in order to
15 acquire additional generating capacity.

16 Q. You indicated in your direct testimony in HECO T-3, page 8, lines 2 to 5, that
17 "Even with the forecasted firm capacity contributions of the proposed CHP
18 Program in combination with the energy efficiency and load management DSM
19 program impacts, new firm capacity would be needed in 2006. Without the firm
20 capacity from the CHP program, new firm capacity would be needed even
21 sooner." Does it appear that the next central-station generating unit, currently
22 scheduled for installation in 2009, can be permitted and installed sooner than
23 2009?

24 A. Not at this time. Based on the estimated timeframes to acquire the necessary
25 permits, perform the engineering, procure the equipment and construct the unit, it

1 is not expected that the unit would be installed sooner than 2009.

2 Q. What other forms of capacity and load reduction is HECO pursuing?

3 A. HECO is also seeking the peak reduction benefits of load management programs,
4 capacity from firm renewable energy projects, and additional capacity from
5 Independent Power Producers (“IPPs”).

6 Q. Please describe the peak reduction benefits of load management programs that are
7 being sought.

8 A. In May 2003, HECO submitted an application to the PUC for approval of a
9 proposed Residential Direct Load Control (“RDLC”) Program in Docket No. 03-
10 0166, and submitted a Stipulated Agreement with the Consumer Advocate on June
11 30, 2004. On October 14, 2004, the PUC issued Decision and Order No. 21415
12 approving the proposed RDLC Program.

13 In December 2003, HECO submitted an application to the PUC for approval
14 of a proposed Commercial & Industrial Direct Load Control (“CIDLC”) Program
15 in Docket No. 03-0415, and submitted a Stipulated Agreement with the Consumer
16 Advocate on July 15, 2004. On October 19, 2004, the Commission issued
17 Decision and Order No. 21421 approving the proposed CIDLC Program.

18 At the time the applications were submitted, it was estimated that a total of
19 about 3.4 MW and 4.6 MW of peak reduction benefits from the RDLC and
20 CIDLC Programs, respectively, could be acquired by the end of 2004. It is now
21 estimated that no impacts will be acquired in 2004 as it will take some time to
22 implement the recently-approved RDLC Program.

23 Q. Please describe the capacity from renewable energy projects that are being sought.

24 A. Renewable Hawaii Inc. (“RHI”), a subsidiary of HECO, issued Requests For
25 Project Proposals for Oahu on May 22, 2003 to stimulate the renewable energy

1 market. Eight proposals were received on August 22, 2003. RHI is continuing to
2 evaluate three of the eight proposals. One is for a windfarm, which will not
3 provide firm capacity. One is for a landfill gas generating unit, which will be
4 about 1 MW in size. The third one is for a Municipal Solid Waste (“MSW”)
5 generating unit. While the MSW unit can provide firm capacity, it is very
6 unlikely the capacity can be installed in the near term due to the long lead time
7 needed to install such a plant.

8 Q. Please describe the additional capacity from IPPs that is being sought.

9 A. HECO has been actively negotiating with Kalaeloa for months to acquire an
10 additional 29 MW of capacity from its existing power plant. On October 12,
11 2004, HECO and Kalaeloa executed Amendment Nos. 5 and 6 to the existing
12 Power Purchase Agreement, which are subject to a number of conditions,
13 including Commission approval. The amendments cover the purchase of up to an
14 additional 29 MW of firm capacity. (HECO has briefed the Commission on the
15 salient terms and conditions of the amendments, and expects to submit an
16 application to the Commission shortly for approval of the amendments.) The
17 additional firm capacity which Kalaeloa is either already capable of providing (9
18 MW) or will be able to provide by improving the efficiency of its two combustion
19 turbines (through an efficiency modification, which was done in May 2004 for
20 one combustion turbine and targeted to be done for the second combustion turbine
21 in December 2004) will become available for dispatch by HECO following
22 Commission approval of the PPA amendments. The additional firm capacity will
23 help address the reserve margin situation, but will not offset the need for the
24 capacity offered by utility owned CHP systems.

1 VIRTUAL POWER PLANT CONCEPT

2 Q. Why is the Virtual Power Plant (“VPP”) concept an issue in this proceeding?

3 A. The County of Maui has recommended that “the Commission direct MECO to
4 modify its planned Capacity Buy-back (“CBB”) program into an expanded virtual
5 power plant program” as stated in the direct testimony of Mr. Kal Kobayashi in
6 COM-T-1, page 16, lines 10 to 12. Similarly, Mr. Jim Lazar, in his testimony in
7 COM-T-2, page 97, lines 15 to 17, stated that the Commission should “Direct the
8 utilities to examine the creation of a virtual power plant from existing customer-
9 owned emergency generators, and to report on the costs and benefits of doing so.”

10 Q. Mr. Jim Lazar, in his testimony in COM-T-2, page 101, lines 16 to 17, also stated,
11 “The Commission should direct each utility to develop a plan to implement a
12 virtual power plant in its service territory. This should include an inventory of
13 possible generators, development of a plan to install synchronization equipment
14 and central dispatch capability, and development of the contractual and
15 institutional framework needed to make the program a success.” What is the
16 HECO Utilities’ response to the County of Maui’s recommendations?

17 A. The County of Maui has not provided any detailed analysis or other basis that
18 would justify the proposed direction that MECO modify its planned CBB
19 Program, and its recommendation appears to go well beyond the scope of this
20 docket. The HECO Utilities, however, are agreeable to undertake a feasibility
21 study of the virtual power plant concept for the island of Maui within the next
22 major MECO IRP review (i.e., MECO IRP-3), provided that the full costs of the
23 study are recoverable via the IRP Cost Recovery Provision.

24 Q. What is a VPP?

25 A. According to the County of Maui, VPPs “are generally considered to be a network

1 of DG systems, integrated together with computer monitoring and control
2 equipment, to allow a system operator to dispatch some or all of the networked
3 DG systems as though they were one or more central generation power plants”, as
4 stated by Mr. Kobayashi in COM-T-1, page 16, lines 2 to 5.

5 Q. Has the County of Maui identified any electric utilities that “aggregate networks
6 of customer-sited generators together into 'virtual power plants' to provide grid
7 reliability services,” as referred to in COM-T-1, page 19, lines 13 and 14?

8 A. In response to this question in HECO/Maui-DT-IR-1, part a, the County of Maui
9 identified Public Service of New Mexico (“PNM”) as an electric utility that
10 aggregates networks of customer-sited generators together into 'virtual power
11 plants'.

12 Q. What has been PNM’s experience with these virtual power plants?

13 A. HECO contacted Mr. Ed Reyes of PNM’s Wholesale Marketing Division (505-
14 855-6304) to obtain current information about their experience with their VPP
15 program. Mr. Reyes stated that an independent project developer, Celerity
16 Energy, raised investment capital to develop a virtual power plant distributed
17 generation entity under contract by PNM. Celerity Energy went into PNM’s
18 service area and signed on PNM customers who possessed standby generators and
19 were willing to let Celerity Energy manage these standby generators for them.
20 Celerity Energy upgraded these units to be able to operate in parallel to the system
21 and connected them to a web-base communication system so PNM could both
22 monitor and dispatch them. Celerity Energy was responsible for the daily
23 operation and all maintenance of these units. PNM initiated the program in 1999,
24 and Celerity Energy has delivered about 6 MW in capacity from three projects –
25 two at hospitals and one at an airport. PNM’s system peak is about 1,600 MW.

1 HECO also contacted Ms. Amy Miller of the Corporate Communications
2 Department at PNM (amiller@pnm.com; (505) 241-2721 or (505) 855-6298).
3 With respect the utility’s operation of the standby units, Ms. Miller indicated that
4 “the available generators do not ramp up very effectively and we do not heavily
5 rely upon it”.

6 Q. What is HECO’s response to the County of Maui’s recommendation that “the
7 Commission direct MECO to modify its planned CBB program into an expanded
8 virtual power plant program”?

9 A. As I stated in my testimony in HECO T-3, page 15, line 8, to page 16, line 11,
10 HECO has a number of issues and concerns with the VPP concept, including the
11 actual availability of the emergency generators during times of system need, air
12 permit limitations, noise, emissions and increased fuel truck traffic, lack of control
13 over testing and maintenance practices for the emergency generators, potential
14 lack of adequate dispatch control, and fuel storage capacity. With respect to
15 actual availability of the emergency generators during times of system need, Mr.
16 Kobayashi conceded in response to CA-IR-47 that the utility’s dispatch control of
17 the customer-sited emergency generators would be “subject to pre-emption by the
18 owner for on-site requirements.”

19 While PNM has acquired some capacity from a so-called virtual power
20 plant, the amount is very small in comparison to its overall system size. In
21 addition, the indication is that the units do not necessarily meet the utility’s needs
22 and therefore “they do not rely heavily upon it.” Furthermore, PNM is
23 interconnected to other utilities so that it can purchase power from neighboring
24 utilities as needed. MECO has no such option since MECO is not interconnected
25 to any other grid.

- 1 Q. Has HECO considered the use of customer stand-by generators as a possible
2 resource?
- 3 A. HECO has developed and filed with the Commission a Commercial and Industrial
4 Load Control Program (“CIDLC Program”) in Docket No. 03-0415. This
5 program proposes that a customer may nominate all or part of its load to be
6 remotely interrupted via under frequency relay or dispatched by the utility when
7 there is insufficient generation to meet peak demand. The loads under this
8 program may be discretionary loads that the customer allows to be interrupted or
9 may be load that can be transferred to a stand-by generator. Under this program,
10 customers will receive payments to facilitate installation of equipment needed to
11 participate and to facilitate on-going maintenance and operation of this equipment.
- 12 Q. Has HECO examined potential customer participation in this program?
- 13 A. Yes, a survey of customers was conducted. Please refer to Exhibit D of the
14 CIDLC Program application to the Commission in Docket 03-0415.
- 15 Q. How does this program compare with the proposed virtual power plant concept?
- 16 A. The County of Maui describes the virtual power plant as “a process of knitting
17 together existing customers emergency generators into available utility reserve
18 resource to meet extreme conditions”.¹ HECO’s CIDLC Program provides a
19 mechanism to use stand-by generators as a resource similar to the virtual power
20 plant concept. However, the CIDLC Program also goes beyond the use of stand-
21 by generators and allows the utility to access additional resources that customers
22 may have available. To narrowly consider stand-by generators will capture only a
23 part of these potential additional resources, which include loads designated by the

¹ Direct Testimony of Mr. Lazar in COM-T-2, page 50, lines 15 and 16.

1 customer that it can interrupt at its own discretion, such as water pumps, chillers
2 or certain processes in industrial production lines. Furthermore, there is a
3 significant difference between capacity that may be available from a VPP and that
4 which can be provided by the CIDLC Program. Under the CIDLC Program, the
5 nominated portion of the customer's load can be interrupted immediately through
6 an underfrequency relay or through manual control with one hour notice by the
7 utility. If the customer has a standby generator, then whether or not that customer
8 turns on the generator to serve the internal load that was interrupted will be at
9 his/her discretion. The customer's decision does not affect the utility's ability to
10 receive the capacity from the interrupted load. With the VPP, on the other hand,
11 the customer's standby generator must be turned on in order for the utility to
12 receive the capacity. Hence, if the generator(s) do not turn on – whether it is
13 because the units have operational or maintenance problems, because the air
14 permit limits have been exceeded, or because of some other reason – the utility
15 will not receive the capacity.

16 Q. In his testimony in COM-T-2, page 52, lines 13 to 15, Mr. Lazar stated that “In
17 order to eliminate rolling blackouts that had plagued the island, HELCO
18 contracted with several large customers with emergency generators to switch
19 some of their loads to their own generators during high-load hours.” With whom
20 did HELCO have contracts?

21 A. Mr. Lazar is mistaken. HELCO did not have any contracts with any customers
22 with emergency generators to switch some of their loads to their own generators
23 during high-load hours. During certain periods, HELCO contacted large
24 customers to voluntarily curtail their demand to try to prevent demand from
25 exceeding available supply. While these customers were under no obligation to

1 do so, they did reduce their demand to the extent they could. Some customers
2 may have operated their standby generators to remove their dedicated emergency
3 loads from the system demand, but the generators were not operated in parallel
4 with the system.

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6 DG/CHP in IRP

7 Q. Issue No. 11 in the instant docket states “What revisions should be made to the
8 integrated resource planning process?” What is the HECO Utilities’ position on
9 this issue?

10 A. As I stated in my direct testimony in HECO T-3, page 12, lines 13 to 16, the
11 HECO Utilities’ position is that no changes to the IRP Framework are required for
12 consideration of DG.

13 Q. Will the Utility CHP Program be evaluated in HECO’s current integrated resource
14 planning process (IRP-3) that is currently in progress?

15 A. Yes, it will, as I explained in my direct testimony in HECO T-3, page 13, line 1, to
16 page 14, line 8. The evaluation will consider two levels of market sizes. The
17 evaluation will also include a supplemental sensitivity analysis which takes into
18 account the revenue impacts from the discount to electric rate tariffs, facilities
19 charges, and thermal charges. The revenue impact analysis cannot be performed
20 during the base integration analysis because the dynamic optimization computer
21 model used for the integration analysis does not have a means to evaluate this.
22 This evaluation must be done outside of the model. This supplemental analysis
23 will estimate the impacts of the Utility CHP Program on non-participants.

24 Q. Please elaborate on how DG/CHP will be evaluated in the IRP process.

25 A. Within the overall IRP process, DG/CHP will be evaluated from the generation

1 capacity planning, transmission planning and distribution planning perspectives to
2 the extent practical.

3 DG/CHP in Generation Capacity Planning

4 Q. What steps will be taken to consider DG/CHP in generation capacity planning?

5 A. I described in my testimony in HECO T-3, page 12, line 13, to page 14, line 5,
6 how the HECO Utilities' proposed CHP Program, as described in the HECO
7 Utilities' application in Docket No. 03-0366, will be evaluated in HECO's IRP-3
8 major evaluation process.

9 Q. What about other DG projects that are only for electrical generation purposes and
10 have no host for use of the waste heat?

11 A. In my direct testimony in HECO T-3, page 7, line 7, to page 8, line 5, I described
12 HECO's capacity situation and indicated that HECO has an urgent need for firm
13 generating capacity. In HECO's Adequacy of Supply letter to the Commission,
14 filed on March 31, 2004², it was noted on page 9, under "Mitigation Measures"
15 that one of the options being considered to mitigate the effects of the higher
16 forecast on generating system reliability is "the installation of DG." This DG
17 capacity would be in addition to that proposed in the HECO Utilities' CHP
18 Program. HECO envisions that this DG capacity would be of the type identified
19 in Mr. Scott Seu's direct testimony in HECO T-1, page 5, line 25 (substation-sited
20 peaking generation), for which an example is provided in HECO T-1, page 6, lines
21 13 to 15.

22 Q. Would any DG or CHP projects be precluded from being pursued if they are not
23 specifically identified in the integrated resource plan?

² My direct testimony in HECO T-3, page 7, line 12, contained an inadvertent error in the date of the filing. The correct date is March 31, 2004.

1 A. No, they would not. As the HECO Utilities indicated in its CHP Program
2 application in Docket No. 03-0366, filed October 10, 2003, on page 19, “the
3 public interest in CHP and the demand by customers for the Companies to offer
4 CHP services continued to increase” since the late 2001 through 2002 timeframe
5 when the Companies’ initial plan was to do a limited number of pilot CHP
6 projects. CHP projects are largely driven by customer needs and it is difficult, if
7 not impossible, for the Companies to identify all potential CHP projects.
8 Therefore, after HECO’s IRP-3 preferred plan and five-year action plans have
9 been finalized and filed with the Commission, new CHP (or DG) opportunities,
10 which are not identified in the resource plan or action plan, may arise. HECO
11 should not be precluded from pursuing these opportunities. See also the CHP
12 Program application, Exhibit K, Docket No. 03-0366.

13 By way of comparison, the HECO Utilities are not precluded from pursuing
14 non-utility central-station generation if an Independent Power Producer (“IPP”)
15 submits a proposal within the scope of Hawaii Administrative Rules 6-74,
16 “Standards for Small Power Production and Cogeneration.” For example,
17 HELCO’s IRP-2 preferred plan, filed with the Commission on September 1, 1998,
18 in Docket No. 97-0349, did not contain any new hydroelectric resources.

19 DG/CHP in Transmission and Distribution Planning

20 Q. How will DG/CHP be considered in the transmission and distribution planning
21 processes?

22 A. Please refer to the rebuttal testimony of Ms. Shari Ishikawa in HECO RT-4.
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1 SUMMARY

2 Q. Please summarize your testimony.

3 A. HECO has an increasing need for capacity, due to in large part to the record
4 demand for electricity. The next central-station generating unit is not expected to
5 be installed sooner than 2009 because of the long lead times needed for
6 permitting, engineering, equipment procurement and construction. The
7 approximately 3.4 MW and 4.6 MW of peak reduction benefits from the RDLC
8 and CIDLC Programs, respectively, that were forecasted for 2004 will not be
9 realized in 2004. HECO is exploring various resource options, such as an
10 enhanced DSM program and additional CHP impacts outside of the CHP
11 Program, for additional capacity. HECO needs the capacity from its CHP
12 Program in addition to the capacity from its RDLC and CIDLC Programs and its
13 existing energy efficiency DSM Programs, in order to maintain its generating
14 system reliability.

15 With respect to the Virtual Power Plant concept, HECO has a number of
16 issues and concerns with the VPP concept, including the actual availability of the
17 emergency generators during times of system need, air permit limitations, noise,
18 emissions and increased fuel truck traffic, lack of control over testing and
19 maintenance practices for the emergency generators, potential lack of adequate
20 dispatch control, and fuel storage capacity. However, the HECO Utilities are
21 agreeable to undertake a feasibility study of the virtual power plant concept for the
22 island of Maui within the next major MECO IRP review (i.e., MECO IRP-3),
23 provided that the full costs of the study are recoverable via the IRP Cost Recovery
24 Provision.

25 With respect to DG/CHP in IRP, no changes to the IRP Framework are

1 required for consideration of DG (which includes CHP). HECO will evaluate the
2 HECO CHP Program within its current HECO IRP-3 process.

3 Q. Does this conclude your testimony?

4 A. Yes, it does.