

**WRITTEN TESTIMONY AND EXHIBITS**

**OF**

**J. RICHARD HORNBY**

**ON BEHALF OF  
THE DIVISION OF CONSUMER ADVOCACY**

**SUBJECT: PRICING RELATED ISSUES**

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1                                   **WRITTEN TESTIMONY OF J. RICHARD HORNBY**

2   **I. INTRODUCTION AND SUMMARY.**

3   Q.   PLEASE STATE YOUR NAME, EMPLOYER, AND PRESENT POSITION.

4   A.   My name is James Richard Hornby. I am a Senior Consultant at Synapse  
5       Energy Economics, Inc., 485 Massachusetts Avenue, Cambridge, MA 02139.

6  
7   Q.   ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS CASE?

8   A.   I am testifying on behalf of the Department of Commerce and Consumer  
9       Affairs of the State of Hawaii, as represented by the Division of Consumer  
10      Advocacy (“Consumer Advocate”).

11  
12   Q.   PLEASE DESCRIBE SYNAPSE ENERGY ECONOMICS.

13   A.   Synapse Energy Economics (“Synapse”) is a research and consulting firm  
14       specializing in energy and environmental issues, including: electric generation,  
15       transmission and distribution system reliability, market power, electricity  
16       market prices, stranded costs, efficiency, renewable energy, environmental  
17       quality, and nuclear power.

18  
19   Q.   PLEASE SUMMARIZE YOUR WORK EXPERIENCE AND EDUCATIONAL  
20       BACKGROUND.

21   A.   I am an energy consultant specializing in planning and ratemaking in the  
22       electric and gas industries. Over the past twenty five years, I have presented

1 expert testimony and provided litigation support on these issues in more  
2 than 120 proceedings in over thirty jurisdictions in the United States and  
3 Canada. Over this period, my clients have included staff of public utility  
4 commissions, state energy offices, consumer advocate offices and marketers.

5 Prior to joining Synapse in 2006, I was a Principal with  
6 CRA International and, prior to that, Tabors Caramanis & Associates.  
7 From 1986 to 1998, I worked with the Tellus Institute (formerly Energy  
8 Systems Research Group), initially as Manager of the Natural Gas Program  
9 and subsequently as Director of their Energy Group. Prior to 1986, I was  
10 Assistant Deputy Minister of Energy for the Province of Nova Scotia.

11 I have a Master of Science in Energy Technology and Policy from the  
12 Massachusetts Institute of Technology ("MIT") and a Bachelor of Industrial  
13 Engineering from the Technical University of Nova Scotia, now merged with  
14 Dalhousie University.

15 I have attached my resume to this testimony as CA-200.

16  
17 Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

18 A. On August 2, 2012, Hawaii Electric Light Company, Inc. ("HELCO") and  
19 Hawaiian Electric Company, Inc. ("HECO"), jointly "the Companies", filed an  
20 Application for approval of a Biofuel Supply Contract with Aina Koa  
21 Pono-Ka'u LLC ("AKP"). The Consumer Advocate retained Synapse to assist  
22 in its evaluation of that Application.

1           My testimony examines whether the proposed Biofuel Supply Contract  
2           is reasonable. I specifically address the price premiums and corresponding  
3           values associated with this contract, which is the fourth issue the Hawaii  
4           Public Utilities Commission (“Commission”) listed on page 4 of its Procedural  
5           Order No. 30685, Stipulation Regarding Amended Procedural Order, filed on  
6           October 12, 2012 in this proceeding. My colleague, Patrick Luckow, presents  
7           testimony on the greenhouse gas emissions associated with the production  
8           and use of the biofuels HELCO is proposing to acquire from the AKP project.

9  
10    Q.    WHAT SOURCES DID YOU RELY UPON TO PREPARE YOUR TESTIMONY  
11           AND EXHIBITS?

12    A.    I relied on the Companies’ Application, its responses to various information  
13           requests (“IR”), recent projections of prices for relevant fossil fuels,  
14           Commission orders in other relevant proceedings, Hawaii energy policies and  
15           relevant resource planning proceedings of other utilities in which I have  
16           participated or which I have reviewed.

17  
18    Q.    PLEASE SUMMARIZE THE PROPOSED CONTRACT FOR BIOFUEL  
19           SUPPLY FROM AKP.

20    A.    Under the proposed contract, HELCO would enter into a twenty year contract  
21           with AKP to buy 16 million gallons of biofuels per year that AKP would produce  
22           on the island of Hawaii for twenty years. HELCO expects to use this biofuel to

1 produce 100 percent of the electricity at its Keahole Power Plant (“KPP”)  
2 combined cycle generating unit. The 16 million gallons of biofuel per year  
3 represents the entire annual fuel consumption of the KPP combined cycle unit.  
4 For this biodiesel, HELCO and HECO would essentially pay a fixed price plus  
5 an annual escalation factor. This price is not linked to fossil fuel prices.

6 AKP proposes to produce the biofuel at a bio refinery it would build on  
7 the island of Hawai’i. Its feedstock would initially be existing invasive species,  
8 and once those are harvested, sustainable crops such as energy grasses.  
9 AKP proposes to produce 24 million gallons per year, of which it would  
10 sell 16 million to HELCO and 8 million as a transportation fuel.<sup>1</sup>

11  
12 Q. PLEASE SUMMARIZE THE COMPANIES’ PROPOSAL FOR RECOVERING  
13 THE COST OF THIS BIOFUEL SUPPLY FROM THEIR CUSTOMERS.

14 A. HELCO is proposing to recover the annual cost of the biofuel up to the amount  
15 HELCO would otherwise have paid for diesel from its ratepayers either  
16 through HELCO’s base rates, the existing Energy Cost Adjustment Clause, or  
17 some combination of those cost recovery mechanisms. In any year in which  
18 the annual cost of the biofuel exceeds the amount HELCO would otherwise  
19 have paid for fossil fuels, the Companies are proposing to allocate that  
20 premium between them in proportion to their annual retail sales and recover

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<sup>1</sup> HELCO / HECO Application, Exhibit G Pg 1.

1 those respective allocated amounts from their ratepayers through the  
2 proposed Biofuel Surcharge Provision. The Companies are proposing this  
3 method of recovery on the grounds that HECO needs the AKP biofuel supply  
4 in order to meet its requirements under the State's Renewable Portfolio  
5 Standard ("RPS") statute.

6  
7 Q. PLEASE SUMMARIZE YOUR EVALUATION OF THE PROPOSED BIOFUEL  
8 SUPPLY CONTRACT.

9 A. My evaluation analyzed whether the purchase of 16 million gallons of AKP  
10 biofuel per year would enable the Companies to provide reliable service at  
11 reasonable rates as compared to continuing to purchase 16 million gallons of  
12 diesel fuels. First, I determined whether the Companies would likely be paying  
13 a "premium" for biofuel under the AKP contract relative to the prices for the  
14 fossil fuels it would displace, and, if so, the size and duration of that premium.  
15 My analysis focused on price premiums from 2017 onward, to reflect the  
16 project construction period allowed under the AKP contract, and measured  
17 those premiums relative to diesel, the fuel HELCO projects to otherwise use.  
18 Next, I estimated several of the AKP contract benefits, including its value as a  
19 hedge against higher than expected fossil fuel prices, and its contribution to  
20 reducing HELCO's air emissions and its contribution to meeting HECO's  
21 targets under the RPS.

1 Q. PLEASE SUMMARIZE THE RESULTS OF YOUR EVALUATION.

2 A. The results of my evaluation indicate that the Biofuel Supply Contract will  
3 enable the Companies to provide reliable service at reasonable rates relative  
4 to continuing to rely upon fossil fuels. Based on current market conditions, our  
5 analyses indicate that the prices the Companies will pay for biofuel under the  
6 AKP contract are likely to be higher than diesel prices according to current  
7 Reference Case forecasts for diesel prices. However, in exchange, the  
8 Companies and their customers will receive a number of benefits from the  
9 AKP contract, in particular, the following benefits would be received:

- 10 • reduced dependence on fossil fuels;
- 11 • reduced exposure to increases in electricity costs in periods when  
12 diesel prices prove to be higher than current Reference Case forecasts  
13 as well as reduced exposure to the volatility associated with diesel  
14 prices;
- 15 • reduced emission of air pollutants;
- 16 • a contribution to compliance with RPS requirements; and
- 17 • diversification of the resources used to meet RPS requirements.

18 Finally, our analyses indicate that entering the AKP contract will not prevent  
19 the Companies from acquiring additional resources that prove to be  
20 cost-effective in the future. The Companies will continue to have that  
21 flexibility.



1           Based on the results of my evaluation, my conclusion is that the cost of  
2           biofuel under the proposed Biofuel Supply Contract is reasonable. The AKP  
3           Biofuel Supply Contract will enable the Companies to provide reliable service  
4           at reasonable rates relative to continuing to rely upon fossil fuels.

5  
6   **II. BACKGROUND.**

7   Q.   PLEASE DESCRIBE THE STANDARD YOU USED TO EVALUATE  
8        WHETHER THE PROPOSED BIOFUEL SUPPLY CONTRACT IS IN THE  
9        PUBLIC INTEREST.

10  A.   I used “reliable service at reasonable rates” as the standard to determine  
11        whether the proposed Biofuel Supply Contract is in the public interest. Under  
12        guidance from the Consumer Advocate, I chose that standard from a policy  
13        perspective because it is the basic obligation that the Companies, like all  
14        utilities subject to the Commission’s jurisdiction, are required to meet. The  
15        Companies are not acquiring these resources in order to ensure reliable  
16        service, therefore, I focused solely on “reasonable rates.”<sup>2</sup> Specifically, I have  
17        focused on whether the AKP biofuel costs represent reasonable long-term  
18        energy costs for the Companies.

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<sup>2</sup>       The Companies ensure reliable service by having sufficient generating capacity available to meet peak demand.

1 Q. WHAT CRITERIA DID YOU USE TO EVALUATE WHETHER THE  
2 PROPOSED BIOFUEL SUPPLY CONTRACT WOULD MEET THAT  
3 STANDARD?

4 A. The criteria I used to evaluate whether the proposed biofuel supply contract  
5 would meet that standard are the price premium and corresponding values  
6 associated with the contract.

7

8 Q. WHY DID YOU CHOOSE THE ABOVE CRITERIA TO EVALUATE THE  
9 PROPOSED BIOFUEL SUPPLY CONTRACT?

10 A. First, the Commission identified the price premium and corresponding values  
11 as one of the five issues in this Docket. Second, these criteria relate to  
12 whether the proposed contract would enable the Companies to satisfy  
13 Hawaii's various regulatory and public policy goals at a reasonable cost. The  
14 first criterion I considered was the premium, i.e., the projected cost of the  
15 Biofuel Supply Contract relative to Reference case forecasts for the fossil fuels  
16 being displaced. The other values associated with the contract I examined  
17 were: 1) reduced exposure to increases in electricity costs in periods when  
18 diesel prices prove to be higher than Reference Case forecasts, 2) reduced  
19 volatility in fuel prices, 3) reduced emission of air pollutants, 4) contribution to  
20 compliance with RPS requirements, and 5) diversification of the resources  
21 used to meet RPS requirements. These additional benefits relate to the  
22 regulatory goal of reasonable cost over time as well as Hawaii's policy goals of

1 reducing its dependence on fossil fuel prices and fossil fuels in general,  
2 reducing air emissions to 1990 levels by 2020 and increasing the portion of its  
3 electricity from renewable energy resources.

4 The determination of what is reasonable often entails the exercise of  
5 judgment, especially when trying to satisfy several potentially conflicting  
6 objectives such as minimizing cost, reducing dependence on fossil fuels and  
7 reducing air emissions. The need for judgment is also required when dealing  
8 with the uncertainty associated with a 20 year contract, such as projections of  
9 future prices and probabilities of future pricing scenarios.

10  
11 Q. PLEASE SUMMARIZE YOUR EVALUATION OF THE PROPOSED BIOFUEL  
12 SUPPLY CONTRACT.

13 A. My evaluation analyzed whether the purchase of 16 million gallons of AKP  
14 biofuel per year would enable the Companies to provide reliable service at  
15 reasonable rates as compared to continuing to purchase an equivalent  
16 quantity of diesel fossil fuels.<sup>3</sup>

17 First, I determined whether HELCO is likely to pay a “premium” for  
18 biofuel under the AKP contract relative to the prices it would otherwise pay for

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<sup>3</sup> In general, a gallon of biodiesel is volumetrically equal to a gallon of diesel but it is not exactly equivalent in energy value. The energy value of a gallon of biodiesel is about 6.8% lower than a gallon of diesel (HELCO 2012-0185 Application, Exhibit J, page 2). Thus, a slightly greater volume of biodiesel would be necessary to replace a set amount of diesel fossil fuel. Such variations in the energy value of liquid fuels are commonplace. For instance, the energy value of ultra-low sulfur diesel is lower than regular diesel because of the additional processing. See [http://en.wikipedia.org/wiki/Ultra-low-sulfur\\_diesel](http://en.wikipedia.org/wiki/Ultra-low-sulfur_diesel).

1 the fossil fuels the biofuel would displace, and if so the size and duration of  
2 that premium. That analysis focused on price premiums from 2017 onward, to  
3 reflect the project construction period allowed under the contract, and  
4 measured those premiums relative to diesel. It is my understanding that  
5 HELCO currently burns diesel with a 0.4% sulfur content at KPP and HELCO  
6 projects that it will not have to convert to low sulfur diesel under current and  
7 anticipated environmental regulations.<sup>4</sup>

8 Next, I examined several of the AKP contract benefits, including its  
9 value as a hedge against higher than expected fossil fuel prices, its  
10 contribution to reducing HECO's air emissions and its contribution to meeting  
11 HECO's targets under the State's RPS statute.

12  
13 Q WHY ARE PRICE PREMIUMS AND CORRESPONDING VALUES  
14 TYPICALLY A KEY ISSUE IN THE EVALUATION OF LONG-TERM  
15 COMMITMENTS SUCH AS THE PROPOSED BIOFUEL SUPPLY  
16 CONTRACT?

17 A. Price premiums and corresponding values are typically a key issue in the  
18 evaluation of long-term contracts and major resource commitments proposed  
19 by regulated utilities because regulators do not want to approve transactions  
20 which may result in ratepayers paying costs that prove to be unreasonable

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<sup>4</sup> CA-IR-21.

1 over the duration of the contract or commitment. This cost risk arises because  
2 the future is uncertain, and while analyses can inform decisions, determining  
3 whether a specific commitment to incur costs for a long-term period ultimately  
4 requires the exercise of some degree of judgment because of the uncertainty  
5 associated with any forecast.

6 For example, in May 2012, the Commission approved a contract  
7 between HECO and REG Marketing for up to 7 million gallons of biodiesel  
8 annually, at a price premium <sup>5</sup>

9 However, the REG contract has a 3 year term whereas the proposed Biofuel  
10 Supply Contract in the instant proceeding has a 20 year term. Thus, a major  
11 portion of the cost risk associated with the Biofuel Supply Contract arises from  
12 the possibility that less expensive supplies of biofuels or other renewable  
13 resources may become available to HELCO and HECO during the term of the  
14 contract.

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<sup>5</sup> Order No. 30384, Docket No. 2011-0337.

1 Q. IS IT SURPRISING THAT THE PRICE OF A GIVEN FUEL UNDER A  
2 LONG-TERM CONTRACT MIGHT APPEAR TO HAVE A PREMIUM  
3 RELATIVE TO THE PRICE OF THAT SAME FUEL BOUGHT ON A SPOT  
4 BASIS?

5 A. No. It is important to appreciate that a fuel bought under a multi-year contract  
6 at an agreed upon pricing formula is a different "product," in economic terms,  
7 than the same fuel bought on a spot basis. The same quality fuel is being  
8 purchased and sold under both approaches, but the differences in the terms of  
9 the two transactions makes them different products. If HECO or HELCO  
10 wanted to enter a 10 year contract for conventional diesel at an agreed upon  
11 pricing formula, it is quite likely the resulting price would be quite different from  
12 the price it pays to purchase on a spot basis. Thus, one of the reasons why  
13 the price of biofuel under the proposed Biofuel Supply Contract may appear to  
14 be at a premium relative to forecasts of fossil fuels is simply the fact that they  
15 are different economic products. The question for this proceeding is whether  
16 any such price premium to ratepayers is justified by the incremental value of  
17 the contract.

18

1 Q. HOW HAVE YOU ADDRESSED THE UNCERTAINTY IN YOUR  
2 EVALUATION OF THE REASONABLENESS OF THE PRICE PREMIUMS  
3 AND ASSOCIATED VALUES OF THE PROPOSED BIOFUEL SUPPLY  
4 CONTRACT?

5 A. In general, my analysis addressed that uncertainty by assessing the proposed  
6 Biofuel Supply Contract in light of the Companies' obligation to provide reliable  
7 service at reasonable rates over the 20 year term of the proposed contract.  
8 I evaluated the proposed Biofuel Supply Contract within the context of HECO's  
9 overall strategy for meeting its obligation and on the facts and analyses  
10 currently available to its management and to the other parties as this point in  
11 time, which is when a decision has to be made. This is the approach I have  
12 used in other proceedings addressing proposals for similar long-term  
13 commitments such as long-term natural gas contracts in the 1990s and more  
14 recently electric utility purchase power agreements and capacity investments,  
15 for example Oklahoma Gas & Electric's proposed wind power purchase  
16 agreement in November 2010, Arkansas Docket 10-073-U, and Kentucky  
17 Power Company's proposed environmental retrofit of its Big Sandy Unit 2 in  
18 March 2012, Kentucky docket 2011-00401.

19

1   **III.   ANALYSIS OF PRICE PREMIUMS.**

2   Q.   PLEASE SUMMARIZE YOUR EVALUATION OF THE PROJECTED PRICE  
3       OF BIODIESEL UNDER THE PROPOSED BIOFUEL SUPPLY CONTRACT  
4       RELATIVE TO THE FORECAST PRICES OF THE FUELS IT WOULD  
5       DISPLACE.

6   A.   My evaluation of the projected price of AKP biodiesel began by identifying the  
7       fossil fuels that it would likely displace, and the forecast prices for those fossil  
8       fuels. Then, as mentioned earlier, I determined whether HECO would be  
9       paying a “premium” for biofuel under the AKP contract relative to the  
10      Reference case price forecasts for those fossil fuels, and, if so, the size and  
11      duration of that premium.

12

13   Q.   PLEASE DESCRIBE THE FOSSIL FUELS THE AKP BIOFUEL WOULD  
14      LIKELY DISPLACE AND THE FORECAST PRICES FOR THOSE FOSSIL  
15      FUELS.

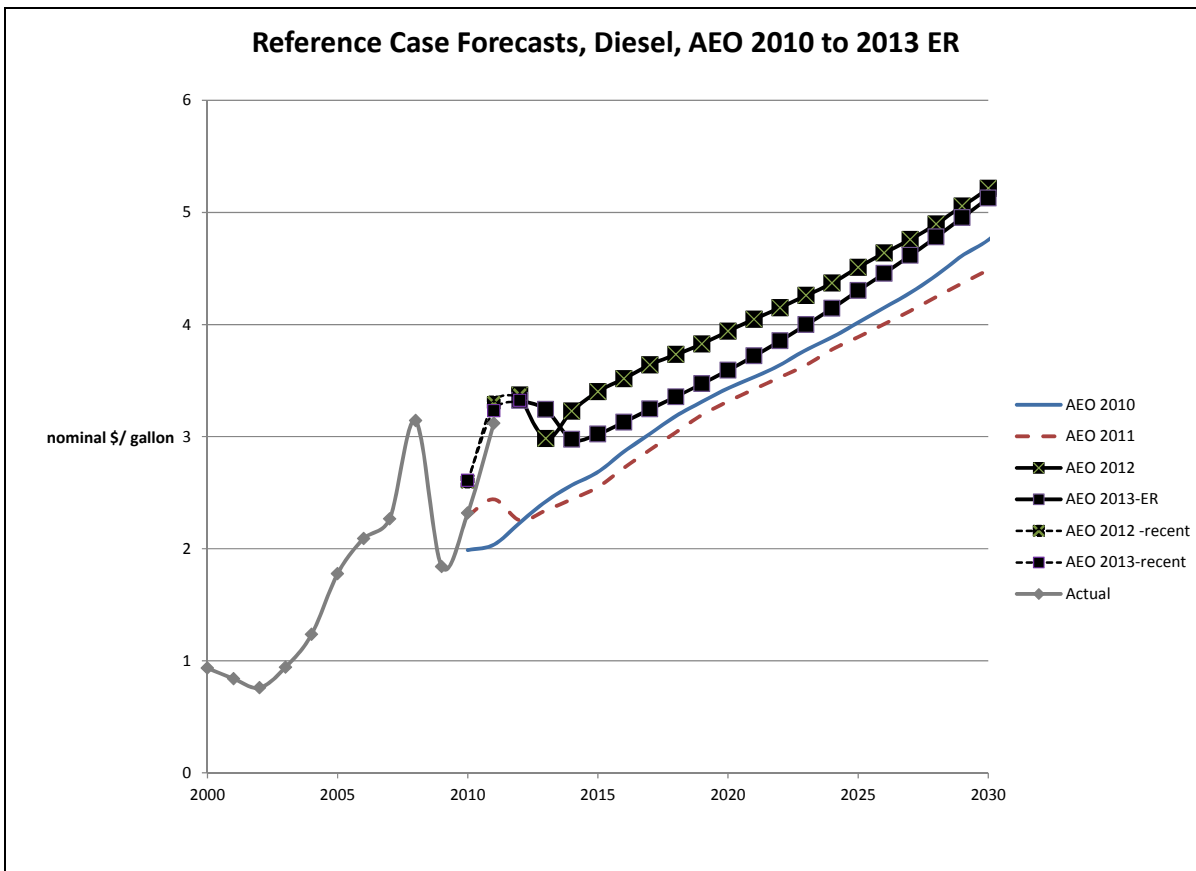
16   A.   The Companies’ Application assumes that the AKP biofuel would displace the  
17      diesel HELCO is currently consuming at KPP. The price comparisons in the  
18      Application are based on long-term forecasts of diesel prices prepared by the  
19      Energy Information Administration (“EIA”) as reported in its Annual Energy



1 Outlook (“AEO”) 2012 adjusted based on the historical correlation between  
2 AEO prices and the Companies’ delivered prices for diesel.<sup>6</sup>

3 As indicated in Figure 1, which is drawn from CA-201, the EIA is  
4 projecting the prices of diesel to increase through 2030. Moreover, the EIA’s  
5 most recent long-term forecasts of those prices, from AEO 2012 and  
6 AEO 2013-Early Release, are higher than the EIA’s forecasts from AEO 2010  
7 and AEO 2011.

8 **Figure 1**



9

<sup>6</sup> Delivered prices will be somewhat different for HECO and HELCO due to import logistics.

1 As even casual observers of fuel prices are aware, actual prices for diesel and  
2 other petroleum fuels are volatile. Figure 1 indicates the volatility in diesel  
3 prices during the past ten years. The AEO forecasts of smooth increases in  
4 diesel prices are forecasts of underlying long-term trends in those prices,  
5 those forecasts do not reflect the year to year volatility the Companies will  
6 actually experience under any of those AEO forecasts.

7

8 Q. PLEASE SUMMARIZE THE PRICING FORMULA FOR BIOFUEL UNDER  
9 THE PROPOSED CONTRACT.

10 A. The price that HELCO would pay for the biofuel is set by a formula equal to a  
11 fixed price plus an annual price escalator. The resulting price is not tied to  
12 fossil fuel prices.

13

14 Q. PLEASE SUMMARIZE THE COMPANIES' PROJECTION OF THE AKP  
15 BIOFUEL PRICE RELATIVE TO ITS FORECAST OF DIESEL PRICES.

16 A. The Companies provide a projection of AKP biofuel prices on page 18 of their  
17 Application. In that figure, the Companies also provide their forecast of diesel  
18 prices based upon the AEO 2012 Reference Case and the AEO 2012 High  
19 Case, respectively.

1 Q. PLEASE SUMMARIZE AND COMMENT ON THE COMPANIES'  
2 COMPARISON OF THE FORECAST PRICE OF AKP BIOFUEL TO THE  
3 PROJECTED PRICES FOR DIESEL.

4 A. The Companies prepared a comparison of projected biofuel prices and diesel  
5 prices over a 20 year contract period assuming purchases began in 2015,  
6 i.e. the years 2015 through 2034. That comparison included projections of  
7 diesel prices under the AEO 2012 Reference Case and under the AEO 2012  
8 High Case. The Companies' projection for that period is presented in CA-202.  
9 CA-202 plots the forecast of biofuel prices in solid lines, the forecast of diesel  
10 prices under the Reference Case in lines with square markers and its forecast  
11 of diesel prices under the High Case in lines with diamond markers. Finally,  
12 CA-202 also plots HELCO's December 2012 actual diesel price as a black  
13 diamond.

14 Under the Companies' comparison, the price of AKP biofuel would  
15 from the AEO 2012 Reference  
16 Cas that begins in 2015.

17 There are three points to note regarding the Companies' comparison.  
18 First, it is unlikely that HELCO would begin buying biofuel as early as 2015.  
19 Instead, 2017 appears to be a more realistic start date given the time that will  
20 be required after the Commission issues its Order to finalize all the necessary  
21 paperwork and construct the facility. A 2017 start date would reduce the

1 number of years the price of AKP biofuel would exceed the forecast diesel  
2 price as I discuss below.

3 Second, the Companies' projection of AKP biodiesel prices assumes  
4 there will be no federal incentives for biofuel production. That is a  
5 conservative assumption. If the AKP project was operational today the biofuel  
6 would be receiving a Federal Blender's Credit of \$1 per gallon,<sup>7</sup> which would  
7 flow through to HELCO<sup>8</sup>. Thus, for example, if the Federal Blender's Credit  
8 continued to be in effect over the term of the AKP Contract, the price of AKP  
9 biofuel would be less than the price of diesel for all 20 years of the contract.  
10 I present an estimate of that potential impact later in my testimony.

11

12 Q. WOULD THE AKP PRICE PREMIUM DECLINE MATERIALLY IF THE  
13 BIODIESEL WAS DISPLACING LOW SULFUR DIESEL?

14 A. No. There is a possibility that AKP biodiesel might displace low sulfur diesel at  
15 KPP. HELCO, in CA-IR-21, indicates that it faces no requirement to switch the  
16 KPP combined cycle units to low sulfur diesel to comply with environmental  
17 regulations. However, the HECO Fuels Master Plan released on  
18 January 31, 2013, indicated that the KPP "combustion turbine and non-RICE

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<sup>7</sup> The Biodiesel and Renewable Diesel Fuels Credit (IRS tax Form 8864) allows a \$1.00 tax credit per gallon of qualifying fuel sold or used.

<sup>8</sup> Biodiesel Supply Contract, sections 5.1 and 5.3.

1 units" may switch to low sulfur diesel in 2017. The Fuels Master Plan does not  
2 estimate the probability of such a switch.

3 To test for that possibility, I prepared a second comparison using the  
4 Companies' forecast of prices for low sulfur diesel, again derived from the  
5 AEO 2012 forecast. That comparison, presented in CA-203, indicates that  
6 forecasts of prices for low sulfur diesel under the Reference and High Cases  
7 are only slightly higher than the corresponding forecasts of prices for diesel.  
8 As a result, the price premium of AKP biofuels measured relative to low sulfur  
9 diesel would not be materially lower than the premium measured relative to  
10 diesel.

11  
12 Q. DID YOU COMPARE THE FORECAST PRICE OF AKP BIOFUEL TO THE  
13 PROJECTED PRICES FOR DIESEL OVER A DIFFERENT TIME FRAME?

14 A. Yes. I prepared a comparison of projected biofuel prices and diesel prices  
15 over an 18 year contract period assuming purchases began in 2017, i.e., the  
16 years 2017 through 2034. That analysis indicates that AKP biodiesel would be  
17 priced at a premium to diesel under the AEO 2012 Reference case forecast

18 On a net present value ("npv") basis, that premium would  
19 be If the Federal Blender's Credit were to continue to be in effect over  
20 just the first five years of the AKP Contract, the NPV premium would decline to  
21 just

1 **IV. ANALYSIS OF CORRESPONDING VALUES.**

2 Q. PLEASE SUMMARIZE YOUR EVALUATION OF THE VALUES OR  
3 BENEFITS OF THE PROPOSED BIOFUEL SUPPLY CONTRACT TO THE  
4 COMPANIES, THEIR CUSTOMERS AND HAWAII IN GENERAL.

5 A. The next step in my analysis was to assess several of the major values or  
6 benefits associated with the proposed AKP contract. Specifically, I evaluated  
7 its value as a hedge against higher than expected fossil fuel prices, its  
8 contribution to reducing HECO's air emissions and its contribution to meeting  
9 HECO's targets under the Renewable RPS statute.

10

11 **A. VALUE AS A HEDGE.**

12 Q. WHAT IS THE BASIC VALUE TO CUSTOMERS OF A UTILITY  
13 DIVERSIFYING ITS SUPPLY PORTFOLIO?

14 A. The basic value of diversifying a supply portfolio is to reduce the utility's  
15 exposure to future events or market trends that may have a low probability but  
16 a high cost to customers.

17

18 Q. DOES YOUR ANALYSIS INDICATE THAT THE AKP BIOFUELS WILL  
19 REDUCE THE COMPANIES' EXPOSURE TO INCREASES IN ELECTRICITY  
20 COSTS DUE TO HIGHER THAN EXPECTED FOSSIL FUEL PRICES?

21 A. Yes. My analysis indicates that the AKP biofuels will reduce the Companies'  
22 exposure to increases in electricity costs due to higher than expected fossil

1 fuel prices. Higher fossil fuel prices can be driven by various factors, such as  
2 crude oil supply disruptions, reduction in refinery capacities, shortages of  
3 diesel, significant changes in the market demand for a particular fuel, as well  
4 as other external factors, such as future regulation of carbon emissions. I will  
5 show this value as a hedge both in terms of HELCO fuel expenditures as well  
6 as the resulting cost of electricity.

7

8 Q. PLEASE SUMMARIZE THE VALUE OF AKP BIOFUELS AS A HEDGE  
9 AGAINST INCREASES IN ELECTRICITY COSTS DUE TO HIGHER THAN  
10 EXPECTED FOSSIL FUEL PRICES.

11 A. Because the price for the AKP biofuels will not be tied to petroleum prices,  
12 those fuels will provide the Companies a hedge against higher than expected  
13 fossil fuel prices, and, hence, against increases in electricity costs as a result  
14 of those higher than expected fossil fuel prices. This hedge value is illustrated  
15 in CA-202, CA-203, and CA-204. In all of those Exhibits, the price of AKP  
16 biofuels is well below the price of diesel under the High case forecasts. For  
17 example, my analysis indicates that biofuel prices would be materially less on  
18 average than the High Case forecasts for diesel over the period 2017 to 2034.  
19 On a NPV basis, the difference between biofuel and diesel prices indicates  
20 that the biofuels prices would be as shown on page 2 CA-205.

1 Q. PLEASE SUMMARIZE THE VALUE OF AKP BIOFUELS AS A HEDGE  
2 AGAINST INCREASES IN ELECTRICITY COSTS DUE TO FUTURE  
3 REGULATION OF CARBON EMISSIONS.

4 A. The AKP biofuels will also be a hedge against the impact of any future  
5 regulation of carbon emissions on electricity costs in Hawaii.

6 While Congress has not yet passed legislation governing greenhouse  
7 gas (“GHG”) emissions from power plants, it is prudent to forecast CO<sub>2</sub> prices  
8 in long term planning. For example, a 2012 report by Synapse<sup>9</sup> indicates that  
9 more than 25 utilities include an estimate of future carbon prices in their  
10 long-term planning. Mr. Luckow provides that report as CA-301. The  
11 low-case forecast in the Synapse 2012 report assumes a policy is enacted  
12 by 2017 and goes into effect in 2020 at an initial price of \$15/short ton of CO<sub>2</sub>  
13 (in 2012 dollars). If one takes those carbon costs into account, the AKP biofuel  
14 premium drops to CONF<sup>0</sup> over the 2017 to  
15 2034 period, as compared to noted above. This  
16 analysis, presented in CA-204, pages 3 and 4, assumes that under a future  
17 carbon regulatory regime the net carbon emissions associated with burning  
18 biofuels would be approximately one-third those associated with burning  
19 diesel. Mr. Luckow provides the basis for this assumption in his testimony.

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<sup>9</sup> Wilson R., P. Luckow, B. Biewald, F. Ackerman, and E.D. Hausman. 2012 Carbon Dioxide Price Forecast. Prepared by Synapse Energy Economics, October 4, 2012.

<sup>10</sup> This analysis does not reflect the inclusion of any tax credits. The inclusion of any expected tax credit would decrease the relative price of biodiesel.





1           **B.     REDUCTION IN AIR EMISSIONS.**

2    Q.    IS IT REASONABLE TO EXPECT THAT THE AKP BIOFUELS WILL  
3           REDUCE HELCO'S EMISSIONS OF AIR POLLUTANTS?

4    A.    Yes. Although HELCO has not conducted tests at KPP, it expects to see the  
5           same positive results that HECO saw from its biofuel tests results at Kahe 3.  
6           Those results which HECO filed in Docket No. 2009-0155, included SO<sub>2</sub>  
7           emissions reductions of 94%, and small reductions in NO<sub>x</sub> emissions. Using  
8           AKP biofuel would enable HELCO to reduce SO<sub>2</sub> substantially at KPP.  
9           However, as discussed below, AKP biofuel may not enable HELCO to reduce  
10          CO<sub>2</sub> emissions as dramatically.

11

12           **C.     RPS REQUIREMENTS.**

13    Q.    WILL THE AKP BIOFUELS HELP HECO MEET ITS RPS REQUIREMENTS?

14    A.    Yes. According to page 23 of the application, AKP biodiesel would increase  
15          the consolidated renewable generation of the Companies by 2% in 2015.  
16          HECO plans to rely on this contribution to comply with the RPS requirements  
17          projected for 2020 and beyond. As indicated in CA-206, based on  
18          HECO's 2011 analysis of RPS compliance, biofuels will be an important part of  
19          compliance in 2020 and 2030.

1 Q. WAS THE PROCESS FOR ACQUIRING THESE BIOFUELS COMPETITIVE?

2 A. Yes. AKP responded to an RFP issued on March 31, 2010. Since that time,  
3 there have been two additional RFPs, in January and April 2011. Per COH-  
4 SIR-25, no additional proposals for locally grown biofuels were received in  
5 response to these RFPs. In LOL-IR-7, the Companies discuss the responses  
6 to the 2010 RFP and note that

7

8

9

10 **Q. WILL THE AKP BIOFUELS HELP HECO MEET ITS RPS REQUIREMENTS**  
11 **IN A COST EFFECTIVE MANNER OVER TIME?**

12 A. Yes. The cost of electricity generated from AKP biodiesel at KPP will currently  
13 be more expensive than the cost of renewable energy from other resources  
14 under recently approved PPAs. However, that is not necessarily the relevant  
15 comparison. First, biofuels have several advantages over other renewable  
16 resources, in particular the ease with which they can be transported using  
17 existing infrastructure. Second, generation from biofuels may be less  
18 expensive than certain of the future renewable resources that will be  
19 developed to meet the 2030 RPS requirements. For instance, my  
20 understanding is that Hawaii has gone through a reliability standards working  
21 docket (Docket No. 2011-0206) and consideration has been given to requiring

1 all new generation, even from as-available sources, to have characteristics  
2 similar to firm generation sources. The additional costs associated with  
3 ensuring that as-available generation has firm generating characteristics have  
4 yet to be quantified, but may be more expensive than generally assumed and  
5 may result in other renewable alternatives, such as biofuel, which is essentially  
6 a drop-in substitute for liquid fossil fuel, viewed as being cost-effective.

7  
8 **D. FLEXIBILITY TO ACQUIRE FUTURE RESOURCES.**

9 Q. WILL THE AKP CONTRACT PREVENT THE COMPANIES FROM  
10 PURCHASING OTHER NEW COST-EFFECTIVE RESOURCES IN THE  
11 FUTURE?

12 A. No. If the Companies enter the contract with AKP, they will continue to have  
13 the flexibility to acquire additional resources that prove to be cost-effective in  
14 the future. HELCO has continued contracting for new renewable energy  
15 resources, with the release of a 50 megawatt ("MW") RFP for  
16 geothermal-derived electricity on February 28, 2013. Based on this RFP,  
17 HELCO foresees de-committing or retiring existing resources based on  
18 environmental regulations as well as plants reaching the end of their useful  
19 lives, which will allow HELCO to utilize both new biofuel- and  
20 geothermal-derived resources.

21 If, at some future point in time, HELCO finds new cost-effective  
22 renewable resources on the Big Island sufficient to displace some, or all, of its

1 requirement for the AKP biodiesel, HECO has ample ability to consume those  
2 displaced volumes of biodiesel in its operations on Oahu. Per the  
3 January 31, 2013 Fuels Master Plan, HELCO's total liquid fuel demand is  
4 approximately 285 million gallons per year<sup>11</sup>. While the most of this is  
5 currently low sulfur fuel oil, HECO, in the same document, made clear its  
6 intention to switch all of its units (with the exception of CIP-CT1, steam units,  
7 and Waiiau combustion turbines) to low sulfur diesel to comply with SO<sub>2</sub>  
8 emissions requirements under National Ambient Air Quality Standards  
9 ('NAAQS'). This would allow AKP biodiesel to be used as a "drop-in"  
10 replacement at these plants.

11  
12 Q. PLEASE COMMENT ON THE COMPANY'S ESTIMATE OF THE RATE  
13 IMPACT OF THIS CONTRACT.

14 A. Under the Companies' proposed ratemaking treatment for the AKP biofuel  
15 costs, they would allocate any premiums over HELCO diesel prices at KPP  
16 between themselves according to their respective annual sales. However, the  
17 Companies propose allocating any savings relative to diesel prices entirely to  
18 HELCO. The Companies' application presents an illustration of the impact  
19 that AKP biofuel costs would have on residential customers under that  
20 proposal, assuming the contract is in effect in 2015 and the biofuel displaces

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<sup>11</sup> 2009-0346 Fuels Master Plan, Page 13

1 diesel at KPP. The Companies' analyses indicate that, under their Reference  
2 case forecast of diesel prices, the impacts on HELCO and HECO residential  
3 customers are additional costs of \$0.84 per month and \$1.00 per month  
4 respectively. Under their High case forecast of diesel prices, the impacts on  
5 HELCO and HECO residential customers are savings of per month and  
6 per month, respectively. I have summarized the Companies results on  
7 page 1 of CA-207 and replicated their calculations on pages 2 - 3 of that  
8 Exhibit.

9 Mr. Ono, in his Direct Testimony, recommends a different allocation.  
10 Specifically, he recommends that any premiums be allocated entirely to  
11 HECO, and that any savings relative to diesel prices be allocated between  
12 HECO and HELCO according to their respective annual sales. I have  
13 prepared an analysis to illustrate Mr. Ono's proposal using the same  
14 assumptions as the Companies except for the change in allocation of the  
15 premium. The results of my analysis, summarized on page 1 of CA-207,  
16 indicates that under the Companies' Reference case forecast of diesel prices,  
17 there would be no impact on HELCO residential customers and the impact on  
18 HECO residential customers would be an additional cost of \$1.16 per month.  
19 However, under a future with High case diesel price forecasts, the impacts on  
20 HELCO and HECO residential customers are savings of \$1.10 per month and  
21 \$1.32 per month, respectively.

1 Q. PLEASE SUMMARIZE YOUR CONCLUSION REGARDING THE COST OF  
2 BIOFUEL UNDER THE PROPOSED BIOFUEL SUPPLY CONTRACT.

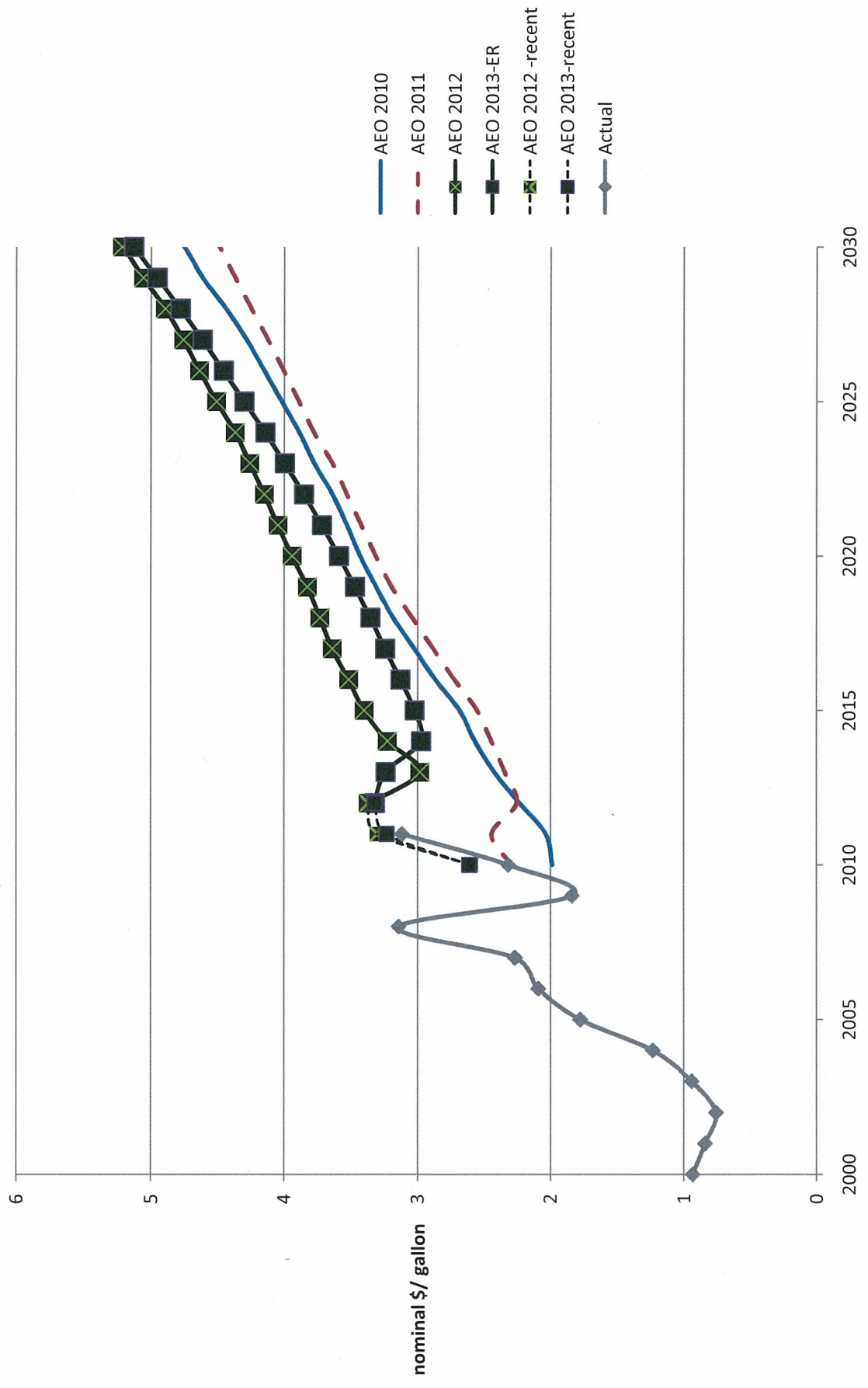
3 A. My conclusion is that the cost of biofuel under the proposed Biofuel Supply  
4 Contract is reasonable. This conclusion is based on the results of my analysis  
5 of the price premiums and values associated with the contract.

6

7 Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

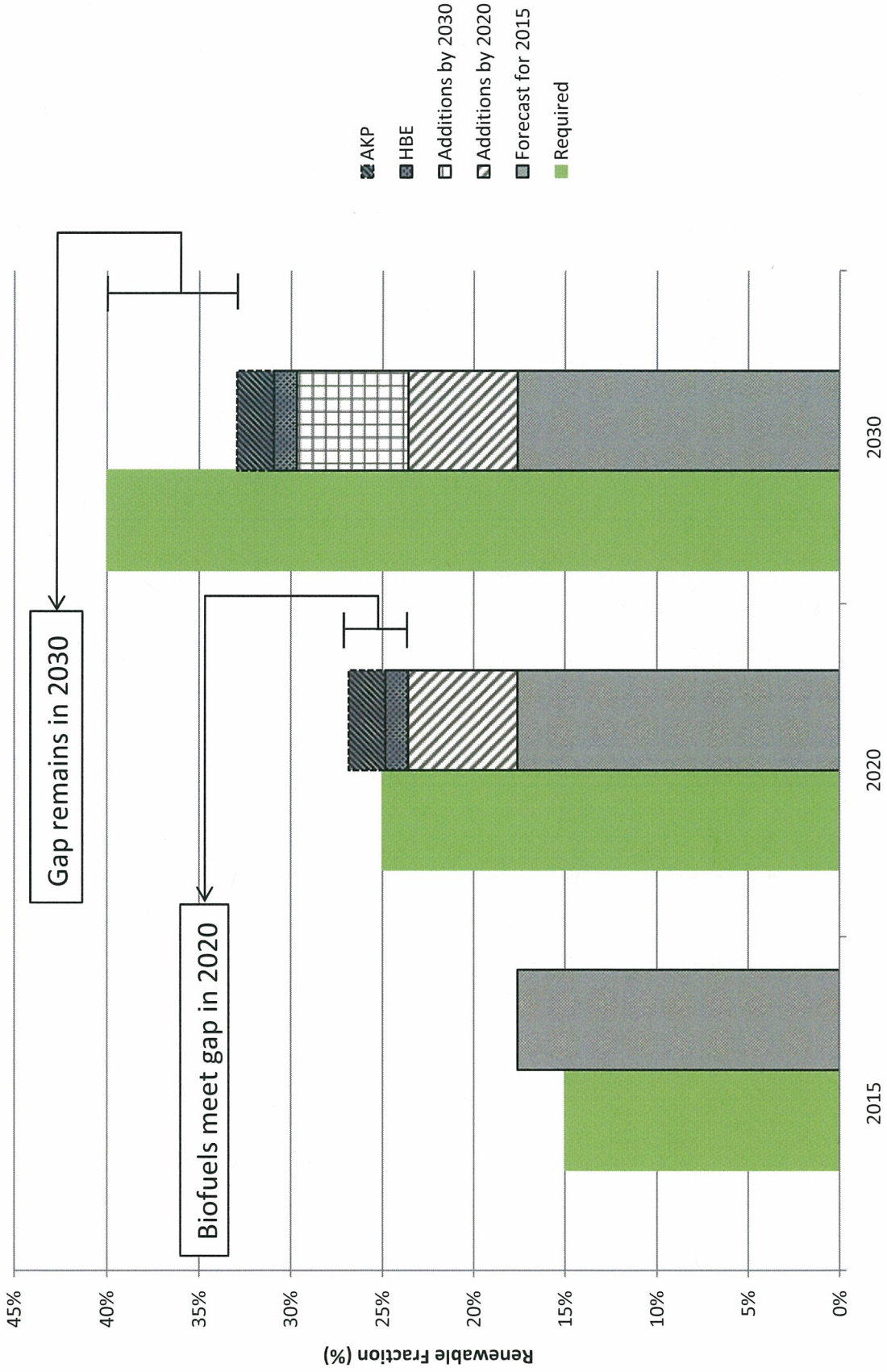
8 A. Yes.

# Reference Case Forecasts, Diesel, AEO 2010 to 2013 Early Release





# HECO RPS Compliance per 2011 Scenario Analysis of the RPS Strategy





**Illustrative Impacts of AKP Biofuels on Residential Monthly Bills in 2015 Under Alternative Allocations and Diesel Price Forecasts**

**2015 Estimated Incremental Cost**  
Provided in Response to CA-IR-3

	<b>HECO</b> <b>(cents/kWh)</b>	<b>Maui</b> <b>(cents/kWh)</b>	<b>Lanai</b> <b>(cents/kWh)</b>	<b>Molokai</b> <b>(cents/kWh)</b>	<b>HELCO</b> <b>(cents/kWh)</b>
Bill impact (cents/kWh)	0.17	-	-	-	0.17

For \$/month residential bill impact, multiply by applicable typical kWh per month, and convert cents to dollars

Typical Sch R (kWh per mo.)	600	600	400	400	500
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	<b>HECO R</b> <b>(\$/mo.)</b>	<b>Maui R</b> <b>(\$/mo.)</b>	<b>Lanai R</b> <b>(\$/mo.)</b>	<b>Molokai R</b> <b>(\$/mo.)</b>	<b>HELCO R</b> <b>(\$/mo.)</b>
Bill impact (typical res \$/mo. )	\$1.00	\$0.00	\$0.00	\$0.00	\$0.84

### Illustrative Impacts of AKP Biofuels on Residential Monthly Bills in 2015 Under Alternative Allocations and Diesel Price Forecasts

**2015 Estimated Incremental Cost**  
Revised to allocate all costs to HECO

	HECO (cents/kWh)	Maui (cents/kWh)	Lanai (cents/kWh)	Molokai (cents/kWh)	HELCO (cents/kWh)
Bill impact (cents/kWh)	-	-	-	-	(1.69)

For \$/month residential bill impact, multiply by applicable typical kWh per month, and convert cents to dollars

Typical Sch R (kWh per mo.)	600	600	400	400	500
Bill impact (typical res \$/mo. )	<b>HECO R</b> (\$/mo.) \$0.00	<b>Maui R</b> (\$/mo.) \$0.00	<b>Lanai R</b> (\$/mo.) \$0.00	<b>Molokai R</b> (\$/mo.) \$0.00	<b>HELCO R</b> (\$/mo.) <b>(\$8.44)</b>

**Illustrative Impacts of AKP Biofuels on Residential Monthly Bills in 2015 Under Alternative Allocations and Diesel Price Forecasts**

**2015 Estimated Incremental Cost**  
Revised to allocate all costs to HECO

	<b>HECO</b> <b>(cents/kWh)</b>	<b>Maui</b> <b>(cents/kWh)</b>	<b>Lanai</b> <b>(cents/kWh)</b>	<b>Molokai</b> <b>(cents/kWh)</b>	<b>HELCO</b> <b>(cents/kWh)</b>
Bill impact (cents/kWh)	0.19	-	-	-	-

For \$/month residential bill impact, multiply by applicable typical kWh per month, and convert cents to dollars

Typical Sch R (kWh per mo.)	600	600	400	400	500
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	<b>HECO R</b> <b>(\$/mo.)</b>	<b>Maui R</b> <b>(\$/mo.)</b>	<b>Lanai R</b> <b>(\$/mo.)</b>	<b>Molokai R</b> <b>(\$/mo.)</b>	<b>HELCO R</b> <b>(\$/mo.)</b>
Bill impact (typical res \$/mo. )	\$1.16	\$0.00	\$0.00	\$0.00	\$0.00

### Illustrative Impacts of AKP Biofuels on Residential Monthly Bills in 2015 Under Alternative Allocations and Diesel Price Forecasts

**2015 Estimated Incremental Cost**

Revised to allocate benefits based on sales

	<b>HECO</b> <b>(cents/kWh)</b>	<b>Maui</b> <b>(cents/kWh)</b>	<b>Lanai</b> <b>(cents/kWh)</b>	<b>Molokai</b> <b>(cents/kWh)</b>	<b>HELCO</b> <b>(cents/kWh)</b>
Bill impact (cents/kWh)	(0.22)	-	-	-	(0.22)

For \$/month residential bill impact, multiply by applicable typical kWh per month, and convert cents to dollars

Typical Sch R (kWh per mo.)	600	600	400	400	500
Bill impact (typical res \$/mo. )	<b>HECO R</b> <b>(\$/mo.)</b> (\$1.32)	<b>Maui R</b> <b>(\$/mo.)</b> \$0.00	<b>Lanai R</b> <b>(\$/mo.)</b> \$0.00	<b>Molokai R</b> <b>(\$/mo.)</b> \$0.00	<b>HELCO R</b> <b>(\$/mo.)</b> (\$1.10)