



January 31, 2017

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PUBLIC UTILITIES  
COMMISSION

The Honorable Chair and Members  
Of the Hawai'i Public Utilities Commission  
465 South King Street  
Kekuanaoa Building, 1st Floor  
Honolulu, Hawai'i 96813

Dear Commissioners:

Subject: Hawaiian Electric Company, Inc.,  
Hawai'i Electric Light Company, Inc.  
Maui Electric Company, Limited  
2016 Net Energy Metering Status Report

Hawaiian Electric Company, Inc., Hawai'i Electric Light Company, Inc., and Maui Electric Company, Limited respectfully submit their 2016 Net Energy Metering Status Report, which provides the total number of installations and the total rated generating capacity of net metered customer facilities in each of their service territories.

If you have any questions on this matter, please call Marisa Chun at 543-4723.

Sincerely,

for Daniel G. Brown  
Manager  
Regulatory Non-Rate Proceedings

Attachment

c: Division of Consumer Advocacy

## Net Energy Metering Status Report

Hawaiian Electric Company, Inc.  
Hawai'i Electric Light Company, Inc.  
Maui Electric Company, Limited

December 31, 2016

### Status

The following table provides the status of NEM in the Hawaiian Electric, Hawai'i Electric Light, and Maui Electric service territories as of December 31, 2016. In addition, a report on the estimates of the rate and revenue impact of NEM participation is shown in Appendix A.

NEM Status as of 12/31/16

|                                | Information packets sent | No. of Installations <sup>1</sup> | Installed kW <sup>2</sup> | NEM System Cap, <sup>3</sup> kW |
|--------------------------------|--------------------------|-----------------------------------|---------------------------|---------------------------------|
| <b>Hawaiian Electric</b>       |                          |                                   |                           |                                 |
| 2001                           | 151                      | 1                                 | 3.60                      | 5,955                           |
| 2002                           | 12                       | 1                                 | 2.06                      | 6,020                           |
| 2003                           | 49                       | 8                                 | 11.74                     | 6,210                           |
| 2004                           | 15                       | 3                                 | 7.90                      | 6,405                           |
| 2005                           | 5                        | 0                                 | 0                         | 6,150                           |
| 2006                           | 23                       | 10                                | 74.28                     | 6,330                           |
| 2007                           | 67                       | 73                                | 400.29                    | 6,080                           |
| 2008                           | 132                      | 220                               | 2,361                     | 11,860                          |
| 2009                           | 111                      | 513                               | 2,460                     | 12,130                          |
| 2010                           | *                        | 1,327                             | 7,267                     | 11,620                          |
| 2011                           | *                        | 3,424                             | 18,518                    | N/A                             |
| 2012                           | *                        | 8,623                             | 52,504                    | N/A                             |
| 2013                           | *                        | 14,010                            | 83,659                    | N/A                             |
| 2014                           | *                        | 6,830**                           | 46,242**                  | N/A                             |
| 2015                           | *                        | 6,193**                           | 44,769**                  | N/A                             |
| 2016                           | *                        | 4,720                             | 40,882                    | N/A                             |
| <b>Total Hawaiian Electric</b> | <b>565</b>               | <b>45,956</b>                     | <b>299,162</b>            | <b>N/A</b>                      |

<sup>1</sup> Completed systems (i.e., NEM Agreements completed).

<sup>2</sup> Installed kW reflects rated generating capacity installed in the year noted. Includes system expansions.

<sup>3</sup> In 2011 the (3) companies NEM cap is based on individual circuit capacity and not total system capacity, therefore this metric is no longer applicable (N/A) from 2011 on. Prior system caps as follows: Hawaiian Electric - 0.5% of system peak in 2001-2007, 1.0% of system peak in 2008-2010. Hawai'i Electric Light, Maui Electric - 0.5% of system peak in 2001-2007, 3% of system peak in 2008-2009, and 4% system peak 2010. System Peak is defined as Net System Peak for Hawaiian Electric, Hawai'i Electric Light, and Maui Electric-Maui only and Gross System Peak for Maui Electric-Molokai and Maui Electric-Lanai.

## Net Energy Metering Status Report

Hawaiian Electric Company, Inc.  
Hawai'i Electric Light Company, Inc.  
Maui Electric Company, Limited

December 31, 2016

NEM Status as of 12/31/16 (cont.)

|                                     | Information packets sent | No. of Installations <sup>1</sup> | Installed kW <sup>2</sup> | NEM System Cap. <sup>3</sup> kW |
|-------------------------------------|--------------------------|-----------------------------------|---------------------------|---------------------------------|
| <b>Hawai'i Electric Light</b>       |                          |                                   |                           |                                 |
| 2001                                | 122                      | 2                                 | 10.20                     | 871                             |
| 2002                                | 25                       | 3                                 | 4.73                      | 890                             |
| 2003                                | 13                       | 6                                 | 28.00                     | 934                             |
| 2004                                | 12                       | 4                                 | 8.84                      | 972                             |
| 2005                                | 17                       | 10                                | 58.27                     | 985                             |
| 2006                                | 12                       | 34                                | 299.57                    | 1,007                           |
| 2007                                | 24                       | 35                                | 263.15                    | 1,017                           |
| 2008                                | 23                       | 116                               | 783.80                    | 5,946                           |
| 2009                                | 30                       | 265                               | 2,063.58                  | 5,838                           |
| 2010                                | *                        | 371                               | 2,287.85                  | 7,624                           |
| 2011                                | *                        | 804                               | 4,522.31                  | N/A                             |
| 2012                                | *                        | 1,734                             | 9,943                     | N/A                             |
| 2013                                | *                        | 1,952                             | 12,442                    | N/A                             |
| 2014                                | *                        | 2,080                             | 13,046                    | N/A                             |
| 2015                                | *                        | 2,210                             | 14,224.4                  | N/A                             |
| 2016                                | *                        | 1,298                             | 9,621                     | N/A                             |
| <b>Total Hawai'i Electric Light</b> | <b>278</b>               | <b>10,924</b>                     | <b>69,607</b>             | <b>N/A</b>                      |

## Net Energy Metering Status Report

Hawaiian Electric Company, Inc.  
Hawai'i Electric Light Company, Inc.  
Maui Electric Company, Limited

December 31, 2016

NEM Status as of 12/31/16 (cont.)

|                      | Information packets sent | No. of Installations <sup>1</sup> | Installed kW <sup>2</sup> | NEM System Cap, <sup>3</sup> kW |
|----------------------|--------------------------|-----------------------------------|---------------------------|---------------------------------|
| <b>Maui Electric</b> |                          |                                   |                           |                                 |
| 2001                 | 49                       | 2                                 | 8.20                      | 993                             |
| 2002                 | 19                       | 5                                 | 8.80                      | 1,006                           |
| 2003                 | 24                       | 3                                 | 13.00                     | 1,047                           |
| 2004                 | 29                       | 8                                 | 21.60                     | 1,091                           |
| 2005                 | 22                       | 16                                | 92.15                     | 1,068                           |
| 2006                 | 49                       | 50                                | 233.47                    | 1,091                           |
| 2007                 | 13                       | 64                                | 359.81                    | 1,081                           |
| 2008                 | 15                       | 135                               | 947                       | 6,171                           |
| 2009                 | 0                        | 298                               | 2,336                     | 6,317                           |
| 2010                 | *                        | 342                               | 1919                      | 8,397                           |
| 2011                 | *                        | 1,039                             | 6,624.22                  | N/A                             |
| 2012                 | *                        | 1,677                             | 10,981                    | N/A                             |
| 2013                 | *                        | 1,566                             | 11,202                    | N/A                             |
| 2014                 | *                        | 1,901**                           | 12,832**                  | N/A                             |
| 2015                 | *                        | 2,207**                           | 17,025**                  | N/A                             |
| 2016                 | *                        | 1,801                             | 15,444                    | N/A                             |
| Total Maui Electric  | 220                      | 11,114                            | 80,047                    | N/A                             |
| <b>TOTAL</b>         | *                        | <b>67,994</b>                     | <b>448,816</b>            |                                 |

\* NEM information and forms are made available on the web and therefore, not tracked for the respective Companies.

\*\* The Number of Installations and the Installed kW are annually adjusted to reflect updates such as modifications to system capacity ratings, agreement execution dates, number of installations, additions to existing systems, changes in rate schedules, and subsequent accounting reconciliations. All accounting reconciliations are tried up in the preceding year totals only to reflect accurate annual and cumulative numbers in the filing year.

## APPENDIX A

Per the Commission's request, the attached pages are included to provide illustrative estimates of lost contributions to fixed cost in 2017 and the associated estimated value per kWh, based on estimated annualized kWh production of NEM installations in place as of year-end 2016. The value shown in these illustrations represents the estimated amount from all installations since the inception of the NEM program. For the calculation of lost contribution to fixed costs, the Base Energy Rates and Production Energy Rates for Hawaiian Electric, Hawai'i Electric Light, Maui, Lana'i, and Moloka'i are unchanged from last year's report. For all Companies, the effective Purchased Power Adjustment Clause rates reflect the January 2017 values. The calculation for lost contribution to fixed cost includes the impact of surcharges for the residential and commercial demand-side management programs, for the renewable energy infrastructure programs, and for the recovery of the Rate Adjustment Mechanism Provision portion of the Revenue Balancing Account Rate Adjustment. Lost contributions to fixed cost related to the Purchased Power Adjustment Clause, to the demand-side management surcharges, to the renewable infrastructure surcharge, and to the Rate Adjustment Mechanism Provision portion of the Revenue Balancing Account Rate Adjustment are reflected in subsequent reconciliations of these surcharges and are eventually borne by customers who incur per kWh charges. Some of the lost contribution amount related to base energy rates may already be reflected in rates through past utility rate cases or through current decoupling rate adjustments. Any remaining lost contributions to fixed cost for base energy rates have no bill impact unless and until the utilities propose and receive Commission approval to adjust rates. At that point, any rate adjustment would apply to all customers, including customers with NEM installations.

**Hawaiian Electric Company**

Estimated Lost Contribution to Fixed Costs and Surcharges, based on NEM installations as of December 31, 2016

| Rate  | Total Lost kWh/yr <sup>1</sup> | Base Energy Rate <sup>2</sup> , cents/kWh | Eff. PPAC <sup>3</sup> , cents/kWh | REIP & DSM <sup>4</sup> , cents/kWh | RAM <sup>4</sup> , cents/kWh | Eff. Base Energy Rate cents/kWh | Production Energy Rate <sup>5</sup> , cents/kWh | Lost Contribution to Fixed Cost, cents/kWh | Total Lost Contribution to Fixed Cost, \$/Yr |
|-------|--------------------------------|---|------------------------------------|-------------------------------------|------------------------------|---------------------------------|---|--|--|
|       | A                              | B   | C                                  | D                                   | E                            | F = sum(B;E)                    | G   | H = F - G                                  | J = A * H / 100                              |
| R     | 401,125,469                    | 22.4707                                   | 2.2812                             | 0.0811                              | 1.3495                       | 26.1825                         | 15.3950   | 10.7875                                    | \$43,271,410                                 |
| G     | 12,589,939                     | 21.3317                                   | 2.3118                             | 0.0746                              | 1.3495                       | 25.0676                         | 15.4450   | 9.6226                                     | \$1,211,479                                  |
| J     | 70,555,626                     | 16.9734                                   | 1.9682                             | 0.0746                              | 1.3495                       | 20.3657                         | 15.4560   | 4.9097                                     | \$3,464,070                                  |
| P     | 925,814                        | 14.9013                                   | 1.6155                             | 0.0746                              | 1.3495                       | 17.9409                         | 15.3860   | 2.5549                                     | \$23,654                                     |
| Total | 485,196,848                    |   |                                    |                                     |                              |                                 |   |  | \$47,970,613                                 |

| Rate          | Total Lost Contribution to Fixed Cost, \$/Yr | Forecast 2017 Sales <sup>6</sup> , kWh/Yr | Estimated Impact on Rates, ¢/kWh |
|---------------|--|---|----------------------------------|
|               | K = J  | L   | M = (K / L) * 100                |
| R             | \$43,271,410                                 |   |                                  |
| G             | \$1,211,479                                  |   |                                  |
| J             | \$3,464,070                                  |   |                                  |
| P             | \$23,654                                     |   |                                  |
| Total         | \$47,970,613                                 |   |                                  |
| Total Company |  | 6,506,700,000                             | 0.74                             |

Notes:

- 1 See Appendix A, page 3, column H
- 2 Source: Base Energy Rates from Docket 2010-0080 (HECO 2011 Test Year) sched R: Docket 2010-0080 (HECO 2011 Test Year); Final revised tariffs, Exhibit B, Attachment 1, page 5, filed 07/24/2012 . sched G: Docket 2010-0080 (HECO 2011 Test Year); Final revised tariffs, Exhibit B, Attachment 1, page 13, filed 07/24/2012. sched J: Docket 2010-0080 (HECO 2011 Test Year); Final revised tariffs, Exhibit B, Attachment 1, page 24, filed 07/24/2012. sched P: Docket 2010-0080 (HECO 2011 Test Year); Final revised tariffs, Exhibit B, Attachment 1, page126, filed 07/24/2012.
- 3 PPAC Rates Effective January 2017
- 4 REIP and DSM rate from effective rate summaries for January 2017, RAM based on PUC Order No. 33724, Transmittal 16-01 filed on March 31, 2016, Decoupling Calculation workbook, Schedule A, page 1
- 5 Source: Cost-of-service calculation, from Docket 2010-0080 (HECO 2011 Test Year); Final revised tariffs, exhibit C, page 80, filed 07/24/2012.
- 6 Sales from 2017 Revenue Budget forecast

**Hawaiian Electric Company**  
 Estimated kW and kWh by technology and rate schedule

| Rate         | NEM kW Installed by Technology                                       |  |   |                | NEM kWh Installed by Technology  |   |  |                    |
|--------------|--|--|---|----------------|--|---|--|--------------------|
|              | PV kW NEM installed<br>(Cumulative Dec 31,<br>2016) NEM <sup>A</sup> | Wind kW NEM installed<br>(Cumulative Dec 31,<br>2016) NEM <sup>E</sup> | Hydro kW NEM<br>installed (Cumulative<br>Dec 31, 2016) NEM <sup>F</sup> | Total kW       | PV kWh generated in<br>one year from NEM<br>installed (Cumulative<br>Dec 31, 2016)<br>NEM <sup>A,B,D</sup> | Wind kWh generated<br>in one year from NEM<br>installed (Cumulative<br>Dec 31, 2016) NEM <sup>E</sup> | Hydro kWh generated<br>in one year from NEM<br>installed (Cumulative<br>Dec 31, 2016) NEM <sup>F</sup> | Total kWh          |
|              | A  | B  | C   | D= sum(A:C)    | E  | F   | G  | H= sum(E:G)        |
| R            | 246,791  | 1  | 0   | 246,792        | 401,122,928  | 2,540   | 0  | 401,125,469        |
| G            | 7,970  | 4  | 0   | 7,974          | 12,579,777   | 10,162  | 0  | 12,589,939         |
| J            | 43,823   | 20   | 0   | 43,843         | 70,504,818   | 50,808  | 0  | 70,555,626         |
| P            | 553  | 0  | 0   | 553            | 925,814  | 0   | 0  | 925,814            |
| <b>Total</b> | <b>299,137</b>   | <b>25</b>  | <b>0</b>  | <b>299,162</b> | <b>485,133,338</b>   | <b>63,510</b>   | <b>0</b>   | <b>485,196,848</b> |

Source: Grid Technologies Department.

<sup>A</sup> NEM PV/wind/hydro kW data from respective 2016 utility detailed year end spreadsheets.

<sup>B</sup> Adjustment made to account for PV conversion from PTC (PVUSA Test Conditions) to STC (Standard Test Conditions) by dividing by a factor of 0.89. PTC to STC conversion factor of 0.89 is an average calculated from GoSolarCalifornia.org web site.

(For HECO prior to 2015, PV NEM capacity (kW) is PTC or inverter rating whichever is lower. For 2015 and beyond PV kW is STC or inverter rating whichever is lower), Multiply by hours in year-8760.

<sup>D</sup> PV capacity factor of 17% ( Based on PV benchmarking developed by E3 for FIT pricing (Docket No 2008-0273, page 20).

<sup>E</sup> Wind capacity factor 29% . Wind kWh generated for the 2016 report is based on 8760 hours. Wind generated for the 2015 report was based on projected kWh generation for 2016, a leap year, based on 8784 hours.

Hawai'i Electric Light

Estimated Lost Contribution to Fixed Costs and Surcharges based on NEM installations as of December 31, 2016

| Rate  | Total Lost kWh/yr <sup>1</sup> | Base Energy Rate <sup>2</sup> , cents/kWh | Eff. PPAC <sup>3</sup> , cents/kWh | REIP & DSM <sup>4</sup> , cents/kWh | RAM <sup>4</sup> , cents/kWh | Eff. Base Energy Rate, cents/kWh | Production Energy Rate <sup>5</sup> , cents/kWh | Lost Contribution to Fixed Cost, cents/kWh | Total Lost Contribution to Fixed Cost, \$/Yr |
|-------|--------------------------------|---|------------------------------------|-------------------------------------|------------------------------|----------------------------------|---|--|--|
|       | A                              | B   | C                                  | D                                   | E                            | F = sum(B:E)                     | G   | H = F - G                                  | J = A * H / 100                              |
| R     | 78,533,488                     | 29.2689                                   | 2.3400                             | 0.0000                              | 0.8498                       | 32.4587                          | 19.0760   | 13.3827                                    | \$10,509,901                                 |
| G     | 6,687,524                      | 31.5858                                   | 2.2179                             | 0.0000                              | 0.8498                       | 34.6535                          | 19.1990   | 15.4545                                    | \$1,033,523                                  |
| J     | 18,540,518                     | 24.8033                                   | 1.9097                             | 0.0000                              | 0.8498                       | 27.5628                          | 19.1130   | 8.4498                                     | \$1,566,637                                  |
| P     | 381,947                        | 21.8184                                   | 1.4659                             | 0.0000                              | 0.8498                       | 24.1341                          | 18.7610   | 5.3731                                     | \$20,522                                     |
| Total | 104,143,475                    |   |                                    |                                     |                              |                                  |   |  | \$13,130,583                                 |

| Rate          | Total Lost Contribution to Fixed Cost, \$/Yr | Forecast 2017 Sales <sup>6</sup> , kWh/Yr | Estimated Impact on Rates, ¢/kWh |
|---------------|--|---|----------------------------------|
|               | K = J  | L   | M = (K / L) * 100                |
| R             | \$10,509,901                                 |   |                                  |
| G             | \$1,033,523                                  |   |                                  |
| J             | \$1,566,637                                  |   |                                  |
| P             | \$20,522                                     |   |                                  |
| Total         | \$13,130,583                                 |   |                                  |
| Total Company |  | 995,993,292                               | 1.32                             |

Notes:

- 1 See Appendix A, page 5, column H
- 2 Source: Base Energy Rates, from Docket 2009-0164 (HELCO 2010 Test Year)
  - Sched R: Docket 2009-0164 (HELCO 2010 Test Year), Exhibit 2C, Attach 1, page 9, Filed 02/21/2012 for base energy rate;
  - Sched G: Docket 2009-0164 (HELCO 2010 Test Year), Exhibit 2C, Attach 1, page 10, Filed 02/21/2012.
  - Sched J: Docket 2009-0164 (HELCO 2010 Test Year), Exhibit 2C, Attach 1, page 17, Filed 02/21/2012.
  - Sched P: Docket 2009-0164 (HELCO 2010 Test Year), Exhibit 2C, Attach 1, page 143, Filed 02/21/2012.
- 3 PPAC Rates Effective January 2017
- 4 REIP and DSM rate from effective rate summaries for January 2017, RAM based on Decoupling Filing, PUC Order No. 33724 Transmittal 16-02, Decoupling Calculation workbook, Schedule A (revised 05/19/16), page 1
- 5 Source: Most-recently approved cost-of-service calculation, from Docket 2009-0164 (HELCO 2010 Test Year), Exhibit 2E, page 65, Filed 02/21/2012.
- 6 Sales from 2017 Revenue Budget forecast



**Hawai'i Electric Light**

Estimated kW and kWh by technology and rate schedule

| Rate         | NEM kW installed by Technology                                 |  |   |               | NEM kWh Installed by Technology  |  |   |                    |
|--------------|--|--|---|---------------|--|--|---|--------------------|
|              | PV kW NEM installed (Cumulative Dec 31, 2016) NEM <sup>A</sup> | Wind kW NEM installed (Cumulative Dec 31, 2016) NEM <sup>E</sup> | Hydro kW NEM installed (Cumulative Dec 31, 2016) NEM <sup>F</sup> | Total kW      | PV kWh generated in one year from NEM installed (Cumulative Dec 31, 2016) NEM <sup>A,B</sup> | Wind kWh generated in one year from NEM installed (Cumulative Dec 31, 2016) NEM <sup>E</sup> | Hydro kWh generated in one year from NEM installed (Cumulative Dec 31, 2016) NEM <sup>F</sup> | Total kWh          |
|              | A  | B  | C   | D= sum(A:C)   | E  | F  | G   | H= sum(E:G)        |
| R            | 52,639   | 57   | 0   | 52,695        | 78,389,701   | 143,787  | 0   | 78,533,488         |
| G            | 4,491  | 0  | 0   | 4,491         | 6,687,524  | 0  | 0   | 6,687,524          |
| J            | 12,090   | 170  | 0   | 12,260        | 18,004,476   | 536,042  | 0   | 18,540,518         |
| P            | 112  | 0  | 49  | 161           | 167,327  | 0  | 214,620   | 381,947            |
| <b>Total</b> | <b>69,332</b>  | <b>226</b>   | <b>49</b>   | <b>69,607</b> | <b>103,249,027</b>   | <b>679,829</b>   | <b>214,620</b>  | <b>104,143,475</b> |

Source: Grid Technologies Department.

<sup>A</sup> NEM PV/wind/hydro kW data from respective 2016 utility detailed year end spreadsheets.

<sup>B</sup> PV capacity factor of 17% ( Based on PV benchmarking developed by E3 for FIT pricing (Docket No 2008-0273, page 20), Multiply by hours in year- 8760.

<sup>E</sup> Wind capacity factor range of 29% to 39%. Wind kWh generated for the 2016 report is based on 8760 hours. Wind calculated for the 2015 report was based on projected kWh generation for 2016, a leap year, based on 8784 hours.

<sup>F</sup> Hydro capacity factor of 50%. Hydro kWh generated for the 2016 report is based on 8760 hours. Hydro calculated for the 2015 report was based on projected kWh generation for 2016, a leap year, based on 8784 hours.

**Maui Electric Company - Maui Division**

Estimated Lost Contribution to Fixed Costs and Surcharges based on NEM installations as of December 31, 2016

| Rate  | Total Lost kWh/yr <sup>1</sup> | Base Energy Rate <sup>2</sup> , cents/kWh | Eff. PPAC <sup>3</sup> , cents/kWh | REIP & DSM <sup>4</sup> , cents/kWh | RAM <sup>4</sup> , cents/kWh | Eff. Base Energy Rate cents/kWh | Production Energy Rate <sup>5</sup> , cents/kWh | Lost Contribution to Fixed Cost, cents/kWh | Total Lost Contribution to Fixed Cost, \$/Yr |
|-------|--------------------------------|---|------------------------------------|-------------------------------------|------------------------------|---------------------------------|---|--|--|
|       | A                              | B   | C                                  | D                                   | E                            | F = sum(B:E)                    | G   | H = F - G                                  | J = A * H / 100                              |
| R     | 84,110,178                     | 33.5605                                   | 0.0000                             | 0.0099                              | 1.1287                       | 34.6991                         | 24.6820   | 10.0171                                    | \$8,425,401                                  |
| G     | 9,720,949                      | 34.5890                                   | 0.0000                             | 0.0113                              | 1.1287                       | 35.7290                         | 24.8630   | 10.8660                                    | \$1,056,278                                  |
| J     | 20,048,198                     | 30.4163                                   | 0.0000                             | 0.0113                              | 1.1287                       | 31.5563                         | 25.0050   | 6.5513                                     | \$1,313,418                                  |
| P     | 1,350,697                      | 27.7504                                   | 0.0000                             | 0.0113                              | 1.1287                       | 28.8904                         | 24.8200   | 4.0704                                     | \$54,979                                     |
| Total | 115,230,023                    |   |                                    |                                     |                              |                                 |   |  | \$10,850,076                                 |

| Rate          | Total Lost Contribution to Fixed Cost, \$/Yr | Forecast 2017 Sales <sup>6</sup> , kWh/Yr | Estimated Impact on Rates, ¢/kWh |
|---------------|--|---|----------------------------------|
|               | K = J  | L   | M = (K / L) * 100                |
| R             | \$8,425,401                                  |   |                                  |
| G             | \$1,056,278                                  |   |                                  |
| J             | \$1,313,418                                  |   |                                  |
| P             | \$54,979                                     |   |                                  |
| Total         | \$10,850,076                                 |   |                                  |
| Total Company |  | 1,060,023,221                             | 1.02                             |

Notes:

- 1 See Appendix A, page 7, column H
- 2 Source: Base Energy Rates, from Docket 2011-0092 (MECO 2012 Test Year)- Maui Division  
 Sched R: Docket 2011-0092 (MECO 2012 Test Year), Maui Division, Exhibit 4, Attachment 1, page 8, filed 06/17/2013.  
 Sched G: Docket 2011-0092 (MECO 2012 Test Year), Maui Division, Exhibit 4, Attachment 1, page 9, filed 06/17/2013.  
 Sched J: Docket 2011-0092 (MECO 2012 Test Year), Maui Division, Exhibit 4, Attachment 1, page 33, filed 06/17/2013.  
 Sched P: Docket 2011-0092 (MECO 2012 Test Year), Maui Division, Exhibit 4, Attachment 1, page 40, filed 06/17/2013.
- 3 PPAC Rates Effective January 2017
- 4 REIP and DSM rate from effective rate summaries for January 2017, RAM based on Transmittal 16-03 filed on March 31, 2016, Decoupling Calculation Schedule A workbook, page 1.
- 5 Docket 2011-0092 (MECO 2012 Test Year), Maui Division, Exhibit 5, page 66, filed 06/17/2013.
- 6 Sales from 2017 Revenue Budget forecast

**Maui Electric Company - Maui Division**  
 Estimated kW and kWh by technology and rate schedule

| Rate  | NEM kW Installed by Technology                                       |  |   |             | NEM kWh Installed by Technology   |   |  |             |
|-------|--|--|---|-------------|---|---|--|-------------|
|       | PV kW NEM installed<br>(Cumulative Dec 31,<br>2016) NEM <sup>A</sup> | Wind kW NEM installed<br>(Cumulative Dec 31,<br>2016) NEM <sup>E</sup> | Hydro kW NEM<br>installed (Cumulative<br>Dec 31, 2016) NEM <sup>F</sup> | Total kW    | PV kWh generated in<br>one year from NEM<br>installed (Cumulative<br>Dec 31, 2016) NEM <sup>A,B</sup> | Wind kWh generated<br>in one year from NEM<br>installed (Cumulative<br>Dec 31, 2016) NEM <sup>E</sup> | Hydro kWh generated<br>in one year from NEM<br>installed (Cumulative<br>Dec 31, 2016) NEM <sup>F</sup> | Total kWh   |
|       | A  | B  | C   | D= sum(A:C) | E   | F   | G  | H= sum(E:G) |
| R     | 56,444   | 21   | 0   | 56,465      | 84,056,703  | 53,475  | 0  | 84,110,178  |
| G     | 6,520  | 5  | 0   | 6,524       | 9,708,959   | 11,991  | 0  | 9,720,949   |
| J     | 13,383   | 47   | 0   | 13,429      | 19,929,562  | 118,637   | 0  | 20,048,198  |
| P     | 897  | 6  | 0   | 903         | 1,335,455   | 15,242  | 0  | 1,350,697   |
| Total | 77,243   | 78   | 0   | 77,322      | 115,030,678   | 199,345   | 0  | 115,230,023 |

Source: Grid Technologies Department.

<sup>A</sup> NEM PV/wind/hydro kW data from respective 2016 utility detailed year end spreadsheets.

<sup>B</sup> PV capacity factor of 17% ( Based on PV benchmarking developed by E3 for FIT pricing (Docket No 2008-0273, page 20), Multiply by hours in year-8760.

<sup>E</sup> Wind capacity factor range of 29%. Wind kWh generated for the 2016 report is based on 8760 hours. Wind calculated for the 2015 report was based on projected kWh generation for 2016, a leap year, based on 8784 hours.

**Maui Electric Company - Lanai Division**

Estimated Lost Contribution to Fixed Costs and Surcharges based on NEM installations as of December 31, 2016

| Rate  | Total Lost kWh/Yr <sup>1</sup> | Base Energy Rate <sup>2</sup> , cents/kWh | Eff. PPAC <sup>3</sup> , cents/kWh | REIP & DSM <sup>4</sup> , cents/kWh | RAM <sup>4</sup> , cents/kWh | Eff. Base Energy Rate, cents/kWh | Production Energy Rate <sup>5</sup> , cents/kWh | Lost Contribution to Fixed Cost, cents/kWh | Total Lost Contribution to Fixed Cost, \$/Yr |
|-------|--------------------------------|---|------------------------------------|-------------------------------------|------------------------------|----------------------------------|---|--|--|
|       | A                              | B   | C                                  | D                                   | E                            | F = sum(B:E)                     | G   | H = F - G                                  | J = A * H / 100                              |
| R     | 561,726                        | 42.7689                                   | 0.0000                             | 0.0099                              | 1.1287                       | 43.9075                          | 35.2000   | 8.7075                                     | \$48,912                                     |
| G     | 98,972                         | 44.8726                                   | 0.0000                             | 0.0099                              | 1.1287                       | 46.0112                          | 35.4360   | 10.5752                                    | \$10,467                                     |
| J     | 288,905                        | 42.5860                                   | 0.0000                             | 0.0099                              | 1.1287                       | 43.7246                          | 35.5590   | 8.1656                                     | \$23,591                                     |
| P     | -                              | 40.2141                                   | 0.0000                             | 0.0099                              | 1.1287                       | 41.3527                          | 34.9320   | 6.4207                                     | \$0  |
| Total | 949,603                        |   |                                    |                                     |                              |                                  |   |  | \$82,970                                     |

| Rate          | Total Lost Contribution to Fixed Cost, \$/Yr | Forecast 2017 Sales <sup>6</sup> , kWh/Yr | Estimated Impact on Rates, ¢/kWh |
|---------------|--|---|----------------------------------|
|               | K = J  | L   | M = (K / L) * 100                |
| R             | \$48,912                                     |   |                                  |
| G             | \$10,467                                     |   |                                  |
| J             | \$23,591                                     |   |                                  |
| P             | \$0  |   |                                  |
| Total         | \$82,970                                     |   |                                  |
| Total Company |  | 27,029,384                                | 0.31                             |

Notes:

- 1 See Appendix A, page 9, column H
- 2 Source: Base Energy Rates, from Docket 2011-0092 (MECO 2012 Test Year)- Lanai Division  
 Sched R: Docket 2011-0092 (MECO 2012 Test Year), Lanai Division, Exhibit 4, Attachment 1, page 83, filed 06/17/2013.  
 Sched G: Docket 2011-0092 (MECO 2012 Test Year), Lanai Division, Exhibit 4, Attachment 1, page 84, filed 06/17/2013.  
 Sched J: Docket 2011-0092 (MECO 2012 Test Year), Lanai Division, Exhibit 4, Attachment 1, page 92, filed 06/17/2013.  
 Sched P: Docket 2011-0092 (MECO 2012 Test Year), Lanai Division, Exhibit 4, Attachment 1, page 101, filed 06/17/2013.
- 3 PPAC Rates Effective January 2017
- 4 REIP and DSM rate from effective rate summaries for January 2017, RAM based on Transmittal 16-03 filed on March 31, 2016, Decoupling Calculation Schedule A workbook, page 1.
- 5 Docket 2011-0092 (MECO 2012 Test Year), Lanai Division, Exhibit 5, page 143, filed 06/17/2013.
- 6 Sales from 2017 Revenue Budget forecast

**Maui Electric Company - Lanai Division**

Estimated kW and kWh by technology and rate schedule

| Rate         | NEM kW Installed by Technology                                       |  |   |             | NEM kWh Installed by Technology   |   |  |                |
|--------------|--|--|---|-------------|---|---|--|----------------|
|              | PV kW NEM installed<br>(Cumulative Dec 31,<br>2016) NEM <sup>A</sup> | Wind kW NEM installed<br>(Cumulative Dec 31,<br>2016) NEM <sup>E</sup> | Hydro kW NEM<br>installed (Cumulative<br>Dec 31, 2016) NEM <sup>F</sup> | Total kW    | PV kWh generated in<br>one year from NEM<br>installed (Cumulative<br>Dec 31, 2016) NEM <sup>A,B</sup> | Wind kWh generated<br>in one year from NEM<br>installed (Cumulative<br>Dec 31, 2016) NEM <sup>E</sup> | Hydro kWh generated<br>in one year from NEM<br>installed (Cumulative<br>Dec 31, 2016) NEM <sup>F</sup> | Total kWh      |
|              | A  | B  | C   | D= sum(A:C) | E   | F   | G  | H= sum(E:G)    |
| R            | 377  | 0  | 0   | 377         | 561,726   | 0   | 0  | 561,726        |
| G            | 66   | 0  | 0   | 66          | 98,972  | 0   | 0  | 98,972         |
| J            | 194  | 0  | 0   | 194         | 288,905   | 0   | 0  | 288,905        |
| P            | 0  | 0  | 0   | 0           | 0   | 0   | 0  | 0              |
| <b>Total</b> | <b>638</b>   | <b>0</b>   | <b>0</b>  | <b>638</b>  | <b>949,603</b>  | <b>0</b>  | <b>0</b>   | <b>949,603</b> |

Source: Grid Technologies Department.

<sup>A</sup> NEM PV/wind/hydro kW data from respective 2016 utility detailed year end spreadsheets.

<sup>B</sup> PV capacity factor of 17% ( Based on PV benchmarking developed by E3 for FIT pricing (Docket No 2008-0273, page 20), Multiply by hours in year-8760.

**Maui Electric Company - Molokai Division**

Estimated Lost Contribution to Fixed Costs and Surcharges based on NEM installations as of December 31, 2016

| Rate  | Total Lost kWh/yr <sup>1</sup> | Base Energy Rate <sup>2</sup> , cents/kWh | Eff. PPAC <sup>3</sup> , cents/kWh | REIP & DSM <sup>4</sup> , cents/kWh | RAM <sup>4</sup> , cents/kWh | Eff. Base Energy Rate cents/kWh | Production Energy Rate <sup>5</sup> , cents/kWh | Lost Contribution to Fixed Cost, cents/kWh | Total Lost Contribution to Fixed Cost, \$/Yr |
|-------|--------------------------------|---|------------------------------------|-------------------------------------|------------------------------|---------------------------------|---|--|--|
|       | A                              | B   | C                                  | D                                   | E                            | F = sum(B:E)                    | G   | H = F - G                                  | J = A * H / 100                              |
| R     | 2,048,208                      | 39.0927                                   | 0.0000                             | 0.0099                              | 1.1287                       | 40.2313                         | 28.8010   | 11.4303                                    | \$234,116                                    |
| G     | 534,519                        | 44.8344                                   | 0.0000                             | 0.0099                              | 1.1287                       | 45.9730                         | 29.3620   | 16.6110                                    | \$88,789                                     |
| J     | 377,274                        | 36.9705                                   | 0.0000                             | 0.0099                              | 1.1287                       | 38.1091                         | 29.2020   | 8.9071                                     | \$33,604                                     |
| P     | 148,920                        | 29.5392                                   | 0.0000                             | 0.0099                              | 1.1287                       | 30.6778                         | 28.5660   | 2.1118                                     | \$3,145                                      |
| Total | 3,108,921                      |   |                                    |                                     |                              |                                 |   |  | \$359,654                                    |

| Rate          | Total Lost Contribution to Fixed Cost, \$/Yr | Forecast 2017 Sales <sup>6</sup> , kWh/Yr | Estimated Impact on Rates, ¢/kWh |
|---------------|--|---|----------------------------------|
|               | K = J  | L   | M = (K / L) * 100                |
| R             | \$234,116                                    |   |                                  |
| G             | \$88,789                                     |   |                                  |
| J             | \$33,604                                     |   |                                  |
| P             | \$3,145                                      |   |                                  |
| Total         | \$359,654                                    |   |                                  |
| Total Company |  | 26,306,081                                | 1.37                             |

Notes:

- 1 See Appendix A, page 11, column H
- 2 Source: Base Energy Rates, from Docket 2011-0092 (MECO 2012 Test Year)- Molokai Division  
 Sched R: Docket 2011-0092 (MECO 2012 Test Year), Molokai Division, Exhibit 4, Attachment 1, page 132, filed 06/17/2013.  
 Sched G: Docket 2011-0092 (MECO 2012 Test Year), Molokai Division, Exhibit 4, Attachment 1, page 133, filed 06/17/2013.  
 Sched J: Docket 2011-0092 (MECO 2012 Test Year), Molokai Division, Exhibit 4, Attachment 1, page 140, filed 06/17/2013.  
 Sched P: Docket 2011-0092 (MECO 2012 Test Year), Molokai Division, Exhibit 4, Attachment 1, page 148, filed 06/17/2013.
- 3 PPAC Rates Effective January 2017
- 4 REIP and DSM rate from effective rate summaries for January 2017, RAM based on Transmittal 16-03 filed on March 31, 2016, Decoupling Calculation Schedule A workbook, page 1.
- 5 Docket 2011-0092 (MECO 2012 Test Year). Molokai Division, Exhibit 5, page 220, filed 6/17/2013.
- 6 Sales from 2017 Revenue Budget forecast

**Maui Electric Company - Molokai Division**  
 Estimated kW and kWh by technology and rate schedule

| Rate         | NEM kW Installed by Technology                                 |  |   |              | NEM kWh Installed by Technology  |  |   |                  |
|--------------|--|--|---|--------------|--|--|---|------------------|
|              | PV kW NEM installed (Cumulative Dec 31, 2016) NEM <sup>A</sup> | Wind kW NEM installed (Cumulative Dec 31, 2016) NEM <sup>E</sup> | Hydro kW NEM installed (Cumulative Dec 31, 2016) NEM <sup>F</sup> | Total kW     | PV kWh generated in one year from NEM installed (Cumulative Dec 31, 2016) NEM <sup>A,B</sup> | Wind kWh generated in one year from NEM installed (Cumulative Dec 31, 2016) NEM <sup>E</sup> | Hydro kWh generated in one year from NEM installed (Cumulative Dec 31, 2016) NEM <sup>F</sup> | Total kWh        |
|              | A  | B  | C   | D= sum(A:C)  | E  | F  | G   | H= sum(E:G)      |
| R            | 1,375  | 0  | 0   | 1,375        | 2,048,208  | 0  | 0   | 2,048,208        |
| G            | 359  | 0  | 0   | 359          | 534,519  | 0  | 0   | 534,519          |
| J            | 253  | 0  | 0   | 253          | 377,274  | 0  | 0   | 377,274          |
| P            | 100  | 0  | 0   | 100          | 148,920  | 0  | 0   | 148,920          |
| <b>Total</b> | <b>2,088</b>   | <b>0</b>   | <b>0</b>  | <b>2,088</b> | <b>3,108,921</b>   | <b>0</b>   | <b>0</b>  | <b>3,108,921</b> |

Source: Grid Technologies Department.

<sup>A</sup> NEM PV/wind/hydro kW data from respective 2016 utility detailed year end spreadsheets.

<sup>B</sup> PV capacity factor of 17% ( Based on PV benchmarking developed by E3 for FIT pricing (Docket No 2008-0273, page 20), Multiply by hours in year-8760.