



# 100% Renewable Default Option Study for EBCE Communities

## *Program Evaluation and Findings*

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FEBRUARY 2018

# Study Overview

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# Project Scope

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**Goal:** *Evaluate potential impact for self-selected communities within East Bay Community Energy (EBCE) to provide 100% renewable energy (100RE) as a default for their residents and businesses.*

**Task 1:** Research and evaluate current Community Choice Energy (CCE) Renewable Energy Products

**Task 2:** Investigate potential for offering 100% RE default product for Albany and Berkeley, plus 5 more Cities – Piedmont, Hayward, Emeryville, San Leandro, Oakland

**Task 3:** Develop and share summary findings with Cities and EBCE

**Key Project Findings:** *“Bright Choice” default does not deliver GHG reductions, but Brilliant 100 and Brilliant 100+ would nearly eliminate GHG emissions from electricity citywide at low to no cost for customers.*

# Investor Owned Utility Trends for RPS Compliance

| Table 2: Average Large IOUs' RPS Procurement Percentages for PG&E, SCE, and SDG&E in 2016 |      |      |                     |      |      |                     |      |      |      |
|-------------------------------------------------------------------------------------------|------|------|---------------------|------|------|---------------------|------|------|------|
| Actuals                                                                                   |      |      |                     |      |      | Forecasted          |      |      |      |
| Compliance Period 1                                                                       |      |      | Compliance Period 2 |      |      | Compliance Period 3 |      |      |      |
| 20% Requirement                                                                           |      |      | 25% Requirement     |      |      | 33% Requirement     |      |      |      |
| 2011                                                                                      | 2012 | 2013 | 2014                | 2015 | 2016 | 2017                | 2018 | 2019 | 2020 |
| 20%                                                                                       | 20%  | 23%  | 28%                 | 30%  | 35%  | 38%                 | 42%  | 47%  | 50%  |

Data source: IOU RPS Compliance Reports, August 2017<sup>17</sup>

<sup>17</sup> Note: The forward-looking data (2017-2020) of each IOU is treated as confidential information per D.06-06-066.

# Review of CCA 100% RE Programs in PG&E Territory

## Key Metrics of Operational CCA Programs in PG&E Territory

(As of February 12, 2018)

| Program Information                         | 2016       |                                        |                 |                                                  |                              |                     |                                  | 2018            | 2018                  |                       |                          |
|---------------------------------------------|------------|----------------------------------------|-----------------|--------------------------------------------------|------------------------------|---------------------|----------------------------------|-----------------|-----------------------|-----------------------|--------------------------|
|                                             | PG&E       | MCE                                    | SCP             | PCE                                              | CPSF                         | SVCE                | RCEA                             | PG&E            | EBCE<br>Bright Choice | EBCE<br>Brilliant 100 | EBCE<br>Brilliant 100+** |
| Renewable content % - default product       | 33%        | 55%                                    | 42%             | 50%                                              | 40%                          | 50%                 | 42%                              | 42%*            | 38%                   | 40%                   | 100%                     |
| Default product (% carbon free)             | 69%        | 68% <sup>1</sup>                       | 91%             | 80%                                              | 78%                          | 100%                | 82%                              | 88%*            | 85%                   | 100%                  | 100%                     |
| Discount - PG&E vs. Residential default     |            | <~1%                                   | >2%             | 5%                                               | 4% higher than PG&E          | 1%                  | ~3%                              |                 | 1.5%                  | Same as PG&E          | n/a                      |
| Discount - PG&E vs. Non-residential default |            | ~ 0.5% higher than PG&E                | >2%             | 5%                                               | 2.4% higher than PG&E        | ~ 1%                | ~3%                              |                 | 1.5%                  | Same as PG&E          | n/a                      |
| 100% renewable product - energy source      | 100% Solar | 50% Wind, 25% Biomass/Waste, 25% Solar | 100% Geothermal | 53% Wind, 26% Hydro, 7% each Solar, Biomass, Geo | 100% wind                    | 80% Wind, 20% Solar | 44% Solar, 44% Wind, 12% Biomass | 100% Solar      | RPS Eligible          | RPS Eligible          | RPS Eligible             |
| Incremental 100% Renewable Price (\$/kWh)   | \$0.0261   | \$0.010                                | \$0.025         | \$0.010                                          | \$0.020 Res, \$0.014 non-Res | \$0.008             | \$0.010                          | \$0.0186**<br>* | n/a                   | n/a                   | <\$0.005/kWh             |

\* PG&E Forecast from November 2017 RPS Report using statewide IOU average and calculations for carbon free based on PG&E ERRAs testimony filed on 12/6/2017

\*\* This is a requested product that has been evaluated by EBCE but not offered yet with pricing based on information from February 7, 2018 Board of Directors meeting, Item 11

\*\*\*Based on PG&E Green Tariff Advice Letter E-5158E dated 12/19/17 for residential E-1 customers. All other customer classes are lower than this value.

<sup>1</sup> MCE's 2017 Integrated Resource Plan shows that their 2017 default offer will be 75% carbon free.

*Renewable Energy percentages for EBCE Bright Choice and Brilliant 100 are **below all CCE peers in 2016 and below PG&E forecast for 2018.***

# Decision Path and Analytical Approach

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*Does the 100% RE default option help achieve city's goals?*

- *Analysis: Calculate the incremental GHG impact from 100% RE.*

*If yes...How much additional cost will electricity customers incur?*

- *Analysis: Calculate incremental cost to representative residential, non-residential and CARE customers if enrolled in the 100% RE option.*

*And what impact would this have on the viability of EBCE?*

- *Calculate incremental revenue and costs to serve 100% RE cities.*

*Review Potential Options and Actions to Move Forward*

- *Develop actions that Cities and EBCE can take.*

# Stakeholder Input

# Report Approach

| Cost and Customer Questions                                                                                                                                                             |                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 1. How much would the 100% renewable energy product cost for all customers (Residential, Commercial, Municipal, CARE)?                                                                  | Analyze customer-level impact from 100% RE program option by scenario.                                                                  |
| 2. How does this option impact low and moderate income customer equity concerns?                                                                                                        | Creation of a default option for all customers ensures that no one is left behind, and analysis of cost impact includes CARE customers. |
| 3. Does this default eliminate choice for customers?                                                                                                                                    | Customers will always have the opportunity to opt-down to a lower impact option or opt-out to PG&E.                                     |
| 4. If all CCAs have an opt-up option to 100% already, why would a default be needed?                                                                                                    | Opt-up rates for existing CCAs are very low compared to default 100% renewable program.                                                 |
| 5. Could the 100% RE default option help accelerate a City's GHG reduction targets?                                                                                                     | Review GHG reduction potential from 100% RE program.                                                                                    |
| CCA and Program Management Questions                                                                                                                                                    |                                                                                                                                         |
| 6. What is the potential for increasing CCA opt outs?                                                                                                                                   | Review examples from existing CCA programs and analyze impact from various 100% RE options.                                             |
| 7. Will the 100% RE default complicate messaging, website content and call center training requirements?                                                                                | Review existing CCA programs and capture their experience with various program implementation models.                                   |
| 8. How would the increased volume of RE purchases impact market prices up or down?                                                                                                      | Review statewide RE deployment and costs trends and compare to expected 100% RE volume.                                                 |
| 9. How could the 100% RE default help increase renewable deployment and consumption?                                                                                                    | Estimate needed renewables to meet expanded 100% RE volume.                                                                             |
| 10. What is the net impact of 100% RE sales and costs to the CCA?                                                                                                                       | Estimate additional CCA revenue and costs from 100% RE default.                                                                         |
| External and Market Questions                                                                                                                                                           |                                                                                                                                         |
| 11. If State requirements are already pushing CCAs to reach new RE targets (50% by 2030), why is this option needed?                                                                    | Compare State RPS goals to expected impact from CCA 100% RE option.                                                                     |
| 12. As PG&E customers' load departs, how will their renewable buying behavior change?                                                                                                   | Potential actions taken by the investor-owned utility will not be forecast as part of this analysis.                                    |
| 13. Solar and wind can have additional requirements for balancing and grid integration. How do other low-carbon, low-cost resources (ex. Hydro) that can alleviate these issues fit in? | Consider EBCE purchasing of low-carbon energy as part of an overall renewables strategy.                                                |
| 14. How are Renewable Energy Credits factored into the options?                                                                                                                         | Focus on CA-sourced RE products only for EBCE 100% RE default.                                                                          |

# Potential 100% Renewable Option for EBCE

| Options Defined                                                 | Sources                                         | Incremental Retail Price above Bright Choice | Incremental Supply Cost Estimate | Overhead Cost Estimate*** | Net Surplus Impact |
|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|----------------------------------|---------------------------|--------------------|
| <b>Brilliant 100*</b><br><b>40% RE, 100% GHG-Free</b>           | Mix of hydro plus utility-scale wind and solar. | \$1.5/MWh                                    | \$1.5/MWh                        | \$0.5/MWh                 | -\$0.5/MWh         |
| <b>Brilliant 100+**</b><br><b>100% Renewable, 100% GHG-Free</b> | Solar and wind from utility scale CA projects   | \$5.0/MWh**                                  | \$5.0/MWh                        | \$1/MWh                   | -\$1/MWh           |

\*From EBCE Board Meeting 02-07-18: NO impact on net margin, same price as PG&E

\*\*From EBCE Board Meeting 02-07-18: 18% margin impact (~\$16.7M/year or ~\$2.7/MWH...rounded up to \$5/MWH)

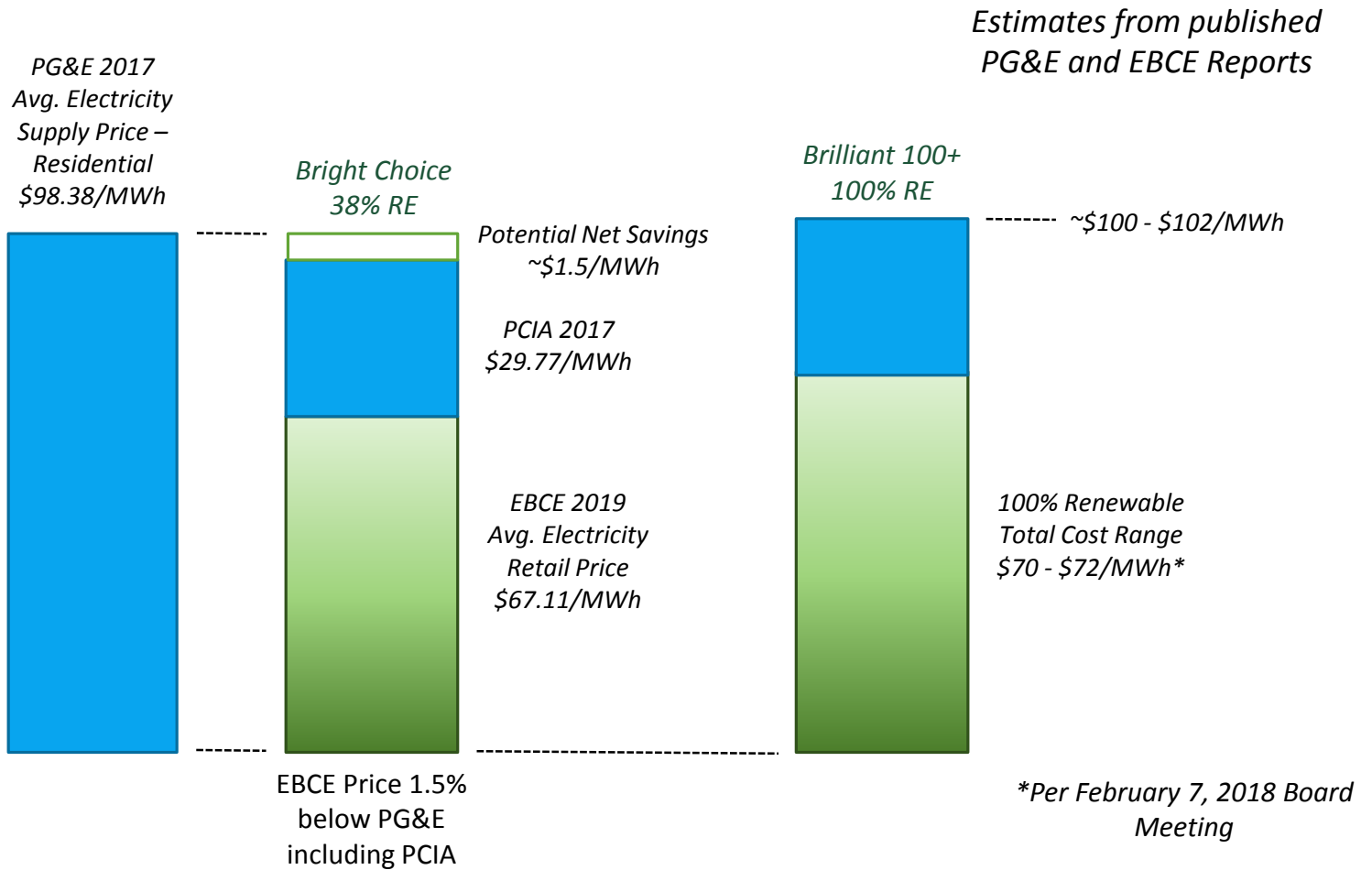
\*\*\*Estimating approximately 5% of incremental revenue for overhead and administration above current budget

***Brilliant 100:*** The incremental costs and required prices for 100% GHG-free are very modest and would not have any increase (or reduction) in average electricity bills compared to PG&E. However, this product is only 40% renewable energy which is below CCE peers and potentially below PG&E renewable rates by 2018.

***Brilliant 100+:*** This product is based on EBCE analysis of a truly 100% renewable offering which indicated approximately \$16.7M in incremental costs or ~\$3/MWh for all customers. **This option has not yet been offered by EBCE** but would have a minimal impact on customer costs. We have increased the potential price to \$5/MWh plus \$1/MWh for overhead to be conservative in this analysis.



# How much more does 100% RE Cost?



# GHG Impact Calculations

## PG&E GHG Emissions Intensity Table

| TABLE OF GREENHOUSE GAS<br>HISTORY OF REVENUE, COSTS AND EMISSIONS INTENSITY<br>(TEMPLATE D-5) |                                                                 |                  |                  |                  |                  |                  |                  |
|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Line<br>No.                                                                                    | Description                                                     | Recorded<br>2013 | Recorded<br>2014 | Recorded<br>2015 | Recorded<br>2016 | Forecast<br>2017 | Forecast<br>2018 |
| (THOUSANDS OF DOLLARS)                                                                         |                                                                 |                  |                  |                  |                  |                  |                  |
| 1                                                                                              | Total GHG Revenues (Net available for customers) <sup>(a)</sup> | \$294,008        | \$578,743        | \$456,431        | \$366,996        | \$225,652        | \$412,456        |
| 2                                                                                              | Total GHG Costs                                                 | \$212,867        | \$199,628        | \$212,062        | \$164,735        | \$155,098        | \$54,253         |
| (MT CO <sub>2</sub> e/MWh)                                                                     |                                                                 |                  |                  |                  |                  |                  |                  |
| 3                                                                                              | Emissions Intensity <sup>(b)</sup>                              | 0.202            | 0.210            | 0.216            | 0.176            | 0.165            | 0.068            |

(a) Line 1 is derived from Table 13-1, line 17.

(b) The emissions intensity shown here is calculated by dividing total GHG emissions reported on Line 13 of Tables 11-1 and 11-2 by the total energy load requirement to serve PG&E's bundled electricity customers for the corresponding year.

The emissions intensity is not the same calculation as the CO<sub>2</sub> emissions rate reported by PG&E to The Climate Registry (TCR).

EBCE Bright Choice Target: 85% GHG-Free for 2018

*Potentially **higher emissions** than PG&E in 2018*

*For analysis, we assumed no reduction or increase compared to PG&E*

PG&E Emissions Calculated Estimate for 2018: ~88% GHG-Free

*2016 Emissions Intensity: 0.176*

*2016 GHG-Free: 69%*

*2019 Forecast Emissions Intensity: 0.068*

*2019 Estimated GHG-Free: 88%*

# Summary of Selected Load Data by City and Impact of 100% GHG Free Energy

EBCE 2019 Load Estimate: 6,201,000,000 Per EBCE Implementation Plan Aug-2017 - Retail Load

| City                      | Population (2016) | Total Citywide Load (kWh) | Residential (kWh)  | Non-Residential (kWh) | CARE Customers (kWh) | Municipal Accounts (kWh) | kWh per capita | Care % of Total | CARE % of All Res | Est. Incremental RE Purchases* (kWh) | Incremental GHG Reduction |
|---------------------------|-------------------|---------------------------|--------------------|-----------------------|----------------------|--------------------------|----------------|-----------------|-------------------|--------------------------------------|---------------------------|
| <b>Albany</b>             | 19,688            | 62,538,718                | 20,650,017         | 38,355,071            | 2,256,344            | 1,277,286                | 3,176          | 3.6%            | 9.9%              | 26,674,752                           | 3,628                     |
| <b>Berkeley</b>           | 121,240           | 692,888,108               | 138,321,059        | 522,430,291           | 20,302,483           | 11,834,276               | 5,715          | 2.9%            | 12.8%             | 295,365,017                          | 40,170                    |
| <b>Piedmont</b>           | 11,353            | 31,326,480                | 26,551,929         | 3,575,853             | 322,995              | 875,704                  | 2,759          | 1.0%            | 1.2%              | 13,379,432                           | 1,820                     |
| <b>Hayward</b>            | 158,937           | 971,646,457               | 163,471,014        | 723,011,629           | 75,770,813           | 9,393,000                | 6,113          | 7.8%            | 31.7%             | 413,654,219                          | 56,257                    |
| <b>Emeryville</b>         | 11,671            | 198,279,194               | 19,350,425         | 173,751,258           | 3,098,781            | 2,078,730                | 16,989         | 1.6%            | 13.8%             | 84,424,562                           | 11,482                    |
| <b>San Leandro</b>        | 90,465            | 587,778,031               | 122,351,054        | 415,343,978           | 41,105,046           | 8,977,953                | 6,497          | 7.0%            | 25.1%             | 250,479,010                          | 34,065                    |
| <b>Oakland</b>            | 420,005           | 2,004,734,629             | 484,288,634        | 1,259,871,710         | 184,779,001          | 75,795,284               | 4,773          | 9.2%            | 27.6%             | 857,696,863                          | 116,647                   |
| <b>TOTAL</b>              | <b>833,359</b>    | <b>4,549,191,617</b>      | <b>974,984,131</b> | <b>3,136,339,790</b>  | <b>327,635,463</b>   | <b>110,232,233</b>       | <b>5,459</b>   | <b>7.2%</b>     | <b>25.2%</b>      | <b>1,941,673,855</b>                 | <b>264,068</b>            |
| EBCE Est. Retention @ 90% |                   | 4,105,295,679             | 877,485,718        | 2,822,705,811         | 294,871,916          | 110,232,233              |                |                 |                   |                                      |                           |
| % of EBCE Est. 2019 Load  |                   | 66.2%                     |                    |                       |                      |                          |                |                 |                   | 31.3%                                |                           |

*If all 7 cities that are part of this analysis were to begin with the Brilliant 100 (or Brilliant 100+) as their default, then up to 1,941 GWh of additional renewable energy would be procured, reducing GHGs by 264,000 MT CO<sub>2</sub>e annually.*

*\* Incremental Renewable purchases calculated based on 100% GHG-free option (Brilliant 100/100+) being selected as default.*

# Emeryville Results

|            |            |
|------------|------------|
| City       | EMERYVILLE |
| Population | 11,671     |

|                     | 2016 kWh    | % of Total |
|---------------------|-------------|------------|
| Total Citywide Load | 198,279,194 | 100%       |
| Residential         | 19,350,425  | 10%        |
| Non-Residential     | 173,751,258 | 88%        |
| CARE Customers      | 3,098,781   | 2%         |
| Municipal Accounts  | 2,078,730   | 1%         |

| GHG Decrease  |               |
|---------------|---------------|
| Bright Choice | Brilliant 100 |
| 344           | 11,482        |
| 34            | 1,121         |
| 302           | 10,061        |
| 5             | 179           |
| 4             | 120           |

*Opt-in Model ~90% Retention in Bright Choice + 3% @ Brilliant 100*

|                           |     |                             |
|---------------------------|-----|-----------------------------|
| GHG Reduction - Base EBCE | 344 | MT CO <sub>2</sub> e (2019) |
|---------------------------|-----|-----------------------------|

*Opt-out Model ~85% Retention in Brilliant 100 + 5% @ Bright Choice*

|                                |        |                             |
|--------------------------------|--------|-----------------------------|
| Est. Incremental RE Purchases* | -      | kWh                         |
| Incremental GHG Reduction      | 11,137 |                             |
| Total GHG Reduction            | 11,482 | MT CO <sub>2</sub> e (2019) |

# Potential Impact on Customers by Segment

| Average Estimated Customer Impact |             |                   |                            |                       |                             |                        |                               |                         |
|-----------------------------------|-------------|-------------------|----------------------------|-----------------------|-----------------------------|------------------------|-------------------------------|-------------------------|
| Customer Group (Tariff)           | Monthly kWh | PG&E Monthly Bill | PCIA Estimate In EBCE Bill | EBCE Default Mix Bill | EBCE B100 40% RE Total Bill | % Change B100 vs. PG&E | EBCE B100+ 100% RE Additional | % Change B100+ vs. PG&E |
| Residential (E1)                  | 460         | \$ 109.00         | \$ 15.60                   | \$ 108.13             | \$ 109.00                   | 0.0%                   | 2.30                          | 1.3%                    |
| CARE (E1L)                        | 349         | \$ 48.00          | \$ 11.84                   | \$ 47.62              | \$ 48.00                    | 0.0%                   | 1.75                          | 2.8%                    |
| Small Commercial (A1)             | 1,533       | \$ 691.00         | \$ 38.33                   | \$ 685.47             | \$ 691.00                   | 0.0%                   | 7.67                          | 0.3%                    |
| Large Commercial (E19S)           | 237,324     | \$ 41,474.00      | \$ 5,062.12                | \$ 41,142.21          | \$ 41,474.00                | 0.0%                   | 1,186.62                      | 2.1%                    |

Inputs by Column:    Monthly Avg of SCP + PCE    Monthly Avg of SCP + PCE    Monthly Avg of SCP + PCE    EBCE Planned Savings 1.5%    Brilliant 100 Match PG&E    Brilliant 100+ Price

*As a proxy for future EBCE customer costs, this analysis used the average of Sonoma Clean Power (SCP) and Peninsula Clean Energy (PCE) published values for usage, bills, PCIA charges, and PG&E comparative costs.*

*Based on the Board of Directors meeting and discussion of Item 11 on February 7, 2018:*

- *EBCE Bright Choice default product is expected to save 1.5% on average compared to PG&E supply costs (including PCIA).*
- *EBCE Brilliant 100 (40% Renewable) is expected to be at parity with PG&E supply costs (including PCIA).*
- *EBCE staff also analyzed the potential impact from a 100% renewable option that we have included and labelled “Brilliant 100+” that has the potential for a low incremental price for customers.*

*Rates for each customer class will be set by EBCE and will likely vary. For example, CARE customers may receive a larger discount than average given their lower starting rates.*

# Potential Impact on EBCE Budget (2019)

## Incremental Revenue and Cost Estimates by City for EBCE

Brilliant 100: 40% RE plus 60% Hydro = 100% GHG-free

| Per Impl. Plan 08-2017  | EBCE Budget    | Albany                  | Berkeley    | Piedmont   | Hayward      | Emeryville  | San Leandro | Oakland      | 7 City Subtotal | New Total      | % Change |
|-------------------------|----------------|-------------------------|-------------|------------|--------------|-------------|-------------|--------------|-----------------|----------------|----------|
| 2019 Revenues           | \$ 391,701,537 | \$ 84,619               | \$ 937,174  | \$ 42,422  | \$ 1,313,132 | \$ 267,989  | \$ 794,847  | \$ 2,717,761 | \$ 6,157,944    | \$ 397,859,481 | 1.6%     |
| 2019 Supply Costs       | \$ 299,159,237 | \$ 84,619               | \$ 937,174  | \$ 42,422  | \$ 1,313,132 | \$ 267,989  | \$ 794,847  | \$ 2,717,761 | \$ 6,157,944    | \$ 305,317,181 | 2.1%     |
| 2019 All Other Costs*   | \$ 32,561,773  | \$ 4,231                | \$ 46,859   | \$ 2,121   | \$ 65,657    | \$ 13,399   | \$ 39,742   | \$ 135,888   | \$ 307,897      | \$ 32,869,670  | 0.9%     |
| Net Surplus + Reserves  | \$ 59,980,527  | \$ (4,231)              | \$ (46,859) | \$ (2,121) | \$ (65,657)  | \$ (13,399) | \$ (39,742) | \$ (135,888) | \$ (307,897)    | \$ 59,672,630  | -0.5%    |
| <u>15.3% of Revenue</u> |                | <u>15.2% of Revenue</u> |             |            |              |             |             |              |                 |                |          |

## Incremental Revenue and Cost Estimates by City for EBCE

Brilliant 100+: 100% RE - RPS compliant wind and solar energy mix

| Per Impl. Plan 08-2017  | EBCE Budget    | Albany                  | Berkeley     | Piedmont   | Hayward      | Emeryville  | San Leandro  | Oakland      | 7 City Subtotal | New Total      | % Change |
|-------------------------|----------------|-------------------------|--------------|------------|--------------|-------------|--------------|--------------|-----------------|----------------|----------|
| 2019 Revenues           | \$ 391,701,537 | \$ 282,063              | \$ 3,123,914 | \$ 141,407 | \$ 4,377,106 | \$ 893,296  | \$ 2,649,490 | \$ 9,059,203 | \$ 20,526,478   | \$ 412,228,015 | 5.2%     |
| 2019 Supply Costs       | \$ 299,159,237 | \$ 282,063              | \$ 3,123,914 | \$ 141,407 | \$ 4,377,106 | \$ 893,296  | \$ 2,649,490 | \$ 9,059,203 | \$ 20,526,478   | \$ 319,685,715 | 6.9%     |
| 2019 All Other Costs*   | \$ 32,561,773  | \$ 14,103               | \$ 156,196   | \$ 7,070   | \$ 218,855   | \$ 44,665   | \$ 132,475   | \$ 452,960   | \$ 1,026,324    | \$ 33,588,097  | 3.2%     |
| Net Surplus + Reserves  | \$ 59,980,527  | \$ (14,103)             | \$ (156,196) | \$ (7,070) | \$ (218,855) | \$ (44,665) | \$ (132,475) | \$ (452,960) | \$ (1,026,324)  | \$ 58,954,203  | -1.7%    |
| <u>15.3% of Revenue</u> |                | <u>15.0% of Revenue</u> |              |            |              |             |              |              |                 |                |          |

\*Assume 5% additional overhead per City based on revenue to cover administrative costs

*Both Brilliant 100 and Brilliant 100+ would have a minimal impact on EBCE's Net Surplus plus Reserves even if all 7 cities selected these products as the default.*

# Conclusions and Findings

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- Renewable Energy is more affordable than ever
- Investor Owned Utilities are increasing renewable percentages rapidly
- Brilliant 100 option would have no net increase to average customers bills
- Brilliant 100+ (100% RE) could be priced very competitively and have only a minor impact on customer bills
- Bright Choice is likely to have no incremental reduction in GHG emissions

**If cities want to achieve GHG reduction goals with EBCE,  
then Brilliant 100 or Brilliant 100+ are the only options.**