East Bay Community Energy
Local Development Business Plan

LDBP Project Team:

Community Engagement Symposium
March 26, 2018

Special Advisors:
Betony Jones & Gary Calderon
General Housekeeping

- Restrooms and Emergency Exits

- Notes on Format:
  - There will be opportunities for Questions & Interactions on each topic throughout the day.
  - Please use either the Microphones or the Note Cards
- Two Scheduled 15-min Breaks + Lunch Break
- Slides will be made available on the EBCE LDBP web page (https://ebce.org/local-development-business-plan/)
Agenda

• 9am-10am: Opening Remarks
• 10am-11am: New Work Products w/Q&A- Part I
• 11-11:15am: Break
• 11:15am-12:15pm: New Work Products w/Q&A- Part II
• 12:15-1pm: Lunch
• 1-2pm: New Work Products w/Q&A- Part III
• 2-3:15pm: Workshop #1: Development & Implementation Strategies
• 3:15-3:30: Break
• 3:30-4:45pm: Workshop #2: Community Benefit & Planning Tools
• 4:45-5pm: Closing Remarks
Opening Remarks

- **Nick Chaset** - CEO of East Bay Community Energy
- **Anne Olivia Eldred** - Chair of EBCE Community Advisory Committee
- **Chris Sentieri** - The Offset Project/Project Manager, LDBP Project
A Few Words of Appreciation

- To the EBCE Community, the EBCE Community Advisory Committee, & Engaged EBCE Stakeholders
- To the EBCE Member Jurisdictions, esp. Alameda County
- To the EBCE Board of Directors & EBCE CEO/Staff
- To the Local Development Business Plan Project Team
EBCE LDBP Project Team

ALH Urban & Regional Economics
Prime Contractor & Chief Economist
Amy L. Herman, Principal
aherman@alhecon.com

The Offset Project
Project Management & Stakeholder Outreach
Chris Sentieri, Senior Project Manager
chris@theoffsetproject.org

Clean Coalition
Solar Site Mapping & Tariff Design
Craig Lewis, Executive Director
craig@clean-coalition.org

EcoShift Consulting
Energy Analysis & Scenario Planning
Zoe Elizabeth, Senior Consultant
zelizabeth@ecoshift.com

Optony Inc.
Integrated Resource Assessment & Planning
Jonathan Whelan, Director of Operations
jonathan.whelan@optonyusa.com

Betony Jones
Labor & Workforce Advisor
betony.jones@gmail.com

Gary Calderon
Energy Storage & Demand Response Advisor
gcalderon1@comcast.net
## EBCE LDBP Development Tasks

<table>
<thead>
<tr>
<th>Task #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Grid-side DER Assessment:</strong> Solar/Wind Siting Surveys &amp; Large-scale DER Potential</td>
</tr>
<tr>
<td>2</td>
<td><strong>Customer-side DER Assessment:</strong> Hot-spot Analysis, Heat Maps, EE &amp; DR Potential</td>
</tr>
<tr>
<td>3</td>
<td><strong>Development Models and Strategies:</strong> Feed-in Tariff Design, NEM, OBF, Agency as Developer</td>
</tr>
<tr>
<td>4</td>
<td><strong>EBCE Development Issues:</strong> Labor/WFD Policies, Financing, Ownership Models</td>
</tr>
<tr>
<td>5</td>
<td><strong>Implementation and Policy Issues:</strong> Contracting, Permitting, Equity, Citizen Participation</td>
</tr>
<tr>
<td>6</td>
<td><strong>Integrated Resource Planning:</strong> Integrating Local Resources w/Long-term Planning</td>
</tr>
<tr>
<td>7</td>
<td><strong>Preliminary Plan Scenarios:</strong> Scenario Modeling, Fiscal/Economic Impacts, Final LDBP</td>
</tr>
</tbody>
</table>
Current Draft LDBP Work Products

1. LCOE for Behind-the-meter Resources *(from Tasks 2)*
2. Recommendations for Clear and Transparent Reporting *(from Task 5)*
3. Considerations for Local Approvals *(from Task 5)*
4. Recommendations for Enhancing Long-term Stability and Reliability *(from Task 5)*
5. Integrated Resource Plan Methodologies *(from Task 6)*
6. Integrating LDBP Goals with IRP *(from Task 6)*
7. Analysis of Risks and Mitigations *(from Task 6)*
8. Integration of DER Development with Procurement & Scheduling *(from Task 6)*
9. New Generation *(from Task 6)*

Remaining LDBP Work Products - April 2018

- Rate Design as Incentive Recommendations
- On-bill Financing/Repayment Recommendations
- Opportunities for Fuel Switching *(Natural Gas & Transportation)*
- Scenario Analysis Reports: *Recommended Scenario, and Analysis of Jobs, Labor Income, and Financial Impacts*
- Draft Local Development Business Plan
EBCE Goals and Priorities

- EBCE’s relationship with its customers is the highest priority.
- Prioritizing the development and utilization of local clean energy resources in ways that maximize local benefits is highly important to the EBCE community.
- Maintaining stable and competitive rates is essential.
- Supporting the local economy & workforce through “new energy programs and local energy investments” is a core value.
- The Local Development Business Plan is an important tool that will support EBCE’s ongoing efforts to deliver on each of these core goals and priorities.
Overarching Principles of the LDBP

- Develop a roadmap and framework for accelerating local DER deployment and maximizing community benefits
- Innovative program designs can overcome market failures & incentivize meaningful community & organizational benefits
- Development of clean, dispatchable, and distributed energy resources supports EBCE’s core values and goals
- EBCE can support a vibrant local economy and workforce, and protect its most vulnerable customers through targeted local energy programming
- A diversified portfolio of local programs coupled with retail rate savings can deliver greater benefit than rate savings alone
Recurring LDBP Concepts & Mechanisms

- Effective delivery of LDBP Programs depends on a robust, integrated data platform & advanced data management.
- A phased-in approach is necessary, & supports successful implementation of the LDBP.
- Community Benefit Adders (CBA’s) can be an effective tool to ensure & enhance beneficial local outcomes.
- Market responsive pricing (MRP) can maximize impacts, constrain costs, & minimize risks associated w/LDBP implementation.
- Contractual relationships with EBCE customers & stakeholders can create lasting, mutually beneficial partnerships.
East Bay Community Energy
Local Development Business Plan

Overview of New Draft Work Products
Part I

LDBP Project Team:

Community Engagement Symposium
March 26, 2018

Special Advisors:
Betony Jones & Gary Calderon
New Draft LDBP Work Products*- Part I

► Levelized Cost of Energy for Behind-the-meter Resources*-
  Chris Sentieri, The Offset Project (*Optony Work Product)

► Recommendations for Clear and Transparent Reporting-
  Zoe Elizabeth, EcoShift Consulting

*Important Note- All of the Draft LDBP Work Products can be accessed here:
  https://ebce.org/local-development-business-plan/
BTM LCOE Analysis - Overview

Purpose
▷ Show current costs for likely behind-the-meter DER/DSM Resources in Alameda
▷ Provide basis for comparing one resource type to another resource type

Format and Content
▷ Costs expressed in levelized cost of energy (“LCOE”)
  ▷ LCOE is the \textit{net present value} of all energy supplies/reductions from a resource over a fixed period of time
▷ LCOE tool is an excel spreadsheet
  ▷ User has ability to adjust resource mix and see affect on overall portfolio LCOE
  ▷ User can also adjust inputs to derive new LCOE analyses
BTM LCOE Analysis - Approach

Methodology

Cost

- For solar, since data is widely available, cost estimates derived ground-up using known pricing for individual components
- For other technologies, cost estimates derived from industry reports and supplemented with vendor quotes and empirical data
- Cost broken down by initial capital cost, annual fixed costs, and annual variable costs

LCOE

- LCOE is a simple summation once cost and energy output numbers are known
- The LCOE calculation is done on a separate tab of the spreadsheet. NREL’s online LCOE calculator was used to validate.
**Key Source for Energy Efficiency Costs**

**Table 1. Savings-weighted average total cost of saved electricity at the national level by market sector**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Total Cost of Saved Electricity (2012$/kWh)*</th>
<th>Program Administrator Cost of Saved Electricity (2012$/kWh)</th>
<th>Participant Cost of Saved Electricity (2012$/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Sectors</td>
<td>$0.046</td>
<td>$0.023</td>
<td>$0.022</td>
</tr>
<tr>
<td>Residential</td>
<td>$0.033</td>
<td>$0.019</td>
<td>$0.014</td>
</tr>
<tr>
<td>Commercial, Industrial, and Agricultural</td>
<td>$0.055</td>
<td>$0.025</td>
<td>$0.030</td>
</tr>
<tr>
<td>Low Income</td>
<td>$0.142</td>
<td>$0.134</td>
<td>$0.008</td>
</tr>
</tbody>
</table>

*Note: Totals may differ from sum of component values due to rounding.*

**“The Total Cost of Saving Electricity through Utility Customer-Funded Energy Efficiency Programs” - Lawrence Berkeley National Labs, 2015**

[by Hoffman, Rybka, Leventis, Goldman, Schwartz, Billingsley, and Schiller]

## BTM LCOE Tool - Main Table

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Capacity (MW)</th>
<th>Capacity Factor (%)</th>
<th>Conversion Losses (%)</th>
<th>Annual Production (MWh/yr)</th>
<th>Capital Cost ($/W)</th>
<th>Annual Fixed Cost ($/kW-yr)</th>
<th>Annual Variable Cost ($/kWh)</th>
<th>20 Year LCOE ($/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solar PV - 5 kW Roof - Oakland</td>
<td>25</td>
<td>16.4%</td>
<td>0%</td>
<td>35,900</td>
<td>$3.09</td>
<td>$15.00</td>
<td>$-</td>
<td>$0.198</td>
</tr>
<tr>
<td>Solar PV - 5 kW Roof - Livermore</td>
<td>25</td>
<td>17.2%</td>
<td>0%</td>
<td>37,600</td>
<td>$3.09</td>
<td>$15.00</td>
<td>$-</td>
<td>$0.189</td>
</tr>
<tr>
<td>Solar PV - 250 kW Roof - Oakland</td>
<td>25</td>
<td>16.4%</td>
<td>0%</td>
<td>35,825</td>
<td>$1.82</td>
<td>$15.00</td>
<td>$-</td>
<td>$0.121</td>
</tr>
<tr>
<td>Solar PV - 250 kW Roof - Livermore</td>
<td>25</td>
<td>17.2%</td>
<td>0%</td>
<td>37,775</td>
<td>$1.82</td>
<td>$15.00</td>
<td>$-</td>
<td>$0.115</td>
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<tr>
<td>Fuel Cell</td>
<td>2</td>
<td>95%</td>
<td>0%</td>
<td>16,644</td>
<td>$5.50</td>
<td>-</td>
<td>$0.065</td>
<td>$0.123</td>
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<tr>
<td><strong>Storage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Batteries - Lithium Ion - Residential</td>
<td>5</td>
<td>11.4%</td>
<td>7%</td>
<td>4,650</td>
<td>$4.00</td>
<td>$50.00</td>
<td>$-</td>
<td>$0.429</td>
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<tr>
<td>Batteries - Lithium Ion - Commercial/Industrial</td>
<td>10</td>
<td>11.4%</td>
<td>7%</td>
<td>9,300</td>
<td>$3.00</td>
<td>$50.00</td>
<td>$-</td>
<td>$0.335</td>
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<tr>
<td>Thermal - Ice-based technologies</td>
<td>2</td>
<td>12.3%</td>
<td>5%</td>
<td>2,052</td>
<td>$0.59</td>
<td>$23.00</td>
<td>$-</td>
<td>$0.073</td>
</tr>
<tr>
<td><strong>Demand Response</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand Response - Base Interruptible Program</td>
<td>1</td>
<td>2.1%</td>
<td>0%</td>
<td>180</td>
<td>$-</td>
<td>$102.00</td>
<td>$-</td>
<td>$0.567</td>
</tr>
<tr>
<td>Demand Response - Capacity Bidding Program</td>
<td>1</td>
<td>2.1%</td>
<td>0%</td>
<td>180</td>
<td>$-</td>
<td>$59.39</td>
<td>$0.045</td>
<td>$0.375</td>
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<tr>
<td>Demand Response - Scheduled Load Reduction Program</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>$0.100</td>
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<tr>
<td><strong>Energy Efficiency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy Efficiency - Residential</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>$0.033</td>
</tr>
<tr>
<td>Energy Efficiency - Commercial/Industrial</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>$0.055</td>
</tr>
<tr>
<td>Energy Efficiency - Low Income</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>$0.142</td>
</tr>
<tr>
<td><strong>TOTALS &amp; WEIGHTED AVERAGES (Visible Rows Only)</strong></td>
<td>121</td>
<td>1,488</td>
<td>180,106</td>
<td>$2.54</td>
<td>$20.31</td>
<td>$0.00</td>
<td>$0.169</td>
<td></td>
</tr>
<tr>
<td><strong>GRAND TOTALS &amp; WEIGHTED AVERAGES</strong></td>
<td>121</td>
<td>1,488</td>
<td>180,106</td>
<td>$2.54</td>
<td>$20.31</td>
<td>$0.00</td>
<td>$0.169</td>
<td></td>
</tr>
</tbody>
</table>

### LCOE of total portfolio:
$0.169/kWh over 20 years
## BTM LCOE Tool - Calculator Tab

The BTM LCOE Tool - Calculator Tab allows the user to select a DER/DSM technology type from a dropdown list (yellow cells) and adjust any of the input associated with that technology (grey cells) to see the effect on LCOE. The user can also adjust the analysis period or discount rate.

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>Year</th>
<th>Delivered Energy (kWh)</th>
<th>Capital Cost ($)</th>
<th>Annual Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource: Thermal - Ice-based technologies</td>
<td>0</td>
<td>0</td>
<td>$1,180,000</td>
<td>-</td>
</tr>
<tr>
<td>Capacity (MW):</td>
<td>1</td>
<td>1,935,849</td>
<td>$</td>
<td>$43,396</td>
</tr>
<tr>
<td>Capacity Factor:</td>
<td>2</td>
<td>1,826,273</td>
<td>$</td>
<td>$40,940</td>
</tr>
<tr>
<td>Conversion Losses:</td>
<td>3</td>
<td>1,722,899</td>
<td>$</td>
<td>$38,622</td>
</tr>
<tr>
<td>Capital Cost ($/W):</td>
<td>4</td>
<td>1,625,376</td>
<td>$</td>
<td>$36,436</td>
</tr>
<tr>
<td>Annual Fixed Cost ($/kW-yr):</td>
<td>5</td>
<td>1,533,374</td>
<td>$</td>
<td>$34,374</td>
</tr>
<tr>
<td>Annual Variable Cost ($/kWh):</td>
<td>6</td>
<td>1,446,579</td>
<td>$</td>
<td>$32,428</td>
</tr>
<tr>
<td>Analysis Period (years):</td>
<td>7</td>
<td>1,364,697</td>
<td>$</td>
<td>$30,593</td>
</tr>
<tr>
<td>Discount Rate:</td>
<td>8</td>
<td>1,287,450</td>
<td>$</td>
<td>$28,861</td>
</tr>
<tr>
<td>LCOE:</td>
<td>9</td>
<td>1,214,576</td>
<td>$</td>
<td>$27,227</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>1,145,826</td>
<td>$</td>
<td>$25,686</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>1,080,958</td>
<td>$</td>
<td>$24,232</td>
</tr>
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<td></td>
<td>12</td>
<td>1,019,781</td>
<td>$</td>
<td>$22,861</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>962,058</td>
<td>$</td>
<td>$21,567</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>907,602</td>
<td>$</td>
<td>$20,346</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>855,228</td>
<td>$</td>
<td>$19,194</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>807,752</td>
<td>$</td>
<td>$18,108</td>
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<tr>
<td></td>
<td>17</td>
<td>762,040</td>
<td>$</td>
<td>$17,083</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>718,905</td>
<td>$</td>
<td>$16,116</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>678,213</td>
<td>$</td>
<td>$15,204</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>639,823</td>
<td>$</td>
<td>$14,343</td>
</tr>
</tbody>
</table>

Allows the user to select a DER/DSM technology type from a dropdown list (yellow cells) and adjust any of the input associated with that technology (grey cells) to see the effect on LCOE. The user can also adjust the analysis period or discount rate.
Overview of Findings

- **BTM Solar** LCOEs range from $0.115/kWh to $0.198/kWh
- **Energy Efficiency** has a low overall LCOE, ranging from $0.033/kWh to $0.142/kWh
  - Energy Efficiency is less predictable and dispatchable than other DER/DSM resources like Energy Storage or Demand Response
- **Demand Response** has the highest costs, ranging from $0.1/kWh to $0.567/kWh
  - Higher costs of Demand Response are offset by the higher value associated with dispatchability during high-cost peak load periods
- **BTM Energy Storage** had a wide range, the range is from $0.073/kWh to $0.429/kWh
  - Ice-based Cold Thermal technology had a notably low LCOE of $0.073
Clear and Transparent Reporting

Zoe Elizabeth
Principal, EcoShift Consulting, LLC
PRESENTATION OVERVIEW

1. Mandatory reporting
   - Power content label
   - GHG Intensity
   - (Integrated resource planning)

2. Voluntary GHG reporting
   - GHG intensity

3. Voluntary performance metrics

4. Reporting standards and quality
CALIFORNIA THANKS YOU!
In 2016, MCE customers like you added more renewable energy to the grid.

### 2016 POWER CONTENT LABEL

<table>
<thead>
<tr>
<th>ENERGY RESOURCES</th>
<th>2016 MCE LIGHT GREEN POWER MIX</th>
<th>2016 MCE DEEP GREEN POWER MIX</th>
<th>2016 CA POWER MIX** (for comparison)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligible Renewable</td>
<td>55%</td>
<td>100%</td>
<td>25%</td>
</tr>
<tr>
<td>Biomass &amp; biowaste</td>
<td>5%</td>
<td>25%</td>
<td>2%</td>
</tr>
<tr>
<td>Geothermal</td>
<td>0%</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td>Small hydroelectric</td>
<td>7%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>Solar</td>
<td>9%</td>
<td>25%</td>
<td>8%</td>
</tr>
<tr>
<td>Wind</td>
<td>34%</td>
<td>50%</td>
<td>9%</td>
</tr>
<tr>
<td>Coal</td>
<td>0%</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td>Large Hydroelectric</td>
<td>13%</td>
<td>0%</td>
<td>10%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>12%</td>
<td>0%</td>
<td>37%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>0%</td>
<td>0%</td>
<td>9%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Unspecified sources of power*</td>
<td>19%</td>
<td>0%</td>
<td>15%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.

** Percentages are estimated annually by the California Energy Commission based on the electricity sold to California consumers during the identified year.
AB 1110

- *GHG Emissions Intensity Reporting: Retail Electricity Suppliers* (Ting, 2016).
- Requires all retail electricity suppliers to report on the GHG intensity of their retail products beginning in 2020 (later for EBCE and other new CCA’s).
- Rulemaking led by CEC is still in process.
- Final rule will lay out methodology for calculating GHG intensity
  - Draft proposal suggests that unbundled renewable energy credits (RECs) will be considered to have the GHG intensity of “unspecified power.”
  - CCA’s with significant unbundled RECs in their portfolio could exceed RPS standards, but report relatively high GHG intensity.
Developing a third-party verified emissions factor through The Climate Registry, would allow EBCE customers to calculate their own carbon footprint using EBCE specific GHG intensity.

<table>
<thead>
<tr>
<th>Greenhouse Gas Emissions</th>
<th>Utility</th>
<th>Emissions Factor (lbs/CO2/MWh)</th>
<th>PG&amp;E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2014 Emission Rates</strong></td>
<td><strong>Sonoma Clean Power</strong></td>
<td><strong>224.38</strong></td>
<td><strong>434.92</strong> (PG&amp;E Average)</td>
</tr>
<tr>
<td></td>
<td>(CleanStart)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Sonoma Clean Power</strong></td>
<td><strong>51.00</strong></td>
<td><strong>404.51</strong> (PG&amp;E Average)</td>
</tr>
<tr>
<td></td>
<td>(EverGreen)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2015 Emission Rates</strong></td>
<td><strong>Sonoma Clean Power</strong></td>
<td><strong>217.57</strong></td>
<td><strong>404.51</strong> (PG&amp;E Average)</td>
</tr>
<tr>
<td></td>
<td>(CleanStart)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Sonoma Clean Power</strong></td>
<td><strong>57.00</strong></td>
<td><strong>404.51</strong> (PG&amp;E Average)</td>
</tr>
<tr>
<td></td>
<td>(EverGreen)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The following performance metrics will provide more information, context and transparency:

- Total direct jobs created through EBCE power procurement, energy efficiency, demand response and energy storage programs
- Dollars invested in community programs (and a description of those programs)
- Direct jobs created through EBCE community investments
- MWh’s of new renewable generation created through EBCE procurement and programs
- MWh’s electricity reduced through demand response and EE programs
How information is reported is as important as what information is reported.

- Be clear, direct, concise.
- Display all metrics in one place on the website.
- Include methods used for calculations.
- Develop annual report as an addendum to web-reporting.
- Report all metrics annually.
- Develop additional metrics when new programs are developed.
Thank You!

Zoe Elizabeth
EcoShift Consulting, LLC

zelizabeth@ecoshift.com
Discussion

Community Engagement Symposium
March 26, 2018
East Bay Community Energy
Local Development Business Plan

Overview of New Draft Work Products
Part II

LDBP Project Team:

Community Engagement Symposium
March 26, 2018

Special Advisors:
Betony Jones & Gary Calderon
New Draft LDBP Work Products*- Part II

- Considerations for Local Approvals- Jonathan Whelan, Optony
- New Generation- Jonathan Whelan, Optony

*Important Note- All of the Draft LDBP Work Products can be accessed here:  
https://ebce.org/local-development-business-plan/
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Jonathan Whelan
Director of Operations
Optony
Overview- Considerations for Local Approvals

Purpose of this LDBP Report

- Assess local jurisdictional approval processes that affect solar development in the County
  - Building permits
  - Zoning ordinances
  - CEQA
- Make recommendations for improvements to streamline development and guide development to best benefit EBCE and distribution grid
  - How can we reduce administrative burden on developers?
  - How can we make sure building and planning staff have all the tools available to efficiently make determinations (without jeopardizing their responsibilities to ensure the safety of these systems and to maintain the integrity of public land)?

Note: This report is focused on solar PV, since it is the predominant DER technology being deployed in the County in terms of quantity of approvals. The recommendations are applicable to review/approval of solar projects, though there is some overlap with approvals for other DER technologies.
Background

Importance of “Soft Costs”

- Rapid declines in solar hardware costs in recent years have left “soft costs” as the main cost driver
  - Soft costs are anything that is not physical hardware
  - According to the DOE, soft costs account for 64% of the cost of a residential solar PV installation, on average
  - This report focuses on the soft cost areas that local jurisdictions can impact (mostly the top 2 items in the stack at the right)
  - Proportionately higher for small residential solar systems—smaller capacity over which to spread costs

![SOFT COSTS BREAKDOWN](https://www.energy.gov/eere/articles/soft-costs-101-key-achieving-cheaper-solar-energy)
Local Permitting: Background

Local permitting adds expense to residential solar projects

$2,516 per residential project, on average, according to a 2011 SunRun installer study

Permit fee is a relatively small portion; bigger contributor is preparing application and multi-touch waiting for approvals

Some previous work has been done to address speed in the County

East Bay Green Corridor worked to streamline permitting in 2011

2014 AB 2188

<table>
<thead>
<tr>
<th>City</th>
<th>Residential (5 kW)</th>
<th>Small Commercial (100 kW)</th>
<th>Large Commercial (1 MW)</th>
<th>Utility (10 MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda County</td>
<td>$280</td>
<td>$2,078</td>
<td>$18,363</td>
<td>$77,563</td>
</tr>
<tr>
<td>Alameda</td>
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<td>$1,813</td>
<td>$1,813</td>
<td>$1,813</td>
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<tr>
<td>Albany</td>
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<td>$10,857</td>
<td>$88,357</td>
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<tr>
<td>Berkeley²</td>
<td>$26</td>
<td>$12,014</td>
<td>$94,194</td>
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</tr>
<tr>
<td>Dublin</td>
<td>$250</td>
<td>$1,432</td>
<td>$6,150</td>
<td>$51,150</td>
</tr>
<tr>
<td>Emeryville</td>
<td>$250</td>
<td>$1,350</td>
<td>$6,150</td>
<td>$51,150</td>
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<tr>
<td>Fremont</td>
<td>$237</td>
<td>$90/hr</td>
<td>$90/hr</td>
<td>$90/hr</td>
</tr>
<tr>
<td>Hayward</td>
<td>$300</td>
<td>$1,350</td>
<td>$6,150</td>
<td>$51,150</td>
</tr>
<tr>
<td>Livermore</td>
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<td>$1,418</td>
<td>$6,218</td>
<td>$51,218</td>
</tr>
<tr>
<td>Newark</td>
<td>$360</td>
<td>$2,327</td>
<td>$12,502</td>
<td>$98,527</td>
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<tr>
<td>Oakland</td>
<td>$546</td>
<td>$677</td>
<td>$939</td>
<td>$939</td>
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<tr>
<td>Piedmont</td>
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<td>$300</td>
<td>$300</td>
<td>$300</td>
</tr>
<tr>
<td>Pleasanton</td>
<td>$250</td>
<td>$1,350</td>
<td>$5,850</td>
<td>$50,850</td>
</tr>
<tr>
<td>San Leandro</td>
<td>$267</td>
<td>$973</td>
<td>$5,773</td>
<td>$50,773</td>
</tr>
<tr>
<td>Union City</td>
<td>$431</td>
<td>$2,109</td>
<td>$5,669</td>
<td>$21,832</td>
</tr>
</tbody>
</table>

Legend: g = East Bay Green Corridor participant, a = Adopted AB 2188 ordinance
Note: City of Berkeley fees derived using a fee calculator on City’s website, may not be accurate
Local Permitting: Recommendations

Push for adoption of AB 2188 Toolkit

- AB 2188 (2014), the *Expedited Solar Permitting Act*, required all jurisdictions in the state to pass an ordinance creating an expedited solar permit process for small systems.
- There is a Toolkit of standardized documents to use for this purpose.
  - Adoption of all toolkit documents by all County jurisdictions would create a standard permit process for residential rooftop systems, reducing installer overhead and lowering system costs.
  - A working group with reps from each jurisdiction and from industry could implement this in under 1 year.

Modify permit fee structure for larger systems

- Valuation-based permit fees result in high costs for larger systems that are out of sync with actual cost to administer permit.
- Base the fee on cost recovery, or put in ceilings on valuation-based fees.
- Example: Piedmont has a fixed cost for all solar permits.
**County Zoning: Background**

**Land-Use Considerations in Alameda County**

- Larger PV arrays, which are a part of the LDBP strategy, are likely to be located on open land administered by the County.
- There are many competing interests and land-use constraints that must be considered.
  - Farmland
  - Williamson Act parcels
  - Wind development priority zones

*Map of major land use constraints in East Alameda County, from Community Development Agency staff*
County Zoning: Recommendations

Develop Amendment to East County Area Plan
- County investigated this topic in 2011
  - Planning Department laid out a series of new policies for large solar arrays, with a goal of amending the County General Plan
  - Process was suspended indefinitely before completion

Goals
- Formalize where solar arrays are permitted and/or conditional uses
- Formalize the review and approval process for solar applications
- Establish “renewable energy zones” hotspot map where development of renewable facilities is prioritized
  - EBCE involvement could ensure that hotspot consideration includes electrical high congestion and load pocket areas
CEQA: Background

About CEQA (California Environmental Quality Act)
- Requires state and local public agencies to analyze environmental impacts of physical development projects
- No state level enforcement, each public agency entrusted with upholding

CEQA for Solar
- Applicability
  - Rooftop systems statutorily exempt from CEQA review
  - Carport systems also exempt if over existing lots (some restrictions)
  - Some categorical exemptions can apply
- Lead agency conducts Initial Study which leads to either:
  - Negative Declaration (no impacts)
  - Mitigated Negative Declaration (potential impacts, but mitigations can alleviate impact)
  - Environmental Impact Report (impacts beyond mitigation, further study needed)
CEQA: Recommendations

Implications for Large Solar Arrays

- Larger (multi-MW) arrays will often require an Environmental Impact Review (EIR)
  - Lengthy and time-consuming (often >1 year)
  - Must solicit public comments
- Many construction-phase mitigations to be followed
  - Dust control measures, limiting idle time of diesel equipment, flagging work area boundaries, periodic wildlife inspections by biologist, fire risk management plans, etc

Recommendations

- Direct projects to favorable Neg Dec or MND “renewable energy zones”
- Maintain list of typical mitigation measures, so developers can include this in initial plan and lessen likelihood of triggering EIR requirement
- Plan for lengthy approval processes when considering large scale solar as a component of EBCE’s IRP
East Bay Community Energy
Local Development Business Plan:
New Generation

LDBP Project Team:

ALH Urban & Regional Economics

Community Engagement Symposium
March 26, 2018

Special Advisors:
Betony Jones & Gary Calderon
Overview

Purpose of this LDBP Report

- Support the development of EBCE’s Integrated Resource Plan (IRP) with projections and considerations of new energy sources in the service territory, specifically those associated with proposed LDBP initiatives
  - IRP needs to plan for long-term power and energy procurement, while integrating new generation sources
  - IRP can limit more-expensive short-term energy procurements by offsetting needs with publicly- or privately-procured dispatchable distributed energy resource (DER) assets
- Make recommendations for program implementation parameters and timing to best benefit EBCE, distribution grid, and community
  - Recommendations and projections will change based on timing, budget, and effectiveness of LDBP (and other) program implementation, which should be subject to regular review
  - See other LDBP sections, including EcoShift scenario-modeling tool, for more detail and modeling ability around proposed programs
Background

Importance of integration into IRP

- Impact of expected new generation on contracted energy needs
- Timing of new generation
  - Phasing plan for implementation
  - Time-of-day generation: intermittent or dispatchable
- Ultimate goal of EBCE/CCE:
  - Service territory meets all energy needs through local DER, with CCE responsible for managing dispatch of stored energy to meet those needs at the right time and place
  - Realistic?
  - Creates appropriate framing of DER deployment onto grid
  - Focus is on integrating new DER with energy storage and capability to remotely control discharge scheduling
    - Creates framework for future Virtual Power Plant (VPP)
Initial Projections

- Estimated, based on draft LDBP sections
- Will change based on final program details, implementation, budgets, macro-economic forces
- Incentive levels should be regularly measured and adjusted to quantify uptake and determine if changes are necessary or desired

<table>
<thead>
<tr>
<th>Technology</th>
<th>Total Potential Generation Capacity</th>
<th>Planned Generation Capacity through LDBP Programs in 5-Year Planning Window (estimated)</th>
<th>LCOE ($/kW)\textsuperscript{1}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar</td>
<td>650 MW (sites &gt; 1000 kW-AC)</td>
<td>144 MW</td>
<td>$0.10-$0.156</td>
</tr>
<tr>
<td>Wind</td>
<td>110 MW</td>
<td>12 MW</td>
<td>$0.10-$0.24</td>
</tr>
<tr>
<td>Biofuels</td>
<td>11 MW\textsuperscript{2}</td>
<td>0 MW</td>
<td>$0.092-$0.119</td>
</tr>
<tr>
<td>TOTAL</td>
<td>771 MW</td>
<td>156 MW</td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{1}LCOE: Levelized Cost of Energy

Graphic from draft LDBP section: New Generation
Initial Projections - Solar

- Solar Siting Survey identified 650 MW of potential, just on 1 MW+ sites
  - Much more potential on small sites
  - Includes limitations based on electrical feeder sizing

- 144 MW of new solar projected over 5-yr planning horizon
  - Includes both proposed Net Energy Metering (NEM) and Feed-In Tariff (FIT) programs
  - Existing PG&E NEM has led to ~30 MW new solar per year, for last 3 years

- Average service territory demand
  - 500-1700 MW (could meet 25-30% min avg. daytime load)
  - More in summer, less in winter
  - Needs energy storage and dispatchability to avoid potential curtailment, utilize (and monetize) ancillary grid benefits, smooth load curve

Graphic from draft LDBP section: New Generation
Initial Projections - Solar

- Considerations about potential for 144 MW new local solar:
  - In short-term, solar demand is unlikely to be significantly reduced
    - Tariffs will be largely offset by price reductions
    - NEM value will continue to exist
  - After NEM, successor tariff (like Value of Distributed Energy Resources (VDER)) will still encourage distributed solar installations
    - NEM customers are important to EBCE
      - Either NEM or migration away from EBCE leads to CCE load reduction
      - Support EBCE goal of maintaining and engaging DER customers:
        - Incent use of integrated storage and telemetry
        - Get highest EBCE value out of new DER
        - Use program parameters to enable CCE dispatchability and associated benefits and opportunities
Initial Projections - Wind/Biofuels

- Focus on draft report was on new, distributed single-turbine development
  - Opportunity exists to re-purpose existing Altamont wind turbines or locations—increase generation from wind sources
- Biofuel studied by local StopWaste Project
  - Not extensive opportunities locally
  - Local preference to use for local waste-hauling fleets

<table>
<thead>
<tr>
<th>Technology</th>
<th>Total Potential Generation Capacity</th>
<th>Planned Generation Capacity through LDBP Programs in 5-Year Planning Window (estimated)</th>
<th>LCOE ($/kW)²</th>
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<td>156 MW</td>
<td></td>
</tr>
</tbody>
</table>

Graphic from draft LDBP section: Wind Siting Survey
Phased New Generation

- Timing of the deployment of planned new generation and yield estimate to enable planning on energy (MWh/kWh) basis
- Projections subject to change based on actual deployment
  - Key takeaway: EBCE procurement plan has to be ready for small but significant local new generation
- At ~12 MWh per utility customer: 240,000 MWh from DER within 5 years is equivalent to providing all energy needs to 20,000 of the ~560,000 current planned EBCE customers, or 3-4% of total expected annual energy usage

<table>
<thead>
<tr>
<th>Year</th>
<th>Solar (MWh)</th>
<th>Wind (MWh)</th>
<th>Annual Total (MWh)</th>
<th>Cumulative Total (MWh)</th>
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<tbody>
<tr>
<td>Year 1</td>
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<td>0</td>
<td>7,500</td>
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<tr>
<td>Year 2</td>
<td>36,000</td>
<td>2,000</td>
<td>38,000</td>
<td>45,500</td>
</tr>
<tr>
<td>Year 3</td>
<td>72,000</td>
<td>8,000</td>
<td>80,000</td>
<td>125,500</td>
</tr>
<tr>
<td>Year 4</td>
<td>70,500</td>
<td>10,000</td>
<td>80,500</td>
<td>206,000</td>
</tr>
<tr>
<td>Year 5</td>
<td>30,000</td>
<td>4,000</td>
<td>34,000</td>
<td>240,000</td>
</tr>
</tbody>
</table>

Graphic from draft LDBP section: New Generation
Incentives and Adjustments

- LDBP incentives and adders: Provide value to local DER, with particular focus on projects with features that meet EBCE financial and community goals
  - Include low-income adders for social equity; municipal agencies who are ineligible for federal tax benefits; workforce adders to support livable wages; and supply-shift adders that incent west-facing solar, energy storage, and wind
- Re-visit program effectiveness/ineffectiveness regularly
  - Make adjustments to incentives on clear, transparent, and gradual timelines
  - Development community and customers need to understand dates certain, grandfathering of incentives, and length of terms of incentives
Framework for Future Planning

- Plan NEM successor tariff
  - Consider model of New York VDER tariff, which includes value of environmental and locational benefits with energy value

- Prepare for eventual Virtual Power Plant approach
  - Build energy storage and dispatchability capabilities into new generation

- CCE 2.0
  - EBCE can be a leader in the development of a VDER tariff that can set an important precedent as we prepare for the possibility of a post-NEM energy valuation structure
  - VPP capabilities open the door for microgrid grants and opportunities
  - Focus on community benefits with new commitment
Recommendations

- **PPAs**
  - Focus on local generation, using 1-3 MW FIT projects and larger 3-30 MW projects on land in the service territory
  - Support integration of energy storage and capability for remote dispatchability
  - Include buyout clauses for future local control of resources
  - Prepare for a VPP reality by working with the distribution system operator (PG&E) to determine ideal siting opportunities to meet load and congestion needs and opportunities

- **Credit rating and credit enhancement**
  - Utilize public-partnerships, including through PPAs, to leverage tax benefits, spur local investment, and meet community goals, all before EBCE has fully developed its own credit rating
  - For example, the Oakland Clean Energy Initiative is working to replace a local jet fuel-powered peaker plant, with local DER plus storage
    - Represents rare opportunity to specifically address local pollution reduction and to provide associated local health benefits
Recommendations (continued)

- Pay for Performance contracting
  - Leverage private funds with pay-for-performance contracting for services that might include energy efficiency, demand response, load-shaping or shifting, and fuel-switching
  - Address EBCE requirements and opportunities while minimizing risk and capital investment
  - Could include innovative pilots around blockchain or microgrids that may interest EBCE, while potentially too risky for EBCE to desire to spend its own funds

- Market Responsive Pricing (MRP)
  - Evaluate and adjust incentive and payment levels based upon market uptake and the meeting of EBCE financial and community goals
  - Again--need to be clear, transparent, and gradual in making adjustments in order to enable the development community to effectively model project benefits for prospective customers

*Graphic from draft LDBP section: Wind Siting Survey*
Recommendations (continued)

- Community Solar
  - With local public agency partners, develop larger DER systems with subscription opportunities for all customers in the load service territory
    - Low-income / low-credit customers, or those without suitable roof or other solar installation location
  - Structure 1: Enhanced Market Access
    - Green energy premium price: MCE Clean Energy Local Sol, SMUD Solar Shares
    - Roof lease: LADWP LAANE Program
  - Structure 2: Community Ownership
    - Community Shared Solar model that links actual system production and value to customer subscriber bills
    - After tax benefits have been monetized, a buyout could enable ownership flip to EBCE or community organizations who could provide credits and some level of system ownership to subscribers
    - On-bill financing, low-income carve-out, storage integration
    - Example: Proposed East Bay Community Shared Solar Collaborative
Recommendations (continued)

- VPP aggregation and regulatory compliance
  - Plan for near-term or mid-term potential of utilizing and directing dispatchable local DER
    - The technology exists and is being used, including in at least one city-wide roll-out in Australia
  - Dispatchable DER can meet energy storage mandates, resource adequacy requirements, power demand needs, RPS and Local Portfolio Standards goals, job creation goals, while also opening opportunities for EBCE to seek revenues from congestion revenue rights, energy sales to neighboring load-service entities, and planned ancillary grid benefits that can be monetized

Graphic from draft LDBP section: Wind Siting Survey
Conclusion

- Work closely with developers of IRP and procurement team to understand current and planned energy generation and needs
- Offer enhanced NEM and FIT with adders that incent designs and construction that support EBCE, PG&E, and community goals
- As often as possible, incent and plan for energy storage and dispatchability with all programs and procurements, through PPAs and future VPP planning
- Partner with public and private collaborators to enhance credit, reduce investment and risk, including through pay-for-performance models
- Explore community solar programs to spur local development and expand accessibility to renewable, local energy sources to all community residents
- Plan for measurement and verification of program effectiveness, and adjust program parameters appropriately, including through Market Responsive Pricing
- Adjust parameters clearly and gradually for industry and consumers to be able to plan
Discussion

Community Engagement Symposium
March 26, 2018

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ALH Econ
ALH Urban & Regional Economics

Special Advisors:
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East Bay Community Energy
Local Development Business Plan

Overview of New Draft Work Products
Part III

LDBP Project Team:
Community Engagement Symposium
March 26, 2018

Special Advisors:
Betony Jones & Gary Calderon
New Draft LDBP Work Products*- Part III

- Integrating LDBP with Integrated Resource Planning (*Task 6*)-
  Samuel Irvine, Optony

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Sam Irvine, MBA/MPA
Senior Program Manager
Optony
Integrated Resource Planning
In Task 6

1. What is an IRP?
2. Three legged stool of an IRP
3. Policy Requirements under SB350
4. IRP Methodologies
5. Integrating IRP with the LDBP
6. Procurement and Scheduling
7. Risks and Mitigation
8. Stability and Reliability
What’s an IRP?

IRP is a planning document that defines a Utility’s:

- Policy Goals (energy mix)
- Operational Constraints
- Energy priorities and resource choices
- Includes Customer-side resources

*The LDBP is **not** the IRP
But it does recommend local resources for the IRP
Forecasts Demand

- First step in an IRP
- Evaluates energy demand needs in the service area
- Forecast energy prices on the wholesale market
- All at different time horizons

Three Legged Stool of IRPs
Three Legged Stool of IRPs

- Forecasted Demand + Supply = Power needs
- Allows utility to keep lights on, at a low rate in compliance with policy
Three Legged Stool of IRPs

Resource Adequacy

- Fill forecasted needs with energy resources to 115% of total peak load
- Traditionally done at wholesale market where cost is low due to scale
- Energy mix and carbon footprint procurement alongside costs
Three Legged Stool of IRPs

- IRP
- Forecasts
- Resource Adequacy
- Supply
SB350 uses IRPs to ensure utilities meet renewable and EE goals

- Doubling EE savings in the electricity and natural gas sectors by 2030
- 50% renewable electricity procurement goal by 2030
- Goal to reduce GHG emissions 40% below 1990 levels by 2030.

*CEC reviews IRP for LSE’s with a load > 700 GWh/yr to ensure this is happening.*
IRP goals under SB350

• Serves customers energy needs reasonable rates
• Ensures system and local reliability
• Strengthens the diversity, sustainability, and resilience of the grid
• Enhances distribution systems and demand-side energy management and resource options
• Minimizes localized pollution and emissions with early priority on disadvantaged communities
LDBP goals align with IRP goals

LDBP Goals

- Select energy resources that result in economic development and local jobs while meeting RA and supply
- Reduce carbon intensity through customer programs (DSM)
- Meet or exceed RPS standards
- Prevent economic leakage (keeping money local)
- Engagement of community, & offering programs for disadvantaged communities
- Low competitive rates
With goals in mind, a main LDBP question becomes how can supply and demand requirements be met through local energy resources?

- Supply and Demand Recommendations
  - Incentives/Adders including under NEM or FIT
  - Provide New Generation Local Solar and Wind
- Resource Adequacy & Load Management
  - Energy Efficiency
  - Demand Response
  - Energy Storage
Supply and Demand Recommendations

- Include FIT, NEM, DR programs
  - Incentives and adders designed to address market failures while providing flexible local capacity
    - Supply and Demand Management (dispatchability)
    - Projects in DAC/Low Income &
    - Municipal/Non Profit customers
    - Workforce development
Resource Adequacy Management

- Dispatchability is essential for DERs interacting with procurement
- Local RE Capacity is not enough... Just as important are renewables at the right time and place
- GHG reductions depend on timing the energy market, or else renewables risk replacing other renewables, and emissions are not reduced
- RA traditionally comes from Peaker Plants
- Dispatchable assets include:

  - Energy Storage
  - Demand Response
  - Energy Efficiency
Recommended Mechanisms to unlock local DERs as supply or RA tools

1. Tariff Design & Price Signals
2. Control Clauses in PPAs and Energy Contracts
3. Integrated Data Platform
4. Virtual Power Plant (VPP) Aggregation
1. Tariff Design

- Tariffs can change energy consumption behavior incentivizes (TOU)
- Move towards rates that rewards RE for its time and place (VDER)
- Requires sophisticated scheduling coordination
- Can displace Peaker Plant use with renewables, reducing emissions

Source: CAISO
2. Control Clauses

- Built in as language of PPAs, or incentive contracts
- EBCE to send automated price signals to customer to incent dispatchable power or load shaping or shifting services
- Customer can opt-out of price signals
- CARE small storage, 20% state of charge
3. Integrated Data Platform

- database of energy data:
  - weather, market prices, forecast, orange button etc.
- Allows data exchanges between EBCE, Customers, and Portfolio Managers
- Automated or Manual signals to customers or energy traders
Simplified Traditional Power Procurement

Price and Energy Forecasts

Risk Policies

Energy Purchases

Portfolio Manager & Scheduling Coordinator

Wholesale Market
Procurement & Scheduling with a VPP

**Integrated Data platform**
Energy Data, Forecasts, Risk, Total available capacity...

**Local Market - Virtual Power Plant**

- Energy Storage
- Demand Response
- Energy Efficiency
Procurement with Virtual Powerplant

Integrated Data platform
Energy Data, Forecasts, Risk, Total available capacity...

Price Signal

Local Market - Virtual Power Plant

Energy Storage
Demand Response

Energy Efficiency
Procurement with Virtual Powerplant

Integrated Data platform
Energy Data, Forecasts, Risk, Total available capacity...

Price Signal

Energy Dispatch

Local Market - Virtual Power Plant

Energy Storage
Demand Response

Energy Efficiency
Procurement with Virtual Powerplant

Integrated Data platform
Energy Data, Forecasts, Risk, Total available capacity...

Local Capacity Report

Price Signal

Energy Dispatch

Local Market - Virtual Power Plant

Energy Storage
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Energy Efficiency
Procurement & Scheduling with a VPP

Integrated Data platform
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Energy Dispatch

Local Market - Virtual Power Plant
Energy Storage
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Local Capacity Report

Portfolio Manager & Scheduling Coordinator
Procurement & Scheduling with a VPP

Integrated Data platform
Energy Data, Forecasts, Risk, Total available capacity...

Price Signal
Energy Dispatch

Local Market - Virtual Power Plant
Energy Storage, Demand Response

Energy Efficiency

Local Capacity Report

Portfolio Manager / Scheduling Coordinator
Final Settlement

Wholesale Market
Risks and Mitigations

- EBCE is setting best practice by:
  - Contracting a portfolio manager & creating ERM prior to entering the wholesale market
  - ERM is comprehensive and will protect EBCE from risk
  - LDBP Risk supplements with mitigation from local resources.
## Risks and Mitigations

<table>
<thead>
<tr>
<th>Risk</th>
<th>Mitigations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volumetric</td>
<td>Dispatchable assets, fuel switching</td>
</tr>
<tr>
<td>Supplier</td>
<td>Pay for Performance</td>
</tr>
<tr>
<td>Model</td>
<td>External checks, checks in back/mid/front office</td>
</tr>
<tr>
<td>Operational</td>
<td>Training, HR practices</td>
</tr>
<tr>
<td>Market</td>
<td>Reserve Accounts</td>
</tr>
<tr>
<td>Regulatory</td>
<td>Collaborations with other CCAs for advocacy purposes</td>
</tr>
<tr>
<td>Financial</td>
<td>Credit enhancement, collaborative procurement</td>
</tr>
<tr>
<td>Reputation</td>
<td>Competitive rates, Env &amp; Social program impacts</td>
</tr>
</tbody>
</table>
Stability and Reliability

- Grid and operational stability
- Stable rates, reliable service
- View PG&E as a transmission and distribution partner critical to moving power to and through the service area
- Oakland Clean Energy Initiative at Jack London square
Task 6 In summary:

LDBP recommends the use of local resources to supplement wholesale power procurement. The phase in of local DERs with dispatchable features can align environmental and economic requirements of the IRP with local economic development outcomes.
Discussion

Community Engagement Symposium
March 26, 2018

LDBP Project Team:
ALH ECON
ALH Urban & Regional Economics
The Offset Project
Clean Coalition
eco-shift
OPTONY

Special Advisors:
Betony Jones & Gary Calderon
East Bay Community Energy
Local Development Business Plan:

Net Energy Metering (NEM) Strategy

LDBP Project Team:

Community Engagement Symposium
March 26, 2018

Special Advisors:
Betony Jones & Gary Calderon
Why offer NEM?

• Without NEM, opt-out risk increases

• Expectation of offering; some CCEs offer enhancements to support development

• Support local generation and job-creation

• Local demand curve can accept more DER in the short-term

• Use NEM structure to incent storage and other solutions to help manage the neck and tail of the duck curve
**EBCE Enhanced NEM Adders**

**Other CCAs:** MCE, PCE, SCP offer $0.01/kWh for export; SVCE $0.008/kWh if subscribing to Green Prime premium product

**EBCE:**
- **Export Adder** $0.005/kWh
  For all existing and new NEM customers (prevent opt-out)

- **Community Benefit Adder:** $0.005/kWh
  Additional incentive to income-qualified residential customers and local tax-exempt entities who may otherwise not be able to access solar installations

- **Workforce Adder:** $0.005/kWh
  Addresses the pressing desire in the EBCE community to incent projects that use skilled local labor paid at livable wages

- **Supply-Shift Adder:** $0.005/kWh
  Incents west-facing solar, small wind, energy storage—with capacity-sharing

*Qualified projects only get one adder per category
Room for more adders overtime*
Additional NEM Program Parameters

- Transition existing customers after true-up date
- True-up on a monthly billing basis, rather than on annual basis
- Pay-out credits in late Spring
- Clear term of NEM adder eligibility
- Plan for NEM successor tariff (Value of Distributed Energy Resources - VDER)
Initial NEM as Approved by Board

**Export and Surplus Credit**

<table>
<thead>
<tr>
<th>NEM Customer</th>
<th>Export Credit</th>
<th>Surplus Credit</th>
<th>Compared to PG&amp;E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing at Enrollment</td>
<td>Retail based on product selected</td>
<td>Match PG&amp;E NSC offer ($0.026-$0.035/kWh)</td>
<td>Same</td>
</tr>
<tr>
<td>New after Enrollment</td>
<td>Retail</td>
<td>Retail capped at $2.5k or NSC without a cap</td>
<td>Better</td>
</tr>
<tr>
<td>Low Income (New only)</td>
<td>Retail + $0.01/kWh</td>
<td>Retail + $0.01/kWh</td>
<td>Better</td>
</tr>
<tr>
<td>Municipal (New only)</td>
<td>Retail + $0.01/kWh</td>
<td>Retail + $0.01/kWh</td>
<td>Better</td>
</tr>
<tr>
<td>Workforce (New only)</td>
<td>Implementation considerations under review</td>
<td>Better</td>
<td></td>
</tr>
<tr>
<td>Supply-Shift (New only)</td>
<td>Implementation considerations under review</td>
<td>Better</td>
<td></td>
</tr>
</tbody>
</table>

- **Adders on export credit:**

<table>
<thead>
<tr>
<th>Adder</th>
<th>Amount / kWh</th>
<th>Eligibility</th>
<th>Proposed Initial NEM Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>$0.005</td>
<td>All NEM customers</td>
<td>No adder, but improve surplus credit</td>
</tr>
<tr>
<td>Community</td>
<td>$0.010</td>
<td>New NEM customers</td>
<td>TBD but noted in initial policy</td>
</tr>
<tr>
<td>Workforce</td>
<td>$0.005</td>
<td>New NEM customers</td>
<td>TBD but noted in initial policy</td>
</tr>
<tr>
<td>Supply-Shift</td>
<td>$0.005</td>
<td>New NEM customers</td>
<td>TBD but noted in initial policy</td>
</tr>
</tbody>
</table>

- Limited resources should be focused on
  - New installations
  - Hard-to-reach communities where the market has failed to deliver significant penetration
  - Municipal customers where savings is immediately reinvested into community services, like schools
  - Supporting local workforce

- Monthly billing with annual cash-out in Spring
- Enrollment per True-Up date
In Discussion, Based on Public Comments

• Higher value for NEM+Storage adder (or link to kW capacity, instead of export energy)
• New/better valuation mechanism for storage exports
• Forego EBCE control of NEM+Storage—instead offer monetary incentives (price signals) for desired CCE utilization
• Storage-friendly rate design
• Workforce adder (keep as “carrot”, not “stick”)
• Clarification on adder terms and grandfathering
• More discussion around proposed transition to VDER tariff
• Virtual Net Energy Metering (VNEM)
• Net Energy Metering Aggregation (NEM-A)
• Premium value for Net Surplus Compensation (NSC)
East Bay Community Energy
Local Development Business Plan:

Agency as Developer- Collaborative Procurement

LDBP Symposium
March 26, 2018

LDBP Project Team:

ALHI ECON
ALH Urban & Regional Economics

The Offset Project
Clean Coalition
eco-shift CONSULTING
OPTONY

Special Advisors:
Betony Jones & Gary Calderon
Introduction

- What does “Agency as Developer” mean?
  - Now: “Collaborative Procurement”
- Context
- Program Goals:
  - Offer low-cost means of stimulating local energy development
  - Create standardized procurement approach for meeting EBCE needs and goals through local collaboration
- Method: Pooled Procurement
  - Pool procurement between like sites and assets
  - Coordinate with Joint Powers Authority member agencies to find opportunities
  - Take advantage of economies of scale in procurement and transactions
<table>
<thead>
<tr>
<th>Small Cities Climate Action Partnership (ScCAP)</th>
<th>Silicon Valley Renewable Energy Procurement (SV-REP)</th>
<th>Regional Renewable Energy Procurement (R-REP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany, Piedmont, El Cerrito, San Pablo</td>
<td>45 sites, 9 agencies, 1 RFP</td>
<td>186 sites, 31 MW, including in EBCE territory</td>
</tr>
<tr>
<td></td>
<td>12 MW Constructed</td>
<td></td>
</tr>
<tr>
<td>- Outcomes -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Lower costs</td>
<td>• 12-14% lower cost than one-off similar projects</td>
<td>• 13 MW built to-date with more in construction/dev.</td>
</tr>
<tr>
<td>• Save staff time</td>
<td>• 50-75% lower admin + legal costs</td>
<td>• ALCO, Oakland, Fremont, Cal, Berkeley, etc.</td>
</tr>
<tr>
<td>• Utilize economies of scale and purchasing power</td>
<td>• Better negotiated contract terms and conditions</td>
<td>• Replicated by Fed Gov, also in NY and new areas</td>
</tr>
<tr>
<td>• Open door for procurement for small cities and sites that would otherwise not gain industry interest</td>
<td>• Best Practices Guide for Collaborative Solar Procurement</td>
<td></td>
</tr>
</tbody>
</table>
**SEED Fund**

- Removes barrier to entry, enables self-sustaining program
- Covers the cost of feasibility analysis and procurement
- Third party covers the upfront cost, in this case CSI
- **Only if** projects happen would money be reimbursed to the “seed” revolving fund
- No financial risk for Agencies

<table>
<thead>
<tr>
<th>SEED FUND LOCATION:</th>
<th>NORTH SF BAY</th>
<th>MONTEREY BAY</th>
<th>SIERRA MOUNTAINS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LEAD AGENCY</strong></td>
<td>City of San Rafael</td>
<td>County of Santa Cruz</td>
<td>County of Amador (proposed)</td>
</tr>
<tr>
<td><strong>CONVENER</strong></td>
<td>Marin Clean Energy Practitioners</td>
<td>Association of Monterey Bay Area Governments</td>
<td>Sierra Business Council</td>
</tr>
<tr>
<td><strong>FUNDING BY</strong></td>
<td>California Solar Initiative</td>
<td>SEED Fund North Bay</td>
<td>SEED Fund Monterey Bay, US Department of Energy</td>
</tr>
<tr>
<td># OF RFP PARTICIPANTS</td>
<td>13</td>
<td>8</td>
<td>6-10 (target)</td>
</tr>
<tr>
<td># OF SITES (BUNDLED)</td>
<td>29</td>
<td>28</td>
<td>20-25 (target)</td>
</tr>
<tr>
<td># OF MW IN RFP</td>
<td>~ 4.3 MW</td>
<td>~ 7.0 MW</td>
<td>3-5 (target)</td>
</tr>
<tr>
<td># OF MW CONTRACTED</td>
<td>~ 3.1 MW</td>
<td>~ 2.3 MW +</td>
<td>TBD</td>
</tr>
<tr>
<td># OF MW BUILT</td>
<td>~ 1.3 MW +</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>
Benefits of SEED to EBCE

- Support member agencies in reaching long-time sustainability goals
- Provide local energy at or near wholesale rate -> energy bill savings
- Reduce EBCE wholesale procurement needs
- Operate with a small staff and one-time budget expenditure
- Stimulate local economic development
- Build goodwill within community w/ high-visibility co-branded projects
- Competitive advantage in building strong relationship w/ member agencies
- Control procurement processes and locations; understand costs
- Pursues ideal end-goal: local clean energy to meet all demand at all times
- Leaves room for innovation...
  - Target groups, collaborate w/ utility, VPP/EV capability, EBCE procurement
Example: Oakland Clean Energy Initiative

- Innovative Collaborative Procurement with PG&E, as recommended in LDBP ES Contracting Strategy and Agency as Developer sections.
- Joint PG&E/EBCE RFO to procure 20-45 MW’s of energy, capacity, and reliability products
- Will replace an aging, jet-fuel powered peaker plant in Oakland’s Jack London Square
- Directly supports EBCE’s JPA and LDBP goals, and Energy Storage procurement mandate
Solar Siting Survey and Feed-In Tariff

Recommendations for East Bay Community Energy (EBCE)

Craig Lewis
Executive Director
650-796-2353 mobile
craig@clean-coalition.org
Solar Siting Survey deliverables

- Searchable spreadsheet including detailed results and linking to the interactive maps
- Interactive maps in the form of Google Earth .kml files with icons marking structures and aggregations with details available in pop-up windows
  - Google Map versions are also made available
- Summary report of key findings and methodology
Summary of EBCE Solar Siting Survey findings

- Over 650 MW of technical solar siting potential was found on built environments in the projected EBCE service territory that can support at least 1 MW sized projects.
  - Note that the technical solar siting potential will be reduced by constraints that were not considered like structures that cannot support extra weight without significant upgrade and grid bottlenecks that would result in excessive solar curtailment (or require time-shifting dispatchability via energy storage).
- 30% of the total comes from parking lots/garages.
- Extrapolations to lower minimum project sizes:
  - 1.2 GW minimum total potential for projects sized at least 500 kW.
  - 2 GW minimum total potential for projects of at least 100 kW.
SSS interactive map: Alameda County overview
SSS interactive map: Marina Square with ICA
## Solar Siting Survey

### Summary by Sites

<table>
<thead>
<tr>
<th>Count</th>
<th>Sites</th>
<th>Solar W/AC &gt;= 5,000 kW</th>
<th>&gt; and &gt;= 2,000 kW</th>
<th>Less than 2,000 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sites</td>
<td>Sites</td>
<td>Sites</td>
<td>Sites</td>
</tr>
<tr>
<td>252</td>
<td>662,224 kW</td>
<td>20</td>
<td>244,609 kW</td>
<td>71</td>
</tr>
</tbody>
</table>

### Sites

- **Berkeley, CA 94710**
  - 1 site: 5,699 kW
- **Emeryville, CA 94608**
  - 2 sites: 7,637 kW, 5,387 kW, 1,250 kW
- **Oakland, CA 94601**
  - 5 sites: 7,650 kW, 1 site: 2,618 kW, 1 site: 2,921 kW, 1 site: 1,476 kW, 1 site: 1,240 kW, 1 site: 1,240 kW
- **Oakland, CA 94602**
  - 2 sites: 5,712 kW, 1,240 kW
- **Oakland, CA 94603**
  - 2 sites: 2,618 kW, 1 site: 2,250 kW
- **Oakland, CA 94605**
  - 2 sites: 2,921 kW, 1 site: 2,921 kW
- **Oakland, CA 94607**
  - 1 site: 7,650 kW, 1 site: 2,619 kW, 1 site: 2,619 kW
- **Oakland, CA 94621**
  - 11 sites: 53,368 kW, 2 sites: 37,490 kW, 3 sites: 6,748 kW, 6 sites: 9,130 kW
- **San Leandro, CA 94579**
  - 2 sites: 3,734 kW, 1 site: 2,424 kW, 1 site: 1,310 kW
- **San Leandro, CA 94578**
  - 4 sites: 10,882 kW, 1 site: 6,390 kW, 1 site: 2,040 kW, 1 site: 2,452 kW
- **San Leandro, CA 94577**
  - 27 sites: 55,645 kW, 1 site: 34,415 kW, 1 site: 21,230 kW
- **Castro Valley, CA 94546**
  - 1 site: 2,690 kW, 1 site: 2,690 kW
- **San Lorenzo, CA 94580**
  - 2 sites: 2,610 kW, 1 site: 7,675 kW, 4 sites: 10,898 kW, 9 sites: 13,494 kW
- **Hayward, CA 94544**
  - 14 sites: 32,067 kW, 2 sites: 7,675 kW, 9 sites: 24,221 kW, 19 sites: 28,211 kW
- **Hayward, CA 94545**
  - 30 sites: 72,478 kW, 2 sites: 20,046 kW, 9 sites: 24,221 kW, 19 sites: 28,211 kW
- **Hayward, CA 94541**
  - 1 site: 2,702 kW, 1 site: 2,702 kW
- **Hayward, CA 94542**
  - 1 site: 5,800 kW, 1 site: 5,800 kW
- **Union City, CA 94587**
  - 27 sites: 54,437 kW, 1 site: 9,249 kW, 7 sites: 18,320 kW, 19 sites: 26,868 kW
- **Newark, CA 94560**
  - 18 sites: 50,766 kW, 2 sites: 17,149 kW, 6 sites: 20,293 kW, 10 sites: 13,328 kW
- **Fremont, CA 94536**
  - 1 site: 2,265 kW, 1 site: 2,265 kW
- **Fremont, CA 94538**
  - 38 sites: 83,755 kW, 1 site: 21,125 kW, 9 sites: 22,861 kW, 28 sites: 39,769 kW
- **Fremont, CA 94539**
  - 5 sites: 8,931 kW
- **Dublin, CA 94568**
  - 12 sites: 30,408 kW, 2 sites: 12,504 kW, 3 sites: 8,133 kW, 7 sites: 9,771 kW
- **Pleasanton, CA 94566**
  - 7 sites: 12,606 kW, 2 sites: 5,465 kW, 5 sites: 7,141 kW
- **Pleasanton, CA 94588**
  - 7 sites: 22,512 kW, 1 site: 11,541 kW, 3 sites: 6,819 kW, 3 sites: 4,152 kW
- **Livermore, CA 94550**
  - 14 sites: 23,891 kW, 3 sites: 9,280 kW, 11 sites: 14,611 kW
- **Livermore, CA 94551**
  - 15 sites: 95,723 kW, 3 sites: 78,846 kW, 1 site: 3,510 kW, 11 sites: 13,367 kW
EBCE FIT project eligibility

- Open to all renewable energy technologies that meet California’s Renewables Portfolio Standard (RPS) eligibility requirements

- Projects must be sited in the EBCE service territory

- Projects can sized up to 3 MW *

*All project size capacity references in this presentation are Alternating Current (AC) rated, unless noted otherwise.
EBCE FIT program size

- A 50 MW FIT will provide roughly 1.29% of EBCE annual electric load

<table>
<thead>
<tr>
<th>FIT capacity</th>
<th>Annual energy production from each kW of FIT capacity</th>
<th>Annual energy deliveries through FIT</th>
<th>Annual CCA energy sales</th>
<th>Percent of total CCA retail sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 MW</td>
<td>1,600 kWh</td>
<td>80,000 MWh</td>
<td>6,200,000 MWh</td>
<td>1.29%</td>
</tr>
</tbody>
</table>

- Annual production of 1,600 kWh/kW of FIT capacity is based on solar resource analysis for Alameda County, as we expect PV to be the dominant FIT technology

<table>
<thead>
<tr>
<th>Location</th>
<th>Solar resource quality (kWh/m²/day)</th>
<th>System type</th>
<th>Capacity factor</th>
<th>Annual energy production (kWh/kW AC/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oakland Airport</td>
<td>4.63</td>
<td>Fixed rooftop installation</td>
<td>19.1%</td>
<td>1521</td>
</tr>
<tr>
<td>Livermore</td>
<td>5.00</td>
<td>Fixed rooftop installation</td>
<td>20.1%</td>
<td>1605</td>
</tr>
<tr>
<td>Livermore</td>
<td>5.00</td>
<td>Single-axis tracking</td>
<td>25.4%</td>
<td>2024</td>
</tr>
</tbody>
</table>
EBCE FIT initial pricing

- Initial baseline FIT pricing of 9¢/kWh fixed for 20 years.
- This price is expected to support larger, ground-mounted solar PV projects in eastern Alameda County.
- Modeling was done using NREL’s System Advisor Model.

<table>
<thead>
<tr>
<th>Type of system</th>
<th>Size of solar PV system (W_{AC})</th>
<th>Installed cost ($/W_{DC})</th>
<th>20-year fixed PPA price (¢/kWh) Oakland</th>
<th>20-year fixed PPA price (¢/kWh) Livermore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built environment</td>
<td>100 kW roof</td>
<td>$2.30</td>
<td>15.6¢</td>
<td>14.8¢</td>
</tr>
<tr>
<td>Built environment</td>
<td>350 kW roof</td>
<td>$2.12</td>
<td>14.5¢</td>
<td>13.8¢</td>
</tr>
<tr>
<td>Built environment</td>
<td>500 kW roof</td>
<td>$2.06</td>
<td>14.2¢</td>
<td>13.5¢</td>
</tr>
<tr>
<td>Built environment</td>
<td>1 MW roof</td>
<td>$1.90</td>
<td>13.5¢</td>
<td>12.8¢</td>
</tr>
<tr>
<td>Ground-mount</td>
<td>1 MW tracking</td>
<td>$1.86</td>
<td>n/a\textsuperscript{11}</td>
<td>10.0¢</td>
</tr>
<tr>
<td>Ground-mount</td>
<td>3 MW tracking</td>
<td>$1.78</td>
<td>n/a</td>
<td>9.74¢</td>
</tr>
</tbody>
</table>
Once baseline pricing is set for the initial FIT tranche, MRP governs baseline pricing, which can never exceed a universal maximum of 11¢/kWh.

*Market Responsive Pricing for EBCE FIT*
The concept of pricing adders is simple
- An LSE identifies the characteristics it would like to see in its FIT projects and then creates adders to its baseline FIT price to incentivize projects with these characteristics.

The Clean Coalition recommends East Bay Community Energy implement four pricing adders:
- Built-environment adder at 20%
  - Rooftops, parking lots, parking structures, etc.
- Small project adder at either 10% or 20%
  - 10% for projects larger than 100 kW and less than or equal to 350 kW.
  - 20% for projects less than or equal to 100 kW.
- Community benefit adder at 5%
  - Tax-exempt and/or disadvantaged zone.
- Dispatchability adder at 15 cents/kWh
  - Eligible for guaranteed daily dispatchable renewable energy at 2-4 hours of nameplate renewable energy FIT project.
Highlights from public comments on the FIT

- Numerous parties expressed strong support for the FIT because it will drive local renewable energy development and local job creation (CalSEIA, Borrego Solar, East Bay Clean Energy Alliance, others)

- Some parties (Borrego, EBCPA) would like to see a larger program and more adders; however, there are rate impacts to consider when it comes to expanding FIT program capacity and increasing the pricing.

- Borrego Solar recommended rolling unselected applications from one tranche into the next tranche. We agree with this suggestion and will clarify this in the final FIT design recommendations.

- More than Smart expressed concern about the benefits of the FIT to EBCE customers, as well as the untested nature of the proposed Market Responsive Pricing (MRP) mechanism.
  - In alignment with the goal of the LDBP, the FIT is designed to drive local economic and environmental benefits through local renewables. It also unleashes commercial-scale projects that are ill-suited to NEM (non-owner occupied, split-metered/multi-tenant, low on-site load) and avoids the tremendous inefficiency of auctions that kill any participation from the commercial-sale market segment.
  - The MRP is similar to California’s ReMAT program, which has effectively driven down pricing for sub-3 MW renewable energy projects using a market adjusting tariff. An MRP has also driven German rooftop solar pricing to less than 5 cents/kWh equivalent.
Energy Efficiency

Phased Recommendations

- Phase I: Support existing EE, build integrated data platform, comprehensive COS Study, RFQ for EE service providers
- Phase II: Targeted revenue-based programs, integrate Metered EE capabilities & CBA’s, implement P4P contracting
- Phase III: ETA ratepayer-funded programs, cost-causation targeting, close coordination w/EE Program Administrators

Public Comments

- Strong support for EE Assessment and Recommendations
- Some concerns re: P4P supplanting Direct Install/Deemed EE Programming
Demand Response

> **Phased Recommendations**

  > Phase I: Support PG&E’s existing DR programs
  > Phase II: Offer customized DR programs in partnership w/established DR provider, rely on 3\textsuperscript{rd}-party expertise/resources
  > Phase III: Offer suite of in-house DR programs designed to shape/shift/shed load, leverage integrated data platform

> **Public Comments**

  > Grid-enabled EV Charging Infrastructure is an important segment for EBCE to focus on
  > Energy Storage is also maturing, but control clauses can create some concerns re reduced value to customers or asset owners
Energy Storage

**Phased Recommendations**

- Phase I: CARE Customer Energy Storage Giveaway, NEM/FIT Adders & TOU Rate Pilots
- Phase II: Collaborative Procurement of Utility-scale ES, Implement VDER Tariff
- Phase III: VPP Aggregation of deployed ES systems

**Public Comments**

- Strong Public Support for recommendations, including CARE Customer ES Giveaway
- Concerns regarding control clauses, recommended value of Energy Storage Adders, and Performance Penalties
- Suggested that we increase system size of CARE Customer giveaways
Pending Assessments/Recommendations

- Opportunities for Fossil Fuel Switching
  - Natural Gas Sector (aka- Building Electrification)
  - Transportation Sector (aka- Vehicle Electrification)
- Rate Design as an Incentive
- On-bill Repayment and On-bill Financing
## LOCAL SOLAR ECONOMIC BENEFITS VS COSTS

In 2018 dollars

<table>
<thead>
<tr>
<th></th>
<th>100,000 MWh from local solar generation (@ $90/MWh)</th>
<th>50 MW new local solar development (single axis) (@ $1.86/W)</th>
<th>Impact of $50/MWh price premium of 100,000 MWh from local solar (@ non-local solar cost of $40/MWh)</th>
<th>Net Impacts (Alameda County)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Investment</td>
<td>$9 million</td>
<td>$93 million</td>
<td>($5 million)</td>
<td></td>
</tr>
<tr>
<td>Direct Jobs</td>
<td>3</td>
<td>54</td>
<td>0</td>
<td>57</td>
</tr>
<tr>
<td>Total Jobs</td>
<td>31</td>
<td>85</td>
<td>(29)</td>
<td>87</td>
</tr>
<tr>
<td>Total Labor Income</td>
<td>$2,060,857</td>
<td>$6,375,580</td>
<td>($1,667,935)</td>
<td>$6,768,503</td>
</tr>
<tr>
<td>Direct Employee Compensation</td>
<td>$130,805</td>
<td>$3,375,864</td>
<td>0</td>
<td>$3,506,669</td>
</tr>
<tr>
<td>Proprietor Income</td>
<td>$80,216</td>
<td>$1,090,762</td>
<td>0</td>
<td>$1,170,978</td>
</tr>
<tr>
<td>Total Economic Output</td>
<td>$13,482,587</td>
<td>$14,395,807</td>
<td>($4,559,176)</td>
<td>$23,319,218</td>
</tr>
</tbody>
</table>

The net benefits of purchasing local solar yields job, income, and economic benefits that far exceed the negative impacts from the higher cost. **100,000 MWh of local solar would create 54 construction jobs and 3 ongoing maintenance jobs.**
Local investment in solar or EE create jobs and stimulate more local economic activity than rate reductions.
Rate reductions targeted to lower income households generate more local economic benefits, than uniform rate reductions across all households. Uniform rate reduction actually cause net leakage of money out of the County due to non-local spending patterns of higher income households.

<table>
<thead>
<tr>
<th></th>
<th>$1 million in residential rate reductions</th>
<th>$1 million residential rate reductions (households &lt;$100K)</th>
<th>$1 million residential rate reductions (households &lt;$70K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Jobs</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total Jobs</td>
<td>5.88</td>
<td>6.48</td>
<td>6.53</td>
</tr>
<tr>
<td>Labor Income</td>
<td>$333,587</td>
<td>$369,492</td>
<td>$371,855</td>
</tr>
<tr>
<td>Total Economic Output</td>
<td>$911,835</td>
<td>$1,003,971</td>
<td>$1,005,036</td>
</tr>
</tbody>
</table>
CONCLUSIONS

• Investing in local renewables, energy efficiency, and other clean energy activities generates greater local economic benefits, by every measure, than rate reductions.

• Union and prevailing wage job creation, an explicit goal of EBCE, only occurs when there is investment in actual projects (when you get “direct” jobs). (Prevailing wage or union jobs are not created by providing discounts on energy bills).

• Due to non-local spending patterns of higher-income households. Residential rate reductions result in a small net flow of money out of the County. Targeting rate reductions to lower-income households neutralizes this negative impact.

• While low or competitive rates are a priority in the EBCE the Joint Powers Agreement, they must be balanced with direct local investments to achieve the full measure of goals stated in the JPA Agreement.

Prepared by:
Betony Jones, Climate and Workforce Research and Advising
http://betonyjones.com
ECONOMIC BENEFITS DEFINED

***ALL benefits are specific to Alameda County***

- **Direct Jobs:** These are the jobs created from capital investments in the Alameda County. In the construction industry, we assume these jobs will provide prevailing wages and benefits, per the goals of EBCE.

- **Total Jobs:** This figure includes all of the direct, indirect, and induced jobs created by the change in spending. Indirect jobs are those that supply the industries directly affected (mainly retail and real estate jobs), and induced jobs are the number of jobs affected by a general change in economic activity (mainly retail, restaurant, and health care jobs).

- **Labor Income:** Includes total employee compensation + proprietor income (business profits). For these examples, profits are assumed to be 8 – 12 percent of the investment (in solar, wind, EE, etc.)

- **Direct Employee Compensation:** Includes the wages and benefits for the jobs created, and can be considered one measure of job quality.

- **Total Economic Output:** The value of the sale of all goods and services in Alameda County associated with a $1 million change in spending.

All benefits extracted from IMPLAN using 2016 data in IMPLAN. Rate reduction calculations by income class based on household income distribution from 2016 census data, and household electricity consumption data by income class from EIA (2009)
JOINT POWERS AGREEMENT

By establishing the Authority, the Parties seek to:

(a) Provide electricity rates that are lower or competitive with those offered by PG&E for similar products;

(d) Establish an energy portfolio that prioritizes the use and development of local renewable resources and minimizes the use of unbundled renewable energy credits;

(f) Demonstrate quantifiable economic benefits to the region (e.g. union and prevailing wage jobs, local workforce development, new energy programs, and increased local energy investments);

(j) Provide and manage lower cost energy supplies in a manner that provides cost savings to low-income households and promotes public health in areas impacted by energy production;

The Joint Powers Agreement establishing EBCE provides clear direction on the local development and economic benefit goals.
Discussion

Community Engagement Symposium
March 26, 2018
East Bay Community Energy
Local Development Business Plan

Workshop #2: Community Benefit & Planning Tools

LDBP Project Team:

Community Engagement Symposium
March 26, 2018

Special Advisors:
Betony Jones & Gary Calderon
APPROACH TO ASSESSING COMMUNITY BENEFIT IMPACTS

- Assess Job, Labor Income, and EBCE Financial Impacts of Recommended Plan Strategies and Options
  - Prepared by ALH Urban & Regional Economics
  - Presenters, Amy Herman, Sarah Murley, and Thomas Jirovsky

- Scenario Analysis, Compare Impacts Across Multiple Scenarios and Support Programmatic Decision-Making
  - Prepared by EcoShift Consulting
  - Presenters, Zoe Elizabeth and Rick Betita
EBCE has been created by citizens of Alameda County to control electric power production, distribution, and ultimate cost to consumers. EBCE is designed to use surplus revenues (in lieu of profit) to provide significant community benefits in the form of:

- Lower electric rates
- Local economic development/job creation
- Renewable energy
- Greenhouse gas reduction
- Energy efficiency investments

2021 stabilized operations expected to generate $50 million in annual surplus
JOB CREATION AND LABOR INCOME IMPACTS

- Sources of impacts
  - Installation of equipment (one-time)
  - Annual maintenance of equipment or on-going operations of utility-scale generation facilities
  - Annual customer savings translated into additional household and business purchases
- Job and labor income impacts are driven by the level of capital investment (regardless of source)
- All impacts estimated are in Alameda County
- Job impact includes estimated average wages as well as total labor income
  - Prevailing wage for large commercial, industrial, and utility-scale installations and maintenance
  - Non-union labor assumed for residential installations and maintenance
ECONOMIC IMPACT MODELING

- Primarily relied on IMPLAN
  - IMPLAN is a national vendor of input-output software and data used to create economic impact models and is widely used in government, higher education, and in the private sector
  - IMPLAN breaks down the U.S. economy into over 500 industry sectors
  - Model creates county-level values by adjusting the national level data, such as removing industries that are not present in a particular region
  - Multipliers used in this analysis are specific to the economy of Alameda County
  - Data are updated annually - most current data are for 2016
  - To model EBCE job impacts, industry-specific multipliers were used for maintenance and repair of residential and non-residential structures as well as construction of new nonresidential structures for installation and maintenance
  - IMPLAN model estimates direct, indirect, and induced jobs
ECONOMIC IMPACT MODELING

- The JEDI model was used to estimate the installation portion of capital investment and to compare direct job impacts from IMPLAN
  - Created by National Renewable Energy Lab (NREL) with models specific to PV Solar, Distributed Wind, and Land-Based Wind
  - Uses state-level IMPLAN multipliers (not specific to Alameda County)
  - Provides significant detail on breakdown of costs for specific sizes of solar and wind projects based on user-input on total cost
COMMUNITY BENEFIT OPTIONS

The LDBP team has identified numerous community benefit investment options/strategies to apply the surplus revenues for EBCE consideration, including:

- Feed In Tariff ("FIT") programs for solar and wind power generation
- Net Energy Metering ("NEM") programs for solar and wind power generation
- Direct investment in solar/wind power production
- Efficiency programs for Commercial/Industrial, Residential and CARE customers
- Energy Storage systems (individual to utility scale investments)
- Demand response programs to reduce peak hour power demand
- Electric vehicle incentives (autos, buses, trucks)
- Fuel switching programs to encourage electric appliance uses
- Lower electricity rates for all customers / low income HH’s
Representative Draft Findings - Illustrative Programs

- Feed In Tariff ("FIT")
- Direct Investment
- Energy Storage
- Electric Vehicles
- Fuel Switching
- Reduced Electricity Rates
Representative Draft Findings - Illustrative Impact Metrics

- Program description
- EBCE Costs
- Private capital investment
- Direct and total job impacts
- Labor income impacts
- Net cost to EBCE over 10 years
- Job creation index per $1.0 million in capital investment
FEED IN TARIFF ("FIT")

- EBCE solicits proposals for wind/solar power development in Alameda County
- EBCE identifies specific goals (built environment, small scale, energy storage, etc.)
- EBCE offers to buy all power generated at $0.09 to $0.13 per kWh (FIT)
- EBCE paying premium of $0.054 per kWh versus existing renewable power contracts
- For every 5 MW of solar production capacity:
  - Private sector capital investment of $9.5 million
  - EBCE will incur $420,000 in increased power costs per year
  - 28 direct jobs related to installation ($41.83 per hour)
  - 48 total jobs
  - 1.1 total annual maintenance jobs will be required
  - $3.8 million in labor income impacts for installation and maintenance
- Over 10-year period: 6.2 direct, indirect, and induced jobs generated per $1 million in capital investment
DIRECT INVESTMENT

- Once EBCE has established a good credit rating, EBCE directly contracts to build wind/solar power systems in Alameda County applying specific goals (union labor, energy storage, etc.). With economies of scale and as a non-profit, EBCE’s amortized cost of power will be similar to the cost from the normal grid.

- For every 5 MW of solar production capacity:
  - EBCE capital investment of $8.9 million
  - 25 direct jobs related to installation ($45.00 per hour)
  - 40 total installation jobs
  - 1.2 total annual maintenance jobs will be required
  - $3.4 million in labor income impacts for installation and maintenance

- Less labor is needed for large scale installations, but EBCE has no net capital investment (funded by debt)

- Over 10-year period: 5.8 direct, indirect, and induced jobs generated per $1 million in capital investment
ENERGY STORAGE

- Solar power generation is concentrated around mid-day, while demand peaks in the evening hours, creating a significant demand/supply imbalance and the need for storage capacity.
- Investment in energy storage reduces reliance on natural gas peaker plants.
- For every $5 million capital investment:
  - 5 to 6 direct jobs related to installation ($47.56 per hour utility-scale and commercial/industrial, $25.00 per hour residential)
  - 9 total installation jobs
  - 0.7 total annual maintenance jobs will be required
  - $613,000 in labor income impacts for installation and maintenance.
- EBCE has $1.5 million net capital investment over 10 years.
- Over 10 year period: 3.0 direct, indirect, and induced jobs generated per $1 million of capital investment.
ELECTRIC VEHICLES

- Illustrative example 400 participating customers at a cost of $37,420 for vehicle and charger installation, with EBCE contributing $2,500 per customer
  - EBCE capital investment of $1.0 million, total capital investment of $15.0 million
  - 18.4 direct jobs related to retail purchase and charger installation, average $34.66 per hour
  - 28.7 total jobs
  - $2.1 million in total labor income impacts
  - All job impacts are one-time
- 1.9 direct, indirect and induced jobs per $1 million of capital investment
- Electric vehicle subsidies are primarily a GHG and air pollution reduction investment
FUEL SWITCHING

- Illustrative program 2,300 customers with appliance replacement cost of $5,500 per home with EBCE contributing $1,600 per home
  - EBCE capital investment of $3.7 million, total capital investment of $12.6 million
  - 106 direct jobs related to retail purchase and installation, average $28.62 per hour
  - 188 total jobs
  - $11.2 million in total labor income impacts
  - All job impacts are one-time

- 7.6 direct, indirect, and induced jobs per $1 million of capital investment

- With profits from recommended Off-Gas program, EBCE will be able to recoup investment in fuel switching subsidies
REDUCED ELECTRICITY RATES

- EBCE plans to sell power under a rate structure similar to PG&E
- For 1.5% overall rate reduction relative to PG&E rates:
  - EBCE will forego $9.9 million in annual revenue
  - Customers savings will result in increased demand for other goods and services
  - 71 annual local jobs supported (average $30.49 per hour)
  - $4.5 million total labor income per year
- Over 10-year period: 7.2 induced jobs generated per $1 million in customer savings
SCENARIO ANALYSIS
SCENARIO ANALYSIS

- A dynamic assessment framework that pulls together results and recommendations from across the LDBP research team

- The purpose of scenario analysis is to:
  - support decision-making
  - clarify complex relationships
  - communicate complex data simply and clearly to multiple audiences

- Analysis is ongoing
ANALYSIS FRAMEWORK

levers

- MW solar
- MW wind
- $ investment

programs

- Local Solar
- Local Wind
- Energy Efficiency
- Demand Response
- Energy Storage
- Electric Vehicles
- Fuel Switching

impacts

- jobs, average wages
- local generation
- surplus revenue
- GHG reductions
- air pollutant reductions
LOCAL SOLAR EXAMPLE

- Local Solar
- Jobs data [#/MW]
- Annual gen [MWh/yr/MW]
- FIT cost [$/MWh]

5 MW solar, West County, FIT program

- ALH Report
- Solar Siting Survey
- Feed-in Tariff Recommendations

Jobs
Local MWh
$
ANALYSIS FRAMEWORK

**Levers**
- MW solar
- MW wind
- $ investment

**Programs**
- Local Solar
- Local Wind
- Energy Efficiency
- Demand Response
- Energy Storage
- Electric Vehicles
- Fuel Switching

**Impacts**
- jobs, average wages
- local generation
- surplus revenue
- GHG reductions
- air pollutant reductions
COMPARE MULTIPLE SCENARIOS

Multiple impacts:
- Jobs
- Average wages
- Local generation
- Surplus revenue
- GHG reductions
- Air quality impacts

Base scenario inputs → Base scenario results
Aggressive scenario inputs → Aggressive scenario results
Conservative scenario inputs → Conservative scenario results
COMPARE MULTIPLE SCENARIOS

- What will the impacts be if...
  - FIT and NEM uptake is really strong or really slow?
  - more small-scale solar is built in Oakland vs. large-scale in Livermore?
  - an aggressive demand response program is adopted?
  - there is more investment in electric vehicles and less in energy storage?
REAL PEOPLE, REAL IMPACTS, REAL ANALYSIS
KEY RELATIONSHIPS

- New local renewables create jobs (at the highest cost to EBCE), but do not result in GHG or air quality improvements.

- Energy storage, electric vehicle programs, and fuel switching have the potential to reduce GHG emissions and improve air quality over time, but create fewer direct jobs.

- Energy efficiency and demand response also have potential to reduce GHG and air pollution over time. The benefits are less direct than the above programs, but these programs also support grid resiliency and are thus essential to long term carbon reductions and sustainability.
BEYOND THE NUMBERS

- The purpose of the scenario analysis is to clarify and communicate a variety of impacts from a variety of programs in one place.
- CCAs generate dollars for community investment, not shareholder profits. The scenario analysis displays one set of options for this investment.
- Additional pathways are possible.
- There are important impacts of all of these programs that cannot be quantified; the final draft will include qualitative analysis.
- In a diverse region, there will be a variety of goals, priorities, and opinions.
FIRST OF ITS KIND DATA-DRIVEN ANALYSIS

- EBCE is the first CCA to invest in sophisticated analysis of local development.
- The results from across the LDBP enable a wide-variety of stakeholders to understand the costs and benefits of a variety of programs and thus to meaningfully engage in program development.
- Ultimately data-driven decision-making will lead to better outcomes for EBCE, its customers, stakeholders, board, and entire community.
QUESTIONS AND ANSWERS

- Thank you for your participation.
- We will be pleased to answer questions on our presentation and analysis.
East Bay Community Energy
Local Development Business Plan

Closing Remarks

LDBP Project Team:

Community Engagement Symposium
March 26, 2018

ALH Urban & Regional Economics

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