2016 and 2020 Draft LCR Study Results - Greater Bay Area

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Stakeholder Meeting

March 9, 2015
Greater Bay Area Transmission System
New major transmission projects

- Contra Costa – Moraga 230 kV Line Reconductoring – 06/16
- East Shore-Oakland J 115 kV Reconductoring Project – 07/18
- Embarcadero-Potrero 230 kV Transmission Project – 04/16
- Evergreen-Mabury Conversion to 115 kV - 12/17
- Metcalf-Evergreen 115 kV Line Reconductoring – 05/19
- Metcalf-Piercy & Swift and Newark-Dixon Landing 115 kV Upgrade – 05/19
- Moraga Transformers Capacity Increase – 10/16
- Pittsburg – Tesla 230 kV Reconductoring – 10/15
- Tesla-Newark 230 kV Path Upgrade – 12/17
- Vaca Dixon-Lakeville 230 kV Reconductoring – 07/17
Power plant changes

Additions:
• Marsh Landing Generating Station
• Los Esteros Critical Energy Facility (LECEF) capacity increase
• Russel City
• Oakley (2020 only)

Retirements:
• Contra Costa units #6 and #7
• GWF #1-5
## Bay Area Load and Resources (MW)

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
<td>9,790</td>
<td>10,048</td>
</tr>
<tr>
<td>AAEE</td>
<td>-144</td>
<td>-369</td>
</tr>
<tr>
<td>Transmission Losses</td>
<td>173</td>
<td>188</td>
</tr>
<tr>
<td>Pumps</td>
<td>264</td>
<td>264</td>
</tr>
<tr>
<td>Total Load</td>
<td>10,083</td>
<td>10,131</td>
</tr>
<tr>
<td>Market Generation</td>
<td>6,243</td>
<td>6,900</td>
</tr>
<tr>
<td>Wind Generation</td>
<td>285</td>
<td>285</td>
</tr>
<tr>
<td>Muni Generation</td>
<td>519</td>
<td>519</td>
</tr>
<tr>
<td>QF Generation</td>
<td>485</td>
<td>485</td>
</tr>
<tr>
<td>Total Qualifying Capacity</td>
<td>7,505</td>
<td>8,162</td>
</tr>
</tbody>
</table>
San Jose Sub Area

San Jose Sub-area – Category B
Contingency: Metcalf-Evergreen #2 115 kV Line with Duane PP out of service
Limiting component: Thermal overload of Metcalf-Evergreen #1 115 kV Line
2016 LCR need: 265 MW (includes 61 MW of QF and 202 MW of generation)
2020 LCR need: no LCR need

San Jose Sub-area – Category C
Contingency: Metcalf El Patio #1 or #2 overlapped with the outage of Metcalf-Evergreen #2 115 kV Line
Limiting component: Thermal overload of Metcalf-Piercy 115 kV Line
2016 LCR need: 687 MW (includes 61 MW of QF and 202 MW of generation as well as 135 MW of deficiency)
2020 LCR need: 522 MW (includes 263 MW of QF/Muni generation)
Llagas Sub Area

Llagas Sub-area – Category B

Contingency: Metcalf D-Morgan Hill 115 kV with one of the Gilroy peakers off line
Limiting component: 5% voltage drop at the Morgan Hill substation

2016 LCR need: 135 MW (includes 0 MW of QF/Muni generation)
2020 LCR need: 158 MW (includes 0 MW of QF/Muni generation)

Llagas Sub-area – Category C

Same as Category B
Oakland Sub Area

Oakland Sub-area – Category B

Contingency: Moraga – Claremont #1 or #2 230 kV line with one Oakland CT off-line

Limiting component: Remaining Moraga – Claremont 230 kV line

2016 LCR need: No requirement

2020 LCR need: 161 MW (includes 49 MW of QF/Muni generation)

Oakland Sub-area – Category C

Contingency: overlapping C-X #2 and C-X #3 115 kV cables

Limiting component: Thermal overload on the Moraga – Claremont #1 or #2 230 kV Line.

2016 LCR need: 92 MW (includes 49 MW of QF/Muni generation)

2020 LCR need: Not binding = Same as Category B

This requirement does not include the need for the Pittsburg/Oakland sub-area
Pittsburg/Oakland Sub Area

Pittsburg/Oakland Sub-area – Category B

Contingency: Moraga #3 230/115 kV Bank
Limiting component: Thermal overload on Moraga #1 230/115 kV Bank

2016 LCR need: 1188 MW (includes 369 MW of QF and 49 MW of Muni generation)
2020 LCR need: No requirement.

Pittsburg/Oakland Sub-area – Category C

Contingency: Moraga #3 230/115 kV Bank and Delta Energy Center
Limiting component: Thermal overload on Moraga #1 230/115 kV Bank
(400 MW of Trans Bay Cable run back has been used)

2016 LCR need: 2001 MW (includes 369 MW of QF and 49 MW of Muni generation)
2020 LCR need: No requirement.
Pittsburg Sub Area

**Pittsburg Sub-area – Category B**

*2016 LCR need:* Yes - Part of Pittsburg/Oakland sub-area  
*2020 LCR need:* No requirement.

**Pittsburg Sub-area – Category C**

*2016 LCR need:* Yes - Part of Pittsburg/Oakland sub-area  
*Contingency:* Vaca-Dixon Lakeville & Vaca-Dixon Tulucay 230 kV lines  
*Limiting component:* Thermal overload on Moraga-Sobrante 115 kV line  
*2020 LCR need:* 1471 MW (includes 369 MW of QF generation)
Ames Sub Area

Ames Sub-area – Category B

2016 LCR need: No requirement.
2020 LCR need: No requirement.

Ames Sub-area – Category C

Contingency: Newark-Ravenswood & Tesla-Ravenswood 230 kV lines
Limiting component: Overload of Newark-Ames #1, #2, #3 and Newark-Ames Distribution 115 kV lines

2016 LCR need: 586 MW (beyond Pittsburg/Oakland sub-area) (includes 0 MW of QF generation)

2020 LCR need: No requirements due to South of San Mateo Capacity Increase transmission project
Contra Costa Sub Area

Contra Costa Sub-area – Category B

**Contingency:** Kelso-Tesla 230 kV with the Gateway off line  
**Limiting component:** Thermal overload on the Delta Switching Yard-Tesla 230 kV Line  
2016 LCR need: 930 MW (includes 256 MW of Wind generation and 264 MW of MUNI pumps)  
2020 LCR need: 1354 MW (includes 256 MW of Wind generation and 264 MW of MUNI pumps)

Contra Costa Sub-area – Category C

Same as Category B
Greater Bay Area Overall

Bay Area Overall – Category B

Contingency: Tesla-Metcalf 500 kV line with Delta Energy Center out of service

Limiting component: Reactive margin within the Bay Area

2016 LCR need: 3790 MW (includes 485 MW of QF, 519 MW of MUNI and 258 MW of wind generation)

2020 LCR need: 3820 MW (includes 485 MW of QF, 519 MW of MUNI and 258 MW of wind generation)
Greater Bay Area Overall

Bay Area Overall – Category C

2016 LCR need: Sum of Category C sub area requirements at 4339 MW (includes 485 MW of QF, 519 MW of MUNI and 258 MW of wind generation as well as 135 MW of deficiency)

Contingency: Tesla-Metcalf 500 kV line with Tesla-Newark #1 230 kV line
Limiting component: Tesla-Delta Switching Yard 230 kV line

2020 LCR need: 4191 MW (includes 485 MW of QF, 519 MW of MUNI and 258 MW of wind generation)
## Greater Bay Area

### Available Generation

<table>
<thead>
<tr>
<th>Year</th>
<th>QF (MW)</th>
<th>Muni (MW)</th>
<th>Wind (MW)</th>
<th>Market (MW)</th>
<th>Max. Qualifying Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>485</td>
<td>519</td>
<td>258</td>
<td>6243</td>
<td>7505</td>
</tr>
<tr>
<td>2020</td>
<td>485</td>
<td>519</td>
<td>258</td>
<td>6900</td>
<td>8162</td>
</tr>
</tbody>
</table>

## Total LCR need

<table>
<thead>
<tr>
<th>Category</th>
<th>Existing Generation Capacity Needed (MW)</th>
<th>Deficiency (MW)</th>
<th>Total MW Need</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2016</td>
<td>2020</td>
<td>2016</td>
</tr>
<tr>
<td>Category B (Single)</td>
<td>3790</td>
<td>3820</td>
<td>0</td>
</tr>
<tr>
<td>Category C (Multiple)</td>
<td>4204</td>
<td>4191</td>
<td>135</td>
</tr>
</tbody>
</table>
Changes

Since last year:

1) 2016 load forecast is lower by 135 MW vs. 2015
2) Sum of sub-area LCR needs drive the Bay Area total requirement in 2016
3) LCR need has decreased by 28 MW vs. 2015 – due to a combination of load and new Ames sub-area requirements.
4) 2020 load forecast is lower by 189 MW vs. 2019
5) Added Generation: Oakley (2020 only)
6) Long-term LCR need has decreased by 33 MW vs. 2019

Your comments and questions are welcome.

For written comments, please send to: RegionalTransmission@caiso.com