Southeast Massachusetts and Rhode Island (SEMA-RI) - Group 2 Alt# 1 –Bristol, RI to Portsmouth, RI New 115 kV line

Dec 14 2016
Group 2 – Alternative #1: New line from Bristol substation to (new) Old Boyd’s Lane substation

- Creates a 3rd supply to Aquidneck Island to mitigate potential for 260 MW of unserved load exposure for M13/L14 DCT N-1 outage and for M13/L14 N-1-1 outage.

- This exposure represents 87% of ISO-NE’s criteria (300MW) for allowable unserved load following a multi-element n-1 contingency.

- Four permanent outages of M13 & L14 in last 12 years affecting approximately 60,000 customers in Fall River & Westport (MA), Tiverton, Portsmouth, Middletown & Newport (RI.) One additional momentary simultaneous outage on M13/L14 during that time.

- Costs of outages to this large load pocket are significant.
Largest Exposed Load Pocket in National Grid Territory

- Approximately 60,000 customers, 260 MW (2026) supplied by two 115kV lines on DCT’s:

**KEY CUSTOMERS:**

3 hospitals
14 Medical Facilities
12 Elderly / Health Centers
23 Police / Fire Facilities
48 Schools / Universities
97 Municipal Buildings
26 MA / RI State Facilities
23 Gas Company Facilities
80 Water / Sewer Facilities
30 Communication Company Services
1 Naval Base (22 MW)

**OUTAGE HISTORY:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Durations</th>
</tr>
</thead>
<tbody>
<tr>
<td>27-Dec-04</td>
<td>Ice Storm</td>
<td>55 minutes</td>
</tr>
<tr>
<td>27-Dec-04</td>
<td>Ice Storm</td>
<td>35 minutes (2nd outage)</td>
</tr>
<tr>
<td>28-Aug-11</td>
<td>&quot;Irene&quot;</td>
<td>3+ hrs</td>
</tr>
<tr>
<td>8-Feb-13</td>
<td>&quot;Nemo&quot;</td>
<td>14+ hrs</td>
</tr>
<tr>
<td>16-Jul-14</td>
<td>Lightning</td>
<td>Momentary &amp; &lt;8 mins</td>
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<tr>
<td>Key Factors</td>
<td>Alt #1 &amp; Alt #2</td>
<td>Alt #1 &amp; Alt #4</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Cost</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Customer Reliability</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Overall System Performance</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Expected ease of permitting</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ease of constructability</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Fewer and shorter construction outages</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Shorter length of time to construct</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Reduced environmental impact</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reduced abutter impact</td>
<td>✗</td>
<td>✓</td>
</tr>
</tbody>
</table>

- ✓ Is applied to the Alternative which better achieves the objective
- ✗ Is applied to the Alternative which does not achieve the objective as well as the other competing Alternatives
National Grid recommends pursuing Alternative #1. This option provides significant reliability and societal benefits to customers.

- Alternative #1 when combined with any other alternative meets the system needs and improves reliability to a 260MW load pocket.
- Total cost of Alternative #1 with other alternatives: $192.4 M to $200.4 M

National Grid is open to feedback from stakeholders and prepared to discuss localization of costs beyond what stakeholders consider a benefit on a regional basis. National Grid will seek input from State Regulators and will return to PAC.
Group 2 – Solution Alternatives

1+2
Bristol → Portsmouth + Somerset → Bell Rock
NEW LINE

1+3
Bristol → Portsmouth + Somerset → Bell Rock
NEW LINE

1+4
Bristol → Portsmouth + Somerset → Bell Rock
NEW LINE

2+4
Somerset → Bell Rock + Dartmouth Town Line
LINES BUSSED TOGETHER
NEW LINE

3+4
Somerset → Bell Rock + Dartmouth Town Line
NEW LINE

NOTE: Alternative #2 and Alternative #3 cannot be combined together due to space constraints within the ROW between Somerset and Bell Rock.

NOTE: DUE TO THE N12/M13 BUSING REQUIRED FOR THE LINE 114 EXTENSION ALTERNATIVE, THIS GROUPING IS IN EFFECT THE SAME AS THE 2 + 4 GROUPING.
Group 2 – Alternative #1: New line from Bristol substation to (new) Old Boyd’s Lane substation
Projected social costs of load interruption in L14/M13 load pocket

- Projected “social cost of an outage” for this particular load pocket ranges between $25M and in excess of $100M per event.
  - Two methods applied: DOE and ICF
  - Factors considered: Per unit cost of outage, number of customers/load level, customer type, urbanicity, outage duration, inflation

- Sources:
  - “Understanding the Cost of Power Interruptions to U.S. Electricity Customers”, Energy Analysis Department, Ernest Orlando Lawrence, DOE