Decision on the 2012/2013 ISO Transmission Plan

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Executive Director, Infrastructure Development

Board of Governors Meeting
General Session
March 20-21, 2013
Approving the plan means approving determinations and recommendations contained in the plan, including 8 new transmission reliability projects and 2 policy driven projects, each of which is over $50 million.
2012/2013 Transmission Planning Process

**Phase 1**
Development of ISO unified planning assumptions and study plan
- State and Federal policy requirements and directives
- Demand forecasts, energy efficiency, demand response
- Renewable and conventional generation additions and retirements
- Input from stakeholders

**Phase 2**
Technical Studies and Board Approval
- Reliability analysis
- Renewable delivery analysis
- Economic analysis
- Central California Study
- Publish comprehensive transmission plan

**Phase 3**
Request for bids, receive proposals, evaluate, and award to successful applicant to build identified reliability, policy and economic transmission projects.

**Coordination of Conceptual Statewide Plan**

**Four Consultation Windows**
- April 2012
- March 2013
- October 2013

**Continued regional and sub-regional coordination**
Developing planning assumptions (Phase 1)

- Incorporates state and federal policy requirements and directives
  - Renewables Portfolio Standard
  - Once-through cooling generation requirements
  - AB 32, supporting AB 1318 requirements

- Demand forecasts, energy efficiency, demand response
  - CEC IEPR Forecasts

- Renewable and conventional generation additions and retirements
  - Generation portfolios developed through CPUC-led process

- Consultation with stakeholders and input from stakeholders at the start of the cycle
Analysis conducted in preparing the plan (Phase 2)

Reliability Analysis ✔ (NERC Compliance)

33% RPS Portfolio Analysis ✔
- Incorporate GIP network upgrades
- Identify policy transmission needs

Economic Analysis ✔
- Congestion studies
- Identify economic transmission needs

Other Analysis ✔ (LCR, Nuclear, etc.)

Results
Nuclear Generation studies were also performed.

- **Mid-Term Study – Contingency Planning (2018)**
  - Considers what elements of the long term plan should be initiated immediately to help mitigate future unplanned extended outages

- **Long-Term Study – Information Purposes (2022)**
  - Studies focus on transmission system implications of loss of SONGS and DCPP
  - Resource requirements, such as planning reserve criteria and flexible resource needs, require further study
Key findings from preliminary nuclear generation studies:

• No material mid-term or long-term transmission system impacts associated with Diablo Canyon

• Loss of SONGS creates transmission impacts (thermal overloading, voltage stability) in LA Basin and San Diego

• Mid-term potential mitigations were developed for SONGS and presented on the next slide

• A range of long-term (2022) mitigations were developed
  – resources in San Diego and/or LA Basin, and major transmission reinforcements
  – the mid-term mitigations continued to be needed and provide value
Consideration was given to the mid-term mitigation alternatives developed for loss of SONGS:

Continue use of synchronous condensers

Construct an 11-mile 230 kV line from Sycamore to Penasquitos

820 MW new or replaced generation

300 MW new generation

650 MVAR SVC support • SONGS and Talega

965 MW new or replaced in northwest San Diego, and 1460 MVAR SVC support • SONGS, Talega, Penasquitos, San Luis Rey, Mission

OR
Dynamic reactive support and Sycamore to Penasquitos line provide value beyond mid-term mitigations.

- Dynamic reactive support can provide a backup if Huntington Beach synchronous condensers do not materialize.

- Sycamore to Penasquitos 230 kV line replaces a large number of smaller policy-driven requirements that do not address the absence of SONGS.

Therefore, we are seeking Board approval today for the mid-term transmission mitigations:

- South Orange County Dynamic Reactive Support (reliability-driven)
- Talega area Dynamic Reactive Support (reliability-driven)
- Sycamore – Penasquitos 230 kV transmission line (policy-driven)
Summary of needed reliability-driven transmission projects:

<table>
<thead>
<tr>
<th>Service Territory</th>
<th>Number of Projects</th>
<th>Cost (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific Gas &amp; Electric (PG&amp;E)</td>
<td>31</td>
<td>$1,168</td>
</tr>
<tr>
<td>Southern California Edison Co. (SCE)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>San Diego Gas &amp; Electric Co. (SDG&amp;E)</td>
<td>5 *</td>
<td>$175 *</td>
</tr>
<tr>
<td>Valley Electric Association (VEA)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36</strong></td>
<td><strong>$1,343</strong></td>
</tr>
</tbody>
</table>

* Includes two reliability-driven projects totaling $147 million that are associated with preparedness for loss of SONGS and other reliability benefits.
Eight reliability-driven projects over $50 Million

1. **Orange County Dynamic Reactive Support (400 MVAR)** – to provide voltage support to the transmission system in the vicinity of SONGS. ($50 - 75 million)

2. **Talega Area Dynamic Reactive Support (250MVAR)** – to provide voltage support to the transmission system in the Orange County area. ($58 - 72 million)

3. **Atlantic-Placer 115 kV Line** – Additions and upgrades within the Central Valley area for potential overload and voltage conditions. ($55 - 85 million)

4. **Midway-Andrew 230 kV Project** – A new 230/115 kV substation and 115 kV additions and upgrades within the Central Coast and Los Padre area for potential overload and voltage. ($120 - 150 million)

5. **Northern Fresno 115 kV Reinforcement** – A new 230/115 kV substation and 115 kV additions and upgrades within the Greater Fresno area for potential overload and voltage conditions. ($110 - 190 million)

6. **Lockeford-Lodi Area 230 kV Development** – A 230 kV reinforcement and substation to supply the Lodi area within the Central Valley area for a potential overload and voltage conditions. ($80 - 105 million)
Reliability-driven projects over $50 million (continued) - Central California Development

7. **Gates #2 500/230 kV Transformer Addition** – a 500/230 kV transformer to support load in the Greater Fresno area for potential overload conditions. ($75 - 85 million)

8. **Gates-Gregg 230 kV Line** – a new line into the Greater Fresno area for overload and voltage conditions and expanded utilization of HELMS pump storage facility. ($115 - 145 million)
PG&E has identified a reliability risk for supply to the San Francisco Peninsula.

• The loss of a major substation impacting supply to the entire San Francisco peninsula

• The ISO is expediting a risk analysis with PG&E to establish the need for reinforcement

• A stakeholder process will be conducted to review the need and identify alternatives

• Depending on outcome of analysis and stakeholder process Management may pursue an amendment to the plan at a later Board meeting

• Upgrades identified in this plan to the TransBay Cable will provide partial relief in the interim
The policy analysis led to identifying five* policy-driven elements

- Sycamore-Penasquitos 230 kV transmission line ($111 - 211 million)
- Lugo-Eldorado series capacitor and terminal equipment upgrade ($121 million)
- Lugo-Eldorado 500 kV line re-route ($36 million)
- Warnerville-Bellota 230 kV line reconductoring ($28 million)
- Wilson-Le Grand 115 kV line reconductoring ($15 million)

* A potential need with the “West of the River” import path from the desert southwest was identified and also requires further study.
Five economic studies were performed in this plan.

<table>
<thead>
<tr>
<th>Study ID</th>
<th>Study subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>P26</td>
<td>Path 26 Northern - Southern CA</td>
</tr>
<tr>
<td>LBN</td>
<td>Los Banos North</td>
</tr>
<tr>
<td>CCA</td>
<td>Central California Area</td>
</tr>
<tr>
<td>NWC</td>
<td>Pacific Northwest - California</td>
</tr>
<tr>
<td>SWC</td>
<td>Desert Southwest - California</td>
</tr>
</tbody>
</table>
Desert Southwest showed the highest potential:

Three alternatives studied

- Alt.1
- Alt.2
- Alt.3

Note:
The dark-colored facilities are in the ISO-controlled grid.
The light-colored facilities belong to other control areas.
Economic study conclusions:

- Preliminary analysis in February indicated high benefits for two projects
  - Delaney – Colorado River
  - Eldorado – Harry Allen

- Problem identified with initial benefit estimates for Delaney–Colorado River associated with greenhouse gas modeling

- Management recommendation is therefore to further evaluate
  - The Delaney-Colorado River transmission project, and, depending on the results, bring forward to the Board later this year
  - The Eldorado to Harry Allen transmission line as part of an ongoing joint study with NV Energy
Competitive solicitation eligibility review (Phase 3)

- Eligible policy-driven or economic-driven projects:
  - Sycamore-Penasquitos 230 kV transmission line
  - Possible future procurement of Delaney-Colorado River depending on future analysis

- Eligible reliability-driven project elements with additional policy or economic benefits:
  - Gregg-Gates 230 kV transmission line
All reliability project elements were screened and reviewed for potentially eligible elements

- Gregg-Gates 230 kV line – **Policy related benefits**
- Lockford-Lodi Area 230 kV development
- Altantic Placer 115 kV transmission line
- Rippon 115 kV transmission line
- Midway-Andrew 230 kV project
- North Fresno 115 kV upgrade
- Cressey-Gallo 115 kV transmission line
- Diablo Canyon dynamic reactive support
- South OC dynamic reactive support
- Talega area dynamic reactive support

**Detailed economic evaluation necessary.**

**Operational requirements negate economic benefits.**
### Detailed economic benefits assessment

<table>
<thead>
<tr>
<th>No.</th>
<th>Project</th>
<th>Capital Cost $ millions</th>
<th>Total Cost</th>
<th>Congestion Benefit</th>
<th>Year 1 Loss Saving MWh</th>
<th>Loss Savings $ Millions</th>
<th>Cost Benefit Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lockeford-Lodi Area 230 kV Development</td>
<td>$80 - 105</td>
<td>$116 - 152</td>
<td>0</td>
<td>12,557</td>
<td>$11.71</td>
<td>8.7%</td>
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<tr>
<td>2</td>
<td>Atlantic Placer 115 kV Line</td>
<td>$55 - 85</td>
<td>$80 - 123</td>
<td>0</td>
<td>3,000</td>
<td>$2.63</td>
<td>2.6%</td>
</tr>
<tr>
<td>3</td>
<td>Rippon 115 kV Line</td>
<td>$10 - 15</td>
<td>$15 - 22</td>
<td>0</td>
<td>841</td>
<td>$0.78</td>
<td>4.3%</td>
</tr>
<tr>
<td>4</td>
<td>Midway-Andrew 230 kV Project</td>
<td>$120 - $150</td>
<td>$174 – 217.5</td>
<td>0</td>
<td>20,140.33</td>
<td>$18.78</td>
<td>9.6%</td>
</tr>
<tr>
<td>5</td>
<td>Cressey-Gallo 115kV</td>
<td>$15 - 20</td>
<td>$22 – 29</td>
<td>0</td>
<td>399</td>
<td>$0.32</td>
<td>1.27%</td>
</tr>
<tr>
<td>6</td>
<td>North Fresno 115kV Reinforcement</td>
<td>$110 - 190</td>
<td>$160 - 275</td>
<td>0</td>
<td>23,654</td>
<td>$19.12</td>
<td>8.79%</td>
</tr>
<tr>
<td>7</td>
<td>New Gates-Gregg 230 kV line*</td>
<td>$115 - 145</td>
<td>$167 – 210</td>
<td>0</td>
<td>113,816</td>
<td>$103.73</td>
<td>55%</td>
</tr>
</tbody>
</table>

* Economic benefits test was unnecessary – competitive procurement established through previously identified policy benefits.
2013 Competitive Solicitation Schedule

Comprehensive Transmission Plan, Category 1 Policy Driven and Economically Driven Elements

- List of all project submissions
  - List of qualified project submissions
    - Potential Joint Project notifications
      - ISO or state siting authority selects among multiple qualified proposals for the same element
        - List of approved project sponsors
          - ISO posts project selection report

Apr 1 – Jun 1
Project Proposal Submission

- ISO evaluates qualifications of each submission

Timeline:
- April
- May
- Jun
- Jul
- Aug
- Sep
- Oct
- November
For the sole purpose of informing the CPUC’s CPCN proceeding, the ISO performed a special study comparing the AV Clearview project as an alternative to the LGIA-driven Coolwater-Lugo Project:
• Coolwater-Lugo is reflected in an executed LGIA that was accepted by FERC in January 2011
• Coolwater-Lugo models and cost estimates were provided by Southern California Edison.
• AV Clearview models and cost estimates were provided by High Desert Power Authority (represented by Critical Path Transmission)
• Critical Path Transmission also submitted a benefits analysis as a stakeholder comment on February 12 for ISO consideration
• Stakeholder comments were received throughout the review on both projects
At this point, the ISO does not see significant benefits to the AV Clearview project as an alternative to Coolwater-Lugo in the CPCN proceeding

- Both projects enable the interconnection of the CPUC-established portfolios that meet the 33 percent RPS
- The AV Clearview project provides access to generation beyond the portfolio amounts north of Kramer
- Viability questions for both projects have been raised
- Our analysis does not support the financial benefits identified in the report provided by Critical Path Transmission

- Next steps
  - ISO will review the Critical Path Transmission revised project proposal, provided on February 25, 2013.
The high voltage transmission access charge estimating model has been updated, indicating a steady increase over the study period.
Stakeholder Feedback

- Varying levels of support for individual projects
- Load forecast and other assumptions
- Range of alternatives and level of detail
- Distinction between role of generator interconnection process upgrades and transmission planning process upgrades
Stakeholder Feedback (continued)

• Consistent treatment of load shedding for multiple-contingency events

• Deliverability requirements being considered in policy needs assessments

• Forecast increase in high voltage transmission access charge

• Role of independent transmission companies and projects eligible for competitive solicitation
Management recommends the Board approve the 2012/13 ISO Transmission Plan

- The 2012/2013 ISO Transmission Plan
  - Addresses reliability needs of the ISO controlled grid
  - Enables the state’s 33% RPS goals
  - Provides for prudent and economic development of the transmission system

- Next steps
  - Initiate implementation of ISO competitive solicitation process
  - Continue analysis of items requiring further study