



CPUC Integrated Resource Plan
Modeling Workshop
January 7, 2019

Objective and Agenda

- GridLiance has reviewed the CPUC's Conforming Hybrid Plan, focusing on the renewable resources in GridLiance's footprint (Southern Nevada)
- Our objectives today are to (i) share our work, (ii) answer questions, (iii) seek feedback, and (iv) identify what would be most helpful for our formal comment submittal on January 30
- Agenda
 - Introduce GridLiance
 - Share modeling results
 - Discuss modeling approach
 - Have discussion and seek your input

Background on GridLiance

GridLiance is an independent transmission company. We partner with electric cooperatives, municipal utilities, and others to plan for the future of the grid, invest in transmission infrastructure and improve grid reliability.

What We Do

- Unlock the financial value of existing transmission assets and invest in transmission projects with our partners
- Own and operate nearly 600 miles of transmission lines and related substation equipment
- Build strong business relationships with long-term agreements based on each partner's needs

Who We Are

- Led by an experienced executive team
- Backed by Blackstone Energy Partners, L.P., a leading energy infrastructure investor, that provides strategic and financial support
- Guided by independent board members who are industry leaders and include Terry Boston (former CEO, PJM Interconnection) and Mike Morris (former CEO, American Electric Power)

Current Partners



GridLiance's CAISO Presence in the West

- In 2017, GridLiance became a Participating Transmission Owner (PTO) in the California ISO (CAISO) as a result of acquiring Valley Electric Association's (VEA) 230-kV transmission system
- GridLiance transmission rates are cost-based rates regulated by FERC; GridLiance has a formula rate approved and in effect for CAISO
- The GridLiance transmission system includes
 - 166 miles of 230-kV transmission lines,
 - Two 230-kV substations, and
 - One 230-kV switching station
- Provides service to VEA's load and interconnects CAISO to WAPA at Mead Substation

GridLiance CAISO System



Our Approach to Analyzing the Hybrid Plan

- Our analytical focus was to assess the benefits to California customers of renewables in Southern Nevada
- **Basis for our Analysis**
 - We used the CPUC's Conforming Hybrid Plan as basis of our analysis as provided by the CPUC on November 5, 2018
 - The plan includes 1,521 MWs of Southern Nevada solar resources
 - We used the geographic locations identified by CEC and CAISO in their mapping of the Reference System Plan
- **RESOLVE Modeling**
 - We used the RESOLVE tool to assess capital costs and basic production costs and benefits
 - It was helpful that RESOVLE is open-source and fast to run
- **Production Cost Modeling (PCM)**
 - We ran more detailed production cost modeling analysis to assess congestion and curtailment
 - Our model is hourly and fully nodal; importantly, it enforces transmission constraints

Summary of our Findings

- Considering capital cost savings and transmission constraints, including 1,521 MW of Southern Nevada renewables in the plan will save customers \$20 million annually
- These savings are net of the annual cost of targeted upgrades to the transmission system necessary to manage congestion; these upgrades have other benefits beyond enabling California’s renewable policy objectives

Savings/Cost Category	Annual Amount	Source and Notes
Capital Cost Savings	\$15 million	<ul style="list-style-type: none"> • Resources in Southern Nevada are less expensive to develop and construct; they are also less risky to develop; we calculate these savings using RESOLVE [see Slides 6-7]
Increased Congestion	(\$25 million)	<ul style="list-style-type: none"> • Our PCM shows increased congestion costs associated with Southern Nevada renewables; this can be managed with targeted upgrades to the transmission system [see Slide 8]
Cost of Transmission System Upgrades	(\$25 million)	<ul style="list-style-type: none"> • Using GridLiance existing formula rate, we estimate the annual cost of transmission system upgrades necessary to manage the Southern Nevada renewable congestion [see Slide 8]
Production Cost Benefits Resulting from Upgrades	\$55 million	<ul style="list-style-type: none"> • Targeted upgrades provide benefits in excess of increased congestion and cost of transmission system upgrades [see Slide 8]
Total Annual Benefit of Southern Nevada Solar	\$20 million	

RESOLVE Analysis: Capital Cost

- We used RESOLVE to analyze the difference in capital cost between 1,521 MW of renewables in Southern Nevada and 0 MW in Southern Nevada
- Compared RESOLVE buildout costs with and without Southern Nevada solar; Compared Hybrid Plan build out with new build out with no Southern Nevada solar as follows
 - Kept carbon emissions at Hybrid Plan level
 - Set RESOLVE build out to Hybrid Plan except for 5 areas to which CPUC staff shifted LSE Aggregated Plan resources
 - Set Southern Nevada solar to 0 MWs
 - Increased build out of other four solar areas using same percentage allocation to four areas, consistent with CPUC Staff's approach to Hybrid Plan (Kramer InyoKern +578 MWs, Riverside East +715 MWs, Mt. Pass El Dorado + 153 MWs, Solano + 77 MWs)

Including Southern Nevada resources in 2030 saves customers \$15 million per year through decreased capital costs

RESOLVE Analysis: Emission Level

- The Hybrid Plan shows 15% higher emissions than the CPUC's Reference System Plan
 - The Hybrid Plan shows 39 MMT for CAISO
 - The Reference System Plan shows 34 MMT for CAISO
- Using RESOLVE we analyzed what additional resources should be added to stay true to the original greenhouse gas goal for California
 - Set Hybrid Plan buildout except for 5 areas to which CPUC staff shifted LSE Aggregated Plan resources (Southern Nevada, Riverside East, Mt. Pass El Dorado, Kramer InyoKern, Solano)
 - Enforced 42 MMT carbon goal
 - Let RESOLVE optimize additional siting to lower emissions
- RESOLVE adds nearly 50% of additional solar to Southern Nevada
 - This results in 2,809 MWs of Southern Nevada solar
 - Balance of need with solar from Riverside East Palm Springs (1,552 MWs added), Mt. Pass El Dorado, and Kramer InyoKern

This analysis shows the value of Southern Nevada resources to meeting California's greenhouse gas goals at least cost

Production Cost Modeling

- We ran an hourly, nodal PCM to examine congestion and curtailment impacts; in total, the Hybrid Plan results in \$1,168 million in congestion and 2,125 GWhs of curtailment
- Comparing PCM results with and without Southern Nevada solar showed \$25 million of additional production costs (*e.g.*, congestion) with Southern Nevada solar without any transmission upgrades
- This congestion can be managed with limited upgrades to the transmission system; we estimate a capital cost for these upgrades of \$155 million and an annual cost to customers of \$25 million based on GridLiance's formula rate template
- These upgrades remove constraints on lower cost resources and improve grid efficiency above and beyond the congestion that was identified, resulting in \$55 million in annual benefits

**Including 1,521 MWs of Southern Nevada renewables lowers costs
and helps meet California's renewable goals**

Questions and Comments?

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