GRIDLIANCE

GridLiance West Transco's 2017 Request Window Proposal

CAISO 2017/2018 Transmission Planning Process

September 21-22, 2017

Valley – Innovation 230 kV Project

- Issues: Overloads on 138 kV system under P1, P4, P6 and P7 events
- Proposed Project
  - Install a second 230 kV circuit on an existing vacant tower position from Innovation to Johnnie Tap and upgrade existing Johnnie Tap to Valley Substation line to double circuit 230 kV/138 kV
  - Expand Valley Substation to install new 230/138 kV transformer and install necessary terminal equipment at Valley and Innovation substations
- Proposed In-Service Date
  - Fall 2022 or earlier
- Estimated Cost: $50M
- Alternatives Considered:
  - Install new RAS (status quo)
    - » Doesn't enhance reliability
  - 230 kV line from Innovation to Lathrop Wells
    - » Didn't resolve all issues

Multiple Benefits of a New Line

1. **Improve overall grid reliability and security**
2. **Studies indicate the new line reduces contingencies requiring mitigation by at least 90%**
3. **Potentially reduces the number of RAS for each generator**
   a) Past Cluster studies indicate multiple SCE RAS per generator sited in VEA's area
   b) Past phase 1 studies indicate up to multiple RAS needed by VEA depending upon the amount of generation in a cluster. Many of these RAS would involve most or all generators sited in VEA's areas.
   c) Point is every generator sited in VEA's area may be required to have multiple RAS – up to double digit number of RAS on each generator if no new line options are considered
   ✓ Avoiding RAS decreases interconnection costs and increases reliability due to less grid complexity
4. **Potentially reduces number of contingencies monitored by RAS**
   a) CAISO Standards allows up to 6 contingencies and 4 monitored elements per RAS (ISO SPS6).
   b) Every 6 contingencies eliminated potentially saves the cost of a new RAS per ISO SPS6 – potentially reducing interconnection costs of generators
5. **Could have a positive benefit cost ratio now which only increases over time**
   a) Cost of line is $50M, cost of avoiding 5 RAS in Cluster 10 at $10M/RAS is $50M.
   b) Costs of avoiding future RAS over the life of the line – increased benefits for every RAS or RAS element avoided
   c) Less generator curtailment with fewer RAS means less lost energy - adds to benefits and provides a more stable energy market
   d) Wire has other quantifiable and non-quantifiable benefits over RAS making the new line more cost effective and more important
      ✓ A new line adds to reliability, stability, wheeling options, lowers generator interconnection costs….
      ✓ Western Interconnect unique in that it seems to rely heavily on RAS compared to Eastern Interconnect and ERCOT

Brattle Group – Identify All Transmission Benefits

- http://wiresgroup.com/docs/reports/WIRES%20Brattle%20Rpt%20Benefits%20Transmission%20July%202013.pdf

Table ES-1
Potential Benefits of Transmission Investments

Benefit Category	Transmission Benefit
1. Traditional Production Cost Savings	Production cost savings as traditionally estimated
1a-1i. Additional Production Cost Savings	a. Reduced transmission energy losses
	b. Reduced congestion due to transmission outages
	c. Mitigation of extreme events and system contingencies
	d. Mitigation of weather and load uncertainty
	e. Reduced cost due to imperfect foresight of real-time system conditions
	f. Reduced cost of cycling power plants
	g. Reduced amounts and costs of operating reserves and other ancillary services
	h. Mitigation of reliability-must-run (RMR) conditions
	i. More realistic representation of system utilization in "Day-1" markets
2. Reliability and Resource Adequacy Benefits	a. Avoided/deferred reliability projects
	b. Reduced loss of load probability or c. Reduced planning reserve margin
3. Generation Capacity Cost Savings	a. Capacity cost benefits from reduced peak energy losses
	b. Deferred generation capacity investments
	c. Access to lower-cost generation resources
4. Market Benefits	a. Increased competition
	b. Increased market liquidity
5. Environmental Benefits	a. Reduced emissions of air pollutants
	b. Improved utilization of transmission corridors
6. Public Policy Benefits	Reduced cost of meeting public policy goals
7. Employment and Economic Development Benefits	Increased employment and economic activity; Increased tax revenues
8. Other Project-Specific Benefits	Examples: storm hardening, increased load serving capability, synergies with future transmission projects, increased fuel diversity and resource planning flexibility, increased wheeling revenues, increased transmission rights and customer congestion-hedging value, and HVDC operational benefits

Table 2
Transmission Benefits Considered in RTO Planning Processes

RTO Planning Process	Estimated Benefits	Other Benefits Considered (without necessarily estimating their value)
CAISO TEAM (as applied to PVD2)	• Production cost savings and reduced energy prices from both a societal and customer perspective • Mitigation of market power • Insurance value for high-impact low-probability events • Capacity benefits due to reduced generation investment costs • Operational benefits (RMR) • Reduced transmission losses • Emissions benefits	• Facilitation of the retirement of aging power plants • Encouraging fuel diversity • Improved reserve sharing • Increased voltage support
SPP ITP Analysis	• Production cost savings • Reduced transmission losses • Wind revenue impacts • Natural gas market benefits • Reliability benefits • Economic stimulus benefits of transmission and wind generation construction	• Enabling future markets • Storm hardening • Improving operating practices/maintenance schedules • Lowering reliability margins • Improving dynamic performance and grid stability during extreme events • Societal economic benefits
Additional benefits recommended by SPP's Metrics Task Force	• Reduced energy losses, • Reduced transmission outage costs • Reduced cost of extreme events • Value of reduced planning reserve margins or loss of load probability • Increased wheeling through and out revenues • Value of meeting public policy goals	• Mitigation of weather uncertainty • Mitigation of renewable generation uncertainty • Reduced cycling of baseload plants • Increased ability to hedge congestion costs • Increased competition and liquidity
MISO MVP Analysis	• Production cost savings • Reduced operating reserves • Reduced planning reserves • Reduced transmission losses • Reduced renewable generation investment costs • Reduced future transmission investment costs	• Enhanced generation policy flexibility • Increased system robustness • Decreased natural gas price risk • Decreased CO_2 emissions output • Decreased wind generation volatility • Increased local investment and job creation
NYISO CARIS	• Reliability benefits • Production cost savings	• Emissions costs • Load and generator payments • Installed capacity costs • Transmission Congestion Contract value
PJM RTEP	• Reliability benefits • Production cost savings	• Public policy benefits
ERCOT LTS	• Reliability benefits • Production cost savings • Avoided transmission project costs	• Public policy benefits
ISO-NE RSP	• Reliability benefits • Net reduction in total production costs	• Public policy benefits

The TPP is Positioned to Capture GWT/VEA's Uniqueness

- The CAISO TPP process is in a unique situation now
  - VEA is in a renewable rich area with no existing RAS
  - VEA load is very small compared to potential renewable generation to be developed – generation could exceed load by 10-20 times load or more
  - GWT has a strong 230kV grid that can be leveraged to maximize reliability, low cost interconnections and maximize generation deliverability (minimize curtailment)
- GridLiance proposes to work with the CAISO to optimize reliability solutions needed to interconnect new generation in VEA's service territory
  - The GIP process is not the appropriate forum to optimize solutions – must use RAS or generation curtailment as mitigation measures since generation participation is so fluid
  - The TPP is the right forum to identify optimal grid solutions – has data and tools such as production models
  - The CAISO is the right entity since it has or controls much of the data needed to quantify all transmission benefits identified by the Brattle Group paper
- GridLiance is a willing partner to support a robust low cost grid which will facilitate the CA renewable energy market for years to come
  - We need to act soon to leverage the opportunities GWT/VEA's uniqueness offers CAISO stakeholders