

**Comments of GridLiance West LLC on
CAISO's 2020-2021 Transmission Planning Process Meeting on 11/17/20**

December 1, 2020

GridLiance West LLC (GLW) appreciates the opportunity to comment on the stakeholder meeting held on November 17, 2020, regarding CAISO's Preliminary Policy and Economic Assessments for the 2020-2021 Transmission Planning Process (TPP). GLW appreciates the detailed presentation that CAISO prepared for this stakeholder meeting and references specific slides from that presentation in these comments.

GridLiance Comments on CAISO's Policy Sensitivity Case 2 Expanded Energy-Only Limit Study

GridLiance offers comments in response to the CAISO's off-peak analysis for Policy Sensitivity Case 2 addressing the expanded Energy Only limits.

CAISO's Off-Peak Analysis Demonstrates Ability to Expand IRP Energy-Only Limits

GridLiance appreciates the CAISO's efforts to publish findings from its study of the Sensitivity Portfolio 2 – the study of expanding the Energy-Only (EO) limits used for the CPUC's Integrated Resource Planning (IRP) Process. The findings provide helpful input to the CPUC's process, and release at this time can enable the CPUC to incorporate these findings for their next portfolios. GridLiance strongly encourages the CAISO to pass these results to the CPUC and at this time recommend increases to the transmission limits for those areas studied such that the portfolios are not unnecessarily constrained (using overly low limits) for the subsequent portfolios that will be used for the 2021 – 2022 TPP.

The CAISO's results show that the renewable buildout of Sensitivity Portfolio 2 (SENS-2 in the CAISO November 17, 2020 slides) could be managed in almost all cases by renewable action schemes (curtailing the renewable generation if need be), dispatching storage, or siting portfolio storage in the areas. The three areas that seemed to warrant transmission upgrades are Tehachapi, the VEA/GLW area of Southern Nevada, and Westlands. The CAISO summarized these results on slide 100 of their November 17¹ results reflecting the off-peak (i.e., periods of high renewable curtailment) results.

¹ <http://www.caiso.com/Documents/Presentation-2020-2021TransmissionPlanningProcess-Nov172020.pdf>

Summary of off-peak deliverability assessment results

- Pre-contingency renewable curtailment was identified to varying extent in the base and sensitivity portfolios
- In addition to RAS, transmission upgrades, dispatching storage behind the constraint in charging mode and adding storage (subject to on-peak deliverability) are considered to mitigate renewable curtailment

Renewable Transmission Zone	Constraint	Battery Storage Behind Constraint (Base/Sens-1/Sens-2)	Renweable Curtailment (Base/Sens-1/Sens-2)(MW)	Potential Mitigation		
				Transmission	Dispatch Storage (Base/Sens-1/Sens-2) (MW)	Add Storage (Base/Sens-1/Sens-2) (MW)
Tehachapi (Whirlwind)	Whirlwind 500/230 Banks	0/267/305	0/120/240	Whirlwind 500/230kV No. 4 (~\$100M) - Sens-1, Sens-2	0/120/240	N/A
Southern NV (CAISO)	VEA/GLW Area Constraints	0/40/40	0/0/830	Multiple options (~\$90M-\$192M each) - Sens-2	0/0/NA	0/0/790
Westlands	Kettleman- Gates 70 kV constraint	0	10/10/10	Reconductor Kettleman-Gates 70 kV line - Base, Sens-1, Sens-2	N/A	10/10/10

- RAS is expected to address pre-contingency curtailment in other areas

Of these three areas, the upgrades to the VEA/GLW system can provide substantial reductions in curtailment for relatively low-cost transmission enhancements. The CAISO's presentation further displayed options it considered for the VEA/GLW area in its slide 48.²

² *Id.*, electronic page 59.

Mitigation Options

Options	Pahrump-Sloan Canyon rebuild	Innovation-Desert View reconductor	Desert View-Northwest reconductor	Innovation-Northwest 138kV rebuild	Pahrump-Sloan Canyon #2	Innovation-Desert View #2	Desert View-Northwest #2	138kV Phase Shifter	Gamebird-Arden 230kV	Cost Estimate (\$M)*	Gen Curtailment (MW)	Inc MW/\$M
Status Quo										0	830	
Option 1	✓	✓	✓	✓						192	450	1.98
Option 2A					✓	✓	✓			112	120	6.34
Option 2B				✓	✓	✓	✓			162	110	4.44
Option 2C					✓	✓	✓	✓		121	130	5.79
Option 3						✓	✓		✓	90	0	9.22
Option 4			✓	✓	✓	✓				162	80	4.63
Option 5	✓					✓	✓	✓		121	350	3.97
Option 6			✓	✓	✓			✓		151	300	3.51

* Cost estimate as provided by GLW



Of these projects considered, Option 3 - the lowest cost set of upgrades - had the biggest benefit in reducing curtailment; according to these CAISO's assessment it had the biggest bang-for-the-buck using the CAISO's simple comparison of annual reduction in curtailment per \$M of capital investment.

Full Production Cost Modeling by GridLiance Further Demonstrates Reasonableness of EO Limit Expansion

GridLiance has performed more extensive production cost modeling of the projects included in Option 3. The modeling was performed using the same tool, GridView, used by the CAISO in its TPP economic studies. GridLiance applied the CAISO's topography, as well as the consistent IRP portfolios and IEPR input assumptions. GridLiance's study of the Gamebird – Arden 230kV upgrade, for example, shows upgrading this path alone has a significant impact at reducing the renewable curtailment, and it produces benefits that essentially would pay for the upgrade costs (estimated at \$69M) in just one year (2030 simulation year). The annual savings resulting for this upgrade path alone are as follows.

Table 1 - Gamebird to Arden Upgrade Impacts to CAISO Load Payments

CAISO	Base Case (\$M)	With Gamebird – Arden 230kV Upgrade (\$M)	Difference (Base – Upgrade) (\$M)
Load payment	7,106	7,000	106
Generation profits	2,736	2,644	-92
Transmission revenue	200	255	54
Net Payment of CAISO Load Customer	4,169	4,101	69

Based on GridLiance’s production cost modeling, inclusion of additional circuits between the VEA/GLW substations Innovation to Desert View and Desert View to Northwest³ further enhances the reduction in curtailment and produces additional benefits to CAISO load of \$81.6M. The additional Innovation to Desert View and Desert View to Northwest upgrades are expected to cost \$24M. Together with the Gamebird to Arden upgrade (total cost of \$93M) the benefits would again nearly pay for the upgrades within one year. GridLiance looks forward to continuing to work with CAISO to determine the optimal projects to accommodate additional buildout of renewables with the GridLiance expanded EO limit of 2,170 MWs.

In short the CAISO’s findings support increasing the EO limits in the GridLiance area, and GridLiance’s complete production cost modeling analysis further reinforces the benefits of the limited transmission upgrades that would support delivery of the renewable energy if sited at the level of the studied EO limit of 2,170 MWs. GridLiance supports expansion to the other limits shown to be manageable through RAS or otherwise cost-effectively managed with upgrades. GridLiance respectfully requests that the CAISO transmit these findings to the CPUC at this time to avoid further delay in an IRP solution that reflects these limits tested through the CAISO’s more detailed analysis.

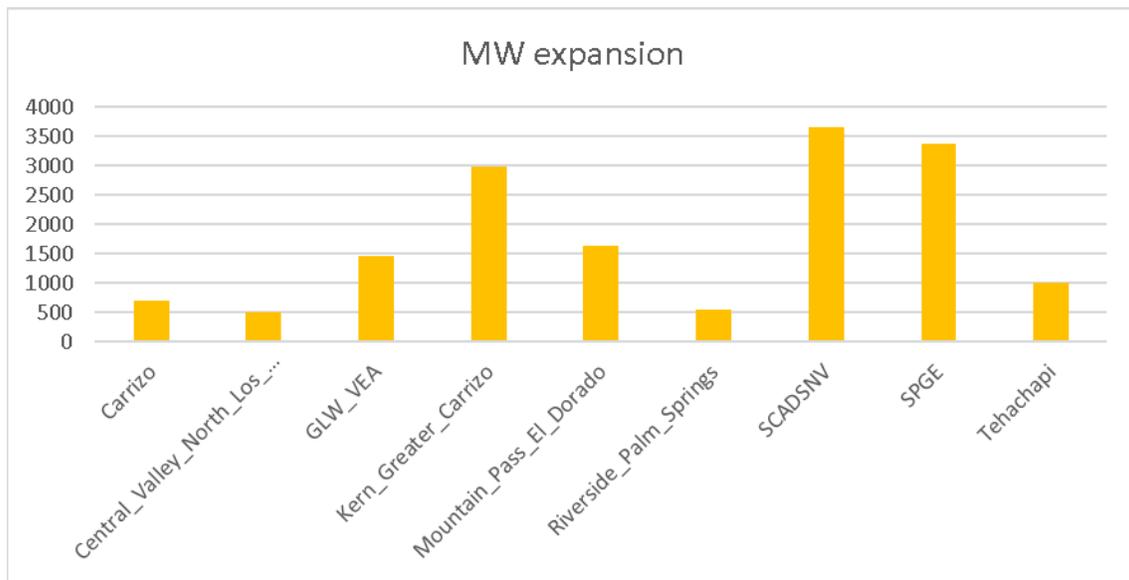
Expanded EO Limits Result in Rational IRP Results in RESOLVE

To ensure the expanded EO limits would produce rational results in the IRP, GridLiance further tested the impacts of the expanded EO limits by performing RESOLVE runs. The findings are rational and further support the CAISO authorizing the increased EO limits to the CPUC at this time.

³ For the addition of a second circuit between Desert View and Northwest, GridLiance found in its modeling such a package of upgrades was greatly enhanced by also upgrading the existing Desert View to Northwest line. The benefits and cost of Option 3 reflected in these comments also reflects that existing circuit upgrade. GridLiance is not clear at this time whether the CAISO considered upgrading of the existing circuit at \$2M as part of its “Option 3.”

GridLiance tested the results by increasing the EO limits in RESOLVE in accordance with the CPUC’s Policy Sensitivity Case 2 expansions. Note that the CPUC developed its Policy Sensitivity Case 2 portfolio using the expanded EO limits, but it also set a carbon goal of 38MMT to drive the portfolio siting high enough to stress test curtailment. GridLiance applied the higher EO limits to the Reference System Plan RESOLVE assumption set, including the 46 MMT carbon goal. In its testing of the expanded EO limits GridLiance also made one adjustment in RESOLVE based on a distortion GridLiance has identified in the past in RESOLVE related to interconnection cost assumptions, a distortion that has caused the CPUC to adjust the portfolios in the mapping process outside of RESOLVE. To have the RESOLVE results be inclusive of this adjustment GridLiance made an adjustment to interconnection cost assumptions within RESOLVE.⁴

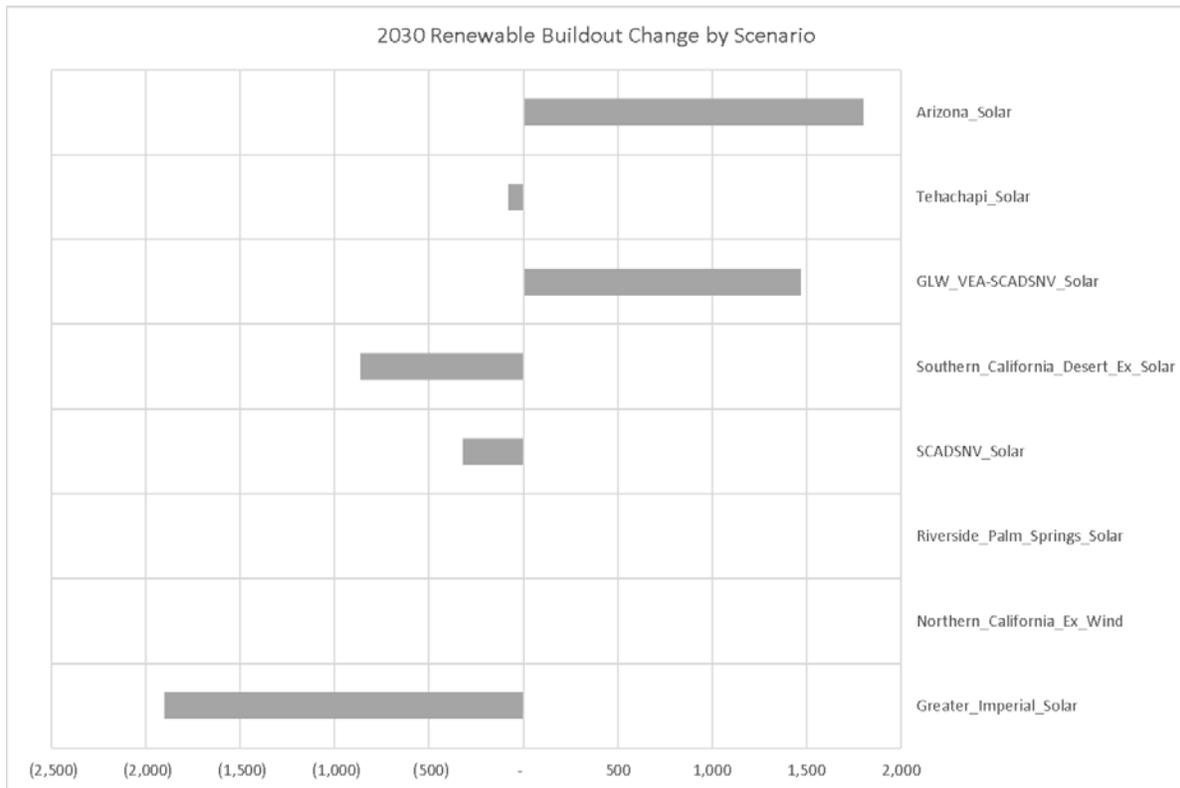
The increases were to the areas and by the amounts shown below.



With these expanded limits the RESOLVE results do not change dramatically or unexpectedly.

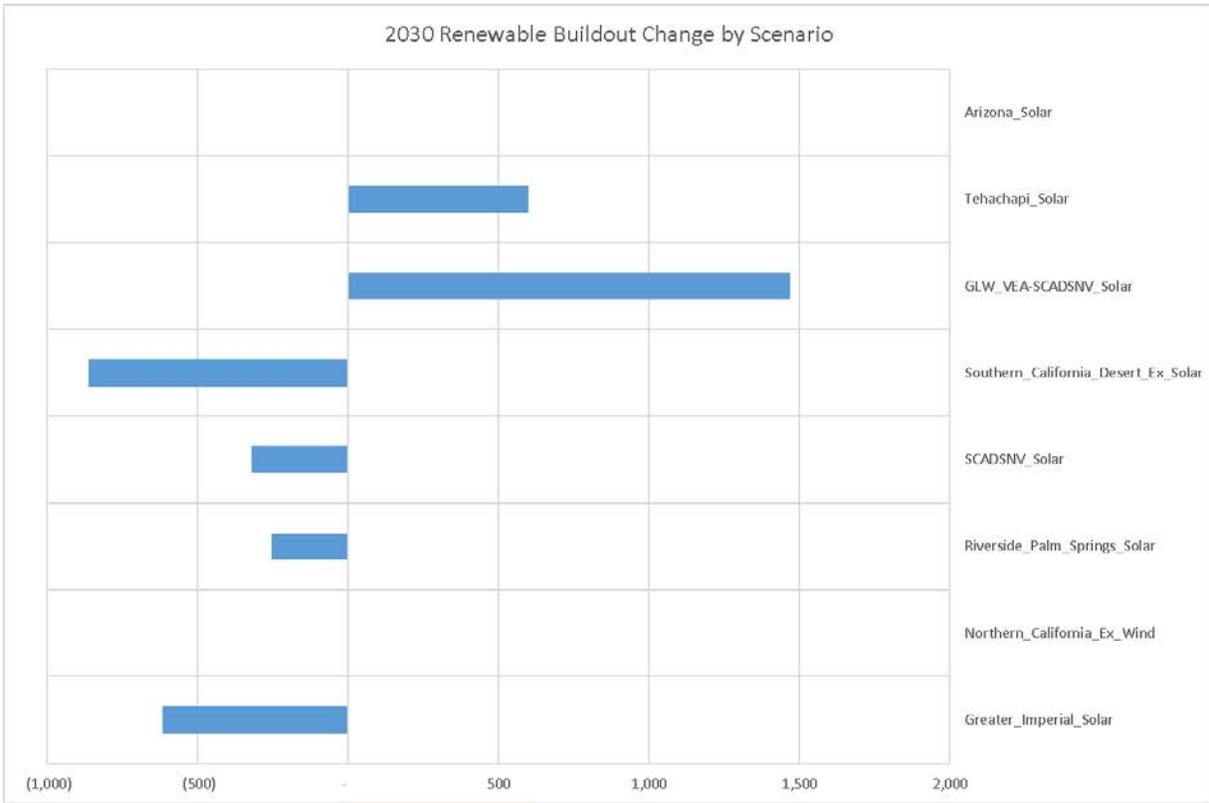
⁴ RESOLVE does not differentiate interconnection costs between 500kV and 230kV interconnection. GridLiance has commented on this extensively in the IRP proceedings. The practical implication is that without adjustment RESOLVE oversites Arizona solar because RESOLVE does not add a premium for developers interconnecting to the 500kV substation in Arizona. GridLiance is working with the CPUC on this issue and has provided information to suggest that the Arizona interconnection costs are under-represented by 50% or more. For the RESOLVE runs reported herein unless otherwise noted, GridLiance increased the Arizona solar interconnection cost by 10%.

Figure 1- Change in Buildout with Expanded EO limits



The findings show that the RESOLVE does not wildly change with increases to transmission limits as tested by the CAISO in its TPP. Figure 1 demonstrates that when the limits are expanded additional siting occurs at the lower cost areas and siting decreases within California. (RESOLVE areas not shown on the chart had no change in portfolio siting with the EO limit expansion.) We note that this result is not entirely driven by the expansion, as it is itself quite sensitive to the interconnection issue cited above. In fact, when the Arizona solar interconnection is increased to 1.5x the cost in the base RESOLVE assumptions siting at Arizona does not increase with expanded EO limits, and siting interior to California instead increases as shown in Figure 2.

Figure 2 - Change in Buildout with Expanded EO Limits at 1.5x Az Solar Interconnection Costs



For the CAISO in its TPP some of these details about RESOLVE responses are not directly relevant as the specific RESOLVE outcomes and IRP choices are under the purview of the CPUC in its IRP process. However, we include these RESOLVE findings in these TPP comments to demonstrate that if the CAISO promotes the tested EO limits to the CPUC for inclusion in the IRP, the results driven by these EO limits are expected to be rational and not produce in themselves wild swings in IRP portfolios.

Summary

GridLiance very much appreciates the CAISO's collaboration with the CPUC to develop the EO Expanded study and appreciates the CAISO's efforts to accelerate results from that study to support the next IRP cycle as intended by the CPUC. The IRP and TPP are recognized as being iterative, and this study and the inclusion of the new limits in the next IRP demonstrate the effectiveness of that interactive nature of these processes and the benefits available through the CAISO's collaboration with the CPUC.

We greatly encourage the CAISO to identify these findings to the CPUC at this time and convey the implications that the GridLiance area transmission limit can be expanded to 2,170 MWs and that other areas' limits as found by the CAISO can also be expanded for the next IRP cycle. GridLiance recognizes that the CAISO's TPP is not officially concluded. At the same time the CAISO identified no reason why their off-peak analysis findings are expected to change. GridLiance urges the CAISO to convey to the CPUC at this time that these expanded limits are the best currently know values to use, recognizing of course that the CPUC and CAISO can find means to adjust the portfolios should anything arise that would warrant a downward adjustment of these expanded limits.

Sincerely yours,



Jody Holland
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