CALIFORNIA ISO

Responses to Comments from Stakeholders On TEAM Analysis for PVD2

Set #3

Prepared by

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Stakeholder Questions & Responses

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1. General comment

I agree with the statement in the Alternate Market Paradigm paper that "…. PLEXOS may overstate the loss of congestion rental associated with the [transmission] upgrade (and thus underestimate the benefits of the upgrade) …." . This over statement is a result of modeling the "full network" including an approximation of schedules among other control areas. Schedules between Arizona and the LADWP, the SMUD, or the PNW, for example will probably contribute to both real time and PLEXOS flows on ISO transmission lines such as Devers-Palo Verde. Thus, they will contribute to the PLEXOS calculated congestion rents. However, in the ISO's day-ahead IFM and congestion management process, only ISO schedules will be known and considered. It is quite possible that absent the flows associated with schedules between non-ISO control areas the ISO's IFM congestion management will not see as much congestion on lines that PLEXOS finds congested and that there will not be as much congestion revenue collected by the ISO and thus less loss of congestion rent when the upgrade is completed, including the "category CA' and other category lines. It is also possible that if there would be congestion absent the external schedules, the shadow price would be lower than calculated by PLEXOS. This would also cause PLEXOS to calculate more congestion rent on the present pre-upgrade system than is realistic, and thus also contribute to under-estimating the economic benefit of a transmission upgrade.

In a similar manner, to the extent that PLEXOS calculates congestion rent on ISO controlled transmission lines even though absent the external schedules there would be no congestion, (and thus no collection of congestion rents in the IFM) the PLEXOS calculation of congestion revenues includes an implicit assumption that the ISO collects congestion revenue on loop flow which is not the case. The ISO will be able to collect congestion rents only on DA IFM schedules.

The ISO's Alternate Market Paradigms approach generally addresses the problems of under estimating economic benefits because of congestion revenue treatment, but does not appear to fully address the above issues. While this specific Devers-Palo Verde 2 case may not require that a complete correction be made, the ISO should commit to addressing these problems completely by updating the TEAM methodology for future project analyses. If the ISO believes these are fully addressed, more information about the details of how the problem of the difference in level of congestion between PLEXOS/real time and the DA IFM is handled, and how uplift costs in lieu of congestion revenues is being calculated and handled.

Response [Farrokh Rahimi]:

In order to manage expectations and avoid potential misunderstanding it is important to put the issue of physical vs contract path network modeling and the adjustment procedure adopted in the TEAM report in the proper context.

To do so, let us start by assuming that all bids are cost-based and that generation resources are **committed** in an efficient manner to meet the real-time local demand and economy interchange throughout WECC with a view to known transmission constraints (public information). In the absence of market power or other perverse incentives, these should be valid target assumptions for real-time dispatch regardless of whether a contract path or physical network model is used for day-ahead market clearing, and regardless of whether some regions work under an integrated regime and others under a forward market paradigm. In other words, if there is no exercise of market power in the form of physical or economic withholding, and unit commitment is done efficiently, the bottom line benefit of transmission upgrade for the entire WECC is the reduced cost of final real-time dispatch to meet the load (regardless of whether a physical or contract path model is used for forward day-ahead scheduling and settlement].

Implicit in the above statement is the fact that under a "no market power" paradigm, and with transparent transmission system information (allowing efficient decentralized unit commitment), the correct network model to use to get the right (efficient) **real-time** dispatch is the full (physical) network model. The impact of physical vs contract path network modeling in the forward (scheduling) time frame is only distributional, i.e., it impacts the benefits of the upgrade as they accrue to various regions (participants). This is what the rental re-allocation (adjustment) attempts to accomplish.

It may be true that in actual practice, the two central assumptions made above (lack of market power and efficient unit commitment) may not hold. To the extent that incorrect (contract path) network modeling in the scheduling time frame may result in inefficient unit commitment[1] there will be an impact on the outcome of the real-time dispatch and thus the system-wide benefits of the upgrade. Whereas the Plexos methodology accounts (and corrects) for the impact of market power, the unit commitment parameters were not modeled in this analysis, due to lack of data, though PLEXOS is capable of handling it. Short of invoking the unit commitment capability in Plexos, it would be a futile attempt to use the Plexos optimization algorithm with a contract path network model. Adding unit commitment would increase the computation burden to such an extent that would require sacrificing some other desirable features that Plexos has at present. Moreover, simply adding unit

[1] Examples are failing to turn on a long start unit that may be needed, or turning on a long run time unit that may not be needed when the physical network model and constraints show up in real-time.

commitment and using it in conjunction with a contract path model in Plexos will not be able to mimic the use of public information (e.g., transmission information) that market participants use in deciding their own (decentralized) resource commitment and the outcome could still be questionable. Based on the above, at present there are no plans to include contract path modeling in Plexos beyond the simple post-optimization adjustments mentioned in the report.

2. Additional comments/questions on the Alternate Market Paradigms approach

a. There is mention of 20 major lines that generate the majority of the transmission rents. Can the ISO provide a list of the lines?

Response [Farrokh Rahimi]:

These are the lines that comprise the three main scheduling interfaces between Arizona and California, i.e., EOR, WOR, and PVWest, namely:

	Line	From Region	To Region	R
1	BIGSANDY_500-PERKINS_500	WAPA LC	Arizona	0.5
2	CIMA_230-ELDORDO_230	SCE	SCE	-
3	COACHELV_230-DEVERS_230	Imperial	SCE	1
4	ELDORDO_500-LUGO_500	SCE	SCE	-
5	HASSYAMP_500-N.GILA_500	Arizona	SDG&E	0.9
6	IMPRLVLY_230-ELCENTRO_230	SDG&E	Imperial	0.1
7	J.HINDS_230-MIRAGE_230	SCE	SCE	-
8	LIBERTY_345-PEACOCK_345	Arizona	WAPA LC	0.47
9	LUGO_500-MOHAVE_500	SCE	SCE	-
10	MARKETPL_500-ADELANTO_500	LADWP	LADWP	-
11	MCCULLGH_500-VICTORVL_500.1	LADWP	LADWP	-
12	MCCULLGH_500-VICTORVL_500.2	LADWP	LADWP	-
13	MEAD_287-VICTORVL_287	LADWP	LADWP	-
14	MOENKOPI_500-ELDORDO_500	Arizona	SCE	0
15	N.GILA_500-IMPRLVLY_500	SDG&E	SDG&E	-
16	NAVAJO_500-CRYSTAL_500	Arizona	LADWP	0.42
17	PALOVRDE_500-DEVERS_500.1	Arizona	SCE	0.7
18	PALOVRDE_500-DEVERS_500.2	Arizona	SCE	1
19	PISGAH_230-ELDORDO_230	SCE	SCE	-
20	RAMON_230-MIRAGE_230	Imperial	SCE	0.72

b. There is mention of a rental allocation factor R. Can the ISO provide information what the factor is for each line and how it was determined?

Response [Farrokh Rahimi]:

The factor R indicates the portion of the rental generated by the line that is assigned to the "To" terminal of the line (based on ownership or right). The default is 0.5 (i.e., 50% to each of the two terminal regions). The R values for some of the lines of interest are shown in the above table.

c. There is mention of uplift charges rather than congestion rents on page 1. Was a specific adjustment made to include the uplift charge? How was the uplift charge determined?

Response [Farrokh Rahimi]:

No attempt was made to quantify the uplift charges. The adjustment involved only the re-allocation of congestion rents.

d. There is mention on page 1 of a "scissors cut radial network". This is the first time I have heard of this. Please provide details on how the cut is made on each line that is radialized. Can you explain how this changes the "full network" model that has been described for the MRTU IFM congestion management?

Response [Farrokh Rahimi]:

The "scissors cut" simply refers to the external network model we use today. The statement was to indicate that under MRTU although we model the internal transmission lines and constraints, we will not be modeling any external loops beyond today's inter-tie scheduling points.

e. Page 1 also mentions that congestion on individual interface lines will continue to be managed in real-time under the initial California LMP paradigm. How much real time congestion management will be required compared to today? How will this be eliminated after the initial period? What is the initial period?

Response [Farrokh Rahimi]:

In the early stages of MRTU (or more precisely, the early MD02 era), modeling of the external loops was considered along with detailed internal network modeling. This was to better capture loop flows resulting from day-ahead internal and external schedules and thus enhance congestion management on the ties (and the internal paths) in the day-ahead time frame. However, the idea was put on hold once

it became clear that in addition to the computed physical flows, the ISO would have to manage contract path flow congestion as well according to the existing WECC rules. This would mean increased forward congestion management cost (to manage both physical and contract path constraints) coupled with reduced efficiency of transmission utilization (since the forward congestion management would have to ignore the beneficial impact of physical counterflows that would otherwise relieve contract path congestion).

Accordingly, the MRTU implementation will commence with the existing radial (scissors cut) external model (referred to here as the initial MRTU implementation) and will continue so as long as the existing WECC rules regarding the need to enforce and manage contract path congestion prevails. If in the future, the WECC moves to a paradigm accounting for the impact of parallel path flows, the ISO will consider adding the external loops for day-ahead congestion management.

The use of radial external fails to prevent real-time congestion that may occur on the ties or the internal paths as a result of the interaction of internal and external schedules and the meshed external network that was not modeled in the forward congestion management and market clearing process. The amount and cost of such real-time re-dispatch is difficult to determine, but it is expected to be smaller than the amount and cost of real-time re-dispatch in the pre-MRTU environment.

3. Questions on the draft report.

a. The analysis report finds benefit / cost ratios ranging from 1.2 to 3.2, but the study appears to be based on 2008 even though the line is planned for 2009. This might be important if economy imports on the new line diminish over time. Are 2008 benefits included or excluded from the analysis? Do benefits diminish after the first year, and would excluding 2008 have an impact on the calculated benefit cost ratio?

Response [Eric Toolson]:

The path flow studies used in the SSGWI databases for their analyses were for years 2008 and 2013 and was taken from the path flow study data of WECC for the same years. We felt it was important to use both years to better understand the benefits of the proposed PVD2. Although the PVD2 upgrade will not come online until 2009, due to lack of path flow study data unavailability for year 2009, and considering that there are no major transmission/generation addition changes from 2008 to 2009 we do not see any invalidation of the results for 2008. In the report submitted by SCE in April of 2004, it is stated that the project would come on line in 2008, and we started our analysis under that assumption. Though SCE updated us on the

starting date in the middle of the analysis, we did not see that it would make significant difference in the analysis for sticking with 2008 for the reasons mentioned above.

In the Draft Board Report, Table VII.1, the benefits in 2013 are greater than those in 2008 for all four perspectives in 2008 dollars. The calculated benefit-cost ratio is for the 50-year life of the project and includes 2008, 2013, and an estimated real escalation rate for the period beyond 2013.

b. Table VI.3 (pg 21) indicates that the Devers-Palo Verde 2 does not require new right of way, [the transmission line] is all rural, and is 230 miles long. This omits the 4 circuits west of Devers to San Bernardino (perhaps about 30 miles each) that have to be rebuilt, that some are on expiring ROWs, and that SCE stated at the ISO presentation a couple of weeks prior that the Indian tribes want the lines all moved further from highway 10 when they are rebuilt, presumably necessitating that new right of way deals be negotiated with the tribe(s). The cost of the rebuild appears to have been included, but has the cost of right of way associated with the 230 kV rebuilds been included?

Response [Jeff Miller]:

From SCE, it is our understanding that all these costs are all included. Please do direct any of the detailed project cost questions directly to SCE.

c. The ISO will not pay for or be paid for changes in losses on transmission lines that are not part of the ISO controlled grid. Why are they included in Appendix I, Table 1? Why are line resistances shown as zero in the table?

Appendix I, Table 1 depict the transmission lines that experience significant changes in losses due the DPV2 project. Our objective is to capture the saving in losses due to the project. If the value of the saving (which as shown is for the whole WECC or southwest to be specific) is used in estimating only ISO benefits then we have to extract the portion that belongs to the ISO. In that case I do agree with you.

The line resistances are not zero. The data in the column was accidentally changed to integers. It will be corrected in the final Technical appendix.