COMMENTS OF ARIZONA PUBLIC SERVICE
REAL-TIME MARKET NEUTRALITY SETTLEMENT
ISSUE PAPER/STRAW PROPOSAL
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Submitted by	Company	Date Submitted
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Arizona Public Service (APS) appreciates the opportunity to comment on the California Independent System Operator's (CAISO) Real-Time Market Neutrality Settlement Issue Paper/Straw Proposal. APS submits the following comments to highlight several core issues for CAISO's consideration.

Discontinuation of Real-Time Imbalance Energy Offset (RTIEO) Transfer Adjustment

APS generally supports the proposal to discontinue performing Real-Time Imbalance Energy Offset (RTIEO) transfer adjustments and we believe that any changes to settlements should be made prospectively. APS believes this is a positive step to enhance the accuracy of settlements, including those related to Greenhouse Gas (GHG) allocations. However, we do have several concerns and would appreciate CAISO's clarification.

Currently, the RTIEO Adjustment mechanism serves as a form of "safety net" that helps reduce settlement volatility. Removing the RTIEO Transfer Adjustments may fix one problem but may adversely impact other settlements. We would appreciate if CAISO could provide further insights to ensure there will be no economic impact to other settlement mechanisms such as Congestion Offset.

Moreover, APS is concerned that discontinuation of the RTIEO Adjustment may expose greater risk on the Transfer Value to the Energy Imbalance Market (EIM) entities if/when errors occur. Currently, there is no mechanism to ensure that data inputs to the EIM Transfer Value calculation are correct. Without this "safety net" to reduce the impact of potential errors, any exposure due to incorrect Transfer Value may significantly impact the financial settlement. APS suggests that CAISO should seriously consider implementing some form of internal controls to validate the inputs to the Transfer Value calculation to ensure accuracy of the final RTIEO settlement. The steps necessary to validate the inputs to the Transfer Value calculation are described below in the "5 Minute Granularity for ETSRs between EIM Entities and CAISO" section.

GHG Awards in Real-Time Market Neutrality

APS believes the proposal surrounding GHG awards in real-time market neutrality is a needed change. The change, as we understand it, proposes to use different transfer prices depending on whether the transaction is with an entity within the GHG Zone or outside of the GHG Zone. As prescribed, the methodology uses System Marginal Energy Cost (SMEC) for Balancing Authority Areas (BAA) inside the GHG Zone and SMEC + GHG with EIM BAAs outside the GHG Zone[1]. The proposal as described on the 5/1/19 stakeholder call seemed to be a more well-rounded solution than what the Real-Time Market Neutrality Settlement Issue Paper/Straw Proposal and presentation outlined. This is primarily due to the simplistic examples and explanations offered in the proposal. The examples provided were too simple to draw a reasonable conclusion as to how the change will truly be applied. As written, the most direct way to interpret the proposed solution puts any entity neighboring an entity within the GHG Zone in a precarious position which would have wheeling EIM transfers calculated at two separate prices for the transfer value.

After the call on 5/1/19, we interpreted the CAISO proposal to essentially bucket Non-GHG transfers separately from GHG transfers with the GHG Zone. A "Non-GHG transfer" is any EIM transfer that has not been awarded GHG compensation (in charge code 491), and a "GHG transfer" is any EIM transfer that has been awarded GHG compensation (in charge code 491). This reduces neutrality by applying two separate prices to EIM transfers. However, when considering that fifteen-minute and five-minute transfers will be settling in this calculation, it will require the CAISO, and consequently a settlement analyst conducting validation, to apply four different prices to the overall EIM transfers and track GHG transfers separately from Non-GHG transfers to calculate financial transfer value. It is possible to have one interval with exports to a GHG Zone BAA that is partially awarded GHG. This would result in 4 separate prices applied to a single interval transfer of energy to a single entity. The steps to conduct the calculation increase in this solution and the calculation may be difficult to understand.

The CAISO proposal, as we interpret it, keeps the GHG buried in the transfers and does not isolate the GHG explicitly in the RTIEO calculation. This is a challenging concept to communicate, especially when real world imbalances enter the RTIEO calculation and convolute the final result. Further, when conducting market analysis, calculating the pure value of EIM transfers requires additional steps to remove GHG compensation from the EIM transfer. This is an un-necessary complication.

APS is a proposing an alternate solution which we believe is more straightforward and achieves the same result as the CAISO proposal discussed on 5/1/19. In the APS solution, all EIM transfers are calculated using the transfer prices of SMEC + GHG, which effectively removes GHG from the transfer value. The RTIEO calculation will require GHG revenue to be added back to the neutrality calculation for BAAs that were awarded GHG, and the BAA that paid the GHG would have the offsetting charge in the GHG revenue line. Within the RTIEO calculation, this

[1] We are characterizing the price as SMEC *plus* GHG because the GHG component of the Locational Marginal Price (LMP) is always negative.

GHG revenue line will always equal zero across all BAAs in EIM. This achieves the same result as the CAISO proposal discussed on 5/1/19 but can be more easily understood.

APS believes that although the settlement results appear to be the same between the CAISO proposal and the APS proposal, the validation and explanation of GHG and RTIEO will be easier with the APS proposal. The APS proposal is a more straightforward approach to settling GHG within RTIEO and is demonstrated in the examples below.

In the following examples, we are showing the current settlement method (with transfer adjustments removed), the CAISO proposal as interpreted from the 5/1/19 discussion, and the APS proposal.

Assumptions for all examples:

- Assume no load imbalance before market optimization (Load = Gen * -1).
- Assume no congestion or losses.
- For the CAISO proposal, new determinants would be implemented to separate Non-GHG transfers from GHG transfers.
- For the APS proposal, a new determinant would be inserted into the RTIEO calculation called "GHG Revenue" to neutralize and properly allocate the GHG dollars.

EXAMPLE 1:

SMEC: $10
GHG: -$4
LMP: $6

BAA1 is importing 10MW from BAA3
BAA2 (CAISO) is importing 10MW from BAA4
BAA3 is exporting 10MW to BAA1
BAA4 is exporting 10MW to BAA2

Current settlement method without Transfer Adjustments								
		BAA1		BAA2 (CAISO)		BAA3		BAA4
Load	$	180.00	$	200.00	$	100.00	$	100.00
Gen	$	(120.00)	$	(100.00)	$	(160.00)	$	(160.00)
GHG	$	-	$	-	$	-	$	(40.00)
Transfer	$	(100.00)	$	(100.00)	$	100.00	$	100.00
Neutrality	$	(40.00)	$	-	$	40.00	$	-
IIE+GHG	$	60.00	$	100.00	$	(60.00)	$	(100.00)
RTIEO	$	40.00	$	-	$	(40.00)	$	-
Net Settlement	$	100.00	$	100.00	$	(100.00)	$	(100.00)

Note:

- BAA1 Gen was charged $60 (10MW * $6 LMP) to decrement generation ($60 = $180 payment before market optimization – $120 payment after-market optimization).
- However, BAA1 was charged an additional $40 in RTIEO since the transfer value uses the SMEC. This is calculated as BAA1 Transfer Amount of $100 (10MW * $10 SMEC) minus the BAA1 Gen Instructed Imbalance Energy (IIE) of $60 (10MW * $6 LMP).
- BAA3 Gen was paid an additional $60 to increment generation and BAA3 was paid an additional $40 in RTIEO since the transfer value uses the SMEC.
- This is an inequitable settlement between market participants BAA1 and BAA3.
    - Neutrality exists due to price difference between Gen and the EIM Transfer for BAA1 and BAA3.
- Settlements for BAA2 (CAISO) and BAA4 work properly, as expected.
    - No Neutrality exists for BAA2 and BAA4.

CAISO Proposal - as interpreted from stakeholder call on 5/1/19
GHG Transfer price: SMEC
Non-GHG Transfer price: SMEC + GHG

	BAA1	BAA2 (CAISO)	BAA3	BAA4
Load	$ 180.00	$ 200.00	$ 100.00	$ 100.00
Gen	$ (120.00)	$ (100.00)	$ (160.00)	$ (160.00)
GHG	$ -	$ -	$ -	$ (40.00)
GHG Transfer	$ -	$ (100.00)	$ -	$ 100.00
Non-GHG Transfer	$ (60.00)	$ -	$ 60.00	$ -
Neutrality	$ -	$ -	$ -	$ -
IIE+GHG	$ 60.00	$ 100.00	$ (60.00)	$ (100.00)
RTIEO	$ -	$ -	$ -	$ -
Net Settlement	$ 60.00	$ 100.00	$ (60.00)	$ (100.00)

Note: No neutrality issues since GHG Zone transfers are calculated using SMEC, which consequently includes GHG, and the EIM transfers are calculated using SMEC + GHG.

- BAA1 Gen was charged $60 (10MW * $6 LMP) to decrement generation ($60 = $180 payment before market optimization – $120 payment after-market optimization).
- BAA1 and BAA3 are conducting a Non-GHG Transfer, so the price applied to the transfer is $6 ($6 = $10 SMEC + (-$4 GHG)).
- BAA1 has no neutrality to settle in RTIEO in this proposal as the Gen of $60 is offset by the Non-GHG Transfer of ($60).
- BAA3 has no neutrality .
- BAA2 and BAA4 are conducting a GHG Transfer, in which GHG dollars were awarded to BAA4 and paid in charge code 491. The GHG Transfer price is $10 ($10 SMEC).
- BAA4 Gen is paid $60 for incrementing generation by 10MW (10MW * $6 LMP) and separately in charge code 491, BAA4 receives $40 (10MW * -$4 GHG). Effectively, BAA4 is receiving $100 ($60 to Gen and $40 to GHG).
- BAA4 has no neutrality because the $100 received matches the $100 GHG Transfer value.

- BAA2 is paying $100 (10MW * $10LMP) to Gen because the generation is decremented and California does not have GHG in the LMP.
- BAA2 has no neutrality because the $100 paid matches the ($100) GHG Transfer value.
- In this example, no neutrality exists across each BAA as each is paying or receiving the expected dollar amount which matches the transfer value.

APS Proposal								
		BAA1		BAA2 (CAISO)		BAA3		BAA4
Load	$	180.00	$	200.00	$	100.00	$	100.00
Gen	$	(120.00)	$	(100.00)	$	(160.00)	$	(160.00)
GHG	$	-	$	-	$	-	$	(40.00)
GHG Revenue	$	-	$	(40.00)	$	-	$	40.00
Transfer	$	(60.00)	$	(60.00)	$	60.00	$	60.00
Neutrality	$	-	$	-	$	-	$	-
IIE+GHG	$	60.00	$	100.00	$	(60.00)	$	(100.00)
RTIEO	$	-	$	-	$	-	$	-
Net Settlement	$	60.00	$	100.00	$	(60.00)	$	(100.00)

Note: Same result as the interpreted CAISO proposal. No neutrality concerns and all EIM transfers are calculated using SMEC + GHG price.

- BAA1 Gen was charged $60 (10MW * $6 LMP) to decrement generation ($60 = $180 payment before market optimization – $120 payment after-market optimization).
- In the APS proposal, all EIM transfers are calculated using the SMEC + GHG price. For this example, the price applied to the EIM transfers is $6 ($6 = $10 SMEC + (-$4 GHG)).
- In the APS Proposal, GHG Revenue (equal to the amount in charge code 491) is added back to the neutrality calculation within RTIEO. Similarly, the value awarded in the transfer is charged to the BAA that awarded the GHG.
- In this example, BAA4 Gen is paid $60 for incrementing generation by 10MW (10MW * $6LMP) and separately in charge code 491, BAA4 receives $40 (10MW * -$4 GHG) for GHG.
- BAA4 has a Transfer value of $60 (10MW * $6 transfer price). To appropriately allocate the dollars received in charge code 491 for GHG revenue, the GHG revenue must be added back to the neutrality calculation.
- BAA4 is neutral in this example as Gen ($60) + GHG ($40) = ($100) and Transfer Value $60 + GHG Revenue $40 = $100. ($100) + 100 = $0.
- BAA2 is also neutral in this example as Gen $100 and Transfer value ($60) + GHG Revenue ($40) = ($100). BAA2 is charged the $40 awarded to BAA4 for GHG. This achieves neutrality and clearly isolates the GHG dollars.
- BAA1 and BAA2 are both neutral as well since the Gen value is offset equally by the Transfer value.
- In this example, no neutrality exists across each BAA as each is paying or receiving the expected dollar amount in Gen and GHG.

EXAMPLE 2:

This example addresses wheeling. This was a concern brought up in the 5/1/19 call due to the simplistic examples in the proposal. From the written proposals and explanation, it appeared that the CAISO proposal would have placed BAAs adjacent to the GHG Zone in a precarious situation with two separate transfer prices. The discussion on the call clarified that this was not the case, and the GHG transfers would be tracked separately.

SMEC: $10
GHG: -$4
LMP: $6

BAA1 is importing 10MW from BAA3 and exporting 10MW to BAA2
BAA2 (CAISO) is importing 10MW from BAA1 and exporting 10MW to BAA4
BAA3 is exporting 10MW to BAA1
BAA4 is importing 10MW from BAA2

Note: GHG pricing can exist because of transfers not listed here.

Current settlement method without Transfer Adjustments								
		BAA1		BAA2 (CAISO)		BAA3		BAA4
Load	$	180.00	$	200.00	$	100.00	$	100.00
Gen	$	(180.00)	$	(200.00)	$	(160.00)	$	(40.00)
GHG	$	-	$	-	$	-	$	-
Transfer	$	-	$	-	$	100.00	$	(100.00)
Neutrality	$	-	$	-	$	40.00	$	(40.00)
IIE+GHG	$	-	$	-	$	(60.00)	$	60.00
RTIEO	$	-	$	-	$	(40.00)	$	40.00
Net Settlement	$	-	$	-	$	(100.00)	$	100.00

Note: BAA1 and BAA2 are wheeling 10MW with equal pricing on import and export. The neutrality concern is the same as Example 1, where the exporting entity, BAA3, is getting paid $100 when the generator is only getting paid $60.

- BAA4 Gen was charged $60 (10MW * $6 LMP) to decrement generation ($60 = $100 payment before market optimization – $40 payment after-market optimization).
- However, BAA4 was charged an additional $40 in RTIEO since the transfer value uses the SMEC. This is calculated as BAA4 Transfer Amount of $100 (10MW * $10 SMEC) minus the BAA4 Gen IIE of $60 (10MW * $6 LMP).
- BAA3 Gen was paid an additional $60 to increment generation and BAA3 was paid an additional $40 in RTIEO since the transfer value uses the SMEC.
- This is an inequitable settlement between market participants BAA3 and BAA4.
    - Neutrality exists due to price difference between Gen and the EIM Transfer for BAA3 and BAA4.

- Settlements for BAA1 and BAA2 (CAISO) work properly, as expected. BAA1 and BAA2 are wheeling 10MW. So the import value ($100) and the export value $100 of the transfer net to $0.
- No Neutrality exists for BAA1 and BAA2.

CAISO Proposal - as interpreted from stakeholder call on 5/1/19 GHG Transfer price: SMEC Non-GHG Transfer price: SMEC + GHG	BAA1	BAA2 (CAISO)	BAA3	BAA4
Load	$ 180.00	$ 200.00	$ 100.00	$ 100.00
Gen	$ (180.00)	$ (200.00)	$ (160.00)	$ (40.00)
GHG	$ -	$ -	$ -	$ -
GHG Transfer	$ -	$ -	$ -	$ -
Non-GHG Transfer	$ -	$ -	$ 60.00	$ (60.00)
Neutrality	$ -	$ -	$ -	$ -
IIE+GHG	$ -	$ -	$ (60.00)	$ 60.00
RTIEO	$ -	$ -	$ -	$ -
Net Settlement	$ -	$ -	$ (60.00)	$ 60.00

- BAA4 Gen was charged $60 (10MW * $6 LMP) to decrement generation ($60 = $100 payment before market optimization – $40 payment after-market optimization).
- BAA3 Gen was paid $60 (10MW * $6 LMP) to increment generation.
- This is considered a Non-GHG Transfer, so the price applied to the transfer is SMEC + GHG ($10 + (-$4)) = $6.
- For both BAA3 and BAA4, The Non-GHG Transfer value matches the Gen and no neutrality exists to be offset in RTIEO.
- BAA1 and BAA2 are wheeling Non-GHG Transfers, so the import value ($60) and the export value $60 of the transfer net to $0.
- In this example, no neutrality exists across each BAA as each is paying or receiving the expected dollar amount in Gen and GHG.

APS Proposal	BAA1	BAA2 (CAISO)	BAA3	BAA4
Load	$ 180.00	$ 200.00	$ 100.00	$ 100.00
Gen	$ (180.00)	$ (200.00)	$ (160.00)	$ (40.00)
GHG	$ -	$ -	$ -	$ -
GHG Revenue	$ -	$ -	$ -	$ -
Transfer	$ -	$ -	$ 60.00	$ (60.00)
Neutrality	$ -	$ -	$ -	$ -
IIE+GHG	$ -	$ -	$ (60.00)	$ 60.00
RTIEO	$ -	$ -	$ -	$ -
Net Settlement	$ -	$ -	$ (60.00)	$ 60.00

Note: Both the CAISO proposal and the APS proposal result in no neutrality concerns due to wheeling.

- BAA4 Gen was charged $60 (10MW * $6 LMP) to decrement generation ($60 = $100 payment before market optimization – $40 payment after-market optimization).
- BAA3 Gen was paid $60 (10MW * $6 LMP) to increment generation.
- In the APS proposal, all EIM transfers settle at the same price. The price applied to the transfer is SMEC + GHG ($10 + (-$4)) = $6.
- For both BAA3 and BAA4, the Transfer value matches the Gen and no neutrality exists to be offset in RTIEO.
- BAA1 and BAA2 are wheeling Transfers, so the import value ($60) and the export value $60 of the transfer net to $0.
- In this example, no neutrality exists across each BAA as each is paying or receiving the expected dollar amount in Gen and GHG.

EXAMPLE 3:

This example highlights an inherent neutrality concern since the GHG Zone settles at a different LMP from other EIM entities. In this example, BAA5 (SMUD, an EIM entity in the GHG Zone) is importing, causing the GHG price. BAA2 (CAISO) is exporting to BAA1. A neutrality concern exists with both the APS proposal and the CAISO proposal. However, the net settlement is correct with both the CAISO and the APS proposals.

SMEC: $10
GHG: -$4
LMP: $6

BAA1 is importing 10MW from BAA2
BAA2 (CAISO) is exporting 10MW to BAA1
BAA3 is exporting 10MW to BAA5
BAA4 is unlisted
BAA5 (SMUD) is importing 10MW from BAA3

Current settlement method without Transfer Adjustments								
		BAA1		BAA2 (CAISO)		BAA3		BAA5 (SMUD)
Load	$	180.00	$	200.00	$	100.00	$	100.00
Gen	$	(120.00)	$	(300.00)	$	(160.00)	$	-
GHG	$	-	$	-	$	(40.00)	$	-
Transfer	$	(100.00)	$	100.00	$	100.00	$	(100.00)
Neutrality	$	(40.00)	$	-	$	-	$	-
IIE+GHG	$	60.00	$	(100.00)	$	(100.00)	$	100.00
RTIEO	$	40.00	$	-	$	-	$	-
Net Settlement	$	100.00	$	(100.00)	$	(100.00)	$	100.00

Note: BAA1 is again paying more for the transfer than the Gen was paying. In this scenario, Gen is paying $60 while the transfer is paying $100. This causes a neutrality concern.

- BAA1 Gen was charged $60 (10MW * $6 LMP) to decrement generation ($60 = $180 payment before market optimization – $120 payment after-market optimization).
- However, BAA1 was charged an additional $40 in RTIEO since the transfer value uses the SMEC. This is calculated as BAA1 Transfer Amount of $100 (10MW * $10 SMEC) minus the BAA1 Gen IIE of $60 (10MW * $6 LMP).
- This is a problem because BAA1 is only paying $60 in IIE to decrement generation, but ends up paying $100 once the RTIEO is applied.
- BAA2 (CAISO) Gen was paid $100 to increment generation. BAA2 (CAISO) doesn't have GHG in the LMP, so applying the SMEC price of $10 to the transfer leaves no neutrality to offset in RTIEO for BAA2.
- Settlements for BAA3 and BAA5 (SMUD) work properly, as expected. The payment and application of GHG between BAA3 and BAA5 works properly and is similar to Example 1 above between BAA2 and BAA4.
- No neutrality exists for BAA2, BAA3 and BAA5.

CAISO Proposal - as interpreted from stakeholder call on 5/1/19
GHG Transfer price: SMEC
Non-GHG Transfer price: SMEC + GHG

	BAA1	BAA2 (CAISO)	BAA3	BAA5 (SMUD)
Load	$ 180.00	$ 200.00	$ 100.00	$ 100.00
Gen	$ (120.00)	$ (300.00)	$ (160.00)	$ -
GHG	$ -	$ -	$ (40.00)	$ -
GHG Transfer	$ -	$ -	$ 100.00	$ (100.00)
Non-GHG Transfer	$ (60.00)	$ 60.00	$ -	$ -
Neutrality	$ -	$ (40.00)	$ -	$ -
IIE+GHG	$ 60.00	$ (100.00)	$ (100.00)	$ 100.00
RTIEO	$ -	$ 40.00	$ -	$ -
Net Settlement	$ 60.00	$ (60.00)	$ (100.00)	$ 100.00

- BAA1 Gen was charged $60 (10MW * $6 LMP) to decrement generation ($60 = $180 payment before market optimization – $120 payment after-market optimization).
- BAA2 (CAISO) Gen was paid $100 to increment generation. BAA2 (CAISO) doesn't have GHG in the LMP, so applying the SMEC price of $10 to the transfer leaves no neutrality to offset in RTIEO for BAA2.
- Although the transfer is between BAA2 (CAISO) and BAA1, this transfer of energy from BAA2 to BAA1 would need to be considered a Non-GHG Transfer, and the price applied to the transfer would be SMEC + GHG ($10 + (-$4)) = $6.
- BAA1 in this case has no neutrality to offset in RTIEO. Gen of $60 is equally offset by the ($60) Non-GHG Transfer value.

- BAA2, however, does have neutrality to offset in RTIEO. BAA has Gen of ($100) which is not completely offset by the $60 Non-GHG Transfer value. BAA2 ends up paying $40 back to the market in RTIEO.
- The net settlement is appropriate. BAA1 is paying $60 for the energy that BAA2 is providing, and BAA2 receives $60 in the settlement. Although the Gen in BAA2 received $100, the RTIEO reduces the net settlement correctly to $60.
- Settlements for BAA3 and BAA5 (SMUD) work properly, as expected. The values provided to Gen and GHG are properly offset by the GHG Transfer value. This is similar to the situation in Example 1 between BAA2 and BAA4.
- No neutrality exists for BAA1, BAA3, and BAA5.

APS Proposal								
		BAA1		BAA2 (CAISO)		BAA3		BAA5 (SMUD)
Load	$	180.00	$	200.00	$	100.00	$	100.00
Gen	$	(120.00)	$	(300.00)	$	(160.00)	$	-
GHG	$	-	$	-	$	(40.00)	$	-
GHG Revenue	$	-	$	-	$	40.00	$	(40.00)
Transfer	$	(60.00)	$	60.00	$	60.00	$	(60.00)
Neutrality	$	-	$	(40.00)	$	-	$	-
IIE+GHG	$	60.00	$	(100.00)	$	(100.00)	$	100.00
RTIEO	$	-	$	40.00	$	-	$	-
Net Settlement	$	60.00	$	(60.00)	$	(100.00)	$	100.00

Note: In both the CAISO proposal and the APS proposal, neutrality exists for BAA2 (CAISO). The export, in this case, is assigned a lower price than the Gen. RTIEO correctly offsets this additional payment so that BAA2 has a net settlement of ($60).

- BAA1 Gen was charged $60 (10MW * $6 LMP) to decrement generation ($60 = $180 payment before market optimization – $120 payment after-market optimization).
- BAA2 (CAISO) Gen was paid $100 to increment generation. BAA2 (CAISO) doesn't have GHG in the LMP, so applying the SMEC price of $10 to the transfer leaves no neutrality to offset in RTIEO for BAA2.
- In the APS proposal, all EIM transfers settle at the same price. The price applied to the transfer is SMEC + GHG ($10 + (-$4)) = $6.
- BAA1 in this case has no neutrality to offset in RTIEO. Gen of $60 is equally offset by the ($60) Transfer value.
- BAA2, however, does have neutrality to offset in RTIEO. BAA has Gen of ($100) which is not completely offset by the $60 Transfer value. BAA2 ends up paying $40 back to the market in RTIEO.
- The net settlement is appropriate. BAA1 is paying $60 for the energy that BAA2 is providing, and BAA2 receives $60 in the settlement. Although the GEN at BAA2 received $100, the RTIEO reduces the net settlement correctly to $60.

- Settlements for BAA3 and BAA5 (SMUD) work properly, as expected. The values provided to Gen and GHG are properly offset by the Transfer value. This is similar to the situation in Example 1 between BAA2 and BAA4.
- No neutrality exists for BAA1, BAA3, and BAA5.

As seen in the examples, the APS proposal is a more straightforward approach to settling GHG within RTIEO. APS believes that although the settlement results appear to be the same between the CAISO proposal and the APS proposal, the validation and explanation of GHG and RTIEO will be easier with the APS proposal.

5 Minute Granularity for ETSRs between EIM Entities and CAISO

APS is very encouraged by the inclusion of the straw proposal for 5 Minute Granularity for Energy Transfer System Resources (ETSR) between EIM Entities and CAISO. Currently, if an EIM Entity has an ETSR Export to CAISO that only occurred during the first 5-Minute interval in the Hour, CAISO averages that first 5-Minute interval's ETSR value to the entire 12 intervals of the hour as an Import. This averaging has caused the following issues:

1) Transfer Value Adjustments calculation that does not reflect the Adjustments at the proper 5-Minute interval level; and
2) Incorrect Net Import/Export quantities in a specific 5-Minute interval leading to incorrect GHG settlements

We strongly agree that using a 5-Minute granularity consistently throughout all EIM Entities and CAISO will result in a more accurate settlement. The imbalance energy settlement for each 5-Minute interval will better correlate with the result of the 5-minute Market Optimization. Using a 5-Minute granularity for all ETSRs will also correct the current misalignment issue where an EIM entity's net settlements of GHG "revenues & charges" between the EIM entity and CAISO uses the hourly integrated value but the specific 5-Minute tag value is used for these same settlements when they happen between EIM entities.

While EIM Entities have a responsibility to submit 5-minute transfer quantities to CAISO, APS believes that CAISO should strongly consider implementing a check on the values that are submitted by the EIM Entities. A basic internal control or some kind of "reasonableness check" should be in place within CAISO to flag material discrepancies between the Transfer quantities and CAISO's Market Award. For example, a reasonable check could be a tolerance range of +or-10MW of market award quantity, and CAISO could notify the EIM entity of this variance. Based on APS' experience, the magnitude of errors related to Transfer Value could be financially material.

We also suggest that CAISO implement submission timeline requirements for these 5-minute transfer quantities so that settlement calculations in the T+12B settlement statement include actual quantities which can be viewed by EIM entities. CAISO has stated that if actual quantities

are not provided by a market participant, an estimated volume will be used in settlements until the T+55B statement.[2] In this type of situation, another EIM entity would be unable to validate actual quantities because only an estimate is available for review.

Another alternative that could achieve the same improvements in settlement accuracy would be for CAISO to utilize the existing Market Award/Market Optimization 5-minute volume data that it already calculates for the Transfer Value calculation. This Real-Time Dispatch (RTD) Market Awards data is currently published by CAISO through CMRI and many EIM entities simply download those values and submit them right back to CAISO. Having CAISO use the original ETSR volume values in settlement calculations instead of relying on the re-submitted values from EIM entities could help avoid issues from potential errors in submissions of ETSR volume data from EIM entities to CAISO.

Timing of Stakeholder Process and Implementation

While APS is supportive of the overall Real-Time Market Neutrality Settlement Stakeholder Process, some of the proposed changes may require significant software and system modifications and will likely require alteration to EIM Entities' internal business processes. Sufficient time must be included in the implementation schedule for accommodating the changes. Furthermore, CAISO should ensure sufficient time to perform all necessary testing prior to implementation.

EIM Governing Body Role

For the reasons set forth in the Issue Paper and Straw Proposal, APS agrees that the EIM Governing Body should have primary authority over the entirety of this initiative.

Conclusion

APS appreciates the CAISO's consideration of these comments and looks forward to working with the ISO on this effort.

[2] In response to a CIDI inquiry where APS asked what happens if After-the-Fact (ATF) tags for Dynamic ETSRs are not submitted, CAISO stated the following: "For the Settlement Initial Settlement Statement, Settlements will estimate all the ETSR ATFs values based upon the RTD Schedule Awards. Settlements is expecting the Participants to provide updated information by T+48B for inclusion in the T+55B Settlement Statement. If updated information is not provided, Settlement will terminate the estimated value and thus assume the ETSR was not delivered. This will have significant impacts on [market participants'] final Settlements, in particular RTIEO Settlement (CC 64770) and BCR Allocation (CC 66780)."