California ISO

EDAM

EXTENDED DAY-AHEAD MARKET

ISSUE PAPER:

EDAM CONGESTION REVENUE ALLOCATION

March 17, 2025

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I. Executive Summary

The Extended Day Ahead Market (EDAM) models all resources and the full capability of the transmission system within the participating balancing area through the full network model (FNM), including associated resource and transmission system constraints. This robust modeling enables the market to optimally commit and dispatch a diverse resource fleet across an interconnected transmission system to serve demand within the market footprint. Modeled transmission constraints that become binding within the market may affect the congestion price component of the locational marginal prices (LMP) at locations across the market footprint reflecting modeled flow relationship between a change in supply or demand at a location and the change in flow on a constraint.

Under the EDAM FERC-approved design, the market operator allocates congestion revenues – the difference of the price at LMPs and the amount of supply or demand between the pricing locations due to congestion on the system – to the EDAM balancing area in which the transmission constraint is located. The LMP-based market will identify the least cost dispatch across the entire interconnected EDAM footprint. Due to transmission limitations on the system, overall the total amounts paid to suppliers will be less than the total amounts paid by load on the system. Aside from accounting for marginal losses, the remaining amounts are congestion revenues to be allocated back to market participants. Because the entire EDAM area is not managed as a single balancing area or under one transmission tariff, the ISO must determine what amount of congestion revenue is to be allocated to each EDAM balancing area who then is responsible for allocating those revenues under their individual tariffs.

The fundamental principle under the EDAM design, as approved by FERC, is that congestion revenues associated with transmission constraints internal to the EDAM balancing area are allocated to that respective balancing area. Since the market optimization considers all demand and supply across the EDAM footprint, there will be internal transmission constraints in one balancing area that arise as a result of supply and demand requirements in another balancing area participating in the EDAM. Therefore, a transmission constraint in an EDAM balancing area can have effects on the congestion price component of the LMP at pricing locations in an adjacent EDAM balancing area as a result of parallel flows between interconnected systems. Congestion revenue collected as a result of these cross-balancing area requirements are referred to as “congestion revenue associated with parallel flows.” The current EDAM design allocates those congestion revenues as a result of parallel flows to the EDAM balancing area where the constraint is located for the EDAM balancing area to further allocate pursuant to their tariff. This congestion allocation method recognizes that the balancing area where the internal transmission constraint is located bears the effects of that congestion and the reliability impacts associated with the constraint, and thus congestion revenues accruing across the interconnected EDAM footprint associated with the particular constraint are equitably allocated fully to the EDAM balancing area where the constraint is located. This is the same congestion revenue allocation method that is in effect in the Western Energy Imbalance Market (WEIM) today.

As part of PacifiCorp’s pending proceeding at the Federal Energy Regulatory Commission (FERC) on revisions to its Open Access Transmission Tariff (OATT) implementing EDAM[1], commenters raised

[1] PacifiCorp Proposed OATT Amendment, FERC Docket No. ER25-951.

concerns with the EDAM design for congestion revenue allocation among EDAM balancing areas and the ability an EDAM area to provide a sufficient congestion hedge to transmission customers exercising their transmission rights. In its answer within the proceeding, the ISO committed to initiate an expedited stakeholder initiative[2] to evaluate potential transitional mechanisms for allocation of congestion revenues resulting from parallel flows in an EDAM balancing area as a result of the effects of supply and demand in an adjacent EDAM balancing area.

This issue paper initiates the stakeholder process and describes the current EDAM congestion revenue allocation method. The issue paper also introduces a potential transitional option for consideration related to congestion revenues associated with parallel flows. Under the potential alternate approach, congestion revenue associated with parallel flows would stay with the balancing area where the congestion revenue was collected (*i.e.*, is retained in the balancing area), which can then allow the EDAM entity to sub-allocate under the terms of its OATT and provide a more complete congestion hedge for transmission customers exercising their transmission rights, when coupled with congestion revenue accrued associated with congestion effects internal to the balancing area as a result of the internal transmission constraint. This approach would be transitional, permitting the market operator to monitor and benchmark the effects of the allocation method and gather granular data on binding transmission constraints and their flow effects across the EDAM footprint, supporting future evaluation of a more permanent and durable congestion revenue allocation and hedging mechanisms design.

The ISO will host a stakeholder workshop on March 24th to discuss the EDAM congestion revenue topics presented in this issue paper.

II. Introduction

The EDAM design overlays an organized market structure with the OATT contract path based frameworks prevalent across the West. Similar to the WEIM today, participating balancing authority areas in EDAM retain key roles and functions: administration of their OATT, transmission planning, resource planning, and reliability management. The transmission service provider(s) within the balancing area continue to administer their OATT and continue to make sales of transmission service within their service territory, while the market seeks to optimize the resource and transmission capabilities of the grid to provide economic, reliability, and environmental benefits.

Under the EDAM design, all resources in the balancing area will submit schedules into the market whether economically bidding or self-scheduling generator output. Similarly, the full transmission system capability is modeled in the FNM, along with transmission constraints that are represented in the market. An important feature of the market is that it is able to reflect these transmission constraints and seek to commit and dispatch resources in such a way as to avoid or ameliorate congestion that may be otherwise created by these transmission constraints. To the extent an internal transmission constraint binds in an EDAM balancing area, any resulting congestion revenues are allocated by the market operator to the EDAM balancing area where the constraint is located. This allocation method recognizes that the balancing area where the constraint is located bears the effects of the constraint and

[2] CAISO Answer, FERC Docket No. ER25-951.

it is thus equitable for the resulting congestion revenues to flow to that balancing area to offset the cost effects of the constraint.

As discussed further below, based on modeled flows and the relationship between supply produced or demand consumed at a location, the flow effects on a transmission constraint referred to as the "shift-factor relationship" between pricing locations in the market and associated transmission constraints, generation in one EDAM area may contribute flow on a transmission constraint in an adjacent EDAM area as a result of parallel flows across interconnected systems. Conversely, a binding transmission constraint in one area can have pricing effects on locations in neighboring EDAM areas. The EDAM design currently allocates congestion revenues associated with these parallel flows based on their contribution to the transmission constraint in the EDAM balancing authority area where the constraint is located rather than the balancing area in which the congestion revenue accrued and the congestion price impact is reflected. This design for the allocation of congestion revenues associated with internal transmission constraints is in effect today, and has been for the last decade, in the WEIM.

PacifiCorp, as the first WEIM entity to extend participation to EDAM starting in 2026, has made revisions to its OATT to support participation in EDAM and those revisions have been filed and are part of an ongoing proceeding at FERC. Commenters in the PacifiCorp OATT proceeding expressed concern with the EDAM design for congestion revenue allocation, in how the market operator allocates congestion revenues between EDAM balancing areas and the ability of an EDAM entity to consequently provide a sufficient congestion hedge for transmission customers exercising their transmission rights.

As part of its answer in the proceeding, the ISO committed to launching an expedited stakeholder initiative to create broader understanding of the existing FERC-approved EDAM design to congestion revenue allocation, and to consider other potential transitional mechanisms for congestion revenue allocation to EDAM balancing area recognizing parallel flow impacts and the desire from transmission customers to receive a more complete congestion hedge through the EDAM entity OATTs.

The publication of this issue paper represents the start of that initiative and stakeholder process, describing key concepts, a detailed description of the current EDAM congestion revenue design, and introduction of a potential alternative approach to the allocation of congestion revenue that can more effectively support the ability of the EDAM entity to provide a more complete congestion hedge to transmission customers exercising their firm OATT transmission rights as may be provided by EDAM entity OATTs.

A. What is Congestion Revenue?

In organized markets, locational marginal pricing is a mechanism used to reflect the value of electricity at different nodal locations across the market footprint, be it at load or generation locations. The resulting Locational Marginal Prices (LMP) are comprised of three components:

- Marginal Energy Component (MEC) – represents the system-wide clearing energy price.
- Marginal Congestion Component (MCC) – represents the cost of congestion at a given location (e.g. a node in the transmission system) when transmission elements (constraints) are congested.

- Marginal Losses Component (MLC) – represents costs associated with transmission line losses.

The LMPs vary by location across the grid – at generator and load pricing locations – driven in large part by the MCC component dependent upon the congestion across the market footprint as represented by transmission constraints that may be binding in the market. In effect, the congestion price at a pricing location reflects the total impact of congestion from the various transmission constraint at that given location.

Figure 1 illustrates the concept of price differences driven by transmission constraints between two price locations, a generator and a load location, representing $15 per MWh in congestion revenue that is allocated under market settlement mechanisms.

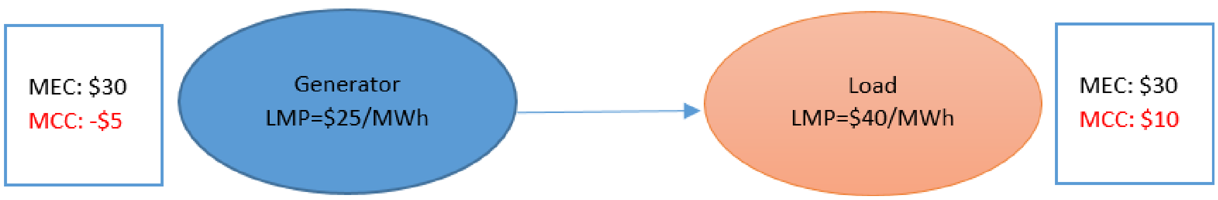


Figure 1: Congestion revenue accrual due to congestion on a system

Within a balancing area, there are many pricing locations representing load and generation, each one with its applicable LMP which includes a congestion component (MCC). Each of these locations can have a different LMP, even within the balancing area, driven by the extent of congestion experienced on binding transmission constraints on the grid.[3] Congestion revenues accrue when energy transactions are settled on the LMPs and there are price differences due to congestion (materializing in the MCC) between locations (e.g. between generation and load areas).

Similarly, within an integrated and interconnected market footprint, a transmission constraint in one balancing area can have a price effect at different pricing locations within a neighboring balancing area. The price impact reflects its contribution to congestion and is based on flow contributions from schedules at that location in relation to the constraint. Moreover, in an integrated market it is common that multiple transmission constraints across a larger and interconnected market footprint may be binding simultaneously, and thus the LMP MCC component at a particular pricing location may reflect the congestion cost associated with multiple transmission constraints based on flow contributions to that constraint. As a result, the LMP MCC can be decomposed into components reflecting the binding constraints based on the area in which the constraint is located. This decomposition approach has been used in the WEIM since its inception and enables the ISO to determine in which balancing area the congestion revenue is to be distributed.

B. What are "Parallel Flows"?

Parallel flow (also known as "loop flow" or "unscheduled flow") refers to the flow of electricity along the natural paths of least resistance on the interconnected transmission grid and across different balancing

[3] The MLC (associated with transmission losses) can also be a driving factor for price differences in the LMP, but the MCC component is generally the most variable and fluctuating element of the LMP based on the congestion conditions on the system.

areas. The generation in one area can contribute to congestion in a neighboring area and this contribution may be reflected in the MCC component of the LMP at load and generation pricing locations across different balancing areas.

Parallel flows exist today across all interconnected transmission systems and have created or contributed to operational challenges across the West. Transmission Service Providers and grid operators deploy different strategies for managing and mitigating the effects of parallel flows. These strategies may be through their Available Transmission Capability (ATC) methodologies that seek to account for uncertainty associated with parallel flows, through different scheduling procedures that may seek to reduce transmission schedules contributing to parallel flows at specific system locations or other approaches including closer study and coordination between neighboring balancing authority areas.

Figure 2 below attempts to illustrate the effects of parallel flows between neighboring balancing areas. In the illustration, a transmission constraint materializes in BAA-A across path A-B. As a result of the constraint, energy may flow from A-C or B-D creating congestion in the C-D direction, potentially creating or contributing to constraint Y. In the organized market context, for example, the LMP at locations C and D may reflect in the MCC a congestion price reflective of its flow contributions to constraint X in the adjacent balancing area.

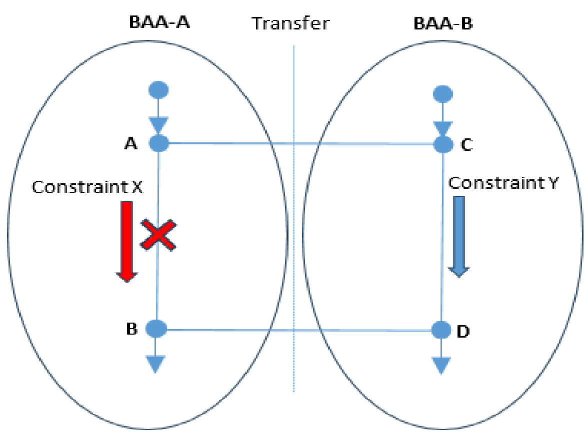


Figure 2: Parallel flow effects illustration between neighboring balancing areas.

In the context of the current EDAM congestion revenue allocation design, congestion revenues that may materialize associated with pricing locations C and D within BAA-B as a result of parallel flows in relation to constraint X would be allocated to BAA-A since constraint X is located in that area.

III. Issue Statement – Congestion Revenue Allocation & Parallel Flow

The EDAM design allocates congestion revenues associated with an internal transmission constraint to the balancing area where the constraint is located, including congestion revenues that may have accrued in an adjacent EDAM area due to parallel flows to the extent that the transmission constraint has a flow impact on schedules in the adjacent area. Thus, the balancing area in which the congestion price effects of parallel flows may have materialized as a result of a binding internal transmission constraint in an adjacent EDAM balancing area is not allocated the parallel flow congestion revenues under the current EDAM design. Instead, this congestion revenue is allocated to the balancing area where the constraint is located. This allocation method associated with parallel flow congestion revenues may reduce the amount of congestion revenue available for the EDAM entity to provide or enable a more complete congestion hedge for transmission customers exercising their OATT transmission rights.

It is also important to recognize the intent of the EDAM entities that will be joining the market in 2026, particularly as demonstrated through the PacifiCorp OATT revisions, is to sub-allocate received congestion revenues first to transmission customers exercising their firm OATT transmission rights through the submission of a balanced self-schedule in the market associated with those transmission rights to support a level of congestion hedge. Remaining congestion revenues are proposed to be allocated to measured demand (load + exports).

Issue Statement: The current EDAM design allocates congestion revenues to the balancing area in which the internal transmission constraint materialized, including congestion revenues resulting from parallel flow effects collected from an adjacent EDAM balancing area to the extent the use of its transmission system impacts congestion prices at locations in the adjacent area. The key question in this initiative is whether the EDAM design should be modified as to how the market operator allocates congestion revenues associated with parallel flows across the EDAM balancing areas.

The initiative focuses narrowly on the allocation of congestion revenues arising as a result of internal transmission constraints within a balancing area, and does not seek to address allocation of transfer revenues that may result from scheduling limit constraints at interties or transfer points between EDAM balancing areas.

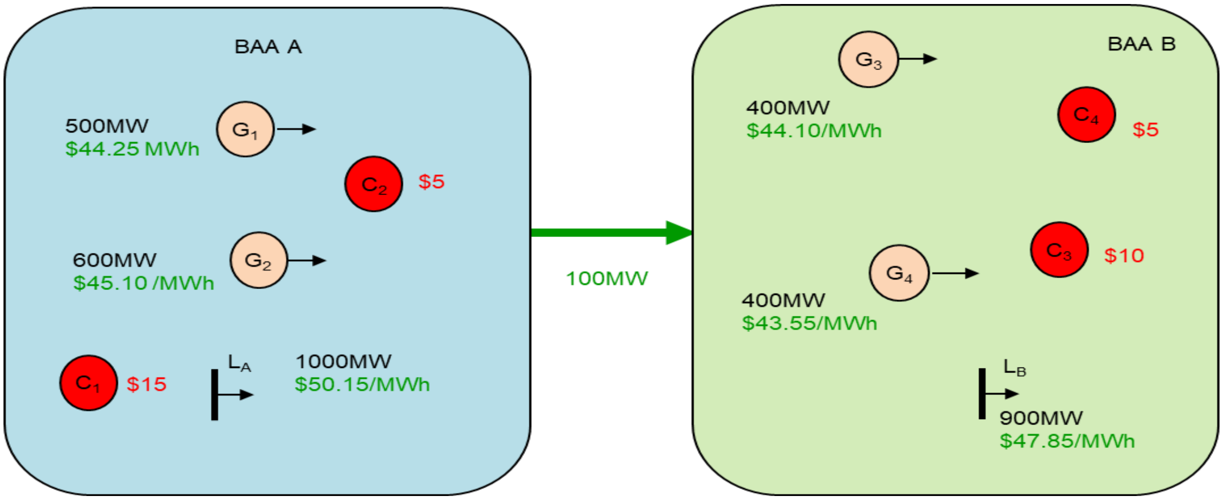
IV. Current EDAM Design for Congestion Revenue Allocation

The current EDAM design allocates congestion revenues to the EDAM balancing authority area in which the internal transmission constraint materialized. This design follows cost-causation principles under which congestion revenues flow to the area where the constraint is binding since the balancing area bears the costs and actions to manage the effects of that transmission constraint. Under this design, congestion revenues arising from parallel flows on an adjacent system – to the extent there is a congestion price impact associated with the constraint at a pricing location in that adjacent EDAM area – are allocated to the balancing area where the transmission constraint is located. This design is consistent with how WEIM congestion revenues are allocated today, and over the last decade, across WEIM balancing authority areas.

The ISO real-time and day-ahead markets, and by extension EDAM and WEIM, utilize the FNM to model and enforce all appropriate transmission system and resource constraints to optimally commit and dispatch resources to meet demand across the market footprint. The FNM provides the necessary information to determine and mitigate transmission congestion as well as calculate the relevant LMP at each pricing node location or aggregated pricing node location within the FNM. The LMP is calculated at each pricing node or aggregated pricing node location across the market footprint.

The MCC of the LMP at each pricing location is calculated based on a linear combination of the shadow prices of all binding constraints in the network, each multiplied by the corresponding power transfer distribution factor (PTDF) as determined by sensitivity analysis of the power flow solution within the minimum effectiveness threshold. This methodology is common to all LMP markets.

The example below illustrates the methodology described above as applied in a multi-balancing area optimization under the approved EDAM design and currently in effect in the WEIM.[4]



In this example, the market optimizes generation bid in Balancing Authority Area A (BAA A) and Balancing Authority Area B (BAA B) to meet demand in BAA A and BAA B. During the market optimization, the market identified four transmission constraint that are binding at various levels. The generation and load have various power transfer distribution factors which indicate their effectiveness in mitigating congestion at these constraint locations. The optimization determines the least cost solution given the transmission constraints in that generation in BAA A serves 1,000 MW of load within BAA A as well as 100 MWs of load in BAA B. The balance of BAA B demand is being served by internal generation within BAA B. Specifically, the market dispatches Generator 1 to 500 MW at $44.25/MWh, Generator 2 to 600 MW at $45.10/MWh, Generator 3 to 400 MW at $44.10/MWh and Generator 4 to 400 MW at $43.55/MWh to serve 1,000 MWs of BAA A Demand priced at $50.15/MWh and 900 MW of BAA B Demand priced at $47.85/MWh. This solutions results in the collection of $8,970 of congestion revenue across the market area (*i.e.*, the total congestion revenue = sum of (500MW X $44.25/MWh, 600 MW X $45.10, 400 MW X $44.10, 400MW X $43.55) – sum (1000 X $50.15, 900 X $47.85).

This example demonstrates the calculation of congestion revenue that will be applied in EDAM to generate congestion revenue across the market area, except for the power balance constraint that will separately account for EDAM transfer revenue when binding. EDAM transfer revenue is generated by differences in the MEC between balancing areas when the power balance constraint binds and not the MCC as described in this example. Each are separately calculated and distributed according to distinct ISO tariff settlement rules,[5] and because in this case we are focused on congestion internal to each

[4] *See* CAISO Tariff, Appendix C as accepted by the DAME-EDAM Order (establishing the LMP as the total of the Marginal Energy Cost (MEC), plus Marginal Cost of Congestion (MCC), plus Marginal Cost of Losses (MCL) and, if applicable, the Marginal Greenhouse Gas (MCG) effective upon implementation of EDAM); *see also* Section 33.11.1.2 (day-ahead congestion revenue calculation effective upon implementation of EDAM), Section 33.11.3.9.3 (day-ahead congestion offset settlement effective upon implementation of EDAM); *compare* CAISO Tariff, Section 11.5.4.1.1 (currently effective real-time congestion offset in WEIM) and Section 11.5.4.1.2 (real-time congestion offset in WEIM effective upon implementation of EDAM).

[5] *See* CAISO Tariff, Section 11.5.4.1.5 (real-time transfer revenue settlement in WEIM effective upon implementation of EDAM), Section 33.11.1.1.1 (day-ahead transfer revenue calculation effective upon

balancing area, for simplicity, this example does not account for the power balance constraint binding so there is no MEC difference or corresponding EDAM transfer revenue settlement to be considered.

Tables 1 through 3 below provide details concerning the inputs to this congestion revenue calculation, specifically the power transfer distribution factors applied in the state estimator solution based upon a power flow analysis, LMP formulation and the congestion revenue calculation and settlement.

Table 1: Congestion Effectiveness

		BAA A			BAA B		
	Power Transfer Distribution Factor						
	Price	G1	G2	L1	G3	G4	L2
MEC	$ 40.00	100%	100%	100%	100%	100%	100%
C1	$ 15.00	15%	25%	50%	3%	2%	5%
C2	$ 5.00	30%	19%	40%	4%	4%	3%
C3	$ 10.00	2%	3%	4%	21%	25%	45%
C4	$ 5.00	6%	2%	5%	27%	11%	49%

Table 2: Locational Marginal Price and Marginal Cost of Congestion

		BAA A			BAA B		
	LMP Formulation						
	Price	G1	G2	L1	G3	G4	L2
MEC	$ 40.00	$ 40.00	$ 40.00	$ 40.00	$ 40.00	$ 40.00	$ 40.00
C1	$ 15.00	$ 2.25	$ 3.75	$ 7.50	$ 0.45	$ 0.30	$ 0.75
C2	$ 5.00	$ 1.50	$ 0.95	$ 2.00	$ 0.20	$ 0.20	$ 0.15
C3	$ 10.00	$ 0.20	$ 0.30	$ 0.40	$ 2.10	$ 2.50	$ 4.50
C4	$ 5.00	$ 0.30	$ 0.10	$ 0.25	$ 1.35	$ 0.55	$ 2.45
LMP		$ 44.25	$ 45.10	$ 50.15	$ 44.10	$ 43.55	$ 47.85

Table 3: Congestion Revenue Calculation and Settlement

BAA A	Schedule	LMP	MEC	MCC	STLMT Amount	MEC	MCC Collection
G1	500	$ 44.25	$ 40	$ 4.25	$ 22,125	$ 20,000	$ 2,125
G2	600	$ 45.10	$ 40	$ 5.10	$ 27,060	$ 24,000	$ 3,060
L1	-1000	$ 50.15	$ 40	$ 10.15	$(50,150)	$(40,000)	$(10,150)
TSR A-B	-100	$ 40.00	$ 40	$ -	$ (4,000)	$ (4,000)	$ -
BAA Neutrality					$ (4,965)	$ -	$ (4,965)
BAA B	Schedule	LMP	MEC	MCC	STLMT Amount	MEC	MCC Collection
G3	400	$ 44.10	$ 40	$ 4.10	$ 17,640	$ 16,000	$ 1,640

implementation of EDAM), and Section 33.11.3.9.4 (day-ahead marginal energy offset settlement effective upon implementation of EDAM).

G4	400	$ 43.55	$ 40	$ 3.55	$ 17,420	$ 16,000	$ 1,420
L2	-900	$ 47.85	$ 40	$ 7.85	$(43,065.)	$(36,000)	$ (7,065)
TSR A-B	100	$ 40.00	$ 40	$ -	$ 4,000	$ 4,000	$ -
BAA B Neutrality					$ (4,005)	$ -	$ (4,005)

The next step in the ISO settlement process is to distribute the total calculated congestion revenue ($8,970) among the balancing areas that constitute the market area. The FERC-approved ISO tariff requires congestion revenue collected across the market area will be distributed to the balancing area in which the constraints materialize in proportion to the net schedule effectiveness to that constraint. For each settlement period, the ISO will calculate the contribution of each balancing area to the MCC at each resource location and intertie based on the location of the constraints in each balancing area, at each intertie.[6]

Table 4 completes this example and reflects the contribution of the constraints (using the PTSD factors) to the congestion revenue collected between BAA A and BAA B, which determines the congestion revenue distribution between BAA A and BAA B.

Table 4: Contribution to Marginal Cost of Congestion

MCC Contribution	G1	G2	L1	G3	G4	L2	Congestion Revenue BAA A	Congestion Revenue BAA B
Constraint 1	$1,125	$2,250	$(7,500)	$180	$ 120	$ (675)	$(4,500)	
Constraint 2	$ 750	$ 570	$(2,000)	$ 80	$ 80	$(135)	$ (655)	
Constraint 3	$ 100	$ 180	$ (400)	$840	$1,000	$(4,050)		$(2,330)
Constraint 4	$ 150	$ 60	$ (250)	$540	$ 220	$(2,205)		$(1,485)
						BAA Neutrality	$ (5,155)	$(3,815)
						BAA Offset	$ 5,155	$3,815

In the example above, the energy settlement generates $8,970 of congestion revenue across the market area, of which $4,965 is attributed to BAA A and $4,005 is attributed to BAA B. The final step is to distribute the congestion revenue collected across the market area to the balancing area in which the constraint materializes in proportion to the net schedule effectiveness to that constraint.[7] This step increases the congestion revenue distributed to BAA A by $190 to $5,155 because that is the balancing area responsible for managing the constraint and represents the congestion revenue associated with parallel flow effects and, at the same time, reduces the congestion revenue distributed to BAA B by $190 to $3,815 because that is the balancing area that contributed to the congestion in BAA A. This

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6 *See* CAISO Tariff Section 33.11.3.9.3 (day-ahead congestion offset settlement effective upon implementation of EDAM); and *compare* CAISO Tariff, Section 11.5.4.1.1 (currently effective real-time congestion offset in WEIM) and Section 11.5.4.1.2 (real-time congestion offset in WEIM effective upon implementation of EDAM)

7 *Id*.

$190 congestion revenue adjustment, representative of parallel flow congestion revenue, from BAA B to BAA A represents about two percent of the total congestion revenue collected across the market area.

V. Potential Transitional Alternative to Congestion Revenue Allocation

In an effort to foster dialogue and consideration of a potential transitional mechanism for allocation of congestion revenues by the market operator among EDAM balancing areas that may enable EDAM entities to provide a more complete congestion hedge to their transmission customers exercising firm OATT transmission rights, this section describes a potential transitional alternative for stakeholder consideration.

The potential alternative would allocate the congestion revenues associated with parallel flow schedules to the EDAM balancing area in which the congestion revenue accrued, not the neighboring EDAM balancing area where the transmission constraint is located. It is important to note, this alternative has no impact on how resources are dispatched or how the market solves congestion, but rather how collected congestion revenues are allocated via settlements among EDAM balancing areas. Described another way, when an internal transmission constraint is binding within an EDAM balancing area:

- Congestion revenues materializing within that EDAM balancing area would be allocated to that balancing area where the constraint is located, and
- Congestion revenues materializing as a result of parallel flows on an adjacent system related to the transmission constraint would be allocated to, and remain with, the balancing area in which the congestion revenue accrued (would not be allocated to the balancing area where the transmission constraint is located).

This alternative would effectively leave the congestion revenues within the balancing area in which these revenues were collected as a result of a transmission constraint, irrespective of the parallel flow impacts on the EDAM balancing area in which the constraint is located. Under this alternative, the ISO would continue to calculate total congestion revenue across the footprint consistent with the existing design. However, the congestion revenues would be allocated to EDAM balancing areas based on where these were collected and thus enable a more complete sub-allocation of congestion revenue from the EDAM balancing area to transmission customers exercising firm OATT transmission rights within their balancing area. It is worth noting here that this alternative methodology may increase or decrease the total congestion revenue available for sub-allocation to a balancing area because the current methodology is reciprocal among all balancing areas participating in EDAM; *i.e.*, congestion revenue collected from one balancing area due to its parallel flow impacts that otherwise would have been allocated to a balancing area where the constraint is located would no longer be included in that balancing area's congestion revenue allocation.

To contextualize this alternative in relation to the example in section IV of this issue paper describing the current EDAM congestion revenue design, the $190 adjustment to allocations at the end of the process between EDAM balancing areas represents the parallel flow congestion revenue. This amount would remain with the balancing area in which the congestion revenue accrued (BAA-B) instead of being allocated to the balancing area in which the constraint transmission constraint is located (BAA-A).

Figure 3 seeks to illustrate and contrasts the concept of this alternative approach compared to the current EDAM congestion revenue allocation design.[8] In the figure, the transmission constraint (constraint X) is located internal to BAA-B, and as a result of parallel flow impacts the pricing locations in BAA-A reflect a portion of congestion costs associated with that constraint; the extent of the congestion is based on power transfer distribution factors.

Under the current EDAM design, the total congestion revenue associated with the constraint X is $1,200 and fully allocated to BAA-B as this is where the binding transmission constraint is located. From the total congestion revenue, $200 is collected from BAA-A and $1,000 from BAA-B. Under the alternate approach, BAA-A would be allocated back the $200 of congestion revenues accrued in its balancing area associated with parallel flow effects, and BAA-B would be allocated only the $1,000 of congestion revenues accrued in its own balancing area where the constraint materialized.

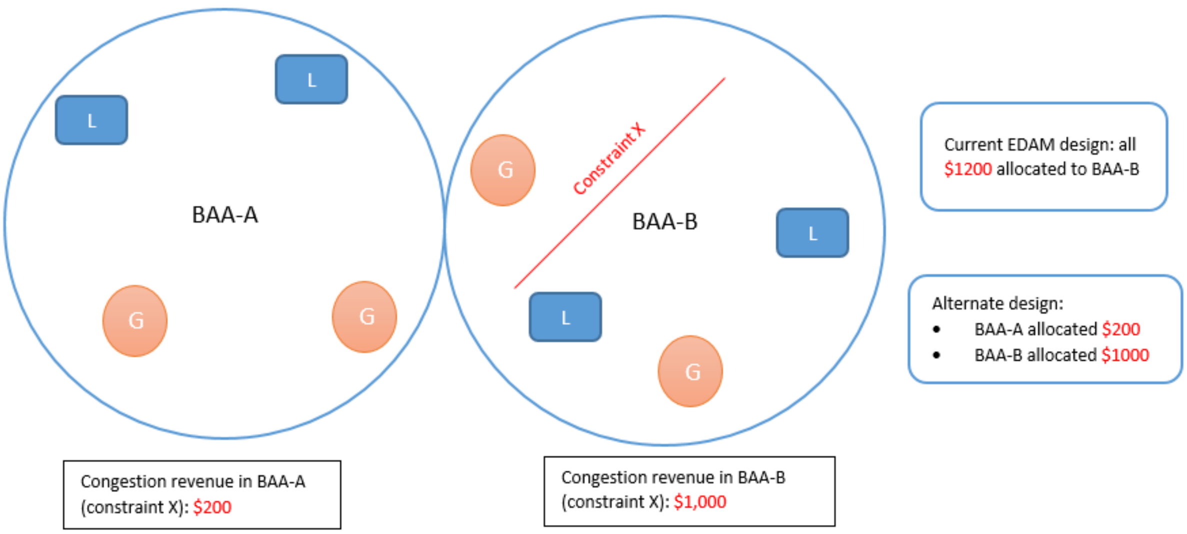


Figure 3: Illustration of congestion revenue under the existing EDAM design and the identified alternative.

Figure 4 seeks to illustrate the same conceptual comparison, but reflecting multiple internal transmission constraints in the respective balancing areas in order to further contrast the congestion revenue allocations between the current EDAM design and the transitional alternative approach introduced in this section.[9] In figure 4, both constraint Y (in BAA-A) and constraint X (in BAA-B) are binding in the day-ahead market. The total congestion revenue on constraint X is $1,200, from which $200 is collected from BAA-A and $1,000 from BAA-B. Similarly, total congestion revenue on constraint Y is $900, from which $800 is collected from BAA-A and $100 is collected from BAA-B.

Under the current EDAM design, congestion revenues are allocated to the balancing area in which the constraint is located. Thus, BAA-A would receive all the congestion revenues that accrue with constraint Y including parallel flow congestion revenue from BAA-B for a total allocation of $900 ($800 from BAA-A

[8] The figure is for illustrative purposes and to convey a conceptual comparison. The calculations are not based on underlying assumptions about LMPs or flow distribution factors.
[9] The figure is for illustrative purposes to convey a conceptual comparison. The calculations are not based on underlying assumptions about LMPs or flow distribution factors.

and $100 from BAA-B) while BAA-B would receive all the congestion revenues associated with constraint X in its balancing area totaling $1,200 ($200 from BAA-A and $1,000 from BAA-B).

Under the alternative approach, congestion revenues would be allocated to the balancing area where the congestion revenues accrued irrespective of the constraint location, including internal congestion revenues from parallel flows associated with a constraint in a neighboring area. BAA-A would be allocated $1,000 ($200 from constraint X and $800 from constraint Y as these are the congestion revenues accrued in BAA-A. Correspondingly, BAA-B would be allocated $1,100 ($1,000 from constraint X and $100 from constraint Y) as these are the congestion revenues accrued in BAA-B reflective of the congestion revenues that materialized within the respective areas.

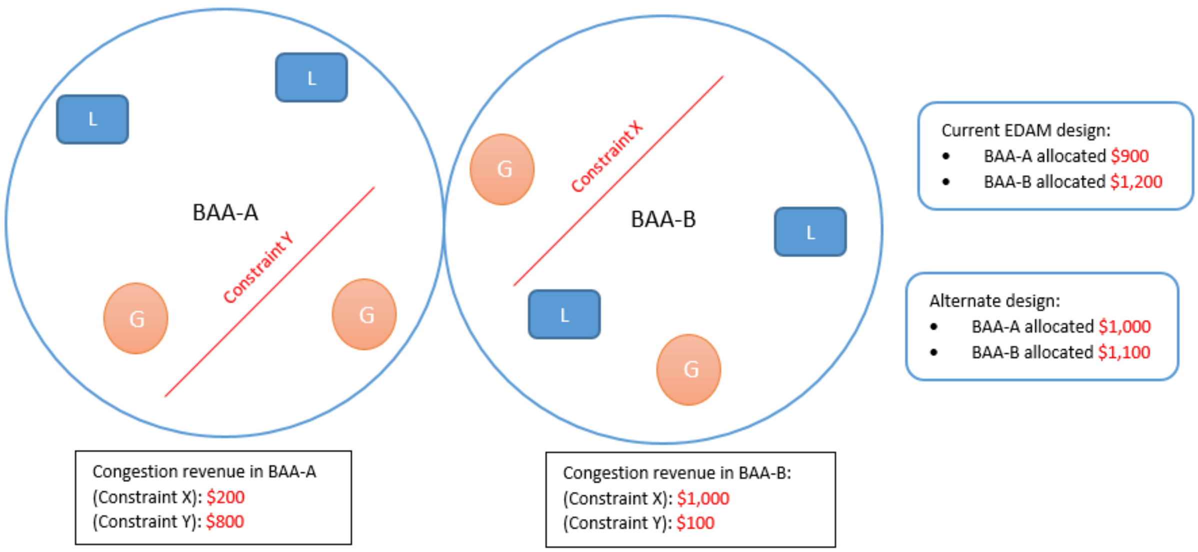


Figure 4: Illustration of congestion revenue with multiple transmission constraints.

The allocation of congestion revenues to the EDAM balancing area in which the parallel flow congestion revenues accrued, irrespective of the location of the constraint, allows the EDAM entity to provide a more complete congestion hedge, if so established under its OATT, to transmission customers exercising firm OATT transmission rights on its system when sub-allocating the congestion revenues received from the market operator. As illustrated above, this is because the balancing area will be allocated congestion revenues accrued within the balancing area resulting from an internal transmission constraint, and will also retain the congestion revenues resulting from parallel flows on its system associated with transmission constraints in other EDAM balancing areas.

Under this alternate design, transmission customers exercising firm OATT transmission rights across an EDAM balancing area to wheel through or export from the area, for example, could receive from the EDAM entity a more complete congestion hedge based on the congestion revenues allocated to the EDAM entity by the market operator. Figure 5 illustrates congestion revenue allocation in two scenarios when there are multiple binding transmission constraints which have congestion price effects at pricing location within both BAA-A and BAA-B as a result of parallel flows.[10]

[10] The figure and the LMPs are for illustrative purposes to convey a conceptual comparison.

In the figure, two transmission customers are exercising their firm OATT transmission rights within the EDAM balancing areas: one transmission customer is exercising its point-to-point (PTP) transmission right to wheel through BAA-A and the other transmission customer is exercising its PTP transmission right to export out of BAA-B. There are two binding transmission constraints, one in each balancing area, which contribute to the congestion price at each balancing area location as a result of parallel flows in each other's areas. Associated with the exercise of PTP transmission rights to wheel through BAA-A, the import location reflects a MCC of $7/MWh ($2/MWh from parallel flows on constraint X in BAA-B, and $5/MWh from constraint Y in BAA-A). The export location associated with the wheel-through in BAA-A reflects a $15/MWh MCC ($5/MWh from constraint X in BAA-B and $10/MWh from constraint Y in BAA-A).

The transmission customer exercising these wheel-through PTP transmission rights in BAA-A is exposed to a congestion price difference between the import and export locations of $8/MWh (LMPs difference between the export and import locations driven by the MCC difference). Under the current EDAM design, the price difference between MCC(Y) at import/export location of $5/MWh would be allocated to BAA-A as congestion revenue of $50 ($5/MWh x 10 MW PTP reservation) to sub-allocate under their OATT. This in turn could be allocated to the transmission customer exercising their transmission right. The remaining MCC(X) difference at import/export locations associated with the constraint in the adjoining BAA-B is $3/MWh and represents congestion revenue of $30 ($3/MWh difference x 10 MW PTP reservation) resulting from parallel flow would be allocated to BAA-B which is where the impacting transmission constraint X is located to further sub-allocate under its OATT terms.

Under the alternate approach to congestion revenue allocation associated with parallel flows described in this section, the $3/MWh or $30 total associated with the exercise of 10 MW PTP rights to wheel through would be allocated to BAA-A since the congestion revenues materialized in the BAA-A balancing area. Thus BAA-A would receive the congestion revenue associated with constraint Y of $50 ($5/MWh for the 10 MW PTP reservation) and the $30 ($3/MWh for the 10 MW PTP reservation) for a total of $80 to sub-allocate under the terms of its OATT, which could support a more complete congestion hedge associated with the exercise of transmission rights.

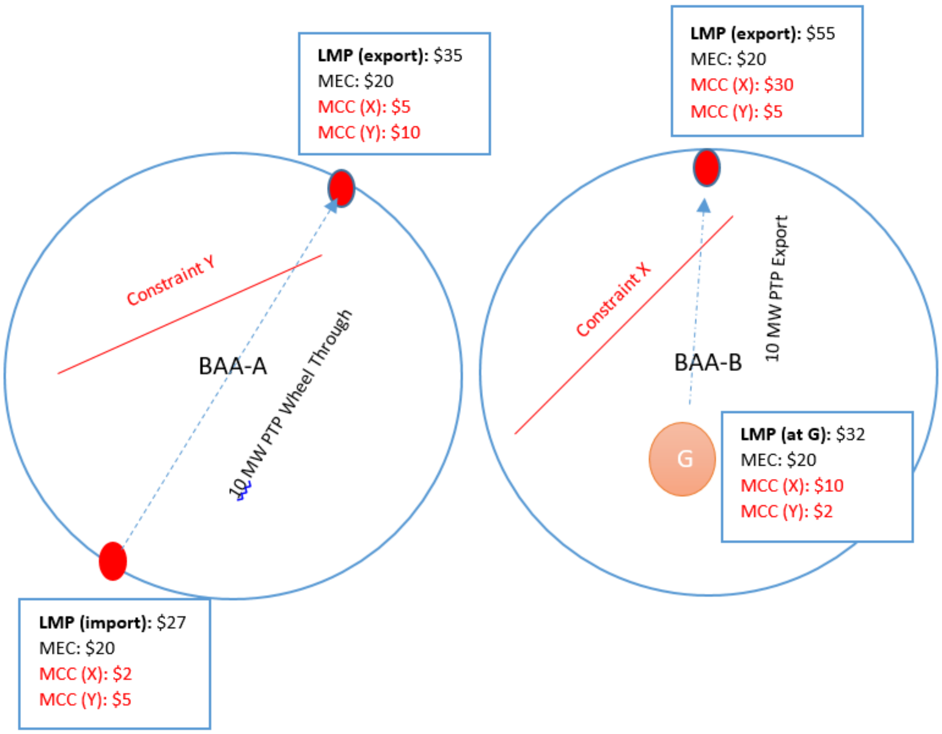


Figure 5: Congestion revenue accrual example of exercise of point-to-point transmission rights to wheel through and export from an EDAM area to a non-EDAM area.

Turning to the example associated with the exercise of PTP transmission rights in BAA-B to export from a generator location to an export location, the treatment remains similar to the wheel-through example from BAA-A. The LMP price difference between the generator and export location is driven by congestion associated with both constraints X and Y. The total price difference between the locations is $23/MWh driven by the impact of the constraints on the MCC, representative of aggregated congestion revenue.

Under the current EDAM design, where congestion revenue is allocated to the EDAM balancing are where the constraint is located, the $20/MWh of congestion revenue associated with constraint X in BAA-B (difference between MCC(X) of $30/MWh at export location and the $10/MWh MCC(X) at the generator) where the export transaction is originating is allocated to BAA-B. In turn, the EDAM entity could sub-allocate these revenues to the transmission customer exercising the PTP transmission rights. The congestion revenue resulting in BAA-B from parallel flow impacts associated with constraint Y in BAA-A totaling $3/MWh or $30 for the 10 MW PTP reservation (difference between MCC(Y) of $5/MWh at export location and MCC(Y) of $2/MWh at generator) is allocated to BAA-A as this is where the impacting constraint Y is located.

Under the alternate approach, to congestion revenue allocation associated with parallel flows described in this section, the $3/MWh or $30 total associated constraint Y with exercise of 10 MW PTP transmission export rights would be allocated back to BAA-B since the congestion revenues materialized in the BAA-B area. Thus, BAA-B would receive the congestion revenues associated with constraint X located in BAA-B totaling $20/MWh or $200 and the $3/MWh or $30 associated with constraint Y, totaling $23/MWh or $230. These congestion revenues allocated to BAA-B could be utilized to support an allocation, if so provided under the OATT, to the transmission customer exercising its PTP transmission rights to export out of the balancing area and provide a more complete congestion hedge.

As noted earlier, this method to congestion revenue allocation in EDAM has the ability to support a more complete congestion hedge associated with the exercise of firm OATT transmission rights based on the congestion revenues that the market operator allocates to the EDAM entity. This is because all congestion revenues, including parallel flow congestion revenues, are allocated to the balancing area in which these accrue.

The appendix to this issue paper includes an additional, and more complex, multi-balancing area example to further illustrate the flow of congestion revenues under this transitional alternate approach contrasted with the existing EDAM congestion revenue design.

A. Application in the Day-Ahead Market

The described alternate approach to congestion revenue allocation, where parallel flow congestion revenues are allocated to the balancing area where these accrue, would apply in the day-ahead market and would not extend to the real-time market. The EDAM is a voluntary day ahead market where WEIM participants can extend participation to EDAM or remain and participate only in WEIM (real time market). Applying this alternate design to congestion revenue allocation associated with parallel flows to WEIM would impact WEIM-only participants, and it is not necessary to establish two separate structures to congestion revenue allocation in real time for EDAM and WEIM-only participants. Moreover, as the driver for this evaluation has been raised in the EDAM and day ahead context as a desire for a more complete congestion hedge, traditional market designs provide congestion hedges only in the day-ahead market and not the real-time market. Thus in real time, congestion revenue allocation associated with balancing area internal transmission constraints would remain to be applied to the balancing area where the constraint resides, as it is applied today in the WEIM.

B. Transitional Nature of Alternate Approach

The transitional approach for congestion revenue allocation where parallel flow congestion revenues remain in the balancing area where they accrue is considered as transitional because it supports a future evaluation of a long-term and more permanent congestion revenue allocation design informed by market operational experience and stakeholder input. The intent is to provide transmission customers exercising firm OATT transmission rights with a sufficient congestion hedge as a transitional measure while distinguishing it from sustainable market structures that provide appropriate long-term participation incentives.

The EDAM design does not currently include a congestion revenue rights (CRR) or financial transmission rights (FTR) design. Introduction of such designs across other markets has traditionally been accompanied by the conversion of firm transmission service for those who have paid the embedded costs of the transmission system. The EDAM, as the WEIM, design does not eliminate the sale of firm transmission service or differentiate transmission rights pre and post-market participation. Rather, the EDAM design continues to support administration of the OATT and continued sales of transmission service, providing deference to the EDAM entity how it sub-allocates the resulting congestion revenues allocated to it by the market operator. These continued transmission sales can continue to perpetuate the parallel flow effects across neighboring balancing areas. As part of a longer term design evaluation, market participants can consider financial transmission rights as CRRs/FTRs, potential flow entitlements over time associated with parallel flows with unique congestion revenue allocation terms, or other enhancements or adjustments to the design that are ultimately implemented informed by market operations and experience.

As a transitional measure, the ISO would monitor the effects and materiality of the congestion revenue allocation associated with parallel flows under the introduced alternate approach. This includes more granular data collection and benchmarking of the congestion effects of binding transmission constraints across the EDAM footprint and the transmission flow effects in the footprint associated with the exercise of transmission rights. The more granular modeling of transmission facilities and their constraints in the FNM, and the relative shift factor impacts of loads and resources on a constraint, will support this data collection during EDAM operations. The information and data gathered during EDAM market operations will support subsequent evaluation of additional enhancements or adjustments to the design, a more robust congestion revenue allocation method with potential flow entitlements across neighboring systems, transition to financial rights, or other approaches discussed with market participants.

To provide stability in the application of the alternate approach for parallel flow congestion revenue allocation at the start of EDAM, the ISO could consider potentially a multi-year transition period (i.e. 3 years) to a forward evolution in the market design. During the first one to two years of market operations as the EDAM expands, the ISO will gather informational data on transmission constraints and their effects on flows across balancing areas, along with related information. The ISO would subsequently initiate a stakeholder process to consider a financial rights design, potential enhancements, or new designs on this topic informed by market operational experience and stakeholder input.

VI. Stakeholder Process and Decisional Classification

A. Stakeholder Engagement

This stakeholder initiative will follow an expedited schedule informed by stakeholder participation in workshops discussions as well as written stakeholder comments. The publication of this issue paper represents the start of the initiative and associated stakeholder process, and seeks to establish a grounded understanding of the existing EDAM design to congestion revenue allocation and introduce an alternative for stakeholder consideration. The goal is to present a proposal that may emerge from the stakeholder process during the May 2025 joint session of the ISO Board of Governors and the Western Energy Markets (WEM) Governing Body.

The following represent the target upcoming milestones:

- March 17th – Publication of *EDAM Congestion Revenue Allocation* issue paper.
- March 24th – Stakeholder workshop on published issue paper.
- April 7th – Comment deadline for issue paper and workshop.
- April 14th – Publication of proposal on *EDAM Congestion Revenue Allocation.*
- April TBD – multiple workshop/working group meetings to discuss published proposal.
- May TBD – publication of final proposal informed by workshops and stakeholder feedback.
- May 20-22nd – Presentation for decision to ISO Board of Governors and WEM Governing Body.

The schedule above may be adjusted or additional workshops may be scheduled as the initial stakeholder discussions take place and inform any schedule adjustments.

B. Decisional Classification

This initiative considers possible solutions to concerns with the EDAM design for congestion revenue allocation between EDAM balancing areas. ISO staff believes that any proposed tariff changes that emerge from this stakeholder process will be subject to the joint authority of the Board of Governors and the WEM Governing Body.

The Board and the WEM Governing Body have joint authority over any

> proposal to change or establish a tariff rule applicable to the WEIM/EDAM Entity balancing authority areas, WEIM/EDAM Entities, or other market participants within the WEIM/EDAM Entity balancing authority areas, in their capacity as participants in the WEIM/EDAM. The WEM Governing Body will also have joint authority with the Board of Governors to approve or reject a proposal to change or establish any tariff rule for the day-ahead or real-time markets that directly establishes or changes the formation of any locational marginal price(s) for a product that is common to the overall WEIM or EDAM markets. The scope of this joint authority excludes, without limitation, any other proposals to change or establish tariff rule(s) applicable only to the CAISO balancing authority area or to the CAISO-controlled grid. Note: For the avoidance of any doubt, that the joint authority definition is not intended to cover balancing authority-specific measures, such as any parameters or constraints, the CAISO may use to ensure reliable operation within its balancing authority area.

Charter for WEM Governance § 2.2.1. Any tariff changes that are proposed as a result of this process would be "applicable to WEIM/EDAM Entity balancing authority areas, WEIM/EDAM Entities, or other market participants within WEIM/EDAM Entity balancing authority areas, in their capacity as participants in WEIM/EDAM." We do not expect they would be applicable "only to … the CAISO-controlled grid." Accordingly, these proposed changes to implement these enhancements should fall within the scope of joint authority.

This proposed classification may evolve as this process develops. Stakeholders are encouraged to submit a response in their written comments to the proposed classification as described above.

VII. Appendix – Additional Examples of Congestion Revenue Allocation

The examples in this appendix illustrate further the allocation of congestion revenues by the market operator across EDAM balancing areas under the current design (as described in section IV of this issue paper) and the alternate approach to congestion revenue allocation (as described in section V of this issue paper).

As described in section IV, the day-ahead market and real-time market, and by extension EDAM and the WEIM, utilize the full network model (FNM) to enforce all appropriate network and resource constraints to optimally dispatch resources to meet demand across the market area. The FNM provides the necessary information to determine and mitigate transmission congestion as well as calculate the relevant LMP at each pricing node location or aggregated pricing location within the FNM. The LMP is calculated at each pricing node or aggregated pricing node location in the market area. The marginal congestion component (MCC) at each pricing location is calculated based on a linear combination of the shadow prices of all binding constraints in the network, each multiplied by the corresponding power transfer distribution factor, as determined by sensitivity analysis on the power flow solution, within the minimum effectiveness threshold.[11] The following examples illustrate this methodology and allocations under the current EDAM design to congestion revenue allocation contrasted with the alternate design introduced in this issue paper.

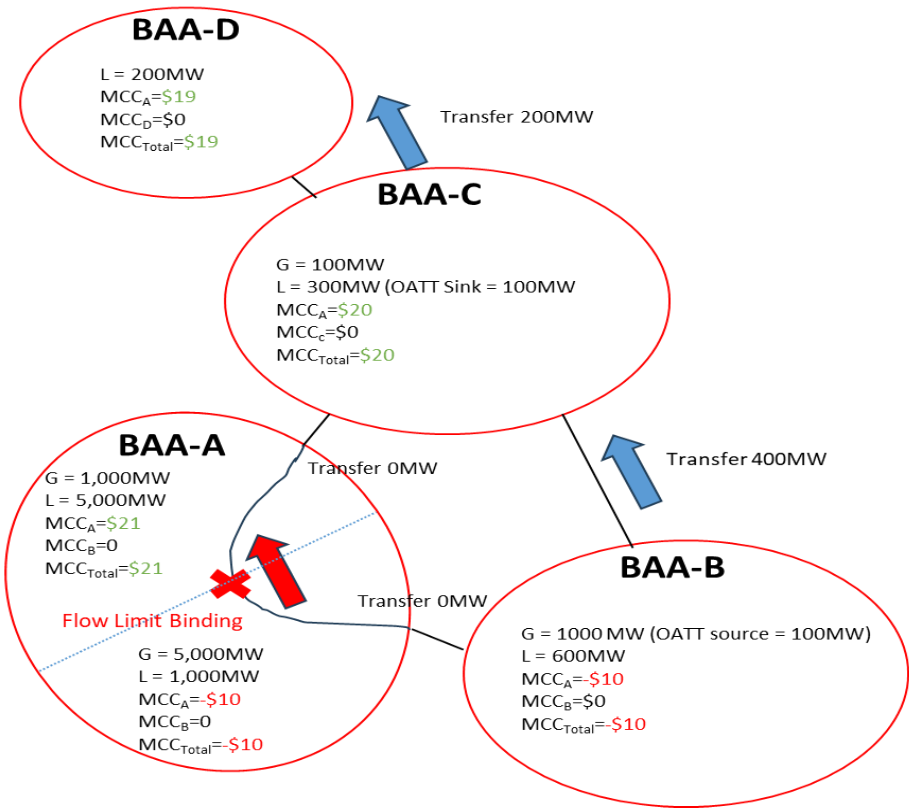
Example 1 – Predominant Flow Example

In the following examples, the full network model consists of four Balancing Authority Areas, BAA A, BAA B, BAA C, and BAA D participating in EDAM. Each of the four BAAs has sufficient generation bid into the market to meet demand forecast and passed the resource sufficiency test. There is transfer capacity released to the market between BAA A and BAA B, BAA A and BAA C, BAA B and BAA C as well as BAA C and BAA D.

In the predominant flow example (example 1), the market has dispatched generation in BAA A, BAA B, and BAA C to meet load in BAA A, BAA B, BAA C, and BAA D. The market dispatched resource to resolve binding flow constraint in BAA A from south to north direction. In addition, the market solution dispatched generation in BAA B to meet demand needs on BAA C and BAA D (see Figure 6).

Figure 6: Predominant Flow Solution when BAA A has Binding Constraint South to North

[11] *See* CAISO Tariff, Appendix C as accepted by the DAME-EDAM Order (establishing the LMP as the total of the Marginal Energy Cost (MEC), plus Marginal Cost of Congestion (MCC), plus Marginal Cost of Losses (MCL) and, if applicable, the Marginal Greenhouse Gas (MCG) effective upon implementation of EDAM); *see also* Section 33.11.1.2 (day-ahead congestion revenue calculation effective upon implementation of EDAM), Section 33.11.3.9.3 (day-ahead congestion offset settlement effective upon implementation of EDAM); *compare* CAISO Tariff, Section 11.5.4.1.1 (currently effective real-time congestion offset in WEIM) and Section 11.5.4.1.2 (real-time congestion offset in WEIM effective upon implementation of EDAM).



In BAA A, 6,000 MWs of internal generation has been dispatched to serve the 6,000 MWs of internal load. Of the 6,000 MWs supply dispatch, 1,000 MWs of generation south of the constraint served 1,000 MWs of load south of the constraint. An additional, 4,000 MWs of supply south of the constraint was dispatched to serve 4,000 MWs of BAA A load north of the constraint. The remaining 1,000 MW of BAA A load north of the constraint was served by generation north of the constraint.

In BAA B, 1,000 MWs of internal generation, including 100 MWs of OATT self-schedules, was dispatched to serve 600 MWs of internal load as well as 400 MWs of export transfer out of BAA B to BAA C.

In BAA C, 100 MWs of internal generation was dispatched to meet 100 MWs of internal load and 200 MWs was served by the 200 MWs of Transfer import from BAA B, including 100 MWs of OATT self-schedules and 200 MWs export transfer from BAA C to BAA D.

In BAA D, no internal generation was dispatched to serve the 200 MWs of internal load. Instead all of BAA D load, 200 MWs, was served by the 200 MWs import transfer from BAA C.

Since the optimal solution does not indicate that any BAA is transfer constrained, the Marginal Energy Cost (MEC) across all four BAAs is $20. However, based upon effectiveness, supply and demand south of the constraint has a Marginal Congestion Cost (MCC) of $(10) while the supply and load north of the binding constraint has a MCC of $21, $20, and $19 for BAA A, BAAC, and BAA D, respectively. Table 5 represents a summary of the dispatches and corresponding prices.

Table 5: Predominant Flow Awards and Prices

		MW	LMP	MEC	MCC_A	MCC_B	MCC_C	MCC_D
BAA A	G_N	1,000	$41.00	$20.00	*$ 21.00*	*$ -*	*$ -*	*$ -*

	L_N	(5,000)	$41.00	$20.00	*$ 21.00*	$ -	$ -	$ -
	G_S	5,000	$10.00	$20.00	*$(10.00)*	$ -	$ -	$ -
	L_N	(1,000)	$10.00	$20.00	*$(10.00)*	$ -	$ -	$ -
	T_{AB}	-	$20.00	$20.00	$ -	$ -	$ -	$ -
	T_{AC}	-	$20.00	$20.00	$ -	$ -	$ -	$ -

BAA B	G_{OATT}	100	$10.00	$20.00	*$(10.00)*	$ -	$ -	$ -
	G	900	$10.00	$20.00	*$(10.00)*	$ -	$ -	$ -
	L	(600)	$10.00	$20.00	*$(10.00)*	$ -	$ -	$ -
	T_{AB}	-	$20.00	$20.00	$ -	$ -	$ -	$ -
	$T_{BC(OATT)}$	(100)	$20.00	$20.00	$ -	$ -	$ -	$ -
	T_{BC}	(300)	$20.00	$20.00	$ -	$ -	$ -	$ -

BAA C	G	100	$40.00	$20.00	*$20.00*	$ -	$ -	$ -
	L_{OATT}	(100)	$40.00	$20.00	*$20.00*	$ -	$ -	$ -
	L	(200)	$40.00	$20.00	*$20.00*	$ -	$ -	$ -
	T_{AC}	-	$20.00	$20.00	$ -	$ -	$ -	$ -
	$T_{BC(OATT)}$	100	$20.00	$20.00	$ -	$ -	$ -	$ -
	T_{BC}	300	$20.00	$20.00	$ -	$ -	$ -	$ -
	T_{CD}	(200)	$20.00	$20.00	$ -	$ -	$ -	$ -

BAA D	G	-	$39.00	$20.00	*$19.00*	$ -	$ -	$ -
	L	(200)	$39.00	$20.00	*$19.00*	$ -	$ -	$ -
	T_{CD}	200	$20.00	$20.00	$ -	$ -	$ -	$ -

Table 6 provides a summary of the market solution. BAA A has a net settlement of $(124,000) where BAA A generation receives a payment $91,000 and BAA A load is charged $(215,000). BAA B has a net settlement of $(4,000) where BAA B generation receives a payment $10,000, BAA B load is charged $(6,000), and BAA B has net transfer settlement charge of $(8,000). BAA C has a net settlement of $(4,000) where BAA C generation receives a payment $4,000, BAA C load is charged $(12,000), and BAA C has a net transfer settlement charge of $4,000. BAA D has a net settlement of $(3,800) where BAA D generation receives a payment of $0, load is charged $(7,800), and BAA D has a net transfer settlement of $4,000. Overall the market footprint net settlement is an over-collection of $(135,800). However, the over-collection is cost of congestion management of the flow binding transmission constraint in BAA A. Based upon the existing EDAM congestion revenue allocation design, a $135,800 payment is distributed to the BAA in which the binding constraint resides. In this scenario, the congestion revenue is distributed to BAA A (Table 7).

Table 6: Predominant Flow settlement

		LMP	MEC	MCC_A	MCC_B	MCC_C	MCC_D
BAA A	G_N	**$41,000**	**$20,000**	*$21,000*	$ -	$ -	$ -
	L_N	**$(205,000)**	**$(100,000)**	*$(105,000)*	$ -	$ -	$ -
	G_S	**$50,000**	**$100,000**	*$(50,000)*	$ -	$ -	$ -
	L_N	**$(10,000)**	**$(20,000)**	*$10,000*	$ -	$ -	$ -

	T_{AB}	**$ -**	**$ -**	*$ -*	*$ -*	*$ -*	*$ -*
	T_{AC}	**$ -**	**$ -**	*$ -*	*$ -*	*$ -*	*$ -*
BAA A STLMT		**$(124,000)**	**$ -**	*$(124,000)*	*$ -*	*$ -*	*$ -*

BAA B	G_{OATT}	**$1,000**	**$2,000**	*$ (1,000)*	*$ -*	*$ -*	*$ -*
	G	**$9,000**	**$18,000**	*$(9,000)*	*$ -*	*$ -*	*$ -*
	L	**$(6,000)**	**$(12,000)**	*$ 6,000*	*$ -*	*$ -*	*$ -*
	T_{AB}	**$ -**	**$ -**	*$ -*	*$ -*	*$ -*	*$ -*
	$T_{BC(OATT)}$	**$(2,000)**	**$(2,000)**	*$ -*	*$ -*	*$ -*	*$ -*
	T_{BC}	**$(6,000)**	**$(6,000)**	*$ -*	*$ -*	*$ -*	*$ -*
BAA B STLMT		**$(4,000)**	**$ -**	*$(4,000)*	*$ -*	*$ -*	*$ -*

BAA C	G	**$4,000**	**$2,000**	*$2,000*	*$ -*	*$ -*	*$ -*
	L_{OATT}	**$(4,000)**	**$(2,000)**	*$(2,000)*	*$ -*	*$ -*	*$ -*
	L	**$(8,000)**	**$(4,000)**	*$(4,000)*	*$ -*	*$ -*	*$ -*
	T_{AC}	**$ -**	**$ -**	*$ -*	*$ -*	*$ -*	*$ -*
	$T_{BC(OATT)}$	**$2,000**	**$2,000**	*$ -*	*$ -*	*$ -*	*$ -*
	T_{BC}	**$6,000**	**$6,000**	*$ -*	*$ -*	*$ -*	*$ -*
	T_{CD}	**$(4,000)**	**$(4,000)**	*$ -*	*$ -*	*$ -*	*$ -*
BAA C STLMT		**$(4,000)**	**$ -**	*$ (4,000)*	*$ -*	*$ -*	*$ -*

BAA D	G	**$ -**	**$ -**	*$ -*	*$ -*	*$ -*	*$ -*
	L	**$(7,800)**	**$(4,000)**	*$(3,800)*	*$ -*	*$ -*	*$ -*
	T_{CD}	**$4,000**	**$4,000**	*$ -*	*$ -*	*$ -*	*$ -*
BAA D STLMT		**$(3,800)**	**$ -**	*$(3,800)*	*$ -*	*$ -*	*$ -*

Table 7: Current Marginal Cost of Congestion Distribution of predominant flow

MCC OFFSET	**MCC_T**	**MCC_A OFFSET by Breakdown**	**MCC_B OFFSET by Breakdown**	**MCC_C OFFSET by Breakdown**	**MCC_D OFFSET by Breakdown**
BAA_A MCC Total	**$(124,000)**	$(124,000)	$ -	$ -	$ -
BAA_B MCC Total	**$(4,000)**	$(4,000)	$ -	$ -	$ -
BAA_C MCC Total	**$(4,000)**	$(4,000)	$ -	$ -	$ -
BAA_D MCC Total	**$(3,800)**	$(3,800)	$ -	$ -	$ -
Overall STLMT	**($135,800)**	**($135,800)**	**$ -**	**$ -**	**$ -**
Congestion Allocation	**$135,800**	**$135,800**	**$ -**	**$ -**	**$ -**

Under the alternative transitional approach, the congestion revenue distribution would change from being distributed to the BAA where the constraint is modeled and located to the BAA where the congestion revenue was collected. In the predominant flow example, $135,800 of congestion revenue will still be paid out, however, the distribution across BAAs would be different. Instead of the $135,800 being distributed to BAA A, each BAA would receive it proportionate share based on where the congestion revenue accrued. BAA A would receive $124,000 of congestion revenue. BAA B and BAA C would receive $4,000 of congestion revenue. BAA D would receive $3,800 of congestion revenue. (See Table 8)

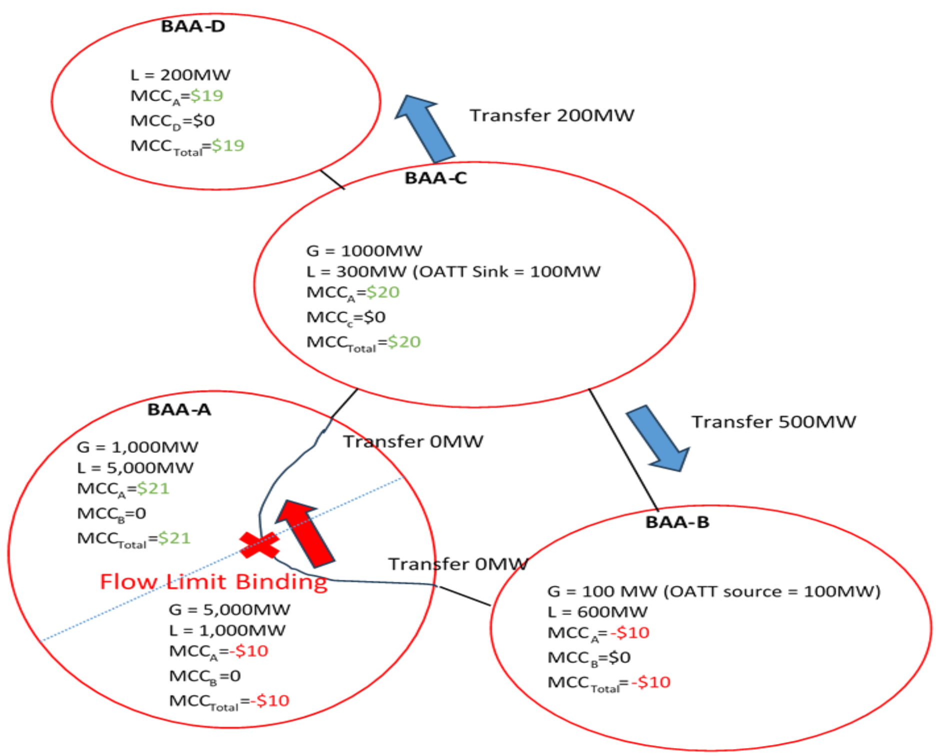
Table 8: Transitional Approach for predominant flow of Marginal Cost of Congestion Distribution

MCC OFFSET	**MCC_T**	**MCC_A OFFSET by Breakdown**	**MCC_B OFFSET by Breakdown**	**MCC_C OFFSET by Breakdown**	**MCC_D OFFSET by Breakdown**
BAA_A MCC Total	**$(124,000)**	$(124,000)	$ -	$ -	$ -
BAA_B MCC Total	**$(4,000)**	$ -	$(4,000)	$ -	$ -
BAA_C MCC Total	**$(4,000)**	$ -	$ -	$(4,000)	$ -
BAA_D MCC Total	**$(3,800)**	$ -	$ -	$ -	$(3,800)
Overall STLMT		**$(124,000)**	**$(4,000)**	**$(4,000)**	**$(3,800)**
Congestion Allocation		**$124,000**	**$4,000**	**$4,000**	**$3,800**

<u>Example 2 – Counterflow Example</u>

In this counterflow example, the market has dispatched generation in BAA A, BAA B, and BAA C to meet load in BAA A, BAA b, BAA C, and BAA D. The market dispatched resource to resolve a binding flow transmission constraint in BAA A from south to north direction. In addition, the market solution dispatched generation in BAA C to meet demand needs on BAA B and BAA D (See Figure 7).

Figure 7: Counter Flow Solution when BAA A has Binding Constraint South to North



In BAA A, 6,000 MWs of internal generation has been dispatched to serve the 6,000 MWs of internal load. Of the 6,000 MWs supply dispatch, 1,000 MWs of generation south of the constraint served 1,000 MWs of load south of the constraint. An additional, 4,000 MWs of supply south of the constraint was dispatched to serve 4,000 MWs of BAA A load north of the constraint. The remaining 1,000 MW of BAA A load north of the constraint was served by generation north of the constraint.

In BAA B, 100 MWs of OATT self-schedules was dispatched to serve 100 MWs of OATT load in BAA C with a 500 MWs net import transfer from BAA C to BAA B.

In BAA C, 1,000 MWs of internal generation was dispatched to meet 200 MWs of internal load, 800 MWs to serve 600 MWs of BAA B load as well as 200 MWs of BAA D load. The remaining 100 MWs of BAA C load is being served by 100 MWs OATT import transfer from BAA B. This dispatch creates a 500 MWs net transfer from BAA c to BAA B as well as a 200 MWs Transfer from BAA C to BAA D.

In BAA D, no internal generation was dispatched. Instead BAA D internal load is being served by the 200 MWs import transfer from BAA C.

Since the optimal solution does not indicate that any BAA is transfer constrained, the MEC across all four BAAs is $20. However, based upon effectiveness, supply and demand south of the constraint has a MCC of $(10) while the supply and load north of the binding constraint has a MCC of $21, $20, and $19 for BAA A, BAAC, and BAA D, respectively. Table 9 represents a summary of the dispatches and corresponding prices.

Table 9: Counter Flow Awards and Prices

		MW	LMP	MEC	MCC_A	MCC_B	MCC_C	MCC_D
BAA A	G_N	1,000	$41.00	$20.00	*$ 21.00*	*$ -*	*$ -*	*$ -*
	L_N	(5,000)	$41.00	$20.00	*$ 21.00*	*$ -*	*$ -*	*$ -*
	G_S	5,000	$10.00	$20.00	*$(10.00)*	*$ -*	*$ -*	*$ -*
	L_N	(1,000)	$10.00	$20.00	*$(10.00)*	*$ -*	*$ -*	*$ -*
	T_{AB}	-	$20.00	$20.00	*$ -*	*$ -*	*$ -*	*$ -*
	T_{AC}	-	$20.00	$20.00	*$ -*	*$ -*	*$ -*	*$ -*
BAA B	G_{OATT}	100	$10.00	$20.00	*$(10.00)*	*$ -*	*$ -*	*$ -*
	G	0	$10.00	$20.00	*$(10.00)*	*$ -*	*$ -*	*$ -*
	L	(600)	$10.00	$20.00	*$(10.00)*	*$ -*	*$ -*	*$ -*
	T_{AB}	-	$20.00	$20.00	*$ -*	*$ -*	*$ -*	*$ -*
	$T_{BC(OATT)}$	(100)	$20.00	$20.00	*$ -*	*$ -*	*$ -*	*$ -*
	T_{BC}	600	$20.00	$20.00	*$ -*	*$ -*	*$ -*	*$ -*
BAA C	G	1,000	$40.00	$20.00	*$20.00*	*$ -*	*$ -*	*$ -*
	L_{OATT}	(100)	$40.00	$20.00	*$20.00*	*$ -*	*$ -*	*$ -*
	L	(200)	$40.00	$20.00	*$20.00*	*$ -*	*$ -*	*$ -*
	T_{AC}	-	$20.00	$20.00	*$ -*	*$ -*	*$ -*	*$ -*
	$T_{BC(OATT)}$	100	$20.00	$20.00	*$ -*	*$ -*	*$ -*	*$ -*
	T_{BC}	(600)	$20.00	$20.00	*$ -*	*$ -*	*$ -*	*$ -*
	T_{CD}	(200)	$20.00	$20.00	*$ -*	*$ -*	*$ -*	*$ -*

BAA D	G	-	\$39.00	\$20.00	*\$19.00*	\$ -	\$ -	\$ -
	L	(200)	\$39.00	\$20.00	*\$19.00*	\$ -	\$ -	\$ -
	T_{CD}	200	\$20.00	\$20.00	\$ -	\$ -	\$ -	\$ -

Table 10 provides a summary of the market solution. BAA A has a net settlement of \$(124,000) where BAA A generation receives a payment \$91,000 and BAA A load is charged of \$(215,000). BAA B has a net settlement of \$5,000 where BAA B generation receives a payment \$1,000, BAA B load charged \$(6,000), and BAA B has a net transfer settlement charge of \$10,000. BAA C has a net settlement of \$14,000 where BAA C generation receives a payment \$40,000, BAA C load is charged \$(12,000), and BAA C has a net transfer settlement charge of \$(14,000). BAA D has a net settlement of \$(3,800) where BAA D generation receives a payment of \$0, BAA D load is charged of \$(7,800), and BAA D has a net transfer settlement of \$4,000. Overall the footprint net settlement is an over-collection of \$(108,800). However, the over collection is cost of congestion management of the flow binding constraint in BAA A. Based upon the current EDAM congestion revenue allocation design, a \$108,800 payment is distributed to the BAA in which the binding constraint resides. In this scenario, the congestion revenue is distributed to BAA A (Table 11).

Table 10: Counterflow settlement

		LMP	MEC	MCC_A	MCC_B	MCC_C	MCC_D
BAA A	G_N	**\$41,000**	**\$20,000**	*\$21,000*	\$ -	\$ -	\$ -
	L_N	**\$(205,000)**	**\$(100,000)**	*\$(105,000)*	\$ -	\$ -	\$ -
	G_S	**\$50,000**	**\$100,000**	*\$(50,000)*	\$ -	\$ -	\$ -
	L_N	**\$(10,000)**	**\$(20,000)**	*\$10,000*	\$ -	\$ -	\$ -
	T_{AB}	**\$ -**	**\$ -**	\$ -	\$ -	\$ -	\$ -
	T_{AC}	**\$ -**	**\$ -**	\$ -	\$ -	\$ -	\$ -
BAA A STLMT		**\$(124,000)**	**\$ -**	*\$(124,000)*	\$ -	\$ -	\$ -
BAA B	G_{OATT}	**\$1,000**	**\$2,000**	*\$ (1,000)*	\$ -	\$ -	\$ -
	G	**\$ -**	**\$ -**	\$ -	\$ -	\$ -	\$ -
	L	**\$(6,000)**	**\$(12,000)**	*\$ 6,000*	\$ -	\$ -	\$ -
	T_{AB}	**\$ -**	**\$ -**	\$ -	\$ -	\$ -	\$ -
	$T_{BC(OATT)}$	**\$(2,000)**	**\$(2,000)**	\$ -	\$ -	\$ -	\$ -
	T_{BC}	**\$12,000**	**\$12,000**	\$ -	\$ -	\$ -	\$ -
BAA B STLMT		**\$5,000**	**\$ -**	*\$5,000*	\$ -	\$ -	\$ -
BAA C	G	**\$40,000**	**\$20,000**	*\$20,000*	\$ -	\$ -	\$ -
	L_{OATT}	**\$(4,000)**	**\$(2,000)**	*\$(2,000)*	\$ -	\$ -	\$ -
	L	**\$(8,000)**	**\$(4,000)**	*\$(4,000)*	\$ -	\$ -	\$ -
	T_{AC}	**\$ -**	**\$ -**	\$ -	\$ -	\$ -	\$ -
	$T_{BC(OATT)}$	**\$2,000**	**\$2,000**	\$ -	\$ -	\$ -	\$ -
	T_{BC}	**\$(12,000)**	**\$(12,000)**	\$ -	\$ -	\$ -	\$ -
	T_{CD}	**\$(4,000)**	**\$(4,000)**	\$ -	\$ -	\$ -	\$ -
BAA C STLMT		**\$14,000**	**\$ -**	*\$ 14,000*	\$ -	\$ -	\$ -

BAA D	G	**$ -**	**$ -**	*$ -*	*$ -*	*$ -*	*$ -*
	L	**$(7,800)**	**$(4,000)**	*$(3,800)*	*$ -*	*$ -*	*$ -*
	T$_{CD}$	**$4,000**	**$4,000**	*$ -*	*$ -*	*$ -*	*$ -*
BAA D STLMT		**$(3,800)**	**$ -**	*$(3,800)*	*$ -*	*$ -*	*$ -*

Table 11: Current Marginal Cost of Congestion Distribution of counterflow

MCC OFFSET	**MCC$_T$**	**MCC$_A$ OFFSET by Breakdown**	**MCC$_B$ OFFSET by Breakdown**	**MCC$_C$ OFFSET by Breakdown**	**MCC$_D$ OFFSET by Breakdown**
BAA$_A$ MCC Total	**$(124,000)**	$(124,000)	$ -	$ -	$ -
BAA$_B$ MCC Total	**$5,000**	$5,000	$ -	$ -	$ -
BAA$_C$ MCC Total	**$14,000**	$14,000	$ -	$ -	$ -
BAA$_D$ MCC Total	**$(3,800)**	$(3,800)	$ -	$ -	$ -
Overall STLMT	**$(108,800)**	**$(108,800)**	**$ -**	**$ -**	**$ -**
Congestion Allocation	**$108,800**	**$108,800**	**$ -**	**$ -**	**$ -**

Under the alternate transitional approach, the congestion revenue distribution would change from being distributed to the BAA where the constraint is modeled to the BAA where the congestion revenue was collected. In counter flow example, $108,800 of congestion revenue will still be paid out across the footprint. However, the distribution of the congestion revenue across BAAs would be different. The $108,800 will be distribute to each BAA in proportionate share of where the congestion was collected. BAA A would receive $124,000 of congestion revenue. BAA Band BAA C would receive a congestion charge of $5,000 and $14,000, respectively. BAA D would receive $3,800 of congestion revenue. (See Table 12)

Table 12: Transitional approach of Marginal Cost of Congestion Distribution for counter flow

MCC OFFSET	**MCC$_T$**	**MCC$_A$ OFFSET by Breakdown**	**MCC$_B$ OFFSET by Breakdown**	**MCC$_C$ OFFSET by Breakdown**	**MCC$_D$ OFFSET by Breakdown**
BAA$_A$ MCC Total	**$(124,000)**	$(124,000)	$ -	$ -	$ -
BAA$_B$ MCC Total	**$5,000**	$ -	$5,000	$ -	$ -
BAA$_C$ MCC Total	**$14,000**	$ -	$ -	$14,000	$ -
BAA$_D$ MCC Total	**$(3,800)**	$ -	$ -	$ -	$(3,800)
Overall STLMT	**$(108,800)**	**$(124,000)**	$5,000	$14,000	$(3,800)
Congestion Allocation	**$108,800**	**$124,000**	**$(5,000)**	**$(14,000)**	**$3,800**