

Losses Task Team CAISO and ERCOT Loss Methodologies

California ISO

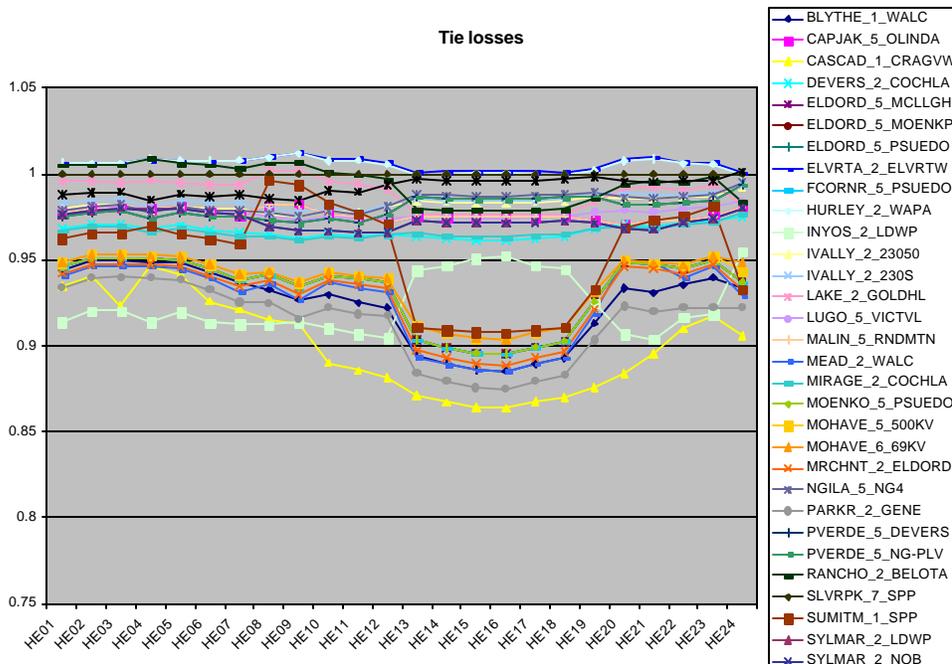
The CAISO allocates losses to generation and imports by way of a Generation Meter Multiplier (GMM) calculated for each interconnection point (generator or interconnect bus) and applied to all energy received at that point. GMMs are estimated a week ahead and then recalculated on a day ahead and finally a real time basis. Real time GMMs are used for all settlement. The Scheduling Protocol describes the following methodology for calculating GMMs:

(a) The ISO Power Flow Model will be utilized to calculate the effects on total Transmission Losses at each Generating Unit and Scheduling Point by calculating the sensitivity of injecting Energy at each Generating Unit bus or Scheduling Point to **serve an increment of Demand distributed proportionately throughout the ISO Control Area.** This will produce the Full Marginal Loss Rate at each Generating Unit and Scheduling Point.

(b) The ISO will then determine the ratio of expected Transmission Losses to the total Transmission Losses that would be collected if Full Marginal Loss Rates were utilized to determine Transmission Losses. This ratio is referred to as the Loss Scale Factor.

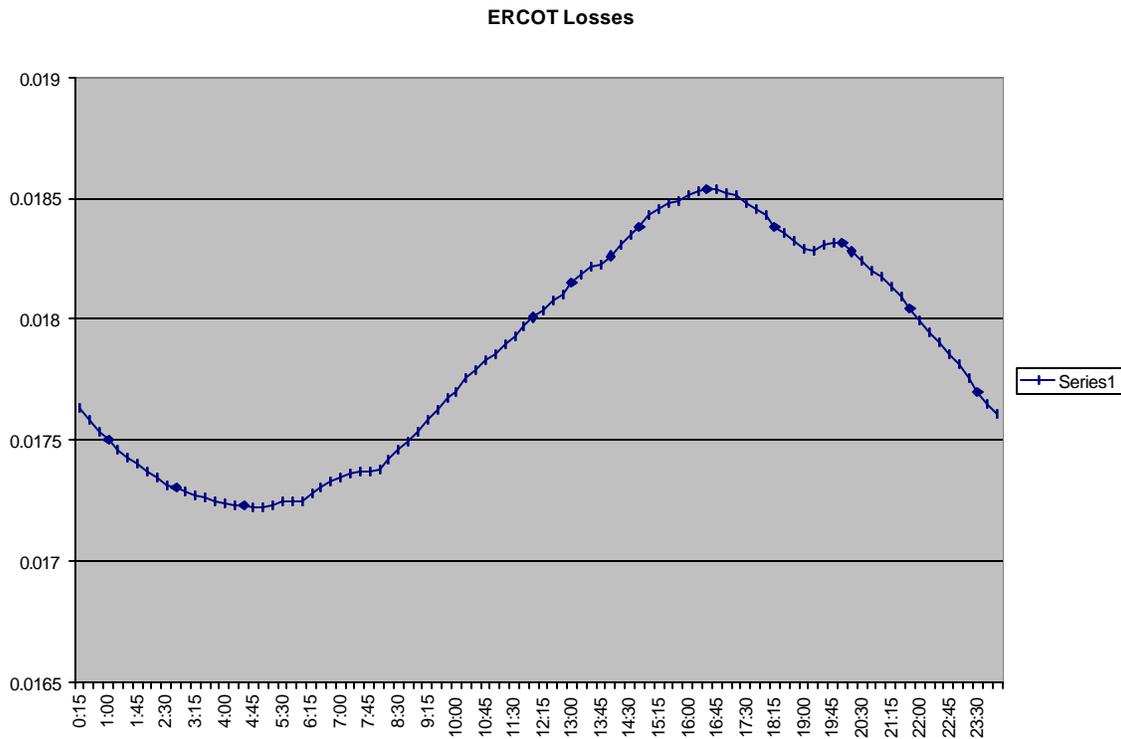
(c) The ISO will then multiply the Loss Scale Factor by the Full Marginal Loss Rate at each Generating Unit or Scheduling Point to determine each Generating Unit's or external import's Scaled Marginal Loss Rate. The GMM is calculated by subtracting the Scaled Marginal Loss Rate from unity.

Thus each generating facility and ISO import point is assigned losses for every hour based on their marginal loss contribution scaled for actual losses. Suppliers can provide their losses physically (by applying their GMMs to their actual output) or financially (by ignoring their GMMs and making up the difference as imbalance energy). GMMs can be greater than or less than unity (allowing for negative losses). The chart below shows intertie GMMs for one day.



ERCOT

ERCOT applies a single loss factor to all transactions each 15 minute interval. The loss factor varies by system load and is scaled to seasonal peak and off peak loss calculations taken from the base case load flow. Loss factors are forecasted day ahead and deemed actual based on total load. Any discrepancies between actual losses and deemed losses is allocated to unaccounted for energy and uplifted. A one day example is shown below.



Losses Principle	CAISO	ERCOT
accurate and based on reasonable identification of causation	<ul style="list-style-type: none"> Adjusted to reflect actual losses Locationally accurate (at least for resources, Allocated only to resources 	<ul style="list-style-type: none"> Reasonably reflect actual losses No locational component
straightforward – easy to understand, simple to administer and reasonably predictable	<ul style="list-style-type: none"> 3 sets of losses calculated every hour for every injection point isn't that simple. Requires load flow to calculate Easy to administer once calculated 	<ul style="list-style-type: none"> Yep
consistent for all system users	<ul style="list-style-type: none"> Applied only to gen/imports 	<ul style="list-style-type: none"> Yep
should not be “gameable.”	<ul style="list-style-type: none"> Isn't 	<ul style="list-style-type: none"> Isn't
consistent with market design	<ul style="list-style-type: none"> Complicated, precise - consistent 	<ul style="list-style-type: none"> Does not factor in location
	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
Question	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
How are total amount of real losses considered	<ul style="list-style-type: none"> Estimated through load flow. Discrepancies are included in UFE 	<ul style="list-style-type: none"> Seasonal estimates adjusted for actual load. Discrepancies included in UFE
How are losses valued	<ul style="list-style-type: none"> Self-supplied or as imbalance energy 	<ul style="list-style-type: none"> Self-supplied by QSE or as imbalance energy
How are costs allocated	<ul style="list-style-type: none"> To generators/imports 	<ul style="list-style-type: none"> To QSE's based on load served
What happens to difference between scheduled and actual losses	<ul style="list-style-type: none"> GMMs calculated based on actual load, any discrepancy uplifted 	<ul style="list-style-type: none"> Deemed loss factor based on actual load used for settlement, discrepancies uplifted
When are losses determined	<ul style="list-style-type: none"> Estimated week ahead and day ahead Actual determined ex post 	<ul style="list-style-type: none"> Estimated day ahead Actual determined ex post
Will method accommodate returns in kind or concurrent provision?	<ul style="list-style-type: none"> Losses are settled each hour based on that hour's market price if not self-provided. No later returns 	<ul style="list-style-type: none"> Losses are settled each interval based on that interval's demand if not self-provided
Is there an adjustment for current load and/or weather	<ul style="list-style-type: none"> All losses settled based on actual system conditions 	<ul style="list-style-type: none"> Adjusted to expected actual losses on system wide basis.
Major advantages	<ul style="list-style-type: none"> Accurate locational price signal Real time loss allocation 	<ul style="list-style-type: none"> Easy to understand and administer Real time allocation

	<ul style="list-style-type: none">• Easy to allocate	
Major Disadvantages	<ul style="list-style-type: none">• Lots of numbers• Multiple estimated iterations• Assumes all load has same loss responsibility.• Difficult to duplicate	<ul style="list-style-type: none">• No locational component for generation or load