

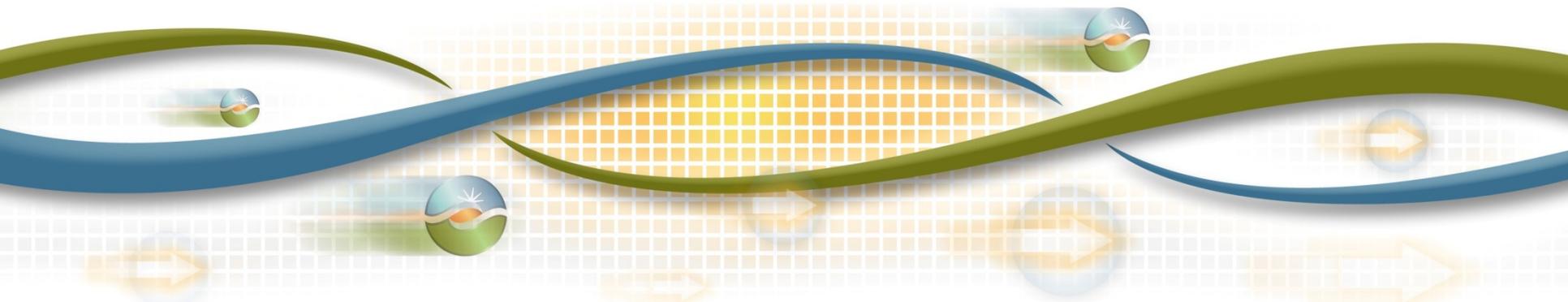


California ISO
Shaping a Renewed Future

Energy Imbalance Market Technical Workshop

Energy Transfer Scheduling in Energy Imbalance Market

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Overview

- EIM Transfer definition and calculation
- EIM Transfer constraints in current implementation
- EIM Transfer distribution to Energy Transfer schedules on interties, subject to scheduling limits
- Energy Transfer System Resource registration
- Energy Transfer schedule tagging
- EIM Transfer financial value

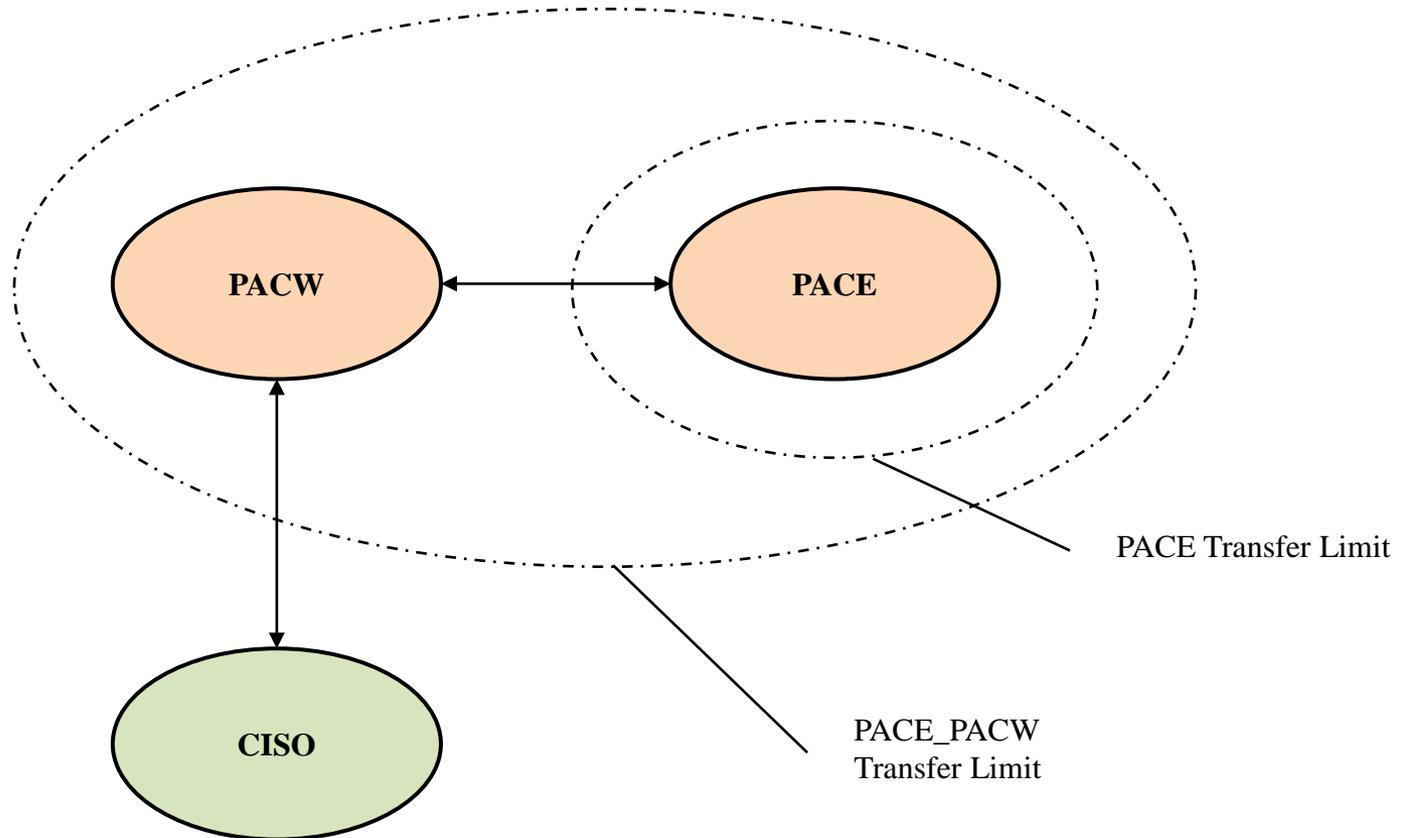
EIM Transfer Definition

- Net imbalance energy exchange between a BAA in the EIM Area and other BAAs in the EIM Area
- It does not include imports/exports from/to non-EIM BAAs
- It is algebraic:
 - ◆ Positive for net export
 - ◆ Negative for net import

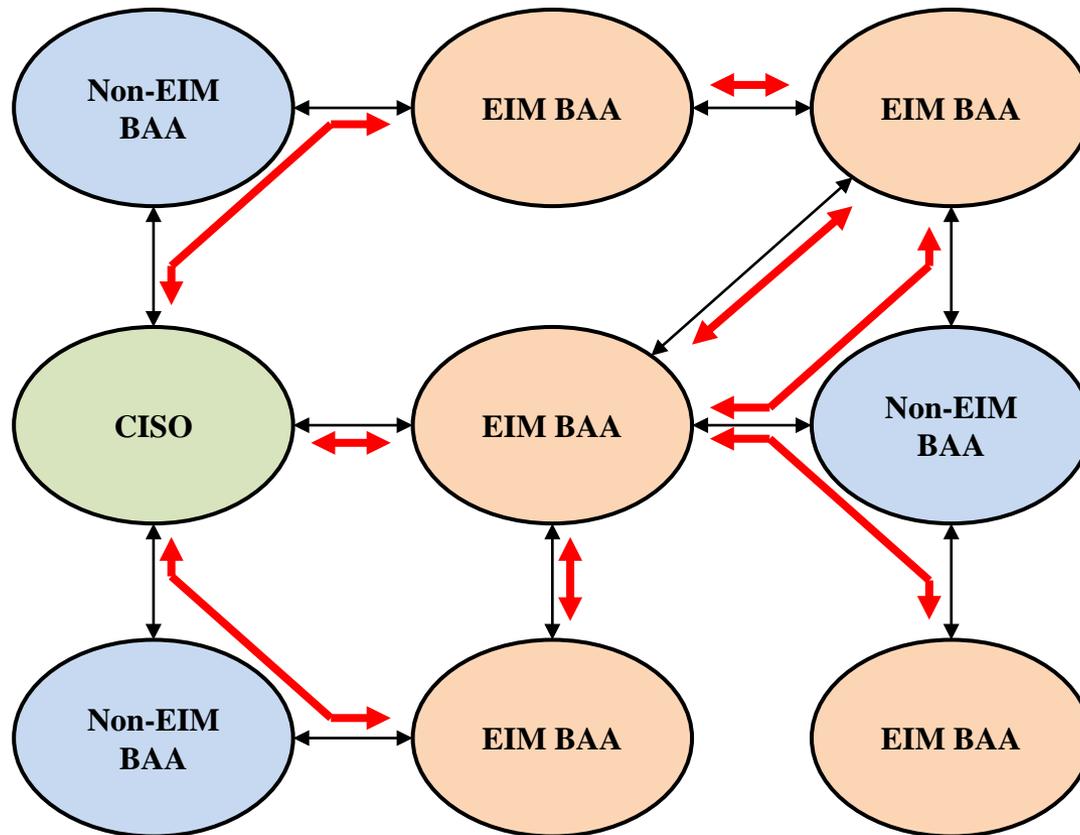
EIM Transfer Calculation and Power Balance

- EIM Transfer =
sum(Generation) –
sum(Load) –
Loss –
sum(Exports to non-EIM BAAs) +
sum(Imports from non-EIM BAAs)
- EIM Area power balance:
sum(EIM Transfer) = 0

EIM Transfer Constraints (Current)



EIM Transfer Constraints (Future)



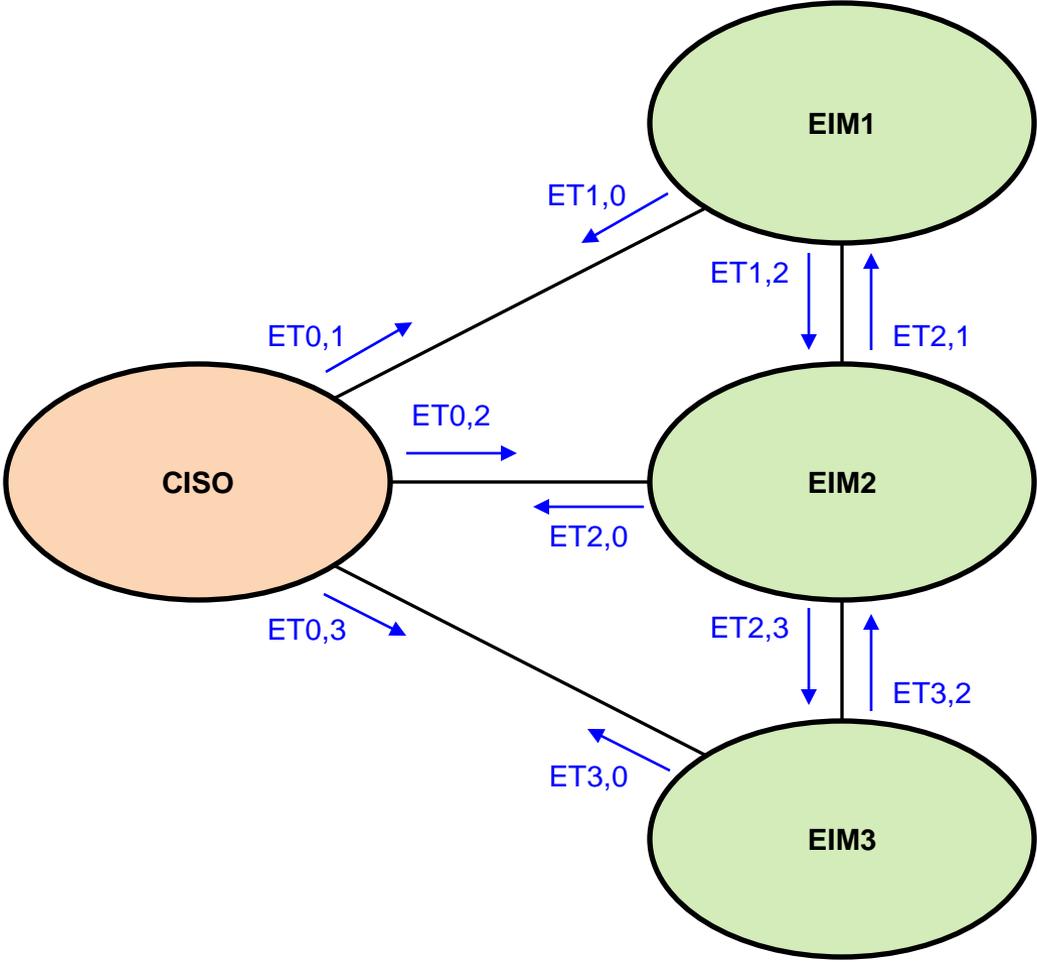
Energy Transfer Schedule Definition

- The portion of the EIM Transfer distributed to an intertie with another BAA in the EIM Area for accounting and tagging
- Constrained by Energy Transfer limits provided by the EIM Entity
 - ◆ Limits reflect transmission rights released for EIM
 - Limits may be 15min static (RTUC) and 5min dynamic (RTD), or only 5min dynamic (RTUC/RTD)
- Constrained by Scheduling Limits (ISL/ITC) on interties with CISO or non-EIM BAAs

Energy Transfer Schedule Calculation

- Expand market optimization model with additional variables and constraints
 - ◆ $\text{EIM Transfer} = \text{sum}(\text{Export Transfer Schedule}) - \text{sum}(\text{Import Transfer Schedule})$
 - ◆ $0 \leq \text{Export Transfer Schedule} \leq \text{Export Limit}$
 $0 \leq \text{Import Transfer Schedule} \leq \text{Import Limit}$
- Augment objective function with a small cost for Energy Transfer Schedules
 - ◆ $\dots + \text{sum}(\text{Export Transfer Schedule} \times \text{Cost}) + \text{sum}(\text{Import Transfer Schedule} \times \text{Cost})$

Example



Energy Transfer System Resources

- Used to anchor the Energy Transfer Schedules
- Used to identify Energy Transfer Schedule tags
- Defined at the Default Generation Aggregation Point (DGAP) of an EIM BAA
- Registered in pairs across interties:
 - ◆ In BAA₁ for export from BAA₁ to BAA₂ on intertie T
 - ◆ In BAA₂ for export from BAA₂ to BAA₁ on intertie T
- No imbalance energy settlement for transfers
 - ◆ The settlement is with resources in the EIM BAA

Energy Transfer Schedule Tagging

- Energy Transfer schedules are duplicated:
 - ◆ Export from BAA_1 to BAA_2 on intertie T
 - ◆ Import to BAA_2 from BAA_1 on intertie T
- By convention, Export Transfer schedules are tagged by exporting EIM Entity
 - ◆ Exception for CISO:
 - Both Import/Export Transfer schedules are tagged by importing/exporting EIM Entity
- Energy Transfer System Resource ID is included in the tag

EIM Transfer Financial Value

- Used in neutrality calculations by BAA so that BAA is energy balanced
- Currently, the financial value is the LMP at the Scheduling Point used in the EIM Transfer tag
- With many potential interties and Energy Transfer schedules, the LMP of the corresponding Energy Transfer System Resource (DGAP LMP) is more robust and appropriate.