

A decorative graphic on the left side of the slide, consisting of a vertical black line intersecting a horizontal black line. To the left of the intersection are overlapping colored squares: blue, red, and yellow.

CRR Educational Material Overview

CRR Educational Class #1

CAISO Market Operations



Contents

- Why is the CAISO providing CRR educational material
- The fundamental components of the CRR allocation/auction & settlement process
- The importance of each component on the CRR allocation/auction & settlement process
- An overview of the educational material content



Why Provide CRR Educational Material?

- The CAISO is implementing Market Redesign and Technology Upgrade (MRTU)
- Part of MRTU is the implementation of a integrated forward market with Locational Marginal Pricing (LMP)
- Forward market congestion is based on the differences between the congestion components of the LMPs
- Congestion Revenue Rights (CRRs) will be the financial instrument that can be used to hedge congestion (against Day-ahead LMPs only)
 - CAISO currently auctions Firm Transmission Rights (FTRs) that are path based to hedge against the current zonal based transmission market



Why Provide CRR Educational Material?

- The CAISO will be implementing CRRs for MRTU
- CRRs are a new product to the CAISO and its Market Participants
- The CAISO has recently completed
 - CRR Study 2
 - LECG review of CRR Study 2 results
 - ISO white paper on allocation rules
- In Progress
 - Stakeholder review of the MRTU Tariff language
- The CAISO is finalizing the testing of the CRR system



Why Provide CRR Educational Material?

- CRRs are financial hedging instruments to hedge against Day-ahead congestion charges
- CRRs are point-to-point and multi-point based
- CRRs can be acquired through
 - Allocations
 - Auctions
 - Trades
- CRRs will be allocated to (current proposed MRTU Tariff language)
 - Load Serving Entities
 - Merchant Transmission
 - Others – LSEs Outside of the Control Area



Why Provide CRR Educational Material

- CRRs are a major component of the new California energy market
- The objective of the educational classes provided in 2004 were to provide market participants with the fundamental knowledge needed help in the development of the current allocation, auction and settlement rules
- As we go forward the CAISO sees three aspects to the understanding of the CRR process
 - The fundamental aspects of CRRs
 - The allocation rules & settlement procedures (MRTU Tariff)
 - How to use the Market User Interface



Why Provide CRR Educational Material

- These educational classes will focus on the first bullet, understanding the fundamental aspects of CRRs
- Market participants can read through the Tariff language to understand the allocation rules
- Market User Interface training will be provided in early 2006



Why Provide CRR Educational Material?

- Building Blocks
 - This educational material is on the fundamentals or the basic building blocks of
 - The basic concepts of CRRs
 - The generalized CRR allocation process and its inputs
 - The specific allocation rules will not be discussed here
 - CRR Settlements
- These educational presentations are **not** intended to be the place or time to discuss policy issues
 - Most of these policy issues have been debated and the CAISO has draft Tariff language
- Understanding the building blocks will help the MPs understand the allocation & settlement processes that has been put forth



Why Provide CRR Educational Material?

- What will not be covered in this material
 - The basics of the CRR Auction process
 - The Secondary Registration System (SRS)
 - Allocation of CRRs to Merchant Transmission
 - Allocation of CRRs to Out of Control Area load

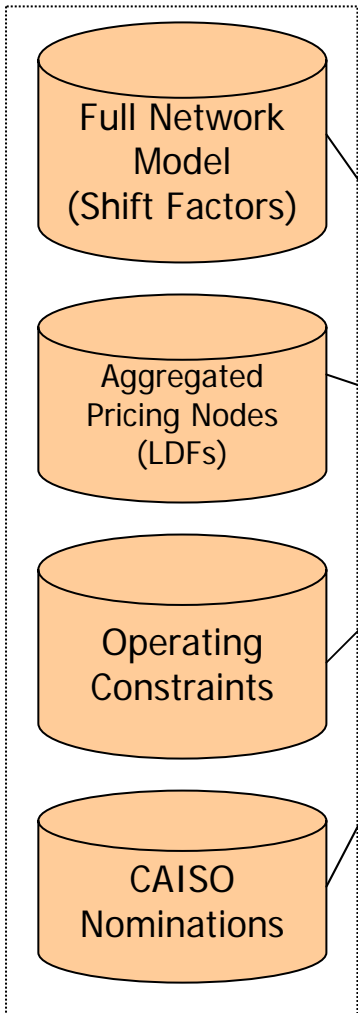


Fundamental Components

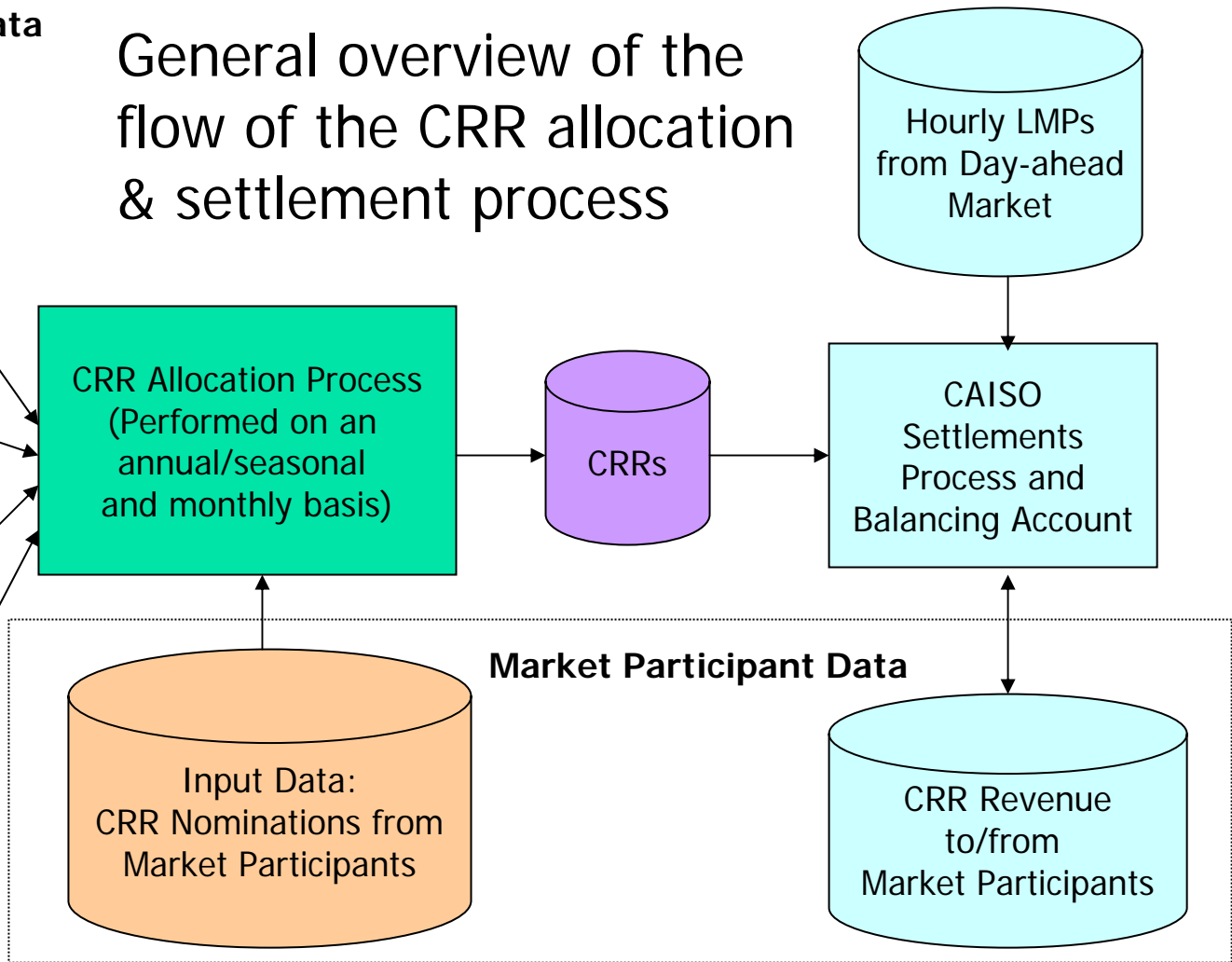
- The Fundamental Components of the CRR allocation process are broken down into the following areas
 - Input Data
 - The Allocation process that determines the cleared (simultaneously feasible) CRRs that market participants receive
 - The cleared CRRs are the output
 - How these cleared CRRs are used in settlements

Fundamental Components

CAISO Developed Input Data



General overview of the flow of the CRR allocation & settlement process





Input Data

- Input Data consists of
 - Full network model
 - Pricing nodes (this includes for example the load distribution factors)
 - Operating constraints
 - Nominated CRRs



Input Data

- Full Network Model (FNM)
 - Why is the FNM important to understand?
 - The FNM is a key component because it determines the flows on constraints (branches and interfaces) that result from the application of nominations which consist of CRR Source(s) and Sink(s)
 - If a constraint(s) is violated (simultaneous infeasibility), CRR nominations must be reduced to achieve simultaneous feasibility!



Input Data

- Shift Factors – directly related to the FNM
 - Not an explicit input data set but are directly calculated from the FNM
 - The shift factors are derived directly from the DC version of the FNM
 - The shift factor is the actual component that determines the flow on a constraint due to the application of a CRR nomination



Input Data

- Aggregated Pricing Nodes
 - Why are the aggregated pricing nodes (APnodes) important to understand
 - APnodes and Pricing Nodes (Pnodes) are used interchangeably in these presentations
 - CRR Nominated Sources and Sinks are APnodes
 - The APnodes determine how Sources and Sinks are mapped and allocated (via allocation factors) to the underlying FNM
 - This in turn plays a role in the resulting flow on constraints in the allocation process



Input Data

- Load Distribution Factors (LDFs)
 - Why are LDFs important to understand
 - The allocation factors of the APnodes that represent the standard Load Aggregation Points (e.g., PG&E, SCE and SDG&E) will be based on LDFs
 - LDFs are derived from
 - Load that is modeled in base cases developed through the FNM development process
 - Energy Management System (EMS) state estimation solutions



Input Data

- Operating Constraints
 - Why are the operating constraints important to understand
 - Operating constraints limit the amount of power that can flow over constraints
 - Constraints in the base case
 - Constraints in the contingency cases
 - The constraints limit the amount of CRRs that can be allocated



Input Data

- CRR Nominations

- Why are the basics of CRR nominations important to understand
 - The nomination is the request that eligible market participants submit into the allocation process
 - The nomination is based on Sources (injections) and Sinks (withdrawals)
 - The cleared or final CRRs are the financial instruments that will provide market participants with a Day-ahead market congestion hedge



CRR Allocation Process

- Why is the allocation process important to understand
 - This is the process that takes the CRR nominations along with the other input data and determines the amount of cleared or simultaneously feasible CRRs
 - The allocation rules/steps have a direct impact on all market participants



CRR Settlement Process

- Why is the settlement process important to understand
 - The settlement process takes into account the cleared CRRs and the Day-ahead LMPs to calculate the CRR revenue to each CRR holder
 - The settlement process will also take into account a CRR balancing account



Educational Material Content

- The CRR training material is split into the following three sections where each section is comprised of a fundamental component of the overall CRR Allocation and Settlement Process
 - Inputs into the Allocation Process
 - Full network model
 - Shift factors
 - Pricing nodes
 - Load distribution factors
 - Operating constraints
 - CRRs
 - Allocation Process
 - CRR allocation process
 - CRR Settlements
 - LMPs
 - Settlements process

Any Questions?

