

DAM OVERVIEW AND TIMELINE



Outline

Topics covered in this presentation:

- I. Description and timeline for Day–Ahead Market activities
- II. Overview of System Implementation
- III. Available Resources, Documentation, Sources
Market Participant Engagement

Presentation Objective

Using the information in this presentation...

...you will be able to understand

- Day-Ahead Market timeline
- Associated inputs/outputs



I. Description and Timeline for Day-Ahead Activities

Day-Ahead Market

Day Ahead Market (DAM) provides

- Market for energy and Ancillary Services
- Platform to hedge congestion costs in the day-ahead of the Operating Day
- Financial instruments to mitigate the risk of price volatility in Real Time



Day-Ahead Market

Features of ERCOT's DAM

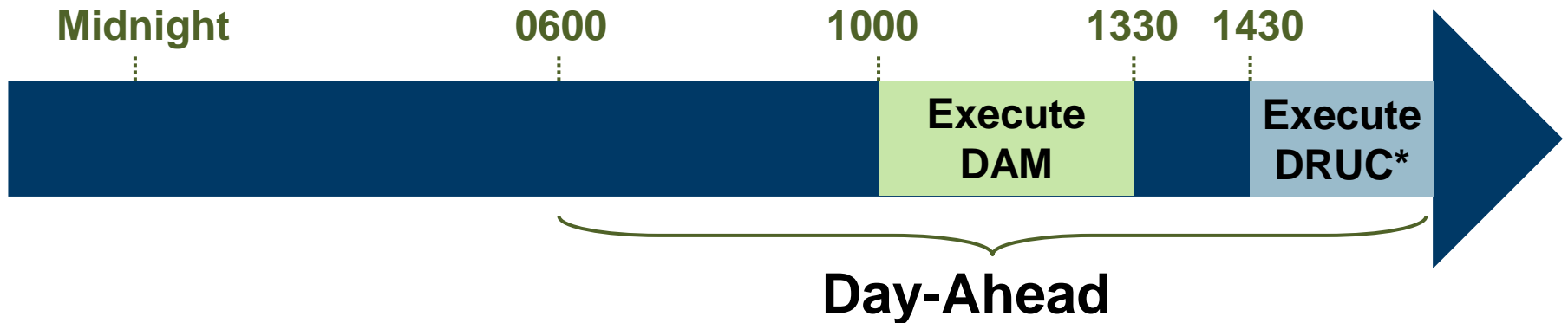
- Co-optimization of Energy, Congestion Revenue Rights, and Ancillary Services
- Financially binding
- Voluntary participation (except for Resources under Reliability Must Run contracts)

Day-Ahead Market



Day-Ahead Market

Day-Ahead Timeline



*DRUC: Day Ahead Reliability Unit Commitment

Day-Ahead Market

Information

By 6 am ERCOT publishes

- Ancillary Services (AS) Plan
- Load Ratio Shares (based on data from 14 days prior)
- AS Obligations
- Wind Forecasts and Production Potential – used to estimate Current Operating Plan Resource limits for wind resources
- Operational Network Model *
- List of all Settlement Points *
- Mapping of Settlement Points to Electrical Buses *
- Competitive Constraints *

* new in nodal



Day-Ahead Market

Information

By 6 am ERCOT publishes forecasted system conditions



- Load forecasts for ERCOT system, Weather Zones and Load Zones
- Load forecast distribution factors to estimate load at the bus level
- Distribution Loss Factors and forecasted ERCOT-wide Transmission Loss Factors to account for energy losses
- Weather assumptions for forecasting system conditions
- Transmission constraints that have a high probability of binding (new in nodal)*

Day-Ahead Market

Transactions

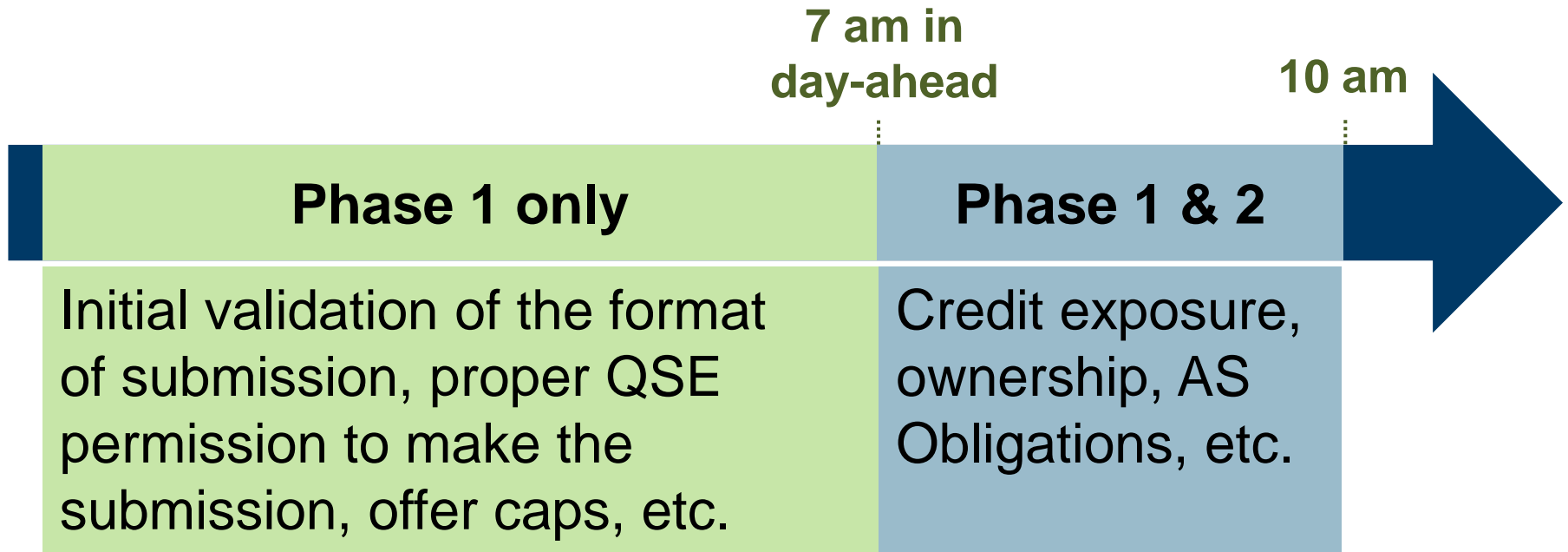
QSE submissions before 10 am in day-ahead

- Three-part Supply Offer
- Energy-Only Offers and Bids
- AS Offer
- AS Self-Arrangement
- Congestion Revenue Rights (CRR) Offer
- Point-to-Point Obligation Bid
- Capacity Trade
- Energy Trade
- AS Trade
- Current Operating Plan



Day-Ahead Market

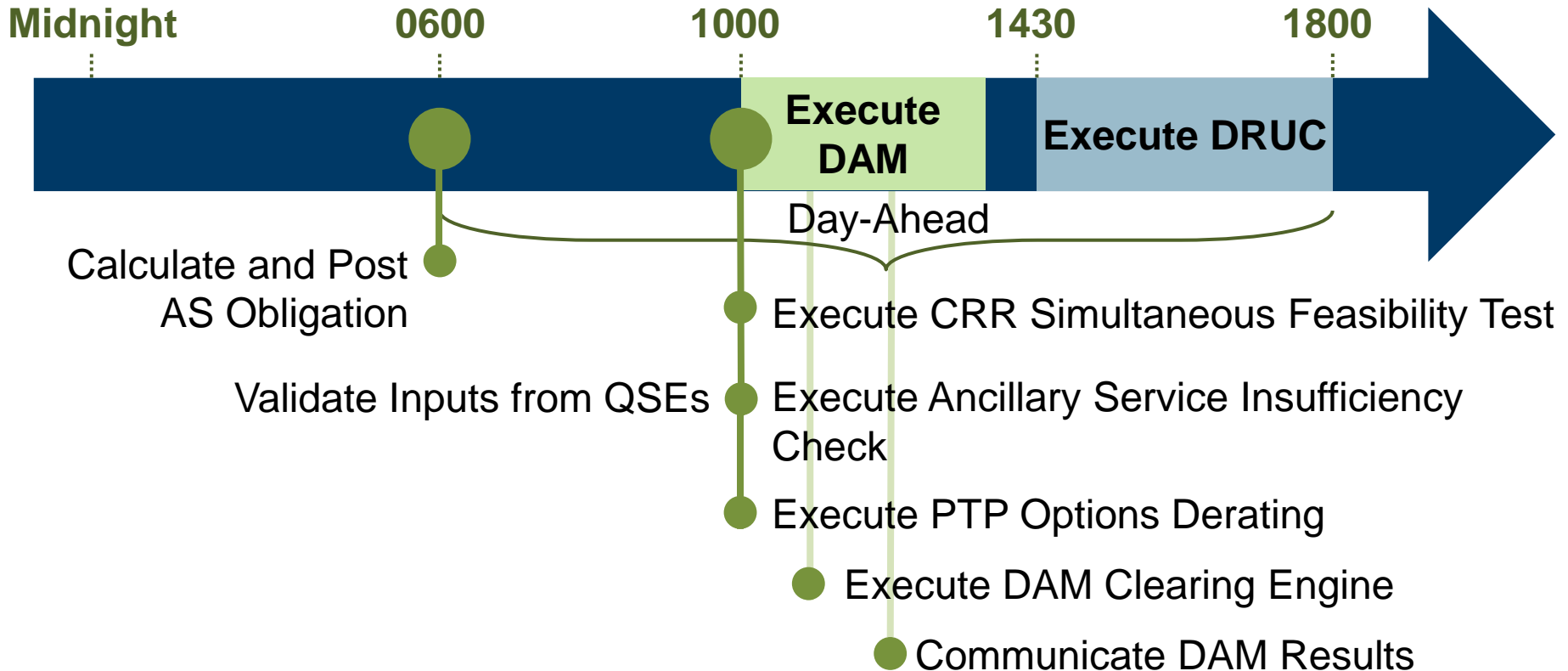
Validating transactions



Note: Market system will cancel submission if it fails phase 2 validation and send notice to the QSE containing reason for failure

Day-Ahead Market

Clearing Process

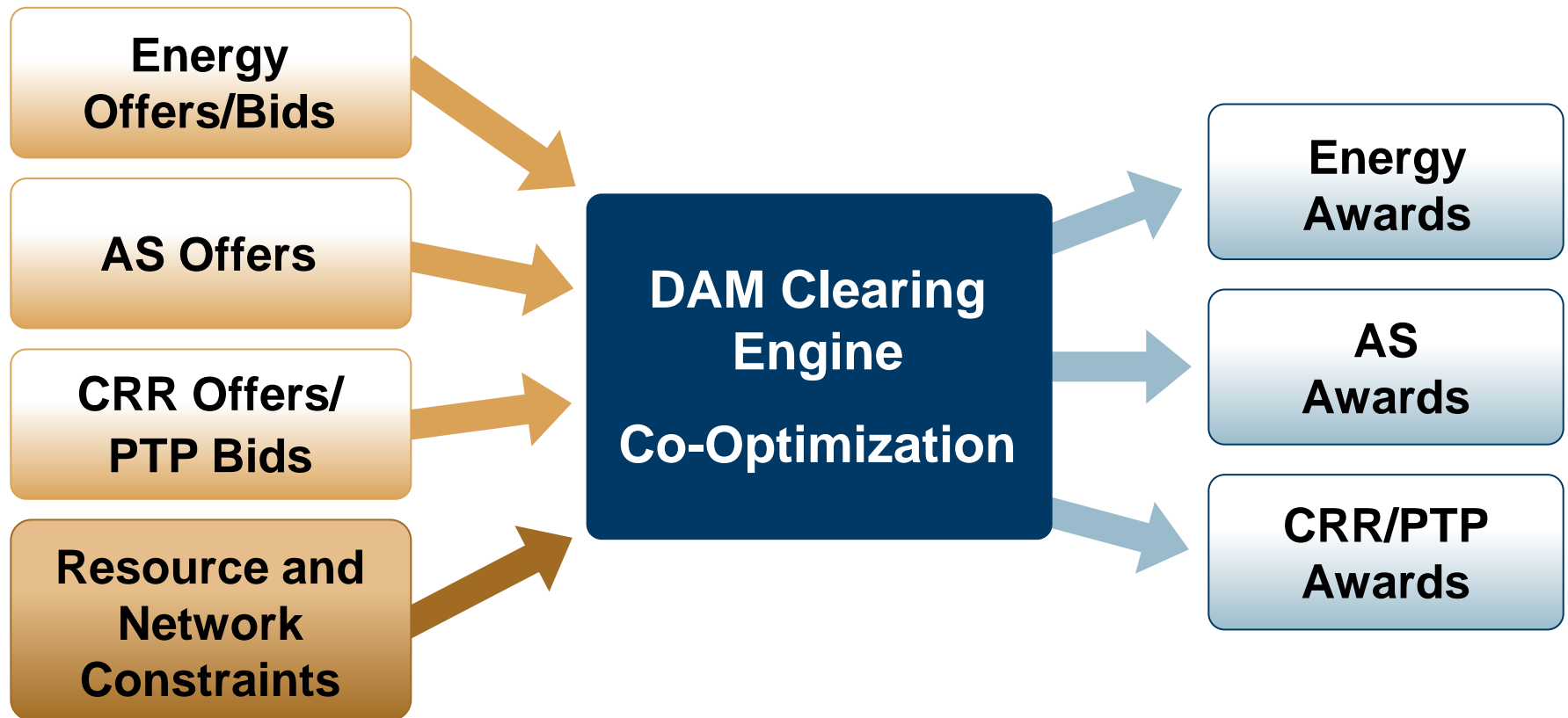


Post-process the outputs of DAM Clearing Engine and publish and communicate the DAM results to Settlement and MIS.

Day-Ahead Market

Clearing Process

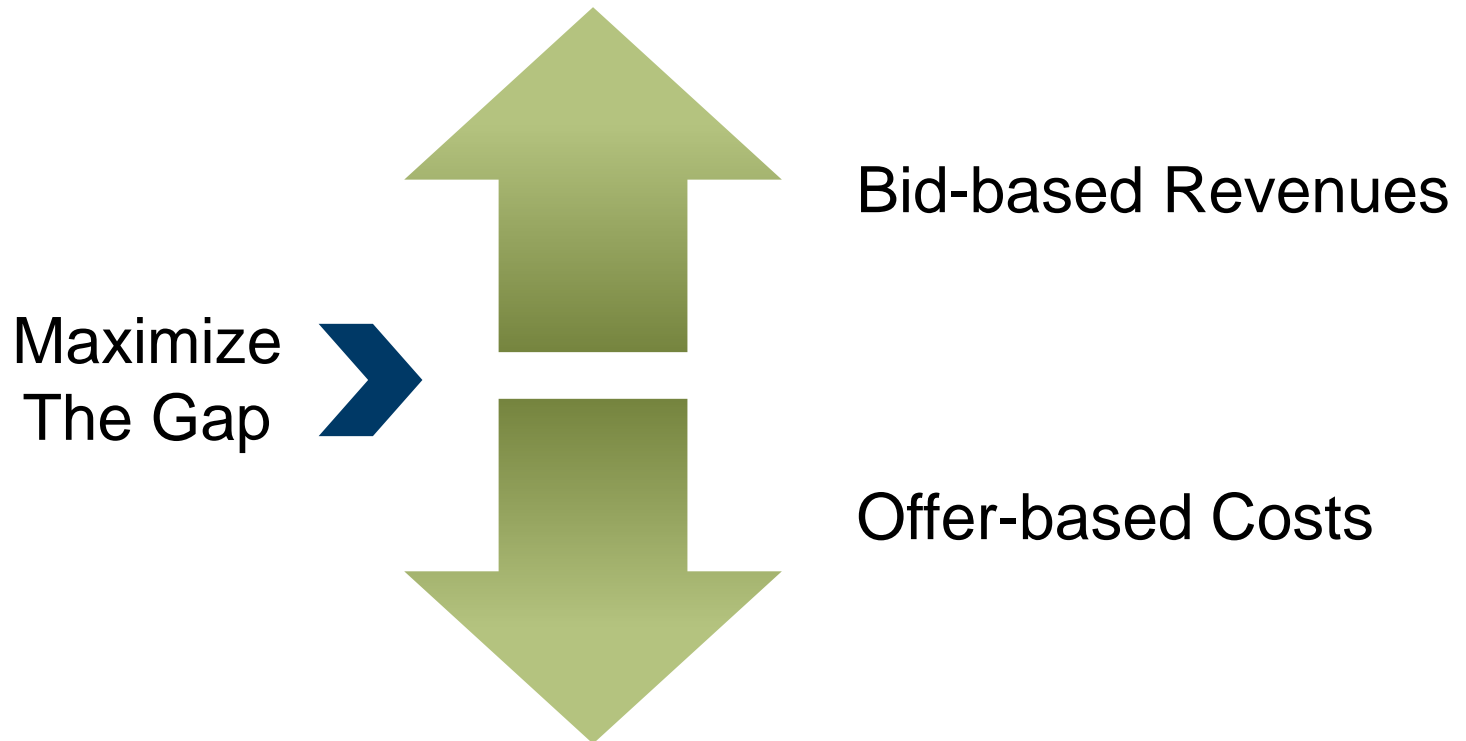
DAM simultaneously clears Energy Offers and Bids, AS Offers, and CRR Offers/Point to Point (PTP) Obligation Bids.



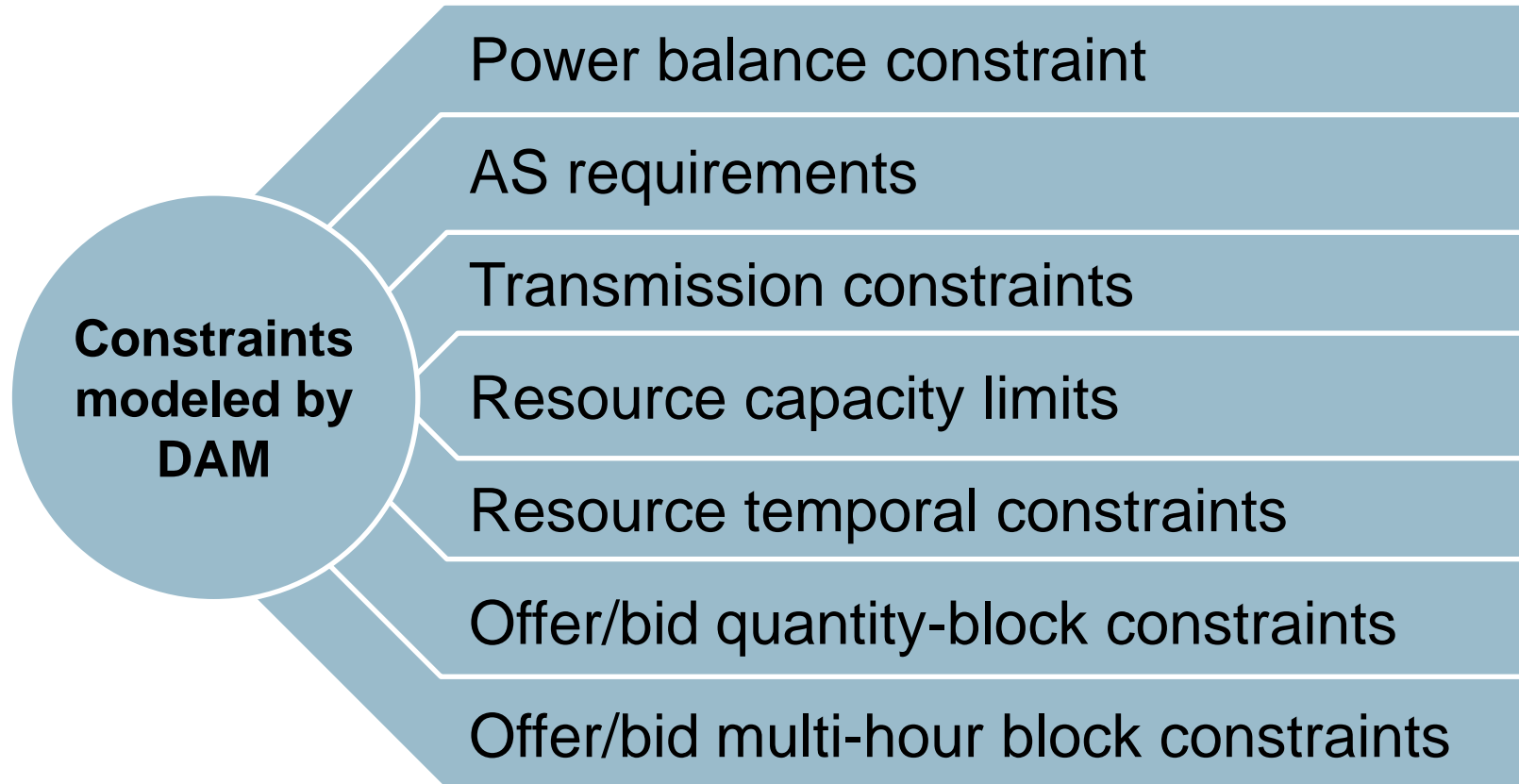
Day-Ahead Market

Mechanism of Clearing

DAM co-optimizes Energy, AS, and CRRs by maximizing bid-based revenues minus offer-based costs given constrained network security.



Day-Ahead Market – Constraints



Day-Ahead Market – Output

Output

Awards

- AS Offers
- Energy Offers
- DAM Energy-Only Offers
- DAM Energy Bids
- CRR Offers
- PTP Obligation Bids

Results published by 1:30 pm

Day-Ahead Market – Output

Output

Prices

- Day-Ahead Market Clearing Price for Ancillary Services (MCPC)
- Day-Ahead hourly Settlement Point Prices (SPPs)
- Day-Ahead hourly Locational Marginal Prices (LMPs)
- Shadow Prices

Summary info

- Quantity of total AS Offers
- Aggregated AS Offer Curve
- Total quantity of energy (in MWh) bought in DAM
- Total quantity of energy (in MWh) sold in the DAM

Results published by 1:30 pm

Day-Ahead Market

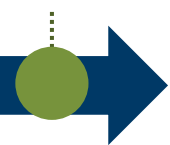
Post-DAM Activities

After DAM, QSEs have at least one hour (by 2:30 pm) to:

Day-Ahead Market



2:30



Note that Three-Part Supply Offers are not allowed during this period.

- Update Current Operating Plans to reflect commitment of resources, AS capacity awarded
- Submit additional Energy or Capacity Trades to be considered in time for the RUC process

Day-Ahead Market

ERCOT AS Plan

*

QSE Load Ratio
Share

=

AS Obligation
in DAM

QSE AS Obligation

-

Self-Arranged AS
submitted

=

AS amount ERCOT
buys in DAM for QSE

ERCOT AS Plan

-

SUM of Self-
Arranged AS
Submitted by QSEs

=

Total AS ERCOT buys
In DAM from AS Offers

Day-Ahead Market

AS Responsibility Check

- Is an hourly event, for balance of current day plus next operating day
- Includes 1) QSE-level AS Responsibility Check, and 2) System-level RRS provided by Load Resources Responsibility Check

For each type of AS, QSE level AS Responsibility Check considers:

- AS Resource Responsibility capacity in COP
- Self-arranged AS
- AS Trade
- DAM AS Offer awards
- SASM AS Offer awards
- RUC AS procurement

Day-Ahead Market

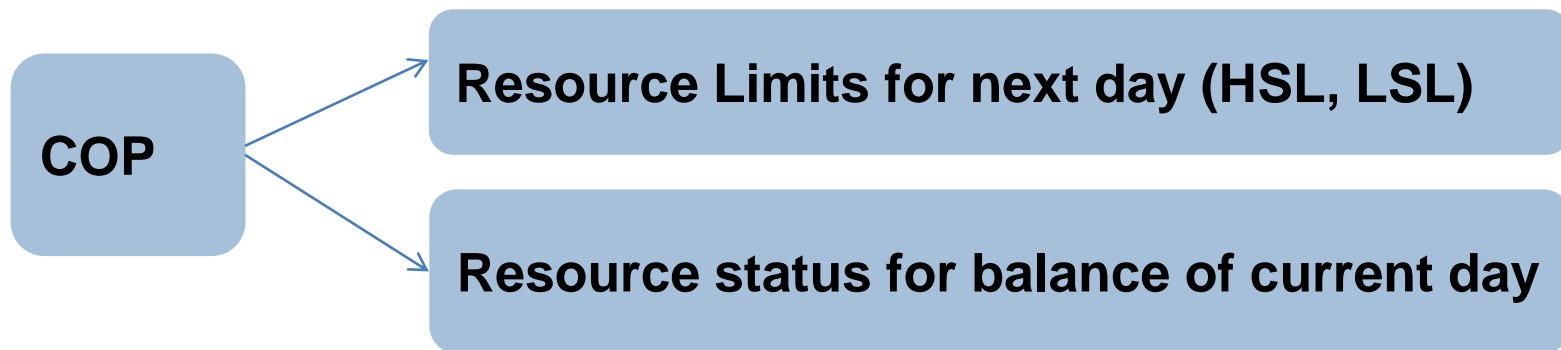
For each QSE and for each type of AS:

$$\begin{aligned} & \text{QSE AS Responsibility} = \\ & \text{Self-Arranged AS} + \text{AS sold in Trades} - \text{AS bought in Trades} \\ + & \text{Total DAM AS Offer awards} + \text{Total SASM AS Offer awards} + \text{RUC Commitments For AS} \end{aligned}$$

If your QSE AS Responsibility >0, ERCOT checks that the Sum of AS capacity in COPs for all QSE's Resources = QSE AS Responsibility

Day-Ahead Market

Reminder of how Day-Ahead Market uses COP:



Day-Ahead Market – Trade Confirmation

Trade confirmation example

- QSE A submits a Capacity Trade for 50 MW for hours 2–6.
- QSE B confirms the trade by submitting matching trade of 50 MW for hours 2–6.



Hour				
2	3	4	5	6
50	50	50	50	50



Day-Ahead Market – Trade Confirmation

Trade confirmation example

- QSE A cancels hours 5–6.



Hour				
2	3	4	5	6
50	50	50	50	50



Day-Ahead Market – Trade Confirmation

Trade confirmation example

- QSE A submits new trade for 100 MW for hours 5–6.



Hour				
2	3	4	5	6
50	50	50	100	100



Day-Ahead Market: – Trade Confirmation

Trade confirmation example

- QSE B confirms 100 MW trade for hours 5–6 by submitting a matching trade.



Hour				
2	3	4	5	6
50	50	50	100	100
			50	50

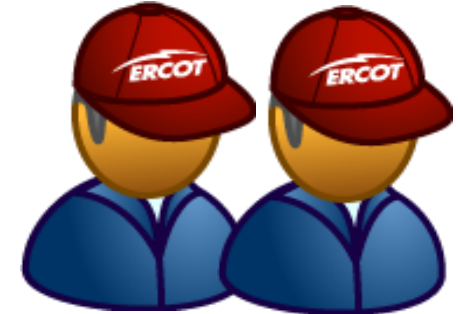


II. Overview of System Implementation

Implementation – Day-Ahead Desk

ERCOT Day-Ahead Operators:

- 2-person desk
- Staffed 5 am to 5 pm a day / 7 days a week
 - Enough time to review 6 am market postings and information
 - Can execute the Constraint Competitiveness Test (CCT) and post results by 6 am
 - Can execute a solved DRUC case to hand off to the system operators for commitment/decommitment



Implementation – Training Overview

Training

- [Nodal 101](#)
- [Basic Training Program](#)
- [Generation 101](#)
- [Generation 201](#)
- [Congestion Revenue Rights](#)

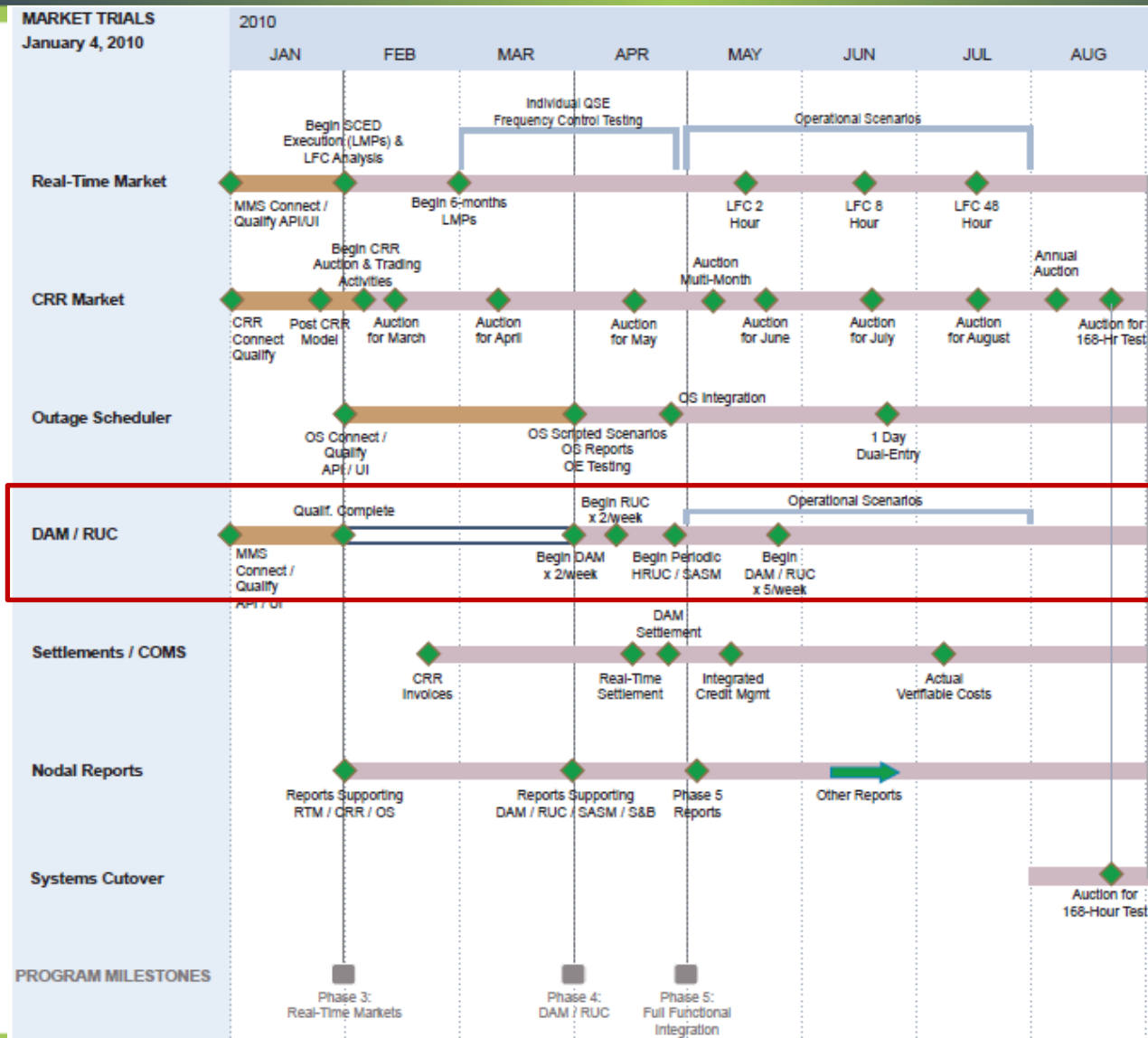
Enroll using the Learning Management System at
<https://www.ercottraining.com/lms/default.asp>

Implementation – Testing Overview

Market Trials

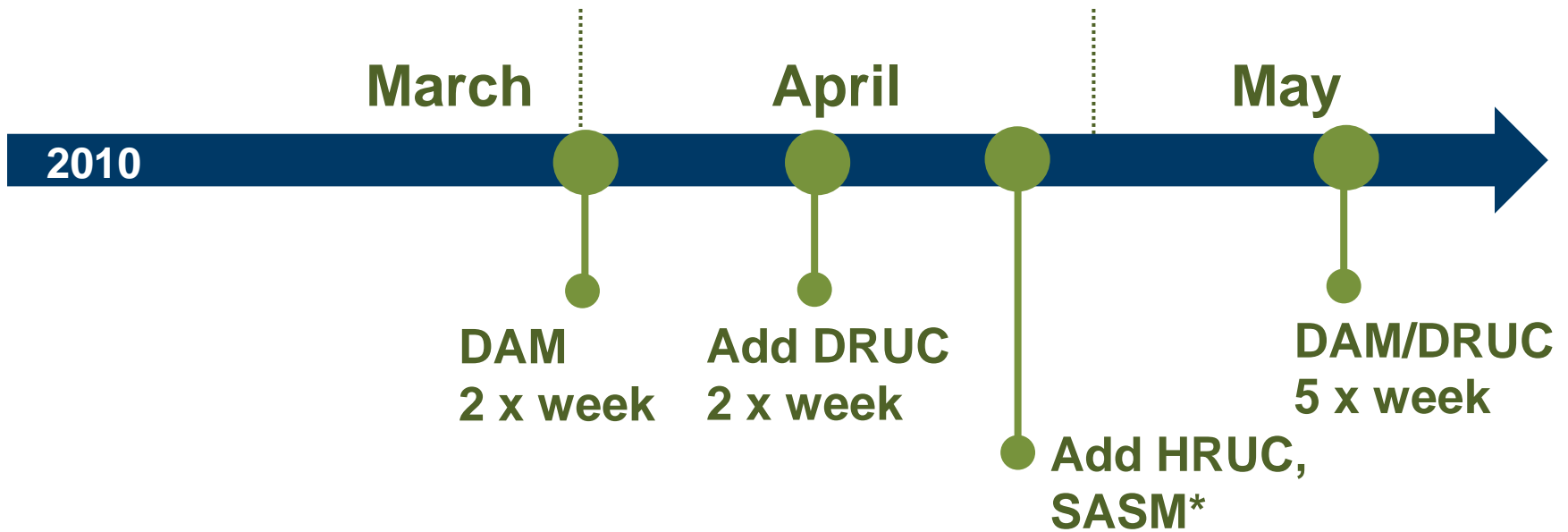
- Integrated market trials with DAM start April 1 2010 (inputs and outputs).

Implementation – Testing Overview



Implementation – Testing Overview

Market Trials



*SASM: Supplemental Ancillary Service Market

Implementation – Testing Overview

Market Trials

DAM testing will be scenario-based initially, with a phase-in approach

- Guardrails on bids/offers
- QSEs with load will submit DAM Energy Bids for a predetermined portion of their expected load

First week: run DAM for energy only and no network constraints

Second week: energy and AS together and no network constraints

Third week →: with constraints

Available Resources, Documentation, Sources

Resources

[Day-Ahead Market Trials](#) Website for DAM Support information

[Market Trials Handbook for Day Ahead Market](#)

[Explanation of Market Submission items](#) – describes transactions, when they are submitted, and how each submission affects previous submissions and inputs to the market system

[MMS Day Ahead Market Requirements](#)

[MMS Conceptual System Design](#)

[MMS White Papers](#) – Special topics such as credit exposure study for DAM

[System Implementation Guide whitepapers](#) – Special topics such as combined cycle and split generation modeling

General

[Web Services interface specification](#)

[Market Manager User Interface design document](#)

[Market Manager User Interface user guide](#)