

RUC Overview and Timeline



Topic Outline

- I. Zonal Unit Commitment Overview**
- II. Nodal Unit Commitment Overview**
- III. Overview of System Implementation / Market Participant Engagement**

Objectives

Upon completion of this presentation, will be able to...

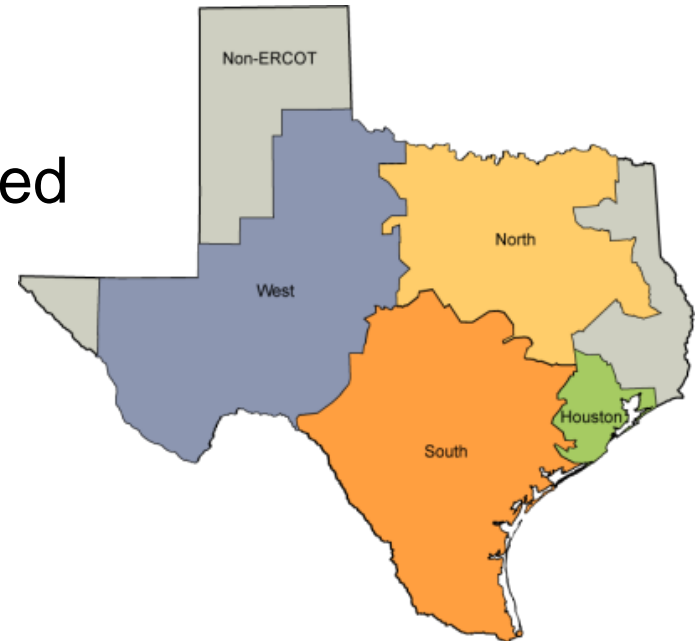
- Describe the Reliability Unit Commitment (RUC) process and its purpose.
- Identify the timeline and participation requirements for Day-Ahead and Hourly Reliability Unit Commitment processes.
- Identify Reliability Unit Commitment process inputs and outputs.



I. Zonal Overview

Replacement Reserve Service (RPRS) Market in zonal

- RPRS Planned execution 1x/day
- RPRS advisory execution as needed
- Steps of RPRS
 - Step 1 Congestion
 - Step 2 Capacity
 - Step 3 Pricing (MCPC)



II. Nodal Overview

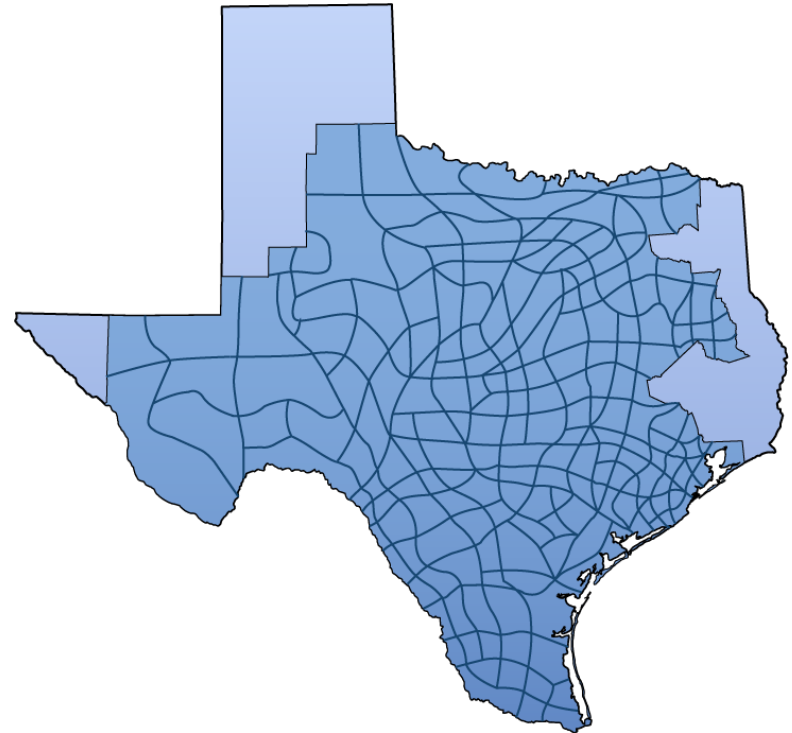
Day-Ahead RUC

DRUC executed 1x day

Hour-Ahead RUC

HRUC executed every hour

No MCPC/Pricing in RUC



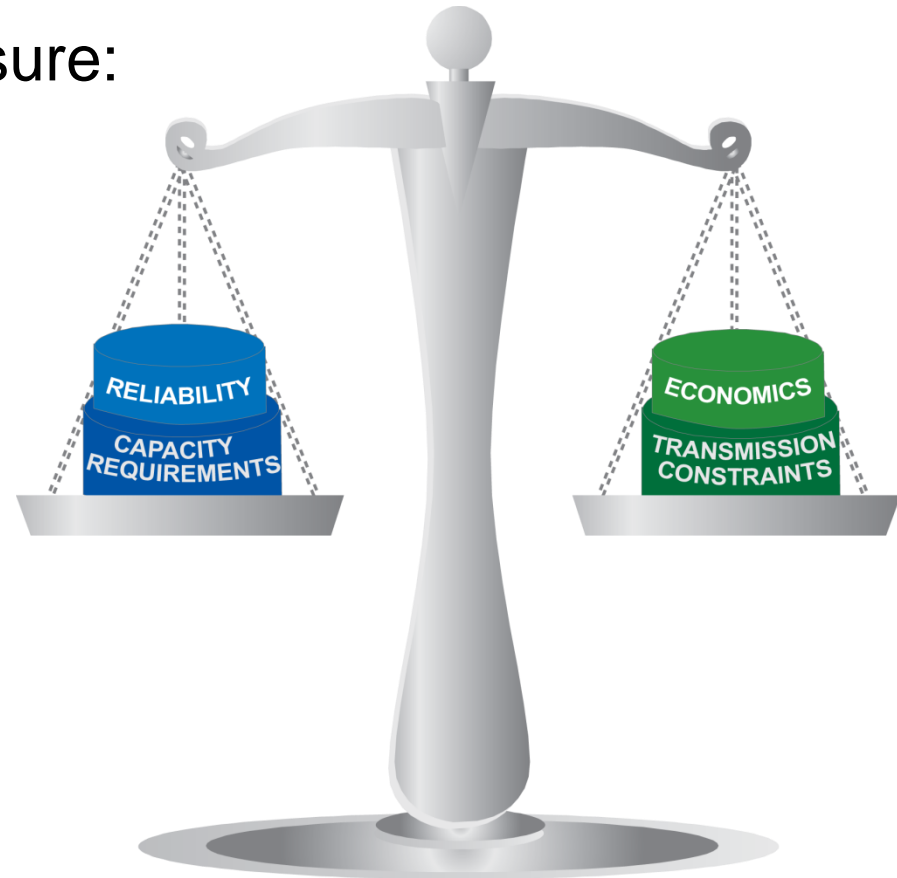
Reliability Unit Commitment

How Does the RUC Process Work?

RUC recommends commitment/decommitment of Generation Resources to ensure:

- Resource capacity
- Ancillary Service capacity
- Deliverable location

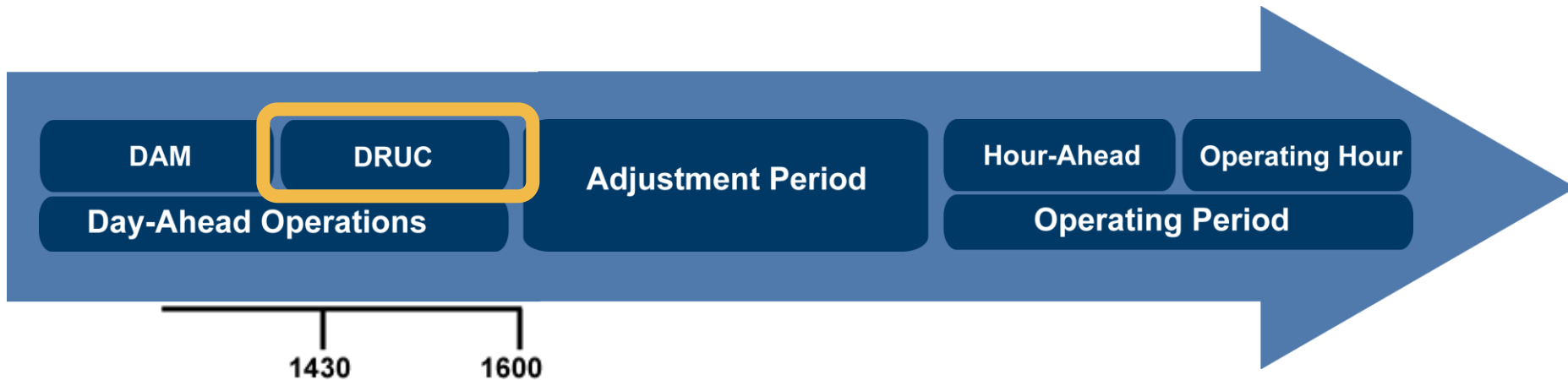
To reliably serve the forecasted Load on the ERCOT system.



Day-Ahead Reliability Unit Commitment (DRUC)

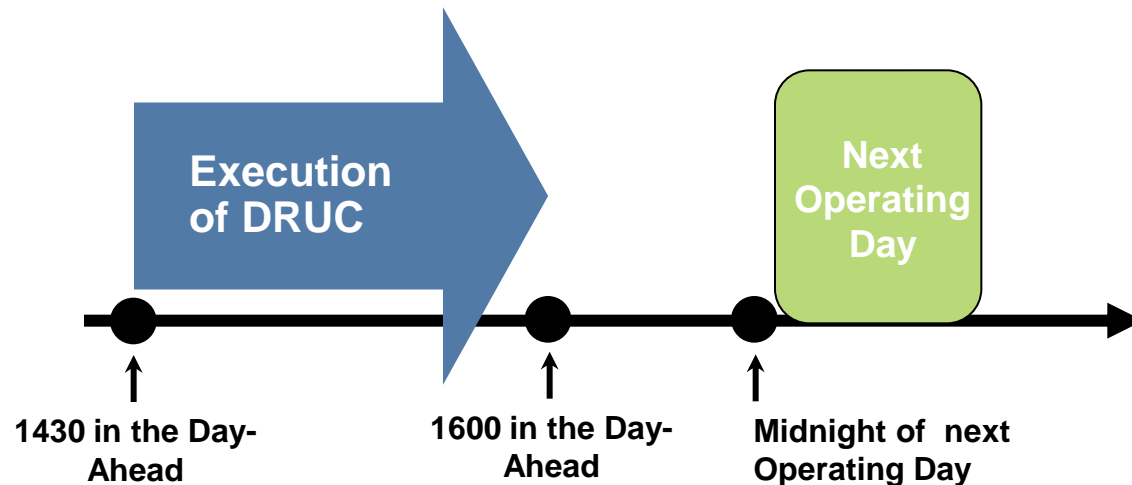
Operational Timeline for RUC-

- Daily DRUC occurs after the Day-Ahead Market and before the Adjustment Period.
- Hourly HRUC occurs every hour at the beginning of the Operating Period

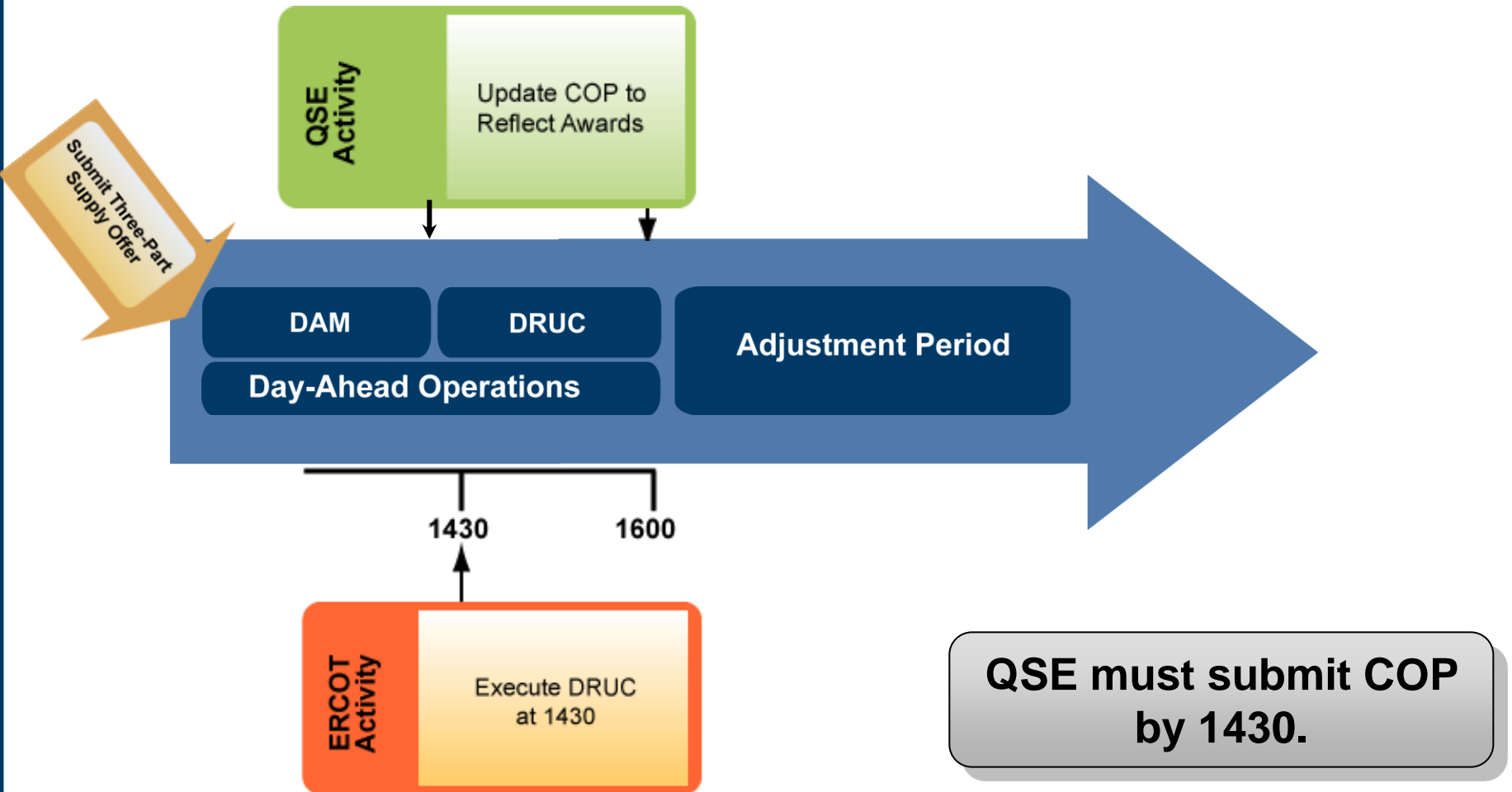


Day-Ahead Reliability Unit Commitment (DRUC)

DRUC ensures that there is enough Resource capacity, in addition to Ancillary Service capacity, committed in the right locations to reliably serve the forecasted Load on the ERCOT system for the next Operating Day.

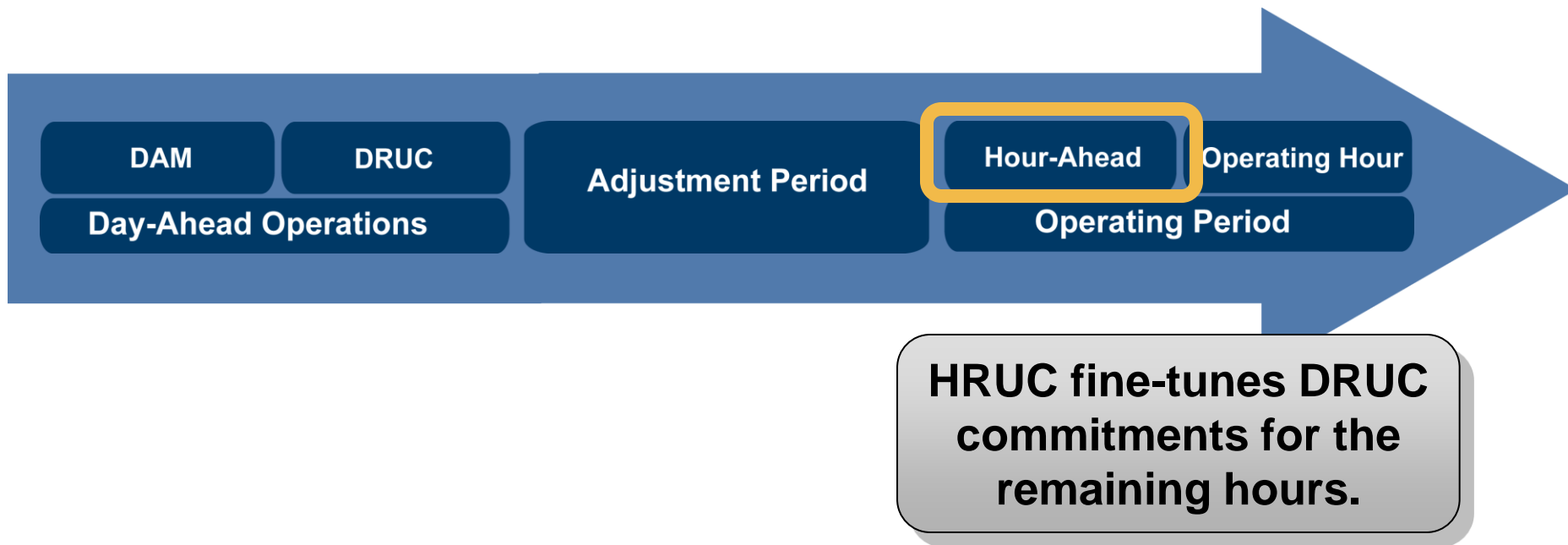


Day-Ahead Reliability Unit Commitment (DRUC)



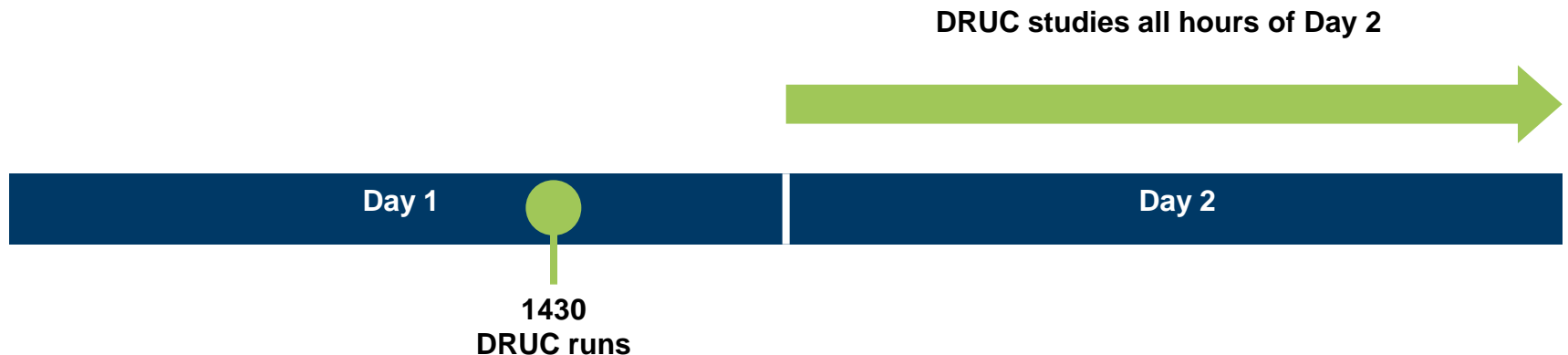
Hourly Reliability Unit Commitment (HRUC)

Hourly Reliability Unit Commitment works like DRUC, but within a different timeframe



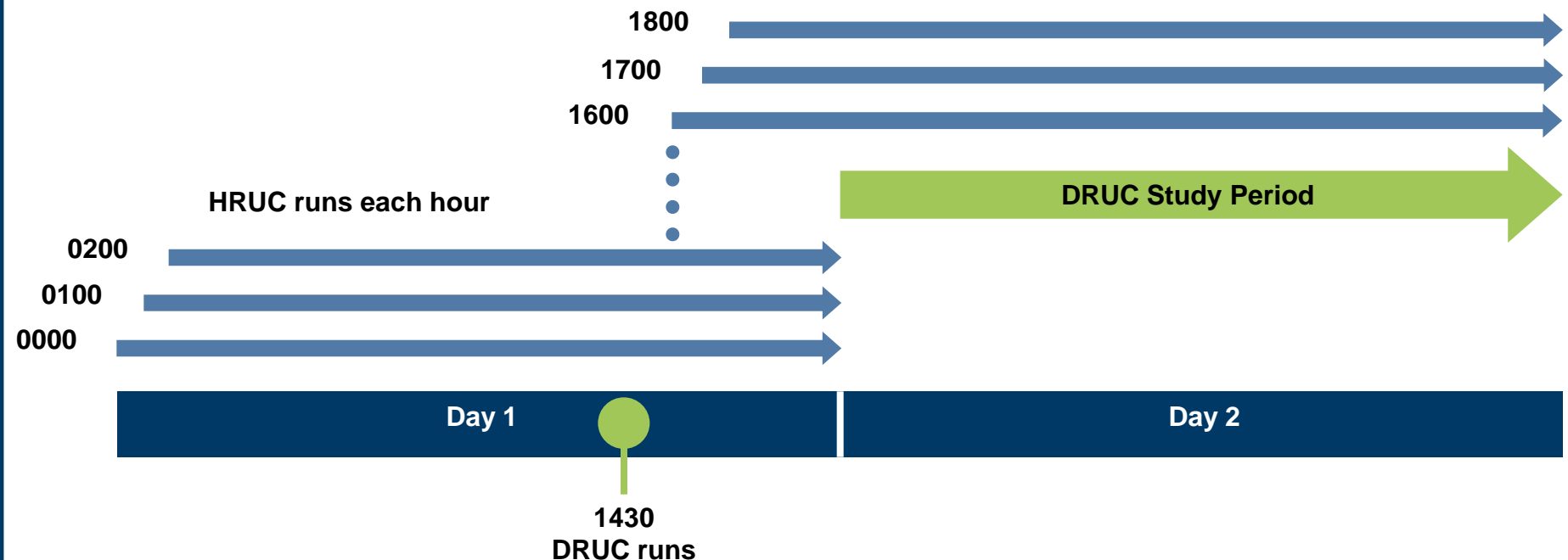
Reliability Unit Commitment

- **Day-Ahead Reliability Unit Commitment (DRUC)**
- Occurs once a day
- Ensures enough capacity committed for next Operating Day

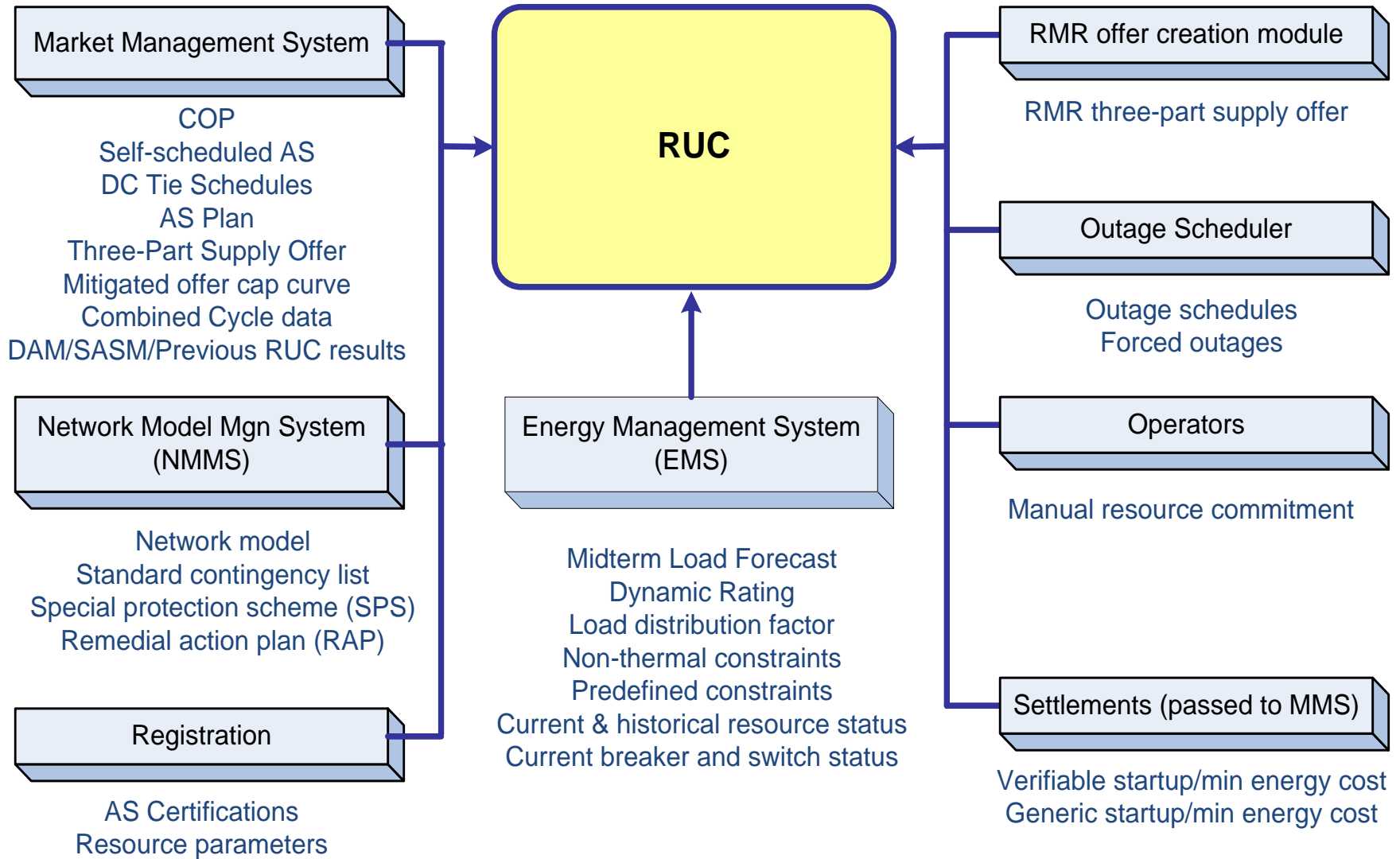


Reliability Unit Commitment

- **Hourly Reliability Unit Commitment (HRUC)**
- Occurs hourly
- Reviews all hours already studied by DRUC



RUC Inputs

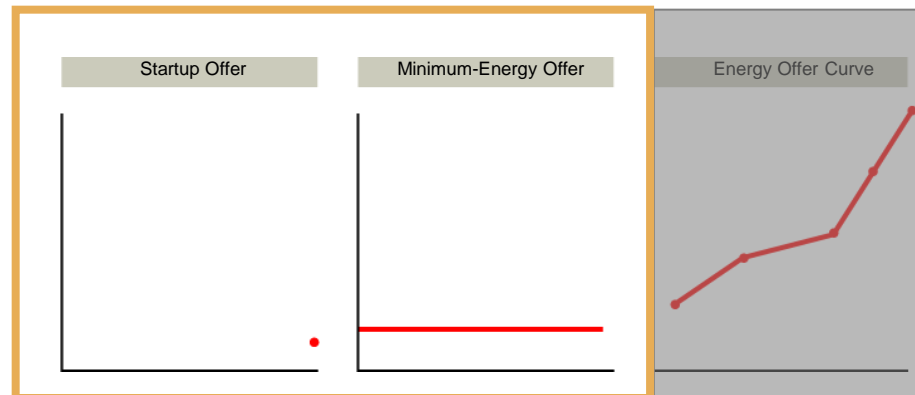


RUC Inputs – Three-Part Supply Offers

RUC Participation with a Three-Part Supply Offer

In evaluating a Resource for commitment, RUC evaluates:

- Startup Offer
- Minimum Energy Offer
 - Both parts of offer are limited by generic or verifiable costs caps



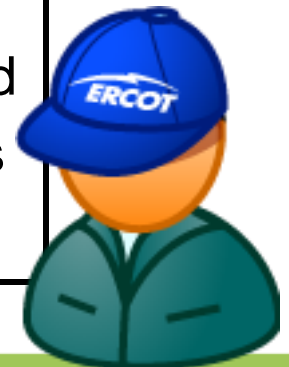
The Energy Offer curve is not used by RUC

RUC Inputs – Three-Part Supply Offers

RUC Participation Without a Three-Part Supply Offer

- Three-Part Supply Offer is not required for RUC-commitment
- ERCOT will create an offer on behalf of a resource

If QSE...	ERCOT will...
<ul style="list-style-type: none">• QSEs did not submit a Three-Part Supply Offer in Day-Ahead Market• Submitted only an Energy Offer Curve in Day-Ahead Market	Create Three-Part Supply Offers in evaluation of the need to commit Resources



RUC Inputs – Three-Part Supply Offers

RUC Participation Without Three-Part Supply Offer

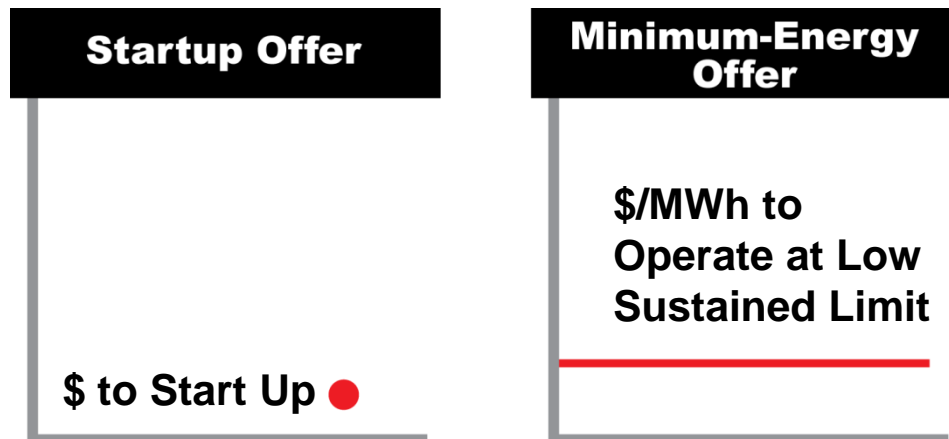
ERCOT creates a Three-Part Supply Offer using:

- 150% of any approved **Verifiable** Startup and Minimum-Energy Offer costs.

If no verifiable costs approved at ERCOT, will use:

- 150% of the Applicable Resource **Generic** Startup and Minimum-Energy Offer costs.

Note - 150% for selection, but settled at 100% of costs



RUC – Treatment Of Special Resources

- **Wind-powered generation resources (WGR)**
 - QSE updates HSL in COP with value less than or equal to WGRPP (wind generation resource production potential) supplied by ERCOT
- **Split Generation resources (SGR)**
 - Each QSE representing SGR independently submits Three-Part Offer and resource parameters. SGR parameters must be consistent for Joint Owned Units (JOU)
 - RUC commits/decommits all SGRs in the same JOU facility together

RUC – Treatment Of Special Resources

- **Combined-Cycle units**

- RUC models multiple configurations for CC, each with distinct set of operating parameters, physical constraints, and energy offer curves
- RUC respects constraints for selected configuration and transition constraints between different configurations as registered in the RARF by the Resource Entity (RE).
 - Minimum-online time of current configuration used for upward transitions
 - Minimum-online time for downward transitions defaults to one-hour
- RE can register unlimited number of configurations
- RUC will only consider the same number of configurations as there are units in the CC train (managed by COP status)
- Lead time for start-up driven by plant status (not individual units)

- **Reliability Must-Run (RMR) Unit**

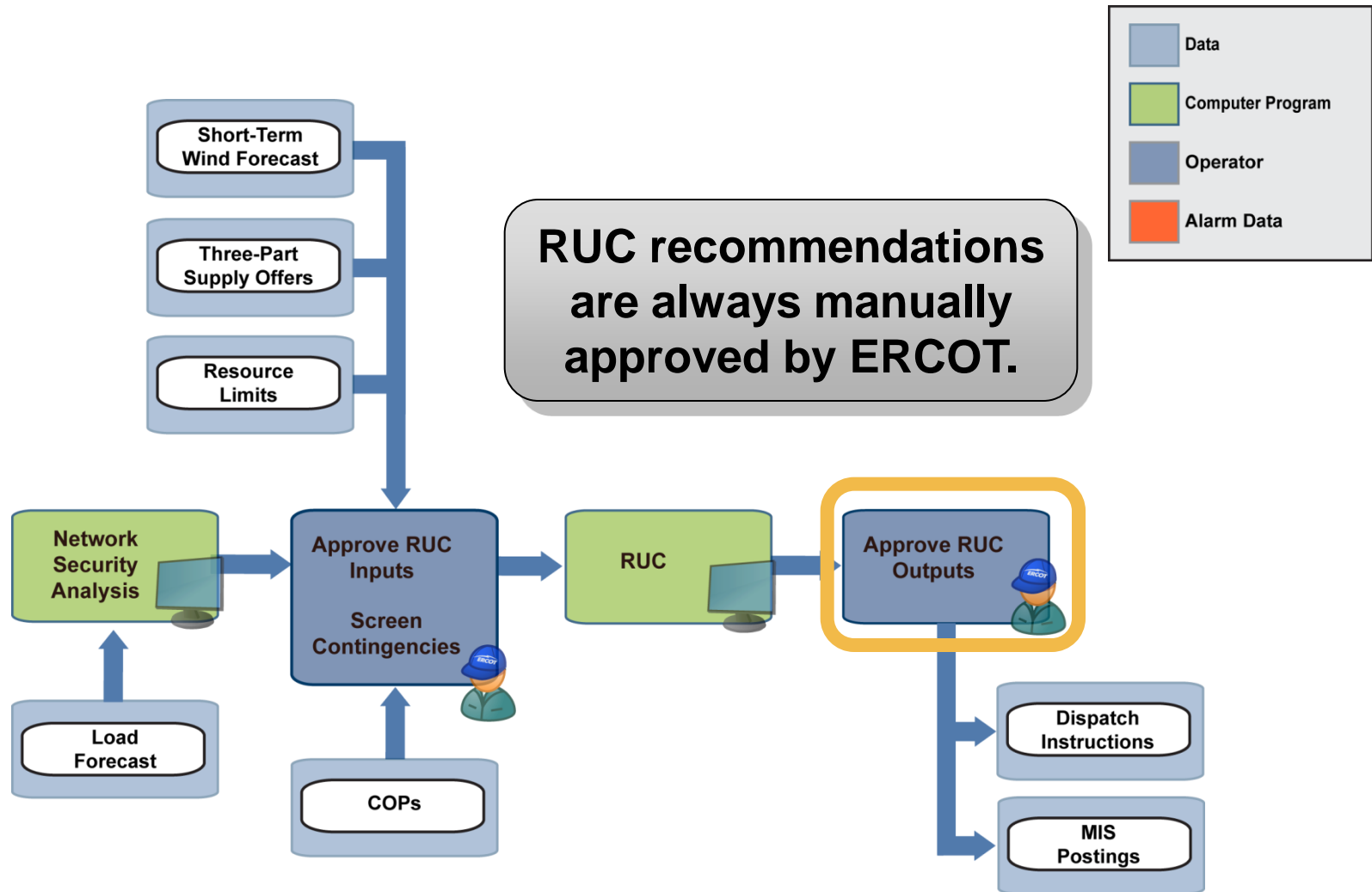
- Three-Part Offer is created based on RMR contracts by the ERCOT system and reviewed by an Operator

RUC Constraints

Constraints

- 1) System Power Balance
- 2) Transmission constraints
- 3) Resource constraints
- 4) Temporal Constraints

RUC – Approve RUC Outputs





RUC Outputs - Decommitment

Decommitments for future hours:

- QSE-committed Resource
 - Request made by status change in COP (for current hour, by phone)
 - Requests evaluated by HRUC
- RUC-committed
 - Decommitment may only be made by ERCOT

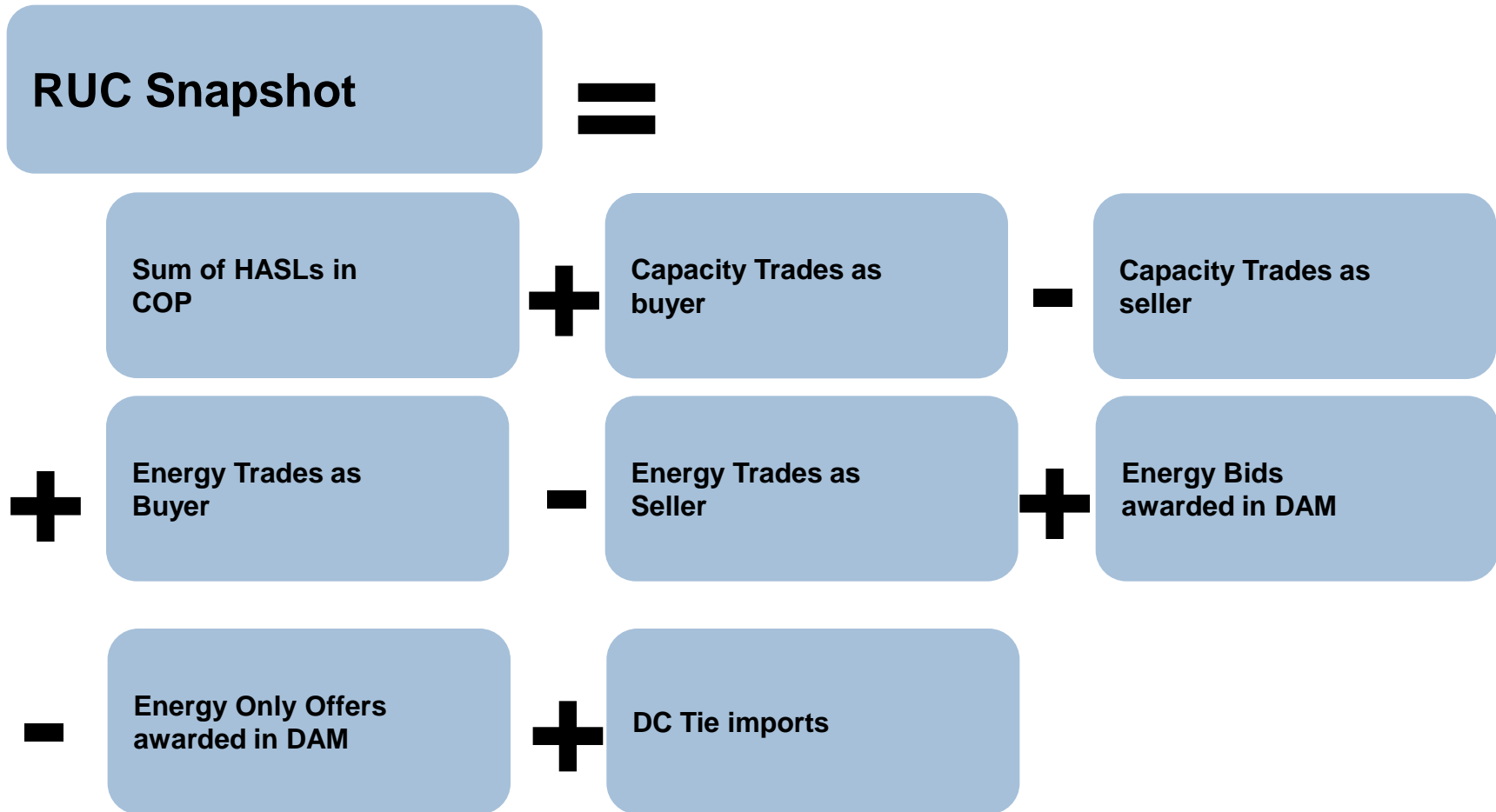
Decommitment Responsibilities:

ERCOT:	QSE:
 Communicates the interval in which the Resource is required to be Off-Line, duration, and reason for decommitment	Updates COP to communicate to ERCOT receipt of Notice 

Reliability Unit Commitment - Snapshot

- ERCOT 'snapshots' capacity prior to each RUC
- QSEs which are capacity-short in each RUC are charged for that shortage if resource(s) are RUC-committed
 - Measured against Real-Time Adjusted Metered Load for the QSE plus any DC Tie exports
- The amount of capacity that a QSE had according to the RUC snapshot (per 15-minute Settlement Interval) uses:
 - Capacity and Energy Trades
 - Energy Only Bids/Offers awarded
 - COP capacity
 - DC Tie imports

Reliability Unit Commitment - Snapshot

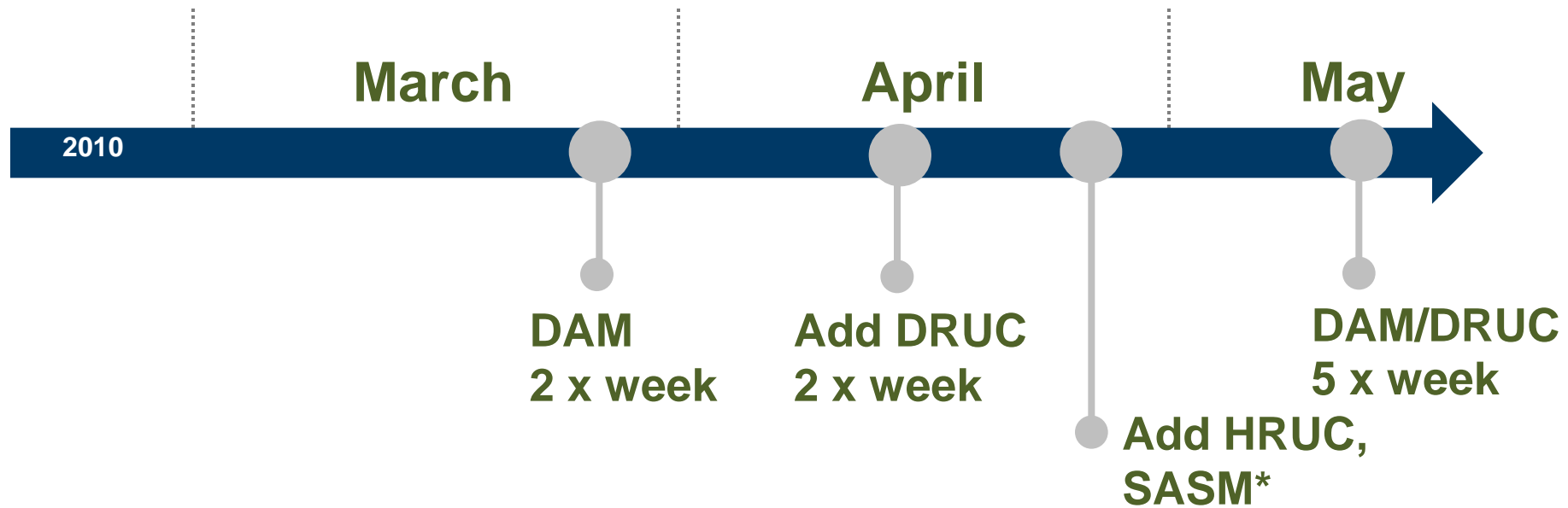


Note that all values/trades are as of the time of the RUC Snapshot

III. Market Participant Engagement

Implementation – Testing Overview

- **Market Trials**



*SASM: Supplemental Ancillary Service Market

Available Resources, Documentation, Sources

•Resources

- [Market Trials Handbook for Day Ahead Market/RUC](#)
- [MMS RUC Requirements](#)
- [MMS Conceptual System Design](#)
- [Explanation of Market Submission items](#) – describes transactions, when they are submitted, and how each submission affects previous submissions and inputs to the market system
- [System Implementation Guide whitepapers](#) – Special topics such as combined cycle and split generation modeling

General

- [Web Services interface specification](#)
- [Market Manager User Interface user guide](#)

Settlements Workshops Schedule

Settlements Workshops 2010 – Tentative

Workshop Type	Date(s)	Location
RUC/Real Time	February 23	Met Center, Austin
RUC/Real Time	March 9	Garland
RUC/Real Time	March 23	Calpine, Houston