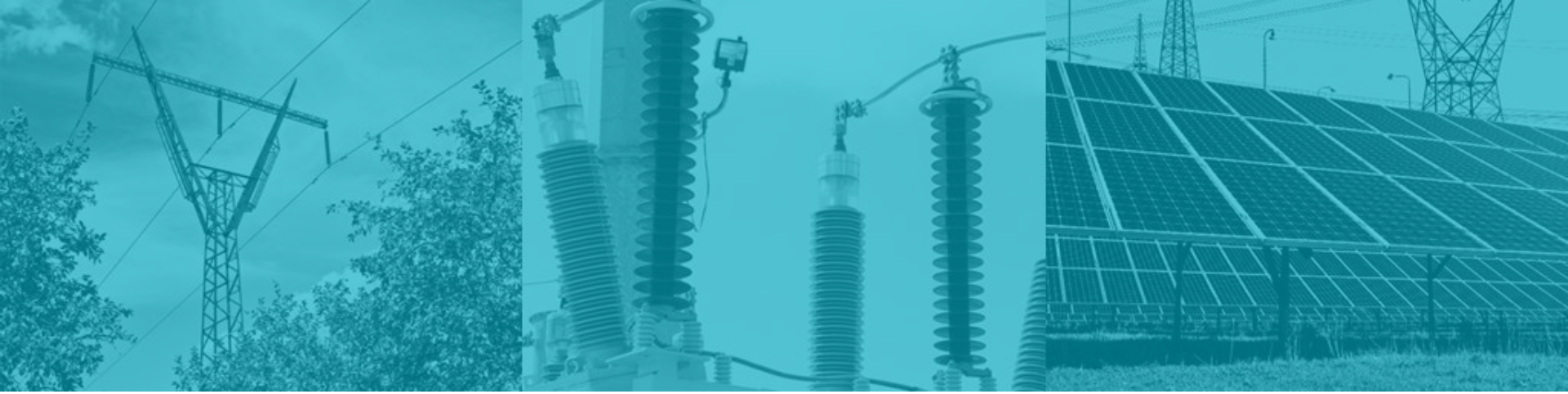


ERCOT Market Education

Resource 301

Module 4: The Reliability Unit Commitment Process

Topics in this module ...

- Reliability Unit Commitment (RUC) Process Overview
- Formation of Resource Constraints in RUC
- The Mind of RUC
- QSE Responsibilities post-RUC

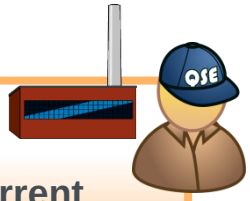
Reliability Unit Commitment Process Overview

Ancillary Service Considerations

- RUC ensures enough "dispatchable" capacity to manage reliability
- Capacity reserved for Ancillary Services are unavailable to RUC

If Ancillary Service capacity is required to resolve a Transmission Constraint, then it is deemed Infeasible.

The Reliability Unit Commitment Process



Current Operating Plans

Network Operations Model

Contingencies

Load Forecast

Economics

Transmission Security Analysis (TSA)

Reliability Unit Commitment (RUC)

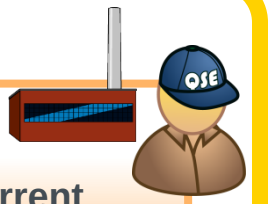
Reliability Unit Commitment Process

Resource Commitments

Resource Decommitments

Infeasible Ancillary Service

Current Operating Plans



Current Operating Plans

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Reliability Unit Commitment (RUC)

Reliability Unit Commitment Process

Resource Commitments

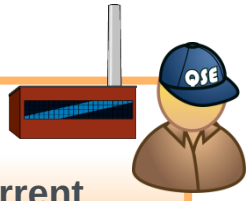
Resource Decommitments

Infeasible Ancillary Service

COP statuses through the eyes of RUC

- **ON** (any variety): Resource capacity is committed
- **OFF**: Resource is offline but available for RUC commitment
- **ONRR**: Resource is online acting as a synchronous condenser and available for RUC commitment
- **OUT**: Resource is not available

Resource Economics



Current Operating Plans

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Transmission Security Analysis (TSA)

Reliability Unit Commitment (RUC)

Reliability Unit Commitment Process

Resource Commitments

Resource Decommitments

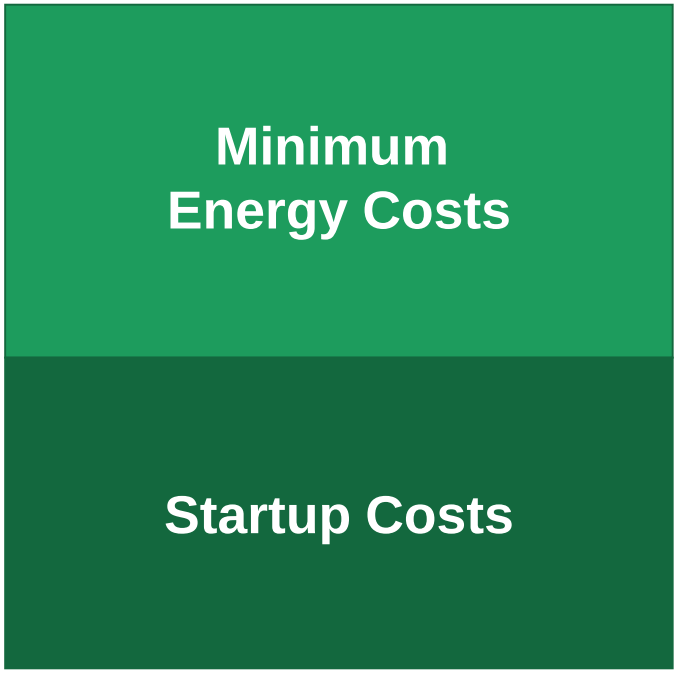
Infeasible Ancillary Service

Discussion

RUC Engine Cost Optimization

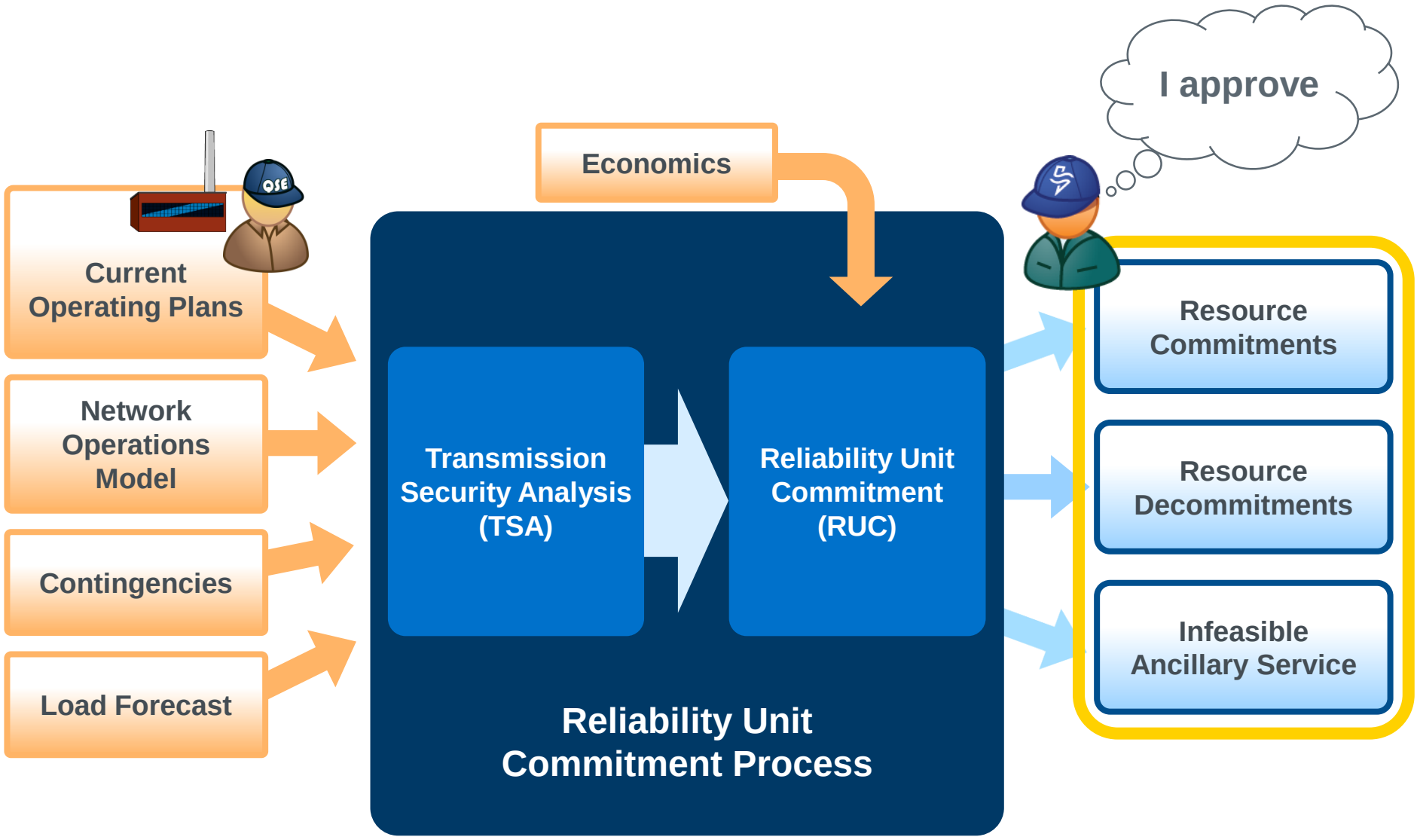
- Actual costs for Start-Times > 1hr
- Discounted costs for Start-Times ≤ 1hr

Why do this?



Commitment Costs

RUC Results


I approve
Economics
Current Operating Plans
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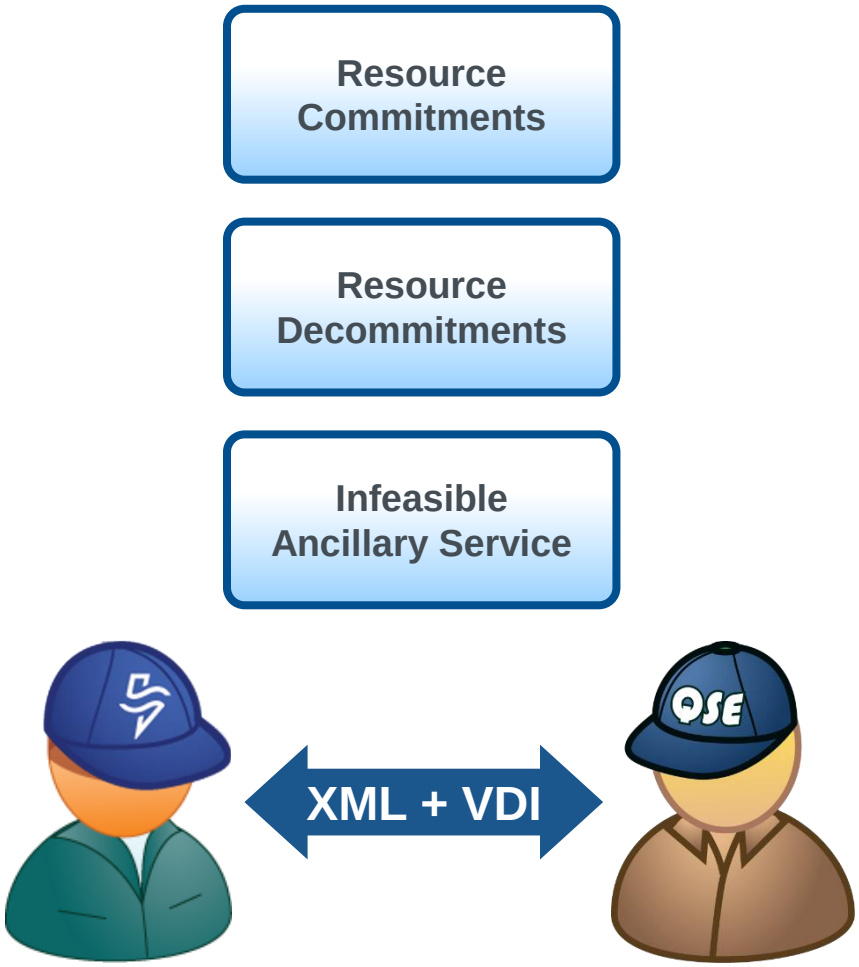
Load Forecast
Transmission Security Analysis (TSA)
Reliability Unit Commitment (RUC)
Reliability Unit Commitment Process
Resource Commitments
Resource Decommitments
Infeasible Ancillary Service

Communication of RUC Instructions

- RUC time stamp
- RUC Commitment
- RUC Decommitment and the corresponding reason code
- Infeasible Ancillary Service Capacity



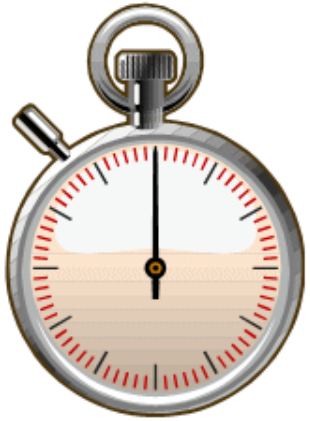
Formation of Resource Constraints in RUC

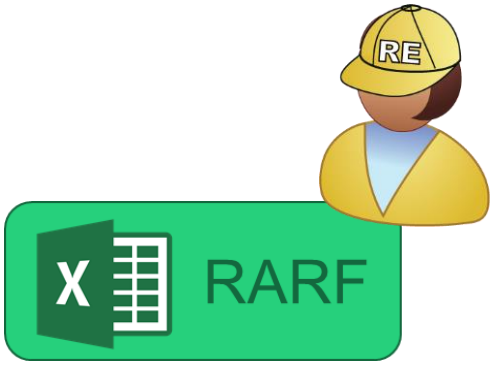
Topics in this Section Include

1. Temporal Constraints
2. Combined Cycle Transitions
3. Split Generation Resources

RUC will enforce the following Temporal Constraints for Available Resources

- Start Time (Hot, Intermediate or Cold)
- Min On-Line Time
- Max On-Line Time
- Min Off-Line Time
- Maximum Daily Starts



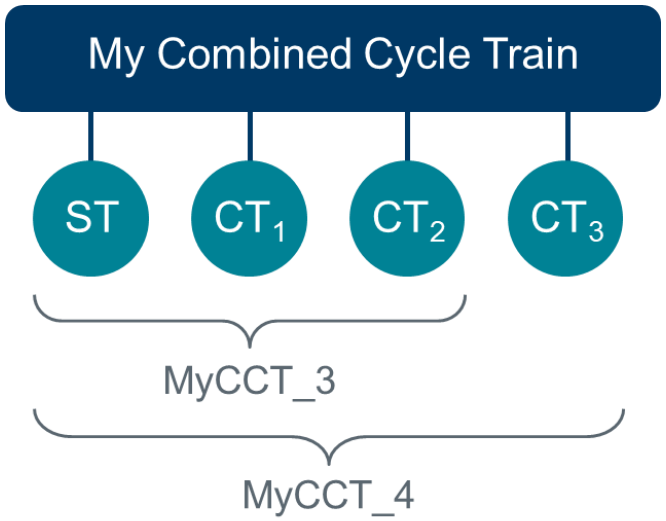


Topics in this Section Include

1. Temporal Constraints
2. Combined Cycle Transitions
3. Split Generation Resources

Committing Combined Cycle Plants in RUC

- QSE may make any configurations available
- RUC may commit
  - One configuration per hour
  - Transitions per registered transition matrix



Topics in this Section Include

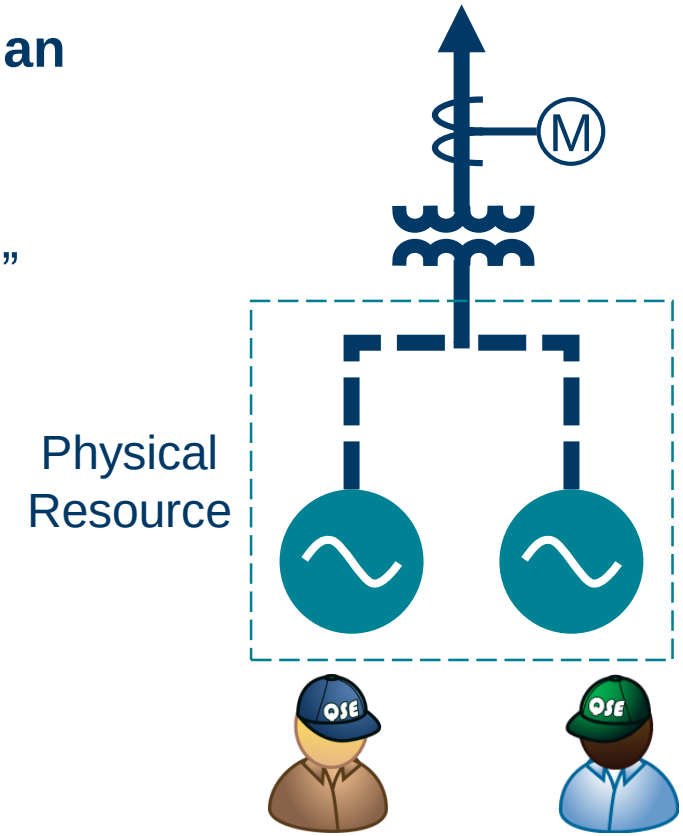
1. Temporal Constraints
2. Combined Cycle Transitions
3. Split Generation Resources

Example

Resource MPD is set up as two Split Generation Resources (SGR)

Each QSE provides a Current Operating Plan

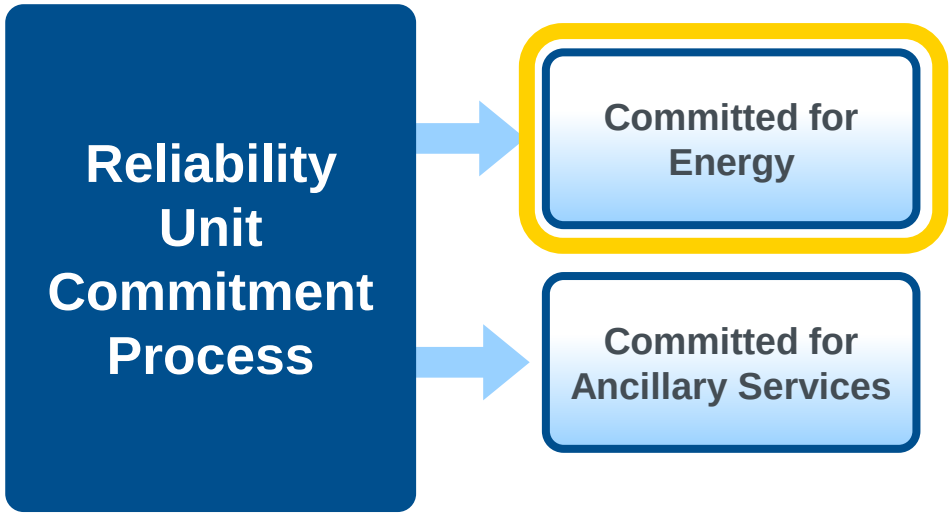
- If one SGR is “OUT,” all are “OUT”
- Otherwise, if one SGR is “ON,” all are “ON”



Suppose each QSE shows a COP Status of “OFF.” Can RUC commit just one SGR?

QSE Responsibilities
Post-RUC

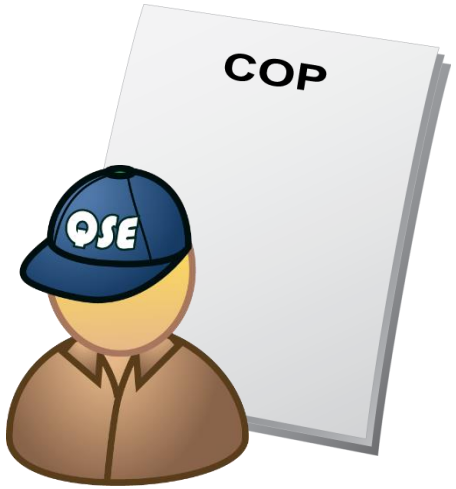
Resource is RUC-Committed for Energy



QSE must update COP within 60 minutes

- ONRUC
- ONOPTOUT

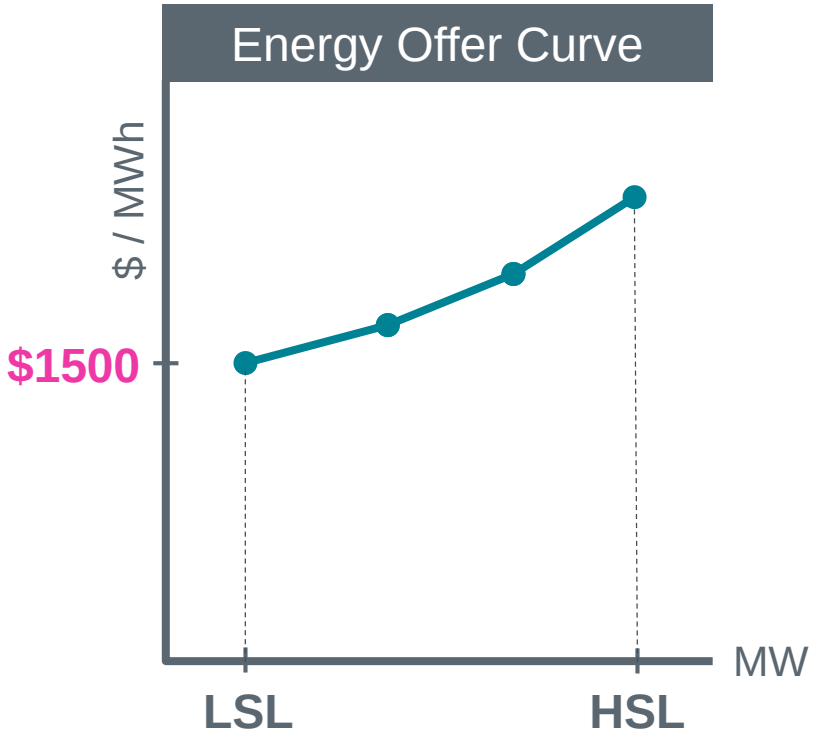
Resource must run during instructed hours



Energy Offer Curve for RUC-Committed Resource

- All energy above LSL subject to offer floor
- QSE may update by end of Adjustment Period
- ERCOT will adjust if QSE does not

Applies only to hours in the RUC-commitment Period



A QSE is “Buying-Back” the RUC Commitment

Operational impacts

- Must start/run resource if available
- May provide Ancillary Services

Financial impacts

- No RUC financial settlements apply
- No requirement for energy to be priced at or above $1500

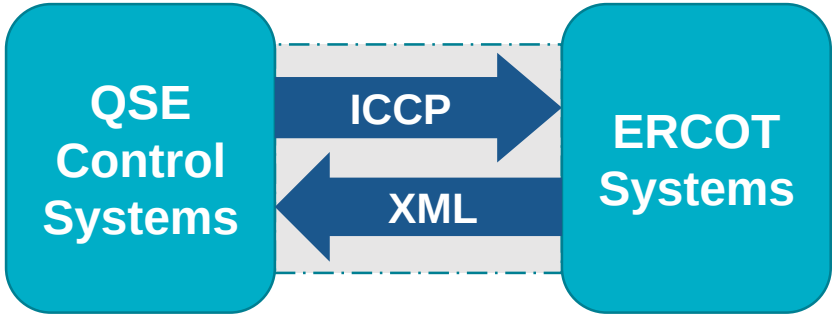
Telemetry Requirements and Confirmation

QSE requirements

- Must telemeter ONOPTOUT status
  - First SCED run Resource is available for dispatch
  - First hour of RUC Commitment

ERCOT requirements

- Set Buy-Back flag to “1”
- Send XML confirmation to QSE



Resource is RUC-Committed for Ancillary Services

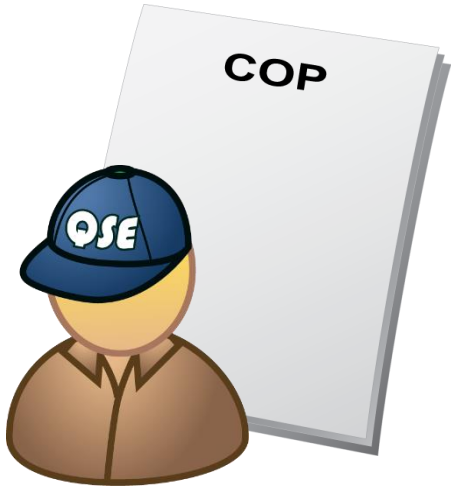
Reliability Unit Commitment Process

- **Committed for Energy**
- **Committed for Ancillary Services**

QSE must update COP within 60 minutes

- ONRUC
- ONOPTOUT

QSE must reserve Ancillary Services on appropriate Resources



RUC deems Ancillary Services Infeasible

Reliability Unit Commitment Process

→ **Infeasible Ancillary Service**

QSE may choose to

- Substitute
- Trade
- Instruct ERCOT to replace

Infeasible Ancillary Services replaced through Supplemental Ancillary Services Market (SASM)

RUC deems Ancillary Services Infeasible

Reliability Unit Commitment Process → **Infeasible Ancillary Service**

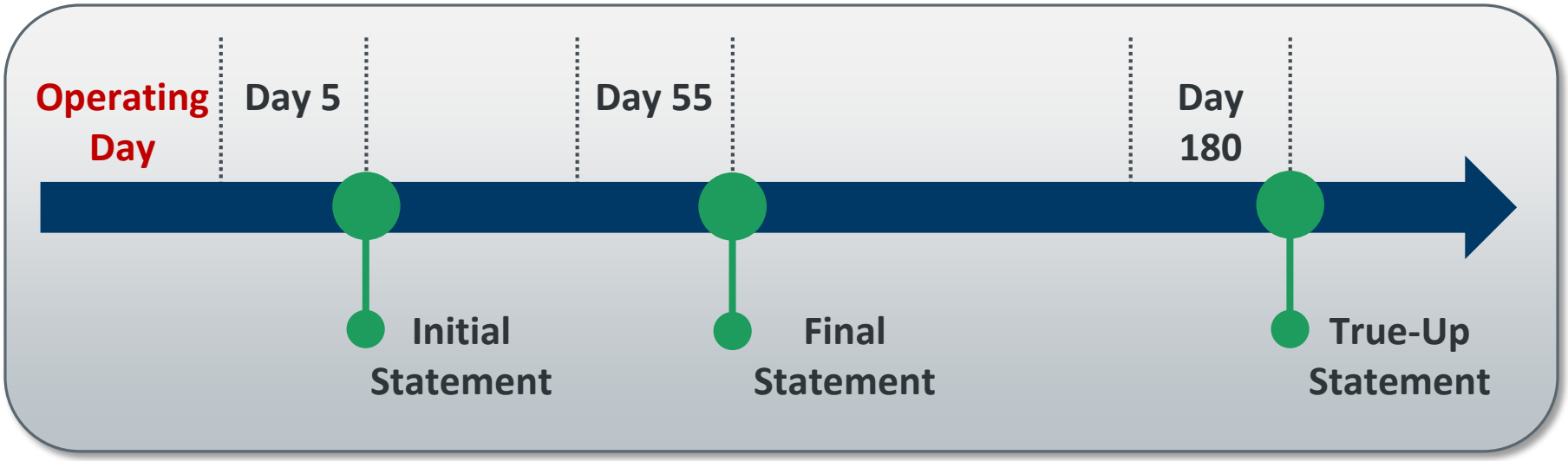
Financial impacts

- Return anything they were paid in DAM
- Still responsible for any Ancillary Service Obligations they have

Infeasible Ancillary Services replaced through Supplemental Ancillary Services Market (SASM)

Settlement of RUC-Committed Resources included with Real-Time Settlements

We will return to this topic later!



You've learned about ...

- The Reliability Unit Commitment (RUC) Process
- Formation of Resource Constraints in RUC
- The Mind of RUC
- QSE Responsibilities post-RUC

Module Conclusion