New York ISO

Bid/Offer Evaluation Process

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LBMP In-Depth Course

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Session Topics

- Overview: Bid/Offer Evaluation Process
- Day-Ahead Market Bid/Offer Evaluation Process
  - SCUC – Outputs
  - SCUC – Additional Inputs
  - SCUC- Scheduling Process
    - 4 Pass Methodology
    - Components of each Pass
- Real-Time Market Bid/Offer Evaluation Process
  - RTC: Real Time Commitment Process
  - RTD: Real Time Dispatch Process
  - RTD-CAM: Real Time Dispatch-Corrective Action Mode
- Supplemental Resource Evaluation (SRE Process)

Session Objectives

- At the end of this module, learners will be able to:
  - Describe the purpose of the Bid/Offer Evaluation process and the Day- Ahead and Real-Time Software components involved
  - List the main outputs from the Day Ahead Scheduling software – SCUC
  - Describe additional inputs such as modeling inputs, IPR forecasting etc. and how they are processed by the SCUC to arrive at the Day-Ahead schedules and prices for generation, load and external transactions
  - Explain the SCUC scheduling process: The 4-pass methodology and the components of each pass
  - Reproduce a timeline of events that constitute the Day Ahead Scheduling Process
  - Identify the various components of the Real Time Bid/Offer Evaluation process

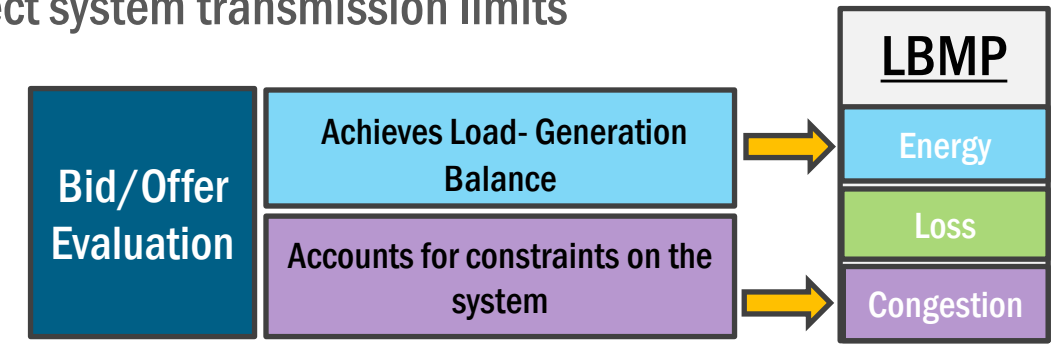
Session Objectives (cont'd)

- List the main outputs from the RTC/ RTD
- Describe how the various inputs are processed by RTC/RTD to arrive at the Real-Time schedules and prices for generation, load and external transactions
- Explain the RTC process of commitment and dispatch of internal generators and External Transactions
- Explain the RTD process of dispatch and the interactions between RTC and RTD
- State when and why RTD-CAM is activated and detail the 5 modes of activation
- Reproduce a timeline of events that constitute the Real-Time scheduling process
- Describe the Supplemental Resource Evaluation (SRE) process and timeline

Overview:
Bid/Offer Evaluation Process

Bid/Offer Evaluation Process

- **Purpose:**
  - Use Economic Dispatch to meet Load requirements, while honoring reliability standards
  - Co-optimize energy, operating reserves and regulation bids in order to minimize total as-bid cost of production
  - Respect system transmission limits



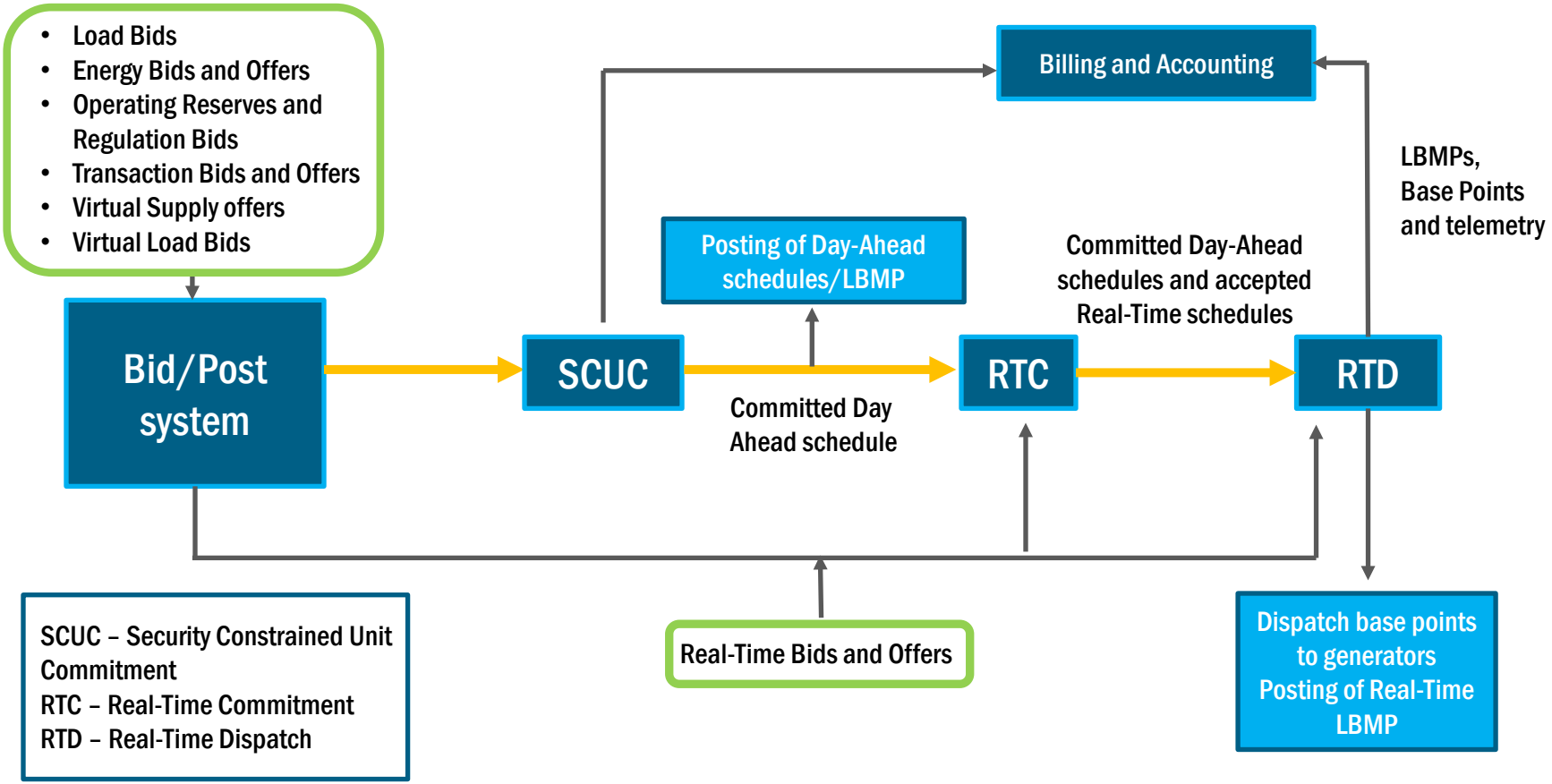
Bid/Offer Evaluation Process

- Day-Ahead Market:
  - Security Constrained Unit Commitment (SCUC) scheduling software optimizes to solve simultaneously for Energy, Operating Reserves and Regulation service requirements to minimize total bid production costs
- Real-Time Market:
  - Real Time Software (RTS) co-optimizes to solve simultaneously for energy, operating reserves and regulation service requirements, while accounting for system changes over its optimization timeframe
    - Four software modules working together:
      - Real-Time Commitment (RTC)
      - Real-Time Dispatch (RTD)
      - Real-Time Commitment – Automated Mitigation Procedure (RTC-AMP)
      - Real-Time Dispatch – Corrective Action Mode (RTD-CAM)

Bid/Offer Evaluation Process

- **Unit Commitment:**
  - Process of selecting units from the available generators to meet the demand
  - Determines start-up and shut-down schedule of all production units
  - Refers to the NYISO scheduling a generator to start-up to run at, or above, its minimum generation level
- **Unit Dispatch:**
  - Follows Commitment
  - For each Day-Ahead or Real-Time interval, determines the actual power output of each of the committed generating units needed to supply demand while complying with Transmission limits
  - RTD dispatches the resources committed by the SCUC and RTC and provides base points for injecting or withdrawing MWs on the grid

Day Ahead to Real Time Process



Day Ahead Market
Bid/Offer Evaluation Process

Day-Ahead Market Evaluation Process

- SCUC- Objective and Overview
- Outputs
- Additional Inputs
- Day-Ahead Scheduling Process
  - 4 Pass Methodology- SCUC
  - Components of Each Pass - SCUC
- Timeline (Summary)

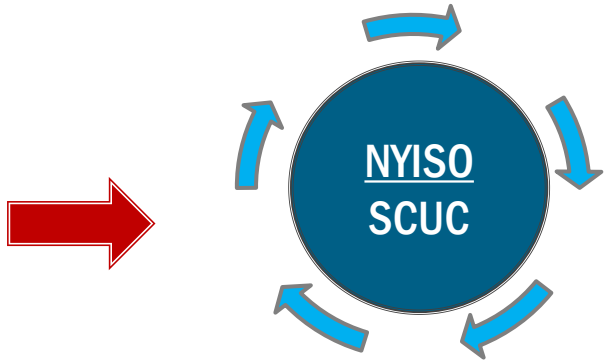
SCUC - Overview

SCUC – Overview

- **Purpose:**
  - Establishes Day-Ahead schedules for generation, load, and transactions
  - Uses economic dispatch to meet demand while minimizing total as-bid production costs
  - Respects Transmission limits and system ramp constraints
  - Accounts for forecast load, bid load, and ancillary service requirements; also includes virtual supply/load bids and demand response bids

SCUC - Overview

- Demand
- Reliability Requirements
- Energy and Ancillary Service Offers from Resources
- Virtual offers and bids
- Transmission Limits



Co-Optimization for lowest total production cost

- DAM Prices
- DAM Schedules

SCUC – Outputs and Additional Inputs

SCUC – Primary Outputs

Hourly Prices – Next Day of Operation

- Energy Market Clearing Price (LBMP)
  - Generator: Bus level
  - Load: Zonal
  - Transactions: Proxy Bus level
- Operating Reserve Prices
  - By Location and Product type
- Regulation Market Clearing Prices
  - Statewide Regulation Capacity Price

Hourly Schedules – Next Day of Operation

- Generator Schedules
- Operating Reserve Schedules
- Regulation Schedules
- External Transaction Schedules

Also posted: The 7 Day Advisory NYISO Forecast, Updated Total Transfer Capabilities (TTCs) and Available Transfer Capabilities (ATCs), Limiting constraints and PAR flows

SCUC – Where Inputs come from

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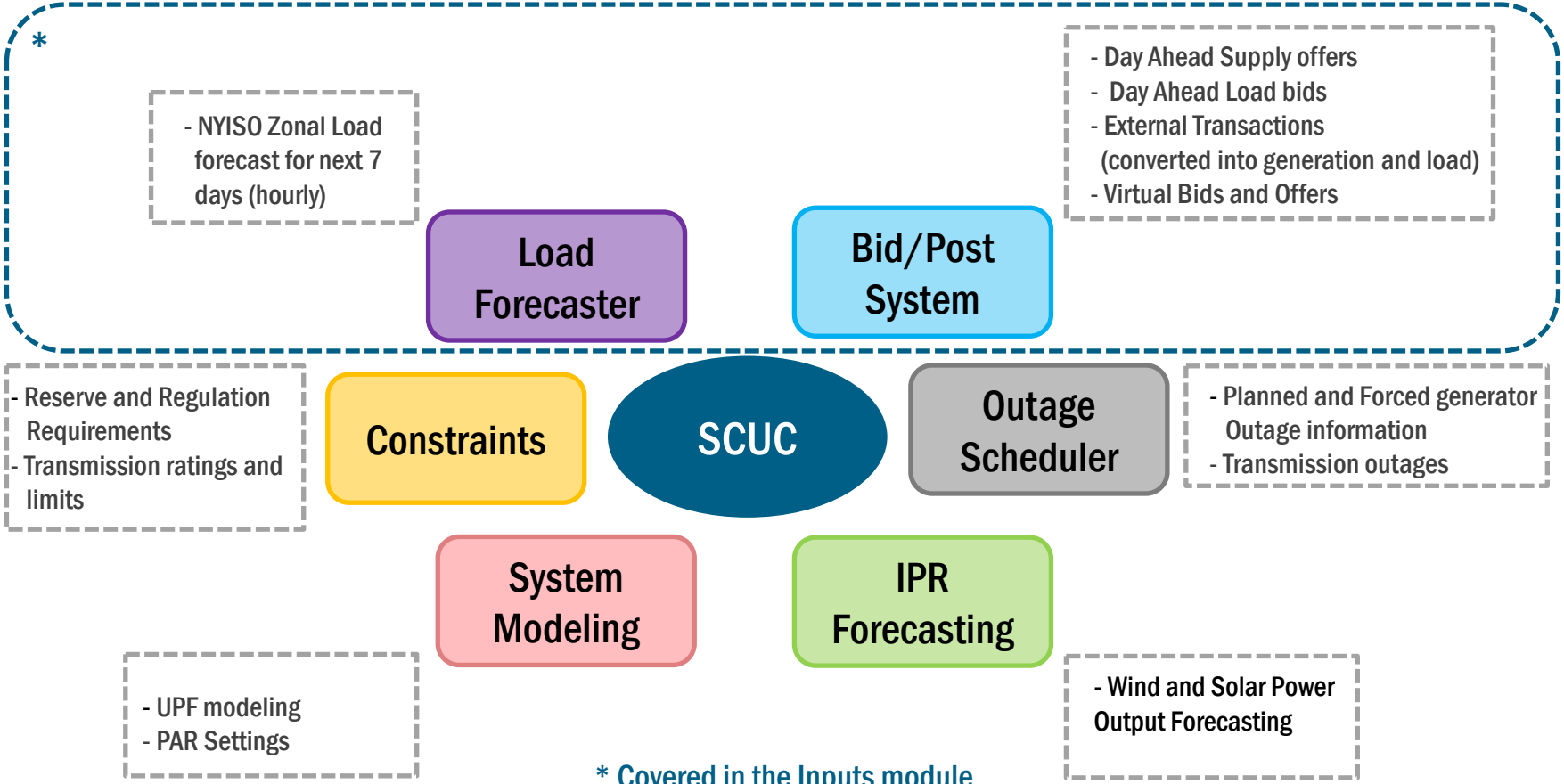

SCUC – Primary Inputs

- Load Forecast
- Bids/Offers

} Covered in the Inputs module

- Transmission and Generator Outage information
- Transmission Limits
- Modeling inputs
- IPR Forecasting

PAR Modeling

- PAR (Phase Angle Regulator) modeling:
  - PARs used to control the phase angle across transformers
    - Allows transformers to regulate the power flow through it
    - PARs can be used to prevent line overloads
  - Typical PAR schedule for SCUC is the previous like day's PAR schedule + any modifications due to anticipated or maintenance facility outages

Unscheduled Power Flow Modeling

- Normally determined on a historical rolling 30-day average, an on peak and off-peak value are calculated
- Scheduled MW in the Day Ahead Market that changes weekly, typically the same for market days Wednesday to Tuesday
- Lake Erie Circulation
  - The measured difference between actual and scheduled flow at the NY (NYISO) and Ontario (IESO) border
  - More actual flow into NY than scheduled is referred to as Clockwise circulation
  - Less actual flow into NY than scheduled is referred to as Counter-Clockwise circulation

IPR Forecasting

- Wind and Solar IPR Forecasts:
  - Day Ahead Forecasts produced twice a day – 4 a.m and 4 p.m
  - Forecasts based on hourly averages
  - Wind and solar power forecasts will be an input to Pass 2 (Forecast pass), regardless of whether the IPR generator provided a bid

Day-Ahead Scheduling Process

SCUC Initialization

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SCUC Initialization

Assembly of Day-Ahead Outages:

- The transmission system outages scheduled for the next day are extracted from the TOA Outage Scheduling system
- Used to update transmission limits during SCUC initialization and to provide SCUC with a network topology that reflects expected transmission capability

Assembly of Day-Ahead Reliability Units:

- Resources committed in the DAM solely for reliability reasons, irrespective of economic merit
- Requests made by Transmission owners (TOs) for local reliability needs or NYISO for state-wide reliability

Production of preliminary NYISO Zonal Load forecasts:

- Prepared by the Load Forecast program
- Independent of LSEs' forecasts

Initial Generator Status and Commitment Rules:

- SCUC input processor updates Resource statuses using actual Generator start and stop times from AGC
- Upon SCUC initialization, statuses of all Resources that bid into the DAM are based on their current operating mode at time of initialization
  - Modifications made based on projected changes for reminder of the day from previous day's DAM schedule

SCUC Execution

SCUC Four Pass Methodology

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Pass 1 of SCUC

Solves for Bid Load, Virtual Load and Virtual Supply

Pass 2 of SCUC

Commits additional units used to supply Forecast Load; Load bids (physical & virtual) and Virtual Supply bids are NOT considered in this pass

Pass 3 of SCUC

Reserved for future use

Pass 4 of SCUC

Forecast Load Re-dispatch; Dispatches units committed in Pass 2

Pass 5 of SCUC

Final dispatch determined to supply Load Bid, Virtual Load and Virtual Supply; Final Day Ahead LBMPs are established

SCUC – Pass 1, Bid-Load Pass

- SCUC commits and schedules generating units and interchange, including DARUs, to supply Bid Load (Physical and Virtual) less Virtual supply
  - Secured against normal NYISO bulk power system contingency and LRRs
  - Interchange Transactions, Virtual Load, Virtual Supply and Internal Generators are evaluated
  - Also includes resources committed to meet state-wide reliability needs and local reliability requirements
  - Automatic mitigation evaluation is performed once the commitment run has converged

Bid Load Pass – LRR Evaluation

- Local Reliability Rules (LRR) are incorporated with the Bid Load Pass
  - Solves for additional capacity constraints for New York City network security
- A Day-Ahead Reliability Unit (DARU) may be designated by a TO or the NYISO for commitment for reliability reasons in advance of the DAM
- Advantages of including LRR within the Bid pass:
  - Allows economic de-commitment of units that are not required after securing local reliability rules and reduces the potential for out of market commitments once DAM is complete
- Optimization to minimize total as-bid production cost given reliability requirements

Automated Mitigation Procedures (AMP)

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- AMP is a selective bid mitigation mechanism that is automatically activated when conditions are not workably competitive
- Integrated into the Day-Ahead and Real-Time market solutions for generators located in New York City

Conduct Tests

- Compares offer ($ Energy + $ Start up cost + $ Min gen cost) to the resource's references
- Conduct failed, if offer costs higher than references by a tariff defined amount

Impact Tests

- Examines the change in prices that would prevail if conduct failing offer prices were mitigated
- Impact failed if change in LBMP exceeds tariff specified amounts for constrained areas

Mitigation

- Mitigation applied to offers that fail Impact tests
- Offers mitigated to corresponding references

Pass 2: Bulk Power System (BPS) - Forecast Load Pass

- Determines the additional generators required to meet the NYISO forecast load
  - FRED – Forecast Required Energy for Dispatch
    - Additional expected energy needed to meet the NYISO forecasted load that is in excess of the sum of Day-Ahead load bids
- Price sensitive Load and Virtual resources are not included in this evaluation
- Generator limits and commitment statuses are modified to ensure that units selected in pass 1 will not be de-committed or dispatched below their Pass 1 value
- Optimization for least additional uplift
- Solves for bulk power system (BPS) facilities and contingencies
- Wind and solar forecast incorporated to schedule wind and solar intermittent resources
- Results in Gen Set 2
  - Includes all units in pass 1 plus additional units to meet forecast load

Pass 4: Forecast Load Re-dispatch

- In Pass #4, the set of generators from committed in Pass #2 is dispatched using the original energy bids
- The dispatch supplies the forecast load and is limited by the bulk power system constraint set produced in the Pass #2 commitment
- The unit capacities (Energy + 30-minute Reserve + Regulation capacity) from this dispatch are used to calculate the forecast reserve for economic dispatch

Pass 5: Bid Load, Virtual Load and Virtual Supply Re-dispatch

- Final dispatch is determined to supply the Bid load, Virtual Load and Virtual Supply (negative load)
- Pass 1 GTs are forced on, all other GTs are forced off (dispatched at 0)
  - Generators dispatched in Pass 4 that are not needed in Pass 5 will be backed down to their min gen
  - Will not be able to set LBMP, but will be eligible for Bid production Cost Guarantee (BPCG)
- Day-Ahead Hourly LBMP is set

Wind and Solar IPR Units- SCUC Process

- Pass 1 (Bid-Load Pass): Only wind and solar generators that provide bids will be considered in this solution
- Pass 2 (BPS Forecast Load Pass): Wind and solar generator bids will be dropped, and wind and solar generation forecasts will be used in this solution
- Pass 4 (BPS Forecast Re-dispatch passes): This pass will use the same wind and solar generator forecasts as Pass 2
- Pass 5(Bid- Load Re-dispatch pass): Will ignore any wind and solar generator forecasts scheduled in passes 2-4, but will instead use any wind and solar generator bids
  - Will use commitments made from pass 1
  - Only economically committed wind and solar generators can be scheduled in this pass

Transmission Loss Calculation – SCUC Process

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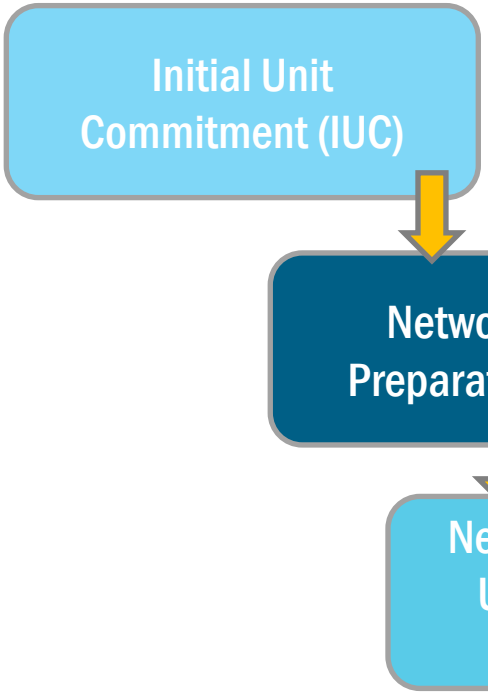
- Power losses occur in the transmission system as energy flows from generation sources to the loads
  - These losses appear as additional electrical load, requiring the generators to produce additional power to supply the losses
- Transmission losses are calculated in the SCUC
  - As part of the power flow solution for each time interval simulated by these programs for each of the eleven load zones in the NYCA
- Hourly losses for the load zones are calculated within the bid load pass of SCUC
  - Energy is scheduled in the bid load pass of SCUC to meet:
    - The hourly zonal bid load demands, and
    - The calculated hourly zonal losses for bid load demand
- Hourly losses for the load zones are also calculated within the forecast load pass of SCUC
  - Energy is scheduled in the forecast load pass of SCUC to meet:
    - The hourly day-ahead forecast of the eleven zonal loads, and
    - The calculated hourly zonal losses for forecast load demand

SCUC – Components of each Pass

SCUC – Components of each Pass

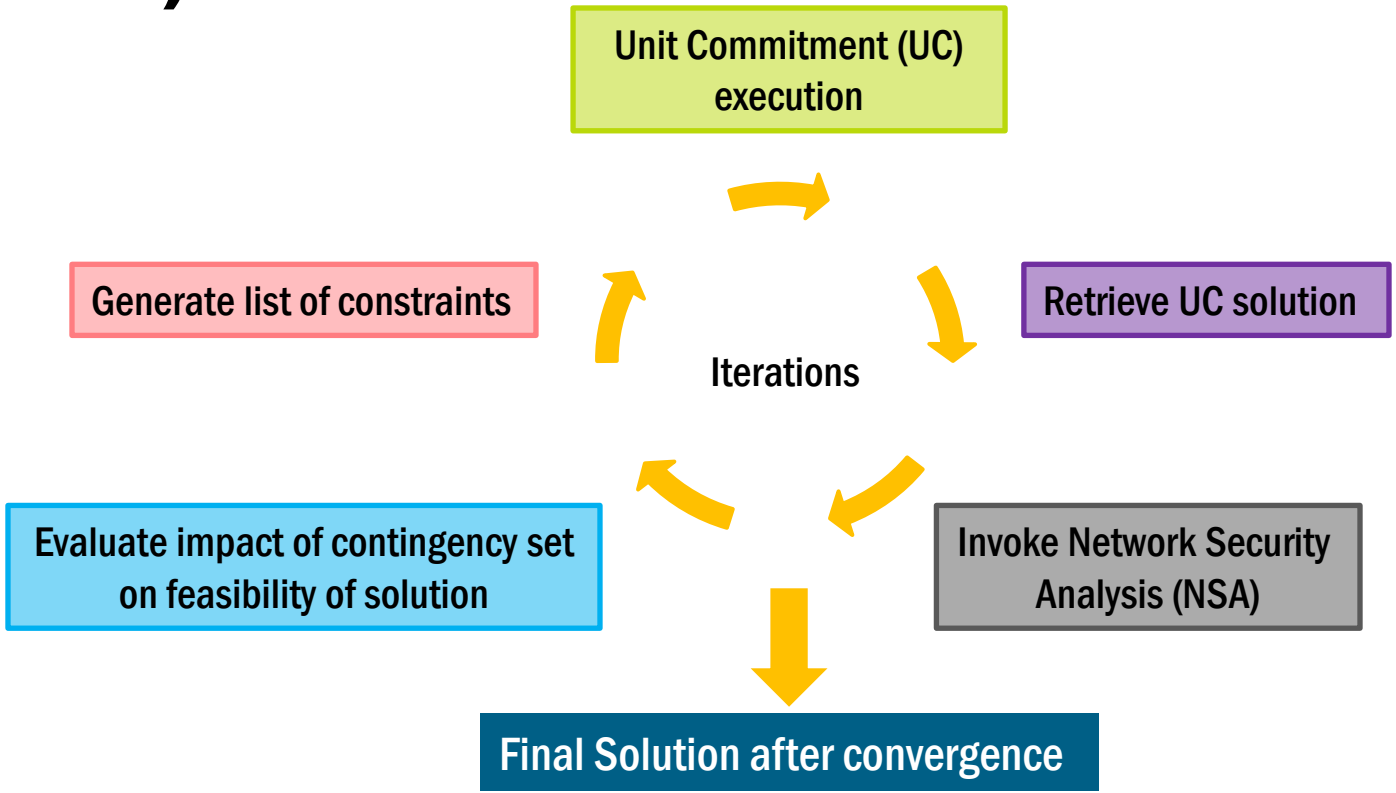


Produces Initial Unconstrained Unit Schedule

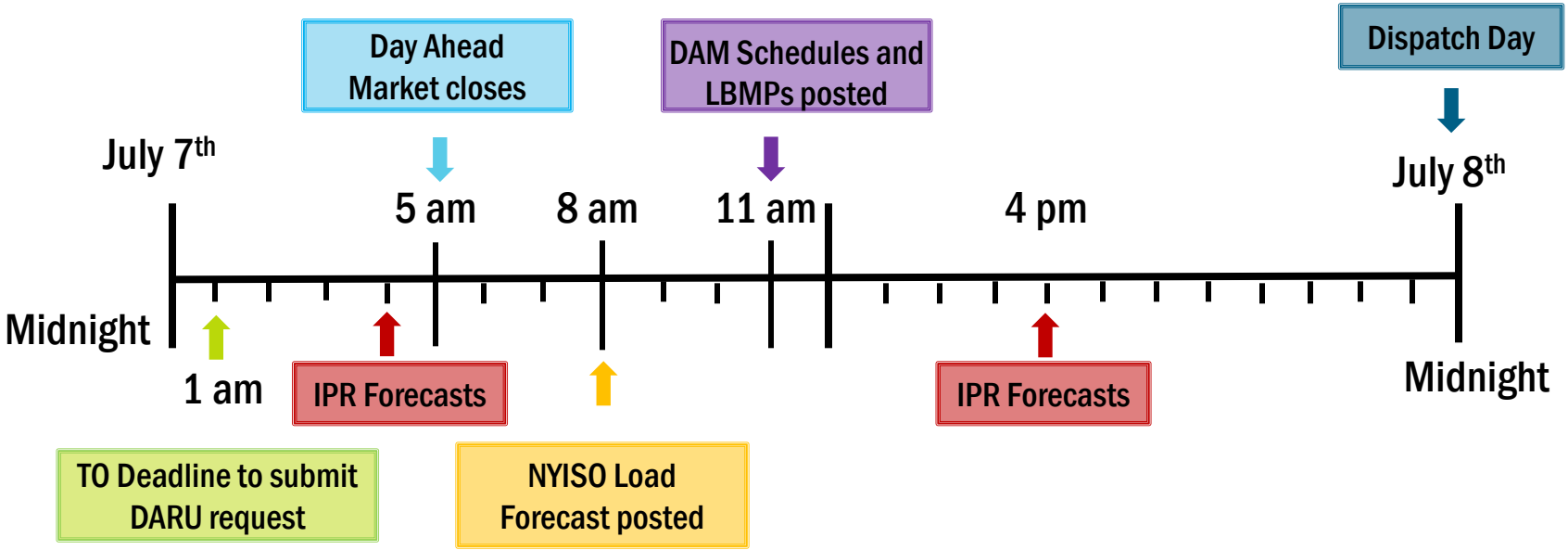
Sets up the initial conditions and various parameters of power flow cases for the specific study period

Calculates generation schedule for a specified study period, satisfying both unit commitment constraints and network security constraints

Network Constrained Unit Commitment (NCUC)



Day-Ahead Market Timeline



Let’s Review

SCUC uses Load forecasts from LSEs as an input

True

False

Let's Review

Unit A has been requested to be committed as a DARU.

Choose the correct statements below

If the unit's offer parameters make it economical, the unit can be economically committed by SCUC

Request for unit A's commitment as a DARU can only be based on a statewide reliability need

The request for Unit A's commitment as a DARU in the DAM must be entered by 1.00 am prior to close of the DAM

If economically committed by SCUC, unit A will no longer be considered a DARU

Let's Review

Select the passes in SCUC that Virtual load and Supply bids will be considered as input

- Pass 1- Bid Load Pass
- Pass 2- Reliability Pass
- Pass 4 – Forecast Load Redispatch Pass
- Pass 5 – Bid Load Redispatch Pass

Let's Review

Automated Mitigation procedures will consider the following parameters for conduct and impact tests

- Only Incremental Energy Offer
- Incremental Energy Offer + Startup cost + Min gen cost +Opportunity costs
- Start-up costs and Min gen costs
- Opportunity costs

Let's Review

Draw a line from each of the processes to the SCUC Pass it is part of:

Initial Unit Commitment	Pass 1- Bid Load Pass
Loss Calculation	Pass 1- Bid Load Pass
LRR Evaluation	Pass 4 – Forecast Redispatch Pass
AMP	Pass 5 – Bid Load Redispatch Pass
Posted DAM LBMP	All Passes
Day Ahead Schedule information relayed to TOs	Pass 1 and Pass 2

Real-Time Market Bid/Offer Evaluation Process

Real-Time Market Bid/Offer Evaluation Process

- Real-Time Software (RTS)- Overview
- Outputs
- Inputs
- Real-Time Commitment (RTC) Process
- Real-Time Dispatch (RTD) Process
- Real-Time Dispatch – Corrective Action Mode (RTD-CAM)
- Timeline (Summary)

Real-Time Software – Overview

Real-Time Software - Overview

- Real Time Software (RTS) co-optimizes to solve simultaneously for energy, operating reserves and regulation service requirements, while accounting for system changes over its optimization timeframe
- RTS evaluations include look ahead time horizon to pre-position dispatch for known system changes
- RTS will consider:
  - SCUC's resource commitment for the day;
  - Load and loss forecasts that will be produced 5-minutes;
  - Transmission limits; and
  - All Real-Time bids and bid parameters (RTC/RTD)

Real-Time Software

- RTC – Real-Time Commitment
- RTC- AMP – Real-Time Commitment Automated Mitigation Process
- RTD – Real-Time Dispatch
- RTD- CAM – Real-Time Dispatch Corrective Action Mode

Real Time Commitment (RTC)- Overview

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- Multi-period security constrained unit commitment model that simultaneously solves for load, reserves and regulation over a 2.5 hours horizon
- Similar software model and structure as SCUC
  - Executes every 15 minutes, optimizing 10 fifteen-minute periods – producing a 2 ½ hour look-ahead with advisory prices and schedules
- RTC makes binding schedule decisions for external interchange transactions, including CTS Transactions and LBMP Transactions
- RTC produces advisory dispatch for all other resources
  - Commitment decisions for other resources will come from the DAM's SCUC solution
  - RTC will only re-evaluate Fast Start resources (provide additional commitment)
  - RTC will not commit "dispatch only" resources such as ESRs and Wind/Solar resources
    - These are considered available over the optimization period

Real-Time Dispatch - RTD

- Multi-period security constrained dispatch model that simultaneously solves for load, reserves and regulation over a 60-minute horizon
  - Executes every 5-minutes
  - RTD optimizes over an hour
    - One 5-minute timestep, which produces the binding real-time schedules/prices, and advisory timesteps occurring on the next 4 fifteen-minute boundaries
- RTD Makes no unit commitment decisions (except RTD-CAM)
- RTD simply dispatches the resources already expected to be online based on SCUC and RTC commitment decisions
  - Each RTD run will use unit commitments from most recent RTC run for the same period of time

RTC and RTD – Outputs and Inputs

RTC - Output

- On 15-minute intervals RTC will:
  - Schedule generation to meet load, reserve/regulation, and transmission limits
  - Commit 10 and 30-minute resources
  - Issue advisory commitment and schedules beyond the 30-minute horizon
  - Schedules Hourly and Intra-hourly Transactions
  - Posts Available Transmission Capability (ATC)'s/ Total Transmission Capability (TTC)'s, advisory generator/zonal and external proxy prices, limiting constraints, and shadow prices

RTD – Final Outputs

5 Minute Prices- Dispatch Day

- Energy Market Clearing Price (LBMP)
  - Generator: Bus level
  - Load: Zonal
  - Transactions: Proxy Bus level*
- Operating Reserve Prices
  - 10-min Spinning Reserve by Load Zone
  - 10-min Non-Spinning Reserve by Load Zone
  - 30-min Spin/Non-Spin Reserve by Load Zone
- Regulation Market Clearing Prices (NYCA only)
  - Capacity Price
  - Movement Price

5 Minute Schedule – Dispatch Day

- 5-minute base points for internal generators and demand side resources
  - Energy (sent to AGC)
  - Operating Reserves
- Advisory base points for the rest of the hour (15-minute level)

RTC and RTD – Inputs

- Resource Commitment Results from SCUC
- New Generator Bids/Offers
  - Energy, Reserve, Regulation
- New Transaction Bids/Offers
- Telemetry information
- Load Forecasts
- IPR Forecasts
- PAR Modeling
- Loop Flow Modeling
- Reserve and Regulation Requirements
- Transmission Limits

Real Time Commitment – Process

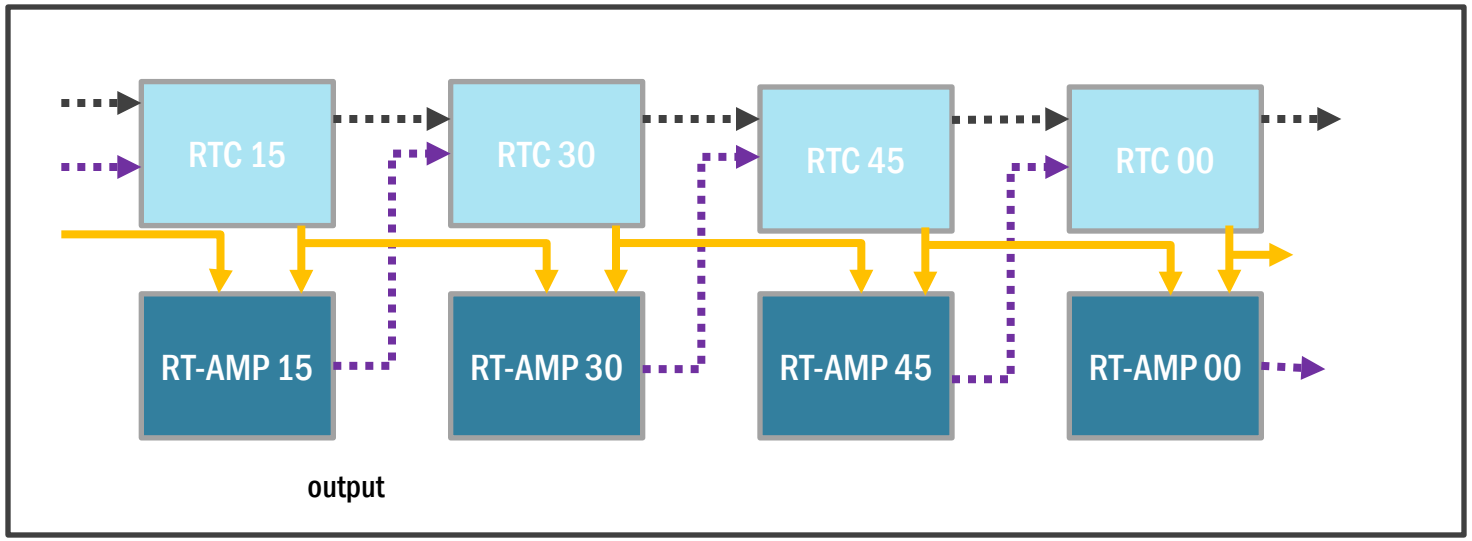
RTC Process

- RTC runs initialize every 15 minutes and posts 15 minutes after initialization
  - RTC runs are labeled by when they post; *e.g.*, RTC15 initializes at XX:00, and posts at XX:15
- For each RTC run, the first timestep begins 15 minutes after RTC posts; *e.g.*, for RTC15, that is XX:30
  - Commitment, schedules, and basepoints in RTC and RTD are labeled by the timestep
- Newly committed Fast Start Resources will receive their start-up notification through RTC
  - For 10-min Fast Start Resources, that can include a start-up notification to be at min gen by the first timestep
  - For 30-min Fast Start Resources, that start-up notification would be for the second timestep

RTC-Automated Mitigation Procedure (RTC-AMP)

- Runs automatically every 15 minutes evaluating a 2.5-hour time horizon
- Runs parallel to RTC with synchronized data except for mitigated bids
- Evaluates if resources are unfairly setting prices (market power) due to reliability
- Mitigated bids determined to cause impact are applied to remainder of current hour and/or all of the next hour
- Conduct, Impact and Mitigation evaluation similar to the SCUC AMP process

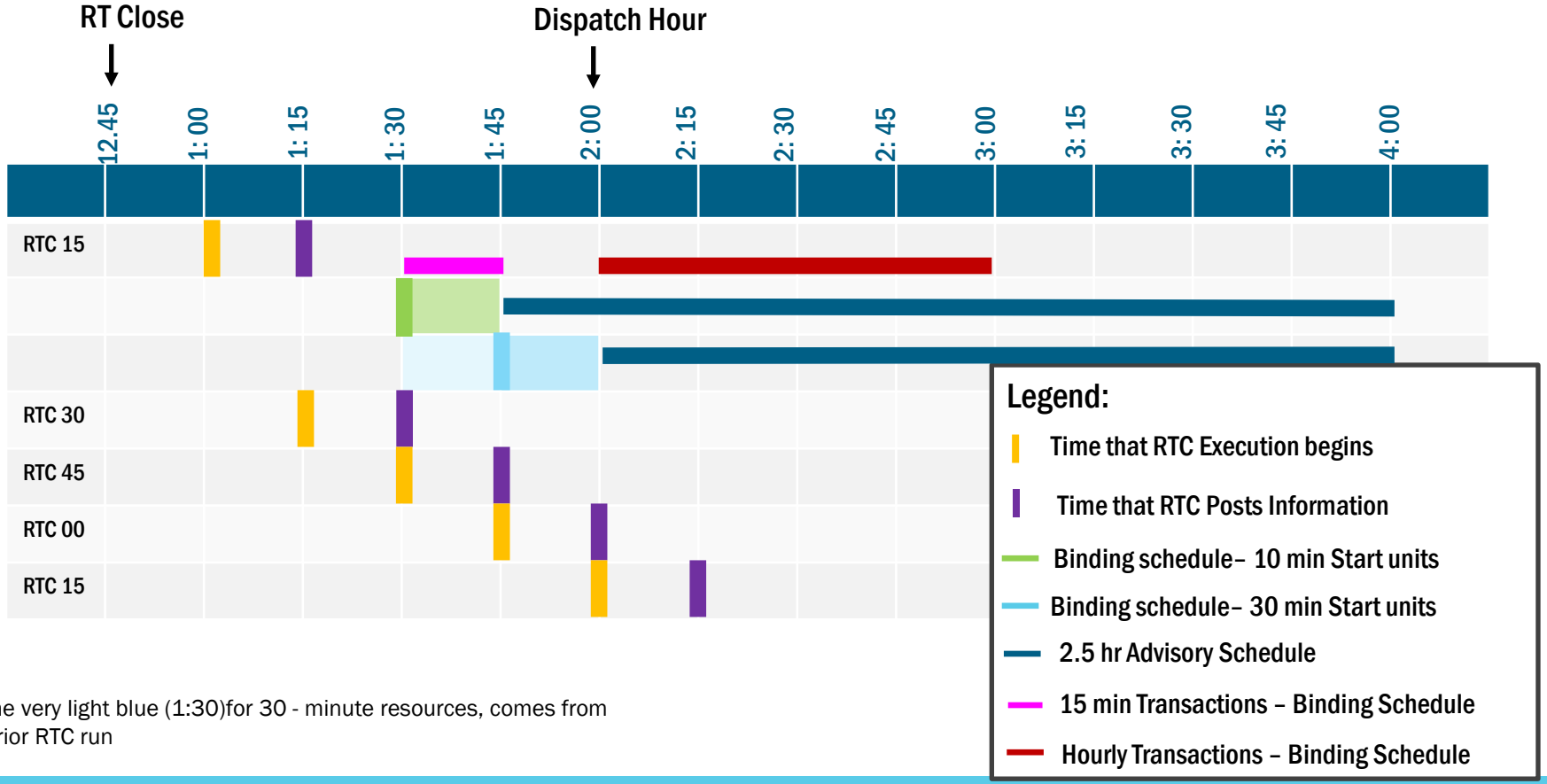
RT-AMP Timeline



External Transactions – RTC

- Interchange Transactions receive commitment and dispatch schedules from RTC
  - Generators involved in Internal Transactions receive dispatch signals from RTD
- 15-minute interchange transactions are evaluated during each RTC run, with binding schedules developed for the first 15 minutes timestep
  - All other timesteps are advisory
- Hourly Transactions are evaluated during the RTC15 run, with binding schedules developed for the next hour
  - All other timesteps are advisory
- Interchange Transactions scheduled through RTC then go through the Operator Checkout process before being scheduled to flow

RTC Timeline



*The very light blue (1:30)for 30 - minute resources, comes from a prior RTC run

Fast Start Resources – RT Scheduling

- Fast-Start Resources:
  - Can respond to instructions to start, synchronize to the grid, inject energy within 30 minutes, and
  - Have a minimum run time of one hour or less
  - Are treated as dispatchable between zero and their UOL
    - ESRs withdrawing energy: treated as dispatchable between LOL and zero
- RTC makes binding commitment and de-commitment decisions only for these 10 and 30 min start resources and produces advisory dispatch for all other resources
- Fast-start resources' commitment costs (*i.e.*, start-up costs and minimum generation costs) will be added to incremental cost curves for calculation of LBMP

Refer Attachment C, T and D manual for example of Fast Start Pricing logic

Real-Time Dispatch – Process

RTC to RTD Interactions

- When each RTD initializes, it will pull unit commitments from the most recent RTC
  - This includes SCUC commitments fulfilled by RTC as well as additional RTC commitments
  - Commitment decisions from RTC include the timestep that the unit will be at Min Gen
- For Example: RTC commits units to be online at 14:30
  - The 3 RTD runs that develop binding schedules for the RTD timesteps covering 14:30-14:45 timeframe will dispatch those units based on the RTC commitment decision for its 14:30 timestep
- RTD will also incorporate RTC interchange schedules into its solution
  - These schedules are fixed and not reevaluated by RTD

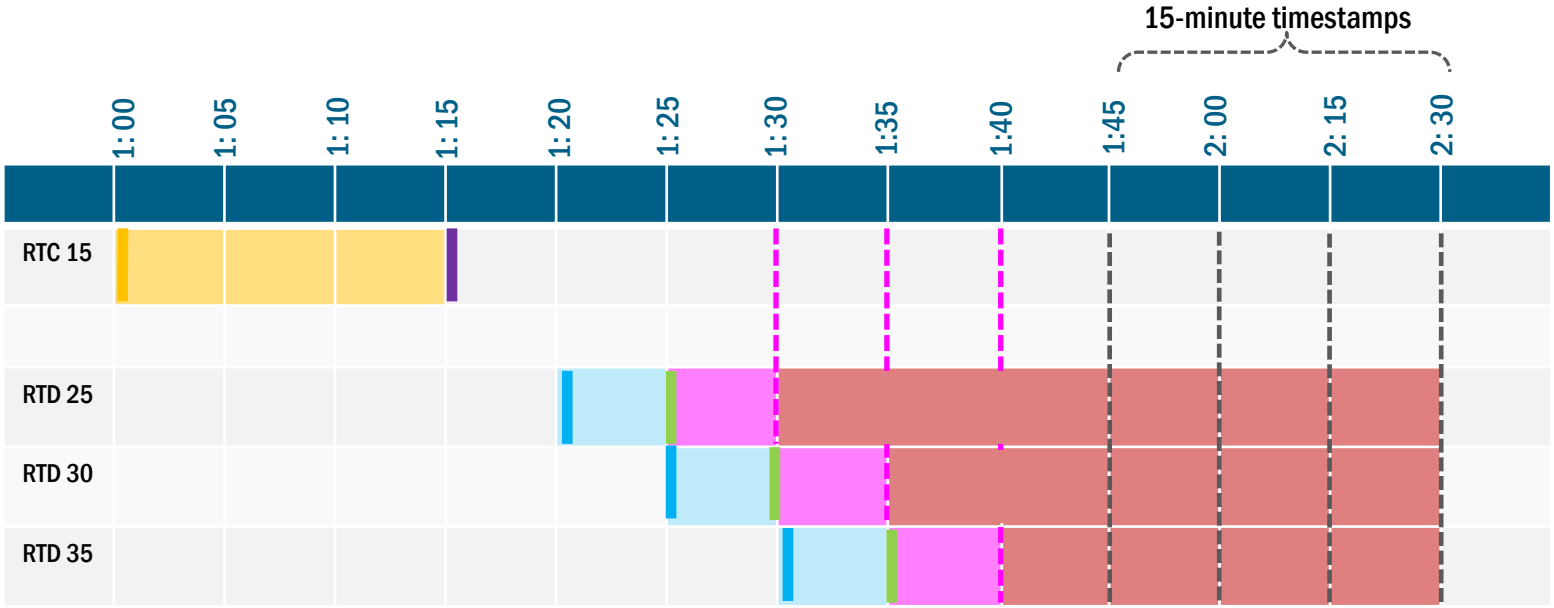
RTD - Process

- RTD calculates a short-term generation schedule for each of the generating units designated as flexible or “on-dispatch”
  - RTD retrieves the information it needs to perform the calculation from data maintained in MIS/OIS&R.
- RTD runs every 5 minutes and the ~60-minute time horizon is divided into one five-minute timestep referred to as a “basepoint” and four 15-minute advisory timesteps
- Binding RTD basepoints are typically generated every five minutes to inform Resources of their target MW output
  - Basepoints are used by AGC to ramp units up or down from one binding RTD basepoint to the next
  - Resources that are Regulation providers may be sent basepoints from AGC that deviate from their binding RTD basepoint to manage immediate generation-load imbalances

RTD Process

- RTD initializes every 5 minutes and post 5 minutes after initialization
- RTD runs are labeled by when they post; *e.g.*, RTD15 initializes at XX:10, and posts at XX:15
- For each RTD run, the first timestep (basepoint) occurs 5 minutes after RTD posts
  - AGC will ramp units on a 6-second basis from the time that RTD posts until the basepoint
    - *E.g.*, at 14:15, RTD15 posts the basepoint for 14:20; AGC will ramp the unit from 14:15 to 14:20 to meet basepoint

RTD Timeline



Legend:

- Time RTC execution begins
- Time RTC posts information
- Time RTD execution begins
- Time RTD posts information
- Binding dispatch period
- Advisory Dispatch period

RTC to RTD Divergence Factors - Examples

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Transmission Network Modeling	- Forecast errors on PAR controlled lines - Variation in Transfer Capability
Forecast Errors	- Load Forecast Errors - Wind/Solar Forecast Errors
RTC/RTD Timing	- Inconsistencies in timing of RTC and RTD evaluations
Loop Flow Modeling	- Changes in Loop flow circulation between RTC and RTD
Generator Performance	- Not following Dispatch - Forced Outages and Derates
Transactions	- Transaction Curtailments

RTD – CAM Corrective Action Modes

Real-Time Dispatch – Corrective Action Mode (RTD – CAM)

New York ISO

- Response to system conditions unanticipated by RTC or regular RTD executions
  - i.e., Loss of major generation or transmission
- Unlike 'normal' RTD, can commit (or de-commit) certain units
- Occurs within the dispatch/operating hour
  - Only looks ahead 10 minutes
- Schedules 10-minute Operating Reserve to energy
- 5 dispatch modes

RTD-CAM: Five Dispatch Modes

Reserve Pickup

- 10 Minute base points
- Optimize Energy and Reserves

Max Gen Pickup

- All Generators in targeted area to UOLE

Base Points ASAP – No Commitment

- Update base points for dispatchable units

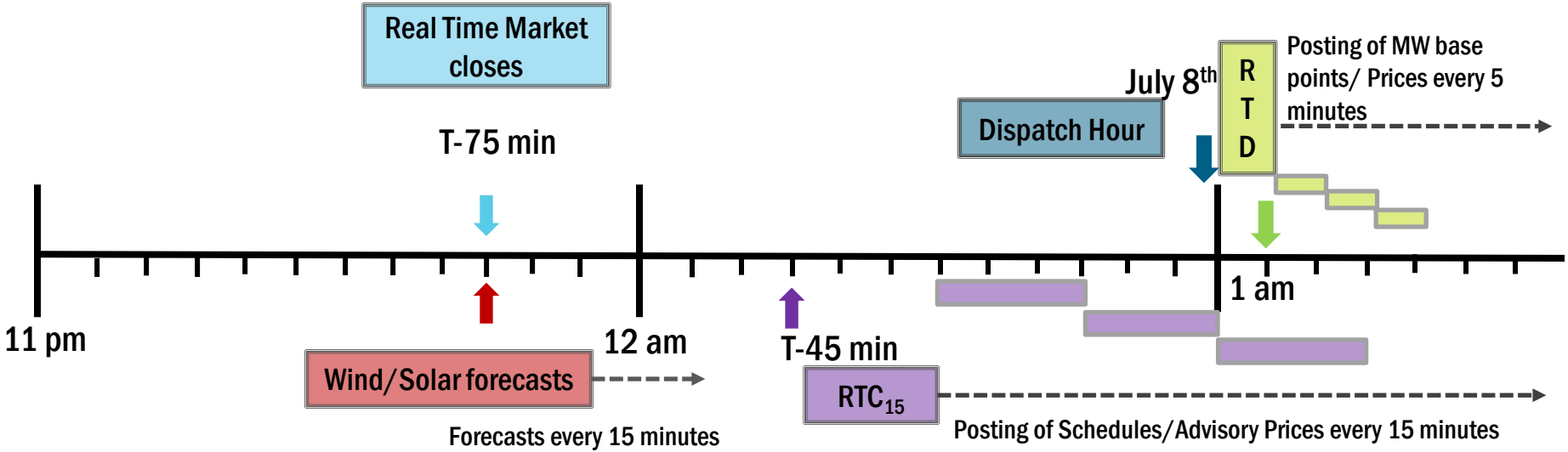
Base Points ASAP – Commit as needed

- Same as previous RTD-CAM, but also can commit 10-minute units

Re-Sequencing

- De-activate RTD- CAM

Real-Time Timeline



Supplemental Resource Evaluation (SRE)

Supplemental Resource Evaluation (SRE)

- Process used to commit additional resources outside of the SCUC and RTC processes to meet NYISO reliability or local reliability requirements
- SRE is used to address resource deficiencies; not to reduce costs

Supplemental Resource Evaluation (SRE)

New York ISO

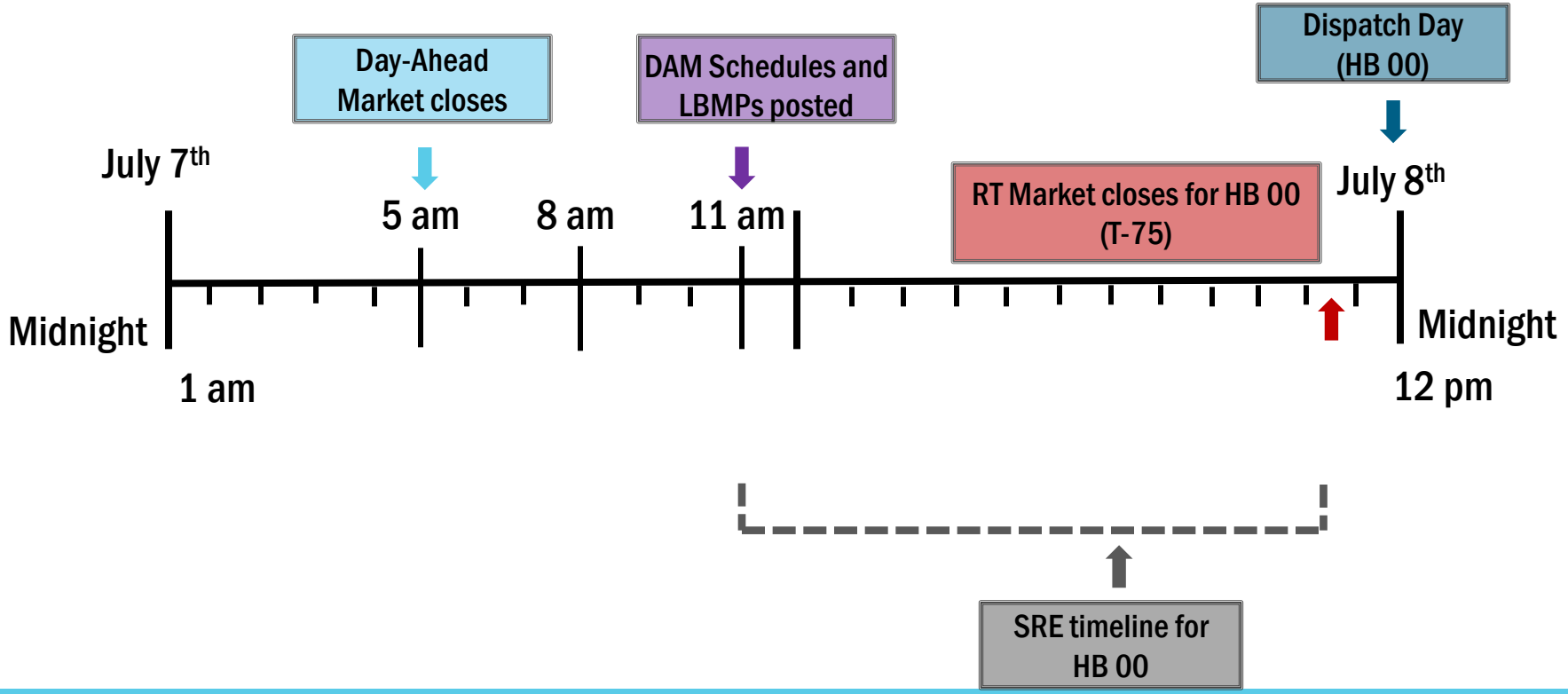
- SRE is used to address:
  - Loss of Generation
  - Loss of Transmission
  - Load "surprises”
- SRE can be used to obtain:
  - Energy
  - Operating Reserve
  - Regulation

Supplemental Resource Evaluation (SRE)

New York ISO

- The NYISO may perform SREs in response to the following two conditions:
  - When Day-Ahead reliability criteria violations are forecast after SCUC has begun or completed its Day-Ahead evaluation (i.e.: too late for additional day-ahead commitments)
  - When In-Day reliability criteria violations are anticipated more than 75 minutes ahead (i.e.: too early for RTC commit additional resources)
- TOs may request the NYISO to issue an SRE to commit additional resources for reliability purposes in a local area
  - TO requests for SREs are subject to the same conditions and the same time frame as the NYISO's use of the SRE process – after SCUC has run

Supplemental Resource Evaluation (SRE) Timeline



Let's Review

Fill in the blanks:

1. RTC commits _____ minute intervals over a _____ optimization period.

2. RTD executes every _____ minutes over a _____ horizon.

Let's Review

What kind of resources can be committed in the RTC

10 minute and 30 minute Fast Start Resources

Dispatchable units

1 Hour Start-up Resources

All types of Resources

Let's Review

Draw a line from each of the processes to the component of the RTS it is part of:

15-minute External Transaction Commitments	AGC
5minute base points for Resources	RTD-CAM
Operating Reserve Activation	RTC-AMP
Regulation movement MWs	RTC
Conduct and Impact tests	RTD

Bid/Offer Evaluation Process - Summary

New York ISO

- SESSION OBJECTIVES:
  - Overview: Bid/Offer Evaluation Process
  - Day-Ahead and Real-Time Software
    - SCUC – Security Constrained Unit Commitment
    - RTS
      - RTC: Real-Time Commitment
      - RTD: Real-Time Dispatch
      - RTD-CAM: Real-Time Dispatch-Corrective Action Mode
  - Supplemental Resource Evaluation (SRE Process)

Additional Resources

- Open Access Transmission tariff (OATT) and Market Services Tariff (MST)
- Day Ahead Scheduling Manual
- Transmission and Dispatch Manual
- Market Participants User's Guide (MPUG)