

Intra-day Real-time Commitments (RTC)

Gabel Associates on behalf of Red Oak Power, LLC; Rockland Capital and J-Power

Electric Gas Coordination Senior Task Force

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Recap of Intra-day Real-time RAC commitments

Adding intra-day RT commitment process reduces the timing differences

Electric Gas Coordination Senior Task Force

- The Electric Gas Coordination Senior Task Force Issue Charge acknowledges the electric day and gas day timing difference and requested the stakeholders to find a solution.
- The EGCSTF has provide adequate education on the differences and appreciation on the complexity.
- Focusing on areas that PJM can control and implement prior to Winter 2023, [request](#) made during the September 2023 meeting for the following:
 1. Require all resources to maintain notification times and minimum run times that reflect any pipeline restrictions and require PJM to use those most current notification times and minimum run times.
 2. Implement new intra-day RT commitment runs that automate the incorporation of these parameters and align with gas flow deadlines.
- Proposed solution is a change to current practices, which provides the benefit of situational awareness and real-time conditions.
 - NERC recommendation #8 – “BAs should improve their short-term load forecasts for extreme cold weather periods by implementing report-identified sound practices and sharing those and newly identified sound practices with peers for continuous improvement across electric grid.”
 - NERC recommendation #9 – “BAs should assess whether new processes or changes to existing ones, such as multi-day risk assessment processes, advance or multi-day reliability commitments, are needed to address anticipated capacity shortages or transmission system-related reliability problems during well-forecast extreme cold weather events.”
- Red wording within slides and slide 5 is a change or addition from September proposal.



Reflecting Proper Resource Parameters during Ratable Take

Pipelines may impose restrictions that do not allow resources to meet approved parameters and Temporary Exceptions should be used

Utilize Current Temporary Exception Process

- Current Temporary Exception process allows for a resource to request different operating parameters than those already approved.
- Pipelines may place restrictions, therefore, causing natural gas fueled resources to follow specific operating levels (min. run time and notification time) due to ratable take requirements. These new data points should be followed by resources and used by PJM.
 - **NAESB practice is that Nominations always represent 24-hour ratable flow.**
- Support 9/8/2023 Monitoring Analytic memo regarding use of Temporary Operating Parameters Limits for Winter 2023.
- However, it is unclear exactly how PJM uses these specific parameters in its commitment process and without established intra-day commitment timeframes aligning with the gas day nomination deadlines, the commitment discount will remain.
- Continue discussions on process efficiency and schedule update automation.
- **Review and construct a new parameter for Maximum Run Time that align with restrictions used daily.**

Hour Begin	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Hour End	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notification Time	15	14	13	12	11	10	9	8	7	6	9	8	7	6	9	8	7	6	5	20	19	18	17	16
Min Run Time	19										15					11					19			
Earliest on	1500										1900					2300					1500			
Run Until	Next Day 0959																			Day + 2 0959				



Real-time Commitment

Add Intra-day commitment review for specific intra-day timeframes that account for notification and fuel procurement timeframes

Real-time Commitment (RTC)

- Each commitment process run should have the following:
 - Establish a pre-set start time, which aligns with the gas day nomination deadlines and provides ample time for processes
 - **Three intra-day real-time commitment (RTC) periods (removed FWD period from September proposal)**
 - Establish a 'will not start before' time, which will align with gas day nomination start times
 - Uses current resource's parameters, especially, Notification Time and Minimum Run Time
 - Uses current load forecast and adjusting for any error and future weather conditions
 - Resource's offer updated in accordance with Fuel Cost Policy
 - Resource will perform for the duration of the Minimum Run Time parameter
 - All resource commitments included in future commitment runs to avoid over commitment
 - All resource fuel types included
 - All resource commitments are real-time physical
 - If resource trips, then a Forced Outage taken and no RT revenues or make whole obtained
 - If PJM cancels commitment, then resource made whole for the entire commitment time
 - Any associated Make Whole (BOR) charges are allocated via Deviations
- Implementation
 - **Shift from only Cold Weather Alerts to Everyday**
 - **Incorporate as a 5-month pilot with monthly review between PJM and Stakeholders for feedback**



Software for RTC

CT Optimizer (CTO) and RT SCED creates the foundation for new process software basics

Utilize current process to create new software process

- CT Optimizer (CTO) (Based on [education](#) PJM posted in 2017):
 - Objective = utilize updated forecasts and system conditions to schedule additional long lead Combustion Turbines (CT) at minimum total production cost
 - Typically run 03:00-07:00 and throughout day if needed
 - Same inputs as RAC but updated closer to the peak, including updated load forecast and updated unit information
 - Focus on CT commitment
 - Used to commit > 2 hour time to start and long minimum run time units
- RT Security Constrained Economic Dispatch (SCED):
 - “Responsible for dispatching resources every five (5) minutes for a future target time in order to co-optimize Energy and Reserves at the target time based on forecasted system conditions.” (M11, 2.5.3)
 - Supplies inputs to Location Pricing Calculator (LPC)
- Suggestion as first step forward:
 - Re-purpose CTO to run multiple times intra-day aligning with gas day nomination deadlines
 - “Tag” units committed in RTC and include in RT SCED at the start of expected run time
 - RT SCED respect unit parameters and included in LPC



Stakeholder Matrix Inputs

Application of the additional RT RAC runs addresses the Issue Charge

Stakeholder Matrix

- Application of the additional RT RAC runs addresses most of the topic areas in situational awareness, financial and markets and operations
- Additional RT RAC runs acknowledges proper parameters, including offers, along with pipelines and operational restrictions

Topic	Design Component	Red Oak/Rockland/J-Power
Situational Awareness	Fuel inventory and alternate fuel capability	Status Quo Plus RTC
Situational Awareness	Pipeline, gas supply, dual fuel arrangements	Status Quo Plus RTC
Situational Awareness	Visibility of all fuel limitations	Status Quo Plus RTC
Financial	Cost adders	Status Quo
Financial	Recovery of cost of fuel disposal as a result of a canceled dispatch	Dominion Energy
Markets & Operations	Natural gas volume commitment	Dominion Energy Plus RTC
Markets & Operations	Dispatch instructions	RTC
Markets & Operations	Day ahead award model	
Markets & Operations	Training	Status Quo plus make training material public
Markets & Operations	N-1 reliability and emergency spin reserves	Address with Reserve PS/IC
Markets & Operations	Communication protocols for advance notice of fuel limitations.	Status Quo Plus RTC
Markets & Operations	CT firm commitment in day-ahead	

Appendix

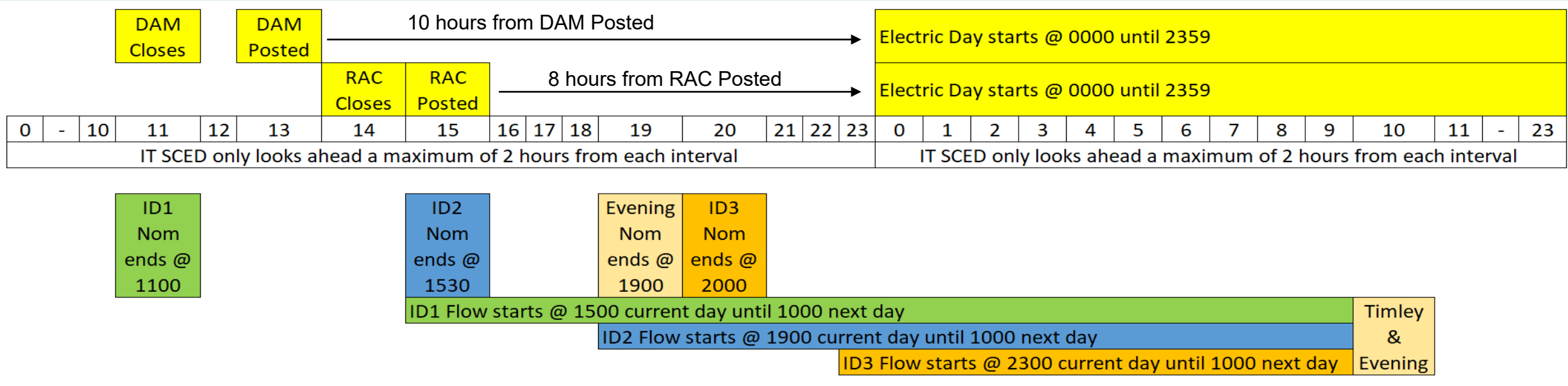


Inherent gap between Electric Day and Gas Day commitment and nomination timeframes

Lack of established intra-day SCED runs aligning with gas day timelines is fundamental root cause

Commitment Timing

- PJM's current commitment process is at least 10 hours (posting of DAM awards to next day) **or 2 hours (IT SCED) ahead of resources starting with nothing in-between and no alignment with the Gas Day.**
 - If PJM determines at 1600 a natural gas resource is needed at 1900, PJM missed the ID2 Nom (ends at 1530). The next gas flow does not start until 2300, at best, or 1000 the following day.
 - If PJM determines at 2100 a natural gas resource is needed at 0100 next day, PJM missed the ID3 Nom (ends at 2000). The next gas flow does not start until 1000 the following day. At this time, no other natural gas resources could obtain gas flow until 1000.
- There is no established process to commit resources intra-day more than 2 hours ahead of time. The RAC process allows for additional commitments but for the next delivery day. Use this similar concept intra-day for specific timeframes that align with the gas day nomination deadlines.

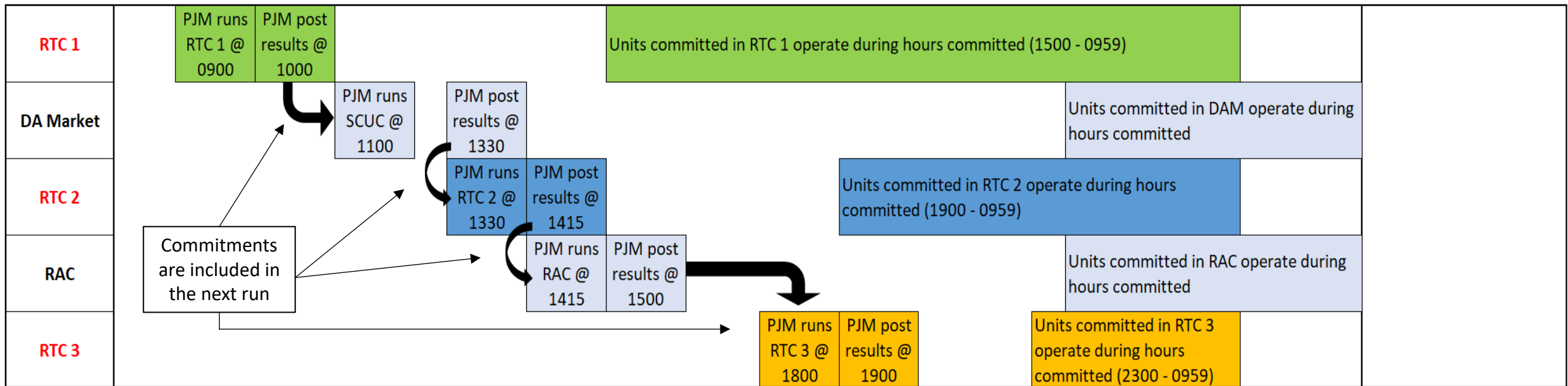


Ignoring the gas day nomination deadlines and the associated resource notification timeframes creates resource commitment issues and reliability concerns.

Processing and Timing

	TUESDAY														WEDNESDAY								THURSDAY										
Hour Begin	0	-	9	10	11	12	13	14	15	16	17	18	19	20	-	23	0	1	2	-	8	9	10	11	-	23	0	-	9	10	11	-	23
Hour End	1	-	10	11	12	13	14	15	16	17	18	19	20	21	-	24	1	2	3	-	9	10	11	12	-	24	1	-	10	11	12	-	24

Gas Nom.		ID1 @		Timely @	ID2 @		Evening	ID3 @																															
Deadlines		1100		1400	1530		@ 1900	2000																															



- RTC – real-time commitment
- RAC = reliability assessment and commitment
- SCUC = security constrained unit (or resource) commitment