

Dual Fuel Schedule Requirements: Initial Design Components & Options

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This presentation introduces design components and solution options to address concerns with dual fuel capability during extreme cold weather events.

These slides are designed to help facilitate discussion around proposal development. Design components and solution options are also documented in the Options Matrix, posted with today's meeting materials.

- Problem statement brought forward after Winter Storm Fern (WSF) states two areas of concern:
 - needed clarity for energy must offer requirements of dual fuel capacity resources
 - during extreme weather events PJM Operations may require additional flexibility to preserve on-site fuel from dual fuel capacity resources
- PJM supports discussion on both areas

For purposes here, dual fuel capacity resources are Gas Combustion Turbine Dual Fuel or Gas Combined Cycle Dual Fuel with a provided attestation during the winter season and capacity commitment

- Requirements from governing documents and business manuals regarding the energy must offer rules for dual fuel capacity resources are clear
- As described during the May MIC education session:
 - ELCC classes are defined in the RAA to group resources that share common operational characteristics and are utilized in the ELCC analysis for capacity accreditation
 - Energy must offer for dual fuel resources committed for capacity must make both fuel schedules available during winter season

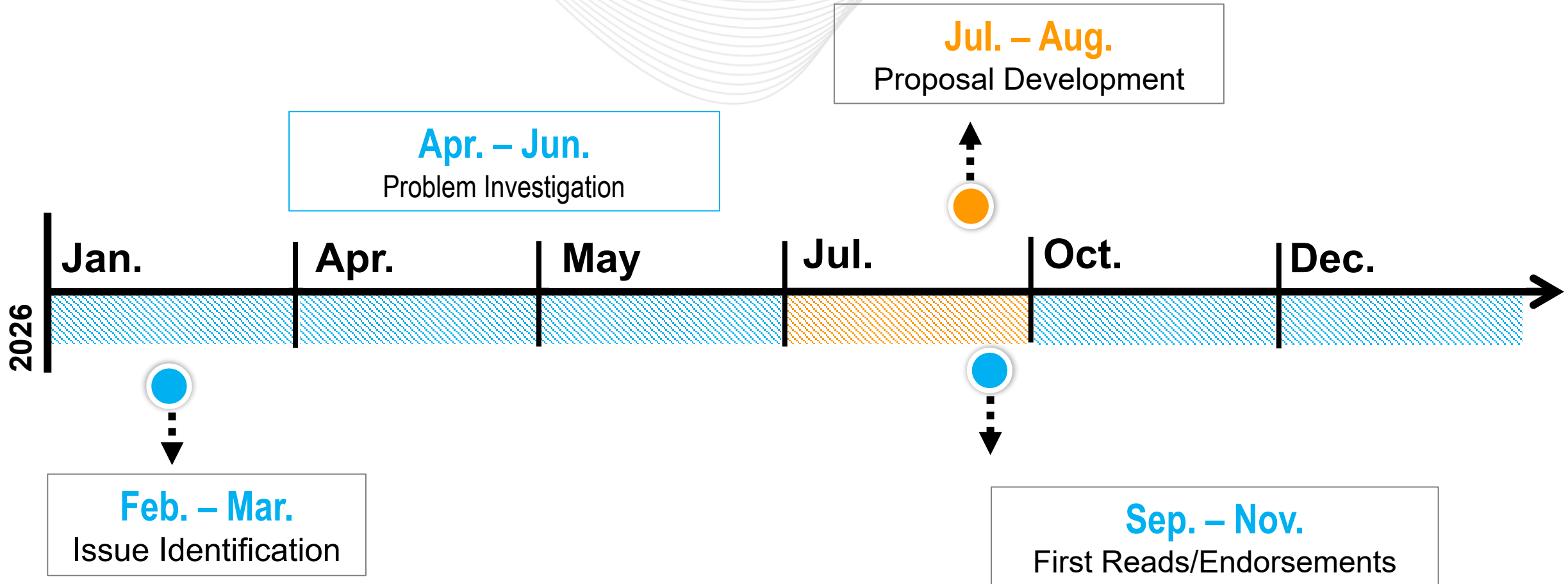
- 16-hour requirement for ELCC classification originates from M-13 Max emergency procedures (see design component #3)
- That qualification is different than requirements for the energy must offer:
 - Capacity Market Sellers that have provided an attestation of dual fuel capability during the winter season for their resources in the Gas Combustion Turbine Dual Fuel Class or Gas Combined Cycle Dual Fuel Class shall meet the must offer requirement by having an available schedule for the primary fuel and an available schedule for the alternative fuel for scheduling by PJM on such alternative fuel during the winter season, within operational limitations due to energy or environmental limitations imposed on the generating unit by Applicable Laws and Regulations. When the resource is not capable of operating on such alternative fuel during the winter season, the resource shall follow the requirements in M10, Section 2: Generation Outage Reporting.

- PJM supports pursuing a more elegant approach to preserving on-site fuels for dual fuel resources in extreme cold weather conditions based on experiences with Winter Storm Fern
- Initial design components focus on enhanced Markets Gateway functionality to effectuate this ability for Market Sellers and clear, definitive triggers that initiate this procedure

Design Components ¹	Status Quo	A
Implementation	N/A	TBD
Conditions that trigger for conservation of on-site fuel for Dual Fuel resources	Operator discretion depending upon the current and future system conditions	Anticipated conservative operations declaration or escalating emergency procedure
Trigger for Dual Fuel Unit Max Emergency Status	Dual fuel units that can run on either natural gas or another onsite fuel are placed in Maximum Emergency when limited by non-fuel (emissions, or other consumable) resource limitations to less than 16 hours for CTs / 32 hours for Steam. When fuel limited, they are to be placed in Maximum Emergency only when unavailable on natural gas, and their on-site fuel inventory is less than 16 hours for CTs / 32 hours for Steam.	Status Quo
Trigger for Dual Fuel Schedule Availability Status	Current energy must offer requirement: Capacity Market Sellers that have provided an attestation of dual fuel capability during the winter season for their resources in the Gas Combustion Turbine Dual Fuel Class or Gas Combined Cycle Dual Fuel Class shall meet the must offer requirement by having an available schedule for the primary fuel and an available schedule for the alternative fuel for scheduling by PJM on such alternative fuel during the winter season, within operational limitations due to energy or environmental limitations imposed on the generating unit by Applicable Laws and Regulations. When the resource is not capable of operating on such alternative fuel during the winter season, the resource shall follow the requirements in M10, Section 2: Generation Outage Reporting.	Status Quo for Winter, plus mandatory schedule for gas offered in Summer, unless there is an anticipated Conservative Operations Declaration or escalating Emergency Procedure and there is an anticipation of less than 32 hours of on-site fuel available during forecasted conditions which enforces schedule for on-site fuel put in Max Emergency by market participant in Markets Gateway prior to Day-ahead market bid close for market day.

Design Components ¹	Status Quo	A	B
Manifestation of conservation of Fuel for Dual Fuel resources in Day-ahead(DA) and Real-time(RT) market	Dual fuel resources need to make both fuels available in DA and RT markets during winter season	The schedule corresponding to the fuel that needs to be conserved put on max emergency and made unavailable in Markets Gateway by Market Participant prior to DA market bid close for the market day.	
Notification/Visualization of conservation of Fuel for Dual Fuel resources in Day-ahead(DA) and Real-time(RT) market	PJM Operations contact with Market Seller	PJM Operations contact with Market Seller (or ALL CALL) and reflection of schedule in Max Emergency in Markets Gateway.	

Review/Endorsement Timeline



1	2
PJM focus is on creating additional operational flexibility during extreme cold weather events	Markets Gateway changes will be required to effectuate these changes

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Dual Fuel Schedule Requirements



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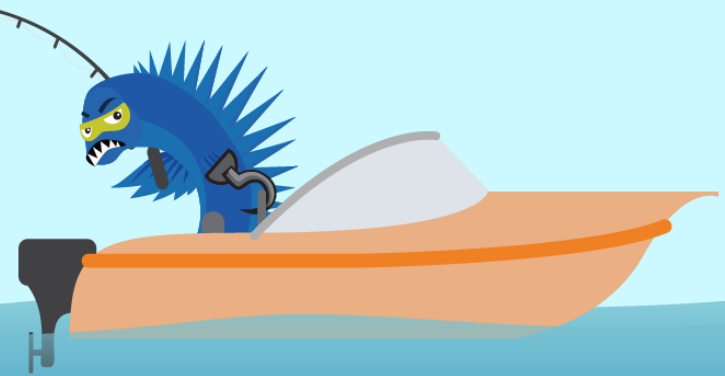
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