New York ISO
Independent System Operator

Improve Duct-Firing Modeling: Update

Vijay Kaki

ENERGY MARKET DESIGN SPECIALIST

ICAPWG/MIWG

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Agenda

- Background
- 2022 Proposed Market Design Concept and Updates
- Next Steps

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Previous Presentations

Date	Working Group	Discussion Points and Links to Materials
10-27-2022	ICAPWG/MIWG	Improve Duct-Firing Modeling: Market Design Concept Proposed https://www.nyiso.com/documents/20142/34087499/Improve%20Duct%20Firing%20Modeling%20MDCP_MIWG_10272022.pdf/8e18e862-1ba0-513b-bc18-1573fb55f1dc
09-30-2022	ICAPWG/MIWG	Improve Duct-Firing Modeling Update https://www.nyiso.com/documents/20142/33520089/Improve%20Duct%20Firing%20Modeling_MIWG_09302022_final%20(002).pdf/1dd9e83a-a2f2-bac4-b8ed-f3e3d97a9461
08-24-2022	ICAPWG/MIWG	Improve Duct-Firing Modeling Update https://www.nyiso.com/documents/20142/32941988/DBimprove_MIWG_08242022_final.pdf/862020d9-faa1-ab30-9f02-e9aa8604d43f
04-05-2022	ICAPWG/MIWG	Improve Duct-Firing Modeling – Update https://www.nyiso.com/documents/20142/29688278/DBimprove_MIWG_040522_final.pdf/fe5ca5ce-d999-7609-a671-6311d06c573a
02-08-2022	ICAPWG/MIWG	Improve Duct-Firing Modeling – Kick-off https://www.nyiso.com/documents/20142/28305948/DBimprove_MIWG_020822_r2.pdf/cd34412c-cce6-5f84-230e-511b0f00e4cc

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Background

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Project Background

- **The Improve Duct-Firing Modeling Project is considering market enhancements to better accommodate combined-cycle gas turbine generators ("CCGTs") equipped with duct-firing.**
  - Market Design Concept Proposed in 2022
  - Not prioritized for 2023
  - Will be included in 2024 project list.

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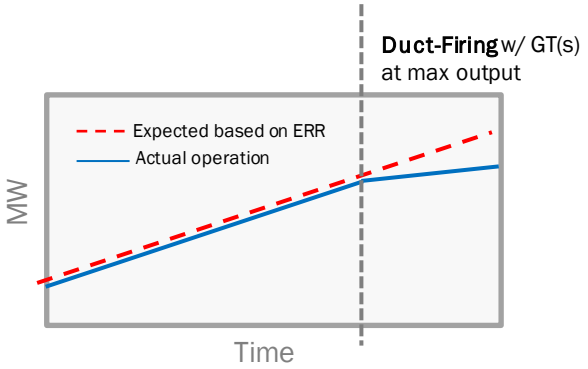
Problem Statement

- **For Energy market participation, up to three normal response rates (NRRs) may be used to characterize the MW/min ramp rate of a generator with respect to MW output.**
  - The NRR values and breakpoints can be tailored to best fit the specific generator's operating characteristics.
    - For example, reduced ramp rate capability in a certain range of operation (e.g., ramping on duct burners alone).
    - NRRs only apply to normal energy dispatch.
- **For Operating Reserves scheduling, the emergency response rate (ERR) is used.**
  - ERR is a single value required to be greater than or equal to all NRRs.
    - Thus, it does not appropriately capture the variable ramp rate over the complete operating range of some units.



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Problem Statement

- **It has been observed that CCGTs equipped with duct-firing systems may not be able to physically achieve their registered ERR when ramping through the region where duct burners are used.**
  - Operators could over-account for generation from these units when they are in the duct-firing region leading to the unavailability of certain generation during RT operation.
- **This project explores changes to accommodate the operating capability of CCGTs when they are in the duct-firing region and called upon to provide reserves.**
  - Although the genesis of this effort was focused on improving the model for CCGTs, the NYISO believes that the functionality may also be helpful for Hybrid resources and/or heterogenous DER Aggregations and accommodate the response rates from the various technologies in a single Aggregation.

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2022 Proposed Market Design Concept And Updates

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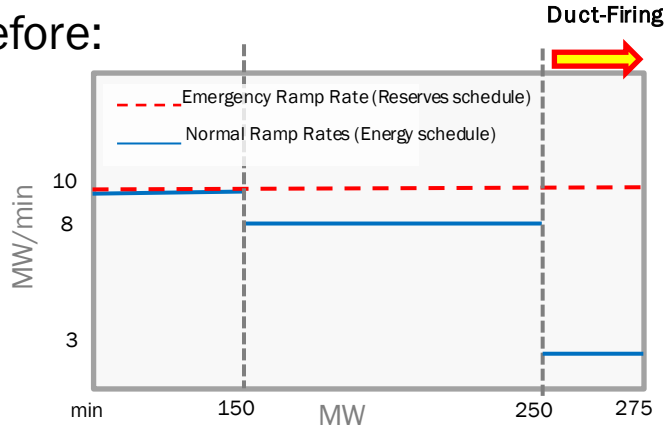
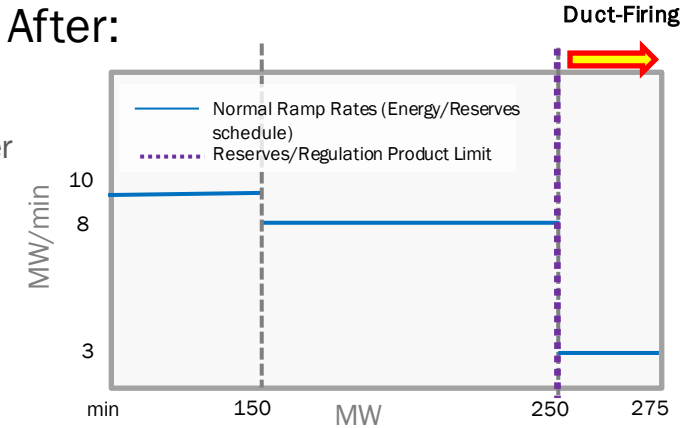
Market Design Concept

- **Use multiple ramp rates for scheduling reserves**
  - Consistent with scheduling of energy today, leverage normal ramp rate “segments” (instead of the single emergency rate) to schedule reserves.
  - The ramp rates utilized for operating reserve shall be the same as energy ramp rates which are registration parameters.
- **Allow limited participation for reserve and regulation products**
  - If necessary due to limitations of the plant’s configuration, the MP may set a participation limit for reserves that is lower than the unit’s operating capacity.
  - The existing ramp rate breakpoint for duct-firing range shall be used for setting the threshold limit when MP opts to limit participation in a specific reserve product.
  - Opting to use the participation limit shall be a registration parameter.

Before:



After:



*example values

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Stakeholder and MMU requests

- **Consider limiting participation for regulation (Stakeholders)**
  - Stakeholders requested NYISO to investigate prototyping limiting participation for regulation since some generators have a transition time to move from the normal operating region to the duct burner region and are not able to provide any MWs during the switch to the duct-burner region when called for regulation.
- **Consider flexible ramp rate break points (MMU)**
  - Currently, the ramp rate breakpoints are registration parameters which are static.
  - Due to ambient condition changes like temperature changes, the ramp rate breakpoints could vary causing operators to over- or under-account for generation from these units.
  - MMU requested NYISO to consider incorporating flexible ramp rate breakpoints into this project scope to accommodate ambient condition changes.

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Market Design Updates

- **MDCP was presented at the end of October 2022.**
  - Prototyping and testing for multiple ramp rates was completed at the time.
  - Prototyping for the limiting participation model for reserves had started.
  - Limiting participation for regulation was also being studied based on stakeholder feedback.
- **At the end of last year, the prototype was delivered for the Limiting Participation for both Reserves and Regulation**
  - Initial testing has also been successfully completed for this prototype with the combination of the multiple ramp rates' prototype.
- **Project is not prioritized in 2023. Project will be added to the 2024 project prioritization.**

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Proposed 2024 Duct Firing Scope

- Multiple Ramp Rates for Reserves
- Limiting Participation for Reserves
- Limiting Participation for Regulation
- Flexible Ramp Rate breakpoints will not be a part of the 2024 scope.
  - Market Participants can change their existing registration ramp rate breakpoints while working with stakeholder services if needed.

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Next Steps

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Next Steps

- This project will be presented in an upcoming BPWG.
- This project will be incorporated in the 2024 project prioritization process.

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Our Mission & Vision

Mission

Ensure power system reliability and competitive markets for New York in a clean energy future

Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

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