New York ISO
Independent System Operator

Improve Duct-Firing Modeling: Implementation Plan and Proposed Tariff Revisions

Vijay Kaki

Market Design Specialist

Energy Market Design

ICAPWG/MIWG

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Agenda

- Background
- Implementation Plan
- Draft Definitions and Tariff Revisions for Limiting Participation and RTD-CAM Enhancements
- Next Steps

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Prior Presentations

Date	Working Group	Discussion Points and Links to Materials
02-29-2024	ICAPWG/MIWG	Improve Duct-Firing Modeling: Market Design Update https://www.nyiso.com/documents/20142/43275262/Improve%20Duct%20Firing%20Modeling_02292024_final.pdf/1512a290-02ec-afb8-92e3-9aa8bf9e9c07
02-07-2024	ICAPWG/MIWG	Improve Duct-Firing Modeling Kickoff https://www.nyiso.com/documents/20142/42807168/Improve%20Duct%20Firing%20Modeling%20MDC_Kickoff_02072024.pdf/ebc1c317-a42f-669e-1f3e-26ccd5e80b44
08-30-2023	BPWG	Market Project Descriptions: Improve Duct-Firing Modeling (Page 13) https://www.nyiso.com/documents/20142/39653286/August%2030%20BPWG%20Market%20Project%20Descriptions.pdf/7ade6560-c017-c29a-7ab9-769cd3a4c01e
03-07-2023	ICAPWG/MIWG	Improve Duct-Firing Modeling Update https://www.nyiso.com/documents/20142/36639552/Improve%20Duct%20Firing%20Modeling%20Update_MIWG_03072023_final.pdf/2f5af6b8-11b5-f1c2-e0ce-59585dfc1f00
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.

- 2024 project commitment is to complete the Functional Requirement Specifications (FRS).

- As per NYISO's 2023 Market Vision Report, the project deployment is scheduled for 2025.

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Implementation Plan

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Implementation Plan

- Initial prototyping for Limiting Participation and Multiple Ramp Rates has been successful.
- Prototyping identified multiple challenges to full implementation, in particular for Multiple Ramp Rates, that require further resources and time.
- NYISO proposes to implement the proposed Duct-Firing enhancements in two phases:
  - **Phase 1:** Limiting Participation and RTD-CAM enhancements being deployed in 2025.
  - **Phase 2:** Multiple Ramp Rates' timeline is under consideration.
  - By implementing Limiting Participation and RTD-CAM enhancements in an initial deployment, it has been observed that this could lead to significant benefits in the near term.
- Today's presentation will review the tariff associated with the Limiting Participation and RTD-CAM enhancements
- The Functional Requirements Specifications (FRS) will be drafted this year.

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Draft Definitions and Tariff Revisions for Limiting Participation and RTD-CAM Enhancements

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Draft Definitions

- **Combined Cycle Gas Turbine ("CCGT") Generator –**
  - A Generator that produces electric power from gas turbine (s) and uses exhaust heat from gas turbine(s) to generate steam and additional electric power with a heat recovery steam generator and steam turbine (s).
- **Combined Cycle Gas Turbine ("CCGT") Generator with Duct-Firing Capability –**
  - A Combined Cycle Gas Turbine Generator equipped with duct burners, which add additional heat to the steam used to produce additional electric power from the heat recovery steam generator and steam turbine (s).
- **Limiting Participation Flag –**
  - An Operating Reserve and Regulation participation option that Combined Cycle Gas Turbine Generators with Duct-Firing Capability may utilize, subject to technical validation pursuant to ISO Procedures, to limit 10-min Spinning Reserves and Regulation Capacity Schedule to the response rate breakpoint corresponding to the start of the Duct-Firing range.
- **Participation Limit –**
  - The response rate breakpoint corresponding to the start of the Duct-Firing range in a Combined Cycle Gas Turbine Generator with Duct-Firing Capability, which is used as the upper limit for scheduling 10-min Spinning Reserves and Regulation Service. This limit does not apply to Energy scheduling.

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Day-Ahead Markets and Schedules (MST 4.2)

- The quantity of Operating Reserves that a Combined Cycle Gas Turbine Generator with Duct-Firing Capability, that has opted for the Limiting Participation Flag, can provide is limited to its Participation Limit.

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Real-Time Markets and Schedules (MST 4.4)

- In RTD-CAM, Combined Cycle Gas Turbine Generators with Duct-Firing Capability that have opted for the Limiting Participation Flag will not be dispatched beyond the Participation Limit.
- If these resources are already at or above their Participation Limit, they will be maintained at their physical basepoint.

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Real-Time Markets and Schedules (MST 4.4) (continued)

- **In Max Gen Pickup mode of RTD-CAM:**
  - Combined Cycle Gas Turbine Generators with Duct-Firing Capability can be scheduled to the UOLe level using their normal response rate pertaining to the operating region that its physical base point was in prior to the activation of the RTD-CAM mode.
  - Combined Cycle Gas Turbine Generators with Duct-Firing Capability, that have opted for the Limiting Participation Flag can be scheduled
    - To their Participation Limit using their normal response rate pertaining to the operating region that its physical base point was in prior to the activation of the RTD-CAM mode if the Generator was at a level below the Participation Limit.
    - To stay at the level that the Generator was in prior to the RTD-CAM activation if the Generator was at a level equal to or above the Participation Limit.

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General Day-Ahead and Real-Time Market Rules (15.4.2 and 15.4.3)

- **Combined Cycle Gas Turbine Generators with Duct-Firing Capability, that have opted for the Limiting Participation Flag can be scheduled to:**
  - The least of the resource's emergency response rate multiplied by ten or the resource's applicable Participation Limit for 10-min spinning reserves.
  - The least of the resource's emergency response rate multiplied by twenty or its applicable upper operating limit for 30-min reserves.

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Variations in RTD-CAM (17.1.2.1.3)

- **Under the Max Gen Pickup mode:**
  - The ISO will have the discretion to either move the RTD basepoint signal of each CCGT with Duct-Firing Capability towards its UOLe at the normal response rate pertaining to the operating region that its physical base point was in prior to the RTD-CAM activation or set it at a level equal to its physical base point.
  - The ISO will have the discretion to either move the RTD basepoint signal of each CCGT with Duct-Firing Capability, that has opted for the Limiting Participation Flag:
    - Towards its Participation Limit at the normal response rate pertaining to the operating region that its physical base point was in prior to the RTD-CAM activation or set it at a level equal to its physical base point if the Generator is below the Participation Limit.
    - Set it at a level equal to its physical base point if the Generator is above or equal to the Participation Limit.

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Proposed Tariff Revisions

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Services Tariff Sections Posted with Today's Materials

- **NYISO posted proposed MST revisions:**
  - MST 4.2
  - MST 4.4
  - MST 15.4
  - MST 17.1

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Next Steps

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Next Steps (Phase 1)

- Q2
  - Consumer Impact Analysis Results
  - Final tariff revisions for Phase 1
- Q2/Q3
  - BIC/MC Vote for Phase 1

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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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