

Appendix A - Explanation of Terms and Instructions for Data Preparation of ISO New England Form NX-12, Generator Technical Data

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Table of Contents

GENERAL INFORMATION	2
SPECIFIC INFORMATION.....	3
Section 1: Data Revision Information	3
Section 2: Operational Basic Information	4
Section 3: Physical Generator Capabilities	11
Section 4: Additional Information Required for Gas Turbine and Combined Cycle Assets Only	13
Section 5: Additional Information	14
OP-14 Appendix A Revision History.....	15

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GENERAL INFORMATION

The NX-12 Generator Technical Data form requests information needed by ISO New England (ISO) to understand the Generator operating parameters. All required data must be provided for each defined Generator, as per OP-14, Section II.A.

Once an initial NX-12 has been provided, any change in Generator data must be reported to ISO via "Ask ISO". The Lead Market Participant (Lead MP) for the Generator shall provide an explanation and/or documentation to support the change request. The explanation may be in the form of a verbal review with ISO or written documentation, as stipulated by ISO. ISO shall review the supporting explanations and determine if the change request will be accepted, denied, or if further modification or information is needed in order to accept the change request.

In order for an NX-12 form to be approved by ISO, all required data must be provided without errors and without omissions. It is the responsibility of the Lead MP to correct errors or omissions of NX-12 data form and re-submit the corrected data to ISO. ISO will be the sole judge of when NX-12 data is complete and correct. The effective date for changes to NX-12 data items must be at least seven (7) business days from the date that such determination is made by the ISO that the data is complete and without errors.

When requested to select from a list of items, please indicate your selection by entering an "x" in the appropriate space on the NX-12 form.

Revision - Form revision identification and date of revision.

Lead Market Participant - The Lead Market Participant of a Generator as defined in Section I.2.2 of the Tariff.

LP ID# - The Customer ID, as assigned to each entity at the time of Customer Registration, as defined in ISO New England Manuals and Procedures.

Local Control Center - The Local Control Center (LCC) with TOP responsibilities for the transmission system where the Generator is interconnected.

Generator Name - The name of the Generator must:

- Be unique to each Generators
- Length **cannot** exceed 30 characters

Generator ID - The Generator Asset ID, as assigned to each Generator at the time of Asset Registration Procedure, as defined in ISO New England Manuals and Procedures.

Designated Entity - Name of the entity, for the Generator, registered in accordance with ISO Manual M-RPA that receives, acknowledges, and responds to the ISO dispatch instructions and communications. The DE name must:

- Be unique
- Not exceed 27 characters

DE ID# - The unique identification number, for each DE, assigned by the ISO at the time of Registration, done in accordance with ISO Manual M-RPA

SPECIFIC INFORMATION

Section 1: Data Revision Information

This information includes the Data Revision Number, date prepared and requested effective date.

Data Revision No. - The first time an NX-12 is filed by a Lead MP and approved by ISO, it must be assigned Data Revision Number 0. Each time revised data is submitted and approved by ISO, the Data Revision Number must be incremented. The revision number should only be incremented from one approved NX-12 to the next approved NX-12. In other words, if changes to an approved NX-12 are desired and a new NX-12 form is submitted for approval, the data revision number should be incremented. If, however, there are errors or missing data on that new NX-12 form, another corrected form must be submitted by the Lead MP. This corrected form should have the errors corrected and/or missing data provided, but the Data Revision Number should be the same as on the previously submitted form. The Data Revision Number is incremented only from one approved NX-12 to the next approved NX-12.

Date Prepared - The date on which the NX-12 data is completed and submitted to ISO.

Requested Effective Date - The date that the new NX-12 is to become effective. For a new Generator, the effective date is to be at least One Hundred Twenty (120) days following the day that the designated recipient at ISO receives the NX-12 (assuming that the NX-12 form and all other required data are complete and without errors). For an existing Generator, the effective date is to be at least seven (7) business days following the day that the designated recipient at ISO receives the data (assuming it is complete and without errors). If there are errors or omissions of NX-12 data, subsequent submittals of corrected NX-12 data must have a Requested Effective Date that is at least seven (7) business days from the date that the corrected NX-12 data is received by ISO.

Section 2: Operational Basic Information

This information indicates the Generator Type, Predominate (Primary) Fuel Type, Secondary (Alternate) Fuel Type, Startup Fuel Type, Heat Rate, Physical Capabilities and Fuel Switch of a Generator.

Generator Type - Select the type (prime mover) of Generator from the choices listed in the drop-down menu.

1. CAS - Compressed Air Energy Storage
2. CC - Combined Cycle Total Unit
3. ES - Energy Storage (Excludes Pumped Storage)
4. FC - Fuel Cell – Electrochemical
5. GT - Combustion (Gas) Turbine
6. HDP - Hydraulic Turbine - Conv Daily Pondage
7. HDR - Hydraulic Turbine - Conv Daily ROR
8. HTT - Hydraulic Turbine - Tidal
9. HW - Hydraulic Turbine - Conv Weekly Pondage
10. PS - Hydraulic Turbine - Reversible (pumped storage)
11. IG - Integrated Coal Gasification Comb Cycle
12. IC - Internal Combustion Engine
13. OT - Other
14. PV - Photovoltaic
15. PB - Pressurized Fluidized Bed Combustion
16. ST - Steam Turbine
17. WT - Wind Turbine

Startup Fuel Type - Select the Generator startup fuel type from the choices listed in the drop-down menu.

1. AB - Agricultural Crop Byproducts/Straw/Energy Crops
2. BIT - Anthracite Coal and Bituminous Coal
3. BLQ - Black Liquor
4. BFG - Blast Furnace Gas
5. SC - Coal Synfuel
6. DFO - Distillate Fuel Oil. Including ULSD and FO1, FO2, FO4
7. PG - Gaseous Propane
8. JF - Jet Fuel
9. KER - Kerosene
10. LFG - Landfill Gas
11. LIG - Lignite Coal
12. MSW - Municipal Solid Waste
13. NG - Natural Gas
14. NUC - Nuclear Uranium, Plutonium, Thorium
15. OBG - Other Biomass Gas. Includes digester gas, methane, and other biomass gasses.
16. OBL - Other Biomass Liquids.

17. OBS - Other Biomass Solids
18. OTR - Other
19. PC - Petroleum Coke
20. PUR - Purchased Steam
21. RFO - Residual Fuel Oil. Including Bunker C and FO6
22. SLW - Sludge Waste
23. SUN - Solar
24. SUB - Subbituminous Coal
25. TDF - Tire-derived Fuels
26. WC - Waste/Other Coal.
27. WO - Waste/Other Oil.
28. WAT - Water
29. WND - Wind
30. WDL - Wood Waste Liquids excluding Black Liquor.
31. WDS - Wood/Wood Waste Solids.

Predominate (Primary) Fuel Type - Select the Generator primary fuel type from the choices listed in the drop-down menu.

1. AB - Agricultural Crop Byproducts/Straw/Energy Crops
2. BIT - Anthracite Coal and Bituminous Coal
3. BLQ - Black Liquor
4. BFG - Blast Furnace Gas
5. SC - Coal Synfuel
6. DFO - Distillate Fuel Oil. Including ULSD and FO1, FO2, FO4
7. PG - Gaseous Propane
8. JF - Jet Fuel
9. KER - Kerosene
10. LFG - Landfill Gas
11. LIG - Lignite Coal
12. MSW - Municipal Solid Waste
13. NG - Natural Gas
14. NUC - Nuclear Uranium, Plutonium, Thorium
15. OBG - Other Biomass Gas. Includes digester gas, methane, and other biomass gasses.
16. OBL - Other Biomass Liquids.
17. OBS - Other Biomass Solids
18. OTR - Other
19. PC - Petroleum Coke
20. PUR - Purchased Steam
21. RFO - Residual Fuel Oil. Including Bunker C and FO6
22. SLW - Sludge Waste
23. SUN - Solar
24. SUB - Subbituminous Coal
25. TDF - Tire-derived Fuels

26. WC - Waste/Other Coal.
27. WO - Waste/Other Oil.
28. WAT - Water
29. WND - Wind
30. WDL - Wood Waste Liquids excluding Black Liquor.
31. WDS - Wood/Wood Waste Solids.

NOTE

The secondary fuel is **not** the startup fuel.

Secondary (Alternate) Fuel Type - If a Generator can run on an alternate fuel or blend of fuels, select the Generator secondary fuel type from the choices listed in the drop down menu. If an alternate fuel is used only during startup, that fuel should be entered under **Startup Fuel Type** and should **not** be repeated here.

1. AB - Agricultural Crop Byproducts/Straw/Energy Crops
2. BIT - Anthracite Coal and Bituminous Coal
3. BLQ - Black Liquor
4. BFG - Blast Furnace Gas
5. SC - Coal Synfuel
6. DFO - Distillate Fuel Oil. Including ULSD and FO1, FO2, FO4
7. PG - Gaseous Propane
8. JF - Jet Fuel
9. KER - Kerosene
10. LFG - Landfill Gas
11. LIG - Lignite Coal
12. MSW - Municipal Solid Waste
13. NG - Natural Gas
14. NUC - Nuclear Uranium, Plutonium, Thorium
15. OBG - Other Biomass Gas. Includes digester gas, methane, and other biomass gasses.
16. OBL - Other Biomass Liquids.
17. OBS - Other Biomass Solids
18. OTR - Other
19. PC - Petroleum Coke
20. PUR - Purchased Steam
21. RFO - Residual Fuel Oil. Including Bunker C and FO6
22. SLW - Sludge Waste
23. SUN - Solar
24. SUB - Subbituminous Coal
25. TDF - Tire-derived Fuels
26. WC - Waste/Other Coal.
27. WO - Waste/Other Oil.
28. WAT - Water
29. WND - Wind

30. WDL - Wood Waste Liquids excluding Black Liquor.

31. WDS - Wood/Wood Waste Solids.

Local Gas Distribution Company - Name of the Local Gas Distribution Company (LGDC) to which a Generator is physically connected. A selection is required whenever Natural Gas is selected in any of the fuel type categories (Startup, Predominant, Secondary) and the Generator is connected to an LGDC. Otherwise, leave this field blank.

Primary Gas Pipeline - Name of the primary pipeline to which the Generator is physically connected. A selection is required whenever Natural Gas is selected in any of the fuel type categories (Startup, Predominant, Secondary) and connected to a pipeline. If the Generator is connected to an LGDC, this field represents the primary natural gas pipeline to which the LGDC is connected. In the event that the Generator is connected to both an LGDC and a pipeline, this shall be the pipeline to which the LGDC is connected. Select the pipeline name from the list below:

1. Algonquin
2. Distrigas
3. Iroquois
4. M&N
5. PNGTS
6. Tennessee
7. Vermont Gas

Secondary Gas Pipeline - Name of the alternate pipeline to which the Generator or LGDC is physically connected. A selection is only required whenever Natural Gas is selected in any of the fuel type categories (Startup, Predominant, Secondary) and the Generator or LGDC is connected to more than one pipeline. Select the pipeline name from the list below:

1. Algonquin
2. Distrigas
3. Iroquois
4. M&N
5. PNGTS
6. Tennessee
7. Vermont Gas

Heat Rate (Btu/kWh), Primary Fuel - For each non-nuclear thermal Generator, the measure of the Generator thermal efficiency at full load at 90 degrees Fahrenheit (F), when using the primary fuel. The heat rate is the ratio of fuel energy input as heat per unit net work output expressed as British thermal units per kilowatt-hour (Btu/kWh). Btu/kWh can be rounded to the nearest 100 Btu.

Heat Rate (Btu/kWh), Alternate Fuel - For each non-nuclear thermal Generator, the measure of the Generator thermal efficiency at full load at 90 degrees Fahrenheit (F), when using the alternate fuel. The heat rate is the ratio of fuel energy input as heat per unit net work output expressed as British thermal units per kilowatt-hour (Btu/kWh). Btu/kWh can be rounded to the nearest 100 Btu.

Primary Fuel Onsite Storage Indicator - Select Y (Yes) or N (No) from dropdown menu to indicate whether the Primary Fuel has any onsite storage. A Generator is considered to have onsite fuel storage if there is immediate access to use of the fuel on its site or nearby with a direct connection.

Primary Fuel Transport Method - The primary means the Primary Fuel is delivered to the onsite storage. Select one of the following from dropdown:

1. Conveyor
2. Pipeline
3. Railroad
4. Truck
5. Barge

Maximum Onsite Storage Capacity - The highest amount of storage capacity for the Primary Fuel measured in units based on the fuel selected.

Maximum Usable Fuel Amount - The highest amount of Primary Fuel usable from the onsite storage for the Generator

Shared Onsite Storage Indicator- Primary Fuel - Indicates whether the Primary Fuel onsite storage is shared by other Generators.

Change to Maximum MW Output on Alternate Fuel - The maximum change in MW output while operating on Alternate Fuel (relative to operation on Primary Fuel)

Change to Maximum Response Rate on Alternate Fuel - The change to maximum response rate while operating on Alternate Fuel (relative to operation on Primary Fuel)

Alternate Fuel Onsite Storage Indicator - Select Y (Yes) or N (No) from dropdown menu to indicate whether the Alternate Fuel has any onsite storage. A Generator is considered to have onsite fuel storage if there is immediate access to use of the fuel on its site or nearby with a direct connection.

Alternate Fuel Transport Method - The primary means the Alternate Fuel is delivered to the onsite storage. Select one of the following from dropdown:

1. Conveyor
2. Pipeline
3. Railroad
4. Truck
5. Barge

Maximum Onsite Storage Capacity - The highest amount of storage capacity for the Alternate Fuel measured in tons or barrels based on the Fuel selected.

Maximum Usable Fuel Amount - The highest amount of Alternate Fuel usable from the onsite storage for the Generator

Shared Onsite Storage Indicator- Alternate Fuel - Indicates whether the Alternate Fuel onsite storage is shared by other Generators.

Fuel Switch:

1. Preparation Time - Primary to Alternate:

For Generators with both a Predominate and Secondary Fuel, identify the advance notice time (in Hours) necessary to perform the fuel switching operation including the swap time. For Generators with a single fuel, leave this field blank.

This transition is from full load on Primary Fuel to dispatchable on Alternate Fuel. This time value is entered regardless of whether the Generator can or **cannot** perform an online fuel switch.

2. Preparation Time - Alternate to Primary:

For Generators with both a Predominate and Secondary Fuel, identify the advance notice time (in Hours) necessary to perform the fuel switching operation including the swap time. For Generators with a single fuel, leave this field blank.

This transition is from full load on Alternate Fuel to dispatchable on Primary Fuel. This time value is entered regardless of whether the Generator can or **cannot** perform an online fuel switch.

3. Online Fuel Switch Capable:

Defines whether a Generator can perform the fuel switching operation, from primary to secondary fuel source, while online and synchronized to the grid.

- Yes would indicate that the fuel switch could be done while the Generator is online and synchronized, even if a slight reduction in output is necessary to perform the fuel switch.
- No would indicate that the Generator must be taken offline (non-synchronized to the grid), perform the fuel switch, and then be resynchronized to the grid.

Capabilities - Select Y (Yes) or N (No) from the dropdown menu:

1. Blackstart Capable

Indicates that a Generator has the physical ability to Blackstart (starting without outside electrical supply). All Generators with this capability must select this indicator in the NX-12 Generator Technical Data Form. This is an indication of physical capability only and does **not** imply or convey approval, acceptance or contractual obligation for supply or compensation under Schedule 16 of the OATT.

2. Electronic Dispatch Capable:

Indicates the Generator has Electronic Dispatch Capability and is able to receive dispatch instructions via an ISO Communications Front End (CFE) connected Remote Terminal Unit (ISO-connected RTU).

3. Do Not Exceed Dispatchable:

Indicates the Generator operates under Do Not Exceed Dispatchable guidelines as specified in the Tariff.

4. Fast Start Capable:

A Generator with the ability to operate with all of the following characteristics:

- a. Minimum Run Time does **not** exceed one hour;
- b. Minimum Down Time does **not** exceed one hour;
- c. Time to start does **not** exceed 30 minutes after receiving a Dispatch Instruction from ISO;
- d. Available for dispatch and manned or has automatic remote dispatch capability;
- e. Capable of receiving and acknowledging a start-up or shut-down dispatch instruction electronically.

5. Auto Start Capable

Any Generator that is configured such that the START / STOP / EMERGENCY / NORMAL signal delivered to the ISO-connected RTU is electronically transferred to the generation plant control equipment. The plant control equipment is then capable of:

NOTE

It is **not** acceptable for the Generator RTU to directly provide the ACK response to an ISO START/EMERGENCY signal. The ACK must come from the Generator generation control computer and be passed to the Generator RTU, which then passes it back to the ISO CFE.

This capability requires prior written approval from ISO before being accepted on NX-12.

The Auto Start Capable Flag shall be "N" for Intermittent Power Resources and Continuous Storage Facilities.

- a. Sending an electronic acknowledgement signal back to the ISO-connected RTU indicating it has acknowledged the START/EMERGENCY request and
- b. Will physically start and operate the Generator autonomously without any user interaction.
- c. It will then follow the specified DDP target automatically and continuously.

The chain of electronic communication is:

ISO CFE → Generator RTU → Asset generation control computer

6. Regulation Capable

This indicates that a Generator has the appropriate telecommunications, control and response capability to increase or decrease its output in response to an electronic regulating control signal, in accordance with the specifications in the ISO Manuals and Operating Procedures.

Section 3: Physical Generator Capabilities

1. Nameplate Capability

The maximum rated output of the Generator Asset, in MVA, under conditions specified by the manufacturer. Installed Generator nameplate capability is typically indicated on a nameplate physically attached to the Generator. For a Generator Asset comprised of multiple units, enter the sum of the nameplate capabilities of the individual units. Typical nameplate values are given at 59 degrees F, 1 atmosphere pressure and 60% relative humidity.

2. Rated Power Factor

Values submitted on the most recent approved and implemented Interconnection Agreement with ISO. (e.g., a Generator rated at 100 MVA and required by Interconnection Agreement to have a 0.95 lagging power factor and a 0.95 leading power factor would have lagging 95 MW -31 MVar, leading 95 MW -31 MVar)

3. Minimum Manual Load Point

The minimum generation amount, in net MW, specified by the manufacturer, for a Generator to remain stable for an extended period of time. For a Generator Asset comprised of multiple units, this is the lowest value required for any individual unit that is capable of operating without the support of another unit (e.g., combustion turbine on a combined cycle plant). In the event that multiple units must be run (e.g., steam **cannot** be dumped or bypassed on a combined cycle plant), this is the lowest output for the combined units. This is a reliability declaration, **not** a Market declaration and will **not** be considered or used for Market operations.

4. Minimum Permitting-Restricted Load Point

The minimum generation amount, in net MW, required for a Generator to meet any regulatory requirements (e.g., emissions, minimum flow restrictions, etc.). For a Generator Asset comprised of multiple units, this is the lowest value required for the Generator Asset. This is a reliability declaration, **not** a Market declaration and will **not** be considered or used for Market operations. For Generators with **no** permitting restrictions, this value would be equal to the Minimum Manual Load Point. For ambient limited Generators, provide the value at 59 degrees F, 1 atmosphere and 60% relative humidity.

5. Network Resource Capability

Enter the *net* Network Resource Capability for each season. The Network Resource Capability can typically be found in the governing Interconnection Agreement and is fully defined in the Section II.48 of the OATT as the maximum net megawatt electrical output of the Generating Facility at the Point of Interconnection.

Winter Network Resource Capability - The maximum net megawatt electrical output of the Generating Facility at the Point of Interconnection at an ambient temperature at or above 0 degrees F.

Summer Network Resource Capability - The maximum net megawatt electrical output of the Generating Facility at the Point of Interconnection at an ambient temperature at or above 50 degrees F.

If the Network Resource Capability is only specified in the governing Interconnection Agreement as a total for a Generating Facility that includes multiple Generator Assets, the sum of the Network Resource Capabilities of the individual Assets may **not** exceed the total Network Resource Capability specified in the Agreement.

Section 4: Additional Information Required for Gas Turbine and Combined Cycle
Assets Only

For Claimed Capability Audit (CCA) purposes, ISO must adjust or normalize the output of a gas turbine and combined-cycle Assets to the standard 90° (summer) and 20° (winter) temperatures upon which Claimed Capability for such a unit is based. Lead MPs submitting an NX-12 for such a unit must include a table reflecting the full range (100° - 0°F, in one degree increments) of temperature versus MW output for that unit. The MW output values in this table must be reported to three decimal places.

The table of temperature versus output MW values in Section 4 should be representative of the expected relationship between ambient (or inlet) temperature and MW output of the Generator. The table values are expected to reflect the manufacturer-supplied relationship between temperature and output for the Generator. The MW output values at 90°F and 20°F do **not** necessarily have to match the current respective summer and winter SCC values. All temperature adjustments made to demonstration values to normalize MW output to the standard at 90°F and 20°F temperatures will be performed using current approved Table 4 values on the NX-12 form.

Section 5: Additional Information

List any additional information regarding the Generator that is not previously detailed in this form or the Offer Parameters

OP-14 Appendix A Revision History

Document History (This Document History documents action taken on the equivalent NEPOOL Procedure prior to the RTO Operations Date as well revisions made to the ISO New England Procedure subsequent to the RTO Operations Date.)

Rev. No.	Date	Reason
--	09/19/16	<u>For previous revision history, refer to Rev 10 available through Ask ISO</u>
Rev 11	04/20/16	<u>Section 2, clarified existing language and added language for new capability "Do Not Exceed Dispatchable Generator (DDG)"</u>
Rev 11.1	09/19/16	Periodic review performed requiring no content changes; Added required corporate document identity to all Footers; Truncated the Revision History per SOP-RTMKTS.0210.0010 Section 5.6;
Rev 11.2	06/06/18	Periodic review performed requiring no changes; <u>Made administrative changes required to publish a Minor Revision (including an update of the OP-14 title in headers;</u>
Rev 11.3	02/04/20	Periodic review performed requiring no changes;
Rev 12	12/23/21	Periodic review by owner; <u>Revised the explanation of "LCC" in General Information section, previous wording was inaccurate.</u>
Rev 13	12/19/23	<u>Section 2 Capabilities: Added to NOTE: "This value shall be "N" for Intermittent Power Resources and Continuous Storage Facilities."</u>