

ISO New England Operating Procedure No. 21 - Operational Surveys, Energy Forecasting & Reporting and Actions During An Energy Emergency

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References:

Federal Energy Regulatory Commission (FERC), Order No. 587 - Standards for Business Practices of Interstate Natural Gas Pipelines; Coordination of the Scheduling Processes of Interstate Natural Gas Pipelines and Public Utilities

FERC, Order No. 698 - Standards for Business Practices for Interstate Natural Gas Pipelines; Standards for Business Practices for Public Utilities

NERC Standard EOP-012 – Extreme Cold Weather Preparedness and Operations

NERC Standard IRO-010 – Reliability Coordinator Data

NERC Standard TOP-003 – Operational Reliability Data

NAESB Standard WEQ-0011 Gas/Electric Coordination Standards

NAESB WGQ Business Practice Standards, Additional Standards; Gas/Electric Operational Communication

ISO New England Inc. Transmission, Markets, and Services Tariff, Section III Market Rule 1 - Standard Market Design

ISO New England Inc. Transmission, Markets, and Services Tariff, Attachment D - ISO New England Information Policy

ISO New England Operating Procedure No. 4 - Action During a Capacity Deficiency (OP-4)

ISO New England Operating Procedure No. 7 - Action in an Emergency (OP-7)

ISO New England Operating Procedure No. 10 - Emergency Incident and Disturbance Notifications (OP-10)

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I. INTRODUCTION

This Operating Procedure (OP) documents the processes, and establishes the associated requirements for ISO New England Inc. (ISO) to:

1. Collect fuel availability and environmental limitation information for each Generator Asset ("Generator") fueled by coal, oil, and/or natural-gas, and any other Resources that ISO determines to be necessary from each respective Lead Market Participant (Lead MP);
2. Forecast and report on expected energy availability over a 21-day look-ahead period;
3. Declare Energy Alerts and Energy Emergencies based on forecasted or Real-Time system conditions;
4. Take appropriate action in anticipation of, or during, an Energy Alert or Energy Emergency;
5. Communicate with interstate natural gas pipelines, Liquefied Natural Gas (LNG) import facilities, local gas distribution companies (LDCs), Designated Entities (DEs), and Lead MPs regarding all matters related to Resource fuel availability and environmental limitations;
6. Perform probabilistic energy assessments for comparison to thresholds (i.e., Regional Energy Shortfall Threshold (REST)) for upcoming seasons and future periods;
7. Collect information related to winter readiness preparations from each Generator Asset;
8. Collect information related to natural gas pipeline system critical infrastructure.

This OP also documents the responsibilities of Lead MPs of applicable Generators for completion of periodic surveys, related communications and reporting requirements, and expectations for responses related to an ISO declaration of an Energy Alert or an Energy Emergency. Nothing in this OP shall relieve Lead MPs from their obligations under the Tariff.

Energy Emergencies (defined in Section III.C of this OP) may occur at any time as a result of sustained national or regional shortages in fuel availability or deliverability to New England's Resources. Such shortages of fuel may occur in many forms, including,

but **not** limited to: severe drought, interruption to availability or transportation of natural gas, oil, or coal.

Any of the conditions listed below, or a combination of these conditions, may contribute to an Energy Emergency (this is not meant to be an all-inclusive list of possible initiating conditions):

- One or more pipeline operational flow orders (OFOs) have been declared
- Significant reductions of Resource capability due to natural gas-related issues
- Weather forecast for an extended period of cold or hot weather, or conditions that would result in reduced production from variable energy resources (e.g., solar and wind)
- Fuel delivery to a significant number of fossil fuel-fired generating Resources is, or may be, impaired
- Prolonged drought
- Adverse weather conditions in the regional shale gas basins
- Abnormal conditions at regional LNG import, satellite storage, or LNG trucking facilities
- Extremely cold regional, national, or international weather conditions
- Any viable threat to one or more of the interstate natural gas pipelines or LDCs supplying New England
- Prolonged, significant reductions of capability to import power into the New England region
- A sustained environmental limitation on some, or several, of New England's Generators
- Any other serious threat to the integrity of the Bulk Electric System (BES) for which ISO determines that the actions of this OP may mitigate the impact

Energy Emergencies are envisioned to last much longer than capacity deficiencies, which are managed through ISO New England Operating Procedure No. 4 - Actions During a Capacity Deficiency (OP-4) and, under extreme circumstances, through ISO New England Operating Procedure No. 7 - Actions in an Emergency (OP-7). Operable capacity deficiencies are typically experienced at seasonal peak load conditions or upon the occurrence of other emergent system conditions and tend to last for a few hours per event. Because fuel shortages and/or environmental limitations may impact New England's ability to fully meet system load and Ten-Minute Reserve Requirements for days, weeks, or months at a time, ISO may need to take action in advance of a projected Energy Emergency to manage and preserve fuel supplies within the region. Unless ISO takes action to address projected Energy Emergencies, a fuel shortage and/or

environmental limitations may lead to a significant loss of Resource capacity and more extreme use of OP-4 and OP-7 actions.

The objectives of this OP are:

1. To facilitate strong lines of communication among ISO, interstate natural gas pipelines, LNG import facilities, LDCs, DEs, and Lead MPs regarding all matters relating to Resource fuel availability and environmental limitations;
2. To facilitate identification of critical infrastructure of the interstate natural gas pipeline system in order to ensure critical components are not included in automatic or manual load shed schemes;
3. To alert regional stakeholders of actual or anticipated near-term reserve deficiency or energy shortfall conditions such that stakeholders with Resources in short supply of fuel, or with potential environmental limitations, can take action to replenish fuel supplies and/or mitigate environmental limitations;
4. To perform probabilistic energy assessments using the Probabilistic Energy Adequacy Tool (PEAT) and report results in terms of the REST to alert regional stakeholders of probabilities of long-term energy shortfall conditions;
5. To alert regional stakeholders of potential energy deficiencies such that they may take action to shorten or reschedule maintenance or repair to transmission facilities or Resources throughout the region;
6. To raise the awareness of New England consumers, Lead MPs, officials of the New England states, regional and national regulators, and regional and national reliability organizations of potential energy deficiencies that may be faced by the region;
7. To allow for timely implementation of load and capacity relief available within actions of OP-4 or through implementation of load shedding through OP-7, in order to address future capacity deficiencies expected as a result of an Energy Emergency.

II. NEAR-TERM ENERGY RELIABILITY ASSESSMENTS, EMERGENCY FORECASTING, AND REPORTING OVERVIEW

A. ENERGY EMERGENCY FORECASTING AND REPORTING PROCESS DESCRIPTION AND FORECAST ALERT THRESHOLDS

ISO shall perform Energy Emergency forecasting and reporting based on available data that includes the information received from Lead MPs through the Generator Fuel and Emissions Survey submittals. Energy Emergency forecasting and reporting is performed at the periodicity specified in Sections III.A, III.B, and III.C. ISO performs Energy Emergency forecasting and reporting by using an hourly 21-day energy assessment, and comparing the results of that assessment with the Energy Emergency forecast alert thresholds (described below) in order to identify and communicate potential reliability issues to regional stakeholders.

The Energy Emergency forecasts are non-binding as forecasted or expected conditions utilized in the development of the forecasts can change. It is the responsibility of the Lead MP to take all actions to ensure that Resources are able to meet applicable obligations under the Tariff.

Energy Emergency Forecast Alert Thresholds

- Forecast MLCC 2 (FMLCC2) – indicates that available Resources during any hour of the Operating Day are forecasted to be less than 200 MW above those required to meet Operating Reserve requirements.
- Forecast Energy Emergency Alert Level 1 (FEEA1) – indicates that available Resources during any hour of the Operating Day are forecasted to be less than those required to meet Operating Reserve requirements, and that the implementation of OP-4 Actions 1 through 5 is being forecasted.
- Forecast Energy Emergency Alert Level 2 (FEEA2) – indicates that available Resources during any hour of the Operating Day are forecasted to be less than those required to meet Operating Reserve requirements and that the implementation of OP-4 Actions 6 through 11 is being forecasted.
- Forecast Energy Emergency Alert Level 3 (FEEA3) – indicates that available Resources during any hour of the Operating Day are forecasted to be insufficient to serve firm load requirements, and the implementation of firm load shedding under OP-7 is being forecasted.

ISO shall identify and report each hour of all Operating Days within the 21-day look ahead of the Energy Emergency forecast as one of the following: normal, FMLCC2, FEEA1, FEEA2, or FEEA3.

ISO shall publish the results of each Energy Emergency forecast on the ISO website. To the extent possible, for each instance where an Energy Emergency forecast alert threshold was met, the results shall include the reason(s) why the threshold was met.

Energy Alert and Energy Emergency Declaration Criteria

ISO shall declare an **Energy Alert**, and take actions as described in Section III.B of this OP, when:

- FEEA2 or FEEA3 is forecasted to occur in at least 1 hour on two or more consecutive days in days 6 through 21 of the 21-day energy assessment, or
- Any other reason(s) for which the ISO Chief Operating Officer (COO), or designee, determines that the actions described in Section III.B of this OP may mitigate the impact of an actual or forecasted energy shortfall.

ISO shall declare an **Energy Emergency** and take actions as described in Section III.C of this OP, when:

- FEEA2 or FEEA3 is forecasted to occur in at least 1 hour on two or more consecutive days in days 1 through 5 of the 21-day energy assessment, or
- Shedding of firm load under OP-7 is occurring or is anticipated to occur due to an actual energy shortfall resulting from a sustained shortage of fuel availability or deliverability to, or sustained environmental limitations on, some or several of New England Resources, or
- Any other reason(s) for which the ISO COO, or designee, determines that the actions described in Section III.C of this OP may mitigate the impact of an actual or forecasted energy shortfall.

For the purposes of this OP, ISO shall declare Normal Conditions any time when neither an Energy Alert nor an Energy Emergency has been declared.

To the extent possible, ISO shall declare Energy Alerts and Energy Emergencies on a daily boundary.

B. COMMUNICATIONS

During Normal Conditions (as described in Section III.A of this OP), the ISO shall communicate with interstate natural gas pipelines/LDCs as often as necessary, dependent on existing or forecasted system conditions. More frequent communications may occur when warranted by electronic bulletin board (EBB) notices or actual pipeline conditions.

In addition to the communications that occur during Normal Conditions, during an Energy Alert or Energy Emergency (as described in Sections III.B and III.C of this OP, respectively) additional or enhanced electric/gas communications may be warranted. These communications serve to ascertain the status of the interstate natural gas pipelines affecting New England, and increase awareness of activities (e.g., maintenance) that may impact natural gas delivery to New England.

ISO shall communicate with interstate natural gas pipelines/LDCs in accordance with the protocols outlined in OP-21, Appendix B - Electric/Gas Operations Committee's (EGOC) Operations Communications Protocol (OP-21B).

ISO Responsibilities:

- Routine monitoring of interstate natural gas pipeline EBBs notices for indications of potential pipeline curtailments and/or restrictions. If there are indications of possible curtailments or restrictions, ISO is responsible for contacting the Lead MP through its DE for each applicable gas-fueled generator and seeking confirmation that each applicable gas-fueled generator has sufficient gas scheduled to its meter(s) to support its scheduled commitment for the current or next Operating Day.
- Contacting any interstate natural gas pipeline/LDC as necessary regarding Real-Time or forecast conditions on the regional natural gas system.
- Emailing expected electric sector gas consumption hourly load profiles to the interstate natural gas pipelines.
- Reviewing natural gas scheduled quantities, via each interstate natural gas pipeline EBB, and contacting the applicable Lead MP through its DE for its respective gas-fueled generator that may indicate a deficient natural gas supply for the current or next Operating Day.
- Contacting each dual-fuel generator after the Day-Ahead Energy Market (DAM) is complete and verifying the type of fuel it anticipates using on the next Operating Day.
- Publishing the results of the Energy Emergency Forecast on the ISO website.
- Declaring and posting Energy Alerts and Energy Emergency declarations on the ISO website.

Responsibilities of each Lead MP through its DE:

- Communicating to ISO, when such change in conditions is known, the available information regarding anticipated or actual reductions in generator availability, including but **not** limited to the ability to procure fuel, physical limitations, or permitting restrictions that could reduce generator output or availability for the Operating Day.
- Communicating to ISO any knowledge of changes to Real-Time fuel deliverability, as soon as possible, to facilitate the proper commitment and dispatch of the affected generator(s).

C. REPORTING REQUIREMENTS

- ISO shall submit all necessary reports in accordance with ISO New England Operating Procedure No. 10 - Emergency Incident and Disturbance Notifications (OP-10).
- Each Lead MP shall submit all necessary reports to the extent and as required by the United States (U.S.) Department of Energy (DOE).
- Each Lead MP, through its DE, shall notify ISO when fuel supply emergencies occur.
- If ISO determines that Resource availability will affect the adequacy or reliability of the BES or a sub-area of the BES, ISO shall notify the U.S. DOE in accordance with Form DOE-417 Electric Emergency Incident and Disturbance Report (Form DOE-417) requirements.
- ISO shall report to the U.S. DOE using Form DOE-417 when an Energy Emergency has been declared.
- On a case-by-case basis, ISO shall consider reporting to the U.S. DOE using Form DOE-417 whenever supplies of fuel types, other than fuel oil or coal, are diminished below normal levels.

III. ACTIONS DURING NEAR-TERM NORMAL, ENERGY ALERT, AND ENERGY EMERGENCY CONDITIONS

A. NORMAL CONDITIONS

For the purpose of this OP, Normal Conditions are conditions that exist any time that neither an Energy Alert nor an Energy Emergency has been declared.

Data Collection

During Normal Conditions, on the following frequency basis, ISO shall distribute a Generator Fuel and Emissions Survey to the Lead MPs of applicable Generators:

- Weekly, in the months of December through February (i.e. winter months), and
- Bi-weekly, in the months of March through November (i.e., non-winter months),

ISO may increase the frequency, up to and including daily, and/or modify the data collection requirements, as necessary, if it finds emergent indications of potential energy deficiencies due to environmental limitations, fuel inventory, procurement or transportation issues, or any other condition that could limit Resource availability.

Each Lead MP shall complete the Generator Fuel and Emissions Survey for each applicable Generator as soon as possible, but **no** later than the date specified by ISO.

- The Lead MP shall report accurate information on its Generator Fuel and Emissions Survey.
- ISO may contact the Lead MP to ask clarifying questions on any submitted information.

Energy Emergency Forecasting and Reporting

During Normal Conditions, based on available data (which includes information submitted by Lead MPs on their Generator Fuel and Emissions Survey), ISO shall perform Energy Emergency forecasting and reporting no less frequently than:

- Weekly, in the months of December through February, and
- Bi-weekly, in the months of March through November

ISO shall publish results of each Energy Emergency forecast on the ISO website.

- To the extent possible, for each instance where an Energy Emergency forecast alert threshold was met, the results shall include the reason(s) why the threshold was met

B. ENERGY ALERT CONDITIONS

An **Energy Alert** is an alert that ISO shall declare when:

- FEEA2 or FEEA3 is forecasted to occur in at least 1 hour on two or more consecutive days in days 6 through 21 of the 21-day energy assessment, or
- Any other reason(s) for which the ISO COO, or designee, determines that the actions described in Section III.B of this OP may mitigate the impact of an actual or forecasted energy shortfall.

Data Collection

During Energy Alert conditions, on a daily basis, ISO shall distribute a Generator Fuel and Emissions Survey to the Lead MPs of applicable Generators.

ISO may increase the frequency and/or modify the data collection requirements, as necessary, if it finds emergent indications of potential energy deficiencies due to environmental limitations, fuel inventory, procurement or transportation issues, or any other condition that could limit Resource availability.

Each Lead MP shall complete the Generator Fuel and Emissions Survey for each applicable Generator and submit it to ISO as soon as possible, but **no** later than the date specified by ISO.

- The Lead MP shall report accurate information on each submitted Generator Fuel and Emissions Survey.
- ISO may contact the Lead MP to ask clarifying questions on any submitted information.

Energy Emergency Forecasting and Reporting

During Energy Alert Conditions, on a daily basis, ISO shall perform Energy Emergency forecasting and reporting based on available data which includes information submitted by Lead MPs on their Generator Fuel and Emissions Survey.

ISO shall publish results of each daily Energy Emergency forecast on the ISO website.

- To the extent possible, for each instance where an Energy Emergency forecast alert threshold was met, the results shall include the reason(s) why the threshold was met.

Energy Alert Actions

When an Energy Alert has been declared, ISO shall:

1. Alert each LCC and surrounding Reliability Coordinator/Balancing Authority (RC/BA) of the Energy Alert.
2. Alert each Lead MP of the Energy Alert via a posting to the ISO website.
3. Alert New England state regulators and officials of the Energy Alert.
4. Initiate daily Generator Fuel and Emissions Surveys, and daily Energy Emergency forecasting and reporting.

When an Energy Alert has been declared, each Lead MP shall evaluate actual and anticipated fuel supplies and environmental limitations and should consider taking action as necessary to replenish fuel supplies and/or mitigate environmental limitations.

When an Energy Alert has been declared, each Lead MP and LCC shall evaluate scheduled maintenance or repair to transmission facilities or Resources in the region, that reduces the capability of a facility or Resource to supply energy to the region, and should consider taking action, if possible, to maximize availability of those facilities or Resources.

C. ENERGY EMERGENCY CONDITIONS

An **Energy Emergency** is an emergency that ISO shall declare when:

- FEEA2 or FEEA3 is forecasted to occur in at least 1 hour on two or more consecutive days in days 1 through 5 of the 21-day energy assessment, or
- Shedding of firm load under OP-7 is occurring or is anticipated to occur due to an actual energy shortfall resulting from a sustained shortage of fuel availability or deliverability to, or sustained environmental limitations on, some or several of New England's Resources, or
- Any other reason(s) for which the ISO COO, or designee, determines that the actions described in Section III.C of this OP may mitigate the impact of an actual or forecasted energy shortfall.

Data Collection

During Energy Emergency Conditions on a daily basis, ISO shall distribute a Generator Fuel and Emissions Survey to the Lead MPs of applicable Generator.

ISO may increase the frequency and/or modify the data collection requirements, as necessary, if it finds emergent indications of potential energy deficiencies due to environmental limitations, fuel inventory, procurement or transportation issues, or any other condition that could limit Generator availability.

Each Lead MP shall complete the Generator Fuel and Emissions Survey for each applicable Generator and submit it to ISO as soon as possible, but **no** later than the date specified by ISO.

- The Lead MP shall report accurate information on each submitted Generator Fuel and Emissions Survey.
- ISO may contact the Lead MP to ask clarifying questions on any submitted information.

Energy Emergency Forecasting and Reporting

During Energy Emergency Conditions, on a daily basis, ISO shall perform Energy Emergency forecasting and reporting based on available data (which includes information submitted by the Lead MPs on their Generator Fuel and Emissions Survey).

ISO shall publish results of each Energy Emergency forecast on the ISO website.

- To the extent possible, for each instance where an Energy Emergency forecast alert threshold was met, the results shall include the reason(s) why the threshold was met.

Energy Emergency Actions

When an Energy Emergency has been declared, ISO shall:

1. Alert each LCC and surrounding Reliability Coordinator/Balancing Authority (RC/BA) of the Energy Emergency.
2. Alert each Lead MP of the Energy Emergency via a posting to the ISO website.
3. Alert New England State regulators and officials of the Energy Emergency.
4. Report the Energy Emergency to the U.S. DOE, using Form DOE-417.
5. Initiate daily Generator Fuel and Emissions Surveys, and daily Energy Emergency forecasting and reporting.
6. Request that each dual-fuel generator scheduled to operate voluntarily switch to operation on the fuel source that is not in short supply.

7. Implement specific capacity and load relief measures available through actions of OP-4, excluding requesting New England State Governors to reinforce appeals for voluntary load curtailment.
8. If actions 1 - 7 above do not result in the necessary relief from the forecasted Energy Emergency, or if there is insufficient time for those measures to provide relief, the following actions may be taken:
9. Implement a New England State Governors appeal in accordance with OP-4: Request New England State Governors to reinforce appeals for voluntary load curtailment and the Power Warning Implementation.
10. Under extreme conditions, ISO shall seek reliability relief through load shedding actions available through implementation of OP-7.

When an Energy Emergency has been declared, each Lead MP shall evaluate actual and anticipated fuel supplies and environmental limitations, and should consider taking action, as necessary, to replenish fuel supplies and/or to mitigate environmental limitations.

When an Energy Emergency has been declared, each Lead MP and LCC shall evaluate scheduled maintenance or repair to transmission facilities or Resources in the region, that reduces the capability of a facility or Resource to supply energy to the region, and should consider taking action, if possible, to maximize availability of those facilities or Resources.

D. CANCELLATION

When conditions have sufficiently improved and the criteria for declaration of an Energy Alert or an Energy Emergency are no longer being met, ISO shall cancel the Energy Alert or Energy Emergency, as applicable

To the extent possible, ISO will cancel Energy Alerts and Energy Emergencies on a daily boundary.

IV. SEASONAL AND LONG-TERM PROBABILISTIC ENERGY ASSESSMENTS

On an annual basis, ISO shall conduct probabilistic energy assessments using PEAT with pre-defined lookahead horizons, as specified in Sections IV.A, IV.B and IV.C, below, and report the findings of the assessments.

Assessment results will be conveyed in terms of energy shortfall magnitude and duration, at a minimum, using the same parameters as the Regional Energy Shortfall Threshold (REST).

NOTE:

REST is defined based on the tail 0.25% of total probability of the most severe cases. For each tail case, the average normalized energy shortfall is calculated over its worst 72-hour period within a 21-day window. The cumulative energy shortfall hours over 21-day period is also calculated. The REST magnitude threshold is the probability-weighted average of these normalized energy shortfall within the tail and must be $\leq 3.0\%$. The REST duration threshold is the probability-weighted average of cumulative shortfall hours within the tail and must be ≤ 18.0 hours. A REST violation occurs only when both the magnitude and duration thresholds are exceeded.

A. ASSESSMENTS FOR UPCOMING WINTER SEASON

Each year, prior to the winter season, ISO shall conduct and report the results of a probabilistic energy assessment using PEAT for the upcoming winter season.

1. Using the same load forecast model as the most recently published Report of Capacity, Energy, Loads, and Transmission ("CELT"), ISO will screen for high-risk weather events for further evaluation.
2. The high-risk weather events are then simulated by considering a wide range of uncertainties (e.g., fuel oil levels, LNG inventory levels, imports, etc.) associated with them to assess energy shortfall risk. The top 0.25% of cumulative probability, representing the most severe outcomes, will be identified. The magnitude and duration metrics will be calculated as probability-weighted average within this tail, compared to the REST thresholds, and reported as such.
3. ISO will maintain a standard set of uncertainties to be incorporated into its seasonal energy assessments.

B. ASSESSMENTS FOR UPCOMING SUMMER SEASON

Each year, prior to the summer season, ISO shall conduct and report the results of a probabilistic energy assessment using PEAT for the upcoming summer season.

1. Using the same load forecast model as the most recently published Report of Capacity, Energy, Loads, and Transmission (“CELT”), ISO will screen for high-risk weather events for further evaluation.
2. The high-risk weather events are then simulated by considering a wide range of uncertainties (e.g., fuel oil levels, LNG inventory levels, imports, etc.) associated with them to assess energy shortfall risk. The top 0.25% of cumulative probability, representing the most severe outcomes, will be identified. The magnitude and duration metrics will be calculated as probability-weighted average within this tail, compared to the REST thresholds, and reported as such.
3. ISO will maintain a standard set of uncertainties to be incorporated into its seasonal energy assessments.

C. ASSESSMENTS FOR FUTURE PERIODS

Each year, ISO shall conduct and report the results of a probabilistic energy assessment using PEAT for 5 years and 10 years in the future.

1. Using the same load forecast model as the most recently published Report of CELT, ISO will screen for high-risk weather events for further evaluation.
2. The high-risk weather events are then simulated by considering a wide range of uncertainties (e.g., fuel oil levels, LNG inventory levels, imports, etc.) associated with them to assess energy shortfall risk. The top 0.25% of cumulative probability, representing the most severe outcomes, will be identified. The magnitude and duration metrics will be calculated as probability-weighted average within this tail, compared to the REST thresholds, and reported as such.
3. ISO will maintain a standard set of uncertainties to be incorporated into assessments of future periods.
4. ISO will accept proposals for additional sensitivities as time and modeling capability allows

V. GENERATOR FUEL AND EMISSIONS SURVEY

A. DATA COLLECTION PROCESS DESCRIPTION

At the periodicity specified in Sections III.A, III.B, and III.C, ISO shall distribute the Generator Fuel and Emissions Survey to the Lead MP of each applicable Generator. The purpose of the Generator Fuel and Emissions Survey is to collect data that allows ISO to monitor fuel inventory levels, fuel replenishment plans, and actual or anticipated environmental limitations on Resources within New England anticipated within the following 21 days. Additionally, ISO shall utilize data submitted as part of the Generator Fuel and Emissions Surveys to perform periodic Energy Emergency forecasting and reporting, as described in Section II.A of this OP.

B. SURVEY QUESTIONS

Respondents will be asked to answer the following questions, as applicable, depending on the fuel sources and characteristics of the Generator. ISO may modify the survey questions, as necessary, if it determines that additional information is needed to accomplish the objectives of the Generator Fuel and Emissions Survey process, as described above.

1. Generator Information

- 1.1. All Generators: Assuming fuel is always available, how many MWs can this Generator continuously produce, in the absence of any environmental or emissions limitations?
- 1.2. Oil Generators: Do you have plans to retire the ability to burn oil in the next two months?
- 1.3. Oil Generators: How much fuel did this Generator burn since the completion of the previous survey?

2. Fuel oil Inventory

- 2.1. What is the station's maximum on-site usable storage capacity, in gallons?
- 2.2. What is the station's current on-site usable storage inventory, in gallons?

For questions 2.1 and 2.2, "usable storage" is the fuel storage amount that is accessible for power generation (e.g., excludes tank heel and municipal steam production), assuming that Generators are able to operate. Do not reduce the "usable storage" values due to Generator outages, emissions/environmental limitations, or black-start fuel reservation requirements.

3. Fuel oil procurement

- 3.1. Have any of your fuel oil supply procurement processes been compromised for any reason? If yes, please describe.
- 3.2. Assuming current seasonal conditions, what is the maximum continuously sustainable fuel oil supply rate for this station, in gallons of fuel oil per day?
- 3.3. Do you currently have fuel oil ordered? If yes, what is the expected date of delivery and the amount, in gallons?
- 3.4. What is the maximum quantity of fuel oil that can be delivered in a single shipment, in gallons?
- 3.5. Is your fuel oil replenishment on a set schedule? If yes, how many days occur between scheduled replenishments?
- 3.6. At what fuel oil inventory level is a replenishment typically ordered, in gallons?
- 3.7. How long does it typically take for fuel oil to arrive after placing an order, in days?
- 3.8. Is your fuel oil supplier under contract for guaranteed delivery?
- 3.9. Has an alternate supplier been identified in case of failure of your primary delivery source?

4. Dual Fuel Information

- 4.1. Does your manufacturer have any requirements for fuel switch testing requirements? If yes, please describe.
- 4.2. Are the Generator(s) capable of starting up without natural gas? If yes, please describe.
- 4.3. Does this Generator have a daily limit on startups on the alternate fuel? If yes, please describe.
- 4.4. Does this Generator have a weekly limit on startups on the alternate fuel? If yes, please describe.
- 4.5. Can the generator operate on multiple fuel types simultaneously? If yes, please describe.
- 4.6. Does extended continuous operation on the alternate fuel impose any additional maintenance requirements that would impact the availability of the unit? If yes, please provide details.

5. Coal, Fuel Oil, and Natural Gas Generator Environmental/Emissions Licensing and Permitting Information

- 5.1. Does the station have any environmental or emissions constraints or limitations that might impact its ability to operate?

If yes, please answer questions 5.2 through 5.6;

If no, proceed to 6.

- 5.2. Would emission limit exemptions or waivers increase the station's maximum generation ability, including return from outage?

- i. Does the station currently require an emissions waiver to operate, or anticipate requiring one within the next 21 days? If yes, please describe the details of the waiver, to the best of your ability.

- 5.3. Does the station have a seasonal limitation that restricts generation during a specific date range, either entirely or for a specific fuel type? If yes, please describe the seasonal limitation.

- 5.4. Does the station have any hourly or continuous limitations, including per-energy limitations (e.g., lb/MMBtu)?

- 5.5. Does the station have any daily limitations? If yes please answer the following questions for the single most limiting daily limitation (in your best estimation):

- i. Does the limitation apply to each Generator individually, or to the station as a whole? Stations with only one Generator, select "station as a whole".
- ii. Dual fuel stations: Does the limitation apply to a specific fuel type: fuel oil, natural gas, or both?
- iii. Is the limitation automatically relaxed under specific conditions (e.g., ISO-NE declares an Energy Emergency or Energy Alert)? If yes, please describe the conditions under which limitations are relaxed.
- iv. What is the maximum allowed daily amount, in hours of runtime or MWh as Seasonal Claimed Capability? Provide hours of runtime only if the limitation directly dictates hours of runtime. Otherwise, please translate to MWh at Seasonal Claimed Capability (in your best estimate).
- v. Please provide any other pertinent details on this limitation not specifically asked.

- 5.6. Does the limitation have any longer-term (e.g., annual, rolling 12 months, rolling 30 days, seasonal) environmental or emissions constraints or limitations that may affect its ability to operate?
- i. Please describe the limitation timeframe: If the limitation is applied on a rolling basis, enter the number of days or months. Otherwise, select the start and end dates of the current/upcoming limitation period.
 - ii. Does the limitation apply to each Generator individually, or to the station as a whole? Stations with only one Generator, select “station as a whole”.
 - iii. Dual fuel stations: Does the limitation apply to a specific fuel type: fuel oil, natural gas, or both?
 - iv. Is the limitation automatically relaxed under specific conditions (e.g., ISO-NE declares an Energy Emergency or Energy Alert)? If yes, please describe the conditions under which limitations are relaxed.

For the following questions (parts v and vi), please translate limitations to MWh at Seasonal Claimed Capability if the limitation does not directly dictate hours of runtime

- v. What is the maximum allowed amount during the limitation timeframe, in hours of runtime or MWh at Seasonal Claimed Capability?
- vi. What is the current accumulated amount during the limitation timeframe, in hours of runtime or MWh at Seasonal Claimed Capability?
- vii. Please provide any other pertinent details on this limitation not specifically asked.

6. Additional Comments

- 6.1. Is there any additional information related to fuels and/or emissions limitations that has not been provided in specific survey questions.

C. DATA RETENTION REQUIREMENTS AND REPORTING

ISO shall retain all data submitted in response to Generator Fuel and Emissions Surveys for **not** less than 36 months.

ISO shall treat submitted data as Confidential Information in accordance with the ISO New England Inc. Transmission, Markets, and Services Tariff, Attachment D - ISO New England Information Policy.

ISO may report all collected data in aggregation.

VI. GENERATOR WINTER READINESS SURVEY

To facilitate ISO's situational awareness of generator readiness for operations during the winter months the ISO will annually distribute a Generator Winter Readiness Survey¹. Survey responses are for informational purposes only.

The objectives of this survey are to facilitate ISO's understanding of the following, as it relates to the winter readiness of the region's Generator Assets:

1. Winter preparation activities;
2. Ambient temperature limitations on Real-Time capabilities or future capabilities;
3. Specific protocols followed in the event of extreme cold weather events;
4. Specific training completed prior to cold weather conditions

A. SURVEY PROCESS

Annually, prior to November 1st, ISO shall distribute a survey to the Lead MPs of all Generator Assets in New England.

Each applicable Lead MP shall annually complete the survey provided by ISO and submit it to ISO as soon as possible, but **no** later than December 1st, unless otherwise specified by ISO.

- The Lead MP shall report accurate information on each submitted survey.
- ISO may contact the Lead MP to ask clarifying questions on any submitted information.

B. SURVEY QUESTIONS

ISO shall include the following questions on the annual Generator Winter Readiness Survey. ISO may modify the survey questions, as necessary, if it determines that additional information is needed to accomplish the objectives of the Generator Winter Readiness Survey process, as described above.

1. For Generators subject to NERC Reliability Standards, what is the calculated Extreme Cold Weather Temperature (ECWT) for this Generator in accordance with NERC Standard EOP-012?
2. Below what ambient temperature (°F) is it expected that this Resource would no longer be able to start?

¹ The Generator Winter Readiness Survey was initially completed prior to the winter period of 2019-2020, in part, as a response to the FERC/NERC joint report, "The South Central United States Cold Weather Bulk Electric System Event of January 17, 2018" issued on July 18, 2019.

3. Below what ambient temperature (°F) is it expected that this Resource would no longer be able to continue operating from an online state? Please describe if this is based on a design temperature, a historical operating temperature or current cold weather performance temperature determined by an engineering analysis.
4. Is there an identified ambient temperature (°F) at which equipment damage may occur that may potentially impact the Resource's future availability? If yes, please describe the temperature at which damage may occur and the nature of the impact(s).
5. Is there an identified environmental constraint or limitation on this Generator during periods of cold weather operations? If yes, please provide additional clarifying information to describe the environmental constraint or limitation.
6. Is the availability of this Resource's on-site primary or backup fuel supply potentially impacted by extreme cold weather? If yes, please describe the nature of this potential impact on the fuel supply and also describe what measures are in place to limit the impact of the extreme cold weather on fuel availability.
7. For natural gas-fired generators, does this Resource hold firm capacity rights on the applicable natural gas pipeline with a path from a supply source to the meter for this Resource? If yes, please provide additional clarifying information as necessary to explain the nature of those rights, including the quantity, location where the gas first enters a pipeline (e.g. PA, TX, Canaport, etc.) and initial point(s) of firm receipt in the transportation path(s) of natural gas (e.g. Lambertville NJ, Algonquin G Lateral, Canaport, etc.).
8. For natural gas-fired generators, have arrangements been made, or will they be made, to source gas for this Resource from alternate supply sources (e.g. LNG supply from Dstrigas, Canaport, or Excelerate). If yes, please provide additional clarifying information as necessary to explain the nature of arrangements that have been made, or when alternate gas supply arrangements are expected to be made, including quantity and location where gas first enters a pipeline.
9. For dual-fuel capable Resources, is there a known ambient temperature below which the ability of the Resource to switch fuel sources or operate on its alternate fuel is impacted? If yes, please provide the temperature (°F) and describe the nature of the impact(s).
10. For solar generators, what design factors (e.g. high angle of tilt, bi-facial panels, etc.) does this Resource have that would mitigate the level of lost energy due to a snow or frozen precipitation event and what effect are they expected to have? With the understanding that each event is unique, please provide details regarding how and when generation capability is generally

expected to be restored to full capability following such an event (e.g. wait for snow/ice to melt by sun, brush panels off the following business day, etc.)

11. For wind generators, does your Resource employ any equipment that mitigates the impact of cold weather on the Resource (i.e. a cold weather package)? If yes, please describe the nature of the equipment, including changes to the Resource's operating capabilities if the equipment were unavailable. If the Resource does not have any such equipment, please describe why it is not believed to be necessary.
12. For wind generators, does your Resource have a mechanism for de-icing the turbines or preventing of turbine icing from occurring? If yes, with the understanding that each event is unique, please describe the nature of the mechanism including how quickly it is anticipated generation capability would typically be restored following the loss of generation capability. If the Resource does not have such a mechanism, please describe why one is not believed to be necessary.
13. Are there any other specific limitations on operation and/or capability of this Resource that are anticipated due to extreme cold weather? If yes, please describe the nature of the limitation(s).
14. Did this Resource experience any equipment freeze-related or other cold weather-related issues which limited the availability of the Resource last winter? If yes, please describe the issues experienced and any remedial actions that have been taken to eliminate or minimize the potential of similar issues occurring under future similar conditions.
15. Is there a winter weather preparation procedure in place in order to prepare this Resource for winter operation?
16. By what date are the actions described in such winter weather preparation procedure planned to be completed?
17. Does the winter weather preparation procedure include processes, staffing plans, and timelines that direct all key activities before, during, and after severe winter weather events?
18. Does the winter weather preparation procedure include winterization of all components (e.g. freeze protection measures and technologies) that are critical for continued operation of this Resource?
19. Does the winter weather preparation procedure include performance of periodic maintenance on and inspection of freeze protection measures (e.g. inspection of heat tracing equipment and thermal insulation on critical components)
20. Does the winter weather preparation procedure include a list of critical components (e.g. instruments, transmitters) that require increased

- surveillance during severe winter weather events?
21. Please describe any other major components of the winter weather preparation procedure for this Resource and, if necessary, providing clarifying information related to any of the responses above.
 22. If the Resource does not have a specific winter weather preparation procedure in place, please describe why it is believed one is not necessary.
 23. Do staff responsible for operation of this Resource receive annual winter preparation training that highlights necessary preparations and expectations for severe winter weather events?
 24. Have any improvements been made to this Resource's winter weather preparation procedure since last winter? If yes, please describe the improvements.
 25. Are there any outstanding preparations or other incomplete work relating to winter readiness that would prevent this Resource from starting, or would increase the potential for this Resource to trip off-line during an extreme cold weather event?

C. DATA RETENTION REQUIREMENTS AND REPORTING

ISO shall retain all data submitted in response to Generator Winter Readiness Surveys for **not** less than 36 months.

ISO shall treat submitted data as Confidential Information in accordance with the ISO New England Inc. Transmission, Markets, and Services Tariff, Attachment D - ISO New England Information Policy.

ISO may report all collected data in aggregation.

VII. NATURAL GAS CRITICAL INFRASTRUCTURE SURVEY

To ensure that the critical infrastructure of the interstate natural gas system are not served by electrical transmission or distribution circuits that may be subject to automatic or manual load-shedding schemes, ISO shall annually perform a Natural Gas Critical Infrastructure Survey.

A. SURVEY PROCESS

Annually, ISO shall distribute a survey to representatives of each interstate natural gas pipeline company operating within New England as well as the Canaport LNG facility located in Saint John, New Brunswick, CA and the Everett LNG facility in Everett, MA.

Each applicable representative should complete the survey by compiling a list of its critical facilities. Critical facilities,² for the purposes of this survey, include infrastructure that is critical to the reliable flow of natural gas to customers, including natural gas-fired generating facilities and thereby requires a supply from the electrical grid to maintain operations.

ISO may modify the survey questions, as necessary, if it determines that additional information is needed to accomplish the objectives of the Natural Gas Critical Infrastructure Survey process, as described above.

ISO shall forward completed surveys to the applicable Local Control Center(s) to facilitate a review of load shedding procedures, schemes, and circuits to verify that natural gas infrastructure deemed to be critical is not connected to or located on any predefined electrical circuits.

B. SURVEY QUESTIONS

The following data points are requested for each component identified to be a critical facility:

1. Physical address of component
2. Applicable meter number
3. Feeder name/number (if known)

C. DATA RETENTION REQUIREMENTS AND REPORTING

ISO shall retain all data submitted in response to Natural Gas Critical Infrastructure Surveys for **not** less than 36 months.

² Examples of critical facilities, for the purposes of this survey, includes, but is not limited to; LNG liquefaction/vaporization facilities, control centers, gate stations, pipeline compressor stations, and other components/facilities deemed critical to operations by each pipeline or facility

OP-21 REVISION HISTORY

Rev. No.	Date	Reason
--	10/15/25	For previous revision history, refer to Rev 10 available through Ask ISO.
Rev 11	10/15/25	Biennial review completed by procedure owner; Added section for performing probabilistic assessments of seasonal and long-term energy reliability for comparison to REST; Cleanup of some antiquated considerations that are no longer applicable (e.g., retired gas supply basins).