# Checklist PART 1: Request for Energization of

# Resource Entity Equipment

**[RESOURCE ENTITY submits checklist to commission non-generator equipment]**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Resource Entity (RE)** Name: |  | | | |
| Agent (optional): |  | | | |
| Date form completed: |  | | | |
| **Proposed Station Energization Date\*:** | | |  | |
| **Generation Interconnection or Change Request number (GINR #):** | | Is this a Temporary POI GINR? Y/N: | | If Temporary POI, What is GINR# of Permanent POI GINR: |

\* Actual date contingent on completion of requirements and approval from ERCOT.

Primary contact for Station Commissioning (Contacts may be RE’s Agent):

|  |  |
| --- | --- |
| Primary Contact Name: |  |
| Primary Contact Telephone Number: |  |
| Primary Contact E-mail Address: |  |

|  |  |  |
| --- | --- | --- |
| **Gen Station Mnemonic:** | |  |
| Gen Site Name: | TDSP: | |
| Load Zone: | Transmission Voltage: | |

Remedial Action Scheme (RAS) Yes No

Can the Generation Resource synchronously connect to another grid? Yes  No

Identify the QSE/TDSP responsible for sending ERCOT station telemetry:

|  |  |
| --- | --- |
| QSE: | TDSP: |

QSE primary contact (may be QSE’s Agent): TDSP primary telemetry contact:

|  |  |  |  |
| --- | --- | --- | --- |
| Name: |  | Name: |  |
| Telephone Number: |  | Telephone Number: |  |
| E-mail Address: |  | E-mail Address: |  |

The QSE and Resource Entity (RE) must comply with the ERCOT Nodal Protocols, Nodal Operating Guides (NOGs) and ERCOT Other Binding Documents (OBD) from the moment the Resource interconnection becomes operational. The RE confirms that the following requirements have been met: [**Submit PART 1 with copy of current Commissioning Plan**]

The Resource is in the ERCOT Control Area.

Resource telemetry to the QSE and TDSP from the facility’s Point of Interconnection (POI) is in place and operational as of       (date), as required under ERCOT NOG Section 7.3, Telemetry, the ERCOT Nodal ICCP Communication Handbook, and any other telemetry required by the ERCOT Nodal Protocols, NOGs, or OBD. Enter specific comments about status of telemetry in comment box on telemetry checklist below.

Primary and backup communications paths for telemetry from the Resource to the QSE are as stated below:

Describe the primary telemetry communications path (e.g., fiber, T1, microwave or other):

Describe the back-up telemetry communications path (e.g., indicate fiber, T1, microwave, wireless, satellite or other):

The RE’s telemetry communicates the Resource’s POI information to ERCOT in the manner specified in NOG Section 7.3, Telemetry, and Nodal Protocols Section 6.5.5.2, Operational Data Requirements, and any other information required by Nodal Protocols Section 3.10.7.5, Telemetry Standards. Instructions for ERCOT to escalate telemetry quality issues with QSE/RE during commissioning shall be included in the following comment section. **Comments**:

The RE has verified the Resource RTU as operational and is sending data from the Resource to ERCOT via the QSE. Furthermore, in accordance with Nodal Protocols Section 6.5.5.2, the RE confirms that any telemetered values sent to ERCOT originate from the Resource RTU and the quality codes are accurate and appropriate. Identify any exceptions in the comments section below.

**Comments:**

If ERCOT has previously determined the proposed Resource may violate operational standards pursuant to Nodal Protocols Section 16.5(4), the Resource Entity has a plan of action to meet the operational standards and received ERCOT approval prior to requesting Initial Synchronization.

**Comments:**

For Intermittent Renewable Resources, the RE confirms capability of Voltage Ride-Through in accordance with NOG Section 2.9.1. **Comments**:

For inverter-based Resources, the RE confirms capability of Voltage Ride-Through in accordance with NOG Section 2.9.1 and momentary cessation will not be used.  **Comments:**

The RE understands its responsibility to provide accurate and timely updates to the Outage Scheduler to reflect expected future equipment unavailability if it expects to not be capable of generating at the modeled maximum output level. Prior to approval of each stage of commissioning, the RE must update the Outage Scheduler to accurately reflect the Resource’s future derate amount, start time and end time. Outage submission requirements are in ERCOT Nodal Protocols Section 3.1. **Comments:**

The QSE has reliable voice communications with the new Resource, ERCOT, and TDSP as required by NOG Section 3.2, Qualified Scheduling Entities.

The RE has provided ERCOT the technical equipment data for modeling studies per NOG Section 3.3, Resource Entities. **Comments:**

The Full Interconnection Study (FIS) stability assessment has been completed as required by Section 5 of the ERCOT Planning Guide and reviewed by the RE. The RE is aware of, and has taken provisions to mitigate, all non-thermal issues associated with interconnecting the Resource to the ERCOT system. **Comments:**

The RE understands the obligations with respect to phasor measurement recording equipment in Section 6 of the NOG and has plans to install phasor measurement recording equipment prior to requesting Initial Synchronization. NOG Section 6.1.3.3(1)(b) requires voltage phasor measurements for at least one generator-interconnected bus, current phasor measurements for each interconnected generator over 20 MVA and frequency and df/dt for at least one generator-interconnected bus measurement. **Comments:**

For Resources adding new netting loads, the RE has provided ERCOT and the interconnected TSP the technical equipment and load data for modeling studies. Any needed amendments to the Standard Generation Interconnection Agreement (SGIA) have been signed, required studies have been completed and approved, an EPS Meter Proposal including the netting loads has been approved, and the Network Operations Model has been updated, including required telemetry. **Comments:**

For Resources adding load to be netted, the Resource must explain how the additional load being netted will not impact the Resource’s Voltage Support Service (VSS) ability to meet the VSS requirements and demonstrate that Reactive Power capability will be available at all MW output levels through a combination of the Resource’s Unit Reactive Limit (URL) (i.e., the unit’s dynamic leading and lagging operating capability) and/or dynamic VAr-capable devices. The RE understands that Resources connected to Transmission Facilities (including self-serve generating units) with a gross generating unit rating greater than 20 MVA or those units connected at the same POI Bus (POIB) that have gross generating unit ratings aggregating to greater than 20 MVA and power to the ERCOT Transmission Grid, must provide VSS. **Comments:**

| **Station Telemetry** | | | | |
| --- | --- | --- | --- | --- |
|  | **Data** | **Frequency** | **Mode** | **Reference/Comments** |
|  | Station Switching Device status | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements. (High side Typical TSP telemetry point; Low side typical QSE telemetry point)  **RE Comment:** |
|  | Station Breaker status | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements. (Typical QSE telemetry point)  **RE Comment:** |
|  | Generation Resource High Side bus voltage | 10 sec | ICCP | Nodal Protocol Section 3.15, Voltage Support. May be supplied by the TDSP (typical TDSP telemetry point) or Low Side voltage with appropriate transformer model may be substituted (typical QSE telemetry point).  **RE Comment:** |
|  | Station Static and/or Dynamic Reactive Device(s) status for each device | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Station Static and/or Dynamic Reactive Device(s) MVAR output for each device | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Generator Step-Up (GSU) Transformer High-Side MW and MVAR for each modeled GSU | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Generation Resource auxiliary load and/or station service MW and MVAR | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Transmission Line Flow | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (RE confirmed that TSP is providing required points; Transmission Line Flow has telemetry for both the sending and receiving end of the interconnecting line if the Resource is registered at a different station in the Network Operations Model).  **RE Comment:** |
|  | MW and MVAR for each netted load | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |

By signing below, I attest the information provided on this form (**PART 1**) is true, correct and complete, and the above-referenced RE will promptly provide Electric Reliability Council of Texas, Inc. (ERCOT) any substantive changes in such information.

|  |  |
| --- | --- |
| Signature: |  |

(RE Authorized Representative)

|  |  |
| --- | --- |
| Printed Name: |  |

(RE Authorized Representative)

|  |  |
| --- | --- |
| Date Signed: |  |

# Checklist PART 2: Request for Initial Synchronization

**(For Wind Units meeting PG 5.2.1(1)(c)(ii) use Part 2a and 2b below)**

**[QSE submits checklist to request Initial Synchronization of generator equipment]**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **QSE** Name: |  | | | |
| Agent (optional): |  | | | |
| Date form completed: |  | | | |
| Date of Notice: |  | | | |
| **Gen Station Mnemonic:** | | |  | |
| Gen Site Name: |  | | | |
| Gen Unit Code(s): |  | | | |
| **GINR Number:** | | Is this a Temporary POI GINR? Y/N: | | If Temporary POI, What is GINR# of Permanent POI GINR: |
| \* Proposed Initial Synchronization Date : |  | | | |

\* Actual date contingent on completion of requirements and approval from ERCOT.

Primary and back-up contact personnel for Initial Synchronization (may be QSE’s Agent):

|  |  |
| --- | --- |
| Primary Contact Name: |  |
| Primary Contact Telephone Number: |  |
| Primary Contact E-mail Address: |  |
| Back-Up Contact Name: |  |
| Back-Up Contact Telephone Number: |  |
| Back-Up Contact E-mail Address: |  |

\*If the Resource is Split Metered:

|  |  |  |  |
| --- | --- | --- | --- |
| Identify the QSE responsible for coordinating start-up testing: | | |  |
| Identify all QSE’s sharing this Resource: |  | | |
| Projected Resource Commissioning Date (Resource approved for participation in ERCOT market operations): | |  | |

The QSE and Resource Entity (RE) must comply with the ERCOT Nodal Protocols and Nodal Operating Guides (NOGs) from the moment the Resource becomes operational. The QSE will comply with procedures for new Resource start-up testing and will communicate the Initial Synchronization schedule to the ERCOT Shift Supervisor. The QSE confirms the following requirements have been met:

The RE understands its responsibility to provide accurate and timely updates to the Outage Scheduler to reflect expected future equipment unavailability if they are expecting to not be capable of generating at the modeled maximum output level. Prior to approval of each stage of commissioning, the RE must update the Outage Scheduler to accurately reflect the Resource’s future derate amount, start time and end time. Outage submission requirements are outlined in ERCOT Nodal Protocols Section 3.1. **Comments:**

Telemetry from the facility (station and generation) to the QSE and TDSP (optional) is in place and operational as of       (date). Enter specific comments about telemetry status in QSE comment box on telemetry checklist on next page.

The QSE can communicate the Resource’s Point of Interconnection (POI) information to ERCOT in the manner specified in NOG Section 7.3, Telemetry and Nodal Protocols Section 6.5.5.2, Operational Data Requirements, and any other information required by Protocol Section 3.10.7.5, Telemetry Standards. Instructions for ERCOT to escalate telemetry quality issues with the QSE during commissioning shall be included in the following comment section. **Comments**:

The QSE has verified the Resource RTU as operational and is sending data from the Resource to ERCOT. In accordance with Nodal Protocols Section 6.5.5.2, the QSE confirms that any telemetered values sent to ERCOT originate from the Resource RTU and the quality codes are accurate and appropriate. Identify any exceptions in the comments section, below.

**Comments:**

QSE confirms voice and data communications with the Resource, ERCOT, and TDSP (optional) NOG Sections 3.2 and 7.1.2. **Comments:**

Automatic Voltage Regulator (AVR) operating in Voltage Control Mode will be in service as of       (date). The RE will report to ERCOT AVR performance tests described in ERCOT NOG Sections 2.2.5 and Nodal Protocol Section 8.1.1.2.1.4 prior to the Resource Commissioning Date, unless it is documented to ERCOT’s satisfaction that the local topology and resources do not permit successful demonstration of full capability. **Comments:**

Synchronous Generation Resources will have Power System Stabilizers (PSS) in service as of       (date). Per ERCOT NOG Section 2.2.6, Power System Stabilizers, PSS will be installed and in-service prior to the Resource Commissioning Date. The RE will report PSS performance tests to ERCOT within 30-days after PSS in-service date. If circumstances beyond the RE’s control prevent testing from taking place, the RE shall document the circumstances and request and obtain an extension from ERCOT. Inverter-based Resources do not have to meet the PSS requirements. **Comments:**

The Resource will have a Governor in service as of       (date). Turbine Speed Governors, or equivalent governor response and governor droop settings and dead-band are registered and comply with ERCOT NOG Sections 2.2.7 and Nodal Protocol Section 8.5.1.2. The RE will report governor performance tests to ERCOT prior to the Resource Commissioning Date. If circumstances beyond the RE’s control prevent testing from taking place, the RE shall document the circumstances and request and obtain an extension from ERCOT. **Comments:**

Prior to Initial Synchronization of an Intermittent Renewable Resource (e.g., wind, solar) the QSE confirms availability of required meteorological data per Nodal Protocol Section 3.13.

The reactive (VAR) controls of the Resource will be in service and enabled as of       (date) to maintain transmission voltage at the POI as described in Nodal Protocol Section 3.15, Voltage Support. Additionally, in Real-Time, Resources must follow Voltage Set Points that could be different than the Seasonal Voltage Profiles posted in the MIS Secure area by ERCOT as described in NOG Sections 2.7.3.5, Resource Entity Responsibilities and Generation Resource Requirements, and 3.3.2, Unit Reactive Capability Requirements. Prior to the Resource Commissioning Date, the RE will demonstrate compliance with Reactive Power requirements in accordance with Nodal Protocol Section 3.15, Voltage Support. **Describe plan for voltage control at POI during commissioning in the space below (may reference associated section or page(s) on commissioning plan)**:

Resource Under Frequency Relays comply with trip settings specified in NOG Section 2.6.2, Generators. **Comments:**

Prior to Initial Synchronization the RE must install, or coordinate with its interconnecting TSP to install, phasor measurement recording equipment, which includes digital fault recorders, certain protective relays and/or meters with phasor measurement recording capability meeting the requirements in Section 6 of the NOG. The recording equipment is installed and capable of operating for its intended purpose. NOG Section 6.1.3.3(1)(b) requires voltage phasor measurements for at least one generator-interconnected bus, current phasor measurements for each interconnected generator over 20 MVA and frequency and df/dt for at least one generator-interconnected bus measurement. **Comments:**

Prior to Initial Synchronization, the RE shall have implemented the Sub-synchronous study Mitigation Plan identified in the Sub-synchronous study completed by the interconnecting TSP. **Comments:**

The RE has confirmed for the QSE that ERCOT has approved the Nodal Protocol Section 16.5(4) compliance check.

**Comments:**

| **New Generator Telemetry** | | | | |
| --- | --- | --- | --- | --- |
|  | **Data** | **Frequency** | **Mode** | **Reference/Comments** |
|  | Real Time data accuracy |  |  | Real Time data for reliability purposes must be accurate to within three percent (3%). This telemetry may be provided from relaying accuracy instrumentation transformers.  **QSE Comment:** |
|  | Generation Resource gross and net MW output | 2 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements. Net Generation is preferred. Otherwise, aux load should also be provided.  **QSE Comment:** |
|  | Generation Resource gross and net MVar output | 2 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements. Net Reactive Power is preferred. Otherwise, aux load should also be provided.  **QSE Comment:** |
|  | Switching Device | 2 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements.  **QSE Comment:** |
|  | Breaker status | 2 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements  **QSE Comment:** |
|  | Generation Resource High Sustainable Limit | 2 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements.  **QSE Comment:** |
|  | Generation Resource Low Sustainable Limit | 2 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements.  **QSE Comment:** |
|  | Generation Resource Automatic Voltage Regulator status | 2 sec | ICCP | Nodal Protocol Section 3.15.3, Generation Resource Requirements Related to Voltage Support; applies to Resources required to provide VSS.  **QSE Comment:** |
|  | Generation Resource Power System Stabilizer status | 2 sec | ICCP | Nodal Protocol Section 3.15.3, Generation Resource Requirements Related to Voltage Support; applies to Resources required to provide VSS.  **QSE Comment:** |
|  | POI kV Bus Voltage from TSP | 2 sec | ICCP | Nodal Protocol 3.10.7.5.2 (8), Continuous Telemetry of the Real-Time Measurements of Bus Load, Voltages, Tap Position, and Flows |
|  | POI Real Time Voltage Set Point from TSP | 2 sec | ICCP | Nodal Protocol 6.5.7.7 (6), Voltage Support Service |

**Intermittent Renewable Resources Only**[[1]](#footnote-2)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Additional Resource Data Required** | **Frequency (sec)** | **Protocol Reference** |
|  | Wind Speed (Miles per Hour) | 10 | 6.5.7.1.13 (1) (d) 4.2.2 (1) (implied) | |
|  | Wind Direction (Degrees) | 10 | 4.2.2 (1) (implied) | |
|  | Temperature (Celsius) | 10 | 4.2.2 (1) (implied) | |
|  | Barometric Pressure (Millibars) | 10 | 4.2.2 (1) (implied) | |
|  | Irradiance (Plane of Array) (PVGR only) | 10 | 4.2.2 (1) (implied) | |
|  | Number of Turbines/Inverters/Generators Online | 10 | 3.15(12) and (13)  6.5.5.2(4) | |
|  | Number of Turbines/Inverters Offline | 10 | 3.15(12) and (13) | |
|  | Number of Turbines/Inverters Unknown | 10 | 3.15(12) and (13) | |
|  | Back Panel Temperature | 10 | 4.2.3(1)(implied) | |
|  | Plane of Array Irradiance | 10 | 4.2.3(1)(implied) | |
|  | Any agreed-upon additional Resource data (multiple data items) | various | 6.5.5.2 (2) g | |

**MET Tower Location [as registered]:**

**Latitude:**       **Longitude:**

**QSE Comment:**

**Energy Storage Resources (ESR) Only**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Additional Resource Data Required** | **Frequency (sec)** | **Protocol Reference** |
|  | Maximum Operating State of Charge, in MWh | 10 | Protocol Section 6.5.5.2, Operational Data Requirements. |
|  | Minimum Operating State of Charge, in MWh | 10 | Protocol Section 6.5.5.2, Operational Data Requirements. |
|  | State of Charge, in MWh | 10 | Protocol Section 6.5.5.2, Operational Data Requirements. |
|  | Maximum Operating Discharge Power Limit, in MW | 10 | Protocol Section 6.5.5.2, Operational Data Requirements. |
|  | Maximum Operating Charge Power Limit, in MW | 10 | Protocol Section 6.5.5.2, Operational Data Requirements. |

By signing below, I attest the information provided on this form (**PART 2**) is true, correct and complete, and the above-referenced RE will promptly provide any substantive changes in such information to Electric Reliability Council of Texas, Inc. (ERCOT).

|  |  |
| --- | --- |
| Signature: |  |

(QSE Authorized Representative)

|  |  |
| --- | --- |
| Printed Name: |  |

(QSE Authorized Representative)

|  |  |
| --- | --- |
| Date Signed: |  |

# Checklist PART 2a: Request for Wind Units meeting PG 5.2.1(1)(c)(ii) Pre-Synchronization

**[QSE submits checklist to request approval to begin re-power work at the site]**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **QSE** Name: |  | | |  |
| Agent (optional): |  | | |  |
| Date form completed: |  | | |  |
| Date of Notice: |  | | |  |
| **Gen Station Mnemonic:** |  | | |  |
| Gen Site Name: |  | | |  |
| Gen Unit Code(s): |  | | |  |
| **GINR Number:** | | Is this a Temporary POI GINR? Y/N: | If Temporary POI, What is GINR# of Permanent POI GINR: |  |
| \* Current Planned Initial Synchronization Date : |  | | |  |

\* Actual date contingent on completion of requirements and approval from ERCOT.

Primary and back-up contact personnel for Initial Synchronization (may be QSE’s Agent):

|  |  |
| --- | --- |
| Primary Contact Name: |  |
| Primary Contact Telephone Number: |  |
| Primary Contact E-mail Address: |  |
| Back-Up Contact Name: |  |
| Back-Up Contact Telephone Number: |  |
| Back-Up Contact E-mail Address: |  |

\*If the Resource is Split Metered:

|  |  |  |  |
| --- | --- | --- | --- |
| Identify the QSE responsible for coordinating the start-up testing: | | |  |
| Identify all QSE’s sharing Generation Resource: |  | | |
| Projected Resource Commissioning Date (i.e., Resource approved for participation in ERCOT market operations): | |  | |

**The QSE will submit Checklist Part 2a prior to any re-powering activity commencing at the site. The model and telemetry used for this checklist will be the model used in ERCOT Operations prior to re-powering.**

Because the Part 1 checklist is typically not required for re-powering projects, the entire list of Part 1 and Part 2 telemetry requirements appear in this checklist.

[**Submit PART 2a with copy of current Commissioning Plan showing the decommissioning of old turbines and commissioning of new or re-powered turbines**]

The QSE is responsible for all telemetry listed prior to submission of checklist Part 2b for Initial Synchronization of the first re-powered turbine, submitted after any model and telemetry changes have been loaded into the Network Operations Model.

The QSE and RE must comply with the ERCOT Nodal Protocols and NOGs from the moment the Resource becomes operational. Following approval of the Part 2b checklist, the QSE will comply with procedures for new Resource start-up testing and will communicate the Initial Synchronization schedule to the ERCOT Shift Supervisor.

The QSE confirms the following requirements have been met:

The QSE has received confirmation from the RE that ERCOT approved the Nodal Protocol Section 16.5(4) compliance check for the re-powered Resource required for part 2A.

**Comments:**

The QSE received confirmation from the RE that no re-power work has commenced at the site of the re-powered Resource. **Comments:**

The RE understands its responsibility to provide accurate and timely updates to the Outage Scheduler to reflect the expected future equipment unavailability if they expect to not be capable of generating at the modeled maximum output level. Prior to approval of each stage of commissioning, the RE must update the Outage Scheduler to accurately reflect the Resource’s future derate amount, start time and end time. Outage submission requirements appear in ERCOT Nodal Protocols Section 3.1. **Comments:**

The QSE can communicate the Resource’s POI information to ERCOT in the manner specified in NOG Section 7.3, Telemetry, and Nodal Protocols Section 6.5.5.2, Operational Data Requirements, and any other information required by Section 3.10.7.5, Telemetry Standards. The QSE shall include in the following comment section instructions for ERCOT to escalate telemetry quality issues with the QSE during commissioning. **Comments**:

| **Station Telemetry** | | | | |
| --- | --- | --- | --- | --- |
|  | **Data** | **Frequency** | **Mode** | **Reference/Comments** |
|  | Station Switching Device status | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements. (High side Typical TSP telemetry point; Low side typical QSE telemetry point)  **RE Comment:** |
|  | Station Breaker status | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements. (typical QSE telemetry point)  **RE Comment:** |
|  | Generation Resource High Side bus voltage | 10 sec | ICCP | Nodal Protocol Section 3.15, Voltage Support. May be supplied by the TDSP (Typical TDSP telemetry point) or Low Side voltage with appropriate transformer model may be substituted (typical QSE telemetry point).  **RE Comment:** |
|  | Station Static and/or Dynamic Reactive Device(s) status for each device | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Station Static and/or Dynamic Reactive Device(s) MVAR output for each device | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Generator Step-Up (GSU) Transformer High-Side MW and MVAR for each modeled GSU | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Generation Resource auxiliary load and/or station service MW and MVAR for each modeled load | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Transmission Line Flow | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements. RE confirmed the TSP is providing required points; Transmission Line Flow has telemetry for both the sending and receiving end of the interconnecting line if the Resource is registered at a different station in the Network Operations Model).  **RE Comment:** |

| **New Generator Telemetry** | | | | |
| --- | --- | --- | --- | --- |
|  | **Data** | **Frequency** | **Mode** | **Reference/Comments** |
|  | Real Time data accuracy |  |  | Real Time data for reliability purposes must be accurate to within three percent (3%). This telemetry may be provided from relaying accuracy instrumentation transformers.  **QSE Comment:** |
|  | Generation Resource gross and net MW output | 2 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements. Net Generation is preferred; otherwise, aux load should also be provided.  **QSE Comment:** |
|  | Generation Resource gross and net MVar output | 2 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements. Net Generation is preferred. Otherwise, aux load should also be provided.  **QSE Comment:** |
|  | Switching Device status | 2 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements.  **QSE Comment:** |
|  | Breaker status | 2 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements  **QSE Comment:** |
|  | Generation Resource High Sustainable Limit | 2 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements.  **QSE Comment:** |
|  | Generation Resource Low Sustainable Limit | 2 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements.  **QSE Comment:** |
|  | Generation Resource Automatic Voltage Regulator status | 2 sec | ICCP | Nodal Protocol Section 3.15.3, Generation Resource Requirements Related to Voltage Support. Applies to Resources required to provide VSS.  **QSE Comment:** |
|  | Generation Resource Power System Stabilizer status | 2 sec | ICCP | Nodal Protocol Section 3.15.3, Generation Resource Requirements Related to Voltage Support. Applies to Resources required to provide VSS.  **QSE Comment:** |
|  | POI kV Bus Voltage from TSP | 2 sec | ICCP | Nodal Protocol 3.10.7.5.2 (8), Continuous Telemetry of the Real-Time Measurements of Bus Load, Voltages, Tap Position, and Flows |
|  | POI Real Time Voltage Set Point from TSP | 2 sec | ICCP | Nodal Protocol 6.5.7.7 (6), Voltage Support Service |

**Intermittent Renewable Resources Only**[[2]](#footnote-3)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Additional Wind Resource Data** | | **Frequency (sec)** | | **Protocol Reference** |
|  | Wind Speed (Miles per Hour) | | 10 | | 6.5.7.1.13 (1) (d) 4.2.2 (1) (implied) |
|  | Wind Direction (Degrees) | | 10 | | 4.2.2 (1) (implied) |
|  | Temperature (Celsius) | | 10 | | 4.2.2 (1) (implied) |
|  | Barometric Pressure (Millibars) | | 10 | | 4.2.2 (1) (implied) |
|  | Irradiance (Plane of Array) (PVGR only) | | 10 | | 4.2.2 (1) (implied) |
|  | Number of Turbines/Inverters Online | | 10 | | 3.15(12) and (13) |
|  | Number of Turbines/Inverters Offline | | 10 | | 3.15(12) and (13) |
|  | Number of Turbines/Inverters Unknown | | 10 | | 3.15(12) and (13) |
|  | Any agreed-upon additional Resource data (multiple data items) | various | | 6.5.5.2 (2) g | |

**MET Tower Location [as registered]:**

**Latitude:**       **Longitude:**

**QSE Comment:**

By signing below, I attest the information provided on this form (**PART 2a**) is true, correct and complete, and the above-referenced RE will promptly provide any substantive changes in such information to Electric Reliability Council of Texas, Inc. (ERCOT).

|  |  |
| --- | --- |
| Signature: |  |

(QSE Authorized Representative)

|  |  |
| --- | --- |
| Printed Name: |  |

(QSE Authorized Representative)

|  |  |
| --- | --- |
| Date Signed: |  |

# Checklist PART 2b: Request for Wind Units meeting PG 5.2.1(1)(c)(ii) Initial Synchronization

**[QSE submits checklist prior to desired Initial Synchronization of first re-powered turbine]**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **QSE** Name: |  | | | |
| Agent (optional): |  | | | |
| Date form completed: |  | | | |
| Date of Notice: |  | | | |
| **Gen Station Mnemonic:** | | |  | |
| Gen Site Name: |  | | | |
| Gen Unit Code(s): |  | | | |
| **GINR Number:** | | Is this a Temporary POI GINR? Y/N: | | If Temporary POI, what is GINR# of Permanent POI GINR: |
| \* Proposed Initial Synchronization Date : |  | | | |

\* Actual date contingent on completion of requirements and approval from ERCOT.

Primary and back-up contact personnel for Initial Synchronization (may be QSE’s Agent):

|  |  |
| --- | --- |
| Primary Contact Name: |  |
| Primary Contact Telephone Number: |  |
| Primary Contact E-mail Address: |  |
| Back-Up Contact Name: |  |
| Back-Up Contact Telephone Number: |  |
| Back-Up Contact E-mail Address: |  |

\*If the Resource is Split Metered:

|  |  |  |  |
| --- | --- | --- | --- |
| Identify the QSE responsible for coordinating start-up testing: | | |  |
| Identify all QSE’s sharing this Resource: |  | | | |
| Projected Resource Commissioning Date (Resource approved for participation in ERCOT market operations): | |  | |

The QSE must submit this Part 2b checklist prior to Initial Synchronization of the first re-powered turbine. In some cases, the re-powering will result in different Wind Generation Resource (WGR) aggregations modeled in the RARF in accordance with Nodal Protocol 3.10.7.2(11). The new model reflecting the WGR aggregations and telemetry required for each WGR must be completed and loaded into the ERCOT Network Operations Model prior to submitting this checklist.

The QSE and RE must comply with the ERCOT Nodal Protocols and Nodal Operating Guides (NOGs) from the moment the Resource becomes operational. The QSE must comply with procedures for new Resource start-up testing and communicate the initial synchronization schedule to the ERCOT Shift Supervisor. The QSE confirms it has met the following requirements:

The Resource Entity (RE) understands its responsibility to provide accurate and timely updates to the Outage Scheduler to reflect the expected future equipment unavailability if they expect to not be capable of generating at the modeled maximum output level. Prior to approval of each stage of commissioning, the RE must update the Outage Scheduler to accurately reflect the Resource’s future derate amount, start time and end time. Outage submission requirements appear in ERCOT Nodal Protocols Section 3.1. **Comments:**

Telemetry to QSE and TDSP (optional) from the facility (station and generation) is in place and operational as of       (date). Enter specific comments about status of telemetry in QSE comment box on telemetry checklist on next page.

The QSE can communicate the Resource’s POI information to ERCOT in the manner specified in NOG Section 7.3, Telemetry, and Nodal Protocols Section 6.5.5.2, Operational Data Requirements, and any other information required by Section 3.10.7.5, Telemetry Standards. The QSE must include instructions for ERCOT to escalate telemetry quality issues with the QSE during commissioning in the following comment section. **Comments**:

Automatic Voltage Regulator (AVR) operating in Voltage Control Mode will be in service as of       (date). The RE will report to ERCOT the AVR performance tests described in NOG Sections 2.2.5 and Nodal Protocol Section 8.1.1.2.1.4 prior to the Resource Commissioning Date, unless it is documented to ERCOT’s satisfaction the local topology and resources do not permit successful demonstration of full capability. **Comments:**

The reactive controls (VARs) of this Resource will be in service and enabled as of       (date) to maintain transmission voltage at the POI, as described in Nodal Protocol Section 3.15, Voltage Support. Additionally, in real-time, Resources must follow Voltage Set Points that could be different from the Seasonal Voltage Profiles posted in the MIS Secure area by ERCOT as described in NOG Sections 2.7.3.5, Resource Entity Responsibilities and Generation Resource Requirements, and 3.3.2, Unit Reactive Capability Requirements. Prior to the Resource Commissioning Date, the RE must demonstrate compliance with Reactive Power requirements in accordance with Nodal Protocol Section 3.15, Voltage Support. **Describe plan for voltage control at POI during commissioning in the space below (may reference associated section or page(s) on commissioning plan)**:

Resource Under Frequency Relays comply with trip settings specified in NOG Section 2.6.2, Generators. **Comments:**

Prior to Initial Synchronization, the RE shall install, or coordinate with its interconnecting TSP to install, phasor measurement recording equipment, including digital fault recorders, certain protective relays and/or meters with phasor measurement recording capability meeting the requirements in Section 6 of the NOG, capable of operating for its intended purpose. NOG Section 6.1.3.3(1)(b) requires voltage phasor measurements for at least one generator-interconnected bus, current phasor measurements for each interconnected generator over 20 MVA and frequency and df/dt for at least one generator-interconnected bus measurement. **Comments:**

Prior to Initial Synchronization, the RE shall have implemented the Sub-synchronous study Mitigation Plan identified in the sub-synchronous Study completed by the interconnecting TSP. **Comments:**

The QSE has received confirmation from the RE that ERCOT has approved the Nodal Protocol Section 16.5(4) compliance check required for parts 2A and 2B.

**Comments:**

| **Station Telemetry** | | | | |
| --- | --- | --- | --- | --- |
|  | **Data** | **Frequency** | **Mode** | **Reference/Comments** |
|  | Station Switching Device status | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements. (High side Typical TSP telemetry point; Low side typical QSE telemetry point)  **RE Comment:** |
|  | Station Breaker status | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Generation Resource High Side bus voltage | 10 sec | ICCP | Nodal Protocol Section 3.15, Voltage Support. May be supplied by the TDSP (typical TDSP telemetry point) or Low Side voltage with appropriate transformer model may be substituted (typical QSE telemetry point).  **RE Comment:** |
|  | Station Static and/or Dynamic Reactive Device(s) status for each device | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Station Static and/or Dynamic Reactive Device(s) MVAR output for each device | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Generator Step-Up (GSU) Transformer High-Side MW and MVAR for each modeled GSU | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Generation Resource auxiliary load and/or station service MW and MVAR for each modeled load | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (typical QSE telemetry point)  **RE Comment:** |
|  | Transmission Line Flow | 10 sec | ICCP | Nodal Protocol Section 6.5.5.2, Operational Data Requirements (RE has confirmed that TSP is providing required points; Transmission Line Flow has telemetry for both the sending and receiving end of the interconnecting line if the Resource is registered at a different station in the Network Operations Model).  **RE Comment:** |

| **New Generator Telemetry** | | | | |
| --- | --- | --- | --- | --- |
|  | **Data** | **Frequency** | **Mode** | **Reference/Comments** |
|  | Real Time data accuracy |  |  | Real Time data for reliability purposes must be accurate to within three percent (3%). This telemetry may be provided from relaying accuracy instrumentation transformers.  **QSE Comment:** |
|  | Generation Resource gross and net MW output | 2 sec | ICCP | Protocol Section 6.5.5.2, Operational Data Requirements. Net Generation is preferred. Otherwise, aux load should also be provided.  **QSE Comment:** |
|  | Generation Resource gross and net MVar output | 2 sec | ICCP | Protocol Section 6.5.5.2, Operational Data Requirements. Net Generation is preferred. Otherwise, aux load should also be provided.  **QSE Comment:** |
|  | Switching Device status other than reported in PART 1 | 2 sec | ICCP | Protocol Section 6.5.5.2, Operational Data Requirements.  **QSE Comment:** |
|  | Breaker status other than reported in PART 1 | 2 sec | ICCP | Protocol Section 6.5.5.2, Operational Data Requirements  **QSE Comment:** |
|  | Generation Resource High Sustainable Limit | 2 sec | ICCP | Protocol Section 6.5.5.2, Operational Data Requirements.  **QSE Comment:** |
|  | Generation Resource Low Sustainable Limit | 2 sec | ICCP | Protocol Section 6.5.5.2, Operational Data Requirements.  **QSE Comment:** |
|  | Generation Resource Automatic Voltage Regulator status | 2 sec | ICCP | Protocol Section 3.15.3, Generation Resource Requirements Related to Voltage Support. Applies to Generation Resources required to provide VSS.  **QSE Comment:** |
|  | Generation Resource Power System Stabilizer status | 2 sec | ICCP | Nodal Protocol Section 3.15.3, Generation Resource Requirements Related to Voltage Support. Applies to Generation Resources required to provide VSS.  **QSE Comment:** |
|  | POI kV Bus Voltage from TSP | 2 sec | ICCP | Nodal Protocol 3.10.7.5.2 (8), Continuous Telemetry of the Real-Time Measurements of Bus Load, Voltages, Tap Position, and Flows |
|  | POI Real Time Voltage Set Point from TSP | 2 sec | ICCP | Nodal Protocol 6.5.7.7 (6), Voltage Support Service |

**Intermittent Renewable Resources Only**[[3]](#footnote-4)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Additional Wind Resource Data** | | **Frequency (sec)** | | **Protocol Reference** |
|  | Wind Speed (Miles per Hour) | | 10 | | 6.5.7.1.13 (1) (d) 4.2.2 (1) (implied) |
|  | Wind Direction (Degrees) | | 10 | | 4.2.2 (1) (implied) |
|  | Temperature (Celsius) | | 10 | | 4.2.2 (1) (implied) |
|  | Barometric Pressure (Millibars) | | 10 | | 4.2.2 (1) (implied) |
|  | Irradiance (Plane of Array) (PVGR only) | | 10 | | 4.2.2 (1) (implied) |
|  | Number of Turbines/Inverters Online | | 10 | | 3.15(12) and (13) |
|  | Number of Turbines/Inverters Offline | | 10 | | 3.15(12) and (13) |
|  | Number of Turbines/Inverters Unknown | | 10 | | 3.15(12) and (13) |
|  | Any agreed-upon additional Resource data (multiple data items) | various | | 6.5.5.2 (2) g | |

**MET Tower Location [as registered]:**

**Latitude:**       **Longitude:**

**QSE Comment:**

By signing below, I attest the information provided on this form (**PART 2b**) is true, correct and complete, and the above-referenced QSE will promptly provide to Electric Reliability Council of Texas, Inc. (ERCOT) any substantive changes in such information.

|  |  |
| --- | --- |
| Signature: |  |

(QSE Authorized Representative)

|  |  |
| --- | --- |
| Printed Name: |  |

(QSE Authorized Representative)

|  |  |
| --- | --- |
| Date Signed: |  |

# Checklist PART 3: Request to Commission a Resource

**[RESOURCE ENTITY submits checklist after approval of all commissioning tests]**

QSE and Resource Entity (RE) provide notice to ERCOT that the Resource named below is ready to be commissioned on the date specified below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **RE** Name: |  | | | | |
| **QSE** Name: |  | | | | |
| Date of Notice: |  | | | | |
| **Gen Station Mnemonic:** | | |  | | |
| Gen Site Name: | | | | |
| Gen Unit Code(s): | | | | |
| **GINR Number:** | | Is this a Temporary POI GINR? Y/N: | | If Temporary POI, What is GINR# of Permanent POI GINR: | |
| Proposed Resource Commissioning Date\*: | | | | |
| \* Actual date contingent on completion of requirements and approval from ERCOT. | | | | |

**In accordance with Nodal Protocols Section 3.15(4) and (5), Voltage Support, and Nodal Protocol Section 8.1.1.2.1.4, Voltage Support Service Qualification, adequate reactive capability has been demonstrated by a performance test and engineering study, as checked below.**

For Generation Resources and Energy Storage Resources requesting to commission a Resource during the winter months (December through February), the *Declaration of Preparedness – Generation Entity Winter Weatherization* required by Public Utility Commission of Texas (PUCT) Substantive Rule 25.55(c)(3)(A), was submitted to ERCOT on  (date).

For Generation Resources and Energy Storage Resources requesting to commission a Resource during the summer months (June through September), the *Declaration of Preparedness – Generation Entity Summer Weatherization* required by PUCT Substantive Rule 25.55(c)(3)(B) and Attachment K: *Declaration of Natural Gas Pipeline Coordination* was submitted to ERCOT on  (date). **Comment:**

If the unit requesting commissioning entered the Generation Resource Interconnection and Change Request process due to meeting PG 5.2.1(1)(c)(ii), the RE must confirm completing all modification activities, otherwise enter N/A. **Comment:**

Reactive performance test submitted and approved by ERCOT. **Comment:**

AVR, PSS (If required) and PFR testing has been completed and approved by ERCOT. **Comment:**

If the Dynamic Model has changed, or if the reactive capability submitted and approved in the reactive tests differs from the RARF/RIOO-RS, a RARF/RIOO-RS update has been submitted and approved by ERCOT. **Comment:**

Five minutes of PMU data has been submitted to and approved by ERCOT. **Comment:**

I understand ERCOT must confirm this Resource has demonstrated adequate reactive capability before the Resource Commissioning Date.

I understand in accordance with Planning Guide Section 5.5(3), Inverter-Based Resources (IBRs) are required to undergo a dynamic model review process prior to the Resource Commissioning Date.

All materials outlined in Planning Guide Section 5.5.(3) have been submitted to ERCOT for review through the designated communication channel specified in Planning Guide Section 5.5(3). **Comment:**

Dynamic model review is complete and approved by ERCOT. **Comment:**

I acknowledge a Plant Verification Report is required to be submitted to ERCOT within 30 days following Part 3 approval per Paragraph (4) of Planning Guide 5.5, and a second report is required within 12 to 24 months following Part 3 approval. Details can be found in Paragraph (5)(b) of Planning Guide 6.2 and in Paragraph 3.1.8 of the [DWG Procedure Manual](https://www.ercot.com/committees/ros/dwg/).

By signing below, I attest the information provided on this form (**PART 3**) is true, correct, and complete, and the above-referenced RE will provide any substantive changes in such information to Electric Reliability Council of Texas, Inc. (ERCOT) in a timely manner.

|  |  |
| --- | --- |
| RE Signature: |  |

(RE Authorized Representative)

|  |  |
| --- | --- |
| Printed Name: |  |

(RE Authorized Representative)

|  |  |
| --- | --- |
| Date Signed: |  |

1. E.g., wind, solar, etc. [↑](#footnote-ref-2)
2. E.g. wind, solar, etc. [↑](#footnote-ref-3)
3. E.g., wind, solar, etc. [↑](#footnote-ref-4)