|  |  |  |  |
| --- | --- | --- | --- |
| OBDRR Number | [052](https://www.ercot.com/mktrules/issues/OBDRR052) | OBDRR Title | Related to NPRR1246, Energy Storage Resource Terminology Alignment for the Single-Model Era |
| Date of Decision | | February 4, 2025 | |
| Action | | Recommend Approval | |
| Estimated Impacts | | Cost/Budgetary: None  Project Duration: No project required | |
| Proposed Effective Date | | Upon implementation of Nodal Protocol Revision Request (NPRR) 1246, Energy Storage Resource Terminology Alignment for the Single-Model Era | |
| Priority and Rank Assigned | | Not applicable | |
| Other Binding Document Requiring Revision | | Procedure for Identifying Resource Nodes | |
| Related Documents Requiring Revision/Related Revision Requests | | Nodal Operating Guide Revision Request (NOGRR) 268, Related to NPRR1246, Energy Storage Resource Terminology Alignment for the Single-Model Era  NPRR1246  Planning Guide Revision Request (PGRR) 118, Related to NPRR1246, Energy Storage Resource Terminology Alignment for the Single-Model Era | |
| Revision Description | | This Other Binding Document Revision Request (OBDRR) inserts terminology associated with Energy Storage Resources (ESRs) in the appropriate places throughout the Procedure for Identifying Resource Nodes, aligning provisions and requirements for ESRs with those already in place for Generation Resources and Controllable Load Resources.  While several key sections of this OBD have already been modified to accommodate ESRs in the “combo model” era — in which ESRs are treated as two Resources — numerous other provisions and requirements rely on the blanket provision from NPRR1002, BESTF-5 Energy Storage Resource Single Model Registration and Charging Restrictions in Emergency Conditions, in paragraph (1) of Protocol Section 3.8.5, Energy Storage Resources, as follows:  “For the purposes of all ERCOT Protocols and Other Binding Documents, all requirements that apply to Generation Resources and Controllable Load Resources shall be understood to apply to Energy Storage Resources (ESRs) to the same extent, except where the Protocols explicitly provide otherwise.”  As discussed at meetings in 2020 of the Battery Energy Storage Task Force (BESTF), ERCOT intended for this provision to be temporary, and explained to stakeholders that it would introduce an NPRR and related Revision Requests in 2021 that incorporated the ESR terminology in all appropriate locations in the Nodal Protocols. This OBDRR accomplishes that objective in the Procedure for Identifying Resource Nodes.  This OBDRR is applicable to ESRs in the future single-model era and should be implemented simultaneously with NPRR1246 and NPRR1014, BESTF-4 Energy Storage Resource Single Model.  ERCOT invites review of this OBDRR from the Real-Time Co-Optimization plus Batteries Task Force (RTCBTF) and any other applicable groups. It is also worth noting these changes have no system impacts as they reflect the current RTC+B business requirements and interface requirements for Market Participants. | |
| Reason for Revision | | [Strategic Plan](https://www.ercot.com/files/docs/2023/08/25/ERCOT-Strategic-Plan-2024-2028.pdf) Objective 1 – Be an industry leader for grid reliability and resilience  [Strategic Plan](https://www.ercot.com/files/docs/2023/08/25/ERCOT-Strategic-Plan-2024-2028.pdf) Objective 2 - Enhance the ERCOT region’s economic competitiveness with respect to trends in wholesale power rates and retail electricity prices to consumers  [Strategic Plan](https://www.ercot.com/files/docs/2023/08/25/ERCOT-Strategic-Plan-2024-2028.pdf) Objective 3 - Advance ERCOT, Inc. as an independent leading industry expert and an employer of choice by fostering innovation, investing in our people, and emphasizing the importance of our mission  General system and/or process improvement(s)  Regulatory requirements  ERCOT Board/PUCT Directive  *(please select ONLY ONE – if more than one apply, please select the ONE that is most relevant)* | |
| Justification of Reason for Revision and Market Impacts | | This OBDRR improves transparency and ease of access to provisions and requirements for ESR developers and Market Participants. | |
| TAC Decision | | On 8/28/24, TAC voted unanimously to table OBDRR052. All Market Segments participated in the vote.  On 11/20/24, TAC voted unanimously to recommend approval of OBDRR052 as amended by the 10/14/24 ERCOT comments; and the 7/31/24 Impact Analysis. All Market Segments participated in the vote.  On 1/22/25, TAC voted unanimously to recommend approval of OBDRR052 as recommended by TAC in the 11/20/24 TAC Report as amended by the 1/21/25 ERCOT comments. All Market Segments participated in the vote. | |
| Summary of TAC Discussion | | On 8/28/24, participants noted the related Revision Requests were still under consideration by the relevant subcommittees and requested tabling of OBDRR052.  On 11/20/24, there was no additional discussion beyond TAC review of the items below.  On 1/22/25, there was no additional discussion beyond TAC review of the items below. | |
| TAC Review/Justification of Recommendation | | Revision Request ties to Reason for Revision as explained in Justification  Impact Analysis reviewed and impacts are justified as explained in Justification  Opinions were reviewed and discussed  Comments were reviewed and discussed  Other: (explain) | |
| ERCOT Board Decision | | On 12/3/24, the ERCOT Board voted unanimously to remand OBDRR052 to TAC.  On 2/4/25, the ERCOT Board voted unanimously to recommend approval of OBDRR052 as recommended by TAC in the 1/22/25 TAC Report. | |
|  | |  | |
| **Opinions** | | | |
| Credit Review | | Not applicable | |
| Independent Market Monitor Opinion | | IMM has no opinion on OBDRR052. | |
| ERCOT Opinion | | ERCOT supports approval of OBDRR052. | |
| ERCOT Market Impact Statement | | ERCOT Staff has reviewed OBDRR52 and believes the market impact for OBDRR052 provides clarity and additional transparency for stakeholders on the applicable provisions and requirements associated with ESRs as the market transitions from the combo model to the single model as part of the RTC+B project. | |

|  |  |
| --- | --- |
| Sponsor | |
| Name | Kenneth Ragsdale / Alfredo Moreno |
| E-mail Address | [kenneth.ragsdale@ercot.com](mailto:kenneth.ragsdale@ercot.com) / [alfredo.moreno@ercot.com](mailto:alfredo.moreno@ercot.com) |
| Company | ERCOT |
| Phone Number |  |
| Cell Number | 512-750-3505 / 512-248-6977 |
| Market Segment | Not applicable |

|  |  |
| --- | --- |
| **Market Rules Staff Contact** | |
| **Name** | Cory Phillips |
| **E-Mail Address** | [cory.phillips@ercot.com](mailto:cory.phillips@ercot.com) |
| **Phone Number** | 512-248-6464 |

|  |  |
| --- | --- |
| **Comments Received** | |
| Comment Author | **Comment Summary** |
| ROS 091024 | Requested TAC continue to table OBDRR052 |
| ERCOT 101424 | Proposed additional edits to align with similar comments to NPRR1246 removing/rephrasing initially proposed uses of “ESR” |
| ERCOT 012125 | Proposed additional edits to align with OBDRR046, Related to NPRR1188, Implement Nodal Dispatch and Energy Settlement for Controllable Load Resources |

|  |
| --- |
| Market Rules Notes |

Please note that the baseline language below has been updated to reflect the incorporation of the following OBDRR(s) into this OBD:

* OBDRR046 (incorporated 12/1/24)

|  |
| --- |
| Proposed Other Binding Document Language Revision |

**Introduction:**

This procedure is the guiding document for ERCOT and Market Participants with a Generation Resource or Energy Storage Resource (ESR) to identify Resource Nodes and manage the lifecycle of the Resource Node.

|  |
| --- |
| ***[OBDRR046: Replace the paragraph above with the following upon system implementation of NPRR1188:]***  This procedure is the guiding document for ERCOT and Market Participants with a Generation Resource, Energy Storage Resource (ESR), or Controllable Load Resource (CLR) that is not an Aggregate Load Resource (ALR), to identify Resource Nodes and manage the lifecycle of the Resource Node. |

Revisions to this document must be approved by the Technical Advisory Committee (TAC). In the following cases, after review and recommendation by TAC, revisions to this document must be approved by the ERCOT Board:

a. The revisions require an ERCOT project for implementation; and

b. The revisions are related to a Nodal Protocol Revision Request (NPRR), a Planning Guide Revision Request (PGRR), or a revision request requiring an ERCOT project for implementation.

Upon approval of revisions, ERCOT shall post the revised procedure to the ERCOT website within three Business Days.

**Procedure to Incorporate a Resource Node into the Network Operations Model:**

1. At the designated time period as determined by Protocol Section 3.10, Network Operations Modeling and Telemetry, and associated ERCOT business processes, a Resource Entity must submit Resource Registration information that includes a detailed electrical one-line drawing of the generation facility. The ERCOT business process indicates that the Resource Registration information will be presented to the Network Modeling Group within ERCOT.

2. The Network Modeling Group will utilize the “Principles for Resource Node Definition” located in Appendix A to determine the Resource Node parameters.

3. The Network Modeling Group will provide documentation back to the Resource Entity clearly indicating the Resource Node parameters.

4. The Resource Entity will have five Business Days to accept or reject the suggested Resource Node parameters.

5. If there are any disagreements with the Resource Node parameters, ERCOT and the Resource Entity shall work together to reach agreement.

6. If agreement cannot be reached by ERCOT and the Resource Entity, the Wholesale Market Subcommittee (WMS) or appropriate WMS working group shall help guide the decision.

7. Upon an agreement between ERCOT and the Resource Entity, the Resource Node parameters will be implemented in the Network Operations Model.

8. The normal timeline for this procedure shall not exceed 20 Business Days after the submission date of validated Resource Registration information that includes a detailed electrical one-line drawing.

9. In the event that agreement between ERCOT and the Resource Entity cannot be reached within 20 Business Days, no Resource Node parameters will be entered into the Network Operations Model. This may have an effect on Congestion Revenue Right (CRR) Network Models and associated CRR activities regarding the Generation Resource or ESR in question. There must be an agreement between ERCOT and the Resource Entity before Resource Node parameters will be implemented into the Network Operations Model.

|  |
| --- |
| ***[OBDRR046: Replace paragraph 9 above with the following upon system implementation of NPRR1188:]***  9. In the event that agreement between ERCOT and the Resource Entity cannot be reached within 20 Business Days, no Resource Node parameters will be entered into the Network Operations Model. This may have an effect on Congestion Revenue Right (CRR) Network Models and associated CRR activities regarding the Generation Resource, ESR or CLR in question. There must be an agreement between ERCOT and the Resource Entity before Resource Node parameters will be implemented into the Network Operations Model. |

10. Once effective in the Network Operations Model, the Resource Node name cannot be changed.

11. Once incorporated into the Network Operations Model, the Resource Node will be used in all associated ERCOT models, applications, and processes.

12. The Resource Node parameters, associated electrical one-line drawings, and other relevant data shall be posted on the Market Information System (MIS) Secure Area and will be available to Market Participants with Digital Certificates.

**Procedure to Retire a Resource Node in the Network Operations Model:**

1. Resource Nodes cannot be retired until all outstanding CRRs on that Resource Node have been settled or a model error was identified in the creation of the Resource Node. Transmission Service Providers (TSPs) cannot submit Network Operations Model Change Requests (NOMCRs) to delete a Resource Node.

2. ERCOT’s Forward Markets team will identify a nearby energized bus to move the location of the retiring Resource Node until such time as all the outstanding CRRs are settled once it has been notified that equipment tied to a Resource Node is requested to be removed from the Network Operations Model. In this specific case, the Resource Node location will not follow the rules in this document and it may not be located near a Generation Resource or ESR.

|  |
| --- |
| ***[OBDRR046: Replace paragraph 2 above with the following upon system implementation of NPRR1188:]***  2. ERCOT’s Forward Markets team will identify a nearby energized bus to move the location of the retiring Resource Node to until such time as all the outstanding CRRs are settled once it has been notified that equipment tied to a Resource Node is requested to be removed from the Network Operations Model. In this specific case, the Resource Node location will not follow the rules in this document, and it may not be located near a Generation Resource, ESR, or CLR. |

3. ERCOT’s CRR team will submit a NOMCR with the appropriate effective date to remove the retiring Resource Node in the future. The effective date is determined based on the last active CRR date.

4. ERCOT’s Day-Ahead Market (DAM) team will update the Resource Node expiration date in the Market Management System (MMS) based on the retirement of the Resource Node.

**Appendix A**

**PRINCIPLES FOR RESOURCE NODE DEFINITION**

**1. Network Operations Model**

a. Annual/Monthly CRR Auctions use a network model as close as possible to the Network Operations Model.

b. MMS and Energy Management System (EMS) use the same Network Operations Model for both commercial and operational purposes.

c. Breakers between the Resource Connectivity Nodes and the Resource Node are assumed closed by default so that Resource Nodes and associated Resource Connectivity Nodes appear energized.

d. Transmission Element Outages, as defined in the Protocols, are submitted into the Outage Scheduler and posted before DAM submission, i.e. de-energized Resource Nodes (Settlement Points) are known in advance of DAM submission.

**2. Resource Connectivity Nodes**

a. Resource Connectivity Node represents the Electrical Bus where physical generator is connected.

|  |
| --- |
| ***[OBDRR046: Replace paragraph a. above with the following upon system implementation of NPRR1188:]***  a. Resource Connectivity Node represents the Electrical Bus where the physical generator is connected or the Electrical Bus of a Common Information Model (CIM) Load that a CLR is mapped to. |

b. Generator output is injected and ESR charging consumption is withdrawn at the Resource Connectivity Node.

|  |
| --- |
| ***[OBDRR046: Replace paragraph b. above with the following upon system implementation of NPRR1188:]***  b. Generator output is injected and ESR charging consumption is withdrawn at the Resource Connectivity Node and CLR consumption is withdrawn at the Resource Connectivity Node. |

c. More than one Resource can be connected to the same Resource Connectivity Node.

**3. Resource Nodes**

3.1 Resource Node Definition

a. Resource Node represents the Electrical Bus or the logical construct that defines the location of a Settlement Point.

b. Resource Nodes include Generation Resource Nodes, Combined Cycle Plant (CCP) Logical Resource Nodes, Combined Cycle Unit (CCU) Resource Nodes and Private Use Network (PUN) Resource Nodes.

c. A Generation Resource Node represents the Settlement Point for ERCOT and PUN Generation Resources and ESRs. The Three-Part Supply Offers, Energy Bid/Offer Curves, DAM Energy-Only Offers, Ancillary Service Offers, and DAM Energy Bids, as well as Point-to-Point (PTP) bids, can be submitted and settled at a Generation Resource Node, unless that Generation Resource Node is within a PUN site where constrainable Transmission Element(s) exist between the Generation Resource Node and ERCOT-Polled Settlement (EPS) Meter, in which case only Three-Part Supply Offers, Energy Bid/Offer Curves, and Ancillary Service Offers can be submitted and settled.

i. Generation Resource Node within a PUN site refers to those Resource Nodes defined for Generation Resources and ESRs within a PUN site that cannot be placed at the PUN Point of Interconnection (POI) due to the rules for placement of Resource Nodes described in Section 3.2, Resource Node Location.

d. CCP Logical Resource Node represents the Settlement Point for Three-Part Supply Offers for CCP configurations. Only Three-Part Supply Offers, and Ancillary Service Offers for CCP configurations can be submitted and settled at a CCP Logical Resource Node.

e. CCU Resource Node represents the Settlement Point for the CCU. Only DAM Energy-Only Offers, DAM Energy Bids and PTP bids can be submitted and settled at a CCU Resource Node.

f. PUN Resource Node represents the Settlement Point at the PUN interconnection to ERCOT. Only DAM Energy-Only Offers, DAM Energy Bids and PTP bids can be submitted and settled at a PUN Resource Node.

g. Multiple Generation Resources and ESRs can be mapped to the same Resource Node, i.e. offers from different Generation Resources and ESRs can be settled at the same Settlement Point.

h. A Generation Resource can only be mapped to one Resource Node, i.e. offers from a Generation Resource can only be settled at one Settlement Price. Similarly, an ESR can only be mapped to one Resource Node, i.e. offers/bids from an ESR can only be settled at one Settlement Price.

i. The Resource Nodes for “single” Resources and for Resources that are a component of a CCP shall be identified prior to the identification of the PUN Resource Nodes. Once those Resource Nodes have been located, the PUN Resource Nodes shall be located for PUN Resources that are not co-located with an existing Resource Node.

j. Resource Nodes shall not be located at the Direct Current Ties (DC Ties). (The DC Ties are Load Zones.)

k. Resource Nodes shall not be located at the Block Load Transfer (BLT) buses.

l. Do not identify or locate Resource Nodes for Non-Modeled Generators.

m. The Resource Node for a Distribution Generation Resource (DGR) or Distribution Energy Storage Resource (DESR) may be located at its Resource Connectivity Node.

|  |
| --- |
| ***[OBDRR046: Replace Section 3.1 above with the following upon system implementation of NPRR1188:]***  3.1 Resource Node Definition  a. Resource Node represents the Electrical Bus or the logical construct that defines the location of a Settlement Point.  b. Resource Nodes include Generation/CLR Resource Nodes, Combined Cycle Plant (CCP) Logical Resource Nodes, Combined Cycle Unit (CCU) Resource Nodes and Private Use Network (PUN) Resource Nodes..  c. Generation/CLR Resource Nodes represent the Settlement Points for ERCOT and PUN Generation Resources, ESRs and CLRs. The Three-Part Supply Offers, Energy Bid/Offer Curves Energy Bid Curves, DAM Energy-Only Offers, Ancillary Service Offers and DAM Energy Bids as well as Point-to-Point (PTP) bids can be submitted and settled at a Generation/CLR Resource Node, unless that Generation/CLR Resource Node is within a PUN site where constrainable Transmission Element(s) exist between the Generation/CLR Resource Node and ERCOT-Polled Settlement (EPS) Meter, in which case only Three-Part Supply Offers, Energy Bid/Offer Curves, Energy Bid Curves, and Ancillary Service Offers can be submitted and settled.  i. Generation/CLR Resource Nodes within a PUN site refer to those Resource Nodes defined for Generation Resources, ESRs, and/or CLRs within a PUN site that cannot be placed at the PUN Point of Interconnection (POI) due to the rules for placement of Resource Nodes described in Section 3.2, Resource Node Location.  d. CCP Logical Resource Nodes represent the Settlement Points for Three-Part Supply Offers for CCP configurations. Only Three-Part Supply Offers and Ancillary Service Offers for CCP configurations can be submitted to be settled at a CCP Logical Resource Node.  e. CCU Resource Nodes represent the Settlement Points for the CCU. Only DAM Energy-Only Offers, DAM Energy Bids and PTP bids can be submitted and settled at a CCU Resource Node.  f. PUN Resource Nodes represent the Settlement Points at the PUN interconnection to ERCOT. Only DAM Energy-Only Offers, DAM Energy Bids and PTP bids can be submitted and settled at a PUN Resource Node.  g. Multiple Generation Resources, ESRs, and CLRs can be mapped to the same Resource Node, i.e. offers and/or bids from different Generation Resources, ESRs, and CLRs can be settled at the same Settlement Point.  h. A Generation Resource can only be mapped to one Resource Node, i.e. DAM offers from a Generation Resource can only be settled using one Settlement Point Price (SPP). Similarly, an ESR can only be mapped to one Resource Node, i.e. offers/bids from an ESR can only be settled using one SPP. A CLR can only be mapped to one Resource Node, i.e. DAM bids from a CLR can only be settled using one SPP.  i. The Resource Nodes for “single” Resources and for Resources that are a component of a CCP shall be identified prior to the identification of the PUN Resource Nodes. Once those Resource Nodes have been located, the PUN Resource Nodes shall be located for PUN Resources that are not co-located with an existing Resource Node.  j. Resource Nodes shall not be located at the Direct Current Ties (DC Ties). (The DC Ties are Load Zones.)  k. Resource Nodes shall not be located at the Block Load Transfer (BLT) buses.  l. Do not identify or locate Resource Nodes for Settlement Only Resources.  m. The Resource Node for a Distribution Generation Resource (DGR) or Distribution Energy Storage Resource (DESR) may be located at its Resource Connectivity Node. |

3.2 Resource Node Location

a. First Fork Rule: Locate Resource Node at the first Electrical Bus with alternate paths starting from the Generation Resource Connectivity Node. Parallel network paths do not count as alternate paths.

i. Exception: There is an exception to this rule for placing Generation Resource Nodes and CCU Resource Nodes that are mapped to Generation Resources or ESRs within a PUN. If the Generation Resource(s) and/or ESR(s) is within a PUN that has only one interconnection to the ERCOT Transmission Grid, locate the Resource Node at the Electrical Bus that is the interconnection point of the PUN to the ERCOT Transmission Grid.

ii. ERCOT-Polled Settlement (EPS) Meter location check: As the network connectivity path is traversed in searching for the first Electrical Bus with alternate paths (First Fork Rule), if an Electrical Bus is encountered with a mapped EPS Meter first, then place the Resource Node at this Electrical Bus.

b. EPS Meter Rule: Locate Resource Node, subject to First Fork Rule, electrically as close as possible to EPS Meter location, i.e. where energy is effectively metered. If the EPS Meter location changes, then a new Resource Node must be established and the old Resource Node retired in accordance with the procedure in this document. Please refer to paragraph (h)(ii) below for a list of exceptions under which ERCOT can relocate a Resource Node.

c. Ownership Rule: Locate Resource Node at the Electrical Bus that is the ERCOT POI (if practical). Subsequent ownership changes shall not change the Resource Node location.

d. De-Energization Rule: Locate Resource Node at Electrical Bus that is less often de-energized, if alternate choices exist. Settlement Point Prices (SPPs) for de-energized Resource Nodes are calculated using heuristic rules.

e. Generic Transmission Constraint (GTC) Rule: A GTC cannot include Transmission Elements between a Resource Node and any Generation Resources or ESRs mapped to it.

f. Transmission Constraint Rule: Initial placement of the Resource Node should not be such that Transmission Elements between Resource Node and associated Resource Connectivity Nodes could be constrained. The parameters of the Network Operations Model are evaluated at that point in time when the determination of the Resource Node placement is being made such that there is no congestion between the location of the Resource Node and the Resource Connectivity Node that the Generation Resource or ESR is physically connected to in the Network Operations Model. Ongoing monitoring to ensure that there is no congestion between the Resource Node and the Resource Connectivity Node of the Generation Resource or ESR requires the Resource Entity and Transmission and/or Distribution Service Provider (TDSP) to monitor and coordinate changes that may impact this. See Articles 5, 6 and 7 of the Standard Generation Interconnection Agreement (SGIA).

g. Publicity Rule: Market Participants need to know where the Resource Nodes are located.

h. In the event of a subsequent NOMCR that changes the topology, ERCOT shall review the impact to the Resource Node location.

i. In cases where a NOMCR, that is to be effective in the future, requires the placement of a new Resource Node, there may be instances where the Common Information Model (CIM) may show both the current and the future topology with the new Resource Node. This is done to handle situations where the energization date/time of the future network changes are different than the date/time of the migration of the changes in the network model into the ERCOT production systems. In such cases:

A. The location of the new Resource Node will be based on the future topology only.

B. The transition of the mapping between Generation Resource or ESR and the new Resource Node (if applicable) will be performed by ERCOT support staff.

ii. ERCOT may relocate the existing Resource Node to an appropriate location to:A. Align with the correct implementation of DGRs and DESRs, as stated in paragraph (m) of Section 3.1 above, in the Network Operations Model;

B. Account for a series compensator(s); or

C. Implement station renames.

i. If all rules cannot be simultaneously satisfied, then the rules are listed in order of priority. ERCOT will use discretion in choosing the appropriate Resource Node location, assuming that such a location does not allow the Resource Entity to control its Resource Node price.

|  |
| --- |
| ***[OBDRR046: Replace Section 3.2 above with the following upon system implementation of NPRR1188:]***  3.2 Resource Node Location  a. First Fork Rule: Locate Resource Node at the first Electrical Bus with alternate paths starting from the Generation Resource Connectivity Node for Generation Resources and ESRs and the Connectivity Node of the CIM Load that a CLR is mapped to for CLRs. Parallel network paths do not count as alternate paths.  i. Exception: There is an exception to this rule for placing Generation/CLR Resource Nodes and CCU Resource Nodes that are mapped to Generation Resources, ESRs, or CLRs within a PUN. If the Generation Resource(s) and/or ESR(s) and/or CLR(s) is within a PUN that has only one interconnection to the ERCOT Transmission Grid, locate the Resource Node at the Electrical Bus that is the interconnection point of the PUN to the ERCOT Transmission Grid.  ii. ERCOT-Polled Settlement (EPS) Meter Location Check: As the network connectivity path is traversed in searching for the first Electrical Bus with alternate paths (First Fork Rule), if an Electrical Bus is encountered with a mapped EPS Meter first, then place the Resource Node at this Electrical Bus.  b. EPS Meter Rule: Locate Resource Node, subject to First Fork Rule, electrically as close as possible to EPS Meter location, i.e. where energy is effectively metered. If the EPS Meter location changes, then a new Resource Node must be established and the old Resource Node retired in accordance with the procedure in this document. Please refer to paragraph (h)(ii) below for a list of exceptions under which ERCOT can relocate a Resource Node.  c. Ownership Rule: Locate Resource Node at the Electrical Bus that is the ERCOT POI (if practical). Subsequent ownership changes shall not change the Resource Node location.  d. De-Energization Rule: Locate Resource Node at Electrical Bus that is less often de-energized, if alternate choices exist. SPPs for de-energized Resource Nodes are calculated using heuristic rules.  e. Generic Transmission Constraint (GTC) Rule: A GTC cannot include Transmission Elements between a Resource Node and any Generation Resources, ESRs, or CLRs mapped to it.  f. Transmission Constraint Rule: Initial placement of the Resource Node should not be such that Transmission Elements between Resource Node and associated Resource Connectivity Nodes could be constrained. The parameters of the Network Operations Model are evaluated at that point in time when the determination of the Resource Node placement is being made such that there is no congestion between the location of the Resource Node and the Resource Connectivity Node that the Generation Resource or ESR is physically connected to, or the Connectivity Node of the CIM Load that the CLR is mapped to, in the Network Operations Model. Ongoing monitoring to ensure that there is no congestion between the Resource Node and the Resource Connectivity Node of the Generation Resource or ESR, or the Connectivity Node of the CIM Load that the CLR is mapped to, requires the Resource Entity and Transmission and/or Distribution Service Provider (TDSP) to monitor and coordinate changes that may impact this. See Articles 5, 6 and 7 of the Standard Generation Interconnection Agreement (SGIA).  g. Publicity Rule: Market Participants need to know where the Resource Nodes are located.  h. In the event of a subsequent NOMCR that changes the topology, ERCOT shall review the impact to the Resource Node location.  i. In cases where a NOMCR, that is to be effective in the future, requires the placement of a new Resource Node, there may be instances where the Common Information Model (CIM) may show both the current and the future topology with the new Resource Node. This is done to handle situations where the energization date/time of the future network changes are different than the date/time of the migration of the changes in the network model into the ERCOT production systems. In such cases:  A. The location of the new Resource Node will be based on the future topology only.  B. The transition of the mapping between the Generation Resource, ESR, or CLR and the new Resource Node (if applicable) will be performed by ERCOT support staff.  ii. ERCOT may relocate the existing Resource Node to an appropriate location to:  A. Align with the correct implementation of DGRs and DESRs, as stated in paragraph (m) of Section 3.1 above, in the Network Operations Model;  B. Account for a series compensator(s); or  C. Implement station renames.  i. If all rules cannot be simultaneously satisfied, then the rules are listed in order of priority. ERCOT will use discretion in choosing the appropriate Resource Node location, assuming such a location does not allow the Resource Entity to control its Resource Node price. |

**4. Combined Cycle Plant (CCP) Modeling**

4.1 CCP Logical Resource Node

a. Each CCP configuration for a train represents a CCP Logical Generation Resource.

b. Each CCP Logical Generation Resource is mapped to a CCP Logical Resource Node. All CCP Logical Generation Resources, i.e. all CCP configurations for a train are mapped to the same CCP Logical Resource Node.

c. Each CCP train has its own CCP Logical Resource Node, i.e. CCP Logical Generation Resources for different CCP trains are mapped to different CCP Logical Resource Nodes.

d. Each CCP Logical Resource Node is a Settlement Point.

e. CCP Logical Resource Nodes are used only for Resource-specific Three-Part Supply Offers and Ancillary Service Offers for CCP configurations.

4.2 CCU Resource Node

a. CCU Resource Nodes are mapped to a CCP Logical Resource Node.

b. A CCU Resource Node is the Electrical Bus determined by above rules (First Fork and others as described in Section 3.2, Resource Node Location, above) starting from the Resource Connectivity Node of the physical CCP train Resources.

c. A CCU Resource Node is a Settlement Point.

d. Only DAM Energy-Only Offers, DAM Energy Bids and PTP bids can be submitted at CCU Resource Nodes.

4.3 CCP/CCU Resource Node Processing

a. PTP cleared quantities are injected at Electrical Buses of CCU Resource Nodes.

b. DAM SPP for CCU Resource Node is used as Settlement Price for PTP bids that sink or source at CCU Resource Node.

c. In DAM, energy for CCP Logical Resource is distributed to Connectivity Nodes of physical CCP Resources proportionally to the Resource capacities that are On-Line in the selected CCP configuration.

d. In DAM, Shift Factor for CCP Logical Resource Node Dispatch is calculated as the High Reasonability Limit (HRL) weighted average of Shift Factors for CCU Resource Connectivity Nodes using the Resource HRLs that are On-Line in the selected CCP configuration as weights. Note that the assumption here is that there is no congestion between the connectivity node of the CCU and the Resource Node.

e. DAM SPP for CCP Logical Resource Node is equal to weighted average of DAM SPPs at CCU Resource Nodes using the Resource HRLs that are On-Line in selected CCP configuration as weights. For an Off-Line CCP, the LMP for the CCP Logical Resource Node is calculated as weighted average of LMPs at CCU Resource Nodes using the HRLs of the CCU Resources. Note that the assumption here is that there is no congestion between the Resource Connectivity Node of the CCU and the Resource Node.

f. DAM SPP for CCP Logical Resource Node is used as the Settlement Price for CCP Three-Part Supply Offers.

g. In Real-Time Market (RTM), Shift Factor for CCP Logical Resource Node is calculated as weighted average of Shift Factors for CCU Resource Connectivity Nodes using the telemetered outputs of CCU Resources that are online in current CCP configuration as weights. Note that the assumption here is that there is no congestion between the Resource Connectivity Node of the CCU and the Resource Node.

h. RTM Locational Marginal Price (LMP) for CCP Logical Resource Node when the CCP is On-Line is calculated based on the weighted average of Shift Factors at CCU Resource Connectivity Nodes using telemetered outputs of CCU Resources that are online in current CCP configuration as weights. For an Off-Line CCP, the LMP for the CCP Logical Resource Node is calculated as weighted average of LMPs at CCU Resource Nodes using the HRLs of the CCU Resources. Note that the assumption here is that there is no congestion between the Resource Connectivity Node of the CCU and the Resource Node.

i. RTM SPP for the CCP Logical Resource Node is the Base Point or time weighted average of RTM LMPs at Logical Resource Node.

**5. Private Use Network (PUN) Modeling**

5.1 PUN Resource Node

a. The placement of a PUN Resource Node is optional. At a PUN, after all the Generation Resource Nodes, CCP Logical Resource Nodes and CCU Resource Nodes are placed (if applicable), if none of the Generation Resource Nodes or CCU Resource Nodes are placed where the EPS Meter is effectively located, then this is the location of the PUN Resource Node.

b. PUN Resource Node represents the Electrical Bus where an EPS Meter is effectively located that is measuring the flow at a POI with ERCOT.

c. PUN Resource Node is a Settlement Point.

d. PUN Resource Node cannot have mapped PUN Generation Resources or PUN ESRs.

e. There can be several PUN Resource Nodes for one PUN.

f. Only PTP Obligation Bids, DAM Energy Bids, and DAM Energy-Only Offers can be submitted at a PUN Resource Node.

g. For DAM Energy-Only Offers, power is injected at the Electrical Bus of the PUN Resource Node.

h. Cleared quantities are settled at PUN Resource Node Settlement Prices.

|  |
| --- |
| ***[OBDRR046: Replace Section 5.1 above with the following upon system implementation of NPRR1188:]***  5.1 PUN Resource Node  a. The placement of a PUN Resource Node is optional. At a PUN, after all the Generation/CLR Resource Nodes, CCP Logical Resource Nodes and CCU Resource Nodes are placed (if applicable), if none of the Generation/CLR Resource Nodes or CCU Resource Nodes are placed where the EPS Meter is effectively located, then this is the location of the PUN Resource Node.  b. PUN Resource Node represents the Electrical Bus where an EPS Meter is effectively located that is measuring the flow at a POI with ERCOT.  c. PUN Resource Node is a Settlement Point.  d. PUN Resource Node cannot have mapped PUN Generation Resources, ESRs, or CLRs.  e. There can be several PUN Resource Nodes for one PUN.  f. Only PTP and DAM Energy Bids and Energy-Only Offers can be submitted at a PUN Resource Node.  g. For DAM Energy-Only Offers, power is injected at the Electrical Bus of the PUN Resource Node.  h. DAM Cleared quantities are settled at PUN Resource Node SPP. |

5.2 Resource Nodes for PUN Generation Resources and PUN ESRs

a. The Resource Connectivity Node for a PUN Generation Resource or a PUN ESR represents the Electrical Bus where the physical Resource is connected.

b. Generator outputs are injected at Resource Connectivity Nodes.

c. The Resource Node for a PUN Generation Resource or a PUN ESR represents the Electrical Bus where the Settlement Point for the PUN Generation Resource or PUN ESR is located.

d. The Resource Node for a PUN Generation Resource or a PUN ESR is defined using First Fork Rule and others as described in Section 3.2, Resource Node Location, above.

e. A Resource Node for a PUN Generation Resource or a PUN ESR is a Settlement Point.

f. PUN energy offers represent the net to grid in respect to PUN self-served load.

g. Three-Part Supply Offers, Energy Bid/Offer Curves, and Ancillary Service Offers can be submitted for a PUN Generation Resource or a PUN ESR for the excess capacity and energy not used to serve the PUN self-serve Load.

h. DAM Resource-specific offers for PUN Generation Resources or PUN ESRs are settled at SPPs at Resource Nodes for PUN Generation Resources and PUN ESRs.

i. Constraints within a PUN can be monitored but will not be enforced by DAM, Reliability Unit Commitment (RUC) and Security-Constrained Economic Dispatch (SCED).

j. Only PTP Obligation Bids, DAM Energy Bids, and DAM Energy-Only Offers can be submitted at PUN Resource Nodes.

|  |
| --- |
| ***[OBDRR046: Replace Section 5.2 above with the following upon system implementation of NPRR1188:]***  5.2 Resource Nodes for PUN Generation Resources, PUN ESRs, and PUN CLRs  a. The Resource Connectivity Node for a PUN Generation Resource, PUN ESR, or PUN CLR represents the Electrical Bus where the physical Resource is connected or the Connectivity Node of the CIM Load that the CLR is mapped to.  b. Generator outputs are injected at Resource Connectivity Nodes and CLR consumption is withdrawn at the Resource Connectivity Nodes.  c. The Resource Node for a PUN Generation Resource, PUN ESR, or PUNCLR represents the Electrical Bus where the Settlement Point for the PUN Generation Resource, PUN ESR, or PUN CLR is located.  d. The Resource Node for a PUN Generation Resource, PUN ESR, or PUN CLR is defined using First Fork Rule and others as described in Section 3.2, Resource Node Location, above.  e. A Resource Node for a PUN Generation Resource, PUN ESR, or PUN CLR is a Settlement Point.  f. PUN energy offers represent the net to grid in respect to PUN self-served load excluding CLR energy consumption. PUN CLR Energy Bid Curves represent the bid to buy of the CLR total energy consumption.  g. Three-Part Supply Offers, Energy Bid /Offer Curves and Ancillary Service Offers can be submitted for a PUN Generation Resource, PUN ESR, or PUN CLR for the excess capacity and energy not used to serve the PUN self-serve Load. CLR Energy Bid Curves and Ancillary Service Offers can be submitted for PUN CLR for its total capacity.  h. DAM Resource-Specific Offers for PUN Generation Resources, PUN ESRs, and PUN CLRs are settled using SPPs at Resource Nodes for PUN Generation Resources, PUN ESRs, and PUN CLRs.  i. Constraints within a PUN can be monitored but will not be enforced by DAM, Reliability Unit Commitment (RUC) and Security-Constrained Economic Dispatch (SCED).  j. Only PTP Obligation Bids, DAM Energy Bids, and DAM Energy-Only Offers can be submitted at PUN Resource Nodes. |

5.3 CCP Modeling within a PUN

a. CCP trains within a PUN are treated in the same way as any CCP within ERCOT.

**6. Settlement Points**

a. Settlement Point is a Resource Node, Load Zone, or Hub.

b. Resource Nodes include Generation Resource Nodes, CCP Logical Resource Nodes, CCU Resource Nodes and PUN Resource Nodes.

c. Generation Resource Nodes within ERCOT as well as within PUNs are Settlement Points.

|  |
| --- |
| ***[OBDRR046: Replace Section 6 above with the following upon system implementation of NPRR1188:]***  **6. Settlement Points**  a. Settlement Point is a Resource Node, Load Zone, or Hub.  b. Resource Nodes include Generation/CLR Resource Nodes, CCP Logical Resource Nodes, CCU Resource Nodes, and PUN Resource Nodes.  c. Generation/CLR Resource Nodes within ERCOT as well as within PUN are Settlement Points. |

**7. DAM Clearing and Settlements**

a. PTP bids can be submitted using any Settlement Point (except Generation Resource Nodes within a PUN site where constrainable Transmission Element(s) exist between the Generation Resource Node and EPS Meter; and CCP Logical Resource Nodes) as a source and sink.

b. CRRs acquired at de-energized Settlement Points will not be considered by Simultaneous Feasibility Test (SFT) function.

c. DAM Energy-Only Offers can be submitted at any Settlement Point (except Generation Resource Nodes within a PUN site where constrainable Transmission Element(s) exist between the Generation Resource Node and EPS Meter; and CCP Logical Resource Nodes).

d. DAM Resource-specific energy offers that are submitted are mapped to a Generation Resource Node or a CCP Logical Resource Node only.

e. DAM Energy Bids can be submitted at Load Zones, Hubs, Generation Resource Nodes, CCU Resource Nodes and PUN Resource Nodes, i.e. at any Settlement Point except Generation Resource Nodes within a PUN site where constrainable Transmission Element(s) exist between the Generation Resource Node and EPS Meter; and CCP Logical Resource Nodes.

f. DAM Resource-Specific Ancillary Service Offers are linked to the Resource, not to the Settlement Point.

g. DAM scheduling determines hourly quantities for PTPs, energy bids, energy offers, Energy Bid/Offer Curves, and Ancillary Service Offers.

h. DAM pricing determines hourly LMPs for all Settlement Points.

i. DAM Settlements are based on DAM quantities and DAM SPPs.

|  |
| --- |
| ***[OBDRR046: Replace Section 7 above with the following upon system implementation of NPRR1188:]***  **7. DAM Clearing and Settlements**  a. PTP bids can be submitted using any Settlement Point (except Generation/CLR Resource Nodes within a PUN site where constrainable Transmission Element(s) exist between the Generation/CLR Resource Node and EPS Meter; and CCP Logical Resource Nodes) as a source and sink.  b. CRRs acquired at de-energized Settlement Points will not be considered by Simultaneous Feasibility Test (SFT) function.  c. DAM Energy-Only Offers can be submitted at any Settlement Point (except Generation/CLR Resource Nodes within a PUN site where constrainable Transmission Element(s) exist between the Generation/CLR Resource Node and EPS Meter; and CCP Logical Resource Nodes).  d. DAM Resource-specific energy offers that are submitted are mapped to a Generation/CLR Resource Node or a CCP Logical Resource Node only.  e. DAM Energy Bids can be submitted at Load Zones, Hubs, Generation/CLR Resource Nodes, CCU Resource Nodes and PUN Resource Nodes, i.e., at any Settlement Point except Generation/CLR Resource Nodes within a PUN site where constrainable Transmission Element(s) exist between the Generation/CLR Resource Node and EPS Meter; and CCP Logical Resource Nodes.  f. DAM Resource Specific Ancillary Service Offers are linked to the Resource, not to the Settlement Point.  g. DAM scheduling determines hourly quantities for PTPs, energy bids, energy offers, Energy Bid/Offer Curves, and Ancillary Service Offers.  h. DAM pricing determines hourly LMPs for all Settlement Points.  i. DAM Settlements are based on DAM quantities and DAM SPPs. |

**8. RTM Clearing and Settlements**

a. SCED dispatch determines Base Points for Generation Resources and ESRs.

b. SCED pricing determines LMPs for all Generation Resource Nodes, CCP Logical Resource Nodes, CCU Resource Nodes, PUN Resource Nodes and all EPS Meter locations. SCED pricing determines MCPCs for AS types.

c. RTM determines 15-minute SPPs for each Settlement Point and each EPS Meter location. These prices are the Base Point-weighted and time-weighted average of the Real-Time LMPs.

d. RTM Settlements uses 15-minute RTM SPPs (prices at Settlement Points) and Settlement Prices (prices at EPS Meter locations).

e. RTM Energy Settlement for the measured output from the Generation Resources and ESRs uses the prices at the EPS Meter locations as specified in Protocol Section 6.6.3, Real-Time Energy Charges and Payments.

f. RTM Resource-Specific Ancillary Service Offers are linked to the Resource, not to the Settlement Point.

|  |
| --- |
| ***[OBDRR046: Replace Section 8 above with the following upon system implementation of NPRR1188:]***  **8. RTM Clearing and Settlements**  a. SCED dispatch determines Base Points for Generation Resources, ESRs, and CLRs.  b. SCED pricing determines LMPs for all Generation/CLR Resource Nodes, CCP Logical Resource Nodes, CCU Resource Nodes, PUN Resource Nodes and all EPS Meter locations. SCED pricing determines MCPCs for Ancillary Service types.  c. RTM determines 15-minute SPPs for each Settlement Point and each EPS Meter location. These prices are the Base Point weighted and time weighted average of the Real-Time LMPs.  d. RTM Settlement uses 15-minute RTM SPPs (prices at Settlement Points) and Settlement prices (prices at EPS Meter locations).  e. RTM Energy Settlement for the measured output from the Generation Resources and ESRs uses the prices at the EPS Meter locations as specified in Protocol Section 6.6.3, Real-Time Energy Charges and Payments.  f. RTM Energy Settlement for the measured consumption from the CLRs uses the prices at the EPS Meter locations as specified in Protocol Section 6.6.3, Real-Time Energy Charges and Payments.  g. RTM Resource-Specific Ancillary Service Offers are linked to the Resource, not to the Settlement Point. |

**9. Summary of Allowed Activities**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **ACTIVITIES** | | | | | |
| **Settlement Points** | **Three-Part Supply Offer and Energy Bid/Offer Curve** | **Ancillary Service Offer** | **DAM Energy-Only Offers** | **DAM Energy Bid** | **PTP bids (both in DAM & CRR\*\*)** | **QSE to QSE Transaction** |
| Generation Resource Node not in a PUN site, or Generation Resource Node at a PUN where no constrainable Transmission Element(s) exist between the Generation Resource Node and EPS Meter | Yes | Yes | Yes | Yes | Yes | Yes |
| Generation Resource Node within a PUN site\* where constrainable Transmission Element(s) exist between the Generation Resource Node and EPS Meter | Yes | Yes | **No** | **No** | **No** | Yes |
| CCU Resource Node | **No** | **No** | Yes | Yes | Yes | Yes |
| PUN Resource Node | **No** | **No** | Yes | Yes | Yes | Yes |
| CCP Logical Resource Node | Yes | Yes | **No** | **No** | **No** | **No** |

Note that Resource-specific offers (Three-Part Supply Offers, Energy Bid/Offer Curves, and Ancillary Service Offers) are made for the Resource and the submittal does NOT specify a Resource Node.

\*These Generation Resource Nodes will be identified as such in the report NP4-500-SG, Day-Ahead Power System Simulator for Engineering (PSS/E) Network Operations Model and Supporting Files. CRR Auctions will use the most recent report available at the time the CRR Auction model is created.

\*\*Generation Resource Nodes within a PUN site where constrainable Transmission Element(s) exist between the Generation Resource Node and EPS Meter will become non-biddable in CRR Auctions for CRR effective dates after December 31, 2020.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***[OBDRR046: Replace Section 9 above with the following upon system implementation of NPRR1188:]***  **9. Summary of Allowed Activities**   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | **ACTIVITIES** | | | | | | | | **Settlement Points** | **Three-Part Supply Offer and Energy Bid/Offer Curve** | **Ancillary Service Offer** | **DAM Energy-Only Offers** | **DAM Energy Bid** | **PTP bids (both in DAM & CRR\*\*)** | **QSE to QSE Transaction** | **Energy Bid Curve** | | Generation/CLR Resource Node not in a PUN site, or Generation/CLR Resource Node at a PUN where no constrainable Transmission Element(s) exist between the Generation/CLR Resource Node and EPS Meter | Yes | Yes | Yes | Yes | Yes | Yes | Yes | | Generation/CLR Resource Node within a PUN site\* where constrainable Transmission Element(s) exist between the Generation/CLR Resource Node and EPS Meter | Yes | Yes | **No** | **No** | **No** | Yes | Yes | | CCU Resource Node | **No** | **No** | Yes | Yes | Yes | Yes | **No** | | PUN Resource Node | **No** | **No** | Yes | Yes | Yes | Yes | **No** | | CCP Logical Resource Node | Yes | Yes | **No** | **No** | **No** | **No** | **No** |   Note that Resource-specific offers (Three-Part Supply Offers, Energy Bid/Offer Curves, Energy Bid Curve, and Ancillary Service Offers) are made for the Resource and the submittal does NOT specify a Resource Node.  \*These Generation/CLR Resource Nodes will be identified as such in the report NP4-500-SG, Day-Ahead Power System Simulator for Engineering (PSS/E) Network Operations Model and Supporting Files. CRR Auctions will use the most recent report available at the time the CRR Auction model is created.  \*\*Generation/CLR Resource Nodes within a PUN site where constrainable Transmission Element(s) exist between the Generation/CLR Resource Node and EPS Meter will become non-biddable in CRR Auctions for CRR effective dates after December 31, 2020. |