**NPRR1020 Implementation: Settlement Metering Operating Guide**

Comments and Submissions – October 20 2020 MWG Meeting

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# Metering Design Proposal Form – Section D

## Description of Attached Documentation, Items 41-43

*At the 9/2020 ERCOT Meeting, ERCOT noted regarding discussion of the “instruction section from numbers 41 to 43”, “more edits might be needed to ensure required information is detailed properly.” Accordingly, we ar providing information below around the expected documentation for each item. Additionally, We propose a rewrite of item 43 instructions to be both more accurate and more expansive/flexible as to the type of data and testing practices any market participant may report to ERCOT in support of aux load calculation accuracy and sensor suite testing.*

1. **Description of Aux Load Calculation Equipment:**
2. Documentation will describe the make and model of sensors utilized in the battery ESR system.
3. The sensors are DC current and voltage measurement devices – i.e.  transducers used to measure DC current and voltage & convert to watts. Current shunts are used to measure DC current.  They perform a variety of functions other than the additional application discussed here – which is to measure integrated aux loads pertaining to the liquid thermal system (pumps, fans, compressor, heater inside Megapack), and LV power for logic boards (master controller, thermal system controller).  Each Megapack is built with six sensors – one I/V sensor pair measures power on each of 3 power converters that supply power to the integrated auxiliaries. ​
4. **Aux Load Calc. Methodology:**
5. Attached documentation will confirm that, within the context of the energy storage system as designed, the points of measurement that form the basis of the calculation are correct. It will also identify the power conversion steps that occur between the measurement point and the electric grid, and determine factors which should apply to the calculation to ensure that the calculation does not understate the load considering any efficiency losses in the conversion steps. Finally, it will confirm that the signal and calculation chain from the sensor to the EPS meter, and any intermediate calculation, is appropriate given the energy storage system design and serves to not understate the load value. This will be approved by a Texas PE prior to submission.
6. Relevant NPRR1020 Language: The methodology by which the auxiliary Load is calculated is subject to ERCOT approval...[supported by] the findings of an independent audit performed by a registered Texas Professional Engineer confirming the auxiliary Load calculation does not understate the Load value.
7. **Initial Sensor Lab Testing and Aux Load Calculation Adjustments for Accuracy to Ensure Load is Not Understated:**
	1. Attached documentation will identify the accuracy of the sensor under anticipated field conditions, utilizing NIST-traceable test data from the sensor OEM and/or NIST traceable test data conducted for the purposes of the audit. The documentation will demonstrate that a correction factor is applied to the calculation to ensure that, given the identified accuracy, the calculation does not understate the load value.  This will be approved by a Texas PE prior to submission.
	2. Relevant NPRR1020 Language: The audit shall be based on laboratory testing that reflects the anticipated field conditions of the same model of sensor as that used by the Resource Entity or validation using measurements by other devices over the past year, as further described in the SMOG.
8. **Aux Load Calculation Accuracy Maintenance:**
	1. The documentation attached to the Part D Metering Design Proposal submission, and updated as required in annual attestation submissions, will confirm the long-term accuracy of the sensor as a result of long-term degradation which may occur naturally in the field, utilizing sensor OEM test data, sensor OEM specifications, and/or analysis of the materials and design of the sensor. As deemed necessary by the PE to cover gaps in the data or analysis, the documentation may include the results of accelerated life cycling conducted to represent the intended life of the deployed system on the sensor suite, and, NIST-traceable accuracy testing thereafter. Additionally, the documentation may include actions taken in the field, such as removal of a sample of sensors consisting of a specified percentage of sensors of each type utilized in the installation, to test their accuracy using NIST-traceable test equipment under anticipated field conditions. This will be approved by a Texas PE prior to submission.
	2. Relevant NPRR1020 language: The audit shall evaluate the impact of any degradation in accuracy of the sensors over time.
	3. Annual Affidavit Language: An office of the Resource Entity attests that “the results of an independent audit performed by an independent registered Texas Professional Engineer (attached herein) demonstrate that laboratory testing has been conducted on the specified sensor models used at the site. In each interval during the Applicable Period, calculated and telemetered data accounted for any known sensor accuracy or degradation information such that the auxiliary Load calculation did not understate the Load value.”

# Metering Design Proposal Form – Section D Instructions

1. Redline Edits to Form Instructions, Item 43
2. **Description of performed or planned testing to support accuracy**

Documentation will describe what actions have been taken and will be taken on an ongoing basis, to ensure that the overall initial correction factor applied to the calculated auxiliary AC load of each battery system component will not understate the load value reported via site telemetry. This includes confirmation by the Texas Professional Engineer that laboratory testing and/or field testing has been conducted on the specified sensor models used at the site, to establish the long-term accuracy of the sensor as a result of long-term degradation which may occur naturally in the field. Such documentation may reference utilization of sensor OEM test data, sensor OEM specifications, and/or analysis of the materials and design of the sensor. It may also include the results of accelerated life cycling conducted to represent the intended life of the deployed system on the sensor suite, a proposal to remove a sample of sensors to test their accuracy using NIST-traceable test equipment under anticipated field conditions, or, other actions required by a Texas Professional Engineer.

~~A document describing the anticipated annual audit process, any laboratory or field testing that has already been performed, and/or will be performed to confirm anticipated sensor accuracy and sensor types, and other information. Laboratory or field testing may include but is not limited to highly accelerated life testing or removal and replacement of a sample of sensors on a regular basis for testing. Regardless of the methodologies used, a chosen methodology must be sufficiently useful for a Texas Professional Engineer to use in required audits.~~

# Telemetry Restoration

1. Detection of Loss of Telemetry and Restoration
2. Megapack systems are highly consistent and modular with each other. Any deviation or failure of a particular sensor is easily detected and alarmed as part of standard tesla SCADA monitoring system. The Resource Entity will employ our Network Operations Center (NOC) to detect, contextualize and respond to the event of loss of auxiliary load telemetry at each site.  Dedicated personnel support NOC operations 24x7 and monitor live data and cases.  In the case of aux load telemetry, the Resource Entity will develop a software-defined monitor within its site manager services, which can ensure that the interface is available and can provide qualified aux load data.
3. In the case of a temporary loss of telemetry between the ERCOT SCADA system and the EPS meter, the implementation of a 45 day auxiliary energy history within the EPS will enable the remediation of the gap in information received by normal polling. This result is supported by redlines in the SMOG as follows:

*5.5       Detailed Standards for Resource Entity owned equipment used for the calculation of the auxiliary load telemetry provided to the EPS Meter*

*(1)      Data Recording Function for Calculated Auxiliary Load:*

* + - 1. *Auxiliary load calculated data shall be stored in a 15 minute interval energy format with a minimum of 45 days of interval data in the EPS Meter; ERCOT may request additional data from the Resource Entity.*

**Note: This is a redline to the current proposed SMOG section 5.5 (1)(a).**

1. In the event that aux load calculating sensors fail, the Resource Entity should impute an average aux load for any impacted megapack via logic within the site controller, which will ensure there is no disruption as between ERCOT’s link and the EPS meter.  If a problem exists between the Resource Entity RTAC and the EPS meter, a local historian (such as a SEL-3355) will be historizing site level aux loads (for up to a year), which could enable manual remediation; the Resource Entity would manually prepare a data driven remediation of lost polling information.
2. In the event that ERCOT detects a loss of telemetry, but the Resource Entity’s monitoring scheme has not triggered, then the problem may exist outside of the Resource Entity site controller and should be troubleshooted in collaboration between ERCOT metering support staff, utility support team, and the Resource Entity NOC.

1. Telemetry Form Comments
	1. The form does not require any edits to appropriately capture remediation scenarios at this time, and should be posted to ERCOT’s website/included in the SMOG Appendices as soon as possible to be available to the market for telemetry validation exercises essential to resource commissioning tasks relying on the NPRR1020 solution.
2. MWG Working Group Action Items
	1. **9/2020 Action Item:** ERCOT to discuss internally to formulate a recommendation regarding how loss of telemetry will be communicated to the resource entity. **Follow up:** Loss of telemetry communication may occur as between ERCOT--- QSE---Resource Entity or ERCOT --- TDSP --- Resource Entity. A loss of telemetry from the EPS Metering to ERCOT can be manually remediated by provision of stored data in the EPS Meter (up to 45 days). The Resource Entity anticipates that if telemetry issues originate at a site link, the site will inform ERCOT MDAS first since potential failures will be alarmed. If ERCOT’s connection to the EPS meter is lost, EPS metering stored data would be provided via communication with the Resource Entity and the TDSP.

# Annual Affidavit – Comments/Edits

*In each interval during the Applicable Period, calculated and telemetered data accounted for any known sensor* ***in****accuracy or degradation information such that the auxiliary Load calculation did not understate the Load value.*

# Additional Comments for SMOG Language

**9/2020 ERCOT Action Item: ERCOT and TDSPs review within their respective organizations to have recommendations regarding sample rates for auxiliary load calculation.**

1. Sample Rate of Sensors - The sensor system operates at a 10hz sample rate.
2. Frequency of calculated value sent to EPS Meter – 4 seconds