



# **Item 5.1: Recommendation Regarding Real-Time Market Price Correction – Incorrect Resource Telemetry MW Values When QSE Sends Suspect Quality Telemetry**

*Gordon Drake*

Director, Market Design & Analysis

Board of Directors Meeting

ERCOT Public

April 7-8, 2025

# Board of Directors Request

Why this is being presented today:

ERCOT staff requests that the ERCOT Board of Directors (Board) approve the proposed correction of Real-Time Market prices for certain Operating Days between August 12 – September 11, 2024 (Board Decision Template Attachments A through D).

# Background

- When a Resource telemeters its data quality as suspect, the Energy Management System (EMS) will use the Resource's last good telemetered MW value.
- In November 2023, an update to the EMS was released which contained a software defect. The defect inadvertently introduced a stale, static MW value to be used in lieu of suspect telemetry, rather than falling back to the Resource's last good telemetered MW value.
- In the Market Management System (MMS), a Resource's telemetered MW value is used in the calculation of a constraint's Mathematical Limit.
- The use of the static MW value passed from EMS to MMS could have a large impact on pricing if the following situation occurs:
  1. One or more Resources are telemetering suspect data quality;
  2. Their current MW output is vastly different than the stale MW value captured before the software defect was introduced; and
  3. They have a large shift factor associated with a binding or violated constraint.

# Price Correction Event

- On September 5, 2024 at approximately 8:35 AM, multiple Resources represented by a single Qualified Scheduling Entity (QSE) telemetered suspect quality measurement on their MW telemetry, resulting in the EMS sending stale MW values to the MMS.
- When Security-Constrained Economic Dispatch (SCED) ran at 08:35:10, the stale MW values impacted the optimization and resulted in System Lambda spiking from \$20.99/MWh to \$199.17/MWh. System Lambda returned to \$27.88/MWh following the 08:40:09 SCED run after the telemetered values were no longer flagged as suspect.
- The unusual spike in System Lambda – occurring at a time of day when a price spike would otherwise be unexpected - prompted an investigation to determine the cause. This then led to the discovery of the software defect noted on the previous slide. A fix to address the defect was implemented on September 11, 2024, at 11:40 AM.
- Market Notice [M-A091124-01](#) was issued on September 11, 2024, notifying the market of the issue and ERCOT's intent, upon completion of impact analysis, to seek ERCOT Board of Directors (Board) approval for price correction as specified by ERCOT Protocol Section 6.3(7)(b) for the Real-Time Market (RTM) and to preserve the eligibility of the ERCOT Board to review prices for the affected Operating Days that were within 30 days of the notice.
  - While the software defect first appeared in November 2023, only Operating Days between August 12, 2024 and September 11, 2024 are considered eligible for Board review, assuming the necessary criteria for significance are met.

# Real-Time Market Impact Analysis

- ERCOT Protocols Section 6.3(7)(b) requires that the absolute value impact to any single Counter-Party meet at least one of the following two criteria before seeking approval from the Board:
  - 2% and also greater than \$20,000; or
  - 20% and also greater than \$2,000.
- ERCOT determined that 27 Operating Days met criteria for significance.

Operating Day	Counter-Parties meeting criteria in Protocol Section 6.3(7)(b)(i)	Counter-Parties meeting criteria in Protocol Section 6.3(7)(b)(ii)
8/12/2024	3	14
8/13/2024	3	7
8/14/2024	0	7
8/15/2024	0	1
8/16/2024	1	8
8/17/2024	2	2
8/19/2024	32	43
8/20/2024	5	5
8/21/2024	13	24
8/22/2024	1	4
8/23/2024	22	37
8/24/2024	4	3
8/25/2024	0	5
8/27/2024	1	4

Operating Day	Counter-Parties meeting criteria in Protocol Section 6.3(7)(b)(i)	Counter-Parties meeting criteria in Protocol Section 6.3(7)(b)(ii)
8/29/2024	1	3
8/30/2024	11	24
8/31/2024	3	2
9/1/2024	11	14
9/3/2024	0	1
9/4/2024	0	1
9/5/2024	21	33
9/6/2024	16	34
9/7/2024	16	19
9/8/2024	16	27
9/9/2024	6	11
9/10/2024	6	17
9/11/2024	3	6

# Real-Time Market Impact Analysis

- The tables below show the maximum estimated absolute value impact to Counter-Parties.

Operating Day	Maximum Amount (\$Thousands)	Maximum Percentage for Criteria (i)*	Maximum Percentage for Criteria (ii)**
8/12/2024	22.87	6431.64%	6431.64%
8/13/2024	51.69	118.12%	226.67%
8/14/2024	17.29	N/A	2438.99%
8/15/2024	4.39	N/A	26.96%
8/16/2024	31.39	448.45%	448.45%
8/17/2024	24.74	5.33%	33.16%
8/19/2024	240.46	3581.92%	3581.92%
8/20/2024	94.26	21.67%	51.25%
8/21/2024	119.36	28.24%	4620.96%
8/22/2024	29.40	5.74%	60.18%
8/23/2024	188.21	99.21%	896.34%
8/24/2024	56.02	58.64%	88.58%
8/25/2024	8.36	N/A	48.26%
8/27/2024	53.62	26.44%	295.85%

Operating Day	Maximum Amount (\$Thousands)	Maximum Percentage for Criteria (i)*	Maximum Percentage for Criteria (ii)**
8/29/2024	22.16	11.69%	38.95%
8/30/2024	115.58	33.59%	245.99%
8/31/2024	25.64	249.37%	249.37%
9/1/2024	69.00	117.30%	203.19%
9/3/2024	2.87	N/A	31.02%
9/4/2024	9.95	N/A	23.43%
9/5/2024	128.10	423.86%	444.51%
9/6/2024	125.14	44.18%	391.75%
9/7/2024	95.50	904.99%	904.99%
9/8/2024	125.37	844.21%	952.62%
9/9/2024	103.92	552.31%	552.31%
9/10/2024	107.26	58.43%	7044.49%
9/11/2024	92.91	172.93%	172.93%

\* The maximum of percentage change to any single Counter-Party with impact more than \$20,000.

\*\* The maximum of percentage change to any single Counter-Party with impact more than \$2,000.

# Real-Time Market Impact Analysis

- The table below has the maximum estimated change in charges due to ERCOT.

Operating Day	Change in Statement Charges Due to ERCOT		Operating Day	Change in Statement Charges Due to ERCOT	
8/12/2024	(156,677)	1.054%	8/29/2024	(47,015)	0.317%
8/13/2024	(231,226)	1.385%	8/30/2024	(386,927)	2.503%
8/14/2024	(92,998)	0.517%	8/31/2024	(10,772)	0.057%
8/15/2024	(225,231)	1.078%	9/1/2024	84,768	0.618%
8/16/2024	(245,310)	1.318%	9/3/2024	(25,285)	0.225%
8/17/2024	62,912	0.384%	9/4/2024	(4,887)	0.036%
8/19/2024	163,412	0.324%	9/5/2024	(841,422)	5.788%
8/20/2024	(654,610)	0.455%	9/6/2024	(507,244)	4.207%
8/21/2024	(458,868)	1.268%	9/7/2024	53,607	0.484%
8/22/2024	(134,290)	0.553%	9/8/2024	378,514	3.826%
8/23/2024	(642,600)	2.888%	9/9/2024	(42,770)	0.335%
8/24/2024	111,500	0.823%	9/10/2024	141,376	1.179%
8/25/2024	67,152	0.486%	9/11/2024	91,183	0.719%
8/27/2024	72,661	0.432%			

- The total impact to statement charges due to ERCOT was \$3,324,370.

Note: Negative amounts are increased payments to Market Participants; positive amounts are increased charges. The percent amount is the absolute value of the percent impact to the previously settlement net amount due to/from ERCOT.

# Price Correction Process and Methodology Enhancement

- Due to the significant number of days involved in the price correction, ERCOT staff were only recently able to conclude the analysis with definitive findings.
- Throughout the course of the analysis, it was discovered that the existing methodology for calculating the impact to Counter-Parties would have resulted in unwarranted payments to certain Resources.
- Upon discovery of these unwarranted payments, ERCOT staff undertook the analysis again, considering settlement changes only for those for whom it was appropriate to be held whole under the price correction principles.
  - This resulted in a reduction in the number of impacted Operating Days, Counter-Parties, and changes in statement charges due to ERCOT.
- Going forward, ERCOT will continue to use this enhanced methodology to ensure that load will not make unwarranted payments in future price correction events.





**Date:** March 31, 2025  
**To:** Board of Directors (Board) of the Electric Reliability Council of Texas, Inc. (ERCOT)  
**From:** Gordon Drake, Director, Market Design & Analysis  
**Subject:** Recommendation regarding Real-Time Market Price Correction – Incorrect Resource Telemetry MW Values When QSE Sends Suspect Quality Telemetry

**Issue for the ERCOT Board of Directors**

**ERCOT Board of Directors Meeting Date:** April 7-8, 2025

**Item No.:** 5.1

**Issue:**

Pursuant to paragraph 7 of Protocol Section 6.3, Adjustment Period and Real-Time Operations Timeline, and whether the Board of Directors (Board) of Electric Reliability Council of Texas, Inc. (ERCOT) should approve price corrections for Real-Time Locational Marginal Prices (RTLMPs), Real-Time Settlement Point Prices (RTSPPs), Real-Time Price for Energy Metered for Resources (RTRMPRs), and Real-Time Price for Energy Metered for Settlement Only Generators (RTESOGPRs) for Operating Days (ODs) August 12 - September 11, 2024, that were affected by the use of incorrect Resource data.

**Background/History:**

ERCOT staff has identified the need to correct prices in the Real-Time Market (RTM) for certain ODs between August 12 - September 11, 2024. The impacted prices include:

- RTLMPs;
- RTSPPs;
- RTRMPRs;
- RTESOGPRs

The ERCOT Protocols require ERCOT to correct prices when invalid prices are identified in an otherwise valid market solution. If ERCOT determines that prices are erroneous, ERCOT must correct the prices before they are final. For the RTM, prices are final at 1600 on the second Business Day following the OD. However, if ERCOT determines that prices are erroneous and need correction after they are final, then ERCOT shall seek Board review of such prices provided that, within 30 days of the OD, ERCOT notifies Market Participants of the need for correction and that ERCOT intends to seek Board approval of the correction.

In considering a correction of prices, the Board may rely on the following reasons to find that prices should be corrected:

- Data Input Error: Missing, incomplete, stale, or incorrect versions of one or more data elements input to the market applications may result in an invalid market solution and/or prices.
- Hardware/Software Error: These include unpredicted hardware or software failures, planned market system or database outages, planned application or database upgrades, software implementation errors, and failure of the market run to complete.
- Inconsistency with the Protocols or Public Utility Commission of Texas (PUCT) Substantive Rules: Pricing errors may occur when specific circumstances result in prices that are in conflict with such Protocol language or the PUCT Substantive Rules.

See ERCOT Protocol Sections 6.3(4) – (7).

In November 2023, an update to the EMS was released which contained a software defect. The defect inadvertently introduced a stale, static MW value to be used in lieu of suspect telemetry, rather than falling back to the Resource's last good telemetered MW value.

On September 5, 2024 at approximately 8:35 AM, multiple Resources represented by a single Qualified Scheduling Entity (QSE) telemetered suspect quality measurement on their MW telemetry, resulting in the EMS sending stale MW values to the MMS.

When Security-Constrained Economic Dispatch (SCED) ran at 08:35:10, the stale MW values impacted the optimization and resulted in System Lambda spiking from \$20.99/MWh to \$199.17/MWh. System Lambda returned to \$27.88/MWh following the 08:40:09 SCED run after the telemetered values were no longer flagged as suspect.

The unusual spike in System Lambda – occurring at a time of day when a price spike would otherwise be unexpected - prompted an investigation to determine the cause. This then led to the discovery of the software defect noted on the previous slide. A fix to address the defect was implemented on September 11, 2024, at 11:40 AM.

Market Notice [M-A091124-01](#) was issued on September 11, 2024, notifying the market of the issue and ERCOT's intent, upon completion of impact analysis, to seek ERCOT Board of Directors (Board) approval for price correction as specified by ERCOT Protocol Section 6.3(7)(b) for the Real-Time Market (RTM) and to preserve the eligibility of the ERCOT Board to review prices for the affected Operating Days that were within 30 days of the notice.

Accordingly, ERCOT requests that the Board:

- (a) Review RTLMPs, RTSPPs, RTRMPRs, and RTESOGPRs for the following ODs:

- August 12, 2024
- August 13, 2024
- August 14, 2024
- August 15, 2024
- August 16, 2024
- August 17, 2024
- August 19, 2024
- August 20, 2024
- August 21, 2024
- August 22, 2024
- August 23, 2024
- August 24, 2024
- August 25, 2024
- August 27, 2024
- August 29, 2024
- August 30, 2024
- August 31, 2024
- September 01, 2024
- September 03, 2024
- September 04, 2024
- September 05, 2024
- September 06, 2024
- September 07, 2024
- September 08, 2024
- September 09, 2024
- September 10, 2024
- September 11, 2024

(b) Make a determination as to whether such prices were significantly affected by the error; and

(c) Direct/authorize ERCOT to correct the impacted RTLMPs, RTSPPs, RTRMPRs, and RTESOGPRs for certain ODs between August 12-September 11, 2024.

Attached hereto are documents containing corrected RTSPPs, RTRMPRs, and RTESOGPRs for certain ODs between August 12 - September 11, 2024, as follows:

- **Attachments A.1 to A.5** - Corrected RTLMPs
- **Attachment B.1 to B.2** - Corrected RTSPPs
- **Attachment C.1 to C.2** - Corrected RTRMPRs
- **Attachment D.1** - Corrected RTESOGPRs

**Relevant Protocol Sections:**

### **6.3 Adjustment Period and Real-Time Operations Timeline**

- (4) ERCOT shall correct prices for an Operating Day when accurate prices can be determined, the impact of the price correction is determined to be significant, and one of the following conditions has been met: a market solution is determined to be invalid, invalid prices are identified in an otherwise valid market solution, the Base Points received by Market Participants are inconsistent with the Base Points of a valid market solution, or the Security-Constrained Economic Dispatch (SCED) process experiences a failure as described in Section 6.5.9.2, Failure of the SCED Process. The following are some reasons that may cause these conditions:
- (a) Data Input error: Missing, incomplete, stale, or incorrect versions of one or more data elements input to the market applications may result in an invalid market solution and/or prices.
  - (b) Data Output error: These include incorrect or incomplete data transfer, price recalculation error in post-processing, and Base Points inconsistent with prices due to the Emergency Base Point flag remaining activated even when the SCED solution is valid.
  - (c) Hardware/Software error: These include unpredicted hardware or software failures, planned market system or database outages, planned application or database upgrades, software implementation errors, and failure of the market run to complete.
  - (d) Inconsistency with the Protocols or Public Utility Commission of Texas (PUC) Substantive Rules: Pricing errors may occur when specific circumstances result in prices that are in conflict with such Protocol language or the PUC Substantive Rules.
- (7) All Real-Time LMPs, Real-Time Settlement Point Prices, Real-Time prices for energy metered, Real-Time On-Line Reliability Deployment Price Adders, Real-Time On-Line Reliability Deployment Prices, Real-Time Reserve Prices for On-Line Reserves, Real-Time Reserve Prices for Off-Line Reserves, Real-Time On-Line Reserve Price Adders, Real-Time Off-Line Reserve Price Adders and SASM MCPCs are final at 1600 of the second Business Day after the Operating Day.
- (a) However, after Real-Time LMPs, Real Time Settlement Point Prices, Real-Time prices for energy metered, Real-Time On-Line Reliability Deployment Price Adders, Real-Time On-Line Reliability Deployment Prices, Real-Time Reserve Prices for On-Line Reserves, Real-Time Reserve Prices for Off-Line Reserves, Real-Time On-Line Reserve

Price Adders, Real-Time Off-Line Reserve Price Adders and SASM MCPCs are final, if ERCOT determines that prices qualify for a price correction pursuant to paragraph (4) above and that ERCOT will seek ERCOT Board review of such prices, it shall notify Market Participants and describe the need for such correction as soon as practicable but no later than 30 days after the Operating Day. Failure to notify Market Participants within this timeline precludes the ERCOT Board from reviewing such prices. However, nothing in this section shall be understood to limit or otherwise inhibit any of the following:

- (i) ERCOT's duty to inform the PUCT of potential or actual violations of the ERCOT Protocols or PUCT Rules and its right to request that the PUCT authorize correction of any prices that may have been affected by such potential or actual violations;
  - (ii) The PUCT's authority to order price corrections when permitted to do so under other law; or
  - (iii) ERCOT's authority to grant relief to a Market Participant pursuant to the timelines specified in Section 20, Alternative Dispute Resolution Procedure.
- (b) Before seeking ERCOT Board review of prices, ERCOT will determine if the impact of the price correction is significant, as that term is used in paragraph (4) above, by calculating the potential changes to the Real-Time Market (RTM) Settlement Statement(s) of any Counter-Party on a given Operating Day. ERCOT shall seek ERCOT Board review of prices if the change in RTM Settlement Statement(s) would result in the absolute value impact to any single Counter-Party, based on the sum of all original RTM Settlement Statement amounts of Market Participants assigned to the Counter-Party, to be greater than:
- (i) 2% and also greater than \$20,000; or
  - (ii) 20% and also greater than \$2,000.
- (c) The ERCOT Board may review and change Real-Time LMPs, Real-Time Settlement Point Prices, Real-Time prices for energy metered, Real-Time On-Line Reliability Deployment Price Adders, Real-Time On-Line Reliability Deployment Prices, Real-Time Reserve Prices for On-Line Reserves, Real-Time Reserve Prices for Off-Line Reserves, Real-Time On-Line Reserve Price Adders, Real-Time Off-Line Reserve Price Adders and SASM MCPCs if ERCOT gave timely notice to Market Participants and the ERCOT Board finds that such prices should be corrected for an Operating Day.

- (d) In review of Real-Time LMPs, Real Time Settlement Point Prices, Real-Time prices for energy metered, Real-Time On-Line Reliability Deployment Price Adders, Real-Time On-Line Reliability Deployment Prices, Real-Time Reserve Prices for On-Line Reserves, Real-Time Reserve Prices for Off-Line Reserves, Real-Time On-Line Reserve Price Adders, Real-Time Off-Line Reserve Price Adders and SASM MCPCs, the ERCOT Board may rely on the same reasons identified in paragraph (4) above to find that the prices should be corrected for an Operating Day.

**Key Factors Influencing Issue:**

Due to the use of incorrect MW values in the calculation of constraint math limits, RTLMPs, RTSPPs, RTRMPRs, and RTESOGPRs for certain ODs between August 12-September 11, 2024 were incorrect and cannot be corrected by ERCOT without authorization from the Board.

Analysis of the impacts of the pricing error for the impacted ODs has shown that the largest dollar impact to any individual Counter-Party for a single OD is approximately \$240.46 Thousand. For Counter-Parties meeting the dollar impact criteria, the largest percentage impact to a Counter-Party for a single OD is 7044.49%

Notably, Nodal Protocol Revision Request (NPRR) 1024, Determination of Significance with Respect to Price Corrections, was approved by the Board in February 2021 and became effective on April 1, 2021. NPRR1024 requires ERCOT to seek Board review of prices if the change in Settlement Statement(s) would result in the absolute value impact to any single Counter-Party, based on the sum of all original Settlement Statement amounts of Market Participants assigned to the Counter-Party, to be greater than 2% and also greater than \$20,000, or 20% and also greater than \$2,000.

**Conclusion/Recommendation:**

ERCOT recommends that the Board make a determination that RTLMPs, RTSPPs, RTRMPRs, and RTESOGPRs for the identified intervals in certain ODs between August 12 - September 11, 2024, were significantly affected by incorrect MW data, and direct/authorize ERCOT to correct the impacted prices for ODs at issue.



**ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.**  
**BOARD OF DIRECTORS RESOLUTION**

WHEREAS, paragraph (7) of Protocol Section 6.3, Adjustment Period and Real-Time Operations Timeline, authorizes the Board of ERCOT to approve a price correction for certain prices if ERCOT has determined that such prices have been significantly affected by an error;

WHEREAS, paragraph (7) of Protocol Section 6.3, ERCOT staff gave timely notice to Market Participants that Real-Time Market Locational Marginal Prices (RTLMPs), Real-Time Market Settlement Point Prices (RTSPPs), Real-Time Price for Energy Metered for Resources (RTRMPRs), and Real-Time Price for Energy Metered for Settlement Only Generators (RTESOGPRs) for certain ODs between August 12 - September 11, 2024 were incorrect; that a price correction for each of those ODs met the criteria for “significance” in Protocol Section 6.3(7)(b); and ERCOT staff would be seeking Board review of such prices; and

WHEREAS, after due consideration of the alternatives, the Board deems it desirable and in the best interest of ERCOT to correct RTLMPs, RTSPPs, RTRMPRs, and RTESOGPRs for certain ODs between August 12 - September 11, 2024, that were affected by incorrect MW data;

THEREFORE, BE IT RESOLVED, that the Board hereby (1) determines that RTLMPs, RTSPPs, RTRMPRs, and RTESOGPRs for ODs August 12 – September 11, 2024, were affected by incorrect Resource data, and (2) directs ERCOT staff to implement the appropriate price corrections pursuant to Protocol Section 6.3.

**CORPORATE SECRETARY’S CERTIFICATE**

I, Brandon Gleason, Assistant Corporate Secretary of ERCOT, do hereby certify that, at its April 7, 2025 meeting, the Board passed a motion approving the above Resolution by \_\_\_\_\_.

IN WITNESS WHEREOF, I have hereunto set my hand this \_\_\_\_ day of \_\_\_\_\_, 2025.

\_\_\_\_\_  
Brandon Gleason  
Assistant Corporate Secretary