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**PROJECT NO. 52771**

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| **INVESTIGATION INTO USE OF DYNAMIC LINE RATINGS FOR TRANSMISSION LINES IN TEXAS** | **§** | **PUBLIC UTILITY COMMISSION OF TEXAS** |

## CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC'S RESPONSES

CenterPoint Energy Houston Electric, LLC (CenterPoint Houston) files its Responses to questions posed by the Public Utility Commission of Texas (Commission) Staff regarding dynamic line ratings (DLR) for transmission lines.

## CENTERPOINT HOUSTON'S RESPONSES

**1. Are you currently using Dynamic Line Rating (DLR) technology or a similar technology on any circuits? If so, how many? What is your experience on the cost, use, and value of these instruments?**

CenterPoint Houston currently does not make comprehensive use of DLR technology on an individual asset basis. CenterPoint Houston does, however, provide the Electric Reliability Council of Texas (ERCOT) an ambient adjusted dynamic normal, emergency, and 15-minute rating for all overhead transmission lines, based only on actual regional ambient temperature, wind speed, and humidity.

CenterPoint Houston Real Time Operations (RTO) estimates dynamic line ratings using IEEE[1] Std. 738-1993 methodology for calculating ambient-adjusted conductor ratings based on the current-temperature relationship of overhead conductors. This methodology uses default values for factors that impact the overhead conductor temperature, such as angle of wind incidence, to generate three sets of dynamic ratings: a normal or steady-state rating, a 2-hour emergency rating and a 15-minute emergency rating. These dynamic ratings are provided to ERCOT in the form of a table for temperatures ranging between 20°F and 115F°, in 5°F intervals, for all overhead transmission lines. CenterPoint Houston estimates a real-time average temperature for its region that is telemetered to ERCOT via ICCP[2] approximately every 10 seconds. The dynamic rating is

[1] IEEE, the Institute of Electrical and Electronics Engineers, is a technical professional organization for electrical engineering and electronic engineering. IEEE is comprised of over 400,000 members worldwide, and IEEE develops international standards for electrical engineering and electronic engineering.

[2] ICCP, the Inter-Control Center Communications Protocol, is the real-time data exchange protocol used by CenterPoint Houston and other utilities in ERCOT for data transfer to ERCOT.

then interpolated from the rating table based on the telemetered temperature.

CenterPoint Energy does not ambient-adjust the rating of substation equipment; therefore, transmission capacity gains are only seen at overhead lines without substation equipment limitations and at operating temperatures below 96.8° which is the temperature used to determine static ratings. At higher operating temperatures typically experienced in the summer, transmission capacity decreases can result due to the ambient temperature impact on the conductor.

The costs associated with our current ambient adjusted dynamic rating process are minimal.

**2. Does ERCOT have the appropriate system to take advantage of this real time technology and is it utilizing this data to expand the use of the power system in a reliable manner?**

Yes. Under ERCOT Nodal Protocols Section 3.10.8, Dynamic Ratings, transmission service providers may provide Dynamic Ratings[3] via ICCP for implementation in the next Operating Hour or provide ERCOT with a table of equipment rating versus temperature and a temperature value in Real-Time for each Weather Zone in which the Transmission Element is located. CenterPoint Energy Houston is primarily located in the Coast Weather Zone, so a single real-time average temperature for its transmission system is provided to ERCOT.

**3. Where on your system could additional DLR systems be deployed and at what cost and value to the system and market?**

CenterPoint Houston does not currently have a DLR program in place.

**4. What are the challenges that a TDU may encounter when trying to install or implement this technology on a widespread basis?**

Currently, the greatest challenge is the potential risk associated with bringing back data in order to estimate a rating to be transmitted back to ERCOT. Ensuring the validity of the multiple points of DLR data being telemetered could result in erroneously calculated dynamic line ratings, creating either a reliability concern or unrealistic market impacts.

[3] Capitalized terms that are undefined shall have the same meaning as provided in the ERCOT Protocols.

**5. Are there drawbacks or benefits to utilizing this technology in the ERCOT market?**

CenterPoint Houston believes there is a risk that capacity may be constrained when transmission capacity is needed the most, mainly when wind is at its lowest on a summer afternoon. Wind speed and direction are parameters for Dynamic Ratings and the default parameters currently used for Dynamic Ratings assume certain level of wind cooling the conductor. CenterPoint Houston's current rating methodology assumes a certain level of conservativeness in system conditions. However, if real-time, sensor-based measurements are used, it may result in needing to derate certain transmission lines to match actual conditions (e.g. zero wind conditions) and may further exacerbate any transmission bottlenecks.

**6. Do the current rate structures in ERCOT reward / encourage grid investments such as DLR?**

Current rate structures in ERCOT reward and/or encourage transmission service providers to make prudent and necessary investments to improve the overall performance and reliability of its infrastructure. In general, DLR investment could possibly benefit the wholesale market, but is not likely to provide a substantial benefit to a transmission service provider.

**7. Is there an unwarranted cybersecurity risk associated with this technology?**

CenterPoint Houston believes there is cybersecurity risk associated with this technology. DLR data would be used to manage constraints on the transmission system in real-time, using a new set of networked field devices. Adverse impact to the availability and integrity of the data from malicious or accidental activity must be considered, since unauthorized changes or outages could have systemic impact. Each transmission service provider individually, and ERCOT as a whole, would need to assess risks associated with the physical and logical design of the DLR system(s), and the risks associated with the controls allowing access to physical hardware, communications infrastructure, and data systems that collect, store, and process the data. In addition to these security assessments, the use of DLR data to calculate line capacity in real-time will require significant resources both to achieve and to maintain compliance with North American Electric Reliability Corporation (NERC) Reliability Standards. Existing systems not built with compliance in mind may require relocation or replacement to achieve compliance, also requiring

resources.

**8. Will widespread utilization of this technology exacerbate other constraints on the system?**

Please refer to CenterPoint Houston's response to Question No. 5.

**9. Should this technology be included in all new high voltage lines in ERCOT?**

ERCOT would have to perform a cost benefit analysis that compares the complexity of having real-time ratings that may be lower than the expected ratings in ERCOT's Operational Planning Analysis and Outage Scheduling studies to the benefit of having additional transmission capacity during off-peak conditions.

**10. Is there system reliability, situational awareness benefits to utilizing this technology?**

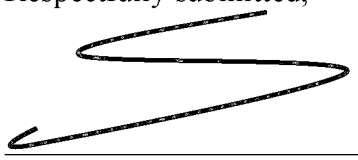
There may be some minimal additional system reliability benefits in allowing for increased power flows based on DLR technology during off-peak conditions resulting in greater flexibility in scheduling planned outages. However, there may also be greater risk resulting in lower reliability associated by the variability of ratings based on real-time wind variability.

**11. Please provide an overall cost-benefit analysis to addition of this technology.**

Each transmission service provider must perform analyses appropriate to ensure the reliability of its portion of the ERCOT System and implement appropriate solutions to meet ERCOT's reliability performance criteria, the applicable NERC Reliability Standard TPL-001-4, ERCOT Planning Guide Section 4, and the transmission service provider's own transmission system design criteria. Based on these sets of standards and criteria, the transmission service provider's planning analyses are required to use static ratings to ensure compliance with the criteria above. Therefore, the use of DLR in real-time or in the operation horizon would not impact the amount of additional transmission investment required by CenterPoint Houston. As a result, a cost-benefit analysis for implementing a DLR program would not drive the need for transmission improvement projects.

Date: December 29, 2021

Respectfully submitted,



Sam Chang
State Bar No. 24078333
1005 Congress Avenue, Suite 650
Austin, Texas 78701
(512) 397-3005
se.chang@centerpointenergy.com

ATTORNEY FOR CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC

**CERTIFICATE OF SERVICE**

I, Michael Burleson, certify that a copy of this document was served on all parties of record in this proceeding on December 29, 2021, by e-mail pursuant to the Order Suspending Rules - PUC Docket No. 50664.

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**CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC'S**

**EXECUTIVE SUMMARY**

CenterPoint Houston supports Commission-led efforts and initiatives that would further enhance the real-time operations of the ERCOT transmission system. Regarding DLR for transmission lines, CenterPoint Houston currently does not deploy DLR technology on an individual asset basis and does not have a DLR program. CenterPoint Houston does, however, provide ERCOT ambient adjusted dynamic ratings for all of its overhead transmission lines. To the extent that the Commission considers requiring transmission service providers use DLR in their real-time operations, CenterPoint Houston requests that the Commission take such action only after the Commission has carefully determined that the operational, cybersecurity, and financial costs of using DLR are substantially outweighed by the reliability benefits of using DLR.