



Date: April 21, 2022
To: Board of Directors
From: John Bernecker, Manager, Transmission Planning Assessment
Subject: ERCOT Recommendations to PUC Project No. 46304, Oversight Proceeding Regarding ERCOT Matters Arising Out of PUC Docket No. 45624 Relating to DC Tie Project Proposed by Southern Cross Transmission, LLC, (Southern Cross) Directive 8 – ERCOT Determination Regarding Voltage Support Service

Issue for the ERCOT Board of Directors

ERCOT Board of Directors Meeting Date: April 28, 2022

Item No.: 12.2

Issue:

Whether the Board of Directors (Board) of Electric Reliability Council of Texas, Inc. (ERCOT) should accept ERCOT staff's determination that, in order to accommodate the Southern Cross Direct Current (DC) Tie: (1) any DC Tie facility that has an initial energization date after January 1, 2021, and any DC Tie facility that is replaced after that date, should be required to have at least 0.95 power factor leading/lagging reactive power capability, as required by approved Nodal Protocol Revision Request (NPRR) 1098, Direct Current tie (DC tie) Reactive Power Capability Requirements, and Nodal Operating Guide Revision Request (NOGRR) 234, Related to Direct Current tie (DC tie) Reactive Power Capability Requirements; and (2) no other necessary changes to Voltage Support Service are needed.

Background/History:

In PUC Project No. 45624, the Public Utility Commission of Texas (PUC) issued an Order that approved the City of Garland's application for a certificate of convenience and necessity (CCN) to build a new 38-mile-long, 345-kV transmission line connecting the proposed 2,000 MW Southern Cross DC Tie to ERCOT. In the Order, the PUC also imposed certain conditions on the interconnection of the Southern Cross DC Tie. The PUC then opened PUC Project No. 46304, and on May 23, 2017 it issued a Revised Order in that project that directed ERCOT to complete a number of tasks set forth in 14 different Directives.

The Directives require ERCOT to study various issues related to the new DC Tie and make determinations as to whether any actions need to be taken by ERCOT in order to accommodate the new DC Tie. ERCOT staff has been working with stakeholders and Southern Cross since mid-2017 to complete the tasks set forth in the Directives. Discussions on the Directives have been taking place in the relevant working groups and subcommittees of the Technical Advisory Committee (TAC) to assist ERCOT staff in reaching resolutions on the discrete issues raised in each Directive, and these discussions are expected to continue until all of the issues raised in the Directives are fully resolved.

For each Directive, ERCOT staff will propose one or more determinations for stakeholder review and comment, along with any Revision Requests needed to address the Directive and will seek stakeholder endorsement of the determination at relevant working groups, subcommittees, TAC, and the Board.

This particular determination concerns whether Southern Cross should be required to provide some form of voltage support service. This issue was raised by the PUCT in Directive 8, which requires that ERCOT:

“...shall (a) study and determine whether Southern Cross Transmission or any other entity scheduling flows across the Southern Cross DC tie should be required to provide or procure voltage support service or primary frequency response, or their technical equivalents, (b) implement any necessary revisions to its standards, guides, systems, and protocols, as appropriate, and (c) certify to the Commission when it has completed these actions.”

Discussions with stakeholders regarding this issue occurred at the following meetings: Regional Planning Group (RPG) on 4/24/2018, 11/27/2018, 1/22/2019, 2/19/2019, and 3/13/2019; Reliability and Operations Subcommittee (ROS) on 12/3/2020; 3/3/2022; Operations Working Group on 2/17/2022; and TAC on 01/20/2021, 04/13/2022.

ERCOT staff prepared a [whitepaper](#) setting forth its determination and considerations relevant to that resolution, which was presented for discussion and endorsement at these meetings.

ERCOT’s process for making the determination included transmission analysis to determine the ability of the transmission system in the area of the Southern Cross DC Tie to support assumed imports and exports across the tie. The analysis was conducted in 2019 following conditions determined through stakeholder consultation.

The Southern Cross DC Tie facility was not originally designed to have any reactive power capability to support ERCOT system voltage. However, any level of imports and exports over a DC Tie will cause reactive losses on the ERCOT system. ERCOT’s study noted that, if the Southern Cross DC Tie provided the equivalent of 0.95 power factor leading and lagging reactive power capability, fewer transmission upgrades would be needed to achieve full export capability under the studied conditions.

Note: This recommendation concerns only the issue of voltage support service in Directive 8. Resolution of the issue of Primary Frequency Response (PFR), also part of Directive 8, was approved by ERCOT Board on August 7, 2018.

Key Factors Influencing Issue:

- ERCOT’s study performed pursuant to PUCT Directive 6 (regarding transmission upgrades needed to address congestion) identified a voltage stability limit for exports of 1,289 MW during high-wind, low-load conditions, which would require

the installation of additional reactive capability to accommodate exports in excess of that amount during those conditions.

- ERCOT currently requires Generation Resources and Energy Storage Resources to provide voltage support. Specifically, with certain specified exceptions, Section 3.15 of the ERCOT Protocols requires Generation Resources and Energy Storage Resources to provide leading and lagging reactive capability equivalent to a 0.95 power factor.
- It is expected that this standard amount of reactive capability will not always perfectly match the amount of reactive capability needed to accommodate the Resource's real power injections or withdrawals. Nevertheless, a Generation Resource's or Energy Storage Resource's obligation remains the same for the life of the asset, even though the grid is always changing.
- Flows across DC Ties are similar to power injections or withdrawals from Generation Resources and Energy Storage Resources.
- As such, ERCOT concluded that it is appropriate to require DC Ties to provide voltage support under a similar paradigm as that currently used for Generation Resources and Energy Storage Resources.

Conclusion/Recommendation:

ERCOT staff recommends that the Board accept ERCOT staff's determination that, in order to accommodate the Southern Cross DC Tie: (1) any DC Tie facility that has an initial energization date after January 1, 2021, and any DC Tie facility that is replaced after that date, should be required to have at least 0.95 power factor leading/lagging reactive power capability, as required by approved NPRR1098, Direct Current Tie (DC Tie) Reactive Power Capability Requirements and NOGRR234, Related to NPRR1098, Direct Current Tie (DC Tie) Reactive Power Capability Requirements; and (2) no other necessary changes to Voltage Support Service are needed.



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

WHEREAS, the Public Utility Commission of Texas (PUCT) issued a Revised Order (Revised Order) on May 23, 2017, in PUCT Project No. 46304 that contains 14 Directives requiring Electric Reliability Council of Texas, Inc. (ERCOT) to study certain issues related to the proposed Southern Cross Transmission, LLC (Southern Cross) DC Tie and make determinations as to whether certain actions must be taken by ERCOT in order to accommodate the Southern Cross DC Tie;

WHEREAS, Directive 8 of the Revised Order requires, in part, that ERCOT evaluate what and determine whether the Southern Cross DC Tie should be required to provide or procure voltage support service and whether any revisions to ERCOT Protocols or Binding Documents (OBDs) are necessary to effectuate that determination;

WHEREAS, ERCOT staff, after discussions with stakeholders, have determined that Nodal Protocol Revision Request (NPRR) 1098, Direct Current Tie (DC Tie) Reactive Power Capability Requirements, and Nodal Operating Guide Revision Request (NOGRR) 234, Related to NPRR1098, Direct Current Tie (DC Tie) Reactive Power Capability Requirements, which were approved by the Public Utility Commission on March 31, 2022, provide the revisions to ERCOT rules necessary to accommodate the Southern Cross DC Tie; and

WHEREAS, after due consideration of the alternatives, the Board deems it desirable and in the best interest of ERCOT to accept ERCOT staff's determination;

THEREFORE, BE IT RESOLVED, that the Board hereby accepts ERCOT staff's determination that, to accommodate the Southern Cross DC Tie: (1) any DC Tie facility that has an initial energization date after January 1, 2021, and any DC Tie facility that is replaced after that date, should be required to have at least 0.95 power factor leading/lagging reactive power capability, as required by approved NPRR1098 and NOGRR234; and (2) no other necessary changes to Voltage Support Service are needed.



CORPORATE SECRETARY'S CERTIFICATE

I, Jonathan M. Levine, Assistant Corporate Secretary of ERCOT, do hereby certify that, at its April 28, 2022, meeting, the ERCOT Board passed a motion approving the above Resolution by_____.

IN WITNESS WHEREOF, I have hereunto set my hand this ____ day of April 2022.

Jonathan M. Levine
Assistant Corporate Secretary