



**Item 8: ERCOT Recommendation 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, Directive 9 – ERCOT
Determination Regarding Modifications to
Ancillary Services**

Janice Ayson

Lead Strategic Advisor

Urgent Board of Directors Meeting

ERCOT Public

August 10, 2021

Overview

- Background of Project and PUCT Directives
- Consideration of Directive #9 – Ancillary Services
- Next Steps
- Appendix
 - List of PUCT Order 46304 Directives
 - Market Stakeholder Process Summary

Background of Project and PUCT Directives

- Southern Cross Transmission LLC (SCT)/Pattern Power Marketing LLC received FERC approval (FERC Docket No. TX 11-1-001) to interconnect DC Tie line.
- PUCT imposed conditions for interconnection of the SCT DC Tie line in two PUCT proceedings:
 - City of Garland CCN docket – Docket No. 45624
 - Oversight proceeding arising out of City of Garland docket – Project No. 46304
- As part of the oversight proceeding, PUCT issued 14 Directives to ERCOT, requiring certain studies and determinations be made to accommodate the SCT DC Tie.
- Planned energization date is 2024.

The bi-directional SCT Project can deliver up to 2,000 MW of economic energy and reliability products in either direction



Consideration of Directive #9 – Ancillary Services

Directive 9

“ERCOT shall (a) evaluate what modifications to existing and additional ancillary services, if any, are necessary for the reliable interconnection of the Southern Cross DC tie, (b) implement any needed modifications to ancillary-services procurement, (c) recommend how the costs of such required ancillary services are to be allocated, and (d) certify to the Commission when it has completed these actions...”

Consideration of Directive #9 – Ancillary Services

Directive 9 Determination

Frequency risks associated with exports over the Southern Cross DC Tie could be addressed by procuring a new type of Ancillary Service. However, procurement of additional new Ancillary Services will be unnecessary because the ERCOT Board of Directors has approved Nodal Protocol Revision Request (NPRR) 1034, Frequency-Based Limits on DC Tie Imports and Exports, which will give ERCOT authority to establish limits on DC Tie transfers and to curtail DC Tie Schedules when necessary to address the risk of unacceptable frequency deviations.

While the loss of the DC Tie at its maximum import of 2,000 MW would exceed ERCOT's single largest contingency of 1,430 MW, no adjustment to Responsive Reserve Service (RRS) or Non-Spinning Reserve Service procurement is necessary to address the impact of such an event. Specifically, North American Electric Reliability Corporation (NERC) Reliability Standard BAL-003-2, which became effective in December 2020, clarifies that the loss of a bi-pole DC Tie that is capable of operating in single-pole mode, such as the DC Tie proposed by Southern Cross Transmission LLC (SCT), would count as two separate contingencies, not one. Based on this guidance, ERCOT has concluded that additional RRS quantities are not necessary to address import-related frequency risk if this proposed design is implemented. Similarly, because ERCOT's current methodology for procuring Non-Spinning Reserve Service is no longer based on the value of ERCOT's single largest contingency ERCOT is not required to procure additional Non-Spinning quantities to meet ERCOT's obligation under NERC Reliability Standard BAL-002-2 standard.

ERCOT has also determined that no changes to Regulation Service are necessary because DC Tie ramp will be adequately addressed by System Change Request (SCR) 800, Addition of DC Tie Ramp to GTBD Calculation, and NPRR 999, DC Tie Ramp Limitations. ERCOT has identified no other necessary changes to Ancillary Services to accommodate the Southern Cross DC tie.

Supporting Details for Determination on Directive #9

- **Basis for Determination**
 - NERC BAL-003-2 standard clarifies that the loss of a bi-pole DC Tie that is capable of operating in single-pole mode will count as two separate contingencies. Because Southern Cross has informed ERCOT that its DC Tie project will be built using this bi-pole configuration, BAL-003-2 will apply assuming this bi-pole design is implemented.
 - NPRR1034 has added express language into Protocols to address the risk of an unacceptable frequency deviation when Southern Cross DC Tie is exporting from ERCOT.
 - ERCOT has modified its procurement practices to eliminate the Non-Spin floor.
 - NPRR999 has added express language into Protocols to address the treatment of insufficient ramp capability due to submitted DC Tie schedules.
 - SCR800 integrates scheduled DC Tie ramp into the Generation to be Dispatched (GTBD) value used by SCED.
- **ROS unanimously endorsed ERCOT Staff's determination on July 8, 2021.**
- **TAC unanimously endorsed ERCOT Staff's determination on July 28, 2021.**

Next steps

- Request Board consideration to accept ERCOT's Determination on Directive #9.
- ERCOT staff continues to work with stakeholders on remaining Directives.
- Webpage on [ercot.com](http://www.ercot.com) tracks progress and artifacts supporting each Directive:
<http://www.ercot.com/mktrules/puctDirectives/southernCross>

Request for Vote: Determination on Directive #9

ERCOT staff recommends that the Board accept ERCOT staff's determination that in order to accommodate the Southern Cross DC Tie: (1) upon implementation of approved NPRR1034, ERCOT will have the authority to establish limits on DC Tie transfers and to curtail DC Tie schedules when necessary to address the risk of unacceptable frequency deviations; (2) no adjustment to RRS Service or Non-Spin Service is necessary if the Southern Cross DC Tie is constructed consistent with the proposed design as a bi-pole DC Tie capable of operating in single-pole mode; (3) no changes to Regulation Service are necessary because, upon implementation, DC Tie ramp will be adequately addressed by approved NPRR999 and approved SCR800; and (4) no other changes to Ancillary Services are needed and no new Ancillary Services costs need to be allocated.

<VOTE>

Appendix



List of PUCT Order 46304 Directives

Directive	Subject	Status
1	Determination of appropriate Market Participant category and market segment for SCT.	Started
2	Execution of any necessary coordination agreements.	Not Started
3	Determination regarding ramp rate restrictions.	Complete
4	Development of methodology for outage coordination.	Complete
5	Determination of planning model assumptions and considerations.	Complete
6	Determination regarding any needed transmission upgrades.	Started
7	Determination as to how to manage congestion caused by DC Ties.	Complete

List of PUCT Order 46304 Directives (continued)

Directive	Subject	Anticipated Start
8	Determination regarding Primary Frequency Response and Voltage Support Service.	Started
9	Determination regarding modifications to Ancillary Services.	Started
10	Determination regarding price formation under emergency conditions.	Complete
11	Determination regarding allocation of costs identified in PUCT Docket No. 45624.	Not Started
12	Determination regarding possible assignment of export-related costs to Qualified Scheduling Entities (QSEs).	Not Started
13	ERCOT reporting of status of work on Directives to PUCT.	Ongoing
14	ERCOT updates to PUCT regarding completion dates for Directives 1 to 12.	Ongoing

Market Stakeholder Process Summary

Working Groups
ERCOT's engagement with experts in non-voting Working Groups or Workshops
Capture key assumptions and solutions in whitepapers and/or Revision Requests

At the direction of TAC/ROS/WMS, ERCOT has engaged the appropriate working groups to brainstorm and assist ERCOT staff in reaching determinations for the issues raised in each Directive.



Sub-committee
Take determinations to appropriate voting body (ROS, WMS, PRS) for endorsement

Whitepapers presented to relevant subcommittees for endorsement. Stakeholder comments posted on ercot.com along with other documents relevant to work on Directives.



TAC
Determination on Directive presented to Technical Advisory Committee (TAC)

TAC has the option to vote to endorse a determination on a Directive.



Board
Determination on Directive presented to ERCOT Board of Directors

ERCOT Board has the option to vote to approve a determination on a Directive.





Date: August 3, 2021
To: Board of Directors
From: Janice Ayson, Lead Strategic Advisor
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 9 – ERCOT Determination Regarding Modifications to Ancillary Services

Issue for the ERCOT Board of Directors

ERCOT Board of Directors Meeting Date: August 10, 2021

Item No.: 8

Issue:

Whether the Board of Directors (Board) of Electric Reliability Council of Texas, Inc. (ERCOT) should vote to accept ERCOT staff's determination that, in order to accommodate the Southern Cross Direct Current (DC) Tie: (1) upon implementation of approved Nodal Protocol Revision Request (NPRR) 1034, Frequency-Based Limits on DC Tie Imports and Exports, ERCOT will have the authority to establish limits on DC Tie transfers and to curtail DC Tie schedules when necessary to address the risk of unacceptable frequency deviations; (2) no adjustment to Responsive Reserve (RRS) Service or Non-Spinning Reserve (Non-Spin) Service is necessary if the Southern Cross DC Tie is constructed consistent with the proposed design as a bi-pole DC Tie capable of operating in single-pole mode; (3) no changes to Regulation Service are necessary because, upon implementation, DC Tie ramp will be adequately addressed by approved NPRR999, DC Tie Ramp Limitations, and approved System Change Request (SCR) 800, Addition of DC Tie Ramp to GTBD Calculation; and (4) no other changes to Ancillary Services are needed and no new Ancillary Services costs need to be allocated.

Background/History:

In PUC Project No. 45624, the Public Utility Commission of Texas (PUCT) 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, 345kV transmission line connecting the proposed 2,000 MW Southern Cross DC Tie to ERCOT. In the Order, the PUCT also imposed certain conditions on the interconnection of the Southern Cross DC Tie. The PUCT 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 NPRRs or other 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 Directive 9, which requires that ERCOT:

“...shall (a) evaluate what modifications to existing and additional ancillary services, if any, are necessary for the reliable interconnection of the Southern Cross DC tie, (b) implement any needed modifications to ancillary-services procurement, (c) recommend how the costs of such required ancillary services are to be allocated, and (d) certify to the Commission when it has completed these actions.”

Discussions with stakeholders regarding this issue occurred at the following meetings: Performance, Disturbance, Compliance Working Group (PDCWG) on 8/23/2018, 9/12/2018, 10/22/2018, 1/16/2019, 2/13/2019, 5/14/2021, 6/16/2021; Reliability Operations Subcommittee (ROS) on 7/08/2021; and TAC on 7/28/2021. ERCOT staff prepared a whitepaper ([link](#)) 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 was to study the potential Ancillary Service needs associated with the interconnection of the Southern Cross DC Tie. These studies were conducted between October 2018 and February 2019, and study findings ([link](#)) are based on Protocols, standards, and limits at that time.

ERCOT’s studies considered the operational impacts of a loss of the Southern Cross DC Tie when importing up to its maximum import capability of 2,000 MW and when exporting up to its maximum export capability of 2,100 MW. ERCOT identified potential needs under each of its existing Ancillary Services—RRS, Non-Spin and Regulation Service—and also considered whether any new Ancillary Service would be needed.

Ancillary Services for Significant Frequency Excursions

ERCOT’s studies initially identified a frequency risk for both import and exports over the Southern Cross DC Tie. However, recently adopted North American Electric Reliability Corporation (NERC) Reliability Standard BAL-003-2 clarifies that no additional Ancillary Service procurement is necessary to address this import-side frequency risk. The standard clarifies that each single pole block in a bi-pole DC Tie configuration—such as the one proposed by Southern Cross—is considered a single contingency. Thus, the addition of the Southern Cross DC Tie will not require additional RRS to address the risk of an import-side frequency excursion.



On the export side, ERCOT's studies identified a risk of unacceptable frequency overshoot in the event of the loss of the Southern Cross DC Tie when exporting above certain levels under certain low-inertia conditions. To address this concern, Southern Cross submitted NPRR1034 to enable ERCOT to establish import or export limits on DC Ties during operating conditions of concern and to curtail DC Tie Schedules that would exceed an established import or export limit. NPRR1034 was approved by the Board and will be implemented prior to the interconnection of the Southern Cross DC Tie.

Non-Spinning Reserve Service

ERCOT has determined that the interconnection of the Southern Cross DC Tie will not impact the quantities of Non-Spin to be procured, which are determined based on historical net-load forecast error and risk of upward ramps in net load, as adjusted for expected growth in installed wind and solar capacity. As of 2019, ERCOT no longer imposes a Non-Spin floor.

Regulation Service

ERCOT has determined that changes to ERCOT rules and systems will avoid the need for additional Regulation Service procurement that might otherwise be necessary because of the interconnection of the Southern Cross DC Tie. Specifically, SCR800 will integrate scheduled DC Tie ramp into the Generation to be Dispatched (GTBD) value used by Security-Constrained Economic Dispatch (SCED). And NPRR999 clarified ERCOT's authority to curtail DC Tie Schedules that would otherwise exceed the ramp capability of the system, and potentially impact system frequency. This SCR and NPRR were previously approved by the Board.

Key Factors Influencing Issue:

- NERC Reliability Standard BAL-003-2 clarifies that the loss of a bi-pole DC Tie that is capable of operating in single-pole mode will count as two separate contingencies. Because Southern Cross has informed ERCOT that its DC Tie project will be built using this bi-pole configuration, BAL-003-2 will avoid any need to procure additional RRS to address import-related frequency risk, assuming this bi-pole design is implemented.
- NPRR1034 approved in February 2021, gives ERCOT authority to establish limits on DC Tie Transfers and to curtail DC Tie Schedules when necessary to address the risk of unacceptable frequency deviations when the Southern Cross DC Tie is importing or exporting from ERCOT. This negates the need for procuring additional Ancillary Services to address export-related frequency risk.
- The interconnection of the Southern Cross DC Tie will not impact the Non-Spin quantities that are procured because these are determined based on historical net-load forecast error and risk of upward ramps in net load, which are not expected to be impacted by the Southern Cross DC Tie.
- SCR800, approved in December 2019, integrates scheduled DC Tie ramp into the Generation to be Dispatched (GTBD) value used by SCED, and NPRR 999, approved in October 2020, clarifies ERCOT's authority to curtail DC Tie Schedules that would otherwise exceed the ramp capability of the system and potentially impact system frequency. This SCR and NPRR should avoid the need for additional Regulation Service.



Conclusion/Recommendation:

ERCOT staff recommends that the Board accept ERCOT staff's determination that in order to accommodate the Southern Cross DC Tie: (1) upon implementation of approved NPRR1034, ERCOT will have the authority to establish limits on DC Tie transfers and to curtail DC Tie schedules when necessary to address the risk of unacceptable frequency deviations; (2) no adjustment to RRS Service or Non-Spin Service is necessary if the Southern Cross DC Tie is constructed consistent with the proposed design as a bi-pole DC Tie capable of operating in single-pole mode; (3) no changes to Regulation Service are necessary because, upon implementation, DC Tie ramp will be adequately addressed by approved NPRR999 and approved SCR800; and (4) no other changes to Ancillary Services are needed and no new Ancillary Services costs need to be allocated.



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 9 of the Revised Order requires that ERCOT evaluate what modifications to existing and additional Ancillary Services, if any, are necessary for the reliable interconnection of the Southern Cross DC Tie, implement any needed modifications to Ancillary-Services procurement, recommend how the costs of such required Ancillary Services are to be allocated, and certify to the Commission when it has completed these actions;

WHEREAS, approved Nodal Protocol Revision Request (NPRR) 999, DC Tie Ramp Limitations, will be implemented prior to the interconnection of the Southern Cross DC Tie and will revise the Protocols to make clear that ERCOT will curtail DC Tie Schedules when necessary to conform with system ramp capability, but that ERCOT will, when time permits, first request that one or more e-Tags be resubmitted with an adjusted ramp duration in order to minimize the need for curtailments;

WHEREAS, approved Nodal Protocol Revision Request (NPRR) 1034, Frequency-Based Limits on DC Tie Imports and Exports, will be implemented prior to the interconnection of the Southern Cross DC Tie and will revise the Protocols to make clear that ERCOT has the authority to establish limits on DC Tie transfers and will curtail DC Tie Schedules when necessary to address the risk of unacceptable frequency deviations;

WHEREAS, approved System Change Request (SCR) 800, Addition of DC Tie Ramp to GTBD Calculation, will be implemented prior to the interconnection of the Southern Cross DC Tie and will integrate scheduled DC Tie ramp into the Generation to be Dispatched (GTBD) value used by Security-Constrained Economic Dispatch (SCED);

WHEREAS, ERCOT staff have determined that implementation of NPRR999, NPRR1034 and SCR800 will be sufficient to address the modifications to Ancillary Services needed to accommodate interconnection of the Southern Cross DC Tie, as required by Directive 9 of the Revised Order, under the assumption that Southern Cross DC Tie will be built as a bi-pole DC Tie that is capable of operating in single-pole mode; 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) upon implementation



of approved NPRR1034, ERCOT will have the authority to establish limits on DC Tie transfers and to curtail DC Tie schedules when necessary to address the risk of unacceptable frequency deviations; (2) no adjustment to RRS Service or Non-Spin Service is necessary if the Southern Cross DC Tie is constructed consistent with the proposed design as a bi-pole DC Tie capable of operating in single-pole mode; (3) no changes to Regulation Service are necessary because, upon implementation, DC Tie ramp will be adequately addressed by approved NPRR999 and approved SCR800; and (4) no other changes to Ancillary Services are needed and no new Ancillary Services costs need to be allocated.



CORPORATE SECRETARY'S CERTIFICATE

I, Vickie G. Leady, Assistant Corporate Secretary of ERCOT, do hereby certify that, at its August 10, 2021 urgent meeting by teleconference, the ERCOT Board passed a motion approving the above Resolution by_____.

IN WITNESS WHEREOF, I have hereunto set my hand this ____ day of August 2021.

Vickie G. Leady
Assistant Corporate Secretary