



**Item 9: 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 3 – ERCOT
Determination regarding Ramp Rate
Restrictions**

Janice Ayson
Lead Strategic Advisor

Urgent Board of Directors Meeting

ERCOT Public
December 8, 2020

Overview

- Background of Project and PUCT Directives
- Consideration of Directive #3 – Ramp Rate Restrictions
- 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 2023.

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



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Consideration of Directive #3 – Ramp Rate Restrictions

Directive 3

- “ERCOT shall determine what ramp rate restrictions, if any, will be necessary to accommodate the interconnection of the Southern Cross DC tie and shall implement those restrictions and shall certify to the Commission when it has completed these actions.”
- *Determination: To accommodate the Southern Cross DC Tie, ERCOT will need to impose restrictions on DC Tie flows when ERCOT determines that system conditions near or in Real-Time cannot accommodate the DC Ties’ scheduled ramp. Upon implementation, Nodal Protocol Revision Request (NPRR) 999, DC Tie Ramp Limitations, will revise the Protocols to make clear that ERCOT will curtail DC Tie Schedules when necessary to conform with the system’s 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.*

Supporting Details for Determination on Directive #3

- **Basis for Determination**

- The potential change in DC Tie flows from one Operating Hour to the next that will be associated with the Southern Cross DC Tie will greatly exceed the swings in flows that currently exist on the ERCOT System with current DC Ties.
 - Given the proposed size of the Southern Cross DC Tie, ERCOT determined that the traditional 10-minute ramp for DC Tie schedules may be insufficient to manage large swings in scheduled flows across the Southern Cross DC Tie during certain grid conditions.
 - NERC Reliability Standard INT-006-4 R1 requires ERCOT to reject or curtail a DC Tie Schedule that ERCOT does not expect to be capable of supporting either in magnitude or ramp.
 - NPRR999 has added express language into Protocols to address the treatment of insufficient ramp capability due to submitted DC Tie schedules.
- **ROS unanimously endorsed ERCOT Staff's determination on November 5, 2020.**
 - **TAC unanimously endorsed ERCOT Staff's determination on November 18, 2020.**



Next steps

- Request Board consideration to accept ERCOT's Determination on Directive #3
- 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>

Appendix

List of PUCT Order 46304 Directives

Directive	Subject	Anticipated Start
1	Determination of appropriate Market Participant category and market segment for SCT.	Started
2	Execution of any necessary coordination agreements.	Mid 2021
3	Determination regarding ramp rate restrictions.	Started
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.	TBD
12	Determination regarding possible assignment of export-related costs to Qualified Scheduling Entities (QSEs).	TBD
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: November 30, 2020
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, Directive 3 – ERCOT Determination Regarding Ramp Rate Restrictions

Issue for the ERCOT Board of Directors

ERCOT Board of Directors Meeting Date: December 8, 2020

Item No.: 9

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 Transmission, LLC (Southern Cross) Direct Current (DC) Tie: (1) ERCOT will need to impose restrictions on DC Tie flows when ERCOT determines that system conditions near or in Real-Time cannot accommodate the DC Ties' scheduled ramp; and (2) upon implementation, approved Nodal Protocol Revision Request (NPRR) 999, DC Tie Ramp Limitations, will revise the Protocols to make clear that ERCOT will curtail DC Tie Schedules when necessary to conform with the system's 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.

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, 345kV 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 NPRRs 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 3, which requires that ERCOT:

“...shall determine what ramp rate restrictions, if any, will be necessary to accommodate the interconnection of the Southern Cross DC tie and shall implement those restrictions and shall 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 04/10/2019, 06/12/2019, 08/14/2019, 10/09/2019, 12/11/2019, 01/14/2020, 09/08/2020, 10/14/2020; Reliability Operations Subcommittee (ROS) on 11/5/2020; and Technical Advisory Committee (TAC) on 11/18/2020. 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.

The planned interconnection of the Southern Cross DC Tie brings the potential for up to a 4,100 MW change in DC Tie Schedules (maximum import to maximum export of the tie). This potential change in DC Tie flows greatly exceeds the potential swings in flows that now exist on the ERCOT System with current DC Ties. DC Ties currently in ERCOT typically ramp over 10 minutes, starting 5 minutes prior to the end of one Operating Hour to the next. To date, this ramp period has been sufficient to address changes in flows between Operating Hours. Given the proposed size of the Southern Cross DC Tie, however, ERCOT has determined that the traditional 10-minute ramp for DC Tie schedules may be insufficient to manage large swings in scheduled flows across the Southern Cross DC Tie during certain grid conditions.

North American Electric Reliability Corporation (NERC) Reliability Standard INT-006-4 R1 requires ERCOT to reject or curtail a DC Tie Schedule that ERCOT does not expect to be capable of supporting either in magnitude or ramp. Further, ERCOT Protocol Section 4.4.4 paragraphs (5) and (15) authorize ERCOT to take action to address physical capacity limitations and transmission security concerns. However, discussions with stakeholders regarding Directive 3 revealed that the Protocols did not include language expressly addressing the treatment of insufficient ramp capability due to submitted DC Tie schedules.

To address this gap, ERCOT, in consultation with stakeholders, sponsored NPRR999, DC Tie Ramp Limitations, to add Protocol Section 4.4.4.3. NPRR999 was approved by the ERCOT Board on 10/13/2020. Upon implementation, NPRR999 will address insufficiency of ramp capability for scheduled DC Tie flows by first allowing ERCOT to request the voluntary resubmission of e-Tags with an adjusted ramp duration, if sufficient time for such a request exists. If there is insufficient time to request resubmission of e-Tags, or an insufficient number of e-Tags are resubmitted to conform with system ramp



capability, ERCOT will have authority under Protocol Section 4.4.4.3 to curtail DC Tie Schedules on a last-in-first-out basis as needed to conform with the system's ramp capability. NPRR999 will be implemented prior to the interconnection of the Southern Cross DC Tie.

Key Factors Influencing Issue:

- The potential change in DC Tie flows from one Operating Hour to the next that will be associated with the Southern Cross DC Tie will greatly exceed the swings in flows that currently exist on the ERCOT System with current DC Ties. Given the proposed size of the Southern Cross DC Tie, ERCOT determined that the traditional 10-minute ramp for DC Tie schedules may be insufficient to manage large swings in scheduled flows across the Southern Cross DC Tie during certain grid conditions.
- NERC Reliability Standard INT-006-4 R1 requires ERCOT to reject or curtail a DC Tie Schedule that ERCOT does not expect to be capable of supporting either in magnitude or ramp. While current ERCOT Protocol Section 4.4.4 paragraphs (5) and (15) generally authorize ERCOT to take action to address physical capacity limitations and transmission security concerns, ERCOT, in consultation with stakeholders, determined that additional Protocol language was needed to expressly address the treatment of insufficient ramp capability due to submitted DC Tie schedules.
- To expressly address DC Tie ramp limitations, ERCOT sponsored NPRR999, which was approved by the ERCOT Board at its October 2020 meeting. NPRR999 will be implemented prior to interconnection of the Southern Cross DC Tie. Once implemented, NPRR999 will expressly allow ERCOT to curtail DC Tie Schedules as needed to conform with system ramp capability.
- Implementation of NPRR999 will be sufficient to address the ramp limitations needed to accommodate interconnection of the Southern Cross DC Tie.

Conclusion/Recommendation:

To accommodate the Southern Cross DC Tie, ERCOT will need to impose restrictions on DC Tie flows when ERCOT determines that system conditions near or in Real-Time cannot accommodate the DC Ties' scheduled ramp. Upon implementation, approved NPRR999 will revise the Protocols to make clear that ERCOT will curtail DC Tie Schedules when necessary to conform with system ramp capability. Implementation of NPRR999 will be sufficient to address the ramp limitations needed to accommodate interconnection of the Southern Cross DC Tie; therefore, no additional actions are necessary to resolve Directive 3 in the Revised Order in PUCT Project No. 46304.



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 PUC 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 3 of the Revised Order requires that ERCOT determine what ramp rate restrictions, if any, will be necessary to accommodate the interconnection of the Southern Cross DC tie, implement those restrictions, 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, ERCOT staff has determined that implementation of NPRR999 will be sufficient to address the ramp limitations needed to accommodate interconnection of the Southern Cross DC Tie, as required by Directive 3 of the Revised Order; 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, ERCOT will need to impose restrictions on DC Tie flows when ERCOT determines that system conditions near or in Real-Time cannot accommodate the DC Ties' scheduled ramp; and
- Approved NPRR999, 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 the system's 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.



CORPORATE SECRETARY'S CERTIFICATE

I, Vickie G. Leady, Assistant Corporate Secretary of ERCOT, do hereby certify that, at its December 8, 2020 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 December 2020.

Vickie G. Leady
Assistant Corporate Secretary