



**Item 12: 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**

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Board of Directors Meeting

ERCOT Public

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Overview

- Background of Project and PUCT Directives
- Process to review and make recommendation on Directives
- Consideration of Directive 6 – Transmission Upgrades
- Consideration of Directive 8 – Voltage Support
- Next Steps
- Appendix
 - List of PUCT Order 46304 Directives and Status

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.
- ERCOT began work with Stakeholders on the 14 Directives in 2017.

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



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.



Request for Vote to Accept ERCOT Determination

Directive 6

“ERCOT shall study and determine what transmission upgrades, if any, are necessary to manage congestion resulting from power flows over the Southern Cross DC tie, make any necessary revisions to its standards, guides, systems, and protocols as appropriate, and certify to the Commission when it has completed these actions. ”

Directive 6 Determination

While ERCOT studies revealed that upgrades would be needed to accommodate the modeled flows over the Southern Cross DC Tie under certain system conditions, ERCOT has determined that no transmission system upgrades are ultimately necessary to manage congestion resulting from power flows over the Southern Cross DC Tie. This is because PGRR077, DC Tie Planning Assumptions, which was approved by the ERCOT Board in October 2020, requires ERCOT to curtail assumed DC Tie flows in transmission planning analysis when necessary to meet reliability criteria. ERCOT expects that it may need to redispatch generation and/or limit flows across the Southern Cross DC Tie to manage constraints in real time.

Supporting Details for Determination on Directive 6

Basis for Determination

- ERCOT transmission analysis conducted in 2019, revealed that upgrades would be needed to accommodate the modeled flows over the Southern Cross DC Tie under certain system conditions.
- PGRR077, DC Tie Planning Assumptions, approved by the ERCOT Board in October 2020 requires ERCOT to curtail assumed DC Tie flows in transmission planning analysis, when necessary, to meet reliability criteria.
- Consequently, ERCOT's future transmission planning studies will not identify any reliability-based need for transmission upgrades following the interconnection of the SCT DC Tie.
- Additionally, ERCOT's Directive 7 determination shows that existing operational and market mechanisms can be used to manage congestion due to flows over the SCT DC Tie including ERCOT's ability to curtail the import or export to the extent necessary to operate the system within its limits.
- **ROS endorsed ERCOT Staff's determination on March 3, 2022.**
- **TAC endorsed ERCOT Staff's determination on April 13, 2022.**

Determination on Directive 6

ERCOT staff recommends that the Board accept ERCOT staff's determination that, in order to accommodate the Southern Cross Direct Current (DC) Tie: (1) no transmission system upgrades are necessary to manage congestion resulting from power flows over the Southern Cross DC Tie because ERCOT will curtail assumed DC Tie flows in transmission planning analysis when necessary to meet reliability criteria, as required by approved PGRR77, DC Tie Planning Assumptions; and (2) ERCOT expects that it may need to redispatch generation and/or limit flows across the Southern Cross DC Tie to manage constraints in real time.

<VOTE>

Request for Vote to Accept ERCOT Determination

Directive 8

“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.”

Note: This determination concerns only the voltage support service portion of Directive 8. ERCOT’s determination for Directive 8 related to Primary Frequency Response (PFR) was approved by ERCOT Board on 08/07/2018.

Request for Vote to Accept ERCOT Determination

Directive 8 Determination

To accommodate the Southern Cross DC Tie, 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. NPRR1098, Direct Current Tie (DC Tie) Reactive Power Capability Requirements and NOGRR234, Related to NPRR1098, Direct Current Tie (DC Tie) Reactive Power Capability Requirements, which were approved by the Public Utility Commission on March 31, 2022, revised the Protocols and Operating Guide to require that new or replaced DC Tie facilities shall have at least 0.95 power factor leading/lagging reactive power capability.

Supporting Details for Determination on Directive 8 regarding Voltage Support Service

Basis for Determination

- NPRR1098, Direct Current Tie (DC Tie) Reactive Power Capability Requirements and NOGRR234, Related to NPRR1098, Direct Current Tie (DC Tie) Reactive Power Capability Requirements, approved by the PUCT on March 31, 2022, revised Protocols and Operating Guide to require that new or replaced DC Tie facilities shall have at least 0.95 power factor leading/lagging reactive power capability.
- 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'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.
- **ROS endorsed ERCOT Staff's determination on March 3, 2022.**
- **TAC endorsed ERCOT Staff's determination on April 13, 2022.**

Determination on Directive 8 regarding Voltage Support Service

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; (2) no further action is necessary to resolve Directive 8 regarding voltage support service.

<VOTE>

Next steps

- ERCOT staff will continue to provide periodic updates to the PUCT on the status of these Directives.
- ERCOT staff will continue to work with stakeholders on the remaining Directives.
- Webpage on [ercot.com](http://www.ercot.com) tracks work on these Directives:
<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.	In Progress
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.	In Progress
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.	In Progress
9	Determination regarding modifications to Ancillary Services.	Complete
10	Determination regarding price formation under emergency conditions.	Complete
11	Determination regarding allocation of costs identified in PUCT Docket No. 45624.	June 2022
12	Determination regarding possible assignment of export-related costs to Qualified Scheduling Entities (QSEs).	June 2022
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