



**GENERAL SESSION MINUTES OF THE
TECHNOLOGY AND SECURITY COMMITTEE MEETING
OF ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.**

8000 Metropolis Drive (Building E), Suite 100, Boardroom B
Austin, Texas 78744
June 17, 2024

Pursuant to notice duly given and after determination that a quorum was present, the meeting of the Technology and Security (T&S) Committee of the Board of Directors (Board) of Electric Reliability Council of Texas, Inc. (ERCOT) convened on the above-referenced date.

Meeting Attendance:

Committee Members:

Director	Affiliation/Role (if any)	Voting Category
Aguilar, Carlos	N/A	Voting
Capuano, Linda	N/A	Voting
England, Julie	N/A	Voting
Swainson, John (Chair)	N/A	Voting

Other Board Members:

Director	Affiliation/Role (if any)	Voting Category
Flexon, Bob	N/A	Voting
Flores, Bill	N/A	Voting
Foster, Paul	N/A	Voting
Gleeson, Thomas	PUC	Non-Voting
Heeg, Peggy	N/A	Voting
Hjaltman, Courtney	Office of Public Utility Counsel (OPUC), Public Counsel	Voting
Vegas, Pablo	ERCOT President and Chief Executive Officer (CEO)	Non-Voting

Officers and Guests:

Officer/Guest	Role
Berlin, Anna	ERCOT Associate Corporate Counsel
Bonser, Drew	ERCOT Director of Cyber Security



Black, Robert	ERCOT Vice President of Public Affairs
Collins, Keith	ERCOT Vice President of Commercial Operations
Day, Betty	ERCOT Vice President of Security and Compliance and Chief Compliance Officer
Hobbs, Kristi	ERCOT Vice President of System Planning and Weatherization
Horton, Shana	ERCOT Corporate Counsel
Jackson, Kathleen	PUCT Commissioner
Kroposki, Ben	National Renewable Energy Lab (NREL)
Levine, Jonathan	ERCOT Assistant General Counsel and Assistant Corporate Secretary
Martinez, Adam	ERCOT Vice President of Enterprise Risk and Strategy
Mereness, Matt	ERCOT Senior Director of Strategic Market Design Programs and Delivery
Parakkuth, Jayapal	ERCOT Senior Vice President and Chief Information Officer
Rickerson, Woody	ERCOT Senior Vice President and Chief Operating Officer
Seely, Chad V.	ERCOT Senior Vice President, General Counsel and Corporate Secretary
Tamby, Jeyant	ERCOT Senior Vice President and Executive Advisor
Woodfin, Dan	ERCOT Vice President of System Operations

Call General Session to Order (Agenda Item 1)

John Swainson, T&S Committee Chair, determined that a quorum was present and called the T&S Committee meeting to order at approximately 9:00 a.m.

Chair Swainson highlighted the Antitrust Admonition and addressed the following Agenda Items in the order below.

Notice of Public Comment, if Any (Agenda Item 2)

Chair Swainson announced that on the agenda for the meeting, which was posted publicly on June 10, 2024, ERCOT had provided instructions for members of the public who were interested in commenting in person and that to date no individuals had expressed interest in commenting, which Jonathan Levine confirmed.

April 22, 2024 General Session Meeting Minutes (Agenda Item 3)

Chair Swainson entertained a motion to approve the April 22, 2024 General Session Meeting Minutes (Minutes).

Julie England moved to approve the Minutes as presented. Linda Capuano seconded the motion. The motion passed by unanimous voice vote with no abstentions.

Committee Briefs (Agenda Item 4)

Chair Swainson invited ERCOT staff and guest Dr. Ben Kroposki of NREL to present the Committee Briefs.



Emerging Technology – Introduction to Grid Forming Inverters – a Key to Transforming our Power Grid (Agenda Item 4.3)

Jayapal Parakkuth introduced Dr. Ben Kroposki, Director of the Power Systems Engineering Center at the National Renewable Energy Lab (NREL). Pursuant to the Committee's request for presentations regarding emerging grid technologies, Dr. Kroposki presented Emerging Technology – Introduction to Grid Forming (GFM) Inverters – a Key to Transforming our Power Grid. Dr. Kroposki discussed why GFM Inverters are a necessary part of the grid's future, including the prevalence of inverter-based resources (IBRs) as a share of new capacity, and what is driving the rapid development of utility-scale wind and solar resources. Dr. Kroposki described the two types of inverters: Grid Following (GFL) and GFM. He explained how GFM IBRs can help maintain operational stability across the grid by preventing load shedding in response to low frequency. He discussed what steps need to be taken to continue adding IBRs to the grid, including adding more storage and GFM battery IBRs.

Committee members, other Board members, Dr. Kroposki, and Woody Rickerson discussed the level of storage capacity needed to support a system entirely comprised of IBRs; the percentage of resources overall—approximately 30 percent—that need to be GFM to ensure system stability and risks when operating below that level; the amount and proportion of IBRs needed to support a Black Start and how Black Start capability impacts the cost of GFM controls; the feasibility and cost of upgrading existing GFL IBRs to GFM IBRs; and use of GFM IBRs to assist with large load trips.

Projects and Technology Update (Agenda Item 4.1)

Mr. Parakkuth presented the Projects and Technology Update. He highlighted that the Market Management System (MMS) migration to Linux that went live in May resulted in a 40 percent system speed increase.

Mr. Parakkuth reported on the success of ERCOT's inaugural Innovation Summit, which served 350 non-ERCOT in-person attendees and 650 online attendees.

Mr. Parakkuth reported projects are generally on track and ERCOT is managing a healthy volume of projects with no issues to report and reviewed year-to-date project statistics, including project labor. Committee members and Mr. Parakkuth discussed the remaining capacity available for new projects and how ERCOT manages project demand. Mr. Parakkuth clarified that most employees working on projects are primarily working on other things (O&M); projects only make up a small portion of their work; and projects are initiated based upon staff and other resource availability. He presented the project portfolio process from ideation to closing and other project-related processes to support workflows, such as designating impactful projects as Objectives and Key Results (OKRs), and how project results are tracked.

Finally, Mr. Parakkuth reported on performance improvements in the Congestion Revenue Right (CRR) auction process achieved through CRR engine software changes and an increase in central processing units (CPUs), which resulted in the March annual auction running in 97 hours, down from 362 hours. Committee members, Mr. Parakkuth, and Matt Mereness discussed CRR auction performance improvements, the amount of time saved during re-runs of CRR auctions, and what would be considered acceptable performance.



Real-Time Co-Optimization Implementation Update (Agenda Item 4.2)

Mr. Parakkuth presented the Real-Time Co-Optimization Implementation Update, including an overview of system changes highlighting that the project is on-schedule and on-budget. He reviewed the major dependencies in the critical path to delivery, most notably, Market Participant system updates. Committee members and Mr. Mereness discussed measures taken to promote Market Participant readiness. Mr. Mereness highlighted attestations his group will ask Market Participants to sign to prepare for the transition and identify responsible employees. Mr. Parakkuth outlined upcoming project deadlines and milestones as well as recent requirements completed. Chair Swainson asked for a sense of the participation from vendors and Market Participants. Mr. Parakkuth and Mr. Mereness reported approximately 150 entities regularly participate in the process. Committee members, Mr. Parakkuth, Pablo Vegas, and Mr. Mereness discussed the optimal timing in the year for go-live and coordinating with Operations staff to avoid periods of high stress on the grid.

Future Agenda Items (Agenda Item 5)

Mr. Parakkuth presented the Future Agenda Items. Committee members and Mr. Parakkuth discussed future presentations on emerging grid technology topics. Chair Swainson requested a presentation on small modular nuclear work going on in Texas. Committee members and Mr. Vegas also discussed transmission technology enhancements as a potential future topic, including education on metrics implicated by changes to the transmission system.

Other Business (Agenda Item 6)

No other business was discussed at this time.

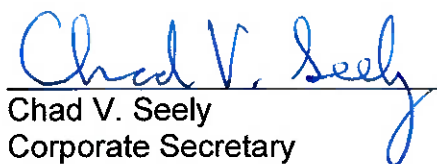
Executive Session; Vote on Matters from Executive Session; Adjournment (Agenda Items 7 – 8)

Chair Swainson announced that no voting items from Executive Session were expected; accordingly, he would adjourn the meeting immediately upon conclusion of Executive Session. Chair Swainson adjourned General Session at approximately 10:24 a.m. and convened Executive Session at approximately 10:34 a.m.

There were no voting items from Executive Session.

Chair Swainson adjourned the meeting upon the conclusion of Executive Session at approximately 11:34 a.m.

Committee materials and presentations from the meeting are available on ERCOT's website at <https://www.ercot.com/committees/board/tech-security>.


Chad V. Seely
Corporate Secretary