

Item 6.3: Grid Transformation Initiatives Update

Venkat Tirupati
Vice-President, DevOps and Grid Transformation

Technology and Security Committee Meeting

ERCOT Public 12/02/2024

Overview

Purpose

An update on Grid Transformation activities

Voting Items / Requests

No action is requested of the ERCOT Board; for discussion only

Key Takeaway(s)

- Initiatives are underway and progressing according to schedules
- Focus to start implementing white paper ideas to proof of concepts
- Activities to engage stakeholders are ongoing



Grid Transformation – Adapting to forces in the industry

- Energy Storage Resources look ahead commitment and dispatch
- Awareness of <u>Distributed Generation</u> operational information
- Create more opportunities to leverage <u>Demand Flexibility</u>
- Monitor, verify and validate <u>Load Dynamic Performance</u>
- Leverage the Smart Meter data for edge intelligence
- Develop techniques to run robust <u>Security Constrained Optimizations</u>
- Leverage <u>Artificial Intelligence</u> advancements



Grid Transformation – Roadmaps – Work in Progress

Grid Transformation Initiatives	Modality	2024			2025				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
A) Managing the grid with large penetration of energy storage resources									
Evaluate the feasibility of multi-interval look ahead commitment and dispatch	White Paper	\boxtimes							
B) Uncertainty & Variability Management									
1. Probabilistic risk assessment to support grid planning and operations	Proof of Concept	/							
C) Managing the grid with large penetration of distributed energy resources									
1. Model and receive operational information from DERs into the control room	White Paper	Σ							
2. Evaluate the value of mapping ESIIDs to actual modeled load	White paper	\boxtimes							
3. Model, dispatch and settle ADER accurately reflecting the operating characteristics	Pilot Project	\boxtimes							
D) Evolving Ancillary Services									
Develop methodology for calculating dynamic ancillary service quantities	White Paper	<u>(1)</u>							
2. Evaluate ancillary services products for meeting future reliability issues	White Paper	<u>(1)</u>							
3. Develop Demand Response Product	White Paper	\mathbf{X}							
4. Develop Tiered definitions of Load and assess the holistic impact	White Paper	\overline{X}							
E) Power system dynamic security awareness									
Measure and estimate regional system strength	Proof of Concept	$\overline{\mathbf{X}}$							
2. Measure and estimate regional and system wide inertia	Proof of Concept	Σ							







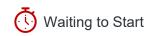


Grid Transformation – Roadmaps – Work in Progress

Grid Transformation Initiatives	Modality	2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
E) Power system dynamic security awareness									
3. Monitor, verify and validate load dynamic performance	White Paper	\overline{X}							
F) Power system dynamic security assessment									
1. Develop frequency domain dynamic stability tool for IBR dominated grid	Proof of Concept	$\overline{\mathbf{X}}$							
2. Evaluate the feasibility of a new tool for accurate and efficient dynamic studies	White Paper	Σ							
G) Power System security assessment									
1. Develop cases with AC power flow and robust security constrained optimizations	White Paper	$\overline{\mathbf{X}}$							
H) Control capability to maintain system security and reliability									
1. Smart DER (including rooftop PV) management	Research Paper	(1)							
2. Smart Load (including residential) management during emergency events	Research Paper	(1)							
I) Emerging Technologies									
1. Evaluate AI/ML techniques for optimization problems	Proof of Concept	X							
2. Identify AI/ML use cases for improving grid and market operations	White Paper	∇							







Grid Transformation Initiatives – Thank You!!

Grid Operations

Fred Huang – Director, Operations Support
Jeff Billo – Director, Operations Planning
Jimmy Zhang - Principal, Inverter based Resources
Luke Butler – Manager, Resource Forecasting
Nitika Mago – Sr. Manager, Balancing Operations
Riaz Khan – Sr. Ops Engineer, Resource Forecasting
Sienna Shi – Ops Engineer, Resource Forecasting
Vamsi Madam – Manager, Ops Engineering

Enterprise Architecture

Weihui Fu - Principal, System Development

Commercial Operations

Sai Moorty – Principal, Market Design & Analysis Kenneth Ragsdale – Principal, Market Design Dave Maggio – Principal, Commercial Operations Gordon Drake – Director, Market Design & Analysis

Grid Planning

Bill Blevins – Director, Grid Coordination Jose Conto - Principal, Dynamic Studies Prabhu Gnanam – Director, Grid Planning Sun Wook Kang – Manager, Dynamic Studies Thinesh Devadhas Mohandas – Principal, ET Tareq Hossen – Engineer, Planning

Grid Transformation

Prashant Kansal – Principal

Key Takeaway: A collaborative effort among several teams



Grid Transformation – Sustaining the focus

- Speaker Series
 - September 12th Dr. Tongxin Zheng, Chief Technologist, ISO-NE
 - Clean Energy Transition: Challenges and Opportunities
 - October 4th Robby Sohi, Chief Operating Officer, IESO
 - Cultural Transformation
 - October 24th Daniel Nelson, Chief Technology Officer and Dan Kopin, Manager of Innovation, Vermont Electric Company (VELCO)
 - Trusted Trio: Transmission, distribution and generation data
 - November 8th Dr. Anjan Bose, Regents Professor, WSU
 - Evolution of Grid Operation and Control
 - December 13th Xavier Florent, Director of R&D Partnerships, Valorization,
 Transformation and Cross-Program Strategies (PRISME), RTE- France
 - Energy pathways in France and R&D activities



Grid Research, Innovation, and Transformation (GRIT) - Activities

Finding home

Research & Innovation Engagement

GRIT Intranet Site

GRIT External Website

Industry Consortiums

Academic Institutions and DOE

Grid Transformation Quarterly

Communication

Research Rendezvous Meetings

Newsletter (Monthly)

Report (Annual)

<u>Innovation Summit – May 6, 2025</u>

Implementation focus

Ideation Workshop

Whitepapers to Proof of Concepts

Multiple POCs in pipeline

