



Item 7: ERCOT System Update – Energy Management System (EMS) and Settlements

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Special Board of Directors Meeting

ERCOT Public

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Agenda

1) Energy Management System (EMS)?

- a) What is it ?
- b) Need for upgrade
- c) Upgrade challenges
- d) Scheduling options

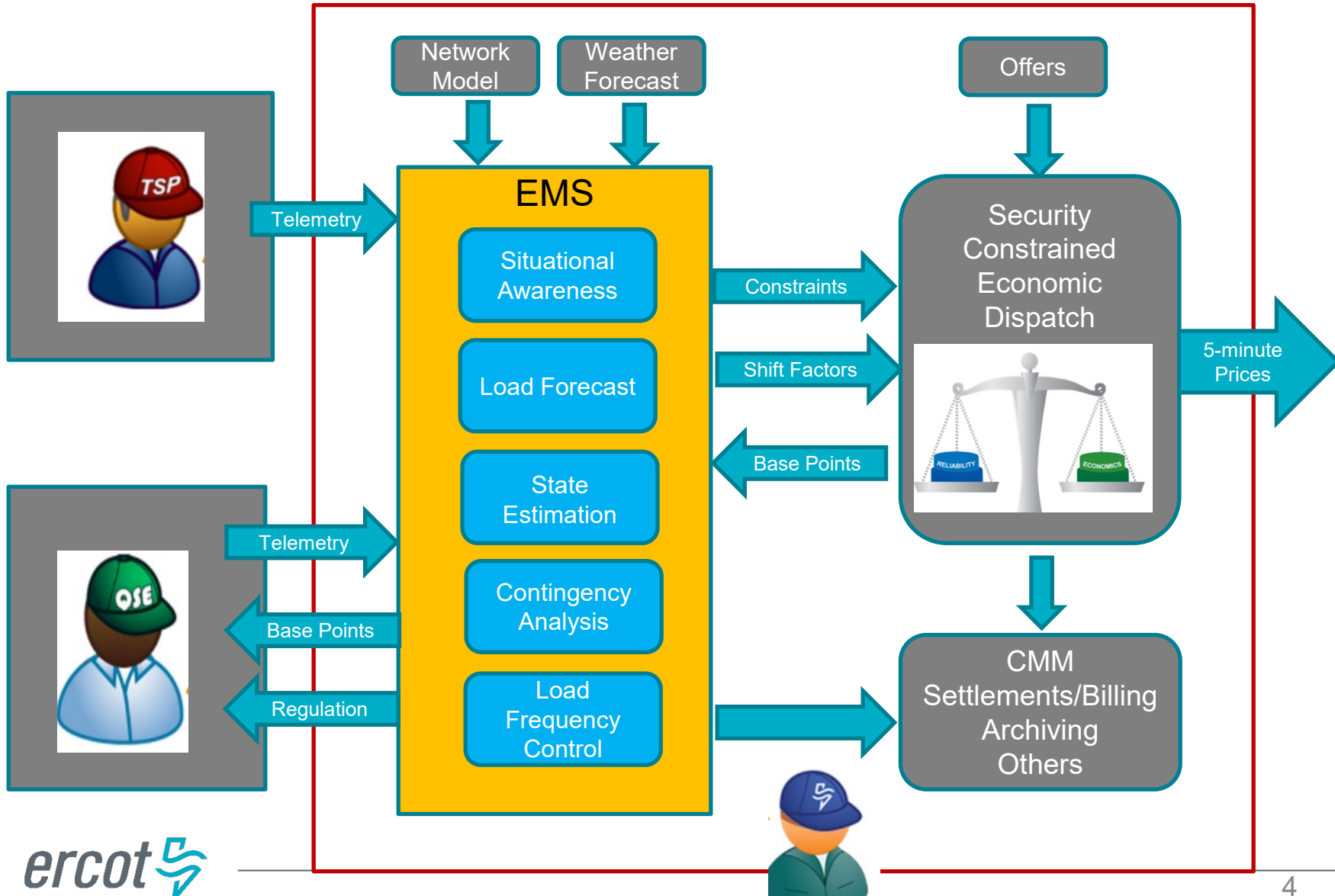
2) Credit Monitoring Management (CMM) and Settlements & Billing

- a) What are they ?
- b) Current challenges

What is an EMS ?

- Ensuring a reliable grid is a key pillar of ERCOT's mission
- ERCOT does this by
 - Maintaining frequency at 60Hz
 - Managing reserves, constraints & limits
 - Managing sudden loss of equipment
- The Energy Management System or EMS is the main tool ERCOT uses for reliability

How does the EMS fit in the big picture ?



Why upgrade the EMS

- Ensure vendor support for:
 - Hardware version
 - Operating system
 - Third party software
 - EMS software version
- Ensure North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) compliance

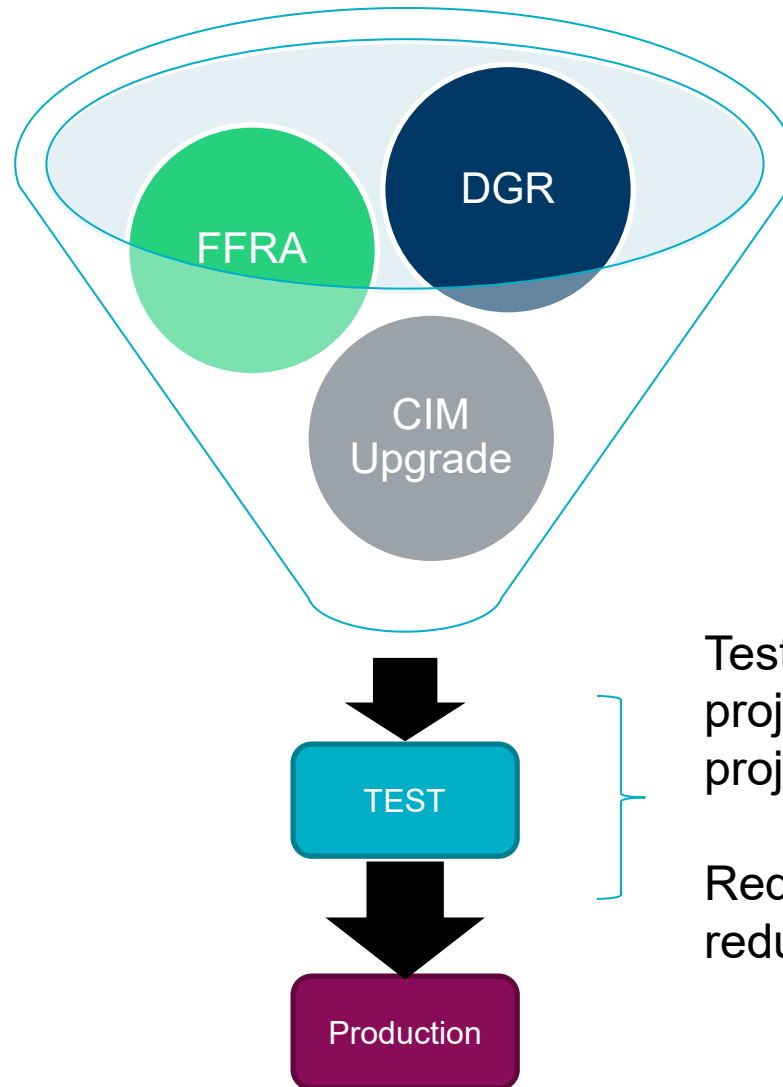
Upgrade challenges

- Highly customized EMS
 - Carrying changes from various revisions for last 20 years
 - Reimplement these changes on new EMS platform from vendor

EMS Project Statistics	Value
Internal Labor	34 person years
Contingent Labor	11 person years
Vendor Labor	22 person years
ERCOT Specific Enhancements	6000+ and growing

- Resource and system constraints
 - Qualified power system professionals with software development background
 - Changes need to converge to one production system which affects how many big changes can be developed in parallel

Various Projects converge to a single production system



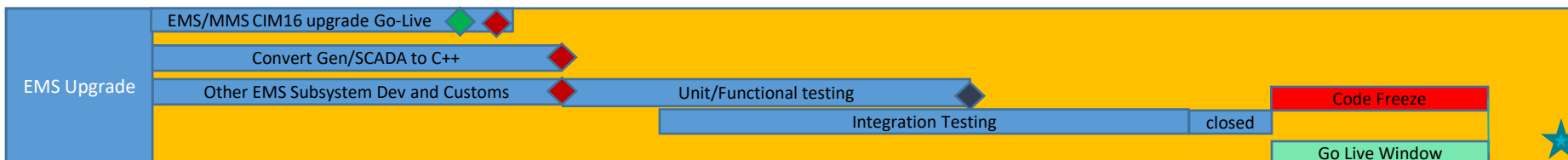
Testing time for each project holds up other projects

Reducing testing is reducing quality

Scheduling Options

- ◆ Achieved milestone
- ◆ Planned milestone
- ◆ Estimated milestone

	2021				2022				2023				2024	
	Q1'21	Q2'21	Q3'21	Q4'21	Q1'22	Q2'22	Q3'22	Q4'22	Q1'23	Q2'23	Q3'23	Q4'23	Q1'24	Q2'24
Data Center Refresh (DC5)	Acquire and build new Hardware													



Projects that can go live before EMS Go-Live

Projects that can go live along with the EMS

Projects that can go live after EMS go-live



What are CMM and Settlements & Billing

- Credit Monitoring and Management (CMM)
 - Calculate credit limit & collateral requirement for participation in the market
 - Minimize losses to be uplifted if counterparty fails to pay
- Settlements & Billing
 - Settlement for activity in ERCOT Markets
 - Complex calculations to determine charges and payments to Qualified Scheduling Entity (QSE) and Congestion Revenue Right (CRR) Account Holders

Current Challenges

- Resource utilization implementing priority efforts:
 - Fast Frequency Response (FFR) Service
 - Distribution Generation Resources (DGR)
 - Securitization
 - Load Resource participation in Non-Spin
 - ERCOT Contingency Reserve Service (ECRS)
- Resource constraints being addressed with additional hires in IT (2), Treasury (1) and Commercial Operations (1)
 - Hiring challenges
 - Lead time of 6 months to be fully productive

Questions

