

Grid Mod and an Advanced Distribution Management System

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Agenda



Grid Modernization

Changing Environment
Existing Investments
Next Steps
Progress



Preparations for Grid Modernization

Progress
Timeline
Delay Impacts



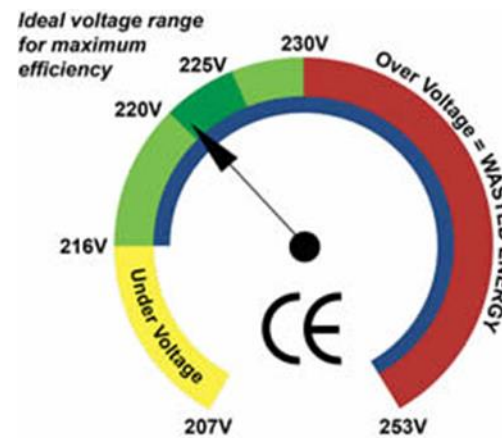
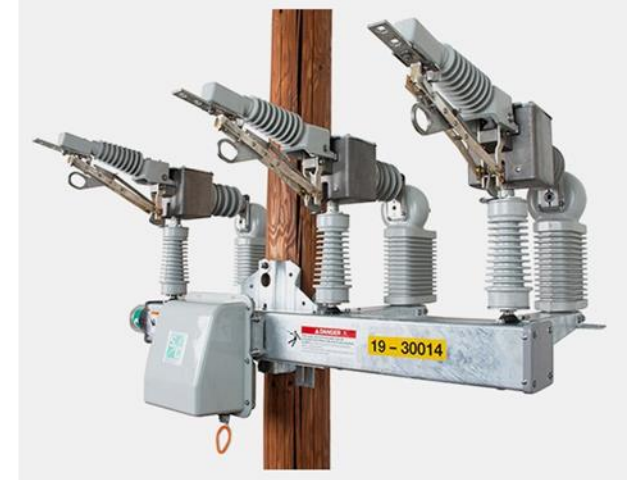
Advanced Distribution Management System

What it is
What it does
Why it is important



Options

Key Areas of Support & Expectations



Grid Modernization - Existing Investments



MODERN ENERGY
MANAGEMENT SYSTEM
(TRANSMISSION +
GENERATION EMS)



ADVANCED METERS
– 60% DEPLOYED



OMS & AMI INTEGRATION
- NOW IN SERVICE



GIS MODERNIZATION
DESTINATION 1

- ESRI WEB APP (GISMO) GO LIVE IN Q4 2023,
- FULL CUT OVER MARCH OF 2024

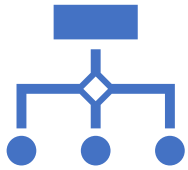


ENERGY IMBALANCE
MARKET IMPLEMENTATION



DATA ANALYTICS

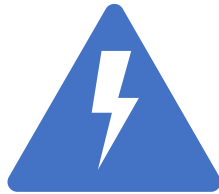
Grid Modernization – Next Steps



GIS Modernization Destination 2

Build out Transmission and Substation Model

(Separate UTSC presentation coming)



Distribution Automation

Communication - Verizon LTE Private Network

Smart Remote Operated Reclosers - Switches

Remote Operated Capacitors - Voltage / Reactive Power (VAR) control

Telemetry to ATS and Secondary Network Protectors



Modern Distribution Advanced Management System

Outage Management

DSCADA

Advanced Distribution Management

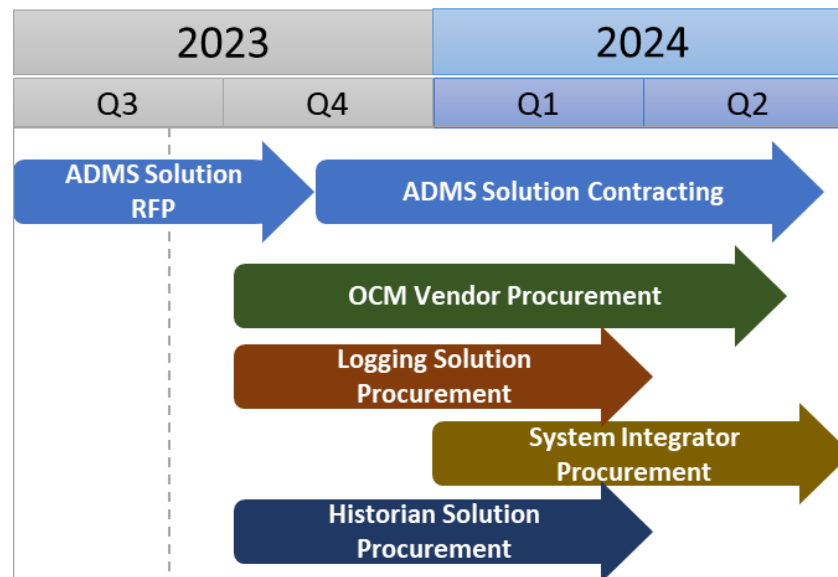
Progress, Timeline & Impacts

Progress

- Specifications & purchase agreements in place (reclosers, capacitors)
- Trusted Advisor, Grid Bright
 - Strategy, Vision, Roadmap
 - Use Cases, Requirements
 - RFP Procurement (Evaluation/Selection) → **RFP Published** ✓
- RFP for OCM/Testing/Training ready to advertise

Contracts – no signatures until governance approval

Near-Term Timeline



** Southwest Power Pool initiative may create delays [key planning assumption]*

Advanced Distribution Management System (ADMS)



Supervisory
Control And
Data
Acquisition
(SCADA)



Advanced
Outage
Management
System
(OMS)



Distribution
Management
System
(DMS)

Advanced OMS



Greater Scalability

- Addition of Transmission system to OMS
- Improved automated metrics calculations



Deeper Advanced Meter Integration

- Improved filtering of planned work
- Visibility of voltage and partial outage issues



Enhanced Failure Tracking

- Broader support for asset data
- Improved reporting

ADMS Value Proposition, Customers

How are Customers impacted?



Near-real-time view of outage scope, duration and precise location



Reduced Outage Durations

- Precision dispatch of restoration crews
- Fault Location Isolation System Restoration



Improved Power Quality

- Precise monitoring of voltage, frequency and phase

ADMS Value Proposition, TPWR

How is Tacoma Power impacted?



Secondary Network Visibility

- Network Protector State
- Cable flows



Distribution Status & Operability

- Switch states
- Feeder loading for transfers



Voltage Control

- Automated Pole Top Capacitor Switching

ADMS Value Proposition, TPWR

How is Tacoma Power impacted?



Switching Analysis

- Dispatcher review w/o system planning modeling
- Distribution Operator training simulator



Distribution Load Shedding

- More refined capabilities, minimize impacts to critical loads

Program Phases, Associated Tools



Phase 0 – OMS/ADMS Simulator

9 months



Phase 1 – OMS replacement / Switching and Logging Tool

18 months



Phase 2 – Distribution SCADA

15 months



Phase 3 – Distribution Management System (DMS) and Advanced Tools

12 months



Phase 4 – Distributed Energy Resource Management System (DERMS) ADMS model and associated DER platforms

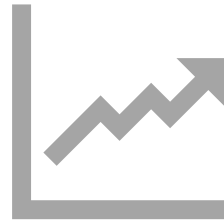
Status, Business Case Development



Complexity of the Business Case

Standard Business Case

Advanced Decision-Making Tool

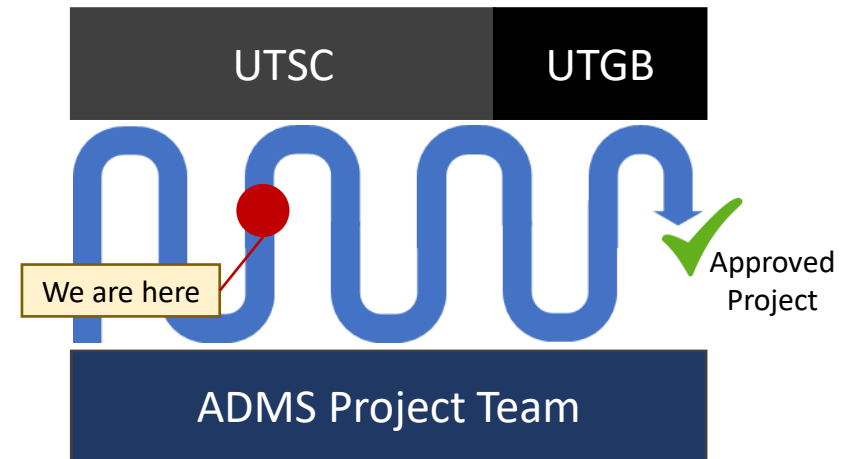


Preliminary Net Present Value Analysis

7 year

15 year

20 year



Tangible Cost Benefits

- Outage Management System hardening
- Benefits of a modern logging & switching tool with workflow features
- Advanced distribution SCADA alarms
- Distribution State Estimation
- Fault Location Isolation and System Restoration capabilities (FLISR)

Better Customer Service
Now & Preparation for
an Electrification Future

Appendix Slide

Appendix: Business Case. More Details

- Numerous Decisions, Alternatives, Considerations
- Scored, weighted
- Model recommends comprehensive

Strategy Themes	Description	CUMULATIVE SCORING ACROSS ALL DECISION POINTS					
		OVERALL RICE (higher is better)	OVERALL WSJF (higher is better)	COMBINED PRIORITY SCORES (higher is better)	OVERALL Value (higher is better)	OVERALL Cost (lower is better)	OVERALL Confidence (higher is better)
Comprehensive ADMS modernization	<ul style="list-style-type: none"> Fully integrated ADMS solution Advanced DMS capabilities Best of breed Historian Best of breed Logging/Switching (for Dist. & Trans.) Highly integrated with other systems Fully deployed Distribution Automation 	36.0	22.9	58.9	605.0	182.7	179.3
Moderate ADMS modernization	<ul style="list-style-type: none"> Fully integrated ADMS solution Advanced DMS capabilities Address existing Historian ADMS Logging/Switching (for Dist.) Highly integrated with other systems Distribution Automation focused on critical sensing Custom Logging/Switching for EMS 	24.1	14.4	38.6	309.2	149.4	70.1
Limited ADMS modernization	<ul style="list-style-type: none"> Deployed DMS solution (w/Logging/Switching) Address existing Historian Key integrations with other systems Distribution Automation focused on critical sensing Custom Logging/Switching for EMS 	23.3	13.2	36.5	266.05	136.6	75.1
Simple OMS upgrade	<ul style="list-style-type: none"> Upgrade existing OMS in place Address existing Historian Key integrations with other systems Custom Logging/Switching for EMS 	15.9	9.0	24.9	164.6	144.4	96.3
Other alternatives	<ul style="list-style-type: none"> Build our own 	7.5	4.1	11.6	98.8	101.4	49.7