

2017 Summer Preparedness TEP & UNS Electric

MIKE SHEEHAN

**SR. DIRECTOR OF
RESOURCE PLANNING**



SAM RUGEL

**DIRECTOR OF SYSTEM
CONTROL AND RELIABILITY**











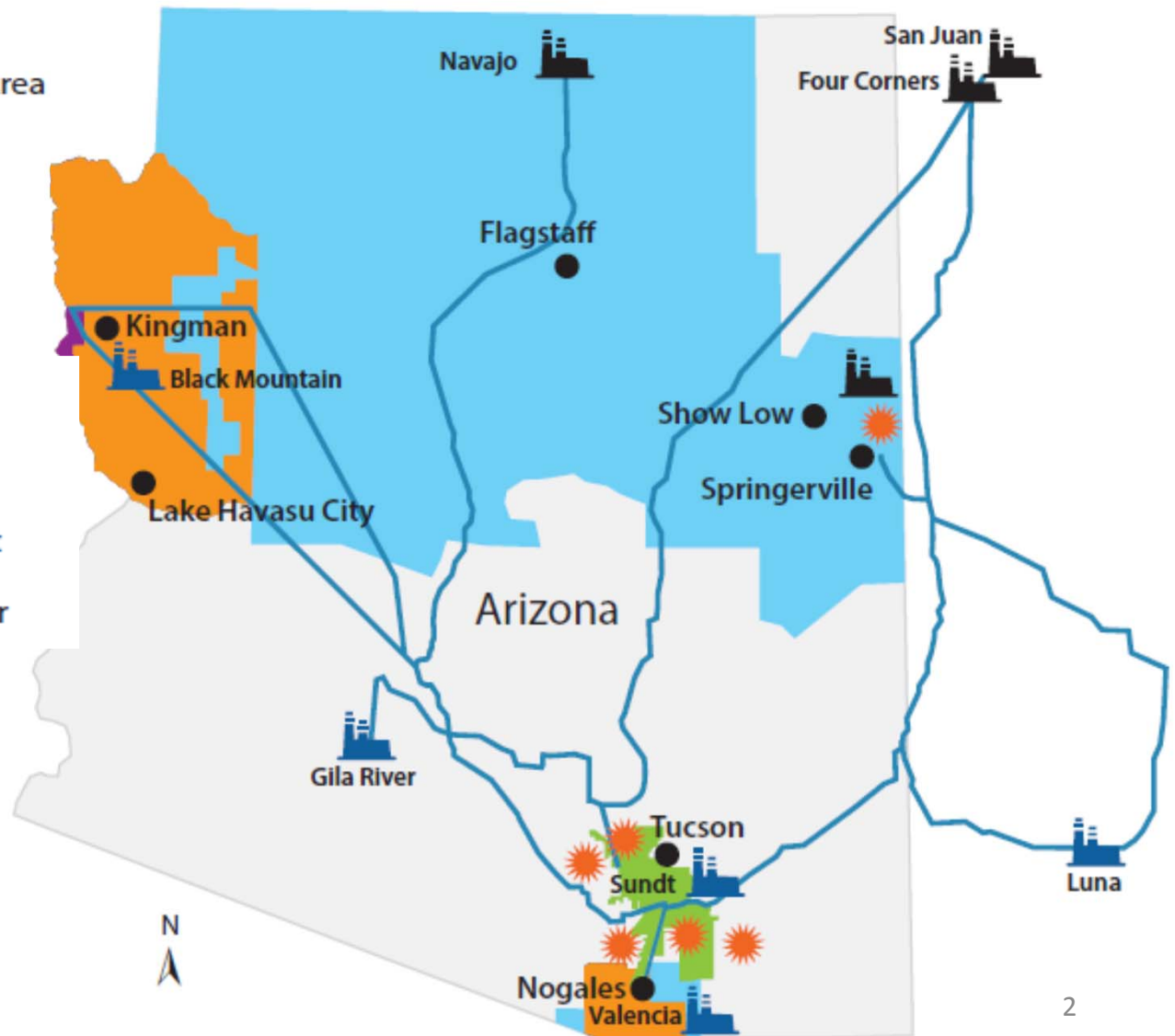
APRIL 25, 2017

TEP
Tucson Electric Power

UniSourceEnergy
SERVICES

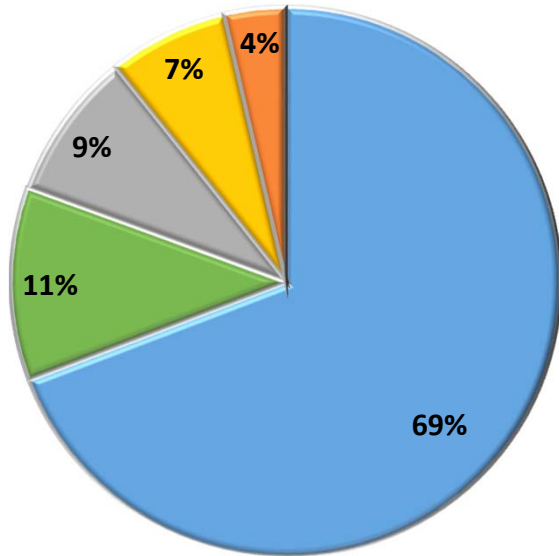
Utility Service Areas

-  Tucson Electric Power Service Area
-  UNS Gas Service Area
-  UNS Electric Service Area
-  UNS Gas & UNS Electric
-  Transmission Line
-  Coal-Fired Power Plant
-  Natural Gas-Fired Power Plant
-  Community-Scale Solar Power

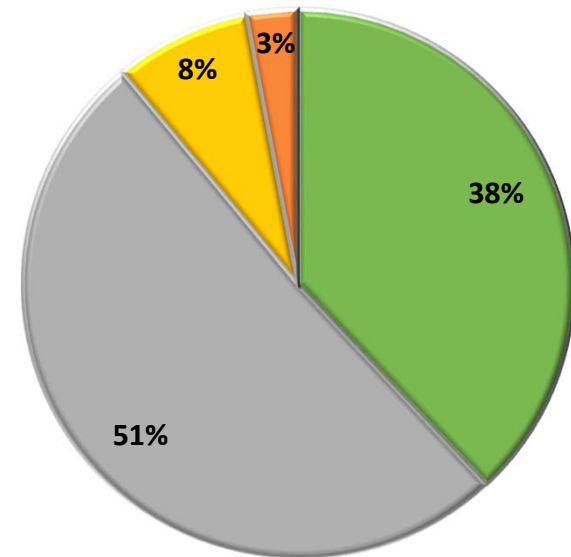


2017 Energy Mix

TEP
2017 Energy Portfolio

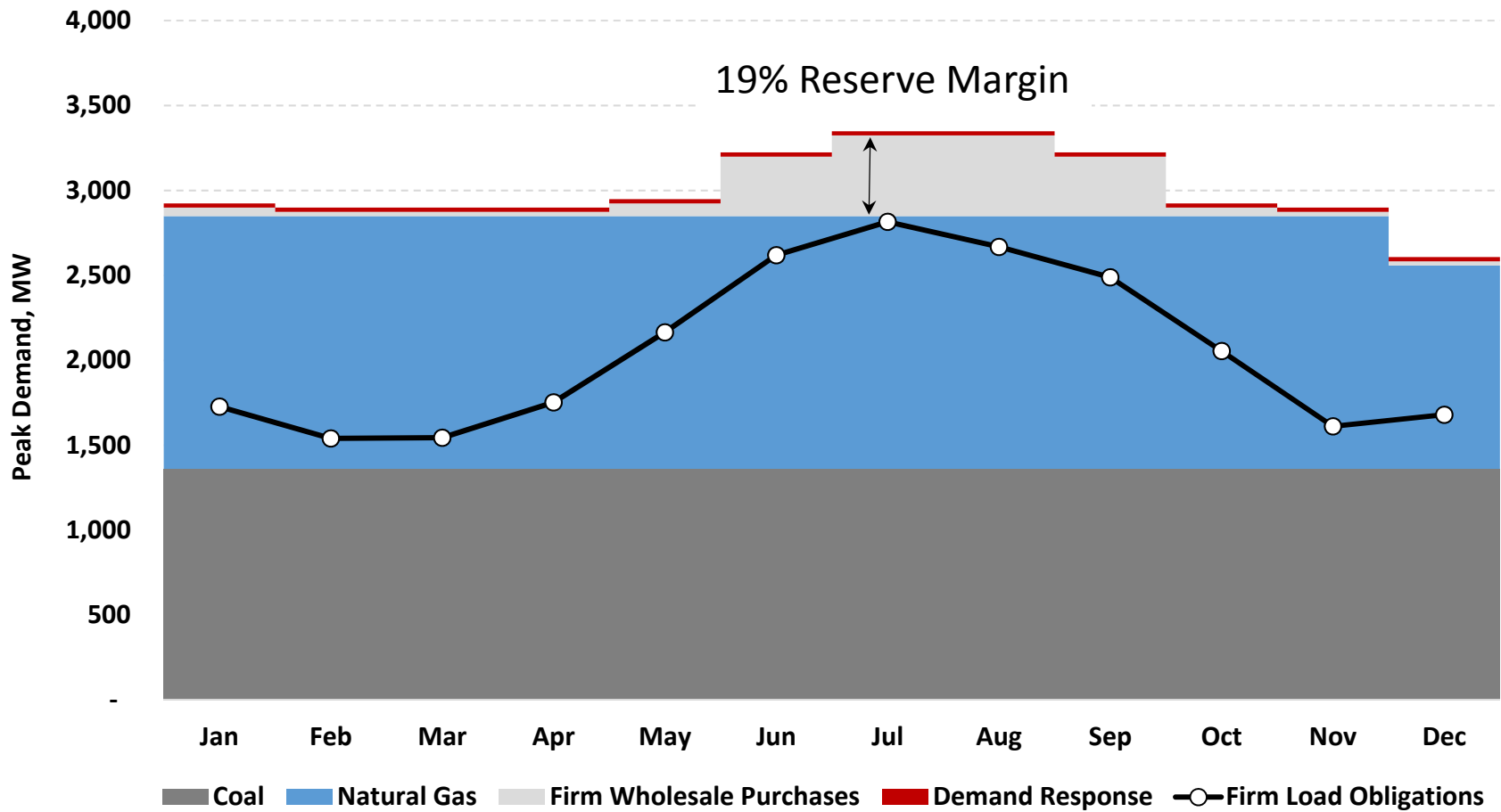


UNS Electric
2017 Energy Portfolio



- Coal
- Natural Gas
- Market Purchases
- Utility Scale Renewables
- Distributed Generation

2017 TEP & UNSE Loads and Resources



Future Reliability Projects



Energy Storage Projects

- 22 MW Lithium Ion Battery Storage
- In-Service 2017
- 50 - 100 MW of Energy Storage by 2020



Arizona Natural Gas Storage

- Support the expansion of solar in Arizona
- Real-time natural gas deliveries to support regional NGCC generation
- In-Service 2020



Nogales DC Tie

- 150 MW HVDC Tie with expansion to 300 MW
- Supports reliability and access to markets
- In-Service mid-2019



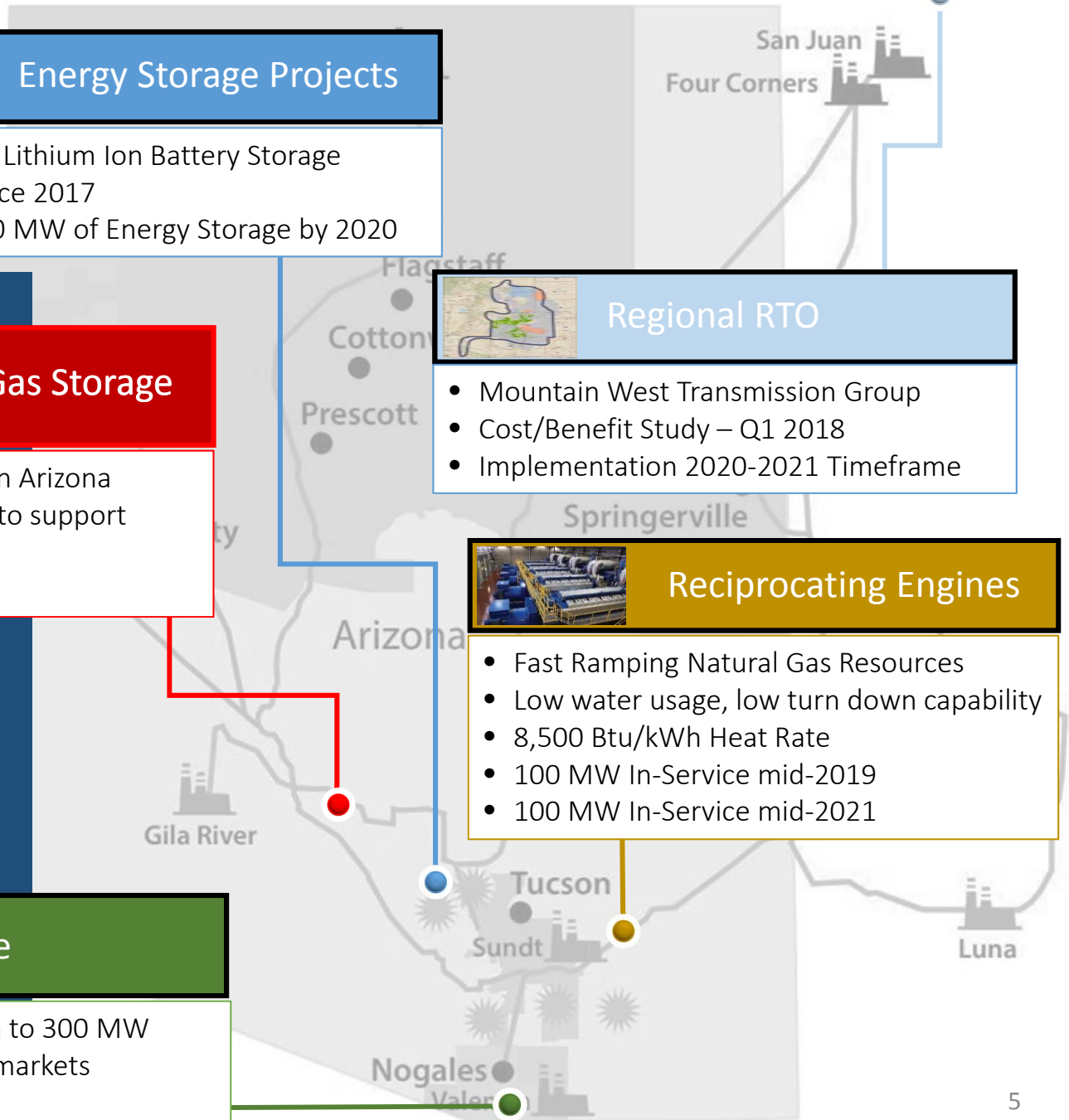
Regional RTO

- Mountain West Transmission Group
- Cost/Benefit Study – Q1 2018
- Implementation 2020-2021 Timeframe



Reciprocating Engines

- Fast Ramping Natural Gas Resources
- Low water usage, low turn down capability
- 8,500 Btu/kWh Heat Rate
- 100 MW In-Service mid-2019
- 100 MW In-Service mid-2021



TEP & UNS Electric Operations

Notable T&D Projects

- Transformer Capacity Replacements 237 MW
- Transmission Line Capacity Upgrades 270 MW
- Communication/Automation Upgrades



NERC Real-Time Contingency Analysis

- West Wide System Model
- Tie Open Load Shed



Renewable Energy Integration

Renewable Project Additions

- Red Horse III – 30 MW
- Ft. Huachuca – 18 MW

Battery Storage Projects

- DMP – 10 MW / 2.5MWh
- Iron Horse – 10 MW / 2.5 MWh
- U of A Science Tech Park – 2 MW

Balancing Authority (BA)

- Load following/regulation
- Disturbance recovery
- Frequency response

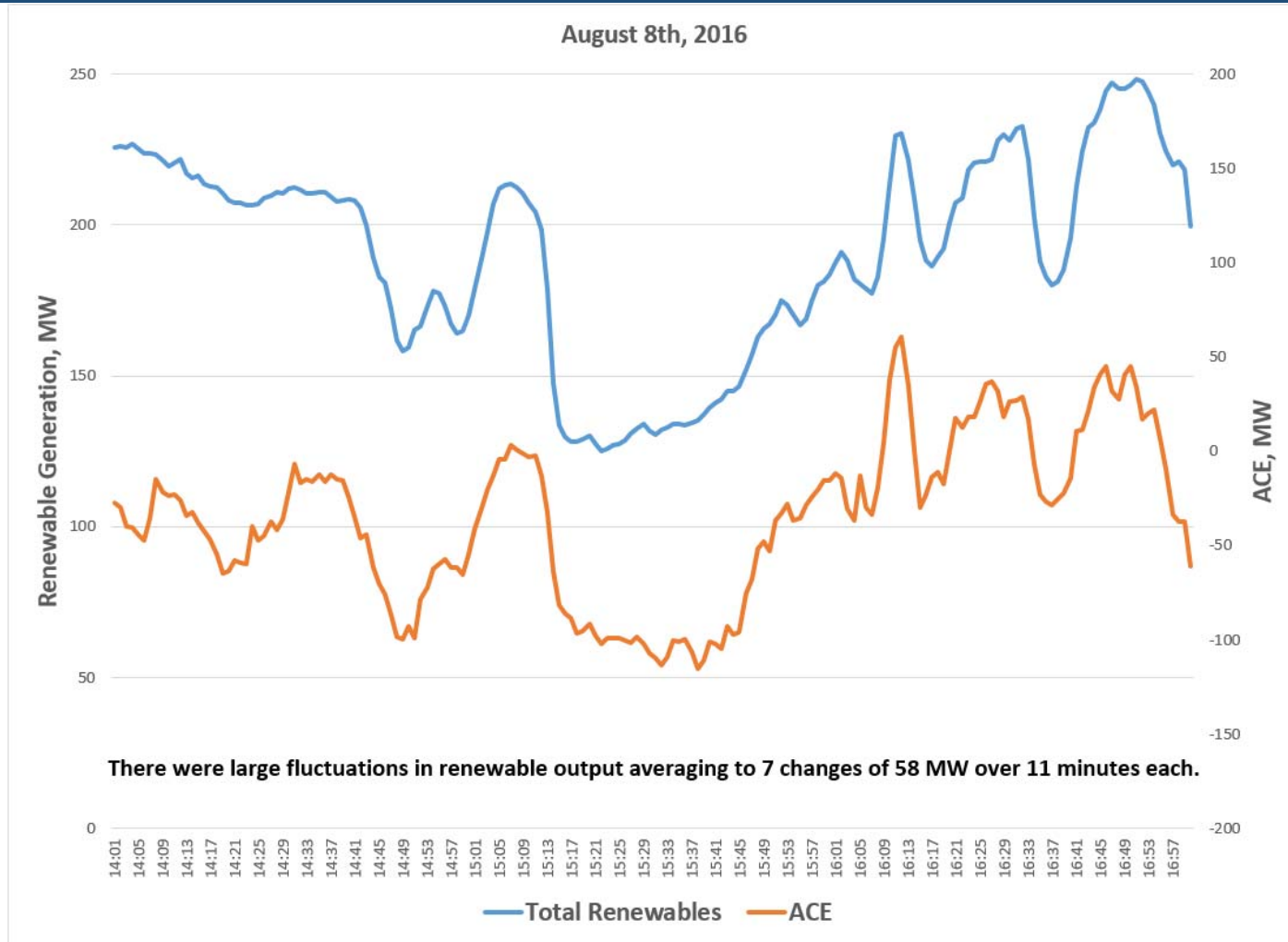


Red Horse III Solar Project



DMP Battery Storage Site

August 8, 2016 Ramps



Outage Response

- **On-Hand Emergency Equipment (TEP and UNS Electric)**
 - Emergency Towers – 23 various sizes and configurations
 - Spare poles – 70+
 - Mobile transformers - 4
 - Spare substation transformers – 7 various capacity and voltages
- **Recent Outage in Nogales (UNS Electric)**
 - Deployed mobile transformer



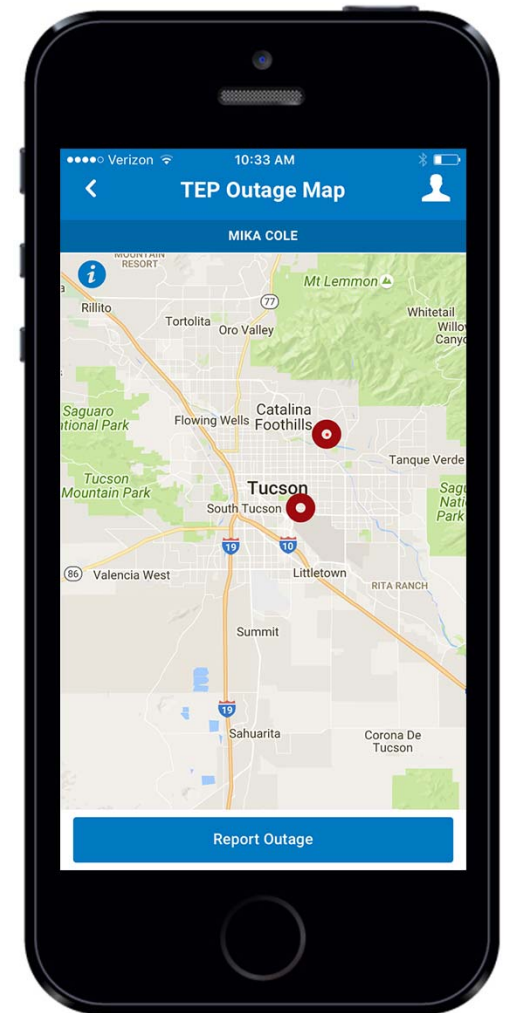
Emergency Preparation

- Regional black start drills between Balancing Authorities and the Reliability Coordinator
- Verification of TEP's Backup Control Center (BCC)
- Daily conference call between Reliability Coordinator and Balancing Authority operators
- During summer peak AZ entities anticipate holding weekly reliability call
- Weekly updates from Transmission Construction & Maintenance regarding wildfires
- Annual Storm Preparation meeting with all departments
- First Responders/Utility Threat Assessment Group quarterly meetings



Multiple Outreach Platforms

- Real-time outage map (online and mobile app)
- Automated customer notification on restoration progress
- Call center staff available 24x7
- Customer Mobile App
- Active Facebook and Twitter presence
- Redesigned websites
- Immediate customer notification
- Advance notice of scheduled curtailments



Q & A

