SOUTHERN CALIFORNIA EDISON®
Energy for What's Ahead®

SCE's Field Area Network

WECC – TCOMS

03/13/2025

Agenda

- Introductions
- FAN Project Overview
- RAN Sites
- Coverage Objective
- Summary
- Questions

Field Area Network Project

A Field Area Network (FAN) is a wireless network designed to connect various devices within an electric utility's operational field. This includes smart meters, distribution assets, control and protection equipment, and remote substation equipment.

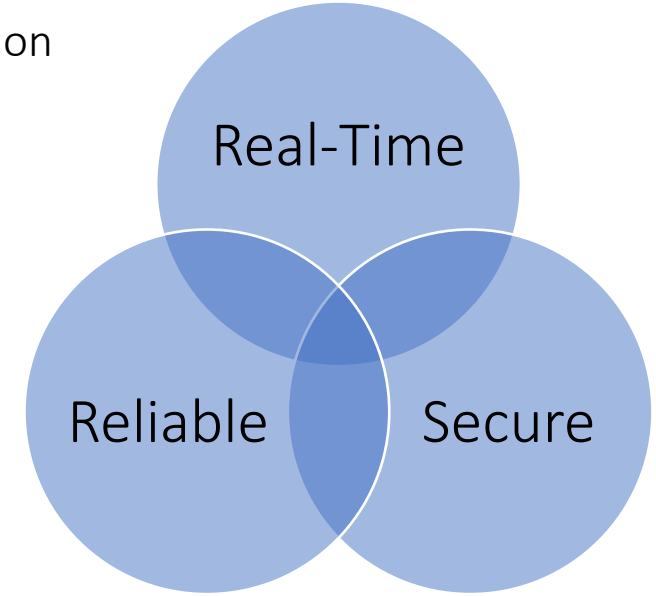
Background

- The current SCE Field Area Network (NetComm Network) is nearing the end of its lifecycle and fails to meet the requirements for Grid Modernization and Grid Resiliency
- The CPUC approved funding for a modern, secure, wireless communications solution in the 2018 GRC decision to address these emerging business needs

Overview – FAN Objective & Scope

Project Mission Statement:

Replace NetComm with a secure, high-capability, private wireless Field Area Network solution



Project Scope:

Replace NetComm

- Network coverage based on Distribution & Sub-Transmission footprint
- 31K+ NetComm Distribution Automation Devices

High-Capability

- Network designed for sub-second round trip latency
- High-Bandwidth to support Grid IT/OT data intensive use-cases
- Peer-to-Peer communication and edge intelligence to support decentralized controls
- Scalability within coverage areas to support Grid management roadmap use-cases

Secure

- Meet the Cybersecurity requirements for current and roadmap use-cases

Mapping SCE's Field Area Network

Purpose

Replace legacy wireless field network (NetComm) with solution that

- Satisfies **grid modernization** requirements
- Improves field communication **security**
- Scales to meet **future** utility use-cases

Scope

Distribution Automation

DERs <10MW

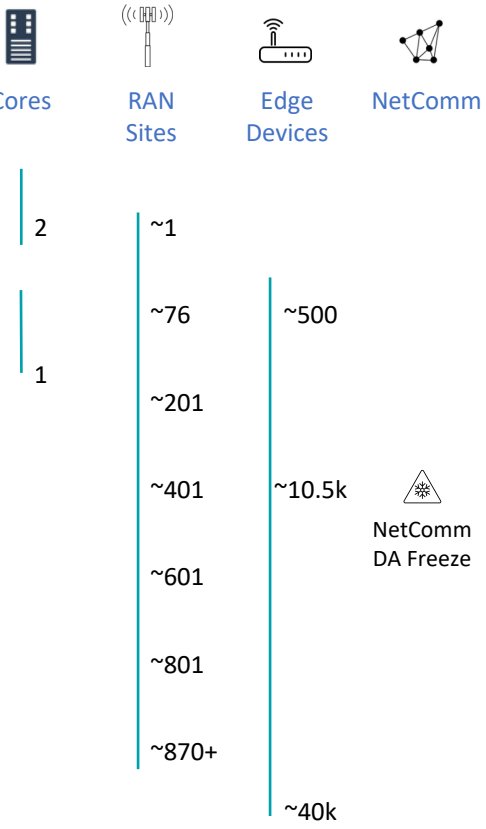
Fault Location, Isolation, and Service Restoration (FLISR)

Device Management

Performance

	NetComm	FAN
Latency	20 –120 seconds	< 1 second
Throughput	19kbps - 115kbps	144kbps – 1Mbps
Availability	95%	99.5%
Message Priority	Limited	QoS
Peer-to-Peer	Limited	**100ms - 1 sec**
Mobility	Not Available	Limited
Failover	Mesh Network	Public Carrier

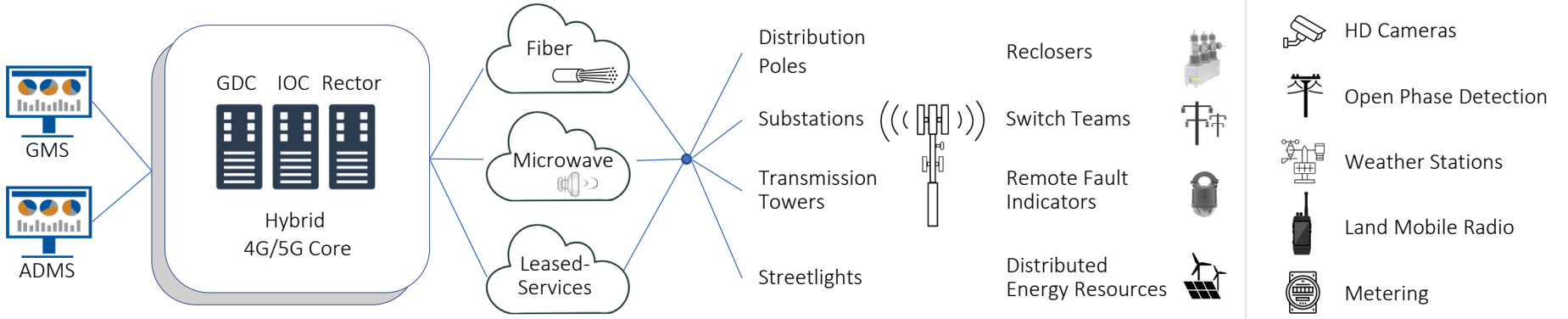
Timeline



Technology

- **4G / 5G** technology stack
- **5G-capable** for initial SCE requirements and **4G roaming**
- 15 county-based **3.5GHz spectrum** licenses (Band 48)
- 3GPP standard **interoperable** with large supplier ecosystem
- Network optimized for **fixed end-point** use cases
- **Foundational** to enable future field data and voice capabilities

Architecture



Applications

Core
SCE Data Centers

WAN
SCE Backbone Network

RAN
Radio Access Network

Edge
Operational Technology

Potential Next Phases
Require Additional Investment

- HD Cameras
- Open Phase Detection
- Weather Stations
- Land Mobile Radio
- Metering

Project Outcomes

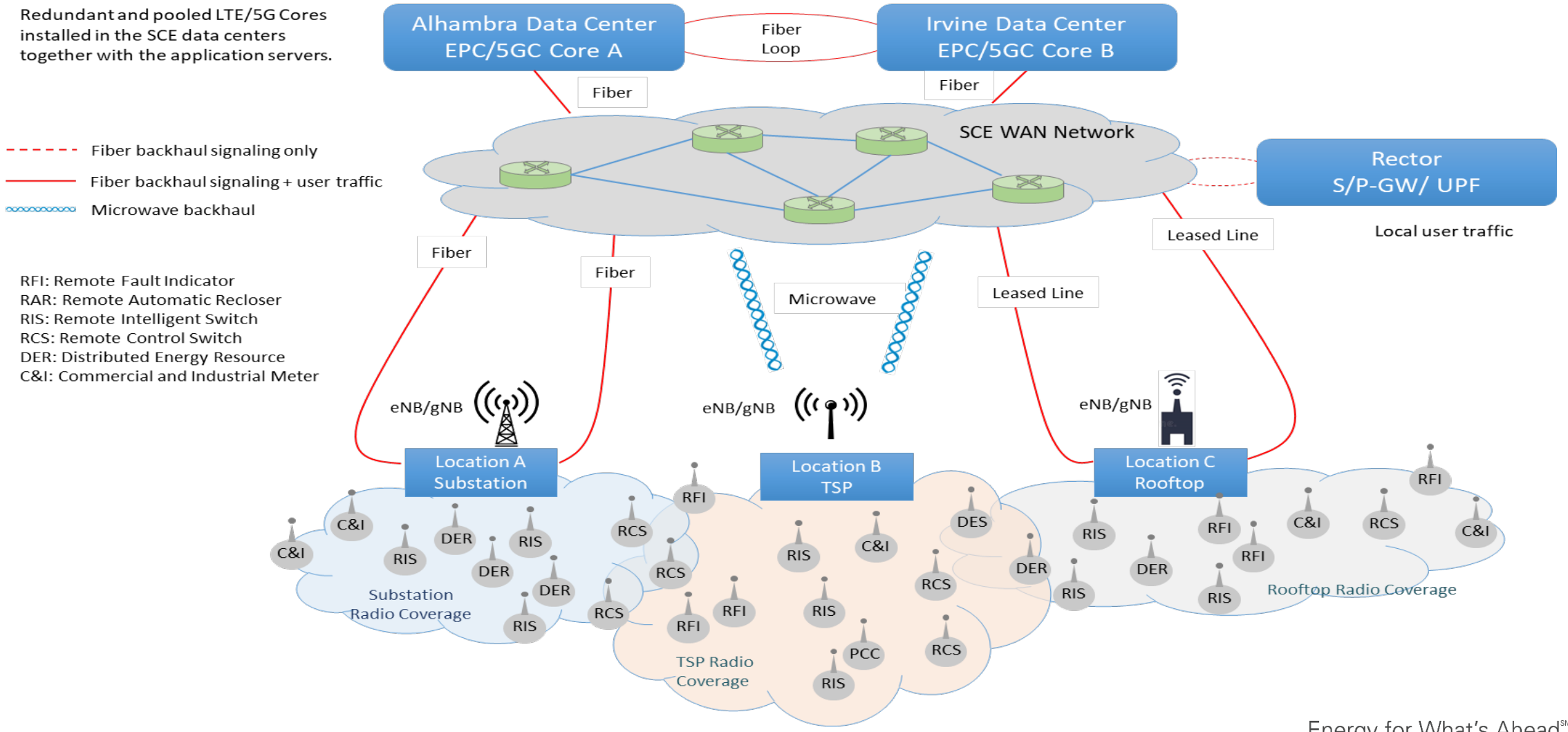
- ~870 RAN sites installed
- ~31,500 DA devices migrated from NetComm
- DER integration
- Scalable and secure communications platform
- Integrated solution for AMI refresh

Energy for What's Ahead℠

June 2023

Field Area Network Architecture

Redundant and pooled LTE/5G Cores installed in the SCE data centers together with the application servers.



Our Journey: Design to Go-Live and Beyond

The road from design to deployment has been filled with challenges and triumphs

Over the past four years, we've collaborated across departments and overcome technical hurdles to bring this groundbreaking technology to life!

2020

- Business requirements & system design
- Business case approval
- Spectrum purchase

2021

- RFP initiation and selection testing
- RF design process
- Fielding RAN sites
- Solution testing

2022

- Vendor selection
- Continued testing
- Contract finalization

2023

- Initial designs approved
- Finished ATP testing
- Architecture design
- First 5G call over the core at Alhambra alpha site

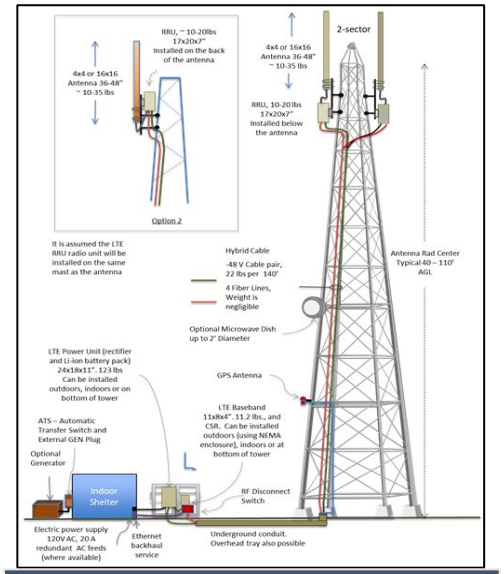
2024

- Cyber remediation
- Network Core live 9/24
- RAN cell tower build in full swing
- Edge radio and antenna deployment gathering pace

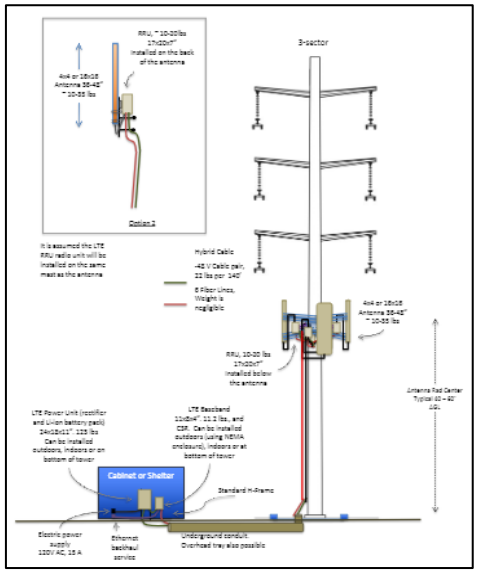
Radio Access Network (RAN) Sites

What are we Building?

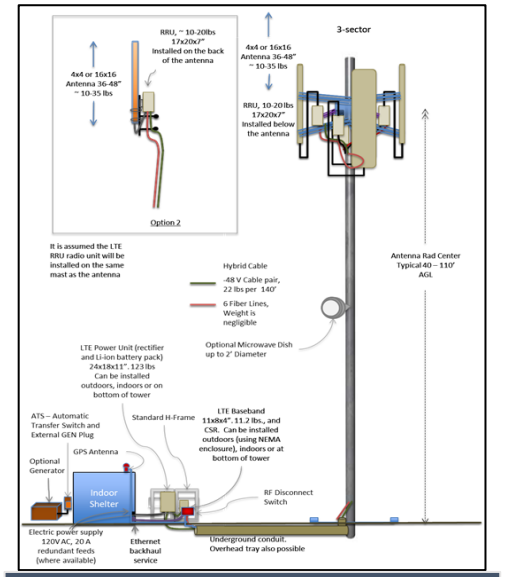
- Approximately 870 Radio Access Network (RAN) sites
- Each RAN site requires site selection, civil/structure design, environmental review, and permitting prior to construction and network installation



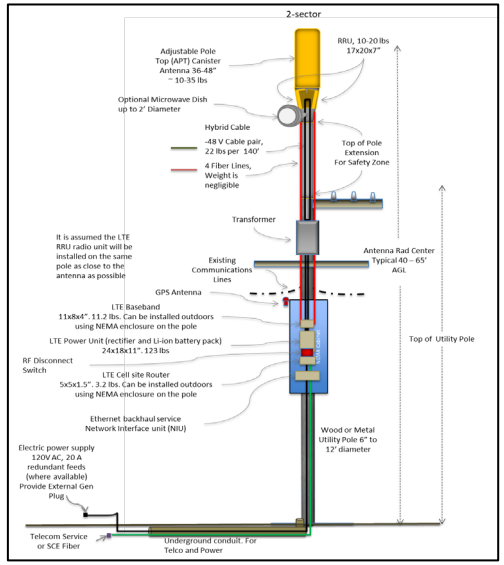
Existing Substation Structure / Existing Communication Tower



Transmission Structure



New Substation Antenna Structure

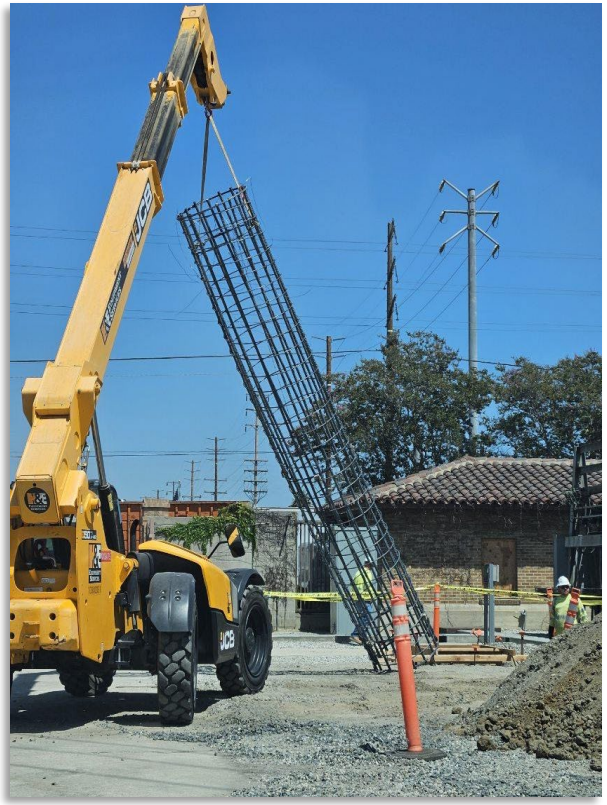


Distribution Structure

RAN Site Construction

We’re building a network of communication towers to relay data between grid devices and the FAN core

Drilling

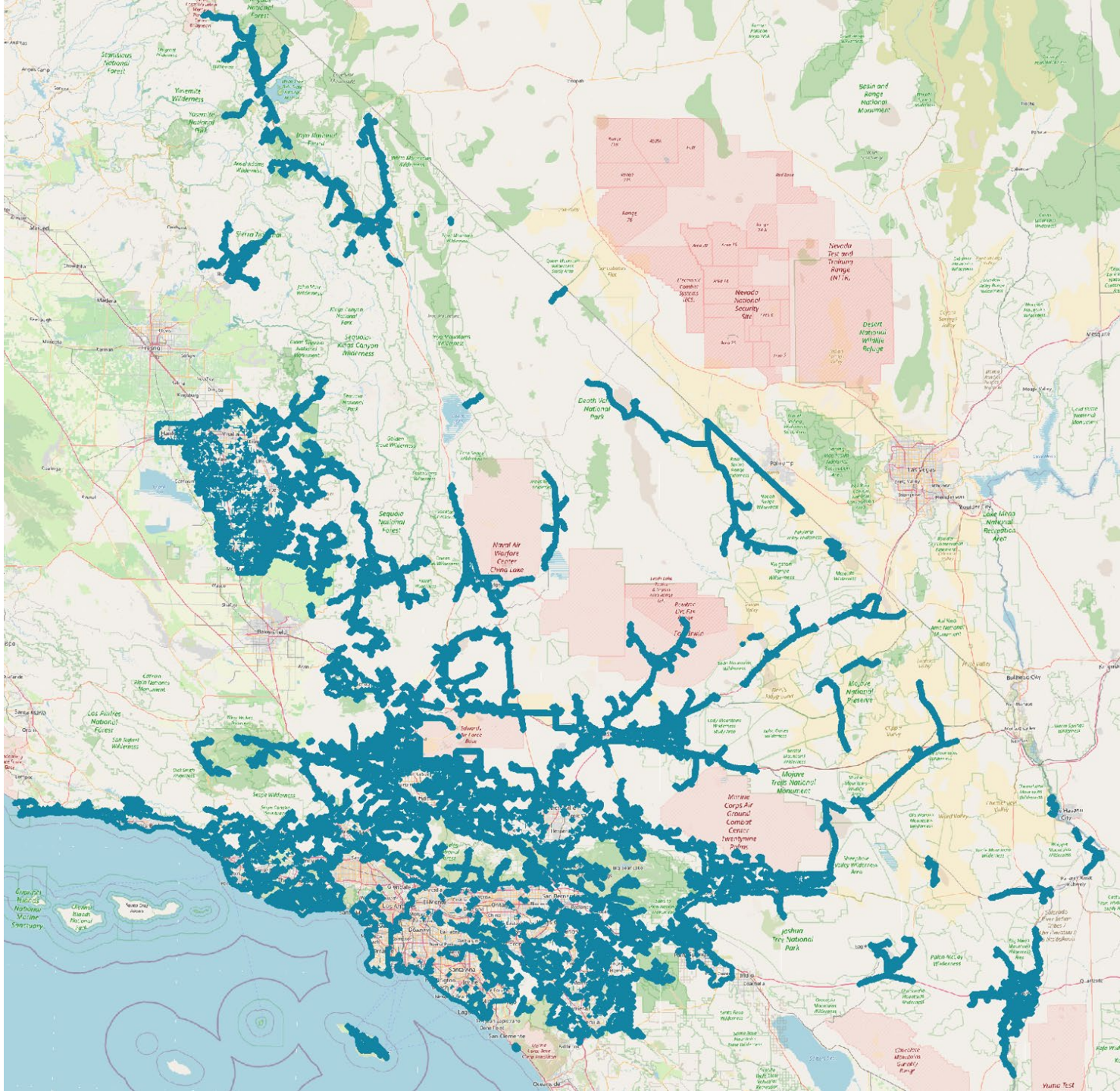


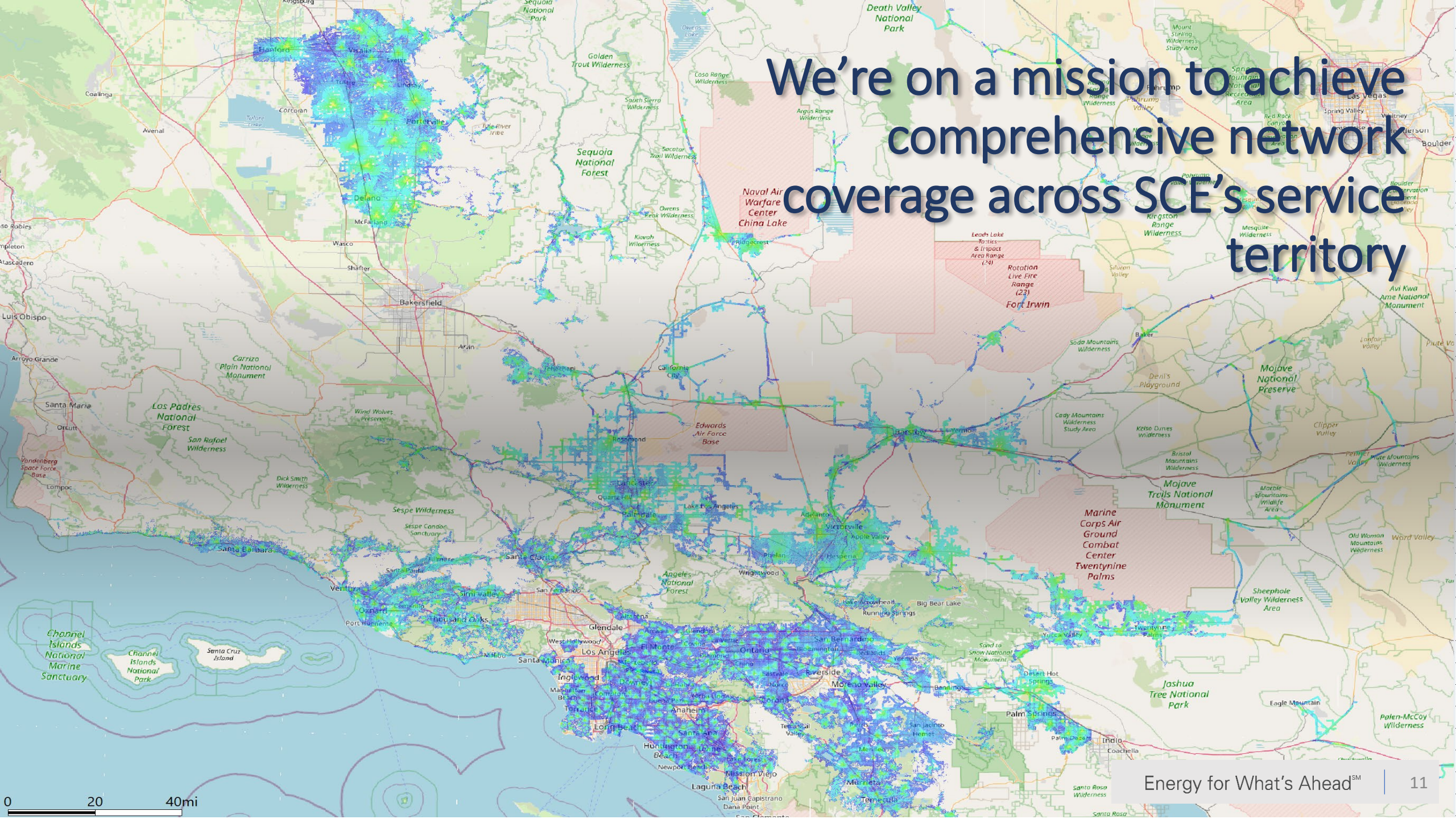
Steel Cage Install

Monopole Install

Completed cell tower
Los Alamitos Sub

Coverage Objective




We’re on a mission to achieve comprehensive network coverage across SCE’s service territory
0
20
40mi

Edge Radio Deployment

We’re deploying modular communication devices (radios) that communicate directly with field sensors and equipment—enabling faster, more responsive interactions between our grid management systems and the devices they control

Summing Up: Next-Level Grid Communications

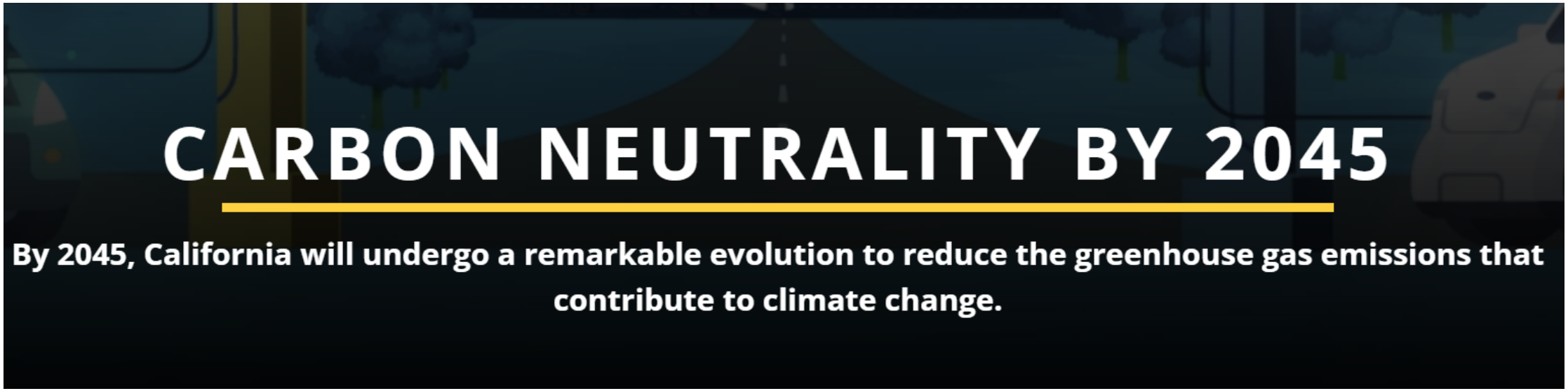
The FAN represents more than just an upgrade—it's a fundamental shift in grid communication. A world-first for a utility company. With low-latency enabled by 5G technology, this high-bandwidth communications highway translates to savings on inspections, remote problem detection, and fewer service disruptions.

- **Real-Time Monitoring:** Our grid will be equipped with sensors and communication devices that instantly send data to core control centers. This means we'll always know what's happening across the entire grid.
- **Coordination and Communication:** The FAN enhances coordination between our field crews and control centers. Real-time communication allows us to identify and address potential issues early.
- **Predictive Maintenance:** By analyzing the real-time FAN data, we can predict when maintenance is needed before something breaks down.

Pathway 2045

The FAN isn't just about today; it's about laying the groundwork for SCE's ambitious Pathway 2045 vision for a cleaner energy future in Southern California.

Serving as the backbone of this vision, the FAN will be instrumental in integrating renewable energy sources, smart grid technology, and more efficient energy storage solutions. Envision a future where renewable energy generation seamlessly integrates into the grid, where smart devices optimize energy usage in real-time, and where energy storage systems smooth out fluctuations in supply and demand. This is the potential unlocked by the FAN.



Why the FAN Matters for Business & Residential Customers

FAN infrastructure will enable the ability to better service residential and commercial customers through improved communications to grid controls which will:

1. **Improve Reliability:** Detect and resolve issues in real-time, often before power interruptions occur, minimizing the number of customers affected by outages.
2. **Prevent Widespread Outages:** Quickly isolate faults to prevent small problems from escalating into larger outages and reduce the frequency of Public Safety Power Shutoffs (PSPS), particularly in wildfire-prone areas.
3. **Minimize Outage Impact:** Utilize circuit segmentation to limit the size and scope of outages, ensuring faster service restoration and reducing downtime for customers.
4. **Enhance Grid Intelligence:** Proactively identify and address potential issues, preventing disruptions before they occur.
5. **Strengthen Cybersecurity:** Implement built-in protections to safeguard the grid from potential attacks, ensuring the reliability and safety of services.

Questions?