

# Liberty Utilities-Empire District Infrastructure Modernization

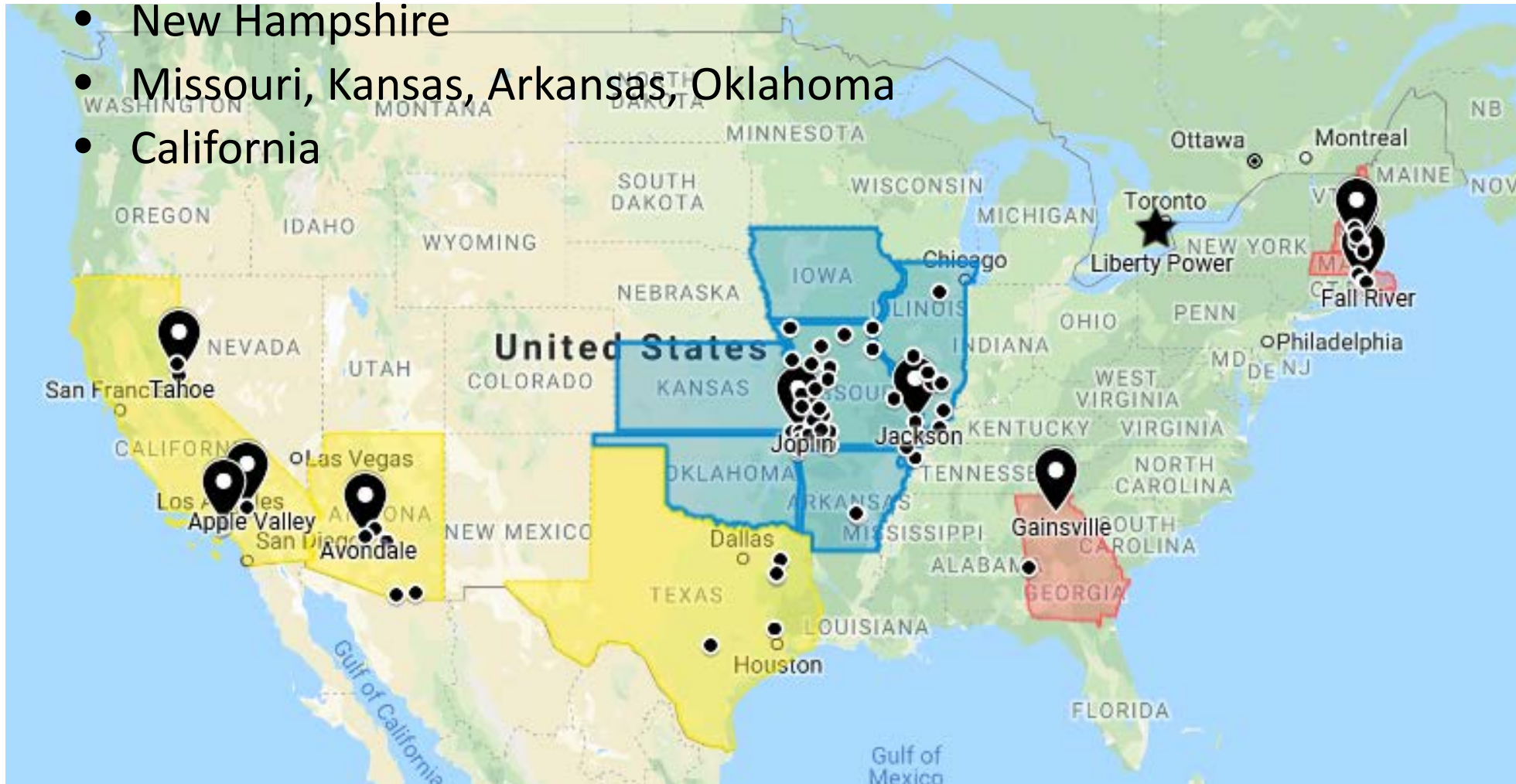


November 2019

# Liberty Utilities Electric Facilities

- Three Electric Operating Regions

- New Hampshire
- Missouri, Kansas, Arkansas, Oklahoma
- California



# Operation Toughen-Up Objectives

- In 2010, Liberty-Empire developed a multi-year plan to construct system improvements solely to improve the reliability of the total system
  - Reliability Targets
    - SAIFI 1.0 outages
    - SAIDI 100 minutes
    - No customer with a high level of outages
      - No more than 3 outages/yr.
      - Even areas with smaller populations

# Operation Toughen-Up Progress

- Overall Estimated Cost \$150 Million
  - Current Investment \$63 million
- Oklahoma Customers Represent 3% of Liberty-Empire system
  - \$20M of Current Investment benefits Oklahoma Customers
  - 14% of the Overall Estimated Investment will benefit Oklahoma Customers

# Oklahoma Projects in Operation Toughen-Up

- **Distribution automation for Welch, OK – Completed** - Created an automated backup source to support the Welch & Bluejacket, OK
- **Welch transmission line rebuild – Completed** – Rebuilt 27 miles of Radial Transmission Line that serves as the primary source.
  - New & larger Poles & Conductor
  - Increased Phase Spacing
- **Welch transmission voltage upgrade - Scheduled for 2020** – Increase Transmission Voltage from 34.5 KV to 69 KV
  - Standardize the equipment consistent with predominant Liberty –Empire 69 KV system
  - Reduce loading and increase voltage support
- **Fairland installation of 2 - 69 kV breakers and increase substation transformer size – Completed**
  - Remove 15.5 miles of transmission line exposure from the customers served by the Fairland West and the Fairland Southwest and the Fairland Shell substations.
- **Installation of 69 kV throw-over switching scheme at Commerce Tap – Completed** –
  - Significantly reduced exposure on the transmission system serving the Commerce Community
- **Fairland installation of additional 12 kV breaker and circuit conductor - Completed** –
  - Increased sectionalization of the distribution system
- **Quapaw Substation – Completed** -
  - Two additional distribution breakers were installed along with two miles of multi-circuit distribution line to increase sectionalization of the distribution system
- **Rebuild Line from Fairland to Wyandotte – Under Construction** –
  - Harden distribution system serving Wyandotte

# Increased Sectionalization in Oklahoma

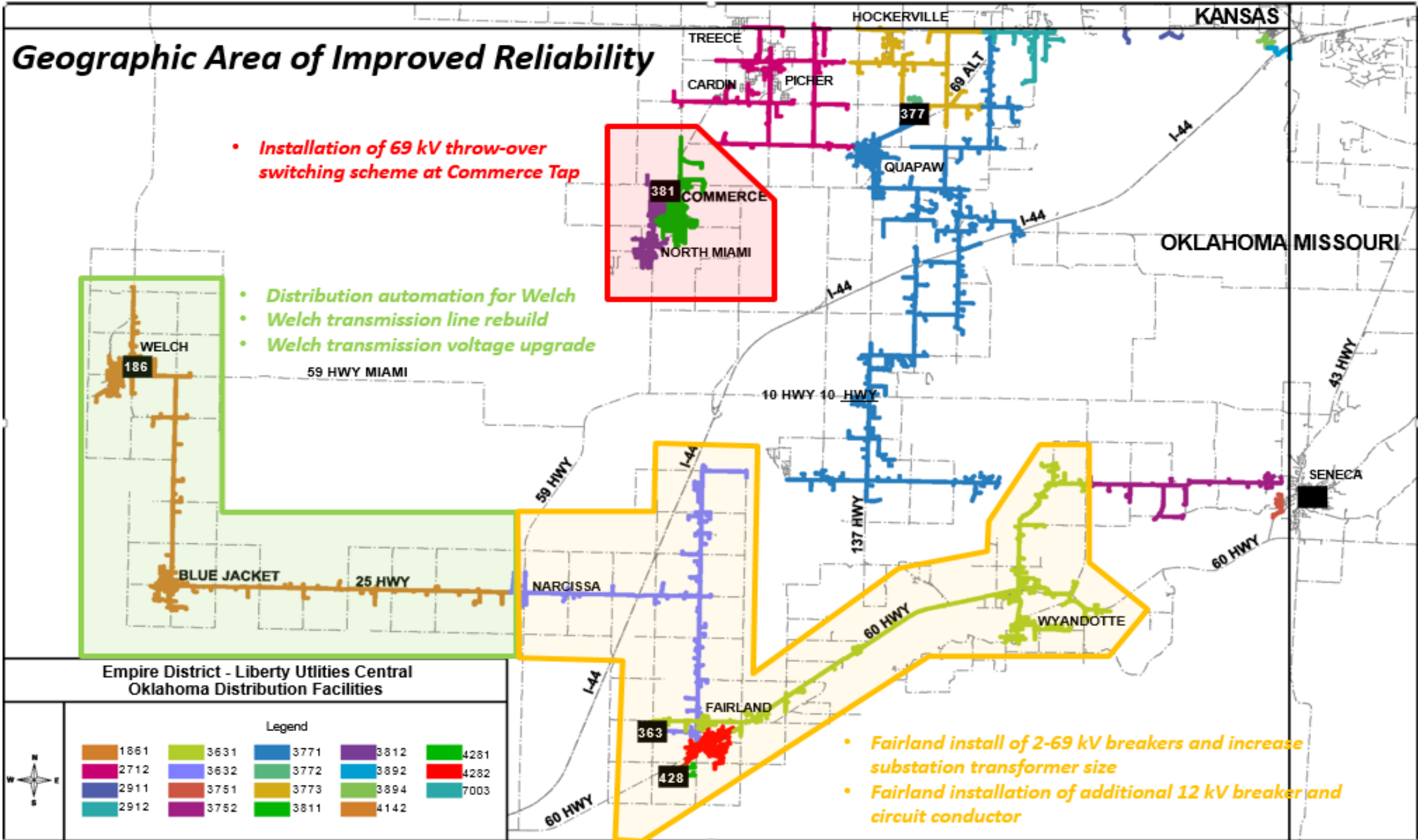
- Liberty-Empire has installed over five hundred (500) sectionalizing devices in the state of Oklahoma.
  - Sectionalization significantly reduces the number of customers impacted by a fault
  - Improves ability to pinpoint problem due to reduced geographic area impacted by fault

# Geographic Area of Improved Reliability

- Installation of 69 kV throw-over switching scheme at Commerce Tap

- Distribution automation for Welch
- Welch transmission line rebuild
- Welch transmission voltage upgrade

- Fairland install of 2-69 kV breakers and increase substation transformer size
- Fairland installation of additional 12 kV breaker and circuit conductor



Empire District - Liberty Utilities Central  
Oklahoma Distribution Facilities

### Legend

|      |      |      |      |      |
|------|------|------|------|------|
| 1861 | 3631 | 3771 | 3812 | 4281 |
| 2712 | 3632 | 3772 | 3892 | 4282 |
| 2911 | 3751 | 3773 | 3894 | 7003 |
| 2912 | 3752 | 3811 | 4142 |      |



# What's Next

- In 2019 Liberty-Empire formed an Innovation Team to take the next step in Grid Modernization
- Focus
  - AMI
  - System Resiliency
  - Micro Grids, Solar
  - Electric Vehicles
  - Smart Communities



# AMI

AMI is a Foundational Building Block for Grid Modernization.  
Scheduled deployment 2021

- **Benefits**

- Reduced O&M (less truck rolls)
- Accurate Meter Reading
- Customer Information improvement
  - Web presentment/customer analytic tools
  - Customer notifications of usage information
  - Customer Equipment Failures
- Power Quality
  - Open Neutrals
  - Voltage Regulation
  - Momentary Outages
- Outages
  - Outage notification
  - Accurate Outage Reporting
- System Planning Data
- Time of Use Metering-Customer Choice

# System Resiliency Strategy

Grid Modernization to improve our customer's quality of life.



## Distribution Automation

Intelligent control of electrical power grid function to enable self healing and other functions

## Increased Visibility and control of systems

Centralization of data and improved information for operational decision making  
AMI  
SCADA

## Opportunity

- *Exceed expectations for reliability and quality of service to customers utilizing new technology providing enhanced economic security and stimulate new development.*

## Enhancements

Resiliency  
Quality  
Safety



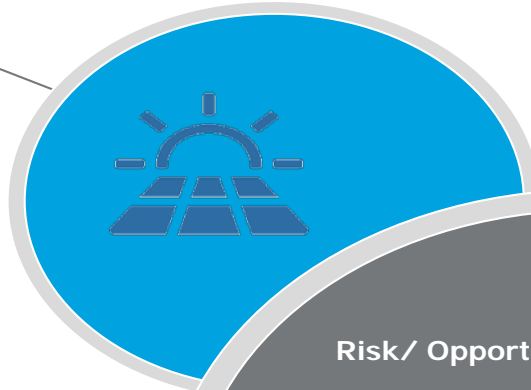
## Security and asset integrity

Physical, cyber and asset security - ensuring existing infrastructure and processes are compliant with internal and external requirements.

# Micro grid Strategy

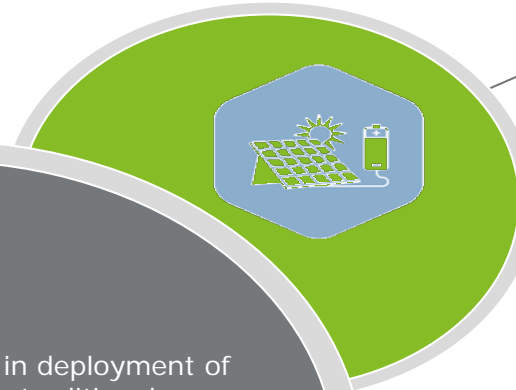
## Utility Scale Solutions

- A goal of our customers are cleaner energy at a lower price
- LU benefits from economies of scale
- LU will direct customers to utility scale solutions which will be able to offer **an economic choice**
- Leverage existing renewables for battery additions



## Non-wires Alternatives

- Micro-grids that are more economical than traditional methods of required investments.
- Renewable, resilient, creative solutions to difficult problems.



## Risk/ Opportunity

The significant increase in deployment of DERs have disrupted the traditional utility business model. Utilities are key in ensuring the effective integration, implementation and operation of Micro grids. LU will pursue several key strategies across all commodities to participate and direct the deployment of micro grids.

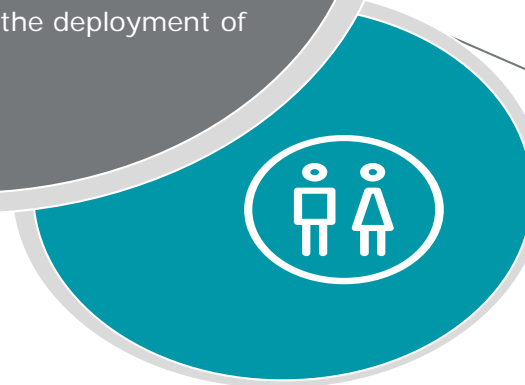


## Premise solutions

- Solar + storage solutions for LU facilities
- Behind the meter ownership for grid management and peak shaving.
- Customers are asking us to provide an alternative to third-party solicitations.
- Potential to lose customers will have significant adverse impact to other customers

## Vulnerable groups

- Low income or other vulnerable groups – programs benefit participants that are otherwise unable to take advantage of renewable energy and added resiliency
- Leverage partnerships with access to **energy grants** to lower our initial cost of capital for these groups.



# Transportation Electrification Strategy

Enable LU to be both the driver and beneficiaries of transportation electrification (TE):



## Modernize the Fleet

Modernize internal fleets and install EVSE for fleet and employee use

## Customer Behaviour

Educating internal and external stakeholders on the benefits of EV to spur adoption



## Opportunity

Electric Vehicles provide a new use for electricity representing an untapped opportunity to grow beneficial load and meet sustainability goals.

According to EEI, there are more than 1.2 million electric vehicles are on the road today in the US with 18.7 million expected by 2030. In addition, annual EV vehicle sales are expected to reach 20% of vehicle sales by 2030.

To support this deployment, EEI estimates approximately 9.6 million charging ports will be needed.

## Managed Charging

Utility owned charging infrastructure (public and home), draft tariffs, incentives for EVSE/vehicle, managed charging, V2G



# Sustainable Smart Communities

Partner with our communities to develop solutions that enable sustainable cities and improve the quality of life of the residents



## Environmental

Develop solutions that help cities reduce their carbon footprint.

## Technology

Leverage cutting edge technology to enable the development of sustainable cities

Recent commission approval of Mercury Vapor replacement with LED is an example



## Opportunity

*Cities are increasingly focused on using data and technology to create efficiencies, improve sustainability and create economic development.*

*As a trusted provider municipal governments are approaching utilities for solutions that align with their goals. LU must be innovative and devise solutions that fit these needs.*

## Community Partnerships

Develop custom solutions with communities based on their goals and focus

