

# Is it Local? Valuing Energy Efficiency in Distribution Planning

Presented at the 2019 ACEEE  
National Conference on Energy as a Resource

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## CEE's nonprofit mission

The Center for Energy and Environment promotes energy efficiency to strengthen the economy while improving the environment.

We provide practical energy solutions for homes, businesses, and communities.

### **WE STAND FOR**

- ✓ Collaboration
- ✓ Community
- ✓ Science
- ✓ Expertise
- ✓ Integrity



## At our core

### **PROGRAMS**



We cut energy waste while improving comfort in homes, commercial buildings, and communities.

### **CONSULTING**



We help building owners and entire communities achieve long-term, energy-saving solutions.

### **RESEARCH**



We identify and explore cost-effective, efficient technologies and ideas through field analysis, modeling, and stakeholder engagement.

### **POLICY**



We strive for high-impact, pragmatic solutions guided by a public interest ethic.

### **LENDING**



We empower people to make upgrades on energy efficiency and comfort in homes or businesses.

## Our 2018 impact



**79 million**  
kWh of Electricity Saved



**11,257**  
Homes and Businesses Served



**\$10.5 million**  
Loaned for Improvements



**75,602,000**  
Pounds of CO<sup>2</sup> Saved



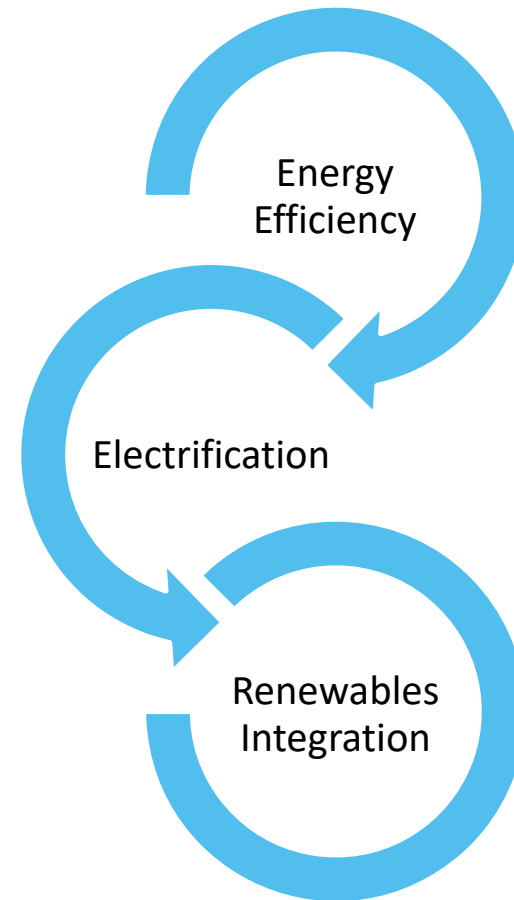
**\$9 million**  
Saved in Energy Costs

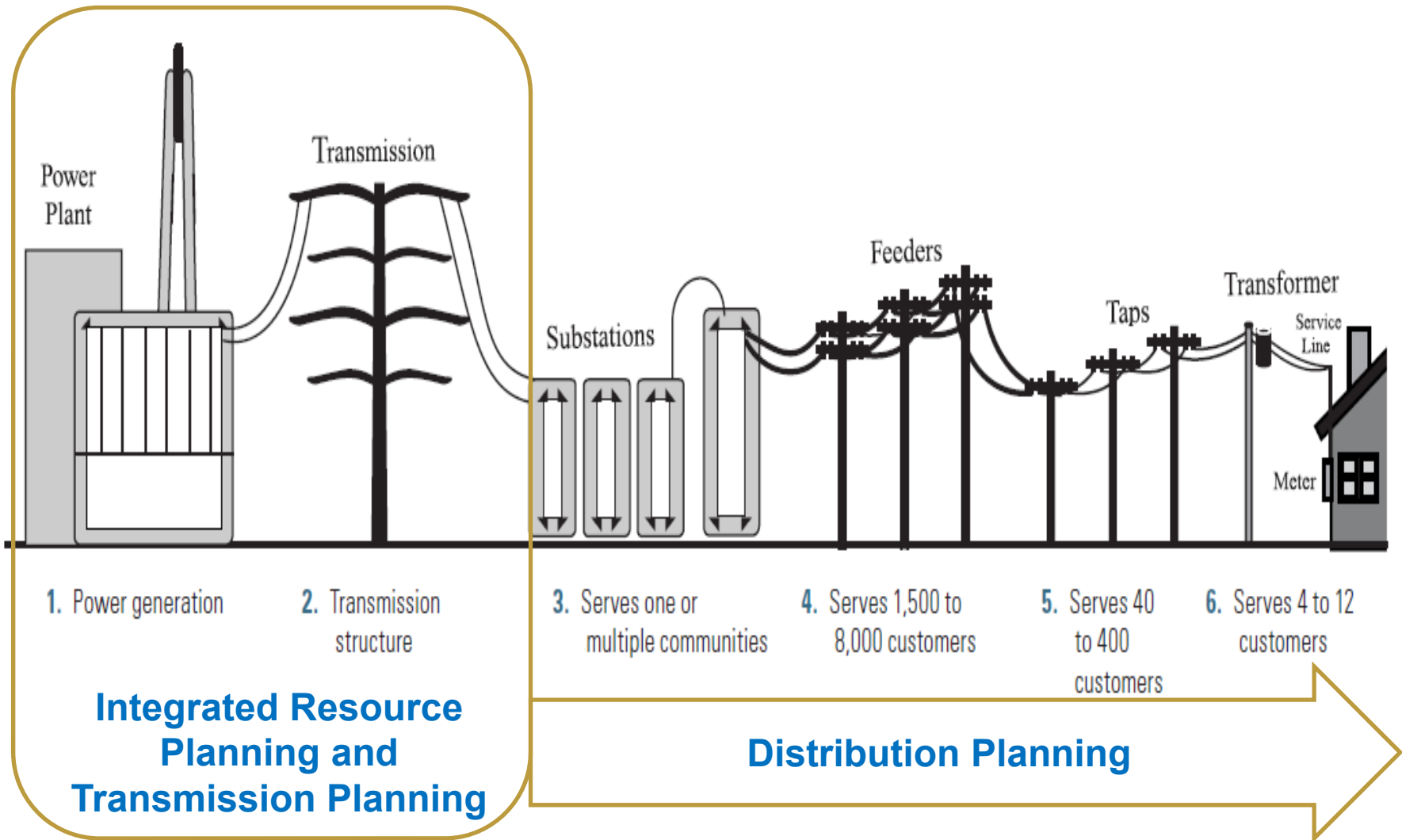


**103,000**  
Dekatherms Saved

# • Advanced and Integrated Grid Work

- Advancing load as a resource in a modernized and low carbon grid
- Strategic and beneficial electrification
- Load shifting for renewables integration
- Energy efficiency in distribution planning







# •• Key Differences

## Resource Planning

- Longer runways: 15 years
- Proactive exercise
- System-wide
- Bigger \$\$
- Established toolset
- Tools can “pick” EE as a resource

## Distribution Planning

- Shorter runways: 3-5 years
- Frequently reactive
- Location specific
- Smaller \$\$
- Nascent toolset
- Tools focused on hardwiring EE based on customer adoption



# DSM in Distribution Planning

Where We Are



Where We Need To Go

Where We Can Go



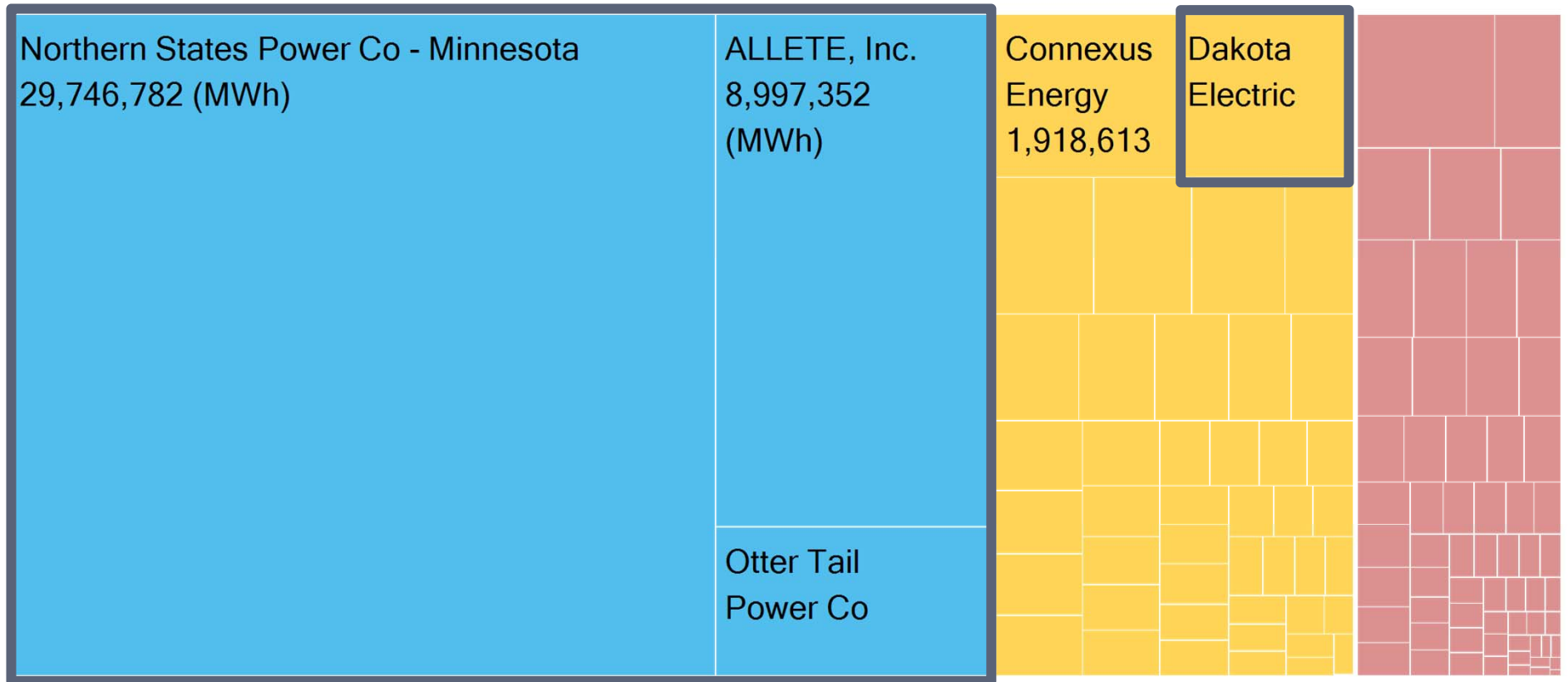


# • Integrated Distribution Plans

- Began with 2015 PUC investigation on grid modernization
- Focused on *all* distributed energy resources
- Every Year
  - Xcel Energy (18-251)
    - **First Filing was Nov 2018**
- Every Two Years
  - Minnesota Power (18-254)
  - Ottertail Power (18-253)
  - Dakota Electric (18-255)
    - **First Filings due Nov 2019**



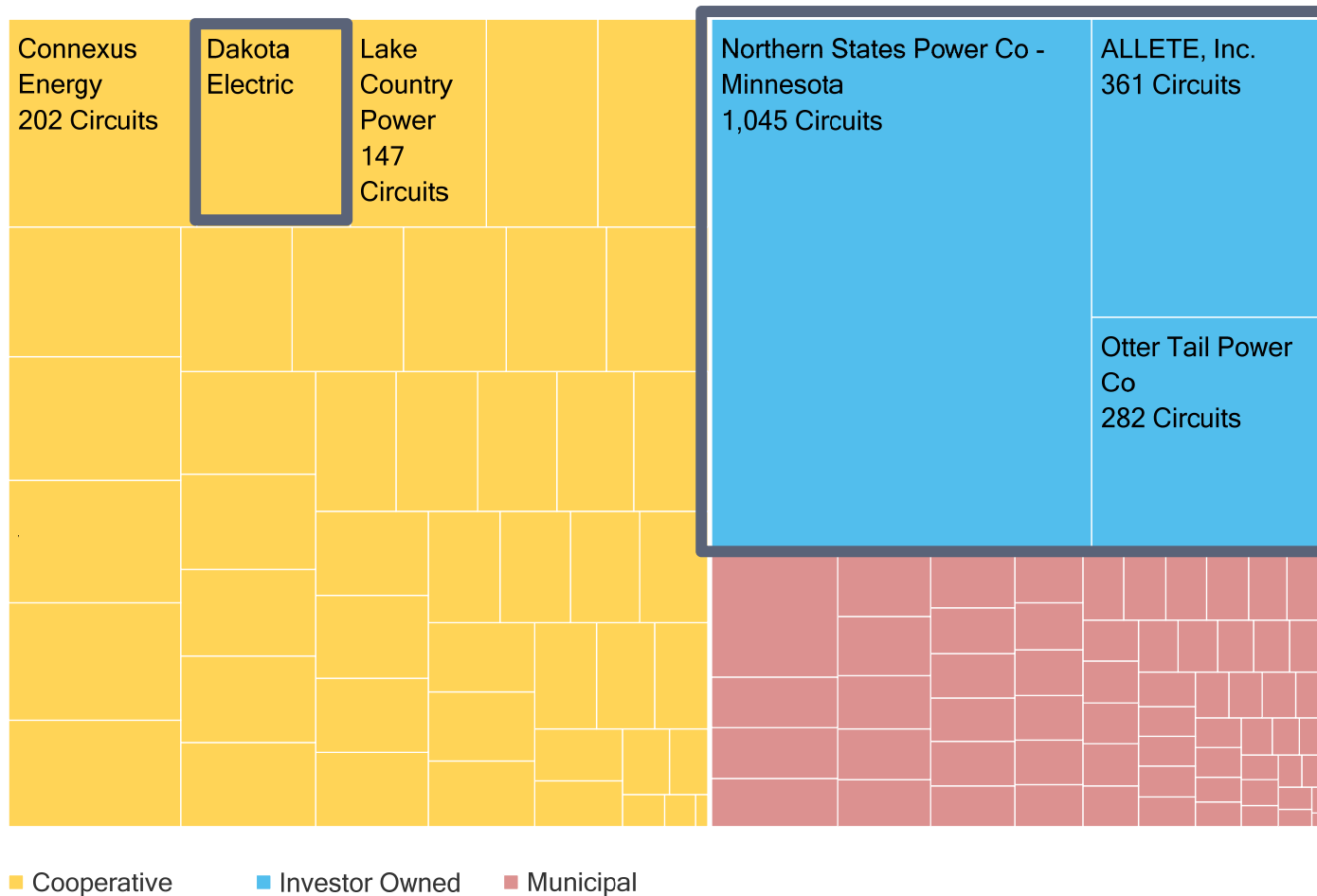
# Minnesota's Utility Sales



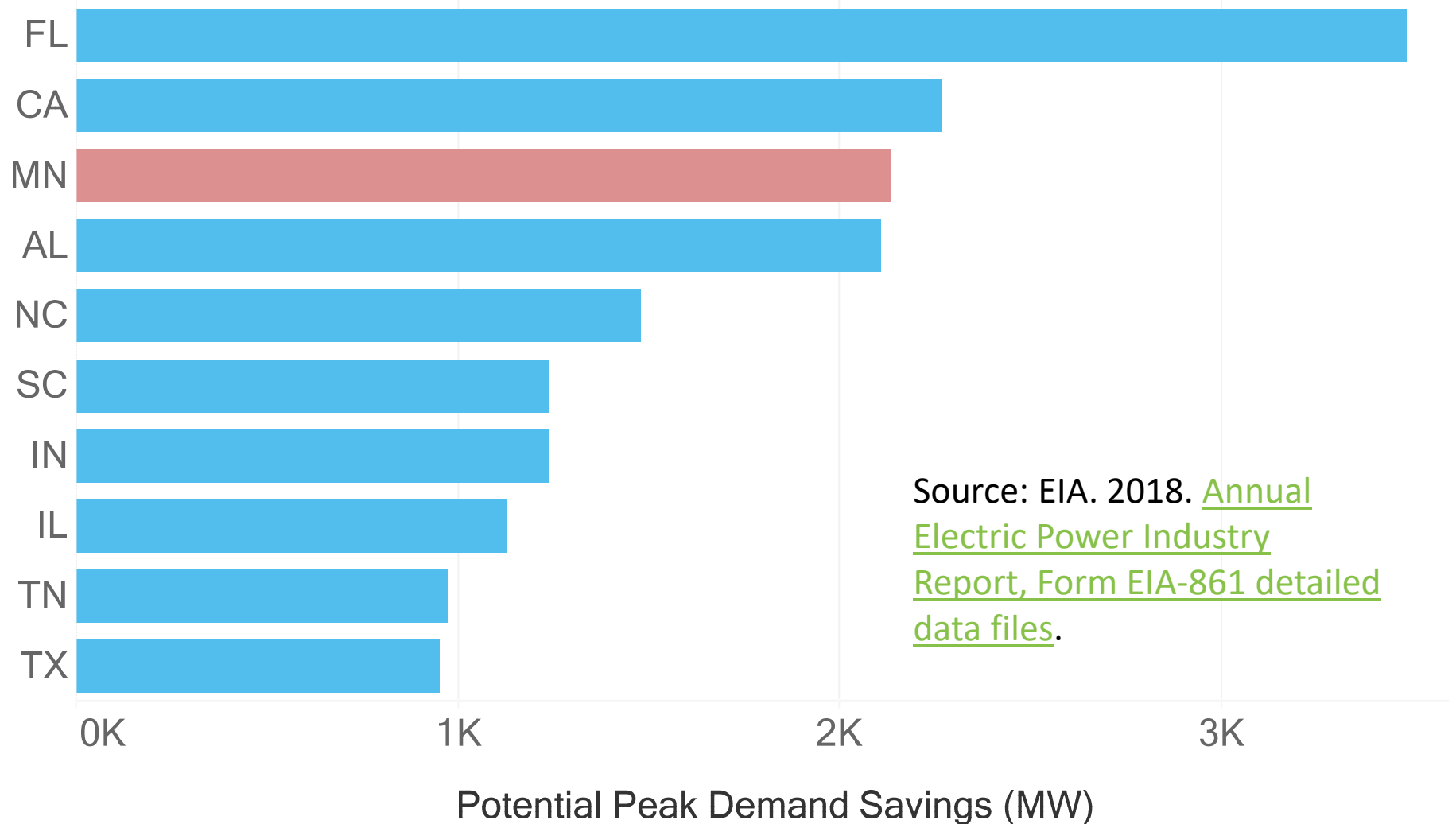
■ Cooperative
 ■ Investor Owned
 ■ Municipal

Source: EIA. 2018. [Annual Electric Power Industry Report, Form EIA-861 detailed data files.](#)

# Number of Distribution Circuits



# Top 10 States for Demand Savings (MW)





## Minnesota's IDP Objectives

1. Maintain and enhance the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state's energy policies;
2. Enable greater customer engagement, empowerment, and options for energy services;
3. Move toward the creation of efficient, cost-effective, accessible grid platforms for new products, new services, and opportunities for adoption of new distributed technologies;
4. **Ensure optimized utilization of electricity grid assets and resources to minimize total system costs,**
5. Provide the Commission with the information necessary to understand utilities' short-term and long-term distribution system plans, the costs and benefits of specific investments, and a comprehensive analysis of ratepayer cost and value.

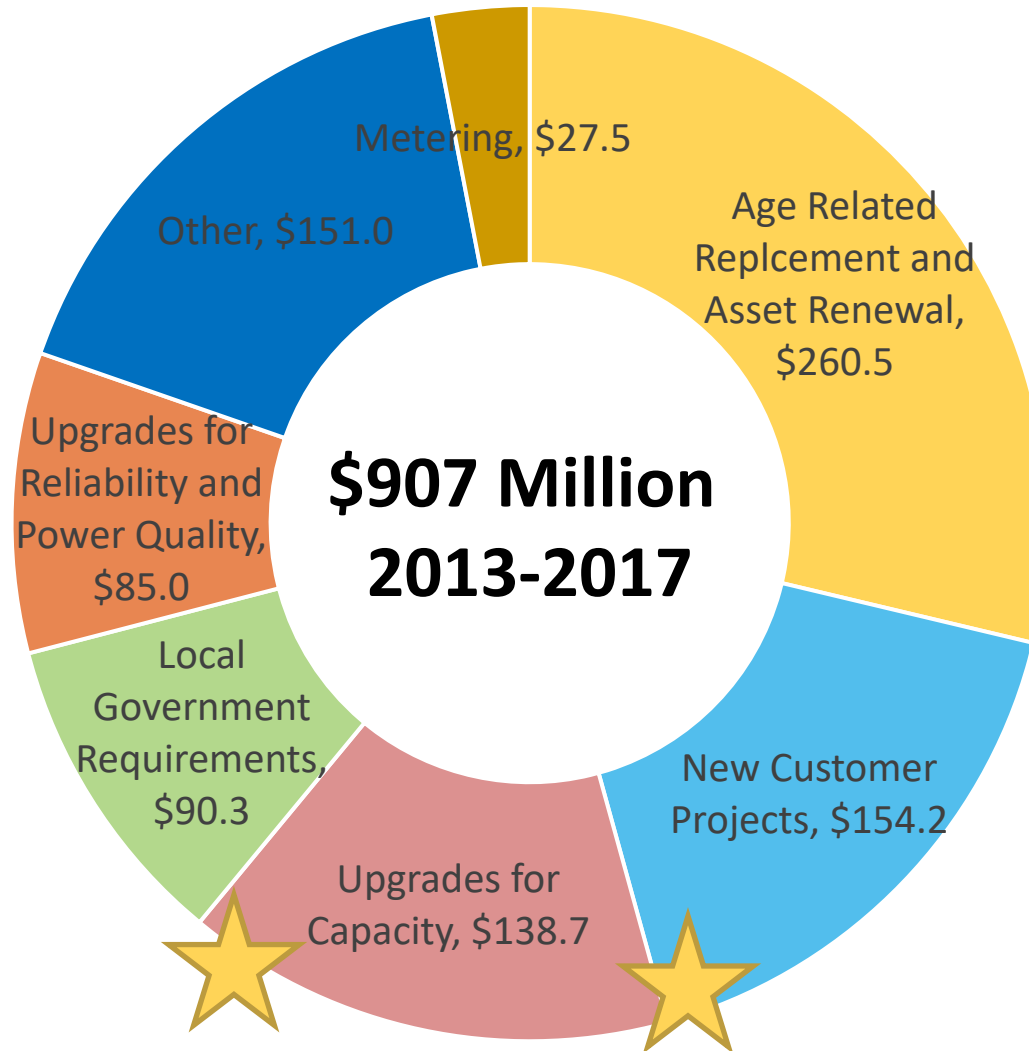


# Why are Distribution Plans Important for Energy Efficiency?

*Noting that drivers are not EE: they are grid mod and distributed generation...*

- Demonstrate expansion from a bulk resource to a more targeted, deployable resource
- Use scenario planning to get ahead as a cost mitigation resource for electrification
- Ensure forecast and scenario tools getting built have EE value not just supply side DER
- A low cost resource in lower cost deferral situations

# Xcel Energy 5-Year Historic Capital Budget



Source: Xcel Energy 2018 Integrated Distribution Plan



# Summer Savings Pilot

- Goal: 500 kW coincident demand reduction
- 9,800 residential; 1,200 business premises
- 6-month pilot duration
- NPV of \$150,000
- Funded by:



## JUMP INTO SUMMER SAVINGS

Xcel Energy is teaming up with the cities of Sartell and Sauk Rapids to offer residents the chance to save money on utility bills with the City Summer Savings Program.

**Schedule a visit**  
Residents can schedule a home energy visit for FREE. Call 651-328-6226 to schedule your visit today. Visits are limited—you must have your visit completed by August 31.

**Complete**  
Two energy experts from an Xcel service provider will come to your home to identify energy saving materials and options. Options may include high-efficiency shower aerators, door weather strippers, and more.

**Don't delay, schedule your visit today!**  
Xcel Energy

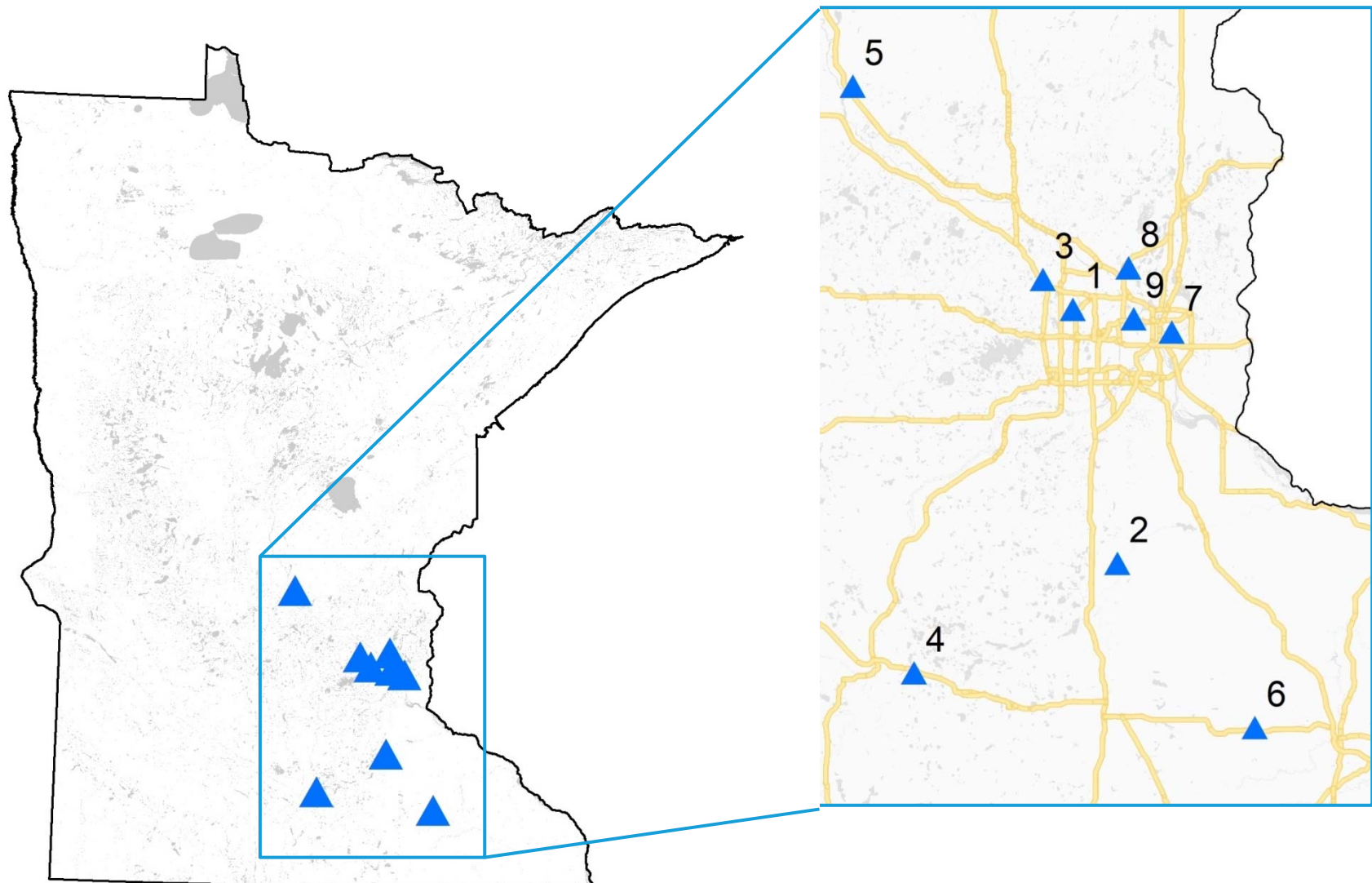
### ENERGY SAVINGS OPPORTUNITIES FOR BUSINESSES

Xcel Energy is teaming up with the cities of Sartell and Sauk Rapids to offer the City Summer Savings Program. Business owners will have the chance to save money on their utility bills by upgrading inefficient equipment and taking advantage of available rebates.

Bonus rebates from Xcel Energy are available for businesses that complete recommended upgrades — for a limited time only.

Xcel Energy Sartell City of Sauk Rapids

# •• Non-Wires Site Selection

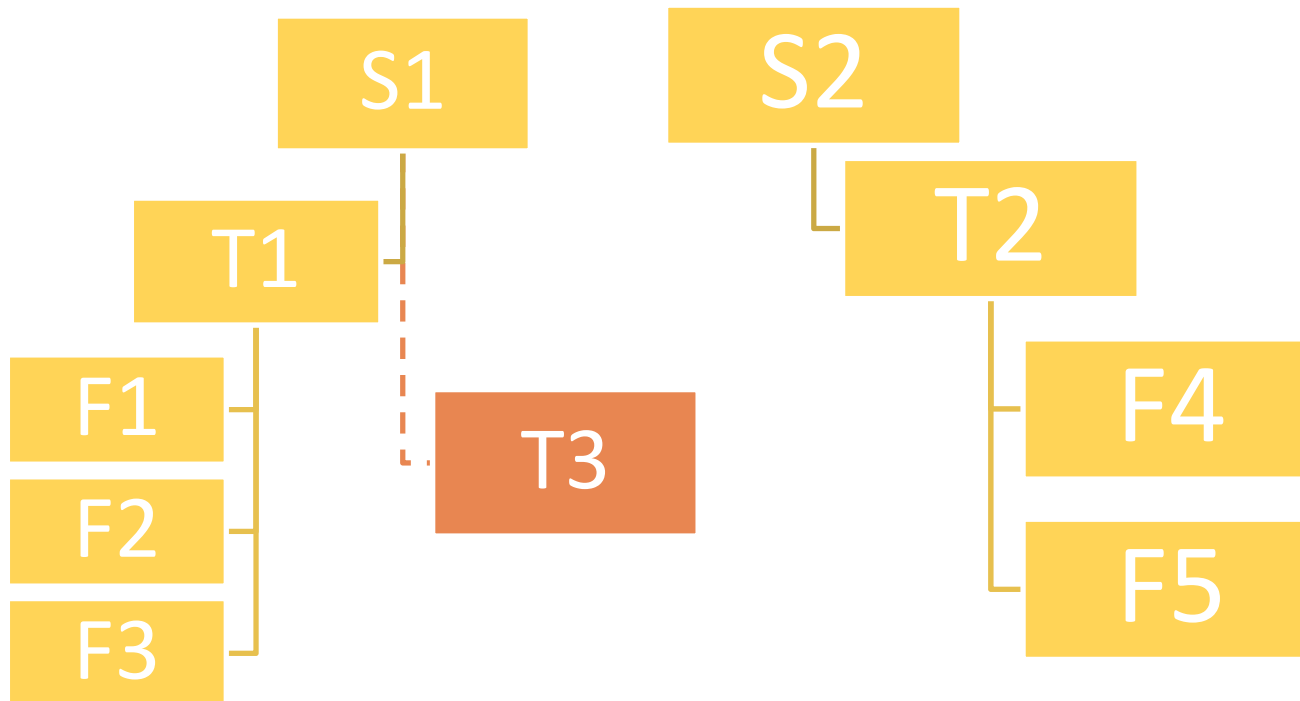




# • Screening Distribution Projects

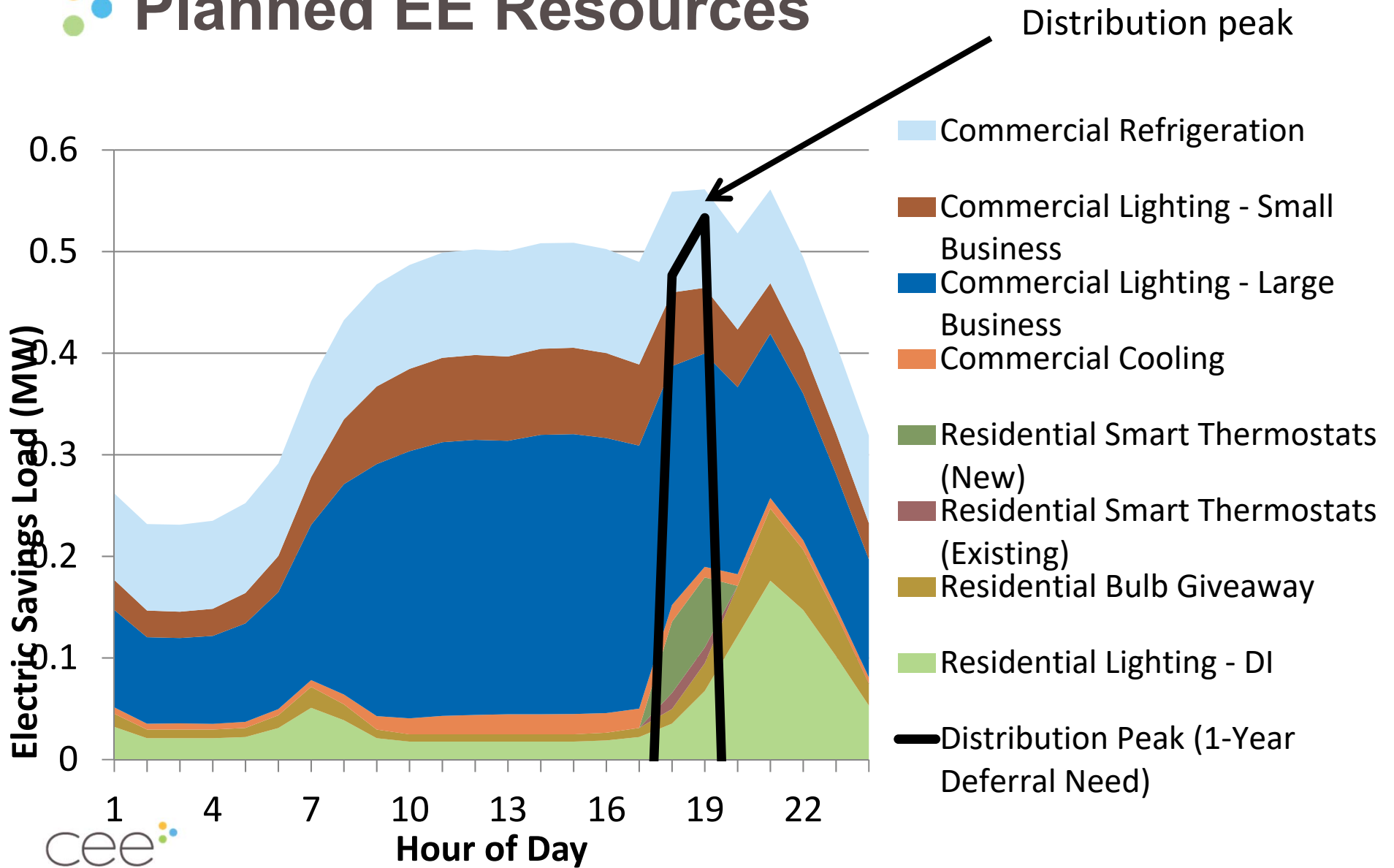
- System/Project Needs:
  - Upgrade need is based on capacity
  - Capacity need is 3 - 5 years out
  - Project need is at the feeder level (versus substation)
  - Estimated project cost is > \$400,000
  - No community solar plans
  - Historical system data available
- Customer Types:
  - Representative balance of residential and business customers
  - Not dominated by a single large customer (> 20% of the load)
  - Over 1,000 customers

# Project Configuration

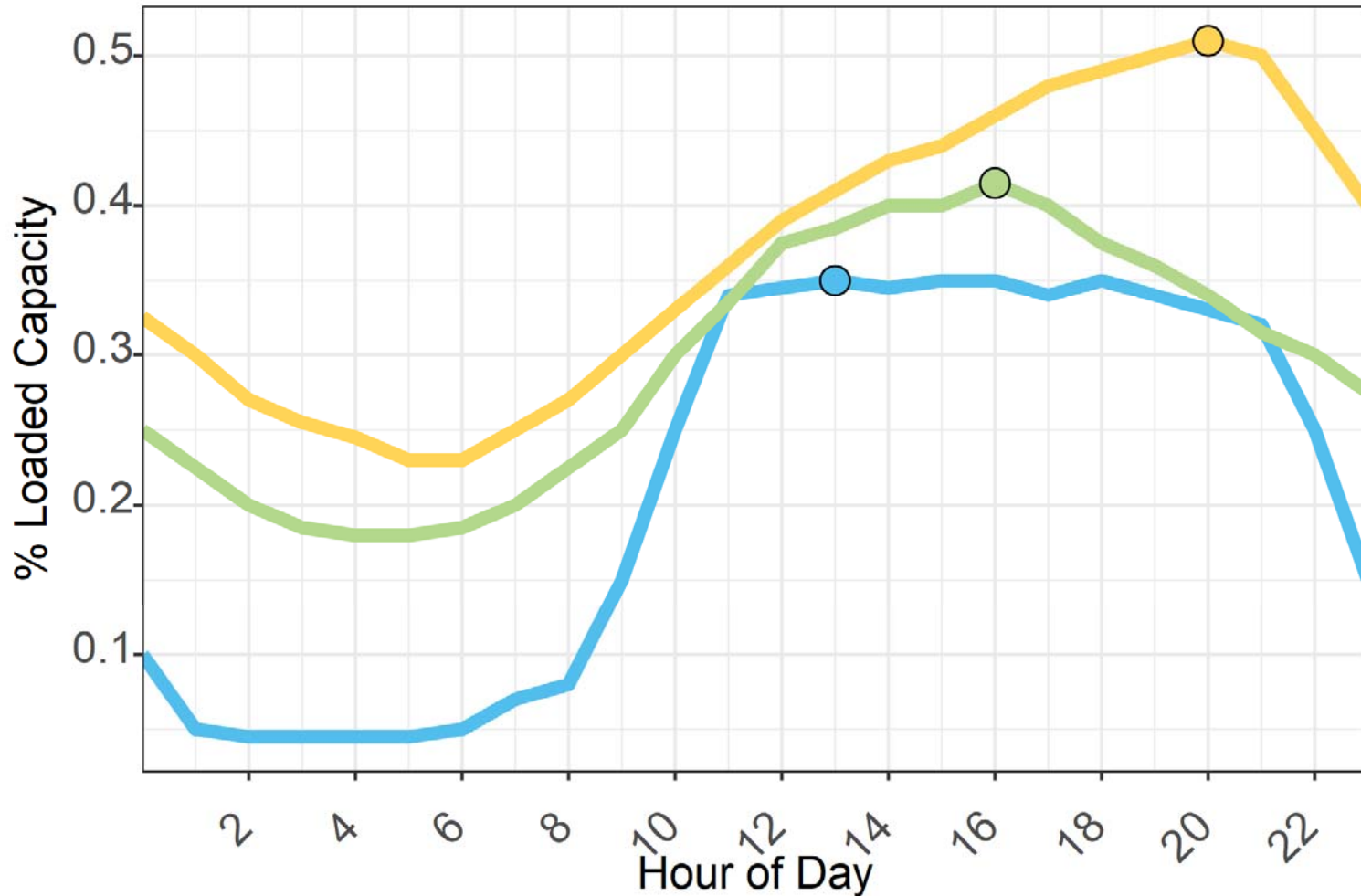


Deferral Value: \$150,000 / 1 year deferral

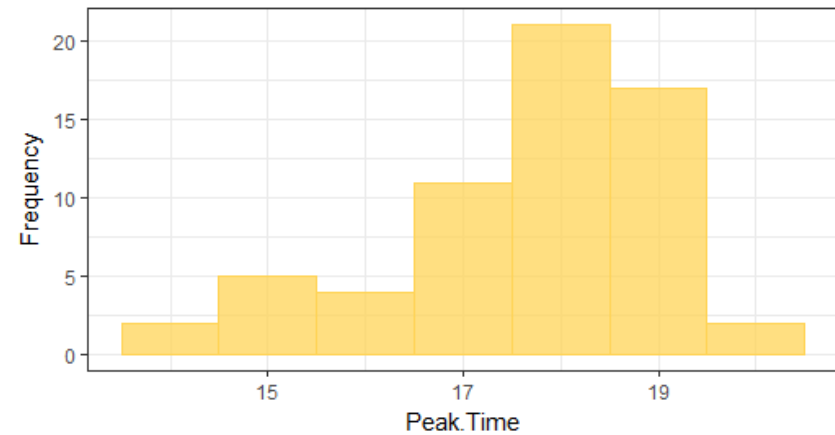
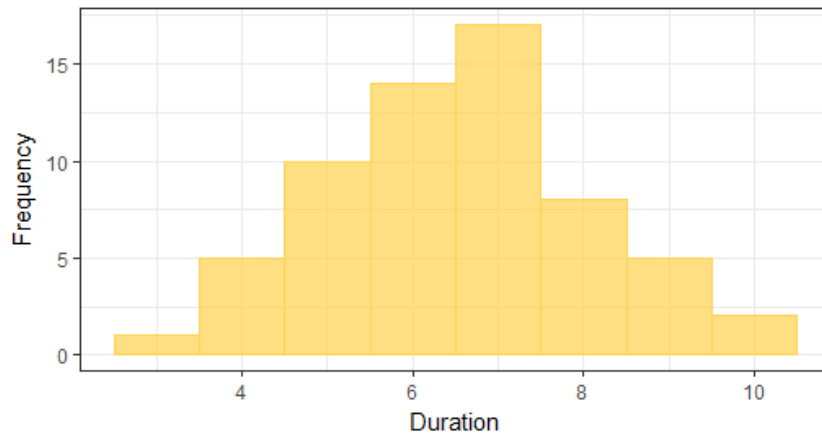
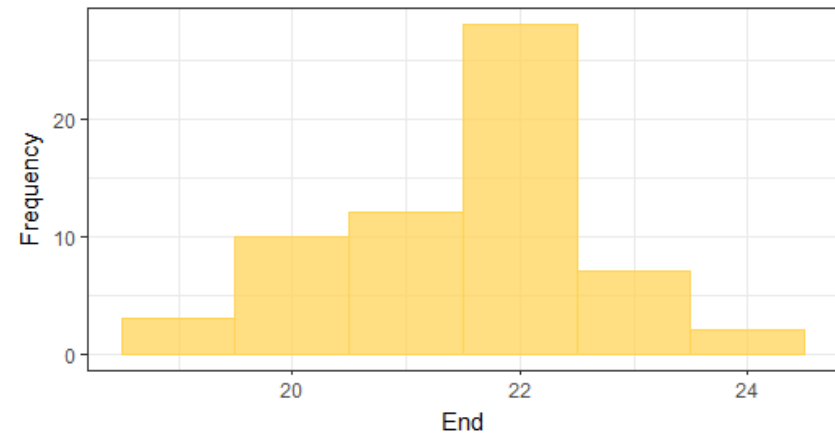
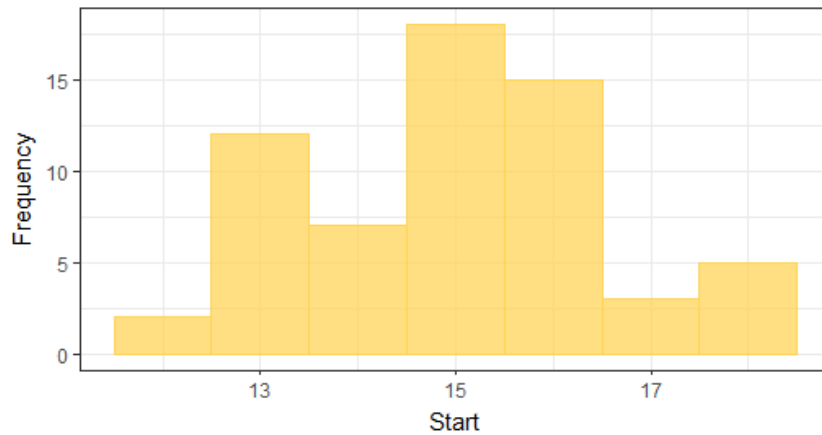
# Planned EE Resources



# Lesson 1: Peak needs are highly variable at the feeder level

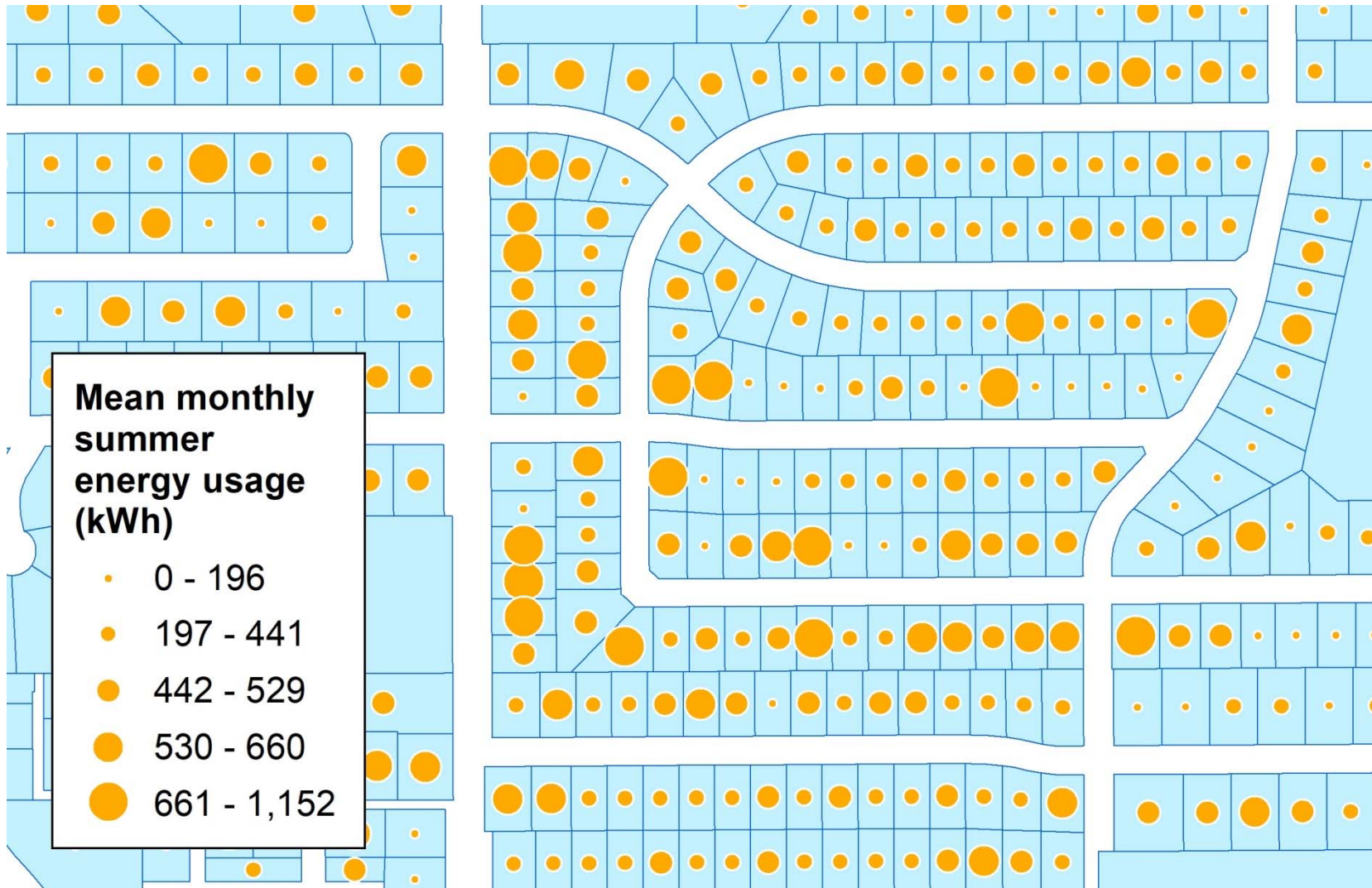


# Lesson 2: DSM creates a need to characterize peak duration

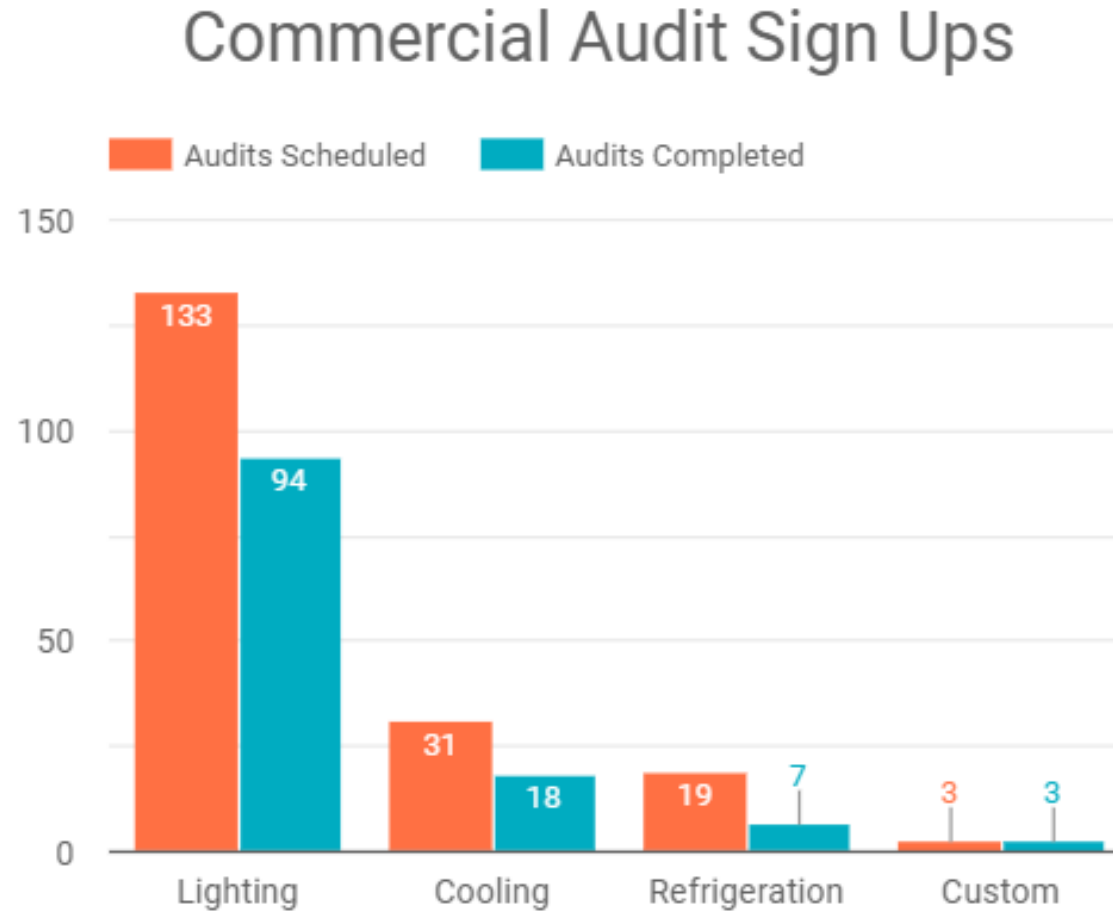




# Lesson 3: Untapped opportunities for segmentation?



## Lesson 4: Uneven “lumpy” participation expectations at the local level



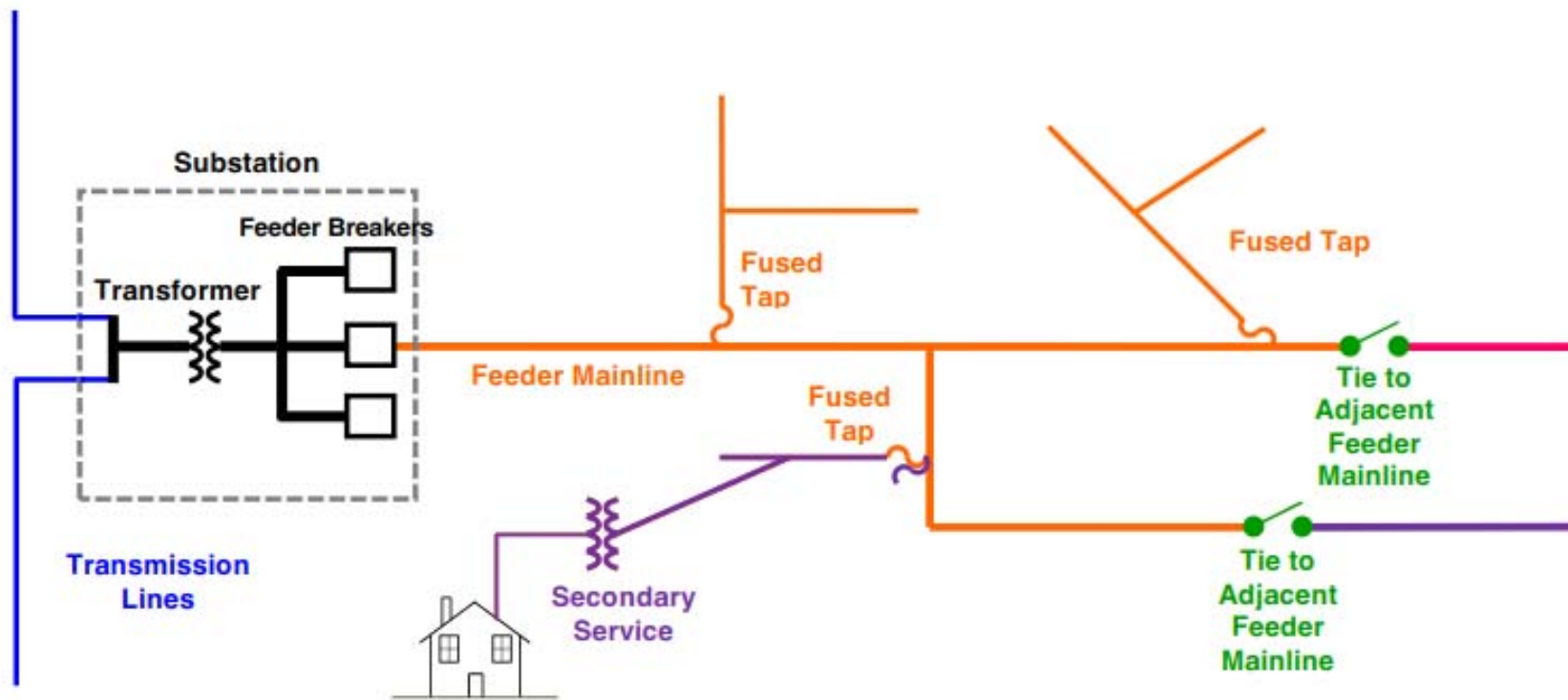
  


# Lesson 5: Optimize Existing Demand Resources

- Current Subscriber Count at pilot location:

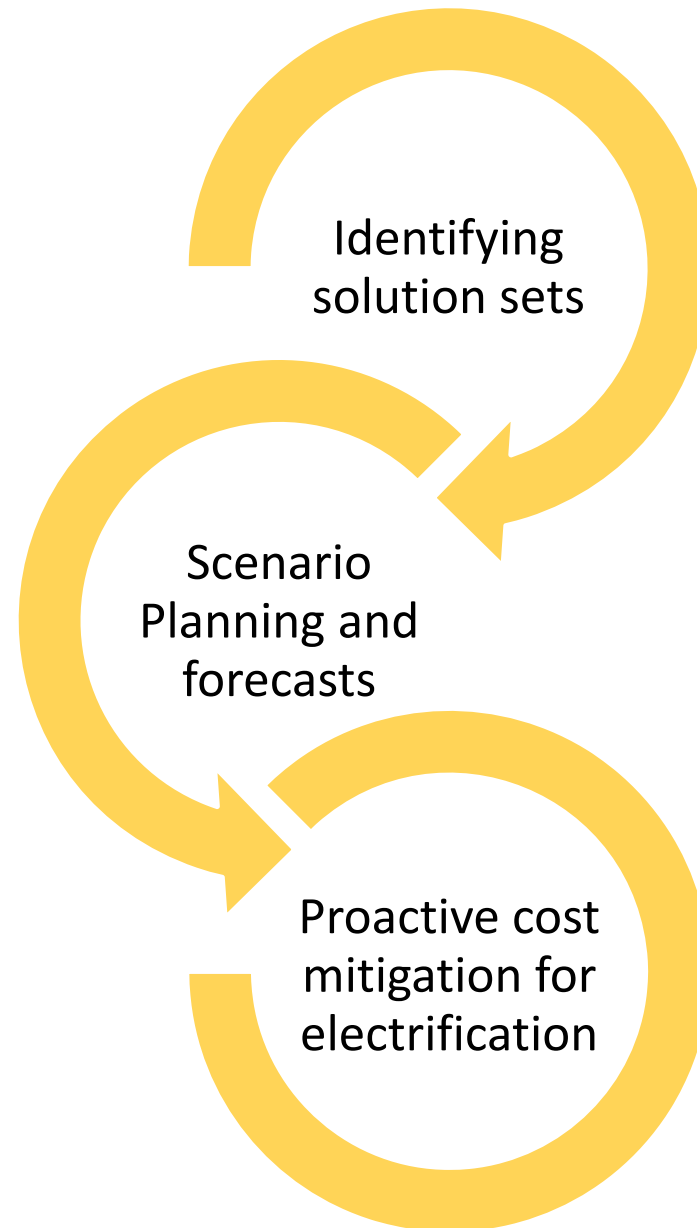
	Customer Count	Total Subscribed (kW)
Residential Saver's Switch	4,451	3,286
Saver's Switch for Business	518	698

# Lesson 6: Increase learnings across distribution planning and operations



Source: Xcel Energy

## Where We Can Go



THANK  
*you!*

Jenny Edwards

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# OTHER SLIDES





# • Developing Deferral Criteria

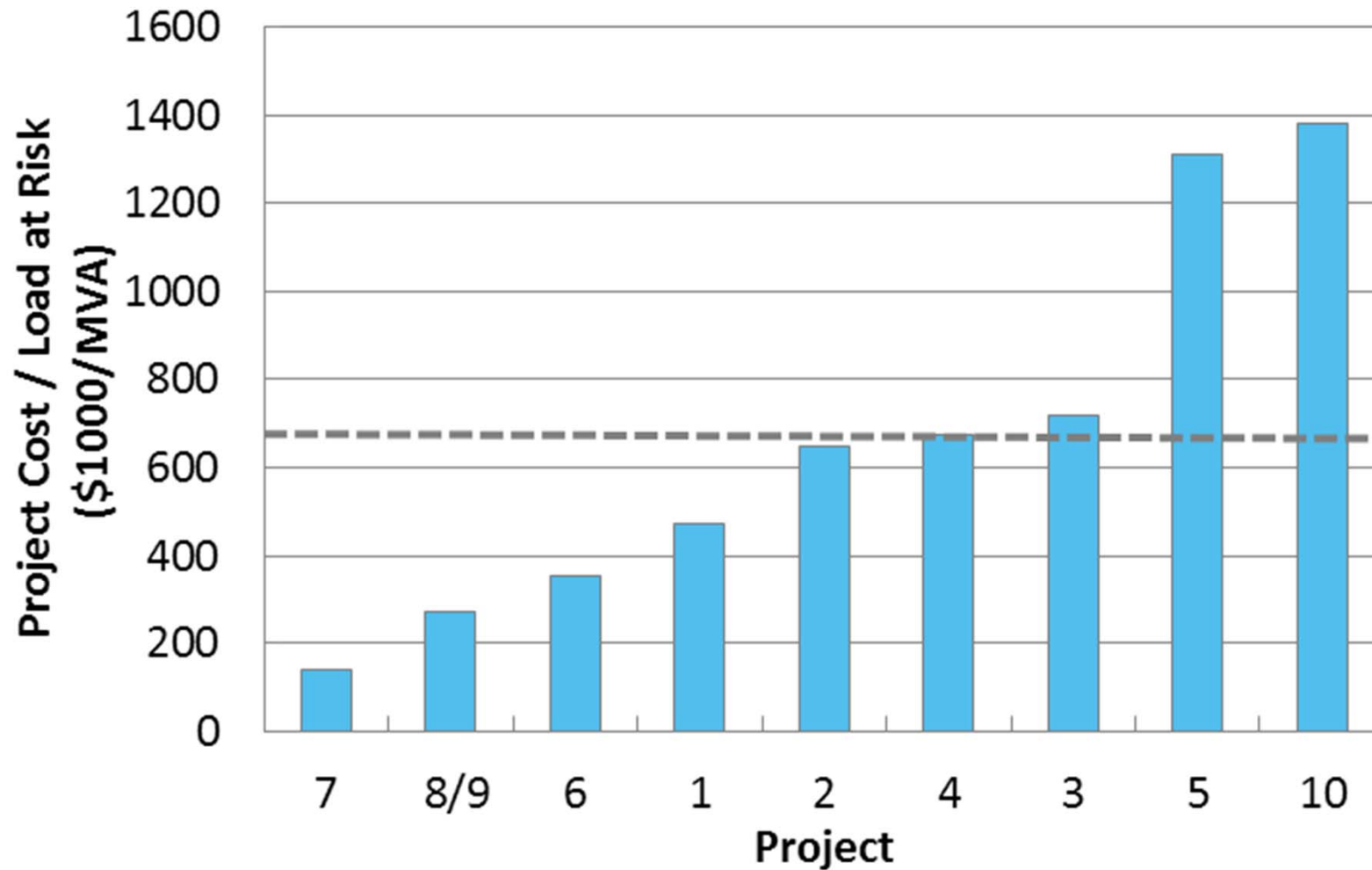
## DISTRIBUTION NEEDS

- Project Timeframe
- Driving Need for Upgrade:
  - Load Growth / Capacity
  - Age of infrastructure
  - Reliability
  - New Development
- Project Cost
- Others

## DER POTENTIAL

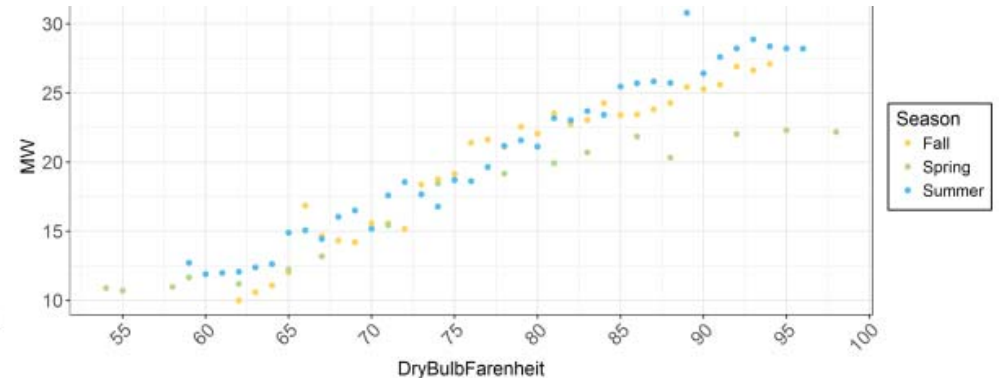
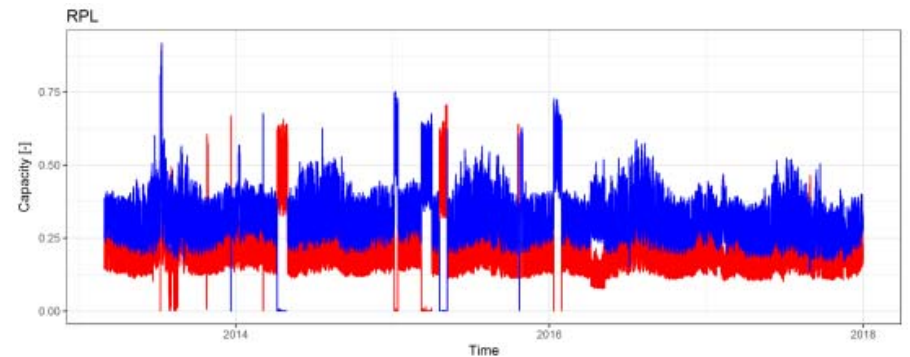
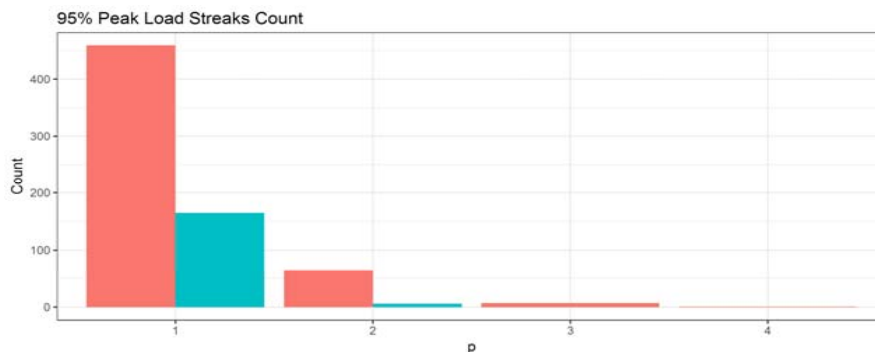
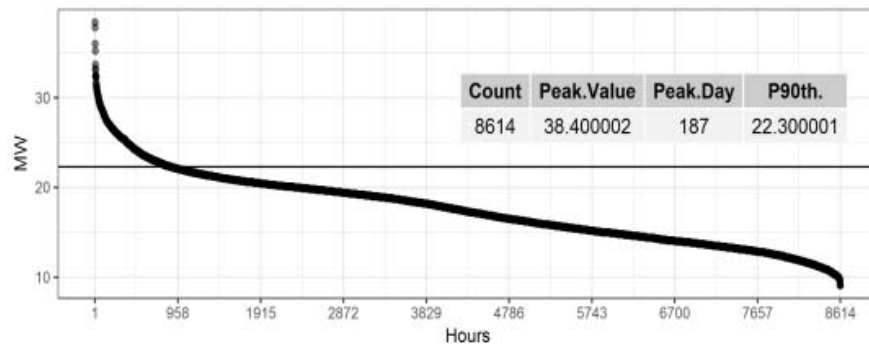
- Building and load type
- Customer type
- Customer propensity for action
- Land use
- Procurement “Scopability”
- Others

## Project Cost per Load at Risk

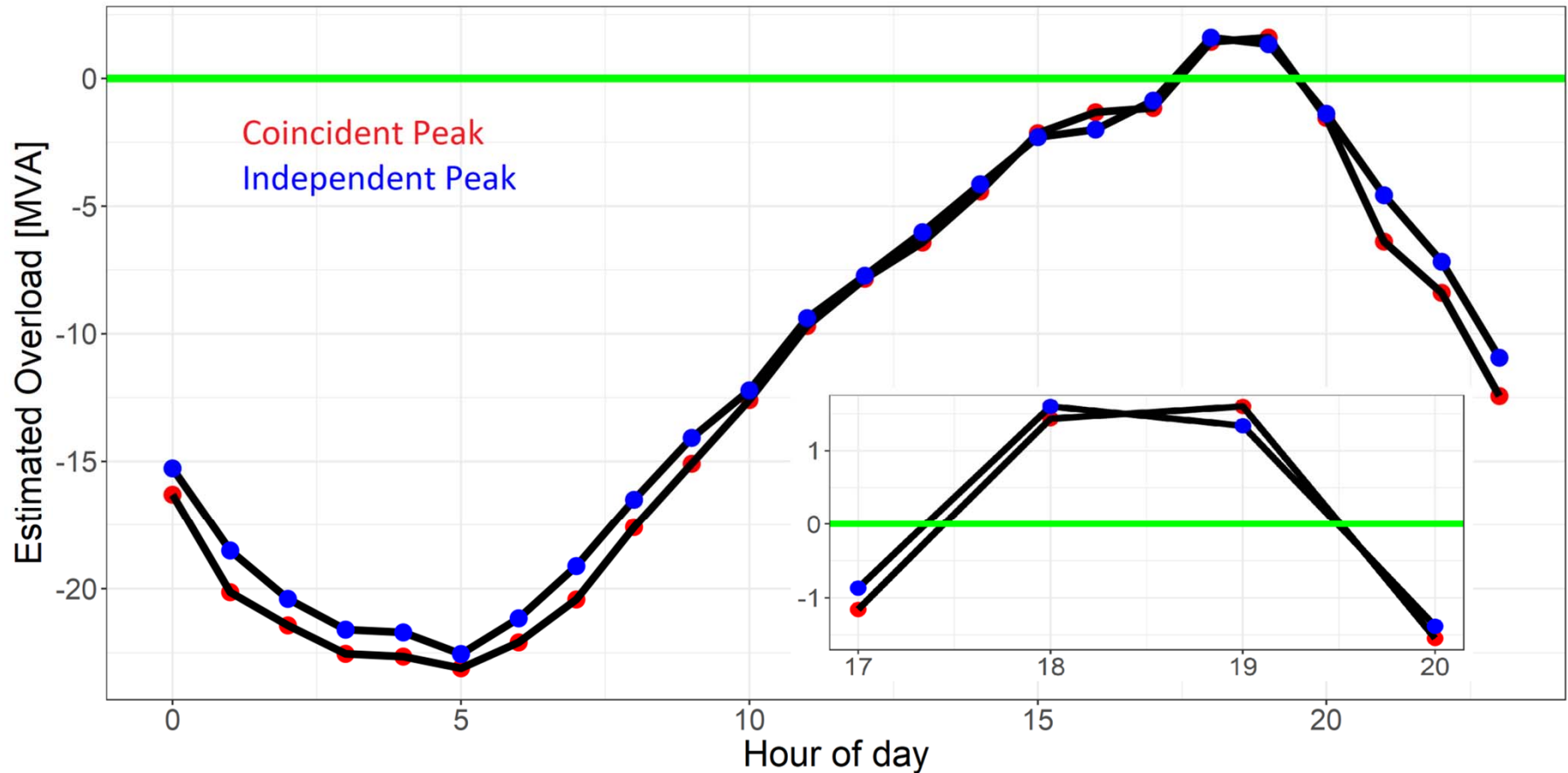


# Understanding System Needs

- Analyze 3 – 5 years of system data at the substation, transformer, and feeder levels
- Identify when and why do peak events occur
- Consider variations in peak events across the system

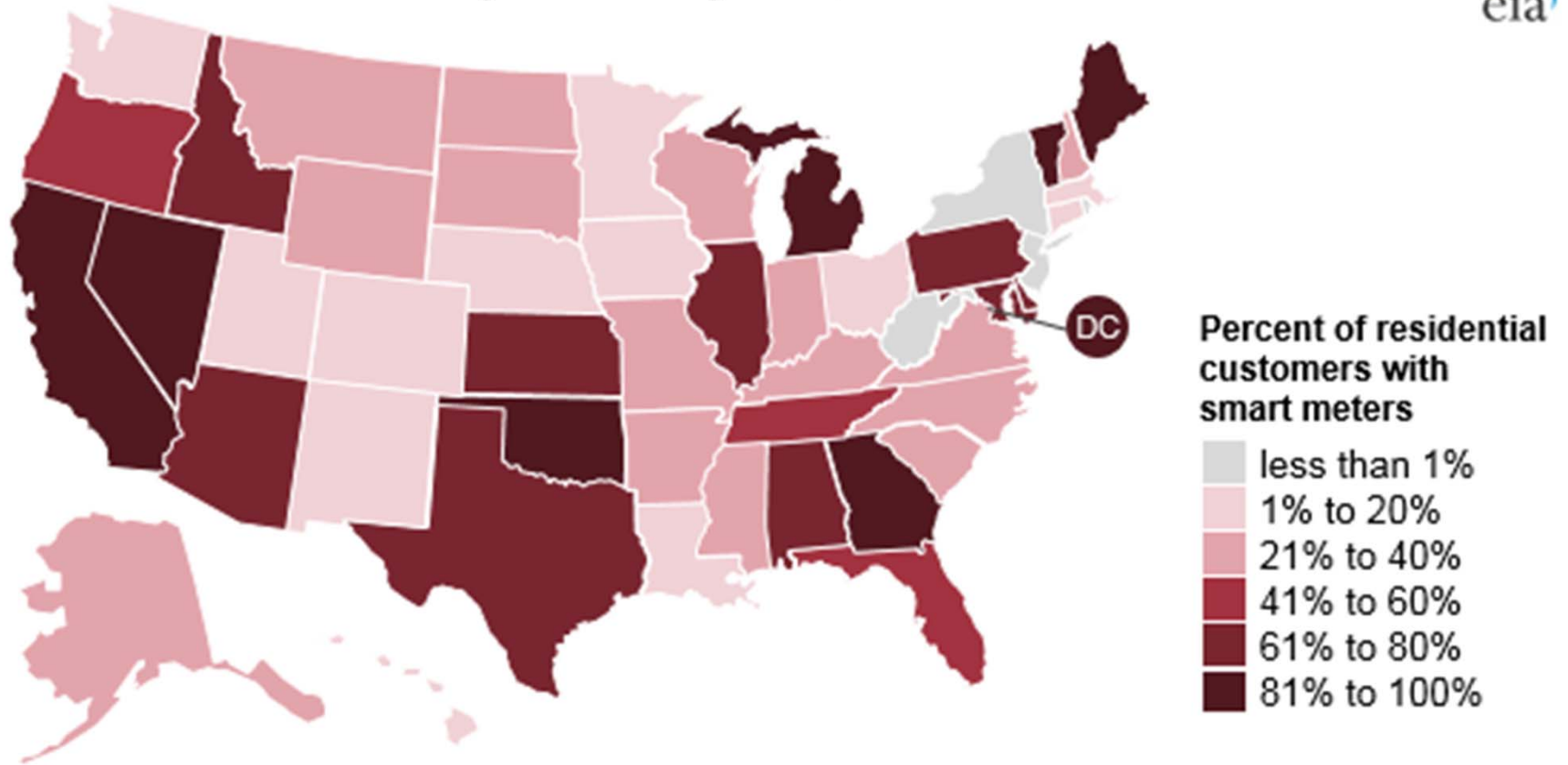


# Final Estimate of N-1 Load at Risk





## Residential smart meter adoption rates by state, 2016





## High Level Takeaways

- Peak needs (and therefore non-wires solutions) can be highly variable at the feeder level
- There are untapped opportunities for customer segmentation to focus on peak reduction opportunities – but also paralysis by analysis.
- The “runway” for acquiring targeted non-wires alternatives is a key variable but this can be shortened with program design
- Working with the communities has been critical for success to date
- Distribution costs are lower here