

# Customer Engagement and Load Management with Wireless Real-Time Energy Management (WREM)

Final Results

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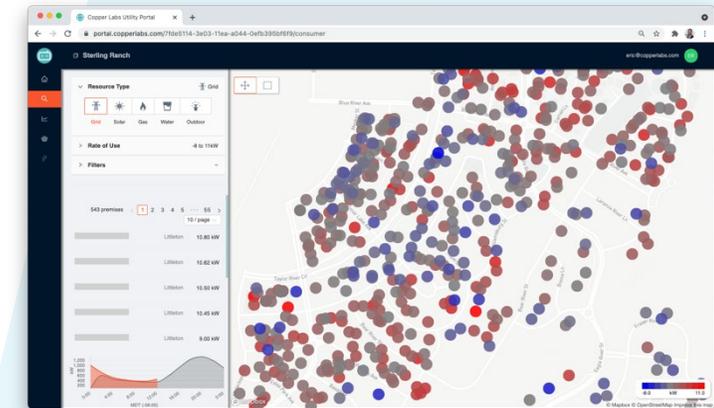
Eric Van Orden – Director of Business Development, Copper Labs

Ryan Austin – Product Developer, Xcel Energy



# About the Need/Opportunity

- The time and location of energy use are becoming increasingly important.
- Broad deployment of AMI, yet frequency (daily) and resolution (15-min) of data collection limits its value
- Real-time data collection could enable advance demand management programs (e.g. behavioral DR)
- Potential to integrate AMI, gas, and local voltage readings for greater insight into customer demand, electrification potential, and grid-edge impacts of DER deployment
- Driven by Xcel's Partners in Energy program to reduce customer costs, promote renewables, drive resource conservation and reduce greenhouse gas emissions through community collaboration
- Focus on demand response notifications and customer engagement through mobile app and targeted messaging



# About the Technology

- Build real-time grid-edge intelligence through wireless energy monitoring (electric and natural gas), as well as local voltage data.
- Wirelessly access real-time electric and natural gas data from smart AMI and drive-by AMR meters, plus collect grid-edge voltage measurements to monitor local power quality.
- Deliver data to consumers via mobile app and to utilities through a web portal to manage demand, target customers, and identify anomalies.
- Inform behavioral demand response, electrification potential, and impact of DER on voltage at grid edge

*\*Note: This project is mostly focused on electric demand rather than natural gas and voltage insights at the grid edge.*



# About the Technology

## Consumer Mobile App

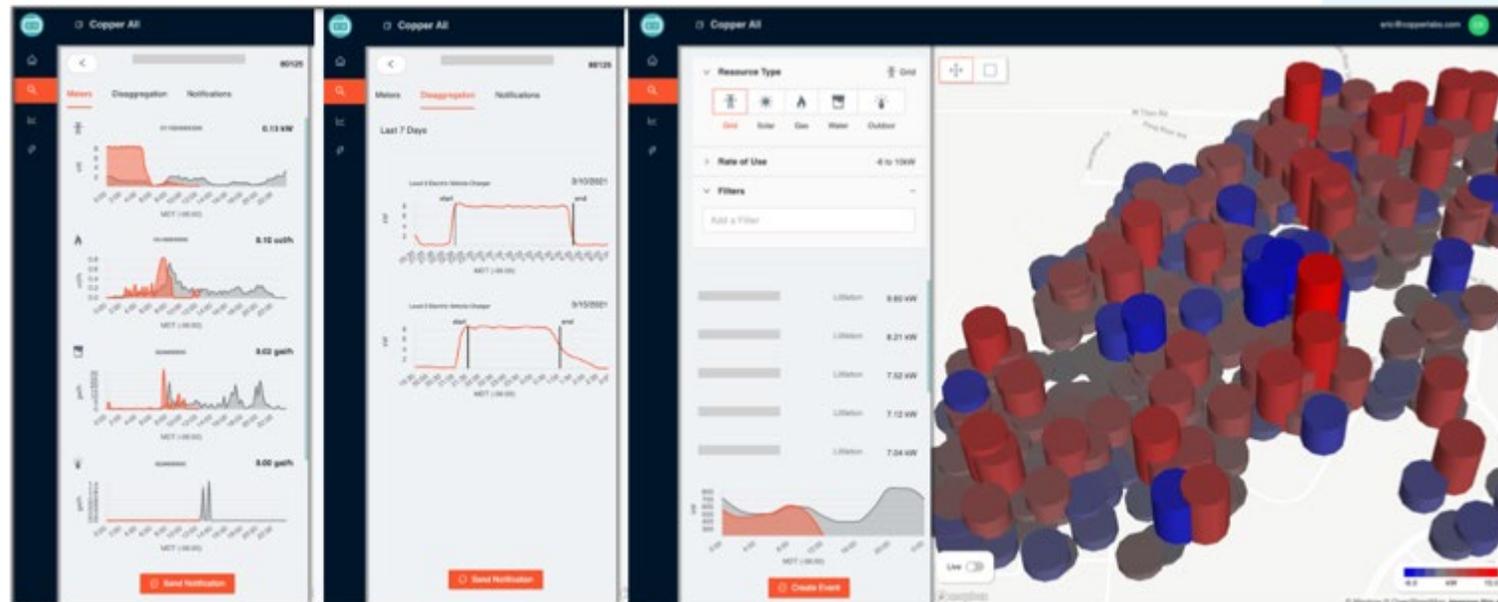
- Track energy usage and solar generation in real-time.
- Save energy and make informed consumption decisions through personalized insights and anomaly detection.
- Utilize goal setting to prepare save energy and prepare for the monthly bill.
- Gamification and utility-initiated demand response notifications.



# About the Technology

## Utility Portal

- Targeted behavioral demand response: Reduce peak demand during hot summer days while engaging targeted energy users with a mobile app based on location and energy usage.
- Geographically plotted energy use in real-time: Gain real-time visibility into rooftop solar production, EV charging and last-mile voltage data.



# Project Scope

## Project Participants:

- Residents of Sterling Ranch, a modern master-planned community south of Denver, CO
- Each resident gets access to real-time electric and natural gas usage insights in a Mobile App
- Xcel Energy can initiate targeting messaging in the Utility Portal

## Project Objectives:

1. Use real-time energy insights to educate consumers about electric demand in prep for BDR events
2. Compare peak reductions between real-time BDR and “traditional” BDR
3. Explore different BDR event performance between solar and non-solar

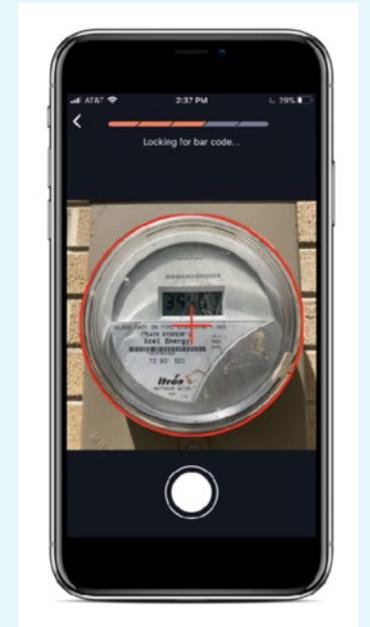
## Key Milestones:

- June (and ongoing): Deploy wireless energy monitors
- July-August: Initiate BDR events and engage consumers with targeted messages
- October: Present Results

# Key Findings

## Key lessons learned include:

- Customer engagement for new construction is different from voluntary participation
- While the most of Xcel Energy's meters are similar Itron, there are many different AMR models. Copper adapted algorithms to support each meter while also working with Xcel Energy on adjusting a unique Net Meter set up.
- Onboarding and connecting to the meter has been designed for consumer self-service with nearly 100% automation. However, it still relies on the customer to connect the device, which is expected take ~5 minutes but could be a challenge for less tech-savvy customers.
- Zigbee Home Area Networks have been around for almost 20 years and a quick “refresher course” for utilities and meter vendors about pairing with Zigbee HANs in AMI meters can be helpful.



# Related Efforts

## Has your scope changed since its inception?

- Portland General Electric completed a typical real-world demo by deploying a few Coppers in their territory for both electric and natural gas usage data. While they are still interested in the technology, they decided not to support the IEL project this year.
- Outside of Incubatenergy Labs, Xcel Energy is deploying Coppers in another targeted region to measure and manage natural gas demand, while also providing consumers with real-time electric and natural gas insights.
- Expect continuous improvement for increased peak reductions including exploration of customer targeting and A/B testing of messages.
- A neighborhood-level collector with dedicated broadband access is being developed to make onboarding even easier, reduce costs, and help utilities with AMR meters to bridge the gap to AMI meters.

# Our Team

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