

Partnering with customers to increase load flexibility in a decarbonizing future

Essie Snell

At Copper, we believe better programs start with better data.

Copper unlocks near-real-time data from existing gas and electric meters and shares it instantly with utilities and their customers.



Load flexibility and decarbonization

Electric utilities



Transportation and building electrification

- Dramatically increase peak loads
- Shift peak periods (daily and seasonally)
- Reduce demand predictability

Transition to zero-carbon power

- Lots of intermittent generation
- Batteries can help, but can be expensive at scale

Load flexibility can help

- Improve reliability
- Keep costs low
- Support more rapid adoption of renewables



Gas utilities

Multiple emerging climate challenges

- Policies that constrain system capacity and limit infrastructure investments/expansions
- Increasing winter storm severity strains distribution networks
- Navigating the mandated duty to serve during the energy transition

Load flexibility can help

- Ensure everyone's gas needs can be met—even under extreme weather conditions
- Better manage an evolving distribution system with innovative new approaches



Demand management measures

Smart home tech

Technical potential

- HVAC represents >50% of total home energy consumption, while water heating comes in second
- Can manage both electric and gas demand
- Post-event “snapback” can reduce total energy savings

Customer impacts

- Can reduce comfort
- Customers may forget they signed up and be upset when their devices change settings

Scalability

- Smart thermostats are currently in <20% of US homes
- Water heater controls have very low penetration

Equity considerations

- Upfront cost and installation
- Requires in-home Wi-Fi to get full benefits



Behavioral

Technical potential

- Per-customer demand reductions may be lower than automated approaches
- Real-time energy data can support evaluation and enable performance-based incentives

Customer impacts

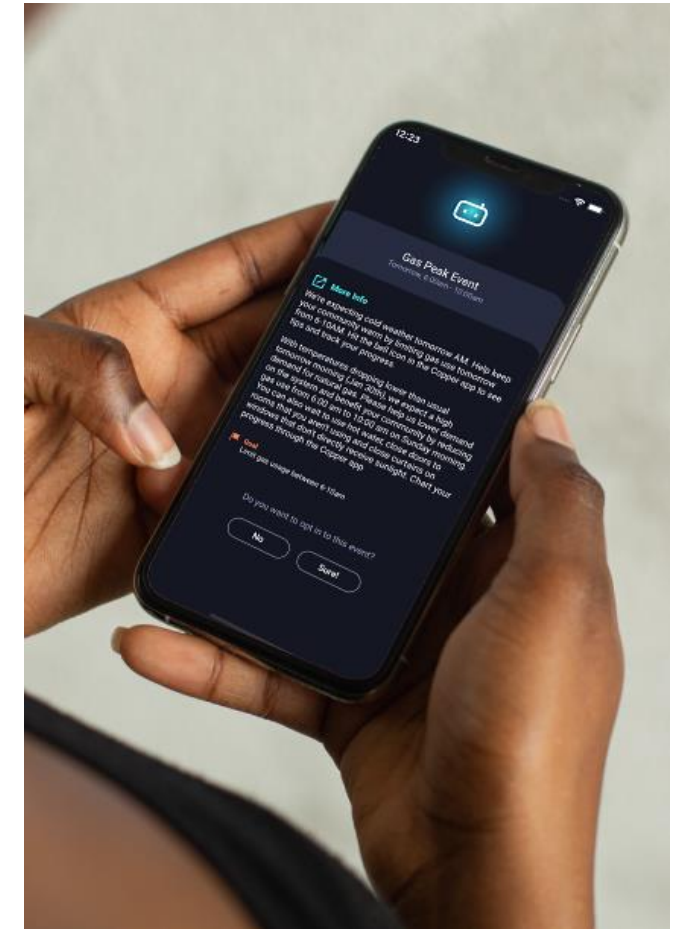
- Better customer engagement and empowerment may reduce negative customer perceptions

Scalability

- Very low deployment cost
- Theoretically scalable across a full service territory

Equity considerations

- No special equipment or even Wi-Fi needed
- Education/awareness



Our approach



Copper's take on load flexibility

Behavioral demand management, simplified

- Utilities launch events through an online portal
- Target specific customers or use a randomized approach
- No customer equipment requirements

Mid-event communications and outreach

- Utilities can reach out to participants to provide real-time feedback and tips
- Updates on community progress as an event occurs

Real-time M&V

- RCT or baseline methodologies show load impacts and results immediately



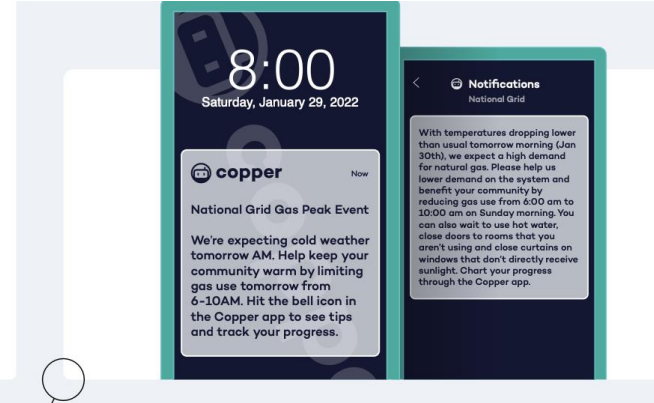
Gas demand response case study: 18% peak load reduction



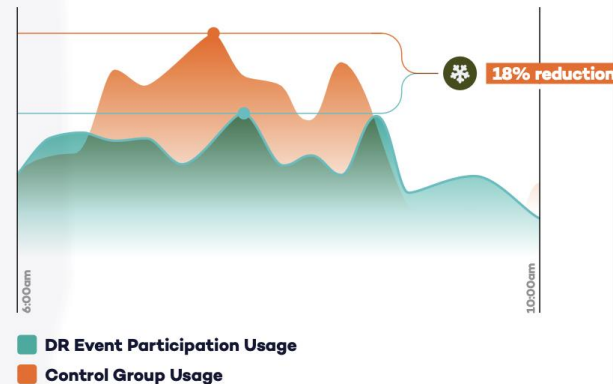
RESULTS

As predicted, the bomb cyclone peaked in New York on the morning of January 30, 2022.

Copper Labs and National Grid executed the demand response event, observing and tracking real-time usage data and sending targeted alerts. The result was an 18% reduction in natural gas usage during the peak demand window from the customers who received the messages compared to those in the control group who did not.



DR EVENT PARTICIPATION USAGE VS. CONTROL GROUP USAGE



The demand response event resulted in an 18% reduction in natural gas usage during the peak demand window from the customers who received the messages compared to those in the control group who did not.

The gas savings allowed National Grid to manage demand during the bomb cyclone while effectively and efficiently serving its customers and contributing to avoid service disruptions.

The utility can also use the program and continued observation of real-time usage data to predict usage patterns and engage consumers during future significant weather events.

Additionally, Copper Labs showed that its high-interval data could identify inefficient HVAC units when comparing homes in similar weather conditions based on gas consumption. These valuable insights are critical for utilities planning future energy efficiency upgrade programs.



Thank you!

Essie Snell

essie@copperlabs.com

