Going for the Gold:
Experimental Design in DR Program Evaluation

Navigant
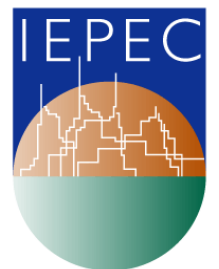
Kathleen Ward

IEPEC Conference

Denver, Colorado

August 21, 2019

nationalgrid NAVIGANT

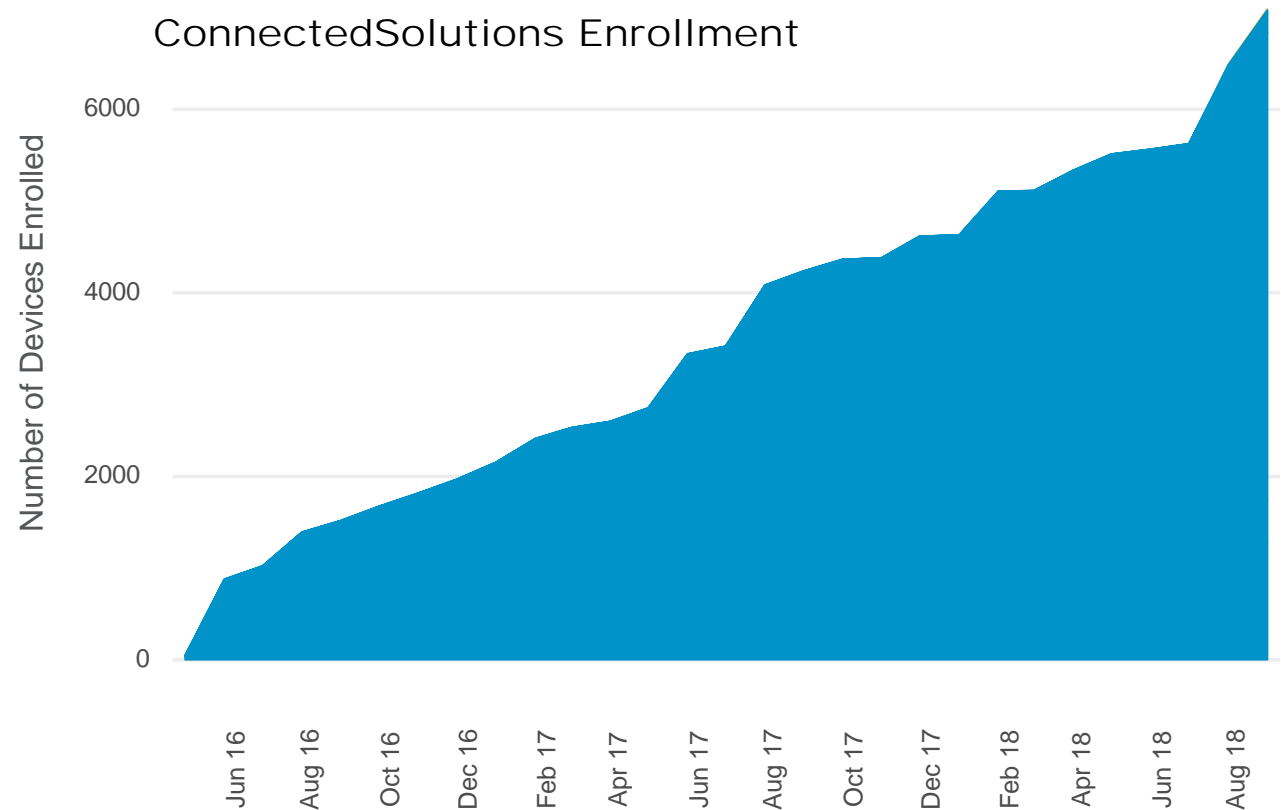IEPEC

The ConnectedSolutions Program.

National Grid's 2018 Bring Your Own Thermostat (BYOT) Demand Response Program

Over **7,000** devices enrolled in Massachusetts through September 2018
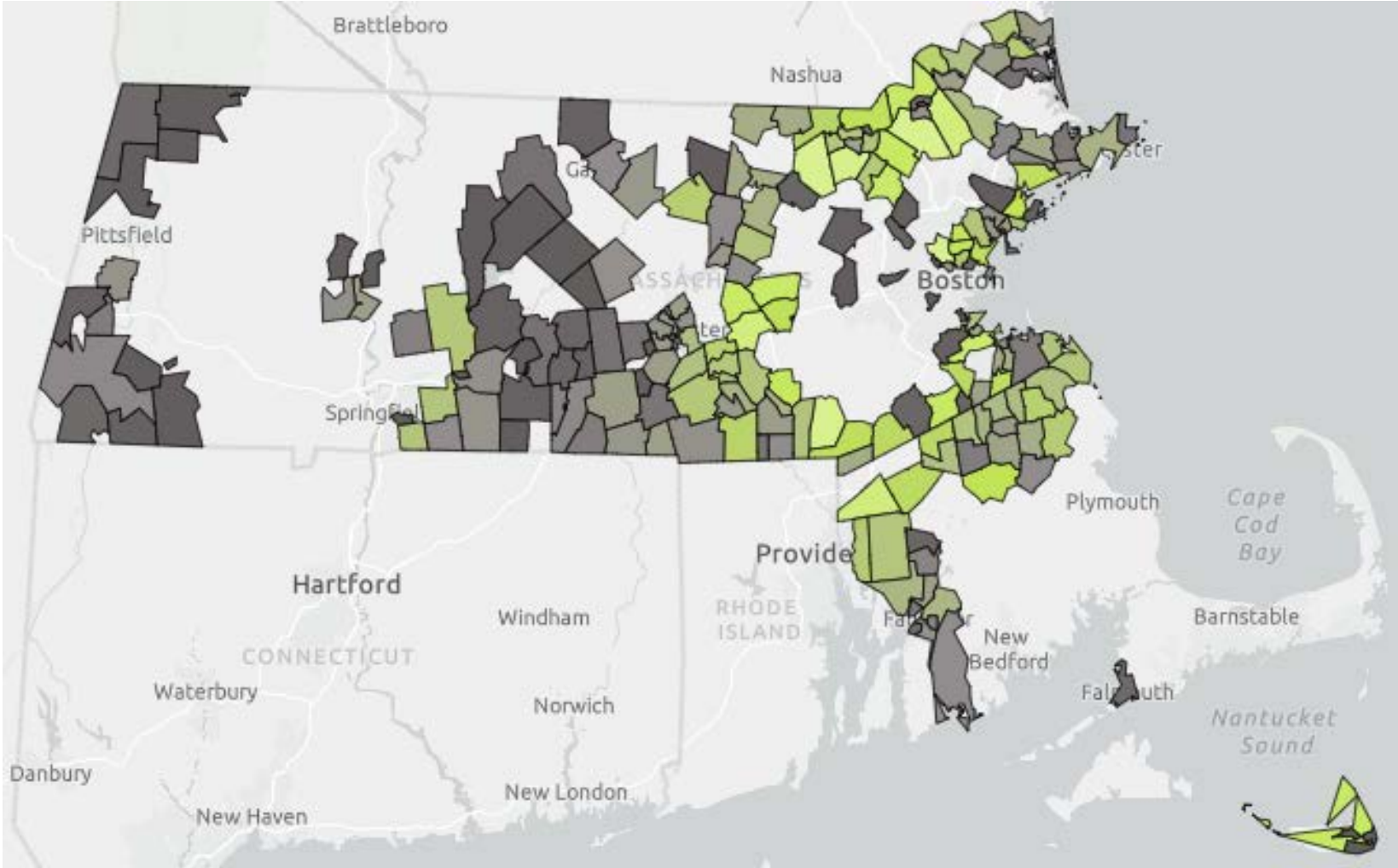
8 eligible device manufacturers

3rd year of implementation

15 events per season

ConnectedSolutions Enrollment

Source: Navigant

The ConnectedSolutions Program.

Source: Navigant

The Evaluation Design Challenge.

Robust Baseline

Results with internal and external validity

Maximum Savings
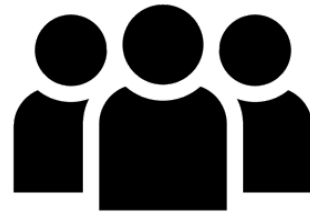
Limited number of devices in control group

Real-World Implementation

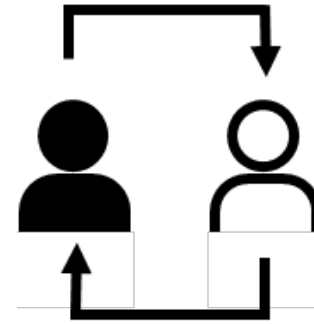Design should allow for a typical program experience
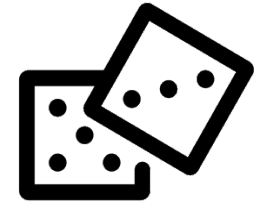
DR Evaluation Methods.

Customer-Specific Baseline Load (X-of-Y)

Within-Subject Regression
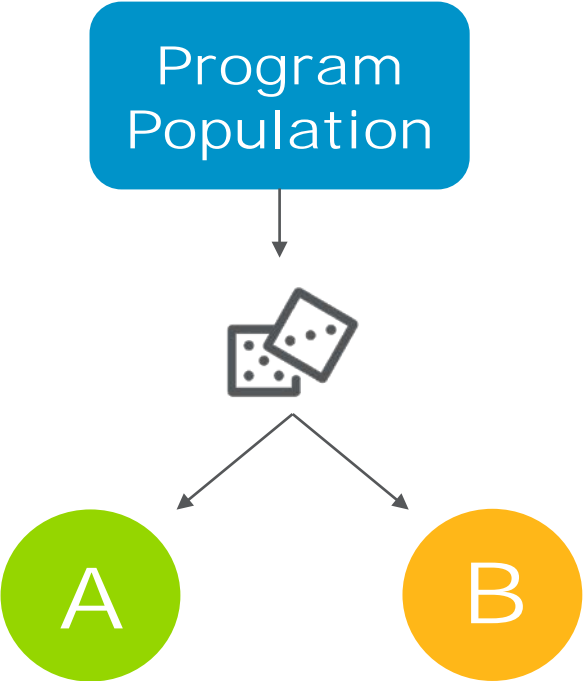
Matched Control Group

Randomized Controlled Trial (RCT)

Low ➜ **Rigor** **High**

The Randomized Controlled Trial (RCT) Approach.

Typical RCT

A/B Design

Program Population

A   B

National Grid's RCT

A/B/C Design

Program Population

A   B   C
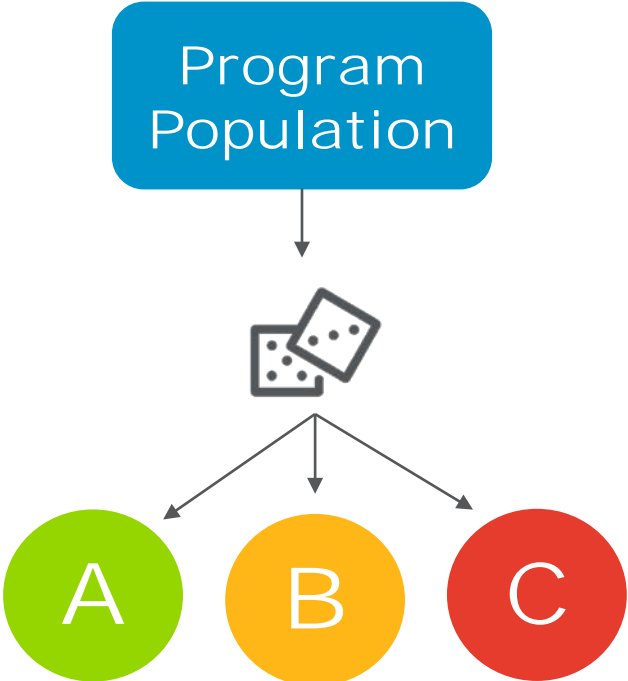
RCT Implementation.

Group Dispatch

Event	Treatment Groups	Control Groups
1	A C	B
2	B C	A
3	A C	B
4	B C	A

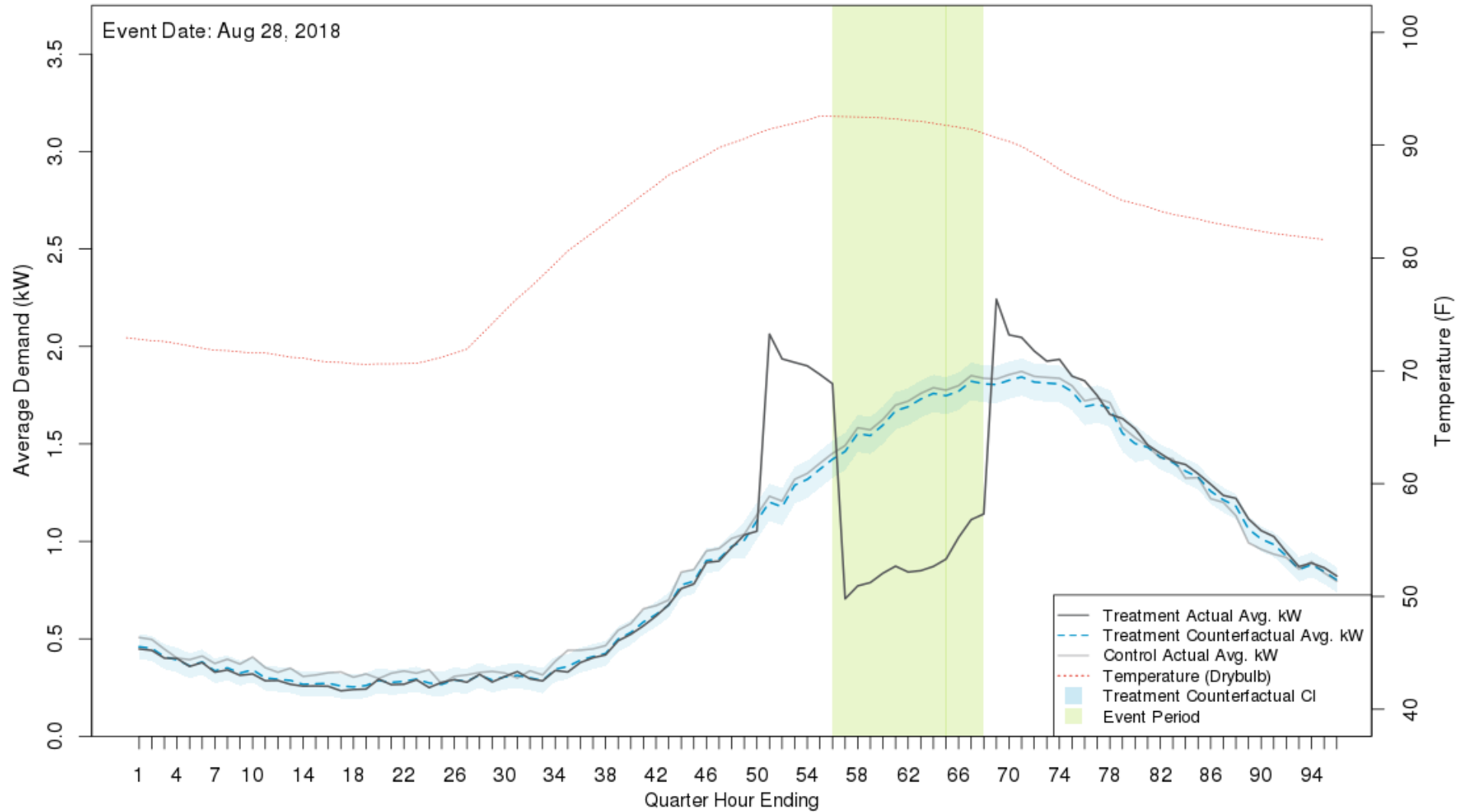## Group Hourly Load Profiles
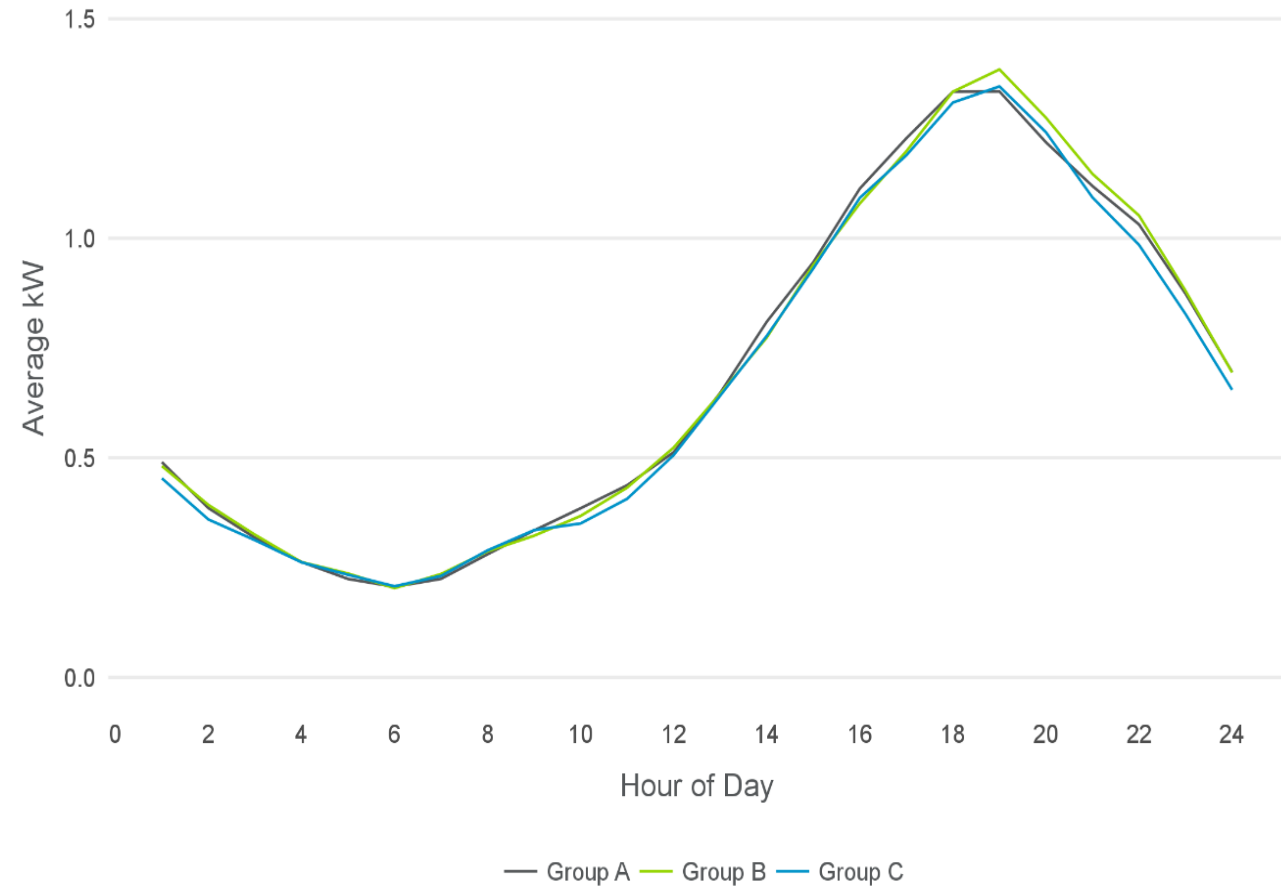
Source: Navigant

So what happened?

2018 Impacts.
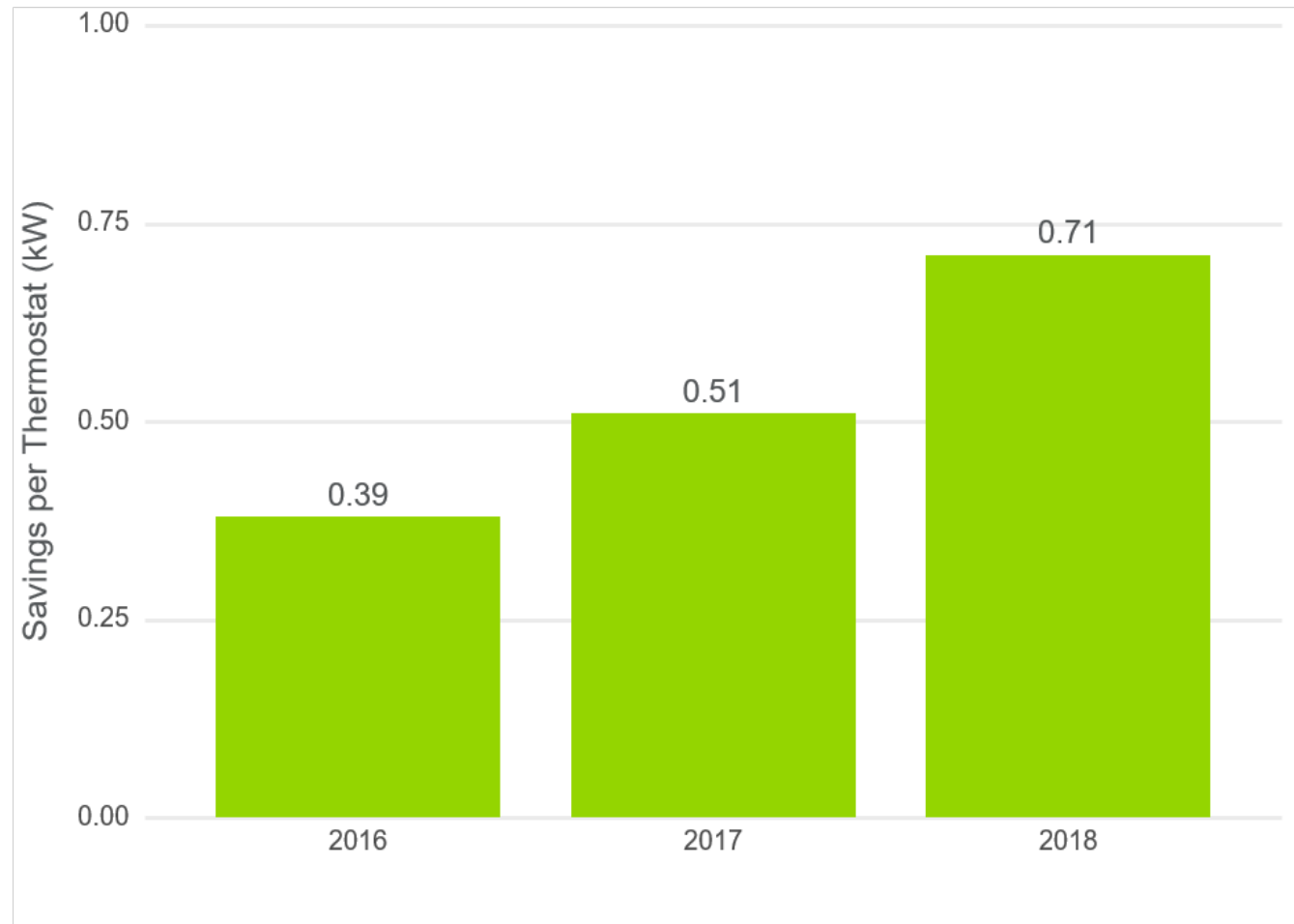
Robust Baseline

Source: Navigant

2018 Impacts.

Evaluation Results

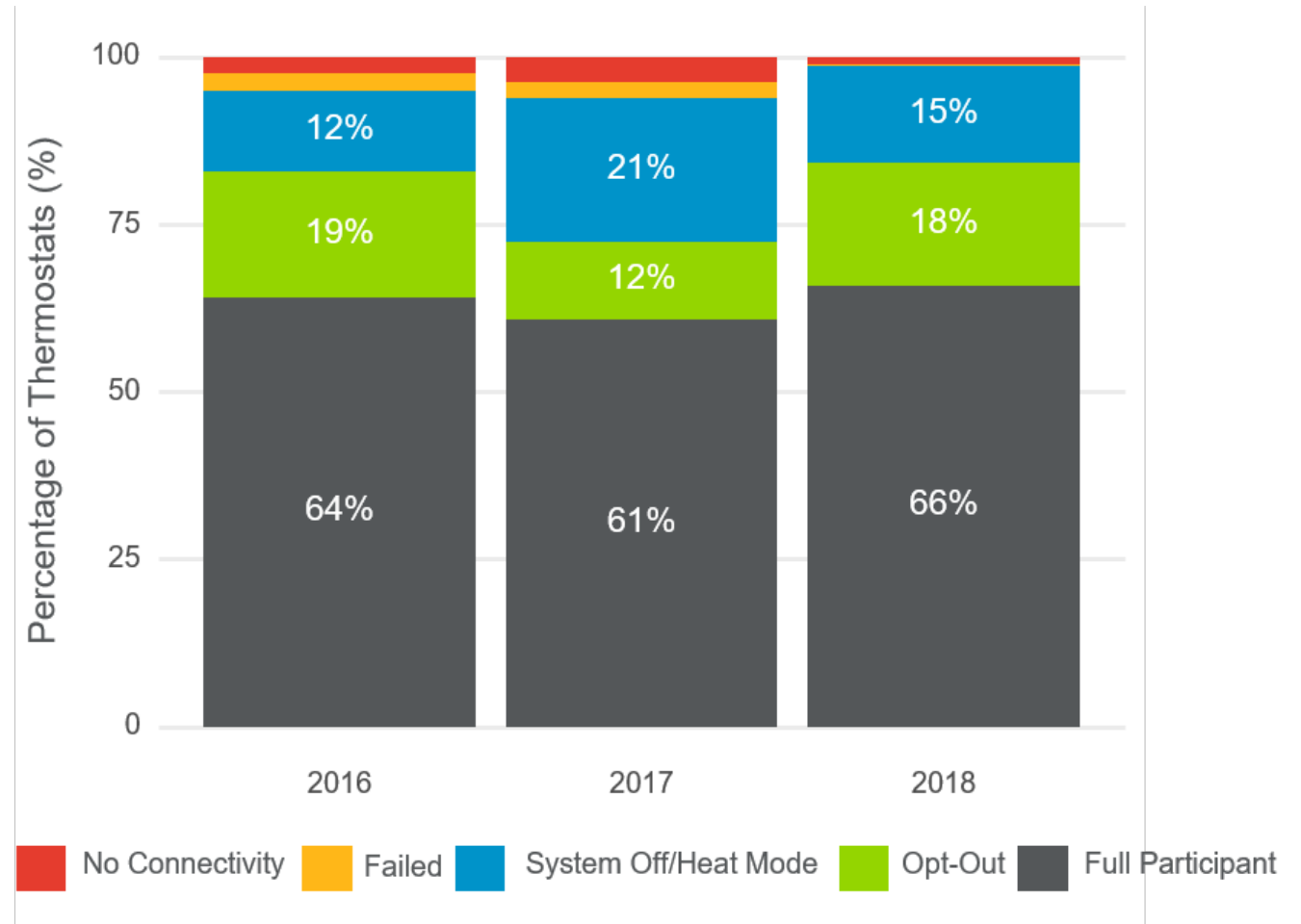2018 savings were higher than the previous two years

Source: Navigant

2018 Event Participation.

Highest Rate of Full Participation

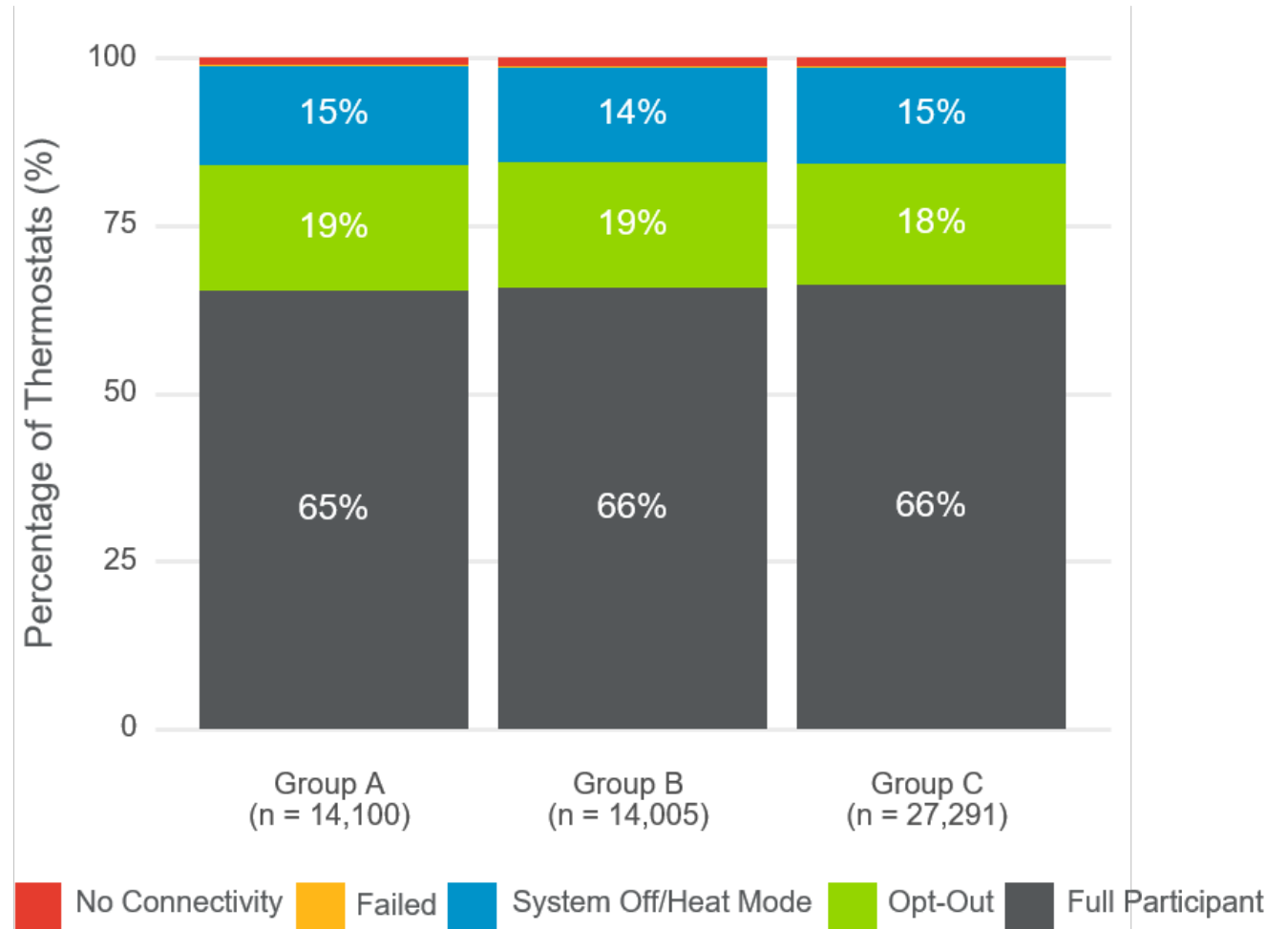Decreased rates of connectivity loss or other dispatch failures

Source: Navigant

Event Participation by Group.

No Evidence of Event Fatigue

All three RCT groups had virtually identical rates of participation across the five categories

Source: Navigant

Key Takeaways

2018 Savings

RCT evaluation design yielded a robust estimate of savings.

Event Fatigue

No evidence of event fatigue in a 15 event season. Group A, B, and C event participation was nearly identical over the course of the season.

Control Group Size

The A/B/C design limited the control group size to 1/3 of the 2018 program population.

Thank You

Navigant

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