



Opinion **Dynamics**

NO PARTICIPANT IS AVERAGE!

How to Inform Program Optimization
and Improve Customer Engagement
Using Advanced Impact Estimation
and Clustering

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Research Questions

- How can we understand which characteristics are related to energy savings?
- How do participant energy impacts change over time?
- Are there ways to approach or message customers to improve program performance?



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Advanced Methods for Understanding Participant Impacts



Participants respond to programs differently



Participants have different housing and equipment



Participants have varying schedules



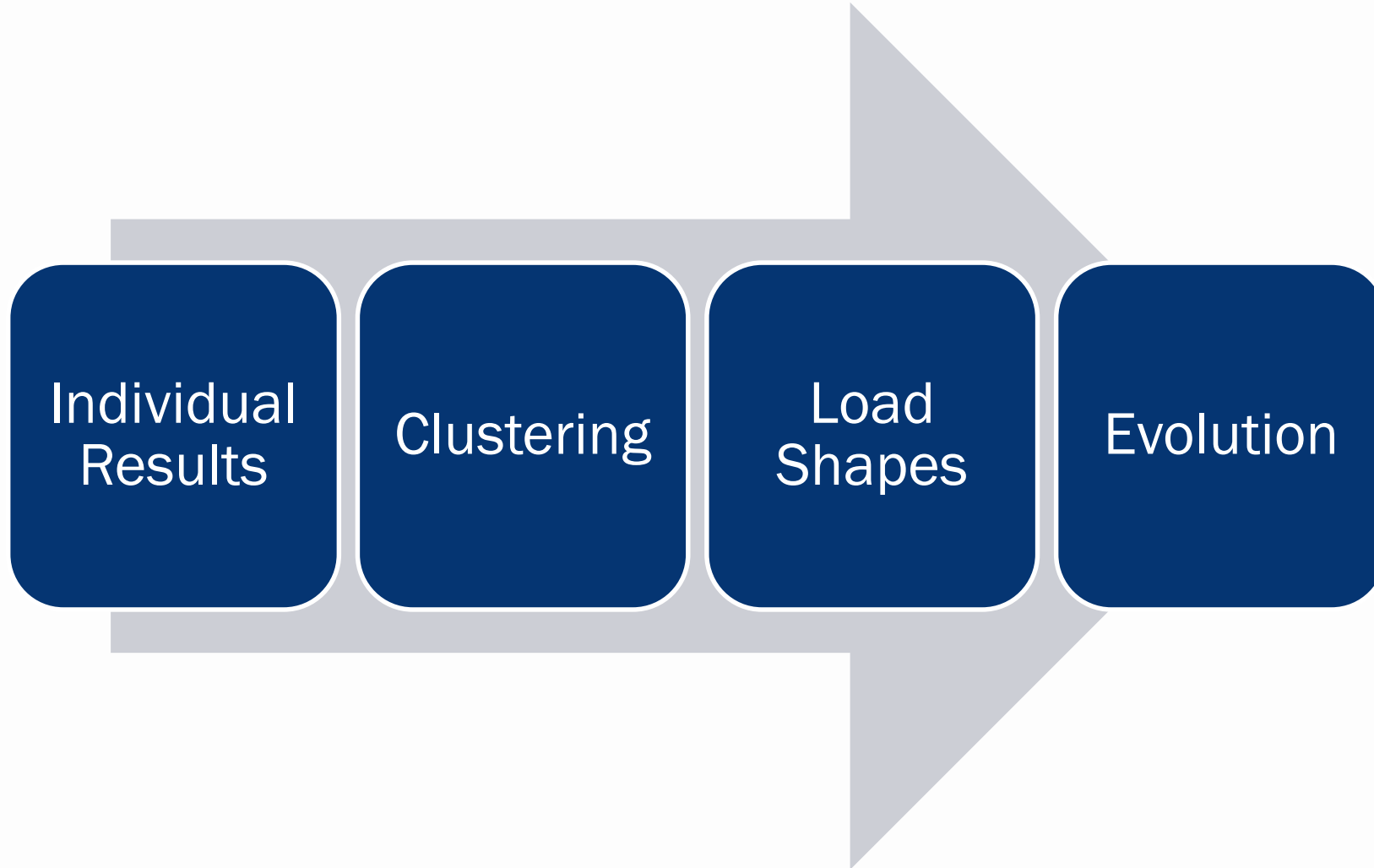
Participants change over time

Key Takeaways

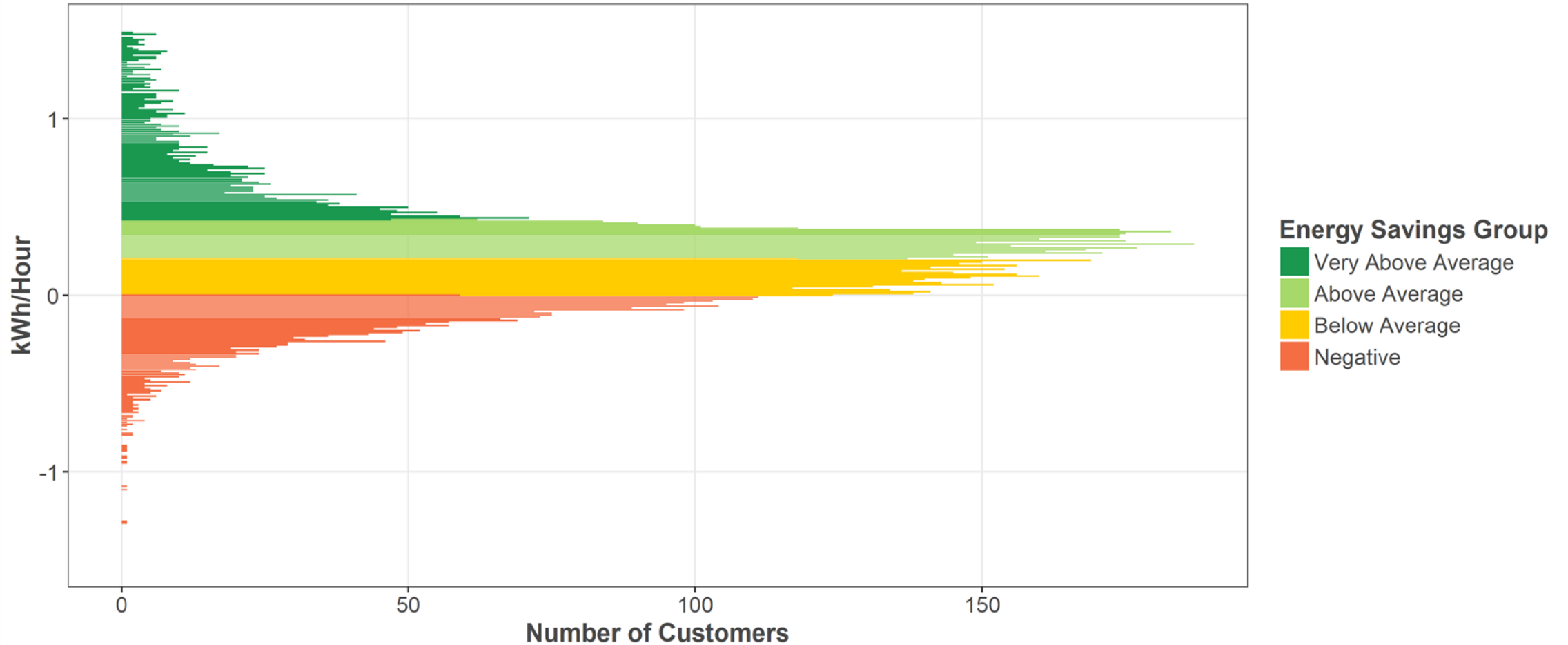
- There are a broad range of tools that we can use to help understand participants
- When we understand the differences in participants and how these differences are related to energy use, we can approach and message customers in different ways
 - Recruiting customers who are similar to high-savings customers may improve program effectiveness
 - Behavioral programs have potential benefit from more targeted messaging



Understanding Variation in Customer Impacts

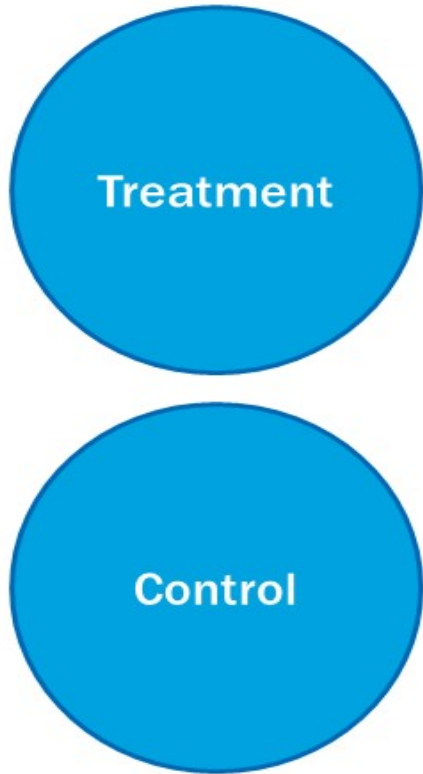


Individual Impact Estimates



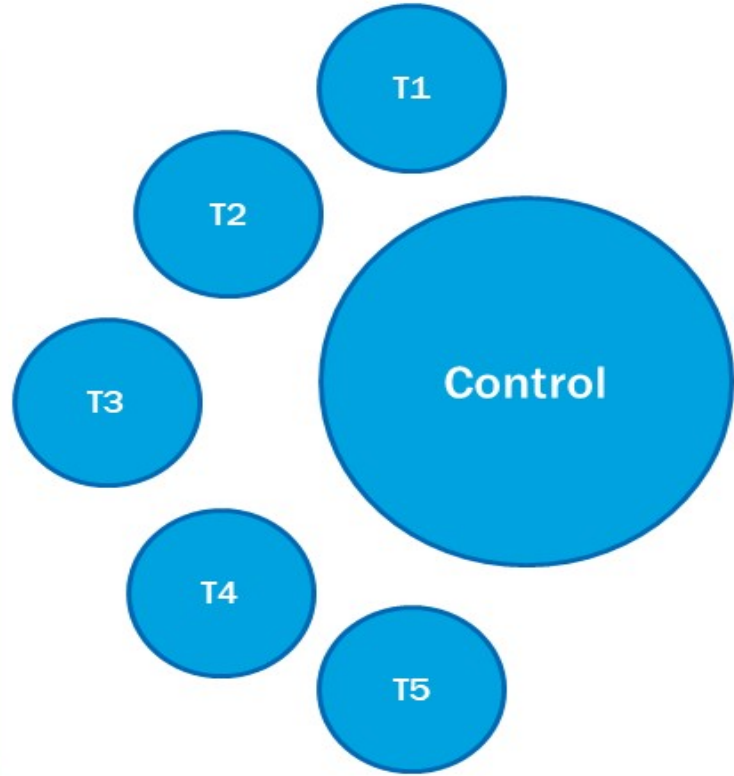
Interpretation of Grouped Results

Linear Fixed Effects
Regression Model



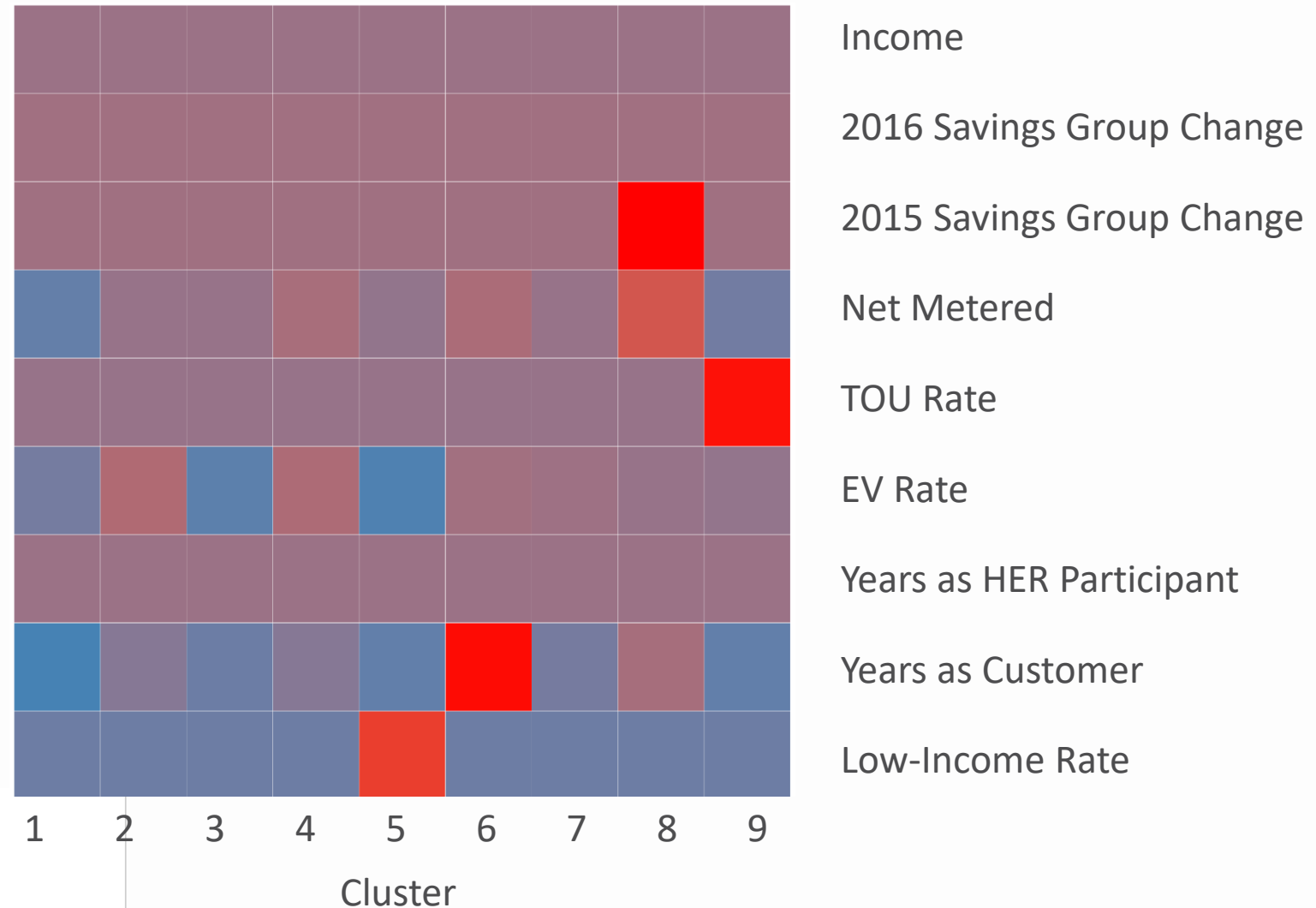
Causal
Impacts

Multi-Level Model



Relative Correlated Impacts (size and
magnitude of savings by groups)

Understanding Cluster Characteristics



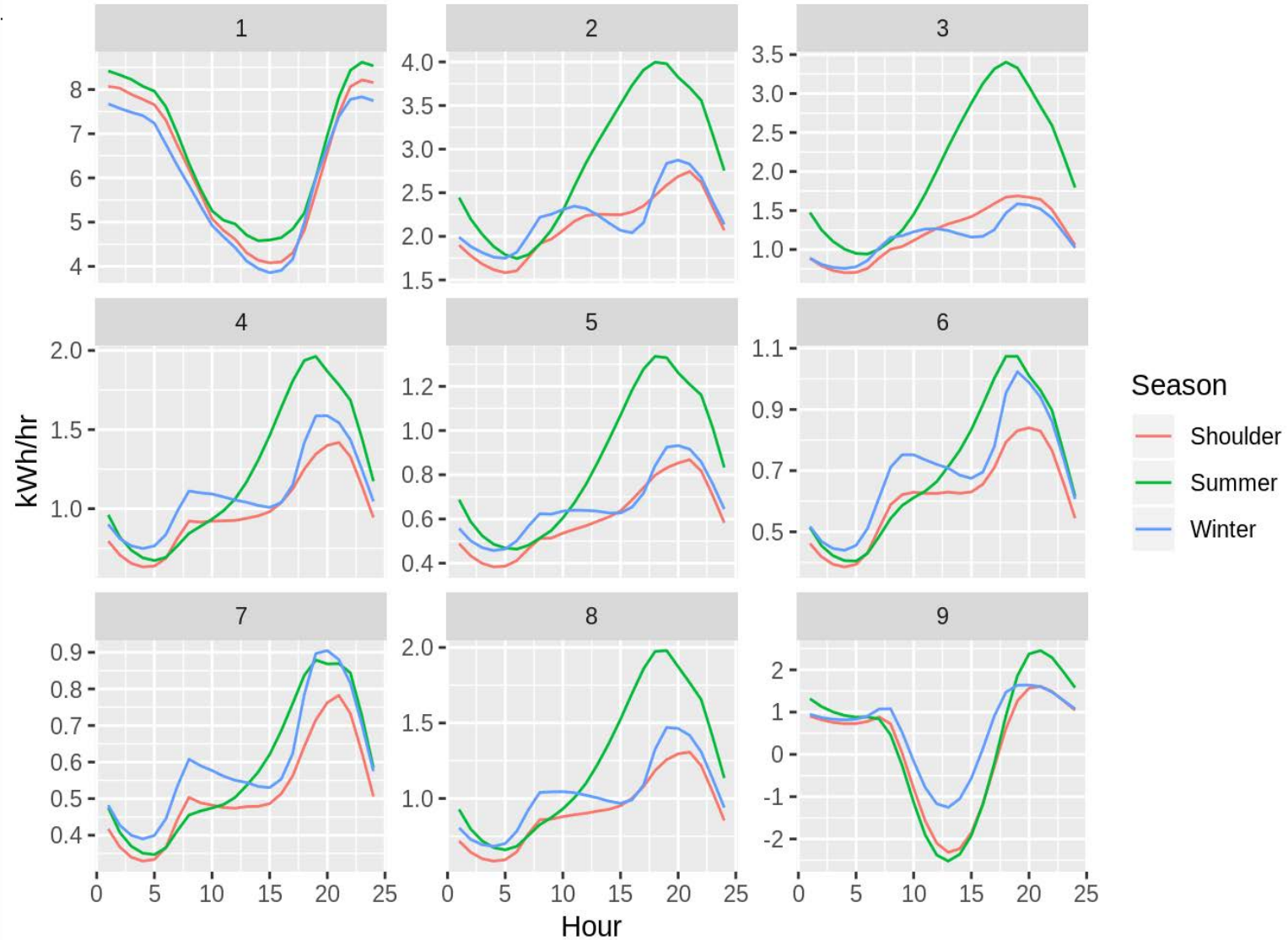
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Understanding Cluster Differences

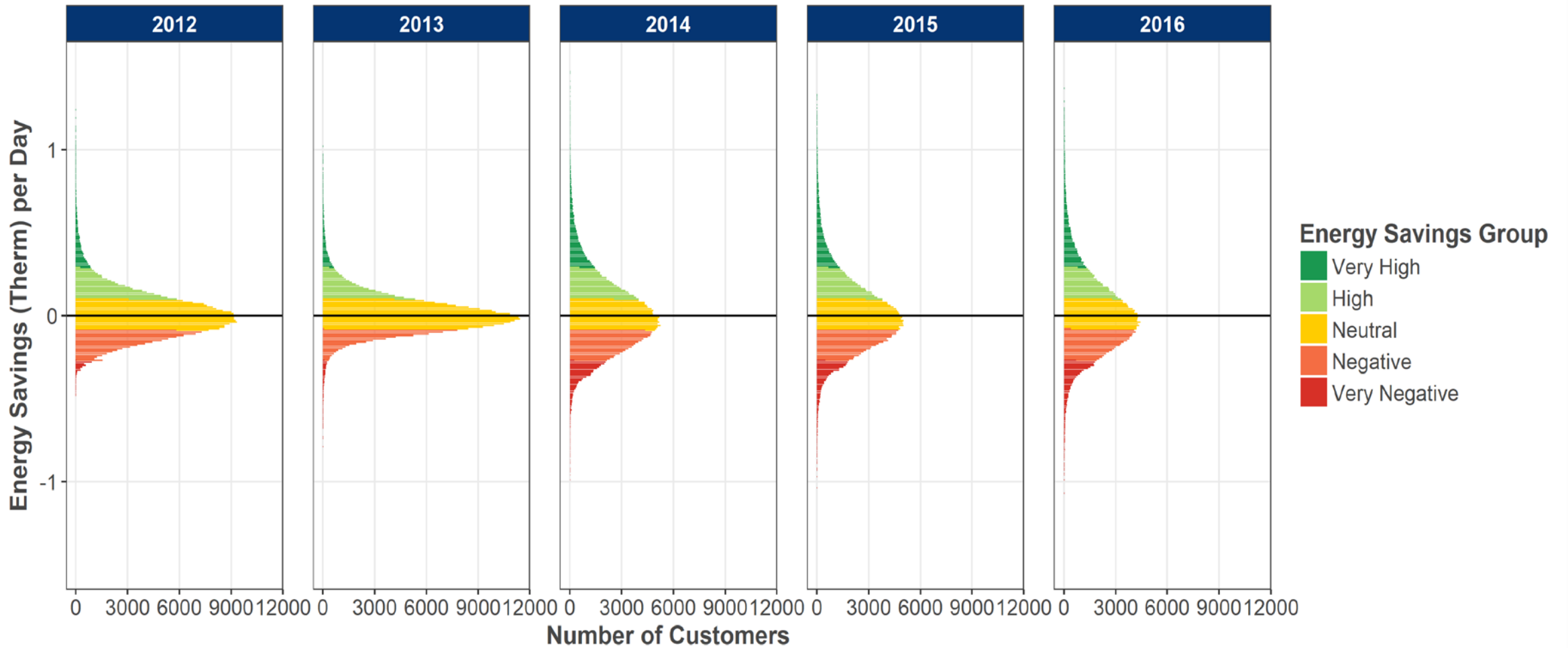
Characteristics	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7	Cluster 8	Cluster 9
Share of Sample	0.23%	3.88%	14.13%	20.92%	18.13%	10.35%	25.18%	3.77%	3.40%
Energy Savings	↓ ^L	↓	↓	↓	○	○	○	↑	↑ ^H
Energy Consumption (Summer)	↑ ^H	↑	↑	○	○	○	○	○	↓ ^L
Energy Consumption (Shoulder)	↑ ^H	↑	○	○	○	○	○	○	↓ ^L
NEM/EV/TOU	↑ ^H	○	○	○	○	○	○	○	↑ ^H
CARE	○	○	↑	○	↑ ^H	○	○	○	○

 = Significantly higher than average
  = Significantly lower than average
  = Average
 = Highest of all segments
 = Lowest of all segments

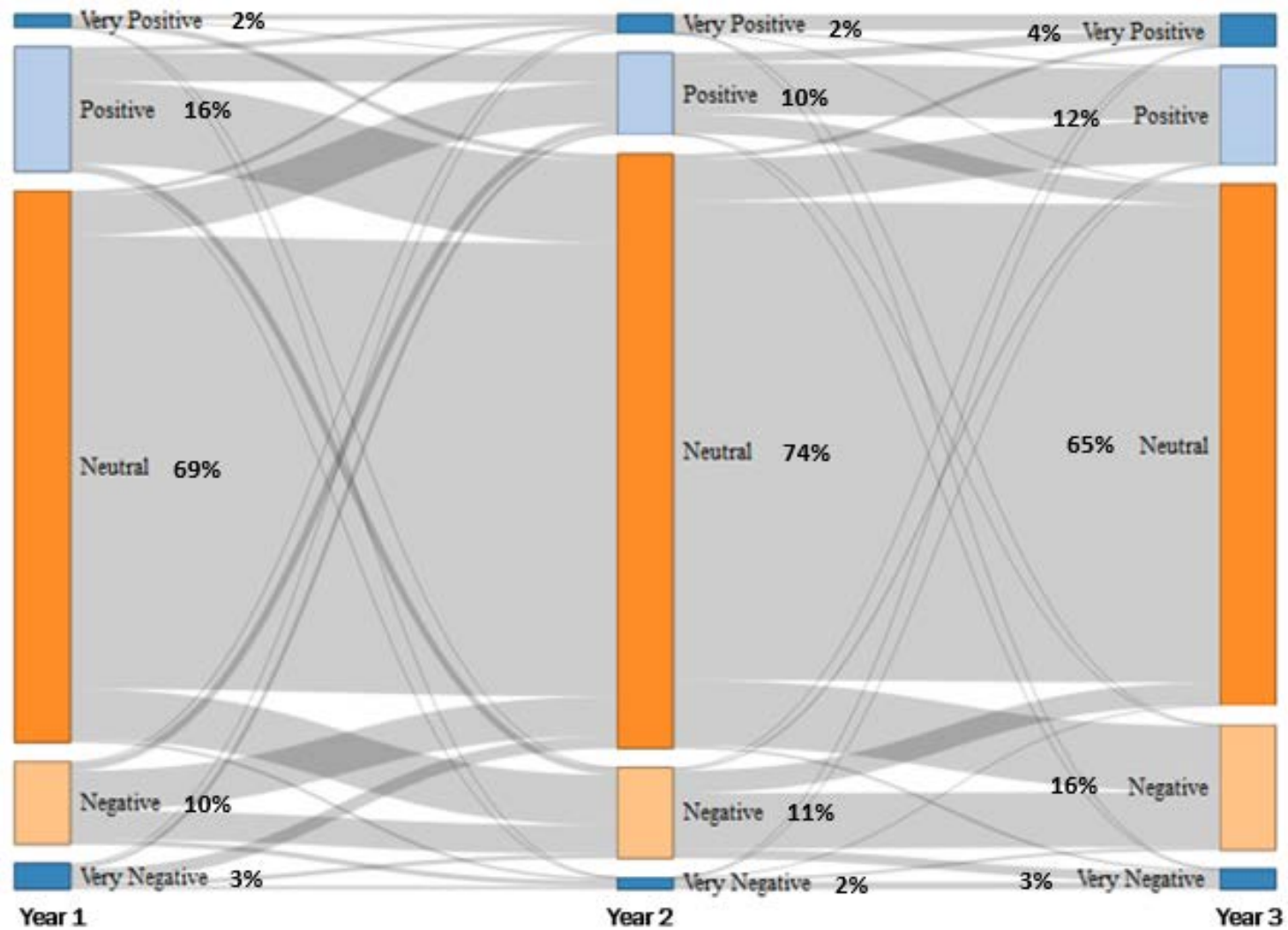
Load Shapes



Participant Impacts Evolve



Impact Evolution



Leverage Customer Diversity



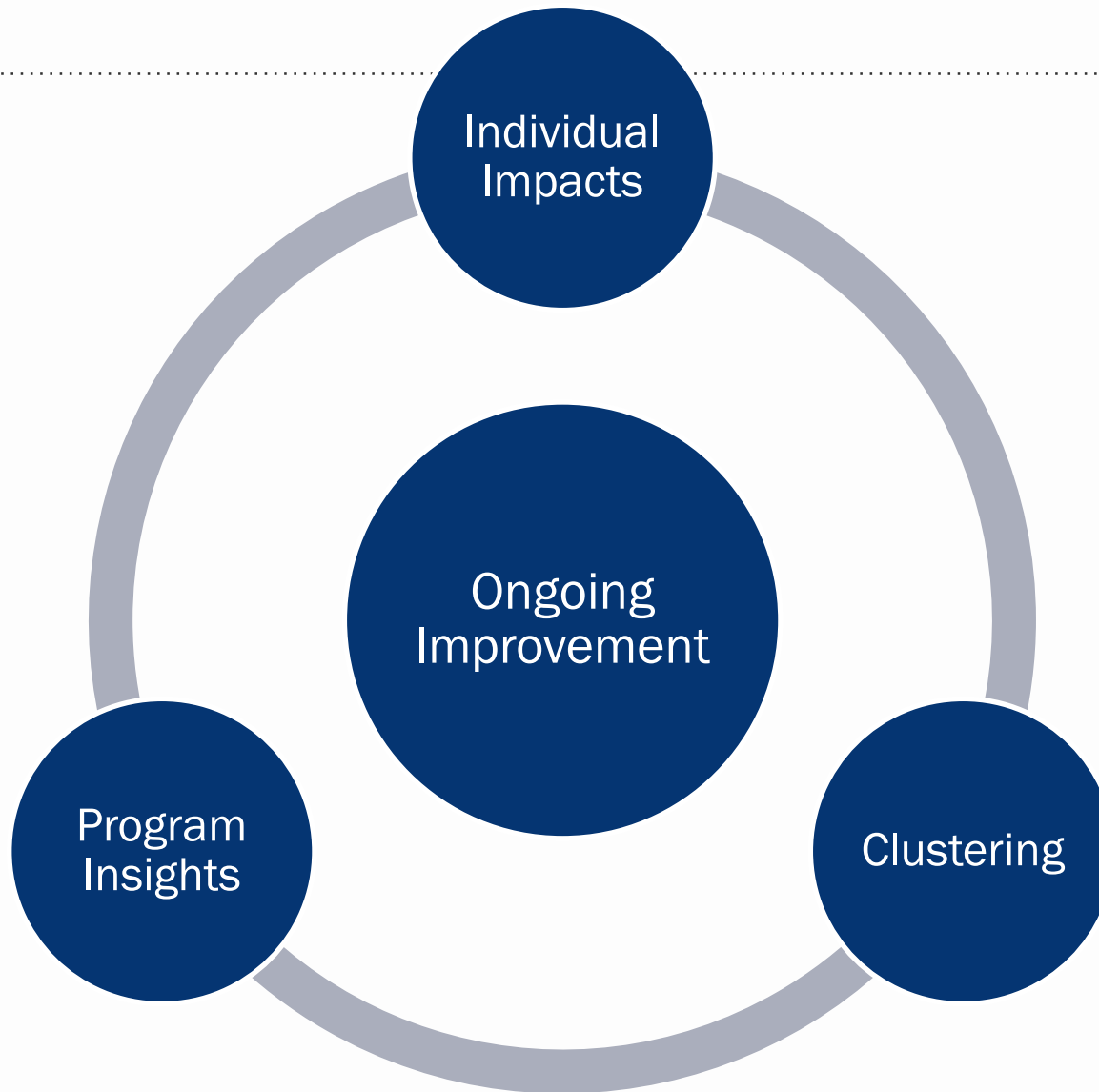
Use advanced impact methods to elucidate the range of impacts among participants



Identify groups of customers who can be approached and messaged differently



Use insights to inform program design and outreach





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