



Matching and Variation in Adoption

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MATCHING AND VIA: QUASI-EXPERIMENTAL METHODS IN A WORLD OF IMPERFECT DATA

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SEE Action Report

- VIA more highly ranked than matched comparison group methods



Evaluation, Measurement, and Verification (EM&V) of Residential Behavior-Based Energy Efficiency Programs: Issues and Recommendations

Customer Information and Behavior Working Group
Evaluation, Measurement, and Verification Working Group

May 2012

Presentation Overview

- Background on the program database
- Description of VIA and matched comparison group methods
- Key considerations for each method
- Recommendations



Program Background

MyMeter Overview

Program features include:

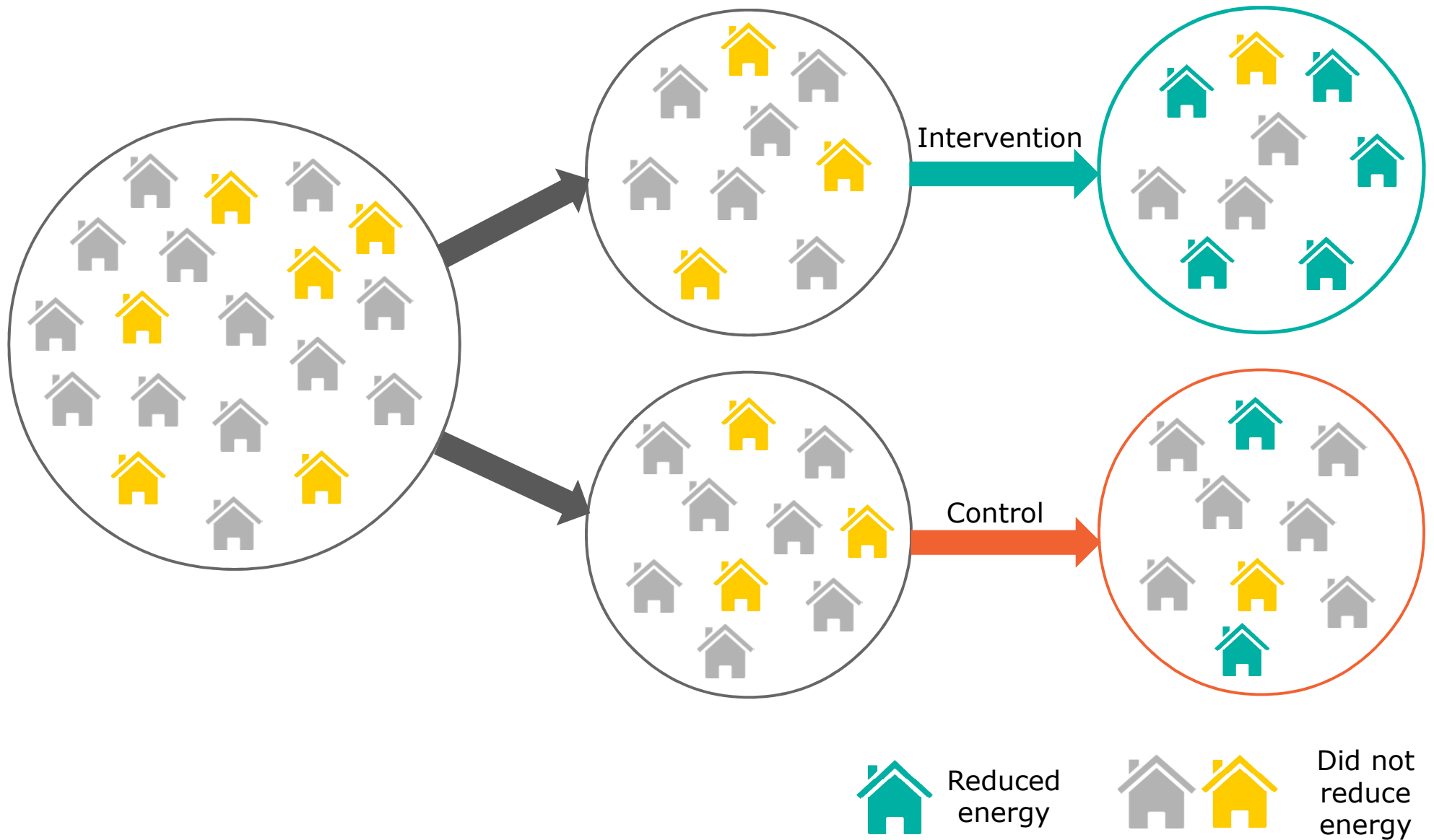
- Comparative usage
- Energy challenges
- Property profile
- Bill threshold alerts
- Peak time alerts
- Energy markers
- Outage alerts





Evaluation Methods

True Experiments



Quasi-Experiments

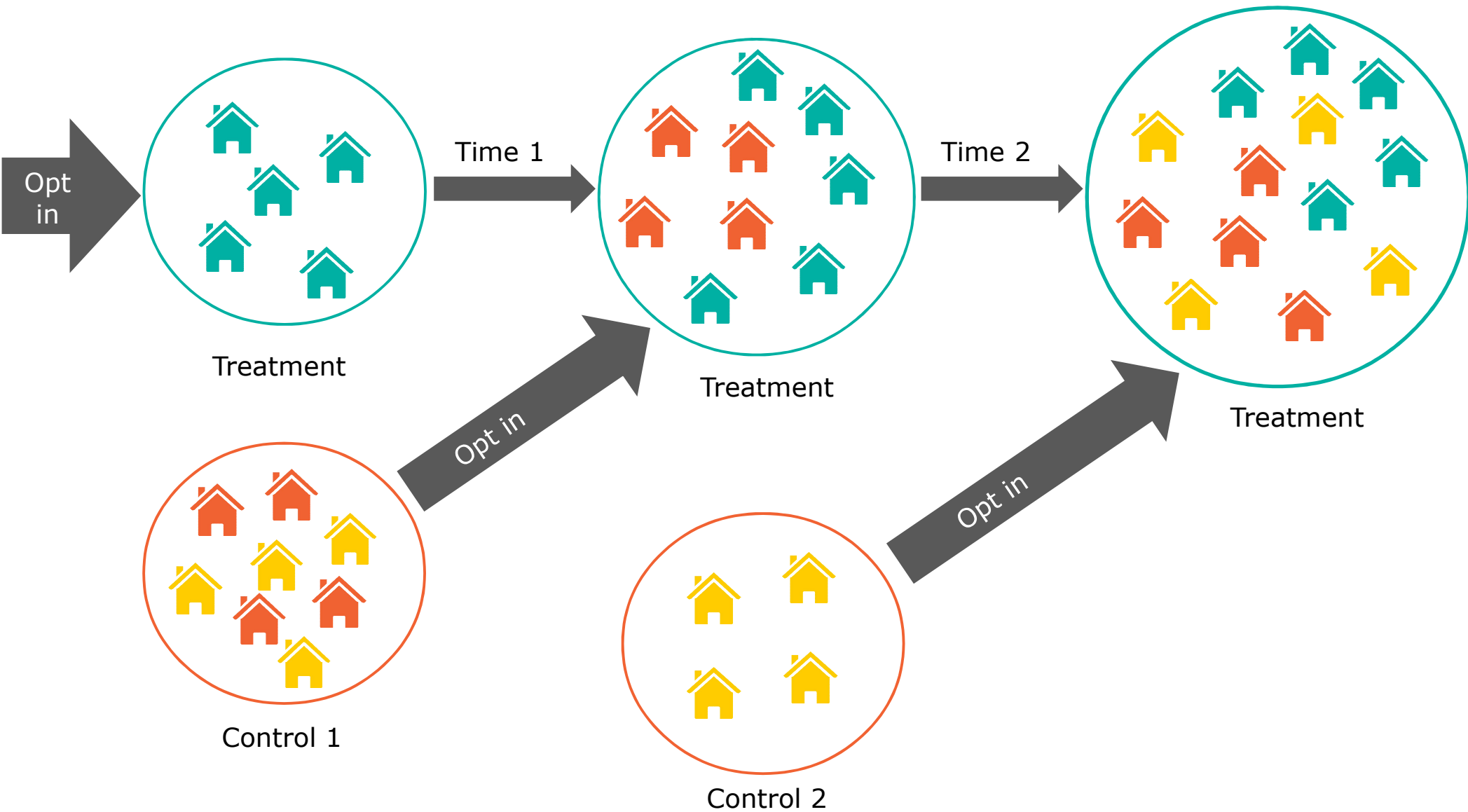


Intervention
Group

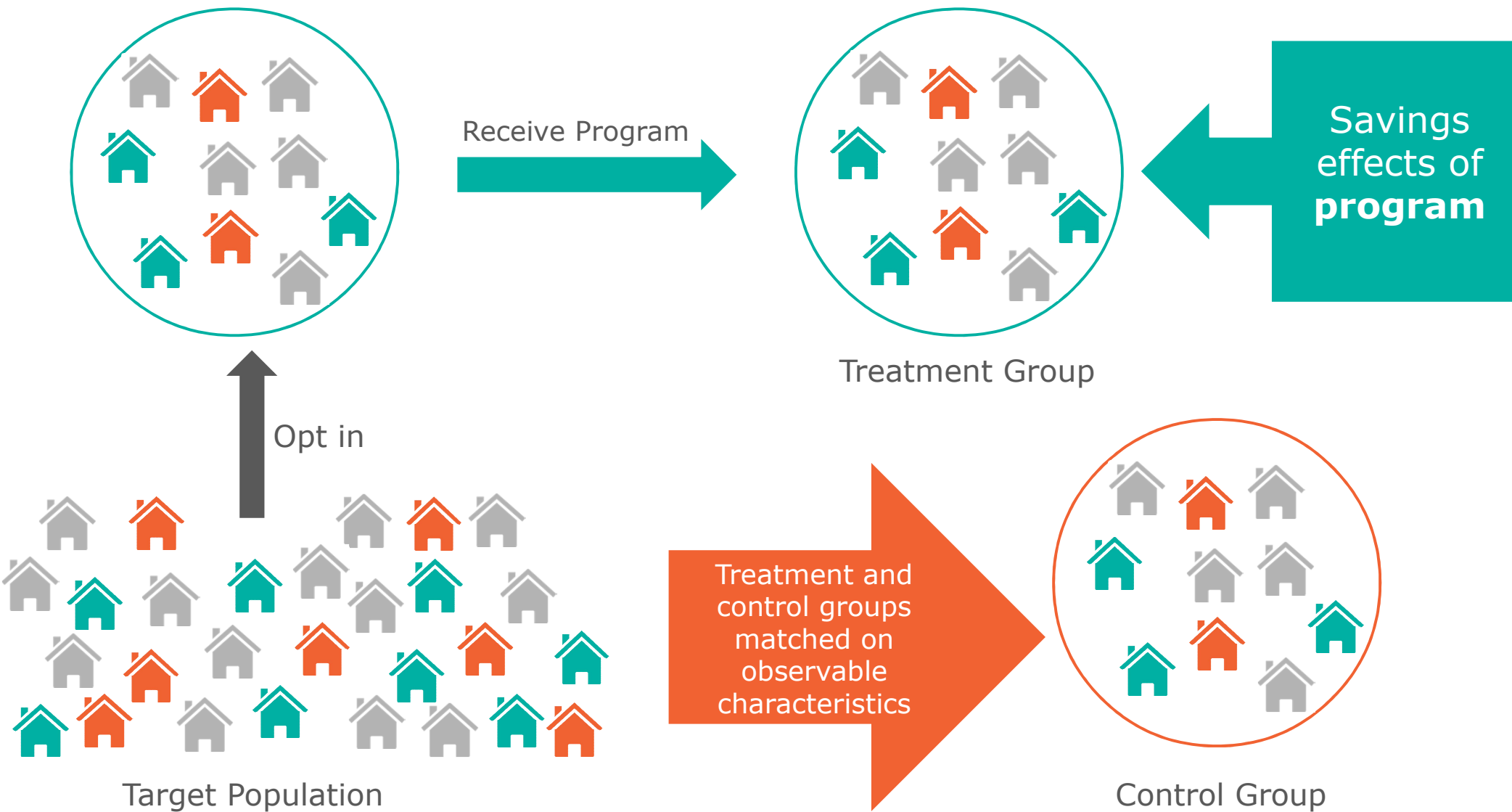


Control
Group

Variation in Adoption



Matched Comparison Group

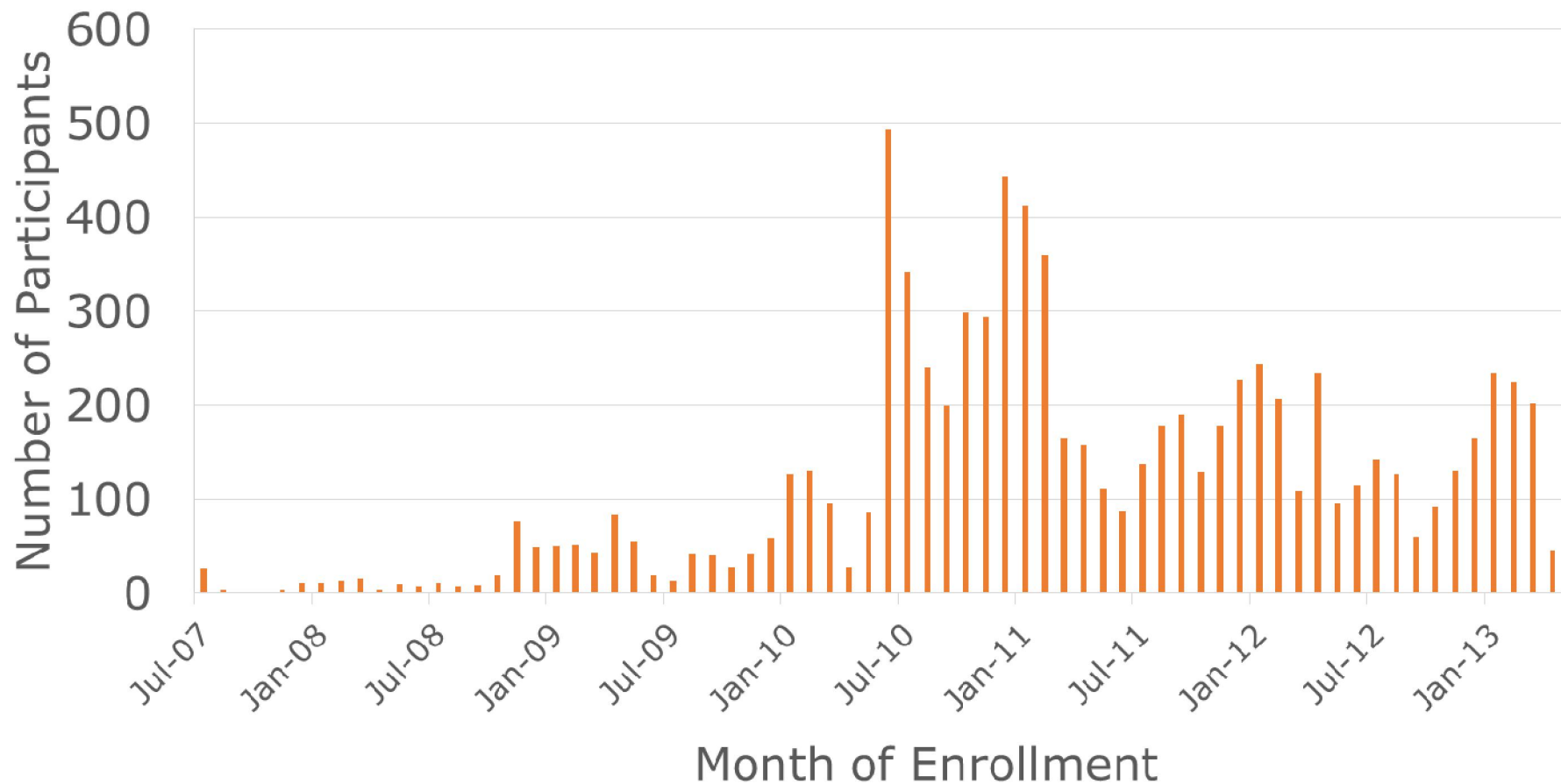


Evaluation Approach Considerations

- Enrollment timing
- Enrollment saturation
- Data availability
- Selection bias
- Territory and program-specific conditions

Enrollment Timing

Key Question: Is enrollment spread out across 6 more months or did it happen during a short period of time?

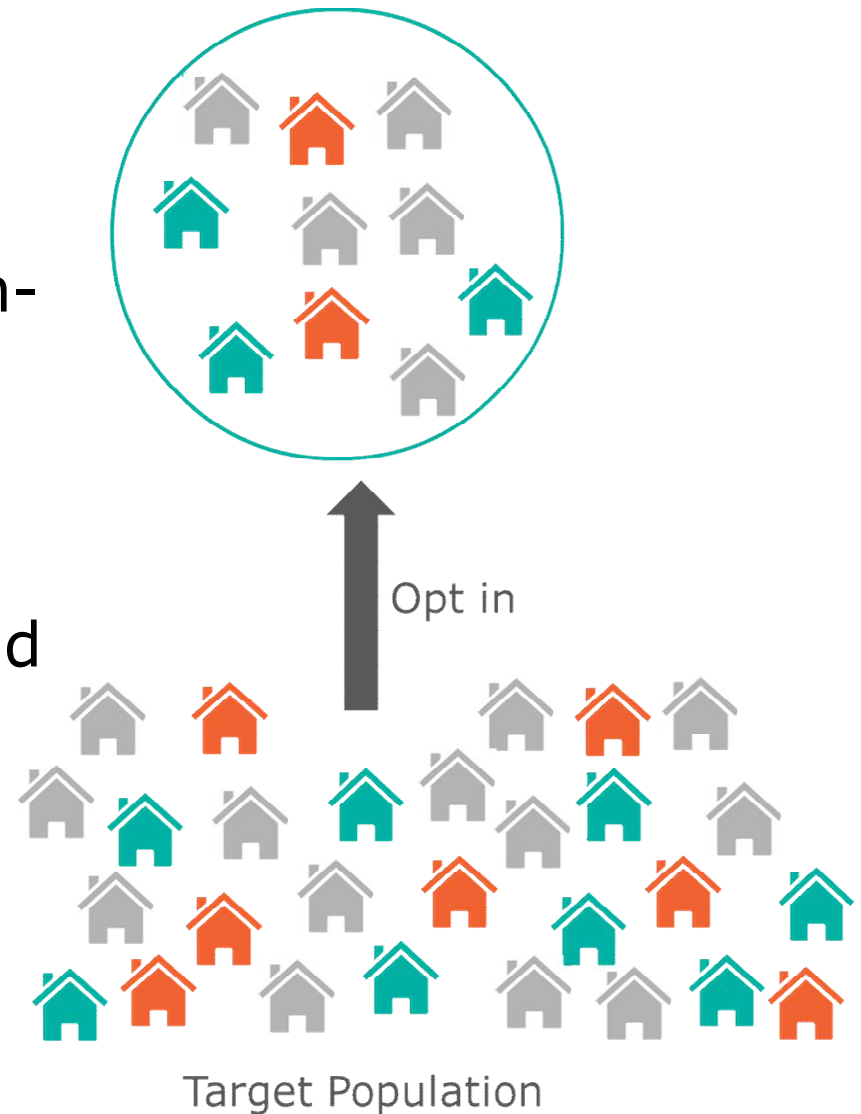


Enrollment Saturation

Key Questions:

Matching: Are there enough non-participants to select a comparison group?

VIA: Are there enough earlier and later adopters?



Data Availability

Key Questions:

Matching: Are sufficient pre- and post- data available for a large pool of customers including non-participants.

VIA: Are data available for earlier and later enrollees?



Territory and Program Conditions

Key Questions:

Matching: Are there specific customer types in the territory that have unusual energy usage patterns that may be difficult to match?

VIA: Can communication about and knowledge of the program be restricted to particular groups of customers at different points in time?

Selection Bias

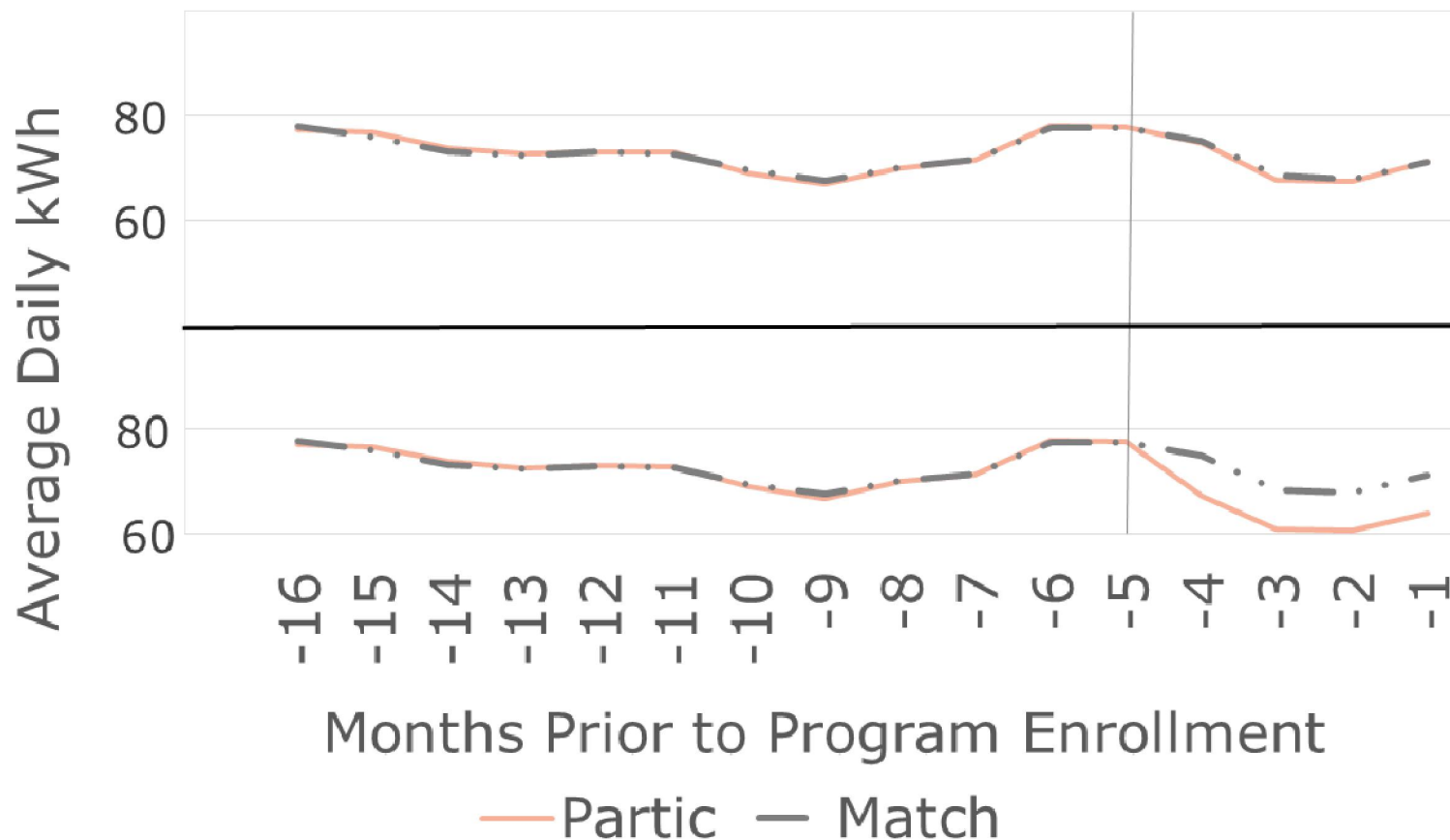
Key Questions:

Matching: Does matching on energy usage control for other differences between participants and comparison customers?

VIA: Are customers who enroll later similar to customers who enroll earlier except for knowledge of the program?

Selection Bias

Matched Comparison Group Method – Imbens and Woolridge (2009) quasi-test

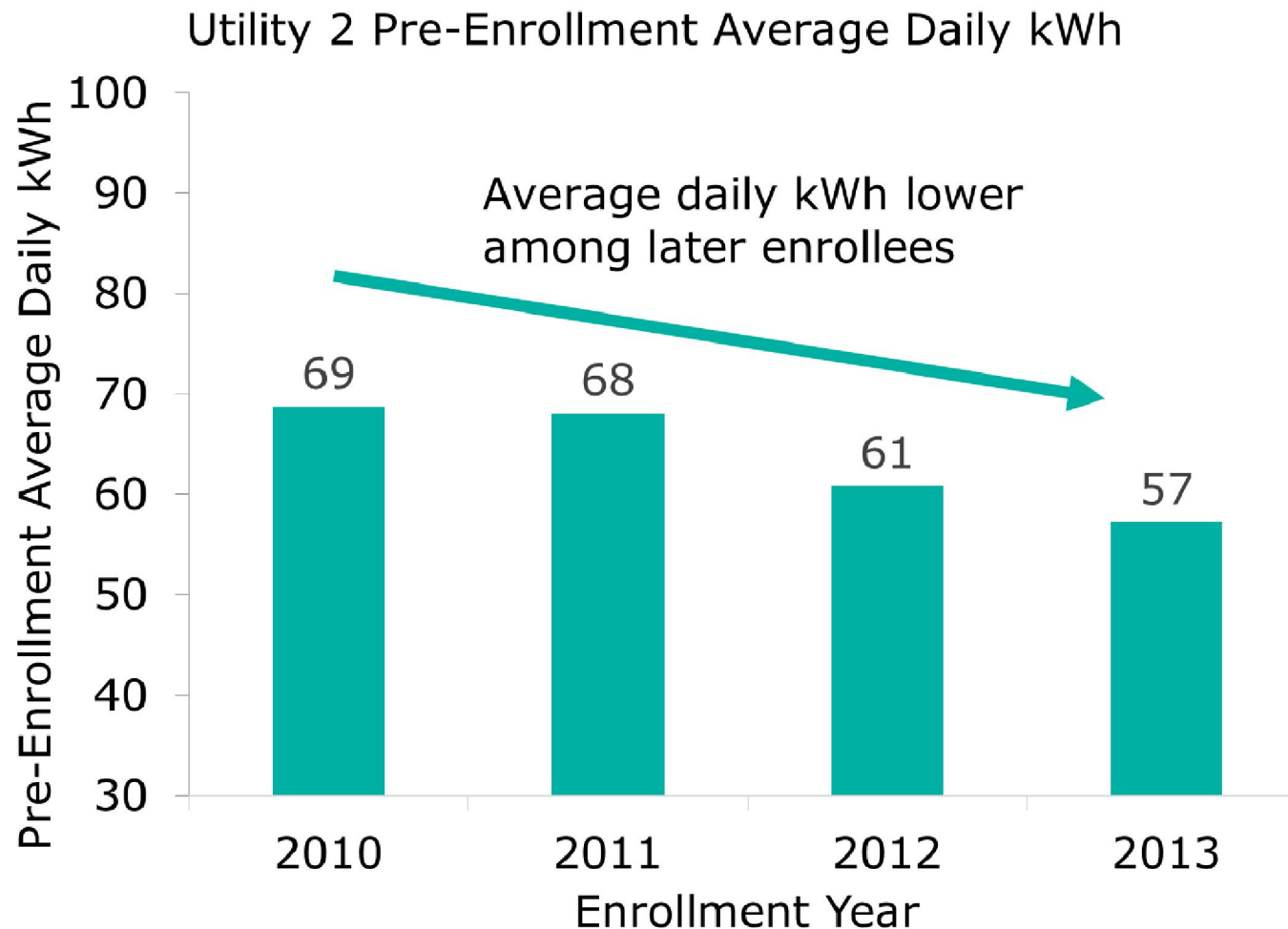


Groups are well-matched in test period

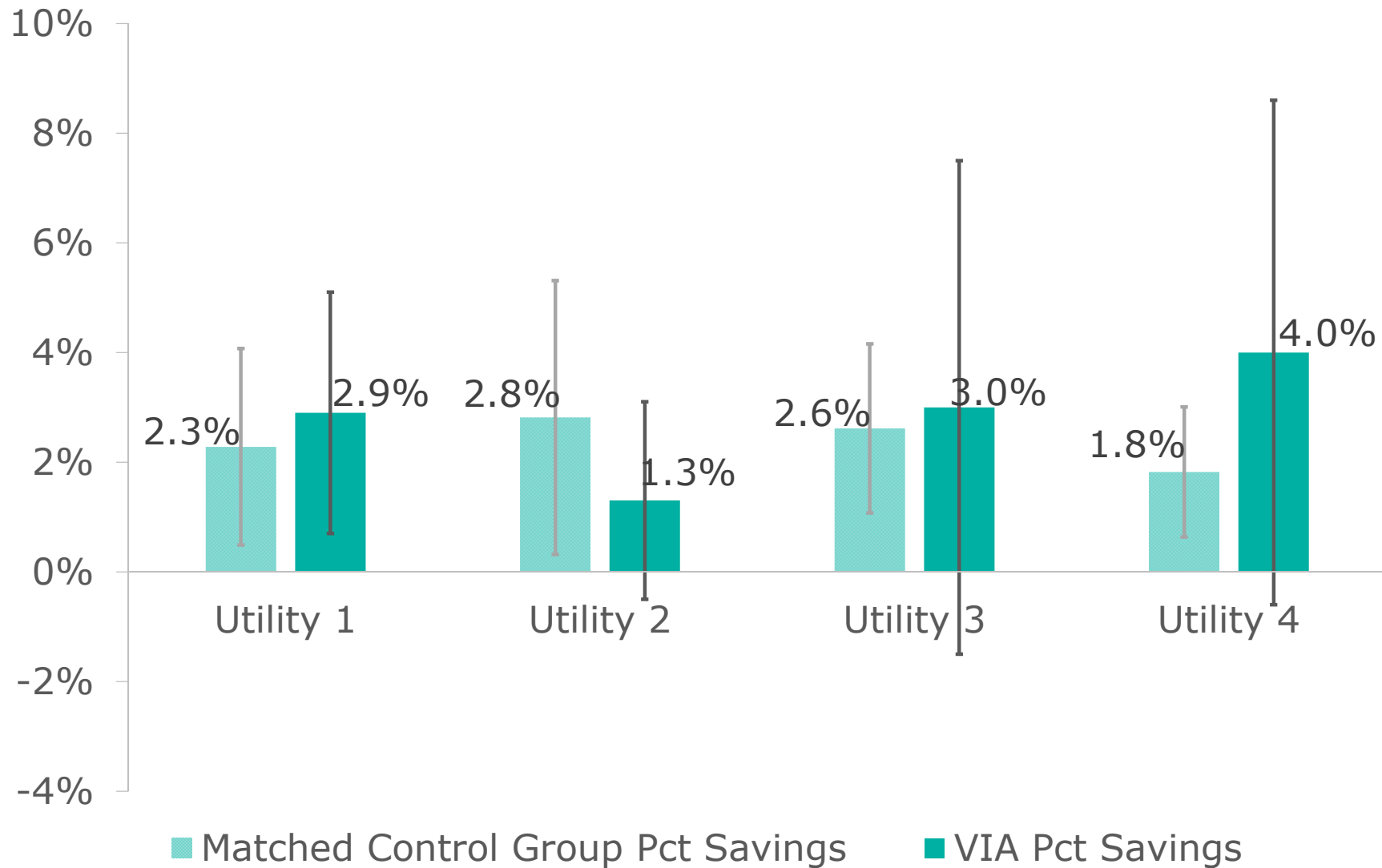
Groups are NOT well-matched in test period

Selection Bias

VIA Method – Assumes no difference in later and earlier adopters



Savings Estimates



Conclusions

Matched Comparison Group Method is dependent on availability of data:

- **Territory and program-specific conditions:** Is there a large enough pool of similar non-participants from which to draw a comparison group?
- Data availability – Are pre- and post-period data available for participants and matches?
- Enrollment saturation – Is there an adequate pool of non-participants?
- Selection bias – Are there 16 or more months of pre-period data available in order to match on 12 and have a test period?

Conclusions

Variation in Adoption is more likely to be successful if planned for upfront:

- **Territory and program-specific conditions:** Can program marketing be rolled out to customers over time?
- Enrollment timing – Need to have enrollment spaced out over 9 to 12 months
- Enrollment saturation – Are there adequate numbers of earlier and later enrollees?
- Data availability – Are data available for earlier and later enrollees?
- Selection bias – Later enrollees should be similar to earlier enrollees except for knowledge of and enrollment in program

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VIA Model Specification

Average daily energy use for customer i in billing period t

- Household effects
- Series of binary variables indicating calendar month of billing period t
- Pre-period: Series of binary variables indicating number of months until enrollment for customer i in billing period t
- Post-period: Series of binary variables indicating number of months since enrollment for customer i in billing period t