

# Auditing Audits:

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## Big Savings Found in Long-Term Assessment



**Satyen Moray, ERS**

*“The implementation rate for energy saving programs based on energy audits remains discouragingly low. While the very best programs may achieve 50% implementation, rates in the 20%-30% range are more typical.”\**

*\*Promotional material for AEE-sponsored seminar at [aeeprogams.com/realtime/EABP/](http://aeeprogams.com/realtime/EABP/).*

# Agenda

- NYSERDA FlexTech Program Overview
- Study Scope & Approach
- Results
- Conclusions

# Program Profile

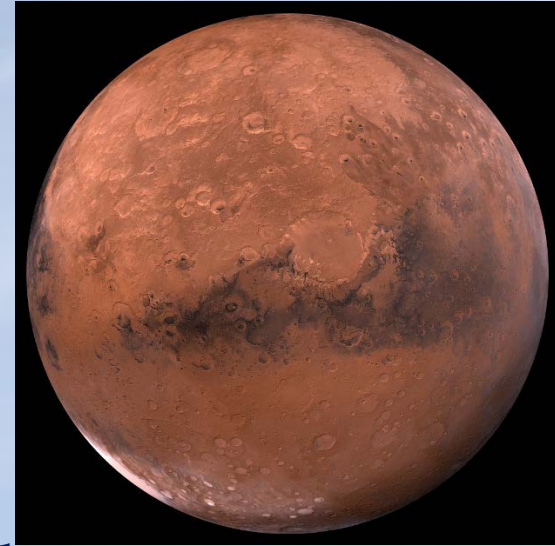
The Program:	NYSERDA FlexTech
Funding:	Cost shared, typically 50/50
Recipients:	All are non-residential, most are large
Scope:	Fuel-blind. Generation is eligible.  » Median cost of all recommended measures: \$300k; average is almost \$1 million
Providers:	Competitively-selected and approved; Customers may bring own
Volume:	Typically 100 studies per year

# Study Scope

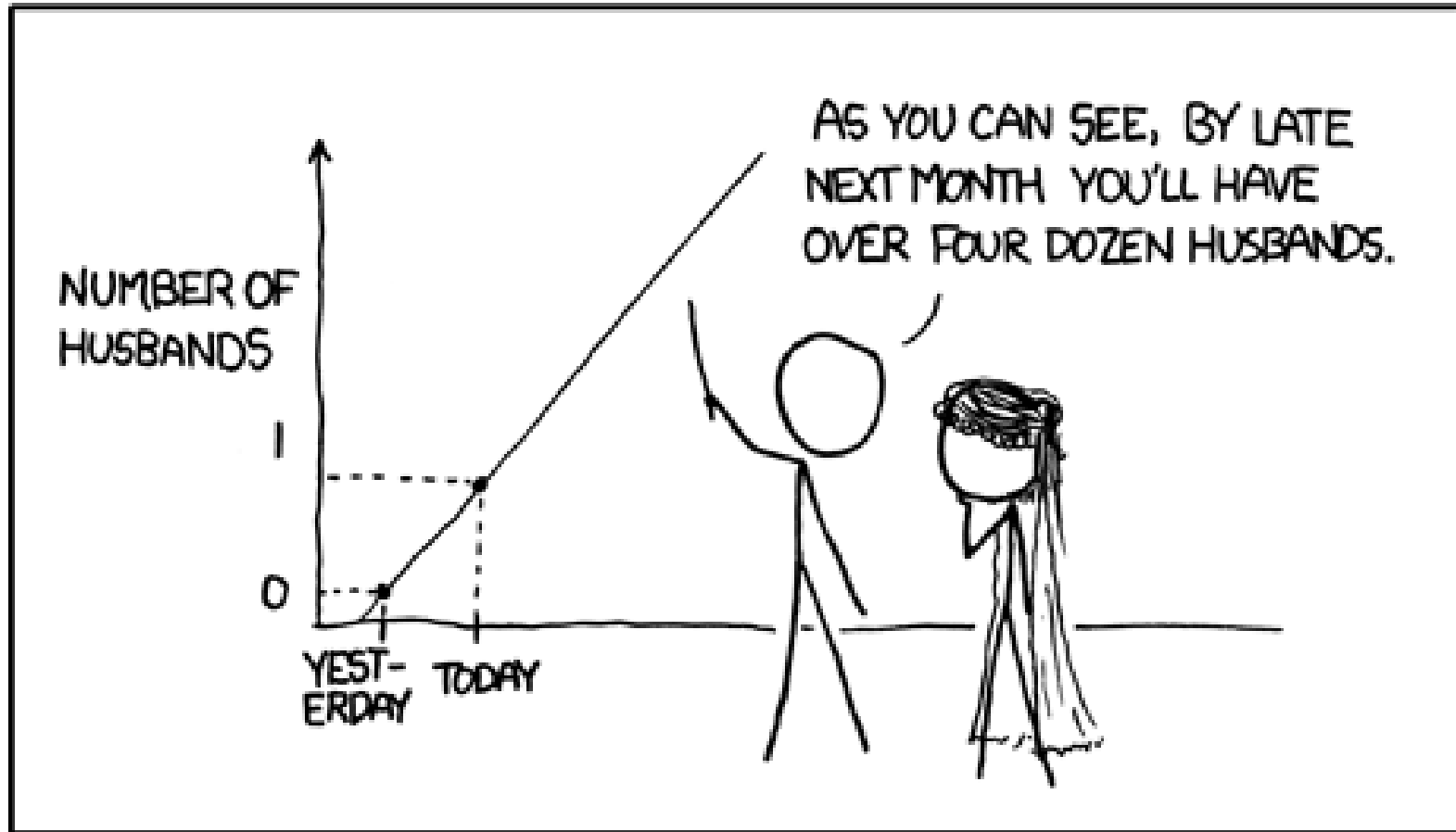
Category	Counts
Studies in FlexTech database	1,176
2003 through 2009 studies only	752
After excluding 2 large CHP projects with known outcomes & those without savings	657
The largest studies contributing 97% of savings	432

# Study Approach

- Determine which recommended savings were implemented and the time lag it took to implement (**Measure Adoption Rate: MAR**)
- $MAR = \text{Installed Savings} / \text{Recommended Savings}$
- Calculate how much energy the implemented measures save compared to the study's predictions (**Savings Realization Rate: SRR**)
- $SRR = \text{Evaluated Savings for Installed Measures} / \text{Study Recommended Savings}$



## More data is better



From *xkcd.com*

# Study Approach (2 of 3)

- Telephone measure adoption rate (MAR) survey of study recipients from the 2003 – 2009 completion period.
  - 432 eligible population, 411 attempted, 303 completed, 2,452 unique measure outcomes
  - Engineers prepared for and conducted interviews
    - Concern over partial completes significant factor in design
  - Design stratified by size, completion year; analysis by study age, measure fuel source, region



# Study Approach (3 of 3)

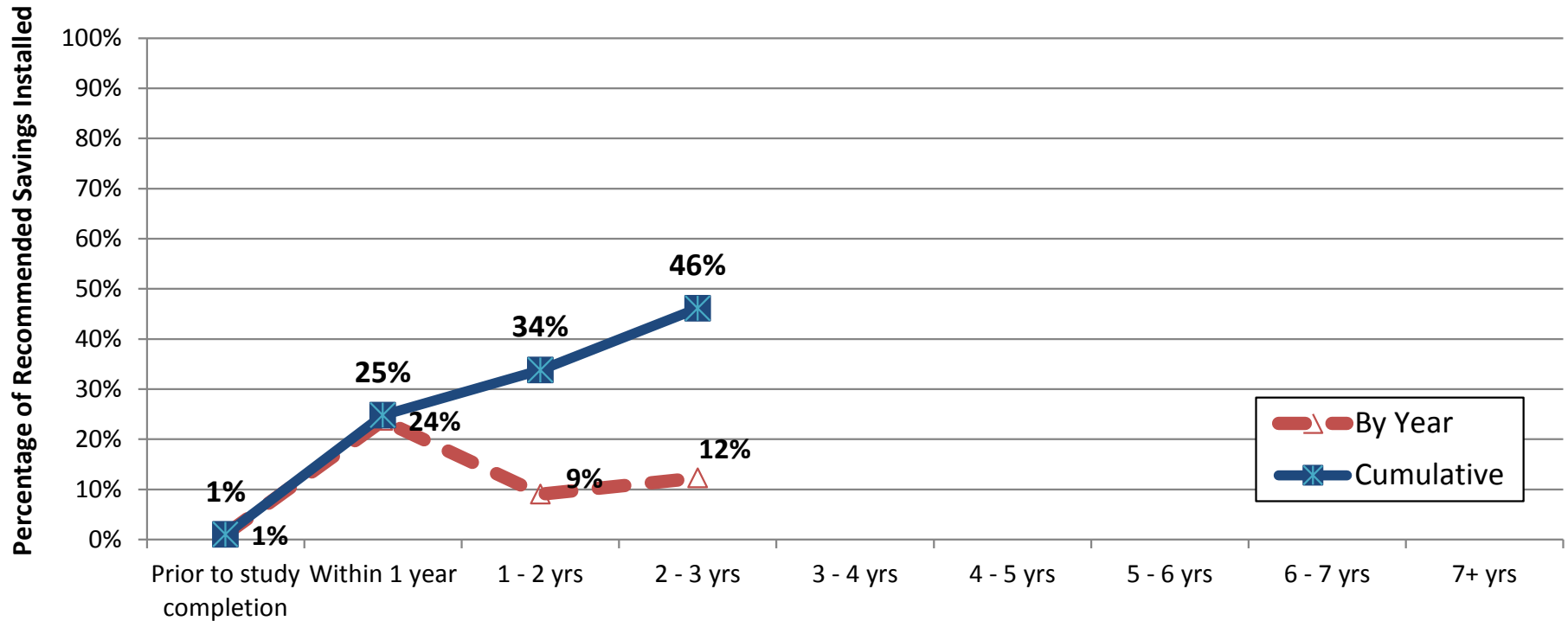
- ❑ Follow-up on-site visits (44) to adjust for telephone response error
- ❑ Repeated MAR survey one year later for unresolved measures



# Results – Overall MAR

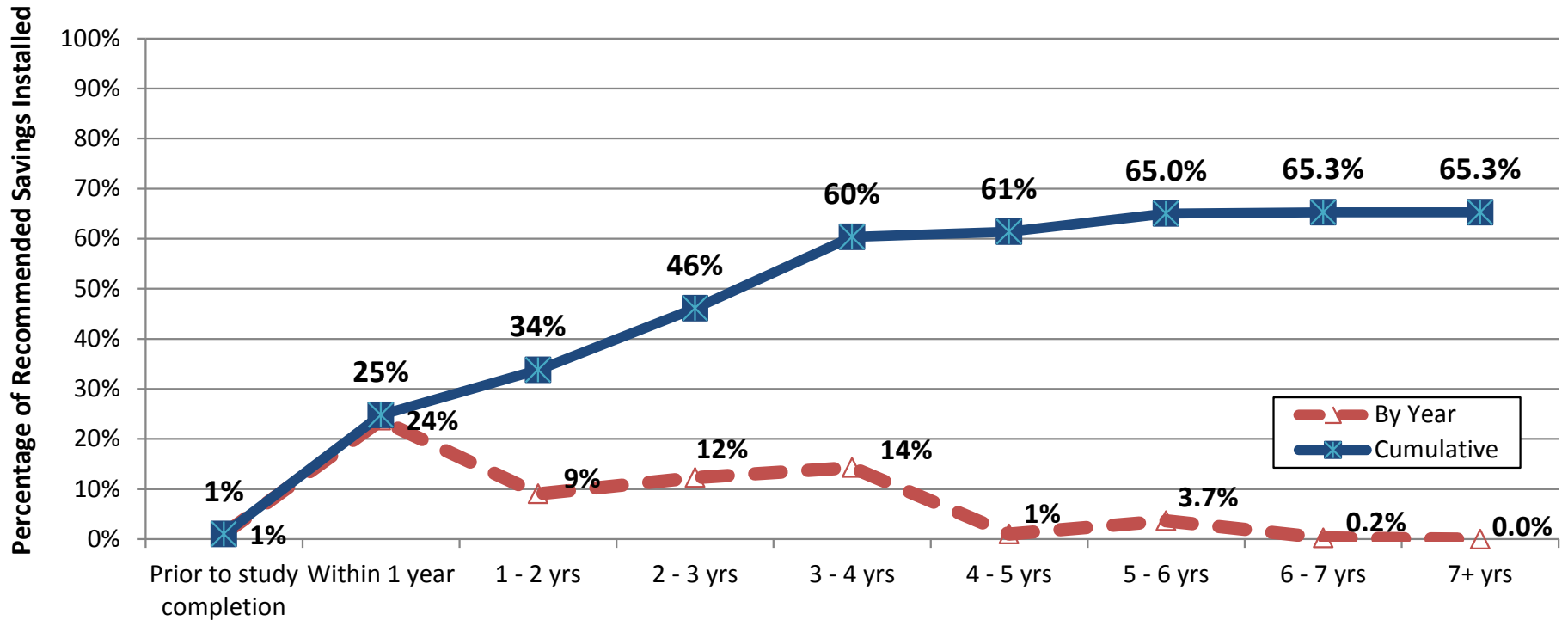
First Three Years

## FlexTech Measure Adoption Rate Over Time



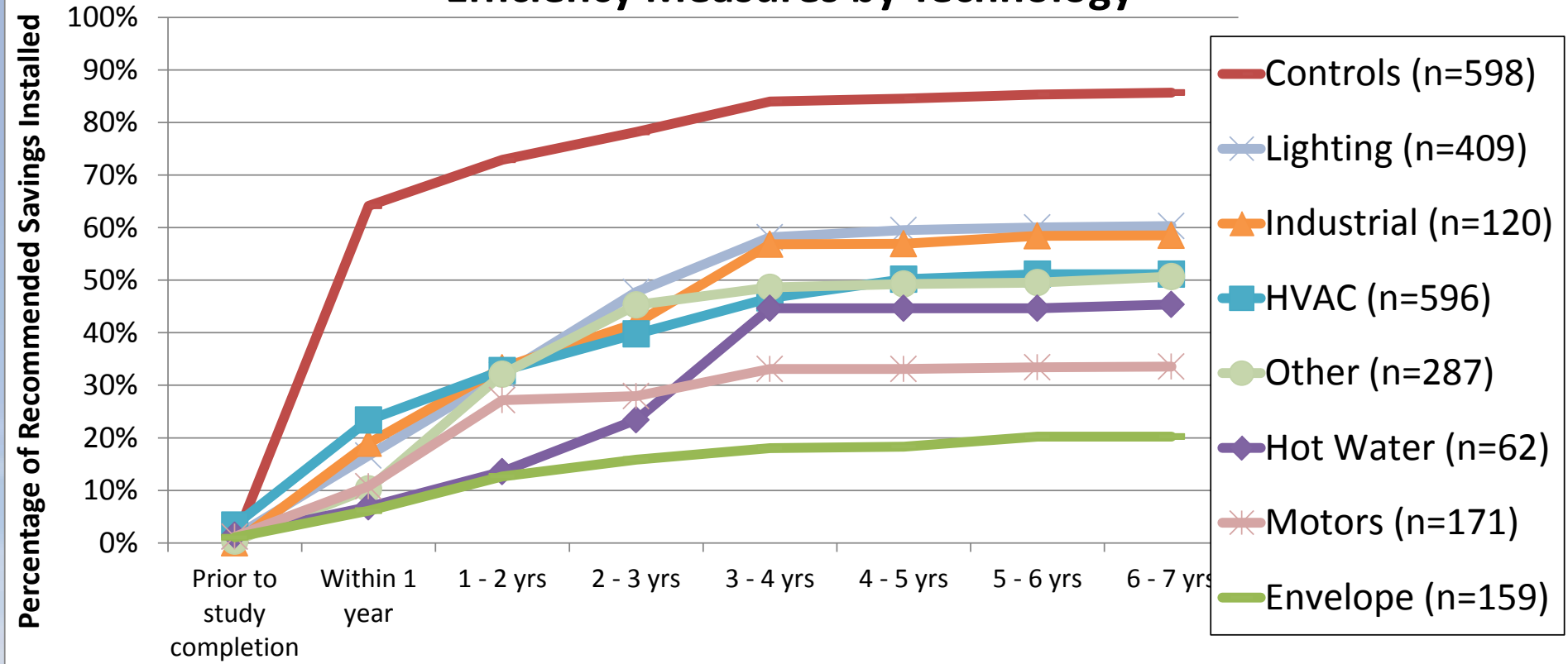
# Results – Overall MAR

## FlexTech Measure Adoption Rate Over Time



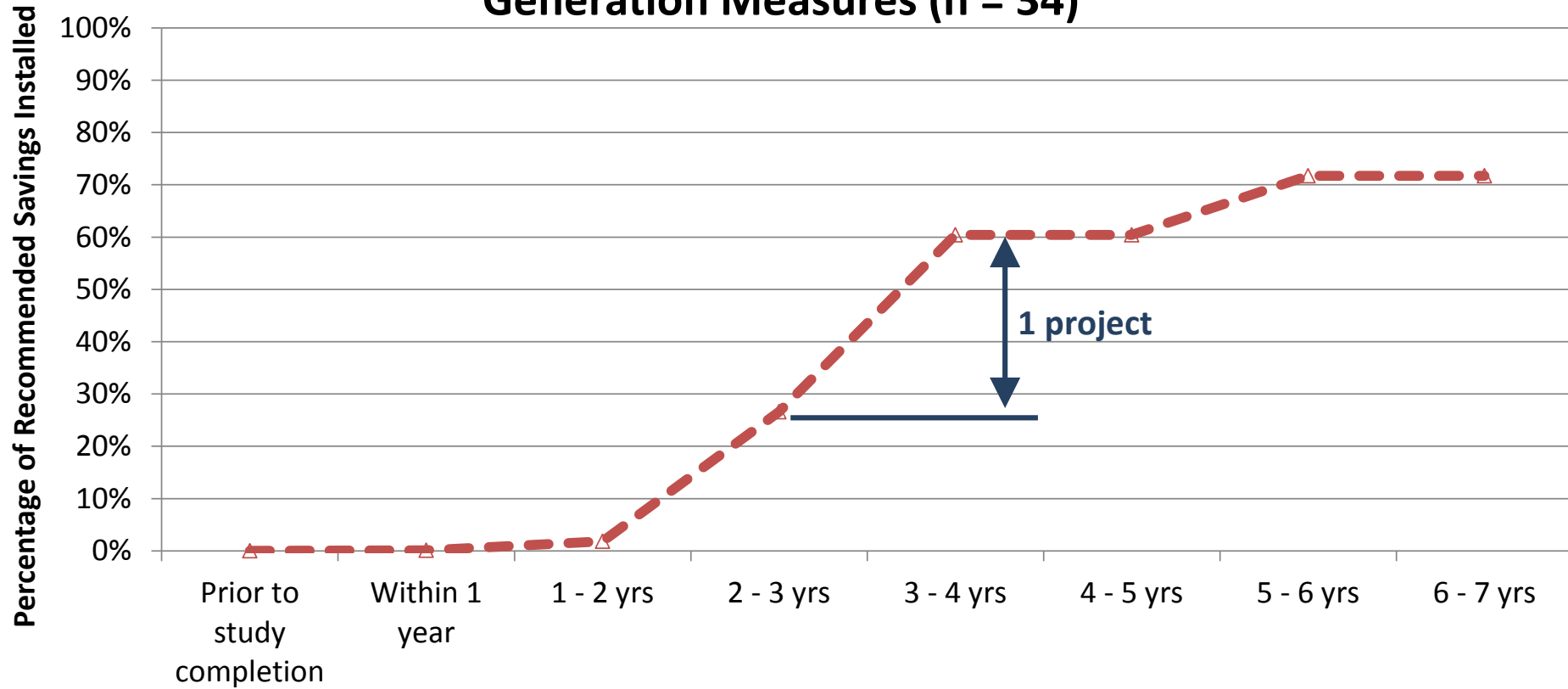
# Results – Efficiency Measures

## FlexTech Measure Adoption Rate Over Time Efficiency Measures by Technology



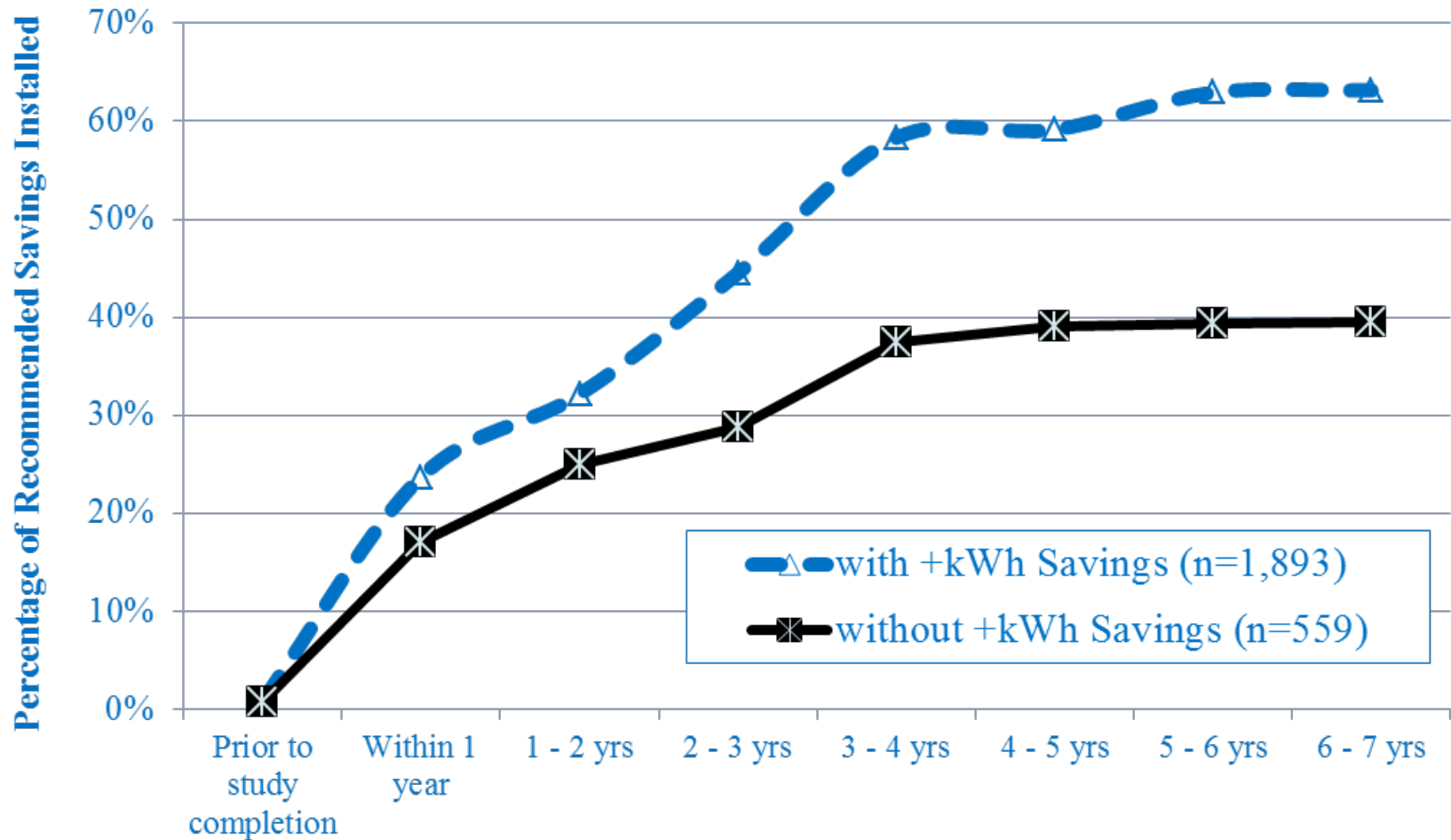
# Results – Generation Measures

## FlexTech Measure Adoption Rate Over Time Generation Measures (n = 34)



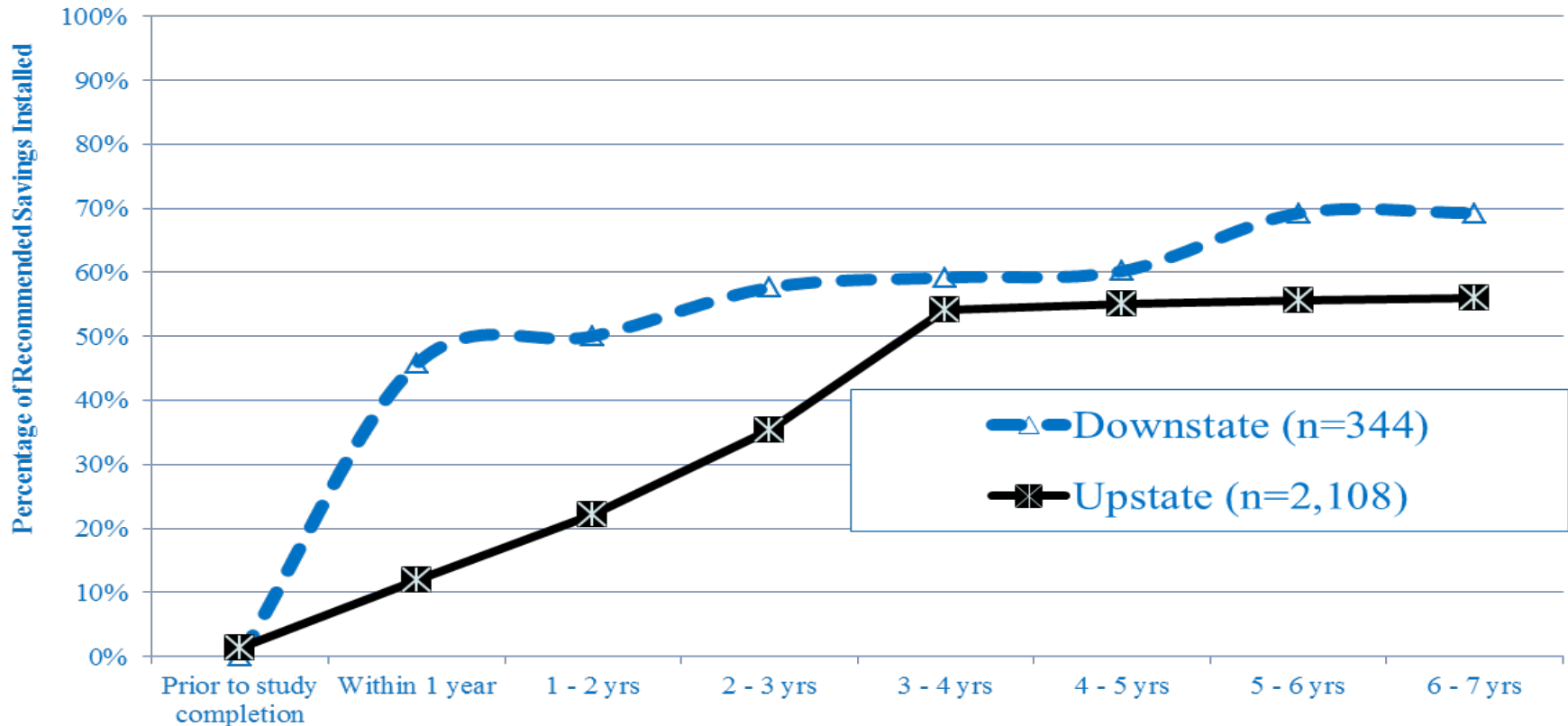
# Results – Electric vs Gas Measures

FlexTech Measure Adoption Rate Over Time



# Results – Electric vs Gas Measures

## FlexTech MAR Over Time – Upstate/Downstate

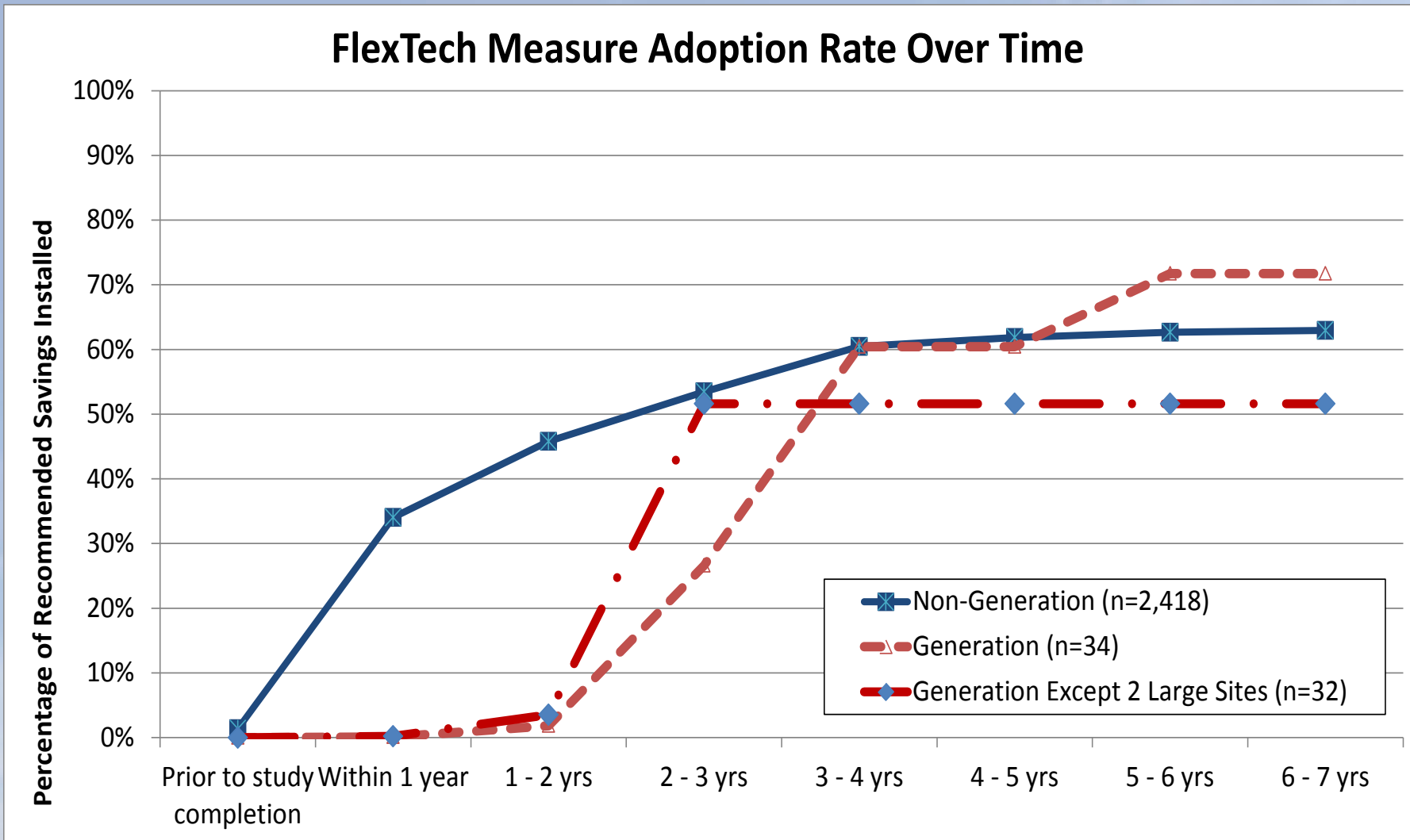


Downstate = New York City, Long Island City and Hudson Valley  
 Upstate = Rest of the state



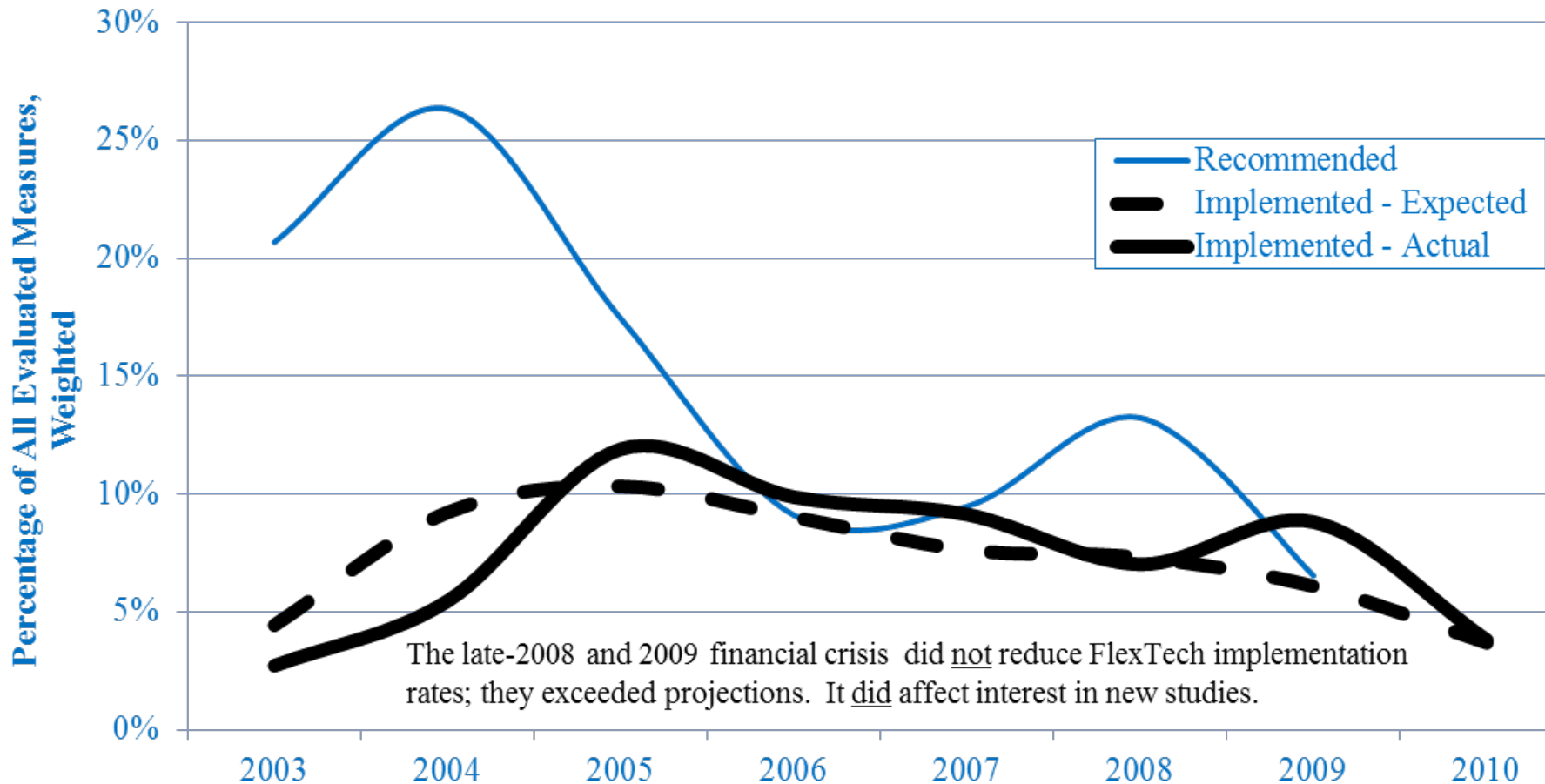
# Results – Non-Generation vs. Generation Measures

## FlexTech Measure Adoption Rate Over Time



# Results

## Years Measures Were Recommended and Implemented



# Typical Audit Programs Performance

Audit Program Type	Measure Adoption Rate
Small Business	12% to 39%
Nonresidential	14% to 30%
Small Business	15%
Large Commercial and Industrial	25% through programs 40% overall estimated
Agricultural Energy Management	±30% approximate
Industrial Steam Traps	42%
Small-Medium Industrial	53%

# Results – Long Term Summary

Measure Type	Long-Term Projected Measure Adoption Rate
Electric energy efficiency	0.67
Non-electric energy efficiency	0.43
On-site generation	0.72
Overall	0.65

# Results – Site Realization Rate

Studies	Total Number of Studies	Number of Completed Sites in SRR Sample	Electric Energy	Peak Demand
			SRR	SRR
Upstate	106	37	0.94	0.80
Downstate	15	7	0.87	1.05
Total	121	44	0.92	0.86

Region	Natural Gas Efficiency
	SRR
Upstate	0.77
Downstate	0.80
Total	0.77

## The case for evaluation method

- ❑ Not aware of other MAR studies that cover such a long span (8 years)
- ❑ Using elapsed time as a key factor in analysis is unconventional (built on prior evaluator work)
- ❑ The curve data is based on over 2,400 measures, holds over a variety of technologies, and is consistent over time
- ❑ MAR after 2-3 years is higher than but in the same range as that found elsewhere

## The case for program design (not tested)

- ❑ Program requires 50% cost sharing
  - Attracts those with serious interest
  - Audits are not a free service to placate high bill complaints or “polish the apple”
  - Also may reduce free ridership
- ❑ Targets larger customers
- ❑ Allows customers to use their own providers and provides a qualified pool
  - Study quality found to be high
  - Market sensitive structure

# Conclusions

- ❑ TA studies continue to produce savings over a long period of time
- ❑ 65% MAR is defensible for at least one program
- ❑ The mean time to adoption was 1.5 years and measures that saved 70% of the eventual total savings were installed within 3 years of study completion
- ❑ Most CHP studies require 2-3 years to implement
- ❑ Within technology groups, control measures were most frequently implemented. They also happen to be most often recommended.



# Conclusions

- ❑ Customers adopted more of the larger savings measures and fewer of the lesser savings measures.
- ❑ Electric measures had a higher adoption compared to gas measures
- ❑ Downstate had higher adoption compared to upstate
- ❑ Even in the middle of the financial crisis of 2007/2008, projects were being implemented
- ❑ FlexTech program design enhances the MAR

# Thank You!

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300+Study recipients:

Some LONG phone calls