

# Evaluation Update and Draft results of the Site-Specific Savings Portfolio

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Prepared for: Regional Webinar

# Why Evaluation?

## What did we achieve?

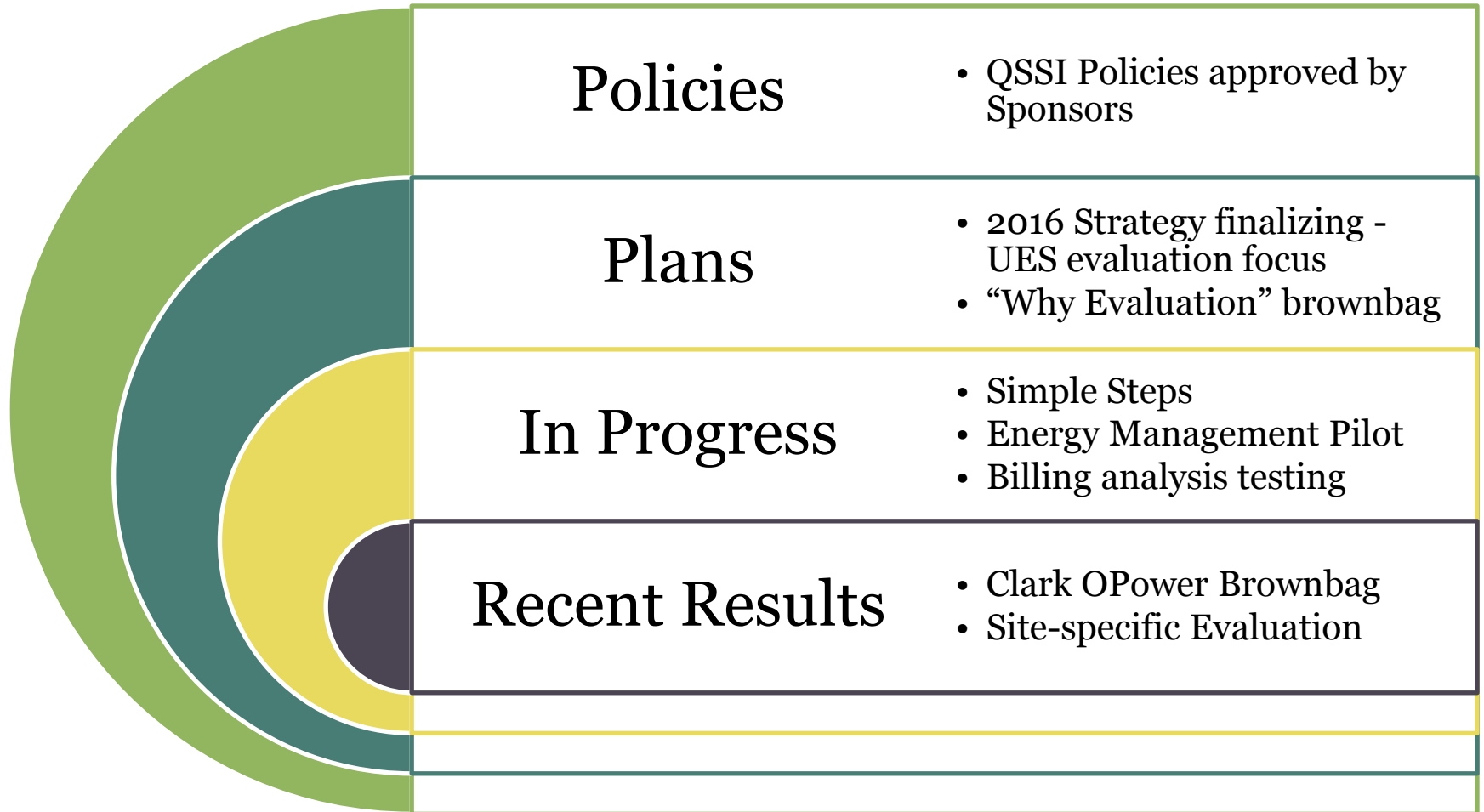
- Objectively, retrospectively documents and measures effects of a program in order to determine how well it has met its intended outcomes or goals.
  - Accurate and reliable achievements
  - Transparency and accountability
  - Effectiveness of spending

## How do we improve?

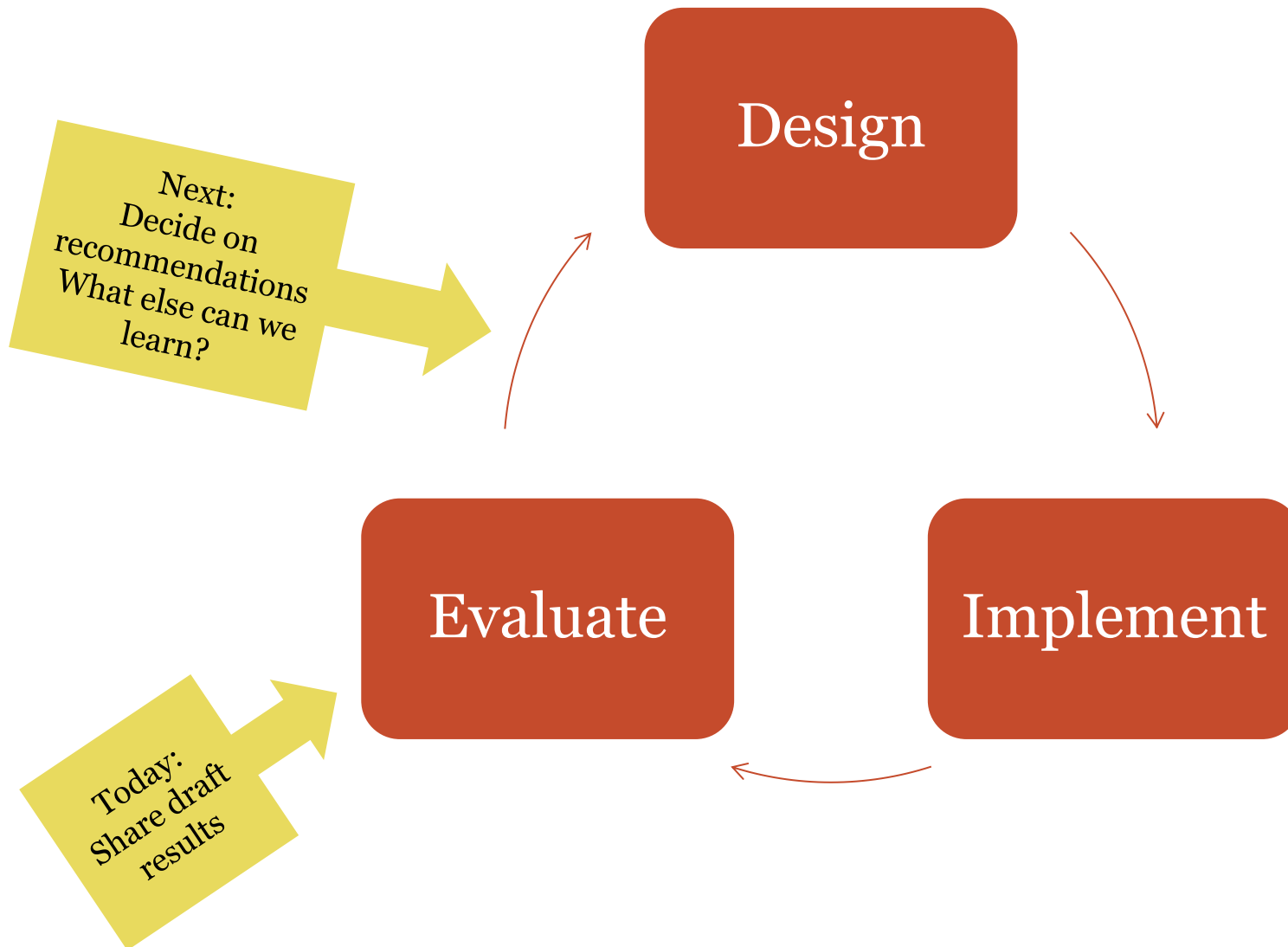
- Understand why effects occurred and identify ways to improve current and future programs
  - Constructive and strategic feedback
  - Understand, improve, get new measures

*More to come!*

# Evaluation Update



# Today's Meeting



# BPA Evaluation Thoughts



## Great Results

- Confirms great work by utility and BPA staff
- Some areas of improvement
- Study meets several needs

## Huge Thanks!

- Internal team
- Utility staff
- SBW/Cadmus team

## Good process, not perfect

- Successes: transparency with utilities, multi-functional team, lots of BPA review
- Improvement needed: duration, communication protocol tracking

## Next steps important

- BPA response to recommendations
- How can we use it fully?

# Background Site-Specific Evaluation

# Evaluation Background

## Site-Specific Savings portfolio

- Custom and calculator projects
- All Sectors
- ~40% of BPA's 2012-2013 achievements

## Little recent evaluation

- Evaluation on non-res lighting in 2008
- Evaluation of Energy Management Pilot in 2012  
*(new, separate evaluation forthcoming)*

## Timeline

- Evaluation Plan : June–December 2013
- Sample selection and contact (Feb – May 2014)
- Data collection (June 2014 – June 2015)
- Analysis and report preparation (July – August 2015)
- Review and Finalize report (September 2015 – now)

# Objectives

**Estimate first-year kWh savings for portfolio and 9 domains**

**Estimate the lifecycle cost-effectiveness**

**Identify opportunities for improving processes, M&V practices, evaluation**



# Domains

## Site-Specific Savings Portfolio

**Option 1**

**Option 2**

**ESRP**

Lighting

Non-lighting

Lighting

Non-lighting

Commercial/  
Ag

Industrial

Commercial/  
Ag

Industrial

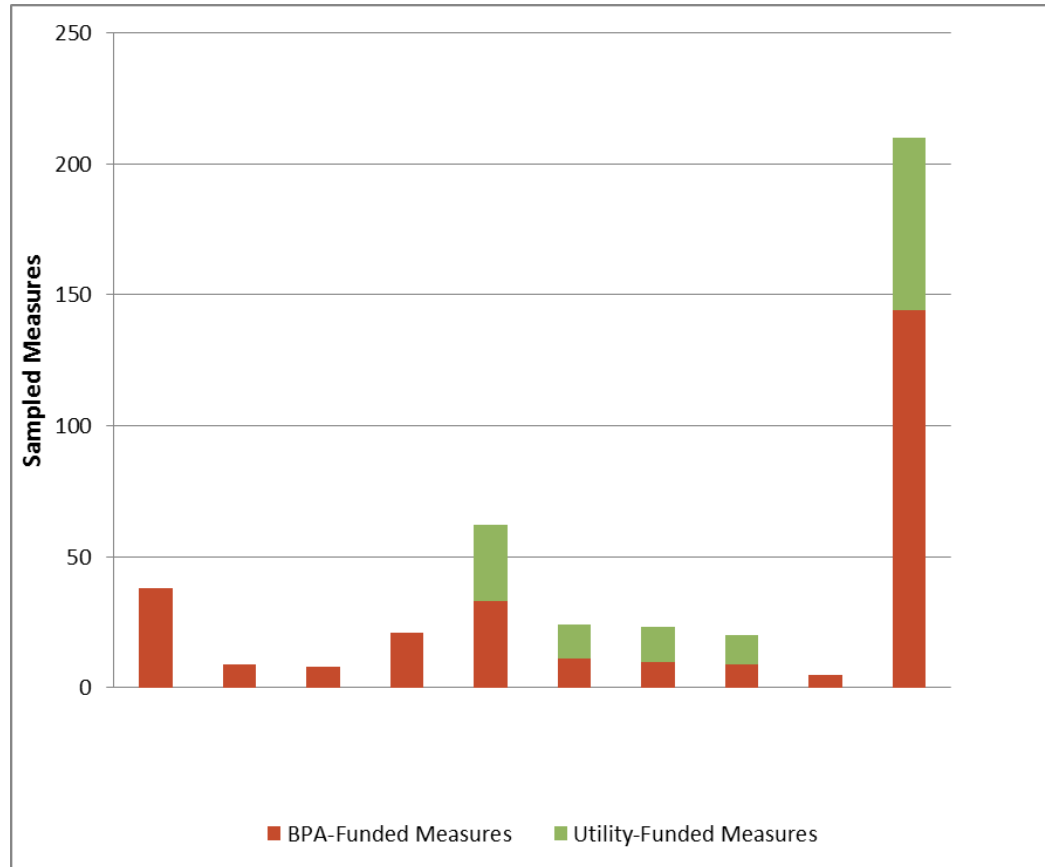
Commercial

Industrial

Commercial

Industrial

# Sample Design



**Sample represents ~28% of savings, but less than 3% of measures in population.**

**Utilities funded 1/3 of measures**

# More Evaluation Information

## Oversample

- 3 Utilities oversampled
- Funded 31% of measures in study
- Allows for separate estimates for their service areas

## Response Rate

- Good response from sample (90%) acceptance
- Little risk of non-response bias

## Supplemental Data Collection

- Majority of sites needed some data beyond program documentation
- Phone surveys 93%, on-site 86%, metering 62%

# Estimating Site-Specific Savings – Guiding Principles



**Treat all measures consistently.** Small savers just as important as large savers in stratified random sample

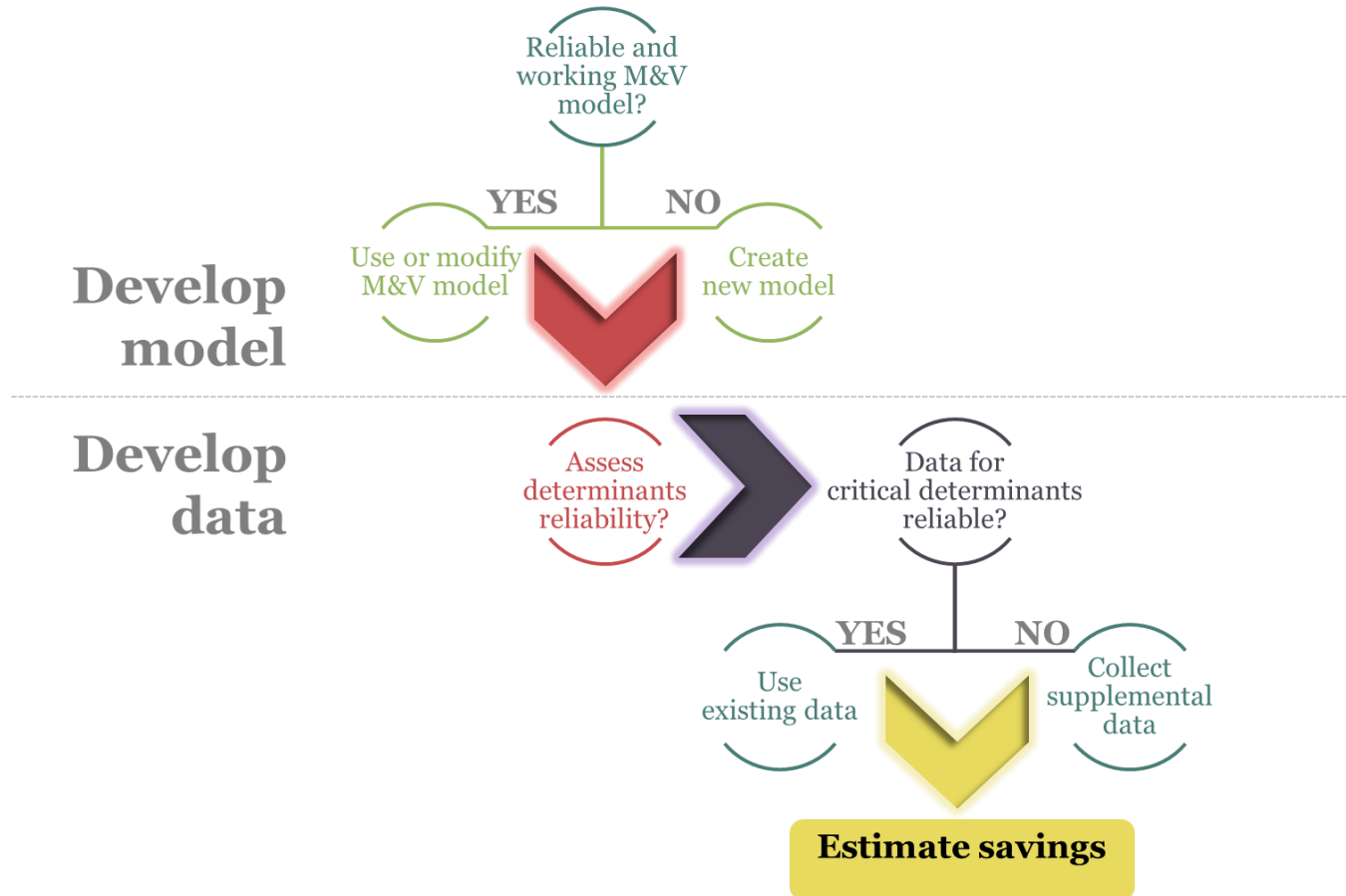
**Reuse available data.** We re-used as much of the program-collected data as we determined to be reliable.

**Focus on the key determinants and areas with greatest savings.**



# Process for Estimating Measure Savings

**Review program documents and models**



# Review by BPA and Utilities

## BPA-Funded Measure Review

- New Models
- Site-specific results : BPA reviewed all Non-Lighting and sample of lighting
- Utility review: Provided results, offered one-on-one discussions but not many occurred

## Oversample Utility Review

- Some one-on-one discussions with utility staff

# What is a Realization Rate (RR)

$$\frac{\text{Evaluation Savings}}{\text{Reported Savings}} = \text{Realization rate}$$

Realization rates greater than 1 mean that we found **more savings** than was reported

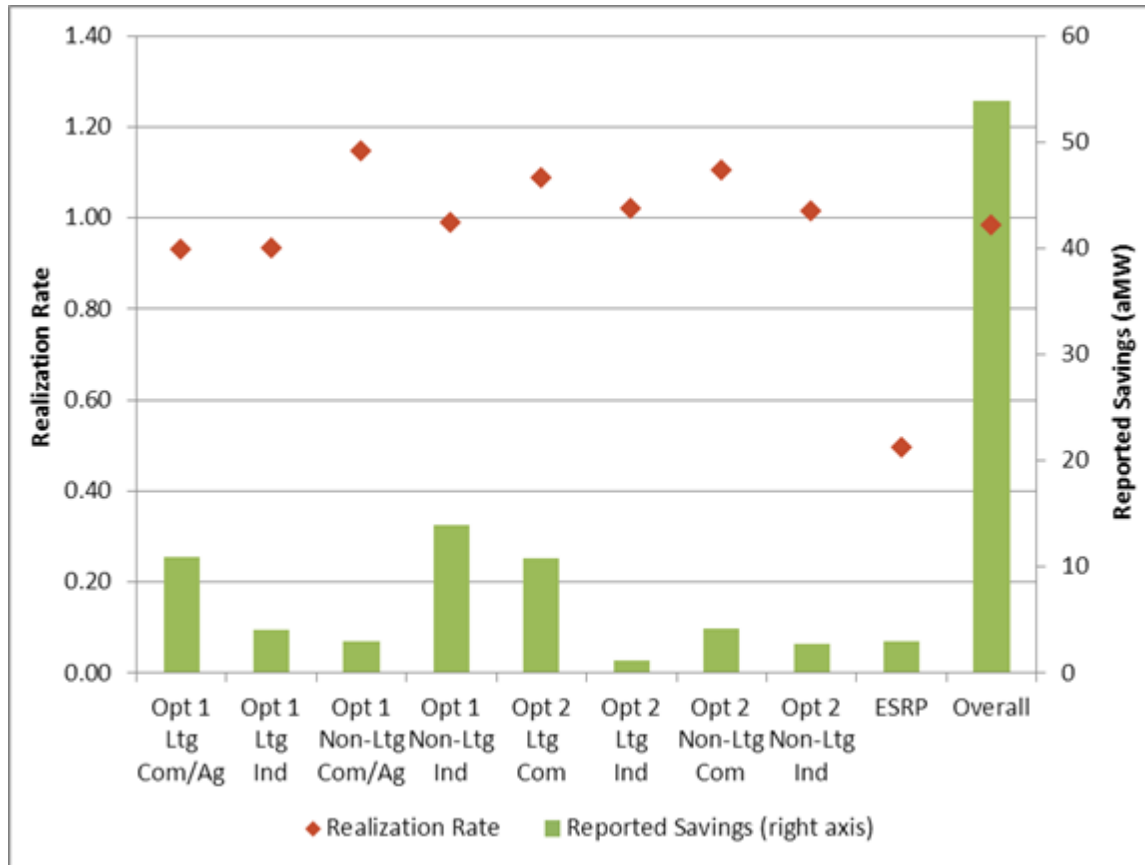
Realization rates less than 1 mean **fewer savings** were found

# Findings

## Site-Specific Evaluation



# Overall Results



Evaluation savings for the portfolio are nearly the same as the reported savings

RR is 0.98

Highs and lows tend to cancel out

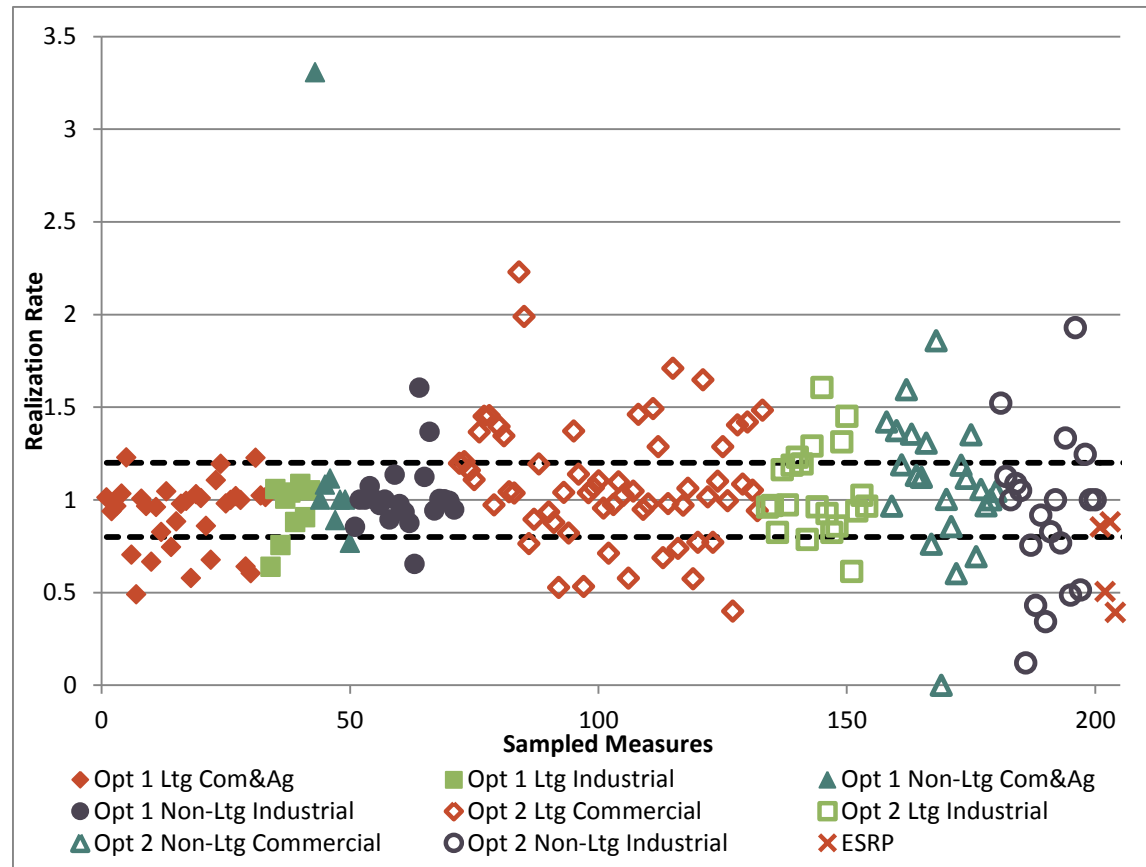
## Combined Domains

Measure: Lighting RR is 1.0 and Non-lighting RR is 1.03

Sector: Both commercial and Industrial RRs are 0.98.

Option: Option 1 RR is 0.98, Option 2 is 1.08

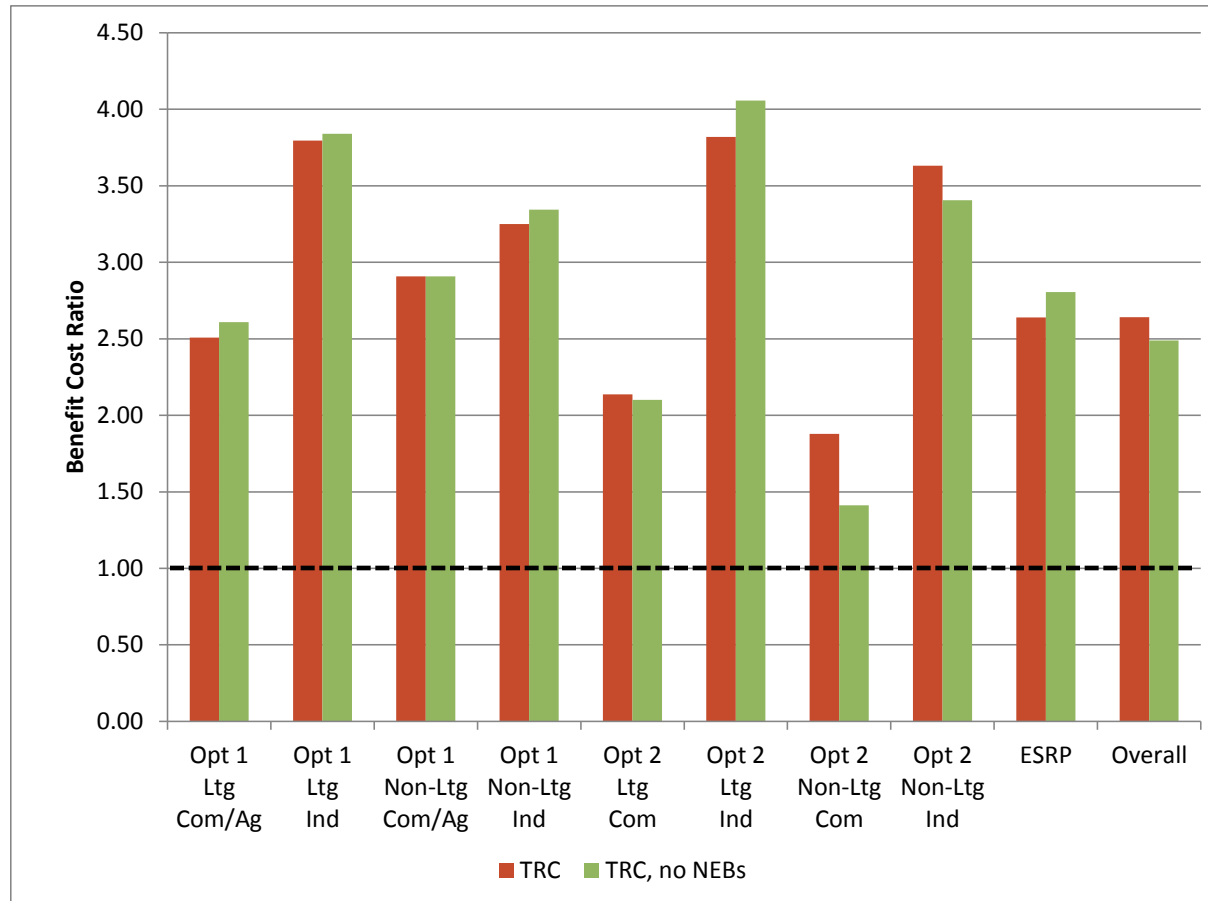
# Measure Realization Rates



**Quite a bit of scatter by measure**

**Approximately 40% of portfolio has either high or low realization rate; essentially equal high and low**

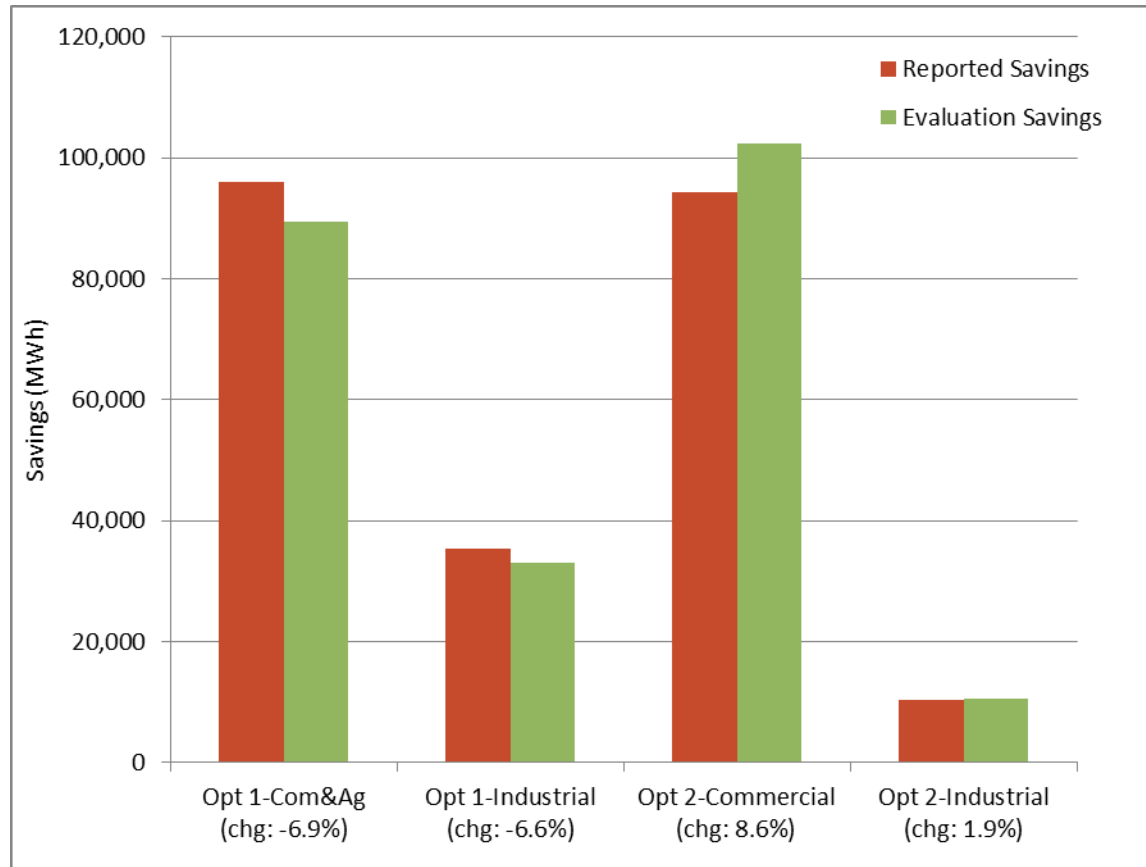
# Life-Cycle Cost-Effectiveness



**All domains and portfolio are cost-effective (TRC 2.65)**

**Non-Electric Benefits increase TRC by 6%  
(from 2.49 to 2.65)**

# Lighting Savings



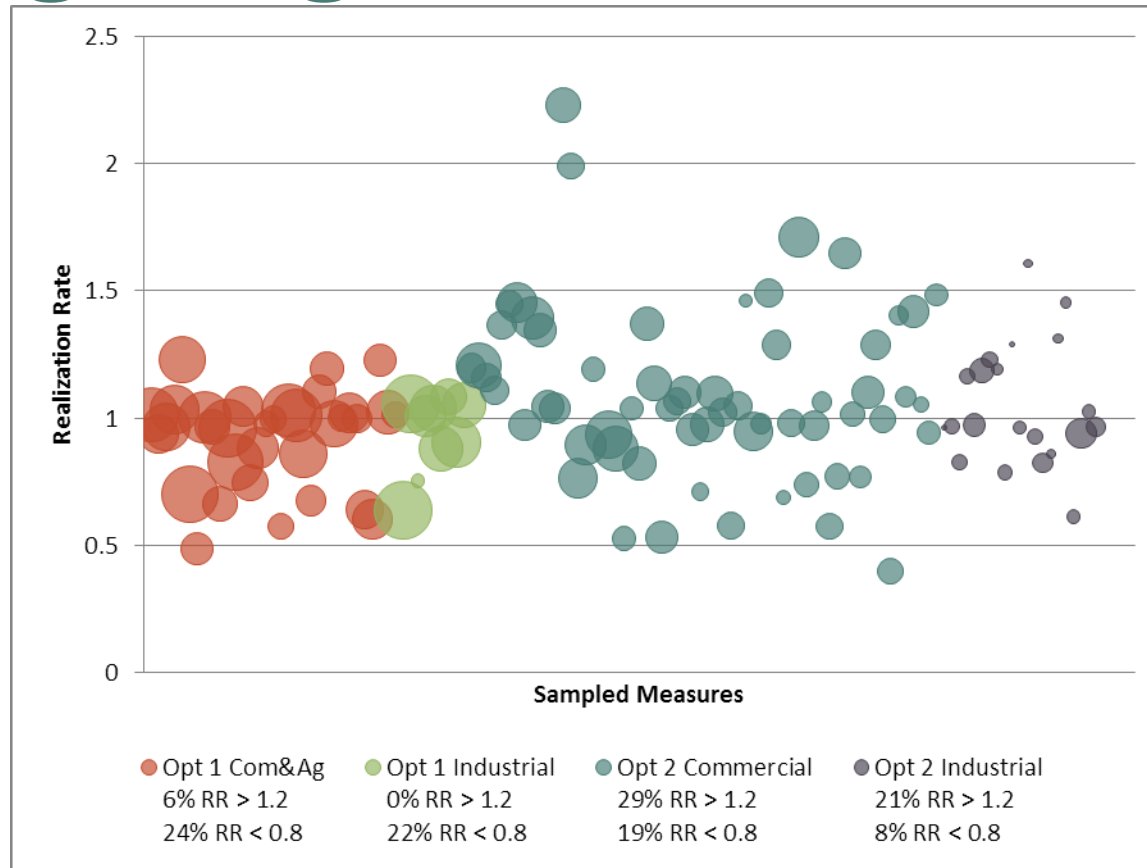
**Overall, lighting RR is 1.0**

**Offsetting factors between Option 1 and Option 2**

Option 1 RR is 0.93

Option 2 Lighting RR is 1.08

# Lighting Realization Rates



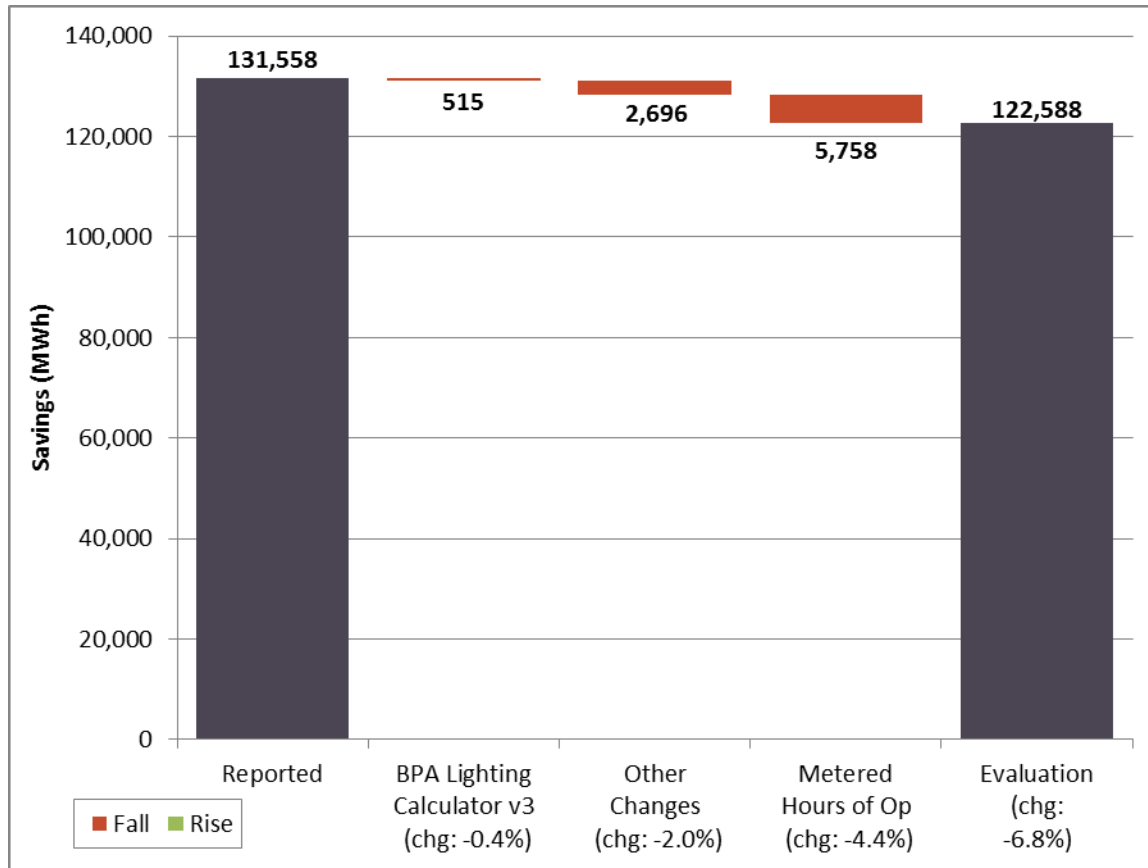
Option 1

Mostly low RRs

Option 2

More scatter, more high RRs

# Option 1 Lighting



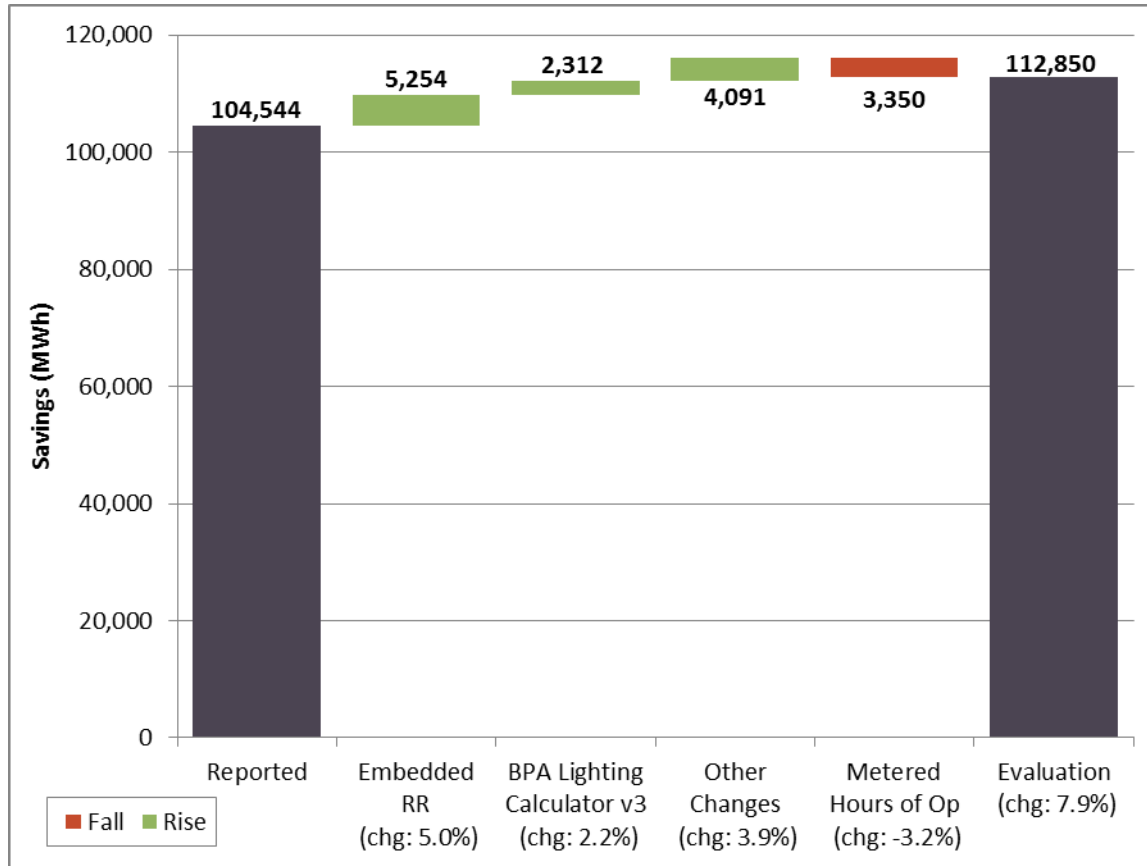
**Evaluation found  
6.8% less savings**

**All factors less  
than 5% difference  
in savings:**

Metering found ~4% fewer hours of operation

Other changes - HVAC system type and fixture type/count – reduced savings by ~2%

# Option 2 Lighting



**Evaluation found 7.9% more savings**

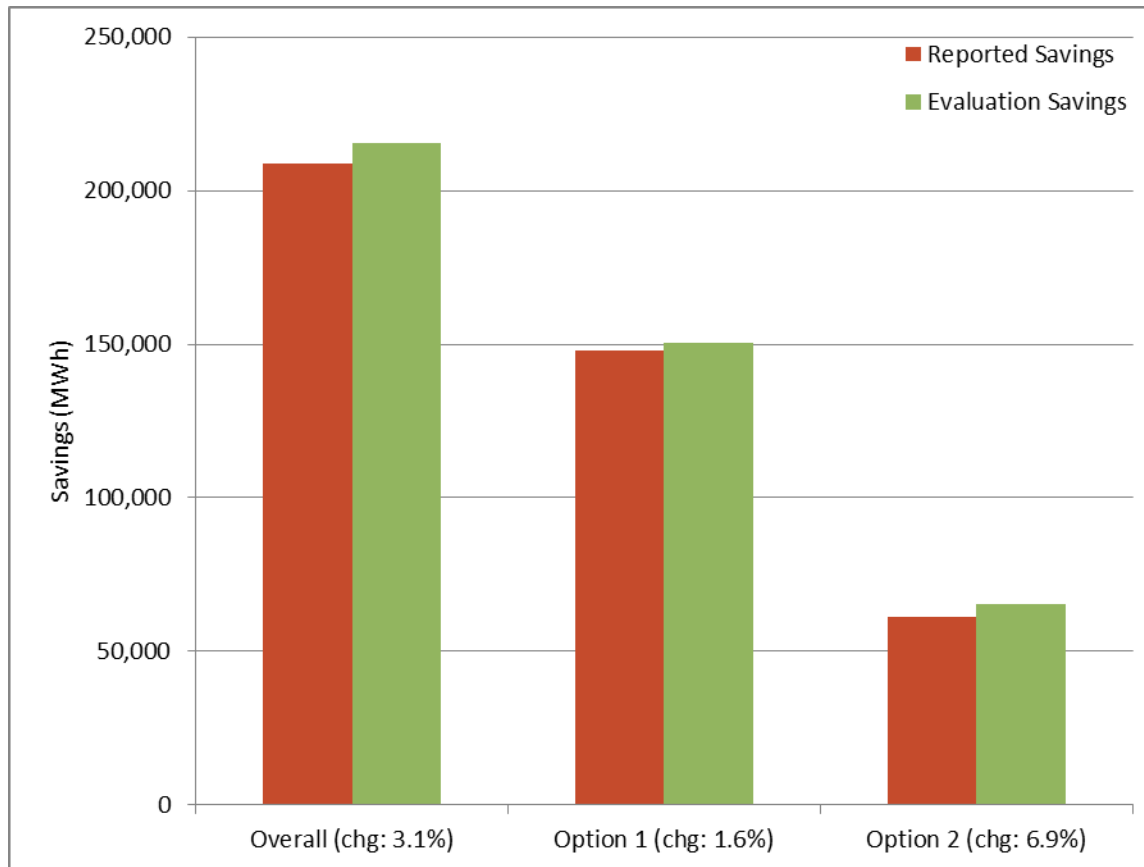
**Utility embedded largest factor (5% increase)**

**Small other changes**

Metering found ~3% fewer hours of operation

Change to BPA calculator increased savings by 2%

# Non-Lighting Savings



**Overall, Non-Lighting RR is 1.03**

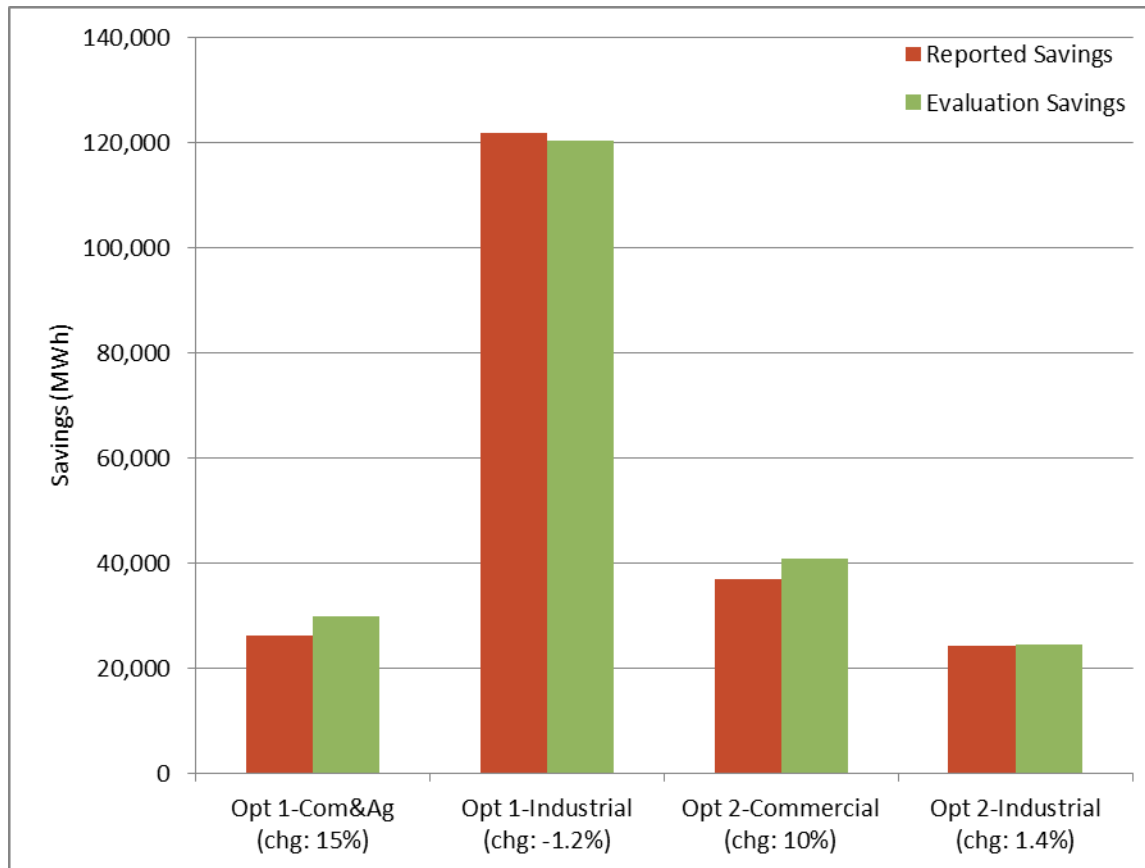
**Evaluation found more savings for both Option 1 and Option 2**

Option 1 RR is 1.02

Option 2 Lighting RR is 1.07



# Non-Lighting Savings

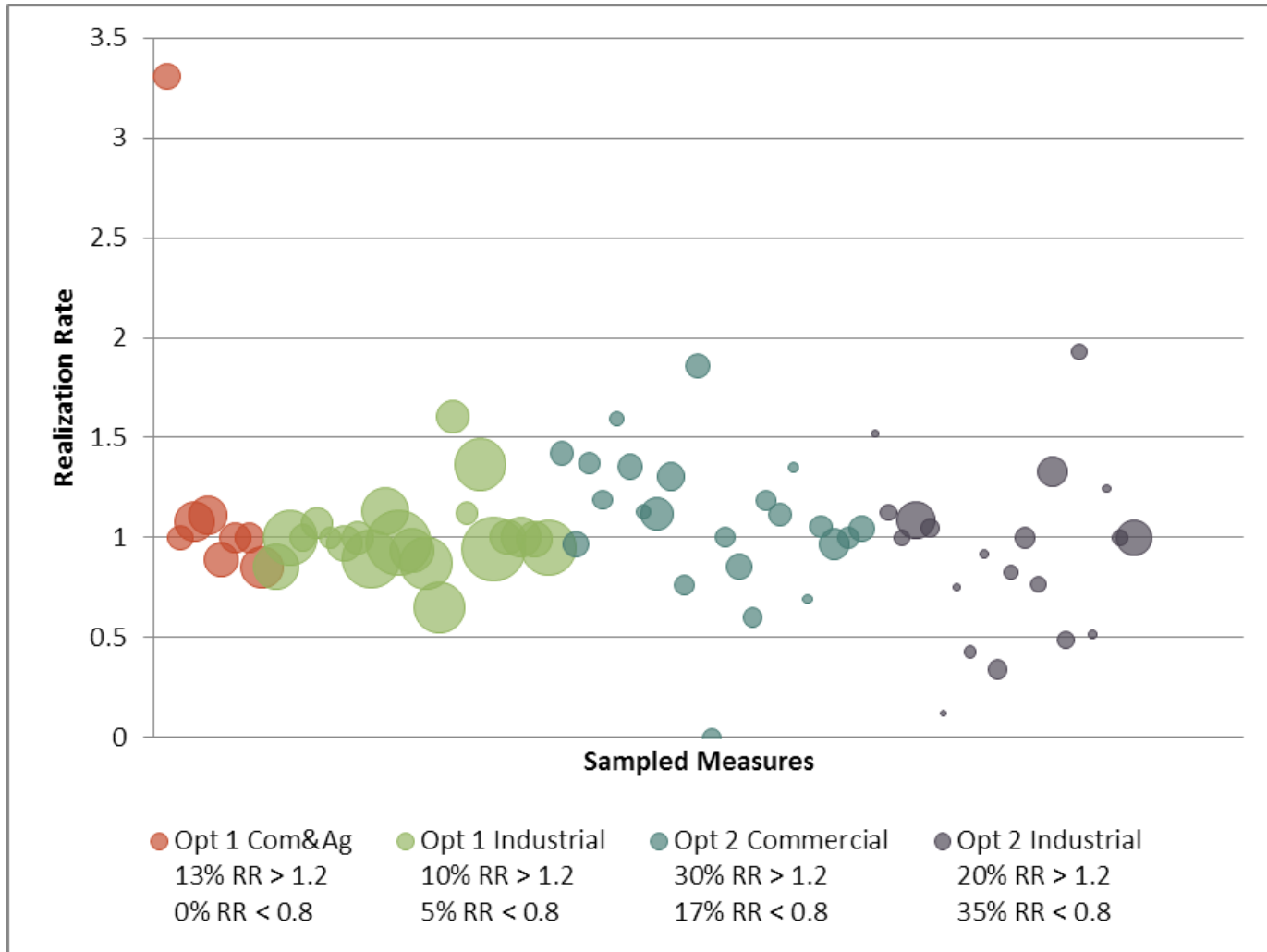


**Evaluation found 10%+ more savings for Opt 1 and 2 Commercial**

**Option 2 embedded RR : under-reporting of savings**

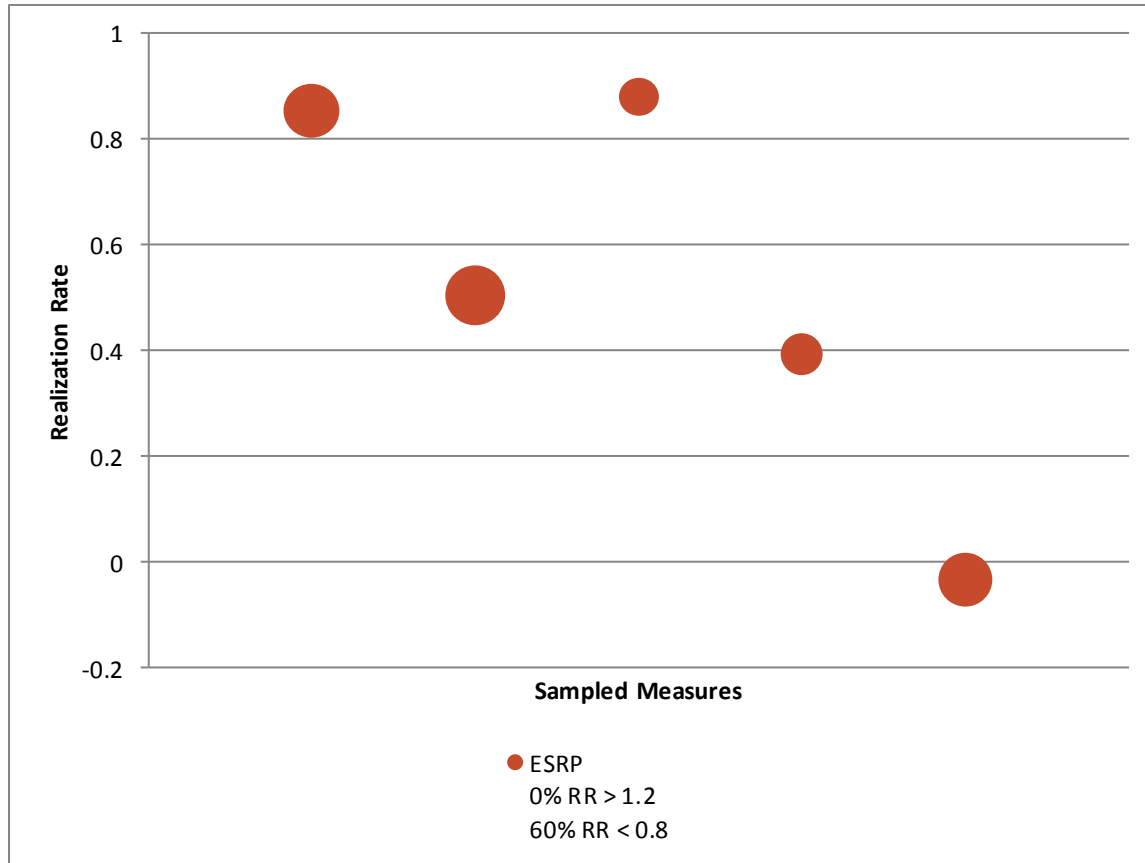
Commercial 7%  
Industrial 5%

# Non-Lighting Realization Rates



**Option 1 has less scatter than Option 2**

# Energy Smart Reserve Projects (ESRP) Realization Rates



All RRs are below 1

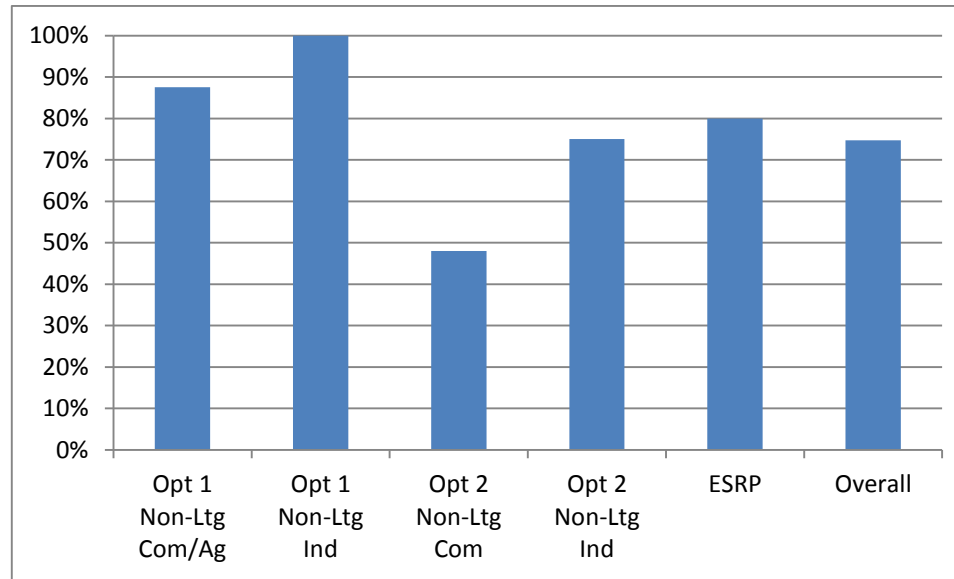
Three measures have RR below 0.5 and one RR is negative

Issues:

- Multiple projects: downstream reuse saved water assumptions
- One project with atypical first-year operation

# Adherence to Protocols and Guidelines

# Compliance with Protocol Selection Guideline



Option 1 has **high** compliance

Option 2 **lower** compliance

Compliance may not predict RR

- Commercial – More than half not compliant

# Other Findings

## IM Documentation Requirements

- Substantial number of invoices missing
  - Option 1: Lighting (~50%), Non-lighting (~25%)
- Some Option 1 Com/Ag completion workbooks missing
- Some Option 2 M&V plans missing (~17%)

## Other documentation

- Some “Working” models missing, especially for Option 2 (~25%)

## TAP Assignment

- Option 1 Lighting calculator does not use TAP codes
- Option 2 has high rate of misclassification for Lighting and Non-Lighting (~48%)

# Other Products

## COTR Oversight

- Site-specific results provided to BPA COTRs for oversight purposes

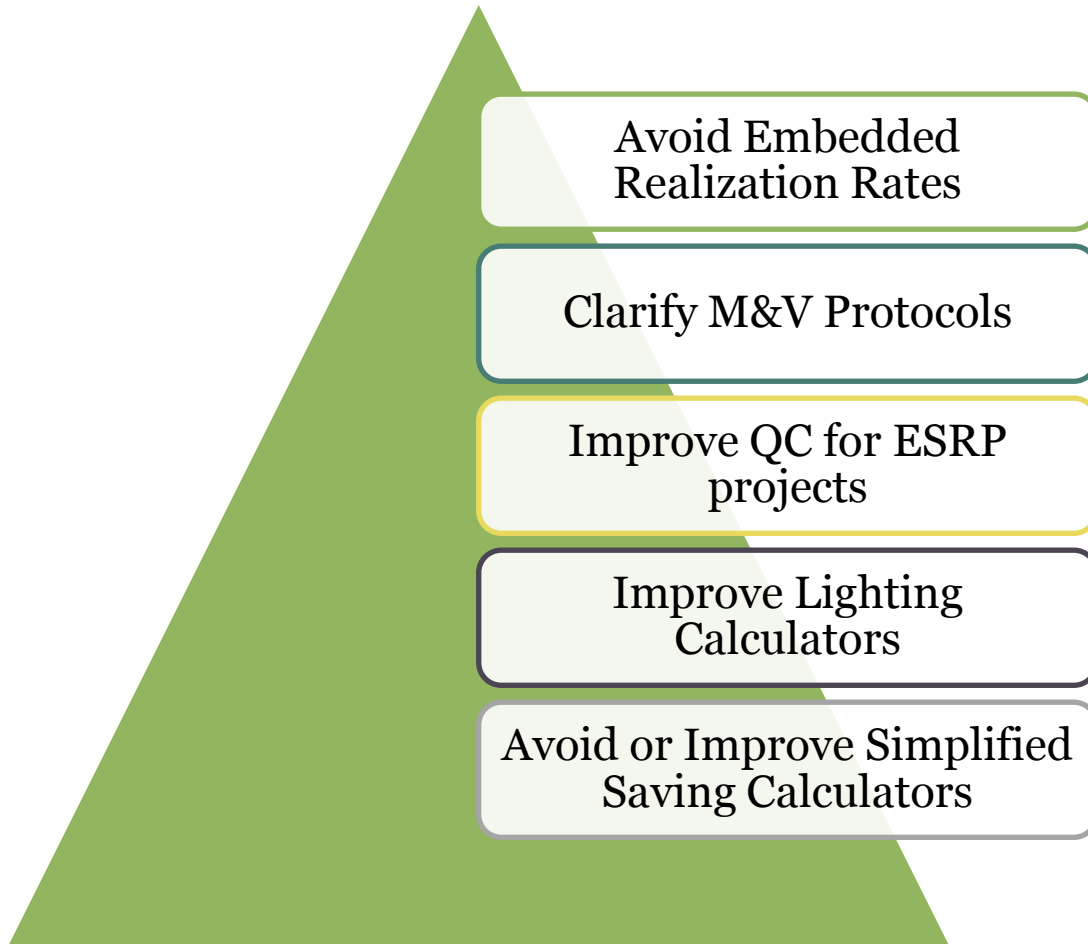
## Lighting Metering Data

- Data to inform RTF lighting standard protocol
- Commercial momentum savings and HVAC interaction factors

# Recommendations



# Increasing Reliability of M&V Savings Estimates



# Improving Program Documentation



Investigate Opportunities for Reducing Reporting Burden

Require Working Models

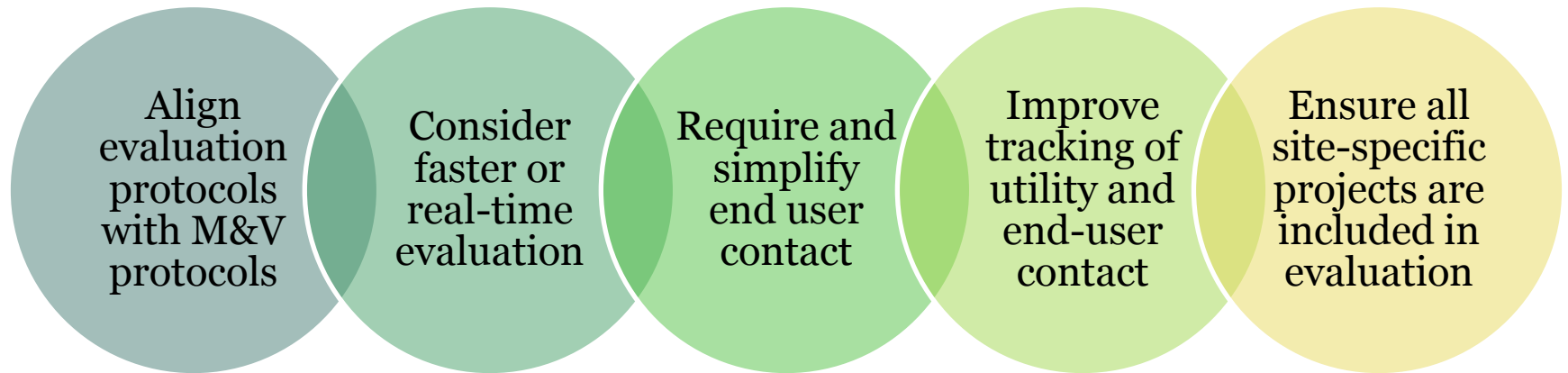
Obtain and Store Contractor Invoices

Improve Document Organization and Version Control

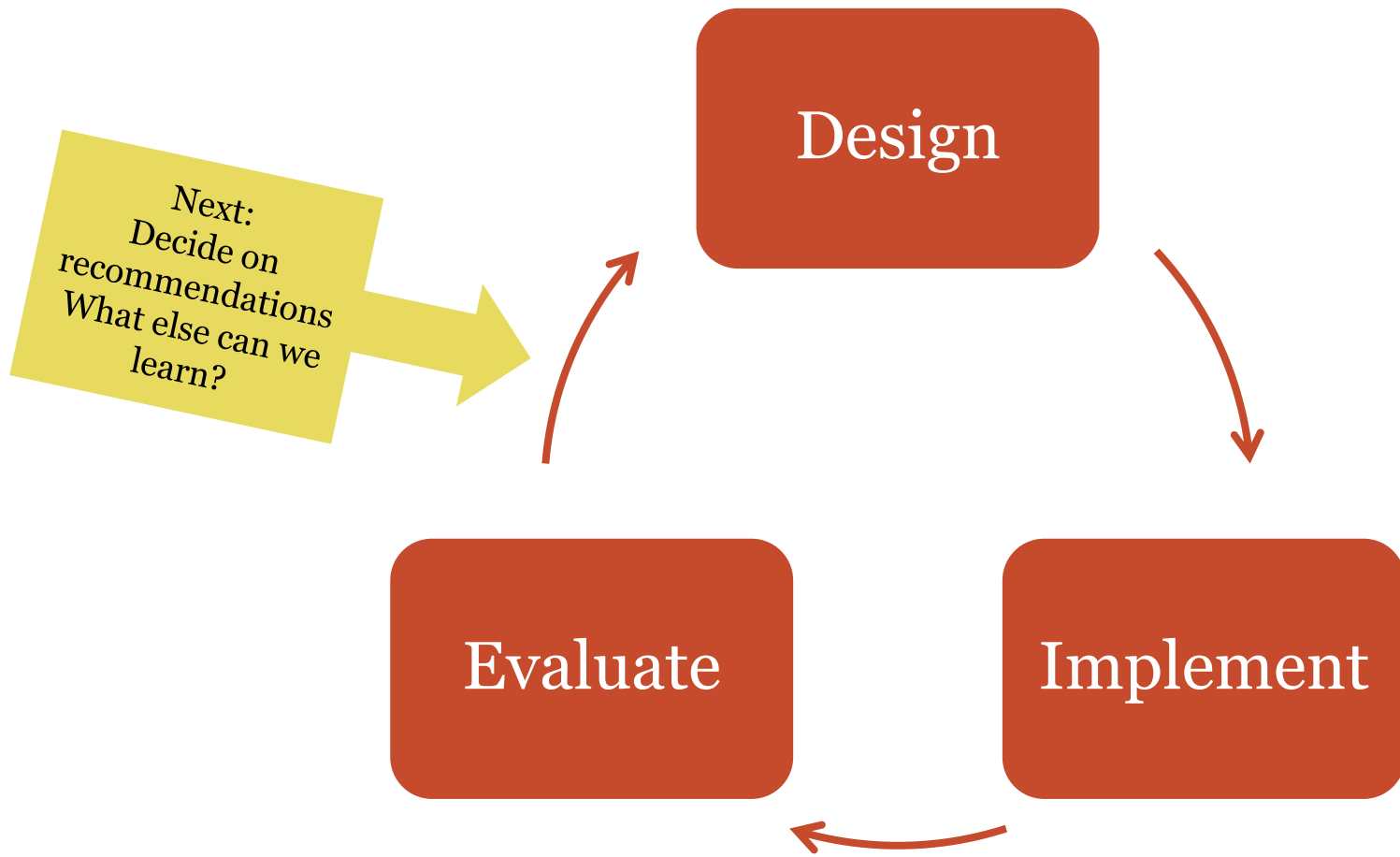
Document: Project Specs, Milestones,  
M&V Protocol, Project Engineer

Improve TAP Coding

# Improving Future Evaluations



# Next Steps



# Questions?

*Report and highlights:*

**[www.bpa.gov/goto/evaluation](http://www.bpa.gov/goto/evaluation)**

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