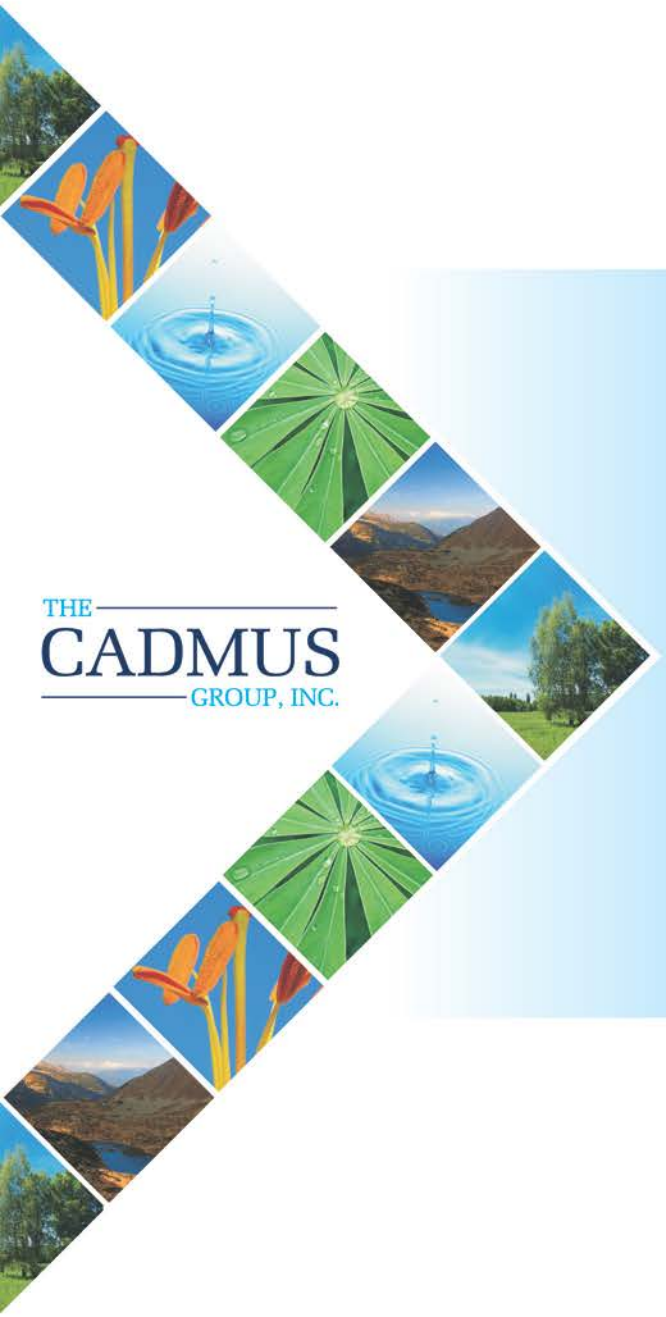
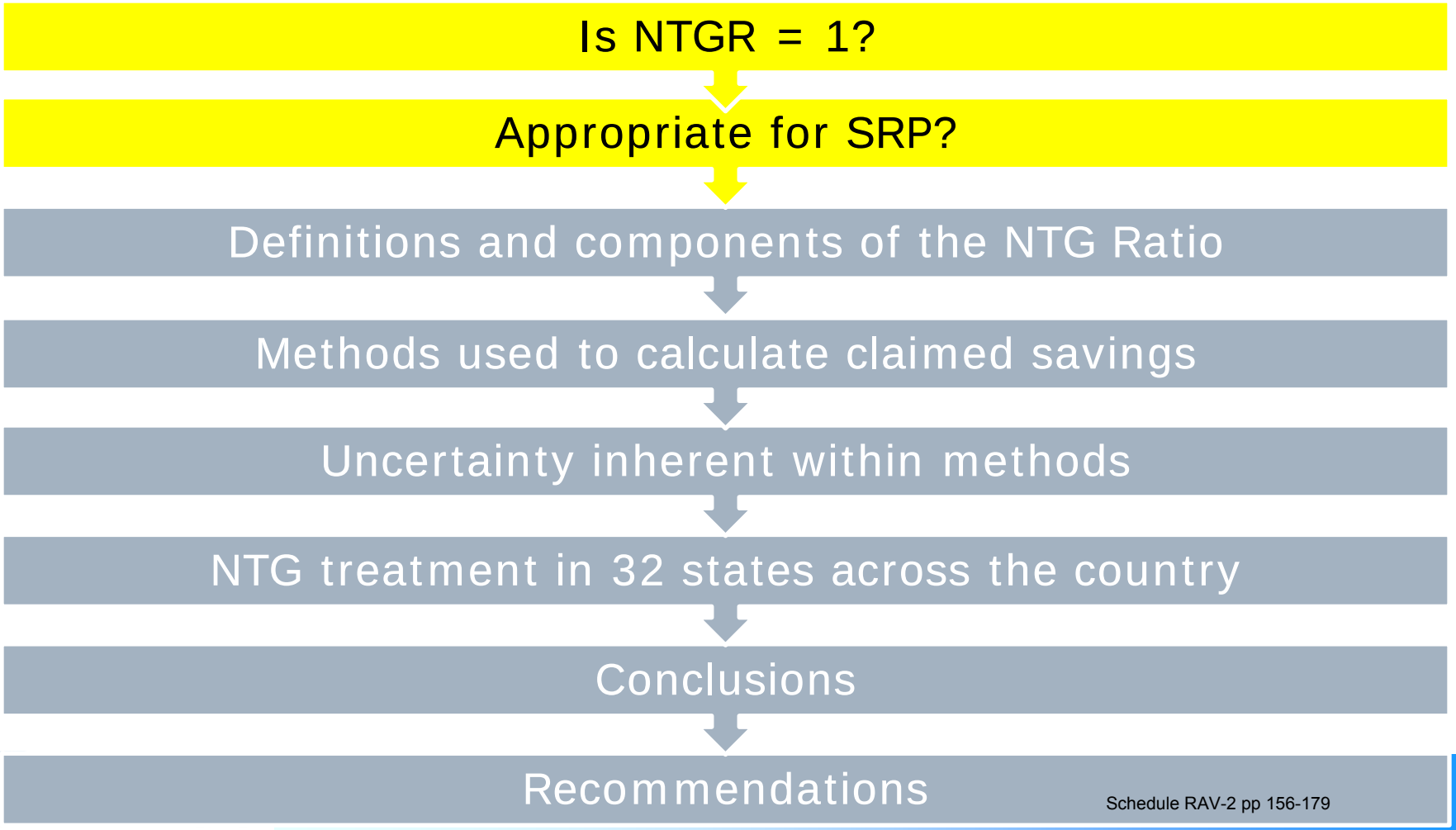


THE CADMUS GROUP, INC.

Salt River Project
Net-to-Gross:
Updating Research

The Cadmus Group, Inc.
December 20, 2011

Research Goals & Tasks



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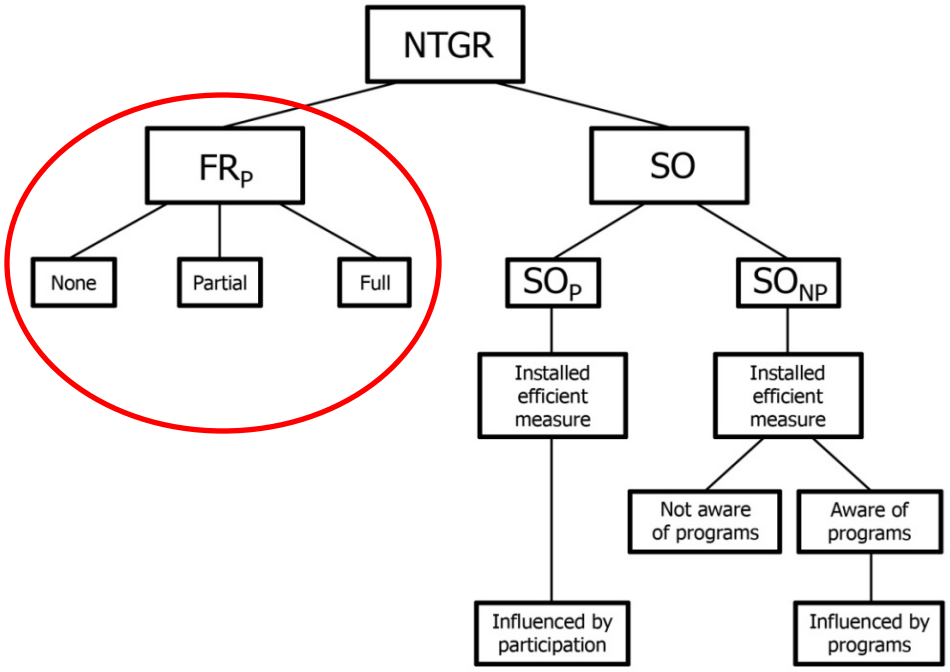
What Do We Mean By “Savings”

Type of Savings	Number of Units	Adjustments
Reported Gross (Ex Ante – unverified)	Claimed	None
Verified Gross (Ex Post – Evaluated)	Observed	Actual installations, actual equipment, operating conditions (e.g., EFLH, climate zone, size, ratings, etc.)
Net Savings (Ex Post – Evaluated)	Observed	Free-ridership, Spillover

NTG Ratio: Freeridership

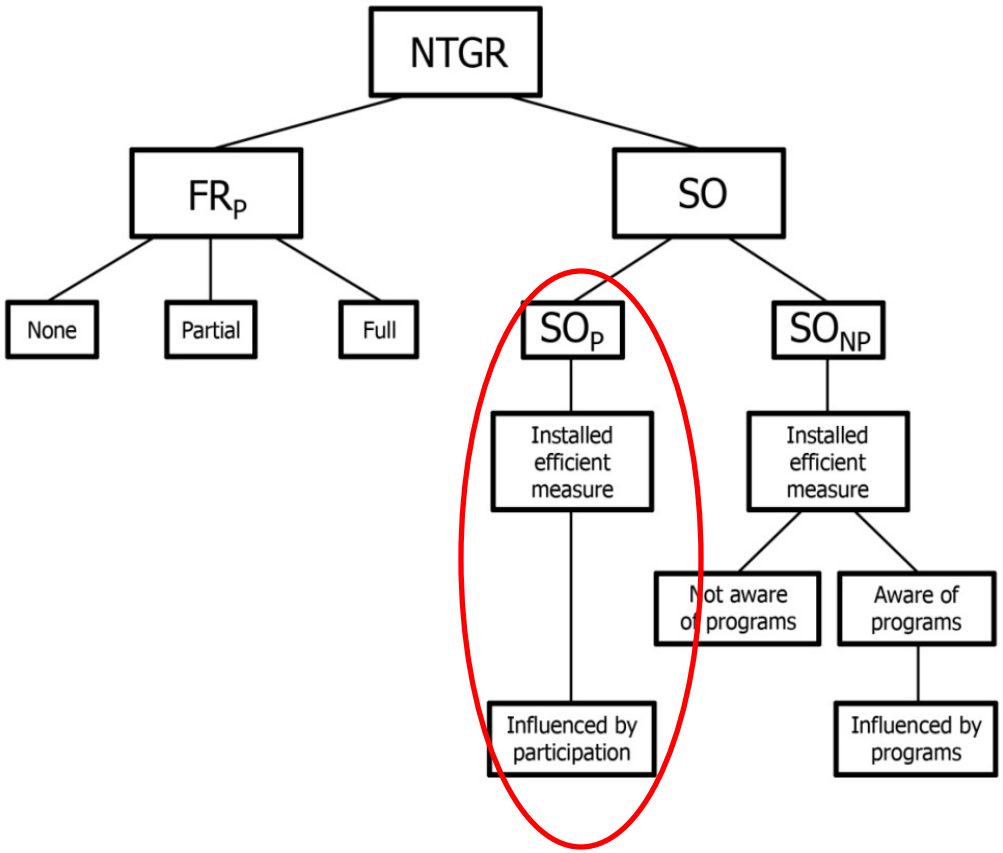


Participants' adoption (installation) of measures offered under the program that would have occurred in the absence of the program.

That is, would they have installed:

- the same thing,
- at the same time,
- in the same quantity,
- with the same efficiency,
- without the rebate?

NTG Ratio: Participant Spillover

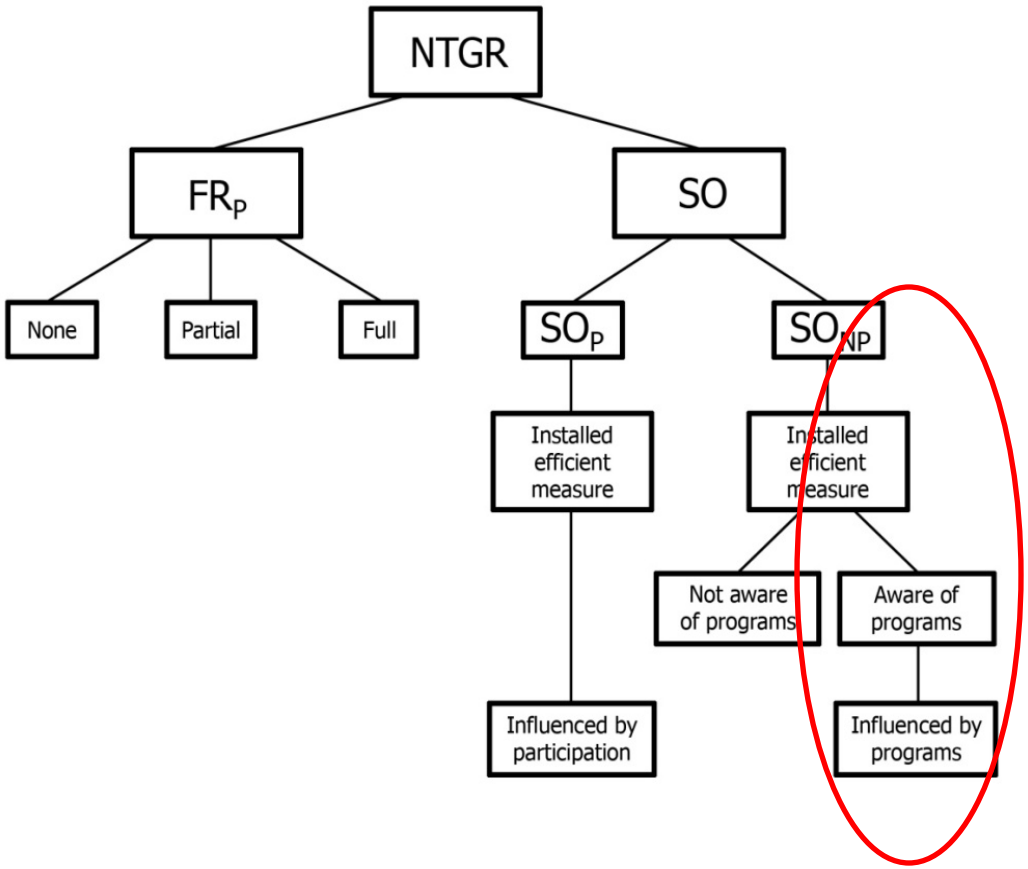


Participants' adoption of measures in addition to those incented by the program, actions induced by the program, at no cost to the program.

Did participants install energy-efficient measures:

- outside of the program,
- without a rebate,
- influenced by the program?

NTG Ratio: Nonparticipant Spillover



Adoption of measures by eligible customers who did not participate in the program, but were influenced by the program.

Three key factors:

- **Measure adoption.** Purchase and installation of measures without participating.
- **Awareness.** Knowledge of the programs and measures offered.
- **Attribution.** Was the purchase influenced by an efficiency program(s).

And, Market Effects

Efficiency programs can influence market practices

Change the way supply chains in energy efficiency markets operate & availability of products or practices:

- SEER level of stocked heat pumps and air conditioners
- stocking only premium efficiency motors
- CFLs and LEDs increasing shelf space, even before EISA
- home design and building practices

More….

Market Transformation effects are the ideal achievement of energy-efficiency programs; the impact could be long-lasting

NTGR can naturally decline over time as markets transform

A significant measurement challenge

Measurement. Statistical Methods: Difference-in-differences

Energy use of participants and nonparticipants measured in pre/Post-program periods

Not well suited for large C&I programs

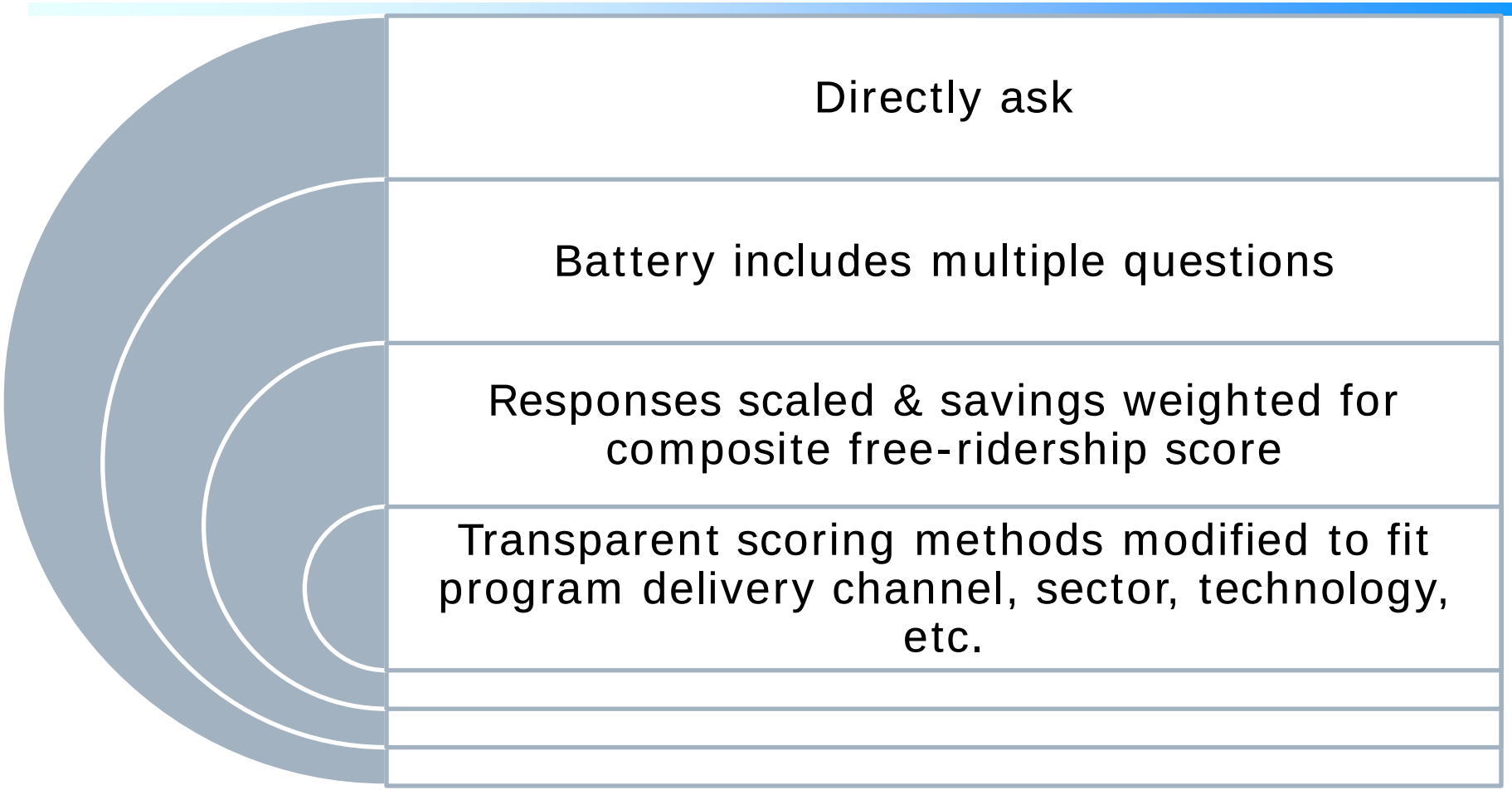
Net program impacts do not provide estimates of individual components of NTGR (FR, SO, and ME)

Measurement. Statistical Methods: Discrete Choice

Probability of choosing one option over another as a function of specific, explanatory factors (e.g., SRP AC Rebate discrete choice modeling)

- lower-efficiency, non-program-qualifying unit
- high-efficiency, program-qualifying unit outside of the program
- high-efficiency, program-qualifying units as part of the program

Measurement. Self Report



Measurement. Self Report: FR

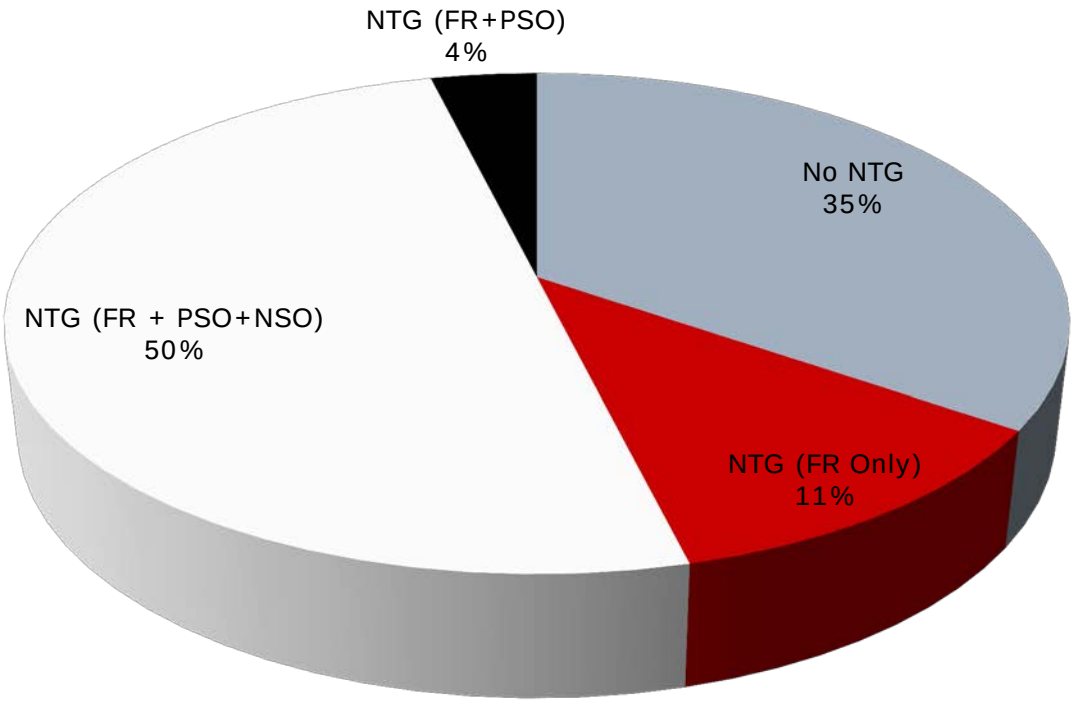
Possible response bias – social desirability	• Internal reasons & cognitive processes- People try to give the "right answer" • Giving the "right answer" tends to overstate free-ridership
Construct validity - participants may be predisposed to conservation	• Responses may be conditioned by psychological effects of the program • May be measuring effect of program, not what would happen in the absence

Measurement. Self Report: SO

Systematic and transparent approaches

Directly ask decision makers about EE purchases w/o rebates, knowledge of available rebates, influence of the programs

Treatment of NTG: Based on 31 States



Across the Country
NTG Treatment by Jurisdiction

No NTG	• MD, NM, RI, DE, DC, NC, TX, NJ
NTG forward looking only	• WI, WA, IN, MD, ME, OH, ID, MN, PA, MA
NTG backward looking	• OR, CO, MO, UT, AK
NTG=Deemed Values	• CA, NV, NY, VT, HI, MI, AR

Arizona

The Arizona Corporation Commission set Energy Efficiency Rules in 2009

The APS DSM plan compliance filing reported net savings; considering free-ridership, spillover, market effects

NTGR varied by program; across portfolio NTGR close to 1 (Supporting notion that in aggregate…free-ridership is at least offset by spillover and market effects")

Policy Direction

Net = (1-freeride+participant spillover + market effects)

Potential, Goals, Analysis, and Reporting

Net as Program Performance Metric

Findings from Other Studies

CPUC National Energy Efficiency Best Practices Study

Over 50% assumed or calculated NTGR >= .90

Findings from Other Studies

California Portfolio Energy Efficiency Program Effects and Evaluation Summary Report

- 50 resource acquisition & 31 information-only programs
  - 23 considered free-ridership
  - 3 measured participant spillover
  - 3 measured nonparticipant spillover

Commercial Lighting Free-ridership & Spillover

Sponsoring Organization	Net-to-Gross Values	Free-ridership Values	Spillover Values
Residential:			
Efficiency Vermont	1.19	6%	25%
Energy Trust of Oregon	0.75	51%	26%
Efficiency Maine	1.10	20%	30%
Non-Residential:			
NYSERDA	1.10	39%	80%

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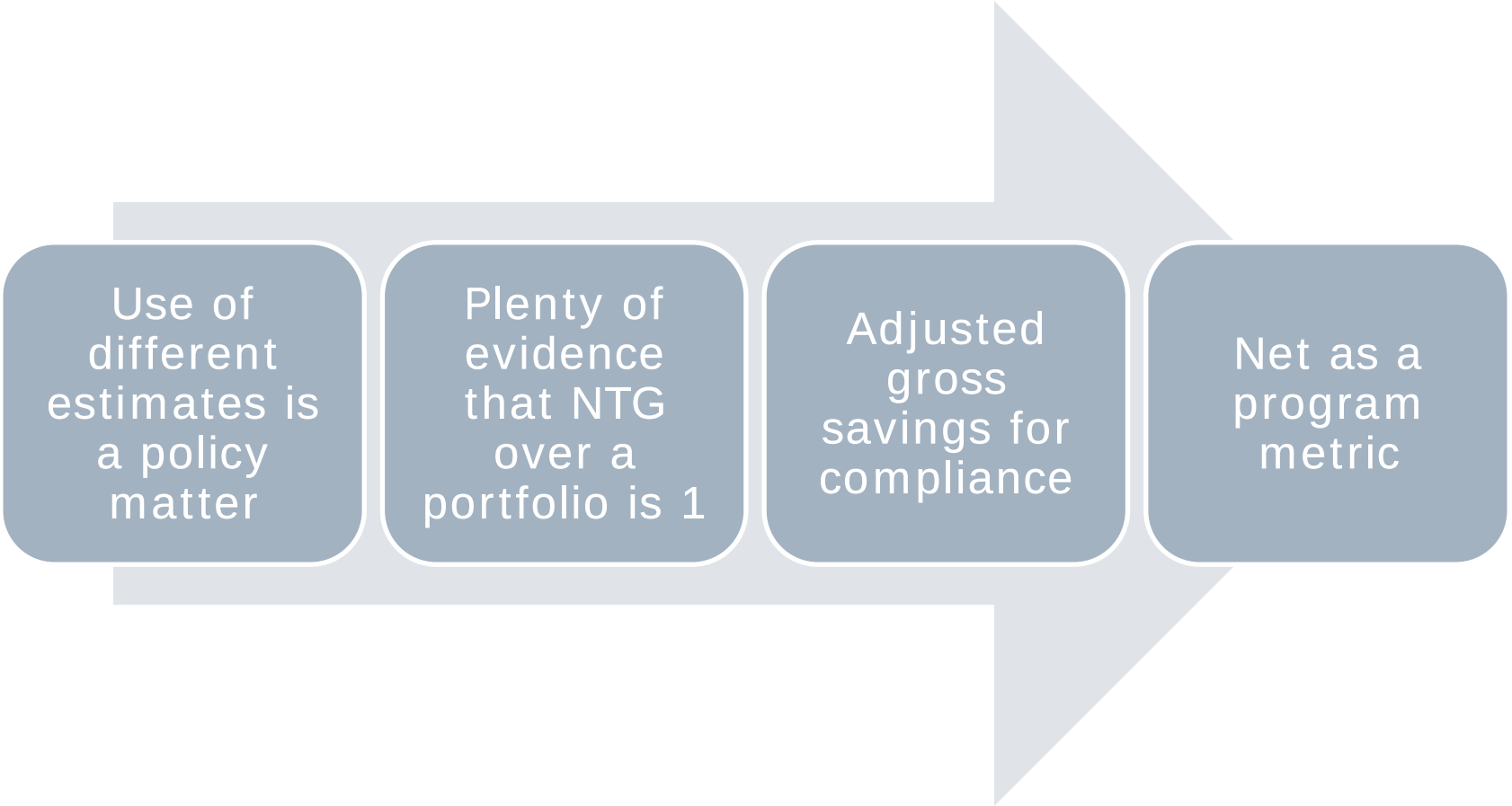
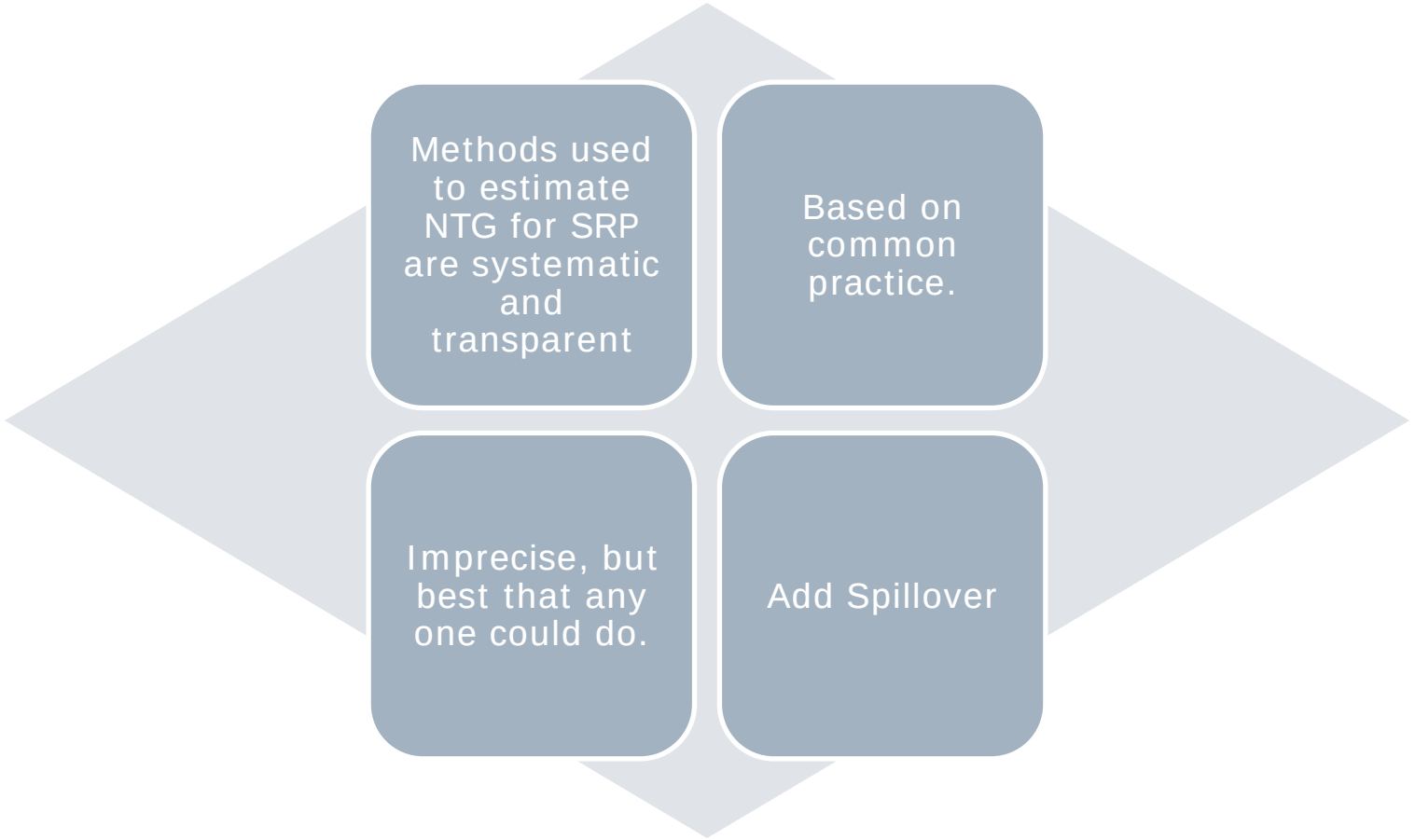
Concluding Remarks



If you DO measure..



Recommendations

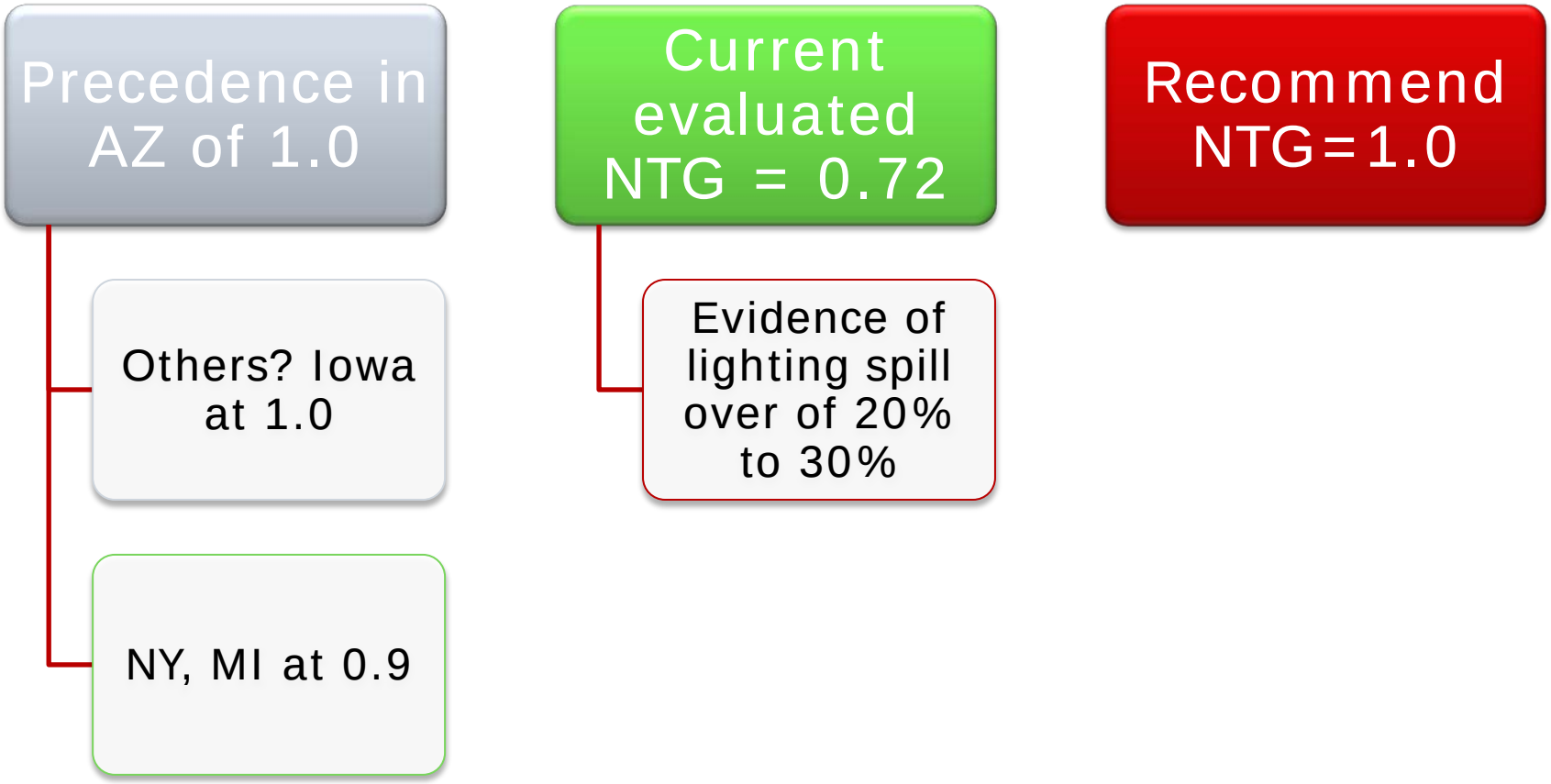
Adopt a deemed NTGR at the portfolio level

- This considers the uncertainty in measuring the NTGR components
- It acknowledges spillover and market effects could offset some portion of the free-ridership estimates

Claim adjusted gross savings

- Continue to compute the net savings estimates and use this information for program planning

What Deemed Value?



Recommendations

Should continue efforts to design effective programs and minimize free-ridership by:

- Regularly tracking measure saturation within service area and other jurisdictions
- Carefully monitor market response to programs and set incentive levels that minimize free-ridership
- Match incentive levels with increased efficiency to motivate participants to install measures that would not have been installed in the program's absence