

# Putting Your Money Where Your Meter Is

A Study of Pay for Performance Energy  
Efficiency Programs in the U.S.

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MT Symposium, April 3, 2017



# Agenda

- Taxonomy of P4P program features
- Lessons learned and recommendations from case studies
- Overall policy considerations for P4P

Download the Issue Brief and Report here:  
<https://www.nrdc.org/resources/putting-your-money-where-your-meter>



REPORT

## PUTTING YOUR MONEY WHERE YOUR METER IS

A STUDY OF PAY-FOR-PERFORMANCE ENERGY  
EFFICIENCY PROGRAMS IN THE UNITED STATES

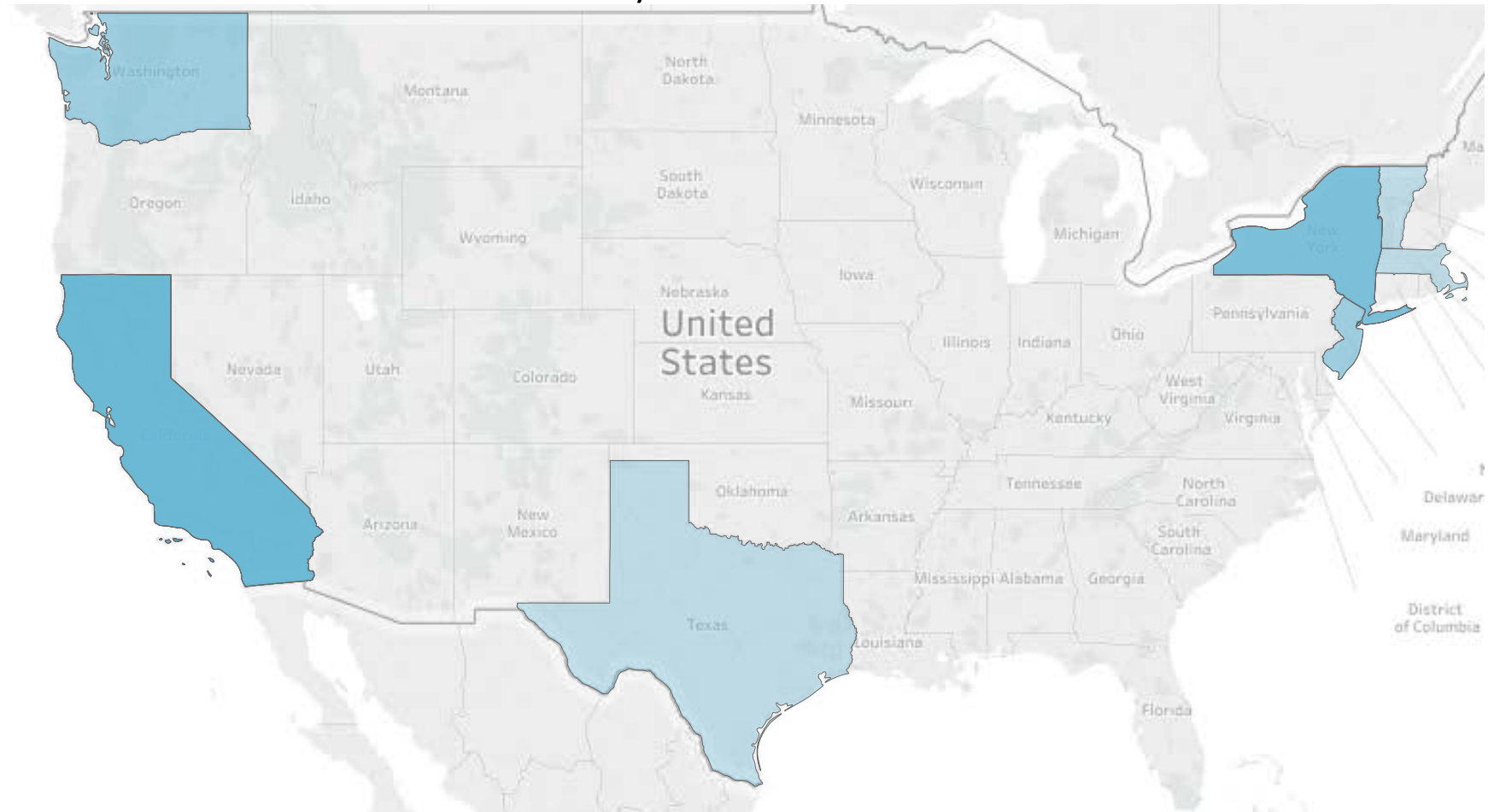
*Prepared for the Natural Resources Defense Council  
and Vermont Energy Investment Corporation*

# P4P not new, but little understanding of past experiences, and potential upsides and pitfalls

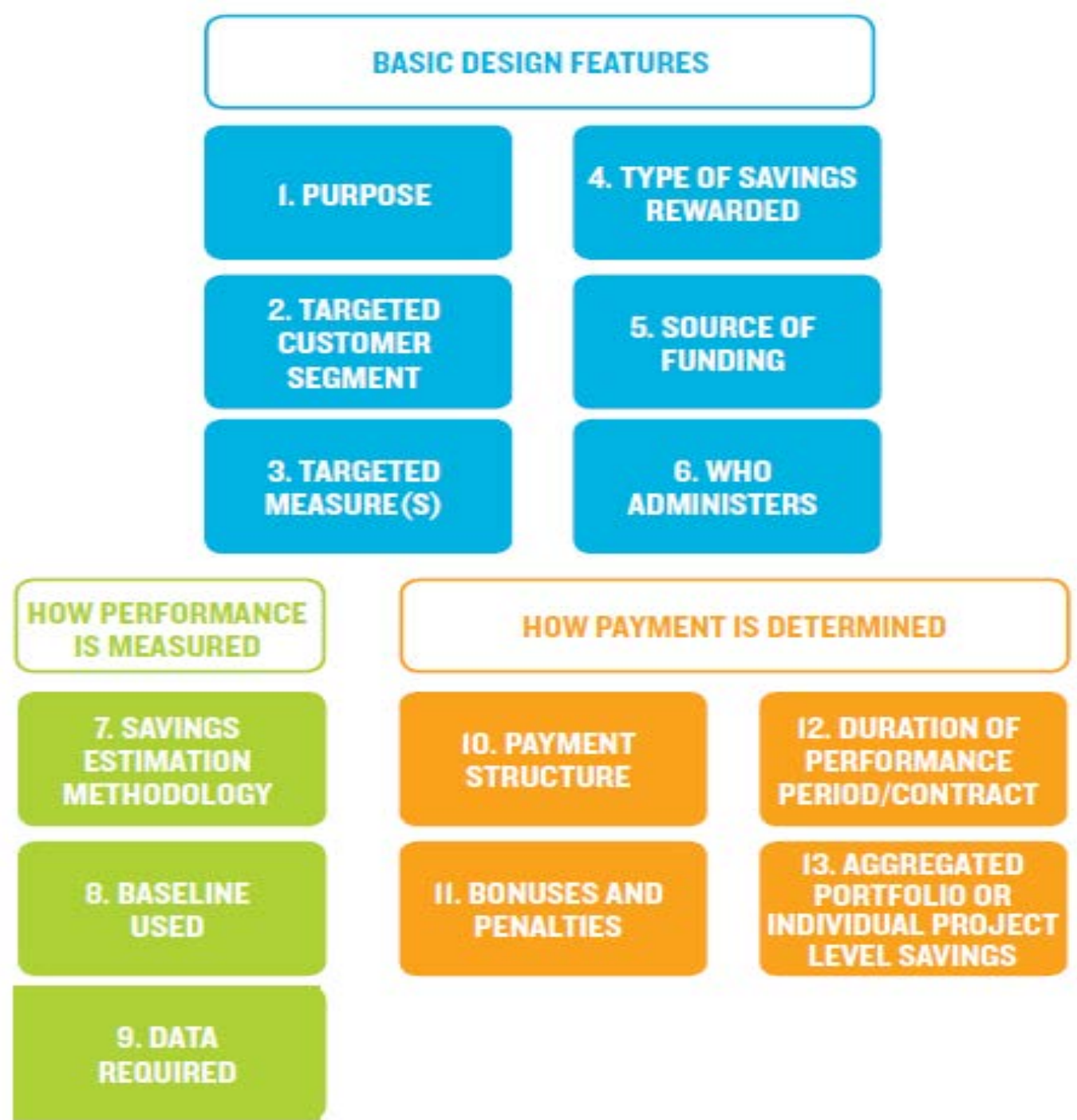
Analysis of key elements and lessons learned from:

- 21 case studies from late 1980s to present
- 24 expert interviews

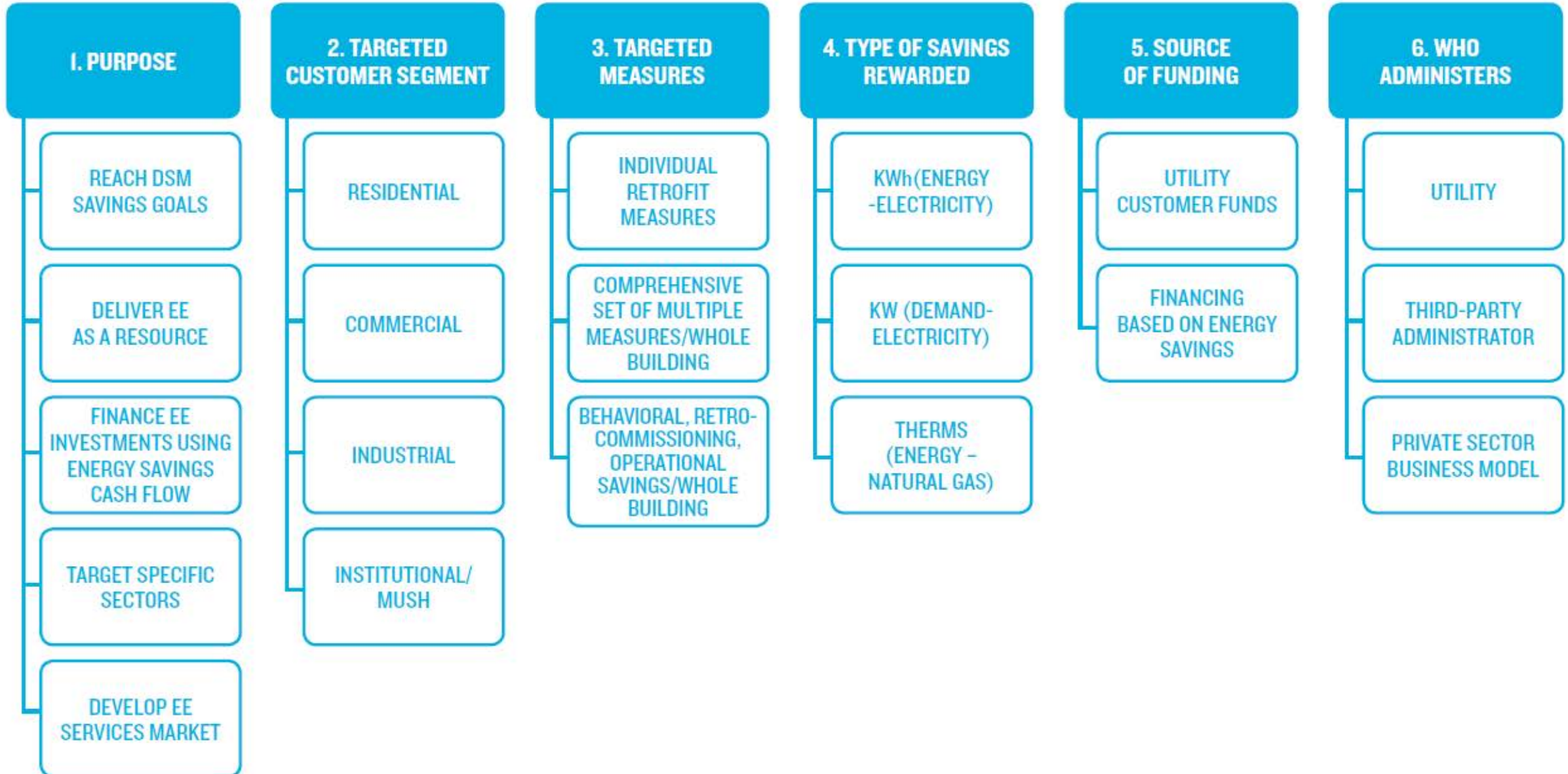
P4P Case Study Locations Across the US



# Analysis of Case Studies through P4P Taxonomy



# Basic Design Features



# Basic Design Features – *Findings from Case Studies*

## Program motivation:

- Determines the M&V, EE measures, payment structure

## Targeted sector:

- Almost all commercial sector, some industrial, few examples in residential

## Targeted measures:

- First gen programs mainly lighting, many newer programs have multiple measures including operational/behavioral savings.

## Basic Design Features – *Recommendations*

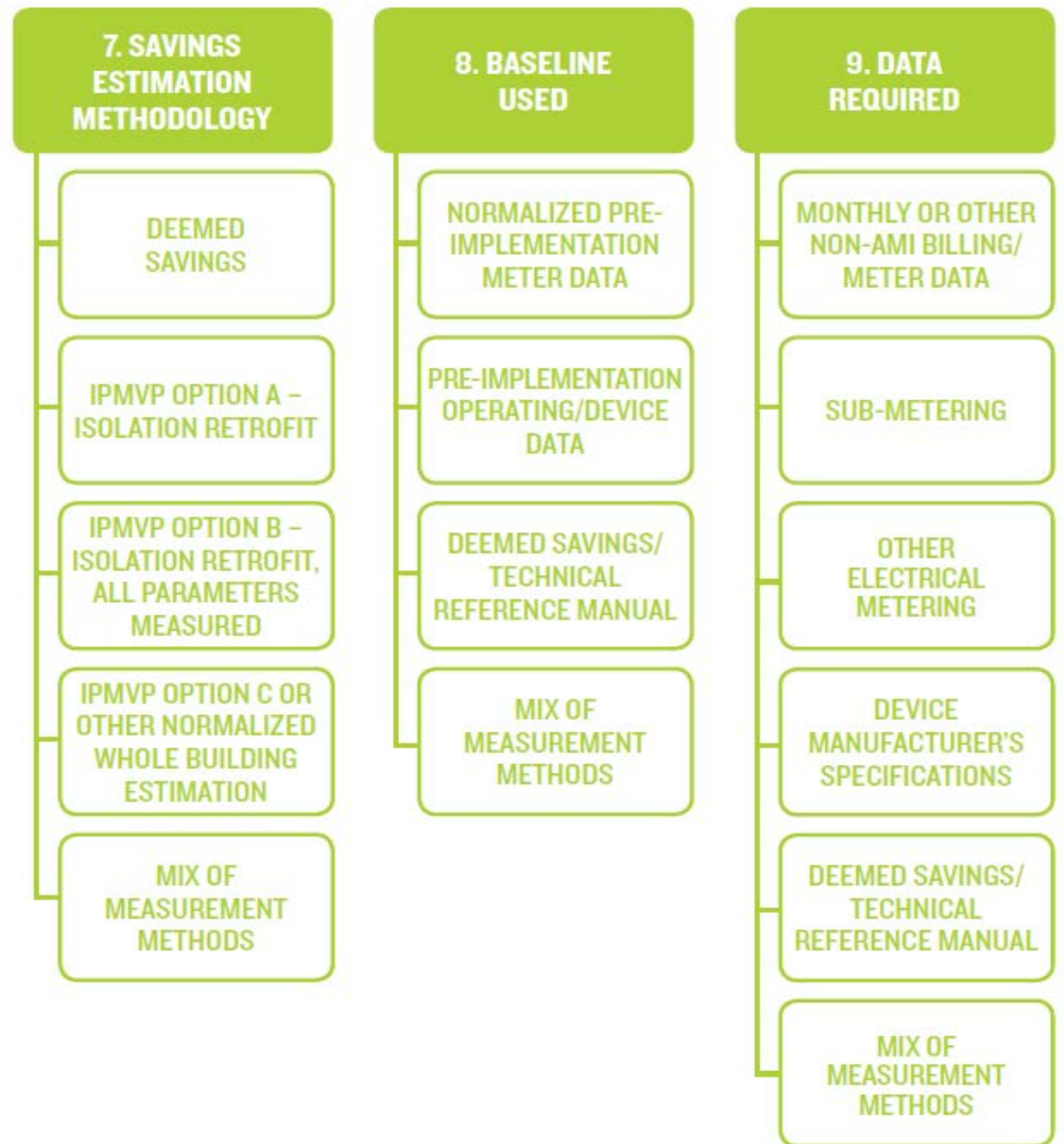
### Avoid “cream-skimming” and encourage deeper savings:

- Minimum savings requirements
- Tiered incentives
- Requirements for multiple measures





# How Performance is Measured

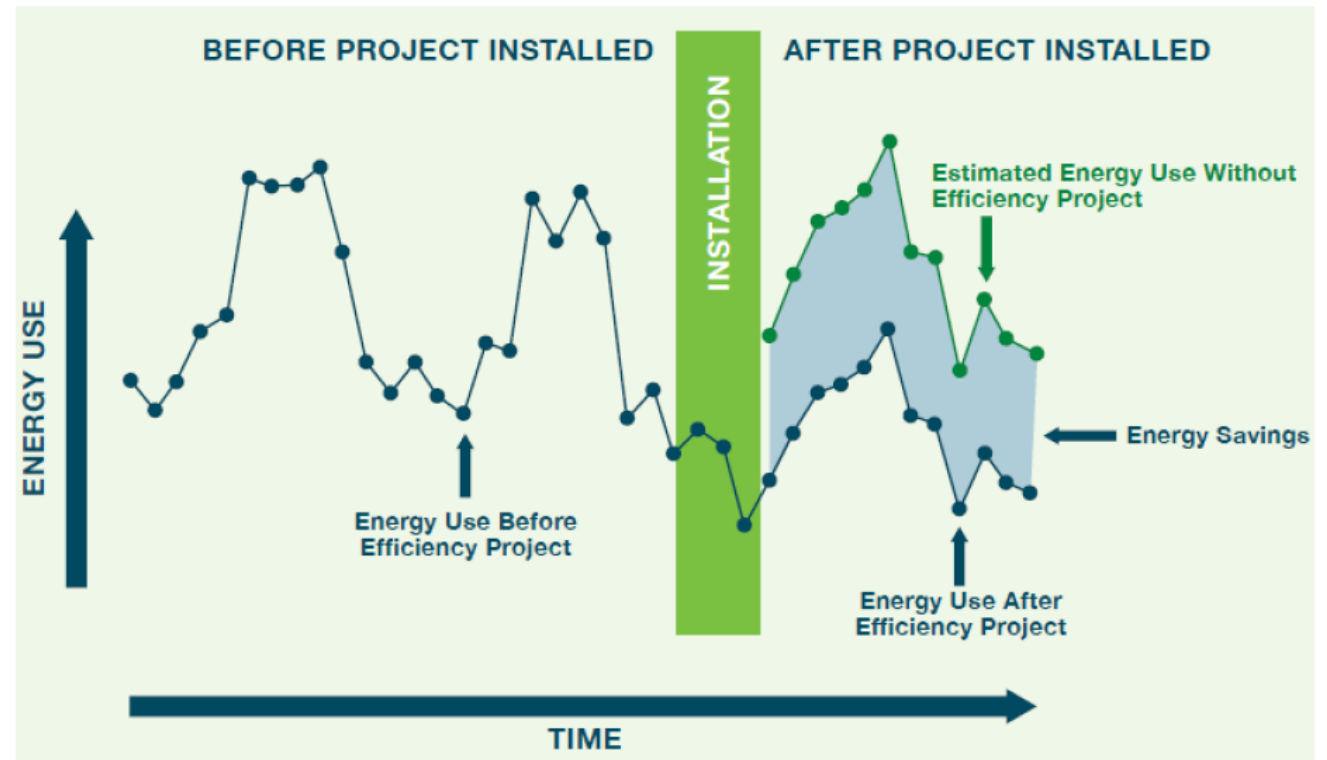




# How Performance Is Measured – *Findings from Case Studies*

**Range of Savings Estimation Methods:** Whole building normalized meter/bill data analysis, building simulation, deemed savings, engineering estimates, or comparison groups.

- 7 of 21 cases used some form of normalized meter/bill data to estimate savings, enabling multi-measure retrofits and operational savings



# How Performance is Measured – *Recommendations*

Even with best models, some buildings are difficult to predict

To improve accuracy and certainty of savings estimates:

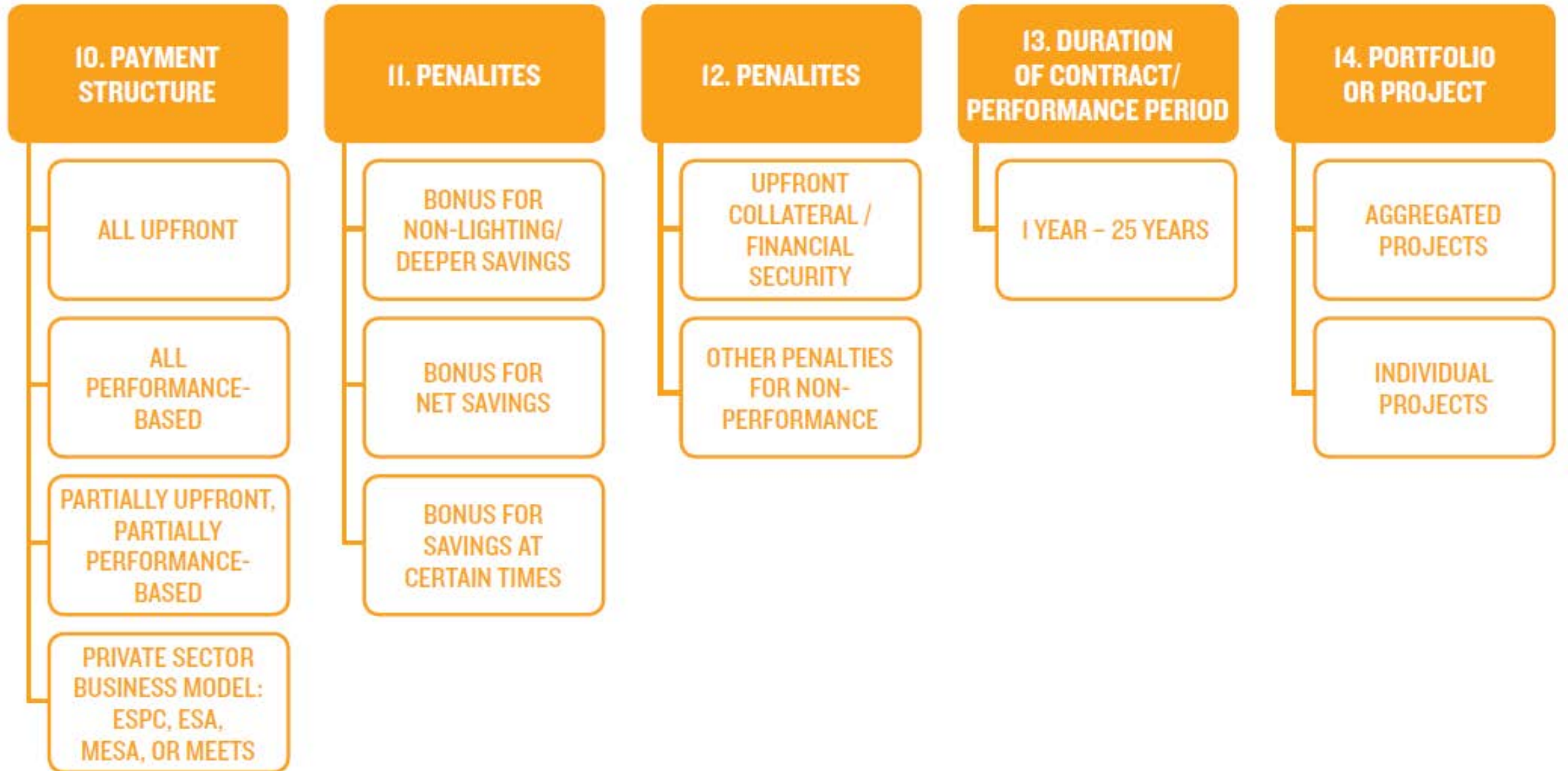
- Screen out unpredictable buildings
- Estimate for a portfolio of buildings
- Backup savings estimation methodology

To streamline M&V and reduce costs:

- Performance metrics to compare savings models
- Standardize and agree in advance on methods and data



# How Payment is Determined



# How Payment is Determined – *Findings from Case Studies*

## Incentive Structure:

- Most programs had payments for milestones (verification of installation) and savings performance (\$/kWh saved).

## Bonuses/Penalties:

- High penalties for programs relying on EE to replace physical infrastructure; programs with bonuses for higher savings had fewer lighting-only measures.

## Duration of Payments:

- Wide range of performance periods from 1 to 25 years long



# How Payment is Determined - *Recommendations*

## Mitigate performance risk for customers, implementers, utilities, ratepayers

- Milestones for installation alongside performance incentives
- Quality standards and insurance for EE projects
- Diversified portfolio of buildings

## Regular feedback and visibility of savings trajectory



## Consider tradeoffs of payment duration

- Longer periods motivate persistence but prolong risk exposure

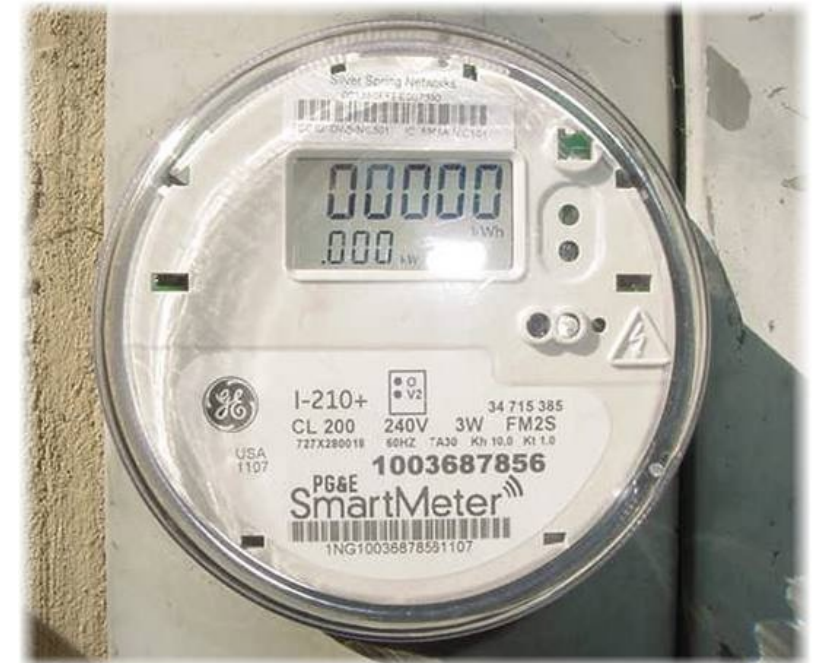
# Overall Policy Considerations

P4P Applications and Limitations



# Potential P4P Applications

- P4P can leverage access to smart meters and improved analytics (M&V 2.0) to capture savings from a wider range of EE projects, especially complex, interactive, multi-measure, whole-building efficiency projects
- P4P can deliver efficiency as a verified energy or capacity resource



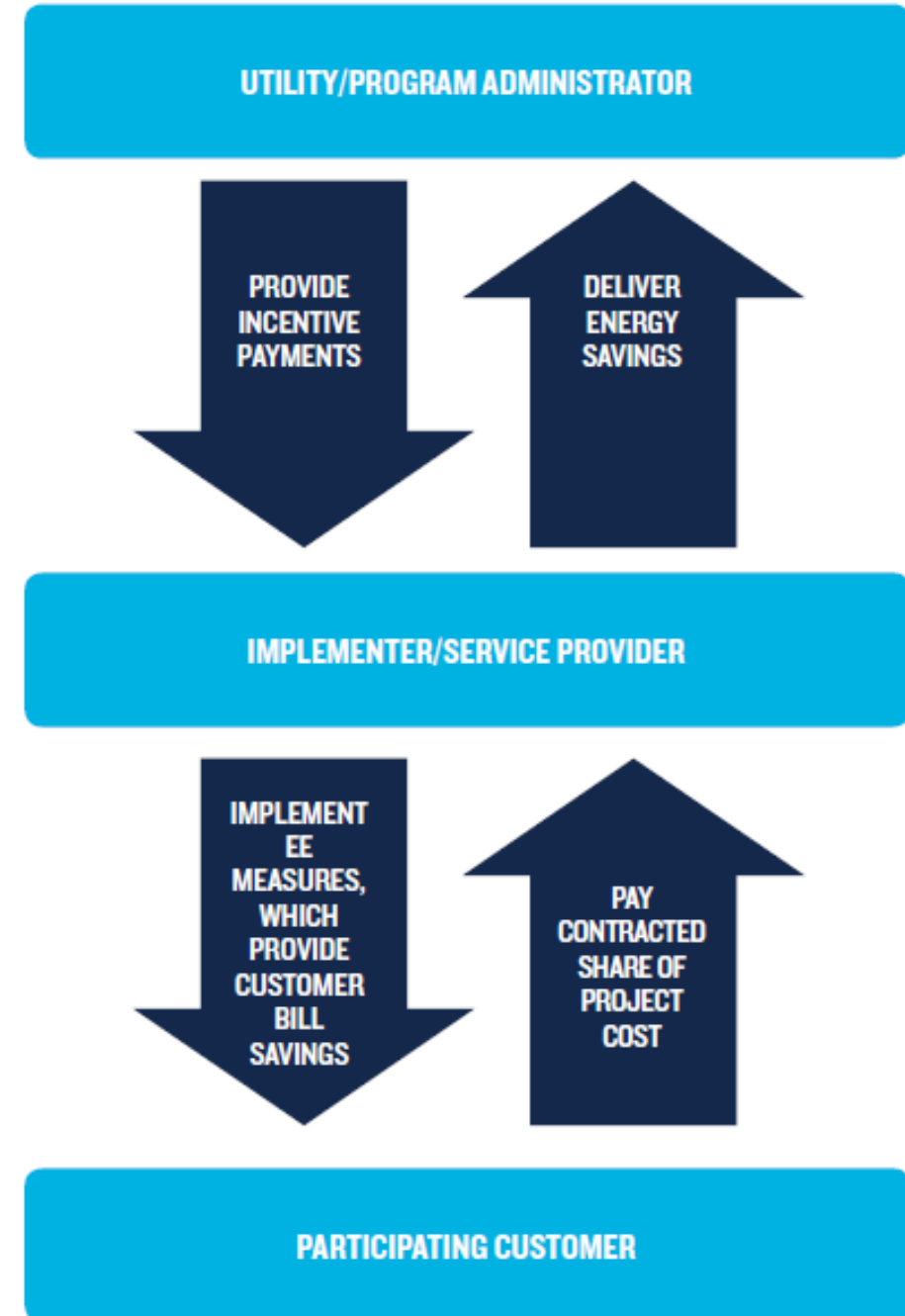
Pge.com

# Potential P4P Applications

P4P may achieve greater scale when aimed at aggregators (rather than individual customers) to:

- Participate in competitive solicitations and bundle savings across a portfolio of buildings
- Bring in private capital and encourage innovation in business models

Common P4P Payment Structure



# Potential P4P Limitations

## Not all buildings can easily participate:

- Not one-size-fits-all approach, especially with unpredictable buildings
- Most programs in commercial sector, less experience in residential, low-income, small business
- Best suited to retrofits; won't replace new construction programs



# Potential P4P Limitations

- Not yet clear if P4P models will be able to achieve *more savings* than traditional efficiency programs or achieve savings at a *lower cost*
- If implemented alongside other EE programs, must avoid double-dipping incentives or double-counting savings
- Net-to-gross savings adjustments are still needed to attribute savings to program intervention

# Next Steps for P4P

## Engage the private sector:

- Continue progress on standardizing M&V methods to encourage investment
- Ensure consistent, automated access to customer data
- Provide fair market access through regular and transparent solicitations

## Encourage innovation and testing:

- Regulators should encourage utilities to conduct P4P pilots
- Within existing DSM programs, track real-time metered savings alongside deemed and modeled savings to assess where a shift to P4P approaches may be appropriate

# Thank You!

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# Appendix

# Common Savings Estimation Methodologies

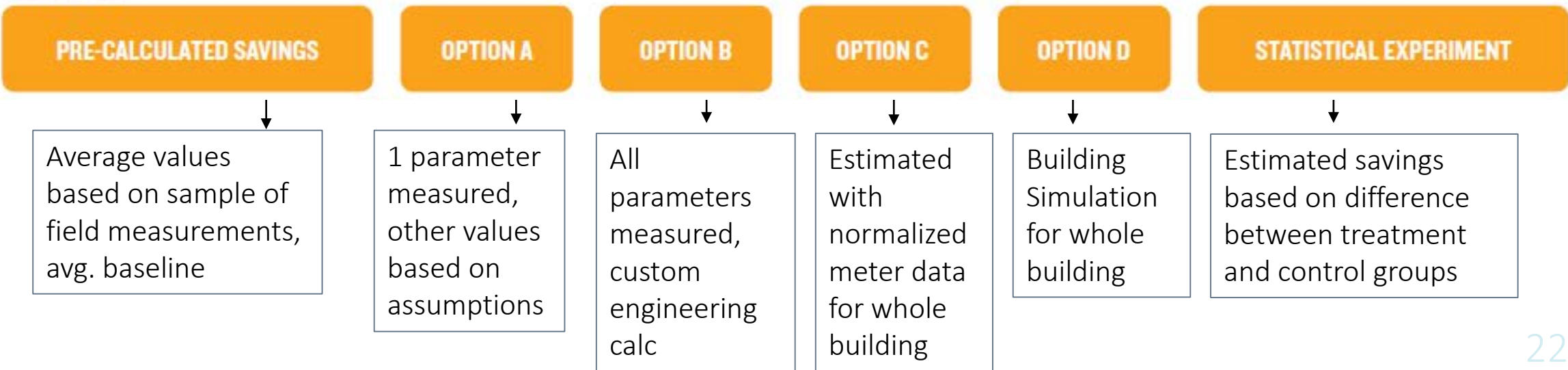
## TYPE



## SCALE



## METHOD



# Eligible measures determine savings estimation methodology

**FIGURE 13: COMPARISON OF CASE STUDY SAVINGS ESTIMATION METHODS AND TARGETED MEASURES**

Targeted Measures	Deemed Savings	IPMVP Option A, B (isolation retrofit)	IPMVP Option B, C or D (not A, mainly stipulated savings)	IPMVP Option C (or similar whole-building normalized meter/bill analysis)	IPMVP Option D (calibrated computer simulation)	Mix of measurement methods (deemed and M&V methods)	Randomized control trial
Individual retrofit measures	2		2			2	
Behavioral, retro-commissioning, operational measures		1		3			1
Comprehensive set of multiple measures		1		4	2	4	

Number of Cases



# First P4P Programs (late 1980s, 1990s)

## DSM Bidding Programs:

Market approach, all-source or demand-side only

Program implementers compete for long-term contracts via RFP, auction, etc.

Often include a savings target, prices vary

## Example:

- Con Edison Integrated Demand-Side Management Bidding (1990-2003)

# First P4P Programs (late 1980s, 1990s)

## Standard Offer Programs:

Pre-set price

First-come, first-serve

Standard performance contract programs developed as a mechanism to capture savings from ESCOs

## Examples:

- Public Service Electric & Gas Standard Offer (NJ, 1993–Present)
- CA Non-Residential Standard Performance Contract (1998—2005)
- NYSERDA Energy Services Industry Program Standard Performance Contract (1999–Present)
- TX Standard Offers (2000-Present)

# Lessons Learned from First P4P Programs

## DSM Bidding Programs:

Balance strict eligibility criteria and screening out bad projects  
Difficult to rank EE resources vs. supply resources

## Standard Offer Programs:

Easier to administer than DSM bidding, but hard to set “right” price

## Both:

Tended to be more expensive than rebate programs because:

- 1) performance risk shifted to implementers, and*
- 2) high EM&V costs from lack of standardization and no smart meters*

Challenges with P4P competing alongside rebate programs



# Evolution of P4P Programs Since 1990s

## P4P in Utility DSM Programs:

Industrial and Commercial  
Strategic Energy Management

Commissioning and Retro-  
Commissioning

Whole building P4P

Usually engage individual customers, not  
aggregators

## Examples:

- CA Monitoring-Based Commissioning
- BPA Strategic Energy Management
- NJ C&I Pay for Performance
- Seattle City Light Commercial P4P
- PG&E Commercial Whole Building Program and PG&E Residential P4P
- Efficiency Vermont Continuous Energy Improvement
- National Grid P4P for Monitoring-Based Commissioning and Retro-Commissioning

# Evolution of P4P Programs Since 1990s

## P4P to Capture EE as a Grid Resource

Utilities targeting constrained areas of the grid

ISOs capturing EE as a capacity resource

Typically target aggregators rather than individual customers

## Examples:

- Con Edison Targeted Demand-Side Management
- Southern California Edison Local Capacity Requirement Request for Offers
- ISO New England Forward Capacity Market

# Evolution of P4P Programs Since 1990s

## Private Sector Business Models

ESCO Performance Contracts  
Efficiency Services Agreements  
Managed Energy Services Agreements  
Metered EE Transaction Structure

## Examples:

- ESCOs
- Metrus
- Sealed
- MEETS