

# National Standard Practice Manual for Energy Efficiency Cost-Effectiveness

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# Overview of the NSPM Process

## **NESP:**

- Group working to improve cost-effectiveness analyses
- Over 75 organizations representing a range of perspectives.

## **NSPM Drafting Committee:**

- Tim Woolf, Synapse Energy Economics
- Chris Neme, Energy Futures Group,
- Marty Kushler, ACEEE
- Steve Schiller, Schiller Consulting
- Tom Eckman (Consultant)

## **NSPM Review Committee:**

- ~40 experts representing a variety of organizations from around the country
- Provided several rounds of review/feedback on draft manual

## **Project Coordination and Funding:**

- Coordinated and funded by E4TheFuture
- Managed by Julie Michals, E4TheFuture
- Earlier work on the NESP and NSPM was managed by the Home Performance Coalition.

**For more information:** <http://www.nationalefficiencyscreening.org/>

# The Need for an NSPM (1)

## Test Selection

- Traditional tests (UCT, TRC, SCT) not meeting states' needs
  - No underlying principles
  - Don't directly address policy goals/needs
  - Lack of clarity on their conceptual constructs
  - Only 3 options, despite much greater variability in state needs
  - Many states modified the tests
    - A good thing if done well, but that has only sometimes been the case...
- Efficiency is significantly under-valued in many states
  - Including participant costs, but not participant benefits under TRC/SCT
  - Not accounting for impacts on all key energy policy objectives
- Lack of transparency on why/how tests were chosen/developed

*Developing the right test is critical to ensuring utility investments are economic.*

## The Need for an NSPM (2)

### Test Use

- Absence of standard guidance on proper application of tests
- Inputs to tests are often problematic
- Most of the common problems lead to under-valuing efficiency:
  - Not accounting for full range of utility system impacts
  - Not valuing hard-to-quantify impacts (utility, participant or societal)
  - Defaulting to WACC for discount rate
  - Use of average instead of marginal line loss rates
  - Improperly counting free rider “costs” under TRC/SCT
  - Etc.

*Regardless of which test is used, big improvement could be made in many states by just more comprehensively and accurately developing inputs to the test.*

# Purpose and Scope of NSPM

## Purpose

- Fundamental principles – both test selection & application
- Framework for primary test selection/development
- Guidance on key test inputs/application issues

## Scope

- Focus on efficiency resources
  - Principles and framework apply to all other resources (incl. other DERs)
  - But only addresses details and nuances of efficiency
- Focus on utility rate-payer funded efficiency acquisition
- Addresses 1<sup>st</sup> order question: “which EE resources merit acquisition?”

# NSPM Outline

## **Executive Summary**

## **Introduction**

### **Part 1: Developing Your Test**

1. Principles
2. Resource Value Framework
3. Developing Resource Value Test
4. Relationship to Traditional Tests
5. Secondary Tests

### **Part 2: Developing Test Inputs**

6. Efficiency Costs & Benefits
7. Methods to Account for Costs & Benefits

8. Participant Impacts

9. Discount Rates

10. Assessment Level

11. Analysis Period & End Effects

12. Analysis of Early Retirement

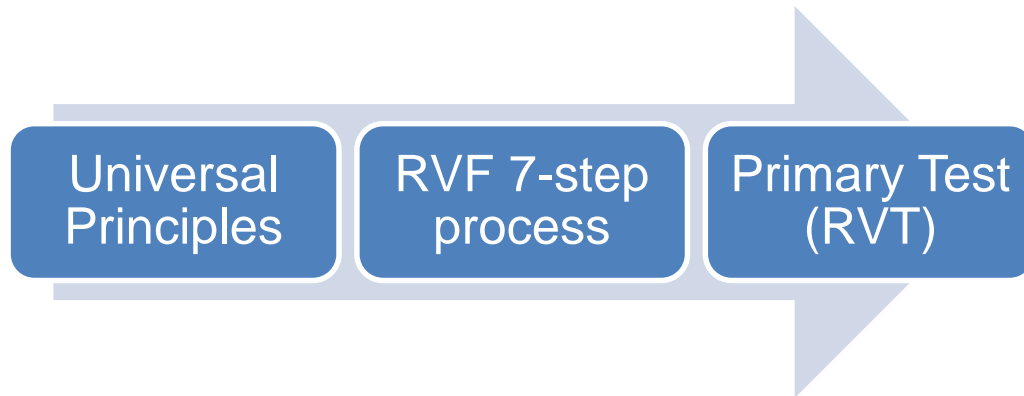
13. Free Rider & Spillover Effects

## **Appendices**

- A. Summary of Traditional Tests
- B. Cost-Effectiveness of Other DERs
- C. Accounting for Rate & Bill Impacts
- D. Glossary

# Part I

## Developing a Cost-Effectiveness Test Using the Resource Value Framework



# NSPM Principles

1. Recognize that energy efficiency is a resource.
2. Account for applicable policy goals.
3. Account for all relevant costs & benefits, even if hard to quantify impacts.
4. Ensure symmetry across all relevant costs and benefits.
5. Conduct a forward-looking, long-term analysis that captures incremental impacts of energy efficiency.
6. Ensure transparency in presenting the analysis and the results.



## 7-Step Resource Value Framework

Step 1	Identify and articulate the jurisdiction's applicable policy goals.
Step 2	Include all utility system impacts in the test.
Step 3	Decide which additional <i>non-utility</i> system impacts to include in the test, based on applicable policy goals.
Step 4	Ensure the test is symmetrical in considering both costs and benefits.
Step 5	Ensure the analysis is forward-looking, incremental, and long-term.
Step 6	Develop methodologies and inputs to account for all impacts, including hard-to-quantify impacts.
Step 7	Ensure transparency in presenting the analysis and the results.

# STEP 1

## Identify and Articulate Applicable Policy Goals

Laws, Regs, Orders:	Policy Goals Reflected in Laws, Regulations, Orders, etc.					
	Low-Cost	Fuel Diversity	Risk	Reliability	Environmental	Economic Development
PSC statutory authority	<b>X</b>			<b>X</b>		
Low-income protection						<b>X</b>
EE or DER law or rules	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
State energy plan	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Integrated resource planning		<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>
Renewable portfolio standard		<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>
Environmental requirements					<b>X</b>	

- Each jurisdiction has a constellation of energy policy goals embedded in statutes, regulations, orders, guidelines, etc.
- This table illustrates how those laws, regulations, orders, etc. might establish applicable policy goals.

## STEP 2

# Include All Utility System Impacts in the Test

- The foundation of every test
  - Central to principle of treating efficiency as a resource
  - Should be comprehensive
- “Utility system” = all that’s necessary to deliver electric or gas service
  - See discussion later for lists of costs, benefits

**STEP 3**

## Decide Which Non-Utility System Impacts to Include

- Determine thru transparent process open to all stakeholders.
- Stakeholder input can be achieved through a variety of means:
  - rulemaking process,
  - generic jurisdiction-wide docket,
  - working groups or technical sessions,
- Address objectives based on current jurisdiction policies
  - be flexible to address new or modified policies adopted over time.
- May wish to incorporate input from other government agencies
  - department of environmental protection
  - department of health and human services

## STEP 4

# Ensure Symmetry Across Benefits and Costs

- Ensure that the RVT includes costs and benefits symmetrically
  - If category of cost is included, corresponding benefits should be too
  - e.g., if participant costs included, participant benefits should also be included
- Necessary to avoid bias:
  - If some costs excluded, the framework will be biased in favor of EE;
  - if some benefits excluded, the framework will be biased against EE.
  - Bias in either direction results hurts ratepayers
    - misallocation of resources
    - higher than necessary costs to meet energy needs

## STEP 5

### Analysis Is Forward-looking, Incremental, and Long Term

- What matters is difference in costs/benefits relative to baseline
  - What would have occurred absent EE investment w/o EE
  - Sunk costs and benefits are not relevant to a cost-effectiveness analysis
- Analysis also needs to capture full lifecycle costs

## STEP 6

# Identify Methodologies & Inputs for Considering All Impacts Included in RVT

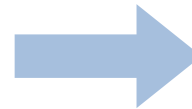
Approach	Application
Jurisdiction-specific studies	Best approach for estimating and monetizing relevant impacts.
Studies from other jurisdictions	Often reasonable to extrapolate from other jurisdiction studies when local studies not available.
Proxies	If no relevant studies of monetized impacts, proxies can be used
Alternative thresholds	Benefit-cost thresholds different from 1.0 can be used to account for relevant impacts that are not monetized.
Other considerations	Relevant quantitative and qualitative information can be used to consider impacts that cannot or should not be monetized.

# STEP 7

## Ensure Transparency

### Sample Template

Efficiency Cost-Effectiveness Reporting Template			
Program/Sector/Portfolio Name:		Date:	
<b>A. Monetized Utility System Costs</b>		<b>B. Monetized Utility System Benefits</b>	
Measure Costs (utility portion)		Avoided Energy Costs	
Other Financial or Technical Support Costs		Avoided Generating Capacity Costs	
Program Administration Costs		Avoided T&D Capacity Costs	
Evaluation, Measurement, & Verification		Avoided T&D Line Losses	
Shareholder Incentive Costs		Energy Price Suppression Effects	
		Avoided Costs of Complying with RPS	
		Avoided Environmental Compliance Costs	
		Avoided Bad Debt, Arrearages, etc.	
		Reduced Risk	
<b>Sub-Total Utility System Costs</b>		<b>Sub-Total Utility System Benefits</b>	
<b>C. Monetized Non-Utility Costs</b>		<b>D. Monetized Non-Utility Benefits</b>	
Participant Costs		Participant Benefits	
Low-Income Customer Costs	These impacts would be included to the extent that they are part of the Resource Value (primary) test.	Low-Income Customer Benefits	These impacts would be included to the extent that they are part of the Resource Value (primary) test.
Other Fuel Costs		Other Fuel Benefits	
Water and Other Resource Costs		Water and Other Resource Benefits	
Environmental Costs		Environmental Benefits	
Public Health Costs		Public Health Benefits	
Economic Development and Job Costs		Economic Development and Job Benefits	
Energy Security Costs		Energy Security Benefits	
<b>Sub-Total Non-Utility Costs</b>		<b>Sub-Total Non-Utility Benefits</b>	
<b>E. Total Monetized Costs and Benefits</b>			
<b>Total Costs (PV\$)</b>		<b>Total Benefits (PV\$)</b>	
<b>Benefit-Cost Ratio</b>		<b>Net Benefits (PV\$)</b>	
<b>F. Non-Monetized Considerations</b>			
Economic Development and Job Impacts	Quantitative information, and discussion of how considered		
Market Transformation Impacts	Qualitative considerations, and discussion of how considered		
Other Non-Monetized Impacts	Quantitative information, qualitative considerations, and how considered		
<b>Determination:</b>	<b>Do Efficiency Resource Benefits Exceed Costs? [Yes / No]</b>		



Date:	
<b>B. Monetized Utility System Benefits</b>	
Avoided Energy Costs	
Avoided Generating Capacity Costs	
Avoided T&D Capacity Costs	
Avoided T&D Line Losses	
Energy Price Suppression Effects	
Avoided Costs of Complying with RPS	
Avoided Environmental Compliance Costs	
Avoided Bad Debt, Arrearages, etc.	
Reduced Risk	
<b>Total Utility System Benefits</b>	

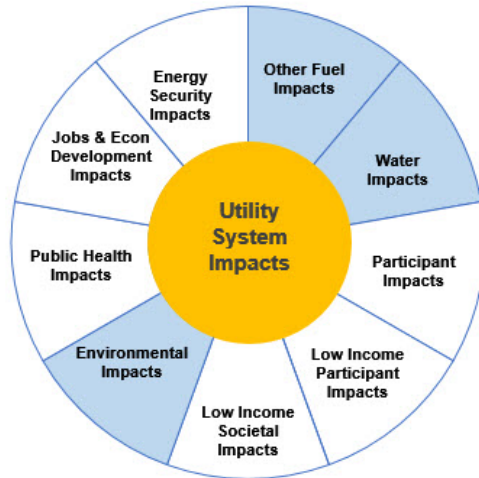


<b>Sub-Total Non-Utility Benefits</b>	
<b>Total Benefits (PV\$)</b>	
<b>Net Benefits (PV\$)</b>	
<b>Quantitative information, and discussion of how considered</b>	
<b>Qualitative considerations, and discussion of how considered</b>	
<b>Quantitative information, qualitative considerations, and how considered</b>	
<b>Do Efficiency Resource Benefits Exceed Costs? [Yes / No]</b>	



# Relationship to Traditional Tests - Examples

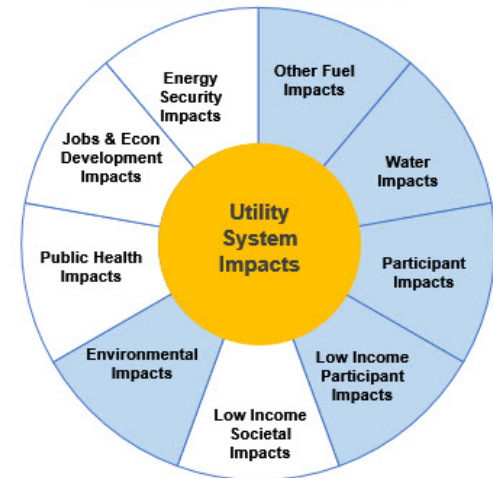
**JURISDICTION 1: RVT**



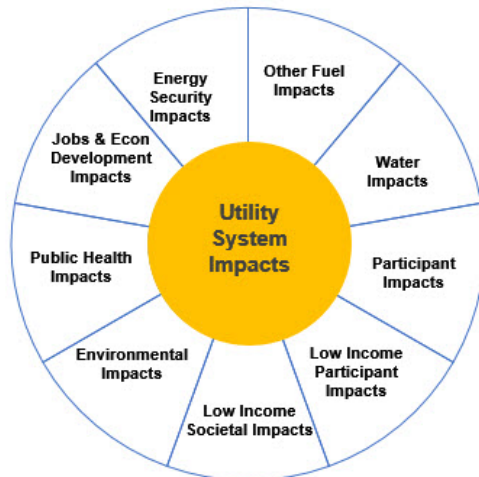
**JURISDICTION 2: RVT**



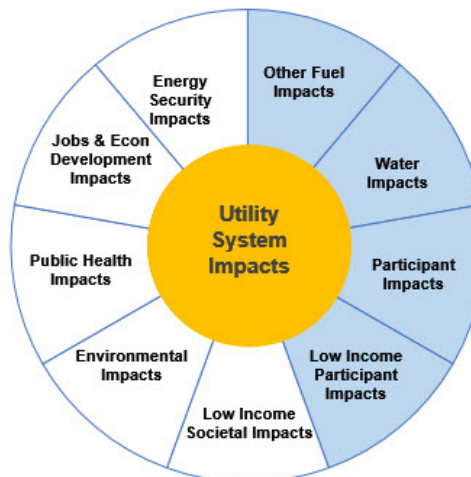
**JURISDICTION 3: RVT**



**JURISDICTION 4: RVT = UCT**



**JURISDICTION 5: RVT = TRC**



**JURISDICTION 6: RVT = SCT**



# Part II

## **Developing Inputs for Cost-Effectiveness Tests**

# Capture All Utility System Impacts

Utility System Costs	Utility System Benefits
• EE Measure Costs (utility portion – e.g. rebates)	• Avoided Energy Costs
• EE Program Technical Support	• Avoided Generating Capacity Costs
• EE Program Marketing/Outreach	• Avoided T&D Upgrade Costs
• EE Program Administration	• Avoided T&D Line Losses
• EE Program EM&V	• Avoided Ancillary Services
• Utility Shareholder Performance Incentives	• Wholesale Price Suppression Effects
	• Avoided Costs of RPS Compliance
	• Avoided Costs of Environmental Compliance
	• Avoided Credit and Collection Costs
	• Reduced Risk
	• Increased Reliability

- *This table is presented for illustrative purposes, and is not meant to be an exhaustive list.*
- *Some categories of benefits are potentially overlapping; care must be taken to ensure no double-counting of benefits.*

# Non-Utility System Impacts to Consider Including

Impact	Description
Participant impacts	Impacts on program participants, includes participant portion of measure cost, other fuel savings, water savings, and participant non-energy costs and benefits
Impacts on low-income customers	Impacts on low-income program participants that are different from or incremental to non-low-income participant impacts. Includes reduced foreclosures, reduced mobility, and poverty alleviation
Other fuel impacts	Impacts on fuels that are not provided by the funding utility, for example, electricity (for a gas utility), gas (for an electric utility), oil, propane, and wood
Water impacts	Impacts on water consumption and related wastewater treatment
Environmental impacts	Impacts associated with CO2 emissions, criteria pollutant emissions, land use, etc. Includes only those impacts that are not included in the utility cost of compliance with environmental regulations
Public health impacts	Impacts on public health; includes health impacts that are not included in participant impacts or environmental impacts, and includes benefits in terms of reduced healthcare costs
Economic development and jobs	Impacts on economic development and jobs
Energy security	Reduced reliance on fuel imports from outside the jurisdiction, state, region, or country

*This table is presented for illustrative purposes, and is not meant to be an exhaustive list.*

## Considering Whether to Include Participant Impacts

- A policy decision
- Should be based on jurisdiction's policy goals
- If participant costs included, participant benefits must be too

## Discount Rates

- The discount rate reflects a particular “time preference,” which is the relative importance of short- versus long-term impacts.
- The choice of discount rate is a policy decision that should be informed by the jurisdiction’s applicable policies.
- The choice of discount rate should reflect the fundamental objective of efficiency cost-effectiveness analysis: *to identify resources that will best serve customers over the long term, while also achieving applicable policy goals.*
- The utility cost of capital does not necessarily reflect this objective.

## Additional Foundational Information

Assessment Level	<ul style="list-style-type: none"><li>• Analysis at all levels can provide valuable insight/value</li><li>• But regulators should focus only on program, sector, or portfolio level for making “yes or no” (“in or out”) investment decisions</li><li>• EE program costs should be included at the level at which they are truly variable</li></ul>
Analysis Period & End Effects	<ul style="list-style-type: none"><li>• Should be long enough to cover lifecycle costs and benefits</li><li>• 2nd best alternative is to amortize/annualize costs</li><li>• comparable portions of costs/benefits over shorter analysis period</li></ul>
Analysis of Early Replacement	<ul style="list-style-type: none"><li>• Should reflect that up-front cost is partially offset by value of deferring the next replacement (e.g. replacing now means not having to replace in 5 years)</li><li>• May need to also account for shifting efficiency baseline and resulting different savings levels in different future years</li></ul>
Free-Riders & Spillover	<ul style="list-style-type: none"><li>• Treatment should be a function of categories of impacts included in energy policy test</li><li>• Free-riders: participant rebates/incentives only a cost if test excludes participant impacts</li><li>• Spillover: additional cost only if test includes participant impacts</li></ul>

The NSPM, and related materials from the NESP, are available at: [nationalefficiencyscreening.org](http://nationalefficiencyscreening.org)



# Extra Slides for Reference

## Foundational Principle: Applicable Policy Goals

Applicable policy goals include all policy goals adopted by a jurisdiction that could have relevance to the choice of which energy resources to acquire.

Examples include:

Common Overarching Goals:	Provide safe, reliable, low-cost electricity and gas services; protect low-income and vulnerable customers; maintain or improve customer equity.
Efficiency Resource Goals:	Reduce electricity and gas system costs; develop least-cost energy resources; promote customer equity; improve system reliability and resiliency; reduce system risk; promote resource diversity; increase energy independence (and reduce dollar drain from the jurisdiction); reduce price volatility.
Other Applicable Goals:	Support fair and equitable economic returns for utilities; provide reasonable energy costs for consumers; ensure stable energy markets; reduce energy burden on low-income customers; reduce environmental impact of energy consumption; promote jobs and local economic development; improve health associated with reduced air emissions and better indoor air quality.

**These goals are established in many ways:**

- Statutes
- Regulations
- Commission Orders
- EE Guidelines
- EE Standards
- Directives
- And Others

# Relationship to Traditional Tests - Examples

Impacts	Jurisdiction					
	1	2	3	4	5	6
	RVTs Differ from Any Traditional Test			RVT = UCT	RVT = TRC	RVT = SCT
Utility System	✓	✓	✓	✓	✓	✓
Other Fuels	✓	✓	✓		✓	✓
Water	✓		✓		✓	✓
Participants			✓		✓	✓
Low-Income Participants		✓	✓		✓	✓
Low-Income Societal		✓				✓
Environmental	✓		✓			✓
Public Health		✓				✓
Economic Development		✓				✓
Energy Security		✓				✓

- Each cost-effectiveness test should include the utility system impacts.
- The other impacts included should be based on applicable policy goals.
- In some jurisdictions, this may result in a Resource Value Test equal to one of the traditional tests.
- In other jurisdictions, the RVT may be different.

## Steps for Choosing a Discount Rate

Step A	<u>Articulate the jurisdiction's applicable policy goals.</u> These should be the same goals used in developing the RVT.
Step B	<u>Consider the relevance of a utility's weighted average cost of capital.</u> Is the utility investor time preference consistent with the jurisdiction's policy goals?
Step C	<u>Consider the relevance of the average customer discount rate.</u> Should the discount rate be based on the average utility customer time preference? Does this time preference adequately address applicable policy goals and future customers?
Step D	<u>Consider the relevance of a societal discount rate.</u> Is a societal time preference and use of a societal discount rate consistent with the jurisdiction's policy goals and associated regulatory perspective?
Step E	<u>Consider an alternative discount rate.</u> Given that the regulatory perspective may be different from the utility, customer, and societal perspective, the discount rate does not need to be tied to any one of these three perspectives.
Step F	<u>Consider risk implications.</u> Consider using a low-risk discount rate for EE cost-effectiveness, if the net risk benefits of EE resources are not somehow accounted for elsewhere in the cost-effectiveness analysis

# The Traditional Cost-Effectiveness Tests

Test	Perspective	Key Question Answered	Summary Approach
Utility Cost	The utility system	Will utility system costs be reduced?	Includes the costs and benefits experienced by the utility system
Total Resource Cost	The utility system plus participating customers	Will utility system costs plus program participants' costs be reduced?	Includes the costs and benefits experienced by the utility system, plus costs and benefits to program participants
Societal Cost	Society as a whole	Will total costs to society be reduced?	Includes the costs and benefits experienced by society as a whole
Participant Cost	Customers who participate in an efficiency program	Will program participants' costs be reduced?	Includes the costs and benefits experienced by the customers who participate in the program
Rate Impact Measure	Impact on rates paid by all customers	Will utility rates be reduced?	Includes the costs and benefits that will affect utility rates, including utility system costs and benefits plus lost revenues

# Distributed Energy Resources Utility System Impacts

		Energy Efficiency	Demand Response	Distributed Generation	Distributed Storage
<b>Costs</b>					
<b>Utility System</b>	Measure costs (utility portion)	●	◐	○	○
	Other financial incentives	●	●	◐	◐
	Other program and administrative costs	●	◐	◐	◐
	Evaluation, measurement, and verification	●	●	●	●
	Performance incentives	◐	◐	◐	◐
	Interconnection costs	○	○	●	●
	Distribution system upgrades	○	○	●	●
<b>Benefits</b>					
<b>Utility System</b>	Avoided energy costs	●	◐	●	◐
	Avoided generation capacity costs	●	●	●	●
	Avoided reserves or other ancillary services	●	●	●	●
	Avoided T&D system investment	●	●	●	●
	Avoided T&D line losses	●	●	●	●
	Wholesale market price suppression	●	●	●	●
	Avoided RPS or EPS compliance costs	●	◐	●	◐
	Avoided environmental compliance costs	●	◐	●	◐
	Avoided credit and collection costs	◐	◐	◐	◐
	Reduced risk	●	●	◐	◐

# Distributed Energy Resources: Non-Utility System Impacts

		Energy Efficiency	Demand Response	Distributed Generation	Distributed Storage
<b>Costs</b>					
<b>Non-Utility</b>	Measure costs (participant portion)	●	●	●	●
	Interconnection fees	○	○	●	●
	Annual O&M	○	○	●	●
	Participant increased resource consumption	●	●	●	●
	Non-financial (transaction) costs	○	●	○	○
<b>Benefits</b>					
<b>Non-Utility</b>	Reduced low-income energy burden	●	●	●	●
	Public health benefits	●	●	●	●
	Energy security	●	●	●	●
	Jobs and economic development benefits	●	●	●	●
	Environmental benefits	●	●	●	●
	Participant health, comfort, and safety	●	○	○	○
	Participant resource savings (fuel, water)	●	○	○	○