

Updating the Energy Efficiency Cost-Effectiveness Framework in Minnesota

Application of the National Standard Practice Manual to Minnesota

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Stakeholder Presentation
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Overview

- Summary of the National Standard Practice Manual
- Current Cost-Effectiveness Practices in Minnesota
- Applying the Resource Value Framework
 - To create the primary test for Minnesota
 - The Minnesota test
- Secondary Tests
 - Utility Cost test
 - Societal Cost test
 - Participant test
 - Rate Impact Measure test
- Additional Issues
 - Discount rates

Overview of the National Standard Practice Manual

The National Standard Practice Manual

New guidelines for cost-effectiveness testing

Drivers...

The traditional tests often do not capture or address pertinent state policies.

The traditional tests are often modified by states in an ad-hoc manner, without clear principles or guidelines.

Efficiency is not accurately valued in many jurisdictions.

There is often a lack of transparency on why tests are chosen and how they are applied.

NSPM Background

NSPM Stakeholders

- National Efficiency Screening Project (NESP) includes stakeholders working to improve EE cost-effectiveness.
- Over 75 organizations representing a range of perspectives.

NSPM Authors

- Tim Woolf, Synapse Energy Economics
- Chris Neme, Energy Futures Group
- Marty Kushler, ACEEE
- Steve Schiller, Schiller Consulting
- Tom Eckman (Consultant and formerly Northwest Power & Conservation Council)

NSPM Background (continued)

NSPM Review Committee

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

NSPM Funding, Coordination, and Advisors

- Coordinated and funded by E4theFuture
- Managed by Julie Michals, E4theFuture
- Advisory Committee input on outreach & education
- Earlier work on the NSPM managed by the Home Performance Coalition

For more information:

<http://www.nationalefficiencyscreening.org/>

NSPM Purpose & Scope

Purpose

- Defining policy-neutral principles for developing cost-effectiveness tests
- Establishing a framework for selecting and developing a primary test
- Providing guidance on key cost-effectiveness inputs

Scope

- Focus is on utility customer-funded energy efficiency resources
- Addresses 1st order question:
 - Which EE resources merit acquisition through customer-funded actions?
 - In other words, which EE resources will provide net benefits to customers?
- Principles and framework apply to all other resources (including other types of distributed energy resources)

NSPM Outline

Executive Summary

Introduction

Part 1: Developing Your Test

Part 2: Developing Test Inputs

Appendices

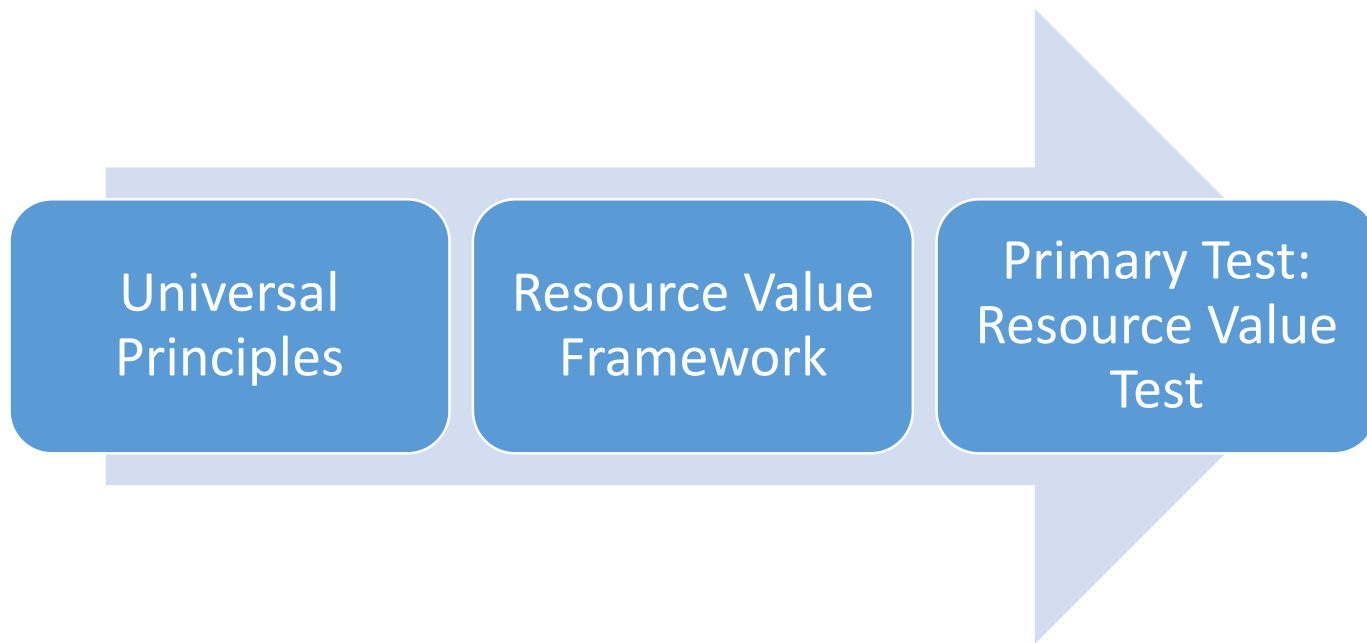
- A. Summary of Traditional Tests
- B. Cost-Effectiveness of Other DERs
- C. Accounting for Rate & Bill Impacts
- D. Glossary

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

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

NSPM – Part I

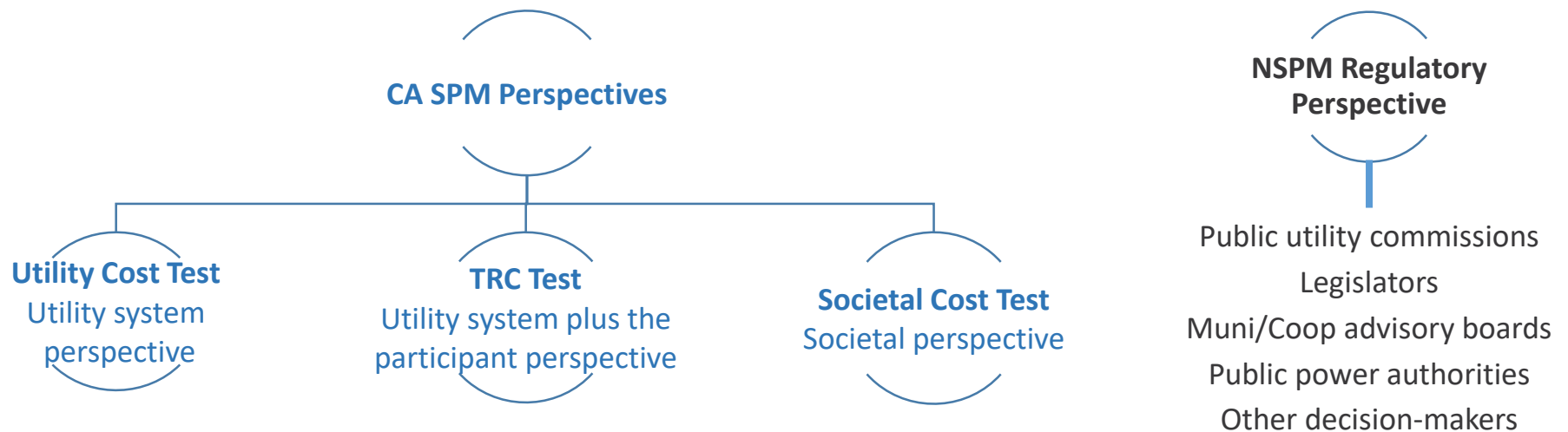
Developing the Primary Cost-Effectiveness Test Using the Resource Value Framework



NSPM Principles

1. Recognize that energy efficiency is a resource.
2. Account for applicable policy goals.
3. Account for all relevant costs & benefits (based on applicable policies), even if impacts are hard to quantify.
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.

NSPM: Cost-Effectiveness Perspectives



- California Standard Practice Manual (CA SPM) – test perspectives are used to define the scope of impacts to include in the “traditional” cost-effectiveness tests
- NSPM introduces the “regulatory” perspective, which is guided by the jurisdiction’s energy and other applicable policy goals

NSPM – Primary & Secondary Tests

- The purpose of the primary test is to address the threshold question of whether an energy efficiency resource will have net benefits, and therefore merits acquisition by the utility.
- Secondary tests can help address other important questions:
 - How will the EE affect total utility system costs?
 - How will the EE affect average customer bills?
 - Which programs should be prioritized if it is not possible to pursue all cost-effective efficiency?
 - What are the implications of addressing relevant policy goals?
 - What are the implications of accounting for all societal impacts?
- Secondary tests and sensitivities can also help inform decisions regarding which impacts to include in the primary test.

The Resource Value Framework

Step 1	Identify and articulate the jurisdiction's applicable policy goals.
Step 2	Include all utility system costs and benefits.
Step 3	Decide which additional <i>non-utility</i> system costs and benefits 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.

NSPM: Traditional Cost-Effectiveness Tests

UTILITY COST TEST



TOTAL RESOURCE COST TEST



SOCIETAL COST TEST



Utility System Impacts,
included



Non-utility system impacts,
not included

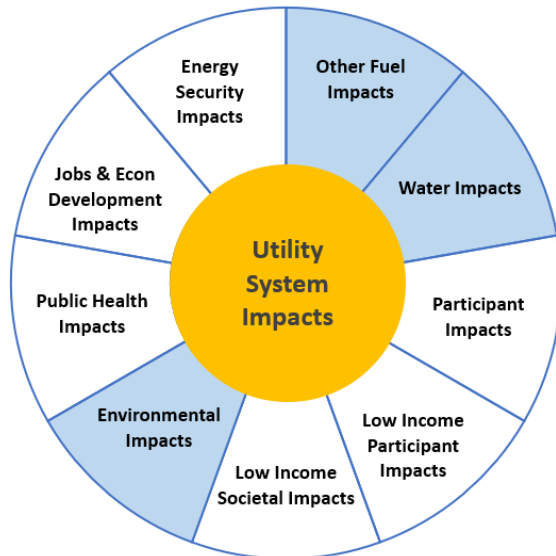


Non-utility system impacts,
included

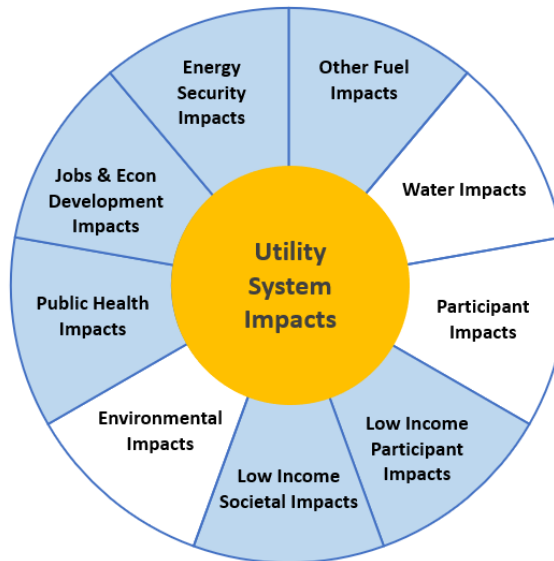
NSPM: Multiple Options for Tests

States are not limited to the three traditional tests.
As long as their test adheres to the NSPM principles.
Particularly about meeting policy goals.

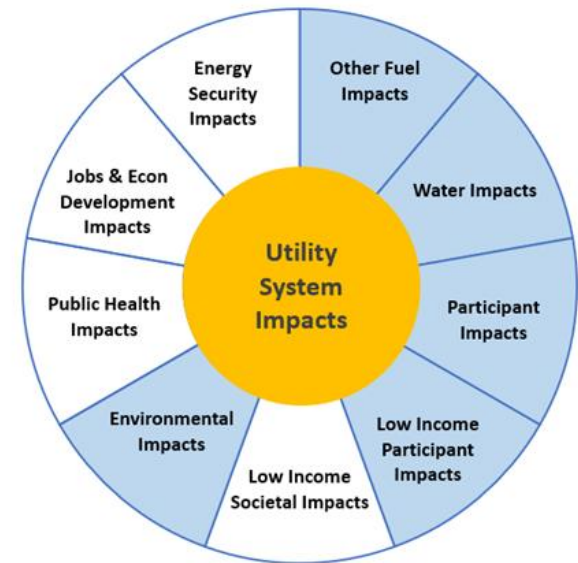
EXAMPLE 1



EXAMPLE 2



EXAMPLE 3



Current Practice in Minnesota

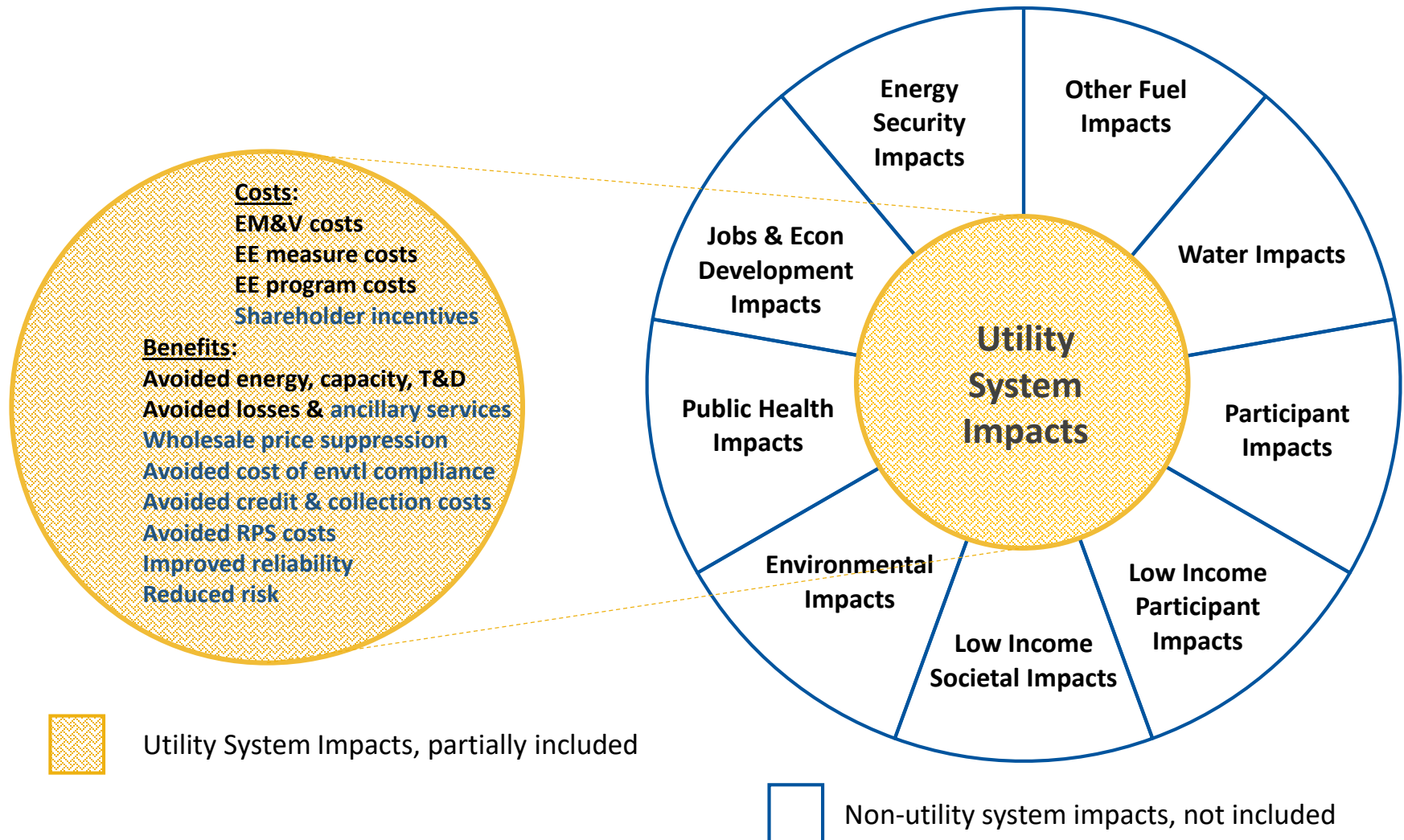
Current Practice: Overview

- In general, current MN cost-effectiveness practices are quite good – especially relative to other states.
 - They generally account for key MN policy goals.
 - They are generally comprehensive, in terms of impacts included.
 - Some inputs (e.g., environmental costs) are well established.
- However, some elements could use improvement.
 - Some utility impacts are missing.
 - Some societal impacts are missing.
 - Participant impacts are treated inconsistently.
 - Discount rates warrant reconsideration.
- The NSPM recommends that every state should “test its test.”
 - Using the Resource Value Framework
 - Starting from a blank slate
 - Avoiding the preconceived notions associated with the traditional tests.

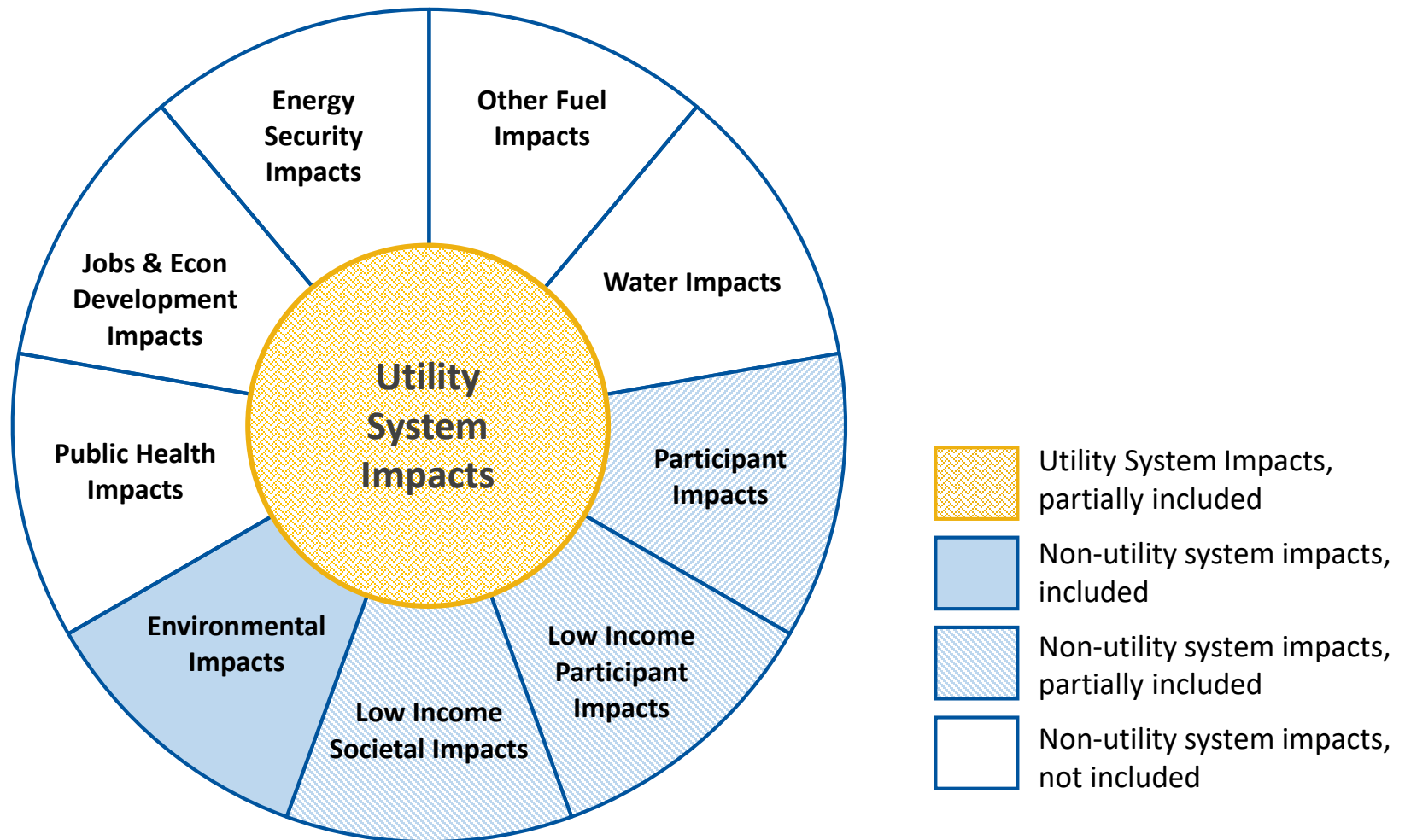
Current Practice: Tests

- The Next Generation Energy Act:
 - In determining cost-effectiveness, the commissioner shall consider the costs and benefits to ratepayers, the utility, participants, and society.
- Consequently, utilities calculate results for:
 - Rate impact measure (RIM) test
 - Utility cost (UC) test
 - Participant cost (PC) test
 - Societal cost (SC) test
- The societal cost test is used as the primary test for determining cost-effectiveness.

Utility Cost Test as Applied in Minnesota



Societal Cost Test as Applied in Minnesota



Applying the Resource Value Framework to Create the Primary Test for Minnesota

RVF Step 1: Articulate Policy Goals

- NSPM: Primary test should reflect relevant policy goals.
 - The CA Standard Practice Manual does not address policy goals well.
- Policy goals come in many forms:
 - Legislation
 - Regulations
 - Commission orders
 - State energy plans
 - Environmental plans
 - Executive directives
- Policies can, and frequently are, updated over time.
- Stakeholders should provide input to policy interpretation.
- Utility regulators are not responsible for all state policy goals, but they are responsible for those related to utility industries.

Example Minnesota Policy Goals

- In determining cost-effectiveness, the commissioner shall consider the costs and benefits to ratepayers, the utility, participants, and society. -Minn. Stat. § 216B.241, subd. 1c (f)
- The legislature finds that energy savings are an energy resource, and that cost-effective energy savings are preferred over all other energy resources.
- The legislature further finds that cost-effective energy savings should be procured systematically and aggressively to reduce utility costs for businesses and residents, improve the competitiveness and profitability of businesses, create more energy-related jobs, reduce the economic burden of fuel imports, and reduce pollution and emissions that cause climate change. - Minn. Stat. § 216B.241
- See Appendix D for a more comprehensive list.

RVF Step 2: Include All Utility System Impacts

- Utility system impacts = all the costs and benefits that are experienced by electric utilities (in the case of electric EE) or gas utilities (in the cases of gas EE) on behalf of customers.
- Utility system impacts = all those impacts that affect a utility's revenue requirements:
 - either as an increase in revenue requirements (e.g., EE costs)
 - or a decrease in revenue requirements (e.g., avoided costs)
- Should be the foundation of every cost-effectiveness test.
 - Central to the principle of treating efficiency as a resource
- All utility system impacts should be included.

Examples of Utility System Impacts

Illustrative Utility System Costs	Illustrative Utility System Benefits
<ul style="list-style-type: none">• EE Measure Costs (utility portion – e.g. rebates)	<ul style="list-style-type: none">• Avoided Energy Costs
<ul style="list-style-type: none">• EE Program Technical Support	<ul style="list-style-type: none">• Avoided Generating Capacity Costs
<ul style="list-style-type: none">• EE Program Marketing/Outreach	<ul style="list-style-type: none">• Avoided T&D Upgrade Costs
<ul style="list-style-type: none">• EE Program Administration	<ul style="list-style-type: none">• Avoided T&D Line Losses
<ul style="list-style-type: none">• EE Program EM&V	<ul style="list-style-type: none">• Avoided Ancillary Services
<ul style="list-style-type: none">• Utility Shareholder Performance Incentives	<ul style="list-style-type: none">• Wholesale Price Suppression Effects
	<ul style="list-style-type: none">• Avoided Costs of RPS Compliance
	<ul style="list-style-type: none">• Avoided Costs of Environmental Compliance
	<ul style="list-style-type: none">• Avoided Credit and Collection Costs
	<ul style="list-style-type: none">• Reduced Risk
	<ul style="list-style-type: none">• Increased Reliability

Include All Utility System Impacts

- Minnesota utilities do not universally include the following:
 - Shareholder incentive costs
 - Wholesale price suppression effects
 - Avoided credit and collection costs
 - Avoided RPS costs
 - Avoided costs of meeting CO2 goals
 - Reduced risk
 - Improved reliability

Recommendation:

- These impacts should be included in the Minnesota test.
- They should also be included in the Utility and Societal Cost tests.
- They should also be included in any rate impact analysis.
- Including these impacts is not a policy decision.

RVF Step 3: Choose Relevant Non-Utility System Impacts

The decision on whether to include in the primary test any non-utility system impact should:

- Be guided by the state's relevant policy goals
- Be informed by a transparent discussion of those goals
- Be informed by stakeholder input

Examples of Non-Utility System Impacts

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 CO ₂ 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

Step 3a: Whether to Include Participant Impacts

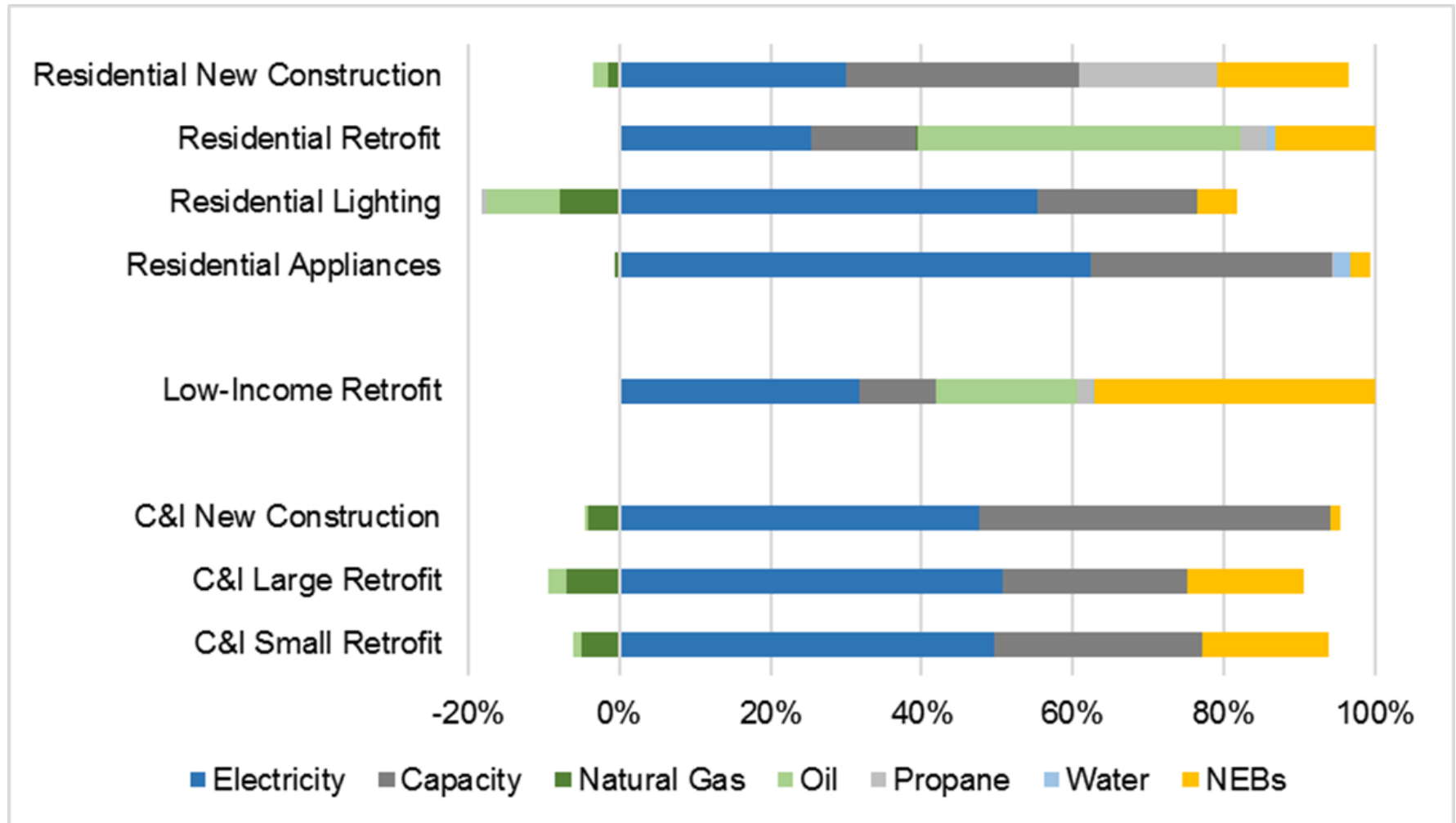
This can be the most challenging question in designing the primary energy efficiency cost-effectiveness test.

- Participant costs are relatively easy to identify, quantify, and monetize.
- Participant benefits, in terms of energy bill reductions, should not included in the primary test. (Utility avoided costs are used instead.)
- Participants also experience non-energy benefits (NEBs), for example increased productivity, improved health and safety.
- Participant NEBs are more difficult to identify, quantify, and monetize.

Examples of Participant NEBs

Category	Examples
Asset value	<ul style="list-style-type: none"> • Equipment functionality/performance improvement • Equipment life extension • Increased building value • Increased ease of selling building
Productivity	<ul style="list-style-type: none"> • Reduced labor costs • Improved labor productivity • Reduced waste streams • Reduced spoilage/defects • Impact of improved aesthetics, comfort, etc. on product sales
Economic well-being	<ul style="list-style-type: none"> • Fewer bill-related calls to utility • Fewer utility intrusions & related transactions costs (e.g., shut-offs, reconnects) • Reduced foreclosures • Fewer moves • Sense of greater “control” over economic situation • Other manifestations of improved economic stability
Comfort	<ul style="list-style-type: none"> • Thermal comfort • Noise reduction • Improved light quality
Health & safety	<ul style="list-style-type: none"> • Improved “well-being” due to reduced incidence of illness—chronic (e.g., asthma) or episodic (e.g., hypothermia or hyperthermia) • Reduced medical costs (emergency room visits, drug prescriptions) • Fewer sick days (work and school) • Reduced deaths • Reduced insurance costs (e.g., for reduced fire, other risks)
Satisfaction/pride	<ul style="list-style-type: none"> • Improved sense of self-sufficiency • Contribution to addressing environmental/other societal concerns

Implications of Including Participant NEBs



NSPM: Whether to Include Participant Impacts

- This is a policy decision (based on jurisdiction's policy goals).
 - Policies may support inclusion of certain participant impacts (e.g., low-income, other fuels, etc.) but not necessarily all participant impacts.
- If participant costs are included, participant benefits should also be included (to ensure symmetry and avoid bias), even hard-to-quantify benefits
- Key questions to consider:
 - Why does it matter what participants pay?
 - Especially given that participants always benefit.
 - Why should non-participants pay for benefits to participants?
 - Especially benefits that are hard to quantify.

Points and Counterpoints on Participant Impacts

Reasons for Including Participant Impacts	Counter-Points
Including participant impacts accounts for the costs on all utility customers: participants and non-participants.	Participant impacts fall outside the scope of utility system impacts. If EE is treated purely as a utility system resource, then participant impacts are less relevant.
Including participant impacts accounts for the total cost of the resource. If the cost of a resource is split between two entities, then it might appear to be cost-effective when it is not.	If regulators prefer to account for the total cost of a resource in order to address concerns about costs being split between two entities, it is necessary to also account for the total benefits. This objective essentially requires the use of the SCT. If this objective is important enough, jurisdictions could use an SCT as a pre-screening test and an RVT as the primary test.
Including participant impacts will help protect program participants. Excluding such costs might result in participants paying "too much" for efficiency.	Including participant impacts will not accurately capture the benefits of program participants, because in practice the primary participant benefit is typically represented in terms of avoided utility costs, not reduced customer bills. The Participant Cost test is one way to protect participants. ¹⁸ In addition, program design is the best way to protect program participants, and sound program design will result in participants being better off.
Excluding participant impacts would exclude low-income participant benefits from the analysis	Low-income participant impacts can be included in the RVT, without including all participant impacts, if justified by policy goals. Well-defined low-income programs do not require participant costs, which eliminates the typical rationale for including participant impacts.
Excluding participant impacts would exclude other fuel and water impacts from the analysis.	Other fuel and water impacts can be included in the primary test, without including all participant impacts, if justified by policy goals.

MN: Whether to Include Participant Impacts

Current practice:

- Participant costs are included in the Societal Cost and the Participant Cost tests.
- Participant non-energy benefits are not included in any tests.

Policy directives:

- In determining cost-effectiveness, the commissioner shall consider the costs and benefits to ratepayers, the utility, participants, and society. - Minn. Stat. § 216B.241, subd. 1c (f)
 - This suggests that participant impacts are important, but also that the Participant Cost test can be used to consider them.
- There are many references in legislation to consideration of societal impacts.
 - These suggest that participant impacts should be accounted for somehow.
- Synapse interviews with stakeholders:
 - There is a clear reluctance to account for participant NEBs, due to uncertainty and the difficulty of quantifying them.

MN: Whether to Include Participant Impacts

The question is whether to include these in the primary test.

Options

1. Include both participant costs and benefits (including NEBs).
2. Exclude both participant costs and benefits.

Recommendation

- Exclude both participant costs and benefits in the Minnesota Test.
- Use the Societal Cost test as a secondary test, and include participant impacts (including the most important participant NEBs).
- Use the Participant Cost test as a secondary test, and include participant impacts (including the most important participant NEBs).

RVF Step 3b: Low-Income Impacts

Current practice

- Historically, low-income programs have not been held to the same cost-effectiveness requirements as non-low-income programs, such as not needing to have a benefit-cost ratio greater than one for the Societal Cost test.

Policy directives

- The commissioner shall ensure that each utility and association provides low-income programs. - Minn. Stat. § 216B.241, subd. 7(a)
- A utility shall use the values established by the commission in conjunction with other external factors, including socioeconomic costs, when evaluating and selecting resource options in all proceedings before the commission, including resource plan and certificate of need proceedings. - Minn. Stat. 216B.2422, Subd. 3(a)

Recommendation

- Continue the current practice.
- Ensure that low-income programs are well-designed, overcome all relevant barriers to customers, and are reasonably low cost.

RVF Step 3c: Other Fuel Impacts

Current practice

- The utilities do not consider other fuels in cost-effectiveness tests.
- The utilities do not provide multi-fuel EE programs.

Policy directives

- The legislature further finds that cost-effective energy savings should be procured systematically and aggressively to reduce utility costs for businesses and residents, improve the competitiveness and profitability of businesses, create more energy-related jobs, reduce the economic burden of fuel imports, and reduce pollution and emissions that cause climate change. - Minn. Stat. § 216B.241
- It is the goal of the state to reduce statewide greenhouse gas emissions across all sectors producing those emissions to a level at least 15 percent below 2005 levels by 2015, to a level at least 30 percent below 2005 levels by 2025, and to a level at least 80 percent below 2005 levels by 2050. - Minn. Stat. § 216H.02, Subd. 1

Recommendation

- Include other fuels in the Minnesota test.
- Include other fuels in the Societal Cost test.
- Evaluate and offer multi-fuel programs.

RVF Step 3d: Environmental Impacts

Current practice

- Minnesota utilities account for environmental impacts in the Societal Cost test.
- Including SO₂, particulates, CO, N₂O, lead, and CO₂.

Policy directives

- The commissioner shall consider the costs and benefits to ratepayers, the utility, participants, and society. - Minn. Stat. § 216B.241, subd. 1c (f)
- Cost-effective energy savings should be procured systematically and aggressively to... reduce pollution and emissions that cause climate change. - Minn. Stat. § 216B.241
- It is the goal of the state to reduce statewide greenhouse gas emissions across all sectors producing those emissions to a level at least 15 percent below 2005 levels by 2015, to a level at least 30 percent below 2005 levels by 2025, and to a level at least 80 percent below 2005 levels by 2050. - Minn. Stat. § 216H.02, Subd.

Recommendation

- Account for environmental impacts in the Minnesota test.
- Continue to account for environmental impacts in the Societal Cost test.
- Properly account for the cost of meeting CO₂ goals in the Utility Cost test.

RVF Step 3e: Socioeconomic Impacts

Current practice

- Minnesota utilities do not account for job, public health, or energy security impacts.

Policy directives

- A utility shall use the values established by the commission in conjunction with other external factors, including socioeconomic costs, when evaluating and selecting resource options in all proceedings before the commission, including resource plan and certificate of need proceedings. - Minn. Stat. 216B.2422, Subd. 3(a)
- The commissioner shall consider the costs and benefits to ratepayers, the utility, participants, and society. - Minn. Stat. § 216B.241, subd. 1c (f)

Recommendation

- The Minnesota Test should include job, public health, and energy security impacts.
- The Societal Cost test should include the job, public health, and energy security impacts.
- Job impacts should (a) be net impacts, (b) avoid double-counting, and (c) not necessarily be monetized.

Step 4: Ensure Symmetry Across Benefits and Costs

- Ensure that the test includes costs and benefits symmetrically.
 - If a category of cost is included, corresponding benefits should be too. (For example, if participant costs are included, participant benefits should also be included.)
- Symmetry is necessary to avoid bias:
 - If some costs are excluded, the framework will be biased in favor of EE.
 - If some benefits are excluded, the framework will be biased against EE.
 - Bias in either direction can result in misallocation of resources (over or under investment)
 - higher than necessary costs to meet energy needs
 - too little or too much investment in actions to achieve jurisdiction's energy-related policies goals

RVF Step 5: Incremental, Forward-Looking, and Long-Term

- Incremental: What would have occurred relative to baseline.
 - Has implications for avoided costs.
- Forward-looking: Sunk costs and benefits are not relevant to cost-effectiveness analysis.
 - Has implications regarding the Rate Impact Measure (RIM) test.
- Long-term: Analysis should capture full remaining lifecycle costs and benefits.
 - Has implications for the length of the study period.

RVF Step 6: Develop Methodologies and Inputs

- Inputs should be developed for all relevant impacts, even those that are difficult to quantify and monetize.
- Ignoring some impacts because they are difficult to monetize will lead to skewed results.
- Example approaches for developing inputs:

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.

RVF Step 7: Ensure Transparency in Reporting

Transparency is one of the fundamental principles of cost-effectiveness analysis.

States should have transparent reporting for all inputs, assumptions, methodologies, and results.

The NSPM provides an example template to assist with transparent reporting.

Efficiency Cost-Effectiveness Reporting Template			
Program/Sector/Portfolio Name:		Date:	
A. Monetized Utility System Costs		B. Monetized Utility System Benefits	
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	
Sub-Total Utility System Costs		Sub-Total Utility System Benefits	
C. Monetized Non-Utility Costs		D. Monetized Non-Utility Benefits	
Participant Costs	These impacts would be included to the extent that they are part of the Resource Value (primary) test.	Participant Benefits	These impacts would be included to the extent that they are part of the Resource Value (primary) test.
Low-Income Customer Costs		Low-Income Customer Benefits	
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	
Sub-Total Non-Utility Costs		Sub-Total Non-Utility Benefits	
E. Total Monetized Costs and Benefits			
Total Costs (PV\$)		Total Benefits (PV\$)	
Benefit-Cost Ratio		Net Benefits (PV\$)	
F. Non-Monetized Considerations			
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		
Determination:	Do Efficiency Resource Benefits Exceed Costs? [Yes / No]		

RVF Step 7: Ensure Transparency in Decisions

- The process for developing the primary cost-effectiveness test should be 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
- The process should address objectives based on current policies.
 - However, it should be flexible to incorporate evolution of policies through time
- Assessment of policy goals may require consultation with other government agencies.
 - Environmental protection
 - Health and human services
 - Economic development

Transparency

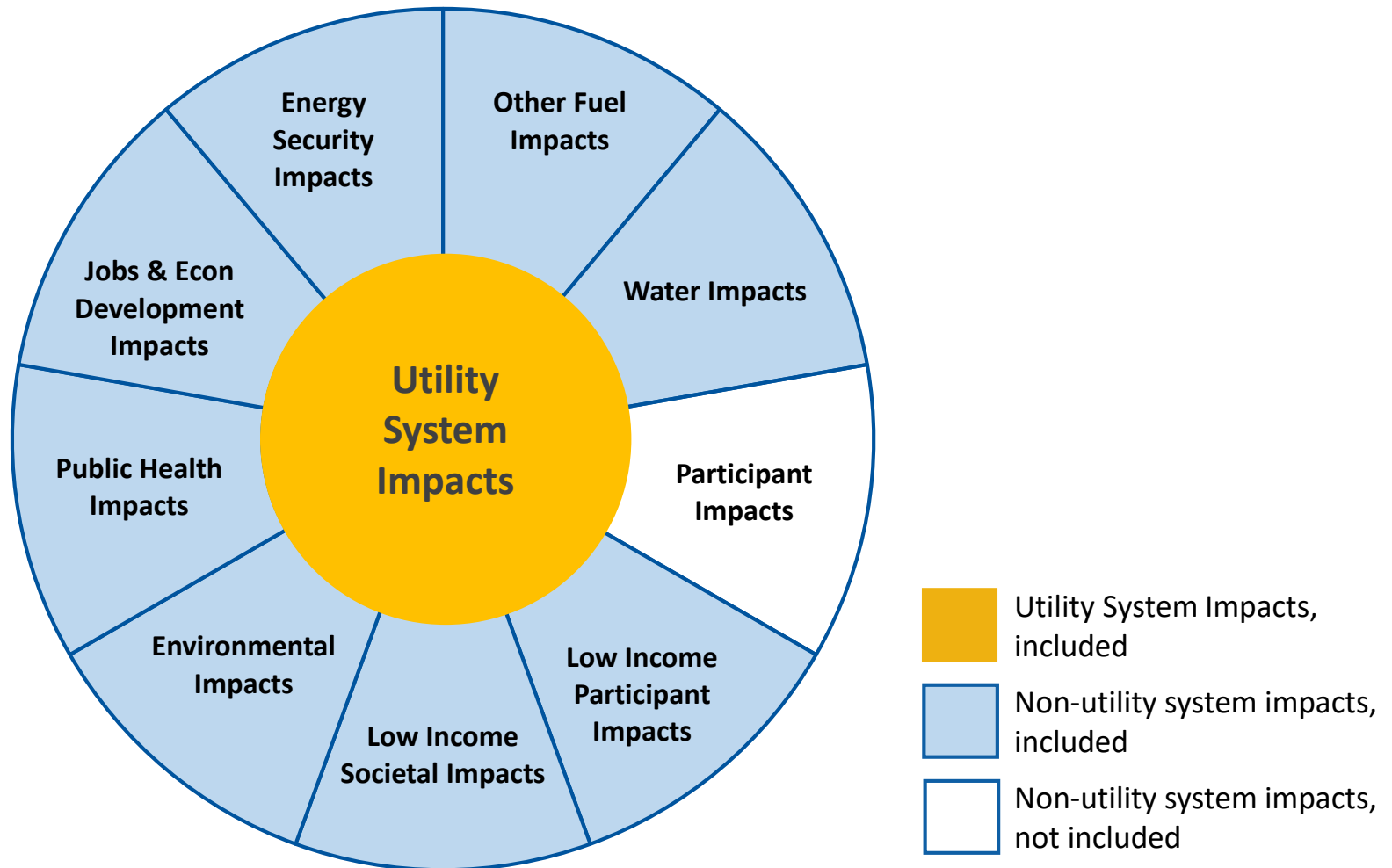
Current Practice

- Minnesota has a robust reporting process through the Energy Savings Platform, the Technical Reference Manuals, and the gas BENCOST model.
- The Excel model for electric EE is not well documented, making it difficult to understand the methodologies used for the analysis.

Recommendation

- Commerce should organize an investigation of EE cost-effectiveness practices, including a review of state policy goals.
 - This report and meeting is an important step in that direction.
- The electric utilities should improve their EE cost-effectiveness model, using the gas BENCOST model as an example.

The Minnesota Test



Priority of Impacts in the Minnesota Test

Impacts	Potential Magnitude	Challenge in Developing	Priority
Other Fuel Impacts	High for some programs	Low	High
Utility System Impacts	Very High	Low	High
Environmental Impacts	High	Moderate	High
Water Savings	Moderate for some programs	Low	Medium
Jobs & Economic Development	Moderate to high	High	Medium
Public Health	Low to moderate	High	Low
Energy Security	Low	High	Low
Participant NEBs*	High	High	Low-High

*If the Minnesota test includes participant impacts, then participant NEBs should be a high priority. If not, they should be low.

Secondary Tests: The Utility Cost Test

- The UC test provides very useful information on cost-effectiveness:
 - Effect of EE on total utility costs
 - Effect of EE on average customer bills
 - Effect of EE on revenue requirements
- If the commission wishes to investigate rate impacts of EE, the Utility Cost test should be the foundation for that analysis.

Recommendation

- Minnesota should use the Utility Cost test as a secondary test for cost-effectiveness.
- The UC test should include all utility system impacts.
- The UC test should properly account for the cost of compliance with environmental requirements (especially CO2 goals).

Secondary Tests: The Societal Cost Test

- Minnesota legislation requires consideration of the costs and benefits to society.
- Minnesota legislation requires the consideration of socioeconomic impacts.

Recommendation

- Minnesota should use the Societal Cost test as a secondary test for cost-effectiveness.
- The SC test should
 - Include all utility system impacts, as recommended above.
 - Include socioeconomic impacts, as recommended above.
 - Include participant impacts (including the most important participant NEBs).

Secondary Tests: The Participant Cost Test

NSPM

- The Participant Cost test is not appropriate for cost-effectiveness analysis.
 - The impacts on participants is not an important criterion for resource planning.
 - The PC test is very important for program design and for marketing to customers.
 - Participants are almost always better off from EE.

Recommendation

- Minnesota should use the results of the Participant Cost test for designing EE programs.
- Minnesota should continue to downplay the results of the PC test for the purpose of cost-effectiveness analysis.
- The PC test should include the most important participant NEBs.

Secondary Tests: The Rate Impact Measure Test

NSPM

- The RIM test is not appropriate for cost-effectiveness analyses:
 - Does not provide meaningful information about the magnitude of rate impacts, or customer equity
 - Will not result in lowest costs to customers
 - Is inconsistent with economic theory. The RIM test includes sunk costs, which should not be used for choosing new investments
 - Can lead to perverse outcomes, where large benefits are rejected to avoid de minimus rate impacts
 - Can be misleading. Results suggest that customers will be exposed to new costs, which is not true
 - Other approaches should be used to assess rate and equity issues.

Recommendation

- The RIM test should not be used for cost-effectiveness analyses

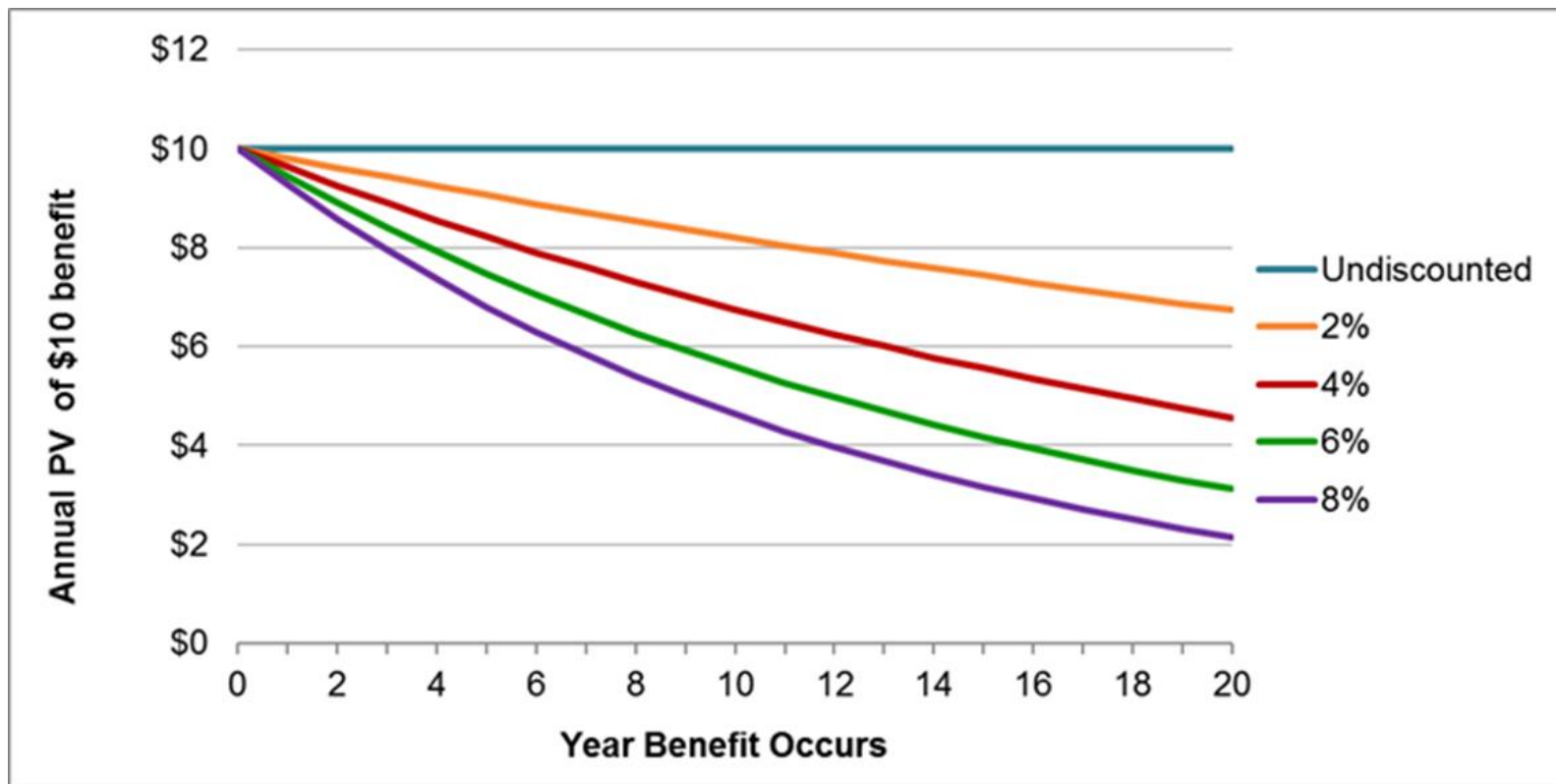
Additional Issues

Discount Rates: Current Minnesota Practice

Cost-Effectiveness Test	MN Practice
Societal	Social discount rate for Residential Utility WACC for Commercial
Utility	Utility WACC
Participant	Social discount rate for Residential Utility WACC for Commercial
RIM	Utility WACC

Discount Rates: Implications

Discount rates can have a significant impact on costs and benefits. Especially for programs with long measure lives (new construction, retrofit).



Discount Rates: Key Concepts

- 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.*

Utility WACC is not consistent with Goals of EE Testing

Using the utility WACC for a discount rate is inconsistent with the goal of energy efficiency cost-effectiveness analysis:

- For unregulated businesses, the goal of benefit-cost analyses is to maximize shareholder value.
 - In light of this goal, the WACC is the best discount rate to use.
 - Investors' time preference is driven entirely by investors' opportunity cost and risk, and the WACC reflects both of those.
- For regulated utilities, the goal of benefit-cost analysis is fundamentally different:
 - Goal: to identify those investments/resources that will best serve customers – all customers.
 - Goal: to provide safe, reliable, low-cost power to customers, and meet other state policy goals.
 - The goal is not to maximize shareholder value.
- Since the goal of the EE testing is different, the time preference is different as well.
 - The discount rate should reflect the time preference of customers, since the resource planning is on their behalf.
 - The rate should reflect the time preference of all customers – not any one group of customers.
 - The rate should also reflect the time preference that accounts for statutory and regulatory policy goals (i.e., the regulatory perspective).

Utility WACC is not consistent with Goals of EE Testing

Ultimately, the decision for which discount rate to use is a regulatory policy decision, and should be consistent with state energy policy goals.

- The discount rate should reflect the time preference chosen by regulators on behalf of all customers.
- The regulatory time preference might be different from: the utility WACC; any one customer's discount rate; or a societal discount rate.
- State policy goals, such as intergenerational equity, increased reliability, reduced risk, environmental protection, socioeconomic impacts, suggest a much greater emphasis on long-term impacts than what is reflected in the utility WACC.

Discount Rates: Recommendation

- A societal discount rate should be used for the primary and secondary Minnesota cost-effectiveness tests:
 - The Minnesota test
 - The Utility Cost test
 - The Societal Cost test
- A societal discount rate is consistent with the Minnesota regulatory perspective.
 - MN legislation frequently refers to social and socioeconomic impacts.
- Using the same discount rate allows for a direct comparison across different tests.
 - The Utility Cost versus the Minnesota test.
 - The Minnesota versus the Societal Cost test.

Analysis Period

NSPM

- The analysis period should be long enough to capture the full stream of costs and benefits associated with the efficiency resources being analyzed.

Current Practice

- Analysis period is limited to the life of the measures with the longest lives.
- But the measure lives are capped at 20 years, regardless of whether the estimated measure life is longer.
- This creates a 20-year cap on the analysis period.

Recommendation

- Minnesota utilities should not place an artificial cap on efficiency measure lives.
- Minnesota utilities should use an analysis period of at least 30 years, perhaps 40 years for some long-lived measures.

Assessment Level

NSPM

- When applying the primary cost-effectiveness test, efficiency resources should be analyzed at the program, customer segment, or portfolio level.
- When applying the primary cost-effectiveness test, efficiency resources should be not be analyzed at the measure level.

Current Practice

- Commerce approves EE cost-effectiveness at the customer segment level.
- Some utilities apparently screen some measures at the measure level.

Recommendation

- Commerce should continue to approve EE cost-effectiveness at the customer segment level
- Minnesota utilities should not screen efficiency resources at the measure level.

Summary and Prioritization of Recommendations

1. Decide whether to include participant impacts in primary test.
 - If so, then it will be necessary to develop participant NEB estimates.
 - If not, then it will be useful to develop estimates of participant NEBs for the Societal Cost test.
2. Decide whether to include other fuel impacts in primary test.
 - This is essentially required by statute.
 - This will also be critical for meeting CO2 goals.
 - Commodity price forecasts can be used for inputs.
3. Reconsider discount rates.
 - Can have significant implications, especially for long-term programs.
4. Include missing elements of the Utility Cost test.
 - Shareholder incentive costs, wholesale price suppression effects, avoided credit and collection costs, avoided RPS costs
 - These affect all tests.

Recommendations for Further Research

- Several utility system benefits are not analyzed in Minnesota but could have important implications for all tests.
 - The cost of meeting Minnesota CO2 goals.
 - Wholesale electricity and gas market price suppression effects.
 - Reduced credit and collection costs.
 - Reduced risk of EE.
 - Increased reliability of EE.
- If the commission chooses to include participant impacts, there are several issues that could assist with developing inputs.
 - Which participant NEBs are likely to be most significant?
 - Which programs are likely to be most affected by participant NEBs?
 - Are there NEB estimates from other states that are relevant to Minnesota?
 - Conduct Minnesota studies to monetize the most significant participant NEBs.
 - Conduct additional studies to develop proxies for other participant NEBs.

Contact Information

Synapse Energy Economics is a research and consulting firm specializing in energy, economic, and environmental topics. Since its inception in 1996, Synapse has been a leader in providing rigorous technical and policy analysis of the electric power and natural gas sectors for public interest and government clients.

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California Manual: Traditional 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

California Manual:

Components of
the traditional
tests in the
California Standard
Practice Manual

	UCT	TRC Test	SCT	Participant Cost Test	RIM Test
EE Costs:					
Efficiency Program Costs	Yes	Yes	Yes	---	Yes
Efficiency Portfolio Costs	Yes	Yes	Yes	---	Yes
Financial Incentive Provided to Participant	Yes	Yes	Yes	---	Yes
Participant Financial Cost of Efficiency	---	Yes	Yes	Yes	---
Participant Non-Financial Cost of Efficiency	---	Yes	Yes	Yes	---
Participant Increased Resource Consumption	---	Yes	Yes	Yes	---
Societal costs (environmental, health, etc.)	---	---	Yes	---	---
Lost Revenues	---	---	---	---	Yes
EE Benefits:					
Avoided Energy Costs	Yes	Yes	Yes	---	Yes
Avoided Generation Capacity Costs	Yes	Yes	Yes	---	Yes
Avoided T&D Capacity Costs	Yes	Yes	Yes	---	Yes
Avoided T&D Losses	Yes	Yes	Yes	---	Yes
Wholesale Market Price Suppression Effects	Yes	Yes	If applicable	---	Yes
Avoided Environmental Compliance Costs	Yes	Yes	Yes	---	Yes
Avoided RPS Compliance Costs	Yes	Yes	Yes	---	Yes
Avoided Credit and Collection Costs	Yes	Yes	Yes	---	Yes
Participant Resource Savings (fuel, water)	---	Yes	Yes	Yes	---
Participant Non-Resource Benefits	---	Yes	Yes	Yes	---
Reduce Low-income Energy Burden	---	---	Yes	---	---
Environmental Benefits	---	---	Yes	---	---
Jobs and Economic Development Benefits	---	---	Yes	---	---
Societal Health Care Benefits	---	---	Yes	---	---
Increased energy security	---	---	Yes	---	---
Customer Bill Savings	---	---	---	Yes	---

Better Options for Assessing Rate Impacts

A thorough understanding of rate impacts requires a comprehensive analysis of three important factors:

- Rate impacts, to provide an indication of the extent to which rates for all customers might increase.
- Bill impacts, to provide an indication of the extent to which customer bills will be reduced for those customers that install energy efficiency measures.
- Participation impacts, to provide an indication of the portion of customers that will experience bill reductions or bill increases.

Taken together, these three factors indicate the extent to which customers will benefit from energy efficiency resources.

Participation impacts are also key to understanding the extent to which energy efficiency resources are being adopted over time.

EE Participation Can Be Increased Through Program Design

- EE programs should address all end-uses.
- EE programs should address all customer types.
- EE programs should address all relevant markets:
 - retrofit, new construction, point-of-sale, upstream, etc.
- All customers should have an opportunity to participate.
- Customer incentives and support should be tailored to assist all customers in overcoming barriers to energy efficiency.
- Program Administrators should actively pursue the non-participants and those who have not participated in a while.

EE Participation Can Be Increased Through Regulatory Policies

- Increase budgets to increase participation.
 - This is the exact opposite of the typical response to rate impact concerns.
- Require program administrators to gather better data on participation.
- Require program administrators to analyze participation rates when designing programs.
- Include participation requirements in efficiency plans, goals, and targets.
- Incorporate participation rates in utility shareholder incentives.
- Make the participation goal explicit:
 - Achieving all cost-effective energy efficiency means serving all customers.

Would Excluding Participant Costs Result in an Uneconomic Outcome?

Hypothetical Example:

- Retail electric rates = 14 ¢/kWh
- Total avoided costs = 10 ¢/kWh
- EE measure cost = 11 ¢/kWh
- EE measure rebate = 5 ¢/kWh

	With Participant Cost (PC)	Without PC: Utility System	Without PC: Participant
Cost (¢/kWh)	11	5	6
Benefit (¢/kWh)	10	10	14
Benefit -Cost Ratio	0.91	2.0	2.3

Answer: Yes, but only from a societal perspective.

If a societal perspective is preferred, then a full Societal Cost test should be used.