National Standard Practice Manual for Energy Efficiency Cost-Effectiveness (Edition 1.0)

OVERVIEW

The National Efficiency Screening Project

NATIONAL STANDARD PRACTICE MANUAL
Published May 2017

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 NESP and NSPM was managed by the Home Performance Coalition

For more information:
http://www.nationalefficiencyscreening.org/

NSPM: Purpose

- Defines policy-neutral *principles* for developing cost-effectiveness tests
- Establishes a framework for selecting and developing a *primary test*
- Provides guidance on *key inputs*

NSPM: Scope

- Focuses on utility customer-funded energy efficiency resources
- Addresses 1st order question: “which EE resources merit acquisition?”
- Principles and framework apply to all other resources (including other types of distributed energy resources).

➢ *NSPM provides a foundation on which jurisdictions can develop and administer a cost-effectiveness test, but does not prescribe “the answer”*

NSPM: What it is – What it Isn't

What it is: The NSPM provides guidance - using principles and framework - to help states:

- Refine, improve or develop right test for their state
- Account for the full range of utility-system impacts
- Identify relevant non-utility system impacts
- Apply their test

What it is not: The NPSM <u>does not</u>

- Prescribe any specific cost-effectiveness test
- Advocate for inclusion of any specific non-utility system impacts (states to determine relevant impacts by applying principles and key steps)
- Adhere or restrict states to theoretically definitions of traditional tests (e.g., TRC, UTC, SCT)

What's Covered -- 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

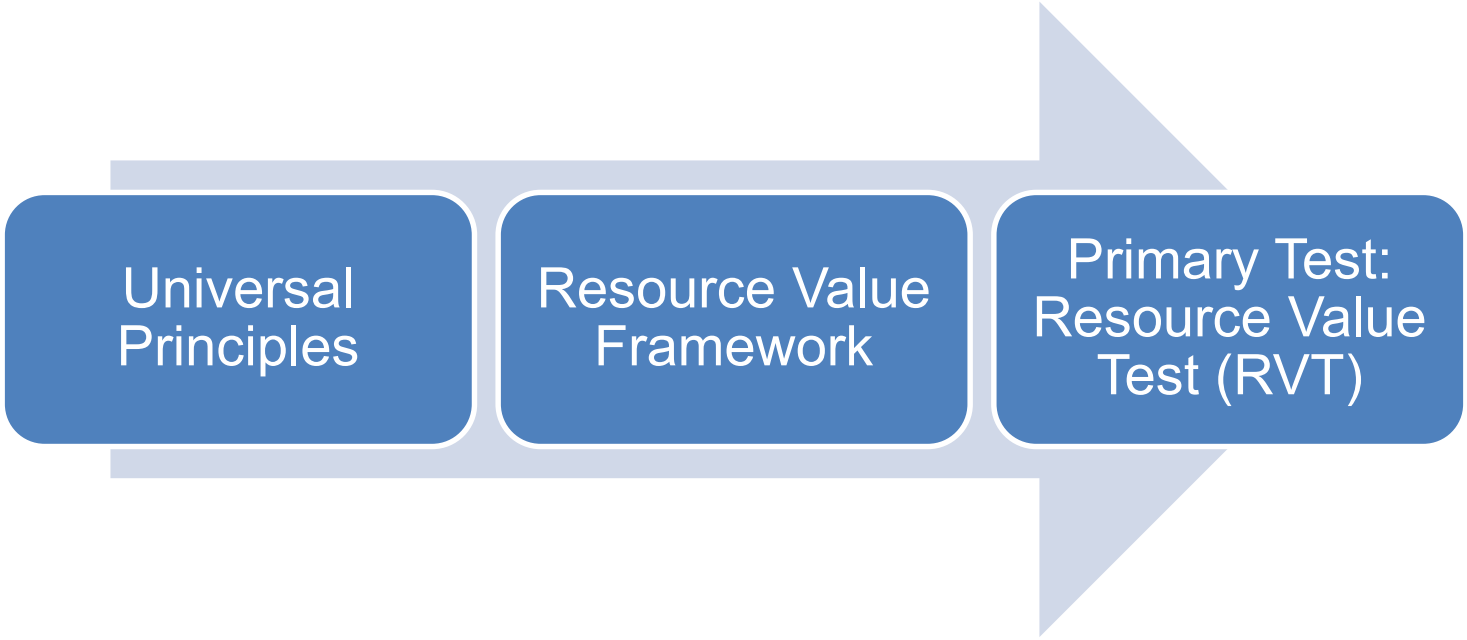
6. Efficiency Costs & Benefits
7. Methods to Account for Costs & Benefits
8. Participant Impacts
9. Discount Rates
10. Assessment Level
11. Analysis Period & End Effects
12. Analysis of Early Retirement
13. Free Rider & Spillover Effects

Appendices

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

Part I

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



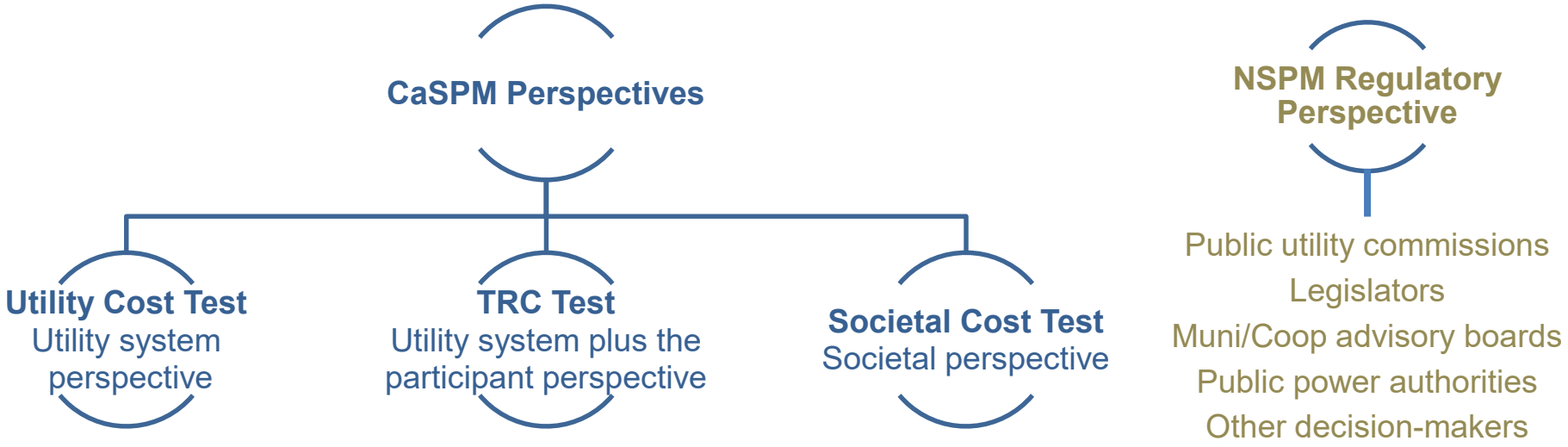
NSPM Principles

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 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.

Implementing the Resource Value Framework Involves Seven Steps

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 *non-utility* 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.

Cost-Effectiveness Perspectives



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

STEP 1

Identify and Articulate Applicable Policy Goals

Laws, Regulations, Orders, Guidelines	Policy Impacts Reflected in Laws, Regulations, Orders, etc.							
	Least-Cost	Fuel Diversity	Risk	Reliability/ Resilience	Low-Income	Environ-mental	Econ Dev / Jobs	Public Health
PSC statutory authority	X			X				
Low-income protection	X		X	X	X			X
EE or DER law or rules	X	X	X	X	X		X	
State energy plan	X	X	X	X	X	X	X	
Integrated resource planning	X	X	X	X	X	X	X	
Renewable portfolio standard		X				X	X	
Climate change		X	X			X		X
Environmental protection		X	X			X		X

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

STEP 2

Include All Utility System Impacts

- 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 2

Examples of Utility System Impacts

Illustrative Utility System Costs	Illustrative 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

The principle of treating energy efficiency as a resource dictates that utility system costs and benefits serve as the foundation for all tests

STEP 3

Include Relevant Non-Utility System Impacts

"Relevant" according to applicable policy goals identified under Step 1 of NSPM Framework. 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.

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 polices adopted over time.
- May wish to incorporate input from other government agencies
  - department of environmental protection
  - department of health and human services

STEP 3

Illustrative 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 impacts
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.

STEP 3

Whether to Include Participant Impacts

- 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?
  - Why should non-participants pay for benefits to participants?

STEP 3

Range of Participant Non-Energy Impacts

Category	Examples
Asset value	• Equipment functionality/performance improvement • Equipment life extension • Increased building value • Increased ease of selling building
Productivity	• Reduced labor costs • Improved labor productivity • Reduced waste streams • Reduced spoilage/defects • Impact of improved aesthetics, comfort, etc. on product sales
Economic well-being	• 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	• Thermal comfort • Noise reduction • Improved light quality
Health & safety	• 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	• Improved sense of self-sufficiency • Contribution to addressing environmental/other societal concerns

STEP 4 Ensure Symmetry Across Benefits and Costs

- Ensure that the test 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)
- Symmetry is 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 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

STEP 5

Conduct Incremental, Forward Looking and Long-Term Analysis

- 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.

Develop Methodologies and Inputs to Account for All Relevant Impacts, Including Hard-to-Quantify Impacts

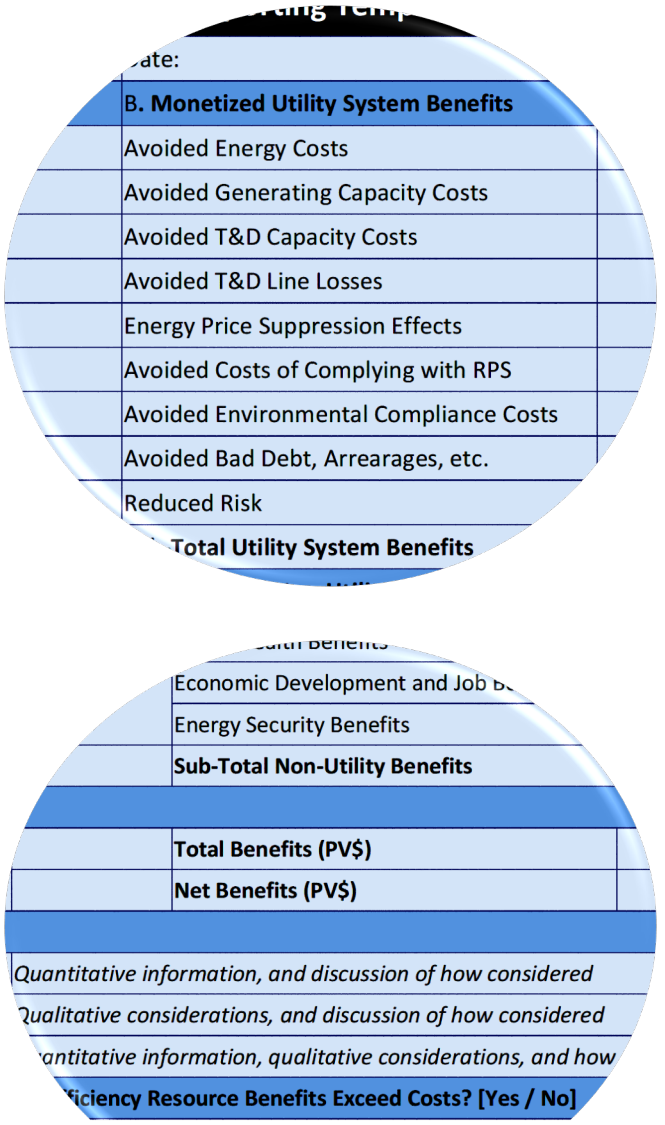
Approach	Application
Jurisdiction-specific studies	Best approach for estimating and monetizing relevant impacts.
Studies from other jurisdictions	Often reasonable to extrapolate from other jurisdiction studies when local studies not available.
Proxies	If no relevant studies of monetized impacts, proxies 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 in Reporting

Sample Template

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]**		

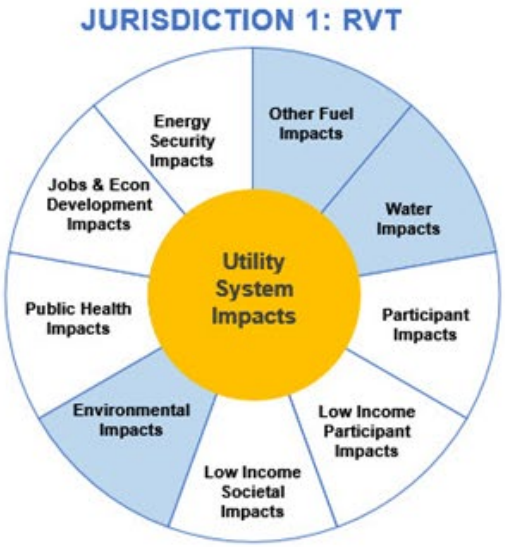


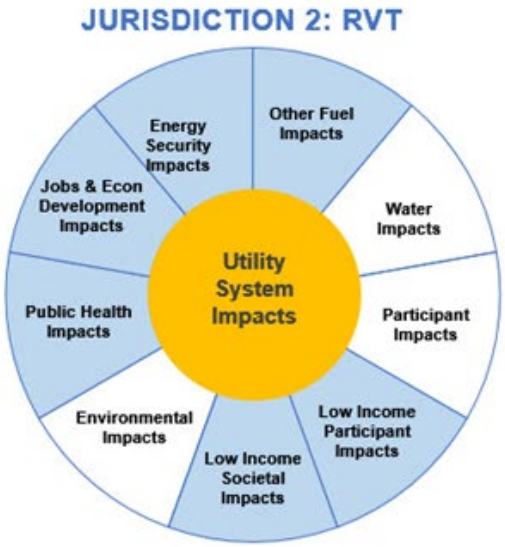
STEP 7

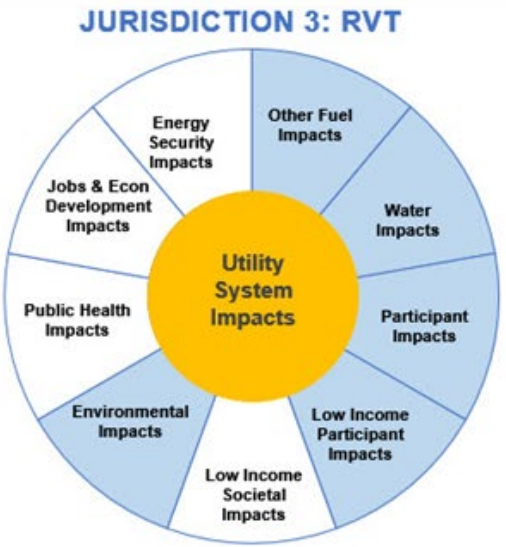
Ensure Transparency in Decisions on which Non-Utility System Impacts to Include

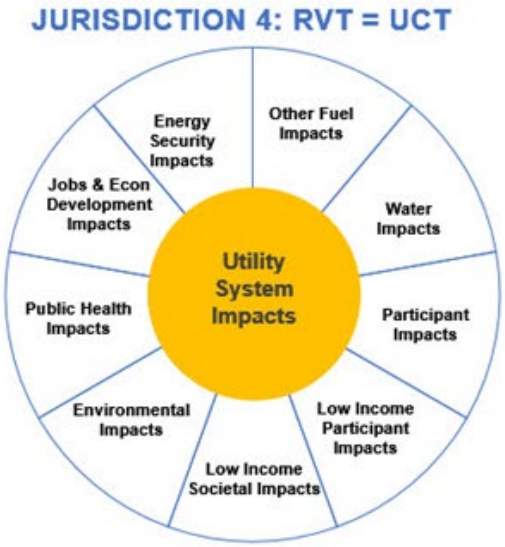
- Process should be open to all stakeholders.
- Stakeholder input can be achieved through a variety of means:
  - rulemaking process,
  - generic jurisdiction-wide docket,
  - working groups or technical sessions,
- Address objectives based on current jurisdiction policies
  - However, be flexible to incorporate evolution of policies through time.
- Policy goals may require consultation with other government agencies
  - Environmental protection
  - Health and human services
  - Economic development

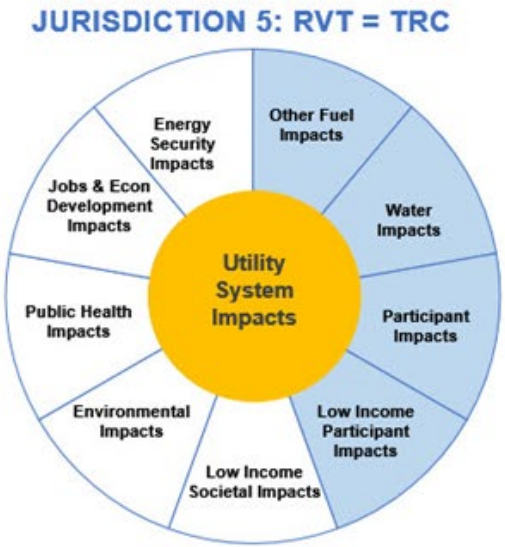
Relationship of Resource Value Test (RVT) to Traditional Tests – Results May Align or Not

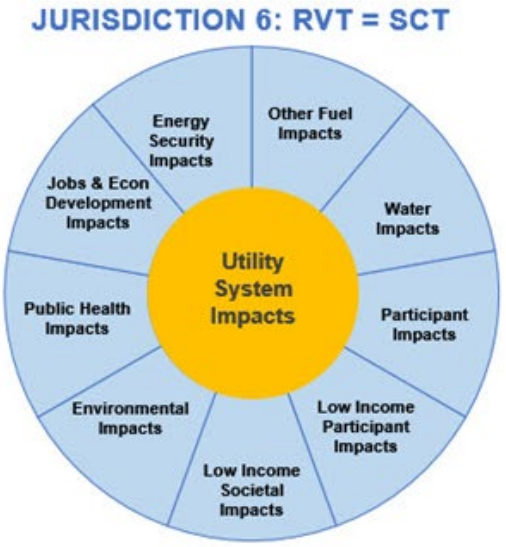












NSPM Part II – Applying CE Tests

6. Efficiency Costs and Benefits
7. Methods to Account for Costs & Benefits
8. Participant Impacts
9. Discount Rates
10. Assessment Level
11. Analysis Period and End Effects
12. Analysis of Early Retirement
13. Free Rider and Spillover Effects

Appendices

Chapter 9: 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.*

Steps for Choosing a Discount Rate

Choice of discount rate should reflect analysis objective: *to identify resources that will best serve customers over the long term, while achieving applicable policy goals*

Step A	Articulate the jurisdiction's applicable policy goals. These should be the same goals used in developing the RVT.
Step B	Consider the relevance of a utility's weighted average cost of capital. Is the utility investor time preference consistent with the jurisdiction's policy goals?
Step C	Consider the relevance of the average customer discount rate. 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	Consider the relevance of a societal discount rate. 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	Consider an alternative discount rate. 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	Consider risk implications. 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

NSPM Progress - 2019

Case studies of NSPM application and supporting guidance documents are available on the NESP website.

- The New Hampshire EM&V Working Group applied the NSPM to issue recommendations, including a "Granite State Test", to the NH PUC.

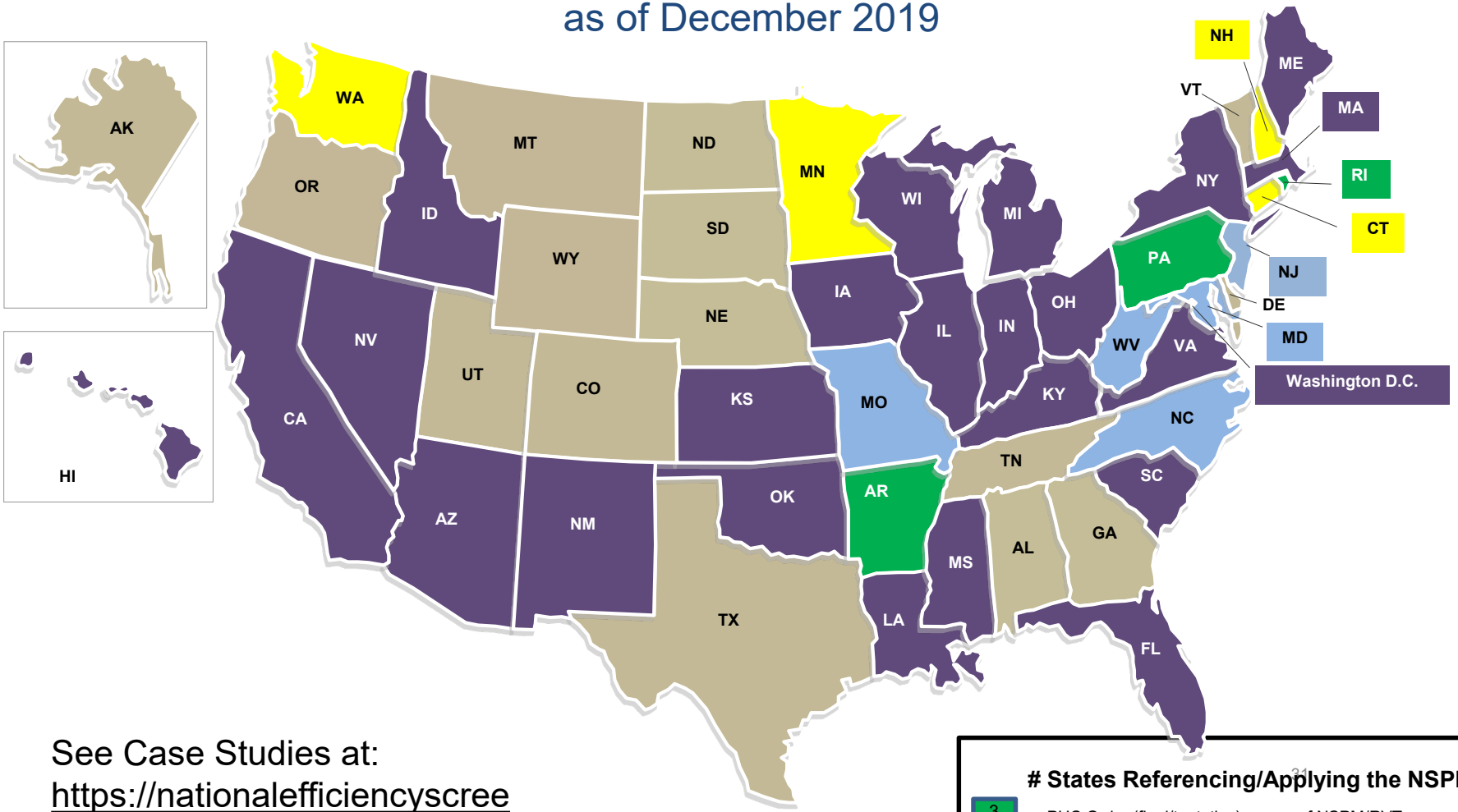
- In Minnesota, the MN Department of Commerce's Framework Study applied the NSPM to develop a new primary cost-effectiveness test.

- In Arkansas, the Parties Working Collaboratively followed the NSPM principles to assess the state's current cost-effectiveness practices.

- Rhode Island's PUC developed a "Rhode Island Test" based on the NSPM principles.

NSPM Progress - 2019

NSPM Applications and References as of December 2019



See Case Studies at: https://nationalefficiencyscreening.org/resources/case-studies/

 # States Referencing/Applying the NSPM

3	PUC Order (final/tentative) on use of NSPM/RVT
4	Actively applying NSPM to review current test
5	In process of learning about the NSPM
23	References made in PUC/legislative proceedings

NSPM Progress - 2019

New resources to support NSPM application are available on the website here:

- Check out the Inventory of Applicable Policies and Relevant Impacts Spreadsheets, based on case study experience identifying applicable policy goals (Step 1)

- These Cost-Effectiveness Results Reporting Tables help states perform more transparent benefit-cost analysis (6th Principle)

- The NSPM Case Study on New Hampshire reviews the state's NSPM process to review their test and develop the Granite State Test

NSPM Progress - 2019

The **Database of State Efficiency Screening Practices (DSESP)** now includes:

- State-specific cost-effectiveness testing policies and inputs for all 50 states, Washington D.C., and Puerto Rico
- Guidance documents on cost-effectiveness testing methodology
- Interactive graphics and menus to sort and display data

Information in the DSESP is subject to updates during ongoing QC and maintenance.

NSPM Progress - 2019

Stay informed with the *NSPM Quarterly* Newsletter:

https://nationalefficiencyscreening.org/national-standard-practice-manual/news/

See NSPM Applications and References to date:

https://nationalefficiencyscreening.org/state-references/

For more information about NESP and NSPM:

http://www.nationalefficiencyscreening.org/

Visit **www.nationalefficiencyscreening.org** to download the full NSPM, an Executive Summary, a summary presentation and Frequently Asked Questions

For additional questions, email NSPM@nationalefficiencyscreening.org

Additional Foundational Information

Assessment Level	• Analysis at all levels can provide valuable insight/value - but focus should be only on program, sector, or portfolio level for making “yes or no” investment decisions • EE program costs should be included at the level at which they are truly variable
Analysis Period and End Effects	• Should be long enough to cover lifecycle costs and benefits • 2nd best alternative is to amortize/annualize costs • Comparable portions of costs/benefits over shorter analysis period
Analysis of Early Replacement	• 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) • May need to also account for shifting efficiency baseline and resulting different savings levels in different future years
Free-Riders and Spillover	• Treatment should be a function of categories of impacts included in RVT • Free-riders: participant rebates are only a cost if test excludes participant impacts • Spillover: is an additional cost only if test includes participant impacts

Appendix A
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

Appendix B
EE vs Distributed Energy Resources **Utility System Impacts**

		Energy Efficiency	Demand Response	Distributed Generation	Distributed Storage
Costs					
Utility System	Measure costs (utility portion)	●	◑	○	○
	Other financial incentives	●	●	◑	◑
	Other program and administrative costs	●	◑	◑	◑
	Evaluation, measurement, and verification	●	●	●	●
	Performance incentives	◑	◑	◑	◑
	Interconnection costs	○	○	●	●
	Distribution system upgrades	○	○	●	●
Benefits					
Utility System	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	●	●	◑	◑

Appendix B

EE vs Distributed Energy Resources **Non-Utility System Impacts**

		Energy Efficiency	Demand Response	Distributed Generation	Distributed Storage
Costs					
Non-Utility	Measure costs (participant portion)	●	●	●	●
	Interconnection fees	○	○	◕	◕
	Annual O&M	○	○	●	●
	Participant increased resource consumption	◑	◑	◑	◑
	Non-financial (transaction) costs	◔	●	○	○
Benefits					
Non-Utility	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)	◑	○	○	○

Appendix C
Limitations of the Rate Impact Measure Test

- The RIM Test 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.

Appendix C
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 might be reduced for those customers that install distributed energy resources.
- 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.