A New Lens for Assessing Cost-Effectiveness - National Standard Practice Manual Heralds an End to Shortcomings

Kara Saul-Rinaldi
Home Performance Coalition

Tom Eckman
NSPM Co-Author

Julie Michals
E4TheFuture

Breakfast Briefing at the
NARUC Summer Policy Summit
July 17, 2017

Why a New Cost-Effectiveness Manual?

- **Traditional tests (UCT, TRC, SCT)**
  - Have no underlying principles
  - Don't directly address policy goals/needs
  - Lack of clarity on their conceptual constructs
  - Only several test options, despite greater variability in state needs
  - Many states have modified the traditional tests
    - A good thing if done well, but not always the case…
- **Efficiency is not accurately valued in many jurisdictions**
  - Don't account for all impacts relevant to applicable policy objectives
  - Don't account for full range of utility system benefits (capacity, T&D, use of average versus marginal line losses)
  - Asymmetrical application of costs and benefits (especially for participant impacts)
  - Defaulting to WACC for discount rate absent some key considerations
  - Where Net Savings is used, improperly counting free rider "costs" under TRC/SCT
- **Lack of transparency on why/how tests were chosen/developed**

Developing the right test is critical to ensuring utility investments are economic and that applicable state policies and goals are explicitly considered.

Overview of the NSPM Development Process

- **Who is behind the NSPM?**
  - National Efficiency Screening Project (NESP) – national group working to improve cost-effectiveness analyses
  - Over 75 organizations representing a range of perspectives
- **Who drafted the NSPM?**
  - Tim Woolf, Synapse Energy Economics
  - Chris Neme, Energy Futures Group,
  - Marty Kushler, ACEEE
  - Steve Schiller, Schiller Consulting
  - Tom Eckman (Consultant and former Director of Power Planning, Northwest Power and Conservation Council)
- **Who reviewed the NSPM?**
  - ~40 experts representing a variety of organizations from around the country
  - Provided several rounds of review/feedback on draft manual
- **Who Coordinated and Funded the NPSM Project?**
  - 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/

Purpose and Scope of NSPM

- **Purpose**
  - Set forth policy neutral principles for test development & application
  - Establish framework for primary test selection/development
  - Provide 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 1st order question: “which EE resources merit acquisition?”

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

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

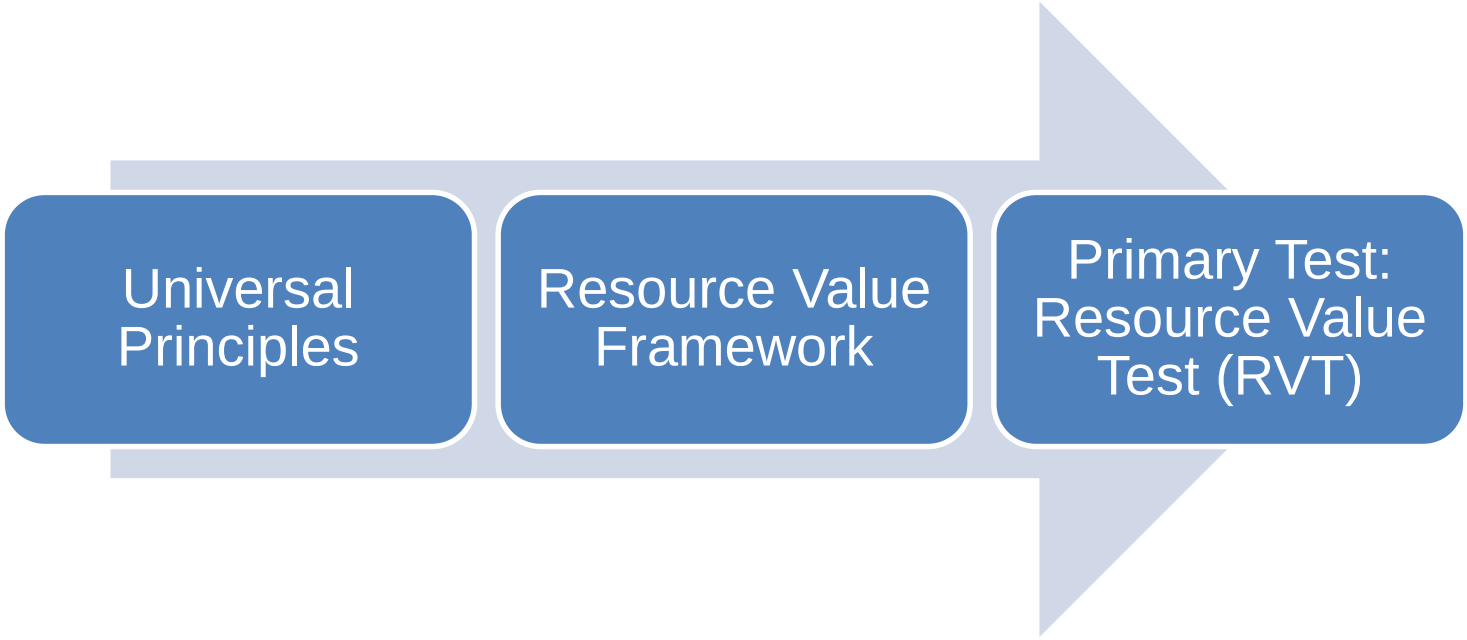
6. Efficiency Costs & Benefits
7. Methods to Account for Costs & Benefits
8. Participant Impacts
9. Discount Rates
10. Assessment Level
11. Analysis Period & End Effects
12. Analysis of Early Retirement
13. Free Rider & Spillover Effects

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, 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.

STEP 1

Identify and Articulate Applicable Policy Goals

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

- 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 Costs and Benefits in the Test

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 Non-Utility System Impacts Based on Jurisdiction's 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

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 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.

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

Conduct Incremental, Forward Looking and Long Term Analysis

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

STEP 6

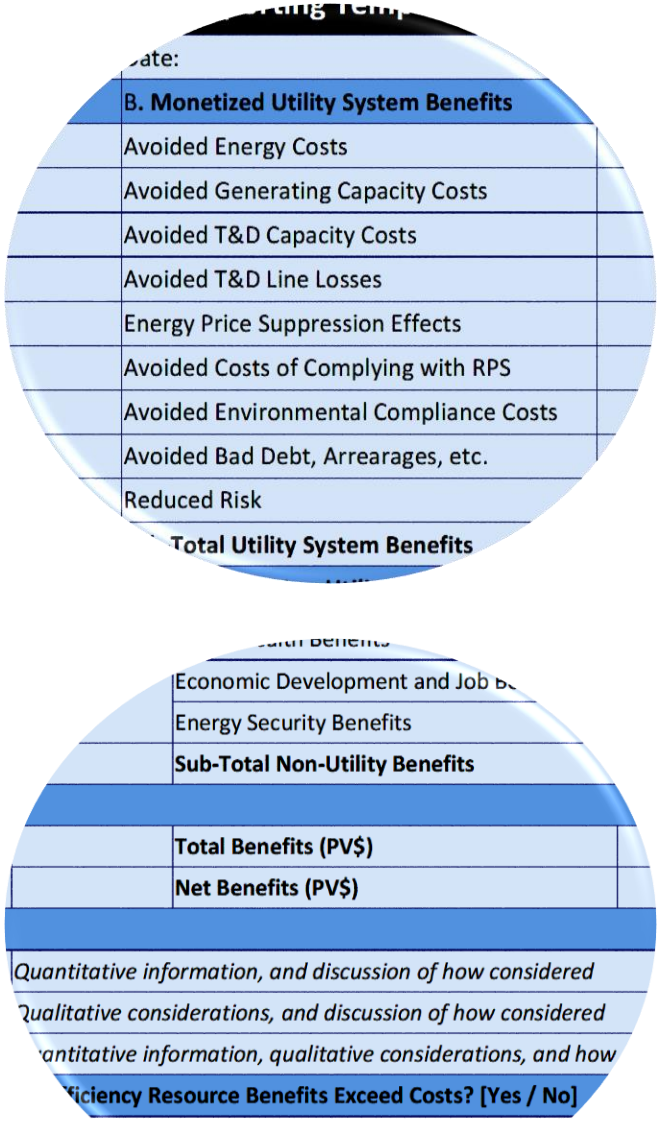
Develop Methodologies and Inputs to Account for All Impacts, Including Hard-to-Quantify Impacts

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

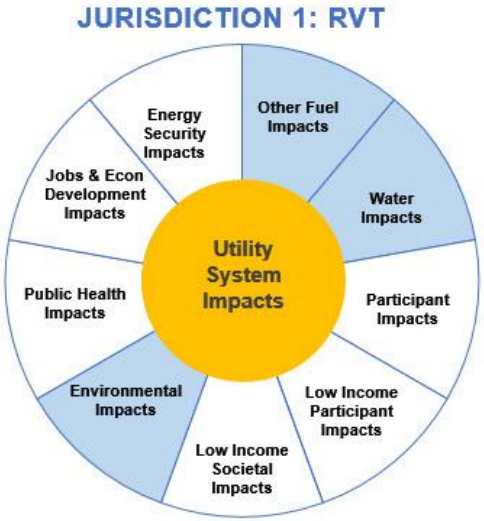
Efficiency Cost-Effectiveness Reporting Template			
Program/Sector/Portfolio Name:		Date:	
A. Monetized Utility System Costs		**B. Monetized Utility System Benefits**	
Measure Costs (utility portion)		Avoided Energy Costs	
Other Financial or Technical Support Costs		Avoided Generating Capacity Costs	
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]**		

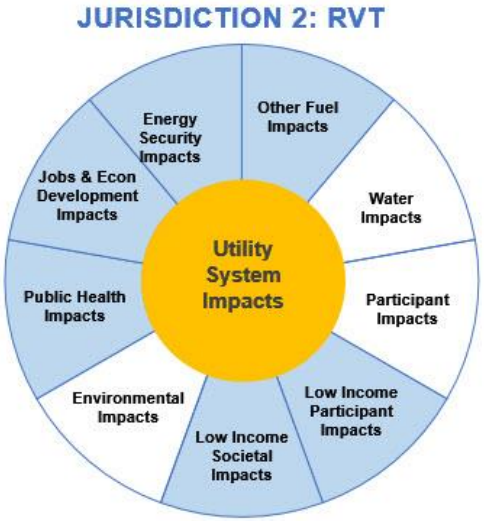


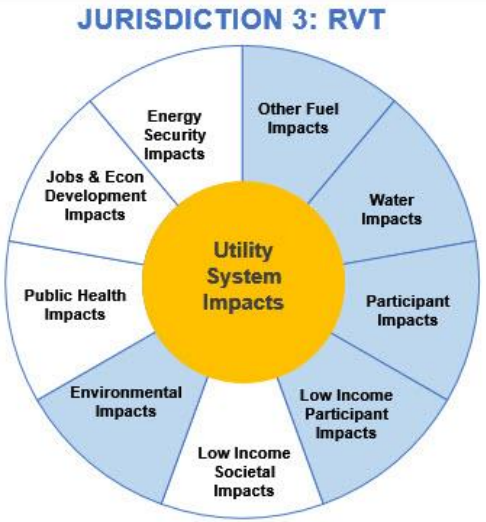
STEP 7 Ensure Transparency in Decisions on Which Non-Utility System Impacts To Include

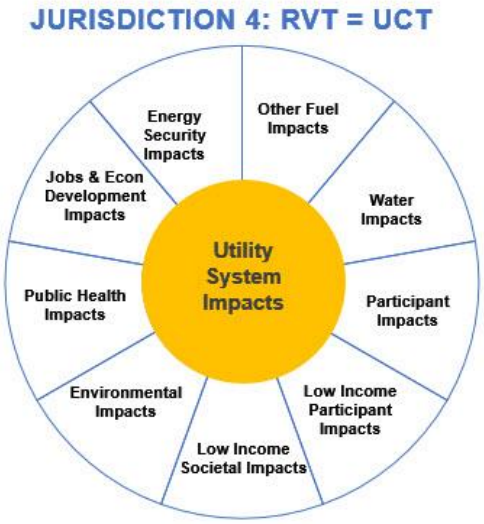
- Process should be open to all stakeholders.
- Stakeholder input can be achieved through a variety of means:
  - rulemaking process,
  - generic jurisdiction-wide docket,
  - working groups or technical sessions,
- Address objectives based on current jurisdiction policies
  - However, be flexible to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

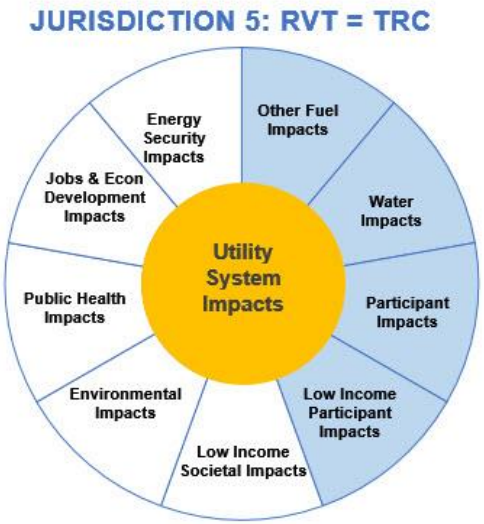
Relationship of Resource Value Test to Traditional Tests – Your Results May Differ

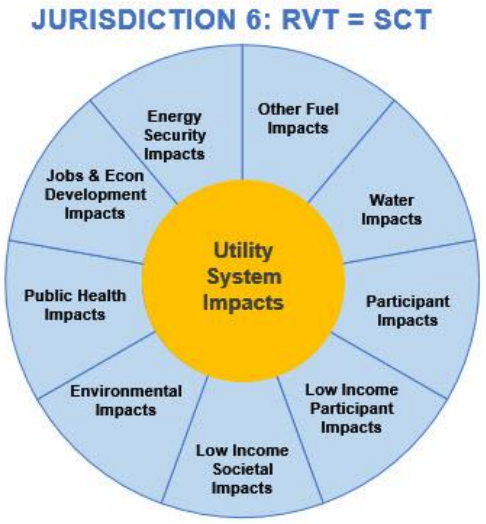




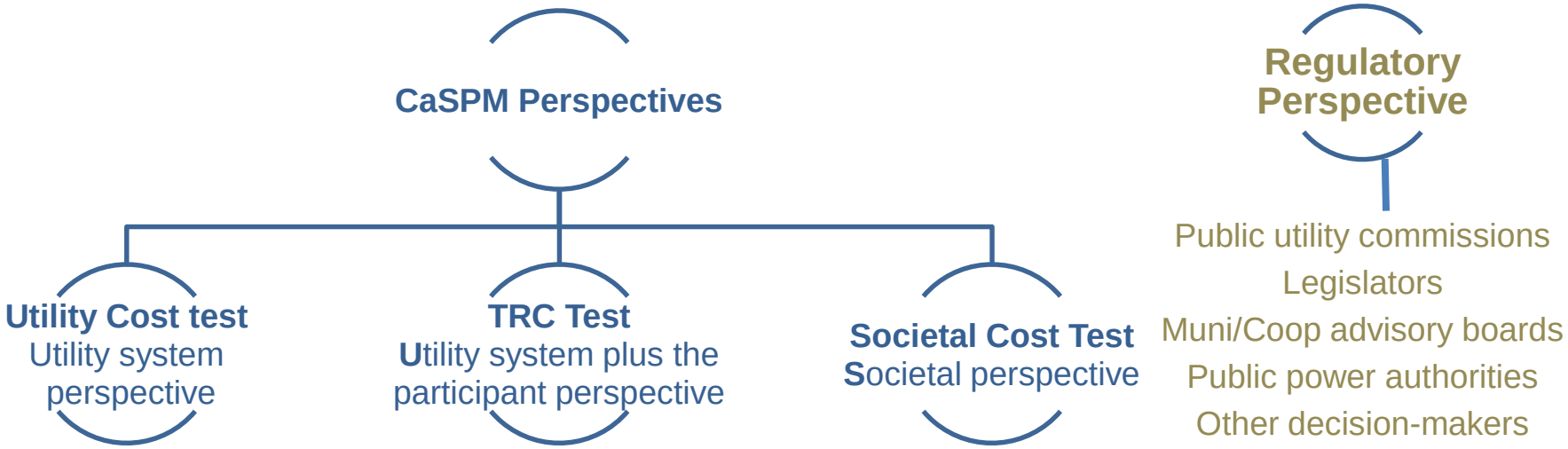








Cost-Effectiveness Perspectives



- These perspectives are used to define the scope of impacts to include in cost-effectiveness tests.
- NPSM introduces the 'regulatory' perspective which is guided by the jurisdiction's energy and other applicable policy goals policy goals.

Part II

Developing Inputs for Cost-Effectiveness Tests

Part II

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

Details in Chapter 3 (Steps 3 and 6)

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

Considering 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
- NSPM provides guidance and supporting information (points and counterpoints) on treatment of participant impacts

To avoid double counting utility system costs and benefits only those participant costs that exceed the value of utility system benefits, should be treated as the incremental investment required to secure participant benefits

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

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

Extra Slides for Reference

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 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	●	●	◑	◑

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

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.

Welcome

Chairman David Danner
Washington Utilities & Transportation Commission

Chairman Ted Thomas
Arkansas Public Service Commission

Questions for the Commissioners:

1. What works well with the current C/E practices in your state? What are some challenges, and what would you like to see improved?
2. Do the NSPM principles and 7-step process look like they may be useful for your state to address challenges or improvements?
3. How would you recommend stakeholders approach commissions about using the NSPM?

Learn More about the NSPM

- Resources on website: FAQs; download template reporting table; presentations
- Training sessions:
  - August 7 Cost-Effectiveness Workshop at IEPEC Baltimore MD
  - October 3 – MSU Institute of Public Utilities Advanced Course Training, Lansing MI
  - Other training venues TBD
- Case Studies – forthcoming this fall
- Additional resources to support NSPM use (e.g. plug and play inputs; methods/calc guidance) – TBD for 2018

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

Thank you!

The NSPM and related materials from the NESP, are available at: http://www.nationalefficiencyscreening.org/

Julie Michals
jmichals@E4TheFuture.org

Tom Eckman
TEckman49@gmail.com

Kara Saul-Rinaldi
ksaul-rinaldi@homeperformance.org