ASSESSING RESOURCE COST EFFECTIVENESS

By Erin Malone, Tim Woolf, and Danielle Goldberg

Introduction

In the past, when it came to cost-effectiveness testing for energy efficiency resources, the California Standard Practice Manual (CASPM) got all the attention. States claim to have adopted the CASPM's tests, as evidenced by the widespread use of the test names across states: the utility cost (UCT), total resource cost (TRC), societal cost (SCT), participant cost (PCT), and ratepayer impact measure (RIM) tests. States may have adopted the tests in name, but in practice their tests can differ wildly in terms of included costs and benefits. Of the 30 states in the recently created Database of State Efficiency Screening Practices (DSESP)[1] no two states apply the same test with the same methodology.

The National Standard Practice Manual — released in 2017 — updates, expands, and improves upon the CASPM. It provides fundamental principles and a comprehensive framework for assessing resource cost-effectiveness, allowing states to develop screening practices that are tailored to their own regulatory goals.

States have applied cost-effectiveness tests to energy efficiency resources for many years. As other distributed energy resources (DERs) – including demand response, distributed generation, distributed storage, electric vehicles, and strategic electrification technologies – continue gaining popularity, states are grappling with the most appropriate method for valuing them. Can the same traditional CASPM cost-effectiveness tests applied to efficiency apply to DERs as well? To answer this question, we first address the traditional tests and their limitations.

Limitations of the traditional cost-effectiveness tests

Perhaps the greatest limitation in the CASPM is its promotion of the widely-held view that traditional screening tests are the *only* tests that can be used to assess cost-effectiveness. The CASPM implies that the only perspectives that matter are those of the utility (UCT), the utility plus the participant (TRC), society (SCT), program participants (PCT), and rate impacts (RIM). What is missing from this mix is the perspective of regulators i.e., legislators, commissioners, advisory boards, energy offices, consumer advocates.

The CASPM does not address the regulatory perspective because it does not address state energy policy goals. The CASPM explicitly states that the "policy rules that specify the contexts in which it is appropriate to use the externalities, their components, and tests mentioned in this manual are an integral part of any cost-effectiveness evaluation. *These policy rules are not a part of this manual*" (CASPM, pages 6-7, emphasis added).

State energy policy goals raise some of the more vexing questions about cost-effectiveness screening. Should benefits to low-income customers be accounted for? Should other fuel impacts, participant non-energy benefits, or environmental benefits be accounted for somehow? These are key questions that every state wrestles with when developing screening practices. The CASPM provides few answers; except to offer the stark choice among UCT, TRC, PCT, RIM, and SCT.

In practice, many states have devised alternative versions of the traditional tests, with several states referring to their test as a "modified TRC test." In most cases, modifications were made to reflect different policy priorities. The problem with these approaches is that states do not articulate their policy goals and then explicitly create cost-effectiveness tests that reflect those goals. The created tests do not necessarily adhere to the theoretical definition of the test they are named after or even to key principles for ensuring sound cost-effectiveness analyses.

The classic example of this is the consideration of participant non-energy impacts in the TRC test. Until recently, simply comparing these impacts was challenging: It is often unclear which participant benefits a state includes in its TRC test without digging into the cost and benefit details in utility filings. Fortunately, the DSESP database described above provides better transparency in a consistent format on cost and benefit details for each state.

Once the various TRC test components are readily comparable, the differences become clear. The table below shows the non-utility system impacts included in the TRC test by selected states. These states include participant costs (the first row), but few states include all – or even a significant portion of – participant benefits such as improved comfort or economic well-being. Colorado and New Hampshire are exceptions in that they include environmental and public health benefits in their TRC tests, even though these benefits are traditionally considered SCT benefits.

Perhaps most states do not include participant benefits because they are difficult to quantify; but that is not a reason to ignore them. Applying the TRC test in this way is internally inconsistent, leading to results that are inherently skewed against energy efficiency.

The National Standard Practice Manual

Problematic cost-effectiveness screening issues led a group of energy efficiency experts to launch the National Efficiency Screening Project (NESP). **The National Standard Practice Manual's (NSPM)** purpose is to guide states through the process of identifying new state-specific cost-effectiveness practices that reflect stated policy goals. The NSPM encourages better cost-effectiveness testing practices by allowing for flexibility and individuality, consistent with each state's policy goals.

The foundation of the NSPM is a set of guiding principles that states should apply when developing and applying a primary cost-effectiveness test. The NSPM's principles are:

1. **Efficiency as a Resource.** Energy efficiency is one of many resources that can meet customers' needs, and therefore should be compared with other energy resources (both supply-side and demand-side) in a consistent and comprehensive manner.
2. **Applicable Policy Goals**. A state's primary cost-effectiveness test should account for its energy and other applicable policy goals. These goals may be articulated in legislation, commission orders, regulations, advisory board decisions, guidelines, etc. They are often dynamic and evolving.
3. **Hard-to-Quantify Impacts.** Cost-effectiveness practices should account for all relevant, substantive impacts, as identified based on policy goals, even those that are difficult to quantify and monetize. Using best-available information, proxies, alternative thresholds, or qualitative considerations to approximate hard to monetize impacts is preferable to assuming those costs and benefits do not exist or have no value.
4. **Symmetry.** Efficiency assessment practices should be symmetrical, for example by including all costs and all benefits for each relevant type of impact.
5. **Forward Looking.** Analysis of the impacts of efficiency investments should be forward-looking, capturing the difference between costs and benefits that would occur over the life of efficiency measures and those that would occur absent the efficiency investments.
6. **Transparency.** Efficiency assessment practices should be completely transparent and should fully document all relevant inputs, assumptions, methodologies, and results.

Applying these principles, the NSPM introduces the **Resource Value Framework (Framework)**, a seven-step structure designed to construct a state's primary cost-effectiveness test, the Resource Value Test (RVT). By using the Framework (Figure 1.) states can include costs and benefits that are best-suited to their needs while embracing the universal principles of the NSPM.

The NSPM does not confine a state to one of the traditional tests. Indeed, a state's energy policies seldom align precisely with any one of the CASPM perspectives. The practice of working through the Framework might lead to a conclusion that one of the traditional tests is appropriate for a state, but the exercise itself is an important way to consider and articulate what the primary cost-effectiveness test should include.

Like the CASPM tests, the RVT reflects a perspective: the regulatory perspective. The regulatory perspective is the view of public utility commissions, legislators, and public power authorities. It is intended to reflect the important responsibilities of institutions, agents, or other decision-makers authorized to determine utility resource cost-effectiveness and funding priorities.

Figure 1. Seven Steps of the Resource Value Framework

Step ❶	Identify and articulate the jurisdiction's applicable policy goals.
Step ❷	Include all the utility system costs and benefits.
Step ❸	Decide which non-utility impacts to include in the test, based on applicable policy goals.
Step ❹	Ensure the test is symmetrical in considering both costs and benefits.
Step ❺	Ensure the analysis is forward-looking and incremental.
Step ❻	Develop methodologies to account for all relevant impacts, including hard-to-quantify impacts.
Step ❼	Ensure transparency in presenting the inputs and results of the cost-effectiveness test.

Table 1. Non-Utility System Impacts for States that use the TRC test

	States that use the TRC Test	AR	CA	CO	DE	HI	IL	ME	MD	MA	NH	NC	WI
Non-Utility Impacts	Measure Costs: Participant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Asset Value	Yes	No	Yes	No	No	No	No	No	Yes	Yes	No	No
	Productivity	No	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	No	No
	Economic Well-Being	No	No	Yes	No	No	No	No	Yes	Yes	Yes	No	No
	Comfort	No	No	Yes	No	No	No	No	Yes	Yes	Yes	No	No
	Health and Safety	No	No	Yes	Yes	No	Not Yet	No	No	Yes	Yes	No	No
	Satisfaction	No	No	Yes	No	No	No	No	No	No	Yes	No	No
	Low-Income	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	No
	Other Fuel	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No
	Water Resource	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No
	Environmental	No	No	Yes	Yes	No	Yes	No	Yes	No	Yes	No	Yes
	Public Health	No	No	Yes	No	No	No	No	No	No	Yes	No	No
	Economic Development and Jobs	No	No	Yes	No	No	No	No	No	No	Yes	No	No
	Energy Security	No	No	Yes	No	No	No	No	No	No	No	No	No

Each state's RVT will likely be unique. Impact categories for each test will vary across states and/or over time because impacts are based on each state's policy concerns, which can and do vary. In contrast, the traditional UCT, TRC, and SCT tests are conceptually static; they do not change geographically or over time if applied in their purest conceptual form.

Properly valuing efficiency resources through cost-effectiveness tests that fully reflect state policies could lead to increased adoption of efficiency resources to benefit customers and the utility system. Additionally, improved cost-effectiveness practices put efficiency on a level playing field with other energy resources.

Distributed Energy Resources

As DERs become more prevalent, regulators and stakeholders need ways to value these investments. It is appealing to apply the cost-effectiveness tests for efficiency resources to DERs. But does that make sense? Can the tests be transferred so easily to different resources?

The answer is yes, but with some important caveats.

States evaluating the cost-effectiveness of DERs are again falling back on the traditional tests offered in the CASPM, despite their theoretical and practical limitations. Current DER cost-effectiveness practices generally suffer from the same challenges as practices for efficiency resources. These include not accounting for all relevant costs and benefits, not explicitly accounting for regulatory policy goals, and not properly analyzing rate or cost-shifting impacts.

It is imperative that states develop cost-effectiveness practices that can be applied consistently and comprehensively across all DERs. The NSPM offers a framework and universal principles for doing that. The NSPM was designed for energy efficiency resources, but its principles can and should be applied to all types of DERs. The Framework, which focuses on the regulatory perspective, can identify the test stakeholders should use when deciding which resources, whether supply-side or DERs, warrant funding from utility customers.

Before states start applying the Framework, there are important ways in which DERs require different treatment from efficiency resources. As examples, some efficiency costs and benefits might not apply to other DERs and vice versa, or some impacts will have different magnitudes. Most DERs will have locational and temporal considerations, which are likely to increase benefits if ideally situated. The policies supporting each DER could differ, and regulators will need to balance those goals and modify tests appropriately. States should also consider synergies across DERs, such as using storage to address operational costs of renewable resources.

Below, we address cost-effectiveness considerations for some DERs as compared to efficiency resource screening.

- **Demand response** may have additional benefits, such as risk reduction and increased resilience, or greater capacity benefits. Such benefits can be difficult to value, and establishing baseline use without demand response can be challenging.
- **Distributed generation** – primarily solar but also combined heat and power, fuel cells, and distributed wind – can inject power into the distribution grid, resulting in additional system benefits and interconnection costs. Avoided costs for solar will depend on forecasts for solar adoption, which vary by state based on policies supporting solar. Cost-shifting – for example when costs are shifted from solar customers using less energy to customers without solar – is perhaps the most important and challenging issue for distributed generation cost-effectiveness.
- **Distributed storage** resources can provide multiple services, depending on location, in-front-of or behind-the-meter, technology, rate design, and operating characteristics. Each such consideration can impact both the costs and benefits included and the magnitude of the included impacts.
- **Electric vehicles** (EVs) face the same considerations as distributed storage. They also require near-term infrastructure investments that will increase adoption and provide long-term benefits. Projecting EV adoption rates will impact cost-effectiveness results.

Regarding supply-side resources, the NSPM principles can be used in the context of integrated resource planning (IRP) or when conducting economic analyses of specific generation, transmission, or distribution infrastructure investments. The Framework can be used to develop the primary test for assessing supply-side investments, or to identify the criteria for selecting the preferred resource plan in the context of an IRP. This approach would not only ensure sound practices for analyzing supply-side resources, it would ensure DERs are analyzed comparably and consistently with supply-side resources.

Conclusion

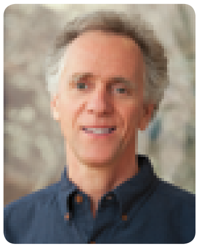
The NSPM offers a valuable set of concepts and principles for valuing all types of utility resources, including demand-side and supply-side resources. Regulators and stakeholders should adopt the NSPM's universal principles and follow the Framework's seven-step process for developing and implementing state-specific cost-effectiveness tests. This will provide a fair comparison for resource investments, grid optimization, and benefits to customers and utilities.

Reference

[1] https://nationalefficiencyscreening.org/state-database-dsesp/

About the authors

Erin Malone specializes in assessing energy efficiency policy, program design, and implementation. Since joining Synapse in early 2012, much of her work has focused on energy efficiency cost-effectiveness, rate and bill impacts, participation analysis, and best practices for energy efficiency.



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