Natural Selection: The Evolution of DSM Valuation and Use of the UCT

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ABSTRACT

Abundant natural gas supply and subsequent declines to forecasted commodity costs have led to differing perceptions of how natural gas conservation efforts should be treated. Should low commodity costs be viewed as a signal to ramp down energy conservation, or is there a better way for regulators to acknowledge the value of these efforts? Cost-effectiveness outcomes are easily muddled by the failure of conventional cost tests to accurately capture a clear and accurate valuation of ratepayer funded conservation efforts. Until recently, the most commonly accepted framework for measuring cost effectiveness has been the Total Resource Cost (TRC) test which is comprised of multiple subjective inputs and is vulnerable to broad interpretation and inconsistency. Meanwhile, an increasing number of regulatory jurisdictions have recognized the Program Administrator or Utility Cost Test (PACT/UCT) as a more straightforward method for assessing utility-run natural gas demand side management (DSM) activities. Because the UCT considers conservation as an equal resource to an actual gas purchase, it is the optimal vehicle for natural gas DSM benchmarking. The use of the PACT/UCT in regulatory jurisdictions such as Washington and New Mexico has offered greater stability to utility-run conservation programs, and offers hope for similar efforts across the country. But many programs remain bound to the TRC paradigm and continue to operate with data that may skew the perceived value of natural gas DSM efforts. The aftermath of remaining in the TRC paradigm and the benefits of moving beyond this model and embracing the PACT/UCT are described below.

Introduction: A Changing Environment

Current gas forecasts continue to reflect pricing far lower than it was less than half a decade prior. For example, in the Cascade Natural Gas Corporation 2008 Integrated Resource Plan for Washington and Oregon, the Medium Forecast, 45 Year Avoided Cost Calculations identified a value of $10.71 for a 20 year conservation measure, and a portfolio levelized cost threshold of $0.800. This meant that the Company could pursue a Residential and Commercial/Industrial conservation portfolio with an average levelized cost of $0.80 (slightly higher or lower depending on the average measure life of said portfolio), and that the *maximum* viable payment for a therm saved through a 20 year measure was $10.71. Four years later, avoided costs had plummeted with 20 year measure values now set at $5.62, and levelized cost thresholds set at $0.419 (Cascade Natural Gas Corporation Integrated Resource Plan, 2008; 2012). This radical change was due to sustained declines to natural gas pricing forecasts and is not limited to a single utility or jurisdiction. It also has profound impacts on the number and type of measures that will be found cost-effective within a conservation portfolio.

While such fluctuations to gas forecasts are an expected part of the ebb and flow of the energy market, such changes have significant impacts on conservation programs, ratepayer energy usage, and spending behavior. When costs are high, consumers are forced to shoulder the additional energy burden or invest in energy efficiency. In times of decreased gas costs, the

energy burden to ratepayers lessens as do the economic drivers that motivate conservation when gas is expensive. Low cost gas forecasts are problematic from an energy conservation standpoint because economic signals that encourage less conservation behavior are also accompanied by a *decline* in the cost-effectiveness of utility run energy efficiency programs as assessed by the standard tests developed in the 1980's. This means that external tools designed to encourage energy efficient upgrades also become less cost-effective and those that remain cost-effective become more difficult to justify through traditional forms of program valuation. Barbose, Goldman, Hoffman and Billingsley have observed downward trends to natural gas prices and anticipate that "…lower gas prices translate into reduced program benefits, which in turn constrains total efficiency spending and flexibility in program design as benefit-cost ratios decrease" (Barbose, et al. 26).

Clearly, there are challenges associated with maintaining and justifying the continuation of natural gas conservation efforts in light of declining costs. However the effort is worthwhile in light of the key benefits of natural gas energy efficiency such as the value of demand side management, electricity & water savings, carbon mitigation, the need for resilience—which remain constant. Avoided gas costs are merely a common benchmark against which the results of an energy efficiency cost effectiveness test can be measured. Research by the American Council for an Energy Efficient Economy has further demonstrated that energy efficiency programs consistently remain as America's least-cost energy resource option, and that energy efficiency is a "low-cost and low-risk strategy" with averaged levelized costs across the US at $0.35 per therm (Molina, 2014). In light of this information, it should be intuitive for utilities to continue forward with robust natural gas conservation efforts.

However, in the Pacific Northwest, individual conservation programs are *not* based from national averages, but instead operate from individual utility supply side costs and the interpretation of regionally accepted cost-test criteria. This inherent variance, paired with the subjective valuation of cost-effectiveness from jurisdiction to jurisdiction creates an environment where the value of natural gas conservation efforts is being questioned. In other words, while gas conservation programs can be demonstrated to have value from a national perspective based on "best practices" in program valuation, this does not mean that individual utilities, regulatory bodies, and states are all working from the same standardized metrics. In reality, energy programs are almost universally filtered through the broad lens of the Total Resource Cost test; where the TRC is a subjective *range of similar but varied cost tests* that all happen to be identified by the same name; and this set of tests is collectively poised as the dominant cost test in the United States. This fundamental flaw with current iterations of the Total Resource Cost (and with other tests in the California Standard Practice Manual) has been called into question by The Home Performance Coalition's National Efficiency Screening Project which has noted that "what are commonly thought to be 'standard' tests are in fact applied inconsistently across states, including ways that do not accurately reflect the value of energy efficiency" (Woolf et al. 2014). Since the type of cost test used, and the manner in which it is applied, can have profound impacts on the operation of natural gas conservation programs it is essential that the cost-effectiveness tests be correctly calibrated, and contextually appropriate. Inconsistent interpretations of how to respond to declining forecasted gas costs have led to a blend of adaptive and maladaptive approaches to the operation of ratepayer funded natural gas conservation efforts that will have profound impacts on the long term health and continuation of natural gas conservation programs.

Evolving Paradigms and Adaptive Strategies

Although conservation has been proven as a least cost resource, many utilities are finding it difficult to ignore the impacts the declining costs of natural gas has had on cost-effectiveness thresholds. This is because wide acceptance of the TRC paradigm has resulted in a framework in which program administrators have no choice but to make program changes or eliminate conservation measures in response to imperfect data. Or, as The Home Performance Coalition eloquently states, "We recommend caution in using the TRC test to screen energy efficiency resources… most states that currently use the TRC include participant costs, but do not include any relevant participant non-energy benefits, with the result being a test that is both biased against efficiency resources and that provides decision-makers with inaccurate information regarding 'total resource' costs and benefits." (Woolf et al. 2014). This has led to a current situation in which even the most "bread-and-butter" DSM strategies, such as rebates for high efficiency furnaces, water heaters, and weatherization become vulnerable to cuts under the TRC. In some cases, this has meant reductions to program budgets or offerings, or proposed elimination of such programs entirely. Thus adherents of the TRC have been forced to manage lowered avoided gas costs by applying one of several primary strategies as described below. While this may seem counterintuitive, each of the strategies below have either been actually implemented, or have at been attempted by the administrators of ratepayer funded programs in the Northwestern United States.

TRC adaptive strategy 1: Suspension of gas conservation efforts? As forecasted natural gas prices have declined, some utilities have attempted to suspend or cancel programs that struggle under the Total Resource Cost test. Other program administrators have been compelled to reduce measures and administrative costs in order to more comfortably fit within the threshold of the TRC. Such was the case in the Washington Utilities and Transportation Commission Docket UG-121119, in which Avista Corporation proposed the indefinite suspension of its natural gas conservation efforts in light of declining gas prices. (Avista, 2012). As Avista pointedly represents in their *2013 Interim Natural Gas Demand Side Management Portfolio Business Plan*, "Given the Company's commitment to delivering a TRC cost-effective program, and the clear inability to do so under expected circumstances, the Company felt the obligation to file in a timely manner for the indefinite suspension of the natural gas DSM portfolio." (WUTC Docket UG-121119, August 8, 2013). Suspension of Avista's conservation efforts were also proposed in Oregon and Idaho with mixed results, although only Washington questioned the validity of the TRC in light of the undervaluation of natural gas conservation. Oregon's response to declining gas costs within the framework of the Societal and Total Resource Cost test will be described under "Adaptive Strategy 2".

While a strict and unwavering adherence to the Total Resource Cost test could have signaled the death knell for gas conservation program in Washington State, the Washington Utilities and Transportation Commission (WUTC) instead launched Docket UG-121207, *Commission Investigation into Natural Gas Conservation Programs*, a public examination of the cost effectiveness of natural gas conservation initiatives. In this docket the WUTC recognized the continued relevance of natural gas conservation, and ultimately issued a Policy Statement released on October 9, 2013. This statement offered significant guidance on the valuation of natural gas conservation efforts and recommended that gas utilities "should use a properly balanced TRC or, if not available, a UCT with the assistance of the utility's advisory committee" (WUTC Docket UG-121207, 13).

The Washington Utilities and Transportation Commission found that while "a properly balanced TRC is the most appropriate test available," there are significant barriers to achieving this balance since all costs are calculated, but only a limited number of non-energy benefits." The Commission goes on to recognize that "with proper quantification of these values, a properly balanced TRC analysis could be possible. Unfortunately, the [Northwest Power Planning] Council does not provide these values for the natural gas utilities, nor does any other similar entity. And it would be unreasonably expensive for a utility to undertake such a study alone. Thus, we are unwilling to allow utilities to end natural gas conservation programs as a result of an unbalanced or incomplete TRC analysis. Any TRC analysis without these values is potentially biased against conservation programs. Accordingly, the UCT is an acceptable option when a properly balanced TRC is not available" (14).

As the WUTC suggests, the Total Resource Cost test is a sensitive instrument that must be meticulously calibrated in order to yield meaningful results. A stark imbalance between quantification of costs and benefits makes gas conservation programs weighed under the TRC particularly susceptible to undervaluation. Thus the WUTC recommends the use of the Utility Cost Test (UCT), also known as the Program Administrator Cost Test (PACT), as a reasonable alternative to the fickle TRC. The UCT/PACT avoids the quagmire of non-energy benefits entirely by treating cost-effectiveness as a simple calculation of energy savings and lifespan weighed against the incentive provided by the utility, and any associated administrative expenses. Additional participant costs for efficiency upgrades are not considered, nor are a limited number of NEBs. Instead, the UCT creates a simple leveraged transaction between the customer and the program administrator resulting in a mutual benefit. If the state wishes to add a cost advantage for resiliency (or any other reason), this is also treated as leverage. This approach offers greater insulation against fluctuating market costs, since it avoids obstacles created by attempting to second guess customers' efficiency investment decisions.

The WUTC has provided specific regulatory direction to Avista Corporation under Docket UG-120790 which has allowed Avista to continue offering natural gas conservation programs, suspended the company's request for program discontinuation under UG-121119, and empowered the utility to apply the Utility Cost test for the purposes of the natural gas DSM portfolio. It appears that this will allow the company to maintain a viable portfolio of conservation measures following adjustments to rebate levels and programmatic costs as necessary to achieve an anticipated cost benefit ratio of 1.20 (WUTC Docket UG-120790, July 27, 2013). This type of regulatory flexibility is essential in order to fully value natural gas DSM, and decreases a utility's urgency to discontinue perceptually "risky," but consistently valuable conservation programs and initiatives.

TRC adaptive strategy 2: Temporary suspension of cost effectiveness criteria. The continued appearance of low commodity costs in Integrated Resource Planning in the State of Oregon has raised interesting questions about how to maintain robust conservation efforts in this ecologically forward-thinking region. Both the Oregon Public Utility Commission (OPUC) and the Energy Trust of Oregon (ETO) have acknowledged challenges to the operation of cost-effective natural gas rebate options for Oregon ratepayers. In 2012, the Energy Trust of Oregon applied for, and received, a two year exemption from the TRC test for natural gas weatherization and certain small commercial and new buildings measures under docket UM-1622. This exemption was necessary under the regulatory parameters set by Oregon Public Utility Commission docket UM 551 which specifies that the variant of the Total Resource Cost test known as the Societal Cost Test (SCT) must be used to determine whether or not an energy

efficiency measure should be deemed cost effective. As defined in the California Standard Practices Manual, "a variant on the TRC test is the Societal Test [but] differs from the TRC test in that it includes the effects of externalities (*e.g.*, environmental, national security), excludes tax credit benefits, and uses a different (societal) discount rate" (California Standard Practices Manual, 18, 2001). While the Societal Cost Test is an improvement upon the TRC, in that a debatably more balanced assessment of costs and benefits take place though this tool, it is still limited to those benefits that are quantified and by its nature, eliminates those that are not explicitly stated. This perpetuates the imbalance in the cost test and more dangerous still, runs the risk of masking this imbalance if the test is framed as an all-inclusive valuation of benefits.

Fortunately the order under UM 551 allows certain measures to be included for an exemption to the SCT/TRC if it is demonstrated that:

A) The measure produces significant non-quantifiable non energy benefits.
B) Inclusion of the measure will increase market acceptance and is expected to lead to reduced cost of the measure.
C) The measure is included for consistency with other DSM programs in the region.
D) Inclusion of the measure helps to increase participation in a cost effective program.
E) The package of measures cannot be changed frequently and the measure will be cost effective during the period the program is offered.
F) The measure or package of measures is included in a pilot or research project intended to be offered to a limited number of customers.
G) The measure is required by law or is consistent with Commission policy and/or direction.

Since key gas conservation measures offered through the Energy Trust of Oregon were demonstrated to have value under items A through E in UM 551, a two year cost-effectiveness exception was granted. These exemptions have allowed more time for the ETO to further adjust programs to the increasingly tight parameters of the SCT/TRC under lowered gas costs (UM-1622 November 12, 2012). The exemption period provides a timeframe in which the Energy Trust can streamline cost effectiveness while avoiding lost opportunities for critical energy savings. However, this exception is finite. Under current regulations, the ultimate determination of whether gas DSM programs should continue falls under UM 551— and the lens of the SCT/TRC. This means that continued exemptions may be required in the future. But for now, temporary suspension of the SCT/TRC test has allowed gas conservation programs to continue without muddling the conventional understanding of optimal cost-effectiveness testing. The fact that certain measures are not currently seen as cost effective under the SCT/TRC and current pricing forecasts is treated as *temporary and circumstantial* and thus the test remains unquestioned.

Ultimately, the continuation of natural gas DSM measures should not be treated as an exception to the rule, and should instead be valued in a clear, consistent manner that allows the benefits to be expressed in the form of energy savings, and costs in the form of the utility incentive. All other costs and benefits fall within a paradox of being essential and subjective at the same time. These modifiers exist with or without formal quantification and are an implied part of the transaction made between a consumer and their utility when they purchase, and receive an incentive for, high efficiency natural gas upgrades. Thus it is unnecessary for energy conservation to be "grandfathered" into continuance without first considering alternative cost test perspectives that offer a more straightforward assessment of such activities.

TRC adaptive strategy 3: Modifications to existing cost test criteria. Just as there is significant variation between the different cost tests acknowledged in the California Standard Practices Manual, there is an equal and often more significant variation within the Total Resource Cost test between –and even within– jurisdictions. This variation offers program administrators the regulatory coverage of a widely accepted evaluation metric, but allows for flexibility to operate programs that balance environmental and demand side management objectives. But such flexibility comes at a cost and makes the test itself susceptible to perceptions of "gaming" and subject to external scrutiny. As Robin LeBaron has astutely observed, "many of the varying applications of the TRC violate the core principle of the test: that it provide a fair assessment of the relationship between the costs and benefits of the program." (LeBaron, 2011).

In other words, if the purpose of a standardized testing methodology is to confer legitimacy upon programs and measures and demonstrate that they are in the public interest, then it is important that genuine standardization be achieved, or else that variances between tests bearing the same name be met with maximized transparency. Furthermore, it is important to understand why certain modifications to the TRC may or may not be included in a particular iteration of the test and to strive towards generally accepted best practices. This is particularly important since the stakes are high and, as the Cadmus Group notes, "significant differences occur between jurisdictions regarding how the TRC is calculated and applied [and] this diversity can create significant differences in the depth of savings, breadth of offerings, and long-term projections for a portfolio" (Daykin, Aiona, Hedman, 2012).

During its investigation into Natural Gas Conservation Programs, the Washington Utilities and Transportation Commission was faced with the decision of either proposing alterations to the TRC, or finding an alternative method to program valuation. In written comments submitted as part of the investigation, the Northwest Energy Coalition explained that they believed "the TRC remains the best measure for cost effectiveness, but only when applied correctly," and that "currently, the TRC is not working as well as it could be because it undervalues non-energy benefits." They go on to suggest more comprehensive quantification of non-energy benefits "and applying a proxy or adder to account for those that present a greater challenge (2013). In turn, the WUTC acknowledged in their policy statement that many non-energy benefits were difficult to quantify and that "without a rigorous technical determination of the amount at which the risk reduction value and non-energy benefits should be set, gas companies' TRC analyses are likely to be incomplete."

Once we recognize that broad variations are taking place in the TRC testing methodology, the next question should be—what *does* a fair and balanced TRC look like, and how can such a tool be developed in a consistent, reliable, and universal manner? Jim Lazar and Ken Colburn of the Regulatory Assistance Project have conducted a comprehensive analysis of the myriad "layer cake" of benefits associated with ratepayer funded conservation programs. They posit that, "although the TRC test is the most widely used test today, states commonly and incorrectly apply it without incorporating many energy efficiency benefits, including associated natural gas and water resource savings and monetized environmental and non-energy benefits. Costs, on the other hand, are completely applied" (Lazar and Colburn, 2013). This analysis is consistent with other criticism of the TRC and points to one of two solutions—either restructure the existing TRC model to be as broadly encompassing as possible, or identify a less subjective means for program valuation.

In the case of Lazar and Colburn, the analysts recommend as a best practice the inclusion of as many benefits as possible, and provide over fifty pages worth of thoughtful and detailed recommendations based along three main categories—"Benefits to the Utility," "Benefits to Participants," and "Benefits to Society." Each category has extensive subcategories of benefits that should be considered. The objective is to "make sure you've accounted for everything you can quantify," and "where measures pass the test with easy-to-count-benefits, quit counting." It is also recommended that the cost test utilized be framed around specific goals/policy objectives (Lazar and Colburn, 2013). Quite simply, a layering of benefits allows ratepayer funded conservation programs to continue on, and are acknowledged as legitimate by any means necessary. This statement should not suggest that quantification of non-energy benefits is inherently inappropriate. In fact, it is laudable that key organizations have taken on the tremendous effort of recognizing the remarkable good resulting from energy efficiency programs. However, this does turn a once simple test into a significantly more subjective and complex math equation. And from a public acceptance, and policy standpoint, the massive scope and scale of benefits makes it an onerous and near impossible task to get all jurisdictions and stakeholders to universally acknowledge and accept them as legitimate points for inclusion.

If the intent of the Total Resource Cost Test is to provide a standardized and accepted hallmark of cost effectiveness, creating controversial or inconsistent inputs for the perceived purpose of simply "making conservation work," undermines its legitimacy and makes it increasingly vulnerable to outside criticism. Even in Vermont, which RAP and others recognize as a living example of where the significant non-energy benefits have been applied to justify continuation of robust energy conservation efforts, the entire layer cake of benefits has yet to be digested. Total benefits quantified in this jurisdiction include production energy cost savings, production capacity cost savings, avoided transmission capacity costs, line losses, avoided reserves, externalities, other resource benefits to participants, other resource savings, O&M cost savings, and other energy savings (among others). Through these calculations the benefits of energy efficiency far exceed the costs. But is this model universally accepted, simple to administer, and easy replicated?

In the absence of other options, the addition of non-energy benefits and cost test modifications—consistently and universally applied— may serve as a temporary alternative to discontinuation of natural gas efficiency programs or other undesirable outcomes. But as the WUTC has acknowledged through their acceptance of the PACT/UCT, the TRC is not the only viable methodology for valuing natural gas conservation efforts. Thus if the TRC is to continue as the primary tool for natural gas program valuation, it is important that the test be broadly inclusive of balanced benefits and costs, simple and non-controversial to administer, and be universally applied in a uniform and consistent manner. Otherwise the TRC begins to resemble an *anchor test*—a canvas upon which benefits and assumptions may be grafted while maintaining legitimacy under the "brand" of the TRC. This may be overly complicated in light of more simple and transparent valuation options.

Selecting a Better Path

The Program Administrator Cost Test/Utility Cost Test (PACT/UCT) is the second most commonly used test for utility run conservation programs in the US, and serves as the primary cost test in Connecticut, Michigan, New Mexico, and Utah, as well as serving as a reasonable alternative to the TRC in Washington State. Although no programs are truly immune to the

impacts of reduced gas costs/forecasts, the use of the PACT/UCT offers a more stable and easily understood framework through which programs may be analyzed. This means more time can be spent on program implementation, and administrators avoid a complex rationalization for programs that can be justified by treating supply side and demand side resources as having equal value. This means that the primary focus for the utility can be on identifying new and innovative avenues to obtain demand side resources, and that it can purchase these resources at the same or lesser cost of conventional gas supply.

The results of the Participant/Utility Cost Test are driven by the rebate/incentive cost paid by the administrator. As acknowledged by others in the industry, "The PAC test…turns energy efficiency into a simple transaction between the utility and consumers, whereby the incentive amount signals the price the utility is willing to pay for a negawatt-hour and the customers accept or reject the price according to their expected return on investment" (Haeri & Khawaja, 2013). The "optimal" market signal for consumers can be achieved by pursuing a *balanced* cost benefit ratio. In other words, while a program must maintain competitiveness with supply side resources, it must also maintain incentive levels high enough to achieve meaningful causality between the utility rebate and a consumer's purchasing decision. This can be achieved through standard regulatory guidance and an understanding of the market in which the program operates. Superfluous measures with minimal savings (the hypothetical "million-dollar, gas-powered cheese grater") are screened out during program development based on hours of operation, incremental savings, and relevance.

Understanding—and measuring—energy efficiency as *demand side management* places ratepayer funded conservation programs in an appropriate context. Thus efficiency is more easily integrated into a utility culture as a means of purchasing energy. Boiling an energy savings program down to its energy savings allows a common baseline from which programs can be understood to have value. This is not a new concept. In jurisdictions where the PACT/UCT is already being utilized as a secondary metric, it is often used to set appropriate rebate levels, whereas the TRC typically offers no guidance on this matter. As others have acknowledged, "[The PAC test] provides a more rational basis for designing programs and incentive structures that are more compatible with the way by which utilities procure resources" (Haeri & Khawaja, 2013). As with any screening tool, it is only as good as its sum of its inputs and the character of the organization utilizing it. But the PACT/UCT has the advantage of reflecting more easily understood and tangible outcomes which makes it far more transparent and less susceptible to gaming than a more subjective, multi-faceted analysis. Thus, the PACT/UCT makes programs easier to follow from an oversight standpoint, but does not preclude regulators from considering broader benefits to natural gas conservation efforts as appropriate.

Natural gas efficiency programs will continue to face challenges to their existence under the Total Resource Cost test because the TRC places conservation at a disadvantage to supply side resources. On the other hand, as stated earlier, the Program Administrator, or Utility Cost Test (PACT/UCT) places supply and demand side resources on equal footing. It does not require additional participant benefit adders because additional participant costs are not included, and subsequent benefits are assumed as inherent to the energy efficiency purchase. This is the optimal model for program administrators of ratepayer programs, provided that costs and benefits are carefully balanced.

A Brief, But Important Note about Discount Rates

There is a common economic misperception that the value of energy savings diminishes over time. A therm of natural gas saved during the first year of its lifetime is often seen as more valuable than a therm saved in the future. This had led to the standard practice of applying a discount rate to energy efficiency investments. Externally imposed discount rates are a significant driver of a program's perceived cost effectiveness and can create an illusion that savings in outer program years are less valuable than savings in the first years. Therms saved in outer years are treated as having a significantly reduced value, or are effectively eliminated. This downplays the very real carbon mitigation benefits of deep, long-lived energy savings (which continue to exist regardless of economists' protests to the contrary) and artificially narrows the value of efficiency programs.

The National Home Performance Council's National Efficiency Screening Project recommends that discount rates should be used based on "the overall regulatory perspective underlying the screening test, and the risk associated with the energy efficiency investment" The thought is that valuation from a societal perspective should likewise utilize a societal discount rate like a US treasury note. (Woolf et al. 2014). This philosophy is consistent with the outcome of the WUTC's UG-121207 policy statement which ultimately concluded that "as each cost-effectiveness test reflects a specific stakeholder's view of conservation investments, each test should use a discount rate that matches the stakeholder's investment perspective" Thus the regulators concluded that the weighted average cost of capital (WACC) should be utilized for the PACT/UCT, residential gas conservation efforts utilizing the TRC should be discounted through the bond rate, and that all commercial and industrial efforts should be held to the WACC as well. It is believed that "unlike residential participants, commercial and industrial program participants typically require a shorter payback period for their investments, which could justify the use of a higher discount rate than a utility's WACC" (WUTC, 2013). This line of reasoning is logical under circumstances in which capital investments are literally taking place in order to finance energy efficiency efforts, or under independent cost-benefit analysis performed by the customer engaged in a particular energy efficiency investment.

However, assigning a future-intolerant discount rate to any cost test or program sector may lead to an overgeneralization of risks and a presupposition regarding the consumer's desired return. As Groom, Hepburn, Koundouri, and Pearce observe, "the use of the classical net present value (NPV) rule to assess the economic efficiency of policies with costs and benefits that accrue in the long term is felt by many non-economists to be particularly problematic." (Groom, et al. 2005). This thought is particularly worthy of consideration since some economists have suggested that consumers themselves play a role in setting "implicit discount rates" that value the present value of an energy efficiency investment over long term benefits (Howarth, Sanstad, 1995). This implies that consumers are making energy efficiency purchasing decisions based on their own internal economics; thus an external discount rate imposed on top of this existing cost benefit analysis is redundant.

An issue paper from the US Department of the Interior shed further light on the counterintuitive nature of applying a positive discount rate to conservation efforts, evoking Georgescu-Roegen's point that, "…present value maximization is irrational because future generations will also require resources" and "to 'eat, drink, and be merry today because tomorrow we may die,' is appropriate only because humans are mortal. Quasi-immortal entities, such as a nation and its economy, must accommodate future generations," (Peacock, 1995). The

human inclination to discount the welfare of future generations and long-term economic well-being compounds with lowered avoided cost thresholds and imprecise cost testing methodologies to create a perfect storm in which meaningful, long lived and deep conservation measures are wrongfully devalued and dismissed as failing cost-effectiveness, while, conversely, low-cost measures with small savings and a very short measure life rise to the top of the cost effectiveness list. Quite simply, "decisions made today on the basis of the CBA appear to tyrannize future generations and in extreme cases leave them exposed to potentially catastrophic consequences" (Groom, et al. 2005).

It is yet to be seen what impacts of a codified WACC discount rate to commercial and all PACT/UCT analyzed programs will have upon the valuation, and operation, of natural gas efficiency programs in Washington State. However, the lost opportunities generated by a prohibitively high discount rate cannot be overstated or underestimated. Properly recognizing the long term value conservation programs is particularly essential in states with aggressive energy savings targets and carbon mitigation goals, such as those driven by the Western Climate Initiative. In regulatory jurisdictions where climate change and carbon mitigation are already acknowledged as priority issues, a reverse, or negative discount rate would be useful to demonstrate how both long-term price inflation and the need for resiliency in the context of accelerating climate change may cause a therm or kilowatt-hour saved today to have *increased* value in the future under changing environmental and economic conditions.

Regardless of the cost test approach utilized, a discount rate should not put demand side resources at a disadvantage to supply side resources. When properly installed, conservation measures are a low-risk investment whose benefits are replicated year after year for the lifespan of the work performed. As decisions about the continuation of natural gas conservation efforts move forward, it is worth considering whether the current application of a discount rate to conservation measures should continue, or whether this strategy artificially masks the long term value of resource management efforts. For jurisdictions that are moving to make energy systems resilient in the face of accelerating climate change, setting the discount rate to zero (as in the USDOE Recovery Act Test) or to a negative value would be a meaningful way to provide state or provincial leverage to cost test outcomes

Conclusions

As natural gas cost projections continue to fluctuate, a meaningful dialogue has emerged regarding the future of natural gas conservation programs, and their value. This dialogue, and subsequent actions, has led to evolving cost-test methodologies and an ongoing reconfiguration of gas efficiency efforts. While on the surface, it seems intuitive to take long-standing conventional wisdom for granted, it is equally important to adapt to changing circumstances and new information in order to ensure that natural gas conservation is measured within a proper context. The Total Resource Cost test was designed to confer greater acceptance and legitimacy upon conservation programs. Yet, as recently noted in testimony in Washington Utility and Transportation Commission Docket UG-121207, the test was also a compromise, with limitations built into the design that inhibit market transformation and that do not view conservation as the equivalent to supply side resources (Peach, April 5, 2013). It is up to program administrators, evaluators, and regulators to explore the ultimate value and purpose of natural gas demand side management, and to continue moving forward with these critical programs.

As Barbose, Goldman, Hoffman and Billingsley recognize, "the pathway that customer-funded efficiency programs ultimately take will depend on a series of key challenges and uncertainties associated both with the broader market and policy context…" (Barbose et al. 2013). It is in the best interest of society that we ensure that utility operated gas conservation programs are understood, measured, and encouraged despite contextual uncertainty, and eliminating or adjusting program offerings on the basis of the TRC alone may ultimately undermine the intent and effectiveness of utility operated DSM efforts. Even altering the inputs of the Total Resource Cost Test or suspending cost test criteria altogether, seems unwieldy when a more straightforward solution already exists. The Program Administrator/ Utility Cost Test requires few, if any modifications to demonstrate the value of natural gas conservation. This means placing natural gas conservation in the correct context—as a utility demand side management program. Under this paradigm, utilities are able to continue robust conservation efforts and are empowered to mitigate lost opportunities for deeper energy savings. The UCT also acknowledges cooperation in which the utility does its part (as guided by the UCT test), the customer contributes leverage as a free citizen and rational actor that is not subject to a test, and the government can contribute a zero (as in the USDOE Recovery Act Test) or negative discount rate for resiliency leverage. This allows the natural gas utility to be a continuing valuable player in an overall cooperative effort, and to cooperatively ensure continued optimization and evolution of our precious energy resources well into the future.

References

51st Legislature – State of New Mexico – First Session, (2013). *House business and industry committee substitute for house bill 267.* Retrieved from website; http://www.nmlegis.gov/Sessions/13 Regular/bills/house/HB0267BIS.pdf

Barbose, G., Goldman, C., Hoffman, I., & Billingsley, M. Ernest Orlando Lawerence Berkeley National Laboratory, Environmental Energy Technologies Division. (2013). *The future of utility customer-funded energy efficiency programs in the united states: Projected spending and savings to 2025*

California Public Utilities Commission, (2001). *California standard practice manual, economic analysis of demand-side programs and projects*

Cascade Natural Gas Corporation *2008 Integrated Resource Plan. Appendix H.* (2008). Cascade Natural Gas Corporation.

Cascade Natural Gas Corporation *2012 Integrated Resource Plan. Appendix H.* (2012). Cascade Natural Gas Corporation.

Daykin, E., Aiona, J., & Hedman, B. Picking a Standard: Implications of Differing TRC Requirements. *The Cadmus Group*. (2012).

Dial, L., Northwest Energy Coalition, Submitted as part of Washington Utilities and Transportation Commission DOCKET NO. UG-121207. (2013). *Response to commission investigation into natural gas conservation programs.*

Electric Power Research Institute, (2011). *Consumer engagement: Facts, myths and motivations, grid strategy 2011, consumer engagement*

Energy Trust of Oregon, Submitted as part of Public Utility Commission of Oregon Docket UM-1622 (2012). *Filing for energy trust proposal for cost-effectiveness exceptions- additional programs*

Groom, B., Hepburn, C., Koundouri, P., & Pearce, D. (2005). Declining Discount Rates: The Long and the Short of It. *Environmental & Resource Economics, 32*, 445-493.

Haeri, H. & Khawaja, S. (2013, July). Valuing energy efficiency. The search for a better yardstick. *Public Utilities Fortnightly,* Retrieved from http://www.fortnightly.com/fortnightly/2013/07/valuing-energy-efficiency

Howarth, R. B., & Sanstad, A. H. (1995). Discount rates and energy efficiency. *Contemporary Economic Policy, 13*(3)

Lazar, J., & Colburn, K. Recognizing the Full Value of Energy Efficiency (What's Under the Feel-Good Frosting of the World's Most Valuable Layer Cake of Benefits). *Regulatory Assistance Project.*

LeBaron, R. National Home Performance Council, (2011). Getting to fair cost-effectiveness testing, using the PAC test, best practices for the TRC test, and beyond

Molina, M. American Council for an Energy-Efficient Economy, U1402, (2014) The best value for America's energy dollar: a national review of the cost of utility energy efficiency program.

Neme, C., & Kushler, M. (2010). *Is it time to ditch the TRC? Examining concerns with current practice in benefit-cost analysis.* ACEEE summer study on energy efficiency in buildings.

Nielsen. (2009). Energy trends, highlights on consumer energy usage.

Peach, H. Gil, H. Gil Peach and Associates, Submitted as part of Washington Utilities and Transportation Commission DOCKET NO. UG-121207. (2013). *Reasons why the utility cost test is preferable to the total resource cost test and a note on the special case of low income programs*

Peacock, B. U.S. Department of the Interior, (1995). *The appropriate discount rate of social policy analysis: Discussion and estimation*

Public Utility Commission of Oregon, (1994). *Docket um 551 investigation-conservation*. Retrieved from website: http://apps.puc.state.or.us/edockets/docket.asp?DocketID=4744

Rocky Mountain Power, Utah Demand Side Management Advisory Group. (n.d.). *Utah demand side management and other resources: benefit and cost analysis, guidelines and recommendations*

Washington Utilities and Transportation Commission, Submitted as part of Washington Utilities and Transportation Commission DOCKET NO. UG-121207. (2013). *Policy statement on the evaluation of the cost-effectiveness of natural gas conservation programs*

Woolf, T., Neme, C., Stanton, P., LeBaron, R., Saul-Rinaldi, K., & Cowell, S. The Resource Value Framework: Reforming Energy Efficiency Cost-Effectiveness Screening. (2014). *Home Performance Coalition: The National Efficiency Screening Project.*