Discount Rates and Adders for Benefit-Cost Tests

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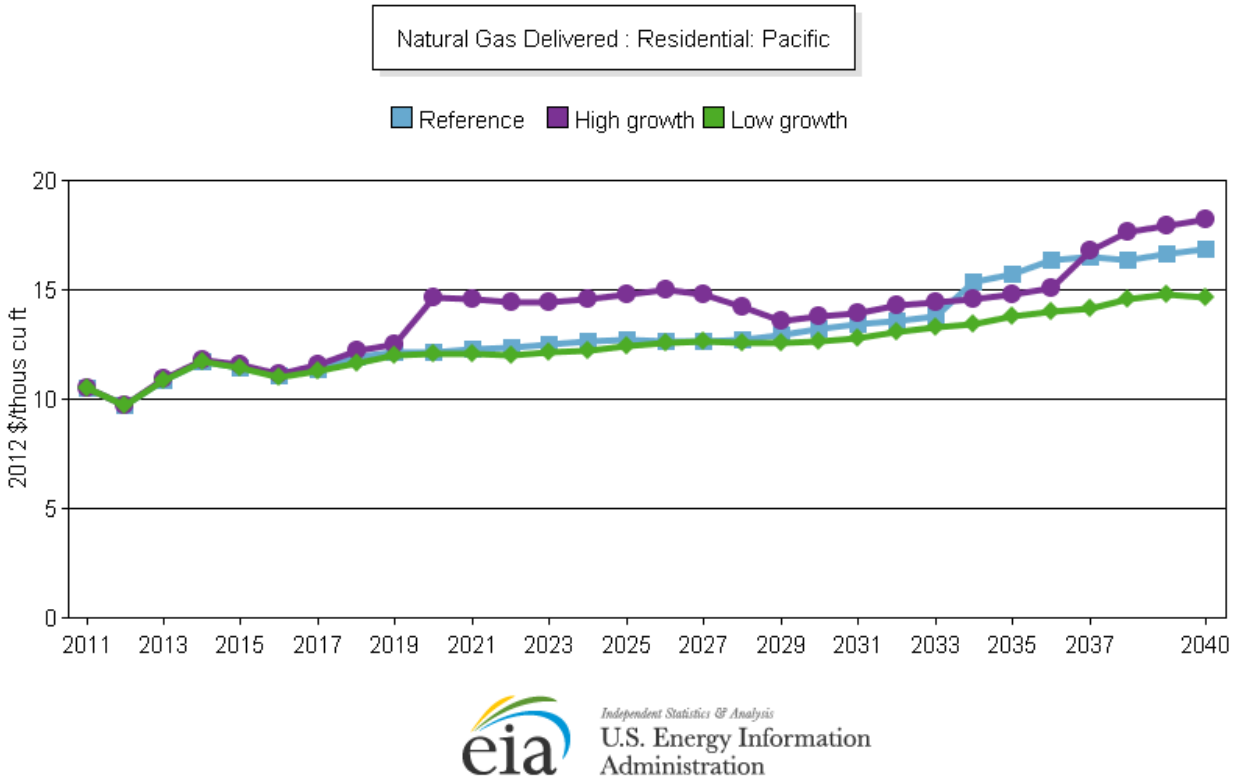
(1) It is likely that the price of commodity gas has passed is bottom point and the trend for residential gas price is now upwards:



This EIA projection likely does not realistically operationalize the effects of climate change on energy costs. The illusion of normality where the future is a simple extension of the past will likely be maintainable for about 20 years (2044). After 2050 it is likely no one will believe that anymore. But in the period covered by the graph food and fuel prices will rise due to climate effects, not simply due to resource shortages but to the interaction of climate effects and

resource limits. So, having passed the low point in price, this is a good time to keep programs in place and to strengthen them. This factor should be taken into account.

(2) The federal (USDOE) evaluations of low-income Weatherization Assistance and the ARRA Weatherization Assistance programs will be out next year. I am on the federal peer review committee with Phil Degens and others, and our review is now complete. It will likely take another six to eight months before the evaluation report series is released. We had to sign a confidentiality agreement so cannot discuss specifics but some of the work included on Non Energy Benefits moves quantification forward quite a bit with new work, particularly in the overlap with Healthy Homes initiatives. Also the programs are nicely cost-effective overall. In part this is due to the use of OMB guidance on discount rate for regulatory programs. This discount rate ranges from about -2% to +2% depending on average measure life. So, since this new work has been completed, this would be a good time to keep low-income and other residential programs in place and to strengthen them. This new work should be taken into account.

(3) The new National Standard Practice Manual will likely come out next year. The framework, *though neutral,* will be much more flexible that of the California Standard Practice Manual and public interest will be a key theme. A preliminary document from the National Efficiency Screening Project (NESP) is shown on pages 3-4. Note that it begins not from an imaginary adjustment for DSM conserved energy to acquisition of a new power plant but from the doctrine of public interest and other goals that exist to charter the work of public utility commissions and state agencies. So, since this new manual will come out in the next year or so, this would be a good time to keep programs in place and to strengthen them. It would be reasonable to look to articulate public interest and higher policy goals now, but, at the same time, wait to make changes once we have the new National Standard Practice Manual.

(4) Discount rates to use in benefit cost testing: One of the things I have become increasingly uneasy about over the years is the use of the weighted average capital cost (WACC) or the WACOG as the discount rate for DSM programs. This is used for purpose of making DSM seem to be reviewed on a comparable basis as construction of new power plants. The WACC is appropriate for plant construction or major capital projects because these projects require that funding be raised through markets. However, DSM funding is not raised through markets. DSM funding is derived from an administrative act that creates a rate rider that feeds a balancing account. So, the funds are neither borrowed at interest nor are they raised, for example, through a conservation bond. If we do a material analysis of the steps and examine each step in the provision of DSM funding there is no actual empirical discount rate involved. The use of a discount rate for DSM is an act of imagination with the intent of making DSM seem like a capital project. But DSM is not a capital project. Especially when DSM is accomplished through the Energy Trust, the illusion of a capital project does not hold up. DSM is an expense, not a capital project. This was an early error in the California Standard Practice Manual with a good intent. But we have to put physics above economics. So, if there is no discount rate involved in the raising of DSM funding, it is inappropriate to insert one.

(5) While some type of benefit cost test is necessary in order to optimize DSM programs and to choose among programs to provide the best return, the programs are both *social* and

The National Efficiency Screening Project (NESP)

The National Efficiency Screening Project (NESP) is a group of organizations and individuals that are working together to improve the way that utility customer-funded electricity and natural gas energy efficiency resources are screened for cost-effectiveness. The purpose of this project is to improve efficiency screening practices throughout the United States, and to help inform decision-makers regarding which efficiency resources are in the public interest and what level of investment is appropriate. The Project is coordinated by the National Home Performance Council, Inc., a division of the Home Performance Coalition.

Organizations interested in reforming cost-effectiveness testing are encouraged to join NESP. Information about NESP and how to join it can be found at: http://www.nhpci.org/campaigns.html.

The Resource Value Framework (RVF)

The NESP recommends that each state use the Resource Value Framework (RVF) for developing and implementing efficiency screening tests. The Resource Value Framework is a framework of principles and recommendations to provide guidance for states to develop and implement tests that are consistent with sound principles and best practices. It is intentionally designed to provide each state with the flexibility to ensure that the test they use meets their state's distinct needs and interests, as provided in relevant energy policies and regulatory orders.

The RVF advocates that in designing an energy efficiency screening test, each state should adhere to the following principles:

- **The Public Interest.** The ultimate objective of efficiency screening is to determine whether a particular energy efficiency resource is in the public interest.
- **Energy Policy Goals.** Efficiency screening practices should account for the energy policy goals of each state, as articulated in legislation, commission orders, regulations, guidelines and other policy directives. These policy goals provide guidance with regard to which efficiency programs are in the public interest.
- **Symmetry.** Efficiency screening practices should ensure that tests are applied symmetrically, where both relevant costs and relevant benefits are included in the screening analysis. For example, a state that chooses to include participant costs in its screening test should also include participant benefits, including low-income and other participant non-energy benefits, otherwise the test will be skewed against energy efficiency resources.
- **Hard-to-Quantify Benefits.** Efficiency screening practices should not exclude relevant benefits on the grounds that they are difficult to quantify and monetize. Several methods are available to approximate the magnitude of relevant benefits, as described below.
- **Transparency.** Efficiency program administrators should use a standard template to explicitly identify their state's energy policy goals and to document their assumptions and methodologies.
- **Applicability.** In general, the Resource Value Framework can be used by regulators in any state to determine if customer-funded energy efficiency resources are cost-effective. The RVF may also be applicable for evaluating the costs and benefits of other demand-side and supply-side resources, although application in this context has not yet been fully examined.

A copy of the RVF recommendations can be downloaded at: http://www.nhpci.org/publications/NHPC_NESP-Recommendations_20140816.pdf.

The National Efficiency Screening Project is generously funded by the MacArthur Foundation and the Energy Foundation.

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NATIONAL EFFICIENCY SCREENING PROJECT

NESP MEMBERS

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Building Performance Contractors Association

Building Performance Institute

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PECI

Performance Systems Development

Retrofit Software

Sealed

Sierra Club

Southeast Energy Efficiency Alliance

Southern Environmental Law Center

Southwest Energy Efficiency Project

Truveon Corporation

Wisconsin Energy Center

The National Efficiency Screening Project is coordinated by the National Home Performance Council.

To contact NESP, email robin.lebaron@nhpci.org.

Resource Value Framework - Template

Program Name:		Date:	
1. Key Assumptions, Parameters and Summary of Results			
Analysis Level	☐ Program		
	☐ Portfolio		
Measure Life		Discount Rate	
Projected Annual Savings		Projected Lifetime Utility Savings	
2. Monetized Utility Costs		**Monetized Utility Benefits**	
Program Administration		Avoided Energy Costs	
Incentives Paid to Participants		Avoided Capacity Costs	
Shareholder Incentive		Avoided T&D Costs	
Evaluation		Wholesale Market Price Suppression	
Other Utility Costs		Avoided Environmental Compliance Costs	
		Other Utility System Benefits	
NPV Total Utility Costs		NPV Total Utility Benefits	
3. Monetized Participant Costs		**Monetized Participant Benefits**	
Participant Contribution		Participants' Savings of Other Fuels	
Participant's Increased O&M Costs		Participant Non-Energy Benefits:	
Other Participant Costs		Participants' Water and Sewer Savings	
		Participants' Reduced O&M Costs	
		Participants' Health Impacts	
		Participant Employee Productivity	
		Participant Comfort	
		Additional Low-Income Participant Benefits	
		Other Participant Non-Energy Benefits	
NPV Total Participant Cost		NPV Total Participant Benefits	
4. Monetized Public Costs		**Monetized Public Benefits**	
Public Costs		Public Benefits of Low Income Programs	
		Reduced Environmental Impacts (if monetized)	
		Public Fuel and Water Savings	
		Reduced Public Health Care Costs	
		Other Public Benefits	
NPV Total Public Cost		NPV Total Public Benefits	
Total Monetized Costs and Benefits			
Total Costs		**Total Benefits**	
Benefit-Cost Ratio		**Net Benefits**	

5. Non-Monetized Public Costs and Benefits	
Non-Monetized Benefits	Comments
Promotion of Customer Equity	
Reduced Risk	
Increased Reliability	
Reduced Environmental Impacts (if not monetized)	
Increased Jobs and Economic Development	

6. Determination:	
☐ Program is in the Public Interest	☐ Program is not in the Public Interest

The National Efficiency Screening Project is generously funded by the MacArthur Foundation and the Energy Foundation.

intergenerational. Just as spending for medical and other programs report in units of meaningful output (days without relapse, etc.), DSM programs should primarily report in terms or energy units produced. In the climate approach, in contrast to earlier DSM cost-testing, policy goals for energy efficiency must be set to accomplish goals by specific dates. *This necessarily means that the future is not discounted – it is either counted as equal to the present or, preferably, counted as more important than the present.* At the same time, the appropriate primary cost test shifts to a combination of the Administrator's Cost Test (PAC Test) and the BTU/dollar test. The non-discounted BTU/dollar test was used by USDOE for the ARRA weatherization work.

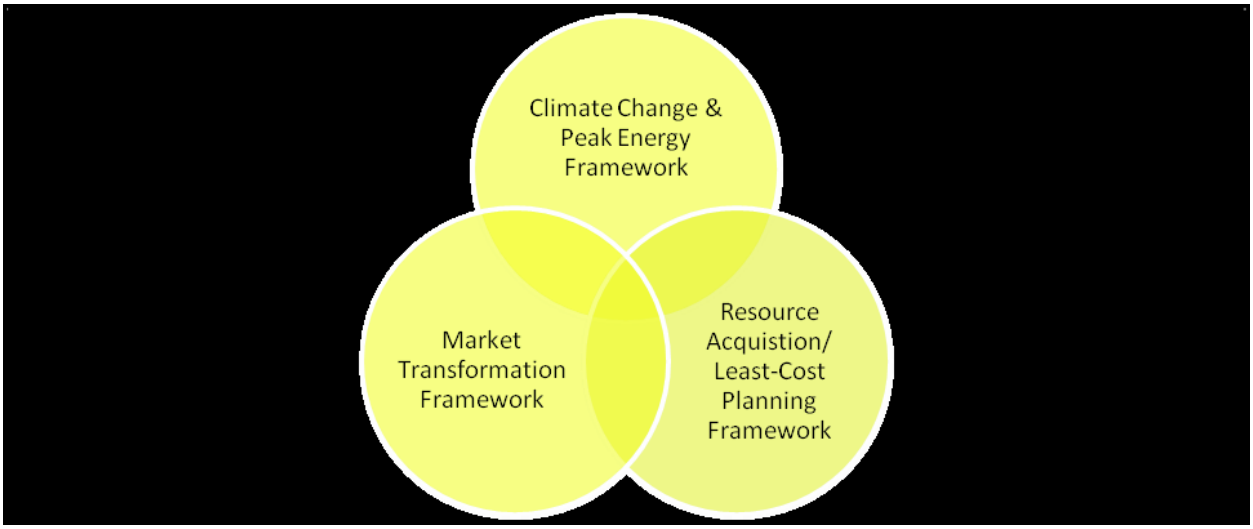

Figure 1: Three perspectives on benefit cost testing.

In addition, it will be necessary to include within the program authorization procedure a review by a small team of engineers and DSM policy people. In itself, the Program Administrator's Cost Test frees the field for climate change programs by explicitly treating cost sharing as leverage. The BTU/Dollar test does not discount energy so it makes it possible to fund an incentive for a Passivehaus designed to last 150 years and to compare possible projects using their actual energy streams (1 year for one, 17 for another, and 150 for another). Note that by not discounting the future, the value of conserved energy does not go to zero at approximately 17 years as an artifact of the cost-testing method. A non-discounted method, or preferably a negatively discounted method is necessary from a climate adaptation perspective. This approach places the public interest as the top level policy goal and views climate change adaptation as the primary problem of this century. From a climate perspective a combination of the BTU/dollar test (non-discounted or negatively discounted) is preferable.

(6) Note that adders can be attached to the PAC test, the TRC test or other tests. This is due to the public interest override.

(7) Although most states prefer the TRC test or the PAC test, though they have the same names, these tests vary considerably by jurisdiction. Note the variation in discount rates among jurisdictions and the use of a public discount rate in Massachusetts, the state highest in the

recent ACEEE ranking of DSM accomplishment by state. These variations show the possibility of using a public discount rate.

State	Cost-Effectiveness Screen	Discount Rate (nominal)*	Data Year	Non-Energy Benefits	Source
Massachusetts	TRC	2.35%	2013	RGGI Price for CO2	Department of Telecommunications and Energy, order D.T.E. 98-100, 2000.
Minnesota	SCT, primary; PCT, PAC, secondary	3.22%	2011		2011 Xcel Annual DSM Report
Wisconsin	Modified TRC	4.00%	2010	Carbon: $30 / ton	Quadrennial Planning Process; 5-GF-191
Maine	SCT	4.22%	2010	No value assigned to these at this time.	Efficiency Maine Trust, Triennial Plan 2011-2013, March 2010.
Iowa	SCT, primary; TRC, RIM, PAC, PCT, secondary	4.81% (SCT)	2012	10% adder for electric, 7.5% adder for gas.	MidAmerican 2012 Annual Report; IAC 199—35.8(2)

Figure 2/Source: Abstracted from Table 1, "Cost Effectiveness Variations," Nickerman, Luke & Richard Aslin, Pacific Gas & Electric, **C***ost-Effectiveness Adjustments: How Effective Have States Been At Recreating the PAC?* ACEEE 2014 Summer Study on Energy Efficiency in Buildings, August 2014. Pp. 8-302 to 8-313.

As has been noted by Tm Woolf of Synapse in a recent NARUC presentation: "Utilities that recover efficiency investments through system benefit charges or balancing accounts do not have to raise capital to invest in efficiency, and thus experience little financial risk. **Therefore, states should use a low-risk discount rate when applying the TRC test or the PAC test."**

(8) OMB Guidance in the area of discount rate (for federal programs) is suggestive. OMB Guidance indicates the use of the actual long-term borrowing cost (if money is, in fact, borrowed):

1) OMB Circular A-94 is the Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs. You can find it at: http://www.whitehouse.gov/omb/circulars_a094/ See Section 8. Discount Rate Policy.

2) OMB Circular A-4 can be found at: http://www.whitehouse.gov/omb/circulars_a004_a-4/
The discount rate discussion starts at (search for): "Discount Rates"

The references to the 3% and 7% values begin just below that:

For "public benefit" programs, OMB guidance to federal agencies is to use 7%, but, if the program is classed as "regulatory" instead of "public benefit" *agencies are to use the federal long-term discount rate of 3%.* The classification into regulatory is not clear but seems to be related to multiple purposes for a program (for example energy saving plus NEBS) and may also have to do with decision by a regulatory agency. The seven percent is analogous, for our purposes to the weighted average cost of capital for a utility (WACC). The three percent is the actual long-term borrowing cost of the federal government based on past records. We could make a similar argument for utility programs, as has been done for natural gas DSM programs in Washington State.

Also, for comparing programs to programs (analogous to what we do for a potential study), there is an appendix that permits using current projected rates based on life of program. Some of these real discount rates are negative and most are about one-percent or a little more. According to Appendix C of OMB Circular A-94:

Circular A-94 Appendix C
Revised December 2013

OMB Circular No. A-94
Click here for PDF assistance <image001.gif>
DISCOUNT RATES FOR COST-EFFECTIVENESS, LEASE PURCHASE, AND RELATED ANALYSES

Effective Dates. This appendix is updated annually. This version of the appendix is valid for calendar year 2014. A copy of the updated appendix can be obtained in electronic form through the OMB home page at http://www.whitehouse.gov/omb/circulars_a094/a94_appx-c/. The text of the main body of the Circular is found athttp://whitehouse.gov/omb/circulars_a094/, and a table of past years' rates is located at http://whitehouse.gov/sites/default/files/omb/assets/a94/dischist-2014.pdf. Updates of the appendix are also available upon request from OMB's Office of Economic Policy (202-395-3316).

Nominal Discount Rates. A forecast of nominal or market interest rates for calendar year 2014 based on the economic assumptions for the 2015 Budget is presented below. These nominal rates are to be used for discounting nominal flows, which are often encountered in lease-purchase analysis.

Nominal Interest Rates on Treasury Notes and Bonds of Specified Maturities (in percent)

3-Year	5-Year	7-Year	10-Year	20-Year	30-Year
1.0	1.9	2.5	3.0	3.6	3.9

Real Discount Rates. A forecast of real interest rates from which the inflation premium has been removed and based on the economic assumptions from the 2015 Budget is presented below. These real rates are to be used for discounting constant-dollar flows, as is often required in cost-effectiveness analysis.

Real Interest Rates on Treasury Notes and Bonds of Specified Maturities (in percent)

3-Year	5-Year	7-Year	10-Year	20-Year	30-Year
-0.7	0.0	0.5	1.0	1.6	1.9

Analyses of programs with terms different from those presented above may use a linear interpolation. For example, a four-year project can be evaluated with a rate equal to the average of the three-year and five-year rates. Programs with durations longer than 30 years may use the 30-year interest rate.

So, OMB Guidance provides an interesting perspective..