Regulatory Policies to Support Energy Efficiency in Virginia

A Discussion of Issues for the 2014 Virginia Energy Efficiency Workshop

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CONTENTS

1. INTRODUCTION AND SUMMARY 1

2. RATEPAYER-FUNDED EFFICIENCY PROGRAMS 3
   - 2.1. The Benefits of Energy Efficiency 3
   - 2.2. Rationale for Ratepayer-Funded Energy Efficiency Programs 4

3. ENERGY EFFICIENCY COST-EFFECTIVENESS 6
   - 3.1. Background on the Standard Energy Efficiency Screening Tests 6
   - 3.2. Limitations of Current Practices 7
   - 3.3. The Resource Value Framework 8
   - 3.4. Virginia's Energy Policy Goals 9
   - 3.5. Avoided Costs 10
   - 3.6. Discount Rate and Risk 11

4. UNDERSTANDING THE RATE IMPACTS OF ENERGY EFFICIENCY 14
   - 4.1. Limitations of the Rate Impact Measure Test 14
   - 4.2. Better Options for Assessing Rate Impacts 16
   - 4.3. Example Rate Impact Estimates 17

5. ENERGY EFFICIENCY PERFORMANCE STANDARDS 22

6. EVALUATION, MEASUREMENT AND VERIFICATION 25

REFERENCES 27

APPENDIX A – RELEVANT VIRGINIA STATUTES 30

1. Introduction and Summary

For over 25 years, utility-funded energy efficiency programs have proven to be a widely available resource for meeting customer demand at low cost. We now have a wealth of experience demonstrating that energy efficiency programs cost a fraction of what it costs to generate, transmit, and distribute electricity, and provide a variety of benefits in terms of lower bills, reduced system risk, increased system reliability, reduced environmental impacts, and more.

However, enormous reservoirs of low-cost efficiency resources remain untapped in many states, primarily because conventional regulatory practices tend to understate the value and the full potential of energy efficiency. This paper describes several regulatory policies and practices that can help provide a better picture of the full value of energy efficiency opportunities, particularly for Virginia. Virginia's very modest DSM programs and older building stock rank it as one of the top southeastern states for energy efficiency resource opportunities.

The purpose of this paper is to provide some background material to discuss at the 2014 Virginia Energy Efficiency Workshop. In the sections below we make the following findings and recommendations:

Enormous reservoirs of low-cost efficiency resources remain untapped in many states, primarily because conventional regulatory practices tend to understate the value and the full potential of energy efficiency.

- Energy efficiency resources can significantly reduce electricity costs and customers' bills. They also offer a variety of additional benefits to utilities, their customers, and society in general.
- Ratepayer-funded energy efficiency programs are necessary to overcome the market barriers to customers who might otherwise adopt cost-effective efficiency measures.
- In recent years it has become apparent that there are several problems with the application of the California Standard Practice Manual efficiency screening tests. Combined, these problems lead to a significant undervaluation of the benefits available from energy efficiency resources.
- The Rate Impact Measure test does not provide regulators and other stakeholders with information necessary to assess rate impacts or the distributional equity issues that go along with them. Different analyses should be used to assess the rate impacts of energy efficiency programs. A thorough understanding of the implications of energy efficiency rate impacts requires analysis of three important factors: rate impacts, bill impacts, and participation impacts.
- Energy efficiency programs will exert downward pressure on rates by avoiding generation, transmission, and distribution investments, and by reducing energy costs at the margin. This helps to offset the upward pressure on rates due to the recovery of program costs, and the recovery of lost revenues from reduced sales.

- An analysis of the energy efficiency programs included in Dominion's 2014 Integrated Resource Plan indicates that the average, long-term rate impacts of those programs is likely to be very small—on the order of 0.1 percent increase in rates over the life of the programs and their associated savings. Increasing the Dominion energy efficiency programs by roughly a factor of two would lead to a slightly higher (but still very low) increase in the average long-term rate impact—on the order of 0.4 percent.

- The discount rate used for energy efficiency screening should not be based on a utility's weighted average cost of capital, but should instead be based on a time preference relevant to all utility customers as a whole.

- Utilities cannot be expected to implement successful, cost-effective efficiency programs unless they have the proper regulatory support and financial incentives to do so. Ideally, energy efficiency performance standards can be designed in such a way that any additional costs to customers due to the standards is more than offset by the additional efficiency savings and benefits generated by the improved utility performance.

- Proper EM&V practices serve as an important foundation to support all energy efficiency regulatory policies and utility practices.

2. RATEPAYER-FUNDED EFFICIENCY PROGRAMS

2.1. The Benefits of Energy Efficiency

The cost of energy efficiency measures is typically significantly less than the cost of generating, transmitting, and distributing electricity. Thus, energy efficiency programs offer a huge potential for lowering system-wide electricity costs and reducing customers' electricity bills.

In addition to lowering electricity costs and customers' bills, energy efficiency offers a variety of benefits to utilities, their customers, and society in general:

- Energy efficiency helps reduce several important risks, including: (a) the financial risks associated with fossil fuels, such as their inherently unstable price and supply characteristics; (b) the financial risks associated with the construction of generating and transmission plants, especially large, long lead time plants; and (c) the planning risk inherent in load forecasting.
- Energy efficiency can improve the overall reliability of the electricity system. First, efficiency programs can substantially reduce peak demand, which is when reliability is most at risk. Second, by slowing the rate of growth of electricity peak and energy demands, energy efficiency can provide utilities and generation companies more time and flexibility to respond to changing market conditions, while moderating the "boom-and-bust" effect of competitive market forces on generation supply.
- Energy efficiency helps reduce the costs of complying with current and future environmental regulations, including future CO_2 requirements.
- Energy efficiency can substantially reduce localized peak demands, and thereby help reduce the stress on local transmission and distribution systems, potentially deferring expensive T&D upgrades or mitigating local transmission congestion problems.

In addition to lowering electricity costs and customers' bills, energy efficiency offers a variety of benefits to utilities, their customers, and society in general.

- Energy efficiency can result in significant benefits to the environment. Every kilowatt-hour saved through efficiency results in less electricity generation and, thus, less pollution. Energy efficiency can also reduce the environmental impacts associated with power plant or transmission line siting.
- Energy efficiency can promote local economic development and job creation by increasing the disposable income of citizens and making businesses and industries more competitive.
- Energy efficiency can help a utility, state, and region increase its energy independence and security by reducing the amount of fuels (coal, gas, oil, nuclear) and electricity that are imported from other regions or even from other countries that may be politically unstable.
- Energy efficiency can provide additional non-energy benefits for low-income customers as well as the public service organizations and utilities that serve them, including, but not limited to, reductions in service terminations, reductions in bad debt, reductions in safety-related emergencies, and reduced stress on public assistance of all kinds, including Medicare.

- Energy efficiency can provide a variety of non-energy benefits for all participants, including, but not limited to, improved comfort, improved health and safety, water savings, noise reduction, lower maintenance costs, increased property durability, and increased property value.
- Energy efficiency can provide additional non-energy benefits for landlords, including, but not limited to, increased marketability of rental units, reduced tenant complaints, and increased rental unit value.
- Energy efficiency in public buildings (schools, hospitals, government buildings) can help reduce the tax burden on all customers by reducing government's annual operating costs.

2.2. Rationale for Ratepayer-Funded Energy Efficiency Programs

It is sometimes argued that fully functional markets cause the economically efficient amount of a good to be delivered to consumers without intervention, and in the most cost-effective manner. If energy efficiency is so plentiful and cost-effective, why should utilities use ratepayer funds to implement energy efficiency programs? In particular, why not rely on market forces to deliver energy efficiency services?

The reason lies in the fact that many market barriers exist that hinder electricity customers from adopting energy efficiency measures on their own. That is, the markets for energy *and* for energy efficiency goods and services are imperfect, meaning that the markets fail to produce the efficient outcome. Examples of ways in which markets for energy efficiency services are imperfect include:

If energy efficiency is so plentiful and cost-effective, why should utilities use ratepayer funds to implement energy efficiency programs?

- Imperfect information. Electricity customers do not often consider energy efficiency measures as an alternative to electricity generation. Customers, businesses, industries, and contractors are often not aware of the full range of energy efficiency options, or lack information on the economic, productivity, and environmental benefits of those efficiency measures.
- Limited product availability. Many energy efficiency measures are produced and distributed on a limited scale and are not readily available to customers, builders, contractors, or industries.
- Lack of capital access. Customers, businesses, and industries may lack the up-front capital for an energy efficiency product. This is particularly true for low-income customers.
- High transaction costs. An investment of time, money, and hassle may be required to obtain information, make an informed purchase, and install energy efficiency measures. This is a particular problem when construction, renovation, or equipment replacement situations require that decisions be made and products obtained quickly.
- Improper price signals. Electricity prices typically do not reflect the actual cost of energy and capacity for the relevant location, hour, or day. Consequently, most customers do not have the proper price signals to avoid system capacity, energy, transmission, and distribution costs.
- Split incentives. The financial interests of those in a position to implement energy efficiency measures are often not aligned with the interests of those who would benefit from such measures. For example, landlords make capital purchases and maintain buildings, while tenants frequently pay the energy bills. Similarly, at the time of new construction the builder has

incentive to minimize short-term costs, while it is the new owner who would benefit from lower electricity bills over the long term.

- Purchasing procedures and habits. Many buildings are constructed, products purchased, and facilities renovated on the basis of minimizing short-term costs, not on minimizing long-term lifecycle costs, including electricity costs.
- Bounded rationality. For many customers, electricity costs represent a small portion of the total costs of maintaining a home, running a business, or operating a factory, so little or no attention is paid to opportunities to reduce these costs.
- Positive externalities. The societal benefits of energy efficiency—particularly the environmental and economic development benefits—are often not considered by customers and producers seeking to minimize their own costs.
- Institutional and regulatory barriers. Rate-of-return regulation rewards electric utilities for increased sales and penalizes them for improvements in end-use energy efficiency. Hence, utilities that could be an influential promoter of energy efficiency instead have powerful financial incentives to oppose it. This point holds true both under traditional regulation and under electricity restructuring.
- Uncertainty and risk avoidance. Customers may be skeptical of potential energy efficiency savings, may have doubts about whether an unfamiliar energy efficiency measure will work properly, or may find the more efficient technology to be less attractive or effective than the existing, less efficient technology.

As a consequence: (a) there is an enormous amount of untapped, cost-effective energy efficiency potential in every jurisdiction; (b) ratepayer-funded energy efficiency programs are necessary to overcome the market barriers that inhibit customers from adopting cost-effective efficiency measures; and (c) energy efficiency programs should be explicitly designed to overcome these barriers.

Ratepayer-funded energy efficiency programs are necessary to overcome the market barriers that inhibit customers from adopting cost-effective efficiency measures.

Regulatory support of ratepayer-funded energy efficiency programs is necessary even where retail electricity markets have been opened to competition. The market barriers and market failures described above apply just as much in a competitive electricity market as in a regulated market.

3. ENERGY EFFICIENCY COST-EFFECTIVENESS

3.1. Background on the Standard Energy Efficiency Screening Tests

Five standard cost-effectiveness tests have been developed to consider energy efficiency costs and benefits from different perspectives. Each of these tests combines the various costs and benefits of energy efficiency programs in different ways, depending upon whose perspective is of interest. These tests are summarized in Table 1.

The standard tests presented in Table 1 are originally based on the California Standard Practice Manual (CA PUC 2001). Note that these tests are sometimes defined slightly differently in different states, and that some parties have different views regarding exactly which costs and benefits should be included in each test.

Table 1. Components of the Standard Energy Efficiency Cost Tests

	Participant Test	RIM Test	Utility Test	TRC Test	Societal Test
Energy Efficiency Program Benefits:					
Customer Bill Savings	Yes	---	---	---	---
Avoided Energy Costs	---	Yes	Yes	Yes	Yes
Avoided Capacity Costs	---	Yes	Yes	Yes	Yes
Avoided Transmission and Distribution Costs	---	Yes	Yes	Yes	Yes
Wholesale Market Price Suppression Effects	---	Yes	Yes	Yes	Yes
Avoided Cost of Environmental Compliance	---	Yes	Yes	Yes	Yes
Non-Energy Benefits (utility perspective)	---	Yes	Yes	Yes	Yes
Non-Energy Benefits (participant perspective)	Yes	---	---	Yes	Yes
Non-Energy Benefits (societal perspective)	---	---	---	---	Yes
Energy Efficiency Program Costs:					
Program Administrator Costs	---	Yes	Yes	Yes	Yes
EE Measure Cost: Program Financial Incentive	---	Yes	Yes	Yes	Yes
EE Measure Cost: Participant Contribution	Yes	---	---	Yes	Yes
Non-Energy Costs (utility, participant, societal)	---	Yes	Yes	Yes	Yes
Lost Revenues to the Utility	---	Yes	---	---	---

Each screening test provides different information to be used for different purposes. Table 2 summarizes the implications of each test: the key question answered, the costs and benefits included, and what the results of the test indicate.

Table 2. Implications of the Standard Energy Efficiency Cost-Effectiveness Tests

Test	Key Question Answered	Costs and Benefits Included	Implications
Societal Cost Test	Will there be a net reduction in societal costs?	Costs and benefits experienced by all members of society.	Most comprehensive. Best able to account for all energy policy goals.
Total Resource Cost Test	Will there be a net reduction in costs to all customers?	Costs and benefits experienced by all utility customers, including program participants and non-participants.	Indicates the full incremental costs of the resource. Generally includes full societal costs but not full societal benefits.
Utility Cost Test	Will there be a net reduction in utility system costs?	Costs and benefits to the utility system as a whole, including generation, transmission, and distribution impacts.	Indicates the impact on average customer bills.
Participant Cost Test	Will there be a net reduction in program participant costs?	Costs and benefits experienced by the customer who participates in the program.	Of limited use for cost-effectiveness screening. Useful in program design to understand and improve participation.
Rate Impact Measure	Will there be a net reduction in utility rates?	Costs and benefits that will affect utility rates, including utility system impacts plus lost revenues.	Should not be used for cost-effectiveness screening. Does not provide useful information regarding rate impacts or customer equity impacts.

3.2. Limitations of Current Practices

Despite widespread use of the CA SPM, there has been considerable debate for many years about the proper way to define the cost-effectiveness of utility-funded energy efficiency programs. Most states use the Total Resource Cost test, some states use the Utility Cost Test, some states use the Societal Cost Test, and two states use the Rate Impact Measure test. However, each state applies these tests differently, resulting in very different screening practices across the states.

Furthermore, several problems with current efficiency screening practices have become apparent in recent years. In particular:

- Many states apply the standard screening tests without consideration of their own energy policy goals. This often results in understating some of the key benefits of energy efficiency programs.
- Many states apply the TRC test in a way that is internally inconsistent. This test includes all of the participant costs of an efficiency measure by design. In order to be internally consistent, the test should include all participant benefits, including non-energy benefits. Most states using the TRC test ignore or significantly understate non-energy benefits, leading to results that are inherently skewed against energy efficiency.

Several problems with current efficiency screening practices have become apparent in recent years.

- Many states are reluctant to account for energy efficiency benefits that are uncertain or difficult to quantify. Since efficiency costs are easy to quantify and many efficiency benefits are difficult to quantify, this reluctance often leads to either understating some of the benefits of efficiency programs or not valuing them at all.

- Ultimately, the five screening tests defined in the CA SPM do not address the one perspective that is most important when deciding whether to approve energy efficiency programs: the public interest perspective.

3.3. The Resource Value Framework

These problems with efficiency screening practices led to the development of the National Efficiency Screening Project (NESP). The NESP is a group of organizations and individuals that are working together to improve the way that electricity and natural gas energy efficiency resources are screened for cost-effectiveness. The purpose of this initiative 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 RVF is not a new screening test; instead, it builds off of the existing screening tests.

NESP has developed a Resource Value Framework (RVF) as a way to address the efficiency screening problems identified above. The RVF is not a new screening test; instead, it builds off of the existing tests. The RVF is a set 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 defined by relevant energy policies and regulatory orders.

The RVF includes the following principles for screening energy efficiency resources.

- 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 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.

- 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. 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.

What does it mean to determine whether an efficiency resource is in the public interest? Utility regulators' primary responsibility is to serve and protect the public interest through oversight of the utility system. In practice, regulators frequently make determinations as to whether utility investments or actions are in the public interest. Such determinations typically require weighing many different factors and considerations, some of which involve tradeoffs (e.g., cost versus reliability) and some of which require consideration of impacts that are not quantified. In making such determinations, regulators consider those factors that are within the bounds of their authority. This same approach can, and should, be applied to screening energy efficiency resources.

Applying the principles outlined above, and properly recognizing the public interest perspective, would significantly improve the efficiency screening practices in many states. They would also make the screening practices, and the rationale behind them, more transparent than they are today. To further encourage transparency, the RVF recommends that a standard template be used to present the specific costs and benefits of each efficiency program, including an indication of how the difficult-to-quantify impacts are accounted for (NESP 2014).

3.4. Virginia's Energy Policy Goals

State energy policy goals can be articulated in several different ways, including legislation, regulations, commission guidelines, commission standards, commission orders, and other pronouncements from a commission or a relevant state agency. These can all provide guidance on the energy policy goals to account for in a cost-effectiveness framework.

There are at least two sections of Virginia law that are relevant to energy efficiency screening practices. First is the introduction to the legislation regarding the Virginia Energy Plans, including the sections on Legislative Findings, the Energy Objectives, and the Commonwealth Energy Policies. (These sections are presented in their entirety in Appendix A.) Some of the key elements that pertain to energy efficiency include: promoting cost-effective conservation of energy and fuel supplies; diversifying the portfolio of energy resources; and reducing the emissions of greenhouse gases from electricity generation (VA Title 67, Chapter 1, §§ 67-100, 67-101, 67-102).

Second is the section of Virginia law that pertains to the regulation of public utilities. The Definitions section includes the following definition:

> "In the public interest, for purposes of assessing energy efficiency programs, describes an energy efficiency program if, among other factors, the net present value of the benefits exceeds the net present value of the costs as determined by the Commission upon consideration of the following four tests: (i) the Total Resource Cost Test; (ii) the Utility Cost Test (also referred to as the Program Administrator Test); (iii) the Participant Test; and (iv) the Ratepayer Impact Measure Test. Such determination shall include an analysis of all four tests,

> and a program or portfolio of programs shall not be rejected based solely on the results of a single test. In addition, an energy efficiency program may be deemed to be "in the public interest" if the program provides measurable and verifiable energy savings to low-income customers or elderly customers." (VA Title 56, Chapter 23, §§ 56-576).

The language above clearly requires the consideration of all four standard screening tests, and the notion that no one test should be used to reject an efficiency program or portfolio. It also allows for some flexibility in the application of these tests in the case of programs serving low-income or elderly customers. At the same time, the statutory language regarding the Virginia Energy Plan clearly states that the utilities should seek to increase the efficiency of their utility systems, diversify their portfolio of energy resources, and reduce environmental impacts of electricity generation.

3.5. Avoided Costs

Energy efficiency programs can help reduce electricity system costs in several different ways. Each of these types of "avoided costs" should be included in the screening analysis and calculated correctly. Here we summarize some key points about these costs.

> Avoided energy costs are the costs associated with hourly electricity generation that can be avoided by energy efficiency. Avoided capacity costs are the costs associated with the financing and construction of new power plants that can be deferred or avoided by energy efficiency. Both of these types of costs should be based on long-term forecasts that properly capture the energy and capacity impacts of energy efficiency resources, account for the structure of the market in which the relevant utility operates, and capture differences between peak and off-peak periods. These are some of the most significant benefits of energy efficiency resources, and it is important that they be properly estimated using sound integrated resource planning practices.

> Avoided transmission and distribution costs include those costs associated with maintaining and upgrading existing T&D facilities, as well as constructing new T&D facilities, which can be avoided by energy efficiency. T&D costs that are at least partly a function of load growth and peak demand are potentially deferrable or avoidable by energy efficiency. Avoided distribution costs tend to be higher than avoided transmission costs, but avoided transmission costs are increasing significantly, particularly in regions of the country that are upgrading and expanding their transmission networks.

> Avoided costs of compliance with environmental regulations include all costs that utilities are expected to incur to comply with existing and reasonably anticipated local, state and federal environmental requirements. This includes compliance with the US Environmental Protection Agency's proposed Clean Power Plan under Section 111(d) of the Clean Air Act, as well as other EPA regulations pertaining to fossil-fired power plants. The costs of environmental compliance will eventually be passed on to ratepayers, and those that can be avoided should be included as part of the avoided costs of energy efficiency. These costs should be explicitly accounted for in all of the screening tests, expect for the Participant Cost Test.

Wholesale electricity market price suppression occurs when energy efficiency resources reduce wholesale energy and capacity prices. Because wholesale energy and capacity markets provide a single clearing price to all wholesale customers, the reductions in wholesale energy and capacity clearing prices are experienced by all customers of those markets. These reduced prices are a benefit that accrues to all electricity customers, regardless of whether they participate in energy efficiency programs.

Reduced transmission and distribution losses are the losses that are avoided by transmitting less power from the generator to the end-use customer as a result of efficiency savings. Because losses increase exponentially with load, marginal losses are substantially higher (50 percent higher is a reasonable rule of thumb) than average losses over the course of the year. Also, marginal peak losses are higher still (100 percent to 150 percent higher is a reasonable rule of thumb) (RAP 2011). Thus, program administrators should account for the marginal energy and marginal peak losses, as opposed to the average losses, when assessing the cost-effectiveness of efficiency programs.

Utility administration cost savings occur when utilities are able to reduce certain categories of financial and customer service costs through the use of energy efficiency resources. These include reduced arrearages, reduced carrying costs on arrearages (interest), reduced bad debt written off, and rate discounts. These benefits accrue to the utility through savings in staff time and materials. These benefits frequently result from low-income energy efficiency programs, but can result from programs that serve other types of customers as well.

For additional information on the best practices for accounting for avoided costs, see:

Regulatory Assistance Project 2012. *US Experience with Efficiency as a Transmission and Distribution System Resource*, prepared by Chris Neme and Rich Sedano, February 2012.

Regulatory Assistance Project 2013a. *Best Practices in Electric Utility Resource Planning: Examples of State Regulations and Recent Utility Plans*, prepared by Synapse Energy Economics, June 2013.

Regulatory Assistance Project 2013b. *Recognizing the Full Value of Energy Efficiency: What's under the Feel-Good Frosting of the World's Most Valuable Layer Cake of Benefits*.

3.6. Discount Rate and Risk

A state's choice of discount rate has important implications regarding the quantification of future benefits, which will significantly affect its cost-effectiveness test results. A relatively high discount rate used for cost-effectiveness screening significantly reduces the monetary value of avoided costs (i.e., benefits) in later years, implying relatively less value on future benefits. This raises the question: What value do regulators want to place on the future benefits of energy efficiency resource investments?

In its Integrated Resource Plan, Dominion uses a discount rate based upon its weighted average cost of capital, equal to 7.45 percent.[1] This is high relative to the discount rates used for screening energy efficiency in other states, as indicated in Table 3.

Table 3. State Discount Rates Used in Energy Efficiency Benefit-Cost Analysis (in real terms)

	Primary Test							
	UCT	**Total Resource Cost Test**					**Societal Cost Test**	
	CT	NY	NH	RI	MA	DE	VT	DC
Basis for Discount Rate	Utility WACC	Utility WACC	Prime Rate	Low-Risk 10 yr Treasury	Low-Risk 10 yr Treasury	Societal Treasury Rate	Societal	Societal 10 yr Treasury
Current Discount Rate (Real)	7.43%	5.50%	2.46%	1.15%	0.55%	TBD	3.00%	1.87%

The choice of a discount rate for efficiency screening should not be a formulaic, simple decision. The choice of discount rate is essentially a decision about time preference, i.e., the relative importance of short- versus long-term costs and benefits.

The time preference used by a regulated utility for evaluating the costs and benefits of resource options can be very different from the time preference used by investors for evaluating their investment options. Regulated utilities have a variety of different goals and responsibilities to consider when planning their system (e.g., reducing system costs, increasing system efficiency, maintaining reliability, maintaining customer equity, maximizing profits for shareholders, mitigating risks to customers, and achieving other energy policy goals as required by the state). Individual investors have a different set of goals when making financial decisions (e.g., balancing risks and rewards, maximizing profits, maximizing short-term versus long-term returns). Consequently, the utility investors' time preference, as indicated by the utility weighted average cost of capital, is not necessarily appropriate for setting the discount rate for the efficiency screening framework.

The purpose of efficiency cost-effectiveness screening is to identify those efficiency resources that will meet several regulatory goals, including: reduce electricity costs, increase electricity system efficiency, maintain reliability, reduce risk, and achieve other state energy policy goals, both in the short-term and the long-term future. The discount rate chosen for the efficiency screening framework must reflect a time preference that is consistent with this set of regulatory goals. The time preference indicated by the utility weighted average cost of capital is not consistent with this set of regulatory goals; consequently, a discount rate based on a utility weighted average cost of capital will not necessarily lead to resource decisions that are consistent with this set of goals.

In addition, the risk benefits of energy efficiency should be factored into the choice of discount rate, to the extent that such benefits are not factored in through other means. Energy efficiency resources

[1] At the time this report was prepared it was not clear whether this value is in real or nominal terms.

generally reduce risk to the electricity system, relative to alternative supply-side resources—for example, by increasing the diversity of the portfolio of electricity resources; by reducing reliance upon fossil fuels with volatile prices; by reducing planning risk by reducing load growth; and by reducing risk associated with current and future environmental regulations. Efficiency resources also help to reduce risk through increased "optionality," i.e., they represent incremental investments that can be made relatively quickly and thus offer greater flexibility in response to change (relative to large, capital-intensive generation, transmission, or distribution upgrades).

In sum, the discount rate used for energy efficiency screening should (a) not be based on a utility's weighted average cost of capital; (b) be based on a time preference relevant to all utility customers as a whole; and (c) reflect the fact that energy efficiency resources offer significant risk benefits relative to supply-side resources. These points suggest that a low-risk discount rate is appropriate for energy efficiency screening. A good indicator of a low-risk discount rate is the yield on 10-year U.S. Treasury bonds.

For additional information on energy efficiency cost-effectiveness, see:

> Advanced Energy Economy Institute (AEEI) 2014. *Benefit-Cost Analysis for Distributed Energy Resources: A Framework for Accounting for all Relevant Costs and Benefits*, prepared by Synapse Energy Economics, September 2014.
>
> Synapse Energy Economics 2012a, *Best Practices in Energy Efficiency Program Screening: How to Ensure that the Value of Energy Efficiency is Properly Accounted For*, prepared for the National Home Performance Council, July 2012.

4. Understanding the Rate Impacts of Energy Efficiency

4.1. Limitations of the Rate Impact Measure Test

Impacts on electricity rates should certainly be considered as part of a regulator's review of energy efficiency resources. However, the Rate Impact Measure (RIM) test should not be used for assessing the rate impacts of energy efficiency. The RIM test suffers from several fundamental flaws and does not provide regulators and other stakeholders with information necessary to assess rate impacts or the distributional equity issues that go along with them. Other analyses are much better suited for assessing rate impacts. These points are discussed in more detail below.

In general, energy efficiency programs can affect rates in several ways, including (a) increasing rates to recover energy efficiency administration and implementation costs from all customers; (b) reducing transmission and distribution rates as a result of reduced transmission and distribution costs; (c) reducing generation rates by suppressing wholesale prices in the wholesale electricity markets; and (d) increasing rates to recover "lost revenues" from energy efficiency. In general, the increase in rates needed to recover energy efficiency costs from customers is offset by the reduction in rates as a result of avoided costs and the wholesale price suppression effect, particularly over the long term. However, the recovery of lost revenues can lead to a net increase in electricity rates. Hence understanding the impact of lost revenue recovery is essential to understanding how energy efficiency might affect electricity rates.

The RIM test suffers from several fundamental flaws and does not provide regulators and other stakeholders with information necessary to assess rate impacts or the distributional equity issues that go along with them.

One of the most important problems with the RIM test is that it does not provide the specific information that utilities and regulators need to assess the actual rate and equity impacts of energy efficiency resources. Such useful information would include the impacts of energy efficiency resources on long-term average rates, the impacts on average customer bills, and the extent to which customers participate in energy efficiency programs and thereby experience lower bills.

Another problem with the RIM test is that it frequently will not result in the lowest cost to customers. Instead, it may lead to the lowest rates (all else being equal, and if the test is applied properly). However, achieving the lowest rates is not the primary or sole goal of utility planning and regulation; there are many goals that utilities and regulators must balance in planning the electricity system. Maintaining low utility system costs, and therefore low customer bills, should be given priority over minimizing rates. For most customers, the size of the electricity bills that they must pay is more important than the rates underlying those bills.

Two hypothetical examples make this point clear. An efficiency program that requires essentially no utility costs (because the customers paid most of the costs on their own), but results in very high net electricity cost reductions would fail the RIM test. At the other end of the spectrum, the utility could encourage its customers to open all their windows and turn on both their space heaters and their air conditioners at the same time. This "program" would pass the RIM test because of increased sales, but would lead to significantly increased costs and bills. Neither of these outcomes would be justifiable or in the customers' interest—confirming that minimizing costs and bills should be given priority over minimizing rates.

One of the problems with the RIM test is that the lost revenues are not a new cost created by deployment of energy efficiency.[2] Lost revenues are simply a result of the need to recover existing costs spread out over fewer sales. The existing costs that might be recovered through rate increases as a result of lost revenues are (a) not caused by the energy efficiency resources themselves, and (b) are not a new, incremental cost. In economic terms, these existing costs are "sunk" costs. Sunk costs should not be used to assess future resource investments because they are incurred regardless of whether the future project is undertaken. Application of the RIM test is a violation of this important economic principle.

In addition, the RIM test does not provide any information about what actually happens to rates as a result of energy efficiency investments. A RIM benefit-cost ratio of less than one indicates that rates will increase (all else being equal), but says little to nothing about the magnitude of the rate impact, in terms of the percent (or ¢/kWh) increase in rates or the percent (or dollar) increase in bills. In other words, the RIM test results do not provide any context for utilities and regulators to consider the magnitude and implications of the rate impacts.

Furthermore, the RIM test results can be very misleading. For an energy efficiency program with a RIM benefit-cost ratio of less than one, the net benefits (in terms of present value dollars) will be negative. A negative net benefit implies that the energy efficiency resource investment will increase costs. However, as described above, the costs that drive the rate impacts under the RIM test are not new, incremental costs associated with energy efficiency resources. They are existing costs, existing fixed costs in particular, that are already in current electricity rates. Any rate increase caused by lost revenues would be a result of recovering those existing fixed costs over fewer sales; not as a result of incurring new costs. However, utilities sometimes present their RIM test results as negative net benefits, implying that the cost impacts of the energy efficiency resource investment are worse than they really are.

A different type of analysis should be conducted separately from the cost-effectiveness analysis to help inform regulators and others about the potential rate impacts and equity concerns of energy efficiency.

In sum, the RIM test should never be used for the purpose of deciding whether to spend ratepayer money on any particular energy efficiency resource. Instead, a different type of analysis should be

[2] The only difference between the RIM test and the Utility Cost Test is the treatment of lost revenues. If the utility is to be made financially neutral to the impacts of the energy efficiency programs, then the utility would need to collect the lost revenues associated with the fixed cost portion of current rates.

conducted separately from the cost-effectiveness analysis to help inform regulators and others about the potential rate impacts and equity concerns of energy efficiency resources.

4.2. Better Options for Assessing Rate Impacts

Rate impacts from energy efficiency resources can raise distributional equity concerns. In general, energy efficiency resources can lead to higher rates, but lower average customer bills. Those customers that install energy efficiency resources will typically experience lower bills, while those that do not participate may experience higher rates and therefore higher bills. The different impacts on energy efficiency participants and non-participants can create distributional equity concerns.

It is important to note that all customers experience some of the benefits of energy efficiency resources—regardless of whether they participate in the programs. In particular, energy efficiency resources can reduce the need for new generation capacity, reduce wholesale capacity prices, reduce wholesale energy prices, reduce transmission and distribution costs, improve system reliability, reduce risk, reduce environmental compliance costs, reduce credit and collections costs, and more. All of these benefits accrue to all customers. Nonetheless, it is also generally true that energy efficiency participants will experience greater benefits than non-participants, due to the immediate reduction in their electricity bills. This is a key issue to consider when analyzing the implications of rate impacts.

A thorough understanding of the implications of energy efficiency rate impacts requires analysis of three important factors: rate impacts, bill impacts, and participation impacts.

A thorough understanding of the implications of energy efficiency rate impacts requires analysis of three important factors: rate impacts, bill impacts, and participation impacts. Rate impacts provide an indication of the extent to which rates for all customers might increase due to energy efficiency resources. Bill impacts provide an indication of the extent to which customer bills might be reduced for those customers that install energy efficiency resources. Participation impacts provide an indication of the portion of customers will that will experience bill reductions or bill increases; participating customers will generally experience bill reductions while non-participants might see rate increases leading to bill increases. Taken together, these three factors indicate the extent to which customers as a whole will benefit from energy efficiency resources, and the extent to which energy efficiency resources may lead to distributional equity concerns.

Care must be given to estimate the rate, bill, and participant impacts properly, and to present them in terms that are meaningful for considering distributional equity issues. In particular:

- Rate impact estimates should account for all factors that impact rates. This would include all avoided costs that might exert downward pressure on rates, as well as any factors that might exert upward pressure on rates (primarily, energy efficiency program costs and the recovery of lost revenues). Any estimates of the impact of lost revenue recovery on rates should (a) only reflect collection of lost revenues necessary to recover fixed costs, and (b) only reflect the actual impact on rates according the state's ratemaking practices. Rate impacts should be estimated over the long term, to capture the full period of time over which the energy efficiency savings will occur. Rate impacts should also be put into terms that place them in a meaningful context; e.g., in terms of ¢/kWh or percent of total rates.

- Bill impact estimates should build upon the estimates of rate impacts. While rate impacts apply to every customer within a rate class, bill impacts will vary between participants and non-participants. As with rate impacts, bill impacts should be estimated over the long term, and they should be put into terms that place them in a meaningful context; e.g., in terms of dollars per month or percent of total bills.

- Participation estimates should be put in terms of participation rates, measured by dividing energy efficiency program participants by the total population of eligible customers. Participation rates should be compared across several years to indicate the extent to which customers are participating in the programs over time. Participation in multiple programs and across multiple years should be captured, and the impacts of participation in multiple energy efficiency programs by the same customer should be accounted for to the extent possible.

If this information is not currently available, it should be collected as soon as possible, so that meaningful estimates can be developed in future years. This type of information, particularly the participation rates, will be critical in determining the extent to which energy efficiency resources are benefitting customers and achieving state energy policy goals.

Consider the following simple example for a ten-year efficiency program forecast:

- Long-term average rates are forecast to increase by roughly 1.5%, relative to implementing no energy efficiency.

- Long-term average bills are forecast to decrease by an average of 10%.

- A large portion of customers (65% of large commercial and industrial customers, 45% of small commercial customers, and 75% of residential customers) are expected to participate in the efficiency programs thereby experiencing net bill reductions.

This kind of information can enable regulators to weigh trade-offs between—in this example—small rate increases that would affect all customers versus substantial net bill savings for the majority of customers. It could also enable regulators to make more nuanced policy decisions. For example, the choice need not be between just proceeding with an efficiency portfolio or not. Instead, part of the response could be that the portfolio would be acceptable if more was done to serve more small businesses. Those kind of assessments cannot be made by regulators if the only information available to them are RIM test results.

4.3. Example Rate Impact Estimates

Methodology and Assumptions

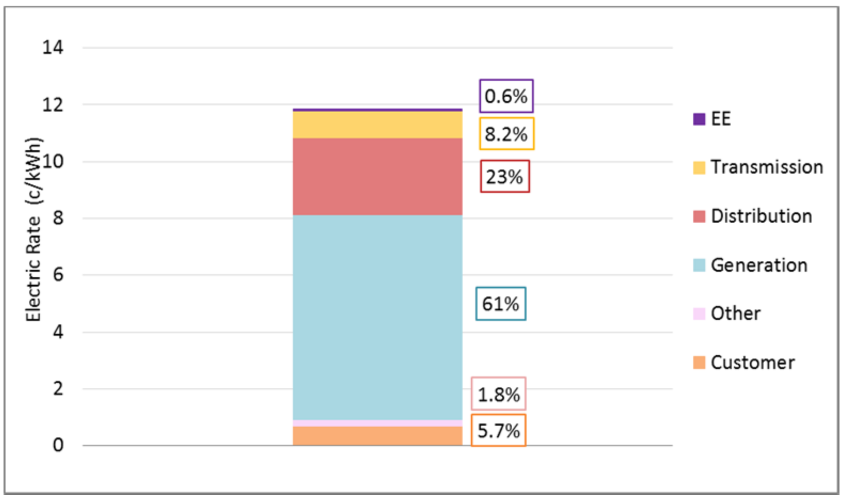
Using the alternative approach for assessing rate impacts discussed above, we conducted an analysis on Dominion's energy efficiency plans as provided in its 2014 integrated resource planning (IRP). We compare the residential rates that result from Dominion's energy efficiency programs to a hypothetical future scenario that where there are no energy efficiency impacts. Rate impacts are calculated this way to isolate the impact of Dominion's energy efficiency programs on future rates.[3]

The impact of energy efficiency on rates is widely misunderstood, and frequently overstated. It is important to recognize that energy efficiency programs will exert downward pressure on rates by avoiding generation, transmission, and distribution investments, and by reducing energy costs at the margin. This helps to offset the upward pressure on rates due to the recovery of program costs, and the recovery lost revenues from reduced sales. Understanding rate impacts requires an assessment of the net impact of all of these effects on rates.

Energy efficiency programs will exert downward pressure on rates by avoiding generation, transmission and distribution investments, and by reducing energy costs at the margin. This helps to offset the upward pressure on rates.

Figure 1 below presents Dominion's actual 2014 electric rates in cents per kWh, broken out by the different rate components. Each rate component's percent of the total rate is indicated in the text boxes. The energy efficiency charge is equal to roughly 0.6% of total rates.

Figure 1. 2014 Rates: c/kWh and Percent of Total Rates



To analyze the effect that energy efficiency has on Dominion's rate, we isolated and reviewed each component of residential customers' rates; including generation, transmission, distribution, the energy efficiency charge, other charges, and the customer charge. Dominion's current electric rates as presented in Figure 1 create the starting point for the rate impact analysis. Then each rate is adjusted as follows:

[3] Note that this analysis is not intended to estimate the particular rate impacts that might occur in any one year. Several simplifying assumptions have been made out of necessity, and the actual rate impacts for a specific customer or year can vary from the estimates here. Consequently, the presentation focuses on the long-term trends and general conclusions regarding typical customers.

The generation rate can be reduced by avoided capacity costs. We assume for this purpose that there are no lost revenues associated with generation costs. This is clearly a simplifying assumption, because a portion of generation costs might be fixed—the extent to which this is true depends upon whether the generation is based on owned power plants, bi-lateral purchases (and the type of contract), or market purchases. On the other hand, there will be generation price suppression effects, but such effects are beyond the scope of this analysis. In sum, for this analysis, the “with-efficiency” generation rate is estimated as the “without-efficiency” generation rate, less capacity avoided costs.

The transmission rate is increased by the recovery of lost revenue and reduced by avoided transmission costs. We assume for this purpose that any lost transmission revenues from one year are corrected for in the following year, and thus are recovered. Efficiency helps avoid future transmission investments, so transmission rates are reduced by avoided transmission costs. In sum, the with-efficiency transmission rate is estimated as the without-efficiency transmission rate, plus transmission lost revenue, less transmission avoided costs.

The distribution rate is set through periodic rate cases. In general, distribution costs are mostly fixed, which means that energy efficiency savings will result in lost distribution revenues. The extent to which any one utility will recover these lost revenues will depend upon several factors, such as how frequently the utility has a rate case and whether a utility is allowed to recover lost revenues between rate cases somehow. We assume that Dominion has a rate case every two years, which allows them to recover a portion of distribution lost revenues. In sum, the with-efficiency distribution rate is estimated as follows: (a) the with-efficiency distribution costs are equal to the without-efficiency distribution costs minus avoided distribution costs; (b) the with-efficiency sales are equal to the without-efficiency sales minus the efficiency savings; and (c) the with-efficiency price is equal to the without-efficiency distribution costs divided by post-efficiency sales.

The energy efficiency charge is estimated as the total efficiency costs for a customer sector divided by the customer sector’s with-efficiency sales. The efficiency costs for Dominion were estimated by assuming the same cost of saved energy as used to determine the 2014 energy efficiency charge.

The customer charge and the other charges are assumed to be unaffected by the energy efficiency investments and savings.

Dominion’s 2014 IRP includes energy efficiency programs through 2029. Our analysis continues out past this point, to 2046, in order to capture the effect of the savings over the remaining lives of the efficiency measures. The efficiency programs in Dominion’s 2014 IRP are forecast to ramp up from today’s programs until they reach annual savings levels of roughly one percent of retail sales from 2017-2020, and then they slowly ramp down after that.

Results – Dominion IRP Case

Figures 2 and 3 below present a more detailed look of the long-term average rate impacts. Figure 2 looks at the impact on each rate component over the long term, in cents per kWh. While the energy efficiency charge and the recovery of lost revenues increase rates, the avoided transmission, distribution and capacity costs decrease rates. As indicted, the average long-term rate increase is roughly 0.01 cents per kWh.

Figure 2. Change in Rates, Dominion vs. No EE, c/kWh

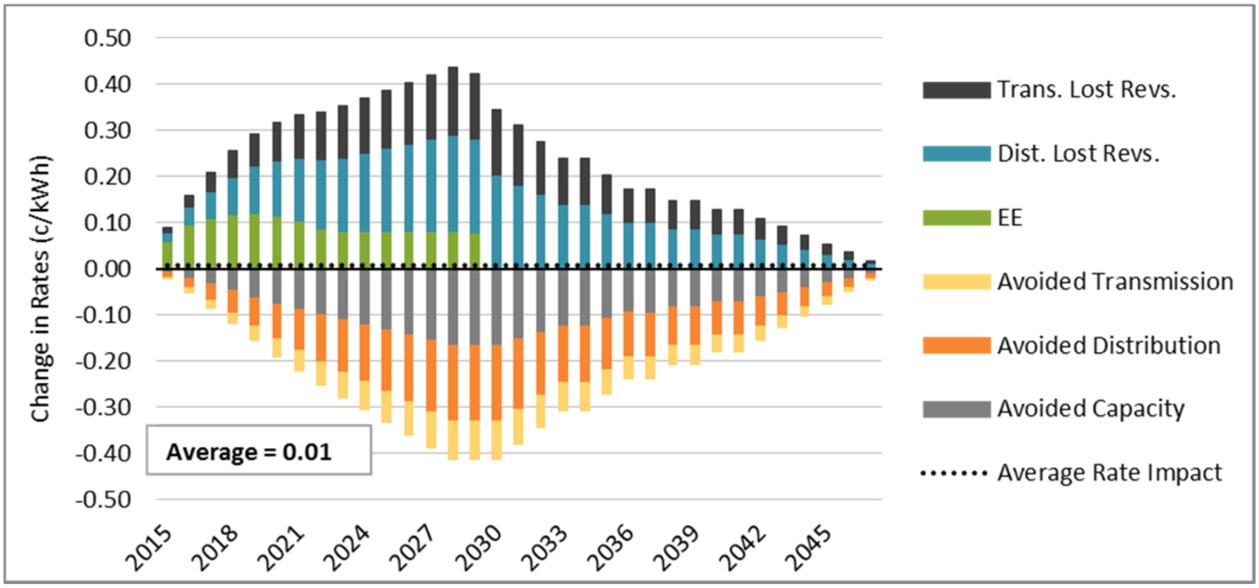
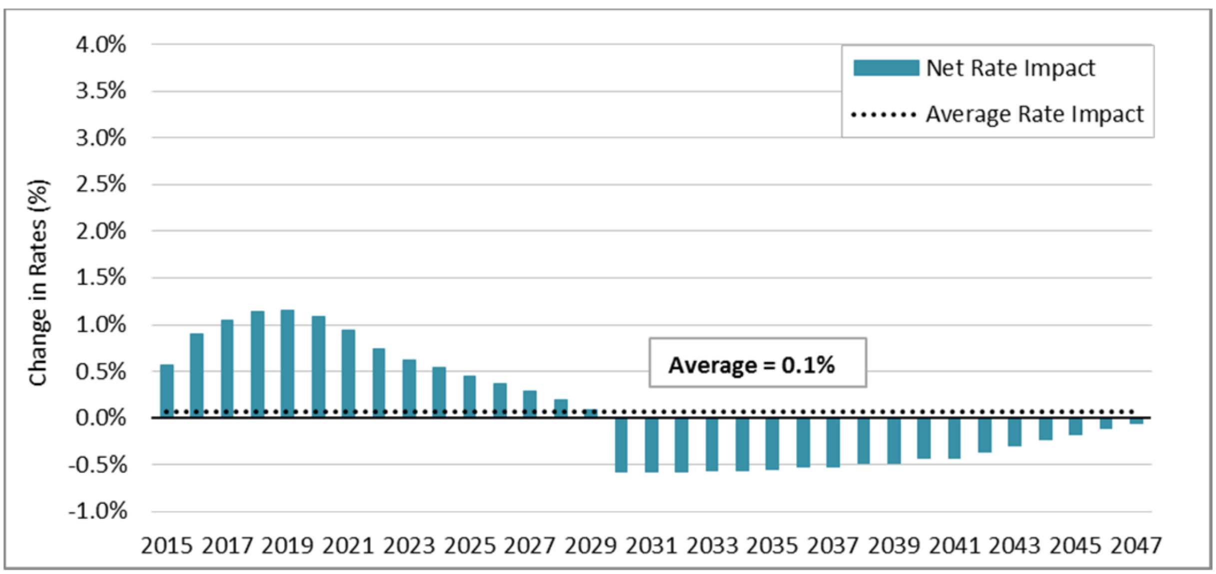


Figure 3 presents the net impact of the different adjustments to rates, expressed as a percent change in overall rates. As the figure shows, the net increase in rates is between roughly 1 percent and minus 0.5 percent, with a long-term average increase of roughly 0.1 percent.

Figure 3. Change in Rates, Dominion vs. No EE, percent change



Both Figures 2 and 3 illustrate the increase in rates towards the beginning of the period as the energy efficiency charge is implemented and savings begin to ramp up. Once the energy efficiency charge ceases in 2029, savings continue to accrue from the measures installed, which leads to the decrease in the rate impacts.

Results – Hypothetical High Efficiency Case

We also conduct a hypothetical scenario with high efficiency expenditures and savings to indicate how rates might be affected with larger efficiency programs. For this purpose, we assume that Dominion is able to achieve twice as much efficiency savings than in the 2014 IRP—equal to annual savings of roughly 2 percent of retail sales for several years. We also assume a slightly higher cost of saved energy than the Company is currently experiencing. Other assumptions are held the same as in the IRP case described above.

The long-term average rate impacts of this higher case are greater than the IRP case, but much greater. We estimate that the average long-term rates will increase by roughly 0.02 c/kWh, which is equal to an increase in total rates of roughly 0.2 percent. The reason that these rate impacts are not much greater than those of the IRP case is that both the effects leading to increased rates and the effects leading to decreased rates are greater. Therefore, the net effect is not as big as one might expect.

5. Energy Efficiency Performance Standards

In general, utilities face two financial impediments to implementing comprehensive, cost-effective energy efficiency programs.

- Disincentive from lost revenues. Utilities face a financial disincentive caused by the reductions in sales as a result of energy efficiency savings. Under traditional ratemaking practices, utilities will experience reduced revenues as a result of reduced sales from energy efficiency. A portion of those "lost revenues" are needed to recover the fixed costs embedded in existing rates. If some or all of these lost revenues are not recovered between rate cases, then the utility will earn fewer profits than it would have earned otherwise.[4]

- Lack of positive incentive. When utilities invest capital in generation, transmission and distribution facilities, they are allowed to place that capital in rate base and earn a reasonable return on it. Unless energy efficiency costs are treated similarly, utilities typically do not experience a positive financial incentive from energy efficiency investments. Further, to the extent that energy efficiency defers or avoids investments in generation, transmission and distribution facilities, it will reduce the opportunity to earn a profit from those investments.

Utilities cannot be expected to implement successful, cost-effective efficiency programs unless they have the proper regulatory support and financial incentives to do so.

It is important for regulators to help utilities overcome these financial impediments. Utilities cannot be expected to implement successful, cost-effective efficiency programs unless they have the proper regulatory support and financial incentives to do so.

To date, Virginia has addressed these financial impediments in two ways. First, utilities are allowed to recover the costs of designing, implementing, and operating energy efficiency programs through a rate adjustment clause. Second, utilities are allowed to request the Commission for the recovery of lost revenues related to energy efficiency programs. To date, the Commission has rejected requests to recover such lost revenues, due to concerns about the estimates of lost revenues and the verification of the efficiency savings that would create lost revenues.

Given that the lost revenue recovery mechanism has not been successful in Virginia, the Commission should consider other options to address the utilities' financial impediments to energy efficiency programs. Any such assessment should consider three key inter-related issues: (a) the recovery of program costs; (b) the recovery of lost revenues; and (c) the positive incentives required to encourage utilities to plan for, design and implement effective, successful efficiency programs.

[4] Note there are several options for mitigating lost revenues from energy efficiency programs, such as increasing off-system sales (or reducing off-system purchases) as a result of efficiency savings.

This latter issue – positive incentives for successful efficiency programs – can be addressed using energy efficiency performance standards. These standards can be designed to provide utilities with positive financial rewards for achieving clearly defined energy efficiency goals, such as energy savings (in terms of MWh), capacity savings (in terms of kW), net benefits (in terms of present value dollars), customer participation rates, or other specific goals. Allowing utilities to earn a positive financial reward through energy efficiency performance standards can be much more effective than simply allowing a return on the energy efficiency program costs, because the incentive can be tied to desired outcomes rather than just the amount of dollars spent on energy efficiency.

Many states provide utilities with energy efficiency performance standards. These states offer a lot of experience to date indicating best practices and the ability of performance standards to overcome the financial barriers facing utilities (AEEE 2011). The standards are sometimes in the form of specific performance targets (e.g., in terms of fixed energy or capacity savings), and they are sometimes in the form of shared net benefits (e.g., where a portion of the net reduction in costs from energy efficiency is shared with the utility). Some performance incentives offer only positive rewards for meeting goals, while others offer both rewards and penalties.

The following principles should be considered when designing energy efficiency performance standards:

Ideally, energy efficiency performance standards can be designed in such a way that any additional costs to customers due to the standards is more than offset by the additional efficiency savings and benefits generated by the improved utility performance.

- The magnitude of performance incentives should be sufficient to capture the attention of utility management, so that utilities incorporate energy efficiency as part of their overall business objectives. At the same time, the magnitude of performance incentives should be kept as low as possible so as to mitigate the costs to customers.
- Efficiency performance incentives should have a threshold below which no incentive is available (so as not to reward unsatisfactory performance), as well as a cap above which no further incentive is available (so as to limit the eventual costs to customers).
- The range of performance incentives should be based on a reasonable portion of the efficiency program budgets (e.g., 5 to 10 percent), so that the magnitude of the incentives will always be proportional to the utility energy efficiency activities and benefits.
- Performance incentives should be designed in such a way as to achieve regulatory policy goals for energy efficiency programs, such as encouraging cost-effective, successful energy efficiency programs that are in the customers' best interests.
- The choice of performance goals and metrics should reward utilities for desired outcomes from efficiency spending (e.g., kWh saved, kW saved, portion of customers served), rather than simply rewarding the amount of spending.
- Performance incentives should be based on clearly-defined goals and activities that can be adequately monitored, quantified, and verified after the fact.

- Performance incentives should be available only for activities that the utility plays a distinct and clear role in bringing about the desired outcome.

Stakeholders sometimes argue that energy efficiency performance incentives should not be needed to motivate utilities, because (a) utilities have an obligation to provide low-cost reliable service to customers, which includes energy efficiency services; and (b) utilities have an obligation to comply with energy efficiency goals set by regulators. While it is true that utilities have these obligations, it is also true that utilities are unlikely to meet these obligations successfully in light of the significant financial barriers that they face. Ideally, energy efficiency performance standards can be designed in such a way that any additional costs to customers due to the standards is more than offset by the additional efficiency savings and benefits generated by the improved utility performance.

For additional information on energy efficiency performance standards, see:

American Council for and Energy-Efficient Economy 2011. *Carrots for Utilities: Providing Financial Returns for Utility Investments in Energy Efficiency*, January 2011.

National Action Plan for Energy Efficiency 2007. *Aligning Utility Incentives with Investment in Energy Efficiency,* prepared by Val Jensen, ICF International, December 2007.

6. Evaluation, Measurement and Verification

Evaluation, measurement, and verification (EM&V) should be a critical component of the suite of regulatory policies overseeing ratepayer-funded energy efficiency programs. Proper EM&V practices serve as an important foundation to support all other regulatory and utility energy efficiency practices, including cost recovery, program design, program planning, program reporting, efficiency performance incentives and more.

EM&V is the process of determining and documenting the results, costs, benefits, and lessons learned from energy efficiency programs. EM&V typically has two overall objectives: (a) to document and measure the effects of an efficiency program and determine whether it met its goals and can be counted on as a reliable energy resource; and (b) to help understand why those effects occurred, and identify ways to improve current programs and select future programs (NAPAA 2007b).

There are three types of EM&V studies typically performed for ratepayer-funded energy efficiency programs: (1) impact evaluations, which identify the actual impacts of the efficiency programs, in terms of kWh saved, kW saved, customers served, and other related impacts; (2) process evaluations, which assess how efficiently a program is implemented, with respect to marketing, delivery, addressing customer needs, and achieving stated objectives; and (3) market effects evaluations, which assess the state of the market for specific efficiency end uses, and the extent to which those end uses have penetrated or transformed that market.

Proper EM&V practices serve as an important foundation to support all other regulatory and utility energy efficiency practices, including cost recovery, program design, program planning, program reporting, efficiency performance incentives and more.

Impact evaluations are most important for demonstrating that efficiency can be relied upon as an electricity resource and that the utility is entitled to recover costs and efficiency performance incentives. Process evaluations and market effects calculations are also important for the purpose of designing, modifying, and improving efficiency programs over time.

The following principles should be considered with regard to energy efficiency EM&V practices.

- EM&V budgets and related resources should be sufficient to support the work needed to be done over the relevant evaluation and planning time period. Funding for these activities should be provided as part of the overall energy efficiency program budget. A good rule of thumb is to dedicate roughly three to four percent of energy efficiency program budgets to EM&V activities.

- The evaluation process should be an integral part of an overall planning-budgeting-implementation-evaluation process. The choice of programs to evaluate at any one point in time should be driven by planning needs, and the evaluations should be timed in such a way as to provide timely information for planning and implementation purposes.

- EM&V studies should be conducted by third-party contractors that are financially independent from the utility whole programs are being evaluated. Such contractors should have sufficient depth of expertise to conduct comprehensive, statistically valid studies.

- Regulators should encourage all utilities within a state to coordinate and cooperate on EM&V studies relevant to programs and end uses that are consistent across the state, so as to encourage economies of scale, reduce EM&V costs, and share relevant information and findings.

- The EM&V process should allow for stakeholder input as much as possible. Many states have formal groups or organized opportunities for stakeholders to observe and comment on the evaluation process. This can ensure that the full range of technical inputs are solicited at the beginning of the evaluation process and can reduce the incidence of objections or challenges to evaluation results once they have been completed.

For additional information on energy efficiency performance standards, see:

California Public Utility Commission (CPUC) 2006. *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals*.

Efficiency Valuation Organization (EVO) 2007. *International Performance Measurement and Verification Protocol*.

Lawrence Berkeley National Laboratory 2013. *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures*, January 2012 — March 2013

National Action Plan for Energy Efficiency 2007. *Model Energy Efficiency Program Impact Evaluation Guide*, prepared by Steven Schiller, Schiller Consulting, Inc., December 2007.

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Regulatory Assistance Project 2012. *US Experience with Efficiency as a Transmission and Distribution System Resource*, prepared by Chris Neme and Rich Sedano, February 2012.

Regulatory Assistance Project 2013a. *Best Practices in Electric Utility Resource Planning: Examples of State Regulations and Recent Utility Plans*, prepared by Synapse Energy Economics, June 2013.

Regulatory Assistance Project 2013b. *Recognizing the Full Value of Energy Efficiency: What's under the Feel-Good Frosting of the World's Most Valuable Layer Cake of Benefits*.

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VT PSB 2012. Vermont Public Service Board, “Order re: Energy Efficiency Utility Budgets for Demand Resources Plan,” EEU-2013-01, July 9, 2014.

Appendix A – Relevant Virginia Statutes

Code of Virginia - Title 67 Virginia Energy Plan - Chapter 1 Energy Policy Of The Commonwealth

§ 67-100. Legislative findings.

The General Assembly hereby finds that:

1. Energy is essential to the health, safety, and welfare of the people of this Commonwealth and to the Commonwealth's economy;

2. The state government should facilitate the availability and delivery of reliable and adequate supplies of energy to industrial, commercial, and residential users at reasonable costs such that these users and the Commonwealth's economy are able to be productive; and

3. The Commonwealth would benefit from articulating clear objectives pertaining to energy issues, adopting an energy policy that advances these objectives, and establishing a procedure for measuring the implementation of these policies.

(2006, c. 939.)

§ 67-101. Energy objectives.

The Commonwealth recognizes each of the following objectives pertaining to energy issues will advance the health, welfare, and safety of the residents of the Commonwealth:

1. Ensuring the availability of reliable energy at costs that are reasonable and in quantities that will support the Commonwealth's economy;

2. Managing the rate of consumption of existing energy resources in relation to economic growth;

3. Establishing sufficient supply and delivery infrastructure to maintain reliable energy availability in the event of a disruption occurring to a portion of the Commonwealth's energy matrix;

4. Using energy resources more efficiently;

5. Facilitating conservation;

6. Optimizing intrastate and interstate use of energy supply and delivery to maximize energy availability, reliability, and price opportunities to the benefit of all user classes and the Commonwealth's economy as stated in subdivision 2 of § 67-100;

7. Increasing Virginia's reliance on sources of energy that, compared to traditional energy resources, are less polluting of the Commonwealth's air and waters;

8. Researching the efficacy, cost, and benefits of reducing, avoiding, or sequestering the emissions of greenhouse gases produced in connection with the generation of energy;

9. Removing impediments to the use of abundant low-cost energy resources located within and outside the Commonwealth and ensuring the economic viability of the producers, especially those in the Commonwealth, of such resources;

10. Developing energy resources and facilities in a manner that does not impose a disproportionate adverse impact on economically disadvantaged or minority communities;

11. Recognizing the need to foster those economically developable alternative sources of energy that can be provided at market prices as vital components of a diversified portfolio of energy resources; and

12. Increasing Virginia's reliance on biodiesel and ethanol produced from corn, soybeans, hulless barley, and other suitable crops grown in the Commonwealth that will create jobs and income, produce clean-burning fuels that will help to improve air quality, and provide the new markets for Virginia's agricultural products needed to preserve farm employment, conserve farmland, and help pay for agricultural best management practices to protect water quality.

Nothing in this section shall be deemed to abrogate or modify in any way the provisions of the Virginia Electric Utility Regulation Act (§ 56-576 et seq.).

(2006, c. 939; 2008, c. 883.)

Sections: Previous 67-100 67-101 67-102 Next

Last modified: April 16, 2009

§ 67-102. Commonwealth Energy Policy.

A. To achieve the objectives enumerated in § 67-101, it shall be the policy of the Commonwealth to:

1. Support research and development of, and promote the use of, renewable energy sources;

2. Ensure that the combination of energy supplies and energy-saving systems are sufficient to support the demands of economic growth;

3. Promote research and development of clean coal technologies, including but not limited to integrated gasification combined cycle systems;

4. Promote cost-effective conservation of energy and fuel supplies;

5. Ensure the availability of affordable natural gas throughout the Commonwealth by expanding Virginia's natural gas distribution and transmission pipeline infrastructure; developing coalbed methane

gas resources and methane hydrate resources; encouraging the productive use of landfill gas; and siting one or more liquefied natural gas terminals;

6. Promote the generation of electricity through technologies that do not contribute to greenhouse gases and global warming;

7. Facilitate the development of new, and the expansion of existing, petroleum refining facilities within the Commonwealth;

8. Promote the use of motor vehicles that utilize alternate fuels and are highly energy efficient;

9. Support efforts to reduce the demand for imported petroleum by developing alternative technologies, including but not limited to the production of synthetic and hydrogen-based fuels, and the infrastructure required for the widespread implementation of such technologies;

10. Promote the use of biodiesel and ethanol produced from agricultural crops grown in the Commonwealth;

11. Ensure that development of new, or expansion of existing, energy resources or facilities does not have a disproportionate adverse impact on economically disadvantaged or minority communities; and

12. Ensure that energy generation and delivery systems that may be approved for development in the Commonwealth, including liquefied natural gas and related delivery and storage systems, should be located so as to minimize impacts to pristine natural areas and other significant onshore natural resources, and as near to compatible development as possible.

B. The elements of the policy set forth in subsection A shall be referred to collectively in this title as the Commonwealth Energy Policy.

C. All agencies and political subdivisions of the Commonwealth, in taking discretionary action with regard to energy issues, shall recognize the elements of the Commonwealth Energy Policy and where appropriate, shall act in a manner consistent therewith.

D. The Commonwealth Energy Policy is intended to provide guidance to the agencies and political subdivisions of the Commonwealth in taking discretionary action with regard to energy issues, and shall not be construed to amend, repeal, or override any contrary provision of applicable law. The failure or refusal of any person to recognize the elements of the Commonwealth Energy Policy, to act in a manner consistent with the Commonwealth Energy Policy, or to take any other action whatsoever, shall not create any right, action, or cause of action or provide standing for any person to challenge the action of the Commonwealth or any of its agencies or political subdivisions.

(2006, c. 939.)

Sections: Previous 67-100 67-101 67-102

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