New Hampshire Public Utilities Commission

Energy Efficiency Resource Standard

A Straw Proposal for New Hampshire

Report prepared by the Electrical Division Staff of the NHPUC

February 3, 2015

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Executive Summary

Background

Staff prepared this energy efficiency (or EE) "straw" proposal at the request of the New Hampshire Public Utility Commission (NHPUC) in order to further advance existing discussions among various stakeholders over implementation of a state-wide energy efficiency resource standard (EERS). It is intended to be clear for both subject specialists and the general public, it identifies basic issues that should be resolved before full implementation of an EERS, and provides a Staff recommendation that seeks to navigate a fine line between the various stakeholder positions with a goal of establishing a broad consensus.

Approach

Staff has recognized that numerous individuals and groups support additional investment in energy efficiency in New Hampshire and that implementation of an EERS is viewed as a vital component to achieving that investment. With that in mind, Staff has prepared this document to identify best practices and raise critical questions; seek to better understand and record the wide range of views possessed by local stakeholders on each issue and navigate between various positions in order to identify the greatest amount of common ground; and to enable the NHPUC to facilitate next steps.

Staff undertook a lengthy and comprehensive stakeholder process that benefitted from the outset by two important energy efficiency documents: GDS Associates Inc. (GDS), *Additional Opportunities for Energy Efficiency in New Hampshire*;[1] and Vermont Energy Investment Corporation (VEIC), GDS, and Jeffery H. Taylor and Associates, Inc. (Taylor), *Increasing Energy Efficiency in New Hampshire.*[2] Staff also reviewed and monitored the progress of EERS activities in our neighboring states and the country at large.

In an effort to gain a wide understanding of the issues and the relative positions of various stakeholders, Staff prepared a questionnaire,[3] which subsequently formed the basis of one-on-one interviews. The objective of each interview was for Staff to suitably record the views of the respondent, while at the same time sharing information about various paradigms for the EERS that are already in existence, and where possible convey a better understanding of the issues requiring consideration. The interviews varied in length from three to six hours.

Staff wishes to acknowledge the time and effort devoted by many Energy Efficiency and Sustainable Energy Board (EESE) members and other interested parties who freely gave of their time in support of this analysis. Staff made every effort to be as all-inclusive as possible: meeting with and interviewing

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[1] *Additional Opportunities for Energy Efficiency in New Hampshire, Final Report* (January 2009). Prepared for the New Hampshire Public Utilities Commission by GDS Associates Inc. in partnership with RLW Analytics and Research Into Action (GDS 2009).

[2] *Increasing Energy Efficiency in New Hampshire: Realizing Our Potential* (November 2013). Prepared by Vermont Energy Investment Corporation, in collaboration with GDS Associates and Jeffrey H. Taylor & Associates (VEIC, GDS & Taylor 2013).

[3] *See* Appendix for Staff Questionnaire.

industry representatives, utility Core program administrators, energy efficiency product vendors, sustainable energy and energy efficiency advocates, relevant state agency representatives, representatives of specialist research institutions, Federal government agencies, and neighboring state experts. Finally, Staff maintained an open-door policy encouraging members of the public to share their views at any time.

All errors and omissions are attributable to Staff.

Proposal Analysis

The Staff's proposal defines the following main issues to be addressed prior to implementation of an EERS:

- Mechanism for establishment of the EERS;
- Definition of EERS targets and implementing strategies;
- EERS administration;
- Best practice in Evaluation, Monitoring and Verification of the EERS;
- Potential need for utility incentives and rate recovery; and
- EERS funding.

In addition, the straw-proposal investigation has drawn attention to a further development that may have a bearing on the EERS process:

- The anticipated impact of the EPA's Proposed Clean Power Plan.

Finally, the analysis seeks to identify a series of actions to promote an effective EERS:

- Paradigms for success.

Preliminary Recommendations

(1) Prompt action by the NHPUC.

> The NHPUC should act promptly to use its existing regulatory powers to establish an EERS. If NHPUC action can be accompanied by a parallel effort to gain legislative support of an EERS as a critical component of State Energy Policy and gain recognition of the principle of "pursuit of all cost effective energy savings measures," then this may be optimal.

(2) Establish mandatory electrical and natural gas (gas) equivalent savings targets for the next ten years.

> Analysis of the current performance of existing Core programs indicates that on the electrical side, Core is at present achieving retail electric sales foregone at a level of O.68%, while in gas the level is 0.62%.
>
> Previous studies have indicated that the target level of energy efficiency in New Hampshire as measured by retail electric sales forgone in a given year may be higher and appears so in our neighboring New England states. The most recent study by VEIC and GDS concerning a suitable

target for NH suggested that by using 2012 as a base year, the 2017 target for energy efficiency should be at a level of equivalent electric and non-electric savings of 6.6% of retail electric sales foregone.[4]

Staff has reviewed this analysis and has modeled at a high level of aggregation various scenarios tracking funding requirements to achieve the designated EERS target (*see* Model Options 1-6, Appendix 4).

Based on our analysis, Staff recommends that the EERS initially leverage the Core energy efficiency programs as a point of departure, and that the principle of "all cost effective measures" be implemented.

By differentiating between electricity and gas utilities, and using the 2014 approved base year revenues as a starting point, and a gradual increase in the level of electrical savings from 2015 to 2025, Staff has determined that cumulative savings of over one billion kWhs are attainable, representing approximately 9.76% of 2012 kWh electrical usage.

For the gas utilities, Staff recommends a flat annual savings target of 0.70% per year for the years 2017-2025 with an initial gradual ramp up in 2015, and 2016, of 0.68%, and 0.70%, respectively. This approach would result in cumulative savings by 2025 of nearly 1.5 million MMBtus representing 7.63% of the 2012 gas MMBtu usage.

(3) Implement a broad reach beyond traditional customer-driven energy savings.

While the electric and gas energy savings targets are important as overall goals , our proposal recognizes that one important objective will be to reach the greatest number of participants in the most effective way, and that therefore the implementation of an EERS should take place via segmenting customer groups and targeting programs accordingly. Similarly, a broader reach for the ERRS, beyond traditional customer-driven energy savings, and embracing transmission and distribution improvements, distributed generation and combined heat and power projects could allow for more ambitious EERS targets while ensuring that funding be allocated between customer groups and programs in an equitable manner.

An EERS should be flexible and robust in order to meet changing demands and technological innovation, perhaps embracing more proactive Building Code compliance, transportation (*e.g.*, Electric Vehicles, CNG vehicles), etc., with other state agencies and bodies assuming the responsibility for their portion of the wider state energy efficiency targets.

Referring to Model Option 1, Electric EERS target, and Option 2, Gas EERS target, found in Appendix 4, please note that these model simulations are based solely on existing Core programs, and as yet do not capture the potential broader reach of an EERS.

[4] VEIC, GDS & Taylor 2013 at 34, Table 6.1.

(4) Examine the possibility of implementing a virtual-utility model in addition to existing utility-driven program administration.

Staff reviewed the various EERS administrative paradigms and believes that while there may be merit to the establishment of a special-purpose-company model as exists in Vermont, that in the short term, the state should leverage the existing Core relationship between NHPUC supervision and utility project administration, while strengthening further the role of the stakeholders as a consultative body. In this way, the NHPUC can safeguard the interests of a broad cross section of the public and provide an opportunity to assist in the establishment of priorities and development of qualified energy efficiency programs.

Staff believes that the NHPUC may wish to examine the case for gradually introducing a hybrid model whereby the utilities compete for funding tranches with a special-purpose company which will seek to bid for a portion of an overall energy efficiency portfolio, and then work collaboratively on complementary programs.

(5) Examine the possibility of augmenting traditional funding sources with greater private-sector investment.

Staff examined EERS funding sources and determined that in many states the majority of funding comes from public-funding mechanisms resembling the New Hampshire System Benefits Charge (SBC), Regional Greenhouse Gas Initiative (RGGI), and the gas utilities' Local Distribution Adjustment Clause (LDAC) funds which augment ratepayer contributions. Staff believes that sole reliance on public funding may serve to dampen the ability to meet an EERS target over time, whereas augmenting traditional funding sources with greater private sector involvement will strengthen the ability to meet an EERS.

Staff modeled funding requirements to meet the EERS electric and gas targets outlined earlier. Staff assumed that the current level of Core-dedicated public funding would remain in place (*i.e.*, at current levels of SBC, RGGI, and ISO-NE Forward Capacity Market [ISO-NE FCM] funding levels). The Staff-model scenarios were based on the 2014-approved Core budget, since forecast 2015/2016 funding levels were not yet known.

On the electrical side, the analysis indicated that all other things being equal, funding levels in year one of the EERS program would be insufficient to meet the target level of savings. That is, the total utility cost to fulfill the first year's target of electrical savings of 0.65% would require $27.3 million in funding whereas we estimate only $24.7 million would be received from current funding, resulting in a shortfall of $2.5 million. (In fact, for the 2015/2016 time period, the approved budget shows no shortfall, since it was based on updated funding levels.)

On the gas side, the estimated total cost for EERS target fulfillment in 2015 would be approximately $7.5 million while the equivalent LDAC funding would represent approximately $7.07 million, resulting in a slight shortfall.

Staff performed sensitivity analysis (Model Option 1, Appendix 4) around the SBC rate and determined that doubling the SBC charge from $0.0018/kWh to $0.0036/kWh would enable the EERS targets to be funded until 2021.

Based upon Staff's examination of the funding requirements for both electricity and gas EERS targets in 2015, Staff concluded that meeting the targets solely with traditional ratepayer funding sources would result in higher rates. Therefore, it will be vital that institutionalized private funding be pursued if targets are to be met.

There are a growing number of paradigms that seek to institutionalize this process, including the Warehouse for Energy Efficiency Loans (WHEEL)[5], which seeks to provide low-cost, large-scale capital for state and local government and utility-sponsored energy efficiency loans. Staff recommends that in view of the scalability challenges facing a small state like New Hampshire, an investigation into the possibility of joining such a program is desirable.

(6) Ensure the existence of a robust Evaluation, Measurement and Verification system.

One of the challenges facing an EERS is being able to allocate adequate resources to perform necessary evaluation, measurement and verification (EM&V) of the multiplicity of programs and projects that would take place under the EERS. Staff has noted that typical budgets for EM&V can vary from 2% to 10% of annual efficiency program budgets. EM&V is critical to increasing awareness among stakeholders, promoting replication, and developing a database. Quality of information is vital in facilitating the development of a competitive market in energy efficiency investment. Staff believes that through the use of third-party evaluators, selected and reporting directly to state counterparts, appropriate tracking and evaluation of utility programs can be accomplished.

(7) Examine the case for utility lost revenue recovery arising from implementation of Energy Efficiency policies.

Staff understands that existing performance incentive (PI) levels related to the Core programs are at or near the top end of a state comparison, and that for the time being the NHPUC has not yet had an opportunity to consider a utility petition for decoupling. This may now change with the recently-filed decoupling proposal of Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities in docket DG 14-180.

Staff understands that the utilities should have an opportunity to demonstrate that they have experienced lost revenues from the direct implementation of energy efficiency strategies and, as the EERS pushes utilities to reach higher savings targets, the problem of lost commodity sales may be exacerbated. On the other hand, costs of compensatory mechanisms like decoupling or

[5] Wheel: A Sustainable Solution for Residential Energy Efficiency. *See* Primer in Appendices, below, and http://www.naseo.org/wheel. The two states currently implementing "Wheel" are Pennsylvania and Kentucky.

other forms of lost-revenue-recovery mechanisms act to dampen the ability to reach higher EE targets in favor of shareholder profitability.

Staff modeled various EERS scenarios to better understand the funding levels required to achieve both electric and gas energy savings between 2015 and 2025. The modeling exercise demonstrated the sensitivity of EERS annual funding to the imposition of a decoupling mechanism.

Staff examined the impact on the base case of applying a relatively-low 0.5% decoupling cap (Model Option 3, Appendix 4). A partial cap was assumed, *i.e*., directed solely to recover commodity sales revenues lost to energy efficiency. In the case of electrical utilities, the application of the decoupling cap led in year one of the EERS, *i.e*., 2015, to an increase in the existing revenue shortfall from $2.5 million to $9.7 million. Thus, the application of the decoupling mechanism served to curtail EERS funding by $7.2 million.

Staff noted that if one assumed a doubling of the SBC charges but retained decoupling at the 0.5% partial level, and then EERS funding shortfalls would occur in 2019 and not in 2021 as in the no-decoupling case. From Staff's perspective, there is a trade-off between higher EERS targets and higher levels of utility decoupling revenues, and stakeholders will need to navigate carefully to effectively balance these apparently competing interests.

Staff believes that, in any event, introduction of a decoupling mechanism associated with EE should be linked to the size of the performance incentive, which in all Staff modeling scenarios was assumed at 7.5%, and indeed, some utilities have suggested that they may be willing to forfeit a portion of their PI in return for a decoupling mechanism. Of course, for the ratepayer, there remains the question of whether a decoupling mechanism decreases the utilities' market risk and, therefore, whether the utilities' rates-of-return should be decreased to reflect a reduced risk, a ratemaking adjustment best undertaken in a rate case.

Please refer to Model Option 3, Electric 0.5% decoupling, and Model Option 4, Electric 2.5% decoupling, and also for gas, Model Option 5, 0.5% decoupling, and Model Option 6, Gas 2.5% decoupling, found in Appendix 4.

(8) Make use of the EERS mechanism to support the EPA's Climate Action Plan.

At present, it is too early to estimate the full impact of the EPA's Proposed Clean Power Plan on EERS development. The June 2, 2012, Climate Action Plan (CAP) proposed reducing carbon pollution from power plants. The CAP proposed a pollution-to-power ratio for each state to meet by 2030. The EPA developed the Best System of Emission Control (BSER) that rests on four planks of policy: (1) measures to make coal plants more efficient; (2) shift from coal to gas via increased use of high efficiency combined cycle; (3) generation of electricity from low/zero-emitting facilities, and (4) demand-side energy efficiency. It is this last plank that some observers believe may strengthen the case for an EERS, although in recognition of the existing RGGI market-based program, EPA has suggested that RGGI states demonstrate that the reductions achieved through its implementation may meet the participating states' performance goals.

It is too early to speculate whether (a) the CAP will go into effect, given the current political climate at the national level, or (b) whether the RGGI states will be able implement still further reductions to their recently-reduced regional CO2 emissions cap, from 165 million to 91 million tons. Those represented a 45% emissions reduction to be followed by an additional annual decline beyond that of 2.0% per year, from 2015 to 2020. In any event, the CCPCAP has served to spotlight the EERS as a mechanism to be used to cut carbon pollution via more aggressive implementation of EE, and this should act as an impetus favoring EERS policy at the state level.

Paradigms for Success

a) Leverage the existing Core programs as a first step in establishing and implementing an EERS.
b) Retain the existing collaboration between identified stakeholders, NHPUC and other agency representatives, and the utilities for the short run, while considering the option to establish a virtual utility in the medium term as an alternative to existing utilities' administration of EE programs.
c) Support unilateral action by the NHPUC to move the EERS agenda forward but seek to obtain concurrent legislative approval for the EERS, and for the "all-cost-effectiveness" approach.
d) Develop short-term targets, such as an initial two-year period with target savings for both electric and gas utilities, as part of a long-term ten-year target.
e) Plan to make use of a full range of energy efficiency measures, recognizing that some measures may be under the auspices of other state agencies, such as Department of Administrative Services (DAS), or the Department of Transportation (DOT), or the Office of Energy and Planning (OEP). However, this activity will require effective coordination to track cumulative energy savings.
f) Encourage utilities to adjust their business model from being primarily focused on commodity sales to a more customer-segment-driven service provider focused on all customer groups.

1.0 Methodological Approach

For policy content, scope and recommendations for the EERS, Staff reviewed legislation and best practices from other jurisdictions as well as reports by various think tanks/research institutions including VEIC, GDS, the American Council of Energy Efficiency (ACEEE), the National Renewable Energy Lab (NREL) and the Lawrence Berkeley National Laboratory (LBNL). *See* bibliography for further details.

In order to develop the straw proposal, Staff interviewed as many interested parties as possible, including renewable energy advocates, energy-efficiency service providers, related state agency staff, business and industry representatives, the utilities, as well as individual ratepayers.

Based on analysis and the conduct of over 45 interviews, Staff developed a primary list of seven key issues that require resolution. These issues are listed below:

1. How should the EERS be established?
2. What should be the energy savings targets?
3. How should the EERS be administered?
4. How should the EERS be funded?
5. How should the programs be evaluated?
6. What may be the possible ramifications of the EPA's proposed CAP?
7. What are the lessons learned from existing EERS models and paradigms for success?

In Section 2, up to four categories of information are provided for each of these primary issues: Existing States' Experience, Stakeholder Positions, Other issues for Consideration, and Staff Recommendations. Within each category, any associated issues arising from the primary issues and any proposed responses to these issues are identified:

(a) Existing States' Experience	Each issue is defined and where possible current state experience cited.

(b) Stakeholder Positions	The issue is reviewed from the perspective of the straw-man interview respondents, and their suggestions and recommendations are recorded.

(c) Other Issues for Consideration	Any other related issues are addressed if considered significant.

(d) Staff Recommendations	Strategies that seek to leverage the feedback as well as existing best practices are identified to define a consensus-building way to move an EERS forward.

2.0 Establishment of the EERS

Existing States' Experience	• EERS is customarily enacted either though state legislation or by order of a state public utilities commission (PUC). • The PUC can establish the EERS under specific instruction from the state's legislature or can establish the standard under its own authority. • Irrespective of whether the EERS is enacted via legislation or order from the PUC, the PUC always plays a central part in the design and implementation of the standard. • At present, 16 of the 23[6] states with an active EERS enacted[7] the policy under state legislation.

Stakeholder Positions	• Many stakeholders favor the NHPUC acting boldly and unilaterally to establish an EERS, under its authority to maintain just and reasonable rates. • They believe that the NHPUC possesses more stability, expertise and a longer view than the legislature. • Many believe that the well-known and respected Core programs should form the basis for the new EERS, providing greater predictability. • There is concern that establishing an EERS via legislative action might limit the NHPUC's latitude to make adjustments. • One respondent drew attention to the fact that the EERS policy must embrace much more than just regulated utilities (*e.g.*, transportation) and, therefore, required a legislative mandate with broad goals defined. • Many respondents pointed out that the NHPUC should act collaboratively with a wide range of stakeholders when drawing up an EERS. • Other respondents were adamant that only a legislative process would enable a full review of existing Core programs and avoid the presumption under a NHPUC-driven process that utilities know best how to affect energy efficiency. • Some respondents believed that it might be more desirable for legislation to empower the NHPUC to conduct a rulemaking designed to implement the EERS, and to establish targets. • There were suggestions that the legislature should embrace the principle of "all cost effective energy efficiency strategies," but that target setting should remain the responsibility of the NHPUC. • Close observers of EERS developments in other states felt that the EERS should be part of an official state energy efficiency policy that required legislative action.

[6] D. Steinberg, O.D. and Zinaman, O. (May 2014). *State Energy Efficiency Resource Standards: Design, Status and Impacts*. Technical Report NREL/TP-6A20-61023, National Renewable Energy Laboratory (NREL), US Dept. of Energy (Steinberg & Zinaman 2014), at 4 and following.

[7] ERRS states are defined in this case as those which have a quantitative and legally-binding obligation to achieve a specified amount of energy savings within a specified time frame. Steinberg & Zinaman 2014 at 3.

	• Others felt that legislation should be confined to establishing a framework, while the NHPUC would set critical targets. • Establishment of an EERS following a legislative mandate might be the best guarantee for stability and permanency, given recent developments in Ohio and Indiana. • Some respondents favored a dual approach that is action by the NHPUC and concurrent efforts to gain a legislative mandate. • Other respondents felt that although the legislative route was the most desirable, political realities might favor NHPUC unilateral action. • Some respondents suggested that formally, authorization for the establishment of the EERS should come from the legislature, while the NHPUC should focus on drafting the implementation rules. • Finally, one or two respondents posed the question, “Does it have to be an either or question?” For these respondents, the NHPUC should focus on implementation and safeguarding associated funding, while the legislature defines the overall direction of the EERS policy.

Other Issues for Consideration	• Should the principle of “all cost effective efficiencies” be embraced? • Who should set the targets, the NHPUC or the legislature? • EERS targets considered here relate to utility-driven activities, which are the purview of the NHPUC. However, the state ERRS targets should also be informed by non-utility activities that take place outside the context, but in parallel to, the NHPUC efforts.

Staff Recommendations	1. In the interest of expediency, the NHPUC should establish the EERS under its own authority and with support of stakeholders, with an initial -short-term (2-year) goal. 2. The EERS should embrace a ten-year preliminary lifecycle (of which the two-year period would form the initial stage) in order to ensure stability and predictability in the electric and gas energy efficiency marketplace. 3. Concurrently, efforts should be taken to enable the legislature to create a positive environment for the EERS as part of broader state energy policy goals. 4. By engaging in two parallel initiatives, Staff believes that there will be a greater probability that the EERS could be up and running in 2015. 5. If the legislative initiative fails, the NHPUC’s unilateral action will enable the EERS to move forward under the NHPUC’s just and reasonable rates authority.

2.1 Criteria for consideration when establishing the EERS

Existing States' Experience	• Several states have chosen to enforce all cost-effective[8] energy efficiency requirements, such that utilities are required to determine and invest in the maximum amount of feasible cost-effective efficiency. • According to ACEEE, states with a cost-effectiveness standard accompanied by multi-year *(e.g.*, minimum of 3 years) savings targets are considered to have established an EERS.[9] • The most common primary measurement of energy efficiency cost-effectiveness is the Total Resource Cost test (TRC), followed by the Societal Cost Test (SCT). A positive TRC result indicates that the program will produce a net reduction in energy costs in the utility service territory over the lifetime of the program. The TRC and SCT cost tests help to address whether energy efficiency is cost-effective overall. The distributional tests, Participant cost test (PCT), Program administrator cost test (PACT), Ratepayer impact measure test (RIM), are then used as secondary measurements.[10] PCT, PACT, and RIM help to answer whether the selection of measures and design of the program is balanced from participant, utility, and non-participant perspectives, respectively. • Several states have adopted voluntary standards for energy savings or have mandated savings targets without fully funding them, but voluntary standards and unfunded mandatory targets are not considered by many as constituting a fully-fledged EERS. • ACEEE claims that an EERS must: (a) Set clear long-term targets for electricity and/or natural gas savings; (b) The savings targets must be mandatory; and (c) Adequate funding must be safeguarded for full implementation of programs necessary to meet targets. • LBNL defines an EERS as follows: (a) The target must be statewide for all utilities under the jurisdiction of the PUC; (b) There must be penalties for failure to meet targets; and (c) The target must extend at least three years.[11] • Alternatively, NREL defines an EERS as a policy that requires utilities or other entities to achieve a specified amount of energy savings within a

[8] M. Kushler, S. Nowak, P. Kushler, M.; Nowak, S.: Witte, P. (2012). *A National Survey of State Policies and Practices for the Evaluation of Ratepayer-Funded Energy Efficiency Programs*. ACEEE, Washington, DC (Kushler, Nowak & Witte 2012).

[9] A. Downs, C. Downs, A.; Cui, C. (2014). *Energy Efficiency Resource Standards: A New Progress Report on State Experience.* American Council for an Energy-Efficient Economy (ACEEE), Washington, DC (Downs & Cui 2014).

[10] National Action Plan for Energy Efficiency (2008), *Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*. Energy and Environmental Economics, Inc. and Regulatory Assistance Project.

[11] G. Barbose, C. Goldman, I. Hoffman, M. Barbose, G.; Goldman, C.; Hoffman, I.; Billingsley, M. (2013). *The Future of Utility Customer-Funded Energy Efficiency Programs in the United States: Projected Spending and Savings to 2025.* Lawrence Berkeley National Laboratory, Berkeley, CA (Barbose, Goldman, Hoffman & Billingsley 2013).

	specified timeframe.[12] • Under these definitions, ACEEE claims that 26 states meet their criteria, while NREL includes 23, and LBNL claim 15 states. • Of the 26 states identified by ACEEE, six have approved "all cost effective efficiency requirements."

Stakeholder Positions	• Stakeholder positions were broad and varied here. • A number of stakeholders were keen to safeguard transparency and implement the TRC standard. • Some respondents wanted to ensure a differential (*i.e*., sector-specific) approach to be applied to electric and gas utilities, while others argued for the same target with no sector differentiation or differentiation at the customer segmentation level. • Others suggested EERS targets be applied evenly to all customer groups in the interest of fairness, but that utilities should also be free to target customers who can provide the greatest energy-usage reductions. • A counter view proposed that commercial and industrial (C&I) customers face higher EE savings targets while residential customers face lower goals. • Opinions were relatively evenly divided over whether municipal utilities should be invited to participate in the EERS, although one respondent suggested including municipalities in EERS legislation. • Quite a few respondents were anxious to make sure that all fuel types be included in the EERS, *i.e*., a fuel-neutral policy. • Some respondents were keen to avoid cross subsidies, and explicitly argued that there should be symmetry between what a given sector (*i.e*., electric or gas) paid, and what it would be able to take out, in funding. • A number of respondents suggested that the EERS should embrace oil and propane customers and that a fuel-specific thermal SBC be established. • One respondent wanted to stress the importance of ensuring that cost effectiveness tests are applied over whole programs rather than individual projects. • Another respondent suggested that where smart meters were about to be installed by utilities, time-of-use (TOU) and Critical Peak Pricing should not be applied to meet the EERS. • A respondent indicated that less-aggressive targets be applied to smaller utilities, while another argued for the application of individual targets within sectors. • A couple of respondents suggested that the pursuit of energy efficiency in transportation/electric vehicles should form part of the EERS target. • One respondent made clear that EERS targets require better utility

[12] D. Steinberg & Zinaman 2014, Page 3.

	access to funding.

Other Issues for Consideration	• Fuel neutral EERS policy. • Caps on customer groups. • Application of cost-effectiveness tests.

Staff Recommendations	Staff believes that a robust, NHPUC-initiated EERS must include the following features. 1. Clear and definable, short-term and longer-term, electric and gas energy savings targets; Short-term targets should extend for a minimum of two years, and longer-term targets should extend for a minimum of ten years. 2. Targets should be statewide and mandated for all utilities under the jurisdiction of the NHPUC. 3. Targets should be specified for electricity and gas. 4. Targets should be specified by customer groups. 5. Clear and definable targets for other thermal fuels in the medium term. 6. Clear penalties for utilities/other possible program administrators (PAs), for failure to meet targets. 7. A clear indication of the sources of funding for the EERS as well as adequate resources to enable implementation of programs designed to meet the targets.

3.0 EERS Savings Targets

Existing States' Experience	• Long-term mandatory savings targets are at the heart of a robust EERS. • States typically justify their targets based on studies that predict the available energy efficiency within the state or adopt targets similar to those of neighboring states. • States typically ramp up targets to reach large-scale savings over several years. • The EERS must set the level of savings required and use a clear point of comparison. • Some states require savings to be measured based on a single "base" year or the previous year's sales. • Other states use forecast assumption levels as their baseline, *i.e.*, achieve 20% savings relative to 2020 business-as-usual forecast energy sales. • Still other states define a baseline based on weather-normalized average sales of the preceding three years. • Additionally, some states set targets in terms of energy unit savings (*i.e.*, GWh or therms) rather than percentage savings, thereby eliminating the need for a baseline. • State legislatures have often elected to enact targets, while PUCs tend to create the implementation framework. • PUCs habitually determine who will implement efficiency programs. • EERS targets often tend to apply exclusively to regulated utilities. • In many states, stipulations indicate the minimum customer size for participating utilities. • A number of states have a third party responsible for administration of EE and/or EERS programs (*e.g.*, ME, WI, VT). • Some states have a mix of third-party and utility (hybrid) administrative responsibility. • Regulators require that savings be reported either as net savings, gross savings, or both. • Often state energy efficiency targets do not align with policy. For example, in Illinois, the PUC-approved utility goals lower than legislative targets due to cost constraints. • Incremental electric savings targets in the 26 states identified by ACEEE fluctuate from 0.1% (TX) to 2.6% (MA). With the percentage of electric sales covered by EERS varying from 56-100%. • Incremental natural gas savings targets in ACEEE-identified states fluctuate from 0.2% (CO) to 1.5% (MN), with percentage of natural gas sales covered by EERS varying from 60-100%. • For incremental electric savings in 2011-2012, ACEEE reported that thirteen states exceeded their targets and six came within 90% of their targets. • For incremental natural gas savings in 2011, eight of thirteen states exceeded their natural gas savings targets, while, in 2012, five states exceeded their natural gas savings target and 6 states were within 90%

	of their required savings. • Evidence indicates that many states are surpassing their targets. Those states with an EERS in place that had planned to save 18 MWh in 2012 actually achieved over 20 MWh of electricity savings.[13] • New England (NE) states' incremental electric savings targets for 2013 are respectively: MA 2.6%, RI 2.4%, VT 2.0%, ME 1.6%, and CT 1.4%. • NE states incremental natural gas savings targets for 2013 are respectively: MA 1.1%, RI 0.9%, VT 0%, ME 0.3%, CT 0.6%. • Natural gas savings targets have tended to be lower than electricity savings targets, with targets from 0.1% of baseline sales up to 1.0%. • Several states with lower gas prices will face a challenge achieving their savings targets, as these lower prices may negatively impact the cost-effectiveness of natural gas efficiency programs within utility portfolios. • Savings targets must be reflective of funding sources available. • Some states capture a portion of energy savings that do not go through a formal EM&V process. In Hawaii, so-called "non-verified savings," *i.e.*, those achieved by state agencies, non-profits and private citizens without utility program assistance, are estimated by the PUC and added to verified savings. • ACEEE extrapolated annual electric savings to 2020, using the last year of each state's savings target, and found the following saving for NE states: CT 15.5%, MA 26.3%, ME 17.1%, RI 24.3%, and VT 24.2%.

Stakeholder Positions	• Consideration should be given to differentiate net vs. gross savings targets, the former better able to capture attribution, while the latter is important when considering externalities. • Targets established should depend on financing available. • The target will depend on how broad the reach of the EERS will be. • The target should be adjusted after the first three years in light of progress. • Further studies are required to determine attainable goals. • 10% energy savings in ten years should be the goal. • The EERS taskforce should remember that it costs more to get more savings, and we should not forget the rate risk of broader targets. • The ACEEE-recommended targets of between 0.75% to 1.25% annual savings from electricity and natural gas retail sales are too modest. • Some respondents are not sure whether transmission and distribution facilities should form part of EERS target plans. • The baseline for the targets should be a three-year rolling average of the previous three year sales, as per Ohio. • NH needs a fairly aggressive target as per the GDS and VEIC policy studies.

[13] *See* Downs & Cui 2014.

	• By the third year of the EERS, annual savings in retail sales should be at 1.0%, in addition to existing Core programs. • Should commence with a 0.75% target and slowly increase over time, taking into account the fact that as targets become more aggressive, the greater the possibility that utilities will focus on larger clients than serving the poor. • ACEEE's 0.75-1.25% annual savings target over the first three years seems reasonable with up to 2.5% savings depending on the time frame. • Better to only establish an annual savings target and renew based on performance. • Targets should be disaggregated by utility over which PA has control. • The MA goal of 2.0 % of retail sales should be attainable in NH in three years, with a 10% target within ten years. • We should ask ourselves, "Are we as aggressive as our neighbors?" • What are our goals, "all cost effective energy efficiency,'' and how does the EERS advance our climate action goals? • Any targets adopted need to be reviewed in light of progress. • Improving the distribution system will clearly be more cost effective than customer facilities, so we must allocate as fairly as possible. Combined Heat and Power (CHP) is likely to short circuit all other measures so we must be sure to implement caps by sector and by customer groups. • Distribution improvements should be approached comprehensively with consideration of grid modernization and storage a part of the planning. • Targets must be ramped up over time and not sure whether the 10% savings target in ten years is realistic. • The targets should be focused only on end-user efficiency goals. Short-term EERS targets should leverage Core end-user efficiency goals; longer-term, consider all options for inclusion in EERS.

Other Issues for Consideration	• The 2013 VEIC and GDS study suggested that by applying their six recommended strategies, cost-effective energy and thermal savings could represent 6.6% of statewide 2012 electricity use by 2017. • The 2009 study by GDS indicated that the appropriate level at which to set targets should depend on policy objectives, the potential for efficiency improvements, and the cost-effectiveness of available efficiency measures, all of which vary by state. • In 2015, SBC funds are anticipated to generate a total of $19.2 million for energy efficiency programs at the current rate of $0.0018/kWh. • The 2015 RGGI funds contribution to energy efficiency is estimated at $3.0 million • ISO-NE FCM funding is estimated at $2.5 million in 2015. • 2015 LDAC funds dedicated to energy efficiency are estimated at $7.07 million.

	• Total EE-dedicated public funds are equivalent to $24.7 million in electric and $7.07 in gas. • Doubling SBC funds, although unlikely to gain political acceptance would increase energy efficiency dedicated funding to an estimated $44.03 million in 2015. • The ERRS target proposed by Staff is based on a gradual ramping up of the existing Core program. It is assumed that as the EERS program consolidates, it will embrace a broader scope of activities to include utility transmission and distribution efficiencies as well as distributed generation and CHP-driven efficiencies. At that stage, the targets for electricity and gas savings will presumably be adjusted upward. • Furthermore, there will be an increasing number of non-utility-driven energy efficiency initiatives directed by other state agencies which will have an impact on the overall state EERS targets.

Staff Recommendations	1. The NHPUC should establish short-term (*i.e*., two-year) and long-term (*i.e*., ten-year) EERS targets. 2. By 2025, the targets should achieve a cumulative level of savings of 9.76% in electric and a cumulative level of savings of 6.91% in gas. 3. The NH legislature should establish a statutory EERS policy framework based on clear, cost-effective principles, within which the NHPUC and other appropriate state agencies administer the programs. Targets to be developed based on a combination of NHPUC analysis, stakeholder review, analysis of targets adopted in neighboring states, and level of feasible funding available. 4. For simplicity, savings to be measured relative to a single base year: 2012 approved savings. 5. The target for electricity and gas to be expressed as percentage of sales foregone in a given year. 6. Due to relative success and level of cooperation and goodwill within the existing Core program, NHPUC to initially assign targets to regulated utilities, which will have primary responsibility for implementation of the efficiency programs via their PAs. 7. In the short term, consideration should be given to the efficacy of establishment of a mix of third-party and utility administrative responsibility to encourage competition. 8. Savings to be reported as gross and net savings. 9. The target for electrical and gas programs combined should build on the existing Core performance. 10. Presently, reported savings for 2012 were 0.68% of retail electrical kWh usage, while for gas the reported savings were 0.62% of 2012 MMBtu usage. 11. Where possible, the target should ramp up gradually over the first two years to adjust to a new higher level of expectations and enable PAs to adjust their planning. 12. The first full EERS planning period should be established as a ten-year cycle, commencing in 2015 and ending in 2025, with the first

	two year ramp-up period to end on December 31, 2017. 13. Thus, the cumulative targets for the first three years should be as follows: • End of year 1 of EERS electric and gas targets, respectively: 0.65 and 0.68 % equivalent savings*; • End of year 2: 1.24% and 1.38% equivalent savings; • End of year 3: 1.89% and 2.07 %;Leading to a cumulative ten-year savings target of 9.76% for electricity and 6.91% for gas. 14. The differential savings targets to be allocated between electric and gas to reflect the challenge in implementing natural gas efficiency programs when gas prices are low. 15. *See* Staff's suggested target schedule, below.

<u>Suggested Target Schedule</u>

For each year from 2015 to 2025, retail electric and natural gas distribution utilities shall implement energy efficiency programs that achieve electric and natural gas energy savings equivalent to the following applicable percentages:

Table 1

Year	Electric Incremental Savings Target %	Electric Cumulative Savings Target %	Gas Incremental Savings Target %	Gas Cumulative Savings Target %
2015	0.65	0.65	0.68	0.68
2016	0.59*	1.24	0.70	1.38
2017	0.65	1.89	0.70	2.07
2018	0.71	2.60	0.70	2.77
2019	0.77	3.37	0.70	3.46
2020	0.84	4.22	0.70	4.16
2021	0.92	5.14	0.70	4.85
2022	1.01	6.15	0.70	5.55
2023	1.10	7.25	0.70	6.24
2024	1.20	8.45	0.70	6.94
2025	1.31	9.76	0.70	7.63

*Reflects lower Core budget.

Staff Modeling Analysis to determine EERS Energy Efficiency Targets for Electric and Gas

With 2014 reported savings for electricity at 0.68% of retail sales and gas savings at 0.62% and considering previous studies, the target level of energy efficiency in New Hampshire as measured by retail electric sales forgone in a given year could be much higher and in keeping with our neighboring NE states. The most recent study by VEIC and GDS concerning a suitable target for New Hampshire indicated that by using 2012 as a base year, the 2017 target for energy efficiency should be at a level of 6.6% of retail electric sales forgone.

Staff reviewed this analysis and has modeled at a high level of aggregation various possible scenarios for the EERS target.

The Staff model calculated performance based on 2014 NHPUC-approved targets and 2012 actual usage to permit a comparison between the VEIC, GDS and Taylor report and the EERS straw proposal. The objectives included a relatively-gradual ramp-up over the first three years for gas followed by predictable, equal changes from year-to-year. For electric, the increase was a uniform 5% per year. Using the EERS target savings listed in Table 1, above, the model was designed to (1) project currently-approved budgetary funding for 2014 on through 2025; and (2) seek to model the relationship between total costs to fulfill the modeled target ERRS from year-to=year with the known and available funding sources.

Given the success of the existing Core program, Staff assumed that the EERS program would initially leverage the Core energy efficiency program as a starting point, and fully embrace the "all cost effective measures" principle. Thus, the benefit arising from each year's program is assumed to be greater or even to the costs to fund it.

The model embraces the following additional assumptions:

- The EERS has a preliminary life cycle of 10 years.
- Electric and gas revenues and costs are tracked separately.
- In all instances a performance incentive was included at the current level of 8.0% of savings for gas and 7.5% for electricity, for 100% fulfillment.
- The following savings are differentiated: incremental savings; annual or accumulated savings; lifetime savings; and total savings.
- The 2014 NHPUC-approved Core energy efficiency budget was used as a baseline.
- An inflation rate of 2.5% was used for costs to achieve savings.
- A discount rate of 1.36% was used for benefits.

Model scenarios include the following:

A. **Option 1 &2** represented the base case both for electric and gas that tracked for the specified EERS target, the total costs required to achieve target fulfillment and the available funding level for each year of the EERS based on known public-funding sources and the associated surplus or shortfalls and when they would occur.
B. **Options 3 & 4** tested the impact of doubling SBC funding and LDAC charges to determine the impact on base case surpluses and shortfalls and how they may delay or advance surpluses or shortfalls.
C. **Option 5 & 6** tested the impact of including decoupling options, and the impact on funding, and on potential EERS targets arising from the application of, a 0.5% or 2.5% partial decoupling cap.

Differentiating between electric and gas utilities, and utilizing the 2014 approved base-year revenues as a starting point, and assuming a gradual increase in the level of electrical savings for each year from 2015 to 2025, cumulative savings of over one billion kWhs are considered attainable, representing approximately 9.76% of 2012 kWh electrical usage.

For the gas utilities, Staff recommends an increase of 0.70% per year for each year 2017-2025 with an initial gradual ramp up in 2015 and 2016 of 0.68% and 0.70%, respectively. This approach would result in cumulative savings by 2025 of nearly 1.5 million MMBtus, representing 7.63% of the 2012 gas MMBtu usage.

Staff also recommends that while the electric and gas energy-savings targets are overall, one objective will be to reach the greatest number of participants in the most effective way. Therefore, the implementation of the EERS should take place via segmenting customer groups and targeting programs accordingly.

By the same token, the broader the reach of the ERRS - beyond traditional customer-driven energy savings, embracing transmission and distribution improvements, distributed generation and CHP projects - the more ambitious the EERS target may become while ensuring that funding is allocated between customer groups and programs in an equitable manner.

For further detail, please refer to model simulations Option 1 Electric EERS target and Option 2 Gas EERS target found in the model appendices, below.

3.1 Target Metrics

Existing States' Experience	• Savings targets are defined in numerous ways across the EERS implementing states. • Targets are defined in incremental or annual terms. The Energy Efficiency Program Action Guide distinguishes between these: *incremental savings* refers to the reduction in electricity-use in a given year resulting from EE measures installed in that year; and *annual savings* refers to reduction in electricity-use in a given year resulting from EE measures installed in that year and measures in prior years that continue to provide savings. *Reference consumption* is the amount of electricity that would have been consumed in the absence of the EERS. • Additionally, EERSs differ in the units in which targets are specified: units are defined in *absolute terms* (*e.g.*, X GWh/year), which tend to be more straightforward; or *in relative terms* (*e.g.*, savings-equivalent to Y% of 20XX electricity consumption), for which it is necessary to define the quantity from which the relative (percentage) reduction is calculated - referred to as the *basis.* • Finally, there are two types of basis, fixed and rolling. A relative target with a *fixed basis* uses electricity consumption in a fixed period to calculate the required level of savings. A relative target with a *rolling basis* uses electricity consumption in a moving period that changes with the compliance year. • Thirteen EERS states employ incremental savings for their targets. • Ten states make use of annual savings targets. • Thirteen states make use of target units in relative terms, *i.e.*, percentages. • Ten states apply absolute GWh savings targets. • Of the New England states, MA, ME, RI, and VT all make use of GWh as target units. • Based on current experience, there is evidence to suggest that use of incremental targets limits the level of complexity of assessing compliance relative to using annual savings targets. • Annual savings targets, which track both measures installed in the compliance year as well as prior years' measures, may better reflect long-term energy savings goals. • Incremental and annual targets differ in how they incentivize utilities or other obligated entities.[14] Incremental targets may encourage low-cost, short-lifetime measures over more costly measures that save more energy and may be more cost effective in the long term. Under annual targets, obligated entities are incentivized to identify low-cost measures that achieve near-term and long-term savings.

Stakeholder Positions	• There was a high degree of congruence among respondents to make

[14] D. Steinberg & Zinaman 2014 at 3, Page 6.

	use of the percentage of cumulative sales forgone as a simple metric that was easily comparable with other states.

Other Issues for Consideration	• What is the most suitable baseline year? • Should the EERS - and how does the EERS - capture external, non-target-specific benefits of the savings program? • How are EERS targets informed by OEP's State Energy Policy?

Staff Recommendations	Based on the experience of other states and taking into account the mechanisms in place in neighboring states, Staff recommends the following: 1. Making use of incremental savings to aid simplicity from year to year. 2. Adopting annual savings targets for the period of the EERS, to better track long-term efficiency gains and provide better incentives for obligated entities to implement long-term measures with more significant, but long-term, savings. 3. Continue to track lifetime savings so as to more effectively screen programs for cost effectiveness.

3.2 Eligible Energy Efficiency Measures

Existing States' Experience	• Traditional energy efficiency measures, such as rebate programs for energy-efficient appliances, home weatherization, and lighting-replacement programs, are widely accepted for compliance across EERS policies. These programs have well-established frameworks for implementation and methodologies for measurement and verification of savings. • In order to increase flexibility, a number of EERS programs allow savings from a broader set of measures to contribute toward compliance, including changes to building codes and appliance standards, market-transformation efforts, behavior-based programs, supply-side efficiency improvements, and CHP or waste-heat recovery applications. • Broadening the definition of eligible savings measures allows for greater program ambition and more flexibility in compliance, and, as a result, many states are pursuing programs/measures from these categories. • Expanding eligibility to these measures also increases the challenge of producing accurate estimates of savings toward compliance, as methods for measurement and attribution of savings for some of these measures can involve a higher level of uncertainty. • Programs under consideration in various states at present include the following: (a) *<u>Building Codes and State Appliance Standards</u>*: Increasing the stringency of codes and standards (C&S) and the level of compliance can result in significant reductions in energy consumption (Lee et al, 2013). States are encouraging utility-run programs that increase the rate of adoption and level of compliance with codes and standards to contribute toward EERS compliance.[15] (b) *<u>Behavior-Based Programs</u>*: Behavior-based energy efficiency programs seek to change consumer energy-use behavior in order to achieve energy savings.[16] By use of outreach, education, competition, benchmarking, and/or informational feedback, these programs seek to change individual and organizational behavior and decision-making about energy use. (Currently being tested in Core pilot programs.) (c) *<u>Market Transformation</u>*: Market transformation programs are designed to remove barriers to the widespread adoption of energy-efficient technologies. Barriers may include lack of consumer awareness of cost savings and environmental benefits of efficiency measures, manufacturer uncertainty about future demand for energy-efficient products, or misinformation about the durability and quality of energy-efficient goods.

[15] *See* Attributing Building Energy Code Savings to Energy Efficiency Programs. IEE/IMT/NEEP, prepared by The Cadmus Group (2013).

[16] Todd, A.; Stuart, E.; Schiller, S.; Goldman, C. *See* SEE Action (2012). "*Evaluation, Measurement, and Verification (EM&V) of Residential Behavior-Based Energy Efficiency Programs: Issues and Recommendations*." Prepared by Todd, A.; Stuart, E.; Schiller, E.; and Goldman, C. Lawrence Berkeley National Laboratory.

	(d) *Supply-Side Efficiency Measures*: Although efficiency improvements to generation, transmission, and distribution infrastructure do not directly impact end-use consumption, supply-side efficiency improvements can be more cost-effective than investments in new generation capacity. A number of states now allow supply-side efficiency measures to contribute toward EERS compliance. Supply-side efficiency measures typically involve improvements or replacement of components of large-scale infrastructure. Supply-side efficiency measures may have a lower administrative cost than running a traditional end-use efficiency program and, as a result, there may be a benefit to allowing these types of measures to contribute. Nevertheless, it is important to point out that individual electricity consumers will not directly benefit from reduced energy use. Further there is some reluctance on the part of utilities to embrace this program since it encroaches on traditional utility transmission and distribution planning. (e) *Combined Heat and Power:* CHP, or cogeneration, is the simultaneous production of electricity and heat from a single fuel source. Every CHP application involves waste-heat recovery usually from an industrial source used for the production of electricity. MA, Michigan and CT permit savings from CHP to contribute towards compliance[17].

Stakeholder Positions	• Perhaps it may be too early to embrace a broader scope for the EERS targets in the short-term and seek to maximize all currently-available efficiencies to end users. • Distributed generation does not belong in the EERS. • Building code compliance must first be resolved at the political level, thus happy to leave out of the EERS in the short run. • There are capacity issues associated with enforcing building code compliance. • Is demand reduction compatible with energy efficiency standards? • EE dollars should only be spent on cost-effective end-use efficiency and are not justified for smart grid infrastructure.

Other Issues for Consideration	• None identified.

Staff Recommendations	• Staff shares the views of many respondents, who favor a broad scope for the EERS - that is beyond end-user customer efficiencies.

[17] Hedman, B.; Hampson, A.; Rackley, J.; Wong, E.; Schwartz, L.; Lamont, D.; Woolf, T.; Selecky, J. (2013). Guide to the Successful Implementation of State Combined Heat and Power Policies. State and Local Energy Efficiency Action Network.

	• Embracing transmission and distribution efficiencies and distributed generation may encroach on traditional utility least-cost planning but should not be an obstacle. • Staff believes that the current political problems around building code compliance in NH are sufficiently intractable to not lend themselves to a rapid resolution and results. • Staff recommends that in the initial planned three-year ramp-up period of the EERS, existing and traditional energy efficiency measures be intensified to reach new energy efficiency targets. • These measures and the gradual approach recommended are reflective of initial budgetary constraints. • Concurrently, groundwork should be established by the stakeholders to broaden the range of energy-efficiency strategies to embrace a broader set of measures. • Recognizing that a single CHP project might soak up a significant portion of allocated EERS funds, the NHPUC and stakeholders should examine mechanisms for better co-option of private-sector capital in order to be able to fund more ambitious projects. • In the case of a landlord-tenant relationship, municipalities adopt an abbreviated, voluntary energy-audit procedure to be paid by the landlord, when premises are vacated, and to be shared with prospective tenants so that they can compare the energy-efficiency of the dwelling and use that as a criterion in selection of a new home.

3.3 Sectors and Customer Groups embraced by the EERS

Existing States' Experience

- According to the McKinsey study on energy efficiency in the US economy,[18] efficiency potential across sectors is as follows:

Sector	McKinsey estimate of 2020 BAU* end-use consumption	End-use efficiency potential	Additional comments.
Residential	29%	35%	Extremely fragmented, spread across conditioning space of 129 million households, and energizing dozens of household appliances.
Commercial	20%	25%	Efficiency potential across 87 billion sq. ft. of floor space (electricity represents a larger share of consumption in this sector, thus, it offers the largest primary energy opportunity at 35% of the total when including commercial CHP opportunities).
Industrial	51%	40%	Opportunities more concentrated, with half the opportunities concentrated in 10,000 facilities, remainder distributed between 320,000 small and medium size enterprises.

*BAU refers to Business as Usual projections.

- Thus, multiple combinations of approaches are required for the state to support the scaled-up capture of energy efficiency as required by an EERS.
- Many state energy efficiency programs are confined to investor-owned public utilities (IOUs) and their customers.
- In some cases, the utilities may choose to serve a more limited subset of their customers.
- The target customer is a function of the location of the PAs at the IOUs.
- In some states, utilities negotiate with larger customers and implement EE objectives outside of the standard EE model of approval and evaluation, while recording the savings as part of their EE annual targets.
- An increasing number of utilities are beginning to differentiate needs of residential, commercial and industrial customers.
- All programs address the need to deliver energy efficiency services to customers in all income groups. However, in practice, at present, there is a ratepayer cohort just above income-wise the qualified low-income group that has difficulty in making full use of the non-low-income EE programs, yet may benefit disproportionately more.
- Many observers believe that reaching the next level in energy savings will require an improved understanding of customer behavior and better ways of engaging them.
- Some analysts have suggested that a new segmentation approach, deploying an integrated segmentation approach employing emotional motivation and attitudinal drivers combined with optimal use of rebates and incentives accompanied by pro-active investment in marketing and

[18] *Choi Granade, H.; Creyts, J.; Derkach, A.; Farese, P.; Nyquist, S.; and Ostrowski, K. (2009). Unlocking Energy Efficiency in the US Economy. McKinsey & Company.*

	sales capabilities, would permit utilities and technology players to succeed in the energy efficiency market.

Stakeholder Positions	• "At least one local utility has made tremendous progress in segmenting the business market and has finally begun to customize programs for various markets. This is clearly a way for the future."

Other Issues for Consideration	• The importance for the utilities to begin evolving from primarily commodity-sales entities into full-service energy companies, assisting their various clients in monitoring and controlling their energy costs

Staff Recommendations	• Staff recommends leveraging the existing Core technology-driven customer focus to meet the increasing energy efficiency targets in the short run. • Concurrently, EERS participants should look beyond specific technology like weatherization and LED lighting to examine in more detail the characteristics of their customers so as to be able to better segment them. • For example, in the residential market it may be helpful to distinguish between so-called "green advocate energy savers," traditionalist cost-focused energy savers, home-focused selective energy savers, and non-selective energy savers, and develop a raft of standardized products and services to meet each segment's needs.[19] • Similar analysis is needed for the commercial and industrial sectors. • Staff recommends expanding energy efficiency programs in NH in a way that increases the participation of residential and small-business customers, who, due to their income level above poverty guidelines, cannot at present afford to participate fully in the energy efficiency market, despite the often severely de-capitalized condition of their homes and businesses. Staff recommends that consideration be given to setting aside a portion of the currently-available public funds to assist these target groups to more fully participate in energy efficiency.

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Frankel, D.; Heck, S.; and Tai, H. (2013). Using a Consumer Segmentation Approach to Make Energy Efficiency Gains in the Residential Market. McKinsey & Company.

4.0 EERS Administration

Existing States' Experience	• At the state level an EERS is frequently supervised by the state PUC, since it has jurisdiction over all investor-owned utilities in the State. • The PUC generally has most of the information that it needs to supervise the program. • Often the PUC conducts a rulemaking to work out the details of administering an EERS program. • A number of states make use of formally established stakeholder boards to collaborate with the PUC to ensure that a variety of interests are represented when formalizing targets for each planning cycle. • The stakeholders also collaborate over data collection and aggregation. • The presence of the stakeholder board can help to smooth regulatory and legislative processes. • Absent a collaborate process, the PUC must rely on rate cases and IRP reviews to resolve issues. • Compliance/administrative responsibility may rest with a number of entities: Investor-Owned Utilities, a third-party organization, a government body or any combination of the above. • Utilities desire to maintain control over EE programs since there is an immediate relationship to resource planning and investment, and to keep a close connection with their customers. • In at least one state (Michigan), the utility has the opportunity to opt out of administering programs in favor of a third party.[20] • The advantage of a third-party organization is that its raison d'etre is to promote EE goals alone (*e.g.*, Efficiency Maine Trust, Efficiency Vermont). • Favoring utility administration and implementation of EE is the close customer relationship, and understanding of customer needs. • Utility program administration provides the possibility for engagement in integrated resource planning and capital investment planning. • Continued utility administration of EE developed within Core programs permits retention of existing infrastructure, staff expertise and energy services professional community. • On the other hand, when as a result of EE programs, unsold kWhs or therms do not generate anticipated utility revenues under a regulated environment, utilities suffer a loss of revenues, therefore disincentivizing them, absent other compensatory payments. • Additionally, given that investor-owned utilities' net income is

[20] M. Sciortino, S. Nowak, P. Witte, D. York, M. Kushler.2011. SEE Action (2014). *Energy Efficiency Financing Program Implementation Primer*. Prepared by Zimring, M., Lawrence Berkeley National Laboratory. Sciortino, M.; Nowak, S; Witte, P.; York, D.; Kushler, M. (2011). *Energy Efficiency Resource Standards: A Progress Report on State Experience.* ACEEE, Washington, DC, at 44.

	proportionate to the size of its capital account or rate base, sales growth enhances rate base while EE suppresses it. • The challenge then is to establish incentives that assist utilities in overcoming the lost revenue constraint while not making the incentives too generous. • Furthermore environmental improvement or market transformation may not be primary interests for utilities and thus require a sea change in corporate policy. • There is evidence to suggest that implementation of EE by utilities can be quite successful, and may avoid the need to dismantle well-established and skilled capabilities developed to serve Core programs as long as the right kind of incentivizing and compensatory payments are in place. • Independent (third-party) Administration of EE programs exists in at least seven states. • Clear benefits include ability to focus on state goals without the prism of conflicting business objectives; no conflicts associated with rate recovery and decoupling issues, ability to participate in utility long-run resource planning, centralized administration resulting in lower transaction costs. • However there are substantial costs in establishing a third-party administrator which, in effect, duplicates the efforts of existing utility program administrators. • In some cases, government has administered consumer-funded EE programs but with mixed success. • Government administered programs may be more responsive to statutory goals than responding to changing market conditions. • A number of states have recently embraced a hybrid administration dividing responsibility between two or more administrators with separate market segments.[21] • Under the hybrid model as applied in New York, the utilities focus on savings oriented programs while NYSERDA focusses on market transformation and finance opportunities, whereas in Indiana, the third party administrator manages statewide Core EE programs alone. • Some observers have suggested that competition between government administered programs and utility managed ones leads to customer confusion and inaction rather than stimulating greater competitive efforts. • Using 2012 data from the Regional Energy Efficiency Database[22] and recognizing that not all states capture administrative expenses in the same way, we can observe the following:

[21] Sedano, R. (2011). *Who Should Deliver Ratepayer Funded Energy Efficiency? A 2011 Update*. Regulatory Assistance Project. VT.

	o New Hampshire admin costs = 14.65% of budget; o Massachusetts admin costs = 5.09%; o Vermont administrative costs = 6.17%; o Rhode Island admin costs = 5.75%; and o Connecticut admin costs = 12.62%.

Stakeholder Positions	• VEIC model is better than utility program administrators since cannot completely rely on utility claims. • For utilities to implement the EERS program components, clear rules are required. • Third-party non-profits should run the program, anything but the utilities. • Utilities have a long trustworthy relationship with their customers so best able to pursue the EERS program. • Utilities have a direct line to their customers and cut out a potential middleman. • The four New Hampshire utilities manage the existing Core program well and have a track record of working well together, and will avoid competing with one another. • Perhaps there may be a case for both the utilities and another entity managing the EERS. • The program should not be dependent on the activities of the Electric Division of the NHPUC in any way. • In an EERS the role of the NHPUC should be "vigilant oversight." • We need to limit the administrative costs as much as possible; thus, the utility program administrators are the right administrators under the oversight of the NHPUC and designated stakeholders. • The past Core administration model should not be threatened since it is already functioning with no intermediary agency. • The benefit of a VEIC-type model is that there is no disincentive; however, it may be a challenge to take away administrative control from the utilities. • A VEIC model with the NHPUC adopting a coordinated role directing the non–profit is the most effective. • The benefits of utilizing the utility administrative model outweigh the risks. • Utilities should administer the existing end user energy efficiency measures but there may be a case for utilizing a NYSERDA look alike to promote other infrastructure development programs. • The utility energy efficiency relationship is not easily duplicated and should therefore stay in place.

[22] Regional Energy Efficiency Database developed by Northeast Energy Efficiency Partnerships. Currently includes 2011 and 2012 electric and natural gas energy efficiency program data for 10 jurisdictions including New Hampshire.

	• Given that the NHPUC has somewhat of an adversarial relationship with the utilities, for the NHPUC to continue to run the EERS energy efficiency program may be a challenge, perhaps another agency may have better outreach and could manage the process with the NHPUC's support. • The EERS program should be administered by the utilities and every effort should be taken to avoid an adjudicative process

Other issues for consideration	• None identified.

Staff Recommendations	• Staff believes that the most efficient way forward for NH is to build on the Core program utility centered administration model that has been in place for some time and has acquired expertise and acceptability from most interested parties. • This model of administration would be supervised by the PUC and be supported by a stakeholder process (perhaps a more active role for the current EESE Board) to ensure that as wide a range of views and priorities are represented when establishing targets. • Primary responsibility for program administration would remain with the utilities in the short run; however, consideration should be given to the possible benefits of opening up the market to a second program administrator such that the utilities would retain their focus on savings oriented programs, while a second entity could focus on market transformation and finance opportunities as is the case with NYSERDA.

5.0 EERS Funding

<table>
<tr>
<td>Existing States' Experience</td>
<td>

States have employed a variety of funding mechanisms to support EERS-driven activities.
California used a combination of utilities' resource procurement budgets (redirected from power plant investments) and a Public Goods Charge (a small charge per kWh added to energy bills).
Connecticut primarily utilizes a public benefit fund (PBF), which is similar to California's Public Goods Charge, to finance energy efficiency programs.
Hawaii takes advantage of significant funds from their lost revenue recovery provisions that have been built into PUC regulations.
In New Hampshire, the Core program currently comprises the following 2015 funding forecast, representing a grand total of $31.8 million/year.

<table>
<tr><td>Electric Funds ($ in thousands)
1. SBC 2015 forecast: $19,267,913 (10,704,396,000 kWh * $0.0018/kWh);
2. RGGI 2015 forecast: $3,000,000 (including $2.0 million for municipal projects); and
3. ISO-NE FCM 2015 forecast: $2,500,000.
Total of $24,767,913</td></tr>
</table>
<table>
<tr><td>Natural Gas Funds ($ in thousands)

Total of $7,075,372</td></tr>
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Typically sources of EE funding can be divided into public and private funds.
Ratepayer Funds: Core and other rebate programs (e.g., SBC and RGGI), energy efficiency reconciliation factor (EERF in MA), ISO-NE FCM funds, loan funds (e.g., Smart Start.), on-bill financing, tariffs and rates.
State Loan Funds: Commercial and Municipal.
State Bond Funds: Business Finance Authority, Business Energy Conservation Revolving Loan Fund, Community Development Finance Authorities, Community Development Block grants, Investment Tax credits.
Municipal Bond Funds: Property Assessed Clean Energy (PACE).
Challenge for many states is how to protect dedicated funds from state-raiding threats.
Aggressive energy efficiency targets will not be met by taxpayer and utility ratepayer funding alone.
Many program administrators increase their reliance on customer financing, seeking to increase the impact of limited program resources.
Financing has historically been a small part of the portfolio of EE offerings.
A significant barrier to EE adoption remains the high initial investment cost since these savings are typically recouped over the lifetime of installed measures via energy savings.
Many potential customers lack the financial means to make the initial

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	purchase of possible improvements, while the private sector has displayed relative reluctance in embracing the energy efficiency market in the past. • Many states including New Hampshire (within Core) have taken steps to embrace EE financing programs with limited success to date. • Program effectiveness is dependent on the provision of more reliable documentation to financial institutions to enable them to assess the performance benefits of energy efficiency financing. • Currently in many states, the energy efficiency financing market, especially for the residential and small business sectors, is characterized by low volume, lack of product standardization, and an absence of appropriate mechanisms to aggregate financing pools for resale to the secondary market. This prevents the recapitalization of the financial institutions with the funds to originate more loans. • High up-front costs, split incentives, and long project paybacks of some EE measures act as impediments to broader customer participation. • Middle and low-income households and small businesses are often underserved by private capital markets, which see them as high risk in relation to potential financial return.

Stakeholder Positions	• SBC, RGGI, FCM and LDAC are the primary funding sources. • There is a need to move away from reliance on public funds. Perhaps the introduction of an inverted-block structure may incentivize energy efficiency. • Core funds should be made available via open bidding to private groups as an alternative to utilities. • The EERS program should anticipate the sunset of public funding, to be replaced over time fully by private funding. • The utilities should focus their attention on administering energy efficiency programs while the banks should devote their energies to making available, and approving low-interest loans to fund the EERS program. • Public funds should be apportioned so that 75% go to utility-administered programs and the balance is made available to other agencies to administer. • Increasing public benefit funds will be a political hornet’s nest. • Raising SBC funds must be a political decision and should only take place with due concern for customer bill impacts. • Whatever strategy for funding EERS is adopted, it must limit the rate impact on the poor. • Raising the SBC charge should be a legislative decision.

Other Issues for Consideration	• Should raising the level of public funds remain within the scope of the NHPUC or should it be a decision of the legislature? • If the CAA (111d) requires ramping up still-further EERS targets to meet

	EPA's objectives, what will be the sources of funding to meet that goal?

Staff Recommendations	• Staff recommends using the existing Core funding in the short run to establish the EERS. • Staff suggests consideration be given to the establishment in the state treasury of an Energy Efficiency Fund into which all SBC, RGGI and LDAC funds would be remitted. • Revenues deposited into this fund shall be for the exclusive purposes of funding state energy efficiency programs and paying the programs' administrative costs. Money unspent in a year should be carried forward and spent in subsequent years. Interest on the fund should be credited to the fund. • The NHPUC should appoint an internal administrator of the Fund, and the Fund and its administration should be subject to a biennial audit. • Given the cumulative energy efficiency targets as recommended, alternative forms of financing of EE will be required to meet the targets, as illustrated in the Staff EERS model, below.

Staff modeled the funding needs required to meet the designated EERS targets.

Staff made use of the modeling tool detailed in section 3A, above.

Based on the EERS targets developed by Staff as gradual, reasonable, and politically-acceptable for the electric and gas utilities, and using the current Core funding as a point of departure, Staff's analysis focused on comparing the projected costs to fund the energy efficiency programs from 2015-2025 with the currently-available public funds under a number of scenarios.

Modeling electric savings, it was assumed that all current levels of energy-efficiency-targeted public funding, including the SBC, ISO-NE FCM, and RGGI funds, would remain the same.

The issue was to determine whether, under current funding levels, more ambitious EERS savings targets could meet the program costs. Staff performed a sensitivity analysis by comparing how well current SBC levels at $0.0018/kWh would cover EERS program costs, and then examining the impact of doubling the SBC charges to $0.0036/kWh (Option 1).

Under the first scenario in Option 1, where SBC remained constant at $0.0018/kWh, retaining public funds at their current level resulted in a funding shortfall of $2.5 million in the first year of the EERS program.

In the second scenario in Option 1, it was assumed that the SBC had been doubled to $0.0036/kWh, while other public funding levels remained constant. Given the estimated utility cost for fulfillment at $27.3 million, the new public funding level of $44.0 million more than met the funding needs of the program in the short term. Moreover, doubling the SBC charge alone enabled the funding requirements to fully meet fulfillment costs up to 2020. In 2021, once again there is a funding shortfall of $1.3 million, which by 2025 rises to $27.0 million.

Turning to gas, under the first scenario (Option 2), the LDAC was assumed to remain constant at $0.0302 per MMBtus. Retaining public funds at their current level resulted in a modest funding shortfall of $453,013 (total utility cost fulfillment in 2015 of $7.5 million and total LDAC funding of $7.07 million).

Under the second scenario in Option 2, the LDAC was doubled to $0.0603 per MMBtus, which led to a significant funding surplus throughout the period 2015-2025 and indicated that, for gas, a more modest increase in the LDAC would be sufficient to safeguard program funding.

Staff concluded that while doubling the SBC charge facilitated five years of funding on the electrical side, this was not a universal panacea, since, by 2021, the program would be facing a shortfall. In any event, Staff doubts the political acceptability of doubling the SBC charges.

Staff, therefore, concluded that from the outset, the proposed EERS program must use all best efforts to identify and make use of private funding to initially augment, and perhaps eventually to replace, public funding.

5.1 Financing of EERS and Use of Private Sector Capital

Existing States' Experience	• Where state policymakers have established aggressive EE savings targets, there is recognition of the need for substantial cost contributions by participating consumers in order to stretch further the impact of limited taxpayer and utility-bill payer funds. • LBNL[23] have determined that while the leverage potential of a 25% rebate incentive might be 4:1, the use of a 5% loan-loss reserve may stimulate up to a 20:1 leverage potential, assuming customer demand for the EE program. • Taking Connecticut as a typical New England example, energy efficiency funding is augmented on the residential side by direct lending with credit unions at pre-negotiated rates, with energy efficiency funds being used to buy down the interest rates in some cases. On the commercial side, the small business program uses on-bill repayment of loans that are bought down to 0% using energy efficiency dollars. In the past, the capital provider was the utility, but after a recent bid auction, the winning bidder became a bank. The CPACE program, run by the Connecticut Green Bank, uses seed capital to make a number of loans that are subsequently bundled and sold. • At present, while many financial tools exist, the terms (*i.e.*, interest rate, length) may not reflect EE benefits in the form of lower participant utility bills, lower defaults, etc. However, many observers believe that better data accumulated today from existing financing programs will make private financing of EE programs more attractive in the future. • The standardization of financial-product terms across programs may also help aggregate volume and facilitate secondary market transactions. • However, a 2011 ACEEE Study found that no residential energy efficiency financing program in the country had yet achieved a truly broad scale, with only two of the programs examined having participation rates of 3% or more. • Successful states have found a way to relieve the burden on utility ratepayers or taxpayers by making greater use of primary and secondary capital markets to fund their EERS programs. They make use of designated originators, who intake customer applications, approve or deny applications, and close and fund the financial product, and servicers, who generate payment statements, collect payments, remit to lenders/investors, and maintain records. • A number of models of originators/servicers has emerged, including banks, credit unions, finance companies, as well as specialized originators/servicers, which perform loan underwriting and bill collection. • The variety of financial products offered is based on their underlying

[23] G. Barbose, Goldman, Hoffman & Billingsley 2013.

	security, from unsecured loans, mortgages, leases, as well as the mechanism by which they are repaid (e.g., utility bill, tax bill, separate bill). • In a number of cases, EERS programs have embraced credit enhancement as a means of reducing lender risk by providing protection against, or as a second source of payment for, losses in the event of borrower default or delinquency. • Program administrators across the country have made use of a range of approaches, from the use of public funds to fund loans, approve the projects and the financing, and verifying project completion (as in the NH Core), to PACE models, in which no utility ratepayer or taxpayer funds are used to finance projects and customers are responsible for identifying a contractor and financial institution, and verifying that projects have been satisfactorily completed. • Examples of state strategies developed to leverage private capital include the following: 1. Oregon - Clean Energy Works Oregon (CEWO) provides a 10% loan-loss reserve to a private lending partner, Craft 3, a Community Development Financial Institution. Craft 3 has made more than $27 million of residential EE loans, yielding ten times leverage of each program dollar allocated to the loan loss reserve. 2. Hawaii - The state legislature authorized the issuance of $100 million in ratepayer-backed bonds to support its On Bill Finance program. Customer repayment of on-bill loans is to be used to repay the bonds. Where repayments are insufficient to cover bond payments, the bonds are to be secured through the states' Public Benefit Charge. • According to SEE Action,[24] there are five key lessons arising from EE-financing program experience: (1) Clearly define target customers, improvements, and financing gaps; (2) Safeguard customer demand by ensuring that EE programs are attractive to their customers; (3) When launching a financing program, leverage existing program delivery infrastructure to reduce costs and deliver consistency; (4) Engage with potential financing partners and contractors from the outset; and (5) Clearly define success from the outset, and design programs to test whether a strategy can deliver that outcome. • On the other hand, a major New England utility representative has suggested that traditional financing through local banks and credit unions has permitted the deployment of more than $90MM in private financing capital in the last two years alone via the MassSave residential HEAT loans, and has suggested that lenders should focus on the lending business, and utilities on driving the demand for EE rather than

[24] Thompson, P.J.; Larsen, P.H.; Kramer, C.; Goldman, C. (2014). *Energy Efficiency Finance Programs: Use-case Analysis to Define Data Needs and Guidelines*. State and Local Energy Efficiency Action Network.

	embracing on-bill financing, loan-loss reserves, use of utility capital, and utility collections. • In all instances, the received wisdom is that EE financing arrangements will not act as a universal panacea in promoting greater customer participation absent detailed knowledge of the target customer and his/her needs. • As stated by ACEEE,[25] when drawing conclusions about EE financing Programs: "Good loan terms don't assure the success of a program." Other programmatic elements beyond attractive financing terms also need to be considered. A list of such considerations was prepared for the Connecticut Fund for the Environment by Energy Futures Group.[26] • One observable trend at the state level has been the recent establishment of state lending institutions to support clean energy and EE projects. Although differing in structure, most institutions draw from a range of funding sources such as the SBC, bonds issued to private investors, private foundations, and cap and trade auction revenues. • In Connecticut, the Connecticut Clean Energy Finance and Investment Authority (CEFIA) is deploying capital to finance more energy efficiency projects, using multiple financing techniques. CEFIA reports that for every $1.00 of ratepayer funds CEFIA invested, about $10.00 was invested from private capital sources. In fiscal year 2013, more than $220 million was invested via CEFIA's various programs. • In February 2014, the $1.0 billion New York Green Bank initiative was opened for business and released its first RFP for a wide range of EE and clean air projects. Initially capitalized with $210 million in funding in December 2013, the New York Green Bank intends to partner with private sector institutions to provide financing for clean energy projects. Projects under consideration will include those related to energy generation and energy savings, *i.e*., solar PV and thermal, on-shore and off-shore wind power, fuel cells, hydroelectric, biomass, biothermal energy, biogas, and tidal/ocean power. Many states are now seeking to replicate the CEFIA and NY Green Bank models.

Stakeholder Positions	• Respondents, while aware that the existing public funding sources may not be adequate to meet new EERS target savings, had few clear recommendations concerning an alternative funding mechanism. • The use of secondary markets may be a useful financial model as long as the administrative costs, and the eventual interest rates achieved on the secondary market, are reasonable. • In the short term, ERRS funding should be based on the traditional Core public funding sources, which over time must be augmented or

[25] Hayes, S.; Nadel, S.; Granda, C.; Hottel K. (2011). *What Have We Learned from Energy Efficiency Financing Programs?* ACEEE, Washington, DC.
[26] C. Kramer, R.C. and Faesy, R. (2013). *Residential Energy Efficiency Financing: Key Elements of Program Design.* Environment Northeast, Connecticut Fund for the Environment.

	replaced by private sector capital.

Other Issues for Consideration	• In 2010, New York State launched their Green Jobs Green NY (GJGNY) program to promote energy efficiency using $51 million of RGGI Funds to establish a Revolving Loan Fund, to finance energy efficiency retrofits for 1-4 unit residential buildings. The revolving loan fund was to be supported by up to $9.3 million as a loan-loss reserve from a grant awarded to NYSERDA by the US Dept. of Energy under the Better Buildings Initiative. By 2013, NYSERDA announced that it had raised $24.3 million in its first ever issuance of revenue bonds for improvements.

Staff Recommendations	• In the absence of a full understanding of customers and their needs and a pro-active approach to the development of demand for EE, progress in meeting EERS targets may be slow. • Current Core budgets would fall short of investment levels necessary to meet more ambitious EERS targets. • Staff believes that although many customers have access to attractive capital today, specific customer segments may face barriers in accessing credit. Typical examples may include middle-income single family households or retirees, which form a significant and growing cross section of New Hampshire households. • Staff believes that the existing financing mechanisms already established in the NH Core program should be leveraged in the first instance to promote the EERS footprint. This would be a suitable start-up strategy and would help to meet the EERS targets in the first two years. • Staff recognizes the good work performed by utilities in facilitating access to low-interest loans or ratepayer funds and believes that these initiatives should be pursued more aggressively. • Staff endorses the use of on-bill financing , commercial PACE, credit enhancements, and rate recovery bonds, which may serve to address the problem of unattractive interest rates, short loan terms, split incentives, or even lack of customer credit access, which constrain EE measure adoption. • On the other hand, Staff is concerned that currently Core PAs, when rolling out a successful EE measure, may often be faced with a financial bottleneck compelling them to actively discourage further customer acquisition. • Staff is not persuaded that the establishment of a Green Bank or CEFIA-type organization is required, desirable, or likely in New Hampshire in the short term. However, these solutions should be revisited in light of their reported progress. • Staff believes that every effort should be made to remove financing barriers to EE through improved financing tools and mechanisms. The

	removal of these barriers may yield broad customer access to attractive capital that will facilitate wider adoption of EE improvements. • Staff believes that the amount of primary market capital is limited, and that it is vital to access secondary markets to provide an unlimited capital source. • Therefore, Staff recommends that once up and running, the EERS program should immediately embrace and develop a financing paradigm that will enable it to better leverage each public dollar, thereby enabling the estimated cost of EE targets to be met. • In implementing a funding program, issues to consider include implementing a funding program that is scalable and reliant primarily on private funding; and that avoids buy downs where possible and possesses a backup fund for credit default. • For example, for residential customers, Staff recommends the establishment of/or participation in a WHEEL (Warehouse for Energy Efficiency Loans) type of program. This residential financing initiative launched initially in Pennsylvania and Kentucky delivers standardized loan products and underwriting processes across jurisdictions. CITIGROUP, as a capital market partner, purchases and warehouses pools of loans as they are originated and as program volume grows. CITIGROUP anticipates pursuing a secondary market sale of its unsecured loan portfolio and doing so on a recurring basis as more and more loans are originated. The proceeds of each sale are to be used to replenish programs and fund more efficiency loans. *See* Appendices for further details. • Staff recommends that the EERS PA track the progress of several emerging models for the financing of EE projects, including rate reduction bonds, energy savings insurance, delivery of EE as a service, and real estate investment trusts. • Staff is aware that EE financing initiatives like credit enhancement and direct loans align poorly with typical ratepayer funded two to four year EE program cycles, as loans and leases often have terms that extend beyond these short-term cycles. Thus, existing regulatory protocols may need to be adjusted to accommodate EE financing attributes.

5.2 Potential EERS Bill and Rate Impacts

Existing States' Experience

- There is relatively limited documentation concerning the bill and rate impact of ramping up EE programs.
- EE programs provide a wide array of benefits both to customers and utilities.
- However, while programs reduce average customer bills in the long term, they also result in increased pressure on electric and gas rates in the short term.
- Recent bill and rate analysis performed for the Rhode Island Division of Public Utilities [27]estimated the long-term rate impact of the electric efficiency charge increase to $0.00896/kWh is likely to be between 0.7% and 1.5%, with most program participants seeing a reduction in electricity bills.
- The following table provides a high-level summary comparing the base-case scenario for the RI three-year (2015-2017) EE plan with a hypothetical no-EE scenario, while keeping the systems benefits charge at the current rate. The average-measure life of EE measures is taken into account. The findings for how electric rates are likely to change as a result of three years of EE activities is as follows: highest short-term rate impacts (experienced in a single year) range from 6.4%, for small C&I customers, to 8.7%, for large C&I. Average long-term rate impacts range from 0.7%, for large C&I, to 1.6%, for low-income customers. Long-term rate impacts are significantly smaller than short-term rate impacts. Impacts on rates for residential, low-income, and small C&I customers are similar in magnitude.
- With respect to bill impacts, the RI analysis indicated the following: participants in EE programs are likely to experience bill reductions that will often outweigh rate increases precipitated by the three-year plan; bill impacts vary widely by program and customer type, with participant bill savings ranging from -1to 43%. Customers who participate in multiple programs or in multiple years will see higher bill savings.

Figure 1. High-Level Summary of Results

	Highest Single-Year Rate Increase	Average Long-Term Rate Increase	Range of Participant Bill Savings	General Participation Conclusions For Cumulative Participation 1998-2017
Residential	6.4%	1.5%	-1% to 8%	Vast majority of customers participate.
Low-Income	7.5%	1.6%	-1% to 11%	Undetermined.
Small C&I	6.6%	1.2%	34% to 43%	Roughly 30% of customers participate.
Large C&I	8.7%	0.7%	0% to 3%	Majority of customers participate.

- Similarly, in Massachusetts, an independent report by the Analysis Group, of 2010-2012 EE programs, reported that they would result in average monthly bill savings of almost 3% for the average customer up until 2020. This does not take into account the reported additional $1.2 billion in net

[27] Woolf, T. (2013.). *Energy Efficiency: Rate, Bill and Participation Impacts*. ACEEE, Washington, DC.

	value to the MA economy or support in the creation of an additional 16,900 jobs by 2025.[28] • The increase in rates is observable in the short term since efficiency program costs are typically collected from ratepayers in the early years, while efficiency savings are reaped over many years. • The 2014 VEIC/GDS final report on increasing energy efficiency in New Hampshire calculated that the bill impact of doubling the SBC by 2017 would allow participating residential customers to save 1.4% of their annual electric bill, while non-participating customers would face a 0.8% increase in their annual electric bill. • For participating C&I customers, the 2014 VEIC/GDS final report suggested electric savings would be in the order of 26%, while non-participant customers would expect to contribute 1.1% more through the SBC. • It is this latter phenomenon that acts as a potential barrier to increasing EE targets. • Others have indicated that rate impacts may include reduced generation costs and reduced wholesale prices. EE programs may also improve reliability, reduce the need for transmission and distribution facilities, and reduce dependence on fossil fuels, and these benefits may be enjoyed by non-participants, too. • SEE Action recommended that EE programs be designed to reduce costs and maximize customer participation; the more customers participate, the more they will experience the benefits of net bill reduction. Therefore, programs should have increased budgets as a means to increase participation. • The central issue here is the different impacts of EE programs on participants and non-participants. Program participants receive most of the direct benefits of EE programs (i.e., reduced bills relative to cost without EE), whereas non-participants experience higher rates without the same level of bill savings. • If the majority of customers become program participants, concerns about rate impacts should be significantly mitigated. • SEE Action recommends that rate and bill analyses be performed in addition to cost-effectiveness testing; that is, first conduct cost-effectiveness tests, and then, if positive, evaluate for rate and bill impacts, differentiating between participants and non-participants, short vs. long term, and on a portfolio - not program-by-program – basis. • Rate and bill analyses should account for all potential savings affecting rates including avoided generation costs, avoided transmission costs, avoided distribution costs and losses, avoided environmental compliance costs, and wholesale-market price-suppression effects. • Design principles to mitigate rate impacts, including PA incentives that encourage energy savings and net benefits rather than rewards for

[28] O'Reilly, J., Craft, J.; and Treat, N. (2014). *Bill and Rate Impacts of an Energy Efficiency Resource Standard in New Hampshire*. *Northeast Energy Efficiency Partnerships* (*NEEP*), MA.

	spending money, while maximizing all customer participation through measures and financial support specifically tailored to each customer type. • A 2010 study performed by LBNL and an independent consultant examined the financial impact of achieving aggressive EE program-savings goals and utilizing a variant of the National Action Plan for EE (NAPEE).[29] The study modeled the impact of three EE savings portfolios: (a) no new EE, (b) business-as-usual EE, assuming 0.9% savings annually, and (c) aggressive EE based on 2.4% growth in savings/year, assuming the programs would run from 2010-2020. The study found that in both of the more-aggressive savings portfolios, customer bills were reduced significantly, while the timing of the bill savings was dependent on how quickly additional funding sources were applied. • The 2010 LBNL study also demonstrated that an aggressive EE portfolio resulted in negative sales growth and large rate increases (4.4%/year), although additional funding sources offset the rate increases somewhat. Further, ratepayers were predicted to experience an additional $1.2 Billion, or 1.3% in bill savings, through full application of FCM, RGGI and other funding sources, with annual all-in retail rates reduced by 0.25c /kWh by 2020. • Finally, the study suggested that utilities need decoupling to reduce the effect of aggressive EE on return on equity (ROE). The study found that achieving aggressive EE through the application of decoupling and additional funding sources would produce $8.9 billion in total bill reductions and suggested that it would be possible to achieve large customer bill savings by aligning utility financial interests with state energy policy goals.

Stakeholder Positions	• The impact of ramping up energy efficiency programs via an EERS should ensure equity with respect to class and location. • Ensure that the greatest number of customers participate in the program, via tax incentives and targeting the retired community. • Although only energy efficiency participants will see their bills decline, when rates rise, for non-participants facing higher bills, the benefits of the EE programs will be in the form of an indirect benefit to the whole of society whether participating or not. • How does one address the needs of low-income residential and small business customers, who are above poverty guidelines? • The best way to avoid discrimination in bill and rate impacts is through the greatest degree of participation via more funding. • Political leadership and customer education about the benefits of energy efficiency are key to ensure maximum participation.

[29] P. Cappers, A.P.; Satchwell, C.A.; Goldman, J.C.; Schlegel. J. (2010.). *Financial Impacts of Achieving Aggressive EE Program Savings Goals*. Lawrence Berkeley National Laboratory. Berkeley, CA.

	• Keep administrative costs to a minimum in order to fund more participation.

Other Issues for Consideration	• Many fixed-income residential customers and small business owners who operate on limited budgets cannot afford to participate in energy efficiency programs despite the severely de-capitalized conditions of their premises. Either they do not have enough liquidity to meet the low-interest loan repayments required, or they are discouraged by unforeseen ancillary costs associated with energy efficiency improvements.

Staff Recommendations	• Two challenges face the EERS PAs at the outset: (1) How to mitigate bill impacts on non-participants? (2) How to limit rate increases caused by risk to existing utility ROEs precipitated by aggressive EE targets? • The EERS PAs must navigate a fine line between reductions in customer bills and increasing customer rates. • Every effort must be taken to ensure high participation rates as the best safeguard against negative bill and rate impacts. • High participation rates have a higher likelihood of success if more funding is made available to programs, whether by increasing public funding or greater private-capital involvement. • Reliable data tracking and reporting of participation rates is critical to understanding the effectiveness and risks associated with specific programs. • Recovery of lost revenue represents a significant driver of rate increases in the long term. Thus, some consideration of a lost-revenue-recovery mechanism or decoupling is vital. • Greater levels of funding will be the best safeguard for higher participation rates, which will overcome the discriminatory effect on non–participants. • Perhaps the EERS PAs may wish to revisit the TRC test currently used in Core and seek to better capture the benefits of each program of measures through consideration of the Resource Value Framework.[30] • Although increasing program participation rates through greater levels of funding will mitigate potential discrimination in bill impacts, it will not resolve the constraints faced by small-scale business and residential households on fixed incomes, just above the poverty level, including some retirees. Staff believes that for these customers, a fixed percentage of the public funds be dedicated as grants to enable them to participate more fully in the energy efficiency programs.

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

6.0 Monitoring and Evaluation

Existing States; Experience	• Despite numerous regional efforts at establishing a more consistent set of tools and protocols for measuring and evaluating the impact of EE programs, much remains to be done before a full comparison of EE programs across the US can take place. • The ability to evaluate and confirm EE-program impacts is critical. Lazard[31] reported that on a levelized-cost basis, new electrical energy efficiency programs cost about -one-half to -one-third as much as new electrical generation resources. • ACEEE recently reported on the costs and effectiveness of 2009-2012 utility-sector energy-efficiency programs, indicating that EE remains the lowest-cost energy resource even as the amount of EE being captured has increased significantly. • According to the report, at a cost of 2.8c/kWh, EE programs are one-half to one-third the cost of alternative new electricity resource options, while in the case of gas, EE programs at a cost of 35c/therm is well below the national average price of 49c/therm in 2013. • On the other hand, of concern to stakeholders is whether EE-program cost of saved energy will increase as EE programs ramp up to meet higher EERS targets. • At present, states have adopted varying practices when evaluating costs and energy savings from efficiency programs. • Utility PAs combine direct program costs and shareholder performance incentives (PIs) when determining the total cost of energy efficiency resources. • Core in New Hampshire makes use of the total resource cost test (TRC), which includes program costs and participant costs. The utility (or PA) cost test (UTC) views cost from the utility perspective alone and does not consider participant costs. • At present, most annual PA reports do not capture participant cost estimates and benefits. • ACEEE representatives have suggested that PIs be included in the calculation of the total cost of energy efficiency, but decoupling and/or lost fixed-cost recovery should not be included. They are not strictly costs of delivering efficiency services, because they do not increase total revenue requirements. In ACEEE's view, decoupling and lost fixed-cost recovery are rate tools designed to reallocate fixed costs in different ways, *i.e.*, recover the same fixed costs that would have been recovered anyway.[32] • Evaluation, monitoring and verification (EMV) of energy efficiency programs enables confirmation of energy savings and verification of cost effectiveness, and helps PAs to improve their performance.

[31] Lazard's *Levelized Cost of Energy Analysis*, Version 3.0 (2009). Lazard. Ltd., New York, NY.
[32] M. Molina 2014. Molina, M. (2014). *The Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs*. ACEEE, Washington, DC.

	However; however, states still employ varied methods to identify and calculate savings, and use different technical resource manuals to specify the engineering calculations used for estimating savings. • One example relates to the estimation of net or gross savings. Gross energy savings capture savings due to program-related actions taken by participants irrespective of why they participated. Net savings seeks to capture energy-use changes directly attributable to a specific EE program, but net savings also accounts for free ridership and may include spillover and induced market effects. • States differ in their reporting of EE "at sight" savings (i.e., at the customer meter) vs. at-generation savings (which include estimates for transmission and distribution line losses) that are avoided. • Another consideration for PA's is whether to express costs of EE portfolios, relative to energy savings, as levelized costs or limited to first year "acquisition" costs. In the NH Core programs, the custom has been to annualize upfront investments over the life of the investment assuming a real discount rate. • In an effort to ensure that EE programs are cost effective relative to their avoided costs, states use of variety of cost effectiveness tests, from the TRC (used by NH Core) to the UCT, and also the societal cost test tests (SCT), the participant cost test (PCT), and the ratepayer impact measure (RIM). ACEEE has reported that states use a combination of tests with the TRC being the most widely used. • SEE Action[33] suggested that when setting an EM&V budget, the following should be taken into account: balancing (1) the cost, time, and effort to plan and complete the evaluation(s); (2) the uncertainty of various impact evaluation approaches; and (3) the value of the information generated by the efforts. • SEE Action indicated that when planning an EM&V budget, states should consider the level of acceptable risk and determine the requirements for accuracy. Factors under consideration may include the following: (1) How large is the program with respect to budget and savings goals? (, (2) What is the level of uncertainty associated with the savings of a program? (3) Does the savings determination need to indicate how much was saved? (4) Is it a new or well-established program? (5) Is it adequate to record that individual projects were installed, or are rigorous field inspections required? (6) is the project likely to be expanded? (7) How long since the last program evaluation has taken place? (8) Do savings need to be attributed to specific projects within a program? (9) How long does the evaluation need to be conducted? (10) What is the time interval of reported savings? (11) What are the reporting requirements? (12) Are other non-energy benefits to be calculated? (12) Are the savings to be reported as part of a regulatory (EERS) requirement for compliance?

[33] SEE Action. (State and Local Energy Efficiency Action Network) (2012.). *Energy Efficiency Program Impact Evaluation Guide*. Prepared by Steven R. Schiller, Schiller Consulting, Inc.

	• There is evidence to suggest that a reasonable spending range for evaluation (impact, process, and market) represents between 3-6% of a portfolio budget. In practice, there is much variation over how budgets are categorized between program and evaluation expenses. • The Consortium for Energy Efficiency reported in 2011 that combined spending on EM&V for gas and electric EE programs was about 3.6%, while other studies have indicated up to 6% spending.%. • EM&V of energy savings will become even more critical as states move forward to embrace the EPA's CAA 111(d).) .

Stakeholder Positions	• Most respondents were not clear on the form and content of EM&V. • Many believe that evaluation should be performed by a third party selected by, and reporting to, the NHPUC, with a budget of approximately 5% of the program budget. • Suitable EM&V activities are crucial; this is an issue of credibility. • Evaluation should not be performed by utilities but by third-party evaluators. • Third-party evaluators add an unnecessary layer of bureaucracy. • Utilities should not select evaluators. • The NHPUC needs to hire evaluators, who report directly to its Staff. • Evaluation can often identify new energy efficiency opportunities.

Other Issues for Consideration	• None identified.

Staff Recommendations	• Robust EM&V are critical to determining which EE programs are truly cost-effective and to what degree, and EM&V are vital to demonstrate the EE programs' impact on procured energy and demand savings. • In view of the potential concern about the impact of ramping up EE targets and their impact on cost of saved energy, it is vital to strengthen further the existing Core-driven EM&V and to cooperate more closely with the NEEP Regional Evaluation Measurement and Verification Forum. This will provide the opportunities to leverage prior experience of other states, more-rapidly approve already-developed and tested EE programs without extensive pilot programs, and to adopt standardized methodologies and reporting guidelines. • In calculating the cost of energy efficiency programs, the EERS PA should continue to make use of the TRC to evaluate the program and participant costs of EE measures. . In addition, the costs should capture the PI received by utilities. • Finally, in contrast to the ACEEE, Staff is not persuaded that decoupling or lost-revenue recovery mechanisms should not be factored into the cost of EE. Staff understands that by saving on energy commodity sales,

	EE programs precipitate decline in utility revenues, which are in part made up by the PI. Absent the EE program, a decline in utility revenues would not necessarily result in regulatory approval of a full recovery mechanism, without some evidence that the utility was seeking other strategies to manage its revenue stream. While Staff recognizes the need for decoupling as a means to ameliorate the sudden decline in revenues precipitated by aggressive EE programs, decoupling, PIs and ROE should all be considered as part of the same packet of measures available to regulators and utilities. A decline in sales precipitated by EE programs may require the regulator to examine PI levels as well as ROE when determining the level of lost revenue recovery, and may task the utility to seek new ways to capture market share. For further discussion, see section 7, below. • Since decoupling or lost revenue recovery mechanisms (LRRMs) are designed expressly to compensate utilities for lost revenues and to enable them to maintain their approved ROE, which may have been eroded through implementation of the EE targets, these compensatory payments - if and when approved -have been precipitated by EE programs, and their cost should be fully captured in the EE cost calculations. • The practice of expressing costs of EE portfolios, relative to energy savings, as levelized costs - as practiced in the Core program today is sound, and Staff would anticipate its continuance under the EERS. • Based on the experience of other states, Staff would seek to limit the EM&V budget to no more than 5% of the program budget.

7.0 Utility Compensation for EE implementation

Existing States' Experience	• Under traditional regulatory rate structures, utility revenues are proportional to sales of electricity and natural gas, while many utility costs are fixed, regardless of sales. Consequently, programs that improve energy efficiency among their customers, and, thus, reduce sales, can have a negative effect on utility profits. This "throughput incentive" is a significant barrier to effective utility energy efficiency programs. • Decoupling is a rate adjustment mechanism that addresses this market barrier. • Decoupling refers to policies designed to "decouple" utility profits from total electric or gas sales, so utilities do not have an incentive to try to sell more energy. • Decoupling modifies traditional ratemaking practices by adjusting rates more frequently to ensure that utility revenue is neither more nor less than what is needed to cover costs and a fair return. • IOUs do not set their rates. Instead, PUCs set rates every few years at a level sufficient for the utility to recover costs and earn a fair return on investment. However, actual utility revenues vary based on actual energy consumption, resulting in utilities receiving more or less revenue than the PUC found they needed. • Decoupling sets the revenue needed to cover known costs, then allows rates to change with consumption to meet the revenue target. • Decoupling can be implemented by adding a "true-up" mechanism, which automatically adjusts rates more frequently based on consumption. Decoupling can also be implemented through other methods, such as a balancing account, which is used to store excess revenue or make up for revenue shortfalls. • Decoupling in and of itself does not provide utilities with incentives to increase energy efficiency. Rather, it removes the "throughput" incentive that discourages such efficiency. • Positive financial incentives for effective energy efficiency programs, such as performance bonuses, enhanced rates of return, or shared savings, are frequently combined with decoupling. • Decoupling can affect ratepayers in a variety of ways. Rate adjustments under decoupling are typically small. According to a 2013 report produced for the American Council for an Energy-Efficient Economy and the Natural Resources Defense Council, almost two-thirds of adjustments made under decoupling were within 2% of the retail rate, and 80% of rate adjustments were within 3%. Such adjustments are modest compared to the impact of changes in other utility expenses that influence rates. Moreover, while 63% of ratepayers surveyed saw small surcharges from their providers, a percent of ratepayers received modest refunds. • Consumers benefit from energy efficiency investments that reduce their energy consumption and their energy utility bills, since savings in fuel and other variable costs (for natural gas, the large majority of costs) are

	passed through to them. As consumers broadly engage in energy efficiency, all ratepayers benefit as the high costs of new power plants, transmission lines, and pipelines may be reduced or avoided. Decoupling may also reduce volatility in energy bills due to weather and other factors, and it reduces risk for utilities, too. It preserves customers' incentives for efficiency while removing utilities' throughput incentive. • Decoupling is only one of several ways to address the throughput incentive issue. Another way would be to charge ratepayers a flat fee that covers all fixed costs, a system known as Straight Fixed Variable Rate Design. However, such a system would reduce efficiency and conservation incentives for ratepayers by reducing their individual savings from lower energy use. • Other methods, called Lost Revenue Adjustment Mechanism (LRAM), Net Lost Revenue Recovery, or Conservation and Load Management Adjustment, seek to distinguish between revenue impacts of energy efficiency and other variables, such as weather and the economy, in adjusting rates. This avoids rates fluctuating due to weather and other causes, but it fails to remove the full throughput incentive and requires sophisticated measurement and verification of program savings. Hence, utilities may benefit from ineffective efficiency programs. Currently, there are a number of states considering implementation of these alternatives as a means to promote efficiency practices among utilities. • Last year, decoupling mechanisms covered 25 states, including 52 LDCs and 25 electric utilities. • A report[34] estimating the retail rate impacts of 1,269 decoupling mechanism adjustments since 2005 found the following findings. Decoupling rate adjustments are mostly small – within plus or minus two percent of retail rates. Across the total of all utilities and rate adjustment frequencies, 64% of all adjustments are within plus or minus 2% of the retail rate, amounting to about $2.30 per month for the average electric customer, and about $1.40 per month for the average gas customer. About 80% are within plus or minus 3%. The primary distinction on size variation exists between mechanisms that adjust monthly and those that adjust on some other basis, most commonly annually. For gas mechanisms that adjust monthly, the adjustments are within plus or minus 2% half of the time; for electric monthly decoupling mechanisms, this is 65% of the time. Electric decoupling mechanisms that adjust other than monthly have been within plus or minus 2% most of the time – 85%. Gas mechanisms that adjust other than monthly have stayed within this range 75% of the time. In other words, the more frequent adjustments yield more volatile rate changes. • Decoupling mechanism adjustments in place today yield both refunds and surcharges. Across all electric and gas utilities and all adjustment

[34] P. Morgan, P. (2012.). *A Decade of Decoupling for US Energy Utilities: Rate Impacts, Designs and Observations*. Graceful Systems LLC.

	frequencies, 63% were surcharges, and 37% were refunds. There are many reasons that actual revenues can deviate from the revenues assumed in ratemaking. Most of the mechanisms do not adjust revenues to remove, or normalize, the effects of weather. If the mechanism does not normalize weather, the primary cause of greater and lower sales volumes, particularly on a monthly basis or for residential rate schedules, is usually weather effects. Other causes include energy efficiency, programmatic and otherwise, customer conservation, price elasticity, and economic conditions. • While under non-EERS-driven conditions, no pattern of either rate increases or decreases emerges, if the primary purpose of the decoupling is to mitigate the negative revenue effects of EE programs, then the trend will be towards surcharges and consequent rate increases. • On some regular basis under an EERS, a decoupling mechanism causes a rate adjustment to ensure that customers, in effect, pay surcharges when the revenues the utility actually received from customers were less than the revenues the mechanism calculates. This difference can occur for many reasons, primary among which are weather, economic conditions, energy efficiency programs and incentives, and customer behavior that cause the use of electricity or gas to differ from amounts assumed in the ratemaking process. • Studies indicate that in 2013, the overwhelming majority of decoupling mechanisms cover only a utility's fixed costs associated with local delivery of natural gas or electricity. However, seven electric utility decoupling mechanisms include the fixed costs associated with generating plants owned by the utility or other supply-related fixed costs. • Decoupling analysts have suggested that states considering adoption of decoupling mechanisms need to address the following five questions: (1) Should the authorized revenue used to calculate the decoupling adjustment (actual revenue less authorized revenue) change from year to year by any means other than a general rate case? (2) How often should a decoupling adjustment take place? (3) Should the actual revenues used in the mechanism be adjusted to remove the revenue effects of sales resulting from weather that is warmer or colder than the weather assumed in setting rates? (4) When comparing actual revenues to authorized revenues, should that occur on an overall utility basis or by customer class or rate schedule? (5) Should there be any limits on the size of decoupling adjustments that occur, and, if there are limits, what should happen to refund or surcharge amounts in excess of the limits? Should the decoupling apply to the full difference between actual and authorized revenues or only some part of it? • An additional issue relates to the ROE. (1) Does decoupling reduce a utility's business risk, and, if so, can one quantify this reduction? (2) Assuming one can quantify the reduction in risk, can one apply this quantification in some mechanical way to the overall determination of

	an appropriate ROE? • A recent study of ROE decisions reported that a large majority of decisions adopting decoupling made no ROE reduction. In fact, of 72 documented decisions on decoupling, the majority had no impact on ROE. For the remaining decisions, nine anticipated a 10 basis point adjustment in ROE, three had a 25 basis point adjustment and four had a 50 basis point adjustment. • A number of PUCs addressing the ROE issue have noted the absence of empirical evidence regarding how, if at all, decoupling changes a utility's business risk. However, there is general agreement that the actual adjustments tend to be small. Some analysts take the view that the amounts that flow through utility cost adjustment clauses, such as power cost or purchased gas adjustment clauses, or trackers for capital additions, environmental remediation expenses, or any of a myriad of other large costs, dwarf decoupling adjustments. • For many market observers, adoption of decoupling presupposes that commodity sales will fall, not rise, preferably because of widespread adoption of cost-effective energy efficiency measures. This, in turn, will have an impact on what is meant by utility competitiveness and reasonableness.

Stakeholder Positions	• Respondents were by and large in favor of a decoupling mechanism for utilities promoting energy efficiency. • Decoupling may not be necessary. Commodity losses may be made up via a rate redesign, which maintains a positive energy efficiency incentive to ratepayers by applying an inverted block rate structure and by transferring less energy charges to capacity charges. • Decoupling is oversold as a utility solution with considerable potential for abuse, especially with warm winters. • A fully-reconciling decoupling mechanism is best, with actual revenues compared to allowed revenues at year's end and the difference collected or refunded over a few months, or the next year, in a small volumetric true-up charge or credit. • Decoupling should be accepted in the short run, but, over time, EVs will ramp up commodity sales and decoupling may be withdrawn. • No double counting. Why should utilities receive PIs and decoupling at the same time? • Decoupling represents the utility shareholder incentive to participate in energy efficiency programs.

Other Issues for Consideration	• Decoupling should be considered as part of a universe of actions affecting utility revenues, profitability, and rate of return. Any discussion of decoupling should also embrace an examination of the Core PIs and the impact of lower risk on ROE.

Staff Recommendations	• In an era of energy efficiency targets and goals, utilities will need to find an alternative business model than one based on commodity sales. • A decoupling or rate recovery mechanism is one way of addressing the revenue shortfall arising from more aggressive energy efficiency targets arising from adoption of an EERS. • The end result of decoupling is that utilities should no longer have an incentive to maximize their sale, because the rate of return does not change within the revenue requirement. Nor is there a disincentive to promote efficiency. Rather, decoupling may have the effect of stabilizing the revenue stream of a utility because its revenues are no longer dependent on sales, or regulatory lag. • While decoupling can remove disincentives for utilities to promote efficiency, it is not designed to create an incentive for energy efficiency. It may be the best tool to balance the removal of utility disincentives to energy efficiency while preserving customer incentives to embrace energy efficiency. • Rate adjustments under decoupling are typically small, with evidence suggesting that almost two-thirds of adjustments made under decoupling were within 2% of the retail rate and 80% within 3 percent. • Of the 26 states currently implementing an EERS, 13 states have full revenue decoupling for at least one major electric utility in the state, and at least 19 states have some form of lost fixed-cost mechanisms for at least one utility. • Therefore, Staff is not opposed to the implementation of a partial or limited decoupling mechanism as part of a process of enabling utilities to safeguard revenues and more fully embrace rising energy efficiency targets. • However, any discussion of decoupling in the context of an EERS must be accompanied by an examination of the need for PIs and whether such a mechanism will reduce utility risk and require a reduction of the ROE. • Further, implementation of a decoupling mechanism should take place after full consideration of the goals of an EERS, and how the implementation of decoupling may soak up part of the energy efficiency program budget. See Staff modeling, below.

Staff modeled the impact on EERS funding levels of implementing various decoupling caps. Staff modeled a partial decoupling solution (modeled in part on the Maine solution), utilizing the lower of a cap vs. a calculated revenue loss attributable to energy efficiency.

Staff used the modeling tool referenced in 3A, above, with all the related assumptions. Contrary to ACEEE's recommendation not to consider decoupling as a cost when determining the total costs of providing EE programs, Staff included both PIs (baseline 8.0% for electric and baseline 7.5% for

gas) and decoupling costs, since both were designed to alleviate the impact of promoting energy efficiency on the utility bottom line.

Staff tested two scenarios for electric and gas:
Scenario 1 (Options 3 and 5) - In the first case, Staff examined the funding shortfall if one assumed a partial decoupling in which the costs were the lower of lost revenue or a cap of 0.5%.
Scenario 2 (Option 4 and 6) - In the second case, Staff examined the funding shortfall if one assumed partial decoupling in which the costs were the lower of lost revenue or a 2.5% cap.

On the electric side, under Scenario 1 (Option 3), the total costs to fulfill the EERS target in 2015, including the decoupling costs was now $34.5 million, while the funding level was assumed as before to be based on the existing public funding sources at a total of $24.7 million, thus leading to a shortfall of $9.7 million. This compared unfavorably with the shortfall of $2.5 million absent the decoupling mechanism.

Under Scenario 2 for electric (Option 4), the decoupling cap was raised to 2.5%. In this case, the total costs to fulfill increased by a relatively-small amount up to $35.04 million, leading to a modest increase in the shortfall from $9.7 million to $10.2 million. Thus, raising the cap appeared to have a minor effect on funding.

On the gas side, under Scenario 1 (Option 5), as with electric, the total costs to fulfill the ERRS target in 2015 including the decoupling costs was now $7.9 million, while the funding level was assumed as before to be based on the existing public funding sources at a total of $7.07 million, leading to a shortfall of $913,490.

Under Scenario 2 (Option 6), the decoupling cap was once again raised to 2.5%. In this instance, once again, there was a modest increase in the shortfall to $984,998, a negligible amount.

Staff concluded that the impact of implementing decoupling led to more pronounced funding shortfalls already in 2015, which in the case of electric utilities was equivalent to a loss in program funding availability of approximately $7.1 million.

Staff has concluded that introduction of decoupling at whatever level will increase target fulfillment costs and act to attenuate the level of funding available to meet the EERS. Thus, Staff recommends that any consideration of a decoupling mechanism should be weighed against the threats to energy efficiency funding and include careful balancing of the interests of all the stakeholders.

7.1 Performance Incentives, Penalties, and Decoupling Strategies

<table>
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<td>Existing States' Experience</td>
<td>
<u>Performance incentives</u>

Most states have implemented some kind of cost recovery mechanism to allow utilities to recover direct program costs for efficiency measures. In addition, many states have adopted PIs for both electric and natural gas utilities.
PI designs vary from state to state. For example, some PIs are dependent on portfolio spending rather than energy savings achieved. In other states, PIs are made available on a sliding scale, with penalties for low levels of savings and positive incentives without achieving their total savings goal in a given year.
Based on a recent ACEEE report, out of 26 states examined, PIs were in place in 18 states for electric and in 12 states for gas utilities. Similarly, penalties were in place in 5 states for electric utilities and in 2 states on the gas side. As for decoupling or LRAMs, 19 states had a mechanism in place on the electric side, and 21 states had adopted such a mechanism for natural gas utilities.

<u>Penalties</u>

A number of states have included penalties when designing their EERS programs in order to guarantee efficiency results. Often, these include a penalty fee that the utility must pay if it does not meet the specified target, as well as the understanding that they must make up the short-fall in subsequent years.
Although penalties can vary from state to state, a common model incorporates two levels of consequence.
Alternative Compliance Payments occur when retail electricity or natural gas distributors pay the state to account for not meeting set savings targets. These payments are due by a specified date, often within one calendar year following the reporting period when the utility fell short. The minimum penalties in most states are as follows:
<ol type="a">
Electric utilities are charged $50 per MWh of electricity savings needed to make up any deficit of the compliance obligation under the relevant performance goal;
Natural gas utilities are charged $5 per MMBtu of gas savings needed to make up any deficit of the compliance obligation under the relevant performance goal.

Civil penalties are the second-tier consequence and occur when the secretary of the state charges the retail electricity or natural gas distributor for failing to document adequate savings. These penalties may be structured as follows:

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	a. Electric utilities assessed with charges of \$100 per MWh of electricity savings or alternative compliance payment that the retail electricity distributor failed to achieve or make, respectively; b. Natural gas utilities assessed with charges of \$10 per MMBtu of natural gas savings or alternative compliance payment that the retail natural gas distributor failed to achieve or make, respectively. • Many EERS policies also call for the utilities to shoulder the full burden of penalties, restricting them from recovering any of the costs from utility customers through rate increases, surcharges, or other mechanisms. Furthermore, the penalty funds collected by the state are reinvested in additional energy efficiency programs. <u>Decoupling</u> • According to the ACEEE EERS progress report (2014), with respect to decoupling or LRAMs, 19 states had a mechanism in place on the electric side, and 21 states had adopted such a mechanism for gas utilities. • ACEEE concluded the following: a. In almost every state that has an EERS policy in place, they have recognized the necessity of a complementary policy mechanism to achieve the level of savings targeted in rules and/or legislation. b. Many states with the highest savings targets have lost fixed-cost recovery mechanisms in place. c. Often high-target, high-savings states rely on PIs to encourage utilities and PAs to reach EE targets.

Stakeholder Positions	• Respondents were relatively silent on the issue of penalties. However, a few claimed that absent a PI, utilities would have little incentive to participate in EE programs. • Some respondents indicated a need to choose between penalties vs. setting targets for innovative projects. • Penalties may act to further disincentivise the utilities or may encourage distorted program outcomes. • For EERS to be successful there must be an enforcement mechanism, *i.e.*, penalties. • Penalties have no place in the EERS program since they lead to risk avoidance.

Other Issues for Consideration	• None identified.

Staff Recommendations	• In view of the success of other jurisdictions in promoting energy efficiency via an EERS, which makes use of a full palette of tools, New Hampshire should leverage its existing Core experience and utilize a combination of PIs and penalties to encourage EE-target attainment. • There should be full consideration of PIs, penalties, and decoupling/LRAMs in order to concurrently incentivize, and not discourage, more aggressive adoption of energy efficiency goals. • The three tools referenced need to be examined together, and in return for a decoupling mechanism, utilities should step forward and offer to limit the level of incentives currently enjoyed under the Core program. • Staff is concerned about the potential for a declining B/C ratio (*e.g.*, Liberty's gas programs are showing a B/C of 1.4 for 2014, but, in 2015-16, it declines to 1.3). Given that decoupling is a cost of EE, it is possible that future B/C may fall below 1.0 B/C. • Finally, in the absence of conclusive evidence on either side, Staff recommends that any discussion of decoupling be accompanied by an examination of potential risk reduction and its impact on the NHPUC-approved ROE. • The forgoing analysis in section 5, concerning funding, indicated that the greater the compensatory decoupling mechanism, the more it will act as a constraint on funding levels required to achieve EERS targets. • Stakeholders will need to exercise caution when choosing amongst the EERS palette and the level of application of each tool, balancing the funding needs of the EERS goals with ways to incentivize utilities and minimize any disincentivizing effects of energy efficiency.

8.0 Impact of the EPA's Proposed Clean Power Plan

While this issue was not discussed as part of the stakeholder process, the EPA's Clean Power Plan warrants discussion in view of its possible significant implications for states' energy efficiency planning.

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<td>Current Status</td>
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On June 2, 2014, the U.S. Environmental Protection Agency (EPA) released its proposed Carbon Pollution Standards for Existing Power Plants (known as the Clean Power Plan)(CCP), per its authority under Section 111(d) of the Clean Air Act (CAA). The development of this rule was announced by President Obama during his June 25, 2013, climate policy speech. The CCP would establish different target emission rates (lbs. of CO2 per megawatt-hour) for each state due to regional variations in generation mix and electricity consumption, but overall is projected to achieve a 30% cut from 2005 emissions by 2030, with an interim target of 25% on average between 2020 and 2029.
Since the federal government adopted new vehicle efficiency standards last summer to address transportation emissions through 2025, the power sector represents the greatest opportunity for greenhouse gas reductions.
Power sector emissions have declined over the past five years in part due to the economic downturn, increased energy efficiency, greater use of renewable energy and a switch from coal, the most carbon-intensive fossil fuel, to gas, the least carbon-intensive (in terms of combustion). In the absence of any policy changes, the EPA projects that as the economy grows and gas prices rise slowly over the next five years, emissions will rise. The CPP will have to push against these underlying trends.
Under the proposed CPP, states would be given a target emissions rate, but have broad flexibility to determine how to achieve that target. Each state would be assigned a carbon-emissions baseline based on its level of carbon emissions from fossil-fired power plants divided by its total electricity generation. Electricity generation in this case includes fossil generation, nuclear, renewables, plus generation avoided through the use of energy-efficiency programs. A target for 2030 is then established for each state based on its capacity to achieve reductions using the following four "building blocks" identified by the EPA:

Make fossil fuel power plants more efficient.
Use low-emitting gas combined-cycle plants more where excess capacity is available.
Use more zero- and low-emitting power sources such as renewables and nuclear.
Reduce electricity demand by using electricity more efficiently.

Each state is then free to meet its established target however it sees fit. States could join multi-state programs to reduce emissions collectively, for example through a cap-and-trade program.
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	• States would have considerable flexibility to adopt a variety of approaches to reduce carbon dioxide emissions from the power sector, if they can demonstrate that they will achieve the emissions target. Among the possibilities: 1. States could allow emissions trading between power companies and even across state lines (such a program would be similar to RGGI). Averaging or trading across power plants, companies, and states cut overall compliance costs by taking advantage of the lowest-cost opportunity for emissions reductions. 2. States could use energy efficiency or renewable energy for compliance, provided that the total emissions met an EPA-approved target. • EPA projects that the compliance costs for this rule would be between \$7.3 billion and \$8.8 billion annually by 2030. This would lead to about a 3% increase in electricity rates by 2030. The rule would deliver considerable benefits as well, including a total of \$55 billion to \$93 billion in public health benefits by 2030, as projected by EPA. The rule could also reduce electricity consumption, meaning a homeowner's electricity bill could stay the same or even decrease by 9% by 2030.

Staff Recommendations	According to the Center for Climate and Energy Solutions, the following list of policy options could be employed to achieve the EPA Standards: 1. Power plant performance standard: Each power plant must achieve a set emissions intensity. 2. Renewable Portfolio Standard: Utilities must deliver a set percentage of renewable electricity. 3. Energy Efficiency Resource Standard: Utilities must cut demand by a set amount by target years. 4. Decoupling: Reduce utility incentive to deliver more electricity by decoupling revenue and profit. 5. Net Metering: Encourage residential solar by paying homeowners to put excess electricity back on grid. 6. Cap and Trade: Issue a declining number of carbon allowances, which must be surrendered in proportion to each plant's emissions. 7. Carbon Tax: Charge a tax for emitting carbon. 8. Grid Operator Carbon Fee: Add a carbon price to grid operator decision over which power plants to run. 9. Appliance Efficiency Standards: Require new appliances sold to meet set electricity consumption standards. 10. Commercial and Residential Building Codes: Require new

	buildings to include electricity saving measures. • For the time being, there are concerns as to whether the final form of 111(d) will remain as presented today and indeed whether it may become another victim of the current political climate. • Furthermore, the EPA is encouraging states to explore market-based mechanisms and to attempt to participate in multi-state CO2 reduction programs. This would permit the RGGI states to include this program as part of their State Plans. However, there is concern as to whether the 2014 decision to reduce the regional CO2 emission cap, by 45% from 165 million to 91 million tons with an additional annual decline beyond that of 2.5%/year from 2015 to 2020, would leave room for still further declines to meet the EPA's target. • It is under these circumstances that the fourth EPA building block, decoupling, as part of a state EERS, may provide a means to meet the EPA's goals. • See under Appendices, Table 2, comparing EPA goals with ISO-NE FCM and Staff Straw Proposal.

9.0 Paradigms for Success

(a) Leverage the existing Core program as a first step in the EERS. It is known, and has a solid track record and a team of dedicated PAs.

(b) Retain the existing collaboration between identified stakeholders, NHPUC and other agency representatives and the utilities, while considering the option to establish a competing virtual utility in the medium-term as a competitive alternative to existing utilities.

(c) Support unilateral action by the NHPUC to move the agenda forward but seek to obtain concurrent legislative approval for the EERS, and for the "cost effectiveness" approach.

(d) Develop a short-term target for the initial two-year ramp up of the EERS for both electric and gas utilities, to ease the transition to broader activities, as part of a minimum ten-year target goal. Targets are to be disaggregated to specific customer groups and to be expressed as both incremental and cumulative energy savings per year.

(e) Plan to make use of a full range of energy efficiency measures. However, not all measures should be piloted via the NHPUC. Some will belong in DES or DOT. This will require effective coordination to track cumulative energy savings.

(f) Encourage utilities to adjust their business model from being primarily focused on commodity sales to a more customer-segment driven service provider focused on all customer groups.

(g) Seek to participate in existing financing mechanisms (*e.g.*, WHEEL) to benefit from a prior track record and scale economies, delivering standardized loan products and then selling unsecured loans to the secondary market to replenish EE programs.

(h) Maximize participation rates in energy efficiency programs through better education and information and more funding to mitigate against the discriminatory effects encountered by non–participants.

(i) Implement a partial decoupling mechanism for utilities but tie its operation to a simultaneous discussion of Core PI levels and the impact of risk mitigation on utility ROE.

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Appendices

Appendix 1

EERS Questionnaire (Revised following subsequent interviews)

Primary Question	1. Who should be responsible for the establishment of an EERS?
Secondary Issues	• PUC via statutory authority, if so, consider a rulemaking**?** • State legislation? • Who establishes the targets, PUC or legislature? • Should the state preserve authority to adopt more aggressive standards?

Primary Question	2. What should be the characteristics of an EERS?
Secondary Issues	• Should the EERS be stand-alone or coupled with a Renewable Energy standard as in some states? • Should targets be limited to electricity or electricity and gas combined? • Should the EERS consider start with electric targets and then add gas a couple of years later? • Should the EERS include municipal electric utilities? • Should savings targets be dedicated to a particular sector, and customer group, *i.e*., residential, C&I, etc.?

Primary Question	3. What should be the savings target size recommendation?
Secondary Issues	• Should we commence with a modest target (*e.g.*, Texas as 0.18% savings per year? • ACEEE recommends 0.75% to 1.25% annual savings from electricity and gas retail sales; is this acceptable? • Should the target be gradually ramped up over a few years to a 1% savings level? • What should be the form of the target? A percent of sales? A percent of sales growth? • What should comprise the eligible resources: customer facilities, distribution system, CHP/DG? • If distribution efficiency improvements and CHP are included in the EERS, do you agree that savings targets greater than 1% are possible? • Cumulative cost effective savings of 10% over a ten-year period are supported by studies.)Your view? • Gas: many state gas utilities are achieving savings of 0.5% of incremental sales/yr. Is this a reasonable target?

Primary Question	4. What types of EERS savings measures should be considered?
Secondary Issues	Three classes of measures may be distinguished: (i) End user efficiency measures at customer facilities? (ii) Transmission and distribution improvements that improve efficiency (*i.e.*, should peak electricity demand savings via energy efficiency and load management be included?) (iii) Distribution generation at end user sites (*e.g.*, CHP, recycled technologies). Other? Should we implement building code compliance asap? How? Paradigms?

Primary Question	5. Projected funding for the EERS
Secondary Issues	• Should the funding be initially based on an expansion of Core programs? • How significant should public/private initiatives be during the initial roll out? • Should rates be decoupled for utility financial health? • Should we consider behind the meter investment by utilities, *e.g.*, via tariff rider attached to meter? Pros and Cons?

Primary Question	6. How to differentiate an effective EERS? (suggestions as to level of importance of the items listed below)
Secondary Issues	• EE incentives? • Cost recovery, decoupling? • Performance incentives? • Education & information programs? • Technical assistance programs? • EM&V activities: utilize benefit cost analysis to evaluate programs? • Clear statement of eligible technologies? • Make use of penalties?

Primary Question	7. How should the EERS be evaluated, measured and verified?
Secondary Issues	• Should standards and protocols be required for Evaluation Measurement & Verification methods? • Should EM&V require 3rd party verification? • Should EM&V represent between 2-5% of budget? • Do you agree that initially shorter time frames may facilitate early problem identification, and subsequently EM&V timeframes may be extended over 10-15 years to create certainty for resource planners/power providers?

Primary Question	8. Should trading of energy savings be considered?
Secondary Issues	• ?

Primary Question	9. Should EE programs be administered by utilities or another entity?
Secondary Issues	• If administered by utilities /other entities, what should be the role of the PUC? • Should we consider self-managed EE programs for larger industrial customers?

Primary Question	10. What should be the length of time for a targeted EERS?
Secondary Issues	• Some states use annual targets, others make use of 2-3 year time spans, what is optimal? • Should a long-term goal, *e.g.*, 20% cumulative energy savings by 2020? • Does a longer time span equals lower administrative burdens, is this desirable? • Any other recommendation here?

Primary Question	11. What is an acceptable rate impact of the EERS?
Secondary Issues	• How should we address the issue of different impacts on efficiency program participants? • How best to provide all customers with opportunities to participate? • How might we consider increasing budgets to increase program participants? • How might we minimize program administrative costs?

Issue	Next steps
	• Establish a common vision for the EERS. • Establish timeline for action.

Appendix 2.

WHEEL: A Sustainable Solution for Residential Energy Efficiency

Introduction to the Warehouse for Energy Efficiency Loans (WHEEL)

The Energy Programs Consortium (EPC) and the National Association of State Energy Officials (NASEO) are pleased to announce the establishment of the WHEEL program. The purpose of WHEEL is to provide low cost, large scale capital for state and local government and utility-sponsored residential energy efficiency loan programs. We have scheduled an introductory webinar on to explain the details of the program. In addition, a comprehensive term sheet and other explanatory materials will be distributed shortly. Please contact Mark Wolfe (mwolfe@energyprograms.org) or Cisco DeVries (cisco@renewfund.com) for additional information.

WHEEL's strategic objective is to create a secondary market for residential clean energy loans and deliver the resulting benefits – a greater volume, and lower cost, of capital – to state and local energy loan programs. WHEEL facilitates secondary market sales by purchasing unsecured residential energy efficiency loans originated in participating programs. The loans are aggregated into diversified pools and used to support the issuance of rated asset backed notes sold to capital markets investors. Proceeds from these note sales will be used to recapitalize WHEEL, allowing it to continue purchasing eligible loans from state and local programs for future rounds of bond issuance.

Sponsors that choose to participate in WHEEL will realize numerous immediate and future benefits:

- ***Sustainable source of private capital.*** WHEEL purchases and aggregates energy loans to support the issuance of investment grade rated securities. This allows for both a national scale and a potentially unlimited amount of low cost capital to flow to participating programs. WHEEL offers sponsors a simple and efficient option to reduce their reliance on unsustainable, non-scalable and/or expensive sources of funding.

- ***Broadly available product.*** WHEEL's fixed rate product (currently <10%) serves a wide range of consumers seeking to pursue energy improvement projects. Loans with five-, seven-, and ten-year terms will be available to borrowers with 640+ FICO scores.[35]

- ***Leverage public funds.*** Sponsors will significantly leverage their public funds (ARRA, public benefit, utility, etc.) with a sustainable source of private capital.

- ***Program Income.*** Excess cash flows from loan pools backing bonds will allow WHEEL to provide a return ("Program Income") to its sponsors. Overall loan performance will determine the amount, if any,

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[35] Consumer will receive a fixed rate for the term of the loan. The rate will be determined at the time of origination based on current market conditions.

2 The U.S. Department of Energy has approved the use of ARRA funds in the WHEEL program. See SEP Guidance dated June 4, 2012 and EECBG Guidance dated June 4, 2012.

of Program Income that sponsors will receive. Excellent performance will result in Program Income that exceeds a sponsor's original contribution of public funds.

- ***Efficient use of public subsidy.*** WHEEL is designed to reduce the cost of capital over time by expanding the public performance data available for these loans, familiarizing secondary market investors with the asset class, and achieving increasing economies of scale as more and more loans are sold into the warehouse. Strong loan performance will lead to greater investor demand, which will be reflected in lower rates for consumers.

- ***Flexible options for sponsors.*** WHEEL offers sponsors important flexibility to design their programs to reflect local priorities. Sponsors may provide additional buy down funds to reduce interest rates to borrowers even further, and may *offer varying levels of incent*ives to encourage deeper energy conservation improvements.

How WHEEL Works

Step 1. Sponsor transfers ARRA or other public funds to a custodial account held for its benefit at a financial institution.
Step 2. When a loan is originated in the sponsor's jurisdiction, its public funds are drawn to support the purchase of the loan.
Step 3. During the initial repayment period, WHEEL aggregates loans across all participating programs to create a bond for sale to secondary market investors.
Step 4. After private investors in the bond are paid off with the revenues from the loan pool, remaining cash flows from the loan pool will be returned as Program Income to sponsors.
• *The amount of Program Income paid to a sponsor will depend on its contribution relative to the size of the entire loan pool and the overall performance of the loan pool.*
Step 5. Program Income can be recycled to support future lending in the sponsor's jurisdiction or reallocated for other uses.
• *Sponsors that initially contribute ARRA funds must redeploy Program Income in accordance with U.S. Department of Energy guidelines.*

WHEEL Team

EPC, in collaboration with the Pennsylvania Treasury Department and Forsyth Street Advisors, started developing WHEEL over two years ago. In 2011, Renewable Funding and Citigroup Global Markets Inc. joined the WHEEL Team. The program, as described above, is the culmination of the WHEEL Team's efforts as well as negotiations with states, the U.S. Department of Energy and other stakeholders.

Citigroup Global Markets Inc.

Citi is a leading corporate and investment bank with expertise in alternative energy, securitization and warehouse finance. As a consistent leader in the asset-backed securitization market, Citi has extensive experience in financing consumer loans and in structuring and executing securitizations of new asset classes.

Energy Programs Consortium

EPC is a non-profit organization based in Washington, DC. EPC is a joint venture of NASCSP, representing the state weatherization and community service programs directors; NASEO, representing the state energy policy directors; NARUC, representing the state PUC commissioners; and NEADA, representing the state directors of the Low-Income Home Energy Assistance Program.

Pennsylvania Treasury

The Pennsylvania Treasury Department is the custodian for more than $100 billion of public funds on behalf of the Commonwealth of Pennsylvania. Since 2006, the Department has provided capital to the Keystone Home Energy Loan Program. The Department's work on the development of WHEEL has been supported by Forsyth Street Advisors.

Renewable Funding

Renewable Funding specializes in design, administration, technology, and financing solutions for clean energy upgrade programs. Since 2008, the firm has worked with over 200 clients across the U.S. to structure and administer residential and commercial financing programs.

Webinar and Contact Information

Webinar Information:
Wednesday, June 13
3:00pm EDT/12:00pm PDT
(log in information provided separately)

For additional information regarding the WHEEL program please contact:
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202-333-5915
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Cisco DeVries
President
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Appendix 3.

EERS
EE Savings Comparisons
MWH Savings Goals - NH Electric Utilities

		ISO-NE FCM			**EPA Goal**			**EERS**		
Description	**Year**	**Incremental MWH Savings**	**Cumulative**	**Percent to 2012 MWH Usage**	**Incremental MWH Savings**	**Cumulative**	**Percent to 2012 MWH Usage**	**Incremental MWH Savings**	**Cumulative**	**Percent to 2012 MWH Usage**
		(1)			**(2)**			**(3)**	**(3)**	
MWH Usage				10,704,396			10,704,396			10,704,396
MWH Savings	2014	52,345	52,345	0.49%				52,345	52,345	
	2015	52,345	104,690	0.98%				54,962	107,307	1.0%
	2016	52,345	157,035	1.47%				57,579	164,886	1.5%
	2017	52,345	209,380	1.96%				60,197	225,083	2.1%
	2018	76,000	285,380	2.67%				62,814	287,897	2.7%
	2019	73,000	358,380	3.35%				65,431	353,328	3.3%
	2020	69,000	427,380	3.99%		331,811	3.10%	68,048	421,376	3.9%
	2021	66,000	493,380	4.61%	124,437	456,248	4.26%	70,666	492,042	4.6%
	2022	63,000	556,380	5.20%	137,493	593,741	5.55%	73,283	565,325	5.3%
	2023	63,000	619,380	5.79%	130,056	723,797	6.76%	75,900	641,225	6.0%
	2024	63,819	683,199	6.38%	119,182	842,979	7.88%	78,517	719,742	6.7%
	2025	64,649	747,848	6.99%	108,614	951,593	8.89%	81,134	800,876	7.5%
	2026	65,489	813,337	7.60%	98,342	1,049,935	9.81%			
	2027	66,340	879,677	8.22%	88,348	1,138,283	10.63%			
	2028	67,203	946,880	8.85%	78,622	1,216,905	11.37%			
	2029	68,077	1,014,957	9.48%	69,149	1,286,054	12.01%			

(1) Order No. 25,615 for 2014-2017, with ISO-NE FCM for 2018-2023, and trend line for subsequent years based on average ISO-NE FCM forecast for 2018-2023.
(2) Per EPA Block #4 Goal for demand side energy efficiency.
(3) Per EERS Scenarios, September 8, 2014

Appendix 4

Model Option 1

EERS	NOTE: Model reflects installed cost based on 2014 Update.												Schedule 6A
Scenario - Decoupling is Not a Cost	NOTE: Model needs to be updated for 2015 and 2016 to reflect costs from 2015 and 2016 Plan.												
12/10/2014	NOTE: Model shows shortfall in 2015 and 2016 at current SBC of $0.0018; but, there is no shortfall per 2015 and 2016 Plan.												
	2014 Budget Baseline	Yr 2015	Yr 2016	Yr 2017	Yr 2018	Yr 2019	Yr. 2020	Yr. 2021	Yr. 2022	Yr. 2023	Yr. 2024	Yr. 2025	Total 2015-20125
Utility Cost of Fulfillment With Decoupling:													
Total Installed Cost, excluding Decoupling	*$ 47,459,449*	$ 46,014,628	$ 43,465,909	$ 48,638,026	$ 54,425,587	$ 60,901,823	$ 68,148,684	$ 76,257,866	$ 85,331,980	$ 95,485,845	$ 106,847,945	$ 119,562,049	$ 805,080,341
Percent Utility Portion of Installed Cost	*59.5%*	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	
Est. Elec. Utility Portion of Installed Cost at 60%	*$ 28,220,619*	$ 27,361,491	$ 25,845,957	$ 28,921,432	$ 32,362,865	$ 36,213,803	$ 40,522,974	$ 45,344,904	$ 50,740,608	$ 56,778,360	$ 63,534,559	$ 71,094,695	$ 478,721,647
Plus: Decoupling Charges/Credits)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Total Utility Cost for Fulfillment incl. 0% Decoupling Cost		$ 27,361,491	$ 25,845,957	$ 28,921,432	$ 32,362,865	$ 36,213,803	$ 40,522,974	$ 45,344,904	$ 50,740,608	$ 56,778,360	$ 63,534,559	$ 71,094,695	
How do we achieve fulfillment with SBC Adjustment		$ 0.0020	$ 0.0019	$ 0.0022	$ 0.0025	$ 0.0029	$ 0.0033	$ 0.0037	$ 0.0042	$ 0.0048	$ 0.0054	$ 0.0061	
Current SBC of $0.0018:													
Status Quo Funding to Meet Above:													
ISO-NE FCM Funding		$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	
RGGI Funding		$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	
Sub-Total		$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	
Plus: SBC													
kWh Sales		10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	
Current SBC Rate		$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	
SBC Funding At $0.0018:		$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	
Total Funding		$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	
Shortfall		$ (2,593,578)	$ (1,078,044)	$ (4,153,519)	$ (7,594,952)	$ (11,445,891)	$ (15,755,062)	$ (20,576,992)	$ (25,972,695)	$ (32,010,447)	$ (38,766,646)	$ (46,326,782)	
What If: Doubling the SBC Rate													
ISO-NE FCM Funding		$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	
RGGI funding		$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	
Sub-Total		$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	
Plus: SBC													
kWh Sales		10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	
Doubled SBC Rate		$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	
SBC Funding At $0.0036 per kWh		$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	
Total Funding		$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	
Shortfall		$ 16,674,335	$ 18,189,869	$ 15,114,394	$ 11,672,961	$ 7,822,022	$ 3,512,851	$ (1,309,079)	$ (6,704,782)	$ (12,742,534)	$ (19,498,733)	$ (27,058,869)	

Model Option 2

EERS — Schedule 6A

Decoupling Not Treated as a Cost

LDAC at "Composite" of .0302/MMBtu (i.e., for Northern and Energy North Combined)

12/15/2014

NOTE: Model reflects installed cost based on 2014 Update.

NOTE: Model needs to be updated for 2015 and 2016 to reflect costs from 2015 and 2016 Plan.

NOTE: Model shows shortfall in 2015 and 2016 at current LDAC of $0.0302 per therm; but, there is no shortfall per 2015 and 2016 Plan.

	2014 Budget Baseline	Yr 2015	Yr 2016	Yr 2017	Yr 2018	Yr 2019	Yr. 2020	Yr. 2021	Yr. 2022	Yr. 2023	Yr. 2024	Yr. 2025	Total 2015-20125
Utility Cost of Fulfillment With Decoupling:													
Total Installed Cost, excluding Decoupling	$ 11,828,915	$ 12,644,823	$ 13,233,377	$ 13,564,211	$ 13,903,316	$ 14,250,899	$ 14,607,172	$ 14,972,351	$ 15,346,660	$ 15,730,326	$ 16,123,585	$ 16,526,674	$ 160,903,394
Percent Utility Portion of Installed Cost	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	
Est. Gas Utility Portion of Installed Cost at 60%	$ 7,075,372	$ 7,528,385	$ 7,878,793	$ 8,075,763	$ 8,277,657	$ 8,484,599	$ 8,696,714	$ 8,914,132	$ 9,136,985	$ 9,365,410	$ 9,599,545	$ 9,839,533	$ 95,797,516
Plus: Decoupling is not Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Total Utility Cost for Fulfillment	$ 7,075,372	$ 7,528,385	$ 7,878,793	$ 8,075,763	$ 8,277,657	$ 8,484,599	$ 8,696,714	$ 8,914,132	$ 9,136,985	$ 9,365,410	$ 9,599,545	$ 9,839,533	
LDAC to achieve Fulfillment	$ 0.03016	$ 0.03209	$ 0.03359	$ 0.03443	$ 0.03529	$ 0.03617	$ 0.03708	$ 0.03800	$ 0.03895	$ 0.03993	$ 0.04092	$ 0.04195	
2014 Composite LDAC of $0.0302 per MMBtu:													
Estimated MMBtu Sales	23,456,642												
Estimated Therms	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	
LDAC Rate per Therm (Composite)	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	
		$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	
LDAC Funding													
MMBtu Sales	23,456,642												
Therm Sales	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	
2014 Composite Budget Rate	$ 0.03016362	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	
LDAC Funding		$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	
(Shortfall)		$ (453,013)	$ (803,421)	$ (1,000,391)	$ (1,202,285)	$ (1,409,227)	$ (1,621,342)	$ (1,838,760)	$ (2,061,613)	$ (2,290,038)	$ (2,524,173)	$ (2,764,161)	
What If: Doubling the LDAC Rate													
Therm Sales (above)		234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	
Doubled LDAC Rate		$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	
LDAC Funding		$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	
Excess/(Shortfall)		$ 6,622,359	$ 6,271,951	$ 6,074,981	$ 5,873,087	$ 5,666,145	$ 5,454,030	$ 5,236,612	$ 5,013,759	$ 4,785,334	$ 4,551,199	$ 4,311,211	

Model Option 3

EERS

Fulfillment with 0.5% Decoupling - SBC at $0.0018 & Doubling of SBC

12/10/2014

NOTE: Model reflects installed cost based on 2014 budget.

NOTE: Model needs to recalculated instatalled costs to be based on 2015-2016 Plan.

Schedule 6A

	2014 Budget Baseline	Yr 2015	Yr 2016	Yr 2017	Yr 2018	Yr 2019	Yr. 2020	Yr. 2021	Yr. 2022	Yr. 2023	Yr. 2024	Yr. 2025	Total 2015-20125
Utility Cost of Fulfillment With Decoupling:													
Total Installed Cost, excluding Decoupling	*$ 47,459,449*	$ 46,014,628	$ 43,465,909	$ 48,638,027	$ 59,416,413	$ 66,486,521	$ 74,397,918	$ 83,250,712	$ 93,156,922	$ 104,241,898	$ 116,645,902	$ 119,562,049	$ 855,276,898
Percent Utility Portion of Installed Cost	*59.5%*	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	
Est. Elec. Utility Portion of Installed Cost at 60%	*$ 28,220,619*	$ 27,361,491	$ 25,845,957	$ 28,921,432	$ 35,330,540	$ 39,534,609	$ 44,238,931	$ 49,503,032	$ 55,393,521	$ 61,984,935	$ 69,360,678	$ 71,094,695	$ 508,569,821
Plus: Decoupling Charges/Credits)		$ 7,179,234	$ 7,358,715	$ 7,542,683	$ 5,335,412	$ 7,924,532	$ 8,122,645	$ 8,325,711	$ 8,533,854	$ 8,747,200	$ 8,965,880	$ 9,190,027	
Total Utility Cost for Fulfillment incl. Decoupling Cost		$ 34,540,725	$ 33,204,672	$ 36,464,115	$ 40,665,951	$ 47,459,141	$ 52,361,576	$ 57,828,743	$ 63,927,375	$ 70,732,136	$ 78,326,558	$ 80,284,722	
Required SBC to achieve "cost with .5% decoupling"		$ 0.00271	$ 0.00259	$ 0.00289	$ 0.00329	$ 0.00392	$ 0.00438	$ 0.00489	$ 0.00546	$ 0.00609	$ 0.00680	$ 0.00699	
Current SBC of $0.0018:													
Status Quo Funding to Meet Above:													
ISO-NE FCM Funding		$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	
RGGI Funding		$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	
Sub-Total		$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	
Plus: SBC													
kWh Sales		10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	
Current SBC Rate		$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	
SBC Funding At $0.0018:		$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	
Total Funding		$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	
Shortfall		$ (9,772,812)	$ (8,436,759)	$ (11,696,202)	$ (15,898,038)	$ (22,691,228)	$ (27,593,663)	$ (33,060,830)	$ (39,159,462)	$ (45,964,223)	$ (53,558,645)	$ (55,516,809)	
What If: Doubling the SBC Rate													
ISO-NE FCM Funding		$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	
RGGI funding		$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	
Sub-Total		$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	
Plus: SBC													
kWh Sales		10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	
Doubled SBC Rate		$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	
SBC Funding At $0.0036 per kWh		$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	
Total Funding		$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	
Shortfall		$ 9,495,100	$ 10,831,154	$ 7,571,711	$ 3,369,874	$ (3,423,315)	$ (8,325,750)	$ (13,792,917)	$ (19,891,550)	$ (26,696,310)	$ (34,290,732)	$ (36,248,896)	

Model Option 4

EERS

Fulfillment with 2.5% Decoupling - SBC at $0.0018 & Doubling of SBC

12/15/2014

NOTE: Model reflects installed cost based on 2014 Update.

NOTE: Model needs to be updated for 2015 and 2016 to reflect costs from 2015 and 2016 Plan.

NOTE: Model shows shortfall in 2015 and 2016 that needs to be recalculated to reflect 2015 and 2016 budgets.

Schedule 6A

	2014 Budget Baseline	Yr 2015	Yr 2016	Yr 2017	Yr 2018	Yr 2019	Yr. 2020	Yr. 2021	Yr. 2022	Yr. 2023	Yr. 2024	Yr. 2025	Total 2015-20125
Utility Cost of Fulfillment With Decoupling:													
Total Installed Cost, excluding Decoupling	$ *47,459,449*	$ 46,014,628	$ 43,465,909	$ 48,638,027	$ 54,425,586	$ 60,901,823	$ 68,148,684	$ 76,257,866	$ 85,331,980	$ 95,485,845	$ 106,847,945	$ 119,562,049	$ 805,080,342
Percent Utility Portion of Installed Cost	*59.5%*	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	
Est. Elec. Utility Portion of Installed Cost at 60%	$ *28,220,619*	$ 27,361,491	$ 25,845,957	$ 28,921,432	$ 32,362,865	$ 36,213,803	$ 40,522,974	$ 45,344,904	$ 50,740,608	$ 56,778,360	$ 63,534,559	$ 71,094,695	$ 478,721,647
Plus: Decoupling Charges/Credits)		$ 7,681,779	$ 15,248,719	$ 10,198,295	$ 5,335,412	$ 6,599,217	$ 6,582,908	$ 6,947,050	$ 9,878,006	$ 13,712,838	$ 18,602,155	$ 24,965,476	
Total Utility Cost for Fulfillment incl. 0% Decoupling Cost		$ 35,043,270	$ 41,094,676	$ 39,119,727	$ 37,698,276	$ 42,813,020	$ 47,105,882	$ 52,291,954	$ 60,618,614	$ 70,491,197	$ 82,136,714	$ 96,060,171	
What SBC is required to fully fund this option		$ 0.002760	$ 0.003325	$ 0.003141	$ 0.003008	$ 0.003486	$ 0.003887	$ 0.004371	$ 0.005149	$ 0.006071	$ 0.007159	$ 0.008460	
Current SBC of $0.0018:													
Status Quo Funding to Meet Above:													
ISO-NE FCM Funding		$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	
RGGI Funding		$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	
Sub-Total		$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	
Plus: SBC													
kWh Sales		10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	
Current SBC Rate		$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	$ 0.0018	
SBC Funding At $0.0018:		$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	$ 19,267,913	
Total Funding		$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	$ 24,767,913	
Shortfall		$ (10,275,357)	$ (16,326,763)	$ (14,351,814)	$ (12,930,364)	$ (18,045,107)	$ (22,337,969)	$ (27,524,042)	$ (35,850,701)	$ (45,723,284)	$ (57,368,801)	$ (71,292,258)	
What If: Doubling the SBC Rate													
ISO-NE FCM Funding		$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	
RGGI funding		$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	$ 3,000,000	
Sub-Total		$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	$ 5,500,000	
Plus: SBC													
kWh Sales		10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	10,704,396,000	
Doubled SBC Rate		$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	$ 0.0036	
SBC Funding At $0.0036 per kWh		$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	$ 38,535,826	
Total Funding		$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	$ 44,035,826	
Shortfall		$ 8,992,556	$ 2,941,150	$ 4,916,099	$ 6,337,549	$ 1,222,806	$ (3,070,056)	$ (8,256,129)	$ (16,582,788)	$ (26,455,371)	$ (38,100,888)	$ (52,024,346)	

Model Option 5

EERS — **Schedule 6A**

Fulfillment with 0.5% Decoupling

LDAC at "Composite" of .0302/MMBtu (i.e., for Northern and Energy Norht Combined)

12/15/2014

NOTE: Model reflects installed cost based on 2014 Update.

NOTE: Model needs to be updated for 2015 and 2016 to reflect costs from 2015 and 2016 Plan.

NOTE: Model shows shortfall in 2015 and 2016 at current LDAC of $0.0302 per therm; but, there is no shortfall per 2015 and 2016 Plan.

	2014 Budget Baseline	Yr 2015	Yr 2016	Yr 2017	Yr 2018	Yr 2019	Yr. 2020	Yr. 2021	Yr. 2022	Yr. 2023	Yr. 2024	Yr. 2025	Total 2015-20125
Utility Cost of Fulfillment With Decoupling:													
Total Installed Cost, excluding Decoupling	*$ 11,828,915*	$ 12,074,273	$ 12,636,271	$ 12,952,177	$ 13,275,982	$ 13,607,881	$ 13,948,078	$ 14,296,780	$ 14,654,200	$ 15,020,555	$ 15,396,069	$ 15,780,970	$ 153,643,236
Percent Utility Portion of Installed Cost	*59.5%*	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	
Est. Elec. Utility Portion of Installed Cost at 60%	*$ 7,075,372*	$ 7,188,695	$ 7,523,293	$ 7,711,375	$ 7,904,159	$ 8,101,763	$ 8,304,307	$ 8,511,915	$ 8,724,713	$ 8,942,831	$ 9,166,402	$ 9,395,562	$ 91,475,014
Plus: Decoupling	$ -	$ 800,168	$ 820,172	$ 840,676	$ 861,693	$ 883,235	$ 905,316	$ 927,949	$ 951,148	$ 974,927	$ 999,300	$ 1,024,282	
Total Utility Cost for Fulfillment incl. Decoup. Cost	*$ 7,075,372*	$ 7,988,862	$ 8,343,464	$ 8,552,051	$ 8,765,852	$ 8,984,999	$ 9,209,624	$ 9,439,864	$ 9,675,861	$ 9,917,757	$ 10,165,701	$ 10,419,844	
LDAC to fully fund this Cost	*$ 0.0302*	$ 0.0341	$ 0.0356	$ 0.0365	$ 0.0374	$ 0.0383	$ 0.0393	$ 0.0402	$ 0.0412	$ 0.0423	$ 0.0433	$ 0.0444	
2014 Composite LDAC of $0.0302 per MMBtu:													
Estimated MMBtu Sales	*23,456,642*												
Estimated Therms	*234,566,420*	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	
LDAC Rate per Therm (Composite)	*$ 0.0302*	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	
		$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	
LDAC Funding													
MMBtu Sales	*23,456,642*												
Therm Sales	*234,566,420*	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	
2014 Composite Budget Rate	*$ 0.03016362*	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	
LDAC Funding		$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	
Shortfall		$ (913,490)	$ (1,268,092)	$ (1,476,679)	$ (1,690,480)	$ (1,909,627)	$ (2,134,252)	$ (2,364,492)	$ (2,600,489)	$ (2,842,385)	$ (3,090,329)	$ (3,344,472)	
What If: Doubling the LDAC Rate													
Therm Sales (above)		234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	
Doubled LDAC Rate		$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	
LDAC Funding		$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	
Excess/(Shortfall)		$ 6,161,882	$ 5,807,280	$ 5,598,693	$ 5,384,892	$ 5,165,745	$ 4,941,120	$ 4,710,880	$ 4,474,883	$ 4,232,987	$ 3,985,043	$ 3,730,900	

Model Option 6

EERS		NOTE: Model reflects installed cost based on 2014 Update.											Schedule 6A
Fulfillment with 2.5% Decoupling		NOTE: Model needs to be updated for 2015 and 2016 to reflect costs from 2015 and 2016 Plan.											
LDAC at "Composite" of .0302/MMBtu (i.e., for Northern and Energy Norht Combined)		NOTE: Model shows shortfall in 2015 and 2016 at current LDAC of $0.0302 per therm; but, there is no shortfall per 2015 and 2016 Plan.											
12/15/2014	2014 Budget Baseline	Yr 2015	Yr 2016	Yr 2017	Yr 2018	Yr 2019	Yr. 2020	Yr. 2021	Yr. 2022	Yr. 2023	Yr. 2024	Yr. 2025	Total 2015-20125
Utility Cost of Fulfillment With Decoupling:													
Total Installed Cost, excluding Decoupling	$ 11,828,915	$ 12,074,273	$ 12,636,271	$ 12,952,177	$ 13,275,982	$ 13,607,881	$ 13,948,078	$ 14,296,780	$ 14,654,200	$ 15,020,555	$ 15,396,069	$ 15,780,970	$ 153,643,236
Percent Utility Portion of Installed Cost	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	
Est. Elec. Utility Portion of Installed Cost at 60%	$ 7,075,372	$ 7,188,695	$ 7,523,293	$ 7,711,375	$ 7,904,159	$ 8,101,763	$ 8,304,307	$ 8,511,915	$ 8,724,713	$ 8,942,831	$ 9,166,402	$ 9,395,562	$ 91,475,014
Plus: Decoupling	$ -	$ 871,676	$ 1,805,715	$ 2,785,912	$ 3,813,990	$ 4,416,177	$ 4,526,581	$ 4,639,745	$ 4,755,739	$ 4,874,633	$ 4,996,498	$ 5,121,411	
Total Utility Cost for Fulfillment incl. Decoup. Cost	$ 7,075,372	$ 8,060,370	$ 9,329,008	$ 10,497,287	$ 11,718,150	$ 12,517,940	$ 12,830,888	$ 13,151,661	$ 13,480,452	$ 13,817,463	$ 14,162,900	$ 14,516,972	
LDAC to fully fund this cost		$ 0.03436	$ 0.03977	$ 0.04475	$ 0.04996	$ 0.05337	$ 0.05470	$ 0.05607	$ 0.05747	$ 0.05891	$ 0.06038	$ 0.06189	
2014 Composite LDAC of $0.0302 per MMBtu:													
Estimated MMBtu Sales	23,456,642												
Estimated Therms	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	
LDAC Rate per Therm (Composite)	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	
		$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	
LDAC Funding													
MMBtu Sales	23,456,642												
Therm Sales	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	
2014 Composite Budget Rate	$ 0.03016362	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	$ 0.0302	
LDAC Funding		$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	$ 7,075,372	
Shortfall		$ (984,998)	$ (2,253,636)	$ (3,421,915)	$ (4,642,778)	$ (5,442,568)	$ (5,755,516)	$ (6,076,289)	$ (6,405,080)	$ (6,742,091)	$ (7,087,528)	$ (7,441,600)	
What If: Doubling the LDAC Rate													
Therm Sales (above)		234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	234,566,420	
Doubled LDAC Rate		$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	$ 0.0603	
LDAC Funding		$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	$ 14,150,744	
Excess/(Shortfall)		$ 6,090,374	$ 4,821,736	$ 3,653,457	$ 2,432,594	$ 1,632,804	$ 1,319,856	$ 999,083	$ 670,292	$ 333,281	$ (12,156)	$ (366,228)	