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**COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF PUBLIC UTILITIES**

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**Methodology for Calculating Avoided Costs of Complying  
With the Global Warming Solutions Act**

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**D.P.U. 14-86**

**Rebuttal Testimony of  
Tim Woolf**

**On Behalf of the Department of Energy Resources  
and the Department of Environmental Protection**

**Regarding the Cost of Compliance with  
the Global Warming Solutions Act**

**December 3, 2014**

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1 **1. INTRODUCTION**

2 **Q. Please state your name, title and employer.**

3 A. My name is Tim Woolf. I am the Vice President of Synapse Energy Economics, located  
4 at 485 Massachusetts Avenue, Cambridge, MA 02139.

5 **Q. Have you previously provided testimony in this docket?**

6 A. Yes, I provided direct testimony on May 16, 2014 and amended direct testimony on  
7 September 16, 2014.

8 **Q. On whose behalf are you testifying in this case?**

9 A. I am testifying on behalf of the Massachusetts Department of Energy Resources (DOER)  
10 and the Massachusetts Department of Environmental Protection (MassDEP).

11 **Q. What is the purpose of your rebuttal testimony?**

12 A. The purpose of my testimony is to rebut the Direct Testimony of Drs. David Montgomery  
13 and Sugandha Tuladhar, of NERA Economic Consulting (NERA), which was filed in this  
14 docket on behalf of Northeast Utilities.

15 **2. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS**

16 **Q. Please summarize the points in NERA's testimony that you respond to in your**  
17 **rebuttal testimony.**

18 A. I respond to four key elements of NERA's direct testimony:

19 1. NERA claims that it is not possible to develop an estimate of Global Warming  
20 Solutions Act (GWSA) compliance costs at this time because of the many  
21 complexities and uncertainties associated with the technologies and policies that  
22 might be utilized to comply with the GWSA.

23 2. NERA claims that the MassDEP/DOER analysis is based on several "arbitrary"  
24 assumptions, particularly with regard to assumptions about policy mechanisms  
25 available to address the requirements of the GWSA.

26 3. NERA claims that the MassDEP/DOER analysis includes an error in the cost of the  
27 Clean Energy Imports.

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1           4. NERA recommends that the Department reject the MassDEP/DOER GWSA  
2           compliance costs, but does not provide an alternative estimate to use instead.

3 **Q. Please summarize your response to these four points.**

4 A. In general, the NERA testimony does not recognize the long history of Department  
5 precedent and practice on energy efficiency screening, as well as the state's policies and  
6 plans for complying with the requirements of the GWSA. In particular:

7           1. Department precedent clearly allows for the use of reasonable planning  
8           assumptions, despite considerable complexities and uncertainties. The Department  
9           has repeatedly accepted avoided cost estimates (for avoided energy, capacity, price  
10          suppression, transmission, distribution, carbon compliance, and other costs) that  
11          include a considerable amount of uncertainty. Furthermore, the Department has  
12          repeatedly allowed the use of avoided cost estimates that are hard-to-quantify, or  
13          even unquantified, for the purpose of cost-effectiveness analyses of long-term  
14          renewable contracts and grid modernization investments. GWSA compliance costs  
15          should not be held to a different standard than all of these other cost-effectiveness  
16          elements and analyses.

17          2. The assumptions used in the MassDEP/DOER analysis are not arbitrary at all. On  
18          the contrary, they are based upon Massachusetts law; the Massachusetts Clean  
19          Energy and Climate Plan (CECP) for 2020; the best information available at this  
20          time; and the expertise, research and analyses of Dr. Stanton and myself. Further,  
21          the assumptions in our analysis are all approved by MassDEP and DOER, and  
22          represent the policy decisions made by two state agencies with significant  
23          responsibilities for complying with the GWSA.

24          3. The estimated cost of the Clean Energy Imports in the MassDEP/DOER analysis is  
25          reasonable and appropriate. While it is true that the cost of this marginal resource  
26          could be lower, it is also true that the cost of this resource could be significantly  
27          higher. The MassDEP/DOER Clean Energy Imports cost assumption represents a  
28          reasonable mid-point estimate of a resource associated with considerable  
29          uncertainty.

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1           4. While NERA offers a host of critiques of the MassDEP/DOER methodology and  
2           analysis, they offer neither an alternative methodology nor an alternative GWSA  
3           compliance cost to use for planning purposes.

4   **Q. Please summarize your primary recommendations.**

5   A. I offer the following recommendations:

- 6           • The Department should reaffirm its long-standing precedent that the program  
7           administrators must account for the cost of compliance with current and future  
8           environmental regulations when evaluating the cost-effectiveness of energy  
9           efficiency resources.
- 10          • The Department should find that the program administrators' current method of  
11          calculating the cost of complying with carbon requirements, which is based on the  
12          projected costs of RGGI allowances and costs of future federal requirements,  
13          understates the long-term compliance costs by not accounting for state GWSA  
14          compliance costs.
- 15          • The Department should find that estimates of GWSA compliance costs do not  
16          require the use of perfect information, and that reasonable estimates should be  
17          developed using the best methodologies, information and assumptions available.
- 18          • The Department should find that the marginal abatement cost (MAC) methodology  
19          is a reasonable and appropriate methodology for estimating GWSA compliance  
20          costs.
- 21          • The Department should find that the assumptions used in the MassDEP/DOER  
22          analysis are reasonable and appropriate for estimating GWSA costs at this time.
- 23          • The Department should find that the results of the MassDEP/DOER analysis are  
24          reasonable and appropriate for energy efficiency cost-effectiveness purposes.
- 25          • The Department should order the program administrators to use the  
26          MassDEP/DOER estimates of GWSA compliance costs in the upcoming Three-  
27          Year Energy Efficiency Plan.

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- 1           • The Department should order the program administrators to include an updated  
2           estimate of GWSA compliance cost each time the Avoided Energy Supply  
3           Component (AESC) Study is updated.

4   **3. DEPARTMENT PRECEDENT ALLOWS FOR UNCERTAINTY**

5   **Q.     Please summarize NERA’s criticism regarding the complexities and uncertainties**  
6   **involved in estimating GWSA compliance costs.**

7   A.     A constant theme running throughout NERA’s testimony is that the MassDEP/DOER  
8     analysis cannot be relied upon because the topic is so complex, there are too many  
9     uncertainties involved, and the analysis requires speculation and arbitrary assumptions. A  
10    quick review of the summary section of the NERA testimony makes this theme very  
11    apparent. The summary lists seven reasons for rejecting the MassDEP/DOER analysis.  
12    Each of these reasons (with the exception of No. 5, which I address in Section 4 of my  
13    testimony) is based on the same theme regarding complexity and uncertainty. In  
14    particular: No. 1 - speculative assumptions; No. 2 - political speculation; No. 3 - arbitrary  
15    choices; No. 4 - inadequate information; No. 6 - limited knowledge; No. 7 - complexity.<sup>1</sup>  
16    NERA even goes so far as to claim that estimates of GWSA compliance costs require  
17    “perfect foresight.”<sup>2</sup>

18   **Q.     Do you agree with NERA’s claim that it is not possible or appropriate to estimate**  
19   **GWSA compliance costs due to the uncertainties and complexities involved?**

20   A.     No. Of course there are uncertainties and complexities associated with GWSA  
21     compliance costs, just as there are for electricity resource planning in general. But these  
22     are not sufficient reasons for ignoring GWSA compliance costs altogether, or for  
23     assuming that they will be zero.

24     In fact, the Department has a very clear precedent regarding the treatment of costs and  
25     benefits that are uncertain or difficult to quantify. Since as long ago as 2000, the  
26     Department has been very clear that the program administrators must account for the cost  
27     of complying with current and anticipated future environmental compliance costs, and

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<sup>1</sup> NERA Direct Testimony, pages 6-8.

<sup>2</sup> NERA Direct Testimony, pages 7, 19, and 21.

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1 that complexity and uncertainty cannot be used as justification to ignore these benefits. In  
2 my amended direct testimony I provide some details on the orders where the Department  
3 has established and reaffirmed this precedent.<sup>3</sup> In the table below I summarize some of  
4 the key findings from relevant Department orders, including an order that was issued  
5 after I filed my amended direct testimony. The clear and consistent requirements that the  
6 Department has established with regard to accounting for environmental compliance  
7 costs can be summarized as follows:

- 8 • Massachusetts program administrators must account for the cost of complying with  
9 current and future environmental regulations, including GWSA, when evaluating  
10 the costs and benefits of energy efficiency. Massachusetts utilities must also  
11 account for these costs when evaluating the benefits of long-term renewable  
12 contracts and grid modernization investments.
- 13 • Quantifying benefits necessitates working with uncertainties and applying the best  
14 available information. Program administrators cannot simply ignore the benefits of  
15 avoiding GWSA compliance costs on the ground that they are too uncertain or too  
16 difficult to quantify.
- 17 • Program administrators must use the best estimate available to quantify GWSA  
18 compliance costs, even though some requirements and costs are not yet known.

19 In light of the clearly established precedent in Massachusetts, the primary theme and the  
20 detailed criticisms of the NERA testimony can be seen as completely without merit and  
21 out of touch with Massachusetts energy efficiency policies and practices. Not only has  
22 the Department been clear on the need to account for environmental compliance costs  
23 despite the complexity and uncertainty involved, the Department has also been clear that  
24 even unquantified benefits should be accounted for somehow. In sum, NERA's critiques  
25 are based on an unachievable, untenable and inappropriate planning standard that does  
26 not exist in Massachusetts.

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<sup>3</sup> Amended Direct Testimony of Tim Woolf, pages 8-16.

**Table 1. Department Orders and Findings Regarding Environmental Compliance Costs**

Topic	Order (date)	Key Findings
Energy Efficiency Guidelines	98-100 (2000)	<p>With regard to uncertainty in the estimates of efficiency benefits, the Department recognized “the uncertainty that exists in estimates of non-resource benefits from energy efficiency programs that accrue to program participants, as we recognize the uncertainty inherent in forecasts of price and load in estimates of energy savings. <u>The Department will not hold estimates of known quantifiable, and significant non-resource benefits to a higher standard of certainty than other estimates</u>, but will require that they be appropriate and sufficiently unbiased, and directs program administrators to make an appropriate trade-off between benefits and costs in seeking accuracy.” (p. 16)</p> <p>The Energy Efficiency Guidelines require that avoided costs “include environmental compliance costs that are reasonably projected to be incurred in the future...” (Guidelines Section 3.3.2(d))</p>
	DPU 08-50-A (2009)	<p>The Department found that it “considers existing state and likely federal measures to control greenhouse gas to constitute reasonably anticipated environmental compliance costs that will be reflected in future electricity prices in the Commonwealth. Consequently, <u>the Department expects program administrators to include estimates of such compliance costs</u> in the calculation of future avoided energy costs (p. 17)</p>
Long-Term Contracts for Renewables	DPU 10-54 (2010)	<p>The Department found that “<u>it is not necessary for all costs and benefits to be quantifiable or quantified in order for us to give them weight</u>.” (p.68)</p> <p>Also, that the Department “can and will include in our cost-effectiveness analysis those costs and benefits that are likely to affect electricity rates, <u>including the cost of compliance with reasonably anticipated future environmental requirements</u>.” (p.69)</p> <p>Also, that costs do not need to be “precisely quantifiable for the Department to have the authority to order their avoidance, so long as such costs are reasonably likely to be incurred” (p.172)</p> <p>Also that “[t]o ignore benefits simply because they are difficult to quantify would <u>unjustifiably skew the comparison</u> of costs and benefits” (p. 173)</p> <p>Ultimately, the Department found that the Cape Wind contract will provide benefits in terms of avoiding future GWSA compliance costs, <u>even though future compliance costs are not yet known</u>.” (p.175)</p>
	DPU 13-146 through 13-149 (2014)	<p>The Department found that the proposed long-term renewable contracts will “contribute to achieving a portion of the emissions reductions necessary to comply with the GWSA targets for the duration of the contracts. For these reasons, we conclude that the contracts <u>will provide an unquantified, but significant, benefit</u> to Massachusetts ratepayers and the Commonwealth by contributing to compliance with renewable energy and environmental requirements.” (p.54)</p>
Grid Modernization	DPU 12-76-A (2013)	<p>The Department found that grid modernization benefit-cost analyses must demonstrate that “the <u>benefits, quantified and unquantified</u>, exceed the costs,” and reaffirmed its previous finding that “it is not necessary for all costs and benefits to be quantified or quantifiable in order for us to give them weight.” (p.20)</p> <p>Also, that “a company’s total benefits must include its ‘best effort’ <u>estimates</u>” of several quantifiable benefits, including “reduced carbon costs.”</p>



		(p.23)
	DPU 12-76-C (2014)	The Department found that “In terms of compliance costs for reducing greenhouse gas emissions, we expect that any jointly developed forecast of electricity prices <u>will include compliance with the Global Warming Solutions Act</u> .. If the companies are not able to monetize the benefits of avoided GWSA compliance costs, <u>we direct the companies to include qualitative assessments</u> of the contribution their STIP proposals will provide to this benefit in their analysis of difficult to quantify benefits.” (p. 16)

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2 **Q. Is there a specific, relevant example of how NERA’s argument is inconsistent with**  
3 **Department practice on the treatment of uncertain costs?**

4 A. Yes. As described in my amended direct testimony, since 2005 the program  
5 administrators have been using projections of (a) the costs to comply with the Regional  
6 Greenhouse Gas Initiative requirements, and (b) the costs to comply with future  
7 anticipated federal regulations to reduce carbon emissions.<sup>4</sup> These are examples of  
8 environmental compliance cost estimates that contain considerable uncertainty, but are  
9 already approved by the Department and in use by the program administrators. Relative  
10 to the projected compliance costs of future federal regulations, projections of GWSA  
11 compliance costs are less complex, less uncertain, and more relevant, because they are  
12 based on a Massachusetts law that is already in place. To hold estimates of GWSA  
13 compliance costs to a more stringent standard for accuracy would clearly be inconsistent  
14 with Department precedent and practice.

15 **Q. In addition to being inconsistent with Massachusetts precedent and practice, are**  
16 **there other reasons why NERA’s criticisms on this point are invalid?**

17 A. Yes. The logic behind NERA’s arguments regarding complexity and uncertainty is  
18 fundamentally flawed in the context of electricity resource planning in general. Benefit-  
19 cost analyses for energy efficiency (as well as other demand-side and supply-side  
20 resources) require numerous complex analyses and must be prepared in light of multiple  
21 uncertainties. For example, forecasts of gas prices play a significant role in the avoided  
22 cost of energy, and these forecasts require complex dispatch models, numerous  
23 assumptions regarding future natural gas costs and availability, the retirement of power  
24 plants in New England, the introduction of new supply-side and demand-side resources in

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<sup>4</sup> Tim Woolf Amended Direct Testimony, pages 17-23.

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1 New England, and more. The fundamental principle that allows regulators, utilities and  
2 other stakeholders to make decisions based on electricity resource planning exercises is  
3 that the planning must be based upon the best methodologies, assumptions and inputs  
4 available at the time of the planning process in order to provide regulators and utilities  
5 with the best information available for making decisions.

6 If the Department were to apply NERA’s standard for simplicity and certainty to all of  
7 the inputs to the energy efficiency benefit-cost analysis, then it would be impossible to  
8 conduct such an analysis. Further, if the Department were to apply NERA’s  
9 recommendation – that in the absence of simplicity and certainty we should assume the  
10 avoided cost to be zero – to the rest of the benefit-cost analysis, then the majority of  
11 energy efficiency benefits would have to be assumed to be zero, despite the fact that this  
12 is patently false. As a consequence of this erroneous assumption, there would be no  
13 energy efficiency programs offered in Massachusetts, customers would be required to  
14 bear significantly greater electricity costs, and it would be much more difficult and  
15 expensive to comply with the requirements of the GWSA. In short, acceptance of  
16 NERA’s inappropriately stringent standard would result in significant negative  
17 repercussions for Massachusetts customers.

18 **4. THE MASSDEP/DOER ASSUMPTIONS ARE NOT ARBITRARY**

19 **Q. Please summarize NERA’s criticism regarding the use of arbitrary assumptions in**  
20 **the MassDEP/DOER analysis.**

21 A. NERA frequently claims that the MassDEP/DOER analysis relies upon “arbitrary”  
22 assumptions.<sup>5</sup> NERA even goes so far as to claim that “[p]olicy uncertainty is ignored,  
23 and the proposed MAC appears to be based solely on the personal opinions of Synapse  
24 staff about the outcomes of political processes that will shape future regulations and  
25 policies.”<sup>6</sup>

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<sup>5</sup> NERA Direct Testimony, pages 6, 7, 8, 15, 16, 17, 20, 27.

<sup>6</sup> NERA Direct Testimony, page 18.

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1 **Q. Do you agree with NERA’s criticism regarding the use of arbitrary assumptions?**

2 A. No. There is no question that several important assumptions are necessary to estimate  
3 GWSA compliance costs, just as with any estimate of any avoided costs. However, none  
4 of our assumptions are arbitrary. On the contrary, they are based upon the policies set  
5 forth in the Massachusetts Clean Energy and Climate Plan, the regulatory agencies’  
6 experience in implementing that Plan, anticipated electricity industry conditions and  
7 likely carbon abatement technologies. In sum, the MassDEP/DOER analysis is based  
8 upon the most reasonable information available at this time. There is nothing arbitrary  
9 about it.

10 **Q. Do you agree that policy uncertainty is ignored, or that the MAC is based solely**  
11 **upon the personal opinions of Synapse staff?**

12 A. No. Our analysis does not ignore policy uncertainty, and is not simply based on the  
13 personal opinions of Synapse staff.

14 First, our analysis is based upon current Massachusetts law (in the form of the GWSA),  
15 and current Massachusetts policies (as articulated in the CECP). It is also informed by  
16 five years of state experience implementing some of the elements of the CECP.

17 Second, the MassDEP/DOER analysis was conducted in close coordination with the staff  
18 at MassDEP and DOER. All of the assumptions in our analysis are informed by our  
19 communications with MassDEP and DOER, and all of them have been reviewed and  
20 approved by those agencies. Consequently, the GWSA compliance cost analysis is not  
21 solely based upon the work of Synapse; it is also based upon the knowledge, expertise,  
22 and professional judgment of MassDEP and DOER staff. MassDEP and DOER are the  
23 two state agencies with the most responsibility for complying with the requirements of  
24 the GWSA, and therefore are very well suited – perhaps best-suited – for making  
25 informed decisions regarding the policies and the options available for complying with  
26 the GWSA.

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1 **5. THE MASSDEP/DOER CLEAN ENERGY IMPORTS ASSUMPTIONS ARE**  
2 **REASONABLE**

3 **Q. Please summarize NERA’s criticism regarding an error in the cost of the Clean**  
4 **Energy Imports.**

5 A. NERA claims that the MassDEP/DOER estimates of GWSA compliance costs contain an  
6 error because the marginal resource, Clean Energy Imports, is likely to have a price  
7 suppression effect that would reduce the net cost of that resource to zero.<sup>7</sup>

8 **Q. Do you agree with NERA’s criticism regarding the cost of Clean Energy Imports?**

9 A. No. Dr. Stanton addresses this point in some depth in her rebuttal testimony. She explains  
10 that while the price suppression effect could reduce the cost of Clean Energy Imports  
11 relative to our estimate, it is also true that many other factors could increase that cost.  
12 Further, she describes several assumptions in the MassDEP/DOER analysis that are  
13 conservative, and are therefore likely to understate the Clean Energy Import costs,  
14 thereby offsetting the effects of the price suppression effect assumption. In sum, Dr.  
15 Stanton explains that the MassDEP/DOER assumption regarding the cost of Clean  
16 Energy Imports is a reasonable mid-case assumption, in light of the uncertainties  
17 associated with this resource.<sup>8</sup>

18 **Q. Is there evidence suggesting that MassDEP/DOER Clean Energy Imports**  
19 **assumption is a reasonable mid-case assumption?**

20 Yes. It is useful to consider the results of the MassDEP/DOER analysis in light of  
21 forecasts of other, relevant cost estimates. Figure 1 compares our GWSA compliance cost  
22 estimates (in 2013 \$/MWh) with recent forecasts of (a) the Renewable Energy Certificate  
23 (REC) prices for compliance with the Massachusetts Class 1 Renewable Portfolio  
24 Standard (RPS); (b) the cost of complying with anticipated federal carbon requirements;

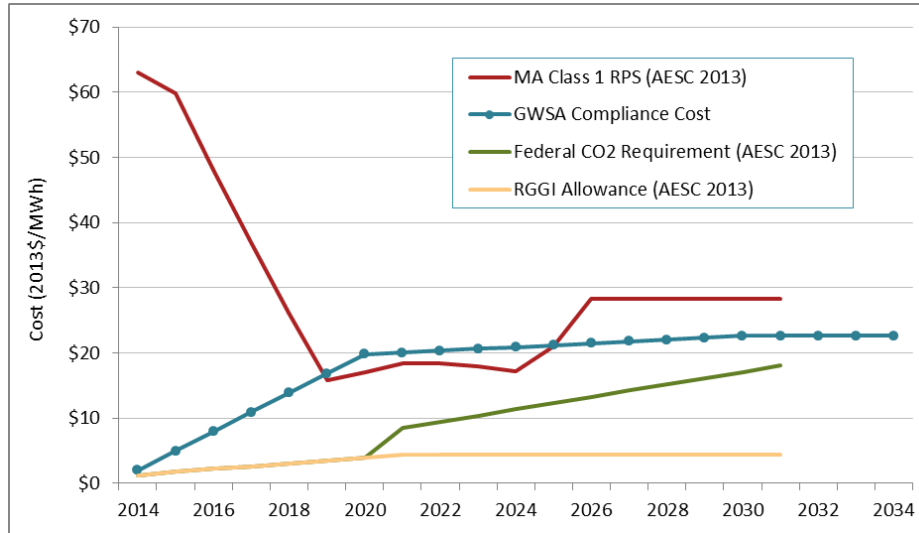
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<sup>7</sup> NERA Direct Testimony, page 22.

<sup>8</sup> The Department has addressed the issue of the uncertainty of price suppression effects before. In D.P.U. 10-54, the Department was presented with several conflicting estimates of the price suppression effect of Cape Wind. In that case, the Department used a range of price suppression estimates to account for the uncertainty associated with the estimates. D.P.U. 10-54, pp. 130-131 (November 22, 2010).

1 and (c) the Regional Greenhouse Gas Initiative (RGGI) allowance prices. All of these  
2 other forecasts are taken from the most recent Avoided Energy Supply Cost report.<sup>9</sup>

3 **Figure 1. MassDEP/DOER GWSA Compliance Cost Relative to Other Cost Forecasts**



4  
5 Figure 1 is also attached to my Rebuttal Testimony as TW Rebuttal Exh. 1.

6 **Q. What is the significance of the projected RGGI price and federal carbon**  
7 **requirement in this comparison?**

8 A. The RGGI prices and the cost of federal carbon requirements represent other carbon  
9 compliance costs that help put the GWSA compliance costs in context. The current RGGI  
10 carbon requirements are significantly lower than those in the GWSA, and thus one would  
11 expect the RGGI price to be significantly lower than the GWSA compliance costs.

12 The cost of future federal carbon requirements was included in the 2013 AESC, based  
13 upon a study prepared in October 2012, which was based upon anticipated federal carbon  
14 requirements that are less stringent than the carbon reduction goals of the GWSA.

15 Consequently, one would expect the projected cost of future federal carbon requirements  
16 to be commensurately lower than the GWSA compliance costs.

17 **Q. What is the significance of the projected REC prices in this comparison?**

18 A. The Massachusetts renewable portfolio standard requires distribution companies and  
19 competitive suppliers in Massachusetts to purchase an increasing amount of renewable

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<sup>9</sup> Synapse Energy Economics, *Avoided Energy Supply Cost in New England: 2013 Report*, July 2013.

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1 generation each year. The RPS allows (a) renewable producers in New England to  
2 generation RECs, (b) any party to purchase and sell RECs openly, and (c) distribution  
3 companies and competitive suppliers to use RECs for compliance purposes.  
4 Consequently REC prices provide a good indication of the incremental cost of renewable  
5 generation in Massachusetts and New England.

6 REC prices are relevant only for the quantity of renewable generation required by the  
7 RPS; less renewable generation would be expected to cost less than the REC prices,  
8 while more renewable generation would be expected to cost more than the REC prices.  
9 The REC prices provide a useful benchmark for comparison with the GWSA compliance  
10 costs, given that renewable generation is likely to be one of the marginal resources for  
11 GWSA compliance.

12 **Q. What do the projections in Figure 1 indicate?**

13 A. Figure 1 provides a high-level reasonableness check on the MassDEP/DOER estimates of  
14 GWSA compliance costs. This is particularly true with regard to the forecast of  
15 Massachusetts Class 1 REC prices, which provide a useful benchmark for what the  
16 marginal cost of renewable generation might be over time.

17 Note that throughout this period the estimates of GWSA compliance costs are either  
18 lower than, or very close to, the forecasted REC prices.<sup>10</sup> This suggests that the  
19 MassDEP/DOER estimates of GWSA compliance costs are within the range of what one  
20 would expect a reasonable estimate to be.

21 For 2020, one would expect the GWSA compliance cost to be at least as high as the REC  
22 price, because compliance with the 2020 RPS target is not likely to be sufficient to meet  
23 the 2020 GWSA emissions reduction requirements. Our estimates of 2020 GWSA  
24 compliance costs (\$20/MWh) are slightly higher than the forecasted REC prices  
25 (\$18/MWh), consistent with the expectation that more low-carbon or zero-carbon  
26 resources will be needed than will be supplied by the RPS.

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<sup>10</sup> The REC prices are especially high in the early years due to limits in the supply of renewable generation.

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1 By 2030, the GWSA compliance costs might be less than the REC prices, consistent with  
2 Figure 1, if there is a sufficient amount of lower-cost carbon abatement options (relative  
3 to the renewables required by the RPS) available to Massachusetts to meet future 2030  
4 GWSA emissions reduction requirements. It is also possible that there is not a sufficient  
5 amount of lower-cost carbon abatement options available to meet future 2030 GWSA  
6 requirements, in which case the 2030 GWSA compliance costs would likely be higher  
7 than the 2030 REC price. Either way, the MassDEP/DOER estimates of GWSA  
8 compliance costs for 2030 are reasonable.

9 **Q. What general conclusions can be drawn from the costs presented in Figure 1?**

10 A. The costs in Figure 1 suggest that the MassDEP/DOER estimates of GWSA compliance  
11 costs are within the range of reasonableness. They are either less than the forecasted REC  
12 price, or very close to the forecasted REC price.

13 The Massachusetts Class 1 REC prices provide a useful benchmark for what the marginal  
14 cost of renewable generation might be over time. If Massachusetts needs to procure more  
15 carbon abatement resources than the renewable generation contained in the RPS  
16 requirement in order to comply with the GWSA over time, then the Class 1 REC prices  
17 will represent a lower bound on the GWSA compliance costs. From this perspective, the  
18 MassDEP/DOER estimates of GWSA compliance costs can be described as conservative.

19 **6. NERA OFFERS NO ALTERNATIVE ESTIMATE**

20 **Q. Has NERA provided an alternative estimate of GWSA compliance costs that the**  
21 **Department could use instead of the MassDEP/DOER estimate?**

22 A. No. NERA provides no alternative estimate of GWSA compliance costs in its direct  
23 testimony. Furthermore, NERA was asked through several information requests to  
24 provide alternative estimates, but they chose not to do so.<sup>11</sup>

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<sup>11</sup> Responses to Information Requests PET-1-6, AG-NU-2, AG-NU-1-4, AG-NU-1-9, AG-NU-1-10, AG-NU-1-11, AG-NU-1-12

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1 **Q. Please explain the significance of the fact that NERA has not provided an**  
2 **alternative estimate of GWSA compliance costs.**

3 A. As described in Section 3 of my testimony, there is no question that the Massachusetts  
4 program administrators have an obligation to account for GWSA compliance costs when  
5 screening energy efficiency resources. In addition, the program administrators have an  
6 obligation to make a good effort to determine a reasonable estimate using the best  
7 methodologies and assumptions available.

8 MassDEP and DOER have met this obligation in the development of the estimated  
9 GWSA compliance costs proposed in this docket. NERA, and Northeast Utilities, in their  
10 testimony do nothing to enhance the ability of the program administrators to meet this  
11 obligation.

12 In light of all the evidence that MassDEP and DOER have provided to support the  
13 estimated GWSA compliance costs, and in light of no alternative estimates being  
14 available, the Department should find that the MassDEP/DOER estimates are  
15 (a) reasonable, and (b) the best estimates available at this time.

16 **Q. What would be the implications of accepting NERA's recommendation to reject the**  
17 **MassDEP/DOER estimates of GWSA compliance costs?**

18 A. NERA's ultimate recommendation that the Department reject the use of the GWSA  
19 compliance cost estimates, without offering alternative estimates, implies that including  
20 no GWSA compliance costs is a more prudent approach than using estimates that are  
21 somewhat uncertain.

22 However, effectively assuming there will be no GWSA compliance costs over the next  
23 twenty years is not prudent, nor is it in the best interest of Massachusetts electricity and  
24 gas customers. If the Department were to follow NERA's recommendation and reject the  
25 GWSA compliance cost estimates proposed by MassDEP/DOER, then it would  
26 undoubtedly cause Massachusetts customers to pay greater costs for more expensive  
27 alternatives to comply with the GWSA.

28 A more prudent approach is for the Department to adopt the GWSA compliance cost  
29 estimate proposed by MassDEP/DOER, as they are the best estimates of GWSA  
30 compliance costs available at this time. Over time, the program administrators should  
31 include updated estimates of GWSA compliance costs, in order to reduce uncertainty as



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1 better information becomes available. This approach of using the best estimate available  
2 at any point in time is consistent with prudent planning practices, and is most likely to  
3 identify the *optimal* amount of cost-effective energy efficiency – neither too much nor  
4 too little – and will lead to the lowest cost outcome for customers.

5 **7. RECOMMENDATIONS**

6 **Q. Please summarize your recommendations.**

7 A. I offer the following recommendations:

- 8 • The Department should reaffirm its long-standing precedent that the program  
9 administrators must account for the cost of compliance with current and future  
10 environmental regulations when evaluating the cost-effectiveness of energy  
11 efficiency resources.
- 12 • The Department should find that the program administrators' current method of  
13 calculating the cost of complying with carbon requirements, which is based on the  
14 projected costs of RGGI allowances and costs of future federal requirements,  
15 understates the long-term compliance costs by not accounting for state GWSA  
16 compliance costs.
- 17 • The Department should find that estimates of GWSA compliance costs do not  
18 require the use of perfect information, and that reasonable estimates should be  
19 developed using the best methodologies, information and assumptions available.
- 20 • The Department should find that the marginal abatement cost (MAC) methodology  
21 is a reasonable and appropriate methodology for estimating GWSA compliance  
22 costs.
- 23 • The Department should find that the assumptions used in the MassDEP/DOER  
24 analysis are reasonable and appropriate for estimating GWSA costs at this time.
- 25 • The Department should find that the results of the MassDEP/DOER analysis are  
26 reasonable and appropriate for energy efficiency cost-effectiveness purposes.

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1           • The Department should order the program administrators to use the  
2           MassDEP/DOER estimates of GWSA compliance costs in the upcoming Three-  
3           Year Energy Efficiency Plan.

4           • The Department should order the program administrators to include an updated  
5           estimate of GWSA compliance cost each time the Avoided Energy Supply  
6           Component (AESC) Study is updated.

7   **Q.    Does this conclude your rebuttal testimony?**

8   **A.    Yes, it does.**