

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

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

D.P.U. 14-86

**Rebuttal Testimony of
Elizabeth A. Stanton**

**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

1
2
3
4
5
6
7
8
9
10
11

Table of Contents

1. INTRODUCTION AND QUALIFICATIONS..... 3

2. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS..... 3

3. THE MARGINAL ABATEMENT COST METHODOLOGY..... 4

4. COSTS OF CLEAN ENERGY IMPORTS 6

5. UNBIASED ANALYSIS..... 8

1 **1. INTRODUCTION AND QUALIFICATIONS**

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

3 A. My name is Elizabeth A. Stanton, and I am a Senior Economist with Synapse Energy
4 Economics (Synapse) at 485 Massachusetts Avenue, Suite 2, Cambridge, Massachusetts
5 02139.

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

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

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

10 A. I am testifying on behalf of the Massachusetts Department of Energy Resources and the
11 Massachusetts Department of Environmental Protection.

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

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

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

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

18 A.

- 19 • The Department should find that the program administrators' current method of
20 calculating the cost of complying with carbon requirements, which is based on the
21 projected costs of RGGI allowances and costs of future federal requirements, understates
22 the long-term compliance costs by not accounting for state GWSA compliance costs.
- 23 • The Department should find that estimates of GWSA compliance costs do not require the
24 use of perfect information, and that reasonable estimates should be developed using the
25 best methodologies, information and assumptions available.

-
- 1 • The Department should find that the marginal abatement cost methodology is a
2 reasonable and appropriate methodology for estimating GWSA compliance costs.
- 3 • The Department should find that the assumptions used in the MassDEP/DOER analysis
4 are reasonable and appropriate for estimating GWSA costs at this time.
- 5 • The Department should find that the results of the MassDEP/DOER analysis are
6 reasonable and appropriate for energy efficiency cost-effectiveness purposes.
- 7 • The Department should order the program administrators to use the MassDEP/DOER
8 estimates of GWSA compliance costs in the upcoming Three-Year Energy Efficiency
9 Plan.
- 10 • The Department should order the program administrators to include an updated estimate
11 of GWSA compliance cost each time the Avoided Energy Supply Component (AESC)
12 Study is updated.

13 **3. THE MARGINAL ABATEMENT COST METHODOLOGY**

14 **Q. On p. 6 of their testimony, Northeast Utilities’ experts characterize the marginal**
15 **abatement cost curve analysis as an “inappropriate methodology.” Do you agree**
16 **with that characterization? If not, why not?**

17 A. I disagree with the Northeast Utilities’ experts’ characterization of the marginal
18 abatement cost curve analysis as an inappropriate methodology. The methodology used in
19 the MassDEP/DOER analysis compares an upward sloping supply curve of abatement
20 measures to the fixed demand for emission reductions determined by state law to find the
21 intersection of supply and demand. The construction and use of a supply curve, such as
22 the marginal abatement cost curve, is ubiquitous in economics.

23 **Q. On p. 21 of their testimony, Northeast Utilities’ experts state that the marginal**
24 **abatement cost (MAC) “is a planning approach that assumes perfect foresight and**
25 **forecasting and knowledge of all possible emission reduction technologies.” Do you**
26 **agree with this statement?**

1 A. I disagree with the Northeast Utilities’ experts’ statement that the marginal abatement
2 cost approach assumes perfect foresight of future emission reduction technologies. Like
3 any model of future years, the marginal abatement methodology used in the
4 MassDEP/DOER analysis requires predictions of future conditions. I do not consider lack
5 of perfect foresight regarding future circumstances to be a valid reason for depriving
6 policy makers of the information and analysis they need to make well informed and
7 thoughtful policy decisions. The GWSA marginal abatement methodology used in the
8 MassDEP/DOER analysis is based on the *Massachusetts Clean Energy and Climate Plan*
9 *for 2020* (CECP) supplemented by the best available information regarding the expected
10 costs and emissions reductions associated with greenhouse gas reduction policies. Using
11 the best information available to fill in data gaps with regard to expected future
12 conditions is, in my opinion, fundamental to the forecasting methodologies commonly
13 used in economic analysis.

14 **Q. On p. 33 of their testimony, Northeast Utilities’ experts state: “The dependence of**
15 **electric load on the electricity price and of estimated emission reductions on the**
16 **assumed load gives rise to a simultaneity that invalidates the MAC.” Do you agree**
17 **with this statement?**

18 A. I disagree with the Northeast Utilities’ experts’ statement regarding the relationship
19 between electric loads, prices and emission reductions invalidating the MassDEP/DOER
20 results. Dynamic analysis using simultaneous equations is one possible analytical tool,
21 but it is, by no means, the only valid tool nor is it without its own detriments. Classic
22 critiques of computerized general equilibrium models and the like include the use of
23 unrealistic assumptions to achieve equilibrium conditions (e.g., full employment—the
24 assumption that policies have no impact on employment because everyone who wants to
25 be employed already is).

26 Certainly, electric loads, prices and emission reductions are interrelated. First order
27 estimation of emission reductions and costs is, however, possible and productive without
28 modeling these dynamic effects. All modeling requires simplification and I do not
29 consider lack of perfect foresight regarding future circumstances to be a valid reason for
30 failing to use careful economic analysis to inform policy decisions. The MassDEP/DOER
31 analysis achieves a good estimate of the expected future costs of compliance with the

1 GWSA that is both reasonable and appropriate for use when screening energy efficiency
2 programs for cost-effectiveness.

3 **Q. Do you think the costs of GWSA compliance presented in this docket are too**
4 **uncertain to use in estimating the avoided costs of GWSA in Energy Efficiency**
5 **Investment Plans?**

6 A. No. In fact, I have presented a number of sensitivity analyses to assess uncertainty in this
7 docket, and have shown that the marginal cost and marginal policy in this docket are
8 relatively insensitive to the changes in assumptions examined.

9 **4. COSTS OF CLEAN ENERGY IMPORTS**

10 **Q. The Northeast Utilities' experts claim that your testimony has erroneously omitted**
11 **the price suppression benefits in the estimate of the cost of Clean Energy Imports.**
12 **Do you agree with this assessment?**

13 A. No. I do not agree with this assessment.

14 The Northeast Utilities' experts are correct in stating that the Clean Energy Import policy
15 may have price suppression effects that are not captured in the MassDEP/DOER analysis
16 and that the impact of any such effects would be to lower the cost of the marginal policy
17 and the cost of compliance with the GWSA. However, it is critical that the Commission
18 consider several additional facts in weighing this information:

19 (1) The scale of the price suppression effect (and anticipated change to the cost of GWSA
20 compliance) has not yet been adequately estimated for use in the MassDEP/DOER
21 analysis.

22 (2) As noted in my response to DPU 3-11, AESC 2013 and the Hydro memo use very
23 different techniques for estimating price suppression.

24 (3) Potential price suppression (elasticity) effects are not included for any measure in the
25 marginal abatement cost curve with the exception of energy efficiency. In practice, an
26 estimation of the cost of GWSA compliance would be improved by a calculation not
27 of any one emission reduction measure in isolation—and out of context of the order

1 in which it is implemented—but rather by an estimation of the price elasticity effect
2 of all of the measures necessary for compliance taken together. The absence at this
3 time of such an integrated assessment need not, in my opinion, delay the Department
4 from approving the MassDEP/DOER estimates of GWSA compliance costs.

5 (4) While inclusion of omitted price suppression would likely lower compliance costs
6 (although the amount by which these costs would be lowered is unknown) several
7 other model assumptions used in the MassDEP/DOER analysis tend to understate
8 GWSA compliance costs. Among these assumptions I would include:

- 9 • The analysis for the Hydro memo on which the Clean Energy Import costs were
10 based, assumed implementation of the two cheapest transmission lines followed
11 by implementation of the most expensive. In reality, however, many factors may
12 affect the order in which transmission lines might be built. If the transmission
13 lines that are actually built have costs at the high end of the range, the cost
14 estimates in the MassDEP/DOER analysis would understate the costs of those
15 transmission lines.
- 16 • I assume that transmission projects could be completed on their pre-construction
17 budgets. Overruns would increase the cost of GWSA compliance.
- 18 • I assume that incremental transmission is feasible before 2020. A failure to bring
19 transmission online by 2020 would make more expensive policies necessary to
20 achieve the 2020 emissions reduction target. If, for example, implementation of
21 the CEPS Policy with transmission were required, the costs of GWSA compliance
22 would be substantially higher than the MassDEP/DOER cost estimates.
- 23 • I assume that Quebecois generation is available at the international border for the
24 ISO-NE wholesale price of energy. A price premium on Canadian generation or
25 capacity—including a Massachusetts certificate or credit mechanism used as an
26 incentive for these imports—would increase the cost of GWSA compliance.

27 **Q. Do you consider the Clean Energy Import cost estimates presented in your**
28 **testimony to be reasonable?**

1 A. Yes. While the price suppression effect may make the Clean Energy Import costs lower
2 than my estimates, there are several factors that may cause the cost of Clean Energy
3 Imports to be higher than my estimates. In addition, price suppression may make the cost
4 of GWSA compliance lower than that estimate, although the extent of this reduction is
5 unknown. Given the range of possible costs, I believe that my estimate represents a
6 reasonable mid-case.

7 **5. UNBIASED ANALYSIS**

8 **Q. The Northeast Utilities' experts claim that there is a pattern of bias in your analysis,**
9 **where you chose some information from the CECP when it serves your purposes,**
10 **and reject some information from the CECP when that serves your purposes. Do**
11 **you agree with this assessment? Explain the basis of your answer.**

12 A. Absolutely not. The starting point for the MassDEP/DOER analysis was the GWSA,
13 decisions by the Secretary of Energy and Environmental Affairs (Secretary) and the
14 CECP. As explained in my testimony, the GWSA set an emissions reduction limit of 10-
15 25 percent below 1990 levels and at least 80 percent below 1990 levels for 2050 and the
16 Secretary issued a decision selecting 25 percent as the emissions reduction limit for 2020.
17 The Secretary also issued decisions determining the level of 1990 emissions and
18 projected business-as-usual emissions for 2020. The CECP set a 64-percent emission
19 reductions target for the Buildings and Electric Supply Sectors. The MassDEP/DOER
20 analysis relied on the CECP and the Secretary's decisions.

21 I updated the Secretary's 2020 business-as-usual projections for the Electric Supply
22 sector to reflect power plant retirements and greater use of natural gas. I also updated the
23 Secretary's business-as-usual projections for the Buildings sector to reflect more recent
24 information. Rather than showing evidence of bias, the changes to the 2020 business-as-
25 usual projections reflect the best information available regarding past, current, and future
26 economic conditions.

27 The MassDEP/DOER analysis examines all the Buildings and Electric Supply sectors
28 policies set forth in the CECP for which the CECP contains a specific emissions
29 reduction projection. I included each strategy in the CECP in the marginal abatement cost

1 curves with the exception of more stringent EPA Power Plant Rules, which are
2 incorporated into the business-as-usual projections, and the expansion of energy
3 efficiency programs to commercial and industrial heating oil which cannot be
4 implemented without legislation. Contrary to the unsubstantiated allegations of Northeast
5 Utilities' experts, I did not pick and choose what policies to evaluate in the
6 MassDEP/DOER analysis. I analyzed the policies selected by the Secretary when he
7 issued the CECP.

8 In sum, as documented in my direct testimony and information responses the approach I
9 used was to start with the CECP and update as necessary to fill data gaps. Using this
10 approach allowed me to use my expertise to perform the MassDEP/DOER analysis
11 without interjecting any personal bias into the process.

12 **Q. Do you have anything to add to your rebuttal testimony?**

13 A. Yes. In preparing my rebuttal testimony, I noticed an error in DPU 3-11. I attach a
14 revised version of DPU 3-11. This revision supersedes my earlier response to DPU 3-11.

15 **Q. On p. 32 of their testimony, Northeast Utilities' experts state that the emission
16 reductions attributed to the Federal Appliance Standard in the MassDEP/DOER
17 analysis "is less than half the estimate made for Massachusetts by the U.S.
18 Department of Energy." Please explain the treatment of the emission reductions
19 arising from Federal Appliance Standards in the MassDEP/DOER analysis.**

20 A. As documented in the CECP and EAS-6, and addressed in DPU 2-18, the emission
21 reduction assumption for the Federal Appliance Standards policy matched the CECP, and
22 is likely appropriately conservative since the federal appliance standards were not
23 implemented by expected dates. Further, even if the emission reductions expected from
24 Federal Appliance Standards were doubled, it would not change the marginal policy or
25 the marginal cost for 2020 or 2030.

1 **Q. On p. 28 of their testimony, Northeast Utilities’ experts point out that the “CECP**
2 **report includes [all cost-effective energy efficiency] emission reductions from fuel**
3 **oil, natural gas and electricity for a total of 6,710 thousand metric tons in 2020.”**
4 **However, the marginal abatement cost attributed “only 5,100 thousand metric tons”**
5 **of emission reductions to the all cost-effective energy efficiency strategy. Further, p.**
6 **32 of their testimony states that you accept “the CECP estimates of cost savings for**
7 **Cost-Effective Energy Efficiency improvements but then revise[] CECP estimates of**
8 **the emission reduction potential downward in a calculation with no logical basis.”**
9 **How would you respond to these statements? Please explain the reason for the**
10 **difference between the CECP projection and the energy efficiency savings used in**
11 **the MassDEP/DOER analysis.**

12 A. Documentation of the sources of the emission reduction values for the All Cost-Effective
13 Energy Efficiency strategy can be found in EAS-13, DPU 1-4, DPU 1-32, DPU 1-35,
14 DPU 1-37, DPU 3-10 and DPU 3-14. Further, even if the emission reductions expected
15 from All Cost-Effective Energy Efficiency matched those of the CECP, it would not
16 change the marginal policy or the marginal cost for 2020 or 2030.

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

18 A. Yes, it does.