

Public Utilities Commission of Ohio
Case No. 16-0743-EL-POR

Rebuttal Testimony of Chris Neme

Submitted on behalf of
the Natural Resources Defense Council,
the Environmental Law and Policy Center,
the Ohio Environmental Council, and
Environmental Defense Fund

January 25, 2017

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Exhibit List

Exhibit CN-1 Chris Neme's Curriculum Vitae

I. INTRODUCTIONS AND QUALIFICATIONS

Q: Please state your name, employer and business address.

A: My name is Chris Neme. I am a co-founder and Principal of Energy Futures Group, a consulting firm that provides specialized expertise on energy efficiency and renewable energy markets, programs and policies. My business address is P.O. Box 587, Hinesburg, VT 05461.

Q: Please describe your educational background.

A: I received a Master of Public Policy (“MPP”) degree from the University of Michigan (Ann Arbor) in 1986. That is a two-year, multi-disciplinary degree focused on applied economics, statistics and policy development. I also received a Bachelor’s degree in Political Science from the University of Michigan (Ann Arbor) in 1985. My first year of graduate school counted towards both my Masters’ and Bachelor’s degrees.

Q: Please summarize your business and professional experience.

A: As a Principal in Energy Futures Group, I play major roles in a variety of energy efficiency consulting projects. Recent examples include:

- Representing Natural Resources Defense Council (“NRDC”) in consultations with utilities and other parties, in both Illinois and Michigan, on efficiency program and portfolio design, cost-effectiveness screening, evaluation, shareholder incentive structures and other related topics;
- Serving as an appointed expert representative on the Ontario Energy Board’s Evaluation and Audit Committee for natural gas demand-side management;

- Serving on the Management Committee and leading strategic planning and program design for a team of firms, led by Applied Energy Group, that was hired by the New Jersey Board of Public Utilities to deliver the electric and gas utility-funded New Jersey Clean Energy Programs;
- Serving on a five-person national drafting committee for development of a new National Standard Practice Manual for cost-effectiveness screening of energy efficiency measures, programs and portfolios;
- Helping the National Association of Regulatory Utility Commissioners and the Michigan Public Service Commission staff assess the relative merits of alternative approaches to defining savings goals for utility efficiency programs (focusing on lifetime rather than just first year savings); and
- Drafting policy reports for the Regulatory Assistance Project on a variety of energy efficiency and related regulatory policy issues such as whether 30% electric savings is achievable in ten years, the history of efforts across the United States to use geographically targeted efficiency programs to cost-effectively defer transmission and distribution system investments, the history of bidding of efficiency resources into the PJM and New England capacity markets, and other topics.

Prior to co-founding Energy Futures Group in 2010 I worked for 17 years for the Vermont Energy Investment Corporation, the last 10 as Director of its Consulting Division managing a group of 30 professionals with offices in three states. Most of our consulting work involved critically reviewing, developing and/or supporting the implementation of electric, gas, and multi-fuel energy efficiency programs for clients across North America and beyond.

43 During my career in energy efficiency I have worked in numerous jurisdictions to develop or
44 review energy efficiency potential studies, develop or review Technical Reference Manuals
45 (“TRM”) of deemed savings assumptions (including the Ohio, Michigan and Illinois TRMs),
46 support utility-stakeholder “collaboratives” (including those in Michigan and Illinois), negotiate
47 or support development of efficiency program performance incentive mechanisms (including the
48 current Michigan and Ontario mechanisms, as well as the mechanism included in recently passed
49 Illinois legislation), and review or develop efficiency programs. All told, I have worked on these
50 and/or other efficiency policy and program issues for clients in more than 30 states and provinces
51 as well as parts of Europe. I have also led courses on efficiency program design, published
52 widely on a range of efficiency topics and served on numerous national and regional efficiency
53 committees, working groups and forums. A copy of my curriculum vitae is attached as Exhibit
54 CN-1.

55 **Q: Did you file direct testimony in this proceeding?**

56 A: Yes. In September of 2016, I filed direct testimony with the Public Utilities Commission of
57 Ohio (the “Commission”), concerning the Cleveland Electric Illuminating Company, the Toledo
58 Edison Company, and Ohio Edison Company (collectively referred to as “FirstEnergy,” or the
59 “Companies,” and individually as the “Company”)’s initial proposed plans for energy efficiency
60 programs for 2017 to 2019.

61 **Q: Have you previously filed expert witness testimony in other proceedings before this**
62 **Commission?**

63 A: Yes. Four years ago I served as an expert witness on FirstEnergy’s limited bidding of
64 efficiency resources into the PJM capacity market (Docket 12-1230-EL-SSO). I also filed and

65 defended testimony before the Commission in 1990 regarding options, including efficiency
66 programs, for complying with acid rain legislation.

67 **Q: Have you been an expert witness on energy efficiency matters before other regulatory**
68 **commissions?**

69 A: Yes, I have filed expert witness testimony on more than 30 other occasions before similar
70 regulatory bodies in nine other states and provinces, including the neighboring jurisdictions of
71 Michigan, Illinois and Ontario, during the past few years.

II. REBUTTAL TESTIMONY OVERVIEW

Q: What is the purpose of your rebuttal testimony?

A: I am responding to the testimony of Patrick Donlon on behalf of Commission Staff and Richard Spellman on behalf of the Office of the Ohio Consumers' Counsel, both of which were filed on January 10, 2017 in opposition to the Stipulation and Recommendation (the "Stipulation") filed in this case on December 9, 2016. Though Mr. Donlon and Mr. Spellman address a variety of issues in their opposition testimony, my rebuttal focuses on their proposals for a cost cap on the Companies' proposed energy efficiency portfolio plan for 2017 to 2019, as modified by the Stipulation (the "Revised Plans"). Mr. Donlon proposes a cap on the Companies' annual energy efficiency program costs and shared savings, equal to 3% of utility revenues reported on line 10 of page 300 of the 2015 versions of FERC Form 1.¹ Mr. Spellman also supports a 3% cost cap, with the modification that, for each program year, the cost cap be based on each Company's filed FERC Form 1 for the year prior.²

Q: Do you have concerns about the *concept* of a cost cap or the *specifics* of the proposed cost cap?

A: Both. The very concept of a cap expressed as a fixed percent or fixed dollar value – without regard for the benefits that are returned – is problematic because it ignores the benefits of the additional efficiency potential beyond that fixed amount. I also have concerns about some of the specifics of the cost cap proposed.

¹ Amended Direct Testimony of Patrick Donlon on Behalf of the Staff of the Public Utilities of Ohio at 3 (January 10, 2017).

² Supplemental Direct Testimony of Richard Spellman on Behalf of Ohio Consumers' Counsel at 14 (January 10, 2017).

91 **Q: Please summarize your concerns regarding the *concept* of a cost cap?**

92 A: I have three related concerns:

93 1. **Cost caps can undermine Commission consideration of value to consumers.** Value is
94 a function of both costs and benefits. A cost cap focuses only on costs. It does not
95 consider benefits. Thus, it implicitly bypasses assessment of value to consumers.

96 2. **Cost caps can have adverse consequences for consumers.** A cost cap can drive a
97 single-minded focus on minimizing the cost of achieving Ohio's statutory savings goals.
98 Program costs may be lower as a result. That could be a good thing if all other things
99 were equal. But all other things will not be equal. A cost cap that constrains the
100 Companies' ability to meet their statutory targets and/or trigger shared savings incentives
101 could drive them to modify their program mix to one that has a greater emphasis on
102 programs with shorter-lived savings, that yield less savings from harder-to-reach
103 customer groups (i.e. a less equitable program portfolio), that focus on actions taken by
104 customers outside of utility-administered programs, and/or that lay less groundwork for
105 acquiring cost-effective savings in the future.

106 3. **A cost cap does not ensure efficiency program spending is efficient, effective or**
107 **appropriate.** Ohio's statutory savings targets are expressed in terms of "first year
108 savings." As a result, a cost cap would encourage utilities to place greater emphasis on
109 programs that deliver first year savings cheaply and less emphasis on those that deliver
110 them more expensively. However, just because a program has a low cost per first year
111 kWh saved does *not* mean that it is efficiently or effectively run. And just because a
112 program is more expensive per first year kWh saved does not mean it is inefficiently or

ineffectively run. For example, even the most efficient and effective low income program will always be significantly more expensive per first year kWh saved than most other programs.

I discuss these issues in more detail in Section III of my rebuttal testimony.

Q: You make reference to Ohio’s statutory savings goals being defined as “first year kWh” savings and the effects of a cost cap that would focus attention solely on minimizing costs per first year kWh. Can you explain what a “first year kWh” savings target is?

A: A savings target that is expressed in terms of “first year kWh” saved, as is the case with Ohio’s statutory target, measures only how much savings are produced in the very first year following the installation of efficiency measures.³ No consideration is given to the longevity of those savings. For example, in Ohio savings from an efficiency measure that produce 100 kWh of savings for just one year, would count just as much towards the target as savings from a measure that produces 100 kWh of savings each year for 20 years. Some efficiency measures and programs have relatively low costs per first year savings but relatively high costs per kWh of lifetime savings. For example, FirstEnergy’s Residential Behavioral program provides first year savings very inexpensively, at only 5.5 cents per kWh.⁴ However, those savings are only forecast to last one year,⁵ rendering its program cost per lifetime kWh saved also 5.5 cents. In contrast, a small business LED linear light fixture has a rebate cost that is nearly twice as great

³ It is my understanding that references to the “acquisition costs” of the Companies’ programs in this case are the same concept as “first year kWh saved.” These terms are interchangeable.

⁴ \$6.86 million to produce 125,788 MWh of savings across the three Companies for all three program years (Stipulation Exhibit A).

⁵ FirstEnergy Revised Plan, Appendix C-1, p. 1 of 8.

(10 cents) per first year kWh saved,⁶ but only one-eighth the cost per lifetime kWh saved (0.7 cents) because its savings last 15 years.⁷

All other things being equal, the cost per lifetime kWh saved is a much better indicator of value to consumers than the cost per first year kWh saved. Thus, Staff's proposed cost cap would force FirstEnergy to attempt to minimize costs per first year kWh, without consideration for value of the savings they produce over their full life (let alone the other benefits they might provide). This will create a perverse incentive that may drive FirstEnergy to alter its program mix, and to invest more in some measures and programs that have lower value to consumers, and comparatively less in other measures and programs that have more value to consumers.

Q: Please summarize your concerns regarding the specific features of the cap proposed?

A: There are two:

1. **It appears to have been set arbitrarily.** No analysis has been put forward to support the notion that 3% of the utility revenues shown on line 10 of page 300 of the FERC Form 1 filing is the "right" amount to spend.
2. **It does not treat each Electric Distribution Utility ("EDU") equally.** The utility revenues shown on Line 10 of page 300 of FERC Form 1 vary considerably, per kWh of electricity consumption, from utility to utility. As a result, Staff's cost cap proposal will lead to very different constraints regarding how much each Ohio EDU (and likewise each of the FirstEnergy Companies) can spend – in dollars per kWh saved – to meet or exceed its statutory savings goals. However, difficulty in achieving those goals is not likely to

⁶ FirstEnergy Revised Plan, Appendix C-3, p. 6 of 15.

⁷ FirstEnergy Revised Plan, Appendix C-1, p. 3 of 8.

151 vary much from utility to utility. Thus, the form of cost cap that Staff proposes is
152 inherently inequitable across Ohio's utilities.

153 I discuss these issues in more detail in Section IV of my rebuttal testimony.

III. Problems with the Concept of a Cost Cap

A. Undermining Commission Consideration of Value to Consumers

Q: You stated that a cost cap would undermine Commission consideration of value to consumers because it focuses solely on cost and ignores benefits. Wouldn't the Companies still be obligated to achieve their statutory savings goals? If so, wouldn't that ensure that there are benefits to consumers?

A: I am not suggesting that consumers would not realize *any* benefits under a cost cap. Rather, I am saying that a cost cap would preclude consideration of the *magnitude* of those benefits and therefore the magnitude of the *value* of the portfolio of efficiency programs for consumers and the mix of programs that would optimize that value.

It is important to understand that FirstEnergy has the option to deploy a variety of combinations of efficiency programs to meet its statutory savings targets. Efficiency programs come in many different forms with a variety of different attributes. Some document actions taken by customers outside of utility-administered programs (e.g. FirstEnergy's Customer Action Programs). Some have short-lived savings (e.g. the Residential Behavior Program whose savings FirstEnergy estimates will last only one year); others have long-lived savings which are often more expensive to acquire (e.g. HVAC equipment and building insulation measures). Some target customers for whom barriers to investment in efficiency are modest (e.g. some larger businesses); others target customers with significant barriers which are more expensive to overcome (e.g. low income and multi-family buildings). Some promote well-established technology (e.g. CFLs or linear fluorescent commercial lighting fixtures); others promote newer technology that may be more expensive today, but can lay the foundation for acquiring savings more cost-effectively in the

future (e.g. LED lighting). Each combination would have a different set of costs, benefits and value to ratepayers. But because a cost cap—by its very name—focuses solely on *costs*, it does not encourage consideration of trade-offs in value between different programs and/or different combinations of programs.

Q: Both FirstEnergy’s current shareholder incentive mechanism and its proposed mechanism for 2017 to 2019 allow it to earn a share of net benefits under the utility cost test. Doesn’t that provide an incentive to maximize value to consumers?

A: The Stipulation proposes that FirstEnergy continue to be able to earn shareholder incentives through a “sharing” of the net economic benefits of its programs as calculated through the Utility Cost Test (“UCT”). The UCT compares just electric system benefits to energy efficiency program and portfolio costs. That provides an incentive to minimize program costs. It also provides an incentive to maximize the electric system benefits that are quantified in the test. However, as applied in Ohio, the UCT does not distinguish between measures or programs for which much of the savings would have occurred without the utility’s programs and those for which such programs were essential for generating the vast majority or all the savings. Moreover, several electric system benefits – such as energy and capacity price suppression effects, the risk-mitigating benefits of efficiency (particularly longer-lived savings) and the marginal impacts of efficiency on line losses (FirstEnergy uses lower average line loss rates in its analyses)⁸ – are not captured in FirstEnergy’s current application of the UCT. Finally, by design

⁸ FirstEnergy uses average line loss rates in estimating the impacts of its programs. However, impacts of efficiency on losses, particularly for peak/capacity savings, are greater than suggested by average loss rates. See Lazar, Jim and Xavier Baldwin, *Valuing the Contribution of Energy Efficiency to Avoided Marginal Line Losses and Reserve Requirements*, Regulatory Assistance Project, August 2011 (http://www.raponline.org/knowledge-center/valuing-the-contribution-of-energy-efficiency-to-avoided-marginal-line-losses-and-reserve-requirements/?_sf_s=line+losses).

the UCT does not capture several important benefits of efficiency programs *beyond* electric system benefits. These include providing equitable access to opportunities to participate in programs for all customers in all rate classes, promoting investments that provide important non-energy benefits (e.g. improved comfort and enhanced business productivity), promoting comprehensive treatment of efficiency opportunities in homes and businesses so as to avoid “lost opportunities,”⁹ and promoting longer-term market transformation. It is worth noting that each of these additional objectives was identified by the Commission in the efficiency program design criteria it established for electric utilities.¹⁰

Thus, while the proposed shareholder incentive mechanism would ensure that FirstEnergy focus on *some* important types of benefits that its efficiency programs can provide, it is not a sufficient basis – either on its own or in conjunction with a cost cap – to produce an optimal efficiency program portfolio.

B. Impact on FirstEnergy’s Ability to Meet or Exceed Statutory Savings Targets

Q: How much of a reduction in efficiency program spending would the cost cap impose?

A: In its Revised Plan, FirstEnergy proposes to spend approximately \$95.5 million per year across the three Companies. Mr. Donlon calculates that the sum of the combined expenditures the three Companies could make under the proposed cost cap would be \$80.1 million. The cap would apply not just to program spending, but to the sum of program spending *plus* shareholder incentives. If FirstEnergy’s proposed shareholder incentive mechanism is approved, it would be

⁹ “Lost opportunities” can occur when a program treats only the easiest or cheapest of measures, leaving more challenging – but still cost-effective – opportunities unaddressed. Because of the transaction costs of recruiting and getting to a home or business, it may not be cost-effective (or would be less cost-effective) to treat those other opportunities later.

¹⁰ See Ohio Administrative Code 4901:1-39-03 Program planning requirements (<http://codes.ohio.gov/oac/4901:1-39-03v1>).

215 eligible to earn up to \$10 million in after-tax profits. That is equivalent to about \$15.6 million in
216 pre-tax profits.¹¹ Thus, if FirstEnergy were to plan to achieve its maximum shareholder
217 incentive, it would only have \$64.5 million in program spending available to do so. That would
218 represent a \$31 million (or 32%) reduction from the annual average budget agreed to in the
219 Stipulation.

220 **Q: In his testimony, Mr. Spellman suggests that the cost cap would effectively require that**
221 **FirstEnergy achieve savings at a cost of about 15 cents per first year kWh saved.¹² He also**
222 **suggests that it is “a reasonable expectation for well-designed utility-administered energy**
223 **efficiency programs.”¹³ Do you agree?**

224 A: No. There are three main problems with Mr. Spellman’s statements.

225 **Q: What is the first problem with his statements?**

226 A: First, Mr. Spellman’s calculation of the average cost per first year kWh saved assumes that
227 FirstEnergy would only just meet its statutory savings target and that (assuming it spend the
228 maximum under the cap on programs) it would not earn any shareholder incentive. It ignores the
229 reality that the Companies, understandably, will endeavor to achieve the maximum shareholder
230 incentive levels that they can, within the constraints of the proposed cap. By way of illustration,
231 I have included a series of calculations in Table 1 below to show what the cost per first year kWh
232 saved would actually be under a range of more realistic scenarios. As shown in Table 1,
233 Scenario 2, if FirstEnergy were to endeavor to earn its maximum shareholder incentive, it would

¹¹ FirstEnergy estimated that an after-tax shared savings cap of \$25 million would equal approximately \$39 million pre-tax (Response to NRDC Set 1-INT-032). I have used the same ratio here to estimate the pre-tax value associated with \$10 million after-tax shared savings cap.

¹² Spellman Supplemental Direct at 17.

¹³ *Id.*

have to achieve savings at an average of 10.6 cents per first year kWh saved. As shown in Scenario 3, if one considers low income program spending as fixed, savings from other non-low income programs would have to be acquired at an average cost per first year kWh saved of only 9.5 cents. In other words, under more realistic scenarios, FirstEnergy would actually have to achieve savings at a much lower cost – 30% to 40% lower – than what Mr. Spellman has suggested.

Table 1: Costs per First Year kWh Saved Under Staff Proposed Cost Cap¹⁴

Scenarios	OE	CEI	TE	Total
1. Total Portfolio, With No Shared Savings				
Statutory 1st Year MWh Savings Goal	238,980	187,550	104,850	531,380
Staff Proposed Spending Cap	\$38,127,828	\$28,505,164	\$13,466,559	\$80,099,551
Spending per 1st Year kWh	\$0.160	\$0.152	\$0.128	\$0.151
2. Total Portfolio, with Max Shared Savings				
Statutory 1st Year MWh Savings Goal	238,980	187,550	104,850	531,380
1st Year Savings Required for Max Shared Savings Tier	274,827	215,683	120,578	611,087
Max Pre-Tax Shared Savings	\$7,015,861	\$5,506,003	\$3,078,136	\$15,600,000
Budget available if max shared savings earned	\$31,111,967	\$22,999,161	\$10,388,423	\$64,499,551
Max Cost per 1st Year kWh	\$0.113	\$0.107	\$0.086	\$0.106
3. Non-Low Income Programs, with Max Shared Savings				
Statutory 1st Year MWh Savings Goal	238,980	187,550	104,850	531,380
1st Year Savings Required for Max Shared Savings Tier	274,827	215,683	120,578	611,087
Low Income Savings	2,510	2,664	1,050	6,224
Non-low income savings required for Max Shared Savings	272,317	213,019	119,528	604,863
Low Income Spending	\$2,850,000	\$2,441,000	\$1,510,000	\$6,801,000
Budget available for non-low income	\$28,261,967	\$20,558,161	\$8,878,423	\$57,698,551
Max Cost per 1st Year kWh (non-low income)	\$0.104	\$0.097	\$0.074	\$0.095

¹⁴ I use the concept of “first year kWh savings” for my analysis both because it is the convention used in Mr. Spellman’s testimony and because it is what one would consider if one were focusing solely on minimizing the cost of meeting the state’s statutory savings target. However, the cost per first year kWh saved is an expression of the *total cost* of acquiring savings to *just the first year of those savings*. It ignores the longevity of the savings. That is similar to comparing the total cost of a new power plant to just the electricity it will produce in its first year of operation. To more accurately compare the cost of efficiency to the cost of supplying electricity one would need to compute a levelized cost of energy savings. An efficiency program with a first year cost per kWh saved of 15 cents and an average savings life of 10 years would have a levelized cost over those ten years of about 1.9 cents per kWh (assuming a 5% real discount rate).

242 **Q: What is the second problem with Mr. Spellman's statements?**

243 A: Mr. Spellman's calculations address only the *average* cost per kWh across all three
244 FirstEnergy Companies. Thus, Mr. Spellman does not take into account the fact that Staff's
245 proposed cap would have different constraints for each Company. For example, Toledo Edison
246 would need to acquire savings at a cost of 12.8 cents per first year kWh saved just to meet its
247 savings target and without earning any shareholder incentive (Scenario 1 in Table 1). To earn its
248 maximum shareholder incentive it would have to acquire savings at a cost of 8.6 cents per first
249 year kWh saved (Scenario 2 in Table 1) and at a cost of just 7.4 cents per first year kWh saved
250 from non-low income programs (Scenario 3 in Table 1). In other words, under any scenario, the
251 cost at which Toledo Edison would have to achieve savings to meet its statutory obligation is
252 considerably lower than Mr. Spellman's analysis implies.

253 **Q: What is the third problem with Mr. Spellman's statements?**

254 A: Mr. Spellman appears to base his conclusion that achieving savings at a cost of 15 cents per
255 first year kWh saved "is a very reasonable expectation" largely on the *historic* experience of
256 efficiency programs in Pennsylvania, Texas, Illinois, Wisconsin and Maine. However, Mr.
257 Spellman's comparison of these state examples with the Companies' 2017 to 2019 portfolio, and
258 his resulting conclusion that the Companies should be expected to achieve savings at an average
259 cost of 15 cents per first year kWh saved, is fraught with problems.

Q: What is problematic about Mr. Spellman’s suggestion that the historic experience of efficiency programs in Pennsylvania, Texas, Illinois, Wisconsin and Maine is indicative of FirstEnergy’s potential to achieve savings at about 15 cents per first year kWh saved?

A: To begin with, all of his comparisons are *backward-looking*. That is, Mr. Spellman examines the cost of achieving savings in these states in past years and implicitly assumes that will be indicative of the costs of achieving savings in 2017 to 2019. There are important reasons to believe this will not be the case. In particular, some of the least expensive savings that were acquired in the past are either no longer available or cost more today. The most obvious example of this is lighting savings. Because of federal product efficiency standards that have gone into effect in recent years, the baseline efficiency of both residential light bulbs and commercial fluorescent light fixtures has increased. As a result, savings from the most commonly-promoted lighting efficiency measures will be substantially lower in 2017 through 2019 than have been in recent years. Ironically, this effect was noted in the very report on the Pennsylvania utilities 2009 to 2013 savings that Mr. Spellman referenced in his testimony and on which his firm was the lead author:

“...Energy efficient lighting programs are also typically considered to have a great deal of ‘low-hanging fruit’ measures. The initial years of these programs often net the greatest savings at the highest cost-effectiveness...Furthermore, because of increasing efficiency of readily available lighting products on the market, baseline wattages for the most common lighting types tend to rise over time. For example, for PY2 Duquesne estimated a savings of 41 kWh/year for its measure ‘Interior Compact Fluorescent Fixture, 5 – 25 watts’, whereas for Phase II that estimated savings was reduced to 30 kWh/year.”¹⁵

¹⁵ GDS Associates et al., Act 129 Statewide Evaluator Final Annual Report, Phase I: June 1, 2009-May 31, 2013, presented to the Pennsylvania Public Utility Commission, March 4, 2014, p. 240 (<http://www.puc.pa.gov/pcdocs/1274547.pdf>).

283 **Q: Does this concern about relying on backward-looking data also apply to Mr. Donlon’s**
284 **conclusion that the Companies can meet their statutory savings obligations under the cost**
285 **cap “based on the Companies 2012-2014 annual status reports”?**¹⁶

286 A: Yes. Based on my review of his amended testimony, Mr. Donlon did not analyze what has
287 changed since 2012 through 2014. To be clear, I haven’t done a comprehensive assessment of
288 the changes myself. However, I have looked into a subset of measures that I know are important
289 from both my review of FirstEnergy’s revised plan and experience in other jurisdictions. I found
290 several examples in which FirstEnergy’s costs per unit of savings in the next few years will be
291 significant more expensive to acquire than they were in 2012 to 2014:

- 292 • **Residential CFLs:** The savings per light bulb that FirstEnergy is planning to claim for
293 residential CFLs in 2017 through 2019 is nearly 40% less than it claimed in 2014.¹⁷
- 294 • **Residential Efficiency Kits:** The savings per residential efficiency kit that FirstEnergy
295 is planning to claim for 2017 through 2019 is nearly 40% less than it claimed in 2014 for
296 Direct Mail kits.¹⁸
- 297 • **Residential Appliance Turn-Ins:** The savings per appliance turn-in that FirstEnergy is
298 planning to claim for 2017 through 2019 is about 40% less than it claimed in 2014.

¹⁶ Donlon Amended Direct at 5.

¹⁷ See FirstEnergy’s revised plan, Appendix C-1, p. 2 of 8; and Table 4-1 of ADM Associates, Energy Efficient Products Program Evaluation, Measurement and Verification Report 2014, Prepared for FirstEnergy Companies, p. 11.

¹⁸ See FirstEnergy’s revised plan, Appendix C-1, p. 1 of 8; and Table 4-1 of ADM Associates, Home Performance Program Evaluation, Measurement and Verification Report 2014, Prepared for FirstEnergy Companies, Tables 1-6, 1-7 and 4-13.

These measures are still very cost-effective as applied in the 2017 to 2019 plan – saving electricity at a lower cost than it could be supplied. They are just not as cost-effective as they were in prior years.

Q: Do you have other concerns about the jurisdictional examples that Mr. Spellman provided to support his suggestion that it would be reasonable for FirstEnergy to achieve savings at a cost of about 15 cents per first year kWh saved?

A: Yes. They are as follows:

- **Pennsylvania:** In his discussion of Pennsylvania, Mr. Spellman not only went back in time, but he chose to focus on the results of the third oldest set of data he could have cited – 2009 to 2013, the first few years that the Pennsylvania utilities ran energy efficiency programs. That choice is perplexing. While it is true that the 2009 to 2013 savings were produced at a cost per first year kWh saved of 14.9 cents, Mr. Spellman’s own firm conducted evaluations more recently, for 2014 and 2015, that suggest costs were higher than the previous years – 17 cents per first year kWh in 2014¹⁹ and 19.5 cents in 2015.²⁰
- **Texas:** At least as of 2015, the Texas utilities were only achieving efficiency savings equal to about 0.2% of annual electricity sales,²¹ or one-fifth of the 1.0% levels required in statute in Ohio for the 2017 to 2019 program years. The costs of achieving that low

¹⁹ GDS Associates et al., Act 129 Statewide Evaluator Annual Report, Program Year 5: June 1, 2013-May 31, 2014, presented to the Pennsylvania Public Utility Commission, February 27, 2015, Table 2-6. Available at http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/act_129_statewide_evaluator_swe.aspx.

²⁰ GDS Associates et al., Act 129 Statewide Evaluator Annual Report, Program Year 6: June 1, 2014-May 31, 2015, presented to the Pennsylvania Public Utility Commission, March 8, 2016, Table 2-8. Available at http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/act_129_statewide_evaluator_swe.aspx.

²¹ Berg, Weston et al., *The 2016 State Energy Efficiency Scorecard*, American Council for an Energy Efficient Economy Report U1606, September 2016, Table 9. Available at www.aceee.org.

level of savings simply cannot be compared to the cost of achieving savings necessary to meet or exceed the applicable Ohio statutory targets.²²

- **Illinois:** Mr. Spellman’s discussion has a few problems. First, his statement that there was a *total* cost cap in Illinois is misleading.²³ In particular, he appears to have either been unaware, or not understood, that there was a parallel provision in state law that required the Illinois Power Agency (with the solicitation process run by the utilities) to acquire “all cost-effective” residential and small business efficiency savings that the utilities were not otherwise acquiring under their energy efficiency portfolio statutory requirement in the 2014-2015 fiscal year Mr. Spellman referenced.²⁴ Second, Mr. Spellman’s own estimates of Ameren’s 2014-2015 fiscal year spending is about 10% greater than the maximum cost that he estimates FirstEnergy could spend (\$80.1 million) in 2017 under the proposed cost cap to meet its statutory targets. Importantly, Ameren’s PY7 spending is also about 60% higher than I estimate is the maximum FirstEnergy could spend if they were to earn their maximum shareholder incentive (see above, Scenario 2 in Table 1).

²² See Ohio Revised Code 4928.66 (A)(1)(a).

²³ Spellman Supplemental Direct at 19-20.

²⁴ New legislation enacted in Illinois in December 2016 abolishes the IPA obligation to procure all cost-effective efficiency from residential and small business customers, consolidating all efficiency resource acquisition obligations with the Illinois investor-owned utilities. The new law has a total energy efficiency spending cap, but that cap is significantly larger than what Staff has proposed for the FirstEnergy Revised Plans. For example, Staff’s proposed cap for FirstEnergy of about \$80 million for a utility with about 53 TWh of load translates to about \$1.50 per TWh of load. In contrast, the new Illinois spending cap allows Commonwealth Edison to spend nearly \$4.50 per TWh of load (approximately \$353 million to serve approximately 79 TWh of annual load), or about three times Staff’s proposed cap for FirstEnergy; Ameren can spend about \$3.60 per TWh (approximately \$100 million to serve approximately 27.7 TWh of load), or about 2.4 times Staff’s proposed cap for FirstEnergy. And the new Illinois cap does not include costs associated with utility shareholder incentives.

- 331 • **Maine:** Mr. Spellman states that Efficiency Maine achieved gross electric efficiency
332 savings of about 224 GWh in 2015 and that Maine’s electric utilities “paid a total of
333 \$15.2 million to the Efficiency Maine Trust in FY 2015 via a system benefits charge.”²⁵
334 However, his juxtaposition of that savings number and the utility system benefits charge
335 spending level is very misleading. Efficiency Maine actually spent \$45.5 million – or
336 20.3 cents per first year kWh – to achieve those electricity savings. While it is true that
337 only \$15.2 million of Efficiency Maine’s FY 2015 budget came from a utility system
338 benefits charge, most of the remaining budget was tied to the electricity system and at
339 least indirectly originated from electric ratepayers. For example, another \$16.3 million of
340 Efficiency Maine’s FY2015 spending came from Maine Yankee Settlement Proceeds,
341 \$11.2 million from Regional Greenhouse Gas Initiative proceeds, and \$7.3 million from
342 its fund balance which I suspect was also largely produced – directly or indirectly – from
343 ratepayers.²⁶

344 **C. Likely Adverse Impact on FirstEnergy Program Mix**

345 **Q: What do you expect to be the impact of the proposed cost cap on FirstEnergy’s**
346 **efficiency programs?**

347 A: The result will almost certainly be significant changes in the mix of efficiency programs that
348 FirstEnergy can deliver. And those changes could very likely include greater emphasis on
349 energy savings achieved through customer actions , on programs that produce shorter-lived
350 savings, that target easier-to-reach customer groups (i.e. a less equitable program portfolio), and

²⁵ Spellman Supplemental Direct at 21-22.

²⁶ Efficiency Maine Trust, 2015 Annual Report, Tables 3 and 26 (<http://www.efficiencymaine.com/docs/2015-Efficiency-Maine-Annual-Report.pdf>).

351 that lay less groundwork for acquisition of cost-effective savings in future years. Each of those
352 changes would have adverse effects on consumers.

353 **Q: Why do you reach that conclusion?**

354 A: That conclusion is based on my analysis of the differences in cost per unit of first year
355 savings for the programs and sub-programs included in FirstEnergy's Revised Plans and my
356 expectations regarding FirstEnergy's (or any other utility's) priorities.

357 **Q: What are the results of your analysis of the differences in cost per unit of first year**
358 **savings for the programs included in FirstEnergy's Revised Plan?**

359 A: The results are presented in Table 2. It is worth noting that only four (highlighted in yellow)
360 of the more than 40 programs or sub-programs in FirstEnergy's Revised Plans are projected to
361 cost at or below the average of 9.5 cents per first year kWh that would have to be achieved from
362 non-low income programs for FirstEnergy to earn its maximum shareholder incentive (see
363 above, Scenario 3 in Table 1):

- 364 • Residential Behavior, which produces extremely short-lived savings;
- 365 • Consumer electronics, which represents less than 2% of the statutory requirement and
366 probably cannot be ramped up significantly;
- 367 • Mercantile Customer Program; and
- 368 • Transmission and Distribution ("T&D").

369 **Table 2: Cost per First Year kWh Saved (FE Revised Plan)**

Sector	Program	Sub-Program	Total FE		Budget
			Budget Revised	Savings Revised	per 1st year kWh
Res	Appl Turn-in	Appliance Turn-In	\$17,574,642	80,822	\$ 0.22
Res	EE Homes	School Ed	\$5,858,205	20,884	\$ 0.28
Res	EE Homes	EE Kits	\$22,961,165	146,271	\$ 0.16
Res	EE Homes	Audits/Education	\$10,012,916	25,304	\$ 0.40
Res	EE Homes	Behavioral	\$6,862,132	125,788	\$ 0.055
Res	EE Homes	New Homes	\$0	0	
Res	EE Homes	Smart T-Stat	\$4,133,632	4,927	\$ 0.839
Res	EE Products	Appliances	\$4,426,588	21,664	\$ 0.204
Res	EE Products	Electronics	\$1,246,039	19,198	\$ 0.065
Res	EE Products	Lighting	\$15,893,043	117,221	\$ 0.136
Res	EE Products	HVAC	\$11,874,052	28,871	\$ 0.411
Res	Cust Action	Customer Action	\$1,420,306	13,681	\$ 0.104
Res	DR	DR	\$1,794,905	0	
Res	Low Income	Com. Connections	\$19,592,530	18,528	\$ 1.057
Res	Low Income	LI-New Homes	\$494,996	144	\$ 3.437
Sm C&I	Energy Solutions	HVAC	\$3,749,979	18,418	\$ 0.204
Sm C&I	Energy Solutions	Lighting	\$20,099,108	195,788	\$ 0.103
Sm C&I	Energy Solutions	Food Service	\$1,364,061	11,209	\$ 0.122
Sm C&I	Energy Solutions	Appliance Turn-In	\$385,012	1,544	\$ 0.249
Sm C&I	Energy Solutions	Appliances	\$615,349	3,214	\$ 0.191
Sm C&I	Energy Solutions	Electronics	\$420,828	630	\$ 0.668
Sm C&I	Energy Solutions	Agricultural	\$889,454	707	\$ 1.258
Sm C&I	Energy Solutions	Data Centers	\$2,839,237	7,276	\$ 0.390
Sm C&I	Energy Solutions	Custom	\$15,857,178	142,886	\$ 0.111
Sm C&I	Energy Solutions	Retro-Cx	\$4,931,915	36,549	\$ 0.135
Sm C&I	Energy Solutions	Custom Bldgs	\$7,177,181	56,855	\$ 0.126
Sm C&I	Energy Solutions	Audits/Education	\$42,809,091	100,556	\$ 0.426
Sm C&I	Cust Action	Customer Action	\$1,827,431	4,927	\$ 0.371
Lg C&I	Energy Solutions	HVAC	\$3,438,317	13,961	\$ 0.246
Lg C&I	Energy Solutions	Lighting	\$6,299,631	49,880	\$ 0.126
Lg C&I	Energy Solutions	Data Centers	\$3,553,018	12,151	\$ 0.292
Lg C&I	Energy Solutions	Custom	\$28,906,314	233,208	\$ 0.124
Lg C&I	Energy Solutions	Retro-Cx	\$1,741,050	8,860	\$ 0.197
Lg C&I	Energy Solutions	Custom Bldgs	\$7,303,284	50,455	\$ 0.145
Lg C&I	Energy Solutions	Audits/Education	\$4,610,777	3,104	\$ 1.485
Lg C&I	DR	DR	\$46,800	0	
Lg C&I	Cust Action	Customer Action	\$1,052,594	9,671	\$ 0.109
Govt	Tariff Lighting	Govt Tariff Lighting	\$876,824	1,908	\$ 0.460
Merc	Mercantile	Mercantile	\$1,464,607	172,101	\$ 0.009
Other	T&D	T&D	\$45,000	22,670	\$ 0.002
Other	Smart Grid	Smart Grid	\$0	0	
Other	ESID	ESID	\$0	0	
Total			\$286,449,191	1,781,831	\$ 0.161

370

371 **Q; What are your expectations regarding FirstEnergy's priorities?**

372 A: I would expect FirstEnergy to have the following priorities, presented in what I would expect
373 to be their order of importance:

374 1. **Meeting the statutory savings target by whatever means necessary.** In my
375 experience, utilities always prioritize meeting statutory requirements. Thus, if it
376 perceives any risk of not meeting the target, I would expect FirstEnergy to emphasize
377 "programs" that produce inexpensive savings that can count towards the statutory target
378 (but not towards shared savings) over more expensive savings that would still count
379 towards shared savings. That could mean increased emphasis on FirstEnergy's Customer
380 Action Programs which capture savings achieved by customers outside of utility-
381 administered programs.

382 2. **Meeting the statutory savings target with savings from programs that can be**
383 **counted towards the trigger for shared savings.** This is essential to earning any
384 shareholder incentives. Thus, if the Companies perceive any risk of not triggering shared
385 savings I would expect them to choose or emphasize a program that provides inexpensive
386 first year savings, but not a lot of lifetime economic net benefits, over a program that
387 provides more lifetime economic net benefits but is more expensive per first year kWh
388 saved. This could mean increasing emphasis on the Residential Behavioral Program.
389 That program produces first year kWh savings at a lower cost than most other programs,
390 but at a much higher cost per lifetime kWh saved, and therefore is likely to provide far
391 fewer economic benefits than many other programs.

3. **Meeting or exceeding the statutory savings target in a manner in which the UCT net benefits – and therefore shared savings – is maximized.** Once it triggers eligibility for shareholder incentives, the magnitude of those incentives becomes a function of the magnitude of UCT net benefits – that is, the degree to which electric system benefits exceed program costs. Thus, FirstEnergy will obviously have an incentive to maximize UCT net benefits so that it maximizes its incentive. Among other things, I would expect that to push FirstEnergy toward prioritizing several types of programs that have been demonstrated to both produce first year savings at low utility cost and produce substantial UCT net benefits at low cost. Residential lighting, residential efficiency kits and commercial lighting promotions are good examples. However, there are some disadvantages to over-emphasis on these programs, including the fact that free rider rates are likely to be relatively high for at least some of them (meaning the actual net benefits produced by the program are not as high as they might seem) and the savings – at least for the residential examples – are likely to be much shorter-lived than those of other programs.

IV. Problems with Staff's/OCC's Specific Cap Proposal

A. Arbitrary Nature of Proposed Cost Cap

Q: What do you understand to be the Staff's proposal for how its cost cap would be structured?

A: Mr. Donlon has suggested that the cap be equal to 3% of the utility revenues shown on line 10 of p. 300 of FERC Form 1 for 2015, with Mr. Spellman recommending a modification to use the prior year's FERC Form 1, rather than 2015 itself.

Q: In the summary of your testimony (Section II) you raised two concerns about the specifics of that proposed cost cap. The first was that the selection of a 3% cost cap appeared arbitrary. Can you please explain that concern?

A: The basis for any spending limitation should be a conclusion that the benefits to consumers of spending above the limit are exceeded by the costs of doing so. That requires analysis of how incremental benefits and costs change at different potential budget levels. Based on my review of his amended testimony, Mr. Donlon did not provide an analysis to support a conclusion that 3% of the revenues on line 10 of p. 300 of FERC Form 1 is the right number.

Q: What kind of analysis would you have expected?

A: I would have expected at least two things:

1. An analysis that compared the cost of FirstEnergy's Revised Plans – both as a whole and for individual programs – to the costs of similar utilities. That analysis would be necessary both: (A) to conclude (if at all) that FirstEnergy's portfolio was cost-inefficient

or ineffective and in need of a control mechanism; and (B) to inform a proposal regarding an appropriate budget.

2. An analysis of how FirstEnergy's Revised Plans could be modified to achieve both its statutory savings requirement and other goals I would expect the Commission to have (e.g. sufficiently serving low income, multi-family, and other harder-to-reach customers, sufficient focus on longer-lived savings, efforts to minimize free riders, and/or others as appropriate) within the proposed cost cap.

Based on my review of his amended testimony, Mr. Donlon did not provide an analysis to assess the reasonableness of FirstEnergy's proposed program costs or of the value that they would provide. Such analysis is simply fundamental to judging any efficiency portfolio. For reasons discussed above, Mr. Spellman's analysis is similarly flawed. The analyses he did conduct only looked backwards. He made no attempt to compare FirstEnergy's Revised Plans for 2017 through 2019 to the plans for the same years in other jurisdictions. Finally, Mr. Spellman only looked at portfolio level costs and did not attempt to assess the specific value of any of FirstEnergy's programs.

Further, based on my review of their amended/supplemental testimony, neither Mr. Donlon nor Mr. Spellman made any effort to assess how FirstEnergy's program mix may have to change if subjected to a cost cap, let alone whether that program mix would be one they could support.

Q: Are there other reasons the proposed cap for FirstEnergy seems arbitrary?

A: Yes. The AEP Stipulation (supported by Staff and OCC) which the Commission recently approved would allow it to spend 15.7 cents per kWh saved to reach its maximum shared savings

tier – even after subtracting the cost of its maximum shareholder incentive.²⁷ That is nearly 50% more than the 10.6 cents the FirstEnergy Companies would be permitted to spend on average (Table 1, Scenario 2) under the proposed cost cap.

B. Proposed Cap Does Not Treat Each EDU Equally

Q: In the summary of your testimony (Section II) you suggest that the cap as proposed by Staff would not treat each EDU equally. Why is that?

A: First, Line 10 of page 300 of FERC Form 1 includes the following: (A) revenues to pay for distribution system costs from all customers; plus (B) revenues to pay for energy and capacity only from customers who buy power directly from the distribution utility – i.e. customers who do not “shop” or buy power from competitive retail energy suppliers. However, it is my understanding that line 10 excludes revenues associated with sales of electricity by competitive retail energy suppliers in each of the Company’s service territories. Thus, all other things being equal, a 3% energy efficiency program cost cap on one Company with a comparatively larger proportion of customers buying power from competitive retail energy suppliers than the other Companies (or, for that matter, other EUDs) will be more constraining. This dynamic will make it more difficult to meet statutory savings goals and/or earn shareholder incentives than the same percentage cap on a utility with a comparatively lower portion of its customers’ load being served by competitive retail energy suppliers.

Q: Are there significant differences between Ohio utilities in the portion of load being served by competitive retail energy suppliers?

²⁷ AEP’s average annual program budget under the Stipulation is \$79 million (AEP Settlement Exhibit JFW-2). Its average annual savings target is 437 GWh (Case No. 16-0574-EL-POR Exhibit JFW-1, (Volume 1), p. 10 of 180), so it would have to achieve an annual average of 502 GWh (115% of the statutory target) to reach its maximum shared savings tier.

A: Yes. As Table 3 shows, all three FirstEnergy Companies had a higher percentage of their load being met by competitive retail energy suppliers in 2015 than Duke, AEP and DP&L. All other things being equal, that means that FirstEnergy will have a more difficult time meeting or exceeding its statutory savings target than the other Ohio investor-owned utilities.

Table 3: Percent of 2015 Load Served by Competitive Retail Energy Suppliers²⁸

	Res	Com	Ind	Other	Total
CEI	71.21%	90.16%	88.46%	0.00%	84.07%
OE	65.17%	86.11%	89.78%	14.34%	78.98%
TE	65.57%	86.10%	78.80%	29.42%	76.81%
Duke	48.03%	81.90%	95.32%	94.81%	74.47%
AEP	32.88%	85.07%	90.99%	73.78%	70.18%
DP&L	46.58%	83.87%	96.85%	64.91%	71.56%
Statewide IOU avg	49.95%	85.47%	89.84%	75.87%	74.98%

Q: How much of an impact do these differences make?

A: I haven't systematically analyzed how much of a difference there would be – in terms of cost per first year kWh that would be available – between the Companies and Ohio's other EUDs. However, as noted in Table 1, there are significant differences even between the Companies. For example, Toledo Edison would have to achieve energy savings at a cost that is about 20% lower than Ohio Edison to meet its statutory savings target. There is no reason to expect that to be possible, or even a reasonable expectation.

²⁸ Summary of Switch Rates from EDUs to CRES Providers in Terms of Sales, for the Month Ending December 31, 2015 (MWh), p. 7 of 9 (<http://www.puco.ohio.gov/puco/index.cfm/industry-information/statistical-reports/electric-customer-choice-switch-rates-and-aggregation-activity/electric-switch-rates-by-sales/sales-2015/>).

V. SUMMARY AND RECOMMENDATIONS

Q: Can you briefly summarize your primary conclusions regarding the proposed cost cap and the arguments of Mr. Donlon and Mr. Spellman supporting it?

A: My conclusions can be summarized as follows:

1. Cost caps do not allow for consideration of value to consumers;
2. The cost cap could drive undesirable changes in FirstEnergy's mix of efficiency programs, including greater emphasis on programs that have short-lived savings, that have higher free ridership, that are less likely to serve hard-to-reach or disadvantaged customers groups, and that are less likely to build a foundation for achieving cost-effective savings in the future.
3. Neither Mr. Donlon nor Mr. Spellman has done any analysis to understand these implications or to assess whether the resulting program mix is one that they could support.
4. Indeed, neither Mr. Donlon nor Mr. Spellman has done any analysis to suggest that FirstEnergy's proposed programs – as a group or individually – are too expensive or do not bring enough value to support their cost.
5. The proposed cost cap does not treat utilities equally – it is significantly more constraining for some EDUs than for others.

In short, the proposed cost cap is a blunt instrument that was arbitrarily set, without regard to whether it was actually needed or what the consequences of its application would be.

501 **Q: Are you suggesting that the Commission should not put any limitations on how much**
502 **FirstEnergy can spend on efficiency programs?**

503 A: Of course not. The Commission should approve both a portfolio of efficiency programs and
504 a not-to-exceed budget for spending on those programs. However, the limitation on spending
505 embodied in Commission approval of a budget should be based on a careful review of the
506 programs proposed, their costs and the mix of benefits they provide and purposes that they serve.

507 **Q: Is that how Public Utility Commissions in other jurisdictions address potential**
508 **concerns about costs?**

509 A: Yes. It is what every other jurisdiction with which I am aware does. And I presume that it is
510 exactly what the Ohio Commission has done when approving utility efficiency program plans in
511 the past. I have seen no evidence to suggest that such processes are flawed or problematic in any
512 way, let alone that they would be improved by such a blunt instrument as a cost cap. In fact, I
513 am not aware of any other state public utilities commission that has imposed a cost cap expressed
514 as a fixed percent of revenues applied to all utilities.

515 **Q: Is there anything else the Commission could do to ensure that money is not spent**
516 **inefficiently or ineffectively or inappropriately on efficiency programs?**

517 A: The Commission could require Staff to compare FirstEnergy's proposed costs per unit of
518 savings to those of other utilities in the Midwest. Such comparisons should be performed at both
519 the aggregate, portfolio level and for individual programs to account for the fact that different
520 jurisdictions place different emphases on attributes other than total portfolio savings (serving low
521 income, multi-family and other hard to reach customers; promoting new technology;

522 emphasizing long-term market transformation; etc.). And they should compare not only the cost
523 per first year kWh saved, but also the cost per lifetime kWh saved to get a better feel for the
524 relative magnitude of electric system benefits being produced.

525 **Q: Does this conclude your rebuttal testimony?**

526 A: Yes.



CHRISTOPHER NEME, PRINCIPAL

EDUCATION

M.P.P., University of Michigan, 1986
B.A., Political Science, University of Michigan, 1985

EXPERIENCE

2010-present: Principal, Energy Futures Group, Hinesburg, VT
1999-2010: Director of Planning & Evaluation, Vermont Energy Investment Corp., Burlington, VT
1993-1999: Senior Analyst, Vermont Energy Investment Corp., Burlington, VT
1992-1993: Energy Consultant, Lawrence Berkeley National Laboratory, Gaborone, Botswana
1986-1991: Senior Policy Analyst, Center for Clean Air Policy, Washington, DC

PROFESSIONAL SUMMARY

Chris Neme leads a variety of consulting projects for clients across the United States, Canada, and Europe. He specializes in analysis of markets for energy efficiency measures and the design and evaluation of programs and policies to promote them. Prior to co-founding Energy Futures Group, he served as Director of the Vermont Energy Investment Corporation's 30-person consulting division. During his 20+ years in the energy efficiency industry, Mr. Neme has conducted or critically reviewed analyses of efficiency potential in ten states; reviewed or developed efficiency programs in more than 30 states and provinces and in Europe; and defended expert witness testimony before regulatory commissions in ten different jurisdictions. Mr. Neme has led training courses on the elements of good efficiency program design and published/presented assessments of efficiency markets, programs and policies through a variety of publications, conferences, Consortium for Energy Efficiency Committees, ENERGY STAR working groups and other forums. He previously served as Co-Chair of NEEP's EM&V Research and Evaluation Committee.

SELECTED PROJECTS

- ***New Jersey Board of Public Utilities.*** Serve on multi-firm management team responsible for administration and delivery of statewide New Jersey Clean Energy Programs (annual budget of >\$200 million). Lead strategic planning and program design for the team; also support regulatory filings, cost-effectiveness screening and evaluation work. (2015 to present).
- ***Home Performance Council.*** Part of five-person drafting team for development of new National Standard Practice Manual for cost-effectiveness screening of energy efficiency measures, programs and portfolios. Manual expected to be completed, after several rounds of external review, in early 2017. (2016 to present)
- ***Regulatory Assistance Project - U.S.*** Providing guidance on efficiency policy and program design. Lead author on strategic reports, including what it would take to achieve 30% electricity savings over ten years, lessons from U.S. experience using efficiency programs to defer T&D system investments, and history of bidding of efficiency resources into New England ISO and PJM capacity markets. Also provide technical assistance to several state regulators, technical support to various Energy Foundation grantees across the U.S., and assistance in RAP's work with the U.S. EPA on efficiency's role in 111d carbon emission regulations. (2010 to present)



CHRISTOPHER NEME, PRINCIPAL

- ***Natural Resources Defense Council (Illinois & Michigan).*** Critically reviewed multi-year DSM plans filed by Illinois and Michigan utilities. Drafted and defended regulatory testimony on critiques. Represent NRDC in monthly stakeholder-utility meetings to review and provide feedback on efficiency potential studies, program designs, evaluation priorities, draft evaluation reports, cost-effectiveness screening, TRM savings assumptions, and other related topics. Also, assisting with strategy for maximizing the cost-effective use of efficiency to address EPA's proposed 111(d) regulations of carbon emissions from power plants. (2010 to present)
- ***Ontario Energy Board:*** Appointed by Ontario Energy Board to serve provincial gas DSM Evaluation and Audit Committee. Previously elected by non-utility stakeholders to serve on provincial Technical Evaluation Committee overseeing gas DSM evaluation planning and individual evaluation studies. Also served on Enbridge Gas's annual Audit Committee which oversaw an annual savings verification process. (2000 to present)
- ***Green Energy Coalition (Ontario).*** Representing a coalition of environmental groups in various regulatory proceedings. Present recommendations on DSM policies (including integrated resource planning on pipeline expansions), critically review and negotiate with utilities on proposed DSM Plans, and defend expert witness testimony. (1993 to present)
- ***Regulatory Assistance Project - Europe.*** Providing on-going technical support on efficiency policy and program design to RAP and its partners in the United Kingdom, Germany, and other countries. Reviewed draft European Union policies on Energy Savings Obligations, EM&V protocols and other related issues. Drafted a policy brief on design considerations for efficiency feed-in-tariffs, a report on bidding of efficiency resources into capacity markets, and a roadmap for achieving deep retrofits in half of the residential building stock. (2009 to present)
- ***Northeast Energy Efficiency Partnerships.*** Managed Regional EM&V forum project estimating savings for emerging technologies. Also, led project to assess national best practices and develop policy guidance on the use of efficiency to defer T&D investments. (2009 to 2015)
- ***Ontario Power Authority.*** Managed jurisdictional scans of how efficiency programs leverage building efficiency labeling/disclosure requirements and how non-energy benefits are addressed in cost-effectiveness screening. Also supported staff workshop on the role efficiency can play in deferring T&D investments. Presented assessment of future efficiency policy and program trends for Advisory Council on Energy Efficiency. (2012-2015)
- ***Vermont Public Interest Research Group.*** Conducted comparative analysis of the economic and environmental impacts of fuel-switching from oil/propane heating to either natural gas or efficient, cold climate electric heat pumps. Filed regulatory testimony on findings. (2014-2015)
- ***New Hampshire Electric Co-op.*** Led assessment of the co-op's environmental and social responsibility programs' promotion of whole building efficiency retrofits, cold climate heat pumps and renewable energy systems. Presented recommendations to the co-op Board. (2014)
- ***National Association of Regulatory Utility Commissioners (NARUC).*** Assessed alternatives to basing state energy efficiency goals on first year savings to eliminate disincentives to invest in longer-lived (but often more expensive) measures and programs. Work was ultimately for the Michigan Public Service Commission and was used by Commission staff to establish lifetime savings metrics for utility programs it regulates. (2013)



CHRISTOPHER NEME, PRINCIPAL

- ***California Investor-Owned Utility.*** Senior advisor on EFG project to compare the cost of saved energy across ~10 leading U.S. utility portfolios. The research sought to determine if there are discernable differences in the cost of saved energy related to utility spending in specific non-incentive categories, including administration, marketing, and EM&V. (2013)
- ***Green Mountain Power.*** Helped develop new program to introduce ultra-efficient cold-climate heat pumps to Vermont residential and small business markets. (2012-2013)
- ***DC Department of the Environment (Washington DC).*** Part of VEIC team administering the DC Sustainable Energy Utility (SEU). Primary responsibilities are characterizing the DC efficiency market and supporting the design of efficiency programs that the SEU will be implementing. (2011 to 2012)
- ***Ohio Sierra Club.*** Filed and defended expert witness testimony on the implications of not fully bidding all efficiency resources into the PJM capacity market. Also critically reviewing First Energy's and other utilities' multi-year DSM plans. (2012)
- ***Regulatory Assistance Project – Global.*** Assisted RAP in framing several global research reports. Co-authored the first report – an extensive “best practices guide” on government policies for achieving energy efficiency objectives, drawing on experience with a variety of policy mechanism employed around the world. (2011)
- ***Tennessee Valley Authority.*** Assisted CSG team providing input to TVA on the redesign of its residential efficiency program portfolio to meet aggressive new five-year savings goals. (2010)
- ***Efficiency Vermont.*** Oversaw residential program planning, input to the VT Department of Public Service on evaluation planning, input to NEEP's regional EM&V forum, and development of M&V plan and other aspects of bids of efficiency resources into New England's Forward Capacity Market (FCM) from March 2000 through Spring 2010.
- ***Ohio Public Utilities Commission.*** Senior Advisor to a project to develop a web-based Technical Reference Manual (TRM). The TRM includes deemed savings assumptions, deemed calculated savings algorithms and custom savings protocols. It was designed to serve as the basis for all electric and gas efficiency program savings claims in the state. (2009 to 2010)
- ***New Jersey Clean Energy Program.*** Oversaw support of Honeywell-led team delivering all statewide residential efficiency and renewable energy programs. Led work on program design, regulatory filings, savings algorithms, and evaluation planning. (2006 to 2010)
- ***New York State Energy Research and Development Authority (NYSERDA).*** Led several analyses of residential electric and gas efficiency potential (over 20 years) for New York State. Scenarios included continuation of existing initiatives, new budget constraints and a least-cost approach to meeting greenhouse gas emission reduction targets. (2001 to 2010)
- ***Long Island Power Authority Clean Energy Plan.*** Led team that designed the four major residential programs (three efficiency, one PV) incorporated into the plan in 1999. Oversaw extensive technical support to the implementation of those programs. This involved assistance with the development of goals and budgets, development of savings algorithms, cost-effectiveness screening, and on-going program design refinements. (1998 to 2009)



CHRISTOPHER NEME, PRINCIPAL

SELECTED PUBLICATIONS

- “The Next Quantum Leap in Efficiency: 30% Electricity Savings in Ten Years”, published by the Regulatory Assistance Project, February 2016 (with Jim Grevatt)
- “Energy Efficiency as a T&D Resource: Lessons from Recent U.S. Efforts to Use Geographically Targeted Efficiency Programs to Defer T&D Investments”, published by Northeast Energy Efficiency Partnerships, January 9, 2015 (with Jim Grevatt)
- “Unleashing Energy Efficiency: The Best Way to Comply with EPA’s Clean Power Plan”, Public Utilities Fortnightly, October 2014, pp. 30-38 (with Tim Woolf, Erin Malone and Robin LeBaron)
- “The Resource Value Framework: Reforming Energy Efficiency Cost-Effectiveness Screening”, published by the National Efficiency Screening Project, August 2014 (with Tim Woolf et al.)
- “Energy Efficiency Participation in Electricity Capacity Markets – the US Experience”, published by the Regulatory Assistance Project, August 2014, (with Richard Cowart).
- “Alternative Michigan Energy Savings Goals to Promote Longer-Term Savings and Address Small Utility Challenges”, prepared for the Michigan Public Service Commission, September 2013 (with Optimal Energy)
- “An Energy Efficiency Feed-in-Tariff: Key Policy and Design Considerations”, 2013 ECEEE Summer Study Proceedings, pp. 305-315 (with Richard Cowart)
- “U.S. Experience with Efficiency as a Transmission and Distribution System Resource”, published by the Regulatory Assistance Project, February 2012 (with Rich Sedano)
- “Achieving Energy Efficiency: A Global Best Practices Guide on Government Policies”, published by the Regulatory Assistance Project, February 2012 (with Nancy Wasserman)
- “Residential Efficiency Retrofits: A Roadmap for the Future”, published by the Regulatory Assistance Project, May 2011 (with Meg Gottstein and Blair Hamilton)
- “Is it Time to Ditch the TRC?” Proceedings of ACEEE 2010 Summer Study on Energy Efficiency in Buildings, Volume 5 (with Marty Kushler).
- “Energy Efficiency as a Resource in the ISO New England Forward Capacity Market”, in *Energy Efficiency*, published on line 06 June 2010 (with Cheryl Jenkins and Shawn Enterline).
- “Shareholder Incentives for Gas DSM: Experience with One Canadian Utility”, Proceedings of ACEEE 2004 Summer Study Conference on Energy Efficiency in Buildings, Volume 5 (with Kai Millyard).

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing *Rebuttal Testimony of Chris Neme* submitted on behalf of the National Resources Defense Council, the Environmental Law & Policy Center, the Ohio Environmental Council, and the Environmental Defense Fund was served by electronic mail upon the following Parties of Record on January 25, 2017.

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Summary: Testimony Rebuttal Testimony of Chris Neme electronically filed by Madeline Fleisher on behalf of Environmental Defense Fund and Ohio Environmental Council and Environmental Law and Policy Center and Natural Resources Defense Council