

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Petition of PECO Energy Company for :
Approval of its Act 129 Phase IV Energy : **M-2020-3020830**
Efficiency and Conservation Plan :

**DIRECT TESTIMONY OF
ALICE NAPOLEON
AND
COURTNEY LANE**

**ON BEHALF OF
NATURAL RESOURCES DEFENSE COUNCIL**

January 14, 2021

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1 **1. INTRODUCTION AND QUALIFICATIONS**

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

3 A. **Ms. Napoleon:** My name is Alice Napoleon. I am a Senior Associate at Synapse Energy
4 Economics, Inc. ("Synapse Energy Economics") located at 485 Massachusetts Avenue,
5 Suite 3, Cambridge, MA 02139.

6 A. **Ms. Lane:** My name is Courtney Lane. I am a Senior Associate at Synapse Energy
7 Economics, located at 485 Massachusetts Avenue, Suite 3, Cambridge, MA 02139.

8 **Q. Please describe Synapse Energy Economics.**

9 A. Synapse Energy Economics is a research and consulting firm specializing in electricity
10 and gas industry regulation, planning, and analysis. Our work covers a range of issues,
11 including economic and technical assessments of demand-side and supply-side energy
12 resources, energy efficiency policies and programs, integrated resource planning,
13 electricity market modeling and assessment, renewable resource technologies and
14 policies, and climate change strategies. Synapse works for a wide range of clients,
15 including state attorneys general, offices of consumer advocates, trade associations,
16 public utility commissions, environmental advocates, the U.S. Environmental Protection
17 Agency, U.S. Department of Energy, U.S. Department of Justice, the Federal Trade
18 Commission, and the National Association of Regulatory Utility Commissioners.
19 Synapse has over 30 professional staff with extensive experience in the electricity
20 industry.

1 **Q. Please summarize your professional and educational experience.**

2 A. **Ms. Napoleon:** Since joining Synapse in 2005, I have provided economic and policy
3 analysis of electric and natural gas systems and emissions regulations, with a focus on
4 energy efficiency policies and programs, on behalf of a diverse set of clients throughout
5 the United States and in Canada. On the national level, I led a team that developed tools
6 that help utilities integrate the U.S. Department of Energy’s Superior Energy
7 Performance and 50001 Ready strategic energy management platforms into their energy
8 efficiency portfolios. I co-authored seminal works regarding designing performance
9 incentive mechanisms and assessing the benefits of clean energy resources.

10 At the state level, I was co-author of reports and comments on the role of energy
11 efficiency in New York State in meeting its Reforming the Energy Vision (“REV”)
12 objectives, as well as a white paper on natural gas regulatory reforms needed for New
13 York to meet its decarbonization targets. In Colorado, Maryland, and South Carolina, I
14 facilitated and provided expert analysis on program costs and benefits for demand-side
15 resource policy working groups. Since 2009, I have provided extensive and ongoing
16 expert analysis and support for the State of New Jersey regarding its state- and utility-
17 administered energy efficiency and combined heat and power programs. I have also
18 provided expert advice on demand-side management programs in Nova Scotia regarding
19 a range of issues including incentive-setting methodologies, cost-benefit analysis,
20 incentive setting, avoided costs, and locational demand-side management.

21 Before joining Synapse, I worked at Resource Insight, Inc., where I supported
22 investigations of electric, gas, steam, and water resource issues, primarily in the context
23 of reviews by state utility regulatory commissions.

1 I hold a Master's in Public Administration from the University of Massachusetts at
2 Amherst and a Bachelor's in Economics from Rutgers University. My resume is attached
3 as Exhibit AN/CL-1.

4 A. **Ms. Lane:** I have over 15 years of experience in energy policy and regulation. At
5 Synapse, I work on issues related to the assessment of cost-effectiveness tests for
6 distributed energy resources and conduct rate and bill impacts assessments for energy
7 efficiency programs on behalf of electric and natural gas utilities. Prior to working at
8 Synapse, I was employed by National Grid where I led the development of Rhode Island
9 Annual and Three-Year Energy Efficiency Plans, led the facilitation of the Rhode Island
10 Energy Efficiency Collaborative, and worked with key stakeholders on the development
11 of policies and strategies to further promote energy efficiency and demand response in
12 the state. During my employment at National Grid I also served as the Growth
13 Management Lead for New England where I oversaw the development of customer
14 products, services, and business models for Massachusetts and Rhode Island. Prior to
15 joining National Grid, I was employed by Citizens for Pennsylvania's Future
16 (PennFuture) where I worked on regulatory and state policy issues pertaining to energy
17 conservation, retail competition, net metering, and the Alternative Energy Portfolio
18 Standard. This work included advocacy on the initial passage of Act 129 and
19 participation in the regulatory process for the development of the Phase I Implementation
20 Order and subsequent Phase I electric distribution company plan filings. Prior to working
21 at PennFuture, I worked for Northeast Energy Efficiency Partnerships, Inc. where I
22 promoted energy efficiency throughout the Northeast.

1 I hold a Master of Arts in Environmental Policy and Planning from Tufts University and
2 a Bachelor of Arts in Environmental Geography from Colgate University.

3 My resume is attached as Exhibit AN/CL-2.

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

5 A. We are testifying on behalf of the Natural Resources Defense Council (“NRDC”).

6 **Q. Have you previously testified before a state or provincial commission?**

7 A. **Ms. Napoleon:** Yes. I have testified before the California Public Utilities Commission,
8 the Nova Scotia Utility and Review Board, the New York Public Service Commission,
9 the New Brunswick Energy and Utilities Board, and the Public Service Commission of
10 South Carolina.

11 A. **Ms. Lane:** Yes. I have testified before the Rhode Island Public Utilities Commission, the
12 Public Service Commission of the District of Columbia, and the Maryland Public Service
13 Commission.

14 **Q. Have you testified before the Pennsylvania PUC?**

15 A. **Ms. Napoleon:** Yes. I testified in Docket No. M-2020-3020824, currently before the
16 PUC, regarding the Petition of PPL Electric Utilities Corporation for Approval of its Act
17 129 Phase IV Energy Efficiency and Conservation Plan.

18 A. **Ms. Lane:** Yes. I previously testified before the PUC in Docket No. M-00061984:
19 regarding the En Banc Hearing on Alternative Energy, Energy Conservation, and
20 Demand Side Response, and Docket No. P-2012-2320369: regarding the Petition of PPL

1 Electric Utilities Corporation for an Evidentiary Hearing on the Energy Efficiency
2 Benchmarks Established for the Period June 1, 2013 through May 31, 2016.

3 **Q. What is the purpose of your testimony?**

4 A. The purpose of our testimony is to review and critique PECO Energy Company's
5 ("Company" or "PECO") proposed Act 129 Phase IV Energy Efficiency and
6 Conservation Plan ("Phase IV Plan" or "Plan").

7 **Q. Are you sponsoring any exhibits with your testimony?**

8 A. Yes. We are sponsoring the following exhibits:

- 9 • Resume of Alice Napoleon: Exhibit AN/CL-1
- 10 • Resume of Courtney Lane: Exhibit AN/CL-2
- 11 • Response of PPL Electric Utilities Corporation Response to Natural Resources
12 Defense Council Interrogatory NRDC-I-9 (Docket No. M-2020-3020824): Exhibit
13 AN/CL-3

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

15 **2.1. Summary of conclusions**

16 **Q. Please summarize your conclusions.**

17 A. Our conclusions are summarized as follows:

- 18 • PECO can do more to facilitate customer adoption of more holistic energy saving
19 solutions.

- 1 • PECO does not provide financing offerings such as low- or no-interest loans to customers
2 participating in its Act 129 programs, despite that incentives alone may not be sufficient
3 to drive customers to invest in deeper, more comprehensive energy savings.
- 4 • PECO does not provide tiered incentive structures for existing residential building
5 retrofits or non-residential buildings, despite the fact such financial signals can support
6 comprehensive efficiency investments.
- 7 • PECO does not indicate it will monitor its progress towards comprehensive savings
8 goals.
- 9 • PECO does not appear to proactively address barriers to the adoption of heat pumps and
10 heat pump water heaters.
- 11 • Energy efficiency will likely figure prominently in Pennsylvania’s strategy for reducing
12 emissions pursuant to the Environmental Quality Board’s proposed CO2 Budget Trading
13 Program, which will enable the Commonwealth to participate in the Regional
14 Greenhouse Gas Initiative (“RGGI”), and energy efficiency will almost certainly play a
15 larger role than it has in the past.

16 2.2. Summary of recommendations

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

18 **A.** We recommend the following:

- 19 • PECO should provide more comprehensive savings opportunities by doing the following:
 - 20 ▪ PECO should provide financing opportunities to residential customers to
21 address the cost-barrier to customer adoption of comprehensive energy
22 solutions;
 - 23 ▪ PECO should include additional offerings within its Residential and Non-
24 Residential programs to provide more opportunities for deeper savings,
25 including pilots for deep energy retrofits;

1 **Table 1. PECO's proposed Phase IV programs**

Programs and components
1. Residential Program Home Rebates - Market Place In-Home Assessments Income-Eligible Multifamily Multifamily New Construction Appliance Recycling
2. Income-Eligible Program Income-Eligible Appliance Recycling Income-Eligible Single Family
3. Residential Home Energy Reports
4. Income-Eligible Home Energy Reports
5. Non-Residential Program Prescriptive Midstream Direct Installation Custom

2 As shown in Table 2, PECO projects that this portfolio would exceed compliance targets
 3 set in the Implementation Order.

4 **Table 2. Summary of Compliance Targets and PECO's Plan**

	Compliance Target	EE&C Plan
Overall Energy Reductions (MWh/year)	1,380,837	1,605,107
Overall Peak Demand Reductions (MW)	256	327
Low-Income Energy Reductions (MWh/year)	80,089	97,421
Budget Cap	\$ 427,385,830	\$ 427,385,830
Cost-Effectiveness (per TRC)	1	1.06

5 *Source: PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan.*

1 PECO indicates that it “developed its program portfolio to offer a holistic, easy customer
2 experience across its service territory.”¹ As summarized on page 2 of the Plan, PECO’s
3 primary objectives include the following:

- 4 • Delivering required energy savings and peak demand reduction
5 with the broadest mix of cost-effective technologies
- 6 • Generating energy savings through streamlined processes that
7 make participation easy for customers and market actors, striving
8 to continuously provide customers with a positive experience and
9 help them save energy in their homes and businesses
- 10 • Meeting data and documentation needs of evaluators and
11 regulators
- 12 • Responsible use of Act 129 dollars on behalf of PECO’s
13 customers²

14 PECO proposes to track its progress in meeting these objectives using metrics shown in
15 Table 3.

16 **Table 3. PECO proposed metrics for measuring and tracking**
17 **efficiency program performance**

Metrics
<ul style="list-style-type: none">• Customer satisfaction with the program and participation trends• Energy savings and PDRs associated with installed efficient equipment or removed equipment• Program implementation costs and program cost-effectiveness

18 *Source: PECO PY 13 – PY 17 Act 129 – Phase IV Energy Efficiency and*
19 *Conservation Plan, p. 46.*

¹ PECO Plan at page 2.

² PECO Plan at page 2.

1 **3.1. Assessment and critique**

2 **Q. Please summarize the Commission’s recommendation for comprehensive programs**
3 **in its Phase IV Implementation Order.**

4 A. The Commission requires the electric distribution companies (“EDC”) to include at least
5 one comprehensive program for residential customers and at least one comprehensive
6 program for non-residential customers.³

7 **Q. Does the Commission define the term “comprehensive”?**

8 A. While the Commission declined to adopt a strict definition of “comprehensive” in its
9 Implementation Order, it does encourage “EDCs to pursue comprehensive portfolios with
10 a greater focus on longer-lived, deeper-savings measures.”^{4,5} This implies that Phase IV
11 programs should seek to move beyond incentivizing individual appliances and equipment
12 to offering more comprehensive whole-building solutions where multiple measures are
13 installed in a building to maximize energy savings.

14 **Q. How does PECO define the term “comprehensive” in its Phase IV Plan?**

15 A. PECO defines “comprehensive” as providing customers with a wide range of energy
16 efficiency upgrades, a range of delivery channels, and a variety of efficiency upgrade
17 recommendations leading to deeper retrofits. PECO also proposes one Residential

³ Energy Efficiency and Conservation Program, Docket No. M-2020-3015228 (Implementation Order Entered June 18, 2020) (Implementation Order) at pages 23-24.

⁴ Implementation Order at page 15.

⁵ We note that the Commission's desire for longer-lived savings measures is somewhat undercut by its interpretation of the definition of “total resource cost test” in Act 129, because it interprets the definition to require that savings from each measure not be counted beyond 15 years. While the Commission remained firm on this point in the TRC Order, we encourage revisiting this issue in future proceedings. In addition, we recommend that the full measure life be counted when tracking lifetime savings, as we recommend on p. 20-21 of this testimony.

1 program and one Non-Residential program that encourage deeper retrofits, rather than
2 asking customers to cross-reference many programs and apply through various channels.⁶

3 **Q. Do you find PECO’s proposal to be sufficient to encourage the adoption of longer-**
4 **lived and deeper energy savings?**

5 A. Only in part. We are encouraged by PECO’s proposal to break down programmatic silos
6 to encourage the adoption of a more comprehensive mix of measures. However, we find
7 that there are further improvements that can be made to PECO’s Plan. These
8 recommended improvements include:

- 9 • PECO should provide residential financing opportunities to residential customers
10 to address the cost-barrier to customer adoption of comprehensive energy
11 solutions;
- 12 • PECO should include additional offerings within its Residential and Non-
13 Residential programs to provide more opportunities for deeper savings;
- 14 • PECO should implement tiered incentives to send the appropriate signal to
15 customers to take a more comprehensive whole-building approach and install
16 multiple measures;
- 17 • PECO should structure contracts with Conservation Service Providers (“CSP”) to
18 promote comprehensive savings;
- 19 • PECO should track its performance related to achievement of comprehensive
20 energy savings; and,

⁶ PECO Plan at pages 18-19.

- 1 • PECO should proactively address market barriers to the adoption of heat pumps.

2 *PECO should provide residential financing opportunities to residential customers to address*
3 *the cost-barrier to customer adoption of comprehensive energy solutions.*

4 **Q. Does PECO propose to offer any financing offerings for its residential customers?**

5 A. No, it does not. PECO indicated it will not provide low- or no-interest loans or on-bill
6 repayment options to customers participating in its Act 129 programs.⁷

7 **Q. Do you support PECO’s decision to not provide financing to its residential**
8 **customers?**

9 A. We do not. Experience indicates that incentives alone are not sufficient to drive
10 customers to invest in deeper, more comprehensive energy savings. The customer
11 contribution required to make the initial investment in more holistic energy solutions can
12 be a significant barrier to participation. Financing programs have shown to be effective in
13 addressing the barrier to lack of upfront capital. For PECO to adequately encourage
14 deeper energy efficiency enhancements per customer, it needs to address this barrier to
15 participation.

16 **Q. Have residential financing programs been successful in increasing energy savings in**
17 **other utility energy efficiency programs?**

18 A. Yes. There are proven mechanisms in place in other jurisdictions that can increase
19 customer access to financing for energy efficiency improvements while mitigating risk to
20 the utility. One type of mechanism is the use of utility program funds to buy-down

⁷ PECO Response to NRDC 1-17.

1 interest rates to facilitate customer access to zero- or low-interest loans. There are several
2 examples of interest buy-down programs shown to be beneficial and a cost-effective use
3 of program funds.

- 4 • National Grid Rhode Island HEAT Loan program: This loan program works in
5 conjunction with National Grid’s EnergyWise Program, which offers in-home
6 energy assessments. Customers that receive recommendations for weatherization
7 measures, efficient heating systems, and domestic hot water systems from their
8 EnergyWise audit can borrow up to \$25,000 for a period of up to seven years at
9 zero-percent interest to finance these improvements. To fund the program,
10 National Grid works with six local financial institution partners in Rhode Island
11 and uses program funds to buy down the interest rate to zero percent. A recent
12 evaluation concluded that the HEAT Loan generated energy efficiency savings for
13 National Grid that would not have otherwise occurred and that the availability of
14 the loan was very important in customers’ decisions to install measures following
15 their home energy assessment. The evaluation found that without the HEAT
16 Loan, three-quarters of loan recipients would have canceled, postponed, or
17 reduced their home energy project scope.⁸

- 18 • Mass Save® HEAT Loan: This HEAT Loan program mirrors the one offered in
19 Rhode Island. The utilities participating in the administration of the Mass Save
20 program use program funds to buy down the interest due on the loan and the cost

⁸ Research Into Action, Inc. HEAT Loan Assessment. November 19, 2018. Available at: http://ricermc.ri.gov/wp-content/uploads/2019/05/heat-loan-assessment-final-report_111918.pdf.

1 to administer the loans. The Mass Save HEAT Loan was recently expanded to
2 cover pre-weatherization safety work and battery storage, if customers agree to
3 participate in an active demand program.⁹

4 **Q. What is your recommendation for a residential financing program in PECO’s Phase**
5 **IV Plan?**

6 A. We recommend that PECO carve out funding within its Phase IV Residential Program to
7 facilitate customer access to zero-percent interest financing to fund comprehensive
8 improvements tied to recommendations from participation in a Comprehensive
9 Assessment. PECO should commit to reaching out to local financial institutions to
10 examine partnerships to buy-down interest rates to increase access to financing.

11 *PECO should include additional offerings within its Residential and Non-Residential*
12 *programs to provide more opportunities for deeper savings.*

13 **Q. Are there other comprehensive savings measures and program offerings that PECO**
14 **has not included in its Phase IV Plan?**

15 A. Yes. PECO’s plan does not include the following offerings and designs:

- 16 • Utilization of advanced metering infrastructure (“AMI”) technology to enhance
17 program offerings; and
- 18 • A deep energy retrofit pilot for residential and non-residential buildings.

⁹ D.P.U. 18-110 – D.P.U. 18-119. Three-Year Plan 2019-2021. October 31, 2018.

1 **Q. Does PECO propose to use its AMI capabilities within its Phase IV Plan?**

2 A. PECO states that its evaluation contractor occasionally uses AMI data to analyze
3 commercial and industrial projects as part of impact evaluation and that evaluators also
4 use AMI to quantify peak demand savings for its Home Energy Reports programs.¹⁰

5 **Q. Are there additional opportunities for PECO to utilize AMI to drive additional**
6 **energy savings?**

7 A. Yes. In addition to use for evaluation and quantification, AMI is also a valuable tool for
8 enhancing delivery of energy savings to customers. AMI allows for more granular,
9 transparent, and connected energy data that can enable PECO to personalize savings
10 opportunities for its customers.

11 For residential customers, AMI can help PECO better understand usage patterns and
12 create more personalized energy usage alerts and recommendations for measures. AMI
13 can be used alongside Home Energy Reports to create more real-time customer
14 engagement and can be incorporated with smart home devices. AMI can also be
15 leveraged alongside PECO's Residential In-Home Assessment program component to
16 provide energy optimization integrated audits.

17 For the Non-Residential sector, PECO can use AMI to obtain disaggregated load profiles
18 that can allow for programs that offer customers continuous commissioning of facilities,
19 smart energy management, and offsite energy management.

¹⁰ PECO Response to NRDC 1-20.

1 **Q. What is your recommendation regarding use of AMI?**

2 Due to the fact that AMI technology is already available within PECO's territory, the
3 Company should take advantage of its capabilities to support new efficiency offerings.

4 **Q. Are there other types of programs or measures that PECO is not planning to**
5 **implement?**

6 A. Yes. PECO does not appear to offer incentives for deep energy retrofits in its Phase IV
7 proposed plan.

8 **Q. Please describe deep energy retrofits.**

9 A. A deep energy retrofit is a whole-building approach to energy efficiency and typically
10 creates a reduction in 50 percent or more of a building's total energy usage.¹¹ While this
11 measure requires a substantial amount of investment on building envelope measures, it
12 could be cost-effective in some instances, such as when a building uses electric resistance
13 heating.

14 If a goal of Act 129 Phase IV is to drive more comprehensive energy savings, it is
15 important to test deep energy retrofit approaches in a pilot program so that PECO can
16 consider incorporating such an approach into its portfolio as a standard measure in the
17 future. This pilot can evaluate the cost and performance of such approaches and find
18 ways to improve costs and performance.

¹¹ American Council for an Energy-Efficient Economy. 2014. *Residential Deep Energy Retrofits*, Available at <https://www.aceee.org/sites/default/files/publications/researchreports/a1401.pdf>.

1 **Q. What do you recommend with respect to a deep energy retrofits offering?**

2 A. We recommend that PECO include a pilot for deep energy retrofits in its Phase IV Plan
3 that provides incentives for the achievement of a per-building savings goal.

4 *PECO should implement tiered incentives to send the appropriate signal to customers to take a*
5 *more comprehensive whole-building approach and install multiple measures.*

6 **Q. Does PECO propose tiered incentives for its Residential Program in its Phase IV**
7 **Plan?**

8 A. Yes. PECO indicates that, within the New Construction component of its Residential
9 Program, incentive spending will be tied directly to achieved savings; further, bonus
10 incentives will highlight and support the installation of leading-edge technology. PECO
11 indicates this structure will reward builders for higher performing homes.¹²

12 **Q. Do you support this proposal?**

13 A. Yes; however, we recommend that PECO also include tiered incentives or a bonus
14 incentive structure to encourage deeper energy retrofits to existing buildings.

15 A tiered incentive structure or bonus incentive for comprehensiveness can send important
16 financial signals to customers to adopt a broader set of energy efficiency strategies during
17 the short periods in which they are considering improvements to their homes. Because
18 there are limited opportunities for utilities to create meaningful touchpoints with
19 customers, once a customer invests in a measure it could be years before they consider
20 making another investment. This creates a lost opportunity to engage the customer in

¹² PECO Plan at page 21.

1 more holistic solutions. Structuring utility programs to incentivize the installation of
2 multiple measures can avoid these lost opportunities.

3 **Q. What is your recommendation for a tiered incentive structure for existing homes?**

4 A. We recommend that PECO adopt a tiered incentive structure or bonus incentive to
5 encourage the adoption of weatherization along with other recommended measures from
6 a customer's In-Home Assessment.

7 Specifically, we recommend a framework similar to what PPL proposes in its Phase IV
8 Plan. For its Residential Program, PPL proposes a Comprehensive Retrofit Bonus
9 Incentive in relation to the bundling of HVAC and water heating measures with
10 weatherization under its Residential Program Energy Efficient Homes component. This
11 framework is described in PPL's response to NRDC 1-9 in Docket No. M-2020-3020824,
12 included with this testimony as Exhibit AN/CL-3. This Bonus Incentive would involve
13 two tiers; Tier 1 would offer a \$250 bonus rebate for customers that have at least two
14 "major measures" and Tier 2 would offer a \$350 bonus rebate for installing three or more
15 "major measures." There is also a requirement that one installed measure must be a
16 building envelope measure (Insulation or Air sealing).¹³

17 **Q. Does PECO propose tiered incentives for the Non-Residential Program?**

18 A. No. There is no indication of a tiered incentive or bonus structure for Non-Residential
19 Programs within PECO's Phase IV Plan.

¹³ PPL Response to NRDC 1-9, Docket No. M-2020-3020824.

1 For the reasons stated above, tiered incentives are a critical piece in encouraging
2 customers to install multiple and more comprehensive measures. We recommend that
3 PECO consider tiered incentives similar to those offered in Connecticut and New York.
4 In Connecticut, Connecticut Light and Power Company and United Illuminating
5 administer the Energy Opportunities Program. This program includes tiered incentives to
6 encourage deeper energy saving retrofits. The per-kWh incentive increases as more
7 measures are bundled together. For example, in 2020 a single non-lighting end-use
8 measure had a per-kWh incentive of \$0.50 with a cap of 50 percent of the installed cost.
9 This increased to \$0.60 per kWh for two end-use measures with a cap of 60 percent of the
10 installed cost and to \$0.75 per kWh for three or more end-use measures with a cap of 75
11 percent.¹⁴

12 In New York, National Grid offers a Tiered Incentive Program for Large Commercial and
13 Industrial (C&I) customers in its Upstate New York electric and gas service territories.
14 C&I customers can earn bonus incentives above traditional incentive offerings for three
15 tiers. For Tier 1, if a customer completes three projects, the customer receives a 15-
16 percent bonus incentive. Tier 2 pertains to the completion of four projects and includes a
17 20-percent bonus incentive. Tier 3 is for customers that complete five projects and has a
18 25-percent bonus incentive. National Grid allows for flexibility in the timing of these

¹⁴ United Illuminating (UI) Existing-Building-Cap-Sheet-Final-6-2020. Available at:
https://www.uinet.com/wps/wcm/connect/www.uinet.com-7188/b4cf87e1-541b-4ea2-89a9-496a5a6bbbcc/C0075-Existing-Building-Cap-Sheet-Final-6-2020.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE.Z18_J092I2G0N01BF0A7QAR8BK20A3-b4cf87e1-541b-4ea2-89a9-496a5a6bbbcc-nb3yjxC.

1 programs to also facilitate the adoption of multiple measures. Customers have two years
2 to complete the projects.¹⁵

3 *PECO should structure contracts with CSPs to promote comprehensive savings.*

4 **Q. PECO contracts with Conservation Service Providers to implement its Phase IV**
5 **programs. How are those contracts structured?**

6 A. PECO states that the CSP payment structure is a pay-for-savings model. Because PECO
7 must meet megawatt-hour (MWh) and megawatt (MW) goals, PECO will pay CSPs for
8 obtaining those savings on a dollar-per-verified MWh basis.¹⁶

9 **Q. Does PECO indicate that this structure will promote comprehensive projects?**

10 A. Yes. PECO states that, due to the fact CSPs are paid for the verified MWh they deliver,
11 they are rewarded for encouraging more MWh from each customer, which it claims
12 would result from a comprehensive project at a customer's site. PECO further states that
13 it may cost CSPs less to encourage more comprehensive savings per customer than it will
14 to acquire more customers to participate in less comprehensive projects.¹⁷

15 **Q. Do you agree with this conclusion?**

16 A. No. PECO's Phase IV Plan savings targets are in annual MWh. Therefore, payment for
17 achieved annual MWh savings does not necessarily incentivize deeper, longer-lived
18 energy savings. It can prove more difficult to encourage customers to invest more in

¹⁵ National Grid. Upstate New York Tiered Incentive Program Bonus Incentive Worksheet. Available at:
https://www.nationalgridus.com/media/pdfs/bus-ways-to-save/ee7198-uny-tiered-incentive-worksheet_fillable.pdf.

¹⁶ PECO Plan at page 6.

¹⁷ PECO Response to CAUSE-PA 1-13(d).

1 multiple measures or more complex projects than to convince multiple customers to
2 invest in lower-cost, shorter-lived measures like lighting and appliances.

3 Basing the CSP contract solely on annual MWh could create a perverse incentive for the
4 CSP to go after less-risky, easier to obtain, lower-cost measures instead of promoting
5 whole-building solutions.

6 **Q. What do you recommend for a CSP contract?**

7 A. Similar to using tiered or bonus incentive structures to send the right signals to customers
8 to invest in more comprehensive energy solutions, the same tool can be used in CSP
9 contracts. For example, PECO could provide a financial bonus for a target number of
10 buildings that receive weatherization, or for achieving a certain percentage of savings per
11 building. There should be some financial reward for better aligning CSP performance
12 with the Phase IV goal for achievement of more comprehensive, longer-lived savings.

13 *PECO should track its performance related to achievement of comprehensive energy savings.*

14 **Q. Please explain why PECO should track its performance related to achievement of**
15 **comprehensive energy savings.**

16 A. In response to discovery, PECO states it will monitor year over year measure-level
17 participation, incentive spending, lifetime electric savings and program total resource cost
18 test results to track program achievements.¹⁸ However, in PECO's description of its
19 "Portfolio Objectives and Metrics that Define Program Success," there is no indication

¹⁸ PECO Response to CAUSE-PA 1-13(e).

1 that metrics pertaining to the achievement of more comprehensive energy savings will be
2 tracked.¹⁹

3 Since PECO has modified its Act 129 programs from Phase III to Phase IV, it will be
4 important to track how these changes resulted in more comprehensive programs.²⁰

5 We therefore recommend that PECO track the following performance indicators: lifetime
6 MWh, per-customer MWh savings, and percentage of energy audits resulting in
7 weatherization (air sealing and insulation). Reporting on these metrics will demonstrate
8 the level of effectiveness of PECO's Phase IV Plan in delivering more comprehensive
9 savings.

10 *PECO should proactively address market barriers to the adoption of heat pumps.*

11 **Q. Please describe your recommendation for PECO to proactively address market
12 barriers to the adoption of heat pumps during Phase IV.**

13 A. The adoption of high efficiency cold-climate heat pumps and heat pump water heaters are
14 critically important to enabling Pennsylvania to meet its climate goals.

15 While PECO is proposing these measures in Phase IV along with reasonable incentive
16 levels, there is more that can be done to promote their adoption by customers.

17 Customers may still be hesitant to adopt this technology or may be more interested in
18 converting to natural gas, due to historical bias against older heat pump technology.

19 However, advancements in heat pump technology have improved control and comfort for

¹⁹ PECO Plan at page 16.

²⁰ PECO Response to NRDC 1-4.

1 homeowners.²¹ When weatherization is conducted along with installation of heat pumps,
2 customers can reduce the system size and the cost of the heat pump. This will make it
3 easier for heat pumps to serve all or most of the heating load for a building. A recent
4 survey by the American Council for an Energy-Efficient Economy (ACEEE) found eight
5 energy efficiency programs require weatherization as part of heat pump installations and
6 encourages such an approach.²²

7 Advancements notwithstanding, PECO customers face barriers to the adoption of heat
8 pumps and heat pump water heaters. PECO can address these barriers in its Phase IV
9 Plan in several ways. PECO can seek to buy-down interest rates as described above to
10 address higher upfront costs. It can expand customer education and outreach channels to
11 increase awareness of the technology and importance of weatherization. PECO can offer
12 bonus incentives for combining weatherization with heat pump installation. PECO can
13 also provide post-installation training on proper use of heat pumps. To the extent PECO
14 is not already doing so, it can also facilitate programs to train installers and builders on
15 right-sizing and proper installation. It can take time for consumers to embrace a new
16 technology and it is therefore critical that PECO seek to increase adoption and market
17 transformation of heat pump measures during its Phase IV Plan.

²¹ Steven Nadel. *Programs to Electrify Space Heating in Homes and Buildings*, ACEEE, available at
https://www.aceee.org/sites/default/files/pdfs/programs_to_electrify_space_heating_brief_final_6-23-20.pdf

²² *Ibid.*

1 **4. ALIGNING EE&C WITH POLICY GOALS**

2
3 **Q. Please describe recent climate policy developments in Pennsylvania.**

4 A. Governor Wolf’s Executive Order 19-07 (“EO 19-07”) charged the Pennsylvania DEP
5 with developing a proposed rulemaking package to abate, control, or limit carbon dioxide
6 emissions from fossil-fuel-fired electric power generators. EO 19-07 specified that the
7 proposed rulemaking should include auctions of emission allowances and align with
8 RGGI, a cooperative regional cap-and-invest program of 10 participating New England
9 and Mid-Atlantic states. Pursuant to EO 19-07, DEP developed its proposed rulemaking
10 to establish a program to limit carbon dioxide emissions from fossil-fired electric
11 generating units with a nameplate capacity of 25 megawatts or greater starting in
12 2022.^{23,24} DEP presented this proposed rulemaking to the Pennsylvania Environmental
13 Quality Board (“EQB”). The EQB voted to approve the proposed rulemaking on
14 September 15, 2020.²⁵

15 **Q. What is the current status of the proposed rulemaking?**

16 A. The EQB is currently accepting public comments on its proposed rulemaking. The
17 comment period is open through January 14, 2021.²⁶

²³ Pennsylvania Environmental Quality Board. Proposed Rulemaking: CO2 Budget Trading Program. [25 PA. CODE CH. 145]. Available at <https://www.dep.pa.gov/PublicParticipation/EnvironmentalQuality/Pages/default.aspx>.

²⁴ Pennsylvania Department of Environmental Protection. Proposed Rulemaking Annex A: Title 25. Environmental Protection, Part I. Department of Environmental Protection, Subpart C. Protection of Natural Resources, Article III. Air Resources, Chapter 145. Interstate Pollution Transport Reduction, Subchapter E. CO2 Budget Trading Program. Available at <https://www.dep.pa.gov/PublicParticipation/EnvironmentalQuality/Pages/default.aspx>.

²⁵ Environmental Quality Board, Meeting Minutes, September 15, 2020. Available at: http://files.dep.state.pa.us/PublicParticipation/Public%20Participation%20Center/PubPartCenterPortalFiles/Environmental%20Quality%20Board/2020/November%2017/9.15.20%20EQB%20Minutes_FINAL.pdf.

²⁶ Pennsylvania Department of Environmental Protection. Regional Greenhouse Gas Initiative. Available at <https://www.dep.pa.gov/Citizens/climate/Pages/RGGI.aspx>, accessed January 11, 2021.

1 **Q. How will Pennsylvania’s entering RGGI impact the role of energy efficiency?**

2 A. While it has not been determined how auction proceeds will be used, energy efficiency is
3 likely to play a major role in the Commonwealth’s approach to RGGI compliance. It is
4 also likely that energy efficiency will receive RGGI allowance revenues. Energy
5 efficiency is highly cost-effective and one of the lowest cost means of curbing GHG
6 emissions. Consequently, energy efficiency will likely figure prominently in
7 Pennsylvania’s strategy for reducing emissions for RGGI compliance, and it will almost
8 certainly play a larger role than it has in the past. The proposed rulemaking calls for
9 establishing a strategic set-aside for funding to “encourage and foster promotion of
10 energy efficiency measures, promote renewable or noncarbon-emitting energy
11 technologies, and stimulate or reward investment in the development of innovative
12 carbon emissions abatement technologies.”²⁷ Moreover, the modeling for the proposed
13 rulemaking assumed that a portion of statewide average annual allowance revenues,
14 estimated at \$261 million per year, would be invested in energy efficiency.²⁸ In the
15 modeling, the investment in energy efficiency ranged from 10 to 31 percent, or \$26
16 million to over \$80 million, of annual allowance revenues *every year*. For comparison, if
17 we assume the higher end of the range used in the RGGI modeling and that the share of
18 these funds directed toward PECO’s service area will be similar to the service area’s
19 share of Act 129 funding, there would be roughly \$28 million additional funds every year

²⁷ Pennsylvania Environmental Quality Board. Proposed Rulemaking: CO2 Budget Trading Program. [25 PA. CODE CH. 145]. Available at <https://www.dep.pa.gov/PublicParticipation/EnvironmentalQuality/Pages/default.aspx>.

²⁸ PA DEP and ICF. 2020. Pennsylvania RGGI Modeling Report. Available at http://files.dep.state.pa.us/Air/AirQuality/AQPortalFiles/RGGI/PA_RGGI_Modeling_Report.pdf.

1 for energy efficiency in PECO's territory. For comparison, PECO's proposed annual
2 budget for the EE&C programs ranges from roughly \$74 million to \$97 million for the
3 Phase IV period.²⁹

4 **Q. Should the Commission wait for the next program cycle to consider these issues?**

5 A. No. The Commission rightly notes that some parameters for Pennsylvania's participation
6 have yet to be determined.³⁰ However, the current timeline for entry into RGGI is before
7 the end of the Phase IV period. As noted above, the DEP's proposed rulemaking calls for
8 carbon dioxide requirements starting in 2022, well before the end of the five-year
9 program period for Phase IV. This timeline calls for proactive, careful planning. The
10 PUC can begin laying the groundwork for these changes now, so that the state is in a
11 better position to implement them once more is known about the specifics. The sooner
12 the state implements changes to address RGGI, the better for ratepayers.

13 **Q. Does the modeling reflect a commitment to provide RGGI auction proceeds to**
14 **energy efficiency?**

15 A. No. However, such a commitment would be consistent with how other RGGI states use
16 their allowance revenues. Across all RGGI states, 38 percent of 2018 allowance revenues
17 were invested in energy efficiency.³¹

²⁹ PECO Plan, p. 4.

³⁰ TRC Test Order, p. 72-72.

³¹ Regional Greenhouse Gas Initiative, Inc. 2020. The Investment of RGGI Proceeds in 2018.
https://www.rggi.org/sites/default/files/Uploads/Proceeds/RGGI_Proceeds_Report_2018.pdf.

1 **Q. Will the rulemaking process impact how Act 129 EE&C programs should be**
2 **implemented?**

3 A. Mostly likely. The decision about how to use RGGI funds is under the purview of the
4 DEP and the regulations it administers. To leverage the existing energy efficiency
5 infrastructure, it is likely that DEP's approach will involve expanding or supplementing
6 the utilities' efforts under the EE&C programs, rather than duplicating or recreating these
7 programs. Whether the utilities' EE&C programs shift in focus or increase under RGGI,
8 the commonwealth's entrance into RGGI will have important implications for the Act
9 129 programs.

10 **Q. What information will stakeholders need for assessing and developing an approach**
11 **to energy efficiency under RGGI?**

12 A. The design and mix of energy efficiency programs should be informed by the emissions
13 that they are likely to displace. This requires understanding when energy efficiency
14 measures save energy on an hourly basis throughout the year (typically called hourly
15 savings profiles). Hourly savings profiles would present information for a typical use
16 pattern for participants in relevant efficiency programs. Data on all measures (or groups
17 of measures) currently offered by the EE&C programs and for all technically feasible
18 measures would be needed to shed light on an optimal measure mix.

19 Optimizing energy efficiency under RGGI also requires understanding whether and to
20 what extent energy efficiency resources are likely to reduce electricity production by
21 fossil-fired power plants. This involves identifying what resources are dispatched to meet
22 the electricity needs of customers in Pennsylvania at different times of the day and of the
23 year, the plants that are highest cost and are therefore most likely to be displaced by

1 energy efficiency, and the emissions of these units. These can be compiled into marginal
2 emissions rates per MWh of energy reduced.

3 **Q. Are there existing studies addressing hourly efficiency savings or emissions rates?**

4 A. We are not aware of such studies for Pennsylvania. While the Statewide Evaluator
5 Potential Study provides a good foundation for planning for an expansion of energy
6 efficiency, it does not appear to have used or developed hourly measure savings profiles.
7 PJM conducts marginal emissions analyses, which look at the emissions for the PJM
8 system as a whole. To support planning for participation in RGGI, Pennsylvania should
9 study the emissions from units that serve customers in the commonwealth.

10 If these data have not yet been analyzed, we recommend that PECO, in coordination with
11 the other EDCs, conduct both of these studies.

12 **Q. Does this conclude your direct testimony?**

13 A. Yes, it does.



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PROFESSIONAL EXPERIENCE

Synapse Energy Economics, Inc., Cambridge, MA. *Senior Associate*, June 2013 – present; *Associate*, July 2008 – June 2013; *Research Associate*, April 2005 – July 2008.

- Provide expert analysis, ongoing stakeholder support, and consulting services in regulatory proceedings regarding energy efficiency program design and performance, funding and incentive mechanisms, evaluation, cost-effectiveness screening, avoided costs, potential studies, and plans. Develop and sponsor testimony and formal comments on electric and natural gas energy efficiency plans, advanced metering infrastructure (AMI) proposals, and innovative programs and regulatory structures.
- Develop a cost-effectiveness tool, program designs, and case studies to facilitate incorporating strategic energy management programs into energy efficiency program administrators' portfolios for commercial and industrial customers.
- Design research approach, manage team, and conduct a sweeping analysis of energy efficiency potential studies from utilities, states, and regions across the U.S.
- Conduct extensive research on low-income energy efficiency efforts in U.S. states. Analyze energy burden differences between low-income and non-low-income households, and across factors that can impact participation in and efficacy of energy efficiency programs, to inform efficiency program design and targeting efforts. Provide consulting services and testimony on low-income energy efficiency programs and proposals.
- Facilitate residential, commercial, and industrial policy working groups and manage technical analysis of working group recommendations to reduce greenhouse gas (GHG) emissions in Colorado, South Carolina, and Maryland.
- Research and analyze historical emissions of criteria and hazardous air pollutants, greenhouse gases, and coal combustion wastes. Research and develop potential state and local emissions mitigation strategies, such as strategies for reducing ambient fine particulates in New York City.
- Conduct surveys of regional, state, and utility policies and practices regarding ratemaking for energy efficiency, power procurement, risk management, and fuel diversity. Research federal, regional, and state policies and case histories on integrated resource planning, power procurement, power plant operations, renewable portfolio standards, and market power.
- Conduct research for modelling macroeconomic impacts of policies that reduce oil production.

Resource Insight, Inc., Arlington, MA. *Research Assistant*, 2003-2005.

Responsible for conducting research and analysis of electric, gas, steam, and water resource issues. Conducted discounted cash flow analysis for asset valuation. Developed market-price benchmarks for analysis of power-supply bids including energy, capacity, ancillary services, transmission, ISO services, losses, and adjustment for load shape. Prepared discovery responses, formal objections, comments, and testimony; collaboratively wrote and edited reports; created and formatted exhibits. Participated in drafting an Energy Plan for New York City. Edited solicitation for competitive power supply to serve aggregated municipal load.

University of Massachusetts, Amherst, MA. *Teaching Assistant*, 2001-2002.

Developed and taught lessons on applied math to a diverse group of incoming graduates; tutored students in microeconomic theory and cost benefit analysis; graded problem sets and memoranda.

International Council for Local Environmental Initiatives, Berkeley, CA. *Cities for Climate Protection Intern for the City of Northampton, MA*, 2001.

Compiled primary and secondary source data on energy consumption and solid waste generation by the municipal government, city residents, and businesses; applied emissions coefficients to calculate total GHG emissions; identified current and planned municipal policies that impact GHG emissions; researched the predicted local effects of global warming ; gathered public feedback to provide acceptable and proactive policy alternatives. Composed a GHG emissions inventory describing research findings; wrote and distributed a policy report and press releases; gave newspaper and radio interviews; addressed public officials and the public during a televised meeting.

University of Massachusetts, Amherst, MA. *Research Assistant*, 2000-2001.

Located federal data sources, identified changes, and updated a research database to evaluate the Habitat Conservation Program; proofread articles and white papers; composed a literature review on land use modelling. Collaboratively administered, tested, and proposed interface enhancements for a web-based data warehouse of regional habitat change research; formally presented the system to an independent research group.

Court Square Data Group, Inc., Springfield, MA. *Administration Manager*, 1998-2000; *Project Administrator*, 1996-1998.

As Administration Manager, analysed profitability and diversity of income sources; managed cash flow, expense, and income data; created budgets; devised and implemented procedures to increase administrative efficiency; implemented new accounting system with minimal disruption to workflow.

As Project Administrator, coordinated implementation of software features; identified opportunities for future development; monitored problem resolution; wrote and coordinated production of a user's manual and questionnaires; edited technical proposals and a business plan.

EDUCATION

University of Massachusetts, Amherst, MA
Master of Public Administration, 2002

Rutgers University, New Brunswick, NJ
Bachelor of Arts in Economics, 1995

Syracuse University, Syracuse, NY, 1994

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California Public Utilities Commission (Application Nos. 19-11-003, 19-11-004, 19-11-005, 19-11-006, 19-11-007): Comments of The Utility Reform Network on the Energy Division Staff Proposal and Utility Applications. On behalf of The Utility Reform Network. July 24, 2020.

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New York Public Service Commission (Cases 19-E-0065 and 19-G-0066): Direct testimony of Tim Woolf and Alice Napoleon regarding energy efficiency targets and incentives in Con Edison rate case. On behalf of the Natural Resources Defense Council. May 24, 2019.

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State of New Jersey Board of Public Utilities (Docket No. GR11070425): Direct testimony of Robert Fagan regarding New Jersey Natural Gas Company's petition for approval of the extension of the SAVEGREEN energy efficiency programs. On behalf of the New Jersey Division of the Ratepayer Advocate. November 16, 2011.

State of New Jersey Board of Public Utilities (Docket No. GR10030225): Direct testimony of David Nichols regarding New Jersey Natural Gas Company's Proposed Energy Efficiency Program. On behalf of New Jersey Division of the Ratepayer Advocate. July 9, 2010.

Virginia State Corporation Commission (Case No. PUE-2009-00097): Direct testimony of William Steinhurst regarding Appalachian Power Company's Integrated Resource Plan filing pursuant to Va. Code

§ 56-597 et seq. On behalf of the Southern Environmental Law Center, Chesapeake Climate Action Network, Appalachian Voices, and the Virginia Chapter of The Sierra Club. March 23, 2010.

Delaware Public Service Commission (Docket No. 07-20): Jointly authored an expert report, with Robert Fagan, William Steinhurst, David White, and Kenji Takahashi, In the Matter of Integrated Resource Planning for the Provision of Standard Offer Service by Delmarva Power & Light Company Under 26 DEL. C. §1007 (c) & (d). On behalf of the Staff of Delaware Public Service Commission. April 2, 2009.

State of New Jersey Board of Public Utilities (BPU Docket EM05020106): Direct and surrebuttal testimony of Bruce Biewald, Robert Fagan, and David Schlissel regarding the Joint Petition Of Public Service Electric and Gas Company And Exelon Corporation For Approval of a Change in Control Of Public Service Electric and Gas Company And Related Authorizations. On behalf of New Jersey Division of the Ratepayer Advocate. November 14, 2005 and December 27, 2005.

Illinois Commerce Commission (Dockets 05-0160, 05-0161, 05-0162): Direct testimony of William Steinhurst regarding Ameren’s proposed competitive procurement auction (CPA). On behalf of Illinois Citizens Utility Board. June 15, 2005 and August 10, 2005.

Illinois Commerce Commission (Docket 05-0159): Direct testimony of William Steinhurst regarding Commonwealth Edison’s Proposal to implement a competitive procurement process. On behalf of Illinois Citizens Utility Board and Cook County State’s Attorney’s Office. June 8, 2005 and August 3, 2005.

Resume updated January 2021



Courtney Lane, Senior Associate

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PROFESSIONAL EXPERIENCE

Synapse Energy Economics, Inc., Cambridge, MA. *Senior Associate*, November 2019 – Present.

Provides consulting and researching services on a wide range of issues related to the electric industry including performance-based regulation, benefit-cost assessment, rate and bill impacts, and wholesale electric retail markets. Develops expert witness testimony in public utility commission proceedings.

National Grid, Waltham, MA. *Growth Management Lead, New England*, May 2019 – November 2019, *Lead Analyst for Rhode Island Policy and Evaluation*, June 2013 – April 2019.

- Portfolio management of product verticals including energy efficiency, demand response, solar, storage, distributed gas resources, and electric transportation, to optimize growth and customer offerings.
- Strategy lead for the Performance Incentive Mechanisms (PIMs) working group.
- Worked with internal and external stakeholders and led the development of National Grid's Annual and Three-Year Energy Efficiency Plans and System Reliability Procurement Plans for the state of Rhode Island.
- Represented energy efficiency and demand response within the company at various Rhode Island grid modernization proceedings.
- Led the Rhode Island Energy Efficiency Collaborative; a group focused on reaching consensus regarding energy efficiency plans and policy issues for demand-side resources in Rhode Island.
- Managed evaluations of National Grid's residential energy efficiency programs in Rhode Island, and benefit-cost models to screen energy efficiency measures.

Citizens for Pennsylvania's Future, Philadelphia, PA. *Senior Energy Policy Analyst*, 2005–2013.

- Played a vital role in several legislative victories in Pennsylvania, including passage of energy conservation legislation that requires utilities to reduce overall and peak demand for electricity (2009); passage of the \$650 million Alternative Energy Investment Act (2008); and important amendments to the Alternative Energy Portfolio Standards law vital to the development of solar energy in Pennsylvania (2007).
- Performed market research and industry investigation on emerging energy resources including wind, solar, energy efficiency and demand response.
- Planned, facilitated and participated in wind energy advocates training meetings, annual partners retreat with members of wind and solar companies, and the PennFuture annual clean energy conference.

Northeast Energy Efficiency Partnerships, Inc., Lexington, MA. *Research and Policy Analyst*, 2004–2005.

- Drafted comments and testimony on various state regulatory and legislative actions pertaining to energy efficiency.
- Tracked energy efficiency initiatives set forth in various state climate change action plans, and federal and state energy regulatory developments and requirements.
- Participated in Regional Greenhouse Gas Initiative (RGGI) stakeholder meetings.
- Analyzed cost-effectiveness of various initiatives within the organization.

Massachusetts Executive Office of Environmental Affairs, Boston, MA. *Field Projects Extern*, 2003.

- Worked for the Director of Water and Watersheds at the EOE, examining the risks and benefits of different groundwater recharge techniques and policies throughout the U.S.
- Presented a final report to both Sea Change and the EOE with findings and policy recommendations for the state.

EnviroBusiness, Inc., Cambridge, MA. *Environmental Scientist*, July 2000 – May 2001

- Conducted pre-acquisition assessments/due diligence assignments for properties throughout New England. Environmental assessments included an analysis of historic properties, wetlands, endangered species habitat, floodplains, and other areas of environmental concern and the possible impacts of cellular installations on these sensitive areas.
- Prepared and managed NEPA reviews and Environmental Assessments for telecommunications sites.

SKILLS

Software: SPSS, Arcview GIS, Access, Dreamweaver, Front Page, Microsoft Excel, Word, Power Point

EDUCATION

Tufts University, Medford, MA

Master of Arts; Environmental Policy and Planning, 2004.

Colgate University, Hamilton, NY

Bachelor of Arts; Environmental Geography, 2000, *cum laude*.

TESTIMONY

Public Service Commission of Maryland (Case No. 9645): Direct and Surrebuttal Testimony of Courtney Lane regarding the Application of Baltimore Gas and Electric Company for an Electric and Gas Multi-Year Plan. On behalf of the Maryland Office of People's Counsel. August 14, 2020 and October 7, 2020.

Public Service Commission of the District of Columbia (Formal Case No. 1156): Supplemental Testimony of Courtney Lane regarding the Application of Potomac Electric Power Company for Authority to Implement a Multiyear Rate Plan for Electric Distribution Service in the District of Columbia. On behalf of the District of Columbia Government. July 27, 2020.

Public Service Commission of the District of Columbia (Formal Case No. 1156): Direct, Rebuttal, and Surrebuttal Testimony of Courtney Lane regarding the Application of Potomac Electric Power Company for Authority to Implement a Multiyear Rate Plan for Electric Distribution Service in the District of Columbia. On behalf of the District of Columbia Government. March 6, 2020, April 8, 2020, and June 1, 2020.

Rhode Island Public Utilities Commission (Docket No. 4888): Oral testimony of Courtney Lane regarding the Narragansett Electric Co. d/b/a National Grid - 2019 Energy Efficiency Program (EEP). On behalf of National Grid. December 11, 2018.

Rhode Island Public Utilities Commission (Docket No. 4889): Oral testimony of Courtney Lane regarding the Narragansett Electric Co. d/b/a National Grid - 2019 System Reliability Procurement Report (SRP). On behalf of National Grid. December 10, 2018.

Rhode Island Public Utilities Commission (Docket No. 4755): Oral testimony of Courtney Lane regarding the Narragansett Electric Co. d/b/a National Grid - 2018 Energy Efficiency Program (EEP). On behalf of National Grid. December 13, 2017.

Rhode Island Public Utilities Commission (Docket No. 4684): Oral testimony of Courtney Lane regarding the RI Energy Efficiency and Resource Management Council (EERMC) Proposed Energy Efficiency Savings Targets for National Grid's Energy Efficiency and System Reliability Procurement for the Period 2018-2020 Pursuant to §39-1-27.7. On behalf of National Grid. March 7, 2017.

Rhode Island Public Utilities Commission (Docket No. 4684): Oral testimony of Courtney Lane regarding National Grid's 2018-2020 Energy Efficiency and System Reliability Procurement Plan. On behalf of National Grid. October 25, 2017.

Rhode Island Public Utilities Commission (Docket No. 4654): Oral testimony of Courtney Lane regarding the Narragansett Electric Co. d/b/a National Grid - 2017 Energy Efficiency Program Plan (EPPP) for Electric & Gas. On behalf of National Grid. December 8, 2016.

Rhode Island Public Utilities Commission (Docket No. 4580): Oral testimony of Courtney Lane regarding the Narragansett Electric Co. d/b/a National Grid - 2016 Energy Efficiency Program Plan (EPPP) for Electric & Gas. On behalf of National Grid. December 2, 2015.

Pennsylvania Public Utility Commission (Docket No. P-2012-2320369): Direct testimony of Courtney Lane regarding the Petition of PPL Electric Utilities Corporation for an Evidentiary Hearing on the Energy Efficiency Benchmarks Established for the Period June 1, 2013 through May 31, 2016. On behalf of PennFuture. October, 19, 2012.

Pennsylvania Public Utility Commission (Docket No. P-2012-2320334): Direct testimony of Courtney Lane regarding the Petition of PECO Energy for an Evidentiary Hearing on the Energy Efficiency Benchmarks Established for the Period June 1, 2013 through May 31, 2016. On behalf of PennFuture. September 20, 2012.

Pennsylvania Public Utility Commission (Docket No. I-2011-2237952): Oral testimony of Courtney Lane regarding the Commission's Investigation of Pennsylvania's Retail Electricity Markets. On behalf of PennFuture. March 21, 2012.

Committee on the Environment Council of the City of Philadelphia (Bill No. 110829): Oral testimony of Courtney Lane regarding building permitting fees for solar energy projects. On behalf of PennFuture. December 5, 2011.

Pennsylvania Public Utility Commission (Docket No. M-00061984): Oral testimony of Courtney Lane regarding the En Banc Hearing on Alternative Energy, Energy Conservation, and Demand Side Response. On behalf of PennFuture. November 19, 2008.

PRESENTATIONS

Lane, C. 2019. "The RI Test." Presentation for AESP Webinar: Emerging Valuation Approaches in Cost-Effectiveness and IRPs, October 31, 2019.

Lane, C., A. Flanders. 2017. "National Grid Rhode Island: Piloting Wireless Alternatives: Forging a Successful Program in Difficult Circumstances." Presentation at the 35th Annual Peak Load Management Association (PLMA) Conference, Nashville, TN, April 4, 2017.

Lane, C. 2013. "Regional Renewable Energy Policy Update." Presentation at the Globalcon Conference, Philadelphia, PA, March 6, 2013.

Lane, C. 2012. "Act 129 and Beyond." Presentation at the ACI Mid-Atlantic Home Performance Conference, October 1, 2012.

Lane, C. 2012. "Act 129: Taking Energy Efficiency to the Next Level." Presentation at the Energypath Conference, June 28, 2012.

Lane, C. 2011. "Pennsylvania's Model Wind Ordinance." Presentation at Harvesting Wind Energy on the Delmarva Peninsula, September 14, 2011.

Lane, C. 2011. "Electric Retail Competition and the AEPS." Presentation at the Villanova Law Forum, November 4, 2011.

Lane, C. 2009. "Act 129: Growing the Energy Conservation Market." Presentation at the Western Chester County Chamber of Commerce, March 25, 2009.

PUBLICATIONS

Chang, M., J. Frost, C. Lane, S. Letendre, PhD. 2020. *The Fixed Resource Requirement Alternative to PJM's Capacity Market: A Guide for State Decision-Making*. Synapse Energy Economics for the State Energy & Environmental Impact Center at the NYU School of Law.

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PPL Electric Utilities Corporation
Response to Interrogatories of the
Natural Resources Defense Council (NRDC), Set I
Date December 31, 2020
Docket No. M-2020-3020824

- Q. NRDC-I-9. Refer to PPL's statement on page 41 of the EE&C Plan "PPL Electric Utilities is also considering offering an enhanced bonus incentive to customers who install a comprehensive package of measures."
- a. Please explain in detail the enhanced bonus incentive for a comprehensive package of measures, including but not limited to the formula for determining the incentive.
 - b. What types of measures would a comprehensive package of measures include?
 - c. Has PPL analyzed the costs and benefits, including but not limited to GHG emission reductions, of such a bonus incentive? If so, please provide the results of this analysis, and describe all associated inputs, assumptions, and sources.
- A. NRDC-I-9.
- a. The Comprehensive Retrofit Bonus Incentive is offered in two tiers:
 - Tier 1 – Customers who opt to have at least two "major measures" installed are eligible for a \$250 rebate on top of measure-specific rebates.
 - Tier 2 – Customers who opt to have three or more "major measures" installed are eligible for a \$350 rebate on top of measure-specific rebates.
 - At least one installed measure must be a shell measure (Insulation or Air sealing)

- b. Comprehensive package measures include:
- HVAC:
 - ENERGY STAR Air Source Heat Pump
 - ENERGY STAR Central Air Conditioner
 - Ductless Mini-split Heat Pump installed
 - Domestic Hot Water:
 - Heat Pump Water Heater
 - Shell Measures:
 - Air Sealing
 - Ceiling Insulation
 - Exterior Wall Insulation
 - Basement Wall Insulation
 - Floor Insulation
- c. The Company has not performed a formal cost-benefit analysis of the Comprehensive Retrofit Bonus Incentive as an independent measure. The bonus incentive would be provided in relation to the implementation of multiple measures that are offered individually under the Energy Efficient Homes component. Therefore, any formal cost-benefit analysis depends on knowing the specific set of measures being implemented by the customer. Moreover, with regard to comprehensive programs and measures, the Commission specifically “decline[d] to adopt a requirement for measure-level TRC test screening” and stated that “the EDC will be required to report program-level cost efficiency test ratios but not at the measure level.” *Energy Efficiency and Conservation Program*, Docket No. M-2020-3015228, p. 24 (Implementation Order entered June 18, 2020) (“*Phase IV Implementation Order*”). Notwithstanding, the costs of the Comprehensive Retrofit Bonus Incentive are listed above in response to subpart (a). The benefits of the Comprehensive Retrofit Bonus Incentive are that it will encourage customers to take a more comprehensive approach to energy efficiency

and conservation, resulting in deeper savings. The Commission itself recognized the benefits of comprehensive measures in its *Phase IV Implementation Order*. See *id.* at pp. 22-24.