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BOARD OF PUBLIC UTILITIES TRENTON, NJ

March 21, 2019

via overnight mail and email Aida Camacho-Welch, Secretary New Jersey Board of Public Utilities 44 South Clinton Avenue, 3rd Floor, Suite 314 P.O. Box 350 Trenton, NJ 08625-0350

 Re: I/M/O Petition of Public Service Electric & Gas Company for Approval of Its Clean Energy Future-Energy Efficiency ("CEF-EE") Program on a Regulated Basis
Presiding Officer: Commissioner Solomon
BPU Docket Nos. GO18101112 & EO18101113

Dear Secretary Camacho-Welch:

We represent Interveners Environment New Jersey ("ENJ"), Sierra Club ("SC"), Environmental Defense Fund ("EDF"), New Jersey League of Conservation Voters ("NJ LCV"), and Natural Resources Defense Council ("NRDC") in this matter. Attached please find the Direct Testimony of Amanda Levin.

We will send one original and six copies by overnight mail and serve all parties on the Service List electronically.

Respectfully Submitted,

Aaron Kleinbaum, Esq. Daniel Greenhouse, Esq. Eastern Environmental Law Center

c: *via* email, with attachments Service List

In the Matter of the Petition of Public Service Electric and Gas Company for Approval of its Clean Energy Future – Energy Efficiency ("CEF-EE") Program on a Regulated Basis

BPU Docket Nos. GO18101112 & EO18101113

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In the Matter of the Petition of Public Service Electric and Gas Company for Approval of its Clean Energy Future – Energy Efficiency ("CEF-EE") Program on a Regulated Basis

STATE OF NEW JERSEY BOARD OF PUBLIC UTILITIES

DIVISION OF ENERGY AND OFFICE OF CLEAN ENERGY

COMMISSIONER SOLOMON

BPU DOCKET NOS GO18101112 & EO10121113

DIRECT TESTIMONY OF AMANDA LEVIN ON BEHALF OF INTERVENERS, ENVIRONMENT NEW JERSEY, ENVIRONMENTAL DEFENSE FUND, SIERRA CLUB, NEW JERSEY LEAGUE OF CONSERVATION VOTERS, AND NATURAL RESOURCES DEFENSE COUNCIL

March 22, 2019

I. INTRODUCTION AND QUALIFICATIONS

Q. Please state your name, affiliation and business address.

My name is Amanda Levin. I am a Policy Analyst for the Natural Resources Defense Council.
My business address is 1152 15th Street NW, Suite 300, Washington, DC, 20005.

Q. On whose behalf are you testifying in this proceeding?

A. I am testifying on behalf of Environment New Jersey ("ENJ"), Environmental Defense Fund ("EDF"), Sierra Club ("SC"), New Jersey League of Conservation Voters ("NJLCV") and the Natural Resources Defense Council ("NRDC").

ENJ, founded in 2006, is one of the State's largest nonprofit, citizen-based advocacy organizations. The state offices are in Trenton and New Brunswick. ENJ's political arm is a project of Environment America, Inc. which is a national network of state-based environmental advocacy organizations, representing more than a million citizen activists and members across the country. In New Jersey, there are more than 20,000 dues-paying citizen members of ENJ, primarily in North and Central Jersey, a majority of them in the service area of PSE&G.

EDF is a national nonprofit membership organization that links science, economics, and law to create innovative, equitable, and cost-effective solutions to society's most urgent environmental problems. EDF has more than 421,000 members nationwide, including more than 13,000 in New Jersey and many in PSE&G's New Jersey service territory.

NRDC is a global nonprofit membership organization that combines the power of more than three million members and online activists with the expertise of some 750 scientists, lawyers, and policy advocates across the globe to ensure the rights of all people to the air, the water, and

the wild. NRDC has more than 410,000 dues-paying members globally, including more 12,000 in New Jersey and many in PSE&G's New Jersey service territory.

Sierra Club is the nation's oldest and largest grassroots environmental organization, with more than 20,000 members in New Jersey. Sierra Club is dedicated to exploring, enjoying, and protecting the wild places of the Earth; to practicing and promoting the responsible use of the Earth's resources and ecosystems; to educating and enlisting humanity to protect and restore the quality of the natural and human environment; and to using all lawful means to carry out these objectives.

NJLCV, founded in 2010, is a leading environmental group in New Jersey. It is the state affiliate of the League of Conservation Voters, located in Washington DC, whose environmental work spans the past four decades. NJLCV's offices are in Trenton and Princeton and it has nearly 12,000 subscribers, many of whom live in PSE&G's service territory.

Q. Please summarize your education, relevant employment experience and other professional qualifications.

A. My professional and educational background is provided in detail in the attached Exhibit 1 that is incorporated herein by reference.

In my current position at NRDC, I focus on analysis and advocacy around carbon and energy policies, decarbonization strategies, energy efficiency, renewables integration, and wholesale market reform. As part of my role, I serve as an expert witness for NRDC and partner organizations in front of state utility commissions, legislatures, and federal agencies on issues related to utility regulation, rate design, and utility resource planning.

I have served, or am currently serving as, an expert witness in proceedings in front of the

Washington Utilities and Transportation Commission, Idaho Public Utilities Commission, New Mexico Public Regulatory Commission, New Jersey Board of Public Utilities, and Montana Public Service Commission. I have previously testified on issues related to utility disincentives to pursue energy efficiency, including alternative mechanisms to address these disincentives such as decoupling and more limited lost revenue adjustment mechanisms.

My research on electric restructuring, alternative utility business model design, and industrial energy efficiency program design have also been published in a variety of academic press and journals. (See Exhibit 1).

Q. Have you previously testified before the New Jersey Board of Public Utilities?

A. I filed testimony on behalf of EDF and NRDC in BPU Docket Nos. ER18010029 and GR18010030 (Petition of Public Service Electric and Gas Company for Approval of an Increase in Electric and Gas Rates and for Changes in the Tariffs for Electric and Gas Service).

Q. What is the purpose of your direct testimony in this proceeding?

A. My testimony will address four topics. First, Section III of my testimony will explain my support for PSE&G's request to implement a full decoupling mechanism, known as the Green Enabling Mechanism (GEM). Section IV of my testimony will discuss the importance of mitigating the impact of the energy efficiency rider and related riders, like GEM, on low-income customers. I will also provide recommendations to ensure the impacts from this filing are minimized for these customers. Section V of my testimony will discuss potential revisions to the Company's costeffectiveness screening tests, including the addition of a Resource Value Test in future EE filings and other best practices PSE&G should follow when applying cost-effectiveness screening tests. Lastly, Section VI will provide comments on a number of PSE&G's pilot programs designed to create more transparent and effective pilots. This section will also include a few suggestions on

potential measures to be considered, based largely upon programs adopted in neighboring states.

II. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Q. Please summarize your conclusions and recommendations.

A. First, I support the approval of a decoupling mechanism for PSE&G, which is called a Green Enabling Mechanism ("GEM") in this proceeding. Decoupling – or breaking the link between a utility's sales and revenue – will be an essential element of meeting the targets laid out by PSE&G in this Clean Energy Filling (CEF). In my testimony, I also recommend that the Company, in consultation with Board Staff and interested stakeholders, undertake and fund a third-party audit after GEM has been in place for 3 or 4 years. This audit would allow the utility, Board, and stakeholders to understand and measure the impacts of GEM on customers, clean energy procurement, the utility's finances, and utility operations, among other things, once there is sufficient data on the mechanism.

Second, I discuss concerns on the potential impact energy efficiency riders and/or revenue adjustment mechanisms (like GEM) may have on low-income consumers. This stems from a concern that low-income customers face greater barriers to participating in energy efficiency programs or otherwise have less ability to respond to price signals - cutting or shifting consumption – to reduce energy bills if rates increase. Luckily, there are several steps that can be taken to mitigate these potential impacts. I detail a number that PSE&G has already included in this filing, as well as provide a few additional recommendations.

I offer two recommendations related to the design of PSE&G's income eligible program: (1) lower the eligibility for the income eligible program to be in line with the more common levels used to denote "moderate" income, specifically either 250 or 300 percent of the FPL and (2) use oil-to-electric conversions as an efficacy measure, in place of its "oil-to-gas-

conversions" measure. I also list recommended elements to be included in PSE&G's Evaluation, Measurement, and Verification (EM&V) reporting for both its income eligible and multi-family programs, including asking PSE&G to set participation goals for LMI sub-sectors and report and track participation rates of low-income and moderate-income households separately in its EM&V reporting for its income eligible program.

Third, I describe the Resource Value Framework, the principles that underpin it, and how and why the Board and PSE&G could implement this framework in their own cost-effectiveness screening. I also provide additional recommendations on how PSE&G could incorporate "hard-toquantify" benefits into their screening tests (RVT, Societal Cost Test, or otherwise), like including a "low-income societal benefits adder," as a proxy for the fact that low income customers see greater benefits from the same efficiency improvements than a household with a lesser energy burden.

Lastly, I make a number of recommendations to enhance and strengthen the company's proposed pilots. Broadly, many of the pilots, as detailed in the CEF, identify important needs and opportunities, but suffer from a lack of transparency and few opportunities for engagement and review from stakeholders. I provide several recommendations to create a more open, collaborative, and transparent process from start to finish. I also include a few more specific recommendations on individual pilots, raising additional measures or technologies that should be explicitly noted and considered during the development phase. This includes studying the use of cold-climate heat pumps and heat pump water heaters as load-shifting/demand response resources in the Emerging Technologies & Approaches pilot and considering the use of electric vehicles (and vehicle-to-grid integration) and electric water heaters as part of the Non-Wires Alternatives pilot.

III. PSE&G'S GREEN ENABLING MECHANISM

Q. Do you support PSE&G's Green Enabling Mechanism?

- A. Yes. I support PSE&G's Green Enabling Mechanism (GEM).
- Q. Why are mechanisms such as PSE&G's GEM necessary in order for a utility to fully promote all cost-effective demand-side measures, including energy efficiency and other distributed energy resources?
- A. Under the current rate structure, PSE&G would see a reduction in both the Company's recovery of authorized fixed costs and shareholder welfare if it were to pursue the company's 22 efficiency subprograms identified in this filing. Energy experts, the New Jersey Legislature, and the Company itself have identified this loss of fixed cost recovery as a potent disincentive to the development of energy efficiency programs.¹ It is called the "throughput incentive"², where traditional "cost-of-service" regulation motivates a utility to increase sales and resist efforts that would decrease sales. This is because a utility currently recovers much of its authorized costs, including those that are fixed in the shorter period like capital investments through the energy (kWh) charge. If sales decrease, a utility's profit and actual ROE decreases, and if sales increase, profit and ROE increases. PSE&G has estimated that the programs, and anticipated savings, identified in this filing would result in a loss of \$901 million in revenue for the utility between 2019 and 2024.³ Annual impacts in 2024 would amount to \$164

¹ See P.L.2018, c.17, pg. 16 (hereinafter referred to as "Clean Energy Act of 2018"). This Act requires all utilities to submit an annual petition seeking recovery of, among other things, "the revenue impact of sales losses resulting from implementation of ... energy efficiency and peak demand reduction schedules..."; Regulatory Assistance Project (hereafter referred to as RAP), "Revenue Regulation and Decoupling: A Guide to Theory and Application", April 2011.

² As an example, See Sedano, Richard,, "Addressing the Throughput Incentive and Digging into Decoupling", Presentation on behalf of RAP, March 3, 2016, Pennsylvania PUC En Banc Session in Docket M-2015-2518883, Harrisburg, PA, http://www.puc.state.pa.us/General/pdf/EnBanc/ARM_EnB_030316-RAP_PPT.pdf

³ See Response to Discovery Request RCR-POL-0009

million.⁴

It is important to note that decoupling is just one element or "leg" to support the implementation of a successful utility efficiency portfolio. Decoupling does not provide the utility with an incentive to pursue additional or all cost-effective efficiency, it just eliminates the disincentive a utility has to pursue cost-effective measures.⁵ Ideally, a suite of policies or mechanisms should be implemented, with mechanisms (e.g. decoupling) that both remove the financial disincentive for PSE&G to pursue energy efficiency measures, as well as offer financial incentives for the utility to pursue greater or all cost-effective energy savings.⁶

With this filing, PSE&G has proposed to vastly increase the size and scope of energy efficiency in its territory. This filing would significantly increase savings, from 0.4 percent of retail sales currently to 1.8 percent annual incremental sales by 2024.⁷ This is equivalent to an additional savings of 570,826 MWh a year in 2024 (compared to anticipated savings in 2019), or enough to power 81,000 households in PSE&G's territory annually.⁸ The utility has also proposed several innovative pilots to better understand new technologies and push the boundaries of efficiency offerings in the state for the future. More can, and should, be done to achieve the 2 percent target incorporated in New Jersey's "Clean Energy Act of 2018", but the programs in this filing are a strong and serious effort from PSE&G to meet these legislative objectives. The GEM proposal is a complementary and essential piece in allowing PSE&G to pursue this expanded, strengthened efficiency portfolio over the next several years.

Q. Are the existing perverse incentives limited to energy efficiency?

⁴ Id.

⁵ See Response to Discovery Request RCR-DEC-0016.

⁶ Maggie Molina and Marty Kushler, "Policies Matter: Creating a Foundation for an Energy-Efficient Utility of the Future", June 2015, ACEEE White Paper, <u>http://aceee.org/sites/default/files/policies-matter.pdf</u>

⁷ Direct Testimony of Karen Reif, Clean Energy Future Energy Efficiency Program Plan, pg. 3 of 224

⁸ Id.; U.S. EIA, Form 861M, with data for December 2018. <u>https://www.eia.gov/electricity/data/eia861m/</u>

A. No. In the last few years, a number of customer-sided technologies have become more affordable and widespread. Like energy efficiency investments, a utility also has a disincentive, or otherwise perverse incentive, under a traditional "cost-of-service" approach to promote or help customers invest in these newer, "behind-the-meter" clean technologies such as distributed generation (DG).

Much like energy efficiency investments, DG – most notably rooftop solar – can also significantly reduce a utility's sales. DG has become a much more common and desirable customer option over the last few years, thanks to technology cost declines and utility, state, and federal incentives to boost local renewable development. The U.S. Energy Information Administration estimates that over 40,000 customers in PSE&G's territory are net metered customers, with almost 6,850 customers added in 2018.⁹ Five years ago, only 12,500 customers in PSE&G's territory had net metered on-site generation. In 2018, these small-scale solar facilities produced more than 1.9 TWh of energy in New Jersey, equal to 2.5 percent of the state's retail sales.¹⁰

Under a cost-of-service regime, each kWh of distributed solar that is used by a home is a kWh sale lost. And with additional state and commission policies, such as net-metering, the utility may face an even more significant financial penalty and disincentive from increasing DG deployment within their territory. Mechanisms that address the "throughput incentive" historically associated with energy efficiency can also address a utility's disincentive to promote or help customers invest in DG. In fact, several decoupled utilities have explicitly noted that decoupling mechanisms have allowed them to be more amenable to and accepting of

⁹ U.S. EIA, Form 861M, with data for December 2018. <u>https://www.eia.gov/electricity/data/eia861m/</u> ¹⁰ See U.S. EIA, "*Electric Power Monthly* with Data for December 2018", February 2019. <u>https://www.eia.gov/electricity/monthly/</u>.

the growing number of DG applications and installations in their territories.¹¹

These newer technologies also provide another compelling reason to break the link between a utility's financial health and sales. Advanced metering technology - coupled with the development of "smart" or grid-enabled, internet-connected appliances – and distributed energy resources provide customers with significantly more control over their energy consumption and supply. These energy technologies and the ubiquity of other internet technologies has also changed customers' expectations from their utilities. Selling electricity and providing reliable service is no longer enough; customers want good customer-centric service and control of their usage, bills, and electricity supply.¹² Utilities must change to meet this new reality. Breaking the link between sales and a utility's profit is a small but vital first step; doing so will allow PSE&G to adopt a business model based on providing energy products and services tailored to meet customer needs while maintaining a reliable grid. PSE&G's filing in this docket is a clear step towards this more customer-centric, technology-forward approach.

Q. Do you have any recommendations on PSE&G's GEM?

A. Yes. While not necessary for the successful implementation of PSE&G's mechanism, I believe the recommendation below would address many concerns that parties frequently raise about decoupling, including some of the concerns raised by other intervening parties in past dockets in front of the BPU. I recommend the Board:

https://www.bizjournals.com/denver/news/2017/06/20/changing-how-coloradans-pay-forelectricity.html. See also the Direct Testimony of Alice K. Jackson, Submitted July 13 in Proceeding 16A-0546E, in front of the Colorado Public Utilities Commission; Puget Sound Energy's Third-Year Decoupling Report in WUTC Docket UE-170033/170034, Direct Testimony and Exhibits of Jon A. Piliaris, Exhibit No. (JAP-29).

¹¹ See, "Steve Wishart, Xcel's manager of pricing and planning, 'Like any other business, the more sales we get, the more revenue we get. If we break that link, we can embrace things like energy efficiency and rooftop solar — which decrease our sales. Those things are great things, and our customers love them, but we lose revenue",

¹² As an example, *See* GreentechMedia, "Utilities 'Need to Be More' Than Electricity Providers, Entergy and ComEd Execs Declare," February 6, 2019, <u>https://www.greentechmedia.com/amp/article/utilities-need-to-be-more-than-electricity-providers-entergy-and-comed-exec?</u> twitter impression=true.

• Require PSE&G, in consultation with Board Staff and interested stakeholders, to undertake and fund a third-party audit after GEM has been in place for 3 or 4 years. The third-party audit would review the impacts of GEM on customers, including special focus on sub-classes of specific interest, and the utility's financial and efficiency program performance, among other things. This would help inform the Board, stakeholders, and the utility on the impacts of and possible improvements to the GEM in the future.

Q. Why do you recommend that the Board require a third-party audit of GEM following an initial period of time?

A. Parties in the past docket on GEM raised questions on the impact of decoupling on consumers, the utility and the utility's cost of capital. Recent decoupling orders have required utility-funded third-party audits of decoupling mechanisms following an initial period to address such concerns. For example, the Washington Utilities and Transportation Commission (WUTC), as a condition of decoupling, has required all three investor-owned utilities to complete a third-party audit following the third year of the initial decoupling mechanism.¹³ For Puget Sound Energy – the first electric utility in Washington to receive approval for decoupling – this third-party audit was of significant value when the utility, stakeholders, and the WUTC were deciding whether to approve the continuation of the utility's decoupling rider and any adjustments for future years. The results of this audit and later orders on Puget's decoupling mechanism will be discussed in more detail in following sections of this testimony.

The Board should direct PSE&G to convene interested stakeholders to advise on the development of study criteria and questions, as well as the hiring of the third-party auditor, and the Board or Board Staff should oversee the audit process. The audit can either be funded through

¹³ For example, *See* WUTC Filing UE-121697, Order 07 and the Amended Petition for Decoupling Mechanisms on behalf of Puget Sound Energy, Inc., and NW Energy Coalition.

general rates with a cap on allowable study costs¹⁴ or funded by the utility's shareholders.

The audit should study the impact of decoupling on: consumer bills, disaggregating between energy efficiency program participants and non-participants, with a separate focus on low-income customers; utility efficiency performance; utility cost control incentives; customer service; and the utility's cost of capital, among other things.

IV. MITIGATING IMPACTS ON LOW-INCOME CONSUMERS

Q. Please explain what impacts this filing may have on low-income consumers, specifically.

A. Some parties, both in New Jersey as well as in other states, have expressed concern that energy efficiency riders and/or revenue adjustment mechanisms (like GEM) may have a negative impact on customer bills and energy affordability, especially for low-income consumers. This stems from a concern that these low-income customers face greater barriers to participating in energy efficiency programs or otherwise have less ability to respond to price signals - cutting or shifting consumption – to reduce energy bills if rates increase. Luckily, these concerns can be and have been successfully addressed by regulators in other states, including in New Jersey.¹⁵

First, it is well-documented that low-income households live in less efficient housing and devote a greater proportion of their income to utility bills than do higher-income households.¹⁶ In New Jersey, those making less than 30 percent of the median state household income spend 18

¹⁴ For example, a cap of \$150,000 was established in the initial PSE docket. See Amended Petition for Decoupling Mechanisms on behalf of Puget Sound Energy, Inc., and NW Energy Coalition.

¹⁵ For example, NJ Natural Gas's mechanism that was first approved in 2006 includes an annual shareholder funding commitment for energy conservation, in addition to a number of other ratepayer-protection elements. As another example, New Hampshire's Public Utilities Commission approved a settlement in 2016, which (1) approved Lost Revenue Adjustment Mechanisms (& decoupling after the initial LRAM pilot ends) (2) established state-wide energy efficiency standards and (3) increased the minimum low-income share of the overall energy efficiency budget from 15.5% to 17%. *See* State of New Hampshire Public Utilities Commission, Energy Efficiency Resource Standard Order Approving Settlement Agreement, Order No. 25,932, entered August 2, 2016.

¹⁶ Drehobl, Ariel, and Lauren Ross. "Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low-Income and Underserved Communities," ACEEE Report u1602, April 20, 2016 <u>https://aceee.org/research-</u>report/u1602.

percent (if owners) and 11 percent (if renters) on energy expenditures, according to federal data.¹⁷ Those making the median state household income or greater spend just 1-2 percent of income on energy. Energy efficiency can help address many of the underlying factors that contribute to a high energy burden by helping homeowners, multifamily building owners, and tenants replace inefficient, old appliances and improve the efficiency of the building's shell (like leaky windows and doors or poor insulation).

At the same time, however, low-income customers face numerous barriers to participation in efficiency programs. One such barrier would be the "principle-agent" problem. Low-income customers may rent, rather than own, their homes. While they may pay for their electricity and gas service, they are likely not making large appliance purchasing decisions. Instead, the landlord likely makes this decision, and the landlord (who doesn't pay the utility bills) likely chooses less efficient, but lower upfront cost, appliances and is not incentivized to fix drafty homes. Credit constraints can be another barrier to participation for these customers.

This makes well-designed, specifically targeted efficiency programs for low-income customers an important consideration for utility portfolios. If not, low-income customers – who are already bear large energy burdens – may face higher rates (due to the inclusion of energy efficiency related riders) without the bill savings from reducing their own energy waste. It should be noted that even those who don't participate in energy efficiency programs will see benefits from energy efficiency.¹⁸ This includes lower energy prices (due to reductions in energy demand across the system, especially in peak times), avoided costs of new transmission and distribution investments (e.g. from the Non-Wires and Non-Pipes Solutions pilots), reduced environmental

¹⁷ U.S Data. Gov, Low-Income Energy Affordability Data (LEAD) Tool, <u>https://catalog.data.gov/dataset/clean-energy-for-low-income-communities-accelerator-energy-data-profiles-2fffb</u>

¹⁸ American Council for an Energy Efficient Council, "Why everyone benefits from energy efficiency programs," https://aceee.org/blog/2015/06/why-everyone-benefits-energy

compliance costs, and public benefits from reductions in air pollution. However, parties may be concerned that these non-participant benefits will not outweigh the rate impacts from the energy efficiency related riders in this filing.

Q. What steps have and can PSE&G take to mitigate potential rate impacts on these lowincome customers?

A. There are a number of steps a utility can take to mitigate potential rate impacts from energy efficiency-related riders, including those related to both program costs and lost revenues associated with savings (including those recovered through a broader mechanism, like GEM). This includes measures taken that: reduce the probability of large, single rate increases; increase participation of low-income and multi-family in energy efficiency programs; increase funding for low-income programs, including both energy efficiency and bill assistance programs; and monitoring of the performance and impacts of these mechanisms/programs on low-income customers.

PSE&G's filing includes a number of elements that should mitigate or protect low-income customers from facing net costs from the programs identified in the CEF. First, the filing includes a number of targeted programs for low-income and multi-family customers.¹⁹ These programs are designed to directly tackle the various obstacles to participation noted above. In PSE&G's Residential Multi-Family and Income Eligible sub-programs, the company has included specific marketing and product offerings designed to address landlord/tenant dynamics, customer awareness, and credit constraints. For example, in the Multi-family program, the company has noted that a key element of the implementation strategy will be "targeted outreach to property

¹⁹ PSE&G notes in its' filing that "This CEF-FF program offer savings opportunities across PSE&G's customer base, with special emphasis on the hardest to reach sectors: low-income and multi-family customers, and small business, local government, and not-for-profit commercial customers. Pg 4 of Clean Energy Future Energy Efficiency Program Plan, Direct Testimony of Karen Reif.

owners," including one-on-one meetings and participation in association events; this program will also make it easier for interested property owners and tenants to take advantage of services, offering participants the ability to schedule direct, in-unit installation and making in-unit HVAC tune-ups free for owners and tenants.²⁰ The Income Eligible program will be marketed to both tenants and landlords, and include coordinated outreach and marketing to churches, community organizations, and other local non-profits to increase customer awareness (and hopefully uptake).²¹ The utility is also proposing to offer on-bill financing options, which – if designed appropriately - can be useful for customers with credit constraints.²² These program design elements should encourage greater participation from low-income customers, and greater savings from these more vulnerable communities.

Second, the utility has included elements in its Green Enabling Mechanism (GEM) to protect customers from significant rate impacts due to the operation of the mechanism. This includes the use of a "soft" rate cap, where excess surcharges are capped and unrecovered balances are allowed to roll-over into future years. A "soft" cap is essential to allow the mechanism to serve its primary purpose, which is to eliminate financial disincentives associated with PSE&G efforts to reduce electricity consumption, while preventing customers from experiencing large rate shocks and rate volatility. PSE&G's proposed cap of 6.5 percent of distribution charges is appropriate and in line with many of the caps set in other proceedings across the country.

Q. What evidence is there on the customer impact of a revenue decoupling mechanism, like GEM?

 ²⁰ See page 28-29 of Clean Energy Future Energy Efficiency Program Plan, Direct Testimony of Karen Reif.
²¹ Id. Pg. 32.
²² See Henderson, Philip, "On-Bill Financing: Overview and Key Considerations for Program Design," NRDC Issue Brief, July 2013.

A. The evidence has shown that decoupling mechanisms, generally, have had little to no discernable negative impact on energy affordability for customers. An exhaustive review of a decade of decoupling experience in the U.S., including more than 1,200 decoupling-related rate adjustments, found that most adjustments (85 percent for electric) were within "a percentage point or two either up or down." ²³ In the study, "a percentage point or two" amounted to less than 7.5 cents per day for the average electric customer.²⁴ Evidence from other jurisdictions have shown that these resulting, small adjustments have had no discernable impact on a customer's conservation behaviors.

As part of Puget Sound Energy's (PSE) electric and natural gas decoupling settlement (UE-121697 and UG-121705), PSE agreed to fund third-party evaluations of PSE's decoupling mechanism over the initial program period. These evaluations reviewed the overall impacts of the decoupling rider on consumers, on low-income consumers specifically (defined as bill-assisted consumers), and on conservation program performance. PSE completed both a second- and third-year evaluation, which both came to similar conclusions.²⁵ Pertinent findings related to customer, and customer service, impacts include:

- The size of decoupling adjustments was small small enough to not noticeably impact customer incentives to conserve energy.
- There was no significant difference in decoupling impacts (as a % impact on bills) for low-income residential consumers and non-bill assisted residential consumers.²⁶

²³ Morgan, P. (2012). A decade of decoupling for US energy utilities: Rate impacts, designs, and observations. Graceful Systems LLC. <u>http://aceee.org/files/pdf/collaborative-reports/decade-of-decoupling.pdf</u>

²⁴ See Morgan, p. (2012). Pg. 3.

²⁵ See Puget Sound Energy's Third-Year Decoupling Report in WUTC Docket UE-170033/170034, Direct Testimony and Exhibits of Jon A. Piliaris, Exhibit No. ____ (JAP-29); WUTC Docket UE-121697, "Second Year Evaluation of PSE's electric and gas decoupling mechanisms, on behalf of Puget Sound Energy, from Ken Johnson"

²⁶ Puget Sound Energy's Third-Year Decoupling Report in WUTC Docket UE-170033/170034, Direct Testimony and Exhibits of Jon A. Piliaris, Exhibit No. ____ (JAP-29), pg. 60-65.

- The evaluators found no evidence of adverse impacts on customer service or on the utility's incentives to control costs or on operational efficiency. In fact, PSE's annual average increase in O&M costs has declined when compared to the historical growth rate.²⁷
- The third-party evaluator did not find any conclusive evidence to suggest that the decoupling mechanism has any adverse effects, building off the earlier finding that "decoupling for the [first] two years studied is, in a word, harmless"²⁸ and "without a downside."²⁹

As part of my testimony on PSE&G's proposed Green Enabling Mechanism, I have recommended that the Board require PSE&G to undertake a similar study of its own after a few years of the mechanism being in place. This would provide the Board, PSE&G, and interested stakeholders with better, utility-specific information on cost impacts of the GEM on low-income consumers in PSE&G's territory.

Q. Do you have any recommendations for the Board to further mitigate potential impacts on low-income customers?

A. Yes. I have two recommendations related to design elements of PSE&G's income eligible program and one recommendation related to PSE&G's Evaluation, Measurement, and Verification (EM&V) reporting for both its income eligible and multi-family programs. I have full confidence that PSE&G's GEM proposal and EE filing in this docket would be of net benefit for all of its' customers. However, these recommendations would provide additional assurance that

²⁷ *Id.* see pg. 21.

²⁸ See WUTC Docket UE-121697, "Second Year Evaluation of PSE's electric and gas decoupling mechanisms, on behalf of Puget Sound Energy, from Ken Johnson," pg. 110.

²⁹ See WUTC Docket UE-121697, "Second Year Evaluation of PSE's electric and gas decoupling mechanisms, on behalf of Puget Sound Energy, from Ken Johnson", pg. 8.

these programs deliver the anticipated savings and services identified in the filing.

Q. What is your recommendation related to EM&V for these low-income and multi-family programs?

- A. As a note, there is a possibility that the company's planned EM&V reporting would include this proposed element; the EM&V requirements, as detailed in the filing, did not provide enough detail to determine this.³⁰ With that note, the Board should require PSE&G, as part of its annual EM&V reporting for the Residential Multi-Family and Income Eligible programs to:
 - (1) report actual participation and savings,
 - (2) compare actual participants and savings to projected participants and savings (as noted in Table 13 and 15 of the Clean Energy Future Energy Efficiency Program Plan),
 - (3) provide an explanation/rationale to the extent feasible for any discrepancies between the actual and projected outcomes, and
 - (4) lay out corrective steps, if actual participation and savings are lower than projections, to be taken during the next program year to improve program outcomes.

Q. What are your additional recommendations for the income eligible program?

A. I have some concerns with the eligible income limits, as proposed by PSE&G. While I applaud PSE&G for its effort to increase its ability to serve vulnerable population by increasing spending and eligibility limits, expanding LMI services to earners as high as 400 percent of the federal

³⁰ I will also note that the Clean Energy Act included language specifying that an EM&V stakeholder process must determine the EM&V. "The board shall establish a stakeholder process to evaluate the economically achievable energy efficiency and peak demand reduction requirements, rate adjustments, quantitative performance indicators, and the process for evaluating, measuring, and verifying energy usage reductions and peak demand reductions by the public utilities. As part of the stakeholder process, the board shall establish an independent advisory group to study the evaluation, measurement, and verification process for energy efficiency and peak demand reduction programs, which shall include representatives from the public utilities, the Division of Rate Counsel, and environmental and consumer organizations, to provide recommendations to the board for improvements to the programs." See

https://www.state.nj.us/bpu/pdf/publicnotice/Energy%20Efficiency%20public%20notice%201-22-19.pdf.

poverty level may have the unintended consequence of shifting efficiency improvements and bill savings away from those that need it most. I also recognize that the inclusion of moderate-income customers is important given the relatively high cost of living in the state, and given that moderate income customers often have a higher than average energy burden but do not qualify for federal efficiency assistance. To that end, I suggest a few alterations intended to allow for a more expansive LMI program, while still ensuring that those with the lowest incomes receive sufficient funding and support.

As some background, there are a number of differences between low- and moderate income households. Across all income brackets, the lower the income, the higher the probability of living in an older home.³¹ This means low-income households tend to live in older buildings than moderate-income who tend to live in older buildings than high-income households. In addition, low-income households are also more likely to be renters, rather than owners.³² Low-income households are the only income bracket to be majority renters. As a result, when broken down into subcategories of below poverty, poverty to low-income, and low-to-moderate income, those below poverty can have energy burdens four times higher than those in the highest brackets of the LMI category.³³

In addition, PSE&G's proposed income eligibility is significantly higher than most other programs. According to an ACEEE analysis, the most common eligibility levels under 200 percent of the federal poverty line (FPL) for low income and between 200-250 percent of the FPL for moderate income. The State and Local Energy Efficiency Action Network has used a slightly

³¹ "Energy Efficiency Financing for Low- and Moderate-Income Households: Current State of the Market, Issues, and Opportunities," State and Local Energy Efficiency Action Network, August 2017. https://emp.lbl.gov/sites/default/files/news/lmi-final0811.pdf.

¹² Id.

³³ "Report on Alternative Approaches to Providing Low and Moderate Income (LMI) Clean Energy Services," New York Clean Energy Advisory Council (CEAC) LMI Clean Energy Initiatives Working Group, Feb 3, 2017.

higher bound for moderate income, of between 200 – 300 percent of the FPL.³⁴

I am putting forward two suggestions that could help address this potential unintended shift of resources. First, would be to lower the eligibility for the income eligible program to be in line with the more common levels used to denote "moderate" income, specifically either 250 or 300 percent of the FPL. Second, having PSE&G commit to setting participation goals for LMI sub-sectors and reporting aggregated income data of participants in its annual EM&V to track participation rates of low-income and moderate-income households separately.

Lastly, I would also suggest PSE&G add oil-to-electric conversions as an option, in place of its "oil-to-gas-conversions" measure noted in the description for the Company's income eligible program.³⁵

V. A CASE FOR ADOPTING A RESOURCE VALUE FRAMEWORK

Q. What is a Resource Value Framework (RVF)?

- A. The Resource Value Framework (RVF) was developed by the National Efficiency Screening Project (NESP) in 2014.³⁶ It is a framework of principles and recommendations to provide guidance for states to develop and implement tests and designed to "provide each state with the flexibility to ensure that the test they use meets their state's distinct needs and interests, as provided in relevant energy policies and regulatory orders." These principles include:
 - a. *Efficiency as a Resource*. EE should be compared with other energy resources (both supply- and demand-side) in a consistent and comprehensive manner.
 - b. Applicable Policy Goals. Screens should account for the energy and other applicable

³⁴ "Energy Efficiency Financing for Low- and Moderate-Income Households: Current State of the Market, Issues, and Opportunities," State and Local Energy Efficiency Action Network, August 2017. https://emp.lbl.gov/sites/default/files/news/lmi-final0811.pdf

³⁵ See pg. 32 of Clean Energy Future Energy Efficiency Program Plan, Direct Testimony of Karen Reif.

³⁶ National Efficiency Screening Project, The Resource Value Framework: Reforming Energy Efficiency Cost-Effectiveness Screening, August 2014.

policy goals of the state. This could include state and/or local energy plans, renewable and energy efficiency standards, climate change goals, low-income objectives, environmental protections and regulations, etc.

- c. *Hard-to-Quantify Benefits*. Screening should not exclude relevant benefits because they are difficult to quantify or monetize. Using best-available information, proxies, alternative thresholds, or qualitative considerations to approximate hard□to□monetize impacts is preferable to assuming those costs and benefits do not exist or have no value.
- d. *Symmetry*. Tests should be applied symmetrically, where both relevant costs and relevant benefits are included.
- e. *Forward-Looking*. Analysis of EE impacts should be forward-looking, capturing the difference in costs and benefits that would occur over the life of efficiency measures and those that would occur absent efficiency investments.
- f. *Transparency*. Program administrators should use a standard template to explicitly identify state energy goals and document assumptions and methodologies.

Q. How would the Board implement RVF?

- A. RFV is conducted via a series of seven steps:
 - 1. Identify and articulate the applicable policy goals, including those set by legislation, regulatory orders, other regulations, and advisory board decisions.
 - 2. Lay out and include all utility system costs and benefits.
 - 3. Decide what non-utility impacts should be included in the primary effectiveness screen (e.g. participant impacts such as reduced bills, increased comfort, increased health & safety, increased productivity, property improvements; additional impacts on low-income participants such as reduced foreclosures, reduced need to move/relocate due to unpaid

bills, or poverty alleviation; non-utility fuel impacts; water impacts; environmental impacts; public health impacts; economic development and jobs; energy security).

- 4. Ensure the test is symmetrical, considering all relevant costs and benefits.
- 5. Ensure the analysis has a forward-looking scope and only considers incremental impacts.
- 6. Develop transparent methodologies, with opportunity for input, to account for all relevant impacts (as determined in steps 2 & 3).
- 7. Present the inputs and results of the cost-effectiveness test in a transparent, open manner.

Q. Where has the RVF been used?

A. RVF has been used in Minnesota in a report funded by a grant from MN Department of Commerce. The report described how the framework could be applied to cost-effectiveness analysis for energy efficiency in Minnesota and makes recommendations based on MN policy. The State of Rhode Island has also directed the distribution company to develop a RI costeffectiveness test that is guided by the RVF principles.³⁷

Q. Why do you support RVF?

A. The consideration of non-energy benefits and applicable policy will be essential to develop successful energy efficiency programs that meet the needs of residents, the Board's objectives, and broader state energy goals. Given the recent passage of the Clean Energy Act, the Governor's announced intention for New Jersey to re-join the Regional Greenhouse Gas Initiative, and the scope and technologies considered in PSE&G's Clean Energy Fillings, the Board should move to develop policy-aligned cost-effectiveness tests that are symmetrical, transparent, and fully consider the harder-to-quantify benefits of efficiency. Achieving the goals encapsulated in state

³⁷ State Of Rhode Island and Providence Plantations Public Utilities Commission, re: The Narragansett Electric Company d/b/a National Grid Annual Energy Efficiency Plan For 2019, Settlement Of The Parties, Docket 4888, Submitted October 15, 2018, <u>http://www.ripuc.org/eventsactions/docket/4888-NGrid-EEPP2019(10-15-18).pdf</u>

policies, like the Global Warming Response Act, New Jersey Energy Master Plan, and Clean Energy Act, will require the Board and state utilities to value environmental externalities of criteria pollutants and greenhouse gases (including without limitation carbon dioxide and methane), peak-shaving benefits (kilowatts, not just kilowatt-hours), and the development of a local clean energy economy, for example.

Q. Are you proposing the Board consider additional revisions to its effectiveness tests?

A. Yes. The recommendation I propose here could be applicable for the Company's existing Total Resource Cost Test (TRC) and Societal Cost Test (SCT), or a Resource Value Test (RVT) (as determined through a Resource Value Framework process).

I recommend including a "low-income societal benefits adder," which serves as a proxy to account for the fact that there are benefits associated with serving low income customers that are greater than the benefits the same efficiency improvements might provide a household with a lesser energy burden. High energy burdens and poor housing quality contribute to health problems: poorly heated or cooled homes contribute to asthma, respiratory problems, heart disease, arthritis, and rheumatism. These healthcare costs are often at least partially borne by the state directly, and moreover reduce the productivity of the workforce at large. Additionally, when LMI households cannot pay their energy bills, it increases rates for everyone; carefully crafted energy efficiency programs can serve as an effective vehicle to put money back in the pockets of those who need it most, while lowering costs for all ratepayers.

Special attention should be paid in the development of methods for cost-effectiveness screening to account for these harder-to-quantify benefits. One such approach, taken by a number of states like Washington, Colorado, and Vermont, is to include a multiplier on the calculated

benefits from LMI programs.³⁸ For example, in Colorado, *low-income program* benefits included in the test calculations are increased by 20 percent "to reflect the higher level of non-energy benefits likely to accrue from DSM services to low-income customers."³⁹ The State of Vermont has taken a similar, if not more holistic, approach for its own cost-benefit analyses. The state implements the SCT with both a 15% non-energy impact (NEI) adder and a 15% low income adder.⁴⁰

I recommend that the Board require PSE&G to incorporate these "adders" in future effectiveness screening tests so that no relevant benefits of energy efficiency programs are excluded on the grounds that they are difficult to quantify or monetize. The ultimate value of such adders could be determined in a transparent process with interested stakeholders. Including such a component can help ensure that investment is directed to disadvantaged customers that are often more expensive to serve and help meet the Board's objectives to promote energy affordability and energy access.

Q. Do you have any other comments?

A. Yes. If PSE&G does not adopt or the BPU does not require PSE&G to adopt a Resource Value Test, then I recommend that PSE&G use the SCT⁴¹ as the primary method for evaluating its energy efficiency programs.

VI. COMMENTS ON PSE&G'S PILOT PROGRAMS

Q. Please summarize your recommendations in this section.

 ³⁸ ACEEE, Supporting Low-Income Energy Efficiency: A Guide for Utility Regulators, <u>https://aceee.org/sector/state-policy/toolkit/supporting-low-income</u>.
³⁹ Public Utilities Commission of the State of Colorado, DOCKET NO. 07A-420E, Decision No. C08-0560, "Order Granting

 ³⁹ Public Utilities Commission of the State of Colorado, DOCKET NO. 07A-420E, Decision No. C08-0560, "Order Granting Application in Part," Adopted May 23, 2008.
⁴⁰ NEEP, Non-Energy Impacts Approaches and Values: an Examination of the Northeast, Mid-Atlantic, and Beyond, June

⁴⁰ NEEP, Non-Energy Impacts Approaches and Values: an Examination of the Northeast, Mid-Atlantic, and Beyond, June 2017, <u>https://neep.org/sites/default/files/resources/NEI%20Final%20Report%20for%20NH%20updated%2010.4.17.pdf</u>

⁴¹ PSE&G has noted that it used the SCT as the primary test in this filing. See pg. 8 -9 of the Clean Energy Future Energy Efficiency Program Plan, Direct Testimony of Karen Reif.

A. I make a number of recommendations to enhance and strengthen the company's proposed pilots. Broadly, many of the pilots, as detailed in the CEF, identify important needs and opportunities, but suffer from a lack of transparency and few opportunities for engagement and review from stakeholders. This includes both transparency and input in the development of the pilots - such as defining pilot objectives, targets, and technological strategies – and transparency in the review and evaluation of these pilots after implementation. I provide a number of recommendations to create a more open, collaborative, and transparent process from start to finish.

I also provide a few more specific recommendations on individual pilots, raising additional measures or technologies that should be explicitly noted and considered during the development phase. This includes studying the use of cold-climate heat pumps and heat pump water heaters as load-shifting/demand response resources in the Emerging Technologies & Approaches pilot and considering the use of electric vehicles (and vehicle-to-grid integration) and electric water heaters as part of the Non-Wires Alternatives pilot.

- Q. Why should the Board and PSE&G implement measures to increase transparency and allow for more engagement during the development, implementation, and review of pilot programs?
- A. First, I want to commend PSE&G for proposing these seven pilot programs. These pilots reflect innovative and highly advanced approaches to energy efficiency and grid management. These programs have a huge potential to transform the way the utility and customers think about energy efficiency, such as a: active alternative to traditional transmission & distribution investments; risk-reduction strategy and service for larger companies; and holistic, whole-building (or even whole-community) measure.

It is precisely because these programs hold so much potential that PSE&G should increase

transparency and provide for greater collaboration, engagement, and feedback from other parties throughout the pilot process. This would better ensure that these pilot programs are designed in a way that identifies the appropriate problems, considers the full suite of solutions and measures, meets the needs of stakeholders, and asks the right questions during the evaluation process.

Q. What steps could PSE&G take to create a more open, transparent process?

A. There are several steps PSE&G could take. On the front-end, PSE&G should reach out and work with Board Staff, Rate Counsel, and other interested stakeholders to provide feedback on proposed pilot design, selection of contractors, and proposed technology and marketing approaches to be implemented. PSE&G has incorporated this broader, front-end engagement into one of its pilots, the Emerging Technologies and Approaches (ETA) pilot. As shown in Table 31 of PSE&G's Clean Energy Future Energy Efficiency Program Plan, a key ETA pilot collaborator is the Stakeholder Advisory Committee with key responsibilities of: participating in meetings and providing feedback on materials; providing input on pilot training needs, outreach plans, likely market acceptance, potential market barriers; and sharing additional research. PSE&G should incorporate and explicitly establish responsibilities for similar advisory groups for its other pilots.

As an example of where and how this could be incorporated, let's consider PSE&G's Non-Wires Alternatives (NWA) and Non-Pipes Solutions (NPS) pilots. The current proposal notes a number of actions PSE&G will take prior to fully implementing the pilots, including: selecting contractors, conducting site identification and feasibility analysis, defining target zone(s), defining necessary demand reductions required to defer infrastructure upgrades, and designing the most "cost-effective and creative plan to achieve desired demand reductions within the target zone(s)." The proposal does not discuss any opportunities for stakeholders to advise and provide feedback at these junctures or for market participants to shape solutions and compete to minimize costs. I

believe that the pilot would be improved if PSE&G explicitly built in time and formal opportunities for stakeholders to review and offer suggestions, especially on the definition and metrics for determining a "target zone" and on a *draft* plan for achieving the necessary demand reductions through the pilots, and if PSE&G used market solicitations to select contractors and determine the work that the contractors would perform.

PSE&G should also provide for a more collaborative and open process at the tail-end of the pilot programs. The description of evaluation, measurement, and verification (EM&V) provided for the proposed pilots is vague. Each pilot only notes "PSE&G will implement a robust EM&V process and impact evaluation to assess customer satisfaction, lessons learned, energy savings, and financial efficiencies that are realized. This process may ultimately contribute to the development and design of a full scale *[insert pilot name here]* Subprogram offering." It is unclear what the EM&V process will look like, who and to what extent non-utility participants will be involved, what questions will be asked and metrics studied, or what the ultimate form and structure of the evaluation will be.

PSE&G should use the EM&V process as another opportunity for stakeholder collaboration and engagement. At the start, during the development of the pilot design and plan (which would be done in an open process with opportunity for stakeholder input), PSE&G should also set the process for the EM&V analysis. This would be done in consultation with stakeholders, and where applicable, facilitators/contractors. Parties would establish expectations for the EM&V process (e.g. areas and timing of input and feedback), the key purposes and questions to be answered for each pilot, the format and scope of the final EM&V product, and specific metrics and impacts to be studied. This list is not exhaustive, but intended to highlight important elements for the EM&V process that should be determined by PSE&G and stakeholders during the development of the pilot.

Q. Do you have other recommendations on PSE&G's proposed pilots?

A. Yes. These recommendations are narrower, focusing on additional technologies and measures that should be considered during the development of the pilot designs. A collaborative approach, where PSE&G seeks input on the measures, outreach plans, and pilot design would likely identify these or other measures not currently noted in the pilot descriptions.

First, in the ETA pilot, PSE&G should consider and study the potential of using heat pump water heaters and cold climate heat pumps as a demand response, or load-shifting, resource. PSE&G notes both of these technologies as "examples of previous technologies (and technologies currently in ETA)," though it is unclear if either or both of these technologies are currently considered as eligible technologies in the ETA. Nonetheless, focusing specifically on the potential role and value of these highly-efficient options as load-shifting or demand-augmenting resources is a new and important area of study. Sonoma Clean Power, in California, has recently implemented a grid-integrated heat pump water heating pilot program for residential customers. This is part of the "lead locally" initiative⁴², in partnership with the California Energy Commission, to develop strategies to double the energy efficiency of the community's existing buildings through the "installation of promising emerging technologies (including heat pump water heaters, advanced air-source "mini-split" heat pumps and phase change ceiling panels).²⁴³

Second, in its NWA pilot, PSE&G should also consider the potential of electric vehicles as distributed energy resources. The NWA pilot already includes energy storage, both in-front-of and behind-the meter, as a possible technology. Recent battery storage pilots, such as those by

⁴² <u>https://sonomacleanpower.org/programs/lead-locally</u>

⁴³ California Energy Commission, GRANT REQUEST FORM for Agreement EPC-17-041 with Sonoma Clean Power Authority, <u>https://www.energy.ca.gov/business_meetings/2018_packets/2018-04-11/Item_12a_EPC-17-041.pdf</u>

Vermont's Green Mountain Power and New Hampshire's Liberty Utilities, have shown that these behind-the-meter storage technologies can produce significant demand, cost, and emissions savings.⁴⁴ However, electric vehicles can potentially be used similarly to reduce peak demand or otherwise provide energy during peak times. For example, ConEd implemented a grid resiliency pilot using electric school buses in 2018.⁴⁵ This pilot used electricity stored in batteries on electric-powered school buses during the peak summer month periods, when the buses were not taking students to classes. ConEd could get 75 kilowatts of power during the summer months from five buses, charging the batteries at times when demand for power is low and then discharging the power onto the grid when demand is high. PSE&G should include electric vehicles, both passenger vehicles and buses, as potential NWA measures available when designing a plan to achieve necessary demand reductions in target zones. If these distributed storage and energy resources are found to be reliable, effective measures in the NWA pilot, PSE&G should consider filing stand-alone programs/pilots for battery storage and electric vehicle charging in the future, as the utilities referenced above have.

VII. <u>CONCLUSION</u>

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

⁴⁴ See Trabish, Herman, "New Hampshire settlement moves 'cutting-edge' utility BTM storage pilot forward," <u>https://www.utilitydive.com/news/new-hampshire-settlement-moves-cutting-edge-utility-btm-storage-pilot-for/542866/;</u> Green Mountain Power, "GMP Customers Keep Lights on With Stored Low Carbon Energy During Storm Outages", Press Release, December 2018, <u>https://greenmountainpower.com/news/gmp-customers-keep-lights-on-with-stored-low-carbonenergy-during-storm-outages/</u>

⁴⁵ <u>https://www.coned.com/en/about-con-edison/media/news/20180619/electricity-from-school-bus-batteries-will-support-con-edison-grid-reliability</u>

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Exhibit 1: Qualifications of Amanda Levin

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CURRENT POSITION

Policy Analyst, Climate & Clean Energy, Natural Resources Defense Council, 2014 – Present

- Serve as lead analyst for NRDC's Climate & Clean Energy Eastern Advocacy. Develop, conduct, and oversee energy-related modeling, analysis, and research for NRDC's state advocates in the Northeast, Mid-Atlantic, and Southeast.
- Represent NRDC and partner organizations in front of state regulatory and legislative bodies, including utility commissions and environmental/air quality agencies. Submit both written and oral testimony, assist with the development of legal briefs, and serve as an expert resource and witness. Areas of expertise include utility rate design and regulatory process, cost-of-service study development, alternative rate mechanisms, the valuation of distributed energy resources, retail choice, and non-traditional utility regulatory models.
- Publish research, modeling, and other analyses related to economy-wide decarbonization strategy and clean energy policy, including issues related to building, vehicle, and industrial electrification, industrial efficiency programs and energy management, and renewable energy grid integration.
- Serve as a policy analyst on federal energy issues, including development of modeling platforms and analytical tools and preparation of policy briefs on federal regulations and policies.

EDUCATION

Stanford University, 2010 – 2014, Stanford, CA

MA in Public Policy, Concentration: Resources, Environment, and Energy

Relevant coursework: Natural Resource and Energy Economics; Environmental Economics; Advanced Econometrics; Energy and Environmental Policy Analysis; Introduction to American Law; Environmental Law.

BA in Public Policy, Minor in Biology, Concentration: Environmental Policy

Relevant coursework: Econometrics; Macroeconomics; Microeconomics; Statistics; Politics and Public Policy; Organizations; Organic Chemistry; Biology and Climate Change.

PUBLICATIONS

Levin, A and Cavanagh, R. NRDC's Sixth Annual Energy Report: America's Climate Crossroads: Pushing Clean Energy Higher and Faster. *NRDC Report R-18-10-A*. 2018.

Levin, A and Cavanagh, R. NRDC's Fifth Annual Energy Report: America's Clean Energy Revolution. *NRDC Report R-17-09-A*. 2017.

Gowrishankar, V and Levin, A. America's Clean Energy Frontier: The Pathway to a Safer Climate Future. *NRDC Report R-16-06-A*. 2017.

Goldstein, D and Levin, A. The Strategic Value of SEM in Limiting Climate Pollution. *ACEEE Summer* Study on Energy Efficiency in Industry. 2017.

Levin, A, Carlisle, G and Benzak, J. Opportunity Lost: How Rolling Back the Clean Power Plan Hurts America's Economy. *Environmental Entrepreneurs*. 2017.

Levin, A and Cavanagh, R. Rehabilitating Retail Markets: Pitfalls and Opportunities. In: *Future of the Utility: Utilities of the Future*. Ed. Sioshansi, F. Menlo Park: Academic Press, 2016.

Williams, S, Gowrishankar, V, and Levin, A. Stemming the Tide of Industrial Opt-Outs: A Flexible, Attractive and Effective Option for Utility-Sponsored Industrial Energy Efficiency. *ACEEE Summer Study on Energy Efficiency in Industry*. 2015.

Levin, A. Customer Incentives and Potential Customer Savings in Retail Markets: A Texas Case Study. *The Electricity Journal*. 2015; 28(3): 51-64.

Sheikh, P, Stern, C, and Levin, A. Overview of Management and Restoration Activities in Lake Tahoe Basin. *Congressional Research Service*, *R43224*. released September 13, 2013.

Sheikh, P, Stern, C, and Levin, A. Overview of Management and Restoration Efforts in the Salton Sea. *Congressional Research Service*, *R43211*. released September 5, 2013.

EXPERT TESTIMONY AND PRESENTATIONS

<u>Northwestern Energy, MT PSC Docket No. D2018.2.12</u>: Testimony detailing a fixed cost recovery mechanism pilot and accompanying conditions for consideration and approval on behalf of Human Resource Council, District XI, and the Natural Resources Defense Council, 2019.

Pembina Institute, 2018 Alberta Climate Summit: "The Future of Natural Gas in a Decarbonizing World," session panelist, September 2018.

<u>"Securing A Clean Energy Future: Just Transition & Equity Considerations,</u>": Invited talk hosted by the Climate Calgary Hub, Canadian Association of Physicians for the Environment, Climate Action Network Canada, and the Alberta Wilderness Association, September 2018.

<u>Electric Power Research Institute, Electrification 2018: International Conference & Expo:</u> "Country-Level Electrification Analysis," session panelist, August 2018.

<u>Public Service of New Mexico, PRC Docket 18-00043-UT:</u> Testimony supporting the approval of a decoupling mechanism and the need for a disincentive removal mechanism for PNM on behalf of the New Mexico Coalition for Clean Affordable Energy (CCAE), 2018.

<u>Public Service Electric & Gas, BPU Docket ER18010029 & GR18010030</u>: Testimony supporting a Green Enabling Mechanism on behalf of Natural Resources Defense Council & Environmental Defense Fund, 2018.

Idaho Power, Idaho PUC Case No. IPC-E-I7-13: Testimony opposing Idaho Power's application to create new customer classes for residential and general service customers who have customer-side generation on behalf of the Northwest Energy Coalition and Snake River Alliance, 2017-2018.

<u>Stanford University, "When Science is Not Enough: How Leading NGOs are Making Progress on</u> <u>Climate Policy":</u> Panelist on behalf of NRDC, February 2018.

Maryland Office of the Attorney General, Hearing on the Repeal of the Clean Power Plan: Testimony concerning the EPA's proposed repeal of the Clean Power Plan on behalf of the Natural Resources Defense Council (NRDC), January 2018.

<u>Puget Sound Energy, WUTC Docket No. UE-170033 and UG-170034</u>: Testimony supporting the continuation of the Company's decoupling mechanism and in opposition to the company's requested increase to the basic customer charge on behalf of the Northwest Energy Coalition, Renewable Northwest, and NRDC, 2017.

New York University, Environmental Law Clinic, "Meeting Carbon Reduction Goals – Persuading <u>Different Audiences</u>": Guest instructor, with co-author Vignesh Gowrishankar, on *America's Clean Energy Frontier: The Pathway to a Safer Climate Future*, November 2017.

<u>Nevada Governor's Office of Energy, Committee on Electric Choice:</u> Presentation to the Technical Working Group on Innovation, Technology, & Renewable Energy, "Renewable Standards: Clean Energy Development & Other Impacts," August 2017.

ADDITIONAL INFORMATION

Skills: R, STATA, Excel, ArcGIS, Microsoft Office, Data Analysis. Experience with power sector modeling (IPM, AuroraXMP, PROMOD, WIS:DOM), economy-wide energy modeling (PATHWAYS, NEMS), economic and jobs modeling (REMI, JEDI, IMPLAN).