April 7, 2025

Secretary Rosemary Chiavetta
Pennsylvania Public Utility Commission
400 North Street
Harrisburg, PA 17120

Re: Docket No. M-2025-3052826 – Act 129 Phase V Energy Efficiency & Conservation (EE&C) Implementation Order

Dear Secretary Chiavetta:

Advanced Energy United submits for filing the attached comments in response to the Tentative Implementation Order issued on February 20, 2025.

Respectfully submitted,

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Introduction

Advanced Energy United ("United") appreciates the opportunity to provide comments in response to the February 20, 2025, Tentative Implementation Order ("Tentative Order") regarding Phase V of Act 129 programs. United is a national association of businesses that works to accelerate the move to 100% clean energy and electrified transportation in the U.S. The term advanced energy encompasses a broad range of products and services that constitute the best available technologies for meeting our energy needs today and tomorrow. These include electric vehicles ("EVs"), energy efficiency, demand response ("DR"), energy storage, solar, wind, hydro, nuclear, heat pumps (air- and ground-sourced), and smart grid technologies. United represents more than 100 companies in the $374 billion U.S. advanced energy industry, which employs 4.1 million U.S. workers and 141,700 in Pennsylvania.

The Pennsylvania Public Utility Commission's ("Commission") proceeding to implement Phase V programs comes at a time when questions on affordability and reliability are at the front-of-mind of regulators, elected officials, and ratepayers across the country. Many regions are facing a future energy landscape where resource adequacy is at risk, generally driven by similar factors: accelerating load growth due to new manufacturing, data centers, and electrification; a shifting resource mix with older resources retiring; and a grid that has been underinvested for decades. With PJM projecting 2030 summer demand to be roughly 16,000 MW higher in its 2025 load forecast than it was in its 2024 load forecast,[1] this proceeding represents a critical opportunity to pursue programs and technologies that reduce peak demand, avoid capacity and transmission costs, and deliver savings for consumers. We offer the following comments with the goal of maximizing the program budgets and providing benefits to a diverse set of consumers.

[1] PJM Interconnection, L.L.C., "2025 Preliminary PJM Load Forecast" (Dec. 9, 2024), *available at* https://www.pjm.com/-/media/DotCom/committees-groups/subcommittees/las/2024/20241209/20241209-item-03---2025-preliminary-pjm-load-forecast.pdf, at 40.

Supporting Demand Response

United supports the return of DR programs in Phase V.[2] DR has great potential to directly contribute to Pennsylvania's peak load reduction needs. It is important to create robust, stable, and attractive DR programs to ensure benefits for the state of Pennsylvania and value for all ratepayers. In support of this goal, we offer a few suggestions to maximize the impact of these programs.

1. **Strengthen peak load reduction targets.**

United encourages the establishment of strong peak load reduction targets to help Pennsylvania maintain resource adequacy and drive significant capacity savings throughout the state. DR programs are a proven and cost-effective means of driving peak load reduction, and a wide variety of distributed energy resources ("DERs") can be leveraged for this purpose. We are pleased to see the Commission re-exploring the role that smart thermostats, EVs, behind-the-meter ("BTM") batteries, and commercial and industrial ("C&I") customers can play in the Phase V programs.

United believes that the peak reduction targets included in the Tentative Order can and should be strengthened. Specifically, based on the extensive experience with smart thermostat programs across the country, smart thermostat programs, especially those enabling DR, have been proven to drive significantly more kW per device savings in the summer than is assumed in the Statewide Evaluator ("SWE") Phase V Demand Response Potential Study[3] ("DR Potential Study"). This is supported by official measurement and Verification ("M&V") reports of the ex-post results of summer peak shaving programs. For example:

- The Connected Solutions program in Massachusetts sees an average of 0.78kW per participant in its Residential DR program, which has nearly 100,000 smart thermostats enrolled state-wide (based on the evaluated results from the 2023 program season, the

[2] DR programs were excluded from Phase IV after the Commission decided to meet Phase IV peak demand reduction targets with coincident demand reductions from EE measures.

[3] Demand Side Analytics *et al.*, *Phase V Demand Response Potential Study*, February 2025, *available at* https://www.puc.pa.gov/pcdocs/1867287.pdf ("Phase V Demand Response Potential Study").

latest available).[4] This program is dispatched specifically to reduce the Installed Capacity Requirement ("ICR") in ISO-NE via reductions in peak demand.

- Con Edison in New York runs a smart thermostat program that is similar to the statewide Commercial System Relief Program ("CSRP") and Distribution Load Relief Program ("DLRP") that are dispatched to reduce peak load on Con Edison's system. The evaluated reports from 2023 and 2024 show savings of 0.59 - 0.82 kW per device on average with approximately 30 event calls annually.[5] The lowest kW per device in any event from 2024 was 0.40 kW per device. Since participants typically have multiple smart thermostats in their household, on a per participant basis (i.e., apples-to-apples with the DR Potential Study), these savings are even higher, likely by approximately 20% if using a conservative assumption of 1.2 thermostats per household.

As expanded upon below, an event-based smart thermostat program could deliver up to 3 times the kW per device savings assumed by the DR Potential Study, which would significantly reduce the assumed acquisition costs. Using a revised assumption of 0.75 kW per smart thermostat under a RAP scenario in an event-based program, **United estimates that the peak load reduction target could be cost-effectively increased by more than 50 MW.** This is in addition to the peak load reductions that are possible under a daily load shifting program.

Event-based behavioral demand response ("BDR") programs have also proven to be successful in Pennsylvania[6] and are able to reach additional customers beyond those that adopt thermostats or other devices. These programs use behavioral messaging, with or

[4] *See* 2023 Annual Results, Electric Statewide Summary, *available at* https://ma-eeac.org/results-reporting/.

[5] New York Public Service Commission, *Consolidated Edison Company of New York, Inc. Report on Program Performance and Cost Effectiveness of Demand Response Programs – 2024,* Nov. 15, 2024, at 27. *Available at* https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7bA0823193-0000-CF35-9D6D-AF830F3A8CC7%7d.

[6] Metropolitan Edison Company, Penn Power, and West Penn Power all offered a BDR program in Act 129 Phase III and had a combined PY12 participation of 281,928 individual accounts. *See* SWE Annual Report: Act 129 Phase III and Program Year 12 (March 31, 2022) at 86-90, *available at* https://www.puc.pa.gov/pcdocs/1746475.pdf.

without a financial incentive, to influence customer action and drive peak reduction without devices.[7] BDR is a good alternative for customers who cannot or do not wish to adopt new devices, including renters and those who do not qualify for assistance but for whom it is still cost-prohibitive. These BDR programs should be considered alongside device-based programs to broaden participation and provide more options for demand reduction.

2. **The kW per participant assumptions for summer load shed from connected thermostat programs will be different for daily optimization vs event-based dispatch.**

Table 51 from the DR Potential Study[8] outlines the RAP and MAP assumptions for the kW savings that each participant in a connected thermostat program can deliver in the Summer and Winter seasons. For the Summer season, the DR Potential Study assumes an average seasonal load relief per participant of 0.16-0.22 (RAP/MAP) kW. For the Winter season, the DR Potential Study assumes an average seasonal load relief per participant of 0.54-0.72 (RAP/MAP) kW.

The calculations behind this assumption appear to originate from the 2023 Residential Baseline Study, [9] in which a variety of heating and cooling systems throughout Pennsylvania were sampled, and it was largely found that the capacity of heating systems is roughly three to five times the capacity of cooling systems. Applying Summer and Winter coincidence factors

[7] A recent New York potential study showed significant potential for BDR – over 500MW in summer, and over 200 MW in winter. *See* New York's Grid Flexibility Potential Volume 1: Summary Report (January 2025) at 47, available at https://www.brattle.com/wp-content/uploads/2025/02/New-Yorks-Grid-Flexibility-Potential-Volume-I-Summary-Report.pdf; In the Phase IV Demand Response potential study, the SWE found that the statewide DR potential for BDR was approximately 55 MW. Comparatively, the potential for connected thermostats was approximately 81 MW. *See* Phase IV Demand Response Potential Study (February 2020) at 12-13, *available at* https://www.puc.pa.gov/pcdocs/1656475.pdf.

[8] Phase V Demand Response Potential Study at 76.

[9] NMR Group, Inc., "2023 Pennsylvania Statewide Act 129 Residential Baseline Study" (March 21, 2024), *available at* https://www.puc.pa.gov/media/2883/2023_pa_residential_baseline_study.pdf.

from the 2026 Technical Reference Manual[10] ("TRM") results in a higher assumed load shed for Winter-connected thermostats than Summer-connected thermostats.

0.22 kW may be a reasonable assumption for daily optimization spread over a large percentage of the smart thermostat population, but more targeted event-based DR would likely result in savings of 0.75 kW or more as shown by the 3rd party M&V studies mentioned above. The participation levels assumed in the DR Potential Study are reasonable for an event-based DR program of this kind, while daily optimization could be additive.

3. Enable both daily and event-based dispatch programs.

United understands and appreciates the need to develop peak shaving programs that are cost-effective, reliably reduce demand during the peak hours that drive capacity costs throughout Pennsylvania, and have a high degree of availability. We desire to see stable, long-term peak shaving programs and see a need to evolve beyond the highly use-limited program design from the Phase III programs.

The DR Potential Study outlines the considerations involved in DR valuation, including key program design attributes such as the dispatch trigger, the number and duration of events, advanced notice of dispatches, etc.[11] United agrees that a peak shaving program should both reliably reduce load during the 5CP hours and be designed to have a high ELCC. In evaluating DR potential, the SWE chose to consider two program design options:[12]

- One design that leverages a weather-based dispatch trigger that is only available for 24 or fewer hours per season, and
- One design that leverages a daily dispatch that triggers events in each day of the DR season for a total of approximately 400 dispatch hours annually.

[10] Pennsylvania Public Utility Commission, 2026 Technical Reference Manual, Volume 1 (Sept. 2024), at 19 (Table 1-9). *Available at* https://www.puc.pa.gov/pcdocs/1848562.pdf.

[11] Phase V Demand Response Potential Study at 22-35.

[12] *Id.* at 22.

The SWE selected the daily load shifting construct as its final recommended program design, noting the following rationale:[13]

- It performed the highest in the 5CP and ELCC metrics;
- There is no need to de-rate capacity (as discussed in the 2026 Total Resource Cost ("TRC") Test Order);
- There is no need to track dispatch triggers and event notifications; and
- Simpler is generally better than complex.

While United appreciates the intention for simplicity, we also recognize that a daily load shifting design is not the only way to reliably and effectively drive peak demand savings. Other states have shown that DR programs with event-based program designs reliably drive peak load reductions. Indeed, these program designs are a more precise tool to target the few peak hours of the year that matter most. For example:

- The Massachusetts Daily Dispatch Connected Solutions program is dispatched to drive savings primarily during the single coincident highest load hour of the year.[14] It is dispatched based on a day-ahead load forecast and can be called up to 60 times per season for events lasting up to 3 hours. This corresponds to up to 180 hours of dispatches per season. Like most DR programs, the program does not require that customers be dispatched that heavily, but requires that much availability to ensure it is a useful resource.
- The New York CSRP establishes 4-hour call windows, and employs both a peak demand-based trigger and a weather variable-based trigger. Operators dispatch the

[13] *Id.* at 35.

[14] *See* Mass Save, "Offering Materials for ConnectedSolutions for Commercial/Industrial Customers" (June 8, 2023) at 2, *available at* https://www.masssave.com/-/media/Files/PDFs/Business/CI-ConnectedSolutions-Offering-Materials_June-2023.pdf.

program whenever the day-ahead system demand forecast exceeds 92% of the peak[15] or when the temperature variable exceeds 84 degrees. There is no limit on how many events can be called within a season; however, in practice the program tends to be dispatched about a dozen times. The program also allows for unplanned and contingency dispatches as well.

These examples highlight that there is an established best practice to include DR programs that call event-based dispatches, should a need arise, during the clearly defined windows in which peak demand reductions may be required, as identified in Table 13:[16]

Table 13: Phase V of Act 129 Periods for Coincident Peak Demand Savings

Period	Summer	Winter
Months	June, July, and August	January and February
Day Types	Non-Holiday Weekdays	
Hour Ending (Eastern Prevailing Time)	15-18	8-9 and 19-20

Specifically, **United recommends that the Commission employ these same availability windows (above) in a final program design that includes both a daily dispatch program and an event-based program that establishes a trigger that DR resources will only be called if projected peak demand exceeds a certain demand threshold (e.g., 92%)**. Given the discussion from the 2026 TRM Order and the history of DR programs in Act 129, United recommends that for the event-based DR program, the total events and total event hours either be uncapped or set at an appropriately high ceiling (e.g., 60 events per season). This should result in minimal de-rating to the capacity value of the DR resources, because the trigger both a) guarantees that the program will be dispatched when needed to reduce demand during the 5CP hours, and b) does not limit how frequently the program can be used, meaning it should effectively have a 100% ELCC rating. United also notes that the administrative

[15] *See* "National Grid Commercial System Relief Program Overview and Guidelines" (February 2023) at 3, *available at* https://www.nationalgridus.com/media/pdfs/bus-ways-to-save/csrp-program-overview.pdf.

[16] Phase V Demand Response Potential Study at 36.

implementation of triggers based on load forecasts and event notifications is a solved problem, can be easily automated, and is not a justifiable reason for overlooking the value of needs-based event triggers in DR program design.

4. Clarify Assumptions for C&I Daily Load Shifting

C&I load reduction programs have proven successful in reducing capacity, transmission, and distribution costs[17] in a number of states including Connecticut, Massachusetts, Rhode Island, New Hampshire, and New York. As one example, the ConnectedSolutions Program in Massachusetts produces a little over 1 MW per participant in load reduction.

In determining payments for customers, United suggests a "pay-for-performance" approach much like the ConnectedSolutions program. Under this approach, a customer receives payment only for the load reductions it provides.[18] This ensures that ratepayers are not paying for something they are not receiving and customers are not subject to punitive penalties that would discourage participation. This is especially important if the program moves forward as a daily dispatch program with a large set of hours because some customers may not be able to produce load reductions in every single dispatch hour, but this does not mean they are not providing significant value to the system.

5. Include EV Managed Charging as an Eligible Resource

United supports the inclusion of both active and passive EV managed charging as an eligible resource. The assumptions in the DR Potential Study are generally reasonable, and although not all programs are found to be cost-effective in each electric distribution company ("EDC")

[17] *See, e.g.*, Guidehouse Inc., "Massachusetts Energy Efficiency and Demand Response Potential Study for 2025-2027" (February 23, 2024) at 127, *available at* https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/19845328.

[18] The ConnectedSolutions program pays customers for the average load reduction they provide over all dispatches in the season. *See supra* n.15 at 11-14.

territory, United encourages the Commission to include them in the final program design as they exceed the TRC threshold of 0.80, as noted in the Commission's Tentative Order.[19]

In particular, United notes that managed charging programs can drive significant locational benefits by managing and avoiding localized distribution system peaks that would otherwise create an infrastructure development need. United understands that the Pennsylvania utilities oppose developing more granular temporal or locational avoided distribution costs, given uncertain benefits and the potential for inaccuracy.[20] United suggests that utilities develop managed charging programs to drive system peak demand reductions, and concurrently, work over the next Phase V cycle to understand the value of more localized use cases with the goal of including those value streams and recommending an appropriate program design no later than the Phase VI filings.

6. Include BTM Batteries as an Eligible Resource, on a Pilot Basis if Needed.

BTM batteries are a proven resource with significant amounts of flexibility to drive grid savings across an expansive value stack. Many states and utilities are developing, or have developed, programs that leverage BTM batteries and generate significant net benefits to their ratepayers. The TRC is assuming that consumers will only install batteries if it makes economic sense, but consumers may also install batteries for the peace of mind and resilience benefits, and even more so when paired with solar. Even if BTM batteries are not cost-effective from the TRC perspective at this time, the Commission should direct utilities to offer a program like ConnectedSolutions to those that install batteries for back-up power and would see any revenue they derive as a welcome bonus. The DR Potential Study notes that "battery storage would be among the lowest-cost ways" to achieve peak demand reduction goals. [21] A pilot program that compensates batteries for peak reduction with no upfront incentives would be a way for the Commission to test the theory that consumers will only install batteries for

[19] Pennsylvania Public Utility Commission, Tentative Implementation Order (February 20, 2025), Docket No. M-2025-3052826, at 42 ("Tentative Order").

[20] Pennsylvania Public Utility Commission, 2026 TRC Test Final Order (Nov. 7, 2024), Docket No. M-2024-3048998, at 42-43.

[21] Phase V Demand Response Potential Study at 118.

economic reasons while posing zero risks to ratepayers. For customers that decide to install BTM batteries for other reasons, there are no incremental costs that should be assigned to "bonus" participation in pay-for-performance dispatch opportunities. Just as customers with bi-directional EVs (i.e., an EV capable of dispatching electricity to the home or grid) purchase the EV for other uses, there is an opportunity to leverage these technologies to achieve grid benefits and to share compensation with participating customers.[22]

Furthermore, a range of incentive levels have proven to be successful for BTM battery programs. For example, this past March, the Arizona Corporation Commission approved a Bring-Your-Own-Device Battery Program with a $110/kW-avg incentive.[23] In Puerto Rico, where nearly all rooftop solar systems are paired with batteries for resilience purposes, the virtual program pilot program compensates BTM battery dispatch at $1.25 per kWh during called events.[24] In the ConnectedSolutions program in Massachusetts, BTM batteries earn $275 per kW based on the average contribution during called summer dispatch events.[25] United strongly encourages consideration of a pilot program to test customer interest in BTM battery participation in Pennsylvania, as other PJM states (e.g., New Jersey, Maryland, and Virginia) all plan to launch such programs in the next year.

The BTM Battery program should be designed to pay participants based on performance, similar to other pay-for-performance battery programs that also target peak reduction (e.g. ConnectedSolutions in Massachusetts). In other words, the program design should not assume that payments are a "cost-subsidization of DR-capable equipment" and should exclude the

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[22] *See*, e.g., Utility Dive, "Sunrun, BGE launch first US electric vehicle-to-home virtual power plant" (July 25, 2024), *available at* https://www.utilitydive.com/news/sunrun-bge-launch-first-us-vehicle-to-home-ev-charging-program/722367/.

[23] Arizona Corporation Commission, Order No. 80124 (March 12, 2025) in Docket No. E-01345A-22-0144, *available at* https://docket.images.azcc.gov/0000213209.pdf?i=1743781554571.

[24] *See* Luma, "Battery Emergency Demand Response (DR) Program – Cost Structure" (August 23, 2023) at 5, *available at* https://energia.pr.gov/wp-content/uploads/sites/7/2023/09/20230823-DR-Program-Cost-Structure-filed-in-Compliance-with-August-11.pdf.

[25] *See* Mass Save, "Battery Storage," *available at* https://www.masssave.com/residential/rebates-and-incentives/battery-storage-and-evs/batteries#:~:text=Through%20ConnectedSolutions%2C%20residents%20receive%20incentives,average%20contribution%20during%20summer%20events.

overnight capital costs from the TRC calculation. A pay-for-performance program design aligns the value of program payments with the value of the benefits that accrue to ratepayers. The Commission could adopt this program design feature and adjust the cost inputs to the TRC test accordingly. In this way, only the actual pay-for-performance sums would be included as program costs and the performance of a BTM pay-for-performance program would fare much better under the TRC.

7. Improve long-term stability of DR in Act 129.

The Commission should look to successful examples of multi-DER program design to ensure long-term success and stability of the Act 129 programs. The above-mentioned ConnectedSolutions program is a model of successful multi-DER program design, balancing ease of administration, customer experience, and impactful implementation. Utilities in the ConnectedSolutions program are also leveraging advanced virtual power plant ("VPP") capabilities, including cross-DER optimization and locational benefits.

Additionally, the Commission and the state of Pennsylvania should work with PJM to ensure peak shaving programs are better reflected in PJM load forecasts.

Programs across the country are scaling quickly and providing valuable grid benefits. For example, over 10% of Arizona Public Service ("APS") ratepayers are enrolled in the CoolRewards program.[26] We encourage the Commission to be aggressive and hold utilities to the peak reduction targets in the first year.

Finally, United recommends that the Commission consider the role that electric generation suppliers ("ESGs") can play in the deployment of smart thermostats to support the DR programs we discussed above. ESGs service a significant portion of load in Pennsylvania, and they can leverage their customer relationships to enroll participants in DR programs. As a recent example, the Public Utilities Commission of Ohio ("PUCO") last year ordered that American Electric Power's ("AEP") smart thermostat programs be co-optimized with a

[26] Arizona Public Service Company, *2024 Demand Side Management Annual Progress Report* (February 28, 2025) at 60, *available at* https://docket.images.azcc.gov/E000041930.pdf?i=1742325554285.

customer's competitive retail supplier. The PUCO's order requires that suppliers be allowed to market smart thermostat devices and per-device rebates as part of retail offerings, and to exercise dispatch rights to obtain energy and capacity and transmission cost reductions.[27] In relying on the private market, the PUCO expanded the ability to achieve greater load shifting and ultimately greater savings for consumers. Competition to deliver results drives the innovation required to reach and engage customers to participate in these programs and is something that the Commission should consider during Phase V implementation.

8. Ensure Low Income Customers Benefit from Act 129 Programs.

A. Establish a Low-Income Peak Demand Reduction Contribution

In the Tentative Order, there is a carve out for energy savings goals for low-income customers. However, there is no carve out for peak demand reduction goals within the low-income sector. Approximately 90% of the benefits of a load flexibility program are delivered to the participating customers in the program through incentives, and the remaining 10% of benefits accrue to all customers in the form of lower rates.[28] Many load-shifting programs rely on technologies that are often found in higher income households meaning that they are the ones most likely to enroll in these programs and also retain the benefits. For this reason, it is crucial for low-income customers to receive greater deployment incentives or equipment rebates, which will allow them to participate. Also, any incentive dollars they receive will have a much greater impact on their energy burden than in a higher income household.[29] Even if demand reduction achieved is lower within low-income households, the direct benefit going into these

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[27] *In the Matter of the Application of Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to R.C. 4928.143, in the Form of an Electric Security Plan*, Case No. 23-23-EL-SSO; *In the Matter of the Application of Ohio Power Company for Approval of Certain Accounting Authority*, Case No. 23-245-EL-AAM, April 3, 2024.

[28] *See, e.g.*, The Brattle Group, Inc., "New York's Grid Flexibility Potential" (January 2025) at 8, *available at* https://www.brattle.com/wp-content/uploads/2025/02/New-Yorks-Grid-Flexibility-Potential-Volume-I-Summary-Report.pdf.

[29] *See, e.g.*, Adam Farabaugh, "Implementing Load Flexibility Programs To Help Alleviate Low-Income Energy Burden" (2024) at 1, *available at* https://www.aceee.org/sites/default/files/proceedings/ssb24/assets/attachments/20240722163059859_6a161e7c-2877-4e45-b909-9e36559f584e.pdf.

customers' pockets is much more valuable and can be a crucial tool to help keep their bills affordable.

Utilities should be encouraged to take advantage of peak demand reduction programs that do not require expensive technology and are free for the customer to participate in. BDR has previously been successful in Pennsylvania and does not require potentially expensive devices. Peak savings are achieved only through changes in customer behavior that are of low or no cost to the consumer.

We recommend establishing a low-income peak demand reduction target for each EDC. The low-income consumption target is approximately 7% of the total goal. Choosing a percentage greater than this will allow EDCs to have a greater impact on energy burden with the Act 129 programs. We also recommend that the cost effectiveness for the low-income carve out be tracked, but not considered, in approving these programs and also be removed from the total portfolios cost tests. Many of the benefits delivered to low-income households are not captured within a cost effectiveness test, such as the impact on energy burden.

B. Support Low-Income Programs with Increased Coordination and Better Use of Data

Many customers in Pennsylvania are energy burdened,[30] but are not currently being served by the utility or state assistance programs. This is often because they have not been identified and contacted by the utility. United recommends the Commission support the use of enhanced data and predictive analytics to improve utilities' ability to find and reach customers who may be in need but are not already enrolled in any programs and do not live in a low-income census tract. By using the best available technology, utilities can combine data sets from government, state agencies, customers, and others to identify customers that meet the 150% Federal Poverty Income Guidelines threshold and expand the reach of their low-income programs.

[30] *See* Pennsylvania Public Utility Commission, "Home Energy Affordability for Low-Income Customers in Pennsylvania" (January 2019), *available at* https://www.puc.pa.gov/pcdocs/1602386.pdf.

Expanding Fuel Switching Options

Act 129 directs that the cost-effective energy efficiency and conservation plans must be implemented by EDCs with the goal to "reduce energy demand and consumption"[31] within their service territories. United appreciates the Commission's acknowledgement of the greenhouse gas reduction potential of beneficial electrification,[32] but United respectfully disagrees that beneficial electrification programming "runs counter to the objectives of the Act."[33] Beneficial electrification that replaces fossil fuel equipment with efficient electric equipment has the potential to reduce total energy consumption.[34] Energy savings, as required by Act 129, should be the determining factor on whether fuel-switching should be promoted by EDCs. If converting from natural gas or another fossil fuel appliance to an electric appliance reduces overall energy consumption, incentives for programs that promote that fuel switching should be considered. Excluding beneficial electrification offerings from utilities' Act 129 programs would be inappropriate and ignores reductions in energy consumption that could otherwise be achieved.

Encouraging greater adoption of electric appliances that are DR-capable can also help better utilize existing capacity and lower costs for all electric ratepayers. In other words, if the new electric appliances have a greater ratio of off-peak consumption to peak consumption than the overall system, system utilization will have been improved. As such, the Commission should expand high efficiency heat pump and heat pump water heater measures to all consumers, regardless of HEAR eligibility. By enrolling flexible loads, such as heat pumps and heat pump water heaters in DR programs, EDCs could mitigate impacts to peak demand while still allowing their customers to benefit from the efficiencies that come with electrification. United

[31] Act 129 at 50, *available at* https://www.puc.pa.gov/electric/pdf/Act129/HB2200-Act129_Bill.pdf.

[32] Tentative Order at 56.

[33] *Id.*

[34] An analysis by the Rocky Mountain Institute (RMI) found that the energy usage of geothermal heat pumps to heat homes in the territories of three utilities in the Midwest is 80% less than that of fossil fuel furnaces. *See* RMI, "Clean Energy 101: Geothermal Heat Pumps" (March 29, 2023), *available at* https://rmi.org/clean-energy-101-geothermal-heat-pumps/.

recommends that the Commission pair incentives for beneficial electrification with opportunities for those appliances to participate in DR programs as described above.

United agrees that stacking non-Act 129 incentives, such as the HEAR program, with Act 129 investments will enable deeper and more cost-effective reductions in electricity consumption and peak demand than would be attained absent this stacking. We encourage the Commission to continue exploring opportunities for consumers to achieve the greatest value from state and federal programs, and United supports the proposed requirement for the EDCs to include high efficiency heat pump and heat pump water heater measures available to HEAR and other non-Act 129 program participants.

Strengthening Energy Efficiency

United supports standard energy efficiency rebates for measures like efficient heating, ventilation, and air conditioning ("HVAC") equipment, lighting, and air sealing and weatherization measures. We also offer the following comments regarding commercial lighting.

Commercial Lighting

Commercial lighting in midstream programs is a key pillar of the Act 129 programs that has driven success in past phases and remains critical for Phase V for the following reasons:

1. **Lighting remains the largest driver of energy savings** in Act 129 C&I portfolios as the most scalable and widely applicable measure. EDC reported data show that in PY14 and PY15, C&I lighting savings accounted for nearly 50% of total portfolio savings (68% of C&I savings).[35] Even when assuming opportunities are limited to the projected stock of baseline lighting equipment and a lack of "legacy" technology once outdated lighting is replaced, the Pennsylvania Energy Efficiency and Peak Demand Reduction Market

[35] Pennsylvania Energy Efficiency and Peak Demand Reduction Market Potential Study Report at 16, *available at* https://www.puc.pa.gov/media/3317/phasev_act129_eepdr_mps_stakeholder_meeting_presentation_020425.pdf ("EEPDR Study").

Potential Study found that interior and exterior lighting opportunities account for more than 60% of small and large C&I savings potential.[36]

2. **Midstream lighting programs have demonstrated superior cost-effectiveness**. The Commission urges the EDCs to minimize the contribution of midstream delivery of non-residential lighting measures in Phase V and focus lighting efforts on replacing the last of the Commonwealth's inefficient equipment stock.[37] The most cost-effective way to replace the remaining stock is by working directly with product distributors. As Phase V allocates a greater portion of the budget to higher-cost measures like solar and combined heat and power,[38] maintaining midstream lighting programs is essential to maximizing the impact of remaining funds and ensuring overall portfolio cost-effectiveness.

3. **Midstream lighting programs support market transformation** by moving the market from replacement lamps to fixtures. The lighting programs of EDCs such as PECO are designed to incentivize customers to purchase new lighting fixtures, not lamps. Fixtures have a 15-year measure life, have higher efficiency drivers, are dimmable, and have better optics. The program is now incentivizing fixtures with integrated controls and will expand these offerings over the life of Phase V. We contend that this represents market transformation, as previous program Phases focused on LED replacement lamps.

   The PUC notes that Act 129 Programs have matured over the years and that the EDCs should focus on comprehensive measures that have longer timelines.[39] In PY16, PECO was one of the first utilities in the country to implement an integrated controls component into its midstream lighting program. Fixtures with integrated controls go beyond the basic energy savings of LED lamp retrofits by optimizing light output based

[36] EEPDR Study at 26-32.

[37] Tentative Order at 29.

[38] Tentative Order at 20.

[39] *Id.* at 9.

on real time environmental signals. The 2026 TRM assumes that fixtures with an integrated sensor and/or a digitally-addressable driver will have the following savings:[40]

- Occupancy only sensor: 24% additional savings
- Daylight harvesting photocell: 28% additional savings
- Multifunctional sensor: 38% additional savings
- Luminaire Level Lighting Control (LLLC): 49% additional savings

Additionally, small C&I customers, which account for 36% of non-residential electric sales in the 2023 Non-Residential Baseline Study,[41] often lack the resources to navigate rebate programs and benefit from the instant discounts provided in midstream offerings.

4. **Lighting measures provide peak demand reductions,** aligning with the PUC's recommendation that EDCs place a premium on measures that reduce peak demand to help mitigate issues with resource adequacy.[42] Non-residential lighting is both a summer and winter peaking resource, with a "Miscellaneous/Other" building type having a coincident factor of 0.58 in summer and 0.39 in winter.[43] Non-residential lighting remains the best measure for cost-effectively capturing both summer and winter peaking.

    - The 2026 TRM includes an approved midstream lighting baseline table and savings calculation.[44] Furthermore, Pennsylvania is a gross-verified savings state, so net energy savings impacts are not included in the official TRC score.

[40] Pennsylvania Public Utility Commission, 2026 Technical Reference Manual, Volume 3 (Sept. 2024), at 3 (Table 3-2), *available at* https://www.puc.pa.gov/pcdocs/1848580.pdf ("2026 TRM Volume 3").

[41] *Pennsylvania Act 129 2023 Non-Residential Baseline Study*, submitted by Demand Side Analytics *et al.*, February 2024, at 35. *Available at* https://www.puc.pa.gov/media/2884/2023_pa_nonresidential_baseline_study.pdf

[42] Tentative Order at 21.

[43] 2026 TRM Volume 3 at 4 (Table 3-3).

[44] *Id.* at 28-30 (Tables 3-17, 3-18, 3-19, 3-20, and 3-21).

Programs should be allowed to leverage all approved equations and deemed savings assumptions over the course of Phase V.

Conclusion

United appreciates the Commission's work to implement Phase V of the EE&C Programs and thanks the Commission for the opportunity to submit these comments. We look forward to collaborating with the Commission and all stakeholders in order to maximize the effectiveness of the Phase V programs.