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November 29, 2021

VIA ELECTRONIC FILING

Pennsylvania Public Utility Commission
Attn: Rosemary Chiavetta, Secretary
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120

Re: Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets
Docket No. M-2020-3022877

Dear Secretary Chiavetta,

Attached for electronic filing please find the Comments of Sierra Club, Clean Air Council, the Union of Concerned Scientists, POWER Interfaith, Philadelphia Solar Energy Association, the Natural Resources Defense Council, Vote Solar, and Citizens for Pennsylvania's Future (collectively, the "Clean Energy Advocates") in response to the follow-up questions raised in the Commission's Secretarial Letter of August 12, 2021. Copies have been served per the attached Certificate of Service.

Sincerely,

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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets	**Docket No. M-2020-3022877**

COMMENTS OF THE CLEAN ENERGY ADVOCATES

TABLE OF CONTENTS

I. INTRODUCTION

Sierra Club, Clean Air Council, the Union of Concerned Scientists ("UCS"), POWER Interfaith ("POWER"), Philadelphia Solar Energy Association ("PSEA"), the Natural Resources Defense Council ("NRDC"), Vote Solar, and Citizens for Pennsylvania's Future ("PennFuture") (collectively, the "Clean Energy Advocates") respectfully submit these comments to the Pennsylvania Public Utility Commission (the "Commission" or "PA PUC") in response to the follow-up questions raised in the Secretarial Letter on August 12, 2021.[1]

The Clean Energy Advocates thank the Commission for convening this proceeding and appreciate the opportunity to comment. The integration of electric storage into distribution infrastructure is essential for modernizing the grid and facilitating the sustainable delivery of electricity to Pennsylvanians. However, storage must be deployed in a just, equitable, and transparent fashion to ensure fair allocation of its benefits and costs.

Sierra Club is a non-profit environmental organization whose mission is to explore, enjoy, and protect the wild places of the Earth and to practice and promote the responsible use of the Earth's resources and ecosystems. The Sierra Club currently has over 31,000 members in Pennsylvania. These members have a strong interest in both the success of sustainable and equitable energy programs and in protecting themselves, their communities, and their ambient environment from the effects of fossil fuel generation.

Clean Air Council is a member-supported environmental organization serving the Mid-Atlantic Region. Clean Air Council is dedicated to protecting and defending everyone's right to a clean environment. Clean Air Council works through a broad array of related sustainability and

[1] PA PUC, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Secretarial Letter (Aug. 12, 2021), https://perma.cc/DMB4-U286. The Clean Energy Advocates gratefully acknowledge the assistance of Synapse Energy Economics in developing these comments.

public health initiatives, using public education, community action, government oversight, and enforcement of environmental laws.

The Union of Concerned Scientists is a national organization with 50 years of experience putting science into action to build a healthier planet, a more equitable society, and a safer world. Our half-million members and supporters include everyday people as well as some of the nation's top scientists, and our distinctive UCS Science Network draws upon more than 25,000 scientists and technical experts across the country to assist our local, state, and national efforts. Working together, we advance science-based solutions to some of the world's most pressing problems, conducting rigorous technical analyses and mobilizing our supporters to educate decisionmakers and advocate for change.

POWER is a racial and economic justice organizing force in the state of Pennsylvania, helping people put faith and values into strategic action to win concrete change in the public sphere. POWER organizes in southeastern Pennsylvania and in coalitions across the state for racial and economic justice on a livable planet by shifting the moral and policy universe towards possibilities that support the common good. POWER's Climate Justice and Jobs team draws people from both marginalized and privileged neighborhoods into the public struggle over land and energy, considering key land and energy issues as contested space in this world. POWER fights against dirty fossil fuel expansion and for green economy solutions. In POWER's integrated strategy POWER centers racial and economic equity issues as an essential part of every single building block of policy.

PSEA was established in 1980 as a nonprofit corporation dedicated to public education and training to support the growth of solar energy in the Philadelphia area and across the region. Recognized as a tax deductible, 501(c)(3) corporation in 1998, PSEA has been a volunteer-based,

member-supported organization for almost forty years. Its principal focus is public education, training and advocacy to advance the understanding and use of solar energy in Philadelphia and the surrounding counties, and Delaware and New Jersey.

NRDC is a non-profit member-based environmental organization with more than 15,000 members in Pennsylvania. Since NRDC's founding in 1970, its lawyers, scientists, and other environmental specialists have worked to protect public health and the world's natural resources and environment. NRDC's primary mission in Pennsylvania is to reduce pollution and create an equitable clean energy economy, including through the creation of modern and equitable electricity distribution systems.

Vote Solar fights for a 100% clean energy future that puts the interests, health and well-being of people at its center. Vote Solar is a nationwide non-profit organization, with over 4,000 members in Pennsylvania. Vote Solar aims to achieve a just and equitable transition to 100% clean power across the U.S. by 2050, with a majority of energy coming from solar. Vote Solar works to repower communities with sunshine and build a thriving clean economy with affordable solar energy for all.

PennFuture is a statewide non-profit environmental advocacy organization focused on leading the transition to a clean energy economy in Pennsylvania and beyond; protecting our air, water and land; and empowering citizens to build sustainable communities for future generations.

II. BACKGROUND

Under Pennsylvania law, the Commission is obligated to ensure that Electric Distribution Companies ("EDCs") provide adequate, safe, and reliable service at just and reasonable rates

under current conditions.[2] At present, a combination of market and technological trends indicate that in the years ahead, EDCs' distribution infrastructure will experience increased stresses and demands, and illuminate how prudent investments in storage and other advanced grid technologies can help address system needs, ensuring safe and reliable service at just and reasonable rates.

One key trend is that as the costs of distributed clean energy resources continue to fall, the deployment of those resources will continue to grow,[3] leading to an increased need for infrastructure to safely and reliably integrate such resources, including to address output variability and voltage fluctuations.[4] Energy storage can help meet these needs.[5]

Another important trend is the rapidly increasing electrification of transportation and buildings, which is leading to increased load and changes in demand patterns, which energy storage can also help manage.[6] The electrification of transportation in Pennsylvania was expected to grow even before the enactment of the federal Infrastructure Investment and Jobs Act, which will invest more than $171 million in electric vehicle infrastructure in Pennsylvania.[7] This growth will increase electric load while also offering load management opportunities through the dynamic, bi-directional use of electric vehicle batteries.[8] With respect to building electrification,

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[2] 66 Pa. Stat. and Cons. Stat. § 1301 (1978).
[3] PA DEP, *Pennsylvania Energy Storage Assessment: Status, Barriers, and Opportunities*, at 4 (April 2021), https://perma.cc/RLZ5-R4JM.
[4] UC Berkeley Goldman School of Public Policy, *2035 Report: Plummeting Solar, Wind, and Battery Costs Can Accelerate Our Clean Energy Future*, at 14 (June 2020), https://perma.cc/5TFQ-JNAN.
[5] PA DEP, *Pennsylvania Energy Storage Assessment: Status, Barriers, and Opportunities*, at 4 (April 2021), https://perma.cc/RLZ5-R4JM ("The use of grid-connected storage will become increasingly important as a tool to integrate renewable energy into the grid while maintaining reliability of the power system.").
[6] National Energy Screening Project, *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, at 10-3 (Aug. 2020), https://perma.cc/V2FS-3Q9U; Penn Environment, *Electric Buildings: Repowering Homes and Businesses for Our Health and Environment*, at 5 (April 2021), https://perma.cc/L6W7-MQGE; Claire McKenna et al., *All-Electric New Homes: A Win for the Climate and Economy*, RMI (Oct. 15, 2020), https://perma.cc/Y63A-7EV2.
[7] *See, e.g.,* Rachel McDevitt, *Advocates hope federal infrastructure money will spur people to buy EVs*, StateImpact PA (Nov. 25, 2021), https://perma.cc/CK4P-Y5NA.
[8] PA DEP, *Pennsylvania Electric Vehicle Roadmap*, at x–xi (Feb. 2019), https://perma.cc/E8QC-ZUMC.

the City of Philadelphia is in the process of developing a business diversification plan for Philadelphia Gas Works that will examine the role of large-scale building electrification as a means for achieving 100% decarbonization of the City's heating needs.[9]

The existential threat of climate change, and its accelerating impacts, constitutes another key trend.[10] Climate change is already having serious impacts in Pennsylvania, and those impacts are projected to grow significantly.[11] For example, the Commonwealth's 2021 Climate Impacts Assessment notes that by 2050, the average annual temperature in Pennsylvania is expected to rise by 5.9°F, and temperatures are projected to rise to at least 90°F on 37 days per year, up from 5 days per year from 1971–2000, bringing a range of serious health, safety, and economic impacts.[12]

Moreover, these climate impacts land inequitably, hitting environmental justice communities hardest.[13] For example, according to the Climate Impacts Assessment, environmental justice areas (defined for purposes of the report as census block groups where 20% or more of individuals live in poverty and/or 30% or more of individuals are from minority groups) are approximately 1.8 times as exposed to high numbers of days exceeding 90°F than the state overall.[14] Additionally, in Philadelphia, some neighborhoods can be up to 22°F hotter than

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[9] City of Philadelphia, *PGW Diversification Study Resources*, (July 29, 2021) https://perma.cc/5C3F-E3U8.
[10] Morgan Chalfant and Rachel Frazin, *Biden warns of 'existential' climate threat at Glasgow summit*, The Hill (Nov. 11, 2021), https://perma.cc/8WRS-TABN (President Joseph Biden stating, "There's no more time to hang back or sit on the fence or argue amongst ourselves. This is the challenge of our collective lifetimes. The existential threat to human existence as we know it."); US DOD, *Defense Secretary calls climate change an existential threat*, DOD News (Apr. 22, 2021), https://perma.cc/WGY9-AE7B. (Secretary of Defense Lloyd J. Austin stating, "Today, no nation can find lasting security without addressing the climate crisis. We face all kinds of threats in our line of work, but few of them truly deserve to be called existential. The climate crisis does.").
[11] PA DEP, *Pennsylvania Climate Impacts Assessment* (July 2021), https://perma.cc/PTJ7-B2KD; Rachel McDevitt, *State climate report predicts nearly six-degree temperature rise, more heat waves and intense storms by 2050*, StateImpact PA (May 5, 2021), https://perma.cc/932P-VYHQ; PA Auditor General, *Climate Crisis: The Rising Cost of Inaction* (Nov. 2019), https://perma.cc/Y56E-JCMA; UCS, *Climate Change in Pennsylvania: Impacts and Solutions for the Keystone State*, at 1 (Oct. 2008), https://perma.cc/B5JZ-SN92.
[12] PA DEP, *Pennsylvania Climate Impacts Assessment*, at 5–6 (July 2021), https://perma.cc/PTJ7-B2KD.
[13] City of Philadelphia, *Philadelphia Climate Action Playbook*, at 10 (Jan. 2021), https://perma.cc/WFM8-RVL6.
[14] PA DEP, *Pennsylvania Climate Impacts Assessment*, at x, 42 (July 2021), https://perma.cc/PTJ7-B2KD.

others, and residents of color and low-income residents are disproportionately likely to live in those neighborhoods.[15]

Finally, an additional trend is the rapid evolution of cost-effective non-wires solutions[16] to meet distribution needs.[17] A non-wires solution ("NWS") is "an electricity grid investment or project that uses non-traditional T&D solutions, such as distributed generation, energy storage, energy efficiency, demand response, and grid software and controls, to defer or replace the need for specific equipment upgrades, such as T&D lines or transformers, by reducing load at a substation or circuit level."[18] Importantly, allowing storage to be synergistically combined with other NWS maximizes the probability of surfacing the most cost-effective possible proposals.[19] To ensure that storage is deployed as cost-effectively as possible, NWS decisions should be made through an integrated distribution planning process that systematically incorporates consideration of whether a non-wires solution (or combination of non-wires solutions) is more cost-effective than a traditional poles-and-wires solution.[20]

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[15] City of Philadelphia, *Beat the Heat Hunting Park: A Community Heat Relief Plan*, at 1 (July 2019), https://perma.cc/KRB8-TYTL; *See also* Ximena Conde, *In one of Philly's hottest areas, neighbors are crowdfunding air conditioners*, WHYY (June 30, 2021), https://perma.cc/5YTG-TYHZ.

[16] Non-wires solutions have also been referred to as "non-wires alternatives" or "NWAs." Consistent with the usage in the *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, these comments use the term "non-wires solutions," or "NWS." National Energy Screening Project, *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, at 12-1 (Aug. 2020), https://perma.cc/V2FS-3Q9U.

[17] Mark Dyson et al., *Non-wires Solutions Implementation Playbook: A Practical Guide for Regulators, Utilities, and Developers*, at 16, Rocky Mountain Institute ("RMI") (Dec. 2018), https://perma.cc/4XLQ-XYTZ.

[18] National Energy Screening Project, *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, at 12-2 (Aug. 2020), https://perma.cc/V2FS-3Q9U.

[19] RMI, *Non-wires Solutions Implementation Playbook: A Practical Guide for Regulators, Utilities, and Developers*, at 20 (Dec. 2018), https://perma.cc/4XLQ-XYTZ.

[20] RMI, *Non-wires Solutions Implementation Playbook: A Practical Guide for Regulators, Utilities, and Developers*, at 11 (Dec. 2018), https://perma.cc/4XLQ-XYTZ ("The dynamics of today's electric grid do not ensure that energy is efficiently distributed or that capital is efficiently allocated. Increasingly, portfolios of distributed energy resources (DERs)—also known as non-wires solutions (NWS)—can address these current inefficiencies by solving grid needs more cost-effectively than business-as-usual approaches to traditional infrastructure investment.").

In light of these considerations, the Commission should adopt policies and procedures to ensure that EDCs perform integrated distribution infrastructure planning processes that systematically consider energy storage and other non-wires solutions and deploy them whenever cost-effective. Such a course of action would be consistent with the Public Utility Code's mandate that EDCs maintain just and reasonable rates.[21] It would also be consistent with the Commission's trustee duties under Article 1, Section 27 of the Constitution of Pennsylvania, since prudently deployed storage assets and other NWS will help support the integration of distributed clean energy resources, thereby helping to mitigate climate change in Pennsylvania as well as supporting reliability and resiliency.[22]

III. RESPONSE TO COMMISSION QUESTIONS

The Clean Energy Advocates ("CEA") offer detailed responses below to the Commission's questions in the Secretarial Letter of August 12, 2021.[23] At the outset, however, CEA would note that all of these responses are undergirded by four key cross-cutting principles. First, storage and other NWS must be considered for every utility distribution infrastructure investment through a screening process. Second, whenever storage or other NWS are more cost-effective (under an appropriate benefit-cost analysis ("BCA") framework of the type discussed below)[24] than traditional poles and wires investments, they must be pursued. Third, the BCA framework must comprehensively account for the benefits and costs of NWS, including public

[21] 66 Pa. Stat. and Cons. Stat. § 1301.
[22] Pa. Const. art. I, § 27; *Pennsylvania Env't Def. Found. v. Commonwealth*, 640 Pa. 55, 87–88, 161 A.3d 911, 930–31 (2017); *See also* Robert B. McKinstry, Jr. and John C. Dernbach, *Applying the Pennsylvania Environmental Rights Amendment Meaningfully to Climate Disruption*, 8 Mich. J. Envtl. & Admin. L. 49 (2018).
[23] PA PUC, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Secretarial Letter (Aug. 12, 2021), https://perma.cc/DMB4-U286.
[24] Where the Clean Energy Advocates use the term "cost-effective" in these comments, the intended reference is to cost-effectiveness under an appropriate BCA framework of the type discussed in the Response to Question 1.

health and environmental externalities. Fourth, utilities must be required to issue a transparent and competitive request for proposals for NWS investments, in order to enable third-party providers to offer their solutions and ensure investments are as cost-effective as possible. Any just and reasonable approach to the integration of storage as a distribution asset should be guided by these principles, which are explained in greater detail below.

Response to Question 1

What are the parameters that would allow for the use of energy storage on the distribution grid? For example, what factors should be used in the consideration of the energy-storage project? Should the energy-storage project meet certain thresholds and demonstrate certain requirements, e.g., demonstration of cost-effectiveness as compared to alternate measures, demonstration of need, required RFPs to solicit potential third-party providers, limitations on project size and scope, etc.?

1. The Need for Integrated Distribution Planning that Incorporates Non-wires Solutions

Question 1 in the Commission's Secretarial Letter asks what factors should be used to evaluate proposed storage deployments on EDC's distribution system. Question 3 asks a separate but related question: when is it appropriate for storage assets to be considered as alternatives to traditional distribution infrastructure in the first place?

In the view of the Clean Energy Advocates, both questions imply a need for an Integrated Distribution Planning ("IDP") framework in which storage and other NWS are considered holistically and on an equal footing with traditional infrastructure investments, taking into account the future needs of EDCs' distribution systems. In their initial comments in this docket the Office of Consumer Advocate ("OCA") recommended that the Commission adopt IDP, and we discuss our support for IDP at length in our response to Question 3. CEA note that response here to make clear that an IDP process that incorporates NWS as a critical procedural mechanism for the refinement and implementation of storage project evaluation parameters.

2. Equity and Transparency as Essential Parameters

It is essential that the processes for deployment of non-wires solutions, including storage, be equitable and transparent. This requires a grid planning process that allows for meaningful consideration of alternatives and opportunities for public participation, as well as a distribution of benefits and costs that supports reliability, resiliency, and emissions reductions in low-income and other underserved communities.

a. Equity Parameters

Equity should be a foundational parameter for energy storage program design,[25] because equity is at core of the just and reasonable rates required by the Public Utility Code.[26] Equity is also at the heart of energy justice, which the Initiative for Energy Justice has defined as "the goal of achieving equity in both the social and economic participation in the energy system, while also remediating social, economic, and health burdens on marginalized communities."[27] Accordingly, it is vital that the Commission proactively incorporate equity protections in distribution storage planning processes.[28]

A growing number of states, including Connecticut and Maryland, are making equity considerations central to their decision-making concerning storage deployments. To start, Connecticut's Electricity Storage Program features a consistent focus on equitable outcomes and the protection of low-income customers, including not just transparent metrics (e.g., the tracking of residential storage installations in low-income households), but also a target for 40% of

[25] UCS, *How to Ensure Energy Storage Policies are Equitable*, at 1 (Nov. 2019), https://perma.cc/LWU6-MN4H
[26] 66 Pa. Stat. and Cons. Stat. § 1301 *et seq.*
[27] Initiative for Energy Justice, *Energy Justice Workbook*, at 5 (Dec. 2019), https://perma.cc/6T7K-7S6A.
[28] Clean Energy States Alliance, *Energy Storage Best Practices from New England*, at 25 (Aug. 2021), https://perma.cc/MQ4E-VBKK ("Equity considerations should be incorporated into energy storage program design from the start, not left to be addressed in later revisions.").

residential storage systems to be installed in such households, along with an upfront incentive for residential storage owners in environmental justice communities.[29]

Maryland's Energy Storage Pilot Program, described in detail in our response to Question 2, provides another good model for both equity and transparency in storage deployment. In the docket that established the Program, the Maryland Public Service Commission ("MD PSC") directed the state's Energy Storage Working Group, which included EDCs, the Energy Storage Association, and PJM, to recommend a list of metrics for use by the MD PSC in assessing energy storage projects proposed by EDCs.[30] In a report released in December 2019, the working group recommended the recognition of societal benefits, such as the provision of reliable and affordable electricity to low- and moderate-income residents, seniors, or schools, as a qualitative value stream and recommended that project applications specifically identify such benefits.[31]

In Pennsylvania as well, equity considerations must be paramount in all decision-making concerning the deployment of distribution-sited storage, including with respect to cost allocation, benefit accounting, siting, and planning processes. For example, it cannot be considered just and reasonable for the reliability and other benefits of storage to be deployed in a way that disproportionately serves wealthy neighborhoods.[32] Potential equity mechanisms that could be considered include, without limitation:

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[29] Connecticut Public Utilities Regulatory Authority ("CT PURA"), *Investigation Into Distribution System Planning of the Electric Distribution Companies - Electric Storage*, Docket No. 1712-03RE03, Decision, at 13, 50 (July 28, 2021), https://perma.cc/VE73-BN73.

[30] MD PSC, *In the Matter of the Maryland Energy Storage Pilot Program*, Case No. 9619, Order Establishing an Energy Storage Pilot Program (Aug. 23, 2019), https://perma.cc/HW4V-LS44.

[31] PC 44 Energy Storage Working Group, *In the Matter of the Maryland Energy Storage Pilot Program*, Case No. 9619, Submission of the PC 44 Energy Storage Working Group (Dec. 2019), https://perma.cc/5D3N-DRUV.

[32] In previous comments in this proceeding, the Clean Energy Advocates and NRDC have highlighted the centrality of equity considerations. *See* Clean Energy Advocates, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Comments (Feb. 18, 2021), https://perma.cc/EXH8-2A5T; NRDC, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Comments (Feb. 18, 2021), https://perma.cc/K9MX-CAJN.

- Planning processes that support robust participation from environmental justice and low-income communities to help identify locations where projects should be sited or not sited.[33]

- Carve-outs and incentives to support investments that serve environmental justice and low-income communities, and critical infrastructure that serves those communities like hospitals, places of worship, cooling centers, homeless shelters, and grocery stores.[34]

The Pacific Northwest National Laboratory has also recently developed a set of "Metrics for an Equitable and Just Energy System" that could be a source of ideas regarding equity metrics.[35] In any case, equity protections should be developed and refined in a stakeholder process that includes robust outreach to environmental justice and low-income communities, including opportunities to provide comment orally at hearings held outside regular working hours.

b. Transparency Parameters

Equity parameters must be paired with transparency parameters that include public reporting on progress toward and compliance with equity parameters, as well as reliability and resiliency parameters and other considerations the Commission may deem important.[36] Transparency requires clear definitions and standards, both when deciding which storage projects to pursue and when tracking project performance over time, because such benchmarks will promote informed dialogue among stakeholders, allow for up-front analysis of various resource

[33] UCS, *Principles of Equitable Policy Design for Energy Storage*, at 1 (May 2019), https://perma.cc/8EUF-2LA9; *See also* Paula Garcia, *East Boston, a Controversial Substation and Opportunities Ahead*, UCS (Nov. 2019), https://perma.cc/G3WH-D6JS.
[34] UCS, *How to Ensure Energy Storage Policies are Equitable*, at 4 (Nov. 2019), https://perma.cc/LWU6-MN4H ("To consider equity, policymakers can include carve-outs or set-asides specifying that some portion of the target should be met with projects that are designed to benefit underserved communities directly through reduced air pollution or improved resiliency.").
[35] Pacific Northwest National Laboratory, *Metrics for an Equitable and Just Energy System* (June 2021), https://perma.cc/SG7Y-5NHF.
[36] Mark Dyson et al., *Non-wires Solutions Implementation Playbook: A Practical Guide for Regulators, Utilities, and Developers*, RMI, at 15 (Dec. 2018), https://perma.cc/4XLQ-XYTZ ("Distribution planning processes have historically been opaque, making it difficult for regulators and market participants to identify and develop alternative solutions to address utility grid needs.").

options, and support the ability of utilities, intervenors, and regulators to track performance over time.

Transparency parameters should be developed through a broadly-inclusive stakeholder process of the type discussed above. As a starting point, however, to help set a clear baseline, EDCs should be required to report on whether under present conditions, any census tracts within their service areas are performing worse on key performance indicators related to reliability (such as SAIDI, SAIFI, CAIDI, CAIFI) and disconnections.[37] These data can then be fed into an analysis of whether investment in storage or other NWS can improve performance and can help support tracking of progress in correcting any inequities. In addition, EDCs that incorporate storage assets should be required to publicly report on the performance and utilization of those assets at regular intervals, including metrics that capture equity and resilience benefits.

3. Benefit-Cost Analysis

Question 1 observes that "[b]ecause of its versatility, energy storage has the potential to provide benefits other than resolving a specific resiliency or reliability problem," and asks, "Should these other functions be considered in a cost-effectiveness test?"[38]

CEA's answer to this question is yes. CEA support a comprehensive benefit-cost analysis for all utility distribution infrastructure investment decisions, including NWS and energy storage deployment, as part of an IDP process. The BCA should, consistent with the principles of energy justice,[39] incorporate societal benefits and costs, including the burdens of the current energy

[37] Pursuant to 52 Pa. Code § 57.192, the Commission establishes performance standards and benchmarks for EDCs at Docket No. M-00991220. Based on CEA's review of that docket, it appears that the Commission has not updated its standards, benchmarks, or EDC reporting requirements since 2004.
[38] PA PUC, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Secretarial Letter, at 4 (Aug. 12, 2021), https://perma.cc/DMB4-U286.
[39] Initiative for Energy Justice, *Energy Justice Workbook*, at 5 (Dec. 2019), https://perma.cc/6T7K-7S6A.

system on marginalized communities.[40] While the below discussion of potential value streams offers a starting point, the BCA framework should be developed and refined with the benefit of a stakeholder process that proactively includes environmental justice and low-income communities.

a. Public Health and Environmental Impacts

i. General Considerations

The BCA should account for public health and environmental impacts, including avoided impacts from air pollution.[41] This evaluation should examine environmental justice impacts across the lifecycle of projects and should be developed in consultation with environmental justice communities.

In particular, the BCA should address air quality impacts, since air quality issues are a significant public health and environmental issue in Pennsylvania,[42] and large parts of the state are designated as non-attainment areas for criteria pollutants under the Clean Air Act.[43] Properly valuing and accounting for the benefits of avoiding additional public health and air quality impacts is an essential equity issue. New York's approach to BCA offers a starting point for doing so.[44] New York allows the avoided cost of local pollutants like sulfur dioxide ("SO_2") and nitrogen oxide ("NO_x") to be counted as a benefit by non-emitting resources, with location-specific modifiers: "To the extent that DER alternatives would produce greater benefits or costs

[40] *See* National Energy Screening Project, *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, at 3-7 (Aug. 2020) (discussing "commonly considered non-utility system impacts" in benefit-cost analysis), https://perma.cc/S3F8-HSSN.
[41] *Id.* (discussing "public health impacts" as an example of "commonly considered non-utility system impacts" in benefit-cost analysis).
[42] Frank Kummer, *ProPublica report highlights Philadelphia-area locations where industrial air pollution exceeds EPA 'cancer risk'*, Philadelphia Inquirer (Nov. 5, 2021), https://perma.cc/Y7N4-PGBD.
[43] PA DEP, *Attainment Status by Principal Pollutants*, https://perma.cc/B6V8-UYHN (revised July 7, 2021).
[44] NY PSC, *Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision*, Case 14-M-0101, Order Establishing the Benefit Cost Analysis Framework (Jan. 21, 2016), https://perma.cc/6E33-2HKG.

[from SO_2 and NO_x] than those forecast in a utility's service territory because of local characteristics, including social or economic justice concerns related to emissions, that potential would be described and estimated in each utility's BCA Handbook."[45]

Additionally, as part of its Energy Storage Pilot Program, Maryland requires reporting "any emissions reductions" as part of a storage project's benefits.[46] The MD PSC has convened a Working Group that is actively developing approaches to evaluating such emissions reductions.[47] In its most recent report, the Working Group notes that PJM is planning to release "granular hourly [carbon dioxide], NOx, and SO2 emissions rates by load node," which will allow for "more granular and hourly emissions calculations...from distributed resources such as battery storage."[48]

ii. Avoided Dispatch of Peaking Power Plants

The highly localized air quality impacts of peaking power plants represent an important subset of air quality problems.[49] Peaking power plants are particularly highly-polluting (as well as operationally-expensive), are disproportionately sited in environmental justice communities, and are often dispatched on days when air quality is already bad.[50]

Accordingly, the public health benefits of avoiding dispatch of peaking power plants should also be accounted for in a BCA framework. Deployment of storage as a distribution asset

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[45] *Id.* at 19.
[46] Md. Code, Pub. Util. § 7-216(h)(7)(i)(47).
[47] PC 44 Energy Storage Working Group, *In the Matter of the Maryland Energy Storage Pilot Program*, Case No. 9619, Submission of the PC 44 Energy Storage Working Group (Mar. 31, 2021), https://perma.cc/YE38-A439.
[48] *Id.* at 4–5.
[49] *In the Matter of the Application of Consumers Energy Company for Authority to Increase its Rates for the Generation and Distribution of Energy and for Other Relief*, Case No. U-20963, Direct Testimony of Joseph Daniel on Behalf of the Environmental Law and Policy Center, the Ecology Center, the Solar Industries Association, and Vote Solar, at 17:1–18:3 (June 22, 2021), https://perma.cc/QMW8-MYJB; Physicians, Scientists, and Engineers for Healthy Energy, *Energy Storage Peaker Plant Replacement Project: Technical and Policy Documentation* (May 2020), https://perma.cc/5L95-5NQK; Krieger et al., *A Framework for Siting and Dispatch of Emerging Energy Resources to Realize Environmental and Health Benefits: Case Study on Peaker Power Plant Displacement*, 96 Energy Policy 302 (Sept. 2016), https://www.sciencedirect.com/science/article/abs/pii/S0301421516302798.
[50] UCS, *How to Ensure Energy Storage Policies are Equitable*, at 2 (Nov. 2019), https://perma.cc/LWU6-MN4H.

that properly incorporates this benefit into a BCA screen can help manage demand peaks efficiently, without needing to trigger dispatch of expensive and highly-polluting peaker plants, resulting in a win-win of efficient load management and improved local air quality.[51]

Notably, Pennsylvania's fleet of fossil-fired generating units includes six units that in 2020 each had a capacity factor of less than 1.5% and collectively emitted 337,458 lbs of NOx and 1,352,752 lbs of SO2.[52] These units' very low capacity factors indicate that they were rarely dispatched, and that peak demand might instead be managed in whole or in part with NWS, including storage, if the public health benefits of doing so were properly valued.

More broadly, the research literature supports the potential for appropriately-sited storage distribution assets to help manage local load peaks such as to reduce the frequency of dispatching peaking power plants.[53] For example, in California, Pacific Gas & Electric Company ("PG&E") recently contracted with two third-party owned energy storage projects to be interconnected with PG&E's distribution grid to help maintain reliability following the retirement of the Oakland Power Plant, a fossil-fuel peaking power plant, as part of a collaborative known as the Oakland Clean Energy Initiative.[54]

b. Avoided Greenhouse Gas Emissions

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[51] *Id.* at 5 ("Regulators can also consider how the deployment and dispatch of energy storage technologies can optimize public health benefits. Evaluating where the new energy resources should be located, as well as when they are used, can reduce pollution in underserved communities, particularly by avoiding the use of peakers.").
[52] U.S. Energy Information Administration, *Form EIA-923 Detailed Data with Previous Form Data (EIA-906/920)* (2021), https://perma.cc/LG28-G6SS. The six plants are Eddystone 3 (2020 capacity factor of 0.23%); Eddystone 4 (2020 capacity factor of 0.13%); Montour 1 (2020 capacity factor of 1.05%); Montour 2 (2020 capacity factor of 1.36%); and Scrubgrass (2020 capacity factor of 0.78%).
[53] Krieger et al., *A Framework for Siting and Dispatch of Emerging Energy Resources to Realize Environmental and Health Benefits: Case Study on Peaker Power Plant Displacement*, 96 Energy Policy 302 (Sept. 2016), https://www.sciencedirect.com/science/article/abs/pii/S0301421516302798.
[54] Paul Doherty, *PG&E Proposes Two Energy Storage Projects for Oakland Clean Energy Initiative to CPUC*, Currents: News and Perspectives from PG&E (Apr. 15, 2020), https://perma.cc/428N-W5V9.

The BCA should also account for the societal value of avoided greenhouse gas emissions.[55] This could be done by factoring the social cost of carbon into the BCA screen.[56] For example, New York incorporates the social cost of carbon into its valuation process for distributed energy resources ("DERs").[57] Additionally, in its Energy Storage Pilot Program, Maryland expressly includes greenhouse gases as part of emissions reductions that must be tracked as part of a storage project's benefits.[58] More broadly, the Institute for Policy Integrity notes twelve states factoring the social cost of carbon into policymaking.[59]

Because the avoided greenhouse gas impacts of a storage project will depend, among other things, on its operational profile and when charging cycles occur, evaluating those impacts will be complex.[60] However, a useful starting point in evaluating the social cost of carbon is the social cost of carbon values calculated by U.S. Government's Interagency Working Group on the Social Cost of Greenhouse Gases.[61]

c. Other Key Benefits

As a general matter, NWS can offer a wide range of benefits, and an appropriate BCA framework needs to be comprehensive enough to account for them. As noted above, the BCA framework should be developed through a stakeholder process that proactively includes

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[55] National Energy Screening Project, *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, at 3-7 (Aug. 2020) (identifying "[i]mpacts associated with GHG emissions" as one of "commonly considered non-utility system impacts" in benefit-cost analysis), https://perma.cc/V2FS-3Q9U; Sara Mulhauser, *Battery Energy Storage Technology Adoption and Utility Structure*, National Association of Utility Regulatory Commissioners, at 19 (Sept. 2020), https://perma.cc/P4JY-VQV2.

[56] Institute for Policy Integrity, *Technical Guidance: How Do We Apply the SCC in Our Analyses?*, Cost of Carbon Pollution: FAQ, https://perma.cc/C2XS-JKBU.

[57] NY Department of Public Service, *In the Matter of the Value of Distributed Energy Resources*, Case 15-E-0751, Updated Environmental Value (Apr. 21, 2021), https://perma.cc/TS5D-JYJ2.

[58] Md. Code, Pub. Util. § 7-216(e)(1)(v).

[59] Institute for Policy Integrity, *States Using the SCC*, Cost of Carbon Pollution, https://perma.cc/4FRE-HWMF.

[60] National Energy Screening Project, *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, at 4-21 (Aug. 2020), https://perma.cc/V2FS-3Q9U.

[61] Institute for Policy Integrity, *What is the SCC?*, Cost of Carbon Pollution, https://perma.cc/8WYY-3M5L; US Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide* (Feb. 2021), https://perma.cc/6F6C-6MEG.

environmental justice and low-income communities. As a starting point, some additional key benefits that a BCA framework should consider include:

1. Comprehensive valuation of resilience. Resiliency benefits can extend beyond traditional metrics of reliability. For example, the islanding, backup, and bridging capabilities of NWS that include microgrids can offer distinct benefits that should be accounted for. Additionally, avoiding and reducing outages for critical community facilities may produce more benefits than for other facilities, which should be factored into a BCA screen.
2. Enhancing DER hosting capacity. Increasing the distribution grid's ability to interconnect distributed generation can contribute to a range of benefits and avoided costs, including economic development and resiliency.[62]
3. Enhancing electric vehicle charging infrastructure. NWS that incorporate storage can help enhance the grid's ability to host electric vehicle charging, including by helping spread out load from advanced charging technologies such as Direct Current Fast Charging.
4. Economic development. NWS project development and operation can drive jobs and wealth creation, a particularly important benefit in environmental justice and low-income communities, and this value should be accounted for.[63] Community ownership is a distinct form of benefit that should be appropriately valued, and the metric for doing so should be developed through an inclusive stakeholder process.

d. General Principles of Benefit-Cost Analysis

[62] *See, e.g.,* Coalition for Community Solar Access, Vibrant Clean Energy, Vote Solar, and Local Solar for All, *Why Solar for All Costs Less: A New Roadmap for the Lowest Cost Grid* (Dec. 2020), https://perma.cc/DDX7-46KK.
[63] National Energy Screening Project, *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, at 3-7 (Aug. 2020) (identifying "economic development and jobs" as among "commonly considered non-utility system impacts"), https://perma.cc/V2FS-3Q9U; RMI, *Non-wires Solutions Implementation Playbook: A Practical Guide for Regulators, Utilities, and Developers*, at 7 (Dec. 2018) (identifying "[l]ocal economic development" and "[j]ob creation" as benefits that NWS can provide), https://rmi.org/insight/non-wires-solutions-playbook/.

More broadly, a BCA framework in Pennsylvania should also be consistent with the general BCA principles articulated in the National Standard Practice Manual, to provide clarity to utilities and stakeholders and ensure that all resources, including both traditional infrastructure and non-traditional alternatives, can be weighed fairly.[64] Such a BCA framework should be employed as part of the screening process for proposed investments, and all data inputs for the BCA framework should be kept up to date.

4. Storage Deployment Sizing

Question 1 also asks whether there should be "limitations on project size and scope" for energy storage deployments.[65] It is not in the public interest for arbitrary size limitations to be imposed on storage deployments because flexibility in sizing and design can enhance efficiency. As discussed further in the responses to Questions 4 and Question 7, the net cost of storage falls if it can be used to access multiple revenue streams. The Commission does not impose limits on the design of conventional distribution components, and thus should presume that arbitrary limitations on non-wire alternatives ("NWA") are discriminatory. Further, to the extent that the Commission limits storage access to revenues from multiple uses, such limitation must be consistent with reliability needs, rather than attempts to inhibit cost-effectiveness.

5. The Importance of Competitive Procurement

Question 1 also asks whether there should be "required [request for proposals ("RFPs")] to solicit potential third-party providers[.]"[66] As discussed in greater detail below in the response to Question 4, the Commission should require (1) that all proposed distribution infrastructure

[64] National Energy Screening Project, *National Standard Practice Manual For Benefit-Cost Analysis of Distributed Energy Resources* (Aug. 2020), https://perma.cc/S3F8-HSSN.
[65] PA PUC, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Secretarial Letter, at 4 (Aug. 12, 2021), https://perma.cc/DMB4-U286.
[66] *Id.*

investments be screened for whether a NWS would be more cost-effective than a traditional solution; and (2) that there are transparent and competitive RFPs for all NWS investments, including storage. An independent third-party administrator should, in consultation with stakeholders, lead the NWS screen, and design and administer the RFPs.[67] This is consistent with the findings of the CT PURA that competitive procurement for NWS "will substantially improve upon existing electric distribution company (EDC) approaches and will seek to leverage competitive forces to drive down the costs of both traditional distribution system capital and operational expenses and future NWA solutions."[68]

6. Storage Deployment Should Allow for Combination with Other Advanced Technologies

NWS that combine storage with other advanced technologies can deliver a broader value stack than storage can alone, so distribution planning and procurement processes should allow for multi-technology solutions. For example, one potential NWS project model is a third-party owned solar plus storage project.[69] Such a project could, pursuant to an NWS RFP, enter into a distribution support services contract with an EDC.[70] Integrated solar assets could help lower the costs of charging the storage and ensure it is more available to provide distribution support services to the EDC even under adverse grid conditions. The addition of solar may also help lower the costs of capital for the project, as a storage project "may be eligible for certain

[67] An exemption from this competitive procurement requirement for a *de minimis* investment below a threshold for which the administrative costs of an RFP would be efficient, if substantiated by facts, may be warranted, but should be discussed in a stakeholder process.

[68] CT PURA, *Investigation into Distribution System Planning of the Electric Distribution Companies - Non-wires Alternatives*, Docket No. 17-12-03RE07, Attachment A—Straw Non-Wires Alternatives Program Design, at 1 (July 30, 2021), https://perma.cc/9862-T8J8.

[69] Lisa Cohn, *What are Non-Wires Alternatives?*, Microgrid Knowledge (June 19, 2019), https://perma.cc/3UKU-9Q38.

[70] Christopher Berendt and C. Baird Brown, *A New Market Pathway for Microgrids: Distribution Support Service Agreements*, IDEA Educational Foundation Microgrid Educational Series (May 2020), https://perma.cc/Y3BB-QVM2; Paula Garcia, *A Clean Energy Alternative to a Risky Proposed Substation in East Boston*, UCS, at 1 (Nov. 21, 2019) (discussing the potential for solar plus storage to avoid the need to construct a substation in East Boston), https://perma.cc/C38Y-7TMK.

financial incentives (e.g., the federal Investment Tax Credit, or ITC) if it is co-located with solar PV and a certain amount of the storage resource's charging is supplied by the solar PV system."[71]

Such a project could also generate additional revenue and position itself to offer distribution support services at more competitive rates, by providing other services. For example, after ensuring the maintenance of adequate resources to meet distribution support obligations, the project could generate additional revenue through participation in wholesale markets and/or RTO/ISO or EDC demand management programs. If configured as a microgrid, such a project could also provide local resiliency services.[72]

An example of such an approach is the solar plus storage project under development at Valencia Gardens, a low-income and senior housing project in San Francisco.[73] This project will comprise 516 kWp of solar with a 250 kWh and 556 kWh energy storage system, and will be interconnected to the distribution grid.[74] The project is designed to provide multiple benefits, including distribution support services such as demand response and frequency regulation as well wholesale market services.[75] The project is also evaluating enhancements and costs necessary to configure the project as a microgrid, which could provide resilience benefits to residents, such as back-up power for critical facilities, during an outage.[76]

Additionally, as discussed below in response to Question 2, virtual power plants can combine distributed energy storage, solar, demand response, and advanced control technologies

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[71] National Energy Screening Project, *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, at 9-10 (Aug. 2020), https://perma.cc/V2FS-3Q9U.
[72] For example, such a project could incorporate design elements of a neighborhood resiliency hub, providing access to shelter and power for community residents during outages. *See, e.g.,* Clean Energy Group, *Maryland's New Resiliency Program Could Serve as Model for Other States* (Nov. 8, 2018), https://perma.cc/Z6AD-3KX6.
[73] Clean Coalition, *Valencia Gardens Energy Storage (VGES) Project* (May 2021), https://perma.cc/V3F7-9D89.
[74] *Id.*
[75] *Id.*
[76] *Id.*

to cost-effectively meet distribution needs and provide other benefits, including on-site backup power.[77]

Any approach to NWS and energy storage deployment in Pennsylvania should facilitate similar innovative, multi-value projects. Procurement should, accordingly, allow for bids to provide NWS reflecting a range of advanced technology combinations and project models, including solar plus storage, microgrids, and virtual power plants.

Response to Question 2

What EDCs have undertaken energy-storage initiatives as a pilot program and what were the results and lessons-learned?

1. Pilots

As discussed below, many states have moved beyond the pilot stage with regard to storage as a distribution asset, and are working to fully integrate storage along with other non-wires solutions into integrated distribution planning.[78] However, some states have also pursued pilot programs with particular learning goals. One key example of such an approach is Maryland. In 2019, the Maryland General Assembly passed Senate Bill 573, known as the Energy Storage Pilot Program Act (the "Act").[79] The Act allowed for projects to both serve local distribution needs and sell power into wholesale markets when not serving distribution needs.[80]

The Act delineated four different regulatory models for participating storage projects: (1) "utility-only," in which the EDC owns and operates an energy storage project for both distribution services and other applications, including wholesale markets;[81] (2) "utility and third-

[77] *See infra* at Response to Question 2.
[78] *See infra* at Response to Question 3.
[79] Md. Code, Pub. Util. § 7-216.
[80] *Id.* § 7-216(c).
[81] *Id.* § 7-216(c)(1).

party," in which the EDC owns and operates an energy storage project for distribution purposes and a third-party operates the project in wholesale markets and other applications;[82] (3) "third-party ownership," in which a third-party would own the project and contract with an EDC for distribution services, and the third-party would be allowed to also use the project for other applications, including wholesale markets, when not providing distribution services;[83] and (4) a "virtual power plant" model in which an EDC would aggregate or use a third-party aggregator to receive distribution services from distributed energy storage projects owned by customers or a third-party (with those projects authorized for use in other applications, including wholesale markets, when not providing distribution services).[84]

The Act required each investor-owned EDC in Maryland to solicit offers to develop energy storage projects from each of the four ownership models described above.[85] The Act also required each investor-owned EDC to submit to the MD PSC projects from at least two of the ownership models, with one of the proposals required to be either third-party owned or a virtual power plant.[86] On August 23, 2019, the MD PSC issued an order initiating the pilot program in accordance with the Act.[87] Although the pilot program is still in early stages, it provides a useful reference point as to the range of different regulatory structures potentially applicable to energy storage as a distribution asset.

Notably, EDCs in several other jurisdictions have also recently undertaken initiatives relating to a virtual power plant model aggregating distributed storage or solar plus storage projects. In Massachusetts, Eversource and National Grid operate a demand response program

[82] *Id.* § 7-216(c)(2).
[83] *Id.* § 7-216(c)(3).
[84] *Id.* § 7-216(c)(4).
[85] *Id.* § 7-216(c).
[86] *Id.* § 7-216(d)(1).
[87] MD PSC, *In the Matter of the Maryland Energy Storage Pilot Program*, Case No. 9619, Order Establishing an Energy Storage Pilot Program, ML# 226537 (Aug. 23, 2019), https://perma.cc/HW4V-LS44.

called "ConnectedSolutions," which aggregates customer-owned behind-the-meter storage or solar plus storage installations to meet distribution needs.[88] ConnectedSolutions began as a pilot, but due to its success was recently expanded to be a full non-pilot program.[89] Under ConnectedSolutions, participating customers receive a performance payment when their storage asset is called upon by the EDC.[90] Across both EDCs, about 1,000 batteries participate in ConnectedSolutions, and provide approximately 5 MW of peak load reduction.[91]

EDCs in Connecticut and Rhode Island have, inspired by the Massachusetts example, adopted similar ConnectedSolutions programs.[92] Additionally, in Oregon, Portland General Electric recently initiated a virtual power plant pilot which will aggregate 525 customer-owned behind the meter batteries, with the goal of providing 2-4 MW of peak load reduction.[93] Finally, in New York, Con Ed recently announced a virtual power plant program that will aggregate distributed, behind-the-meter storage and solar plus storage projects to provide distribution support services.[94]

2. Relevant Non-Pilot Initiatives

In addition to pilot programs, several jurisdictions have adopted relevant non-pilot legislation. These efforts hold their own lessons that complement those described above. Several

[88] Eversource, *Battery Storage Demand Response Program FAQs* (2021), https://www.eversource.com/content/ema-c/residential/save-money-energy/manage-energy-costs-usage/demand-response/battery-storage-demand-response/home-battery-storage-faqs; National Grid, *Battery Program: Using Your Battery Storage Device to Make the Grid More Sustainable* (2021), https://perma.cc/JV73-LBAP.
[89] Jeff St. John, *Massachusetts Blazes Its Own Trail on Distributed Energy Policy*, Greentech Media (Nov. 4, 2020), https://perma.cc/H47G-KXFS.
[90] *Id.*
[91] *Id.*
[92] Clean Energy States Alliance, *Energy Storage Best Practices from New England*, at 8 (Aug. 2021), https://perma.cc/MQ4E-VBKK.
[93] Clean Energy Group, *An Introduction to Virtual Power Plants* (Sept. 28, 2020), https://perma.cc/JB4B-V5WV.
[94] Andy Colthorpe, *New York utility Con Edison recognizes value of home energy storage with new virtual power plant*, Energy Storage News (March 17, 2021), https://perma.cc/4NYP-ZNBT.

of these efforts were described in the comments submitted by NRDC in response to the previous set of PA PUC questions in February 2021.[95]

Since then, new developments have occurred in several of the case studies. To start, in New Hampshire, the legislature passed S.B. 91 in August 2021.[96] The bill established a proceeding to investigate various issues regarding energy storage in the state, including "ways to enable energy storage projects to receive compensation for avoided transmission and distribution costs, including avoided regional and local network service charges, while also participating in wholesale energy markets. The commission shall investigate how this might be done for both utility-owned and non-utility-owned energy storage projects, as well as for both behind-the-meter storage and front-of-the-meter storage."[97] In the bill, New Hampshire intends to explore "how to compensate energy storage projects that participate in wholesale electricity markets for actual avoided transmission and distribution costs in a manner that provides net savings to consumers" and expressly seeks to "encourage both utility and non-utility investments in energy storage projects."[98] The bill established a time limit of two years for the proceeding.

In Texas, the legislature passed S.B. 415 in June 2021,[99] a bill that restricts transmission and distribution ("T&D") utilities from owning and operating energy storage but allows them to enter into a "contract with a power generation company to provide electric energy from an electric energy storage facility to ensure reliable service to distribution customers."[100] In addition to this clear delineation between third-party contracts and restricted utility ownership, the bill mandates that utilities issue a request for proposals before entering into a contract. Texas S.B.

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[95] NRDC, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Comments (Feb. 19, 2021), https://www.puc.pa.gov/pcdocs/1693787.pdf.
[96] S.B. 91, 2021 Regular Session (N.H. 2021), https://perma.cc/MB7E-TULU.
[97] *Id*.
[98] *Id*.
[99] S.B. 415, 87th Leg. 2021–2022 (Tex. 2021) ("Tex. S.B. 415"), https://perma.cc/RUT7-3J6M.
[100] *Id.*

415 also only allows utilities to initiate a contract "if use of an electric energy storage facility is more cost-effective than construction or modification of traditional distribution facilities."[101] The bill places the burden of proof on the utility to prove that contract costs are reasonable and necessary, but does allow recovery of a reasonable rate of return. With regards to the third-party operator ("TPO"), the bill allows TPOs to "sell electric energy or ancillary services" from the storage asset as long as they reserve the storage capacity required by the contract with the utility.[102]

In Connecticut, the legislature approved the ability for EDCs to own storage assets in 2019.[103] Connecticut then conducted a regulatory proceeding to implement this change by exploring the value of storage and determining territory-specific implementation details. The decision from that proceeding was published by the Connecticut Public Utilities Regulatory Authority on July 28, 2021, as part of Connecticut's Equitable Modern Grid initiative.[104] That decision established the Connecticut Electricity Storage Program, set to go into effect in early 2022. The program will be jointly administered by EDCs and the Connecticut Green Bank ("CGB") and includes several important policies that may guide storage deployment in Pennsylvania. First, there is a consistent focus on equitable outcomes and the protection of low-income customers. This focus is part of the program's data transparency, because utilities are required to disclose pre-identified metrics that include items like total installed storage capacity and installed storage energy in low-income households and underserved communities.[105] The

[101] *Id.*
[102] *Id.*
[103] Connecticut General Assembly, *Public Act No. 19-35: An Act Concerning A Green Economy And Environmental Protection* (January 2019), https://trackbill.com/bill/connecticut-house-bill-5002-an-act-concerning-a-green-economy-and-environmental-protection/1621037/.
[104] CT PURA, *PURA Investigation Into Distribution System Planning of the Electric Distribution Companies - Electric Storage*, Docket No. 17-12-03RE03, Decision (July 28, 2021), https://perma.cc/VE73-BN73.
[105] *Id.* at 42.

program also allows an upfront incentive adder for residential storage customers from households in environmental justice communities whose household income is less than 60% of the state median.[106] Finally, the CT PURA calls on utilities to "strive to deploy 40 percent of the residential installations in low-income households statewide and LMI households in underserved communities,"[107] and will monitor progress towards this goal via annual program reviews.

In addition to the focus on low-income customers, Connecticut's storage program design includes notable features for increased transparency. These include a clear benefit-cost analysis framework that outlines the role of each type of cost-benefit test and the benefits that are included in each. While the CT PURA relied on existing cost-benefit tests, it also stated in its decision that "not all Program benefits or Objectives can be captured through these tests, such as the added resilience for underserved communities and small businesses, or the local health benefits of replacing fossil fuel-based peaking generation and backup generators."[108] Connecticut's EDCs and the CGB are required to update the BCAs in each annual review that they produce and to use a competitive RFP to retain an independent party to evaluate, measure, and verify the results of the program, including BCA results.[109]

3. Pilots Should Be Limited to Genuine Learning Needs, Because Storage is a Mature Technology Ready for Full Deployment

The U.S. is on track to deploy 14.5 gigawatt-hours ("GWh") of storage across residential, commercial, and front-of-the-meter sectors by the end of 2021—more than the total energy storage installed in the U.S. from 2012 to 2020 combined.[110] This deployment tempo, and the

[106] *Id.* at 11–13.
[107] *Id.* at 13.
[108] *Id.* at 34.
[109] *Id.* at 45–46.
[110] Chloe Holden et al., *U.S. Energy Storage Monitor Q3 2021,* Wood Mackenzie (Sept. 2021), https://www.woodmac.com/industry/power-and-renewables/us-energy-storage-monitor/.

fact that many jurisdictions have moved beyond pilot projects and implemented more robust energy storage frameworks for electric utilities, shows that storage is a mature technology that is ready for widespread deployment.

Consequently, pilot programs should be used in Pennsylvania only to test new technologies or policy designs for which sufficient learnings from other jurisdictions are not available, and in those cases they should be designed to fill learning gaps and introduce new prototype technologies at a small scale. While pilot programs have an important role in spurring widespread storage deployment, there comes a point where pilots no longer break new ground and instead slow down large-scale deployment. CEA believe that that point has largely arrived for the deployment of storage on utility distribution systems.

Response to Question 3

Under what circumstances is it appropriate to deploy energy storage as compared to traditional infrastructure upgrades?

Although the December 3, 2020 Secretarial Letter that commenced this proceeding identified electric distribution company investments in storage assets as a "specific focus" of the Commission, it outlined a broad scope for the docket, overall: "the Commission is interested in exploring policies which can allow electric utilities the opportunity to substitute conventional distribution upgrades with alternatives that may provide sound economic investments."[111] Accordingly, the third question in the 2020 Secretarial Letter raised the issue of how EDCs conduct distribution system planning, asking whether it is "prudent for utilities to include electric

[111] PA PUC, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Secretarial Letter, at 2 (Dec. 3, 2020), https://www.puc.pa.gov/pcdocs/1686327.doc.

storage in their distribution resource planning and, if so, where and under what circumstances."[112]

In response, several commenters, including the Advanced Energy Management Alliance, the Energy Storage Association, and NRDC, outlined the need for a new distribution planning framework in Pennsylvania to better accommodate the deployment of energy storage. The Office of Consumer Advocate also called for the Commission to "consider moving to integrated distribution planning (IDP), which is a comprehensive planning framework that requires, among other things, behind-the-meter resource forecasting, hosting capacity analysis, and benefit/cost analysis of non-wires alternatives."[113] OCA's comments included a 44-page report from Rakon Energy, LLC that describes the shortcomings of Pennsylvania's current distribution planning framework, explains how IDP can address those shortcomings, and provides examples of how other states are adopting IDP frameworks.

The Clean Energy Advocates strongly support the adoption of IDP in the Commonwealth for the reasons set forth in the Rakon Energy report, and because the use of IDP can ensure that storage assets and other NWS are deployed in a manner that is both equitable and transparent, as we urge in response to Question 1. The paragraphs that follow will emphasize the importance of IDP to the consideration of non-wires solutions ("NWS"), discuss the state of IDP adoption in other jurisdictions, and—building on OCA's initial comments—explain why the long-term infrastructure planning process under Act 11 of 2012 ("Act 11"), which authorizes the recovery

[112] *Id.* at 3.
[113] OCA, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Comments at 1 (Feb. 18, 2021), https://perma.cc/KLM5-7DXH.

of distribution system infrastructure charges in the Public Utility Code, is an inadequate tool for forward-looking distribution planning.[114]

1. IDP and Non-Wires Alternatives

One of IDP's key advantages is that it creates a framework allowing energy storage and other NWS to be considered as options alongside traditional infrastructure investments.[115] As a report from the Mid-Atlantic Distributed Resources Initiative ("MADRI") explains:

> The essence of an IDP, and what sets it apart from a traditional distribution system planning process, is the integrated approach. All options to address forecasted needs should be considered on a fair and equal footing. This includes not just distribution infrastructure investments, but also greater use of NWAs.[116]

New York and California are generally recognized as the leading states in developing NWS approaches.[117] However, in determining how the assessment of NWS should be incorporated into IDP in Pennsylvania, the Commission should also look to other states that have adopted NWS frameworks, including Maine, Michigan, New Hampshire, Rhode Island, and Vermont. For example, utilities in Maine must identify potential opportunities for NWS when they file their capital investment plans. Maine has also created an NWS coordinator role within the Office of the Public Advocate to review utility investment plans, evaluate their cost-benefit calculations,

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[114] *See* 66 Pa.C.S. §§1350–1360; PA PUC, *Implementation of Act 11 of 2012*, Docket No. M-2012-2293611, Supplemental Implementation Order (Sept. 21, 2016), https://www.puc.pa.gov/pcdocs/1475413.doc; PA PUC, *Implementation of Act 11 of 2012*, Docket No. M-2012-2293611, Final Implementation Order (Aug. 2, 2012), https://perma.cc/W7HN-F2P4.

[115] Smart Electric Power Alliance, *Integrated Distribution Planning: A Framework for the Future*, at 11 (Sept. 2020) https://sepapower.org/resource/integrated-distribution-planning-a-framework-for-the-future/ ("In many cases the 'integrated' portion of IDP references integration of NWAs and other potential solutions to grid constraints into the planning processes.").

[116] Mid-Atlantic Distributed Resources Initiative, *Integrated Distribution Planning for Electric Utilities: Guidance for Public Utility Commissions*, at 27–28 (Oct. 2019), https://www.madrionline.org/wp-content/uploads/2019/10/MADRI_IDP_Final.pdf.

[117] Wood Mackenzie maintains a database of NWA opportunities in the U.S. and, as of August 2020, disclosed that 72% of 321 total NWA opportunities that they track are located in New York and California, showing the predominance of NWA in those two states. Francesco Menonna, *U.S. utilities are leaving non-wires alternatives on the table*, Wood Mackenzie (August 27, 2020), https://perma.cc/P25Y-DQF4.

and recommend a course of action for the utility.[118] CEA support the establishment of a third-party NWS coordinator and evaluator for Pennsylvania as part of an IDP framework.[119]

2. IDP in Other States

An increasing number of states have begun to adopt IDP for distribution-system planning. According to the Smart Electric Power Alliance ("SEPA"), twenty-six states plus Washington D.C. and Puerto Rico have initiated proceedings to examine IDP. Of these 28 jurisdictions, 18 have held proceedings, four are in the process of implementing IDP, and six have established enhanced distribution planning processes aligned with IDP.[120] Figure 1 below shows the high-level approaches to IDP across those six states.

Figure 1: States With Established Integrated Distribution Planning Processes[121]

Table 2: State IDP Objectives and Goals

State	Objective/Goal/Vision
New York	▪ Transition to a Distribution System Platform (DSP) and enable efficient investments in DERs ▪ Roadmap for technology investments to improve the intelligence of the grid and prepare for higher DER penetration levels ▪ Provide data to bring greater transparency to the planning process ▪ Address the tools, processes, and protocols needed to plan and operate a modern grid[18]
California	▪ Modernize the electric distribution system to accommodate two-way flows of energy and energy services throughout the IOUs' networks ▪ Enable customer choice of new technologies and services that reduce emissions and improve reliability in a cost-effective manner ▪ Animate opportunities for DERs to realize benefits by providing grid services[19]
Hawaii	▪ Comprehensive, customer centric, planning and sourcing process ▪ Identify and enable the optimal mix of DER, DR, and grid-scale resources ▪ Harmonize resource, transmission, and distribution planning processes[20]
Minnesota	▪ Enhance the customer experience ▪ Lead the clean energy transition ▪ Keep customer bills low ▪ Safe, reliable, affordable electric service—with an eye to the future[21]
Rhode Island	▪ Identify and reveal spatiotemporal value on the distribution system ▪ Source DER solutions from the marketplace ▪ Guide investment decisions by the utility, customers, and third-parties[22]
Nevada	▪ Evaluate locational benefits and costs of distributed resources ▪ Propose standard tariffs, contracts, or other mechanisms for the deployment of cost-effective distributed resources ▪ Coordinate existing programs approved by the Commission ▪ Identify spending necessary to integrate cost-effective distributed resources ▪ Identify barriers to deployment of distributed resources[23]

Source: Smart Electric Power Alliance, 2020.

[118] 129th Maine Legislature, *LD1181: An Act to Reduce Electricity Costs Through Nonwires Alternatives* (2019), https://legislature.maine.gov/legis/bills/display_ps.asp?paper=HP0855&PID=undefined&snum=129.
[119] *See infra* at Response to Question 4.
[120] Harry Cutler and Brenda Chew, *Integrated Distribution Planning (IDP): What is it? And how do we achieve it?*, Smart Electric Power Alliance (Nov. 5, 2020), https://sepapower.org/knowledge/integrated-distribution-planning-idp-what-is-it-and-how-do-we-achieve-it/.
[121] Smart Electric Power Alliance, *Integrated Distribution Planning: A Framework for the Future*, at 13 (Sept. 2020) https://sepapower.org/resource/integrated-distribution-planning-a-framework-for-the-future/.

The New York example is especially relevant to this proceeding given the state's focus on NWS. In New York, the drive for utilities to consider NWS began with the 2016 REV proceeding, under which each utility is required to publish a Distributed System Implementation Plan ("DSIP") every two years.[122] The plan must include specific impending infrastructure projects and must identify areas that are in line for distribution system upgrades so that NWS can be considered as alternatives.[123] The New York State Energy Research and Development Authority maintains a website in which NWS opportunities are published by utilities so that third parties can easily track and respond to NWS RFPs.[124] The website maintains a list of both past and current opportunities, showing a clear prioritization of NWS as a valid solution to distribution grid needs.

The Pacific Northwest National Laboratory ("PNNL") published a review of distribution-system planning in May 2018 that identifies several benefits of IDP, including increased opportunities for meaningful regulator and stakeholder engagement, comprehensive and holistic planning, and improved forecasting of grid needs and priorities.[125] Similar and more recent studies from MADRI in October 2019 and SEPA in September 2020 reinforce the benefits of IDP, especially in relation to assets like energy storage that can provide transmission, distribution, and generation benefits.[126] While energy storage is vitally important to a decarbonized grid, in some cases it might be best deployed as part of a portfolio of solutions for

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[122] Olivia Pearman and Abigail Anthony, *Distributed System Implementation Plans in New York: Summary and Analysis*, Acadia Center (June 21, 2017) https://perma.cc/3KVL-HQHJ.
[123] *Id*.
[124] NYSERDA, *REVConnect: Non-Wires Alternatives* (2021), https://perma.cc/B8RH-EHWQ.
[125] A.L. Cooke, L.C. Schwartz, and J.S. Homer, *Distribution System Planning – State Examples by Topic*, Pacific Northwest National Laboratory (May 2018), https://perma.cc/SQ32-U225.
[126] Smart Electric Power Alliance, *Integrated Distribution Planning: A Framework for the Future*, at 13 (Sept. 2020) https://sepapower.org/resource/integrated-distribution-planning-a-framework-for-the-future/; Mid-Atlantic Distributed Resources Initiative, *Integrated Distribution Planning for Electric Utilities: a Guide for Public Utility Commissions*, at 27–28 (Oct. 2019), https://www.madrionline.org/wp-content/uploads/2019/10/MADRI_IDP_Final.pdf.

a particular location. IDP offers a way to fully assess these alternatives, take stakeholder feedback into account, and provide a reliable and least-cost distribution grid to customers.

3. The Limitations of Pennsylvania's Long-Term Infrastructure Planning Process

OCA's initial comments in this proceeding note that EDCs are required to evaluate their systems for compliance with state and federal standards, and that one of the ways that EDCs currently meet these requirements is through Long-Term Infrastructure Improvement Plans ("LTIIP") under Act 11.[127] OCA also notes that that the LTIIP process is very limited compared to IDP, because it "is focused on the need to replace, upgrade, or add distribution infrastructure to enhance the safety, reliability, and security of the grid" and is "not necessarily designed to compare and evaluate the benefits of non-wires alternatives against traditional replacement of electric distribution infrastructure."[128]

CEA strongly agree with OCA that the LTIIP process is not an effective surrogate for IDP. First, the LTIIP process is voluntary, not mandatory. Second, while IDP is about conforming distribution systems to future needs and imperatives, the LTIIP process is essentially backward-looking. For example, distribution system improvement charges ("DSIC") are not recoverable for improving hosting capacity to support increased numbers of distributed energy resources, but only to repair, improve, and replace "eligible property," a category that by definition is limited to existing property. Nor does the LTIIP process require any consideration of NWS, let alone condition the Commission's approval of plans on such consideration.

In addition, the fact that the LTIIP process for EDCs was established only in 2012 begs the question of what statutory scheme governed EDC distribution planning before 2012 (and

[127] OCA, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Comments at 3 (Feb. 18, 2021), https://perma.cc/KLM5-7DXH.
[128] OCA, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Comments at 3, 4 (Feb. 18, 2021), https://perma.cc/KLM5-7DXH.

continues to govern types of system planning not covered under Act 11). The answer appears to be the Commission's broad statutory authority to establish just and reasonable rates and provide for adequate, efficient, safe service and facilities. CEA respectfully submit that the Commission can and should exercise this authority to direct the use of IDP in Pennsylvania.

4. Statewide Adoption of IEEE-1547-2018

In response to the Commission's stated interest "in exploring policies which can allow electric utilities the opportunity to substitute conventional distribution upgrades with alternatives that may provide sound economic investments,"[129] OCA recommended that the Commission should not just adopt IDP, but also initiate a statewide stakeholder proceeding regarding the adoption of Institute for Electrical and Electronics Engineers Standard 1547TM -2018 for Interconnection and Interoperability of DERs and Associated Electric Power Systems Interfaces ("IEEE 1547-2018").[130] The Clean Energy Advocates strongly support this recommendation.

By way of background, IEEE 1547-2018 applies to many DERs of the size found on distribution systems, including storage, and among other things, specifies the performance and functional technical capability requirements needed to ensure effective DER interconnections and requires DERs to be capable of performing specific grid support functions related to voltage, frequency, communications, and controls. The goal of the standard is to ensure that with increasing levels of DERs, both the distribution and bulk power systems will remain reliable and can be visible to grid operators. Through the capabilities established by IEEE 1547-2018, EDCs have far greater access to and use of the reliability benefits of relevant DERs.[131]

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[129] PA PUC, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Secretarial Letter, at 2 (Dec. 3, 2020), https://www.puc.pa.gov/pcdocs/1686327.doc.
[130] OCA, *Policy Proceeding—Utilization of Storage Resources as Electric Distribution Assets*, Docket No. M-2020-3022877, Comments, at 5–6 (Feb. 18, 2021), https://perma.cc/KLM5-7DXH.
[131] *See* NERC, *Reliability Guideline: Bulk Power System Reliability Perspectives on the Adoption of IEEE 1547-2018* (Mar. 2020), https://perma.cc/7MWE-37J7.

The Commission's interconnection regulations incorporate changes to IEEE 1547, including the adoption of IEEE 1547-2018, by reference.[132] However, the reliable deployment of IEEE 1547-2018-compliant equipment requires additional action by the Commission. According to the North American Electric Reliability Corporation ("NERC"):

> The specifications for DERs in IEEE 1547-2018 include performance capability categories and allowable ranges of functional settings that provide flexibility to align with specific system needs. However, these flexibilities require coordination between distribution and transmission entities for effective adoption. The adoption of IEEE 1547-2018 requires the authority governing interconnection requirements (AGIR) and various stakeholders to get involved at a deeper technical level than in the past. Due to the required amount of coordination in IEEE 1547-2018, it is expected that AGIRs may need around two years to develop an effective implementation plan for the standard.[133]

In light of NERC's statement, the NARUC Board of Directors in February 2020 adopted a resolution recommending that "state commissions, consistent with the practices and procedures of that State, convene proceedings that engage stakeholders soon; utilize existing research and experience and make evidence-based decisions to adopt the current IEEE 1547; and align implementation of the Standard with the availability of certified equipment."[134]

Many states have initiated stakeholder proceedings concerning IEEE 1547-2018, as NARUC recommends.[135] Pennsylvania has not. CEA urge the Commission to do so as soon as possible.

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[132] *See* 52 Pa. Code § 75.35.

[133] NERC, *Reliability Guideline: Bulk Power System Reliability Perspectives on the Adoption of IEEE 1547-2018*, at v (Mar. 2020), https://perma.cc/7MWE-37J7.

[134] NARUC, *Resolution Recommending State Commissions to Adopt and Implement Distributed Energy Resources Standard IEEE 1547-2018*, at 2 (Feb. 12, 2020), https://perma.cc/RLV5-GV6L.

[135] As of September 2021, the public utility commissions in two states (Maryland and Minnesota) and the District of Columbia had finalized IEEE 1547-2018 implementation orders following stakeholder proceedings, and eleven more (including Texas, North Carolina, and Kentucky) had opened dockets or initiated inquiries concerning implementation. *See* IEEE Standards Association, *Adoption of IEEE Standard 1547-2018* (Sept. 2021), https://perma.cc/CB3Z-4GNA.

Response to Question 4

Who should own an energy-storage asset? EDCs, third-party vendors, or some combination of both?

1. Competitive Procurement Can Help Enhance Cost-Effectiveness and Provide Opportunities for Community Ownership

With regard to ownership, it is essential as a starting point that the Commission require transparent, competitive solicitations for NWS, including energy storage projects. Maximizing transparency and participation in such solicitations will help ensure that the best and lowest cost solutions are surfaced, which is core to protecting ratepayer interests.

Importantly, such an approach will help provide opportunities for community-owned energy storage assets to compete for solicitations to provide distribution services to EDCs.[136] Facilitating community ownership of energy storage assets is an essential component of energy justice and energy democracy, and it can help provide a range of benefits to overburdened communities, including jobs and wealth creation.[137] As the Union of Concerned Scientists has observed, storage "offers the opportunity to generate revenue by providing grid services—such as frequency regulation, capacity, and demand response, all of which could translate into local wealth creation for community-owned projects."[138] As RMI has observed, "Rather than

[136] Sustainable Economies Law Center, *Community Renewable Energy*, https://perma.cc/V4S8-M3PW; UCS, *How to Ensure Energy Storage Policies are Equitable*, at 5 (Nov. 2019), https://perma.cc/LWU6-MN4H ("Importantly, utilities should be required to conduct open solicitations to meet proposed resource needs—which can allow for different ownership models, enabling distributed resources such as storage to qualify.").
[137] Initiative for Energy Justice, *Energy Justice Workbook*, at 16-17 (Dec. 2019), https://perma.cc/6T7K-7S6A; UCS, *Frequently Asked Questions about Community-Level and Large-Scale Battery Energy Storage*, at 2 (Sept. 2021), https://perma.cc/JPV5-KYUN; Pacific Northwest National Laboratory, *Community Energy Storage and Energy Equity*, at 1 (June 2021), https://perma.cc/N3XQ-VYEQ.
[138] UCS, *How to Ensure Energy Storage Policies are Equitable*, at 3 (Nov. 2019), https://perma.cc/LWU6-MN4H; Pacific Northwest National Laboratory, *Community Energy Storage and Energy Equity*, at 1 (June 2021), https://perma.cc/N3XQ-VYEQ ("Community ownership of assets is one way to deliver a more equitable distribution of benefits and control in the energy sector.").

deploying traditional utility-owned infrastructure, NWS can provide opportunities for local investment

in communities where customer-sited solutions can address grid needs."[139] Additionally, "[w]hereas traditional infrastructure equipment markets are mature, non-wires solution projects support the animation of DER markets in which rapid innovation is unlocking significant potential for new job growth."[140]

Creating the conditions for creative and open competition, including opportunities for community ownership, will require the development of detailed guardrails to ensure transparency. Since EDCs' "regulated level of profit is based in turn on their investment in the assets (wires and generators, meters and software) used in their business," EDCs "typically have no incentive to have their assets displaced by resources owned by customers or...third-party service providers."[141]

As a recent NARUC report observed, this dynamic can result in "missing markets" for energy storage distribution services.[142] "Absent regulatory action," the report concluded, "there is little incentive for utilities to share detailed distribution-level data with potential competitors, and the information asymmetry that results exacerbates the missing markets failure."[143]

Along similar lines, CT PURA found that unlike traditional distribution infrastructure, in the context of NWAs, "the conditions of a natural monopoly do not exist," because "NWAs by

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[139] RMI, *Non-wires Solutions Implementation Playbook: A Practical Guide for Regulators, Utilities, and Developers*, at 14 (Dec. 2018), https://perma.cc/4XLQ-XYTZ.
[140] *Id*.
[141] C. Baird Brown, *Financing at the Grid Edge*, 48 Envtl. L. Rep. News & Analysis 10785, 10788–89 (2018), https://perma.cc/NE2Q-HP43; Lisa Cohn, *What are Non-Wires Alternatives?*, Microgrid Knowledge (June 2019), https://perma.cc/3UKU-9Q38 ("Utilities have major incentives for investing in traditional infrastructure... because they earn a rate of return on these expenditures that are included in their rate base").
[142] Sara Mulhauser, *Battery Energy Storage Technology Adoption and Utility Structure*, National Association of Utility Regulatory Commissioners, at 18 (Sept. 2020), https://perma.cc/P4JY-VQV2.
[143] *Id.*

their nature as alternatives to traditional utility infrastructure, made technologically and economically feasible by advanced technologies, may be better understood and more economically and reliably implemented by non-utility energy companies."[144] As such, "possible competition is preferable so long as safe, affordable, and reliable service is thereby furthered," and "NWAs present just this opportunity."[145]

With regard to whether EDCs should own energy storage deployed as a distribution asset, the issue is complex. CEA believe that this question must be explored within a transparent and participatory IDP framework in which particular EDC proposals can be evaluated in the context of comprehensive NWS screening and a competitive bidding process. Only after the implementation of such processes can it be determined clearly whether the market is unable to meet certain storage needs, such that it would be appropriate to consider a potential role for EDC ownership.

2. Protecting Space for Competition

As discussed above in the response to Question 3, a well-designed and transparent IDP process is key to the development of cost-effective NWS proposals. Such a process should review any proposed distribution system investment, and screen for the potential of NWS to meet the identified need.[146] A competitive solicitation via RFP should be conducted where the potential for NWS to meet a distribution need is identified. In order to help support transparency

[144] CT PURA, *Investigation Into Distribution System Planning of the Electric Distribution Companies - Non-wires Alternative*s, Docket No. 17-12-03RE07, Attachment A - Straw Non-Wires Alternatives Program Design, at 3 (July 30, 2021), https://perma.cc/9862-T8J8.
[145] *Id.*
[146] *Id.* at 7.

and competition, an independent third-party administrator should, in consultation with stakeholders, lead the NWS screen, and design and administer the RFPs.[147]

More broadly, an RFP should take a "best-fit" technical approach that allows for combinations of advanced technologies, including energy storage, demand response, and solar, and project models, including microgrids and virtual power plants. As RMI recommends, "RFPs should provide ample data to bidders accurately describing the identified need and desired performance attributes of the solution, while remaining agnostic to all potential technology proposals."[148]

In addition, EDCs, as part of the IDP process, should be required to maintain updated public "heat maps" indicating areas of projected upcoming distribution capacity needs. For example, in New York, National Grid and the Joint Utilities "provide public maps containing pertinent grid topology and feeder-level load information."[149] To ensure that innovative and cost-effective solutions can be surfaced, third parties should be allowed to review these maps and submit unsolicited proposals for NWS, which should be opened to competitive counterproposals.

Finally, EDCs should be required to offer bankable, long-term contracts for NWS. Such contracts could be based on the distribution support services agreements concept proposed by the Microgrid Resources Coalition.[150] Bankable, long-term contracts are important for market development generally.[151] They are particularly important for creating opportunities for

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[147] As noted above, an exemption from this competitive procurement requirement for a *de minimis* investment below a threshold for which the administrative costs of an RFP would be efficient, if substantiated by facts, may be warranted, but should be discussed in a stakeholder process.
[148] RMI, *Non-wires Solutions Implementation Playbook: A Practical Guide for Regulators, Utilities, and Developers*, at 46–47 (Dec. 2018), https://perma.cc/4XLQ-XYTZ.
[149] *Id.* at 60; *See also* PG&E, *Distribution-Resource Planning Data Portal* (2021), https://perma.cc/L743-VGCA.
[150] Christopher Berendt and C. Baird Brown, *A New Market Pathway for Microgrids: Distribution Support Service Agreements*, IDEA Educational Foundation Microgrid Educational Series (May 2020), https://perma.cc/Y3BB-QVM2.
[151] Dr. Jurgen Weiss and Dr. Mark Sarro, *The Importance of Long-Term Contracting for Facilitating Renewable Energy Project Development*, Brattle Group (May 2013), https://perma.cc/G5XE-URBF.

community development and ownership of projects, as it can open up access to capital for project development through financing based on reliable revenue streams from a credit-worthy EDC.[152]

3. Storage Should Help Pay For Itself With Diversified Revenue Streams

Finally, in order to maximize affordability and to protect low-income ratepayers from unnecessary rate increases, it is critical that all potential revenue streams of an energy storage asset be used and that no part of the storage asset lies idle unnecessarily.[153] The distribution grid will require substantial investments in coming years to withstand climate-change-driven severe weather events and accommodate increased levels of electric vehicles and distributed energy resources, but it is a matter of energy justice that such investments be made as efficiently and leanly as possible. Where an energy storage asset deployed to meet a distribution system need can, consistent with meeting that need, help "pay for itself" by selling capacity or other energy services into wholesale markets, it should do so.

Bids of third-party providers in response to well-managed, competitive, and transparent RFPs can unlock creativity and drive down costs for distribution services, creating a structure in which third-party providers will be incentivized to maximize revenue streams from the energy storage asset. Third-party providers could also help storage pay for itself by pairing storage with an integrated solar array, to charge the storage inexpensively and make sure the storage is ready and available both to meet distribution needs and generate wholesale revenue, all of which would help third-party providers compete to provide distribution services contracts at lower rates.[154]

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[152] UCS, *How to Ensure Energy Storage Policies are Equitable*, at 3 (Nov. 2019), https://perma.cc/LWU6-MN4H

[153] Sara Mulhauser, *Battery Energy Storage Technology Adoption & Electric Utility Structure*, National Association of Regulatory Utility Commissioners (Sept. 2020), https://perma.cc/64XX-UXBD ("Many [battery energy storage] projects can offer multiple services in the same installation. This is called value stacking. Not only does it represent an efficient deployment of capital, but also the potential stacking of revenue streams that, when allowed, can make BES projects viable or profitable more quickly.").

[154] See *supra* at Response to Question 1, Point 6 for further discussion.

This flexibility to stack several different revenue streams is particularly important to creating supportive conditions for community ownership.[155] Small business or nonprofit project development entities may have less access to capital and may be more reliant on business plans that combine robust and diversified revenue streams to enable financing.

With regard to potential EDC-owned energy storage, the question becomes more complex. If EDCs are permitted to own energy storage distribution assets, CEA support investigating mechanisms by which potential additional revenue streams from the assets can be realized—subject to the requirement that any resulting revenue be credited back to ratepayers to offset the need for rate increases. For example, New York recently approved limited participation for an EDC-owned energy storage distribution asset in wholesale markets, with a requirement that the financial benefits of doing so be provided to ratepayers.[156] Additionally, as noted above, Maryland has adopted rules for its energy storage pilot program allowing storage that is a deployed as an EDC-owned distribution asset pursuant to the pilot to operate in wholesale markets or other applications when not providing distribution services.[157]

Response to Question 5

What processes should the Commission use to review requests to utilize energy storage as a distribution asset and recover associated costs?

Any proposal to use energy storage as a distribution asset should be treated as a proposal to use a NWS to meet a distribution infrastructure need and be reviewed under an IDP

[155] Pacific Northwest National Laboratory, *Community Energy Storage and Energy Equity*, at 3 (June 2021), https://perma.cc/N3XQ-VYEQ.
[156] Jason Plautz, *New York authorizes National Grid to serve retail, bid into wholesale market with upstate battery project*, Utility Dive (Sept. 17, 2021), https://perma.cc/DA3Z-S7D5; NY PSC, *In the Matter of Energy Storage Deployment Program*, Case 18-E-0130, Order Approving Utility-Owned Asset Participation in Wholesale Market (Sept. 9, 2021), https://perma.cc/3BEV-XD9C.
[157] Md. Code, Pub. Util. § 7-216(c).

framework of the type described in the response to Question 3. As noted above, the process should include integrated planning that considers the full spectrum of potential solutions, including both traditional infrastructure and storage, as well as other solutions such as demand response and energy efficiency, to identify the least-cost path to reliability. If storage is identified as a potential solution, the EDC should be required to conduct an open and competitive solicitation for providers.

To the extent that an EDC wishes to conduct a pilot involving storage, and identifies specific learnings that would warrant a pilot, the EDC can avail itself of the traditional pathway of petitioning the Commission for approval of a pilot. As noted above, however, energy storage is a mature technology that is ready for integration into distribution infrastructure now, and pilots should be conducted only where needed to test a new policy design or technology. There is no need to delay ratepayers' access to the substantial savings and benefits of integrating energy storage into distribution infrastructure planning with unnecessary pilots.

Putting aside pilot projects, a process in which EDCs seek approval for individual storage projects outside the context of a transparent IDP process risks serious inefficiencies. Such an approach would not, for instance, be aligned for success because it would not create transparency and ensure that all potentially cost-effective storage projects are surfaced and exposed to transparent and competitive bidding. Nor would it ensure that projects selected by an EDC for a one-off application are the best and most suitable projects, since no transparent and holistic review of opportunities would have been performed. For these reasons, the prudential advantages of a robust and transparent IDP process are essential to provide the context necessary for evaluating the merits of a particular proposed project.

Response to Question 6

What cost recovery mechanisms should be implemented for the ownership and operation of energy-storage assets?

Although energy storage offers an expanded toolset for distribution infrastructure planning in a 21st century grid, traditional ratemaking principles should still guide cost recovery. Capital assets that an EDC owns should be recovered through the rate base, while operating expenses should be recovered using existing mechanisms (i.e., surcharges, riders, or trackers), for the recovery of operating expenses. Energy that is required to charge and/or operate an energy storage distribution asset, consistent with traditional ratemaking principles, should be treated as an operational expense.

EDCs should be required to evaluate whether entering into distribution services contracts with third-party energy storage providers is a more cost-effective solution than other alternatives. EDCs have an obligation to ratepayers to prudently manage ratepayer funds by identifying and implementing cost-effective reliability solutions. Where a third-party energy storage provider is the most cost-effective reliability solution, it is in the ratepayer interest that EDCs enter into a services contract with them. According to traditional ratemaking principles, such contracts would be considered operational expenses and not subject to any additional rate of return as a capital expense would be.

As noted above in response to Question 4, EDCs exist within an incentive structure that incentivizes them to prefer capital solutions over operational solutions due to the guaranteed rate of return on capital. As such, there is an important role for regulators in ensuring that EDCs make prudent choices that employ operational reliability solutions where doing so is cost-effective. Consistent with existing law, it would be improper for an EDC to select a less cost-effective capital solution over a more cost-effective operational solution.

Another means of helping to keep costs down is to enable energy storage distribution assets to help pay for themselves by allowing flexible operation of the asset, to the extent consistent with a primary purpose for distribution services, to generate revenue that is credited back to ratepayers. CEA offer comments on important guardrails for wholesale market participation in response to Question 7 below.

Response to Question 7

What are the appropriate models and limitations necessary to allow energy storage to participate in wholesale power markets?

As noted above, permitting energy storage distribution assets to also participate in wholesale power markets is a powerful mechanism for keeping rate increases down by helping energy storage deployments pay for themselves. At the same time, the following guardrails are needed to protect ratepayers. First, the risk of failure of the third-party asset to meet contractual services be fairly allocated between the EDC and the third party operator ("TPO"). For example, in Texas, TPOs are required to reimburse the utility for "any administrative penalty that results from a "violation caused by the [energy storage] facility's failure to meet the requirements of the agreement."[158]

Second, if EDC ownership of storage projects is permitted, such projects should still be allowed to participate in wholesale markets, but wholesale revenues must be passed through back to ratepayers to offset the capital cost of the asset. For example, New York approved a dual-participation model for a National Grid storage 2MW/3MWh storage system in September 2021.[159] The storage system will "provide peak load reduction and avoid thermal overload on the

[158] Tex. S.B. 415 (2021), https://perma.cc/2ZKB-JKH4.
[159] Jason Plautz, *New York authorizes National Grid to serve retail, bid into wholesale market with upstate battery project*, Utility Dive (Sept. 17, 2021), https://perma.cc/DA3Z-S7D5.

substation's transformer" but will also "be able to bid energy, capacity, and ancillary services into wholesale markets when the battery is not needed for reliability services."[160]

National Grid's application for storage dual-use identified that "the Project's local reliability support is needed only in the summer months of June through September, so [National Grid] proposes utilizing the Project during the months of October to May for wholesale market participation."[161] In response, the New York PSC authorized National Grid to:

> bid the energy, capacity, and/or ancillary services available from the Project into the NYISO-administered wholesale markets when not needed for local reliability support. The financial gains from any such market transactions shall accrue entirely to the benefit of National Grid's customers, as proposed in the Petition.[162]

National Grid will work with a third-party power marketer to bid battery services into the wholesale market. In addition, the utility proposed that "100 percent of the net revenues from the dispatch and wholesale marketing of the Project to the Company's customers through the LTC [Legacy Transition Charge] mechanism."[163] In approving the application for multi-use storage, the NY PSC cited both the role of the third-party power marketer and the 100% revenue allocation to ratepayers as reasons to approve the application, writing that these two features would be enough for "market power abuse concerns [to be] adequately addressed."[164]

In sum, whether storage assets are contracted by the EDC or owned by the EDC, clear guardrails need to be in place that protect ratepayers and ensure that the storage asset will be available for distribution reliability services when needed.

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[160] *Id.*
[161] NY PSC, *In the Matter of Energy Storage Deployment Program*, Case 18-E-0130, Order Approving Utility-Owned Asset Participation in Wholesale Market, at 5 (Sept. 9, 2021), https://perma.cc/3BEV-XD9C.
[162] *Id.* at 2.
[163] *Id.* at 8.
[164] *Id.* at 13.

IV. CONCLUSION

The Clean Energy Advocates appreciate the opportunity to offer these comments on storage as a distribution asset and look forward to working with the Commission on this important issue.

Dated: November 29, 2021.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that I have this day served a true copy of the foregoing electronically-filed document upon the parties, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a party).

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