NOTICE[1]

IN THE MATTER OF THE NEW JERSEY ENERGY STORAGE INCENTIVE PROGRAM

DOCKET NO. QO22080540

The New Jersey Board of Public Utilities ("BPU" or "Board") hereby gives notice of a series of virtual stakeholder meetings to discuss the New Jersey Energy Storage Incentive Program ("NJ SIP") Straw Proposal ("Straw") attached to this Notice.

The State of New Jersey has one of the most ambitious storage targets in the nation, with a statutory mandate to achieve 2,000 megawatts ("MW") of installed energy storage by 2030. Energy storage resources are critical to increasing the resilience of New Jersey's electric grid, reducing carbon emissions, and enabling New Jersey's transition to 100% clean energy. The NJ SIP described in this Straw will build a critical foundation for a long-term energy storage effort in the State.

In this Straw, Board Staff proposes to create two energy storage programs for Front-of-Meter and Behind-the-Meter energy storage incentives, both patterned after the solar-plus-storage program proposed in the Board's Competitive Solar Incentive ("CSI") Program.[2] However, while the CSI Program is designed to incentivize solar-plus-storage projects, this Straw will focus on incentivizing stand-alone energy storage devices physically connected to a New Jersey electric distribution company ("EDC"). Staff proposes to apply the incentives only to energy storage projects placed into service after the effective date of the Board Order establishing this program would qualify for incentives.

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[1] Not a paid legal advertisement.

[2] *Available at:* https://www.nj.gov/bpu/pdf/publicnotice/Notice%20Stakeholder%20Meeting%20Siting%20with%20Straw%20included.pdf.

The stakeholder meetings will be held at the following dates and times, and in the following manner:

Meeting Date	Purpose and Registration Link
Fri, Oct 21, 2022 (9AM-12PM EDT)	**Meeting 1** will provide an overview of this Straw, provide a summary of energy storage in New Jersey to date and discuss use cases, including bulk storage and distributed storage. This meeting will also discuss how other states are handling energy storage in their programs. The potential for energy storage as an enabler of grid modernization will also be discussed. https://us06web.zoom.us/webinar/register/WN_1XJMFb7YT9qBtEzXD1m_TA
Fri, Nov 4, 2022 (9AM-12PM EDT)	**Meeting 2** will explore the portions of the NJ SIP focusing on Grid Supply storage, with a focus on economic drivers for investment and operation of energy storage systems, including the various components of the value stack and how those components can be monetized and accessed. This meeting will also explore the potential use of the PJM marginal carbon intensity signal to drive investment in energy storage and incentivize operating projects to maximize carbon emission reductions. https://us06web.zoom.us/webinar/register/WN_Qr_HtBplRleOCo3zPk9TMw
Mon, Nov 14, 2022 (9AM-12PM EST)	**Meeting 3** will explore how to best implement the NJ SIP at the distribution level, including how New Jersey's EDCs should establish distribution price signals and how to maximize the benefits of energy storage to facilitate investment in distributed energy resources ("DER"). The emerging role of the DER Aggregator will be discussed relative to energy storage asset enrollment and management. https://us06web.zoom.us/webinar/register/WN_-lzi2iTwR6-pLAx-l0T7Wg

Held Via Webinar

Please note that these meetings will be conducted virtually. You must register for the meeting before attending. Please register for any or all of the sessions at least 48 hours prior to the scheduled date. If you want to reserve a speaking opportunity, please designate this during the online registration process. After registering, you will receive a confirmation email containing information about joining the meeting and information about checking your system requirements in advance of the meeting. Stakeholders should check their access devices in advance of the meeting to ensure that they will properly connect.

Questions on this stakeholder process may be directed to Jim Ferris at jim.ferris@bpu.nj.gov.

All public comments should be filed under Docket No. QO22080540. **The deadline for written public comments is 5 p.m. EST on Monday, December 12, 2022.** Please submit comments directly to the specific docket listed above using the "Post Comments" button on the Board's Public Document Search tool. Comments are considered "public documents" for purposes of the State's Open Public Records Act and any confidential information should be submitted in accordance with the procedures set forth in N.J.A.C. 14:1-12.3. Written comments may also be submitted to:

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Carmen D. Diaz

Carmen D. Diaz
Acting Secretary

Dated: September 29, 2022

State of New Jersey
Governor Philip D. Murphy
Lt. Governor Sheila Y. Oliver

Board of Public Utilities
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Commissioners

IN THE MATTER OF THE NEW JERSEY ENERGY STORAGE INCENTIVE PROGRAM

DOCKET NO. QO22080540

I. Introduction:

The State of New Jersey has one of the most ambitious storage targets in the nation, with a statutory mandate to achieve 600 megawatts ("MW") of installed energy storage by 2021, growing to 2,000 MW by 2030. Energy storage resources are critical to increasing the resilience of New Jersey's electric grid, reducing carbon emissions, and enabling New Jersey's transition to 100% clean energy. The New Jersey Storage Incentive Program ("NJ SIP") described in this Straw Proposal ("Straw") will build a critical foundation for a long-term energy storage effort in the State.

In this Straw, Staff of the New Jersey Board of Public Utilities ("Board" or "BPU") ("Staff") proposes to create two energy storage programs for Front-of--Meter and Behind-the-Meter energy storage incentives, both patterned after the solar-plus-storage program proposed in the Board's Competitive Solar Incentive ("CSI") Program.[1] However, while the CSI Program is designed to incentivize solar-plus-storage projects, this Straw will focus on incentivizing stand-alone energy storage devices physically connected to a New Jersey electric distribution company ("EDC"). Incentives are not retroactive. Only energy storage projects placed into service after the date of the Board Order establishing this program are eligible for incentives.

As proposed by Staff:

- NJ SIP incentives will be available to energy storage devices that are located either in-front-of-the-meter ("Grid Supply") or behind-the-meter ("Distributed" or "Customer Level"), and separate market segments will be created for both types of storage;

- At least 30% of the NJ SIP incentive will be structured as a fixed annual incentive, paid in $ per kilowatt-hour ("kWh") ("$/kWh") of energy storage capacity, contingent on satisfactory up-time performance metrics;

- The NJ SIP fixed incentive will be established through a declining block structure in order to establish a market-based incentive while also providing the industry clear insights into the incentive value for energy storage devices. The Grid Supply and Distributed market segments will each have their own pricing structure.

[1] *Available at:* https://www.nj.gov/bpu/pdf/publicnotice/Notice%20Stakeholder%20Meeting%20Siting%20with%20Straw%20included.pdf *Available at:* https://www.nj.gov/bpu/pdf/publicnotice/Notice%20Stakeholder%20Meeting%20Siting%20with%20Straw%20included.pdf

- The remaining NJ SIP incentive will be provided through a pay-for-performance mechanism:
    - For Grid Supply storage resources, payment is based on the amount of carbon emissions abated through operation of the energy storage device, determined by measuring the marginal carbon intensity of the wholesale electric grid ([Marginal Emissions Rate set by PJM Interconnection, LLC ("PJM"))] at the time the energy is discharged, minus the carbon intensity of the energy drawn during the charging interval for the resource; and
    - For Distributed storage resources, payment is based on the successful injection of power into the distribution system when called upon by the EDC during certain performance hours, established by each EDC;
- A portion of the Distributed storage incentive program will be reserved for projects located in, or directly serving, overburdened communities;[2] and
- Eligibility for NJ SIP incentives will be technology neutral and based only on meeting functional requirements in a cost-effective manner.

To maximize private investment, Staff proposes that, in addition to the incentives discussed above, private investors be allowed to own and operate the energy storage devices, allowing them to "stack" revenues from the wholesale electricity market, to utilize the behind-the-meter resource to actively manage their energy usage at the distribution level and reduce electricity costs, or to participate in a Distributed Energy Resource ("DER") Aggregation service, when available.

The NJ SIP is designed to provide New Jersey ratepayers with a variety of benefits such as carbon savings (peak/off-peak arbitrage by charging from cleaner energy off-peak to displace the need for more emissions-intensive generation during peak periods), hosting capacity improvements (for enabling grid management flexibility at higher DER penetration levels), and improving system resilience. The NJSIP is also expected to drive cost declines in storage deployment balance-of-plant and other "soft" costs as New Jersey gains more experience in deploying storage devices at scale. Further, recent changes in federal tax policy included as part of the Inflation Reduction Act allow stand-alone energy storage systems to access the Investment Tax Credit for the first time, which may significantly decrease state incentive requirements.

[2] The Board has previously identified overburdened communities and municipalities as part of its Community Energy Plan Grant Program, and this Straw proposes to use the same definition.

II. Background on Storage in New Jersey:

The National Renewable Energy Laboratory expects storage to become "a critical element of a low-carbon, flexible, resilient, future electric grid,"[3] and the New Jersey Energy Master Plan ("EMP") likewise expects energy storage to be a key component of the state's clean energy future.[4] The EMP, and the associated Integrated Energy Plan ("IEP") modeling, conducted by the Rocky Mountain Institute and Evolved Energy ("RMI/Evolved") in connection with the EMP, showed that the least-cost pathway to 100% clean energy by 2050 involves significant investment in energy storage resources. RMI/Evolved's work suggests that New Jersey needs substantially more energy storage than is currently called for in New Jersey legislation, establishing that need at between 9 and 11 gigawatts ("GW") by 2050. Thus, the investments in energy storage contemplated by the Clean Energy Act ("CEA") and this Straw are fully in keeping with the least-cost path to decarbonizing New Jersey's economy.

The Board has been considering incentivizing energy storage since at least 2015. The CEA required the Board to consult with the Laboratory for Energy Smart Systems ("LESS") in the Center for Advanced Infrastructure and Transportation at Rutgers, The State University of New Jersey, and public and private entities in conducting an Energy Storage Analysis ("ESA") that inventories existing energy storage resources in New Jersey and analyzes the costs and benefits of expanding our suite of energy storage resources. On November 1, 2018, the Board retained LESS to conduct the ESA. On March 6, 2019, the Board requested comments from stakeholders to help inform the ESA. LESS also conducted a public stakeholder meeting to help inform the ESA. On June 12, 2019, the Board accepted the LESS ESA, transmitted it to the Legislature, and directed Staff to initiate a proceeding to establish a process and mechanism for achieving the goal of 600 MW of energy storage by 2021 and 2,000 MW of energy storage by 2030.

The ESA noted that "energy storage…is an essential component of New Jersey's sustainable energy future because it enables the grid to handle increasing amounts of clean renewable energy and manage changing, highly variable electricity demand." Multiple other states are already rapidly deploying large quantities of energy storage capacity and some are even finding energy storage already has the ability to reduce costs to electricity consumers in addition to helping advance the clean energy transition. Yet, despite the demonstrated benefits of energy storage and New Jersey clean energy leadership, the state is currently lagging when it comes to energy storage deployment.

The Board's CSI Program represents the latest step in promoting investment in storage. The CSI Program Straw Proposal, issued on April 26, 2022, proposed to "offer[] competitively set incentives for

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[3] Blair et al., Nat'l Renewable Energy Lab., *Storage Futures Study: Key Learnings for the Coming Decades* 1 (2022), https://www.nrel.gov/docs/fy22osti/81779.pdf.

[4] N.J. Bd. of Pub. Utils. et al., *2019 New Jersey Energy Master Plan: Pathways to 2050* at 287 (2019), https://nj.gov/emp/docs/pdf/2020_NJBPU_EMP.pdf ("EMP").

grid supply solar projects that are paired with storage." *CSI Straw Proposal*, at p. 20. The CSI Program, including the solar + storage procurement, is expected to formally be presented to the Board later in 2022, with the first procurement scheduled to take place in late 2022.

New Jersey currently has approximately 497 MW of storage resources known to Staff to be installed, largely in the form of one 420 MW pumped storage facility.

III. State of the Energy Storage Market Nationally:

Though still in its relative infancy, energy storage is now a proven technology that is rapidly scaling up across the country. As of the end of 2021, 4.6 GW of large-scale battery storage capacity was operating in the United States.[5] The U.S. Energy Information Administration ("EIA") projects that will increase to 12 GW by the end of 2023.[6] Furthermore, across all market segments, the U.S. deployed about 6.3 GW of energy storage capacity between the beginning of 2016 and the end of 2021.[7] Wood Mackenzie, a firm specializing in following market trends, likewise, predicts that the U.S. will deploy 48.2 GW of energy storage capacity during the 2021-2026 period. Of this 48 GW, Wood Mackenzie predicts that roughly one-quarter, or 10.3 GW, will be residential storage capacity, and another 4.9 GW will be commercial and industrial storage capacity.[8] Additionally, as noted above, the improved outlook for federal tax incentives included in the Inflation Reduction Act provides significant additional support for storage deployment.

Furthermore, energy storage has the potential to simultaneously improve grid reliability, enable more extensive grid decarbonization through expanded hosting capacity, improve community resilience, and reduce electricity costs for all consumers. For example, energy storage provides numerous reliability and resilience services traditionally performed by dispatchable fossil-fuel burning generators.[9] Therefore, storage is expected to play a key role in maintaining electric system reliability as carbon-intensive resources are displaced by more intermittent renewable generation due to the ongoing clean energy

[5] *Duration of Utility-Scale Batteries Depends on How They're Used*, U.S. ENERGY INFO. ADMIN. (Mar. 25, 2022), https://www.eia.gov/todayinenergy/detail.php?id=51798.

[6] *U.S. Large-Scale Battery Storage Capacity up 35% in 2020, Rapid Growth Set to Continue*, U.S. ENERGY INFO. ADMIN. (Aug. 20, 2021), https://www.eia.gov/todayinenergy/detail.php?id=49236.

[7] Wood Mackenzie Power & Renewables, *U.S. Energy Storage Monitor: 2021 Year in Review Executive Summary* 4 (2022), https://go.pardot.com/l/131501/2022-03-23/2rxhxj/131501/1648047875hnhIqnk7/US_ESM_2021YIR_ExecSummary.pdf.

[8] *Id.* at 6.

[9] *See* N. Am. Elec. Reliability Corp., *Energy Storage: Impacts of Electrochemical Utility-Scale Battery Energy Storage Systems on the Bulk Power System* 1-2, 22 (2021), https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/Master_ESAT_Report.pdf.

transition.[10] Their ability to store renewably generated electricity and release it when needed will also allow the grid to cost-effectively integrate higher levels of wind and solar energy.[11]

Furthermore, multiple benefit-cost analyses commissioned by other states indicate that energy storage deployment can reduce consumers' net electricity costs, with total ratepayer benefits more than covering the ratepayer costs of storage incentives.[12] For example, the Massachusetts Department of Energy Resources ("Massachusetts DOER") found that deploying 1,766 MW of storage would cost no more than $1.35 billion while saving ratepayers $2.3 billion, thereby delivering a benefit-cost ratio of at least 1.7 even if ratepayers paid the *full* cost of such projects.[13]

Unfortunately, energy storage investments that would reduce the total cost of electricity often remain unbuilt. This is because energy storage developers generally can only monetize a fraction of the benefits they produce. As the ESA Report explains, "market forces have not produced much [energy storage] investment" because "investors are not receiving benefits to offset their costs," even though energy storage "brings net benefits to society from the top-down perspective of optimizing the regional electric power system."[14] Indeed, Massachusetts DOER's modeling found that "the existing revenue mechanisms that would encourage investment from a private storage developer are often insufficient" to drive deployment even when an energy storage project "would result in cost benefits to ratepayers that

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[10] *See Iid.* at 2 ("[Battery energy storage systems] can . . . provide peaking generation capacity replacing the need to use high cost natural gas plants that have historically been dispatched during peak seasons."); *Iid.* at 22 (finding "that battery storage can provide sufficient frequency response to support grid frequency stability" on systems with high amounts of variable renewable generation and "heavily reduced grid inertia" due to the retirement of traditional generation resources).

[11] *See* Mass. Inst. of Tech. Energy Initiative, *The Future of Energy Storage: An Interdisciplinary MIT Study* xi (2022), https://energy.mit.edu/wp-content/uploads/2022/05/The-Future-of-Energy-Storage.pdf ("Energy storage enables cost-effective deep decarbonization of electric power systems that rely heavily on wind and solar generation without sacrificing system reliability.").

[12] *See* Guidehouse, Benefit-Cost Analysis at 10, 16 , Docket No. 17-12-03(REO3) (Conn. Pub. Utils. Regulatory Auth. Oct. 1, 2021), https://www.dpuc.state.ct.us/dockcurr.nsf/8e6fc37a54110e3e852576190052b64d/06045b22997703bc8525876400540604/$FILE/17-12-03RE03%20BCA.pptx. (finding that the cost-savings and reliability benefits to ratepayers of a proposed energy storage incentive program exceeded the program's cost, even though ratepayer money would fund the incentives); Mass. Dep't of Energy Res., *State of Charge: Massachusetts Energy Storage Initiative* xiii (2016), https://www.mass.gov/media/6441/download (projecting that the benefits to the electric system of deploying energy storage would significantly exceed the costs of doing so).

[13] Mass. Dep't of Energy Res., *supra*, at xi.

[14] Rutgers Univ., *New Jersey Energy Storage Report Analysis (ESA) Final Report: Responses to the ESA Elements of the Clean Energy Act of 2018* at 32 (2019) https://nj.gov/bpu/pdf/commercial/New%20Jersey%20ESA%20Final%20Report%2005-23-2019.pdf

substantially outweigh the cost of investment."[15] It therefore concluded that the most significant barrier to storage deployment "is the lack of clear market mechanisms to transfer some portion of the system benefits (e.g. cost savings to ratepayers) . . . to the storage project developer."[16]

This likely explains why energy storage developers have deployed most U.S. storage projects in a handful of states that either explicitly mandate or incentivize energy storage. Indeed, "[f]ive states accounted for 70% of the nation's battery storage capacity as of December 2020: California, Texas, Illinois, Massachusetts and Hawaii, with California accounting for nearly a third of the total."[17] The EIA largely attributes this to the fact that "all of these states . . . have passed legislation favourable to the deployment of storage, either through requirements or incentives."[18] The EIA also expects this trend to continue in the short term, with, according to the EIA "California, Texas, Arizona and New York" projected to account for 70% of storage capacity deployed in the U.S. over the 2021-2024 period.[19]

IV. <u>Summaries of Other States' Energy Storage Incentive Programs:</u>

A. The California Self-Generation Incentive Program

California's Self-Generation Incentive Program ("SGIP") provides financial incentives to various distributed energy resources,[20] including customer-sited energy storage systems.[21] SGIP provides a single lump sum incentive to residential storage systems once they commence operation[22] and a combination of an initial lump sum and performance based incentives to non-residential storage systems.[23] A project's energy storage capacity in watt-hours ("Wh") determines the total base incentive

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[15] Mass. Dep't of Energy Res., *supra*, at xiii.

[16] *Id.*

[17] Morley, *supra*.

[18] Andy Colthorpe, *EIA: US Battery Storage Installed Capacity Hit 1,650MW by End of 2020*, ENERGY STORAGE NEWS (Aug. 5, 2021), https://www.energy-storage.news/eia-us-battery-storage-installed-capacity-hit-1650mw-by-end-of-2020/.

[19] *Id.*

[20] *Self-Generation Incentive Program (SGIP)*, CAL. PUB. UTIL. COMMISSION, https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/self-generation-incentive-program (last visited July 12, 2022).

[21] *Participating in Self-Generation Incentive Program (SGIP)*, CAL. PUB. UTIL. COMMISSION, https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/self-generation-incentive-program/participating-in-self-generation-incentive-program-sgip (last visited July 12, 2022).

[22] Ctr. for Sustainable Energy et al., *Self-Generation Incentive Program Handbook* 15, 26-27 (2022), https://www.selfgenca.com/documents/handbook/2022.

[23] *Id.* at 57.

it can receive.[24] The SGIP then accounts for several factors that either increase or decrease the base incentive to determine the final incentive for which the energy storage project qualifies.[25] The base incentive levels start at $0.50 per Wh, or $500 per kilowatt-hour ("kWh"), of storage capacity and gradually decrease as each program "step" in each electric utility's territory becomes fully subscribed.[26]

Non-residential storage systems receive 50% of their total incentive when they initially commence operation and then have the opportunity to receive the remaining 50% over 5 years in annual performance-based incentive payments.[27] How much energy an eligible non-residential project discharges in a year is the primary determinant of the exact performance-based incentive payment it receives.[28] However, qualifying for the full performance-based incentive payment also requires reducing annual greenhouse gas ("GHG") emissions by at least 5 kilograms ("kg") of carbon dioxide equivalent ("CO_2-e") per kWh of energy storage capacity the system possesses.[29] Those that do not have their annual performance-based incentive payment reduced by $1 for kg of CO_2 by which they fall short.[30] Thus, an eligible non-residential battery system with 100 kWh of storage capacity must reduce grid GHG emissions by at least 500 kg of CO_2 a given year in order to receive its full performance-based incentive payment. If it only reduced grid GHG emissions by 100 kg, its performance-based incentive payment for that year would be reduced by $400 ($1 per kg of CO_2-e times the 400 kg of CO_2-e by which it fell short of the reduction requirement).

B. The Connecticut Energy Storage Solutions Program

The Connecticut Energy Storage Solutions ("ESS") program offers a combination of upfront and performance-based financial incentives to residential as well as well as commercial and industrial ("C&I") customers who install energy storage systems on their premises.[31] The performance-based incentives

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[24] *Id.* at 25-26.

[25] *See id.* at 26-27 (noting that projects that satisfy equity or equity and resiliency criteria, as well as those that use equipment manufactured in California, qualify for higher incentives); *id.* at 55-57 (noting that storage projects with storage durations of over 4 hours and those with storage capacities of more than two megawatt-hours receive smaller per-Wh incentives).

[26] *Id.* at 25-26.

[27] *Id.* at 57-58.

[28] *Id.* at 58.

[29] *Id.* at 55.

[30] *Id.*

[31] *Introducing Energy Storage Solutions*, ENERGY STORAGE SOLUTIONS, https://energystoragect.com/ (last visited July 13, 2022); *Energy Storage Solutions for Homes*, ENERGY STORAGE SOLUTIONS, https://energystoragect.com/energy-storage-solutions-for-homes/ (last visited July 13, 2022); *Energy Storage*

are the same for all systems, but medium and large C&I customers receive smaller upfront incentives than residential and small C&I customers.[32] Specifically, residential and small C&I customers with peak loads under 200 kilowatt ("kW") currently qualify for an upfront incentive of $200 per kWh of installed storage capacity, though residential customers in underserved communities qualify for $300 per kWh and low-income households qualify for $400 per kWh.[33] In contrast, medium C&I customers with peak loads of between 200 and 500 kW qualify for $175 per kWh of installed storage capacity, and large C&I customers with peak loads of over 500 kW qualify for only $100 per kWh.[34] The ESS program also uses a declining incentive structure, in which the upfront incentives automatically step down once certain installed capacities thresholds are reached.[35] Residential incentives will start to decline once total installed residential storage capacity reaches 10 MW,[36] while the C&I incentives will start to decline once C&I storage capacity reaches 50 MW.[37]

The performance-based component of the program rewards participating systems for discharging power "during critical periods" when demand for electricity is high.[38] More specifically, the ESS program calculates a system's performance-based payment by multiplying its average discharge rate in kW during "active dispatch events triggered by the [electric] utility company" by the applicable incentive value.[39] For the ESS program's first five years, participating systems will annually receive $200 per kW of average discharge during summer dispatch events, and $25 per kW of average discharge during winter dispatch events.[40] For example, a battery that discharges 5 kW on average during summer dispatch events and 4 kW on average during winter dispatch events would receive an annual performance payment of $1,100 ($1,000 for its summer performance, plus $100 for its winter performance). The summer incentive rates

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Solutions for Buildings & Communities, ENERGY STORAGE SOLUTIONS, https://energystoragect.com/energy-storage-solutions-for-buildings-communities/ (last visited July 13, 2022).

32 *Compare Energy Storage Solutions for Homes*, *supra*, *with Energy Storage Solutions for Buildings & Communities*, *supra*.

33 *Energy Storage Solutions for Homes*, *supra*; *Energy Storage Solutions for Buildings & Communities*, *supra*.

34 *Energy Storage Solutions for Buildings & Communities*, *supra*.

35 *Energy Storage Solutions for Homes*, *supra*; *Energy Storage Solutions for Buildings & Communities*, *supra*.

36 *Energy Storage Solutions for Homes*, *supra*.

37 *Energy Storage Solutions for Buildings & Communities*, *supra*.

38 *Energy Storage Solutions for Homes*, *supra*; *Homeowner FAQ*, ENERGY STORAGE SOLUTIONS, https://energystoragect.com/homeowner-faq/ (last visited July 13, 2022).

39 *Homeowner FAQ*, *supra*.

40 *Id.*; *Energy Storage Solutions for Buildings & Communities*, *supra*.

will then decline to $115 per kW and the winter incentive rates will decline to $15 per kW during the ESS program's second five-year period.[41]

C. *NYSERDA Bulk and Retail Energy Storage Incentive Programs*

The New York State Energy Research and Development Authority ("NYSERDA") recently ran programs that provided upfront incentives for both large "bulk" and customer-sited storage projects. Beginning in 2019, NYSERDA's bulk storage program provided an upfront incentive of $110 per kWh of storage capacity to bulk storage systems with a nameplate capacity of between 5 and 20 MW,[42] which declined to $100 per kWh of storage capacity in 2020 and $90 per kWh in 2021.[43] As originally designed, these incentives were to continue stepping down by $10 per kWh every year through 2025 before the program terminated, although the program terminated early.[44] The program also offered smaller incentives for systems with nameplate capacities of over 20 MW or more; as originally proposed it would have offered $85 per kWh for projects in the first NYISO Class Year and $75 per kWh in the second NYISO Class Year following March 11, 2019.[45]

NYSERDA's retail storage program provided[46] upfront financial incentives to residential, commercial, and industrial customers who installed energy storage systems with a nameplate capacity of no more than 5 MW on their premises.[47] Such systems could either be standalone storage or solar-plus-storage systems.[48] These incentives steadily declined, but unlike the bulk program, the incentive stepped down

[41] *Homeowner FAQ*, *supra*; *Energy Storage Solutions for Buildings & Communities*, *supra*.

[42] More specifically, these incentives applied to energy storage projects with a nameplate capacity that was greater than 5 MW but also no more than 20 MW. Consequently, an energy storage project with a nameplate capacity of exactly 5 MW would not qualify, but a project with exactly 20 MW would qualify. NYSERDA, *Bulk Energy Storage Incentive Program: Program Manual* 2, 7 (2021), https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Energy-Storage/bulk-program-manual.pdf ("Bulk Program Manual").

[43] *Id.*

[44] *Id.*

[45] *Id.*

[46] Note that the program is still providing a $250 per kWh incentive to energy storage systems paired with solar arrays that are installed at single-family residences on Long Island. However, all other components of the program have closed. *Incentive Dashboard*, NYSERDA, https://www.nyserda.ny.gov/All-Programs/Energy-Storage/Developers-Contractors-and-Vendors/Retail-Incentive-Offer/Incentive-Dashboard (last visited July 14, 2022).

[47] *Id.*; NYSERDA, *Retail Energy Storage Incentive Program: Program Manual* 2 (2021), https://www.nyserda.ny.gov/all-programs/energy-storage/developers-contractors-and-vendors/retail-incentive-offer ("Retail Program Manual").

[48] Retail Program Manual at 3.

once applicants fully subscribed certain megawatt-hours ("MWh") "blocks" of incentive funding.[49] Furthermore, the program established four different series of blocks, each with different incentive levels and rates of decline, for New York City, Long Island, and the rest of the state.[50] For example, in the "Rest-of-State" region the Block 1 commercial incentives were $350 per kWh of storage capacity and declined to $125 per kWh in Block 4, while New York City's Block 4 incentive rate was only $100 per kWh.[51]

V. New Jersey Energy Storage Program Straw Proposal:

A. Program Goals

Energy storage is a rapidly evolving technical and economic solution to key challenges presented by the energy transition. This Straw presents a policy framework designed to meet the following goals:

1. Achieve the 2030 energy storage goal of 2,000 MW by 2030, as set forth in the CEA in a manner that is consistent with New Jersey's competitive electricity markets;

2. Promote deployment of private capital by establishing a stable market structure that attracts low-cost capital;

3. Ensure that energy storage devices are deployed in a manner that decreases GHG emissions by tying operations to pay-for-performance metrics;

4. Support deployment of energy storage devices interconnected to the transmission or distribution system of a New Jersey EDC;

5. Grow a sustainable energy storage industry that gradually requires decreased incentives to deploy additional storage resources, in order to ensure that the benefits of energy storage last well beyond the term of this initial program;

6. Support overburdened communities with energy resilience, environmental improvement, and economic opportunity benefits derived from energy storage; and

7. Encourage storage deployment that accelerates the clean energy transition, including facilitating deployment of renewable energy, electric vehicle or other DERs.

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[49] *Incentive Dashboard*, *supra*.

[50] *Id.*

[51] *Id.*

8. Establish a Program Administrator at the BPU who would oversee the efficient implementation of the program and stay current on all technology and processes used for energy storage.

B. Business Model Considerations:

Staff notes that the question of who should own and operate energy storage assets is a major question for any energy storage program design. This Straw recommends that the Board adopt a storage business model that encourages private ownership and operation of energy storage devices, consistent with New Jersey's restructured competitive market structure. While ratepayers will support investment in storage resources, the commercial and operational risks will largely be borne by private investors.

While the energy storage devices are expected to be privately owned and operated, there will also need to be a robust effort by the EDCs to ensure that the grid is capable of connecting storage devices at the distribution and transmission levels. This role is particularly important for the Distributed portion of the NJ SIP, where the EDC will interconnect the resources and will be directed to establish pay-for-performance incentives that address the "value" of storage operations that are tailored to the needs of the particular utility. Thus, while the NJ SIP does not propose to allow for utility ownership or operation of devices, EDCs will play a key role in building the grid infrastructure necessary to enable the effective dispatch of energy storage devices.[52]

As noted above, two major goals of the NJ SIP program are to attract low-cost private capital and to develop an energy storage program that is consistent with New Jersey's competitive electric markets. A major goal of the NJ SIP structure is therefore to encourage long-term investment in, and maintenance of, energy storage devices at the transmission and distribution level. To encourage this long-term outlook, Staff anticipates that energy storage owners will engage in "value stacking." Generally, value stacking refers to the practice of aggregating various sources of customer savings/benefits and grid revenues to make energy storage projects financially compelling to end-use customers or energy storage developers. Revenue from the value stack reduces the need for incentives to move the market at a desired pace. Customer savings and grid revenue may be driven by elements such as:

- Wholesale market revenues;
- Energy arbitrage in time of use ("TOU") differentiated markets;
- Participation in wholesale ancillary services markets;
- Retail bill reductions created by active management, such as management of demand charges, standby charges, and distribution costs; and/or

[52] Staff notes that utility-owned energy storage devices may serve as "Storage As a Transmission Asset," or SATA, resources. SATA resources can function at either the transmission or distribution level (despite the less-inclusive SATA label). A future proceeding may include additional guidance on EDC-led SATA investments.

- Cost-effective investment in DERs, electric vehicle charging, or other technologies, supported by energy storage devices.

These value-stacking revenues are in addition to any NJ SIP incentives, such as distribution-level price signals established by the EDCs or grid-level performance-based incentives that incorporate marginal emission rates reported by PJM, both of which are discussed below.

C. Technical Considerations and Proposed Definition of Energy Storage:

Energy storage consists of a variety of physical, thermal, and chemical technologies, each of which offer unique capabilities and limitations and may be at different stages of commercial maturity. Staff believes that the bulk of the NJ SIP should focus at this time on replicable projects using commercially available technologies but also be flexible enough to promote new and emerging energy storage technologies if they are cost-competitive with more established energy storage technologies.

Staff proposes adopting as broad of a definition of energy storage as possible, in order to leverage innovation and competition to meet New Jersey's energy storage goals at the lowest possible cost to ratepayers. Staff proposes to adopt the following definition for energy storage:

> *A device that is capable of absorbing energy from the grid or from a Distributed Energy Resource (DER), storing it for a period of time using mechanical, chemical, or thermal processes, and thereafter discharging the energy back to the grid or directly to an energy using system to reduce the use of power from the grid.*

By adopting as broad of a definition of energy storage as possible, Staff hopes to leverage innovation and competition to meet our energy storage goals at the lowest possible cost to consumers and to invite all energy storage developers to participate in the NJ SIP.

D. Installed Storage Targets & Deployment Timeline:

Staff believes that setting annual installed energy storage targets that increase over time creates a compelling opportunity for energy storage developers to build businesses here in New Jersey and to invest in the workforce of the future, paving the way for high paying green careers to locate in our State. In setting these targets, Staff weighs three main factors: (i) expected declines in the installed cost of storage over time (recognizing the disruption to this trend caused by recent supply chain issues); (ii) the environmental, public health, and grid benefits of quickly scaling storage; and (iii) the need to gain operational experience in New Jersey's storage program.

The CEA describes the storage target in terms of "megawatts" of storage. Because energy storage is typically denominated in MWh, Staff proposes to interpret the CEA's 2030 storage mandate as requiring

New Jersey to procure 2,000 MW of storage devices capable of four hours of continuous discharge, or 8,000 MWh. The solar+storage component of the CSI Program already includes a targeted storage procurement of 160 MWhs per year and uses fourhours of continuous discharge as the standard. For purposes of the measuring progress towards the CEA target, Staff therefore proposes measuring an NJ SIP project's capacity as the lesser of its nameplate capacity (in MW) or its energy storage capacity (in MWh) divided by 4 hours. For example, a 2-hour battery with a nameplate capacity of 10 MW and an energy storage capacity of 20 MWhs would count as 5 MW of storage capacity (as that is the maximum amount of power it could continuously discharge for 4 hours). In contrast, both a 4-hour, 10 MW and 40 MWh battery and a 6-hour, 10 MW and 60 MWh battery would each count as 10 MW of storage capacity (as they each could discharge at a maximum rate of only 10 MW, but both can maintain that rate of discharge for at least 4 hours).

Taking these various factors into account, Staff proposes the targets shown in Table 1 below for the NJ SIP. Each targets are established per Energy Year, which is June 1 of the first year until May 31 of the second year. Targets will be additional to the storage component of the CSI solar+storage market segment and would be split between the Distribution and Grid Supply portions of the NJ SIP as shown in the tables below, with specific quantities targeted to Grid Supply and Distributed storage resources. Further, Staff notes that meeting the 2000 MW target established by the CEA will involve contributions from both the CSI solar+storage and NJ SIP programs. While the size of future solar+storage procurements in the CSI program has not yet been established, for the purposes of meeting the CEA's 2030 goal through the combination of the NJ SIP and CSI programs, Staff assumes that the CSI program will procure approximately 1000 MW of four-hour storage capacity between 2022 and 2030, resulting in a total contribution of 4000 MWh, or roughly half the total towards the CEA goal for 2030. Staff expects that this ratio may change as the Board gets more experience with both programs, but for planning purposes, this appears to represent a reasonable assumption.

Table 1: Total Grid Supply and Distributed NJ SIP Allocations*

Energy Year in which Awards are Made	Proposed Procurement Quantity (MWs of 4 Hour Storage)	Proposed Procurement Quantity (MWhs)
2023/2024	40	160
2024/2025	60	240
2025/2026	90	360
2026/2027	120	480
2027/2028	160	640
2028/2029	200	800
2029/2030	330	1320
Subtotal from NJ SIP	**1000**	**4000**

Contribution of CSI	1000	4000
Total NJ Storage	**2000**	**8000**

* Targets in this table are intended to be illustrative and may change as the Board gathers experience with both programs.

Table 2: Grid Supply and Distributed NJ SIP Allocations

Energy Year in which Awards are Made	Proposed Grid Supply Procurement Quantity (MWs of 4 Hour Storage)	Proposed Grid Supply Procurement Quantity (MWhs)	Proposed Distributed Procurement Quantity (MWs of 4 Hour Storage)	Proposed Distributed Procurement Quantity (MWhs)
2023/2024	30	120	10	40
2024/2025	50	200	10	40
2025/2026	75	300	15	60
2026/2027	105	420	15	60
2027/2028	140	560	20	80
2028/2029	180	720	20	80
2029/2030	300	1200	30	120

Staff recommends that the Board reserve the right to change the proposed procurement quantities depending on economic and market conditions, as well as how much storage is procured as part of the CSI Program. However, Staff believes it is important to propose quantities for future years to show New Jersey's long-term commitment to storage and to attract long-term commercial interest into New Jersey's nascent storage industry, while also allowing the Board to remain nimble enough to take advantage of pricing changes as the energy storage industry matures.

E. Incentive Structure:

Staff proposes that the total NJSIP incentives be comprised of two main incentive payments. The first will be a fixed incentive, measured in $/kWh of storage capacity and paid annually to both Grid Supply and Distributed projects, for a fixed term of years, contingent on satisfactory up-time performance metrics. The second will be a performance-based incentive tied directly to the grid and environmental benefits created through the storage device's operations.

Staff recommends that the Board's goal should be that the term of any award is sufficient to provide financing of winning projects, while minimizing the period over which ratepayers will support each energy storage resource. Staff recognizes that projects are likely to require higher contract prices if the length of the contract is shorter, given that there is a shorter time over which to recover the capital costs of the project. On the other hand, shorter contractual terms create more opportunity for innovation and turn-over of projects, minimizing the risk of technological obsolescence and requiring ratepayer support for a shorter period of time. Further, a traditional net-present value ("NPV") analysis results in a significant discount of the out-years of a contract. Staff initially proposes focusing on a contract length of between 10 and 15 years, which may appropriately balance the costs and benefits of shorter versus longer contractual terms.

A. *Fixed Incentive:*

Staff proposes to use a declining block market design to set the fixed portion of the NJ SIP incentive, the initial level of which is intended to cover approximately 30% of the total fully installed cost of the project.[53] Staff contemplates that the fixed incentive for storage resources would be paid annually to Grid Supply and Distributed projects, for a fixed term of years, so long as the storage resource meets up-time performance metrics. Any performance-based adjustments would be added or subtracted from the fixed payment.

i. Setting the Fixed Portion of the NJ SIP Incentive Levels:

This Straw proposes that the Board establish administratively set incentives that change over time in response to market participation, often referred to as a "declining block" rate structure. A declining block structure is designed to ensure that the total cost to ratepayers decreases as the quantity of resources

[53] This Straw proposes that the Board use a declining block structure for the NJ SIP. However, Staff also considered adopting a pay-as-bid structure for incentive levels, comparable to the process in the CSI Program. Staff notes that New Jersey's energy storage sector is generally less mature than its solar sector, and Staff believes that setting incentive levels via a declining block may provide more certainty to project developers than a pay-as-bid structure, while still allowing for incentive levels to react to the market. However, Staff welcomes comment if stakeholders believe that a pay-as-bid system is preferable.

procured increases, while also providing investors a clear trajectory of state incentives for the next several years. As noted above, a number of state storage programs utilize some form of declining block structure.

Under a declining block rate structure, the Board establishes an initial "Capacity Block" or "Block" of storage capacity, denominated in MWhs of storage capacity. The Board likewise establishes an initial annual incentive amount for projects registering in the initial Capacity Block, denominated in $/kWh of storage capacity. Once the Capacity Block is fully subscribed, the incentive level automatically steps down by a pre-determined amount. As each Block fills, the incentive amount associated with the next block is reduced at a pre-determined rate. After the second Block fills, the incentive amount continues to decline by a set $/kWh of storage capacity.

Under a declining block structure, if a Capacity Block remains unsubscribed or under-subscribed, then the incentive level would remain at that level until the incentive level becomes attractive to bidders. As storage costs are generally expected to decline over the next decade, using a declining block to establish incentive levels has the benefit of allowing incentive levels to adjust automatically, over time, in a predictable fashion. However, as discussed below, if a Capacity Block remains under-subscribed for a significant period of time, the Board would have the option to step in and increase the incentive level. This provides both price certainty to the industry, as well protecting ratepayers against excessive incentives.

Staff sees a number of benefits to the use of a declining block structure, including the fact that it allows for relatively quick program implementation, making it a prime candidate to help meet the EMP's goals and bring additional jobs to New Jersey. Second, an NJ SIP incentive structure that is, in part, fixed and known in advance provides a lower-risk incentive for developers and investors, thereby, encouraging investment of at-risk private capital, avoiding surprises, and providing the industry access to a proven program that investors and consumers interested in shopping for storage are already familiar with.

Third, a declining block incentive provides the Board flexibility to establish block sizes, reset incentive levels (if necessary), and adjust programmatic elements on an annual basis, as needed, to meet policy goals and cost considerations. For example, if storage targets are not being met, or if a Capacity Block remains significantly under-subscribed, the Board could readjust the incentive level. Indeed, the Board already has an existing mechanism for setting MW targets and incentive payments as part of the Administratively Determined Incentive ("ADI") solar program. Staff proposes that any adjustment to the NJ SIP program would be made at the same time as the adjustments to the ADI Program. Similar to the approach in the ADI Program, Staff proposes that the Board reserve the right to adjust the size or incentive amount of blocks – up or down – prior to each year's procurement. The reasons the Board could adjust a block's incentive amount by more than the pre-determined step down amount, include under-subscription of a Capacity Block, fundamental changes in technology costs, new sources of energy storage, federal tax policy, supply chain issues or other reasons that show that the incentive amount associated with a given Capacity Block is no longer an effective gauge of ratepayer value.

Additionally, as in the ADI Program, Staff recommends that the Board maintain additional flexibility to adjust incentive amounts in response to adoption rates and other similar measure of program success. Likewise, Staff intends to recommend that the NJ SIP go through a similar Year 1 Review process, comparable to that committed to for the ADI Program; whereby, Staff would review the performance of the NJ SIP twelve months after initiation to ensure that program is working, and if not, to make any necessary adjustments.

Staff proposes that storage developers must select between the NJ SIP or the CSI Programs. Participation in more than one program should be prohibited; however, Staff is interested in how best to allow developers the flexibility to select which program they wish to participate in. For example, a solar+storage project that does not clear in the CSI program may elect to later participate in the NJ SIP, or vice versa.

ii. Initial Block Incentives, Decreases, Mechanics and Reset Mechanism:

Staff seeks comment on what the initial annual incentive amount should be in $/kWh of storage capacity for both the Grid Supply and Distributed programs. Based on administrative estimates of energy storage resources from publicly available estimates and comparable state programs nationwide, Staff suggests providing 10 annual payments of $20/kWh of storage capacity for the grid supply program and $40/kWh of storage capacity for the distributed program for the first year incentive block.[54]

The U.S. Department of Energy's National Renewable Energy Lab ("NREL") produces an annual estimate of four-hour lithium-ion battery storage system costs that looks at "total system overnight capital costs expressed in units of $/kWh."[55] NREL provides high, medium and low price projections between now and 2050, projecting significant declines in lithium-ion systems, which implies a total capital cost of $200-$300/kWh in 2025, projected to drop to $150-$250/kWh by 2030, as shown in NREL's report:

[54] Staff notes that the recent Inflation Reduction Act and other federal tax policies may warrant moving incentives up or down and Staff seeks comment on where initial incentives should be set.

[55] NREL, Cost Projections for Utility-Scale Battery Storage 2021 Update (*available at*: https://www.nrel.gov/docs/fy21osti/79236.pdf).

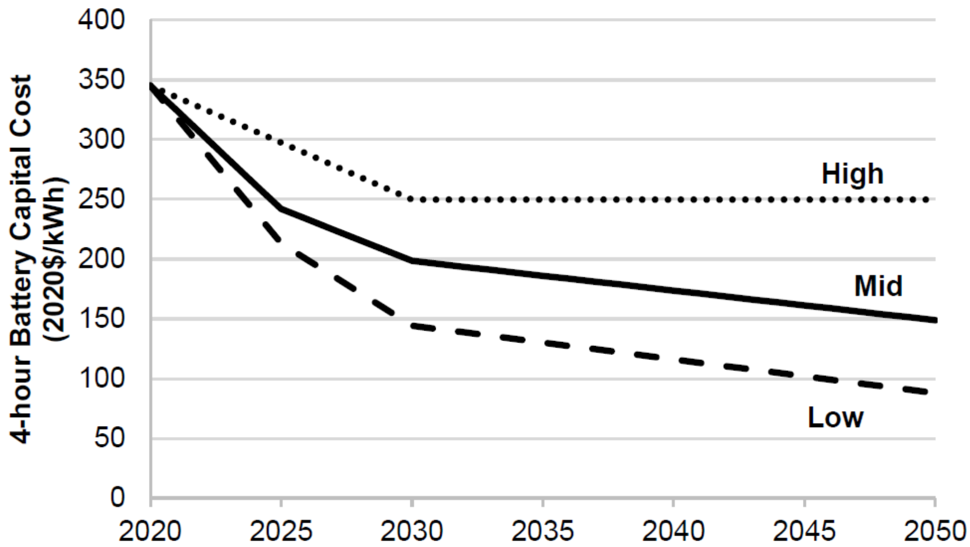

Figure 2. Battery cost projections for 4-hour lithium ion systems.

These values represent overnight capital costs for the complete battery system. Figure values are included in the Appendix.

More broadly, Staff seeks comment on the best way to formalize these starting incentive levels in a manner that considers both ratepayer impact and the need to establish the storage program and allow the declining block mechanism to reveal the competitive incentive level for storage. In terms of the decreases between blocks, Staff recommends a $2/kWh decrease in annual payments between each block. By starting with relatively small blocks, Staff believes that the NJ SIP can protect against excessive rate impacts, while moving quickly to deploy the storage program.

As Capacity Blocks begin to fill, the incentive level associated with each Block likewise decreases. As discussed above, Staff would propose to undertake an annual process to evaluate the Capacity Block sizes and, if necessary, to adjust the incentive levels upwards. Absent the need for the Board to affirmatively modify an incentive level, however, Staff proposes that the incentive level associated with the currently open Capacity Block at the end of an energy year would be carried forward to the next energy year.

Additionally, should an energy storage project fill a Capacity Block and overflow into one or more additional Blocks, the incentive level would be set at the weighted average of the affected Blocks.

iii. Initial Block Sizes:

Staff proposes to establish the following blocks in the first year program for both distributed and grid supply storage program:

	First Year Allocation	Block 1	Block 2	Block 3
Grid Supply:	30 MW	5 MW	10 MW	15 MW
Distributed:	10 MW	1.5 MW	3.5 MW	5 MW

* All values in MWs of 4-Hour storage capacity equivalents

Adopting three blocks will ensure that the incentive amount in the initial year of the program can reset relatively quickly to ensure that developers have a clear line-of-sight to the size of the incentives while also providing developers a clear understanding of what incentive rate they would qualify for.

For the second and subsequent years, Staff proposes to move to three Blocks of equal sizes, with each Block equal to one-third of the annual quantity established by the Board for that energy year. Additionally, any amount of the procurement targets not met in a given year would be rolled over and added to the next years' procurement target, with corresponding pro rata increases in each Block size. As an example, if 10 MWhs of storage capacity was left unsubscribed over at the end of Energy Year 2023/2024, that 10 MWhs would be added to the 2024/2025 allocation of 240 MWhs. The total allocation for 2024/2025 would then be divided into the three equally sized blocks. By rolling forward the unused portion of any Capacity Block into the next energy year, the Board can ensure that it continues to meet its energy storage targets.

iv. Allocation for Energy Storage Projects Located in Overburdened Communities.

This Straw proposes to ensure that an equitable share of Distributed energy storage resources are placed into overburdened communities. Distributed storage plays an important role in reducing localized emissions and enhances the resilience of the electric grid – both important factors in meeting Governor Murphy's environmental justice and equity directives. Because Distributed storage resources are customer-sited, energy storage projects located in overburdened communities will provide additional resilience to the local communities, and, in many cases, may help offset dirtier backup generation options during emergency conditions. Staff seeks comment on the best way to ensure that Distributed storage resources locate in overburdened communities, including the following options:

1. Establishing an adder of to be determined value per kWh of energy storage capacity to the fixed portion of the incentive for projects located in overburdened communities; or

2. Establishing a separate Capacity Block limited only to customers in overburdened communities; or

3. Adding an additional up-front incentive for projects located in overburdened communities to help defray the initial cost of installation.

Staff sees advantages and disadvantages to each of these options. For example, Staff seeks comment on how to structure any adder, as well as how much an adder should be. Staff recognizes that creating an adder is likely the least administratively complex option, but while effectively promoting location of storage in overburdened communities it does not guarantee that they are located there. Establishing a separate Capacity Block solves this problem but is potentially more administratively complex. Creating an additional up-front incentive may also help ensure that homes and businesses have access to the necessary capital to promote adoption of storage in overburdened communities. Staff seeks comment from stakeholders on whether one of these or another proposal will best promote adoption of energy storage in overburdened communities.

In the initial program, Staff does not propose to include additional incentives to locate Grid Supply storage in overburdened communities, as those projects typically have fewer localized benefits, as compared to Distributed storage resources, which directly add to the resilience of the local community. Staff is concerned that, unless the program is carefully managed, the Board could simply incent additional energy infrastructure to be located in communities that already bear a disproportionate share of energy infrastructure. However, Staff also recognizes the compelling need to ensure that Grid Supply energy storage resources are encouraged to displace, and eventually replace, generation from low-efficiency peaker plants. Peaker plants are disproportionately located in overburdened communities and typically have substantially higher local emissions that other sources of electricity generation and, as a result, they impose significant public health costs on local communities. Because the performance-based incentive portion of the Grid Supply NJ SIP incentive prioritizes locating in areas with the highest carbon emissions, the program already includes a clear price signal for energy storage projects to locate in areas with highest emitting resources. However, Staff seeks comment on whether this price signal is sufficient to encourage the transition from peaking generation to energy storage, or whether additional steps are necessary.[56] Staff requests comment on whether the how best to address these interrelated issues.

v. <u>Term of Fixed Incentive:</u>

Staff recommends that the Board's goal should be that the term of any award is sufficient to provide financing of winning projects, while minimizing the period over which ratepayers will support each energy storage resource. Staff recognizes that projects are likely to require higher contract prices if the length of the contract is shorter, given that there is a shorter time over which to recover the capital costs of the project. On the other hand, shorter contractual terms create more opportunity for innovation and turn-over of projects, minimizing the risk of technological obsolescence and requiring ratepayer support for a

[56] Staff also recognizes that, in some cases, replacing a higher emitting peaker plant with energy storage may mute the very carbon intensity price signal that the storage resource was counting on. Staff welcomes comments on whether a peaker-for-storage replacement should receive a

shorter period of time. Further, a traditional net-present value ("NPV") analysis results in a significant discount of the out-years of a contract. Staff initially proposes focusing on a contract length of between 10 and 15 years, which may appropriately balance the costs and benefits of shorter versus longer contractual terms.

vi. Performance Metrics:

Staff seeks to ensure that storage devices do not remain off-line or uncharged for extended periods of time. Such deactivated resources provide limited grid stability or environmental benefits and thus should not receive full payment. Staff proposes making the fixed incentive payment available to storage resources contingent on the storage resource remaining online and available for dispatch in 95% percent of all hours. Staff further recommends that the Board utilize the PJM Equivalent Forced Outage Rate ("EFORd") as the metric for Grid Supply projects. Owners of such storage devices would report this data to PJM through the Generator Availability Data System ("GADS"), which "enables the operators of generation units to submit performance data into PJM records for determination of unit availability" and forms the basis for determining a units' EFORd rating.[57]

Resources failing to meet the EFORd requirement would have their fixed incentive level decreased by the percentage of the unavailability. Staff proposes that a resource with an EFORd of less than 95% receive a lower fixed payment according this formula:

Adjusted Payment = (Fixed Payment)*(1-EFORd)

Staff notes that "availability" does not affect whether a resource is dispatched or not. Instead, the requirement is that the energy storage device is participating in placing economic bids offering the unit for dispatch in the PJM market. Staff thus believes that EFORd is an appropriate metric that ensures that resources are participating in the PJM market but also that storage device owners can manage their own participation and risk in the wholesale markets. Staff also seeks comment on whether an availability level of less than a certain percentage (initially proposed at 50% availability over a rolling 12 month period) should result in the project being investigated and potentially terminated from the program.

Staff also seeks comment on how best to incorporate a similar performance requirement for Distributed resources and whether there should be a size cutoff. For example, such a cut-off may be an appropriate means of ensuring individual homeowners are not subject to complicated program requirements that could dissuade them from installing storage and participating in the program. For similar reasons, Staff seeks comment on whether to exempt all Distributed storage projects from this availability requirement, due to their smaller size and the need to limit program complexity.

[57] *See* PJM Manual 14D, at p. 45.

vii. Treatment of Long-Duration Storage

Staff also invites comment on whether the NJ SIP should provide appropriate incentives (in terms of dollars per kWh of storage capacity) for storage systems that have durations substantially longer than four hours. Staff proposes to define long-duration storage as any storage technology that is greater than 20 hours of storage and requests comment on that proposed definition. Staff notes that one reason to establish lower incentives for longer duration systems is to prioritize incentivizing systems that most cost-effectively contribute towards the legislative target, which is expressed solely in terms of MW of nameplate capacity. Another reason is that some emerging very long-duration technologies may have substantially lower costs per kWh of storage capacity *and* a reduced ability to abate carbon emissions due to possessing lower round-trip efficiencies. For example, Staff notes that the company Form Energy already has agreements with both a Minnesota electric cooperative and a Georgia utility to deploy pilot versions of "a novel iron-air-exchange flow battery" that it claims "can offer up to 100 hours of electricity storage at a price of less than $20/kWh."[58] However, this battery likely has a much lower round-trip efficiency than currently commercialized lithium-ion batteries, as Form Energy describes it as "complementing" rather than competing with lithium-ion systems.[59] If Form Energy or another company can indeed deploy a system with similar price, duration, and efficiency characteristics in the next few years, then without further modification the annual fixed incentive payments proposed above could massively overpay such storage technologies, technologies that also have less carbon abatement value. Staff therefore invites comment on how the NJ SIP should address longer duration systems.

B. *Performance-Based Incentives*

The performance-based incentive for storage resources will be designed to encourage the operation of storage assets in a manner that maximizes environmental benefits and helps the electric grid during times of operational stress. The flexibility of grid-supply energy storage can result in a range of benefits for the efficient and effective operation of the bulk electricity system while also providing environmental benefits by reducing carbon emissions and criteria pollutants.

Likewise, storage resources at the distribution level can provide all of these benefits while also contributing to local system resilience, helping integrate higher levels of distributed generation, and potentially reducing the cost of operating and maintaining the distribution grid. As noted in the EMP, while "New Jersey does not currently have a means of pricing the benefits that batteries can provide at

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[58] Jason Plautz, *Form Energy Announces Partnership with Georgia Power to Test 100-hour Iron-air Battery*, UTIL. DIVE (Feb. 10, 2022), https://www.utilitydive.com/news/form-energy-announces-partnership-with-georgia-power-to-test-100-hour-iron-/618626/.

[59] *Battery Technology*, FORM ENERGY, https://formenergy.com/technology/battery-technology/ (last visited Aug. 22, 2022).

the distribution level . . . New Jersey is committed to adopting changes in regulatory policy that recognize the full wholesale and distribution value of batteries." EMP at p. 128.

i. Setting the Performance-based Incentive for Grid Supply Resources:

Energy storage can significantly contribute to emissions reductions by enabling the reliable integration of higher levels of renewable energy and by displacing generation from emissions-intensive peaking units. However, experience with other storage programs has also shown that, absent a mechanism to incentivize GHG emission reductions during operation, energy storage projects can also increase GHG emissions. Ensuring New Jersey's energy storage policies help achieve the State's overarching climate objectives thus requires creating such a mechanism.

Incenting energy storage devices to reduce the marginal carbon emissions rate in PJM also correlates with other times of grid stress and high prices on the PJM system. In general, high marginal carbon emissions rates track with higher PJM prices and tend to occur on days when the grid is otherwise stressed or when relatively emissions-intensive peaker generating plants are dispatched. However, this correlation does not always hold true, which is why ensuring that storage projects reduce emissions requires an incentive mechanism directly tied to marginal carbon emission rates. Nonetheless, incenting energy storage devices to discharge during periods when marginal emissions are high will tend to simultaneously drive down GHG emissions levels, levels of Clean Air Act "criteria" pollutants, reduce prices, and enhance grid resilience. Further, because energy storage devices participating in the NJ SIP remain merchant for their energy revenues, they will remain strongly incented to respond to wholesale energy prices as well. Combining locational marginal price and marginal emissions signals will incent storage developers to site their units in the places on the grid where they will provide the most significant price and environmental benefits to consumers.

While PJM does not currently reward energy storage resources for their contribution to decreasing the carbon intensity of the PJM grid, it does *track* the marginal carbon intensity of the grid at each of its thousands of wholesale pricing nodes across the regional grid on a real-time basis. This Straw proposes that the Board will hire a Program Administrator to track and administer the performance-based incentive portion of the NJ SIP based on PJM's marginal carbon emissions data. This will allow the NJ SIP to reward grid-supply storage resources that result in lower marginal grid emissions, while reducing payments to energy storage resources that increase emissions or do not lower emissions sufficiently. California's SGIP follows this basic framework, requiring participating storage resources to abate at least 5 kilograms of CO2 per kWh of storage capacity annually. Resources have their incentives reduced by $1 for every kg of CO_2 by which they fall short of their emissions reduction requirements, down to a minimum of zero revenue for the pay-for-performance portion of the incentive.

As PJM explains it, "marginal units, and hence the marginal emissions rates, can provide an indication of what would happen based on a change in behavior. For example, if a single coal-fired generator were on the margin, and a customer increased their power usage, the generator would need to burn more coal.

Likewise, if the customer decreased their power usage, the coal generator would burn less coal."[60] Because storage resources can inject power when marginal emissions are high or charge when marginal emissions are low, storage resources are well suited to minimizing system wide carbon emissions. In terms of calculating marginal GHG intensity, PJM explains that: "[t]he marginal emissions rate for a given location is calculated by multiplying the average emissions rate for the individual marginal unit by the corresponding percentage for that unit. These rates are then added together to create the marginal emissions rate for the given location."

In terms of determining the exact incentive rate, this Straw proposes that the Program Administrator work with stakeholders to develop the specific calculation. However, at the simplest level, Staff envisions that energy storage devices will be required to track the marginal emissions rate at the time the device is discharging (in pounds of CO2-equivalents/MWh) minus the marginal emissions rate at the time the resource is charging. As the delta between those increases, the storage resource is contributing to a progressively cleaner grid. While PJM cautions that its marginal GHG emissions data is not fully developed, Staff believes that it is sufficiently robust to enable the Program Administrator to develop a clear market framework based on the differences in the marginal emissions rate between times when the a system is charging and when it is discharging.

Staff anticipates working with the Program Administrator and stakeholders to develop a system loosely patterned off of California's SGIP. In that program, resources can earn the full performance based incentive if they reduce GHG emissions by a certain amount. New Jersey's version will similarly establish a benchmark where a resource will earn the full performance-based incentive. However, this Straw also proposes to allow resources to over-perform as well as under-perform, up to 200% of the benchmark. Staff seeks comment on the mechanics of how this would work but initially proposes a target benchmark of 10 pounds of CO2-e abated per kWh of storage capacity, roughly comparable to the California SGIP's requirement of 5 kg of CO2-e abated per kWh of storage capacity.

Staff seeks comment on whether the performance-based incentive should establish specific "performance hours" to ensure that storage devices are targeting operations to peak-load conditions within PJM. An example of performance hours could be 3 pm – 7 pm during the summer peak period. Another option would be to remain agnostic about when the storage resources are participating and simply prioritize GHG reduction. Staff also notes that the desired performance hours may evolve over time, particularly as solar and offshore wind become an increasingly important part of New Jersey's energy mix. Staff seeks comment on whether it is appropriate to adjust performance hours in future years and whether future adjustments to performance hours can be accomplished while still providing sufficient certainty for developers to commit the necessary capital and receive financing.

[60] "Marginal Emission Rates – A Primer," *available at*: https://pjm.com/-/media/etools/data-miner-2/marginal-emissions-primer.ashx.

Staff also seeks comment on how to treat storage resources charging directly from a co-located power source and how to impute a specific emissions rate in such a situation. In other words, if a storage device is charged by a Class I renewable resource Staff proposes that it would be reflected as charging during a time when the marginal system emissions rate was 0 pounds of CO2-e per kWh of storage capacity. Staff requests comment on whether this or another metric would be preferable.

ii. Setting the Performance-based Incentive for Distributed Storage Resources:

For Distributed storage devices, Staff proposes to direct each EDC to establish a performance-based incentive, in $/kWh, that would be provided to storage resources operating during specific call hours, in part, patterned off of the ConnectedSolutions program utilized in Connecticut and Massachusetts. These programs provide an easy-to-understand incentive to distributed storage resources by providing a $/kWh payment for customers injecting power when called by the EDC during specific performance hours, usually summer afternoons. However, the Straw proposes that each EDC be provided the flexibility to establish the call hours and payments based on its specific needs.

Each EDC energy storage filing will be required to address the following items:

1. Program Call Hours:

Staff proposes that each EDC will identify the seasons and times of day when deployment of storage resources are most likely. Staff initially proposes that the call hours would focus on summer peak hours, which typically occur between 3 pm – 7 pm on weekdays. However, each EDC would have the flexibility to determine the season and preferred hours based on its specific needs.

2. A $/kWh Incentive Payment for Calls:

Staff proposes that each EDC would adopt a simple $/kWh payment for storage resources on its system.

The EDC may adopt a single-system payment or may establish geographically variable payments, if such payment differentiation is warranted. Rate and tariff design should align with expected PJM rules related to Federal Energy Regulatory Commission ("FERC") Order 2222 and include co-optimizing economic and GHG reduction considerations. Enhancing the value stack will provide a strong financial incentive for energy storage resources to provide energy to the grid (or to cease charging) during the times when the grid is the most stressed. The release of stored energy during these times could provide significant environmental, reliability, and cost savings to New Jersey consumers, since the energy storage resources will potentially result in avoiding the use of, or at least reducing the use of, peak generation, typically the most expensive, dirtiest, and least efficient generation.

Each EDC should explain how its proposed payment structure meets the following criteria: (i) maximize environmental benefits of storage deployment; (ii) minimize distribution investment; and (iii) otherwise minimize the stress on the local distribution system and reduce operating costs.

3. Payments to Resource Owners

During dispatch events, a Distributed resource owner will meet its obligations under the performance based payment portion of the NJ SIP if it responds to a call. Successfully "responding" to a call can take two forms: either injecting energy into the distribution system or by reducing the customer's consumption of power from the grid. Collectively, these are the Distributed customer's "Response kWhs," are measured in kWhs of relief provided. When a dispatch signal is sent by the relevant EDC, the customer would receive credit for each kWh of Response kWhs it provides during the call period, averaged over all call periods in a particular year. For example, an EDC that issued 10 calls over the course of a summer, would sum up the total Response kWhs provided by a storage device and report the average response over those 10 calls. A resource owner would then receive the $/kWh incentive established by the EDC, multiplied by their average Response kWhs. As proposed by Staff, the only penalty for resources that did not respond to a particular call is that the resource's average Response kWhs would decrease and the resource owner would receive a lower pay-for-performance payment. At no point would the Distributed storage resource incur penalties or result in a decrease to the fixed payment.

4. A Mechanism for Calling Resources

Each EDC will be required to develop a system for calling resources and communicating with distributed storage resources, many of which are expected to respond automatically. However, customers may always opt-out of a particular call, without penalty (apart from foregoing performance incentives they could earn during that call). Each EDC should rely, to the maximum extent possible, on Advanced Metering Infrastructure ("AMI"), as set forth by the Board in each EDC's AMI rollout filings and in any compliance with the AMI Data Access Plan proceeding, Docket No. EO20110716.

Staff proposes that each EDC program offer incentives for customer performance but that responding to calls should be voluntary for the consumer, as is the case in the ConnectedEnergy programs. Further, Staff recognizes that many customers invest in Distributed storage resources in order to provide backup power during blackouts or other reliability events. In order for customers to rely on storage devices during these times of grid stress, the customer may want to ensure that the storage device is fully charged before a storm or other event. In order to prevent storage devices from being drained immediately in advance of a potential grid event (i.e., a significant weather event). Staff notes that the ConnectedSolutions programs typically prohibit EDCs from dispatching Distributed resources more than 48-hours of anticipated extreme weather or likelihood of outages in order to address this concern.

VI. Project Maturity Requirements, Geographic Limitations, and Participation Fees:

Ratepayers benefit when the project allowed into a particular block has a reasonable likelihood of successful and timely completion. Project qualification and maturity requirements aim to strike a balance between awarding MW allotments sufficiently early in the development process to not create undue development risk or burden on developers but also to support projects that can be successfully built and that can install storage devices within a reasonable timeframe and meet their obligations at the incentive amount offered under the applicable block. This means that a well-designed declining block incentive structure must take steps to ensure that projects registering in the program best satisfy certain qualitative criteria.

For this reason, this Straw focuses on recommendations related to requiring projects to meet maturity requirements when they enter the declining block structure, as well as pay a fee for participating in the program. The intention of these requirements is to eliminate projects that cannot reasonably be expected to reach commercial operation within three years of registering for a megawatt allotment. If projects are not able to deliver on that timeframe, then the capacity they reserved should be returned to the market, at which point those MWs will increase the size of the then open block. Projects that fail to meet the maturity requirements in one block are free to reapply in subsequent rounds, as their plans become more developed. Staff anticipates that the Program Administrator will be charged with implementing these requirements.

A. Project Maturity Requirements:

This Straw recommends that projects be required to meet one of the following criteria at the time they reserve MW capacity in a block: (i) demonstrate a sufficiently advanced position in the PJM queue (taking into account the realities of the ongoing PJM interconnection reform process), (ii) demonstrate a comparable interconnection position in a state-jurisdictional queue, or (iii) for net metered projects, demonstrate conditional approval of their utility interconnection request. In addition, projects would be required to pay a non-refundable solicitation participation fee of $1,000 per MW of nameplate capacity. Relying on the PJM (or the equivalent state jurisdictional interconnection process) would avoid having to engage in a more complex, subjective process relating to permitting, securing right of ways, or evidence of public support.

For projects not interconnecting via the PJM interconnection process (including grid supply projects interconnecting at distribution voltage or PURPA-eligible projects that qualify to sell energy directly to the utility under a pre-established rate), projects must provide evidence of having filed an interconnection application with the applicable distribution utility and having received Part 1 Approval, as defined in N.J.A.C. § 14:8-5.

As noted in the CSI Straw Proposal, one factor that adds significant uncertainty to this discussion is PJM's proposed queue reform, discussed in greater detail below. Any final recommendations on maturity requirements for projects reserving a spot on a block will need to take into account the status of PJM's proposed changes to the process through which projects interconnect to the PJM grid.

For grid supply projects, queue position, while it is not a perfect indicator of remaining time in the queue or certainty of project completion, is well-suited to the pre-screening process in that it is a clear benchmark that is transparent to both bidders and evaluators so that it will be clear whether or not projects meet this criterion.

PJM's proposed queue revision would change the phases of the queue, the names of the required interim interconnection reports, and the structure of fees and deposits for projects in the queue. Accordingly, it is not possible to finalize queue position requirements for projects submitted under the new queue rules until the outcome of the PJM queue reform process is known. A discussion of potential benchmarks and requirements under the current process has been included in the Appendix to this Straw.

Assuming that PJM's queue reform, or some version of it, is adopted, it seems likely that projects not already in the PJM queue will be unable to demonstrate any queue position (other than a submitted application) until 2026. Such projects will likely not achieve commercial operation until at least 2028, due to the additional time needed to complete the interconnection process and final interconnection, including the construction of any required transmission upgrades.

For net metered projects, Staff proposes to require a signed letter of intent with the host location and that projects have Part 1 Interconnection Application executed (signifying the distribution utility's approval to commence construction).

B. *Bid Participation Fees:*

Fees or deposits for projects applying for state incentives are frequently used as means of ensuring the seriousness of bidders, incentivizing bidders to follow through on project commitments, and (in some cases) helping to defray the cost of administering state incentive programs. Projects serving public entities would be exempt from the bid fee.

Three models can be found in New York, California, and Connecticut.

- **New York.** In the New York Renewable Energy Certificates Program (administered by NYSERDA), bidders are assessed non-refundable bid fees in amounts that vary with the size of the projects, ranging from $1,000 per MW to $4,000 per MW, as follows:[61]

Table 1. NYSERDA Bid Fees

Nameplate Capacity (MW)	Bid Fee
Less than 5.00 MW	$5,000
5.00-19.99 MW	$20,000
20.00 – 49.99 MW	$50,000
50.00 MW or more	$100,000

[61] NYSERDA, "Purchase of New York Tier 1 Eligible Renewable Energy Certificates (RECs) Request for Proposals (RFP) No. RESRFP21-1," April 22, 2021, https://portal.nyserda.ny.gov/servlet/servlet.FileDownload?file=00Pt000000UOhG5EAL.

- **Massachusetts.** In Massachusetts, bidders in the SMART Program are required to provide a performance guarantee deposit in amounts that may vary but must not exceed $25 per kW of capacity (equivalent to $25,000 per MW).[62] These amounts are refunded to unsuccessful bidders and to selected bidders who meet Program Effective Date requirements.
- **Illinois.** In Illinois, renewable energy product procurements are administered by the Illinois Power Agency. In Illinois's Renewable Resources Procurement, applicants must pay a non-refundable application fee of $10 per kW, with a not-to-exceed cap of $5,000 per project.[63] This amount is not returned to applicants; rather it is used to offset program costs and decreases "the administrative fees that would otherwise be taken from the utility RPS budgets."[64]

Consistent with these other programs and the proposed CSI Program deposits, the Straw proposes to implement a non-refundable $1,000 per MW fee. Such a fee is at the low end of the bid fees imposed in other states. These fees would be applied to help defray the cost of administering the bid process. Staff proposes that energy storage projects serving public entities would be exempt from the bid fee.

VII. Commercial Operation Date Requirements:

Commercial Operation Date ("COD") requirements would establish the allowable length of time between when a storage developer reserves a MW quantity in a block and when the unit must be in commercial operation. In order to achieve commercial operation, the project must not only be fully constructed, but it must also have completed the full interconnection process, either at PJM or with a state jurisdictional EDC, including construction of any required interconnection upgrades.

The discussion of qualification requirements is paired in this Straw with a discussion of COD requirements because of the relationship between project pre-qualification requirements and how quickly a project can be expected to be completed after reserving space in a block. The central goal is to find a way to select projects that had solid prospects for successful development within a delineated timeframe, without setting the bar so high that these requirements would discourage prospective applicants from conducting the up-front development necessary to bring a storage project to fruition. In general, the more stringent the pre-registration requirements are in terms of how far advanced a project must be in order to enter into an NJ SIP block, the less time should be needed between registration and the project's COD.

[62] 225 CMR 20.00: SOLAR MASSACHUSETTS RENEWABLE TARGET (SMART) PROGRAM, https://www.mass.gov/doc/225-cmr-2000-final-071020-clean/download.

[63] Illinois Power Agency, "Long -Term Renewable Resources Procurement Plan," June 7, 2021, p. 172, https://www2.illinois.gov/sites/ipa/Documents/Final%20Reopening%20Revised%20Long-Term%20Plan%20(7%20June%202021%20rev).pdf.

[64] *Id.* at 172.

Staff proposes that Grid Supply storage projects should be required to reach commercial operation within three years. However, to mitigate the commercial risk of not meeting the COD, Staff proposes that any project may, at its option, renew its project back into the NJ SIP. However, projects exercising the option to renew would receive the lower of its initial registration price or the block price at the time that they renew their registration. Renewing the registration would thus allow the project to receive up to an additional three years to come online, while also appropriately reflecting the market value of the storage at the time it actually comes online, ensuring that the economic development, environmental, and grid resilience benefits associated with new storage projects are realized by consumers on schedule. Developers are advised to incorporate the risks associated with this requirement into their commercial decision-making process.

Staff notes that PJM's queue reform process is currently under review by the FERC. Staff expects to update this section as there is additional clarity from PJM or FERC. However, assuming that PJM's current queue reform proposal is accepted as proposed, the projections for transition timing suggest that new storage projects would complete their Final Interconnection Agreements by mid-2025 for projects in groups up through AG1—that is, projects that entered the queue by mid-2020. Projects that entered before the fourth quarter of 2021 are projected to reach Final Interconnection Agreements by mid-2026. All other projects would be delayed in reaching Final Interconnection Agreements until mid-to-late 2027.[65]

Assuming that the first block opens in mid-2023, PJM's timing suggests that projects in the first group could reasonably expect to complete the interconnection process within a three-year timeframe.

Staff proposes that Distributed storage projects receive 18 months to reach commercial operation and notes that developers should incorporate this risk into their project economics, as extensions are not allowed under the proposed program. However, similar to Grid Supply projects, this Straw proposes to allow projects to roll-forward their registrations, should they not meet the 18 month in service date requirement, again at the lower of their initial registration price or the currently open block price.

VIII. Technical Requirements:

In order to be eligible to apply for incentives, Staff proposes that Grid Supply storage and Distributed storage projects must meet the following criteria:

- The energy storage system must be comprised of new products, electrically interconnected to the transmission or distribution system of a New Jersey EDC;

[65] See: PJM. Interconnection Queue Reform. March 15, 2022. Slide 5: https://www.pjm.com/-/media/committees-groups/task-forces/iprtf/2022/20220315/20220315-item-02-transition-to-cycle-process-and-tariff-revision-information.ashx

- Bulk storage devices must be qualified to provide energy, capacity, and/or ancillary services in the wholesale markets established by PJM Interconnection, LLC, while resources at the distribution level may either sell aggregated output, such as the ConnectedSolutions programs in Connecticut and Massachusetts, into PJM or participate in a distribution level incentive program;

- Meet the COD requirements, as demonstrated by submitting as-built drawings and confirmation of Permission to Operate from the relevant utility to the Program Administrator;

- Meet appropriate financial security and project maturity requirements;

- Meet minimum safety requirements by a Nationally Recognized Testing Laboratory as evidenced by specific UL listings defined in the program manual at the time the system enters commercial operation. These references are intended to evolve to meet current best practices in the storage industry; and

- Comply with all manufacturers' and NFPA[66] installation requirements, applicable laws, regulations, codes, licensing, and permit requirements.

IX. <u>Administration of Program and Assignment of Block Priority Dates:</u>

In terms of administration of incentives, Staff proposes that block allocations ("block priority date") be established on a first-come, first-served basis, based on the date stamp of when the Program Administrator receives a completed application. Projects will be required to meet all of the maturity, fee, and other requirements discussed below in order to be deemed complete. Applications will be deemed "complete" if the application is approved as-submitted or with a minor deficiency, as determined by the Program Administrator. Applications with major deficiencies will be assigned the block priority date on which the deficiency is cured. A project that is larger than the size of any individual block will be carried over into the next block and be offered a rate that blends the two (or more) blocks. Developers will be offered the opportunity to decide whether to accept the blended offer, reduce their project size, or withdraw the project.

X. <u>Stakeholder Workshops:</u>

Staff requests comments on all elements of this Straw, including program design, administrative processes, financial proposals, and the roles of EDCs, private parties and the BPU, as well as any other comments on items not specifically addressed in this Straw.

[66] NFPA 855 Standard for the Installation of Stationary Energy Storage Systems
https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=855

Staff proposes a series of three virtual workshops described below. The BPU will provide agendas in advance of each workshop with a series of specific questions for stakeholder comment. All workshops will be recorded and available for video playback. Oral comments provided at the workshops and written comments provided subsequent to workshops will be given equal weight in Staff's evaluation.

Workshop 1 will provide an overview of this Straw and provide a summary of energy storage in New Jersey to date and discuss use cases, including bulk storage and distributed storage, and will look at how energy storage is being handled in programs from other states. The potential for energy storage as an enabler of grid modernization will be discussed.

Workshop 2 will explore the proposed portions of the NJ SIP focusing on Grid Supply storage, with a focus on economic drivers for investment and operation of energy storage systems, including the various components of the value stack and how those components can be monetized and accessed. This workshop will also explore the potential use of the PJM marginal carbon intensity signal to drive investment in energy storage that will operate to maximize carbon reductions.

Workshop 3 will explore how the energy storage program can best be implemented at the distribution level, including how New Jersey's EDCs should establish distribution price signals, how the program should be implemented, and how to maximize the benefits of energy storage to facilitate investment in distributed energy resources. The emerging role of the DER Aggregator will be discussed relative to energy storage asset enrollment and management.

APPENDIX: PJM'S CURRENT QUEUE PROCESS

Queue phases

Under the current PJM queue process, large projects (greater than 20 MW) in the PJM queue move through the following phases:

- Feasibility Study
- System Impact Study
- Facilities Study
- Interconnection Service Agreement: Signed Interconnection Service Agreement. Smaller projects (20 MW or less) may be eligible for a streamlined process, in which the Feasibility and System Impact Studies are combined, and the Facilities Study is waived.
- Wholesale Market Participation Agreement
- Construction Services Agreement

Each of the required studies requires time to complete and requires funding from the applying project. Throughout the process, projects drop out of the queue for a variety of reasons. For example, a review of withdrawn solar projects in New Jersey from 2013–2019 shows that, among the roughly 65% of projects that withdrew at some point, almost two thirds withdrew before completion of the System Impact Studyand more than three quarters withdrew before completion of the Facilities Study.

Queue costs

In order to proceed through the PJM queue, projects must pay for the costs of the required studies. For smaller projects (20 MW and below), the most significant potential cost is a $50,000 charge for the facilities study, if it is required. For larger projects, costs prior to the facilities study depend on project size but are capped at $410,000. The facilities study is at least $100,000, or higher, depending on the complexity of the study. PJM is currently evaluating a proposal that may significantly increase these deposit amounts.

Queue timing

The timeline for the PJM queue process for larger projects is designed to be about 26 months.[67] For smaller projects, an abbreviated process that should take about a year is available, provided the project does not "cause transmission system violations" and only requires a single point of interconnection. In

[67] PJM, "Interconnection Process Overview," 2020, p. 12, available at: https://www.pjm.com/-/media/committees-groups/task-forces/iprtf/postings/interconnection-process-overview.ashx.

practice, for large projects, developers commented that completion of the process all the way to an Interconnection Service Agreement is a necessary part of the development process.

Recently, many of the delays in the process occur at the very beginning, as more than a year can go by between the deadline to register for a queue position and when the queue position becomes active.