The Commonwealth of Massachusetts

DEPARTMENT OF PUBLIC UTILITIES

October 7, 2022

D.P.U. 21-80-A

Petition of NSTAR Electric Company d/b/a Eversource Energy for approval by the Department of Public Utilities of its Grid Modernization Plan for calendar years 2022 to 2025.

D.P.U. 21-81-A

Petition of Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid, for approval by the Department of Public Utilities of its Grid Modernization Plan for calendar years 2022 to 2025.

D.P.U. 21-82-A

Petition of Fitchburg Gas and Electric Light Company d/b/a Unitil for approval by the Department of Public Utilities of its Grid Modernization Plan for calendar years 2022 to 2025.

ORDER ON PREVIOUSLY DEPLOYED TECHNOLOGIES

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TABLE OF CONTENTS

I. INTRODUCTION

On July 1, 2021, NSTAR Electric Company d/b/a Eversource Energy ("NSTAR Electric"), Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid ("National Grid"), and Fitchburg Gas and Electric Light Company d/b/a Unitil ("Unitil") (collectively, "the Companies"; individually, "company") each filed for approval by the Department of Public Utilities ("Department") a proposed 2022-2025 Grid Modernization Plan. Additionally, each company proposed revisions to its grid modernization cost recovery mechanism tariff. The Companies filed their plans pursuant to Grid Modernization – Phase II, D.P.U. 20-69-A (May 21, 2021). The Department docketed these matters as D.P.U. 21-80, D.P.U. 21-81, and D.P.U. 21-82, respectively.[1]

II. BACKGROUND

On May 10, 2018, the Department approved each company's first grid modernization plan. Grid Modernization, D.P.U. 15-120/D.P.U. 15-121/D.P.U. 15-122 (2018) ("Grid Modernization Order"). The Department's approval included preauthorization[2] of the

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1 These cases have not been consolidated and remain separate proceedings.

2 Preauthorization means that the Department will not revisit whether the company should have proceeded with the investments as proposed. D.P.U. 20-69-A at 30 n.9; Grid Modernization Order at 110. The Department will, however, review the prudence of a company's implementation of those investments. D.P.U. 20-69-A at 30 n.9; Grid Modernization Order at 110; Modernization of the Electric Grid, D.P.U. 12-76-B at 19 (2014).

following categories of grid-facing investments:[3] (1) volt/volt-ampere reactive optimization ("VVO"); (2) advanced distribution automation/automated feeder reconfiguration; (3) feeder monitors/advanced sensing technology; (4) communications and information technologies/operation technologies ("IT/OT"); (5) advanced distribution management systems ("ADMS")/load flow analytics; (6) supervisory control and data acquisition systems ("SCADA");[4] (7) an enterprise mobile damage assessment tool; (8) outage management system integration with existing advanced metering infrastructure ("AMI/OMS integration"); (9) field area network; and (10) a distributed energy resource ("DER") analytics visualization platform. Grid Modernization Order at 139-140, 154-155, 163-164, 172-173.[5] The Companies' first grid modernization plan term included calendar years 2018 through 2020 and was subsequently extended through calendar year 2021. Grid Modernization, D.P.U. 15-120-D/D.P.U. 15-121-D/D.P.U. 15-122-D at 1, 6-7 (2020); Grid Modernization Order at 114-115. On February 4, 2021, the Department preauthorized a power quality monitoring investment as a pilot project as part of NSTAR Electric's first grid modernization plan. NSTAR Electric Company, D.P.U. 20-74, at 28-29 (2021).

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3 The categories of grid-facing investments varied by company and the Companies also used different terms to refer to their proposed investments, but the Department found substantial similarities between each company's proposed investments. Grid Modernization Order at 139-140.

4 In this Order, unless otherwise indicated, all references to SCADA are to SCADA in the distribution system.

5 The Department did not preauthorize any customer-facing investments, including for advanced metering functionality and advanced metering infrastructure, at that time. Grid Modernization Order at 1-2, 120-135.

For the Companies to recover the costs of eligible preauthorized grid modernization investments, the Department established a short-term cost recovery mechanism, the grid modernization factor ("GMF"), and annual and term-specific filing requirements to document each company's performance in implementing its plan. Grid Modernization Order at 112-115, 216-235. Additionally, the Companies' first grid modernization plans are subject to statewide and company-specific infrastructure and performance metrics that measure progress in achieving grid modernization objectives. Grid Modernization, Stamp-Approved Performance Metrics (July 25, 2019); Grid Modernization Order at 196-204. The Companies' plans are also subject to third-party evaluation plan requirements. Grid Modernization Order at 204-205.

The Department subsequently established a second grid modernization plan term to encompass calendar years 2022 through 2025 and directed each company to submit a 2022-2025 Grid Modernization Plan by July 1, 2021, consistent with the Department's directives on the form and content established for these plans. D.P.U. 20-69-A at 28-39; D.P.U. 15-120-D/D.P.U. 15-121-D/D.P.U. 15-122-D at 6-7. The Department required that each plan include: (1) a five-year strategic plan that included a plan for the full deployment of advanced metering functionality; (2) a separate four-year, "short-term" investment plan

each for grid-facing and customer-facing[6] technologies; and (3) a composite business case in support of both short-term investment plans. D.P.U. 20-69-A at 38-39. In their short-term investment plans, the Department directed the Companies to categorize proposed grid-facing investments as either (1) previously deployed and/or preauthorized technologies, or (2) new technologies. D.P.U. 20-69-A at 31-32. Further, the Department directed that each company address all proposed customer-facing investments needed to support the company's longer-term strategic plan for full advanced metering infrastructure deployment. D.P.U. 20-69-A at 34. The Department explained that it would review the short-term investment plans to determine which proposed investments and technologies were appropriate for preauthorization. D.P.U. 20-69-A at 30.

Additionally, the Department noted that grid modernization plan filings must include proposed infrastructure and performance metrics to measure progress in achieving grid modernization objectives. D.P.U. 20-69-A at 28, citing Modernization of the Electric Grid D.P.U. 12-76-B at 16 (2014). For the second grid modernization plan term, the Department directed the Companies to include proposed company-specific performance metrics for all new grid-facing technologies. D.P.U. 20-69-A at 33. The Department also directed the

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[6] By "grid-facing," we mean technologies that automate grid operations and allow distribution companies to monitor and control grid conditions in near real time. Modernization of the Electric Grid, D.P.U. 12-76-A at 2 n.4 (2013). "Customer-facing" technologies primarily include customer metering and related infrastructure and may include any of the following technologies: meters; two-way communications systems (fixed, wireless, and home area networks); internet-based information portals; wireless applications; direct load control technologies (e.g., in-home energy devices and programmable communicating thermostats); and smart appliances and electronics. D.P.U. 12-76-A at 2 n.4.

Companies to coordinate and propose statewide performance metrics for similar new technologies. D.P.U. 20-69-A at 33. The Department observed that it already approved both company-specific and statewide performance metrics associated with the Companies' grid-facing investments under their first grid modernization plan term. D.P.U. 20-69-A at 33, citing Grid Modernization, Stamp-Approved Performance Metrics (July 25, 2019).

III. PROCEDURAL HISTORY

On July 1, 2021, each company filed its respective 2022-2025 Grid Modernization Plan and proposed revisions to its GMF cost recovery tariff. On July 28, 2021, the Attorney General of the Commonwealth of Massachusetts ("Attorney General") filed notices of intervention in D.P.U. 20-80, D.P.U. 20-81, and D.P.U. 20-82 pursuant to G.L. c. 12, § 11E(a). Additionally, the Department granted full intervenor status to each of the following entities: the Massachusetts Department of Energy Resources ("DOER") (D.P.U. 21-80; D.P.U. 21-81; D.P.U. 21-82); The Energy Consortium ("TEC") (D.P.U. 21-80; D.P.U. 21-81; D.P.U. 21-82); Green Energy Consumers Alliance (D.P.U. 21-80; D.P.U. 21-81); Cape Light Compact JPE (D.P.U. 21-80); Conservation Law Foundation (D.P.U. 21-80; D.P.U. 21-81; D.P.U. 21-82); Utilidata, Inc. (D.P.U. 21-80; D.P.U. 21-81; D.P.U. 21-82); Acadia Center (D.P.U. 21-80; D.P.U. 21-81; D.P.U. 21-82); and the NRG Retail Companies (NRG Home, Direct Energy Services, LLC, Direct Energy Business, LLC, Green Mountain Energy Company, Energy Plus Holdings, LLC, and XOOM Energy Massachusetts, LLC) (D.P.U. 21-80; D.P.U. 21-81).

On September 1, 2021, the Department bifurcated its investigation of the 2022-2025 Grid Modernization Plans into two separate, parallel tracks. D.P.U. 21-80/ D.P.U. 21-81/D.P.U. 21-82, Procedural Notice at 2 (September 1, 2021). The Department designated Track 1 to review proposed investments identified as having been previously deployed and/or preauthorized grid modernization investments and technologies under the Companies' first grid modernization plan term ("continuing investments"), and Track 2 to review proposed investments identified as new grid modernization investments and those investments proposed as part of each company's advanced metering infrastructure implementation plan. D.P.U. 21-80/D.P.U. 21-81/D.P.U. 21-82, Procedural Notice at 2 (September 1, 2021). See also D.P.U. 20-69-A at 37. On September 3, 2021, the Department issued an interlocutory order on scope regarding the Companies' proposed investments associated with implementation of the Federal Energy Regulatory Commission's ("FERC") Order 2222, determining that the review of any proposed investments driven primarily by compliance with FERC Order 2222 was both premature and outside the scope of these proceedings. D.P.U. 21-80/D.P.U. 21-81/D.P.U. 21-82, Interlocutory Order at 7-8 (September 3, 2021) ("Interlocutory Order on Scope").[7]

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[7] Accordingly, the investments and associated costs addressed in the instant Order do not include any investments driven primarily by compliance with FERC Order 2222, and specifically excludes Department review of the following investments identified in the Companies' initial filings: (1) the Companies' proposed Joint Study; (2) the Companies' proposed statewide customer participation performance metrics; (3) National Grid's proposed distributed energy resource operations portal; and (4) National Grid's proposed retail/wholesale settlement system upgrades. Interlocutory Order on Scope at 7.

Pursuant to notices duly issued, the Department conducted a joint public hearing and procedural conference in these proceedings on September 9, 2021. The Department received comments from the Attorney General, Massachusetts State Senator Michael O. Moore, Connecticut State Representative David Michel, DOER, Acadia Center, Northeast Clean Energy Council, Northeast Energy Efficiency Partnerships, the Berkshire-Litchfield Environmental Council, the Massachusetts Association for the Chemically Injured, the Scientific Alliance for Education, and SW Pennsylvania for Safe Technology. The Department also received comments from numerous individual members of the public. At the joint procedural conference, the Department established the Track 1 procedural schedule, which included dates for discovery, evidentiary hearings, and briefing. D.P.U. 21-80/ D.P.U. 21-81/D.P.U. 21-82, Procedural Notice at 2 (September 10, 2021).

Consistent with the Track 1 schedule, on November 3, 2021, and November 4, 2021, the Department held two days of joint evidentiary hearings ("Track 1 evidentiary hearings"). On November 17, 2021, NSTAR Electric and TEC each submitted an initial brief in D.P.U. 21-80, National Grid submitted an initial brief in D.P.U. 21-81, Unitil submitted an initial brief in D.P.U. 21-82, and the Attorney General and DOER each submitted a single brief for all three dockets. On December 1, 2021, each company submitted a reply brief in its respective docket. On December 30, 2021, the Department issued an Interim Continuation Order authorizing the Companies to continue their respective grid modernization programs and implement Track 1 investment categories consistent with the investment categories previously preauthorized for their 2018-2021 Grid Modernization Plans, pending

issuance of the instant decision. D.P.U. 21-80/D.P.U. 21-81/D.P.U. 21-82, at 6-7 (December 30, 2021) ("Interim Continuation Order"). The Department also approved a revised GMF cost recovery tariff for each company, effective January 1, 2022. Interim Continuation Order at 7-8; D.P.U. 21-80, Stamp-Approved Tariff, M.D.P.U. No. 73E (December 31, 2021); D.P.U. 21-81, Stamp-Approved Tariff, M.D.P.U. No. 1469 (December 31, 2021); D.P.U. 21-82, Stamp-Approved Tariff, M.D.P.U. No. 376 (December 31, 2021).[8]

During the course of the Track 1 investigation, NSTAR Electric sponsored the testimony of two witnesses in D.P.U. 21-80, both employees of Eversource Energy Service Company: (1) Jennifer A. Schilling, vice president, grid modernization, and (2) Robert W. Frank, director, Massachusetts revenue requirements; National Grid sponsored the testimony of seven witnesses in D.P.U. 21-81, each employees of National Grid USA Service Company, Inc.: (1) Wajiha A. Mahmoud, vice president, future of electric, (2) William F. Jones, director, transmission and distribution grid modernization New

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[8] The tariff revisions approved by the Department involved updates to the grid modernization term lengths and the filing deadline for the 2022-2025 Grid Modernization Plans as set forth in D.P.U. 20-69-A, deletion of unnecessary language, and correction of a typographical error. See D.P.U. 21-80/D.P.U. 21-81/ D.P.U. 21-82, Hearing Officer Memorandum at 2 (December 16, 2021). More recently, the Department approved further revisions to these tariffs resulting from the Department's directives in Grid Modernization, D.P.U. 15-120-F/D.P.U. 15-121-F/ D.P.U. 15-122-F (September 7, 2022). See D.P.U. 21-80, Stamp-Approved Tariff, M.D.P.U. No. 73F (September 30, 2022); D.P.U. 21-81, Stamp-Approved Tariff, M.D.P.U. No. 1497 (September 30, 2022); D.P.U. 21-82, Stamp-Approved Tariff, M.D.P.U. No. 379 (September 30, 2022).

England, (3) Samer Arafa, principal engineer, electric strategy activation, future of electric, (4) Rashmi Dani, director, IT grid modernization, (5) Stephen Lasher, director, electric markets integration, future of electric, (6) Kathleen Hammer, principal analyst, New England revenue requirements, and (7) Mindy Rosen, lead analyst, New England electric pricing, New England regulatory; and Unitil submitted the testimony of four witnesses in D.P.U. 21-82, each employees of Unitil Service Company: (1) Kevin E. Sprague, vice president, engineering, (2) John Bonazoli, manager, distribution engineering, (3) Christopher Goulding, director, rates and revenue requirements, and (4) Daniel Nawazelski, manager, rates and revenue requirements.

For purposes of the instant Order, the evidentiary record in each docket includes the company's initial filing exhibits and corresponding revisions to those exhibits, and responses to information requests, submitted on or before November 2, 2021, and record request responses from the Track 1 evidentiary hearings. In D.P.U. 21-80, NSTAR Electric responded to 369 information requests and ten record requests. In D.P.U. 21-81, National Grid responded to 292 information requests and seven record requests. In D.P.U. 21-82, Unitil responded to 123 information requests and three record requests.[9]

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[9] Although this Order addresses Track 1 investments, for administrative efficiency, the Department identifies the total number of information requests issued in both Tracks 1 and 2 of these proceedings. At the conclusion of the Track 2 evidentiary hearings, the Department moved all exhibits into the records of each docket (Tr. 6, at 1125-1127).

IV. DESCRIPTION OF PROPOSALS

A. Introduction

In their 2022-2025 Grid Modernization Plan filings, NSTAR Electric, National Grid, and Unitil each identify grid-facing investments as either (1) previously deployed and/or preauthorized technologies, or (2) new technologies (D.P.U. 21-80, Exhs. ES-JAS-1, at 13-16; ES-JAS-2, at 35-36, 42-45; D.P.U. 21-81, Exh. NG-GMP-1, at 10-11; NG-GMP-2 (Rev. 2) at 16, 23-112; D.P.U. 21-82, Exh. Unitil-KES-1, at 16-19, 25).[10] The Companies request that the Department preauthorize as part of each company's second grid modernization plan multiple categories of grid-facing investments that the Department previously preauthorized for each company's first grid modernization plan (D.P.U. 21-80, Exh. ES-JAS-1, at 17-18; D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 23; D.P.U. 21-82, Exh. Unitil-KES-1, at 18-19). The Companies contend that the investments underlying these categories are a continuation of the investments previously approved by the Department for their first grid modernization plans (D.P.U. 21-80, Exhs. ES-JAS-1, at 13-14; ES-JAS-2, at 35-36; D.P.U. 21-81, Exhs. NG-GMP-1, at 10; NG-GMP-2 (Rev. 2) at 4; D.P.U. 21-82, Exhs. Unitil-KES-1, at 16-18; Unitil-GMP[11] at 64).

Additionally, the Companies jointly propose: (1) revisions to their existing VVO performance metrics; and (2) statewide metrics for new proposed grid-facing technology

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10 The instant Order only addresses continuing investments, i.e., the previously deployed and/or preauthorized technologies and associated performance metric proposals. The Department will address Track 2 investments in a separate Order.

11 For ease of reference to this exhibit, the Department cites to Unitil's Grid Modernization Plan as "Unitil-GMP."

(D.P.U. 21-80, Exh. ES-JAS-2, at 145-146 & Atts. A&B; D.P.U. 21-81, Exhs. NG-GMP-1, at 11-12; NG-GMP-4; NG-GMP-5; D.P.U. 21-82, Exhs. Unitil-KES-1, at 22-23; Unitil-GMP, Atts. A&B).[12] NSTAR Electric also proposes a company-specific performance metric for power quality monitoring (D.P.U. 21-80, Exh. ES-JAS-2, at 146-147 & Att. B at 5-7).

A. NSTAR Electric

For its 2022-2025 Grid Modernization Plan, NSTAR Electric proposes an estimated $165.3 million in investments, inclusive of estimated O&M costs, in the following five categories of continuing grid-facing investments: (1) monitoring and control ($76.3 million), involving substation automation ($71.5 million, including $10.5 million in unexpended calendar year 2021 budget amounts to complete investments preauthorized for deployment as part of the company's first grid modernization plan) and power quality monitoring ($4.8 million); (2) VVO ($40.4 million, including $400,000 in unexpended calendar year 2021 budget amounts to complete investments preauthorized for deployment as part of the company's first grid modernization plan); (3) communications, involving wireless communications improvements ($24.0 million); (4) ADMS ($21.9 million, including $5.4 million in unexpended calendar year 2021 budget amounts to complete investments preauthorized for deployment as part of the company's first grid modernization plan); and

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12 Each company also proposes company-specific metrics for the new proposed grid-facing technology (D.P.U. 21-80, Exh. ES-JAS-2, at 146-147 & Att. B; D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 112; NG-GMP-5; D.P.U. 21-82, Exhs. Unitil-KES-1, at 24; Unitil-GMP, Att. C). As noted, above, the Department will address the new technology proposals in a separate Track 2 Order.

(5) measurement, verification, and support,[13] involving program management and third-party measurement and verification ($2.7 million) (D.P.U. 21-80, Exhs. ES-JAS-2, at 36, 42-45, 52-94; DPU 4-4; Tr. 2, at 265-268; RR-DPU-13).[14] NSTAR Electric describes its 2022-2025 Grid Modernization Plan as an evolution from its first grid modernization plan reflecting on lessons learned with increased focus on the deployment of tools to support system operations needed to manage two-way power flows in real time and further integration of energy storage and other dispatchable resources as grid assets for multiple use cases (D.P.U. 21-80, Exh. ES-JAS-2, at 35). NSTAR Electric filed a business case analysis in support of its investment plan during the course of the proceeding (D.P.U. 21-80, Exh. DPU 1-1).

As part of its monitoring and control program, NSTAR Electric proposes continuing investments in substation automation and power quality monitoring (D.P.U. 21-80, Exhs. ES-JAS-1, at 13-14; ES-JAS-2, at 43-44, 69-79). NSTAR Electric's proposed substation automation program is twofold: (1) replacing older relay technology with current microprocessor relay technology for 190 additional feeders at bulk substations across Massachusetts; and (2) adding relays with remote telemetry to 55 high-priority four kilovolt ("kV") feeders in eastern Massachusetts (D.P.U. 21-80, Exhs. ES-JAS-2, at 71, 69-73;

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[13] NSTAR Electric also proposes additional costs for the measurement, verification, and support category for Track 2 investments, which will be addressed in a separate Order (D.P.U. 21-80, Exh. ES-JAS-2, at 36; RR-DPU-13).

[14] NSTAR Electric initially estimated a total four-year budget of $150.4 million for the continuing investments, but subsequently adjusted the total during the course of the proceeding to $165.3 million (D.P.U. 21-80, Exh. ES-JAS-2, at 36; RR-DPU-13).

DPU 3-3). NSTAR Electric states that this program provides improved visibility and automation capabilities to critical substation assets used to manage power flows and is a key enabling investment of the modern grid (D.P.U. 21-80, Exhs. ES-JAS-1, at 14; ES-JAS-2, at 43). NSTAR Electric proposes to deploy power quality monitoring system metering at four to five additional substations serving industrial customers, utilizing the same technology relied on for its Cambridge pilot (D.P.U. 21-80, Exhs. ES-JAS-2, at 77-80; DPU 3-5; DPU 3-6; DPU 8-2).

NSTAR Electric proposes to expand its VVO program to an additional five to seven substations in western Massachusetts and, in eastern Massachusetts, to a regional control room and four to six substations (D.P.U. 21-80, Exhs. ES-JAS-2, at 63-64; DPU 3-10). For the western Massachusetts facilities, the project will upgrade additional load tap changers with remote control capability, install remote controlled voltage regulators and capacitor banks, and deploy additional feeder heads and end-of-line sensors (D.P.U. 21-80, Exh. ES-JAS-2, at 63). NSTAR Electric states that this system will eventually be transitioned to the model-based DMS system, which will bring all dispatch and control entities within a single scheme that expands the utility of individual devices across multiple functions, and the VVO devices will be recommissioned into NSTAR Electric's energy control system and SCADA system (D.P.U. 21-80, Exhs. ES-JAS-2, at 63-64; DPU 3-11; DPU 8-6). Within this program, NSTAR Electric also proposes to install advanced inverters at a company-owned DER facility in Southampton (D.P.U. 21-80, Exhs. ES-JAS-2, at 61, 64). For the eastern Massachusetts facilities, deployment will be commissioned into the enterprise energy control system and DMS platform, but deployment will be similar to

the western Massachusetts deployment, including through the use of micro-capacitors for both deployments (D.P.U. 21-80, Exh. ES-JAS-2, at 64). NSTAR Electric states that expansion of VVO will reduce demand, increase system efficiency, and integrate DER with software and remotely operated distribution equipment that actively manages system voltage (D.P.U. 21-80, Exh. ES-JAS-1, at 14).

For the communications investment, NSTAR Electric proposes to augment its existing wireless communications field area network through deployment of new base radios and associated infrastructure across eastern and western Massachusetts (D.P.U. 21-80, Exhs. ES-JAS-1, at 13; ES-JAS-2, at 80-88). With its deployment strategy, NSTAR Electric seeks to enhance the bandwidth, latency, and frequency of data communications required of its control room technology (e.g., SCADA, DMS, outage management system ("OMS"), distributed energy resource management system ("DERMS") to provide grid operators with real-time status information, and to support more frequent, high bandwidth communications from more devices on the grid (D.P.U. 21-80, Exh. ES-JAS-2, at 81-83).

With regard to investment in ADMS, NSTAR Electric proposes continuing implementation of DMS for all overhead and underground primary feeders in its Massachusetts service territory, with control room technology to model as-operated distribution system power flows based on real-time field device telemetry (D.P.U. 21-80, Exhs. ES-JAS-1, at 13; ES-JAS-2, at 52-53). NSTAR Electric states that its DMS is an enabling investment for advanced tools to optimize DER on the system using VVO

applications and DERMS,[15] and will provide operators with an as-operated electrical model of its entire distribution system (D.P.U. 21-80, Exh. ES-JAS-2, at 42, 55). According to NSTAR Electric, the three-year DMS project will be based on the company's geographic information system and asset databases and integrate directly with its energy control and outage management systems (D.P.U. 21-80, Exh. ES-JAS-2, at 55-56). NSTAR Electric states that DMS will be used by system operators to manage two-way power flows on the distribution grid while providing safe and reliable service for customers (D.P.U. 21-80, Exhs. ES-JAS-1, at 13; ES-JAS-2, at 42).

Finally, NSTAR Electric requests preauthorization and continuation of its internal grid modernization project management program to oversee, track, and report on grid modernization plan implementation activities, as well as continuation of its third-party measurement and verification activities (D.P.U. 21-80, Exhs. ES-JAS-1, at 13-14; ES-JAS-2, at 44-45, 134-139).

During the course of the proceeding, NSTAR Electric provided the anticipated bill impacts for its continuing investments during the 2022-2025 Grid Modernization Plan term. NSTAR Electric estimates a monthly bill impact of 0.423 percent[16] for an average residential

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[15] NSTAR Electric proposed its DERMS investments as a new technology under its 2022-2025 Grid Modernization plan (D.P.U. 21-80, Exhs. ES-JAS-1, at 15; ES JAS-2, at 49, 114-124). This proposal is being investigated in Track 2 of the Department's investigation.

[16] NSTAR Electric estimates that its proposed $146.8 million in investments would increase the currently effective amount for recovery through the GMF by $17.3 million, assuming all of the associated plant additions are in service at the end of the 2022-2025 Grid Modernization Plan (D.P.U. 21-80, Exh. DPU 9-3). NSTAR

customer, with the exact amount dependent on the final level of investments (D.P.U. 21-80, Exh. DPU 9-3).

B. National Grid

For its 2022-2025 Grid Modernization Plan, National Grid proposes an estimated $305.3 million in investments, inclusive of estimated O&M costs, in the following seven categories of continuing grid-facing investments: (1) monitoring and control, involving feeder monitor sensors ($4.1 million); (2) VVO/conservation voltage reduction ("CVR"), including advanced capacitors and regulators ($76.4 million); (3) communications, involving improvements towards the development of a private communications network and creation of an integrated network operations center ($102.8 million); (4) IT/OT, including data management, cybersecurity, and an enterprise integration platform for the grid modernization systems investments ($18.8 million); (5) ADMS, involving ADMS core functionality, mobile dispatch, remote terminal unit separation, a distribution plant information historian application, and geographic information system data enhancements ($61.0 million); (6) advanced distribution automation ("ADA"), including fault location, isolation, and service restoration ("FLISR") capabilities with advanced reclosers and breakers ($37.7 million); and (7) measurement, verification, and support, involving project management and third-party

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Electric notes that in calculating the amounts attributed to this total, it did not estimate the impact of accumulated depreciation or deferring income taxes associated with capital additions placed in-service over the course of the 2022-2025 Grid Modernization Plan, nor did it calculate the revenue requirement of vintage years 2018 through beyond 2021 or any prior period reconciliation (D.P.U. 21-80, Exh. DPU 9-3).

measurement and verification ($4.4 million) (D.P.U. 21-81, Exhs. NG-GMP-1, at 10-11; NG-GMP-2 (Rev. 2) at 16; DPU 1-2, Att. 1 (Rev. 3)).[17,18] To support the delivery of these investments during the four-year term, National Grid proposes to hire 42-48 full-time equivalent employees to support the program for four years (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 129; Tr. 2, at 210). National Grid provided a business case analysis in support of its proposed grid modernization plan investments (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 129-157; NG-GMP-3 (Rev.)).

As part of its monitoring and control program, National Grid proposes to deploy approximately 32 additional headend mainline feeder monitors in each plan year, for a total of 128 monitors, which will be used to capture real-time voltage, current, and power quantities, in order to provide enhanced visibility and facilitate electric system planning (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 25). During the course of the proceeding, National Grid clarified that it will use the same feeder monitor devices it deployed during the first grid modernization term and, further, will use the devices for overhead circuit applications (D.P.U. 21-81, Exh. DPU 3-1(b)).[19] Further, National Grid stated that it reduced the size of

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17 National Grid initially estimated a total four-year budget of $289.3 million for the continuing investments, inclusive of estimated O&M costs, but subsequently adjusted the total (D.P.U. 21-81, Exhs. NG-GMP-2, at 16; NG-GMP-2 (Rev.) at 16; NG-GMP-2 (Rev. 2) at 16; DPU 1-2, Att. 1 (Rev. 3)). National Grid did not revise its Track 1 investment totals between the Revised and Second Revised Exhibit NG-GMP-2.

18 All values presented are in nominal dollars (D.P.U. 21-81, Exh. DPU 1-3, Att. 1 (Rev. 3)).

19 National Grid does not anticipate deploying devices for underground feeder monitoring until calendar year 2026 (D.P.U. 21-81, Exh. DPU 3-1(b)).

its feeder monitor program to only focus on deployments where advanced metering infrastructure cannot support the system visibility, situational awareness, and planning needs (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 25; DPU 1-1; DPU 3-3; DPU 6-2). National Grid preselected 25 of 32 feeder monitors locations for deployment in 2022 and will determine the remaining locations in a timeframe that balances workstream needs and evolving system conditions (D.P.U. 21-81, Exhs. DPU 3-2; DPU 6-2).

National Grid plans to deploy VVO/CVR on approximately 188 targeted feeders where benefits continue to justify costs (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 28). National Grid proposes to utilize VVO with CVR technology to flatten and lower feeder voltage profiles through the use of feeder monitors and centralized control of advanced capacitors and regulators based on real-time system performance (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 27). Additionally, National Grid proposes to deploy advanced capacitors and regulators, including substation voltage regulating devices, line voltage regulators, and capacitors to accomplish the coordinated operation necessary to achieve VVO/CVR benefits, including load optimization and reduced customer energy use and system capacity requirements (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 27-28). National Grid anticipates fully integrated system automation centralizing the VVO/CVR and FLISR applications into the third and final phase of its ADMS project by December 2025 (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 19, 42).

During the course of the proceeding, National Grid clarified that 15 feeders at three substations have progressed to the VVO/CVR deployment design stage for planned deployment in calendar year 2022 (D.P.U. 21-81, Exhs. DPU 3-4; DPU 6-3). National Grid

will select the remaining feeders annually during 2023 through 2025 using its VVO benefit-cost analysis ("BCA") prioritization tool which allows changing system conditions such as recent loads, DER penetration levels, and ongoing system modifications, to be updated and considered in the upcoming year's program deployment (D.P.U. 21-81, Exhs. DPU 3-4; DPU 6-3).[20]

As part of the systems framework to enable the two-way flow of information and services, National Grid proposes further investments in IT/OT and communications that connect its back-office systems to devices in the field. National Grid observes that a fundamental component of grid modernization is a systems architectural framework that can deliver "any data, any service, anytime[,]" and that building this technology foundation is needed to deliver the capabilities of the proposed grid modernization investments, including VVO/CVR, ADA, feeder monitors, ADMS including SCADA, and integrated DER (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 48). National Grid explains that the proposed IT/OT investments involve integrating all the above systems together, as well as integrating its existing systems to new ones (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 48). The company includes data management, cybersecurity, and data analytical functions (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 49-70). National Grid states that its planned company-wide integration platform will provide a full set of capabilities that includes an

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20 National Grid states that it developed its BCA tool to rank the substations in its service territory according to the monetary benefit to the customer by deploying the VVO scheme (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 28). The BCA tool uses a net present value cost calculation and a percent energy reduction benefit to identify the substations (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 28).

enterprise service bus and other tools and components to support comprehensive integration services, i.e., the middleware required to move data between systems, automate and manage business processes, transfer files between entities, and enable real-time and batch integration of data (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 50). National Grid has planned for a three-phase deployment of its enterprise integration platform, beginning during its first grid modernization plan and continuing through 2025 (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 52-54).

National Grid's proposed communications investments include all infrastructure to connect its IT/OT infrastructure with field devices in the service territory (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 49, 71). The infrastructure consists of additional backhaul networks, substation for fiber installations, a multi-tiered field based wireless communications network, and radios for devices without embedded communications (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 49). Additionally, National Grid proposes to augment its transport network and field area network and to create an integrated network operations center to provide a centralized location for network administrators to manage, control, troubleshoot, and monitor National Grid's communications infrastructure (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 71-85).

For its ADMS, National Grid plans to implement phases two and three of its deployment schedule. Phase two is planned to be in-service by May 2024 and includes control and management of ADMS components (i.e., SCADA, OMS, and DMS applications) on a single platform, as well as the initial implementation of advanced automation applications (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 33-34, 42). Phase three has a

planned in-service date of December 2025 and will complete the integration of VVO/CVR and FLISR applications and progress toward active network management (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 42).

In addition, National Grid proposes four supporting projects to optimize operation of its ADMS: (1) mobile outage dispatch, which is an outage management application that enhances and digitizes the operational processes around outage dispatching by allowing crews to visualize and update outage information directly via a mobile clients back to the centralized ADMS/OMS; (2) remote terminal unit separation, which allows for substation level devices to communicate directly to the ADMS/SCADA module rather than relying on the bulk electric system energy management system; (3) distribution plant information historian, which will be a separate plant information system infrastructure directly coupled with SCADA, allowing for separation between the bulk electric system plant information that is coupled with National Grid's energy management system; and (4) geographic information system data enhancements, which enhances model data and the granularity required by an ADMS (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 33-48; DPU 6-9). National Grid states that its planned ADMS investment is an integrated grouping of hardware and software necessary for distribution control center operations to provide greater visibility, situational awareness, and optimization of the distribution grid resulting in improved outage response, and increased efficiencies through automating and digitalizing multiple control center processes (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 35).

As part of its ADA/FLISR program, National Grid proposes to deploy approximately 82 schemes covering an additional 164 feeders during the term of its plan

(D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 31). By the end of 2025, National Grid projects that 18 percent of feeders will be equipped with ADA/FLISR (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 31). National Grid has preselected eight of the 16 ADA/FLISR schemes for deployment in 2022 (D.P.U. 21-81, Exh. DPU 3-5). National Grid will evaluate the remaining locations on an annual basis, informed by emergent reliability trends (D.P.U. 21-81, Exh. DPU 6-4). Similar to the VVO/CVR application, National Grid anticipates integrating the ADA/FLISR application into the third phase of the ADMS project (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 30-33, 42).

Finally, National Grid proposes recovery for project management and third-party evaluation of its progress toward meeting the Department's grid modernization objectives (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 127-129). For project management, National Grid states that it established its Grid Modernization Execution team in August 2018, which functions as a project management office and manages the overall delivery of Department-approved grid modernization investments, and that the costs proposed for recovery are for a subset of incremental employee costs or third-party services (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 127-128). Additionally, National Grid identifies estimated costs for an anticipated evaluation and services to be conducted by a third-party consultant (D.P.U. 21-81, Exh. NG-GMP-2 (Rev.) at 127).

During the course of the proceeding, National Grid provided the anticipated bill impacts for its continuing investments made during the 2022-2025 Grid Modernization Plan

term. National Grid estimates bill impacts to be in the range of 0.8 percent to 2.0 percent,[21] with the exact amount dependent on the final level of investments (D.P.U. 21-81, Exhs. NG-GMP-1, at 12; AG 2-16 & Att.; DPU 7-2 & Atts.; DPU 7-3 & Atts; Tr. 2, at 235-237).

C. Unitil

For its 2022-2025 Grid Modernization Plan, Unitil proposes an estimated $9.8 million in investments, inclusive of estimated O&M costs, in the following six categories of continuing grid-facing investments: (1) monitoring and control, involving AMI/OMS integration and SCADA ($1.3 million); (2) VVO ($5.4 million); (3) communications, involving a field area network ($823,000); (4) ADMS ($1.7 million); (5) measurement, verification, and support, involving a third-party evaluation ($300,000); and (6) workforce management, involving a mobile damage assessment platform ($250,000) (D.P.U. 21-82, Exhs. Unitil-KES-1, at 18; Unitil-GMP at 13, 65, 69, 71, 75, 79, 81-82). Unitil states that its 2022-2025 Grid Modernization Plan investments are a continuation of the investments made during its first grid modernization plan and foundational elements to Unitil's Advancing the Grid vision, are required to facilitate the distribution system as an enabling platform and are designed to be flexible to changes in technology, system needs, and customer service (D.P.U. 21-82, Exhs. Unitil-KES-1, at 16; Unitil-GMP at 63-64). Unitil provided a business

[21] National Grid calculated the bill impact based on a total budget for continuing investments of $289.3 million (D.P.U. 21-81, Exh. NG-GMP-2, at 16).

case analysis in support of its proposed investments (D.P.U. 21-82, Exhs. Unitil-GMP at 100-103; DPU 1-1).

As part of its monitoring and control investments, Unitil proposes to deploy SCADA to the remainder of its distribution substations (D.P.U. 21-82, Exhs. Unitil-GMP at 64-65; DPU 2-1). Work will include the upgrade and integration of existing SCADA sites into the new ADMS system and expansion of SCADA functionality to support the ADMS, OMS, and VVO applications and other modernization projects (D.P.U. 21-82, Exh. Unitil-GMP at 64-65). Additionally, Unitil expects to complete implementation, testing, and verification of its AMI/OMS integration software project[22] by the end of 2021 (D.P.U. 21-82, Exh. Unitil-GMP at 67, 69).

For its VVO project, Unitil plans to test and commission the ADMS monitoring and control technology on the Townsend substation circuits to determine whether additional adjustments are necessary (D.P.U. 21-82, Exh. Unitil-GMP at 69, 71). Unitil also proposes installation of VVO controls and monitors on all voltage and reactive power equipment on the distribution circuits emanating from six additional substations (D.P.U. 21-82, Exh. Unitil-GMP at 69, 71). During the course of the proceeding, Unitil clarified that it plans completion of this project on its remaining substations and distribution circuits subsequent to 2025 (D.P.U. 21-82, Exhs. DPU 2-4; DPU 2-5). Unitil states that, because

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[22] Unitil states that this is its internal software development project to enhance the current advanced metering infrastructure to OMS interface (D.P.U. 21-82, Exh. Unitil-GMP at 67, 69).

the VVO system is integrated with the ADMS, the VVO team coordinates its efforts closely with these other project teams (D.P.U. 21-82, Exh. Unitil-GMP at 70).

For its investment in communications, Unitil states that the project is a continuation of the field area network project started in the first phase of grid modernization and consists of installing modems connected to an internet service provider vendor's network, including backhaul communications (D.P.U. 21-82, Exh. Unitil-GMP at 76). Unitil classifies its field area network project work into four categories: (1) construction; (2) deployment; (3) IT and engineering; and (4) network and asset management (D.P.U. 21-82, Exh. Unitil-GMP at 77-78). Unitil established a deployment schedule based upon the prioritized listing of circuits and substations from the VVO project ranking system (D.P.U. 21-82, Exh. Unitil-GMP at 70, 79).

Unitil states that its ADMS project consists of upgrading its current OMS to an ADMS that will support VVO and unbalanced load flow analysis (D.P.U. 21-82, Exh. Unitil-GMP at 72). In the future, Unitil's ADMS will also support distribution system automation, including automated distribution switching and FLISR, and will serve as a platform for more advanced modules such as DERMS (D.P.U. 21-82, Exh. Unitil-GMP at 72). Unitil anticipates that in 2022, (1) its remaining substations and circuits will be modelled in ADMS and integrated with the available SCADA sites, and (2) the switch order module will be fully integrated (D.P.U. 21-82, Exh. Unitil-GMP at 74). By the end of 2023, Unitil plans to complete and implement the initial build of its ADMS (D.P.U. 21-82, Exh. Unitil-GMP at 74-75).

For its workforce management investment, Unitil expects to complete the implementation of its mobile damage assessment platform by the end of 2021 (D.P.U. 21-82, Exh. Unitil-GMP at 81). However, Unitil anticipates approximately $100,000 in spending in 2022 and $50,000 in annual licensing fees for each subsequent year of the plan term (D.P.U. 21-82, Exhs. Unitil-GMP at 80; DPU 1-3 & Att. 6). Finally, Unitil identifies estimated costs associated with the evaluation process being conducted by a third-party consultant (D.P.U. 21-82, Exh. Unitil-GMP at 82).

During the course of the proceeding, Unitil provided the anticipated bill impacts for its continuing investments made during the 2022-2025 Grid Modernization Plan term. Unitil estimates a bill impact of approximately 3.1 percent[23] for residential customers, with the exact amount dependent on the final level of investments (D.P.U. 21-82, Exh. DPU 3-4, Atts. 1 & 9).

D. Performance Metrics

1. Existing Statewide Metrics

The Companies jointly propose revisions to their existing statewide VVO performance metrics approved by the Department in D.P.U. 15-120, D.P.U. 15-121, and D.P.U. 15-122 (D.P.U. 21-80, Exh. ES-JAS-2, at 145 & Att. A; D.P.U. 21-81, Exhs. NG-GMP-1, at 11; NG-GMP-2 (Rev. 2) at 84; NG-GMP-4; D.P.U. 21-82, Exhs. Unitil-KES-1, at 22-24; Unitil-GMP at 109 & Att. A). The Companies state that they amended the metrics to resemble Guidehouse's method to evaluate their first grid modernization plans

[23] Unitil calculated the bill impact based on a total budget for continuing investments of $9,780,000 (D.P.U. 21-82, Exh. DPU 3-4, Att. 1).

(D.P.U. 21-80, Exh. ES-JAS-2, at 145; D.P.U. 21-81, Exhs. NG-GMP-1, at 11; NG-GMP-2 (Rev. 2) at 84; D.P.U. 21-82, Exhs. Unitil-KES-1, at 23; Unitil-GMP at 109). The Companies observe that the original VVO metrics were developed prior to engagement by Guidehouse or before the system was fully developed and operational (D.P.U. 21-80, Exh. ES-JAS-2, at 145; D.P.U. 21-81, Exhs. NG-GMP-1, at 11; NG-GMP-2 (Rev. 2) at 84; D.P.U. 21-82, Exhs. Unitil-KES-1, at 23; Unitil-GMP at 109).

2. Company-Specific Metrics

NSTAR Electric submits two company-specific metric proposals applicable to its previously deployed technology investments. First, NSTAR Electric proposes to delete its existing company-specific advanced load flow performance metric (D.P.U. 21-80, Exh. ES-JAS-2, Att. A at 23-24). Second, NSTAR Electric proposes a new company-specific metric associated with its power quality monitoring investment (D.P.U. 21-80, Exh. ES-JAS-2, at 146-147).

V. POSITIONS OF THE PARTIES

A. Attorney General

The Attorney General recommends that, if the Department elects to approve the Companies' proposed spending on Track 1 investments, it should also implement three additional directives related to those investments (Attorney General Brief at 3).[24] Specifically, the Attorney General argues that the Department should: (1) require a

[24] Because the Attorney General and DOER each submitted the same brief in all three dockets, the Department does not cite to the individual dockets for these two parties' briefs.

reevaluation in a future proceeding of whether the types of grid-facing investments authorized here continue to justify extraordinary cost recovery; (2) direct the Companies to develop and propose performance metrics that measure whether customers are actually receiving the projected benefits from the Companies' grid-facing investments; and (3) direct the Companies to develop additional standards and methodologies to ensure that the grid-facing investments are providing benefits to Massachusetts' environmental justice communities (Attorney General Brief at 3, 9).

The Attorney General first argues that the Department should clarify that it will reevaluate in a future proceeding whether the grid-facing investments identified in the Companies' grid modernization plans should continue to receive extraordinary or accelerated cost recovery (Attorney General Brief at 4). The Attorney General states that, in any such future proceeding, the Department should also evaluate whether special recovery is necessary for any grid-facing investment given the Companies' capital recovery mechanisms and performance-based ratemaking ("PBR") plans (Attorney General Brief at 4, 6). The Attorney General maintains that the Department designed the short-term investment plan and associated cost recovery mechanism to accelerate incremental modernization investments in new and more advanced technology than the utility would otherwise deploy or capital spending at a pace or level higher than that underlying base distribution rates (Attorney General Brief at 4, citing Grid Modernization Order at 221; D.P.U. 12-76-B at 19). The Attorney General asserts that the Department has expressly cautioned that it expects grid modernization will become part of the normal course of business and what is considered incremental at the moment may not be incremental in future grid modernization filings

(Attorney General Brief at 5, citing D.P.U. 20-69-A at 32; Grid Modernization Order at 149). The Attorney General argues that the Companies are now four years into substantial grid-facing investments previously approved in D.P.U. 15-120, D.P.U. 15-121, and D.P.U. 15-122, and the investment categories proposed in Track 1 of this proceeding are no longer advanced or new but have become business-as-usual to much of the industry (Attorney General Brief at 5, citing D.P.U. 15-120, Exh. AG-GLB-1, at 41-42).

The Attorney General argues that it is not evident that the Companies' Track 1 investments proposed for 2022-2025 are any different from those that the Companies proposed in 2015, and that it is unclear whether these proposed Track 1 investments are at an accelerated pace that would exceed investment planning in base distribution rates (Attorney General Brief at 5). The Attorney General asserts that the Department should not authorize accelerated cost recovery for grid-facing equipment categories and devices if they are no longer incremental to business-as-usual practices and urges the Department to clarify that it will review and reevaluate the preauthorized investments in a future proceeding (Attorney General Brief at 6). The Attorney General further argues that the Department should make clear that the Companies have the burden to prove that any such grid-facing investments continue to be incremental to business-as-usual practices and that they would not be made absent extraordinary cost recovery (Attorney General Brief at 6).

The Attorney General next argues that the Department should direct the Companies to develop and propose performance metrics in their next annual grid modernization report filings that measure whether customers are actually receiving the projected benefits specified by the Companies in their business case analyses (Attorney General Brief at 3, 6, 7-8). The

Attorney General contends that, with the exception of energy and demand savings on circuits equipped with VVO investments, the grid-facing metrics approved in D.P.U. 15-120, D.P.U. 15-121, and D.P.U. 15-122 do not measure whether or how customers receive the benefits the Companies projected in their business cases (Attorney General Brief at 7). The Attorney General maintains that most metrics only count considerations such as number of substations or circuits where devices have been installed or the number of customers affected by specific grid modernization plan investment additions, but that the Companies fall short of optimally measuring successful performance of grid modernization plan investment outcomes (Attorney General Brief at 7).

Finally, the Attorney General urges the Department to direct the Companies to develop additional standards and methodologies to ensure that their investments provide benefits to environmental justice communities (Attorney General Brief at 8, 9). The Attorney General argues that the Department directed the Companies to demonstrate how their proposed investments would benefit low-income customers and environmental justice communities, but that the Companies' statements concerning general benefits do not provide any detail and fall short of this directive (Attorney General Brief at 8, citing D.P.U. 20-69-A at 31 (additional citations omitted)). The Attorney General observes that, during the course of these proceedings, the Companies generally indicated a willingness to develop additional standards and methodologies to offer greater transparency and accountability for the selection of grid modernization investments in environmental justice communities, including a collaborative technical session proposed by NSTAR Electric to develop additional grid

modernization policy objectives related to environmental justice goals (Attorney General Brief at 8-9, citing Tr. 2, at 229, 331-333).

B. DOER

DOER supports Department approval of the proposed Track 1 investments (DOER Brief at 4-5, 14). Further, DOER makes several recommendations on metrics and reporting on any approved Track 1 investments, specifically, that the Department require each company to provide: (1) a comprehensive and cohesive transition plan within this or a subsequent investigation to ensure the proposed investments get incorporated into business-as-usual ratemaking; (2) interim, quarterly reporting on spending and deployment progress in the months in between Annual Reports; and (3) amendments to annual reporting metrics that incorporate (a) recommendations of the third-party consultant, Guidehouse, and (b) environmental justice community and low-income metrics (DOER Brief at 6-14). DOER also supports a Department-led technical session on the development of criteria and metrics to ensure that deployments benefit environmental justice communities and low-income customers and recommends that the Companies file a proposal for such prior to any technical session (DOER Brief at 10-14).

DOER maintains that while it defers to the Department to determine exactly which Track 1 investments meet its approval criteria, it anticipates, based on its review of the materials in the proceeding, that the Track 1 investments will provide cost-effective modernization of the distribution system while supporting the integration of clean energy technologies and distributed energy resources required to meet the Commonwealth's net-zero emissions commitment (DOER Brief at 5). DOER asserts, however, that the proposals raise

longer-term questions as to when the Companies will transition away from the grid modernization plans and integrate grid modernization investments into core utility ratemaking (DOER Brief at 5).

DOER maintains that the existing ratemaking structure, including PBR plans, provides transparency for tracking progress on clean energy and enhanced reliability while including ratepayer impact safeguards (DOER Brief at 5). DOER emphasizes the Department's finding that only investments made during the first two preauthorization terms will be eligible for short-term targeted cost recovery (DOER Brief at 6, citing Grid Modernization Order at 235). DOER notes that the 2022-2025 Grid Modernization Plans at issue in this proceeding are the second of two preauthorization terms and should represent the last term before grid modernization plan investments will transition to business-as-usual investments according to the Department's precedent (DOER Brief at 6). DOER maintains that, during the course of the proceeding, the Companies indicated that some investments would be transitioned to business-as-usual by the end of the 2025 preauthorization term, while others would not be transitioned until 2031 (DOER Brief at 6, citing Tr. at 238-239; D.P.U. 21-80, Exh. DPU 6-1; D.P.U. 21-81, Exh. DPU 4-1; D.P.U. 21-82, Exh. DPU 4-1).

DOER, therefore, recommends that the Department require the Companies to each provide a comprehensive, cohesive, and transparent transition plan in order to achieve greater transparency to the Department, DOER, and other stakeholders on the status of the investments, the parameters that dictate whether an investment should be moved into core ratemaking, and how the Companies expect to implement the transition (DOER Brief at 6-7). DOER argues that these transition plans should be made on an annual basis and include, at a

minimum: (1) the investment categories that were included in the grid modernization plans; (2) the spending and deployment targets for each investment category covering the first four years after the completion of the grid modernization plan; and (3) a narrative description of how planning processes have included the new technologies (DOER Brief at 7). Additionally, DOER maintains that the Companies could provide any concerns that they have regarding the continued need for separate grid modernization investment phases in these annual transition reports (DOER Brief at 7).

DOER also recommends that the Department retain annual reporting for the Track 1 investments, as well as establish a new, interim quarterly reporting requirement in the same format as the Companies' current annual reports (DOER Brief at 7, 9 citing 2020 Grid Modernization Annual Reports, D.P.U. 21-30, Hearing Officer Memo, Revised Grid Modernization Annual Report Templates). DOER argues that, while the Grid Modernization Annual Reports have provided visibility into the Companies' progress, additional interim reports would further improve visibility into spending and deployment patterns in light of delays to ramping up spending, the deployment of grid modernization in 2018 and 2019, and the Companies' plans to increase deployment and spending on grid modernization in 2022 and beyond (DOER Brief at 9). DOER notes that, while the increased spending in deployment by the Companies in 2020 is welcome progress, it seeks to help ensure that progress continues and that potential future delays in spending and deployment are identified and addressed on a timely basis to prevent disruption in the progress of delivering clean energy, reliability, and ratepayer benefits associated with grid modernization investments (DOER Brief at 9). DOER also argues that the proposed 2022-2025 Grid Modernization

Plan budgets, if approved, would require the Companies to continue or significantly increase spending and deployment, and, therefore, the Department should carefully monitor progress (DOER Brief at 9).

Additionally, DOER recommends that the Department require the Companies to refine and revise the metrics included in their annual grid modernization plans to incorporate both the recommendations of their third-party consultant and metrics involving environmental justice communities and low-income customers (DOER Brief at 10). According to DOER, metrics should not be considered static and should be continuously refined and revised as the configuration of the distribution system is changed and as the Companies have access to more granular data regarding the performance of their grid modernization investments (DOER Brief at 10). DOER maintains that refinements and revisions are necessary to ensure that the Companies are tracking the quantitative benefits associated with the investments, progress toward grid modernization objectives, and the extent to which investments will benefit low-income customers and environmental justice communities (DOER Brief at 10, citing D.P.U. 20-69-A at 31; Grid Modernization Order at 202).

DOER notes that the independent evaluation consultant, Guidehouse, made several recommendations in their evaluation reports regarding the Companies' performance metrics for previously approved and preauthorized investments (DOER Brief at 10-11). DOER argues that these recommendations are directly applicable to metrics for Track 1 investments, which are in many cases the same investments that Guidehouse evaluated (DOER Brief at 11). DOER asserts that the Department should require the Companies to address the recommendations from the Guidehouse evaluation process in their future Annual Reports and

refine the metrics as necessary to continue effectively tracking grid modernization objectives (DOER Brief at 11).

Further, DOER recommends that the Department require the Companies to develop criteria and metrics for ensuring that low-income customers and environmental justice communities benefit from the Companies' deployment of preauthorized and previously approved investments in their 2022-2025 Grid Modernization Plans (DOER Brief at 11). DOER points to the Companies' statements and commitments made during the course of the proceeding in relation to these customers and communities, including NSTAR Electric's recommendation for the Department to conduct a technical session involving these considerations (DOER Brief at 11-12, citing D.P.U. 21-80, Exh. DPU 4-1; RR-DPU-10; D.P.U. 21-81, Exh. DPU 4-3; RR-DPU-11; D.P.U. 21-82, RR-DPU-12, at 1). DOER states that it recognizes the need to collaborate on the topic and supports NSTAR Electric's request for the technical session, as it will allow for broader participation and collaboration with stakeholders and the Department (DOER Brief at 12-13). DOER recommends, however, that the Department require the Companies to (1) propose how to identify the quantifiable, non-quantifiable, monetized, and non-monetized benefits to low-income customers and environmental justice communities for Track 1 investments prior to the technical session, including the use of system average interruption duration index ("SAIDI") and system average interruption frequency index ("SAIFI") metrics to evaluate reliability in environmental justice communities, and (2) explain how these benefits affect low-income customers and environmental justice communities as compared to the broader distribution system (DOER Brief at 13 & n.40, citing D.P.U. 21-80, RR-AG-1, Att.; D.P.U. 21-81,

RR-AG-2, Att.; D.P.U. 21-82, RR-AG-3, Att.). DOER also argues that the scope of the technical session should include the development of metrics to track the delivery of benefits to low-income customers and environmental justice communities and the Companies should include a straw proposal for these and other related metrics as part of their pre-technical session proposals (DOER Brief at 13).

C. TEC

TEC argues that the power quality monitoring pilot approved in D.P.U. 20-74 supports the grid modernization goal of optimizing system performance through greater system visibility and functions as a learning experience replicable in other similar settings (D.P.U. 21-80, TEC Brief at 2, 6, citing D.P.U. 20-74, at 28). TEC asserts that these investments are primed to deliver insightful data regarding power quality on the distribution system and should be continued (D.P.U. 21-80, TEC Brief at 3). According to TEC, the start-up and learning curve for this pilot is complete, including the installation and operation of the monitoring equipment, associated staff training to utilize it, and ability to interpret results (D.P.U. 21-80, TEC Brief at 3). TEC also states that while early results of the pilot are encouraging, continued investment in equipment, IT, and staff training at NSTAR Electric is essential to fully realize the pilot's value and to yield knowledge and experience that can be applied in the larger context of optimizing power quality across the entire system (D.P.U. 21-80, TEC Brief at 4).

TEC reiterates that there is an urgent need for action to reduce momentary outages and power quality disturbances on key feeders, maintaining that power interruptions can have disastrous consequences, including spoiled experiments, interrupted medical research, and

lost production due to damaged equipment and scrapped work in process (D.P.U. 21-80, TEC Brief at 1, citing D.P.U. 20-74; NSTAR Electric Company and Western Massachusetts Electric Company, D.P.U. 17-05 (2017)). TEC states that when a TEC member experiences a power quality event, obtaining a credible explanation from the utility supported with data is essential (D.P.U. 21-80, TEC Brief at 4). TEC represents that its members do not have knowledge of the NSTAR Electric system or access to the right data to determine the causes of power quality issues that result in outages or trips of sensitive equipment (D.P.U. 21-80, TEC Brief at 1). TEC contends that the only way to know whether the solution to a power quality issue is on the customer side or the utility side of the meter is with comprehensive datasets from the utility feeder and substation (D.P.U. 21-80, TEC Brief at 2).

TEC maintains that progress on these issues requires an engaged utility partner with regulatory authorization to deploy resources to investigate and understand the causes of and solutions to power quality events, which NSTAR Electric has done (D.P.U. 21-80, TEC Brief at 1-2). TEC asserts, however, that an effective communication approach for the pilot requires a single direct contact at NSTAR Electric who has responsibility for the successful identification, investigation, and resolution of these issues (D.P.U. 21-80, TEC Brief at 5-6). TEC notes that discussions between TEC and NSTAR Electric remain ongoing, and a finalized formal communication plan may be overly proscriptive at this time (D.P.U. 21-80, TEC Brief at 5). TEC states that it appreciates NSTAR Electric's commitment to ensure that a qualified engineering management representative will be focused on the pilot for its duration and that TEC membership will have access to them when needed (D.P.U. 21-80, TEC Brief at 6).

D. NSTAR Electric

1. Previously Deployed Technologies

NSTAR Electric states that it is proposing to continue six investments from its first grid modernization plan into its 2022-2025 Grid Modernization Plan: (1) DMS; (2) wireless communications system improvements; (3) substation automation; (4) power quality monitoring; (5) VVO; and (6) program management and measurement and verification (D.P.U. 21-80, NSTAR Electric Brief at 16, citing Exh. ES-JAS-1, at 13). NSTAR Electric contends that its first grid modernization plan investments have successfully advanced the Department's grid modernization objectives and informed its development of the 2022-2025 Grid Modernization Plan and, in particular, the Track 1 investments (D.P.U. 21-80, NSTAR Electric Brief at 28, citing Exh. ES-JAS-2, at 9). NSTAR Electric argues that the Track 1 investments will also further the Department's grid modernization objectives and will provide significant benefits to customers across its service territory that are not available with the portfolio of business-as-usual investments (D.P.U. 21-80, NSTAR Electric Brief at 29-65, 75).

NSTAR Electric argues that it has engaged in cost-management practices to ensure that the continuing investments are cost-efficient for customers (D.P.U. 21-80, NSTAR Electric Brief at 65-75). In particular, NSTAR Electric represents that it competitively procures all material, equipment, and external services for all projects, including for its grid modernization plan investments (D.P.U. 21-80, NSTAR Electric Brief at 65, citing Exh. DPU 4-10; Tr. 2, at 249-250). For software and equipment specific to its grid modernization plan, NSTAR Electric states that its engineering team reviews the need for

these items relative to its plan and develops requirements based on the specific needs (D.P.U. 21-80, NSTAR Electric Brief at 66, citing Tr. 2, at 250). NSTAR Electric maintains that it then solicits responses from vendors and, when reviewing those responses and selecting a vendor, it relies on established criteria for assessing price and technical requirements (D.P.U. 21-80, NSTAR Electric Brief at 66, citing Tr. 2, at 250-251). NSTAR Electric also maintains that it bases vendor contract payments on the vendor achieving milestones set forth within the contract and reassesses vendor contracts every two to three years to ensure that it is procuring the least-cost option for the equipment (D.P.U. 21-80, NSTAR Electric Brief at 66, citing Tr. 2, at 251, 262). NSTAR Electric states that for the 2022-2025 continuing investments where the services and equipment remain the same, the Company will utilize the vendors competitively procured for the previous grid modernization plan (D.P.U. 21-80, NSTAR Electric Brief at 66, citing Exh. DPU 4-10; Tr. 2, at 252).

NSTAR Electric states that it has developed specific cost estimates for each service or equipment for the Track 1 investments (D.P.U. 21-80, NSTAR Electric Brief at 67, citing Exhs. ES-JAS-2, at 36; DPU 1-4; DPU 4-4; Tr. 2, at 251-252). According to NSTAR Electric, it developed its cost estimates by calculating the previous average costs of services and equipment used during its first grid modernization plan and included in its second plan, and that these averages already reflect the result of the competitive procurement process (D.P.U. 21-80, NSTAR Electric Brief at 67, citing Tr. 2, at 251-252). For new services or equipment used for the Track 1 investments, NSTAR Electric states that it developed its cost estimates based on subject matter expertise and historical costs from similar projects as well

as known vendor costs (D.P.U. 21-80, NSTAR Electric Brief at 67, citing Exh. DPU 1-4; Tr. 2, at 252).

Regarding its proposed power quality monitoring investments, NSTAR Electric states that this technology will effectively support optimization of system performance and system demand in alliance with the Department's grid modernization objectives (D.P.U. 21-80, NSTAR Electric Brief at 41-42). NSTAR Electric maintains that the benefits of these investments from the pilot include reduction in time required to diagnose the source of power quality events affecting industrial customers, improvement in customer communications related to sustained and momentary outages, and reduction in total number of voltage complaints (D.P.U. 21-80, NSTAR Electric Brief at 61, citing RR-DPU-14). NSTAR Electric contends that the power quality monitoring system allows it to better understand when a system disturbance occurs and remotely retrieve the system data needed to enable engineering personnel to further investigate the disturbance causal factors (D.P.U. 21-80, NSTAR Electric Brief at 41, citing Exh. DPU 3-7; RR-DPU-4).

NSTAR Electric proposes to utilize the information from the monitoring system to communicate with customers, to evaluate whether disturbances were outside of standard operating parameters, and to identify and inform potential distribution system modifications (D.P.U. 21-80, NSTAR Electric Brief at 41-42, citing Exh. DPU 3-7; RR-DPU-4). NSTAR Electric agrees with TEC's observations regarding the power quality monitoring pilot and notes its concerns regarding development of institutional knowledge and experience related to the pilot (D.P.U. 21-80, NSTAR Electric Reply Brief at 10-11). NSTAR Electric asserts that it is working with customers to ensure that communications meet customer needs and

will take TEC's feedback into consideration as it develops further communication plans or protocols that will be refined over time as additional experience is gained (D.P.U. 21-80, NSTAR Electric Reply Brief at 11, citing Exh. DPU 8-2; RR-DPU-4, at 2).

2. Business as Usual and Accelerated Recovery

NSTAR Electric maintains that its Track 1 investments continue to be incremental to its business-as-usual work plan pending achievement of the Department's grid modernization objectives (D.P.U. 21-80, NSTAR Electric Brief at 75, citing Exh. DPU 1-3; D.P.U. 21-80, NSTAR Electric Reply Brief at 4). NSTAR Electric contends that each of its six investment categories are either ongoing projects that will not be completed during the first grid modernization plan term or are existing programs that have not yet achieved their grid modernization objectives (D.P.U. 21-80, NSTAR Electric Brief at 75, citing Exhs. DPU 1-3; DPU 6-1). Therefore, NSTAR Electric contends that it is appropriate to categorize its proposed Track 1 investments as continuing investments that remain eligible for accelerated cost recovery (D.P.U. 21-80, NSTAR Electric Reply Brief at 4).

Additionally, NSTAR Electric contends that a process for transitioning to business-as-usual already exists and asserts that it has detailed the factors that it will take into consideration when determining whether investments cross the threshold to business-as-usual (D.P.U. 21-80, NSTAR Electric Reply Brief at 4, 8, citing Exhs. DPU 1-3; DPU 6-1). According to NSTAR Electric, the ultimate transition will be driven by the degree to which: (1) the project is placed in service with the capabilities needed to deliver the customer benefits described in its grid modernization plan; (2) a program has delivered a "step change" in grid visibility and control within a given population of grid devices; and/or (3) a

new technology has been successfully demonstrated and going forward is more appropriately deployed as a part of the comprehensive business-as-usual work plan (D.P.U. 21-80, NSTAR Electric Brief at 80, citing Exh. DPU 6-1; Tr. 2, at 238-239; D.P.U. 21-80, NSTAR Electric Reply Brief at 4-5). NSTAR Electric maintains that, based on the existing process, it would be unduly burdensome to require the additional transition plan filing proposed by DOER (D.P.U. 21-80, NSTAR Electric Reply Brief at 8). NSTAR Electric further identifies three investment categories (i.e., SCADA, automated feeder reconfiguration, and urban underground automation) that it considers as completed on its network for grid modernization purposes and will continue as part of its business-as-usual work plan (D.P.U. 21-80, NSTAR Electric Brief at 16, 76-80, citing Exhs. ES-JAS-1, at 13; ES-JAS-2, at 40-41; DPU 1-3).

NSTAR Electric disputes the Attorney General's suggestion that the Track 1 investments are only consistent with investments proposed in the grid modernization plan considered in D.P.U. 15-122, countering that there is no prohibition on continuing investments and that her argument misconstrues the Department's standard of review and grid modernization objectives (D.P.U. 21-80, NSTAR Electric Reply Brief at 5). NSTAR Electric argues that, contrary to the Attorney General's assertions, its Track 1 investments remain eligible for cost recovery under the short-term investment plan and associated cost-recovery mechanism (D.P.U. 21-80, NSTAR Electric Reply Brief at 2-6). NSTAR Electric maintains that its 2022-2025 Grid Modernization Plan prioritizes continuing previous investments (i.e., Track 1 investments) to ensure that there is no lapse in traditional grid-facing investments for the benefit of customers (D.P.U. 21-80, NSTAR Electric Brief at 4; D.P.U. 21-80, NSTAR Electric Reply Brief at 3).

NSTAR Electric further asserts that the Department has identified the benefits associated with these Track 1 investments as reducing outages by enabling the electric distribution companies to attain optimal levels of grid visibility, remote command and control of their assets, and the ability to self-heal the grid (D.P.U. 21-80, NSTAR Electric Reply Brief at 3, citing Grid Modernization Order at 100). NSTAR Electric argues that when determining cost recovery eligibility, the Department should consider whether the Track 1 investments are designed to achieve measurable progress toward these objectives (D.P.U. 21-80, NSTAR Electric Reply Brief at 3). NSTAR Electric also argues that the Attorney General has not identified any evidence to support a finding that the proposed Track 1 investments fail to meet the Department's criteria for preauthorization and accelerated cost recovery (D.P.U. 21-80, NSTAR Electric Reply Brief at 3-4). According to NSTAR Electric, it is irrelevant for the purposes of this proceeding to compare its investments to those of other utilities across the country or whether those investments have changed since NSTAR Electric outlined its first grid modernization plan (D.P.U. 21-80, NSTAR Electric Reply Brief at 3).

Moreover, NSTAR Electric argues that at the time grid modernization investments become business-as-usual, these investments become subject to the utility's general budget process as part of its base capital program and, as a result, these investments will be funded as an allocation of its total investment funds that must be allocated across multiple competing interests (D.P.U. 21-80, NSTAR Electric Reply Brief at 5). NSTAR Electric observes that the Department has recognized the value of maintaining a separate process for grid modernization investments to ensure that all relevant investments could be considered

together but separate from traditional capital investments (D.P.U. 21-80, NSTAR Electric Reply Brief at 5, citing D.P.U. 17-05, at 441). NSTAR Electric maintains that this need for a focused review outside of a base rate proceeding continues to exist as it and stakeholders continue to gain experience with implementation of the grid modernization plan (D.P.U. 21-80, NSTAR Electric Reply Brief at 5). NSTAR Electric also notes that the objectives of its approved PBR framework, namely incentivizing NSTAR Electric to manage costs while providing benefits to customers, differ from the objectives of grid modernization where accelerated investments are necessary to meet the Department's goals on a near-term basis and provide benefits to the grid (D.P.U. 21-80, NSTAR Electric Reply Brief at 5-6, citing D.P.U. 17-05, at 376).

3. Metrics and Reporting

In response to the Attorney General's argument that additional metrics are necessary to measure whether implementation of the grid modernization plans are providing customer benefits, NSTAR Electric argues that it is already required to report on its performance under statewide and NSTAR Electric-specific infrastructure and performance metrics to illustrate customer benefits and cost containment (D.P.U. 21-80, NSTAR Electric Reply Brief at 6, citing Grid Modernization Order at 112). NSTAR Electric argues that, as a result, it is already providing data to address the Attorney General's concern, that these metrics have shown significant customer benefits and cost containment through the 2018-2021 Grid Modernization Plan term, and that it anticipates these customer benefits will continue to be realized through the 2022-2025 plan term (D.P.U. 21-80, NSTAR Electric Brief at 13, citing Grid Modernization Order at 112; D.P.U. 21-80, NSTAR Electric Reply Brief at 6).

NSTAR Electric states that it is not opposed to additional metrics if these metrics are objective and measure criteria within its control (D.P.U. 21-80, NSTAR Electric Reply Brief at 6). NSTAR Electric contends, however, that the Attorney General has failed to provide any additional metrics that could be implemented, nor identified any flaws in the current ones (D.P.U. 21-80, NSTAR Electric Reply Brief at 6). As a result, NSTAR Electric argues that the Attorney General's recommendation should be rejected (D.P.U. 21-80, NSTAR Electric Reply Brief at 6).

Additionally, NSTAR Electric disagrees with the Attorney General's assertion that the Companies failed to provide specific detail on the benefits to low-income and environmental justice communities from the grid modernization investments (D.P.U. 21-80, NSTAR Electric Brief at 7). NSTAR Electric states that it has suggested a technical session to discuss the issue (D.P.U. 21-80, NSTAR Electric Brief at 65, citing RR-DPU-10; D.P.U. 21-80, NSTAR Electric Reply Brief at 7). NSTAR Electric also states that its grid modernization plan is already designed to deliver the benefits of modernization of the distribution system to all customers in communities across Massachusetts, inclusive of low-income customers and environmental justice communities (D.P.U. 21-80, NSTAR Electric Brief at 63-64, citing Exh. DPU 4-1; RR-DPU-10; RR-CLF-1; D.P.U. 21-80, NSTAR Electric Reply Brief at 7). According to NSTAR Electric, this means that these customers are already benefitting from its grid modernization investments (D.P.U. 21-80, NSTAR Electric Reply Brief at 7). NSTAR Electric avers that it is nevertheless supportive of incorporating investments that provide direct and specific benefits to environmental justice communities or other Commonwealth-sponsored initiatives that help promote and achieve the

state's goals through a technical session process that ensures alignment among the Companies (D.P.U. 21-80, NSTAR Electric Brief at 65, citing RR-DPU-10; D.P.U. 21-80, NSTAR Electric Reply Brief at 7-8). Additionally, NSTAR Electric states that in the event of a technical session, it will work with National Grid and Unitil to develop a proposal, as suggested by DOER, that can guide discussions with stakeholders (D.P.U. 21-80, NSTAR Electric Reply Brief at 10).

NSTAR Electric disagrees that the additional quarterly reports proposed by DOER will be useful because (1) it already provides semi-annual data to the third-party consultant, Guidehouse, and (2) deployment of investments does not necessarily align with specific quarters (D.P.U. 21-80, NSTAR Electric Reply Brief at 9). NSTAR Electric further notes that it submits Annual Reports to the Department that can be used to identify potential problem areas and as the basis for a more focused investigation when warranted (D.P.U. 21-80, NSTAR Electric Reply Brief at 9). Additionally, NSTAR Electric asserts that it did not experience delayed spending during the grid modernization plan ramp up period, and, instead, it invested during this period to a level that necessitated $56 million in supplemental funding for grid-facing investments for the 2018-2021 Grid Modernization Plan term (D.P.U. 21-80, NSTAR Electric Reply Brief at 9, citing D.P.U. 20-74, at 5). NSTAR Electric argues it is making sufficient progress on implementation of its grid modernization plan and that the Department and other stakeholders are receiving adequate updates on this progress (D.P.U. 21-80, NSTAR Electric Reply Brief at 9).

E. National Grid

1. Previously Deployed Technologies

National Grid states that it is proposing the continuation of five investments from its first grid modernization plan into its 2022-2025 Grid Modernization Plan: (1) VVO/CVR, including advanced capacitors and regulators; (2) ADA/FLISR, including advanced reclosers and breakers; (3) feeder monitoring sensors; (4) ADMS; and (5) IT/OT and communications (D.P.U. 21-81, National Grid Brief at 6, citing Exh. NG-GMP-2, at 23-85). National Grid maintains that these proposed investments build on investments from its first grid modernization plan and are designed to make measurable progress toward achievement of the Department's grid modernization objectives (D.P.U. 21-81, National Grid Brief at 6, citing Exh. NG-GMP-2, at 16-86, 124-125). National Grid further maintains that these technologies have already made progress on achieving the Department's grid modernization objectives (D.P.U. 21-81, National Grid Brief at 7, citing Exh. NG-GMP-2, at 17-23).

2. Business as Usual and Accelerated Recovery

National Grid argues that its proposed investments are incremental to business-as-usual investments (D.P.U. 21-81, National Grid Brief at 6, citing Exhs. NG-GMP-2, at 17-23; DPU 1-1). National Grid disputes the Attorney General's assertion that the proposed Track 1 investment categories are no longer advanced or new, arguing that the "advanced" and "new" criteria identified by the Attorney General are not the Department's criteria for determining whether an investment is part of grid modernization (D.P.U. 21-81, National Grid Reply Brief at 3, citing D.P.U. 20-69-A at 30). Rather, National Grid maintains that the proposed investments must (1) be designed to make

measurable progress towards achievement of the Department's grid modernization objectives; (2) be incremental to existing or business-as-usual investments; (3) be supported by a business case that shows that the projected costs are reasonable and the projected benefits justify the costs; and (4) result in reasonable bill impacts (D.P.U. 21-81, National Grid Reply Brief at 3, citing D.P.U. 20-69-A at 30).

According to National Grid, the Attorney General has not pointed to any evidence that the Track 1 investments fail to meet the Department's criteria (D.P.U. 21-81, National Grid Reply Brief at 3). National Grid states that, in contrast, it has provided extensive evidence that its Track 1 investments meet these criteria and provided detailed information on its strategy for transitioning all of its proposed Track 1 investments to business-as-usual, including timelines for doing so (D.P.U. 21-81, National Grid Reply Brief at 3, citing Exhs. NG-GMP-2, at 17-85; NG-GMP-3; DPU 1-1; DPU 6-1(a) & Att.). National Grid further states that it relies on the Department's criteria for preauthorizing grid modernization investments to determine when grid modernization investments become business-as-usual, and will continue to do so (D.P.U. 21-81, National Grid Reply Brief at 4, citing Exh. DPU 6-1(b)).

National Grid notes, however, that additional grid modernization investments are required in order to make progress on the Department's grid modernization objectives and the Commonwealth's energy and environmental policy goals (D.P.U. 21-81, National Grid Reply Brief at 4). National Grid states that the objectives, such as optimizing system performance and system demand, will be evolving targets and require implementation of additional technologies (D.P.U. 21-81, National Grid Reply Brief at 4). Additionally,

National Grid maintains that different utilities are at different starting points in the process of implementing grid modernization technologies, and while technology may have become business-as-usual for one utility does not mean that those investments are business-as-usual for another utility (D.P.U. 21-81, National Grid Reply Brief at 4). National Grid also asserts that it is important to consider how the Commonwealth's clean energy goals differ from other states and that technologies must be evaluated for what best aligns with the Commonwealth's needs (D.P.U. 21-81, National Grid Reply Brief at 4-5). National Grid argues that the value in technologies such as feeder monitors, VVO, FLISR, and communications comes with scale and that, currently, such technologies are deployed at less than ten percent of National Grid's projected need (D.P.U. 21-81, National Grid Reply Brief at 5). National Grid asserts that transitioning grid modernization investments to business-as-usual too early may reduce the ability to scale at the speed needed to deliver grid modernization needs in the Commonwealth (D.P.U. 21-81, National Grid Reply Brief at 5).

National Grid maintains that there remains a need to continue the special ratemaking treatment for grid modernization investments due to the significant expenditures required for these investments (D.P.U. 21-81, National Grid Reply Brief at 7, citing Grid Modernization Order at 216; D.P.U. 12-76-B at 4). National Grid states that grid modernization investments are future looking and may be undervalued when compared with time-sensitive needs, and these investments would be competing for funding with all of its other necessary capital investments if separate cost recovery for grid modernization investments were terminated too quickly (D.P.U. 21-81, National Grid Reply Brief at 5). National Grid argues that this would likely significantly slow the pace of grid modernization and reduce the

benefits customers would receive (D.P.U. 21-81, National Grid Reply Brief at 5). National Grid also states that while some of its grid modernization investments will be transferred to base distribution rates in a future rate case, it anticipates that a significant number of these investments will not be in service as of the end of its next test year and it may be administratively efficient to continue recovery of these investments outside of base distribution rates through the GMF for ease of segregating these investments from the rest of its rate base (D.P.U. 21-81, National Grid Reply Brief at 6). Additionally, National Grid asserts that it will have ongoing "run the business" costs for the operation of these investments that may not be captured in the test year (D.P.U. 21-81, National Grid Reply Brief at 6).

In response to the Attorney General's argument that the Department should evaluate whether special recovery for grid-facing investments is necessary given the Companies' capital recovery mechanisms and PBR plans, National Grid argues that its PBR plan is not designed to be a cost recovery mechanism for programs having costs incremental to the costs creating the cast-off rates that are subject to the PBR adjustment, such as National Grid's grid modernization plan (D.P.U. 21-81, National Grid Reply Brief at 6). National Grid asserts that while it is left to management discretion how to spend the revenue generated through application of the PBR formula, this revenue is not sufficient to fund traditional utility investment and operational expense along with the inflationary increases in these costs plus the revenue requirement on grid modernization investments and expenses (D.P.U. 21-81, National Grid Reply Brief at 7).

National Grid states that it intends to transfer recovery of grid modernization plan investments to base distribution rates over time, likely beginning with its base distribution rate case in November 2028 after completion of the second short-term investment plan in consideration of the strategy presented in Exhibit DPU 6-1 (D.P.U. 21-81, National Grid Reply Brief at 7). National Grid notes that if it were to transfer recovery of grid modernization plan investments to base distribution rates in its 2023 rate case, identifying incremental grid modernization in the second short-term investment plan may prove difficult in the operation of its grid modernization factor tariff (D.P.U. 21-81, National Grid Reply Brief at 7). National Grid states that in its November 2028 base distribution rate case it will not seek to recover costs that have already been recovered in annual cost recovery filings, but it will propose to transfer or otherwise include in rate base the plant investment that is and has been used and useful as of the end of that case's test year for investments that have become business-as-usual investments (D.P.U. 21-81, National Grid Reply Brief at 8).

In response to DOER's recommendation that the Department require the Companies to provide transition plans on an annual basis, National Grid states that it already reports extensively in its Annual Reports on its deployment of investments and on which investments have gone into service, as well as on detailed metrics regarding its investments (D.P.U. 21-81, National Grid Reply Brief at 8-9). National Grid argues that the additional reporting recommended by DOER would not be of value (D.P.U. 21-81, National Grid Reply Brief at 9).

3. Metrics and Reporting

National Grid proposes jointly with NSTAR Electric and Unitil to change the existing grid modernization plan performance metrics (D.P.U. 21-81, National Grid Brief at 32, citing Exh. NG-GMP-4). According to National Grid, the performance metrics approved by the Department on July 25, 2019, remain generally unchanged except for the VVO metrics (D.P.U. 21-81, National Grid Brief at 32, citing Exh. NG-GMP-2, at 86). National Grid states that the original VVO metrics were developed prior to engagement by Guidehouse or before the system was fully deployed and operational, and that Guidehouse has since collected significant data and started its data analysis (D.P.U. 21-81, National Grid Brief at 32). National Grid maintains that the revised VVO performance metrics were amended to resemble Guidehouse's evaluation methods (D.P.U. 21-81, National Grid Brief at 32). National Grid does not otherwise recommend changing the Companies' statewide and company-specific infrastructure metrics at this time (D.P.U. 21-81, National Grid Brief at 33, citing Exh. NG-GMP-2, at 86).

In response to the Attorney General's argument that the Department should direct the Companies to develop and propose performance metrics to measure whether customers are actually receiving the projected benefits from the Companies' grid-facing investments, National Grid counters that the Attorney General does not identify any specific flaw in the current metrics (D.P.U. 21-81, National Grid Reply Brief at 9-10). National Grid asserts that additional metrics on successful performance of grid modernization plan investment outcomes are unnecessary (D.P.U. 21-81, National Grid Reply Brief at 10). National Grid states that its existing performance metrics are comprehensive and carefully designed to

measure progress on the performance of these technologies to further the Department's grid modernization objectives, including the benefits customers receive (D.P.U. 21-81, National Grid Reply Brief at 10, citing Exh. NG-GMP-4). National Grid further states that its grid modernization plan implementation is already subject to extensive review by an independent third-party evaluator, Guidehouse, and that as part of this evaluation, case studies were introduced to provide greater insight into those investments (D.P.U. 21-81, National Grid Reply Brief at 10-11). National Grid maintains that it would consider additional metrics that provide value and are feasible to report on, but that additional metrics are not needed at this time to measure the progress or benefits of grid modernization (D.P.U. 21-81, National Grid Reply Brief at 11).

Regarding DOER's recommendation that the Companies address the Guidehouse evaluation recommendations in future Grid Modernization Annual Reports and refine the metrics as necessary, National Grid states that it currently does this as part of the Guidehouse evaluation process and in its reporting and plan development (D.P.U. 21-81, National Grid Reply Brief at 11). National Grid maintains that it has made changes in response to the Guidehouse recommendations (D.P.U. 21-81, National Grid Reply Brief at 11, citing D.P.U. 21-30, Exhs. DPU 2-7 through DPU 2-11). National Grid contends that there may be some recommendations, however, that are not feasible to implement and therefore have not been implemented (D.P.U. 21-81, National Grid Reply Brief at 11, citing D.P.U. 21-30, Exhs. DPU 2-7 through DPU 2-11).

Additionally, National Grid disputes DOER's recommendation that the Department require quarterly reporting on spending and deployment progress between the Annual Reports

(D.P.U. 21-81, National Grid Reply Brief at 11). National Grid maintains that compiling the Annual Reports is a time- and resource-intensive process that involves significant effort by the Department and parties to review and that quarterly reporting would be an undue burden (D.P.U. 21-81, National Grid Reply Brief at 11). National Grid also disputes the value of quarterly reporting as the deployment of investments over the course of a year is not aligned to a specific quarterly schedule but can span multiple quarters (D.P.U. 21-81, National Grid Reply Brief at 11). Regarding DOER's statements about implementation delays, National Grid states that a ramp-up period was necessary after the Department's approval of the first grid modernization plan on May 10, 2018, and that the lapse in time was not indicative of any systemic problems with grid modernization implementation (D.P.U. 21-81, National Grid Reply Brief at 12, citing Grid Modernization Order).

With regards to environmental justice communities and low-income customers, National Grid insists that these communities and customers have benefitted from its grid-facing grid modernization investments and that they will continue to do so (D.P.U. 21-81, National Grid Brief at 38, citing Exhs. NG-GMP-2, at 12, 26, 29-46; DPU 4-3; D.P.U. 21-81, National Grid Reply Brief at 13, citing Exh. NG-GMP-2, at 17-23). Additionally, National Grid supports a Department-led technical session on the development of criteria for consideration of environmental justice communities and low-income customers in the deployment of grid modernization investments and is willing to work with NSTAR Electric and Unitil to develop an initial proposal to help guide this process (D.P.U. 21-81, National Grid Reply Brief at 13). National Grid also states that going forward it will consider the location of environmental justice communities and

low-income customers as a criterion in the deployment of its grid-facing grid modernization investments (D.P.U. 21-81, National Grid Brief at 38-39, citing Exh. DPU 4-3; Tr. 2, at 227-228; D.P.U. 21-81, National Grid Reply Brief at 13, citing Tr. 2, at 227-228).

F. Unitil

Unitil maintains that its Track 1 investments are foundational elements to its "Advancing the Grid" vision and are required to facilitate the distribution system as an enabling platform (D.P.U. 21-82, Unitil Brief at 2). Unitil proposes the same technology that the Department preauthorized in its initial grid modernization plan: (1) SCADA; (2) AMI/OMS integration; (3) VVO; (4) ADMS; (5) DERMS; (6) field area network; and (7) mobile platform damage assessment (D.P.U. 21-82, Unitil Brief at 2-3, citing Grid Modernization Order at 163). Unitil asserts that each of its seven grid modernization investments are incremental to its existing or business-as-usual investments (D.P.U. 21-82, Unitil Brief at 6, citing Exh. DPU 1-2; D.P.U. 21-82, Unitil Reply Brief at 1). Further, Unitil argues that it has provided bill impacts that meet the criteria outlined in the Grid Modernization Order (D.P.U. 21-82, Unitil Brief at 1-2).

Additionally, Unitil notes that its proposed investments are not required to operate a safe and reliable electric system and would not have been implemented by Unitil at this time outside of the grid modernization program (D.P.U. 21-82, Unitil Brief at 6; D.P.U. 21-82, Unitil Reply Brief at 1). Unitil argues that there is no evidence that its Track 1 investments fail to meet the criteria previously set forth by the Department for eligibility for preauthorization and accelerated cost recovery (D.P.U. 21-82, Unitil Reply Brief at 1). Unitil maintains that its Track 1 projects are ongoing projects that will not be completed

during the 2022-2025 term and have not yet achieved their grid modernization objectives (D.P.U. 21-82, Unitil Reply Brief at 1).

Unitil contends that its 2022-2025 Grid Modernization Plan shows that it is making significant progress towards the design and implementation of its initial grid modernization plan, arguing that its efforts to date have included the following foundational steps: analysis, evaluation, specification, request for proposals ("RFP"), evaluation, initial purchase, and scope of work development (D.P.U. 21-82, Unitil Brief at 3). Unitil maintains that its analysis and design work identified efficiencies, such as combining VVO functionality with ADMS, and that it expended considerable effort even though these efforts are not easily quantified with units installed or monetary expenditures (D.P.U. 21-82, Unitil Brief at 3). Unitil also notes that it experienced challenges associated with the COVID-19 pandemic that negatively impacted implementation of its grid modernization plan due to scheduling and material delivery delays, and that it is difficult to quantify the overall effect of the pandemic on implementation as Unitil continues to experience longer than anticipated lead times for some equipment (D.P.U. 21-82, Unitil Brief at 3).

Furthermore, Unitil states that it is not opposed to additional metrics if those metrics are objective and measure criteria within its control (D.P.U. 21-82, Unitil Reply Brief at 1). Unitil contends, however, that the Attorney General has not provided any such additional metrics, nor has she identified any flaws in the current metrics (D.P.U. 21-82, Unitil Reply Brief at 1). Unitil asserts that the quarterly interim reports recommended by DOER would not be meaningful because the Companies already provide semi-annual data to Guidehouse and because deployment of investments does not necessarily align with specific quarters

(D.P.U. 21-82, Unitil Reply Brief at 2). Unitil maintains that the Companies already submit Grid Modernization Annual Reports that can be used to identify potential problem areas and as the basis for a more focused investigation when warranted, and an additional layer of reporting is likely to be onerous and time consuming without providing meaningful benefits (D.P.U. 21-82, Unitil Reply Brief at 2).

Regarding the Attorney General and DOER's arguments involving methodologies and standards for providing benefits to environmental justice communities, Unitil maintains that due to the prevalence of environmental justice communities throughout its service area, its grid modernization plan will necessarily provide benefits to environmental justice communities as well because those investments are designed to provide benefits to customers within that area (D.P.U. 21-82, Unitil Brief at 7; D.P.U. 21-82, Unitil Reply Brief at 1-2). In particular, Unitil notes that 65 percent of its customers live in the city of Fitchburg and that 72.9 percent of the population of Fitchburg is located in environmental justice block groups (D.P.U. 21-82, Unitil Brief at 7, citing Exh. Unitil-GMP at 63). Unitil states that it is nevertheless supportive of a technical session to consider other initiatives to promote this objective and is willing to work with the other electric distribution companies to develop an initial proposal to guide the process (D.P.U. 21-82, Unitil Reply Brief at 2).

Finally, Unitil disagrees with DOER's statements regarding delayed spending during the grid modernization ramp-up period (D.P.U. 21-82, Unitil Reply Brief at 2). Unitil contends that the original grid modernization plans assumed that project spending for each investment would be spread evenly over a number of years (D.P.U. 21-82, Unitil Brief at 2, citing D.P.U. 15-121, Exh. FG&E-2 at 19:16-21, 21:8-16; D.P.U. 21-82, Unitil Reply Brief

at 2). Unitil notes that the Department's Order regarding its initial grid modernization plan was issued in May 2018, and that following that order, it completed more detailed design, RFP processes, and project scheduling that resulted in spending that was not spread evenly over the years (D.P.U. 21-82, Unitil Brief at 2; D.P.U. 21-82, Unitil Reply Brief at 2).

VI. PREAUTHORIZED GRID MODERNIZATION INVESTMENTS

A. Introduction

In D.P.U. 12-76, the Department outlined a policy framework intended to move Massachusetts towards a modern electric grid. The Department set forth a vision for grid modernization designed to achieve the following four objectives: (1) to reduce the effects of outages; (2) to optimize demand, which includes reducing system and customer costs; (3) to integrate distributed energy resources; and (4) to improve workforce and asset management. D.P.U. 12-76-B at 2, 9. In the Grid Modernization Order at 99-106, the Department refined these objectives, specifying that grid modernization should: (1) optimize system performance (by attaining optimal levels of grid visibility, command and control, and self-healing); (2) optimize system demand (by facilitating consumer price-responsiveness); and (3) interconnect and integrate distributed energy resources. To support achievement of these objectives, the Department implemented a regulatory review construct whereby an electric distribution company's short-term grid modernization plan investments could be eligible for preauthorization, subject to a budgetary cap, with the costs afforded special ratemaking treatment using a short-term targeted cost recovery mechanism, the GMF, where certain conditions are met. D.P.U. 20-69-A at 30-31; Grid Modernization Order at 106, 113-116; 216-235.

To be eligible for preauthorization, a company must demonstrate that its proposed investments: (1) are designed to make measurable progress towards achievement of the Department's grid modernization objectives; (2) are incremental to existing or business-as-usual investments; (3) are supported by a business case that shows that the projected benefits justify the costs; and (4) will result in reasonable bill impacts. D.P.U. 20-69-A at 31; Grid Modernization Order at 115-116; D.P.U. 12-76-B at 15-23; Modernization of the Electric Grid, D.P.U. 12-76-C at 29-30 (2014); D.P.U. 17-05, at 469-470. As part of its business case, the company must demonstrate that the projected cost of the proposed investments is reasonable and that the projected benefits justify the costs. D.P.U. 20-69-A at 31; Grid Modernization Order at 116; D.P.U. 12-76-B at 15, 17. Further, the Department has determined that investments may be treated as incremental to current investment practices if their primary purpose is to accelerate progress in achieving the grid modernization objectives. D.P.U. 20-69-A at 32; Grid Modernization Order at 116, 145-146; D.P.U. 12-76-B at 19-20. Because investments previously determined to be incremental will become a part of a company's normal course of business over time, the Department will consider whether previously preauthorized technologies continue to be incremental in our review of the Companies' grid modernization plan filings. D.P.U. 20-69-A at 32; Grid Modernization Order at 149.

The Department will also consider how the Companies' proposed investments will benefit low-income customers and environmental justice communities. See D.P.U. 20-69-A at 31. Finally, as part of its review, the Department considers the safety, security, reliability

of service, affordability, equity, and reductions in greenhouse gas emissions. G.L. c. 25, § 1A.

B. Analysis and Findings

1. NSTAR Electric

a. Introduction

NSTAR Electric requests that the Department preauthorize the following categories of grid-facing investments, with a total budget of approximately $165.3 million: (1) ADMS; (2) communications; (3) monitoring and control, through substation automation and power quality monitoring investments; (4) VVO; and (5) measurement, verification, and support (D.P.U. 21-80, RR-DPU-13).[25,26] NSTAR Electric maintains that the five proposed investments are continuing investments in categories previously preauthorized by the

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25 The proposed $165.3 million budget includes $16.3 million in funds remaining from the supplemental budget approved in D.P.U. 20-74 for DMS, substation automation, and VVO investments that the company seeks to expend in calendar year 2022 (D.P.U. 21-80, RR-DPU-13; Tr. 2, at 265-268).

26 NSTAR Electric proposes two distinct investment components in the measurement, verification and support investment category: (1) program management, measurement and verification; and (2) systems support and maintenance. In this Order, we address only the program management, measurement and verification component. The proposed systems support and maintenance component is identified as a new investment by the company and will be addressed in the Department's Track 2 Order (D.P.U. 21-80, Exh. ES-JAS-2, at 36; RR-DPU-13).

Department. DOER generally supports approval of the proposed Track 1 investments (DOER Brief at 4-5, 14), and no other party opposed these proposed investments.

b. Previously Deployed Technologies

In the Grid Modernization Order at 172, the Department preauthorized grid-facing investments in the following seven categories: (1) distribution management systems; (2) advanced load flow; (3) VVO; (4) overhead automated feeder reconfiguration; (5) underground automated feeder reconfiguration; (6) advanced sensing; and (7) communications. Additionally, the Department directed the Companies to establish a formal evaluation process, including an evaluation plan and evaluation studies, for preauthorized grid modernization investments. Grid Modernization Order at 204-205. During the 2018-2021 term, NSTAR Electric completed the following grid-facing investments: (1) deployed VVO to 26 feeders across four substations; (2) added advanced relays to approximately 250 feeders at high-priority substations; (3) implemented power quality monitoring equipment at a substation serving industrial customers with power quality sensitivity; (4) installed nine communications nodes expanding the capacity of the company's wireless communications network and the ability to conduct remote monitoring and control; and (5) deployed modeling/simulation software and tools, including hosting capacity maps (D.P.U. 21-80, Exhs. ES-JAS-2, at 39-41, 72, 78, 85, 95; DPU 3-8; DPU 3-9). Additionally, NSTAR Electric completed its investments in SCADA, automated feeder reconfiguration, and underground automation, and any further deployment of these technologies will occur as part of its base capital program (D.P.U. 21-80, Exh. ES-JAS-2, at 39-42). NSTAR Electric, in coordination with National Grid, Unitil, and DOER, also

engaged an outside consultant to conduct evaluations of its preauthorized grid modernization investments (D.P.U. 21-80, Exh. ES-JAS-2, at 45, 135-138). See, e.g., Grid Modernization, Massachusetts Grid Modernization Program Year 2020 Evaluation Report: Monitoring and Control (July 1, 2021) ("2020 Evaluation Report").

In its proposed 2022-2025 Grid Modernization Plan, NSTAR Electric modified its investment categorization and proposes investments in the following seven grid-facing investment categories: (1) ADMS; (2) communications; (3) monitoring and control;[27] (4) VVO; (5) measurement, verification, and support; (6) advanced load flow; and (7) DERMS (D.P.U. 21-80, Exh. ES-JAS-2, at 36, 42-45).[28] The Department addresses the first five investment categories (i.e., ADMS; communications; monitoring and control; VVO; and measurement, verification, and support) in this Order; the remaining two categories, advanced load flow[29] and DERMS, are presented by the company as new investments and will be addressed in the Track 2 proceeding.

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27 NSTAR Electric formerly identified this category as the advanced sensing category in its first grid modernization plan (see D.P.U. 21-80, Exh. ES-JAS-2, at 69-73). Grid Modernization Order at 40, 139.

28 NSTAR Electric also proposed an eighth category consisting of congestion management investments to facilitate implementation of FERC Order 2222 (D.P.U. 21-80, Exh. ES-JAS-2, at 124). The Department, however, determined that those investments were outside the scope of these proceedings. Interlocutory Order on Scope at 6-7.

29 The Department approved the advanced load flow investment category in the Grid Modernization Order at 172; however, the company identifies the proposed advanced load flow investments in its 2022-2025 Grid Modernization Plan as new investment types within the advanced load flow investment category (D.P.U. 21-80, Exh. ES-JAS-2, at 36).

Based upon our review, the Department finds that the five investment categories are consistent with the grid-facing investment categories preauthorized by the Department in the Grid Modernization Order. Further, the technologies proposed by NSTAR Electric in these five categories are the same or substantially similar to the technologies preauthorized by the Department in NSTAR Electric's 2018-2021 Grid Modernization Plan (D.P.U. 21-80, Exhs. ES-JAS-1, at 17; DPU 1-3). Grid Modernization Order at 35-41, 172; D.P.U. 20-74 at 19-20. For instance, NSTAR Electric proposes to continue implementation of its ADMS and deployment of VVO and advanced relays on feeders, to expand its wireless communications network, and to engage in oversight and evaluation of its implementation of preauthorized grid modernization investments.

Because the five categories of investments in ADMS, VVO, monitoring and control, communications, and measurement, verification and support are consistent with the investments completed as part of its prior plan, the Department finds that these proposed grid-facing investments are a continuation of or an enhancement to the technologies and investments preauthorized in the Grid Modernization Order. Therefore, the Department relies on the Grid Modernization Order to support our analysis of whether the proposed investments are designed to make measurable progress towards achievement of the Department's grid modernization objectives. D.P.U. 20-74, at 22-23.

In the Grid Modernization Order at 144, the Department found that the interplay of grid-facing investments in advanced sensing, SCADA, DMS, load flow analytics, advanced communications, VVO, and automated feeder reconfiguration or advanced distribution automation, will bring direct benefits to customers and make measurable progress toward

achievement of the Department's grid modernization objectives. Similarly, the proposed grid-facing investments in the instant proceeding in ADMS, communications, monitoring and control, and VVO are a suite of investments designed to further the achievement of the Department's grid modernization objectives. NSTAR Electric has demonstrated that its investments in ADMS will improve situational awareness (e.g., high- and low-load conditions) and provide system operators extensive monitoring and control capabilities, as well as optimize its VVO system and future DERMS' control of DER assets (D.P.U. 21-80, Exhs. ES-JAS-2, at 57-58; DPU 3-11; DPU 7-3, at 2; DPU 8-6). Further, the Department finds that NSTAR Electric's expansion of VVO will proactively address voltage issues and improve system efficiency (D.P.U. 21-80, Exhs. ES-JAS-2, at 62-64, 65; DPU 3-12). See also Grid Modernization Order at 168. In addition to improving reliability, investments in substation automation will provide advanced telemetry to enhance the company's DMS model and optimize sectionalization, and NSTAR Electric has demonstrated that its investments in communications infrastructure will support the connectivity required for control room technology (i.e., SCADA, DMS, OMS, DERMS) (D.P.U. 21-80, Exhs. ES-JAS-2, at 71, 81-82; DPU 3-3, at 2). Accordingly, based on our findings above and consistent with the Grid Modernization Order, the Department finds that the continuing investments will make measurable progress towards achievement of the Department's grid modernization objectives by: (1) optimizing system performance by improving grid visibility, command and control, and self-healing; and (2) facilitating the interconnection and integration of DER.

Regarding the program management, measurement and verification investment category, NSTAR Electric's cost estimates for this category includes components applicable

to both Track 1 and Track 2 investments,[30] and the record does not include a disaggregated budget for the investments in each track. As a result, the Department will address preauthorization for this investment category in the Track 2 Order.

The Department has stated that investments may be treated as incremental to current investment practices if their primary purpose is to accelerate progress in achieving the grid modernization objectives. See D.P.U. 12-76-B at 19-20. Consistent with the Grid Modernization Order at 116, 146-149, the Department finds that the proposed continuing investments, with the exception of the program management, measurement and verification investment category at this time, are incremental to the company's existing or business as usual investments (D.P.U. 21-80, Exhs. DPU 1-3; DPU 6-1). As noted above, the proposed grid-facing investments continue the deployment of technologies that were preauthorized in the Company's 2018-2021 Grid Modernization Plan with a primary purpose to accelerate progress in achieving the Department's grid modernization objectives. Grid Modernization Order at 116, 146-149. Further, each of the proposed continuing investments are either ongoing projects that were not completed during the prior grid modernization term or are existing programs that have not achieved their grid modernization objective (D.P.U. 21-80, Exhs. DPU 1-3; DPU 6-1; Tr. 2, at 265-266, 273-274).

NSTAR Electric competitively procures all material, equipment, and external services for all grid modernization plan investments and its cost estimates are based on vendor quotes

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30 For instance, this component includes program management and third-party evaluation that would apply to both Track 1 and Track 2 investments (D.P.U. 21-80, Exh. ES-JAS-2, at 134-143).

and historical deployment costs (D.P.U. 21-80, Exhs. DPU 1-4, Atts. (a)-(j); DPU 4-10; Tr. 2, at 249-251). Further, when selecting a vendor, the company relies on established criteria for assessing price and technical requirements and bases vendor contract payments on the vendor achieving milestones set forth within the contract and reassesses vendor contracts every two to three years to ensure that it is procuring the least-cost option for the equipment (D.P.U. 21-80/D.P.U. 21-81/D.P.U. 21-82, Tr. 2, at 250-251, 262). Finally, NSTAR Electric will utilize the vendors competitively procured for the previous grid modernization plan for the 2022-2025 continuing investments where the services and equipment remain the same (D.P.U. 21-80, Exh. DPU 4-10; Tr. 2, at 252). After review, the Department finds that the projected costs of the proposed continuing investments are reasonable.[31] Accordingly, based on the Department's review here and our analysis in the Grid Modernization Order at 167-171, we find that the anticipated benefits justify the estimated costs (D.P.U. 21-80, Exh. DPU 11 & Atts. (a)-(b)).

The Department must also consider the bill impacts customers would experience as a result of the proposed grid modernization investments. D.P.U. 20-69-A at 31; Grid Modernization Order at 116; see also G.L. c. 25, § 1A. NSTAR Electric has submitted bill impact analyses identifying estimated increases that would result to each applicable rate class from the proposed continuing investments over the four-year grid modernization term

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31 The Department acknowledges the uncertainty inherent in planning estimates and accepts NSTAR Electric's cost estimates to determine eligibility for preauthorization. NSTAR Electric, however, bears the burden to demonstrate that its actual expenditures are reasonable and prudently incurred at the time it seeks final cost recovery. Grid Modernization Order at 166-167, 220-221.

(D.P.U. 21-80, Exhs. DPU 4-3; DPU 9-3; DPU 9-4; Tr. 2, at 234-237). The Department finds that the bill impacts resulting from the total proposed budget for continuing Grid Modernization Plan investments are reasonable in light of the anticipated benefits these investments will provide.[32]

c. Category-Specific Directives

i. Introduction

The Department, above, preauthorizes NSTAR Electric's continuing investments in ADMS, VVO, monitoring and control, and communications. Notwithstanding our preauthorization of the continuing investments, the Department provides additional directives to address specific concerns and/or issues with the VVO and monitoring and control investments.

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[32] The company estimates a monthly bill increase of approximately $0.54 per month or 0.4 percent compared to bills as of the time of the filing for a typical residential customer (D.P.U. 21-80, Exhs. DPU 9-3 & Att. DPU 9-3(c)). The company's bill impact analysis was based on a budget estimate that did not include unexpended calendar year 2021 budget amounts incorporated into the preauthorized total the company is requesting, or certain additional amounts identified supra at n.14 and n.16 (D.P.U. 21-80, RR-DPU-13). However, the inclusion of these additional amounts would not impact the Department's conclusion.

ii. VVO Control Software

In December 2020, NSTAR Electric placed into service the Integrated Volt Var Control ("IVVC") platform which was deployed as part of its prior 2018-2021 Grid Modernization Plan (D.P.U. 21-80, Exh. DPU 8-6(e)). NSTAR Electric uses the IVVC platform as the control software for its VVO equipment (D.P.U. 21-80, Exhs. DPU 3-11; DPU 8-6). As part of its 2022-2025 Grid Modernization Plan, NSTAR Electric will transition its VVO equipment from the existing IVVC control software into ADMS and retire the IVVC platform (D.P.U. 21-80, Exh. DPU 3-11).[33] NSTAR Electric will use the IVVC platform to operate VVO until its existing assets can be transitioned to operate within the ADMS in 2025 (D.P.U. 21-80, Exh. DPU 8-6(e); RR-DPU-1, at 1).

The Department finds that the benefits of VVO integration into the ADMS outweigh the costs associated with early retirement of the IVVC software (D.P.U. 21-80, RR-DPU-1). For example, incorporating VVO into its ADMS alongside additional asset classes (e.g., inverters, micro-capacitors, static VAR compensators) that are not supported within the IVVC platform will result in voltage reductions of one percent higher relative to the continued use of the IVVC platform (D.P.U. 21-80, RR-DPU-1). Additionally, further power and energy reductions are expected when considering the benefit of AMI-enabled

[33] NSTAR Electric contends that any impact on cumulative depreciation reserve balances due to the software retirement would be reviewed in a future depreciation study and inform depreciation accrual rates as part of a future base rate proceeding (D.P.U. 21-80, Exh. DPU 3-11).

ADMS-based VVO (D.P.U. 21-80, RR-DPU-1). Nevertheless, the Department is concerned with the early retirement of the IVVC platform.

The Department acknowledges that, during the planned transition of VVO control to the ADMS, the IVVC platform will continue to provide the benefits of VVO until the transition of existing assets into the ADMS is completed in 2025. The strategic deployment of a suite of grid-facing investments, however, must coordinate the deployment of individual technologies, as well as consider the timing, location, and scale of these investments, with the overall aim of maximizing the benefits to customers. Grid Modernization Order at 144 n.76. Accordingly, to further alleviate our concerns over the early retirement of the IVVC platform, the Department directs NSTAR Electric to optimize the transition time of VVO control for existing, in-progress, and future VVO schemes into ADMS so that benefits to customers are maximized.

Notwithstanding this finding, the Department takes this opportunity to note that investments in new technologies for modernizing the grid should be conducted in a strategic and thoughtful manner to avoid early retirements and to minimize stranded costs. Technologies evolve quickly and subsequent, more advanced technologies may provide enhanced benefits to customers, but it comes at a significant cost to customers. Accelerated cost recovery through the GMFs is intended to promote an evolution of the electric distribution system to advance the Commonwealth's energy and environmental policies. See Sections VIII and IX, below. However, the grid modernization framework is not intended to promote constant replacement and early retirements of technologies. The Companies should ensure that the technologies and investments proposed through their grid modernization

proposals achieve the objectives established by the Department and law and are designed to provide long term solutions for customers.

iii. VVO Advanced Inverters

As part of its 2022-2025 VVO program, NSTAR Electric proposes to replace four existing central inverters with advanced inverters at its Southampton distributed generation facility at an estimated expense of $400,000. Each of the four central inverters, which the company installed and commissioned in October 2018, has a useful life of twelve and a half years (D.P.U. 21-80, Exh. DPU 3-12).[34] As of November 4, 2021, NSTAR Electric had not, however, determined whether the existing inverters could be reused or repurposed (D.P.U. 21-80/D.P.U. 21-81/D.P.U. 21-82, Tr. 2, at 176). Thus, the replacement of the existing inverters could result in stranded costs.

Nevertheless, the Department determines that the benefits of the advanced inverters justify the estimated costs (D.P.U. 21-80, Exh. DPU 8-4 (Rev.); Tr. 2, at 176-179). Currently, NSTAR Electric does not own or operate any advanced inverters and the Department determines that deployment of the advanced inverters can provide the following

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[34] The four central inverters have a total booked value of $275,624.93 (D.P.U. 21-80, Exh. DPU 8-4 (Rev.)). From the depreciation start date of December 2018 through September 2021, NSTAR Electric has recovered approximately $15,619 of $68,906 per inverter (D.P.U. 21-80, Exh. DPU 8-4 (Rev.)). The company currently receives recovery for these inverters through its Solar Expansion Program. See M.D.P.U. No. 67C; NSTAR Electric Company, D.P.U. 19-59-A at 4 n.8 (2020) & Exhs. ES-MWK-2; ES-MWK-3, at 3. In its pending base distribution rate proceeding the company requests to incorporate its solar investments under this program into rate base. NSTAR Electric Company, D.P.U. 22-22, NSTAR Electric filing, ES-ADDITIONS-1, at 48-49.

benefits: (1) more precise and dynamic control of the active and reactive output of the distributed generation facility; (2) integration within the Company's VVO scheme to stabilize voltage and improve system efficiency; and (3) receive operating-mode updates from centralized control room over-the-air dispatches (D.P.U. 21-80, Exhs. DPU 3-12; DPU 8-7(b)).

Additionally, the Department finds that the deployment of advanced inverters will allow the company to gain experience optimizing the use of advanced inverters within its VVO scheme as well as broaden the company's experience with optimizing the operation of customer-owned inverters (D.P.U. 21-80/D.P.U. 21-81/D.P.U. 21-82, Tr. 2, at 177-179). But any future replacement of inverters with advanced inverters must be part of the company's normal business-as-usual investments, as the company indicated (D.P.U. 21-80/ D.P.U. 21-81/D.P.U. 21-82, Tr. 2, at 239-240). Further, the Department directs NSTAR Electric to provide status updates and identify lessons learned on the company's operation of the advanced inverters in its Grid Modernization Annual Reports. As part of these updates, the Department directs NSTAR Electric to demonstrate how the experience gained from operating the advanced inverters assists operation of customer-owned DER equipment.

iv. Power Quality Monitoring

In D.P.U. 20-74, at 28-29, the Department preauthorized NSTAR Electric's power quality monitoring technology as a pilot project for a single substation to allow the company to gain experience in deploying power quality monitoring technology, analyzing the collected data, and resolving power quality issues experienced by commercial and industrial ("C&I") customers. D.P.U. 20-74, at 28-29. The Department further determined that the proposed

investment was an important first step towards resolution of a concern that impacts certain C&I customers and that the potential benefits of the proposed investment were sufficient to justify the proposed budget for the investment as a proof-of-concept pilot project. D.P.U. 20-74, at 28-29. The Department directed NSTAR Electric to submit detailed information and analysis on the implementation of the pilot program in its future Grid Modernization Annual Report filings. D.P.U. 20-74, at 29.

In the instant proceeding, as part of the monitoring and control investment category, NSTAR Electric seeks $4.8 million to expand the program and deploy the power quality monitoring technology at up to five additional substations (D.P.U. 21-80, Exhs. ES-JAS-2, at 73, 77-78; DPU 3-6). TEC argues that the early results of the previously approved power quality monitoring pilot are encouraging, but that continued investment is essential to fully realize the pilot's value and to yield knowledge and experience that can be applied in the larger context of optimizing power quality across the entire system (D.P.U. 21-80, TEC Brief at 3-4).

NSTAR Electric deployed its power quality monitoring system at its Cambridge substation in early 2021 (D.P.U. 21-80, Exh. ES-JAS-2, at 78-80). The power quality monitoring system provided NSTAR Electric with detailed information on the nature of a faulted underground cable which led to replacement of the faulted cable (D.P.U. 21-80, Exhs. ES-JAS-2, at 78-79; DPU 3-9). Further, through the program, NSTAR Electric and TEC are engaged in developing a communications strategy regarding the conditions and protocols of information transfer (D.P.U. 21-80, Exhs. ES-JAS-2, at 80; DPU 8-2).

Given the positive outcome of the pilot program, the Department finds merit in the continuation of power quality monitoring investments as part of NSTAR Electric's 2022-2025 Grid Modernization Plan. These investments will reduce the time to investigate and diagnose the cause of power quality events and is consistent with the Department's grid modernization objectives (D.P.U. 21-80, Exh. DPU 3-7; RR-DPU-4; RR-DPU-14). The proposed power quality investments are designed to make measurable progress towards achievement of the Department's grid modernization objective through optimizing system performance by improving system visibility. D.P.U. 20-74, at 28-29. Moreover, the Department determines that the expansion of the power quality program to encompass up to five additional substations serving C&I customers with sensitive equipment will allow further testing of this new technology and will provide a better understanding of system disruptions and additional experience in developing appropriate mitigation strategies to address a broader range of power quality issues and C&I customers. Accordingly, the Department finds that it is appropriate to preauthorize the proposed power quality monitoring investment to allow NSTAR Electric to gain additional experience in analyzing the monitoring data and developing solutions to resolve power quality issues experienced by C&I customers. While the Department preauthorizes the power quality monitoring investment, we do not, however, anticipate the need for preauthorization or short-term targeted cost recovery of additional power quality monitoring technology going forward. We expect any further investments in power quality monitoring technologies to be part of the company's normal business-as-usual capital planning.

Further, consistent with our preauthorization in D.P.U. 20-74, at 29, NSTAR Electric shall include detailed information and analysis on the implementation of power quality monitoring in its future Grid Modernization Annual Report filings.[35] In addition, the Department expects NSTAR Electric to continue to refine its established process for handling customer inquiries to ensure that the process meets industrial customer needs for detailed and immediate assessments of power quality events, including potential real-time notification, while also ensuring safety, reliability, security and customer protection (D.P.U. 21-80, Exh. DPU 8-2; RR-DPU-4).

v. Substation Automation Unit Commitment

Within the monitoring and control investment category, NSTAR Electric proposes additional investments in substation automation. Specifically, NSTAR Electric plans to (1) replace older relay technology with current microprocessor relay technology for 190 additional feeders at bulk substations across Massachusetts, and (2) add relays with remote telemetry to 55 high-priority 4 kV feeders in eastern Massachusetts (D.P.U. 21-80, Exhs. ES-JAS-2, at 69-73; DPU 3-3). As part of the proposed deployment, NSTAR Electric identified the substation locations and the number of feeders that would benefit from the microprocessor and 4 kV relay upgrades as well as the process and criteria used to determine

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35 Specifically, NSTAR Electric shall include the following information: (1) a detailed description of the implementation of the power quality monitoring technology; (2) information regarding data collection and analysis from this technology; (3) an analysis of the effectiveness of the power quality monitoring technology in identifying the cause of the power quality issues of the C&I customers associated with the substation where the technology has been deployed; and (4) a description of any actions taken to resolve these power quality issues. D.P.U. 20-74, at 29.

the substations and feeders that would be upgraded with relays (D.P.U. 21-80, Exhs. DPU 3-3; DPU 11-2 & Att.; RR-DPU-5). NSTAR Electric stated that after detailed engineering and design is completed it could substitute identified substation or feeder locations to meet the desired unit commitments (i.e., 190 unit/feeder commitment for microprocessor relay upgrades and 55 unit/feeder commitment for 4 kV upgrades) (D.P.U. 21-80, Exhs. DPU 3-3; DPU 11-2). NSTAR Electric states that it would only substitute a substation or feeder that is consistent with the costs or benefits it specified for the substation automation category (D.P.U. 21-80, Exhs. DPU 3-3; DPU 11-2).

In D.P.U. 17-05, at 439-440, the Department determined that the company's commitment to undertake grid modernization investments based on a predetermined spending target was misplaced and that the company must focus on a commitment to achieve the greatest benefit from grid modernization investments. Here, we are similarly concerned with the company's proposed commitment to a deployment of a predetermined number of microprocessor relay and 4 kV upgrades. Although the Department recognizes the importance of relying on completed engineering and design plans to finalize the precise feeders to deploy relays and the need for flexibility to make adjustments to chosen deployment locations, the Department determines that unit commitments are misplaced. NSTAR Electric must commit to maximizing customer benefits rather than to a predetermined number of feeders on which to install relays. Grid Modernization Order at 144 n.76. If the company determines that certain feeders are no longer suitable for deployment of relays as a result of its engineering and design study, the company must demonstrate that any substitute feeders chosen for deployment of relays meet the

requirements of grid modernization preauthorization, maximizes customer benefits, and is not a business-as-usual investment to qualify for targeted cost recovery through the company's annual grid modernization factor filings (D.P.U. 21-80, Exhs. DPU 3-3; DPU 11-2). The company shall also report on any feeder revisions or substitutions in its Annual Report filings.

d. Category-Specific Caps

In the Grid Modernization Order at 173, the Department established a budget cap for preauthorized investments, permitting NSTAR Electric the flexibility to shift spending among the preauthorized categories in order to respond to evolving conditions. The Department found that in the early stages of grid modernization, it was reasonable to expect that significant changes would take place associated with, among other things, the introduction of new technologies and the costs of new and existing technologies. Grid Modernization Order at 107, citing D.P.U. 17-05, at 442. The Department finds, however, that because NSTAR Electric's proposed investments are continuing investments in categories that the company now has significant experience implementing, the same level of flexibility afforded during the first grid modernization term for these investment categories is unnecessary for the second grid modernization term. See Grid Modernization Order at 107-108. Accordingly, for the investment categories preauthorized herein, the Department establishes a total budget cap of $162.6 million[36] and finds it appropriate to limit funds being allocated between each

[36] $21.9 million (ADMS) + $24.0 million (communications) + $76.3 million (monitoring and control including power quality monitoring) + $40.4 million (VVO) = $162.6 million (see D.P.U. 21-80, RR-DPU-13).

investment category. Thus, NSTAR Electric may not shift spending among the preauthorized grid-facing categories by more than 15 percent. Compare with NSTAR Electric Company and Western Massachusetts Electric Company, D.P.U. 16-105, at 28-29 & n.14 (2016) (permitting a 15 percent variance for the total pre-approved budgetary amount for the company's proposed solar program capital investments); Massachusetts Electric Company and Nantucket Electric Company, D.P.U. 16-104, at 19-20 & n.13 (2016) (same). NSTAR Electric may, however, shift spending between years over the four-year term, subject to the 15 percent budget cap variance for each category. Any spending over the overall total budget cap or the 15 percent cap variance in each category is not eligible for targeted cost recovery through the GMF and, instead, may be recovered by the company in a base distribution rate proceeding subsequent to a prudency finding by the Department in a GMF filing or term review Order. Further, the Department's preauthorization only applies to expenditures during the approved four-year term.

e. Conclusion

Based on the foregoing, the Department preauthorizes a $162.6 million budget cap for NSTAR Electric's continuing grid-facing investments in ADMS ($21.9 million), communications ($24.0 million), monitoring and control including power quality monitoring ($76.3 million), and VVO ($40.4 million) for the 2022-2025 Grid Modernization Plan term (D.P.U. 21-80, RR-DPU-13). The Department also finds that these investment categories will improve safety, security, reliability of service, affordability, equity, and enable clean energy technologies to lower emissions. G.L. c. 25, § 1A.

2. National Grid

a. Introduction

National Grid requests that the Department preauthorize the following seven categories of grid-facing investments with a total budget of approximately $305.3 million: (1) feeder monitor sensors in the monitoring and control category; (2) VVO/CVR including advanced capacitors and regulators in the VVO category; (3) ADA and FLISR, including advanced reclosers and breakers in the ADA category; (4) ADMS; (5) IT/OT; (6) communications; and (7) measurement, verification, and support (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 16; DPU 1-2, Att. 1 (Rev. 3)).[37] National Grid maintains that its proposed investments are continuing investments in categories previously preauthorized by the Department in the Grid Modernization Order (D.P.U. 21-82, Exh. NG-GMP-2 (Rev. 2) at 16-86, 124-125). DOER generally supports approval of the proposed Track 1 investments (DOER Brief at 4-5, 14), and no other party opposed these proposed investments.

b. Previously Deployed Technologies

In the Grid Modernization Order at 154-155, the Department preauthorized National Grid's grid-facing investments in the following five categories: (1) VVO; (2) ADA; (3) feeder monitors; (4) communications and information/operational technologies; and (5) ADMS/SCADA. As part of its 2018-2021 Grid Modernization Plan, National Grid completed the following grid-facing investments: (1) installed VVO/CVR on 39 feeders,

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[37] National Grid originally proposed $289 million but during the proceeding revised its budget to reflect revisions to cost and deployment assumptions and to correct errors (D.P.U. 21-81, Exh. DPU 1-2, Att. 1 (Rev. 3), Tabs Full Summary (Nominal Dollars) and Change Log).

representing approximately three percent of total feeders; (2) installed 22 ADA/FLISR schemes across 44 feeders, representing four percent of total feeders; (3) deployed 202 head-end mainline feeder monitors to improve grid visibility and efficiently direct work crews to the affected system areas to restore power; (4) deployed enabling communications and IT/OT infrastructure to support other grid modernization investments; and (5) completed Phase 1 of its ADMS program, including implementation of baseline distribution management system applications (e.g., load flow, restoration switching analysis, simulation mode, experimental fault location capabilities) in service on 125 distribution circuits; and (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 17-23). National Grid, in coordination with NSTAR Electric, Unitil, and DOER, also engaged an outside consultant to conduct evaluations of its preauthorized grid modernization investments (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 127). See, e.g., Grid Modernization, 2020 Evaluation Report.

As part of its 2022-2025 Grid Modernization Plan, National Grid proposes to build on its prior investments and proposes grid-facing investments in the following seven categories: (1) monitoring and control; (2) VVO; (3) ADA; (4) ADMS; (5) IT/OT; (6) communications; and (7) measurement, verification, and support (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 16; DPU 1-2, Att. 1 (Rev. 3)). Notwithstanding minor differences between the previously preauthorized categories and the current proposed categories, the proposed investment categories are consistent with the grid-facing investment categories preauthorized by the

Department in the Grid Modernization Order.[38] Importantly, the technologies proposed by National Grid in the current proceeding are the same as or similar to technologies preauthorized by the Department in National Grid's 2018-2021 Grid Modernization Plan (D.P.U. 21-81, Exhs. NG-GMP-1 at 10-11, 15-16; DPU 1-1). Grid Modernization Order at 14-18, 154-156. For instance, National Grid proposes to deploy feeder monitors as part of its monitoring and control category, to continue its ADMS, VVO, and ADA, to expand its communications network and upgrade its IT/OT, and to engage in oversight and third-party evaluation of its implementation progress.

The Department finds that the proposed grid-facing investments in monitoring and control, VVO, ADA, ADMS, IT/OT, communications, and measurement, verification, and support are a continuation of, or enhancement to, the technologies and investments preauthorized in the Grid Modernization Order. Therefore, the Department relies on the Grid Modernization Order to support our analysis of whether the proposed investments are designed to make measurable progress towards achievement of the Department's grid modernization objectives.

In the Grid Modernization Order at 144, the Department found that the interplay of grid-facing investments in advanced sensing, SCADA, DMS, load flow analytics, advanced communications, VVO, and automated feeder reconfiguration or advanced distribution

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38 The differences between the proposed categories and those explicitly preauthorized in the Grid Modernization Order include incorporating the feeder monitor category within the monitoring and control category, bifurcating communications and IT/OT into separate categories, and creating a distinct measurement, verification, and support category.

automation, will bring direct benefits to customers and make measurable progress toward achievement of the Department's grid modernization objectives. Similarly, the Department determines that the proposed grid-facing investments in feeder monitors in the monitoring and control category, VVO, ADA, ADMS, IT/OT, and communications are a suite of investments designed to further the achievement of the Department's grid modernization objectives.

In particular, the Department finds that National Grid's continued investment in feeder monitors will improve grid visibility and deliver real-time information through the ADMS to assist the operations control center (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 26; DPU 3-3; DPU 6-2). National Grid has also demonstrated that its phased investments in ADMS will provide grid optimization and forecasting functionalities, including integration with advanced applications (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 44-46; DPU 6-8; DPU 6-9). National Grid has further demonstrated that when coupled with ADMS, its investments in ADA will offer several benefits including reduced outage restoration times, avoided infrastructure costs, and reduced DER curtailment (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 32-33; DPU 10-3). Finally, the Department finds that National Grid's planned IT/OT and communications infrastructure will enable and protect the operation of all other preauthorized grid modernization investments (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 68-69, 80-81, and 82-85). Accordingly, based on our findings above and consistent with the Grid Modernization Order at 137-145, the Department finds that the proposed continuing investments will make measurable progress towards achievement of the Department's grid modernization objectives through: (1) optimizing system performance by improving grid

visibility, command and control, and self-healing; and (2) facilitating the interconnection and integration of DER.

Regarding the program management, measurement, and verification category, National Grid's cost estimates for this category includes components applicable to both Track 1 and Track 2 investments,[39] and the record does not include a disaggregated budget for the investments in each track. As a result, the Department will address the preauthorization for this investment category in the Track 2 Order.

The Department has stated that investments may be treated as incremental to current investment practices if their primary purpose is to accelerate progress in achieving the grid modernization objectives. See D.P.U. 12-76-B at 19-20. Consistent with the Grid Modernization Order, at 116, 146-149, the Department finds that the proposed continuing investments, with the exception of the program management, measurement and verification investment category at this time, are incremental to National Grid's existing or business as usual investments (D.P.U. 21-81, Exh. DPU 1-1). As noted above, the proposed grid-facing investments continue the deployment of technologies that were preauthorized in National Grid's 2018-2021 Grid Modernization Plan with a primary purpose to accelerate progress in achieving the Department's grid modernization objectives. Grid Modernization Order at 116, 146-149.

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[39] For instance, this component includes program management and third-party evaluation that would apply to both Track 1 and Track 2 investments (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 89, 127-128).

National Grid's cost estimates are based on vendor quotes, subject matter expertise, and historical deployment costs (D.P.U. 21-81, Exh. DPU 1-2, Atts.). After review, the Department finds that the projected costs of the proposed investments in previously deployed grid-facing technologies are reasonable.[40] Accordingly, based on the Department's review here and our analysis in the Grid Modernization Order at 151-153, we find that the anticipated benefits justify the estimated costs (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 129-157; DPU 1-1).

The Department must also consider the bill impacts customers would experience as a result of the proposed grid modernization investments. D.P.U. 20-69-A at 31; Grid Modernization Order at 116; see also G.L. c. 25, § 1A. National Grid has submitted bill impact analyses identifying estimated increases that would result to each applicable rate class from the proposed continuing investments over the four-year grid modernization term (D.P.U. 21-81, Exhs. DPU 7-1 and Atts.; DPU 7-3 and Atts.).[41] The Department finds that the bill impacts resulting from the $305.3 million budget for continuing Grid Modernization

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40 The Department acknowledges the uncertainty inherent in planning estimates and accepts National Grid's cost estimates to determine eligibility for preauthorization. National Grid, however, bears the burden to demonstrate that its actual expenditures are reasonable and prudently incurred at the time it seeks final cost recovery. Grid Modernization Order at 220-221.

41 The company estimates bill impacts to be in the range of 0.8 percent to 2.0 percent from its proposed continuing grid-facing investments over the four-year term, with the exact amount dependent on the final level of investments (D.P.U. 21-81, Exhs. NG-GMP-2, at 12; AG 2-16 & Att.; DPU 7-2 & Atts.; DPU 7-3 & Atts.; Tr. 2, at 235-237).

Plan investments are reasonable in light of the anticipated benefits these investments will provide.

c. Category-Specific Directives

i. Introduction

The Department, above, preauthorizes National Grid's continuing investments in monitoring and control, VVO, ADA, ADMS, IT/OT, and communications. In addition to our preauthorization of the continuing investments, the Department provides additional directives to address specific concerns and/or issues identified within the VVO and monitoring and control investment categories.

ii. VVO Control Software

As of calendar year 2021, National Grid has installed VVO on three percent of its feeders and, by the end of calendar year 2025, that figure is expected to rise to 20 percent of its feeders (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 28; AG 5-6). As part of its 2018-2021 Grid Modernization Plan, National Grid placed the current VVO control software (i.e., AdaptiVolt technology) into service on 16 feeders in 2019, 23 feeders in 2020, and an estimated 32 feeders in 2021 at an estimated cost of approximately $3,166,110 (D.P.U. 21-81, RR-DPU-7). In its 2022-2025 Grid Modernization Plan, National Grid proposes to transition the control of VVO equipment from the existing stand-alone VVO control software to the centralized ADMS platform during the 2026-2027 timeframe once the third phase of its ADMS program is complete (D.P.U. 21-81, Exh. DPU 6-8; RR-DPU-7). The third phase of the ADMS program has a planned in-service date of December 2025 (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 41-42). National Grid will focus its initial

ADMS enablement of VVO devices on in-progress and future VVO scheme activations before transitioning existing VVO schemes (D.P.U. 21-81, Exh. DPU 6-8; RR-DPU-7).

The Department is persuaded that the planned transition of VVO control to the centralized ADMS platform will provide benefits to customers that justify the estimated costs associated with the potential early retirement of the existing VVO control software. Automation and coordinated control of multiple advanced processes, applications, and technologies on a single, integrated ADMS control platform will allow for optimized solutions when the electric grid is in abnormal states (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 27-28). Further, the existing standalone VVO platform is switched off when the electric grid is operating in an abnormal configuration, however, an ADMS-based VVO platform will operate on an "as-switched" network model informed by underlying real-time load flow which will allow VVO to operate when the electric grid is in an abnormal configuration (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 153 n.52). Finally, once customer-level voltage information is available through advanced metering infrastructure, the granular data can be used to fine tune the VVO control scheme for additional reductions in energy and peak demand (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 27-28).

Additionally, the Department determines that National Grid's transition approach will maintain the benefits of VVO with minimal interruption (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 27; DPU 6-8). National Grid will also minimize any unamortized costs and mitigate ongoing maintenance costs of supporting a second solution during the planned transition from the existing VVO control software to ADMS (D.P.U. 21-81, RR-DPU-7). Further, the transition to a single integrated and automated solution will reduce costs and

result in efficiency gains (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 27; DPU 6-8; Tr. 2, at 173-174).

Last, the Department finds that the strategic deployment of a suite of grid-facing investments, at a minimum, must coordinate the deployment of individual technologies, as well as consider the timing, location, and scale of these investments, with the overall aim of maximizing the benefits to customers. Grid Modernization Order at 144 n.76. Accordingly, to alleviate concerns with the potential early retirement of the current VVO control software, the Department directs National Grid to optimize the time to transition from the current VVO control software to the ADMS-based control for all existing, in-progress and, future VVO schemes so that benefits to customers are maximized.

iii. VVO Smart Capacitors

In its 2022-2025 Grid Modernization Plan, National Grid proposes to deploy smart capacitors as part of its VVO program and to also use the smart capacitors to minimize the impact on customers from DER voltage penetration on the distribution system (D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 29). Given that the smart capacitor units are the same for VVO and DER aggregation mitigation solutions and they play a similar role for implementing VVO and mitigating DER-related voltage issues, National Grid proposes to utilize the VVO budget as a funding mechanism for both smart capacitor functions (D.P.U. 21-81, Exh. DPU 6-6; Tr. 2, at 170-171). National Grid will ultimately control the smart capacitors to perform the primary function of VVO through the ADMS Phase II algorithm, but until Phase II of the ADMS is complete, the smart capacitors will be used, as

needed, to address voltage issues caused by interconnected DERs (D.P.U. 21-81, Exh. DPU 6-6).

Based on record in this proceeding, National Grid has demonstrated that the proposed smart capacitors will be controlled by the ADMS which will perform the dual functions of VVO and mitigating voltage issues caused by interconnected DERs. Because National Grid will use a central platform to coordinate and automate the VVO functionality, the Department determines that the proposed smart capacitors are properly within the scope of preauthorized grid modernization investments.

The Department distinguishes the investments in smart capacitors proposed in the present proceeding from the smart capacitor units deployed as part of the Affected System Operator ("ASO") program in the 2018-2021 Grid Modernization Plan. In Massachusetts Electric Company and Nantucket Electric Company, D.P.U. 21-32, at 3 (2021), the Department found our preauthorization of investments in VVO and ADMS did not apply to the ASO smart capacitors because these smart capacitors were used to address transmission substation voltage issues and were not integrated into the VVO software or the ADMS. D.P.U. 21-32, at 3. Based on the record in these proceedings, our concerns in D.P.U. 21-32 are not present here (D.P.U. 21-81, Exh. DPU 3-7; Tr. 2, at 168-170). Further, in addition to voltage control, the ability of the smart capacitors to mitigate DER voltage issues provides added benefits to customers and inclusion of smart capacitors as part of preauthorized VVO and ADMS investments is reasonable and appropriate.

Finally, the Department finds it appropriate to track the benefits provided with the smart capacitor deployments to mitigate voltage issues caused by DER aggregations.

Accordingly, National Grid shall propose a company-specific performance metric on the ability of smart capacitors to mitigate voltage issues caused by DER aggregations within 90 days after the date of this Order for consideration in a compliance phase of these proceedings. The performance metric shall track National Grid's progress integrating the smart capacitors into ADMS and report separately from the existing smart capacitors operating within National Grid's AdaptiVolt control platform. The performance metric proposal shall measure and report on the benefits of mitigating DER voltage issues separately from VVO benefits. As part of a compliance phase of these proceedings after issuance of an Order in Track 2, the Department will evaluate the proposed smart capacitor performance metric, along with any additional metrics that may be proposed in connection with new investments being investigated in Track 2 of these proceedings.

d. Category-Specific Caps

In the Grid Modernization Order at 155-156, the Department established a budget cap for preauthorized investments, permitting National Grid the flexibility to shift spending among the preauthorized categories in order to respond to evolving conditions. The Department found that in the early stages of grid modernization, it was reasonable to expect that significant changes would take place associated with, among other things, the introduction of new technologies and the costs of new and existing technologies. Grid Modernization Order at 107, citing D.P.U. 17-05, at 442. The Department finds, however, that because National Grid's proposed investments are continuing investments that the company now has significant experience implementing, the same level of flexibility afforded during the first grid modernization term for these investment categories is unnecessary for the

second grid modernization term. See Grid Modernization Order at 107-108. Accordingly, for the investment categories preauthorized herein, the Department establishes a total budget cap of $300.8 million[42] and finds it appropriate to limit funds being allocated between each investment category. Thus, National Grid may not shift spending among the preauthorized grid-facing categories by more than 15 percent. Compare with D.P.U. 16-105, at 28-29 & n.14 (permitting a 15 percent variance for the total pre-approved budgetary amount for the company's proposed solar program capital investments); D.P.U. 16-104, at 19-20 & n.13 (same). National Grid may, however, shift spending between years over the four-year term, subject to the 15 percent budget cap variance for each category. Any spending over the overall total budget cap or the 15 percent cap variance in each category is not eligible for targeted cost recovery through the GMF and, instead, may be recovered by the company in a base distribution rate proceeding subsequent to a prudency finding by the Department in a GMF filing or term review Order. Further, the Department's preauthorization only applies to expenditures during the approved four-year term.

e. Conclusion

Based on the foregoing, the Department preauthorizes a $300.8 million budget cap for National Grid's continuing grid-facing investments in monitoring and control ($4.1 million), VVO ($76.4 million), ADA ($37.7 million), ADMS ($61.0 million), IT/OT ($18.8 million),

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[42] $4.1 million (monitoring and control) + $76.4 million (VVO) + $37.7 million (ADA) + $61.0 million (ADMS) + $18.8 million (IT/OT) + $102.8 million (communications) = $300.8 million (see D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 16; DPU 1-2, Att. 1 (Rev. 3)).

and communications ($102.8 million) for the 2022-2025 Grid Modernization Plan term (D.P.U. 21-81, Exhs. NG-GMP-2 (Rev. 2) at 16; DPU 1-2, Att. 1 (Rev. 3)). The Department also finds that these investment categories will improve safety, security, reliability of service, affordability, equity, and enable clean energy technologies to lower emissions. G.L. c. 25, § 1A.

3. Unitil

a. Introduction

Unitil requests that the Department preauthorize a budget of $9.8 million for the following grid-facing investments: (1) SCADA in the monitoring and control category; (2) AMI/OMS integration in the monitoring and control category; (3) VVO; (4) ADMS; (5) field area network in the communications category; (6) mobile damage assessment platform in the workforce management category; and (7) third-party evaluation in the measurement, verification, and support category (D.P.U. 21-82, Exhs. Unitil-GMP at 13; Unitil-KES-1, at 18; DPU 6-1). The company specifies that its proposed budget includes some costs that will be allocated to Unitil Energy Systems, Inc. ("UES"), which refers to Unitil Corporation's electric distribution subsidy serving customers in New Hampshire (D.P.U. 21-82, Exhs. Unitil-GMP at 12 n.1; DPU 1-3). Unitil maintains that these investments are a continuation of the projects previously approved by the Department (D.P.U. 21-82, Exh. Unitil-GMP at 64). DOER generally supports approval of the proposed Track 1 investments (DOER Brief at 4-5, 14), and no other party opposed these proposed investments.

b. Previously Deployed Technologies

In the Grid Modernization Order at 163-164, the Department preauthorized Unitil's grid-facing investments in seven categories: (1) enterprise mobile damage assessment tool; (2) OMS integration with advanced metering infrastructure; (3) field area network; (4) SCADA; (5) VVO; (6) ADMS; and (7) distributed energy resource analytics visualization platform. Additionally, the Department directed Unitil to establish a formal evaluation process, including an evaluation plan and evaluation studies, for preauthorized grid modernization investments. Grid Modernization Order at 204-205.

As part of its 2018-2021 Grid Modernization Plan, Unitil: (1) deployed SCADA at four substations and upgraded SCADA capabilities at a fifth substation; (2) completed its AMI/OMS interface prototype; (3) installed primary VVO equipment, including voltage regulators and capacitor banks, at two substations and completed detailed engineering and cost estimates for VVO across all substations and circuits; (4) initiated ADMS implementation, including transitioning one substation to the ADMS SCADA system in a test environment, completing the modeling and implementation of load flow for a substation in the ADMS test environment, and activated the ADMS production environment and new IT network in which the ADMS platform operates; (5) developed the field area network requirements, specifications, implementation strategy, and installed two fiber backhaul circuits for the field area network; and (6) reviewed, evaluated, and selected the software platform for the mobile damage assessment tool with a projected implementation by the end of 2021 (D.P.U. 21-82, Exhs. Unitil-GMP at 63-81; DPU 2-9). Unitil, in coordination with NSTAR Electric, National Grid, and DOER, also engaged an outside consultant to conduct

evaluations of its preauthorized grid modernization investments (D.P.U. 21-82, Exh. Unitil-GMP at 82). See, e.g., Grid Modernization, 2020 Evaluation Report.

As part of its 2022-2025 Grid Modernization Plan, Unitil proposes continuing the investments preauthorized in its prior plan, including the third-party evaluations required by the Department. For instance, Unitil proposes to: (1) deploy SCADA to the remainder of the company's distribution substations; (2) install VVO controls and monitors on all circuits originating from the company's substations and to test and commission the ADMS monitoring and control of the Townsend substation circuits; (3) complete and implement the initial build of its ADMS by the end of 2023, including integrating VVO and transiting the pre-existing standalone SCADA into the ADMS SCADA system; (4) continue work on its field area network; (5) launch its mobile damage assessment platform; and (6) undertake third-party evaluations of its progress toward meeting the Department's grid modernization objectives (D.P.U. 21-82, Exhs. Unitil-GMP at 65, 71-72, 74-75, 77-80, 82; DPU 2-1; DPU 2-3; DPU 2-4; DPU 2-10).

Unitil's proposed investments in its 2022-2025 Grid Modernization Plan are similar or identical to technologies preauthorized by the Department in Unitil's 2018-2021 Grid Modernization Plan (D.P.U. 21-82, Exhs. Unitil-KES-1, at 16-20; Unitil-GMP at 13, 64-81; DPU 1-2). Grid Modernization Order at 26-29, 163-164. Further, the proposed grid-facing investments described above are a continuation of, or an enhancement to, the technologies and investments preauthorized in the Grid Modernization Order. Therefore, the Department relies on the Grid Modernization Order to support our analysis of whether the proposed

investments are designed to make measurable progress towards achievement of the Department's grid modernization objectives.

As an initial matter, the Department excludes from Unitil's preauthorized budget, at this time, its proposed DERMS investment totaling approximately $162,000, which the company included in its ADMS investment category (D.P.U. 21-82, Exh. DPU 6-1, at 5), because this is not a previously preauthorized technology.[43] The Department will, instead, address Unitil's DERMS proposal as part of our Track 2 Order. Additionally, the Department also excludes at this time the entire budget for AMI and OMS integration within the monitoring and control category, totaling $188,000, because, during the course of these proceedings, the company attributed these costs to UES and did not identify the costs that would be allocated to the company (D.P.U. 21-82, Exhs. Unitil-KES-1, at 18; DPU 1-3, at 1 & Att. 2). Within 30 days of this Order, the company shall submit a compliance filing for Department approval with revised budgetary amounts for the monitoring and control (AMI/OMS integration) category with UES-allocated budget costs removed.[44]

Regarding Unitil's Track 1 investments, in the Grid Modernization Order at 144, the Department found that the interplay of grid-facing investments in advanced sensing, SCADA, DMS, load flow analytics, advanced communications, VVO, and automated feeder

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[43] The company's proposed budget for DERMS investment includes costs that will be allocated to UES (D.P.U. 21-82, Exhs. DPU 3-1, Att. 4; DPU 6-1, at 5). Unitil estimated that of the $500,000 DERMS budget, $162,000 will be allocated to the company (D.P.U. 21-82, Exh. DPU 6-1, at 5).

[44] To the extent that the Department approves this compliance filing, the preauthorized budgetary amounts for Unitil will adjust accordingly.

reconfiguration or advanced distribution automation, will bring direct benefits to customers and make measurable progress toward achievement of the Department's grid modernization objectives. Similarly, Unitil has demonstrated that the proposed grid-facing investments in this proceeding are a suite of investments designed to further the achievement of the Department's grid modernization objectives. In particular, Unitil has demonstrated that its investments in SCADA, VVO, ADMS, DERMS, and the field area network are interrelated and coordinated together in the company's deployment schedule (D.P.U. 21-82, Exhs. Unitil-GMP at 65, 69-70, 72-75, 78-79; DPU 1-2; DPU 2-3; DPU 6-1). Further, Unitil's investment in AMI/OMS integration will enable the company to give near real-time restoration feedback to customers and provide work crews with additional insight into possible outages (D.P.U. 21-82, Exhs. Unitil-GMP at 69; DPU 2-2). In addition, Unitil's mobile damage assessment platform application will provide more accurate information on customer counts, outage causes, and restoration times (Exh. Unitil-GMP at 81). Field damage assessment information will help enable the company to allocate its resources with enhanced specificity, resulting in time and monetary savings for customers (D.P.U. 21-82, Exh. Unitil-GMP at 81). Based on our findings above and consistent with the Grid Modernization Order at 137-145, the Department finds that the proposed investments in previously deployed grid-facing technologies will make measurable progress towards achievement of the Department's grid modernization objectives through: (1) optimizing system performance by improving grid visibility, command and control, and self-healing; and (2) facilitating the interconnection and integration of DER.

Regarding the third-party evaluation in the measurement, verification, and support category, Unitil's cost estimates includes components applicable to both Track 1 and Track 2 investments,[45] and the record does not include a disaggregated budget for the investments in each track. As a result, the Department will address the preauthorization for this investment category in the Track 2 Order.

The Department has stated that investments may be treated as incremental to current investment practices if their primary purpose is to accelerate progress in achieving the grid modernization objectives. See D.P.U. 12-76-B at 19-20. Consistent with the Grid Modernization Order at 116, 146-149, the Department finds that the proposed investments in previously deployed grid-facing technologies are incremental to the company's existing or business-as-usual investments (D.P.U. 21-82, Exhs. DPU 1-2; DPU 1-3). As noted above, the proposed grid-facing investments continue the deployment of technologies that were preauthorized in the company's 2018-2021 Grid Modernization Plan with a primary purpose to accelerate progress in achieving the Department's grid modernization objectives. Grid Modernization Order at 116, 146-149.

Unitil's cost estimates are based on vendor quotes and historical deployment costs (D.P.U. 21-82, Exh. DPU 1-3). After review, the Department finds that the projected costs of the proposed continuing investments, with the exception of the third-party evaluation in the measurement, verification, and support investment category at this time, are reasonable and

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45 For instance, this component includes program management and third-party evaluation that would apply to both Track 1 and Track 2 investments (D.P.U. 21-82, Exh. Unitil-GMP at 82-83).

based on our analysis in the Grid Modernization Order at 158-162, we find that the projected benefits justify the costs (D.P.U. 21-82, Exhs. Unitil-GMP at 100-103; DPU 1-1, Atts. 1 & 2). While the Department accepts Unitil's cost estimates to determine eligibility for preauthorization here of the proposed investments, excluding AMI/OMS integration and DERMS-related costs at this time, the company bears the burden to demonstrate that its actual expenditures are reasonable and prudently incurred at the time it seeks final cost recovery. Grid Modernization Order at 220-221.

The Department must also consider the bill impacts customers would experience as a result of the proposed grid modernization investments. D.P.U. 20-69-A at 31; Grid Modernization Order at 116; see also G.L. c. 25, § 1A. Unitil has submitted bill impact analyses identifying estimated increases that would result to each applicable rate class from the proposed continuing investments over the four-year grid modernization term (D.P.U. 21-82, Exhs. DPU 3-2; DPU 3-3; DPU 3-4; Tr. 2, at 234-237).[46] The company submitted bill impacts resulting from its total proposed budget of $9.8 million (D.P.U. 21-82, Exh. DPU 3-4, Atts. 1 & 9).[47] The Department finds that the bill impacts resulting from this budget for continuing Grid Modernization Plan investments are reasonable in light of the anticipated benefits these investments will provide.

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46 The company estimates a monthly bill increase of approximately $0.67 per month or 0.4 percent compared to bills as of the time of the filing for a typical residential customer (D.P.U. 21-82, Exh. DPU 3-2 & Att. 9).

47 The total proposed budget of $9.8 million includes proposed costs for DERMS, AMI and OMI integration, and third-party evaluation, which are removed from the proposed budget pursuant to the above directives.

c. Category-Specific Caps

In the Grid Modernization Order at 164-165, the Department established a budget cap for preauthorized investments, permitting Unitil the flexibility to shift spending among the preauthorized categories in order to respond to evolving conditions. The Department found that in the early stages of grid modernization, it was reasonable to expect that significant changes would take place associated with, among other things, the introduction of new technologies and the costs of new and existing technologies. Grid Modernization Order at 107, citing D.P.U. 17-05, at 442. The Department finds, however, that because Unitil's proposed investments are continuing investments that the company now has significant experience implementing, the same level of flexibility afforded during the first grid modernization term for these investment categories is unnecessary for the second grid modernization term. See Grid Modernization Order at 107-108. Accordingly, for the investment categories preauthorized herein, the Department establishes a total budget cap of $9,073,000[48] and finds it appropriate to limit funds being allocated between each investment category. Thus, Unitil may not shift spending among the preauthorized grid-facing categories by more than 15 percent. See D.P.U. 16-105, at 28-29 & n.14 (2016) (permitting a 15 percent variance for the total pre-approved budgetary amount for the company's proposed solar program capital investments); D.P.U. 16-104, at 19-20 & n.13 (2016) (same). Unitil

[48] $1.1 million (SCADA) + $5.4 million (VVO) + $823,000 (communications) + $1.5 million (ADMS, less DERMS-related costs) + $250,000 (workforce management) = $9,073,000 (see D.P.U. 21-82, Exhs. Unitil-KES-1, at 18; Unitil-GMP at 13, 65, 69, 71, 75, 79, 81-82).

may, however, shift spending between years over the four-year term, subject to the 15 percent budget cap variance for each category. Any spending over the overall total budget cap or the 15 percent cap variance in each category is not eligible for targeted cost recovery through the GMF and, instead, may be recovered by the company in a base distribution rate proceeding subsequent to a prudency finding by the Department in a GMF filing or term review Order. Further, the Department's preauthorization only applies to expenditures during the approved four-year term. Finally, to the extent that the Department approves the costs to be identified by Unitil in its compliance filing, corresponding updates to the relevant category cap amounts will automatically apply.[49]

d. Conclusion

Based on the foregoing and the budget changes identified above, the Department preauthorizes at this time a $9,073,000 budget cap for Unitil's continuing grid-facing investments in monitoring and control for SCADA ($1.1 million), VVO ($5.4 million), communications ($823,000), (4) ADMS, less DERMS-related costs ($1.5 million), and workforce management ($250,000) for the 2022-2025 Grid Modernization Plan term (D.P.U. 21-82, Exhs. Unitil-KES-1, at 18; Unitil-GMP at 13, 65, 69, 71, 75, 79, 81-82). The Department also finds that these investment categories will improve safety, security, reliability of service, affordability, equity, and enable clean energy technologies to lower emissions. G.L. c. 25, § 1A.

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[49] The Department notes that any project spending that includes costs that require an allocation between the company and UES will be scrutinized in the company's annual grid modernization factor filings.

VII. METRICS, REPORTING, AND EVALUATION

A. Metrics for Previously Deployed Technologies

1. Introduction

The Department requires grid modernization plan filings to include proposed company-specific and statewide infrastructure and performance metrics. D.P.U. 20-69-A at 28; Grid Modernization Order at 187-188; D.P.U. 12-76-B, at 30-34. For the Track 1 investments under review in the instant Order, the Companies jointly propose revisions to their existing statewide VVO performance metrics approved by the Department in D.P.U. 15-120, D.P.U. 15-121, and D.P.U. 15-122 (D.P.U. 21-80, Exh. ES-JAS-2, at 145 & Att. A; D.P.U. 21-81, Exhs. NG-GMP-1, at 11; NG-GMP-2 (Rev. 2) at 84; NG-GMP-4; D.P.U. 21-82, Exhs. Unitil-KES-1, at 22-24; Unitil-GMP at 109 & Att. A). See Grid Modernization, Stamp-Approved Performance Metrics (July 25, 2019). Additionally, NSTAR Electric requests Department approval of the following company-specific metric proposals applicable to these investments: (1) deletion of its existing advanced load flow performance metric; and (2) a new performance metric associated with its power quality monitoring investment (D.P.U. 21-80, Exh. ES-JAS-2, at 146-147, Att. A at 23-24, Att. B at 5-7). The Companies propose to retain their existing infrastructure metrics (D.P.U. 21-80, Exh. ES-JAS-2, at 144; D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 84; D.P.U. 21-82, Exh. Unitil-GMP at 109). None of the intervenors addressed these proposals on brief.

The Attorney General, however, urges the Department to direct the Companies to develop and propose performance metrics in their next annual grid modernization report

filings that measure whether customers are actually receiving the projected benefits specified by the Companies in their business case analyses. The Attorney General argues that the grid-facing metrics approved in D.P.U. 15-120, D.P.U. 15-121, and D.P.U. 15-122 do not measure whether or how customers receive the benefits the Companies projected in their business cases (Attorney General Brief at 3, 6, 7-8). Additionally, the Attorney General and DOER urge the Department to direct the Companies to develop additional standards and metrics to ensure that their investments provide benefits to low-income customers and environmental justice communities (Attorney General Brief at 8-9, citing Tr. 2, at 229, 331-333; DOER Brief at 11). DOER supports a collaborative approach and technical session on the topic and recommends that the Department require the Companies to submit a straw proposal prior to the technical session on how the Companies would quantify and measure any proposed metrics and track the delivery of benefits to low-income customers and environmental justice communities as compared to the broader distribution system (DOER Brief at 12-13).

The Companies counter that they already report on customer benefits in their annual filings and the Attorney General has not identified any flaws in the current performance metrics. Nevertheless, the Companies are not opposed to additional metrics if the metrics are objective and measure criteria within the Companies' control (D.P.U. 21-80, NSTAR Electric Reply Brief at 6; D.P.U. 21-81, National Grid Reply Brief at 9-11; D.P.U. 21-82, Unitil Reply Brief at 1). Regarding environmental justice communities and low-income customers, the Companies state that their investment proposals are designed to benefit these communities and customer segments (D.P.U. 21-80, NSTAR Electric Reply Brief at 7;

D.P.U. 21-81, National Grid Reply Brief at 13; D.P.U. 21-82, Unitil Reply Brief at 1-2). The Companies, however, are also supportive of a collaborative technical session to consider additional criteria and initiatives for investments that directly benefit environmental justice communities, and they agree to work together to develop a proposal for discussion with other stakeholders (D.P.U. 21-80, NSTAR Electric Brief at 65; D.P.U. 21-80, NSTAR Electric Reply Brief at 7-8, 10; D.P.U. 21-81, National Grid Reply Brief at 13; D.P.U. 21-82, Unitil Reply Brief at 2).

2. Analysis and Findings

For grid-facing technologies preauthorized for investment under the Companies' initial grid modernization plans, the Department approved both statewide and company-specific performance metrics. D.P.U. 20-69-A at 33; Grid Modernization, Stamp-Approved Performance Metrics (July 25, 2019). Additionally, the Department approved the Companies' proposed statewide and company-specific infrastructure metrics and directed the Companies to establish baselines by which the grid-facing metrics would be measured (D.P.U. 21-80, Exh. ES-JAS-2, at 144; D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 84; D.P.U. 21-82, Exh. Unitil-GMP at 109). Grid Modernization Order at 198-201, 203. The Companies submitted these baseline metrics on August 15, 2018 (D.P.U. 21-80, Exh. ES-JAS-2, at 144; D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 84). D.P.U. 15-120, National Grid, Grid Modernization Plan Infrastructure Metrics (August 15, 2018); D.P.U. 15-121, Unitil, Grid Modernization Plan Performance and Infrastructure Metrics – Baselines and Targets (August 15, 2018); D.P.U. 15-122, NSTAR Electric, Grid Modernization Plan Statewide and Eversource-Specific Infrastructure Metrics – Baselines and

Targets (August 15, 2018). The Department required the Companies to track and report both the statewide and company-specific infrastructure metrics as part of their Annual Reports and Term Reports. Grid Modernization Order at 201.

As discussed above, the Companies proposed multiple changes to their existing statewide VVO performance metrics (D.P.U. 21-80, Exh. ES-JAS-2, at 145 & Att. A; D.P.U. 21-81, Exhs. NG-GMP-1, at 11; NG-GMP-2 (Rev. 2) at 84; NG-GMP-4; D.P.U. 21-82, Exhs. Unitil-KES-1, at 22-24; Unitil-GMP at 109 & Att. A). The Department finds these proposals to be reasonable and approves the Companies' proposal, with the exception of the VVO energy and greenhouse gas ("GHG") impact performance metric. The Companies shall update the GHG emissions factors to be consistent with those used in the current 2022-2024 Three-Year Energy Efficiency Plans.[50] Additionally, the Department directs the Companies to make non-substantive revisions to their existing statewide performance metrics. These revisions shall be jointly submitted by the Companies as a compliance filing for Department approval within 30 days of this Order.

In particular, the Companies' existing VVO energy and GHG impact performance metric relies on the GHG emissions factors used in the 2019-2021 Three-Year Energy Efficiency Plans (D.P.U. 21-80, Exh. ES-JAS-2, Att. A at 14-15; D.P.U. 21-81,

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50 In their filings, the Companies indicate that they submitted the same proposal for VVO metrics in D.P.U. 15-120, D.P.U. 15-121, and D.P.U. 15-122 (D.P.U. 21-80, Exh. ES-JAS-2, at 145; D.P.U. 21-81, Exhs. NG-GMP-1, at 11; NG-GMP-2 (Rev. 2) at 86; D.P.U. 21-82, Exhs. Unitil-KES-1, at 23-24; Unitil-GMP at 109). The Department's approval herein applies only to the instant proceedings, D.P.U. 21-80, D.P.U. 21-81, and D.P.U. 21-82.

Exh. NG-GMP-4, at 13-14; D.P.U. 21-82, Exh. Unitil-GMP, Att. A at 13-14). While these GHG emissions factors were appropriate for the 2018-2021 investment term, the emissions factors need to be updated for the 2022-2025 term. On January 31, 2022, the Department issued its Order on the proposed Three-Year Energy Efficiency Plans for 2022 through 2024. See 2022-2014 Three-Year Energy Efficiency Plans, D.P.U. 21-120 through D.P.U. 21-129 (January 31, 2022). Accordingly, the Companies shall rely on and replace references to the 2018-2021 Three-Year Energy Efficiency Plans with those for the 2022-2024 Three-Year Energy Efficiency Plans for purposes of calculating the VVO energy and GHG impact performance metric. See 2022-2014 Three-Year Energy Efficiency Plans, D.P.U. 21-120 through D.P.U. 21-129, Exh. 1, App. D at 8.

Additionally, the Companies shall revise their existing statewide performance metrics with certain non-substantive changes. Specifically, the Companies shall: (1) update the cover page to reflect the compliance filing date and dockets in which the submission is filed (i.e., D.P.U. 21-80, D.P.U. 21-81, and D.P.U. 21-82, rather than D.P.U. 15-120, D.P.U. 15-121, and D.P.U. 15-122); (2) update the Introduction section to account for the Department's findings in this Order; (3) update the Table of Contents pagination, as necessary; and (4) correct the section numbering for VVO Peak Load Impact (see, e.g., Section 2.3.3's added incorporation of the Calculation Approach). To the extent that further

revisions to the VVO metrics may be identified, the Department will address those proposals during the compliance phase of these proceedings after issuance of the Track 2 Order.[51]

With regard to NSTAR Electric's proposal to delete its existing company-specific advanced load flow performance metric, the Department denies this request since the company did not explain or provide support for this proposal (D.P.U. 21-80, Exh. ES-JAS-2, at 146-147 & Att. A at 23-24). The Department, however, approves NSTAR Electric's proposed power quality monitoring performance metric (D.P.U. 21-80, Exhs. ES-JAS-2, at 146-147 & Att. B at 5-7). Further, as discussed in Section VI.B.2.c.iii., the Department directs National Grid to develop a company-specific performance metric for its smart capacitor investment for consideration during a compliance phase of this proceeding. For all other performance metrics, the Companies shall continue the existing performance metrics approved on July 25, 2019, including each company's existing company-specific metrics. Additionally, no parties proposed revisions to or raised issues involving the existing infrastructure metrics. The Department has reviewed the existing infrastructure metrics and determines it is appropriate to retain these metrics at this time for the approved Track 1 investments.

Finally, regarding the Attorney General and DOER's requests for the Department to direct the Companies to develop additional standards and metrics involving benefits to

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51 For instance, we note that the baseline metrics and calculations that rely on SAIDI, SAIFI, and voltage complaint history covering the years 2015, 2016, and 2017, may also be dated and need to be revised (D.P.U. 21-80, Exh. ES-JAS-2, Att. A at 18-22; D.P.U. 21-81, Exh. NG-GMP-4, at 17-22; D.P.U. 21-82, Exh. Unitil-GMP, Att. A at 17-20).

customers, including low-income customers and environmental justice communities, and the DOER's straw proposal and technical session considerations (Attorney General Brief at 3, 6, 8-9, citing Tr. 2, at 229, 331-333; DOER Brief at 11-13), the Department will address proposals for additional performance metrics as part of our Track 2 Order.

B. Reporting Requirements

1. Introduction

In the Grid Modernization Order at 112, the Department required the Companies to submit Grid Modernization Annual Reports to allow the Department and stakeholders to monitor the status of a company's performance during a term. See also NSTAR Electric, M.D.P.U. No. 73F at 10; National Grid, M.D.P.U. No. 1497, at 8; Unitil, M.D.P.U. No. 379, at 9. The Department further directed the Companies to each submit a Term Report upon the conclusion of the term that documents the company's performance during the entirety of the 2018 to 2021 term ("Grid Modernization Term Report" or "Term Report"). D.P.U. 15-120-D/D.P.U. 15-121-D/D.P.U. 15-122-D at 4 n.3; Grid Modernization Order at 112, 115. See also NSTAR Electric, M.D.P.U. No. 73F at 10; National Grid, M.D.P.U. No. 1497, at 8; Unitil, M.D.P.U. No. 379, at 9.[52] DOER recommends that the Companies also report their grid modernization investment progress on a quarterly basis (DOER Brief at 7-9). The Companies counter that quarterly reporting

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[52] The Department stated that it will review the Term Report in the context of an adjudicatory proceeding to determine whether each company implemented its grid modernization investments consistent with its Department-approved plan. Grid Modernization Order at 112. The Term Report would include the data for the prior calendar year that would have otherwise been submitted through the Annual Report for that year.

would not be meaningful and would create an undue burden in consideration of the reporting already provided to Guidehouse and the Department on the matter (D.P.U. 21-80, NSTAR Electric Reply Brief at 9; D.P.U. 21-81, National Grid Reply Brief at 11; D.P.U. 21-82, Unitil Reply Brief at 2).

2. Analysis and Findings

On December 30, 2021, the Department approved a revised GMF cost recovery tariff for each company, effective January 1, 2022.[53] As modified, each company's GMF tariff applies to its 2022-2025 Grid Modernization Plan, in addition to its first grid modernization plan. See NSTAR Electric, M.D.P.U. No. 73F at 9; National Grid, M.D.P.U. No. 1497, at 7; Unitil, M.D.P.U. No. 379, at 8. Accordingly, the filing requirements applicable to the Companies' first grid modernization plans, including those involving the Annual Reports and Term Reports, also continue to apply to each company's second grid modernization plan. NSTAR Electric, M.D.P.U. No. 73F at 9-10; National Grid, M.D.P.U. No. 1497, at 7-8; Unitil, M.D.P.U. No. 379, at 8-9. As a result and at this time,[54] the Annual Reports for plan year 2022 will be due on or before April 1, 2023, and the Term Reports for the 2022 through 2025 term will be due on or before April 1, 2026.

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53 See supra at n.8 for a summary of the approved changes.

54 In consideration of the proposals being addressed in Track 2 of these proceedings and recent statutory directives, the Department may revisit in the Track 2 Order the timing of the Companies' filing requirements and for the prudency reviews involving grid modernization investments made during the 2022-2025 plan term. See An Act Driving Clean Energy and Offshore Wind, St. 2022, c. 179; G.L. c. 164, § 92B; Grid Modernization Order at 110-115.

The Department disagrees with DOER's recommendation that the Companies report their grid modernization investment progress on a quarterly basis. The purpose of the Annual Report is to allow the Department and stakeholders to monitor the status of a company's performance during a term. Grid Modernization Order at 112. Although more frequent reporting may provide additional insight into the Companies' progress, the Department finds that the benefit of doing so is unlikely to outweigh the significant burden placed upon the Companies. Moreover, we find that such an approach would be overly inefficient in consideration of the Annual Report filings already required. Therefore, the Department declines to increase the frequency of reporting at this time. Nevertheless, the Department directs the Companies to report any significant adjustments and/or modifications to their deployment plans or implementation progress, if applicable, in their Annual Reports and Term Reports.

C. Evaluation and Consultant Recommendations

1. Introduction

In the Grid Modernization Order at 204, the Department established a formal evaluation process, including an evaluation plan and evaluation studies, for the Companies' preauthorized grid modernization plan investments. As part of the evaluation process, the Department directed the Companies, in consultation with DOER, to select an evaluation consultant or consultants to conduct evaluation studies related to the deployment of the preauthorized grid modernization investments. Grid Modernization Order at 205.[55] During

[55] On May 1, 2019, the Companies jointly submitted their proposed Evaluation Plan and subsequently initiated the evaluation stage.

the 2018-2021 term, the Companies engaged Guidehouse to provide third-party management and verification services to evaluate progress towards grid modernization objectives and the results of infrastructure and performance metrics (D.P.U. 21-80, Exh. ES-JAS-2, at 137; D.P.U. 21-81, Exh. NG-GMP-2 (Rev. 2) at 127; D.P.U. 21-82, Exh. Unitil-GMP at 82). DOER argues that the Department should require the Companies to address the evaluation consultant's recommendations in their future Annual Reports and refine the approved performance metrics as necessary (DOER Brief at 11). National Grid counters that it already addresses these recommendations and has made changes in response to the Guidehouse recommendations, but that some recommendations are not feasible (D.P.U. 21-81, National Grid Reply Brief at 11, citing D.P.U. 21-30, Exhs. DPU 2-7 through DPU 2-11).

2. Analysis and Findings

The Department finds DOER's recommendation to be reasonable. During the 2018-2021 term, the selected evaluation consultant has produced evaluation reports with recommendations. See, e.g., Grid Modernization, 2021 GMP Evaluation Reports (July 1, 2022); 2020 GMP Evaluation Reports (July 1, 2021). For the 2022-2025 term, because the investments preauthorized herein are continuing investments from the first grid modernization term, the Department requires the Companies to address in their Annual Reports the status of each consultant recommendation as identified during the 2018-2021 term and that may be identified during the 2022-2025 term. The Department acknowledges that the Companies considered the recommendations from the 2018-2021 term in their plan development and implementation, and that not all recommendations may be feasible. See D.P.U. 21-30, Exhs. DPU 2-7 through DPU 2-11. Nevertheless, the Department finds that reporting on the

consideration and implementation of the recommendations as part of the Annual Reports would enhance transparency and improve the Department and stakeholders' ability to monitor the Companies' performance on an annual basis and, thus, limiting the need for discovery on the issue. Grid Modernization Order at 112. Therefore, the Department directs the Companies to include an assessment of the evaluation consultant's recommendations in each of their Annual Reports and final Term Reports for the 2022-2025 term. Specifically, the Companies shall (1) report on the implementation status of each recommendation, and (2) explain whether and how the company considered the recommendation during plan development and implementation.

VIII. COST RECOVERY

A. Introduction

In D.P.U. 12-76-B, at 4, the Department determined that, in order to remove what may be impediments to some grid modernization investments, special ratemaking treatment using a short-term targeted cost recovery mechanism was appropriate. Thereafter, as part of its review of the Companies first grid modernization plans, the Department approved a short-term targeted cost recovery mechanism, the GMF, for recovery of eligible grid modernization investments. Grid Modernization Order at 219-234. In the instant proceedings, the Department approved a revised GMF tariff for each company and stated that it would address whether any further revisions were necessary as part of investigation of Track 1 issues. Interim Continuation Order at 7.[56]

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[56] See NSTAR Electric, M.D.P.U. No. 73F; National Grid, M.D.P.U. No. 1497; and Unitil, M.D.P.U. No. 379.

B. Analysis and Findings

1. Grid Modernization Factor Tariffs

During our Track 1 investigation, no party proposed an alternative cost recovery or timeline proposal to the GMF tariff associated with implementation of the 2022-2025 Grid Modernization Plan. The Department, however, recently required the Companies to submit revised GMF tariffs in the instant proceedings as a result of Department approvals relating to a protocol for tracking and identifying incremental grid modernization O&M expense, a five-step test to determine whether O&M labor expense is eligible for recovery through the GMF, and an incremental overhead and burdens test to determine whether non-capitalized overhead and burdens O&M expense is eligible for recovery through the GMF. Grid Modernization, D.P.U. 15-120-E/D.P.U. 15-121-E/D.P.U. 15-122-E, at 25-41 (September 7, 2022). On September 30, 2022, the Department approved revised GMF tariffs submitted by the Companies in accordance with this directive. The Department otherwise determines that no further revisions to the GMF tariffs are required at this time, but, if necessary, may address additional tariff revisions in the Track 2 Order. See supra at n.54; see also Grid Modernization, D.P.U. 15-120-F/D.P.U. 15-121-F/D.P.U. 15-122-F at 18 n.12 (September 7, 2022).

2. Tariff Expiration Date

The GMF is a special ratemaking mechanism designed to remove financial barriers to a reasonable level of investment in grid modernization technologies, and the Department has precluded business-as-usual investments from accelerated cost recovery through this mechanism. D.P.U. 20-69-A at 31; Grid Modernization Order at 145-146, 224;

D.P.U. 12-76-B at 19-20. The Department expects grid modernization investments to become a company's normal business practice over time. Grid Modernization Order at 235; D.P.U. 12-76-B at 19. To that end, the Department limited eligibility for short term targeted cost recovery to those grid modernization investments made in the first two preauthorization terms (i.e., a total of six years).[57] Grid Modernization Order at 235. The Department subsequently extended the term for preauthorization of the grid modernization plans from three to four years. D.P.U. 15-120-D/D.P.U. 15-121-D/D.P.U. 15-122-D at 4-7 & n.7. Accordingly, with our above preauthorization of the Companies' continuing grid modernization investments, the Companies are eligible for short term targeted cost recovery through the GMF of their approved grid modernization investments over an eight-year period, from 2018 through 2025, provided certain conditions are met.

In these proceedings, the Attorney General requests that the Department clarify that it will reevaluate in a future proceeding whether the types of grid-facing investments authorized here continue to justify extraordinary cost recovery given the Companies' then-existing capital recovery mechanisms and PBR plans (Attorney General Brief at 4, 6). Further, DOER urges the Department to require each company to provide a comprehensive and cohesive transition plan within this or a subsequent investigation to ensure the proposed

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[57] In D.P.U. 12-76-B, at 19-20, the Department established a five-year preauthorization term for grid modernization investments. As a result of our determination in the Grid Modernization Order at 235, that short-term targeted cost recovery for grid modernization investments would expire after two three-year terms, the five-year expiration of the GMF tariff established in D.P.U. 12-76-B, was extended by one year.

investments get incorporated into business-as-usual ratemaking (DOER Brief at 10-13). Finally, we note that the Companies refer to a third preauthorization term for grid modernization investments (D.P.U. 21-80, Exh. DPU 6-1; D.P.U. 21-81, Exh. DPU 4-1; D.P.U. 21-82, Exh. DPU 4-1; see also National Grid Reply Brief at 4-5).

To begin, in this Order, we preauthorize specific grid-facing investments for the 2022-2025 term. Accordingly, we do not intend to re-evaluate whether accelerated cost recovery is appropriate during the 2022-2025 term for each preauthorized investment except to the extent to determine eligibility for recovery through the GMF as part of each company's annual GMF proceedings. Next, the Department declines to require the Companies to submit transition plans for incorporating grid modernization investments into base rates. As noted above, the Department expects grid modernization investments to become a company's normal business practice. Grid Modernization Order at 235; D.P.U. 12-76-B at 19. The recent passage of An Act Driving Clean Energy and Offshore Wind, St. 2022, c. 179 ("2022 Clean Energy Act"), reinforces this position and, accordingly, the Department also expects that the Companies' grid modernization investments will be reflected in their electric sector modernization plans.[58] G.L. c. 164, § 92B. Moreover, as part of our review of each company's 2018-2021 Grid Modernization Term Reports, filed on April 1, 2022, the Department will specifically address how grid modernization investments are transitioned to

[58] The Department will address expectations for the electric sector modernizations plans in our Track 2 Order.

base rates. D.P.U. 15-120-F/D.P.U. 15-121-F/D.P.U. 15-122-F at 21-22; Grid Modernization, D.P.U. 15-120-B/D.P.U. 15-121-B/D.P.U. 15-122-B at 28 (2019).

IX. ADDITIONAL CONSIDERATIONS

The Department has recognized that there is a fundamental evolution taking place in the way electricity is produced and consumed in Massachusetts. D.P.U. 17-05, at 373-374. This evolution has been driven, in large part, by a number of legislative and administration policy initiatives designed to address climate change and foster a clean energy economy through the promotion of energy efficiency, demand response, and distributed energy resources, reductions to greenhouse gas emissions, and the procurement of long-term contracts for renewable energy. See, e.g., 2022 Clean Energy Act; An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy, St. 2021, c. 8; An Act to Advance Clean Energy, St. 2018, c. 227; An Act to Promote Energy Diversity, St. 2016, c. 188; An Act Relative to Competitively Priced Electricity in the Commonwealth, St. 2012, c. 209; An Act Relative To Green Communities, St. 2008, c. 169; An Act Establishing the Global Warming Solutions Act, St. 2008, c. 298; Commonwealth of Massachusetts, *Massachusetts 2050 Decarbonization Roadmap* (December 2020); Executive Office of Energy and Environmental Affairs, *Massachusetts Clean Energy and Climate Plan for 2025 and 2030* (June 30, 2022). To varying degrees, this evolution is changing the operating environment for electric distribution companies in Massachusetts. D.P.U. 17-05, at 373-374.

The Department has determined that grid modernization is vital for maintaining and improving the reliability of the electric system and offers potential savings to customers, and finds above that the preauthorized investments will improve safety, security, reliability of

service, affordability, equity, and enable clean energy technologies to lower emissions. G.L. c. 25, § 1A; D.P.U. 17-05, at 503; D.P.U. 12-76, at 1-2. The Department remains committed to ensuring that the Companies implement appropriate grid modernization technologies and prioritize equitable practices that enhance safety, security, and reliability, reduce costs, empower customers to better manage usage, and support a cleaner, more efficient electric system. G.L. c. 25, § 1A; D.P.U. 17-05, at 503; D.P.U. 12-76, at 5-6.

X. ORDER

After due notice, hearing, and consideration, it is

ORDERED: That the continuing investments in the 2022 through 2025 grid modernization plans filed by NSTAR Electric Company d/b/a Eversource Energy, Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid, and Fitchburg Gas and Electric Light Company d/b/a Unitil, are APPROVED in part, consistent with and subject to the directives contained herein; and it is

FURTHER ORDERED: Fitchburg Gas and Electric Light Company d/b/a Unitil shall, within 30 days of the date of this Order, file a compliance filing consistent with the directives contained herein; and it is

FURTHER ORDERED: Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid shall, within 90 days of the date of this Order, file a compliance filing consistent with the directives contained herein; and it is

FURTHER ORDERED: NSTAR Electric Company d/b/a Eversource Energy, Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid, and Fitchburg Gas and Electric Light Company d/b/a Unitil shall, within 30 days of the date

of this Order, jointly file a compliance filing consistent with the directives contained herein; and it is

FURTHER ORDERED: That NSTAR Electric Company d/b/a Eversource Energy, Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid, and Fitchburg Gas and Electric Light Company, d/b/a Unitil shall comply with all other directives contained in this Order.

By Order of the Department,

Matthew H. Nelson, Chair

Robert E. Hayden, Commissioner

Cecile M. Fraser, Commissioner