The Commonwealth of Massachusetts

DEPARTMENT OF PUBLIC UTILITIES

D.P.U. 12-76-C November 5, 2014

Investigation by the Department of Public Utilities on its own Motion into Modernization of the Electric Grid.

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I. INTRODUCTION AND SUMMARY OF PROCEEDINGS

On October 2, 2012, the Department of Public Utilities ("Department") issued a Notice of Investigation ("NOI") into the modernization of the electric grid. Modernization of the Electric Grid, D.P.U. 12-76 (2012). The Department hosted a workshop, attended by over 125 stakeholders, and subsequently created a stakeholder working group to inform the Department's approach to grid modernization and provide input on the sequence and pace of grid modernization infrastructure investments. From November 2012 through June 2013, stakeholders discussed a full range of issues relating to modernization of the grid, and on July 2, 2013, submitted a report to the Department that contained information, principles, and recommendations on a wide array of grid modernization issues: "Report to the Department of Public Utilities from the Steering Committee," D.P.U. 12-76 ("Report"). The Department solicited comments on the Report and, on December 23, 2013, issued an Order setting forth a proposal for achieving grid modernization, Modernization of the Electric Grid, D.P.U. 12-76-A (2013) ("Straw Proposal"). In Section V.B.4.b. of that Order, the Department proposed that grid modernization plans include a benefit-cost analysis, using a "business case" approach that "assesses all costs and benefits, including those that are difficult to quantify, and provides its underlying assumptions." On February 21, 2014, the Department initiated a working group to further develop and finalize the parameters of the business case and benefit-cost analysis model.

On June 12, 2014, the Department issued an Order requiring each Massachusetts electric distribution company[1] ("company" or collectively "companies") to submit a grid modernization plan ("GMP"), and outlining the requirements of those filings. Modernization of the Electric Grid, D.P.U. 12-76-B (June 12, 2014). In that Order, the Department affirmed that the companies must include a business case analysis within their GMPs, and noted that the deliberations of the working group regarding the business case and benefit-cost analysis were ongoing. D.P.U. 12-76-B at 18.

The Department held working group meetings on March 25, April 23, and May 19, 2014. Additionally, between working group meetings, the Department sought written input from participants on certain topics. On July 30, 2014, the Department issued draft Grid Modernization Business Case Filing Requirements ("Draft Filing Requirements") and a draft Business Case Summary Template ("Draft Template"), along with briefing questions, to the working group participants ("participants") for comment and proposed revisions.[2] On August 22, 2014, the following participants filed comments: (1) the Massachusetts Department of Energy Resources ("DOER"); (2) Environment Northeast ("ENE"); (3) Fitchburg Gas and Electric Light Company d/b/a Unitil ("Unitil"); (4) Gary Fauth ("Fauth"); (5) Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid ("National Grid"); and (6) NSTAR Electric Company ("NSTAR Electric") and Western Massachusetts

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1 Fitchburg Gas and Electric Light Company d/b/a Unitil, Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid, NSTAR Electric Company, and Western Massachusetts Electric Company.

2 The Department requested that participants submit proposed revisions to the Draft Filing Requirements in redline/strikeout in addition to comments.

Electric Company ("WMECo") (collectively "Northeast Utilities")[3]; with joint comments filed by the Office of the Attorney General ("Attorney General"), the Low Income Network ("LEAN"), the Associated Industries of Massachusetts ("AIM"), and the National Consumer Law Center ("NCLC") ("Joint Commenters").

In this Order, the Department establishes the final Grid Modernization Business Case Filing Requirements ("Filing Requirements") and the final Business Case Summary Template ("Template"), both attached to this Order.

II. BUSINESS CASE FILING REQUIREMENTS AND TEMPLATE

A. Introduction

The Filing Requirements are designed to provide guidance on the business case that the companies must file as part of their GMPs (Draft Filing Requirements at 1). See D.P.U. 12-76-B at 15-17. In the Draft Filing Requirements, the Department proposed to require each company's short-term investment plan ("STIP")[4] to include one composite business case that illustrates how the STIP investments will achieve measurable progress towards the Department's four grid modernization objectives, including achieving advanced metering functionality (Draft Filing Requirements at 1-2). See D.P.U. 12-76-B at 10-13. The business case will serve as the vehicle by which the Department and other parties will evaluate whether the benefits, both quantified and unquantified, justify the costs of the proposed STIP

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[3] NSTAR Electric and WMECo are affiliated companies within the holding company system of their parent company, Northeast Utilities. NSTAR Electric Company/Northeast Utilities Merger, D.P.U. 10-170-B at 1, 15-16 (2012).

[4] The STIP will address the capital investments a company proposes to make over the first five years of the GMP. D.P.U. 12-76-B at 17.

investments (Draft Filing Requirements at 1).[5] The Draft Filing Requirements set forth four primary components for the business case: (1) goals, scope and scale, and drivers for investments; (2) detailed descriptions of the proposed investments, as well as identification and quantification of all quantifiable benefits and costs associated with the STIP; (3) identification of all difficult to quantify/unquantifiable benefits and costs; and (4) a stranded cost analysis (Draft Filing Requirements at 2). Additionally, under the Draft Filing Requirements, each company must present an overall assessment of whether its business case justifies the proposed investments (Draft Filing Requirements at 2).

The Draft Template consisted of tabs the companies must fill out, and included summary information and analysis regarding quantifiable and unquantifiable benefits and costs as well as an analysis of stranded costs (Draft Filing Requirements at 2). The Department developed the Draft Template in order to assist the Department and other parties in the review of each company's business case.

The Department has given careful consideration to all of the comments submitted by the participants in this proceeding. We have adopted a number of the recommendations in developing the final versions of the Filing Requirements and Template. We conclude that a number of arguments raised in the comments warrant specific discussion in this Order. As such, in the sections that follow we will address the following issues: (1) composite business case; (2) business case components; (3) STIP investments and incremental STIP investments; (4) alternative and least-cost investments; (5) common assumptions; (6) common analysis

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[5] As discussed in D.P.U. 12-76-B, a company may also propose an alternative STIP with a corresponding business case if the benefits of implementing advanced metering functionality within five years do not justify the costs. D.P.U. 12-76-B at 17.

methods; (7) unquantifiable benefits; (8) stranded cost analysis; (9) bill impact analysis; (10) template structure; (11) allocation of benefits; (12) preventing double counting; and (13) granularity of data.

B. Composite Business Case

1. Introduction and Summary of Comments

The Draft Filing Requirements provided that each STIP must include one composite business case to justify the STIP investments (Draft Filing Requirements at 1). National Grid supports the use of a composite business case to review all STIP investments as a single package (National Grid Comments at 3). Other participants recommend that the Department instead require that each individual STIP investment be supported by a separate business case (Joint Redline at 2; Northeast Utilities Comments at 9-11; Northeast Utilities Redline at 2). Northeast Utilities argues that aggregating grid modernization investments under one umbrella business case would result in investments that might not be justified by their own individual business cases (Northeast Utilities Comments at 9). Northeast Utilities further asserts that a composite business case also may make it difficult to parse out cost and benefit information for a specific investment (Northeast Utilities Comments at 10).[6] Unitil does not oppose the composite business case, but states that it expects that each proposed STIP investment also will be justified based on a standalone business case (Unitil Redline at 1).

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[6] Northeast Utilities also suggests that companies undertake a business case analysis, including a benefit-cost component, for all investments in the GMP (i.e., for all proposed investments over the ten-year GMP timeframe) (Northeast Utilities Comments at 7-9). The Department declines to expand the business case analysis beyond STIP investments given that cost and investment planning over such a large timeline will be speculative and prone to changes due to the rapidly evolving nature of technology.

2. Analysis and Conclusions

After consideration of the arguments raised by participants to require a separate business case for each STIP investment, the Department is not persuaded to revise its requirement that companies provide a composite business case for all STIP investments. Rather, we conclude that a composite business case will provide a more comprehensive view of the proposed STIP by examining the costs and benefits of the full package of grid modernization investments.

The Department has previously found that seemingly stand-alone capital projects may be interrelated to such an extent that these projects are more appropriately examined as part of a single analysis. See, e.g., Massachusetts-American Water Company, D.P.U. 95-118, at 56 (1996). As discussed in the Report at 11-21, many technologies that are required to enable grid modernization functionalities can be leveraged to achieve improvement in multiple objectives. For instance, a company's investment in a communications system for a distribution automation project may not provide a positive business case when evaluated as a single project; however, evaluating this system based on the technologies that it enables, (e.g., advanced metering, distribution automation, and voltage regulation), which will lead to measureable progress in multiple objectives, may produce a positive business case.

With respect to the argument that a composite business case will prevent the appropriate evaluation of individual investments, the Department concludes that the level of data and documentation required as part of the STIP, including the Template, will enable sufficient review of proposed investments, both on a combined basis and for individual projects. Therefore, we affirm that when evaluating a STIP, the Department will look to the company's

business case as the primary lens for evaluation, and requires that all capital investments in the STIP be supported by one comprehensive business case.

C. Business Case Filing Requirements

1. Business Case Components

a. Introduction and Summary of Comments

Under the Draft Filing Requirements, the business case would be organized into four primary parts: (1) goals, scope and scale, and drivers for investments; (2) detailed descriptions of the proposed investments, and identification and quantification of all quantifiable benefits and costs associated with the STIP; (3) identification of all difficult to quantify/unquantifiable benefits and costs; and (4) a stranded cost analysis (Draft Filing Requirements at 2).

ENE proposes an alternative organization based on five components, including the addition of an analysis of how the STIP will enable the achievement of metrics and state policy goals and an overall justification of the STIP (ENE Comments at 6-7). Specifically, ENE recommends structuring the business case on the following five primary components: (1) descriptions of technologies; (2) description of investment scenarios including baseline, proposed STIP, and other alternatives; (3) costs and benefits; (4) achievement of metrics and state policy goals; and (5) overall justification of the STIP (ENE Comments at 6-7; ENE Redline at 2). Additionally, participants suggest the addition of: (1) a revenue requirements analysis; and (2) bill impact analyses (Joint Comments at 6-9; ENE Comments at 7; Fauth Redline at 2; National Grid Comments at 4).

b. Analysis and Conclusions

Upon review, we have adjusted the components of the business case in a number of ways. First, we adopt ENE's proposal to add a separate section to the business case analysis to demonstrate how the proposed STIP will impact performance metrics and state policy goals. Additionally, while the Draft Filing Requirements required each company to present an overall assessment of whether its business case justifies the proposed investments, we adopt ENE's proposal to include this overall justification of the STIP as a separate component of the business case.

The overall justification section will provide a summary of the costs and benefits of the STIP, while weighing other information that will influence the justification for the business case. The stranded cost analysis, a separate component under the Draft Filing Requirements, will now be included within the overall justification section. In addition, as proposed by participants, the Department finds that it is appropriate to include an analysis of how the companies' STIPs will affect customers' bills as part of the overall justification of the STIP. Therefore, as detailed in the Filing Requirements, the Department requires each business case to include the following components: (1) goals and drivers for investments; (2) technology/project descriptions; (3) costs and benefits, including both quantifiable and unquantifiable costs and benefits; (4) achievement of performance metrics and state policy goals; and (5) an overall assessment of the STIP.

2. STIP Investments and Incremental STIP Investments

a. Introduction and Summary of Comments

In the Draft Filing Requirements, the Department directed companies to include within their business cases the benefits and costs of their STIP investments (Draft Filing Requirements

at 1, 3, 4, 6-7). The Joint Commenters assert that, in order to prevent double counting and to establish a clear and traceable understanding of STIP benefits and costs, the Department should require each company to identify a baseline against which the STIP-specific incremental impacts of costs and benefits may be tracked as distinct from historic practice or other current and future programs (Joint Comments at 10-12 & n.17, 17-18, 24; Joint Redline at 4-6, 8-10). ENE proposes incorporating a forward-looking baseline scenario into the Filing Requirements (ENE Comments at 6; ENE Redline at 2-3). Specifically regarding a prospective transition to advanced metering functionality through the widespread installation of advanced metering infrastructure ("AMI"), Northeast Utilities argues that companies must analyze only those benefits provided by AMI in excess of a baseline level of automatic meter reading ("AMR") benefits (Northeast Utilities Comments at 5).

b. Analysis and Conclusions

In D.P.U. 12-76-B at 15-18, the Department stated that each company's STIP will include all new grid modernization investments to be made over the next five years, including those that are not incremental to current practice. Consequently, all benefits and the costs associated with new grid modernization investments will be included in the business case.

In terms of capital costs, a company must include all direct capital costs and capitalized overhead costs, and must only include those benefits that it projects will accrue from the new STIP investments and not from any prior investments. See Filing Requirements at 1. In terms of non-capitalized O&M costs that are integral to the STIP and achievements of its benefits, a company must include only the change in projected O&M expenses attributed to STIP investments; any increase in expenses should be counted as a cost and any decrease should be counted as a benefit. See Filing Requirements at 1, Template Key Terms tab. In addition, we

direct companies to include as a benefit the avoided costs of replacing current technologies with like technologies for those investments that will reach the ends of their useful lives within the benefit-cost analysis time horizon ("BCA time horizon").

In terms of a baseline, the companies must clearly present and support any baseline information that they use to calculate the costs and benefits of proposed STIP investments. Beyond this, however, the Department declines to require the companies to develop a comprehensive investment baseline to show that proposed benefits and costs are incremental to historic or future investment practices, as proposed by some participants.

In D.P.U. 12-76-B, the Department distinguished between incremental and non-incremental grid modernization investments for the purposes of cost recovery. In particular, we determined that only capital expenditures included in the STIP that are incremental to current practice are eligible for targeted cost recovery through a capital expenditure tracker mechanism. D.P.U. 12-76-B at 22-23. Further, we found that only technologies that are either new types of technology or with respect to which there is an increase in the level of investment a company proposes relative to its current investment practices will qualify as incremental. D.P.U. 12-76-B at 19-20. We require that incremental investments: (1) be addressed in a separate table and narrative (see Filing Requirements at 3); (2) be identified in the Costs tab in the Template; and (3) be used in the bill impacts analysis, as discussed in Section II.C.9. For any technologies that a company identifies as incremental in the Template, the company must provide evidence that the technology meets our definition of incremental, including a comparison of current investment with proposed investments.

3. Alternative and Least-Cost Investments

a. Introduction and Summary of Comments

The Draft Filing Requirements proposed that each company include a clear statement of its reasoning and rationale for its proposed STIP investments, including a discussion of any alternative investments considered and the rationale for choosing the proposed suite of investments (Draft Filing Requirements at 2).

Several participants suggest that the Department require the companies to provide an analysis of alternative investments considered as part of their STIP business case (DOER Redline at 2; ENE Comments at 6-7; ENE Redline at 2). National Grid argues that any mandate to discuss alternative investments be limited to a company's planning framework (i.e., investments considered, evaluation process and decision criteria) rather than a requirement to discuss each alternative technology considered (National Grid Comments at 4). The Joint Commenters assert that companies should propose least-cost investments within their business cases and explain the rationale for deviating from a least-cost investment approach (Joint Comments at 3, 24; Joint Redline at 3).

b. Analysis and Conclusions

After consideration of the arguments raised by the participants, the Department concludes that a discussion of alternative investments in the business case should be limited in scope to a company's distribution planning framework process. Our intention in requiring companies to discuss alternative investments is to provide a high level analysis of the range of investments a company considered and its evaluation criteria for these proposed STIP investments. We do not seek a detailed comparative analysis of proposed STIP investments to

the universe of all other potential investments. Accordingly, we have amended the Filing Requirements to reflect this intent.

In addition, the Department declines to adopt the recommendation that companies be required to justify all proposed investments against a benchmark of least-cost alternatives. As discussed in D.P.U. 12-76-B at 16, the business case will be the primary lens to assess the STIP. Central to this business case framework is that the benefits of proposed investments must justify the costs. Given the range of possible grid modernization proposals and investment options, it would be infeasible to require that such proposals be benchmarked against least-cost alternatives.

4. Costs and Benefits

a. Introduction and Summary of Comments

The Draft Filing Requirements proposed requiring each company to evaluate the full suite of costs and benefits that result from its investment plan, including an itemization and analysis of all quantifiable costs and benefits, as well an assessment of difficult to quantify or unquantifiable benefits (Draft Filing Requirements at 3-7). The companies request that costs and benefits for proposed investments be presented in a range, rather than as a single figure (Northeast Utilities Response to Briefing Question 4; National Grid Comments at 1; Unitil Response to Briefing Question 4). In addition to a range estimate, Unitil proposes application of a sensitivity analysis to address expectations of uncertainty in estimates (Unitil Response to Briefing Question 4).

b. Analysis and Conclusions

The Department declines to adopt the companies' proposal to provide a range of estimates for costs and benefits for a company's proposed grid modernization investments. We

direct companies to include a single dollar value for the present value of each monetized cost and benefit in the Template. Instead of providing a range of estimates, the Department directs companies to perform sensitivity analyses, if estimates are uncertain.

Although we recognize that cost and benefit estimates may need to be revised and refined during the development and implementation of a company's GMP, the Department directs each company to include its best estimates of costs and benefits at the time its STIP is submitted to the Department. The Department directs the companies to attempt to monetize all costs and benefits to the extent possible using vendor quotes, estimates from in-state pilot projects, and data from relevant case studies in other jurisdictions. To the extent that costs and benefits cannot be monetized, the Department directs companies to attempt to quantify them to the extent possible.

5. Common Assumptions

a. Introduction and Summary of Comments

In calculating quantifiable benefits and costs, the Draft Filing Requirements identified seven common assumptions and values for the companies to jointly develop: (1) rate of inflation; (2) energy forecast; (3) demand forecast; (4) forecast of energy prices; (5) forecast of capacity prices; (6) forecast of demand reduction induced price effects (also referred to as "market price suppression"); and (7) forecast of renewable energy certificate ("REC") costs (Draft Filing Requirements at 3-4). Additionally, the Department issued a briefing question about the possibility of leveraging data from studies in other Department proceedings to develop values for common assumptions (Briefing Question 3).

Several participants assert that forecasts of energy, demand, and demand-induced reduction price effects should be company-specific, rather than common assumptions (Unitil

Redline at 5; ENE Comments at 6; ENE Redline at 4). Other participants propose additional common assumptions relative to: (1) greenhouse gas compliance costs, (2) avoided SOx, NOx, PM-10 compliance costs, and (3) other fuel prices (DOER Redline at 4; ENE Comments at 6, ENE Redline at 4).

In response to the Department's briefing question, several participants suggest that the Department may be able to use studies and work from other Department dockets as a starting point in establishing some of the common assumptions (National Grid Comments at 20-21; DOER Comments at 3; ENE Comments at 4-5). However, participants also caution that if the Department seeks to rely on studies such as Avoided Energy Supply Costs in New England ("2013 AESC")[7] for demand-induced price effects, the assumptions in that study would need to be updated to apply to grid modernization (National Grid Comments at 20-21; ENE Comments at 4-5; Northeast Utilities Comments at 19). DOER suggests that to calculate the costs of greenhouse gas emissions reduction, the Department may be able to incorporate work from Method for Calculating Avoided Costs of Complying with Global Warming Solutions Act, D.P.U. 14-86 (DOER Comments at 3).

The Joint Commenters object to the use of studies from other proceedings to develop common assumptions because they assert that: (1) the use of studies from other dockets would deprive parties of their due process rights to evaluate those studies; (2) the applicability of those studies to grid modernization has not been evaluated; and (3) the timing of those studies

[7] The most recent version of this study is the Avoided Energy Supply Costs in New England: 2013 Report (July 12, 2013), available at http://www.synapse-energy.com/project/avoided-energy-supply-costs-new-england.

relative to GMP filings might render any cost and benefit data from those studies outdated (Joint Comments at 18-20).

Several participants request that the Department create a stakeholder process and commission new studies to establish the values for the common assumptions before the companies file their GMPs (Northeast Utilities Comments at 11-13; Unitil Redline at 4-5). These participants argue that establishing the common assumptions before companies file GMPs will faciliate the review process and reduce delays implementing GMPs that may result from modification or changes in the assumptions (Northeast Utilities Comments at 11-13; Unitil Redline at 4-5).

b. Analysis and Conclusions

After consideration of the comments, we adopt some of the recommended changes and provide additional guidance on establishing the common assumptions. First, we agree that each company's demand and energy forecasts are more appropriate as company-specific assumptions because each company has significant experience in this area given the unique demographics and economic conditions of its service territory. Accordingly, we have removed these two from the list of common assumptions for companies to jointly develop.

As the companies develop their common forecasts for energy prices, capacity prices, demand reduction induced price effects, and renewable energy portfolio standard ("RPS") compliance costs, they should leverage similar studies, such as those conducted for the review of long-term contracts for renewable energy procured under Section 83A, and the AESC, to the extent that assumptions across the studies are comparable and the timing of such studies are applicable to that of the GMPs. See, e.g., Fitchburg Gas and Electric Light Company et al., D.P.U. 13-146/13-147/13-148/13-149, at 46-48 (February 26, 2014). Embedded in any

forecast will be projections of future prices of fuels such as natural gas, oil, and gasoline, as well as compliance costs for environmental regulations limiting pollutants such as SOx, NOx, and PM-10, and to some degree, greenhouse gas emissions (i.e., through the Regional Greenhouse Gas Initiative). All assumptions must be well documented in a transparent manner that is easily reviewable by the Department and other stakeholders. We also note that a company's use of data or forecasts, as well as any underlying assumptions, from other proceedings will not preclude parties to the GMP proceedings from fully investigating those inputs within the GMP proceedings.

In terms of compliance costs for reducing greenhouse gas emissions, we expect that any jointly developed forecast of electricity prices will include compliance with the Global Warming Solutions Act ("GWSA")[8], either as an embedded cost within the electricity price forecast or through a method similar to that contemplated in D.P.U. 14-86, pending the outcome of that proceeding. If the companies are not able to monetize the benefits of avoided GWSA compliance costs, we direct the companies to include qualitative assessments of the contribution their STIP proposals will provide to this benefit in their analyses of difficult to quantify benefits. We include compliance with the GWSA as an additional common assumption.

In addition, the Department declines to create a stakeholder process to establish the values for the common assumptions before the companies file their GMPs. We expect that the companies will be able to jointly develop appropriate common assumptions. The Department

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[8] St.2008, c. 298.

and other stakeholders will have the ability to assess any common assumptions, and their underlying methods, during the adjudication of GMPs.

6. Common Analysis Methods

a. Introduction

The Draft Filing Requirements identified four common analysis methods for the companies to use in calculating quantifiable benefits and costs in their business cases: (1) treatment of stranded costs, (2) discount rate, (3) benefit-cost analysis time horizon ("BCA time horizon"), and (4) sensitivity analyses (Draft Filing Requirements at 4-5). Additionally, the Department issued a briefing question regarding whether the weighted average cost of capital ("WACC") or the 20-year Treasury bond rate was the most appropriate discount rate for evaluating benefits and costs of GMP investments in the STIP proposals (Briefing Question 1).

In addition, in finalizing the Filing Requirements, we add a common analysis method regarding customer response to time varying rates. We address the discount rate, BCA time horizon, time varying rates, and sensitivity analyses, below. We address the treatment of stranded costs in Section II.C.8.

b. Discount Rate

i. Introduction and Summary of Comments

In the Draft Filing Requirements, the Department proposed that companies employ a discount rate of the WACC and/or the 20-year Treasury bond rate, as appropriate (Draft Filing Requirements at 5). Several participants supported the WACC as the appropriate discount rate for grid modernization investments rather than the 20-year Treasury bond rate (Northeast Utilities Comments at 18; National Grid Comments at 15-16; Unitil Response to Briefing

Question 1; Joint Comments at 13-15). These participants argue that using the WACC is consistent with best practices of utilities and regulators in other jurisdictions evaluating advanced metering and smart grid investments, as well as with the rate the companies use to analyze investments (National Grid Comments at 16-18; Northeast Utilities Comments at 18; Unitil Response to Briefing Question 1; Joint Comments at 15). Fauth suggests that the WACC is the appropriate rate to apply to discount utility costs, while the 20-year Treasury bond rate might be appropriate to apply to customer costs and benefits[9] (Fauth Comments at 1).

DOER and ENE propose that the Department adopt the 20-year Treasury bond rate as the discount rate, asserting that STIP investments constitute a lower risk profile than continuing with business-as-usual distribution investments and based on the argument that such STIP investments are backed by legislation (DOER Comments at 3; ENE Comments at 3-4). National Grid and ENE suggest a requirement that companies conduct a sensitivity analysis for the discount rate to illustrate alternative perspectives (National Grid Comments at 18-19; ENE Comments at 3-4).

ii. Analysis and Conclusions

The Department is persuaded by the comments from participants that the company-specific WACC is the appropriate discount rate for companies to use in their business cases. While we view the risk profile for those STIP grid modernization investments eligible for preferential cost recovery to be lower than the risks associated with other distribution-related investments, this observation does not necessarily lead to the conclusion

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[9] Fauth suggests that because the Treasury bill rate is such a low rate, it may be more appropriate to create a customer discount rate for benefits based on a weighted average of the common consumer borrowing costs (Fauth Comments at 2).

that 20-year Treasury bond rates represents a reasonable or appropriate discount rate. In view of prevailing practices and the companies' reliance on the WACC to evaluate non-grid modernization investments, we find that the WACC represents the appropriate discount rate. However, as a means to illustrate how the value of the benefit streams may be influenced by an alternative discount rate, we direct companies to conduct a sensitivity analysis that uses the 20-year Treasury bond rate as the discount rate for all benefits accruing directly to customers, as designated in the Template.

c. Benefit-Cost Analysis Time Horizon

i. Introduction and Summary of Comments

In the Draft Filing Requirements the Department proposed a common approach to a BCA time horizon of projecting out costs and benefits to the end of the depreciable life of the technology or asset in question (Draft Filing Requirements at 5). Unitil and Northeast Utilities assert that because each company may deploy different technologies with a unique lifespan a common analysis method for the BCA time horizon may not be appropriate (Unitil Redline at 5; Northeast Utilities Comments at 14). National Grid proposes a 15-year BCA time horizon for the evaluation of all STIP investments, a period of time that is aligned with the economic life of advanced meters, and long enough to capture STIP investment costs while realizing projected benefits (National Grid Comments at 10).

ii. Analysis and Conclusions

The Department agrees with National Grid's proposal to adopt a fixed time horizon for the benefit-cost analysis. To simplify and standardize the review process of the business cases, the Department directs the companies to use 15 years as the time horizon to discount costs and benefits for all STIP investments. The Department also directs companies to conduct a

sensitivity analysis for the BCA time horizon, using 20 years to permit an analysis of how the overall values of benefits and costs will vary based on changes in this assumption.

d. Time Varying Rates

i. Introduction

In Time Varying Rates, D.P.U. 14-04-C (November 5, 2014), the Department adopted a policy framework for the implementation of time varying rates for basic service. In particular, the default basic service offering will be a time of use rate, with a critical peak pricing component. Customers may opt out of the time of use rate and into a flat rate with a peak time rebate ("PTR") component. D.P.U. 14-04-C at 2, 20. The Department finds it appropriate to add an additional common analysis method applicable to each company's assessment of time varying rates.

ii. Analysis and Conclusions

The Department requires the companies to include in their business case analyses the implementation of the time varying rates framework established in D.P.U. 14-04-C. At a minimum, such analyses must include an estimate of the benefits and costs associated with customer peak load response to time varying rates.[10] A number of key variables will affect the impact and, therefore, the benefits of the time varying rate framework. These variables include: (1) customer peak load reduction in response to time varying rates; (2) the percentage of customers that opt out of advanced metering functionality technology (e.g., advanced meters); (3) the percentage of customers that opt out of the default basic service rate offering

[10] The companies also should include, as applicable, the benefits of time varying rates related to: (1) overall conservation; (2) off-peak charging of electric vehicles; (3) energy storage; and (4) solar energy resources. See D.P.U. 14-04-C at 3.

and receive service under a flat rate with a PTR component; (4) the persistence over time of the level of customer response; and (5) the percentage of customers served by competitive suppliers who opt to receive flat rate service.

The key assumption in this analysis will be the level of customer peak load reduction in response to time varying rates. To develop company-specific values for this assumption, the companies should use a common analysis method to estimate the peak period response of customers that corresponds to the critical peak, peak, and off-peak electricity price ratios, based on the companies' forecasts. This method should use the common forecast of energy and capacity prices to calculate electricity price ratios and consider evidence from industry pilots and deployments of time varying rates to estimate the corresponding peak load reductions and energy savings by customers.[11] We expect that this common method will provide each company with discretion in estimating a load response that appropriately reflects the unique characteristics of its service territory while taking into account the energy price

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[11] See, e.g., Ahmad Faruqui and Jenny Palmer, The Discovery of Price Responsiveness: A Survey of Experiments Involving Dynamic Pricing of Electricity, EDI Quarterly, 4(1), at 15-18 (2012) available at http://www.energydelta.org/uploads/bestanden/f5ef3dfc-81ee-41f1-9ffd-2faa24bd1c2f; NSTAR Electric Company, D.P.U. 09-33, NSTAR Smart Grid Pilot Final Technical Report (June 30, 2014); Ahmad Faruqui and Sanem Sergici, Impact Evaluation of CL&P's Plan-it Wise Energy Program: Final Results, The Brattle Group, at 16 (November 2, 2009) available at http://nuwnotes1.nu.com/apps/clp/clpwebcontent.nsf/AR/PlanItWiseAppendix/$File/Plan-it%20Wise%20Pilot%20Results%20Appendix.pdf; Sacramento Municipal Utility District, SmartPricing Options Final Evaluation at 4, 74-75, 83 (September 5, 2014) available at https://www.smartgrid.gov/document/smartpricing_options_final_evaluation; Global Energy Partners, OG&E Smart Study Together Impact Results: Auxiliary Final Report – Summer 2011 (April 23, 2012) available at https://smartgrid.gov/sites/default/files/doc/files/Chapter_4_Load_Impact_Results_2011.pdf

forecast. In developing its estimate of customer response, we expect each company also will take into account other factors affecting this value, including climatic conditions, appliance saturation rates, customer education and awareness of rate structures, and other relevant customer demographic information.

In addition, we direct the companies to use common analysis methods for: (1) the percentage of customers that opt out of advanced metering functionality technology (e.g., advanced meters); (2) the percentage of customers that opt out of the default basic service rate offering and receive service under a flat rate with a PTR component; (3) the persistence over time of the level of customer response; and (4) the percentage of customers served by competitive suppliers who opt to receive flat rate service. These common analysis methods should lead to reasonable estimates, based on available studies and evidence from pilots and deployments in the Commonwealth and in other jurisdictions.

We conclude that this common analysis approach is an appropriate way to incorporate our time varying rates framework into the companies' business case analyses. However, we acknowledge that there is uncertainty in estimating these variables. Therefore, we expect each company to present at least two additional scenarios that evaluate a lower and higher estimate of the customer response rate to assess the sensitivity of its business case results to varying customer response rates. These lower and higher estimates should be in line with low and high impact results from pilots and deployments. Further, we direct the companies to conduct an additional scenario based on the assumption that all distribution customers are subject to a time

of use rate with a critical peak pricing component, akin to the Department's framework for time varying rates for basic service.[12]

e. Other Sensitivity Analyses

i. Introduction and Summary of Comments

The Draft Filing Requirements proposed requiring each company to include sensitivity analyses for a limited set of variables, to be determined by the company, to arrive at a reasonable range of quantifiable benefits and/or costs (Draft Filing Requirements at 5). Northeast Utilities states that the variables a company selects for a sensitivity analysis may differ as they will be specific to the types of investments a company selects (Northeast Utilities Comments at 13-14).

ii. Analysis and Conclusions

In the final Filing Requirements, the Department amends the table of required sensitivity analyses to include the sensitivity analyses related to the discount rate, BCA time horizon, and time varying rates, as discussed above. In addition to these required sensitivity analyses, we agree that other sensitivity analyses may differ by company depending on the investment profile. We expect that each company will conduct other company-specific sensitivity analyses based on the criteria laid out in the Filing Requirements.

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[12] This assumption reflects the perspective that time varying rate products will become the new norm for electricity supply. This perspective reflects the assumptions that: (1) achievement of advanced metering functionality will allow broad deployment of time varying rates; (2) retail competitive suppliers will build off marketing and education efforts by distribution companies and others in support of time varying rates; and (3) time varying rate structures will provide most customers with opportunities to shift load and save money.

7. Identification of Difficult to Quantify/Unquantifiable Benefits and Costs

a. Introduction and Summary of Comments

In the Draft Filing Requirements, the Department proposed directing the companies to provide a weight for all unquantifiable variables included in the Template and a narrative explanation of the weight assigned (Draft Filing Requirements at 5-6). Additionally, the Department issued a briefing question soliciting feedback from participants on what additional guidance the companies seek from the Department in assessing and ranking unquantifiable benefits (Briefing Question 5). Several participants request further guidance on evaluating unquantifiable benefits, as well as on the role that unquantifiable benefits will have for cost recovery purposes (ENE Comments at 5; DOER Comments at 3; Joint Comments at 21-23; Unitil Redline at 6; Northeast Utilities Comments at 20). ENE suggests that the Department determine which categories of benefits should be (1) quantifiable and monetized, (2) quantifiable but not monetized, and (3) unquantifiable (ENE Comments at 5). DOER recommends adoption of an explicit formulaic treatment of the weights for unquantifiable benefits (DOER Comments at 3). The Joint Commenters maintain that while the Department cannot rely on qualitative or unquantifiable benefits as part of the cost effectiveness analysis in the business case, it may allow these benefits to be qualitatively described in the business case (Joint Comments at 21-23). Fauth suggests that the Department should consider requiring companies to quantify some benefits that the Department acknowledges may be difficult to quantify, such as reliability (Fauth Comments at 3).

b. Analysis and Conclusions

In response to participants' requests for guidance on how to categorize both quantifiable and unquantifiable benefits, we have revised the Template to require companies to identify

those benefits that are: (1) quantified and monetized; (2) quantified but not possible to monetize; and (3) not quantifiable (Template, Benefits Tab 3). Each company must include full descriptions of unquantifiable benefits in the Template. The Filing Requirements direct companies to provide in their business case narratives an explanation of the contribution of the unquantifiable benefits to state policy goals and Department mandates, including the weights companies give to these benefits in the overall business case analysis. As part of the GMP review process, all parties will have the opportunity to evaluate and suggest alternatives to a company's determination of the value of the unquantifiable benefits to its STIP.

Several participants requested guidance on the criteria companies will use to weigh the unquantifiable benefits and suggested that the Department establish weights to standardize company analysis of the unquantifiable benefits. We acknowledge that in the first iteration of the GMPs, companies and stakeholders may have difficulty in evaluating unquantifiable benefits across companies. Nonetheless, the Department will not prescribe standard weights at this time. However, the Department and other stakeholders will assess how each company weighed unquantifiable benefits within its STIP as part of the GMP review.

8. Stranded Costs

a. Introduction and Summary of Comments

In the Draft Filing Requirements, the Department proposed requiring that companies exclude the undepreciated value of existing assets from their presentations of costs and benefits (Draft Filing Requirements at 5, 7-8). However, the Department recognized that the magnitude of stranded costs may inform a company's business case and the timing of proposed investments (Draft Filing Requirements at 5, 7-8). As a result, the Department proposed requiring the companies to submit separate accountings of estimated stranded costs associated

with existing capital equipment that they propose to replace as a result of the proposed STIP investments, as well as a narrative regarding the expected impact of these costs on the company's overall business case (Draft Filing Requirements at 5, 7-8).

National Grid suggests that the Stranded Costs tab of the Department's Template should include a time dimension to show the difference between date of retirement and the end of useful life for stranded assets (National Grid Comments at 11). Further, National Grid proposes that companies provide amortization schedules and carrying charges for the undepreciated portion of stranded assets in order to facilitate Department rulings on cost recovery for stranded assets at the same time as issuing a STIP decision (National Grid Comments at 11). According to National Grid, companies must be allowed to recover the undepreciated value and appropriate carrying charges of used and useful assets that are stranded as a result of grid modernization within a certain timeframe, and this approval should be provided as part of the Department's approval of the STIP and GMP (National Grid Comments at 8-9, 11).

Northeast Utilities asserts that the Department's decision to exclude stranded costs from the benefit-cost analysis of the business case is contrary to the Department's own cost recovery prudency standards and is an attempt to manipulate the business case analysis to force a positive outcome for AMI (Northeast Utilities Comments at 4, 6-7). Northeast Utilities further argues that stranded costs associated with the removal of existing capital equipment (such as AMR meters) that would not be retired but for grid modernization should be included in a company's cost benefit analysis as part of the STIP investment business case, and that without

the inclusion of stranded costs, a business case will not reflect the true cost of the investment (Northeast Utilities Comments at 4-6).

Unitil proposes including a sensitivity analysis of stranded costs to determine the effect of stranded costs and overall impact on customers flowing from investment decisions within the business case (Unitil Redline at 5, 8). Unitil maintains that the outcome of the sensitivity analysis should dictate whether stranded costs are properly includable in the decision-making process, and that the Department should allow depreciation and stranded costs within a company's economic evaluation (Unitil Redline at 5,7-8).

b. Analysis and Conclusions

The Department has considered the various arguments raised by participants and reaffirms the approach to stranded costs proposed in the Draft Filing Requirements. As discussed in Section II.C.2., above, the benefit and cost analysis portion of a company's STIP business case will be forward-looking and, therefore, only the costs of new investments and the benefits that flow from those investments are appropriate for inclusion.[13] However, as discussed in the Filing Requirements at 8-9, we have included an analysis of stranded costs as a component within the overall justification section of the business case. We expect each company to assess the magnitude of potential stranded costs when determining the timing of

[13] This finding is consistent with the principle that an analysis of benefits and costs used to assess a forward-looking investment should not include previously expended costs (i.e., sunk costs). See, e.g., N. GREGORY MANKIW, PRINCIPLES OF ECONOMICS 286-287 (Cengage Learning, 7th ed., 2014); PAUL KRUGMAN ET AL., ESSENTIALS OF ECONOMICS 210 (Worth Publishers, 2d ed. 2010); OFFICE OF MGMT. & BUDGET, EXECUTIVE OFFICE OF THE PRESIDENT, OMB CIRCULAR A-94. MEMORANDUM FOR HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS: GUIDELINES AND DISCOUNT RATES FOR BENEFIT-COST ANALYSIS OF FEDERAL PROGRAMS 6.a (1992), available at http://www.whitehouse.gov/omb/circulars_a094#6.

proposed STIP investments and explain how stranded costs affect the business case. In addition, the companies must provide the remaining depreciable life of these assets in the Stranded Costs tab of the Template.

Regarding National Grid's proposal to review stranded cost recovery proposals as part of GMP review, we note that the Department has a significant body of precedent regarding the ratemaking treatment of stranded costs.[14] The companies may file proposals for the treatment of retired plant as an extraordinary loss consistent with the Uniform System of Accounts for Electric Companies ("USOA") and the Department's ratemaking practice within their GMPs (see Filing Requirements at 9, n.8).

9. Bill Impact Analysis

a. Introduction and Summary of Comments

As discussed above, the Department amends the Filing Requirements to include a bill impact analysis as proposed by some participants. The Joint Commenters suggest that companies file two distinct types of bill impact analyses: (1) a bill impact analysis of the STIP; and (2) bill impact analyses of all known rate changes that will occur during the STIP cost recovery period (Joint Comments at 6-9).

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[14] See, e.g., Milford Water Company, D.P.U. 12-86, at 29-77 (2013) (water treatment plant); Bay State Gas Company, D.T.E. 05-27, at 197-200 (2005) (meter reading technology); Boston Gas Company, D.P.U. 93-60, at 41-44 (1993) (SNG plant); Boston Edison Company, D.P.U. 18515, at 10-11 (1976) (pollution control devices); Fitchburg Gas and Electric Light Company, D.P.U. 18031-A at n.1 (1975) (generating plant); Western Massachusetts Electric Company, D.P.U. 558, at 39-41 (1982) (gas-fired turbines); Worcester Gas Light Company, D.P.U. 16316, at 8 (1970) (manufactured gas facilities).

b. Analysis and Conclusions

A bill impact analysis is generally used to show the impact on bills of a specific and discrete change in the rates customers will face from a specific charge (or credit). In their STIPs, the companies must include two types of grid modernization investments, those that are non-incremental to current practice and incremental investments. Recovery of the costs of non-incremental investments will be addressed in the future through traditional ratemaking means (e.g., rate cases). Therefore, we exclude such investments from the bill impact analysis. The Department determines that the appropriate bill impact analysis will capture the bill impacts of the incremental investment in new technologies or new levels of investment resulting from grid modernization, those that the company would likely not make but for our grid modernization proceeding. Therefore, the Department concludes that the most appropriate bill impact analysis is of costs the companies project to recover through their capital expenditure trackers. We direct the companies to include a bill impact analysis for each year of the STIP (e.g., five years) that includes the investments a company proposes to recover through the capital expenditure tracker.[15]

We emphasize, however, that a bill impact analysis must not be examined in isolation, as STIP investments also will result in lower customer bills relative to what they otherwise would have been through reduced utility costs, and other benefits that accrue to customers. Therefore, a bill impact analysis is appropriately viewed as one component of the larger

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[15] A traditional bill impact analysis shows: (1) the existing charges; (2) the proposed charges; (3) the percentage change in the charges; (4) the total dollar change in total monthly bill at various consumption levels; and (5) the percentage change in the total bill per month at various consumption levels. See 220 C.M.R. §§ 5.03, 5.06.

business case necessary to assess the short-term rate impacts of the STIP and in context of the full benefits of grid modernization investments identified elsewhere in the business case.

Finally, we decline to require companies to provide an analysis of all known rate changes that will occur during the STIP cost recovery period. As discussed above, a bill impact analysis will allow the Department to examine near-term rate impacts as a result of the proposed STIP investments. Including other rate changes over the STIP planning horizon would involve numerous assumptions and uncertainty, making it difficult, if not impossible, to draw any conclusions from such an analysis.

D. Business Case Summary Template

1. Introduction

The Department developed and proposed the Draft Template for the companies to provide summary information and analysis regarding quantifiable and unquantifiable benefits and costs as well as an analysis of stranded costs (Draft Filing Requirements at 2). By requiring the use of the Template, the Department seeks to promote a level of transparency, uniformity, and granularity in the data and analyses underlying each company's business case.

In their GMP filings, the companies will itemize and quantify each cost and benefit associated with their proposed grid modernization technology investments. To facilitate this task, in the Draft Template the Department provided reference lists of costs and benefits, as well as functional and technology categories commonly associated with grid modernization investments. The Department also instructed each company to add categories of costs, benefits, functions, and technologies that were not already included in the Draft Template, as needed, to accurately reflect each company's proposed STIP investments.

2. Structure of Template

a. Introduction and Summary of Comments

The Draft Template was designed to provide a snapshot of each company's benefits and costs associated with its proposed STIP investments. The Draft Template was organized into three main data entry tabs: (1) Benefits; (2) Costs; and (3) Stranded Costs, and six main reference tabs: (1) Overview; (2) Instructions; (3) Key Definitions; (4) List of Benefits; (5) List of Costs; and (6) Glossary. Using the reference lists as a guide, the companies would enter information about their portfolio of selected technologies and corresponding functions, and then identify and assign values to the benefits and costs associated with those investments.

Participants state that building some degree of flexibility into the structure of the Template is necessary to account for changes in costs, benefits, and assumptions over time (e.g., changes introduced by emerging technologies, or best practices from other jurisdictions) (DOER Comments at 2; National Grid Comments at 2-3, 12). Participants assert that the Department should allow the companies to: (1) modify the structure of the Template as they develop their STIP proposals (National Grid Comments at 2, 3-4); (2) use the Template as a guide in organizing costs, benefits, and functions, without requiring the mandatory application of a pre-defined template (National Grid Comments at 2, 11); or (3) add new items to the Template, as needed (DOER Comments at 2; ENE Comments at 3; Joint Comments at 9; National Grid Comments at 3). Unitil asserts that the Department should not require companies to investigate the costs and benefits of every technology, system, or device listed in the Template (Unitil Redline at 2).

Several participants propose adding: (1) new categories of benefits for distributed energy resources ("DER"), resiliency, safety, and transmission capital savings (DOER

Comments at 2; ENE Comments at 8; National Grid Comments at 14); (2) new categories of costs related to DERs, customer contacts, cyber security, and storage capacity (Joint Comments at 23, 24); (3) new and/or expanded definitions for key terms (ENE Comments at 3, 8; National Grid Comments at 12, 15); (4) summary tables of overall costs and benefits by category (ENE Comments at 3); and (5) a results tab, which compares quantifiable benefits to costs, and provides an overview of the score on the unquantifiable benefits, resulting in a conclusion (DOER Comments at 3; DOER Redline at 2, 3, 5).

National Grid proposes that the Department restructure the Benefits tab of the Template, so that the logic of the worksheet flows in the opposite direction (i.e., benefit → function → technology) (National Grid Comments at 3). National Grid argues that the consideration of benefits in the business case analysis would more logically focus on a particular benefit and then define the functions and technologies that would enable that benefit (National Grid Comments at 3).

b. Analysis and Conclusions

After careful consideration of the arguments raised, the Department adopts some of the participants' suggestions, but retains the general structure of the Draft Template. In addition, based on the comments, the Department clarifies and refines certain aspects of the Draft Template.

The Department acknowledges that building some degree of flexibility into the structure of the Template is necessary to account for variations in each company's proposed STIP investments. Accordingly, the Department encourages each company to make additions to the Template as needed, including adding new categories of benefits, costs, functions, and technologies, to ensure that all the costs and benefits associated with its proposed STIP

investments are reflected in the business case analysis. However, the companies may not modify the structure of the Template, other than to add new categories to the Benefits and Costs tabs. Further, the purpose of the lists included in the Template is to provide a comprehensive reference list of the type of investments a company could make, but not require an investigation of every technology, device, or system included in the Template. Accordingly, a company need not enter information into categories that do not apply to its proposed set of grid modernization investments.

The Department agrees that the addition of summary tables will benefit the Department and other stakeholders in evaluating whether the benefits justify the proposed STIP investments in a company's business case. Accordingly, the Department has added to the Template a new tab, "Summary – Benefits and Costs" which will include summary tables that display: (1) monetized costs aggregated by cost category and benefits aggregated by function; (2) a list of all quantified but non-monetized benefits, the function associated with each benefit and the quantified value; and (3) a list of all unquantified benefits and the function associated with each benefit.

The Department declines to adopt the proposal to restructure the Benefits tab in the Template so that the worksheet flows in the opposite direction (i.e., benefit → function → technology). The Department structured the flow of the Template based on the assumption that the company will complete the Template after it has selected the technologies for its proposed STIP investments. Therefore, the selected technologies and functions will define the benefits. Accordingly, we will maintain the flow of the Template, from technology to function to benefit.

Although the Department retains the basic structure of the Draft Template, we simplify it by: (1) removing the "Action/ Impact" column from both the Benefits and Costs tabs; and (2) removing the "Function" column from the Costs tab. Finally, we adopt National Grid's proposal to add a new column to the Costs tab of the Template to indicate which costs the company proposes including within the capital expenditure tracker.

3. Allocation of Benefits

a. Introduction and Summary of Comments

In the Draft Template, the Department proposed instructing each company to apportion the benefits associated with its proposed STIP investments in a clear and consistent manner across the Template.[16] Several participants assert that it will be difficult to fully allocate or compartmentalize the elements of each company's STIP investments in the Template (Fauth Comments at 2; National Grid Comments at 13). Some argue that the Draft Template appears to be based on an assumption that there are simple one-to-one or one-to-many correspondences between grid modernization objectives, actions/impacts, functions, technologies, and benefits (National Grid Comments at 13; ENE Comments at 7-8). Participants identify challenges in demonstrating how benefits are allocated in the Draft Template, such as when: (1) a particular benefit is realized as a result of several grid modernization investments and new O&M activities working together in concert, and the company is not able to clearly apportion the benefit across the different technologies (National Grid Comments at 13); (2) an enabling technology (e.g., a backhaul communication system) does not produce any benefits of its own,

[16] In issuing the Draft Filing Requirements, the Department addressed the allocation of benefits and costs. Because participants did not raise cost allocation issues, we limit our analysis to benefits only.

but, instead, enables benefits via other technologies (e.g., advanced meters) (National Grid Comments at 13); and (3) a group of technologies deliver a function (e.g., conservation voltage reduction) that provides a particular benefit (e.g., reduced line losses) on its own, but when paired with other technologies (e.g., advanced meters) results in an increase of that same benefit (Fauth Comments at 2).

b. Analysis and Conclusions

The Department recognizes that the companies will need to address the challenge of appropriately allocating calculated benefits to specific technologies in the Template. We direct each company to identify a method that ensures that all benefits are allocated in a consistent manner throughout the Template. Each company must document how, where, and why benefits are allocated when it is not otherwise clear how the benefits should be allocated. In instances where a technology or network systems enabler[17] (e.g., a backhaul communications system), which may or may not produce any benefits on its own, enables benefits through other technologies (e.g., advanced meters), the Department recommends attributing the value of the benefit to the enabled technology and not trying to allocate any portion of the benefit back to specific enabling technologies.

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[17] The term network systems enabler ("NSE") was used during the Grid Modernization Stakeholder Working Group meetings and in the Working Group Report (Report at 13). In the Template, the Department defines NSEs as "systems and software applications that underpin distribution company operations and support implementation of various grid modernization capabilities. For example, supervisory control and data acquisition ("SCADA") and a distribution management system ("DMS") are NSEs that are necessary to implement automated feeder reconfiguration."

4. Preventing Double Counting

a. Introduction and Summary of Comments

In the Draft Template, the Department proposed instructing each company to produce line items for each benefit and cost associated with its proposed STIP investments to avoid double counting. In addition, the Department asked a briefing question on the topic of preventing double counting of costs and benefits in the business case and requested that the participants address whether the Draft Template was adequate to prevent double counting. We also requested recommendations for how these materials could be modified to address potential concerns with double counting.

In response to the Department's briefing question, participants assert that there is sufficient guidance in the Draft Filing Requirements and Draft Template to prevent double counting, but recognize that the potential for double counting still exists due to: (1) arbitrary assignments of costs or benefits to functions or technologies (Fauth Comments at 2); (2) counting benefits that do not directly result from the achievement of grid modernization objectives (DOER Comments at 3); and (3) redundancies between broad common assumptions and specific estimates that may account for portions of the same costs/savings (Unitil Response to Briefing Question 2).

Some participants assert that the burden of proof is on companies to prove that their quantification of benefits and costs has not resulted in double counting (Joint Comments at 24; Northeast Utilities Comments at 18-19; National Grid Comments at 19).

b. Analysis and Conclusions

As noted by the participants, the companies bear the burden of demonstrating that they have not double counted in the quantification of costs and benefits. The Department

encourages each company to develop its own method to ensure that all costs and benefits are treated in a consistent and non-duplicative manner throughout the Template. Similar to the Department's findings on the allocation of benefits in Section II.D.3., we expect that each company will describe its approach to avoiding double counting, how it consistently apportioned projected benefits and costs among multiple rows in the Template, and where such apportioning occurred in the Template.

5. Granularity of Data

a. Introduction and Summary of Comments

In the Draft Filing Requirements, the Department proposed that the business case include detailed descriptions of the proposed investments, as well as identification and quantification of costs and benefits (to the extent possible) associated with the STIP. In the Draft Template, the Department provided lists of technologies and functions commonly associated with grid modernization investments that companies would use to identify and quantify all costs and benefits of its proposed STIP investments. The Department also issued a briefing question requesting input on the level of granularity that would be appropriate for quantified costs and benefits.

Participants agree that the companies must provide sufficiently granular estimates for costs and benefits for the Department and stakeholders to evaluate the business case, but disagree on what constitutes a sufficient level of granularity (DOER Comments at 3, National Grid Comments at 21-22; Northeast Utilities Comments at 20). The Joint Commenters propose that companies provide costs on the unit of property level as found in the Department's USOA (Joint Comments at 20). In addition, the Joint Commenters and Fauth

argue that the granularity of data underlying costs and benefits should reflect the geographic location of the proposed investment (Joint Comments at 20; Fauth Comments at 3).

Others expressed concerns with the trade-off between granularity and accuracy, with National Grid asserting that requiring a high degree of granularity in the business case is likely to suggest a false sense of precision for costs and benefits that are difficult to quantify, especially for benefits that depend on high-level assumptions and inputs, such as customer participation (National Grid Comments at 21; Unitil Response to Briefing Question 4).

b. Analysis and Conclusions

The companies must present costs and benefits at a level of granularity that strikes the appropriate balance between enabling review of their proposed STIP investments while reflecting the relatively high-level nature of the plans and the uncertainty inherent in planning estimates.

As a general matter, the Department agrees with the Joint Commenters that the companies should provide cost estimates on the unit of property level as found in the USOA, wherever possible. Providing cost estimates at this level of detail in the business case analysis will facilitate the identification of the retirement units associated with the grid modernization investments, which is necessary to determine their useful lives and, consequently, depreciation expense. See, e.g., Boston Gas Company, D.P.U. 88-67 (Phase One) at 131-132 (1988); Commonwealth Gas Company, D.P.U. 87-122, at 45 (1987). However, as discussed in Section II.D.2., individual costs should be grouped and summed by technology, while individual benefits should be grouped and summed by function in the Summary – Benefits and Costs tab in the Template.

While the Department recognizes that the estimates of costs and benefits of a proposed investment may vary depending on the geographic location of the investment, we decline to require that all investments include geographic information. However, where companies are proposing phased or partial technology deployments based on geography, we expect that they will provide their rationale for this proposal within the STIP.

III. CONCLUSION

In this Order the Department establishes requirements for the business case component of the companies' GMP filings, and adopts the final Grid Modernization Business Case Filing Requirements and the final Business Case Summary Template, both attached to this Order.

IV. ORDER

Accordingly, after notice, working group input, comment, and due consideration, it is

ORDERED: That Fitchburg Gas and Electric Light Company d/b/a Unitil, Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid, NSTAR Electric Company, and Western Massachusetts Electric Company shall file grid modernization plans consistent with the directives in this Order; and it is

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

By Order of the Department,

/s/
Ann G. Berwick, Chair

/s/
Jolette A. Westbrook, Commissioner

/s/
Kate McKeever, Commissioner