BEFORE THE
STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DOCKET **DE 24-070**

IN THE MATTER OF: Public Service Company of New Hampshire
d/b/a Eversource Energy
Request for Change in Distribution Rates

DIRECT TESTIMONY

OF

Nicholas A. Crowley and Daniel McLeod, PhD

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1. Introduction

Q. Mr. Crowley, please state your full name.

A. My name is Mr. Nicholas Allen Crowley.

Q. By whom are you employed and what is your business address?

A. I am a Vice President with Christensen Associates Energy Consulting LLC (CA Energy Consulting). My business address is 800 University Bay Drive, Suite 400, Madison, Wisconsin, 53705.

Q. Please summarize your education and professional work experience.

A. I have been with CA Energy Consulting since 2016. During this time, I have testified on incentive regulation issues in both the United States and Canada. I have also conducted research related to incentive regulation, recently co-authoring an article with Dr. Mark Meitzen on the impact of performance-based regulation (PBR) on Canadian electricity distribution utilities.[1] Prior to joining this firm, I was an economist in the Office of Energy Market Regulation at the Federal Energy Regulatory Commission (FERC), where I assisted with energy industry benchmarking, the incentive regulation of oil pipelines,[2] and the review and evaluation of natural gas pipeline rate cases. In these roles, I have worked extensively with FERC and other federal data for the development of cost benchmarks for power systems, in measuring industry total factor productivity, and the development of PBR frameworks filed before regulatory authorities across North America. I have a Bachelor of Science degree in economics, as well as a Master of Science degree in economics from the

[1] Nick Crowley and Mark Meitzen, "Measuring the Price Impact of Price-Cap Regulation Among Canadian Electricity Distribution Utilities," *Utilities Policy,* 72 (2021).
[2] Five-Year Review of the Oil Pipeline Index. Issued: December 17, 2015. 153 FERC ¶ 61,312.

University of Wisconsin-Madison. I am also a CFA charterholder. My curriculum vitae is attached as Attachment NAC-DPM-1.

Q. Dr. McLeod, please state your full name.

A. My name is Dr. Daniel McLeod.

Q. By whom are you employed and what is your business address?

A. I am an economist with Christensen Associates Energy Consulting LLC (CA Energy Consulting). My business address is 800 University Bay Drive, Suite 400, Madison, Wisconsin, 53705.

Q. Please summarize your education and professional work experience.

A. I have been with CA Energy Consulting since 2021. During this time, I have been involved with electric and gas utility regulatory proceedings in the United States and Canada with a focus on incentive regulation. I received my Ph.D. in economics from the University of Wisconsin-Madison in 2021. My academic background is in industrial organization (IO) and applied econometrics. As an IO economist, I have worked on litigation cases spanning several industries, including agriculture, electronics, and telecommunications. My curriculum vitae is attached as Attachment NAC-DPM-2.

Q. What is the purpose of your testimony in this proceeding?

A. This testimony reviews the proposed PBR framework filed by the Public Service Company of New Hampshire d/b/a/ Eversource Energy ("PSNH," or "Eversource," or "the Company"). The purpose of the review is to assess the incentives that the Company will face under its proposed PBR plan, including the "revenue cap," the capital supplement mechanism known as "K-bar," the Earnings Sharing Mechanism (ESM), and the Performance Incentive Mechanisms (PIMs). This testimony will evaluate the reasonableness of each of these

proposed elements of Eversource's plan. We are testifying on behalf of the New Hampshire Department of Energy ("the Department").

Q. How is your testimony organized?

A. This testimony contains a section for each major component of PSNH's proposed PBR framework. Section 2 provides background on the Company's proposed framework and the principles of PBR. Section 3 provides an overview and assessment of the Company's PBR framework, with a discussion of the practical implications on the utility's revenues and customer rates. Section 4 evaluates the total factor productivity (TFP) and benchmarking studies filed by the Company's witness Dr. Agustin Ros. Section 5 evaluates the proposed K-bar mechanism. Section 6 discusses the implications of revenue decoupling in Eversource's proposal. Section 7 assesses additional elements of the Company's plan, including the earnings sharing mechanism (ESM), the option to renew the revenue cap after four years, and the Company's proposed PIMs. Section 8 assesses the Company's proposed Performance Incentive Mechanisms. Section 9 contains a possible alternative to the Company's proposed PBR framework. Section 10 presents a summary and conclusions.

2. Background and Principles of PBR

Q. Has PSNH filed a PBR framework that fundamentally differs from its previous regulatory framework?

A. Yes. The regulatory framework under which PSNH has operated prior to this filing could be described as a form of traditional cost-of-service regulation, in which the company sets rates according to a cost-based revenue requirement. Under this form of regulation, the Company may file periodic rate cases to reset rates according to prudently incurred costs. PSNH has proposed to change its regulatory framework by operating under what it calls a revenue cap.

(In Section 3, we demonstrate that the proposed PBR framework is, in fact, a form of price cap.)

Q. Please explain the difference between setting rates under traditional cost of service regulation and setting rates under a revenue cap.

A. Generally speaking, utility rates are established by two components: (1) a revenue requirement; and (2) company billing determinants, typically consisting of energy (kWh), demand (kW), and the number of customers served. Under traditional cost-of-service regulation, a utility establishes a test year revenue requirement for each customer class, and then divides this revenue requirement by class-level billing determinants to determine prices per billing unit. A revenue cap mechanism operates similarly, except that over the revenue cap period, rates are adjusted each year such that revenues increase no faster than inflation minus a productivity offset (known as "I-X"). A distinguishing feature of revenue caps is that the regulated company is not able to file an application for increased rates during the revenue cap term. This is the source of cost efficiency incentives under PBR.

Q. What is your understanding of why PSNH is proposing to change the structure of its regulatory regime to a PBR framework?

A. The Company cites several reasons for proposing to move from its existing regulatory regime to a PBR framework. These reasons include the promotion of long-term cost control, the reduction of customer bill impacts, and the ability to operate with fewer base distribution rate proceedings.[3] The Company states that the current approach, which involves periodic base-rate proceedings with step adjustments, will not provide the level of rate stability for

[3] Testimony of Douglas W. Foley, Robert S. Coates, and Douglas P. Horton, pp. 36-37, Bates 01380-01381.

customers that the PBR approach might provide. Additionally, the Company states that PBR may introduce superior cost efficiency incentives, resulting from its rate case stay-out commitment.

Q. Will PBR provide the benefits cited by PSNH?

A. There is no guarantee that PBR will result in superior regulatory outcomes relative to other forms of regulation. Not all PBR plans are created equal, nor are the conditions under which each utility operates within the regulatory mechanism. However, a well-designed PBR framework provides the profit maximizing utility with an enhanced incentive to find ways to reduce costs through the elimination of inefficiencies that might have otherwise persisted if the utility had continued operating in the status quo regulatory environment. A well-designed PBR framework also offers greater efficiency in the operation of the regulatory process by lengthening the period of time between costly and administratively burdensome rate cases. A utility under PBR might have two rate applications over a ten-year period, while a comparable utility could have as many as five over the same time period, depending on the jurisdictional ratemaking process. In principle, these incentives and a longer time period between regulatory proceedings than under cost-of-service (COS) regulation can be expected to lead to more efficient utility behavior, efficiency in the regulatory process, and benefits for all stakeholders, including customers of the regulated utility. This testimony evaluates whether the design of PSNH's proposed PBR framework is likely to produce these benefits.

Q. How do customers benefit from the utility's profit maximizing incentives under PBR?

A. One of the fundamental principles of PBR is that customers share in the benefits of incentive regulation. These benefits may occur contemporaneously during the operation of the plan

(i.e., *ex ante* benefits) or after the fact (i.e., *ex post* benefits). *Ex ante* benefits would include slower rate escalation and stability of rates as compared to alternative COS-based forms of regulation. *Ex post* benefits would include consumers realizing the fruits of more efficient utility behavior and efficiencies in the regulatory process through the rebasing of rates at the time the plan is reviewed.[4]

Q. Is there any evidence from other jurisdictions that price or revenue caps work to reduce price escalation for consumers?

A. Yes. In a recent paper published in *Utilities Policy*, I found (in collaboration with my colleague Dr. Mark Meitzen) that electric distribution utility customers in Alberta and Ontario, where utilities operate under price caps, experienced slower rate escalation than comparable utilities.[5] In a recent publication in *The Electricity Journal,* Ken Costello stated that "for a utility with normal operating efficiency, our model finds that long-run cost performance on average improves 0.51 percent more rapidly each year in an MRP with a five-year term and no earnings sharing than it does under traditional regulation when rate cases occur every three years."[6] In addition, extensive economics research in the telecommunications industry indicate productivity improvements among firms operating under price caps during the 1990s. The National Regulatory Research Institute found increased productivity among telecommunications companies operating under incentive regulation.[7]

[4] Typically, incentive regulation plans such as price cap plans are subject to a comprehensive review after a pre-determined number of years of operation—e.g., five years.
[5] Nick Crowley and Mark Meitzen, "Measuring the Price Impact of Price-Cap Regulation Among Canadian Electricity Distribution Utilities," *Utilities Policy*, 72 (2021).
[6] Kenneth W. Costello, "Multi-year rate plans are better than traditional ratemaking: Not so fast," *The Electricity Journal,* 36, (2023).
[7] Jaison R. Abel, "The Performance of the State Telecommunications Industry Under Price-Cap Regulation: An Assessment of the Empirical Evidence," NRRI 00-14, The National Regulatory Research Institute, September 2000.

Q. What are the potential risks of implementing a PBR framework?

A. A utility under PBR has enhanced cost efficiency incentives, but these incentives exist because the utility operates over a longer period of time between its rate cases. One result of spending more time between rate applications is reduced transparency into the company's spending. The regulator does not have the opportunity to review the utility's spending during the PBR term. Another risk is the divergence of costs and revenues. The utility takes this risk, as it cannot recover costs beyond what is allowed by the PBR framework during the years of the PBR term. In addition, in general, customers do not obtain the benefits of cost efficiencies until the end of the term when rates are reset. (However, as explained later, PSNH has proposed an earnings sharing mechanism that returns a portion of earnings 25 basis points above the allowed ROE to customers during the PBR term.)

3. Assessment of the Company's PBR Framework

Q. Please describe the key components of the Company's proposed PBR framework.

A. The Company has proposed a four-year "revenue cap" plan defined by an inflation rate and a capital supplement known as "K-bar", with new rates set at the start of each year of the PBR term. The plan also consists of other mechanisms common to PBR frameworks, including an ESM and PIMs. The plan does not include an off-ramp or re-opener for the first four years.[8] An off-ramp is a mechanism by which the revenue cap can be terminated as a result of unforeseen circumstances during the term of the plan that would threaten the financial integrity of the company or harm service to customers. Table 1 summarizes the company's proposed PBR elements.

[8] Attachment NAC-DPM-3 (Response to Data Request No. DOE 6-126).

Table 1: Summary of PSNH's PBR Framework

PBR Component	Proposed Approach
Indexed Cap	"Revenue Cap"
Inflation Measure	GDP-PI
X Factor	0.00%
Capital Supplement	K-Bar
Exogenous Costs	Yes
Earnings-Sharing Mechanism	75/25 split, 25 bps deadband
Off ramp/Re-Opener	None
Consumer Dividend	0.15%
PIMs	Two penalty-only PIMs
PBR Term	4 years

Q. Please demonstrate how each of these components fit together to calculate PSNH's revenue requirement in a given year of the PBR term.

A. The Testimony of Douglas W. Foley, Robert S. Coates, and Douglas P. Horton provides the following simplified formula for Eversource's PBR framework (Equation 1).[9] Note that "CD" stands for "Consumer Dividend" in this formula, and is synonymous with the term "stretch factor."

[9] Testimony of Douglas W. Foley, Robert S. Coates, and Douglas P. Horton. P. 36, Bates 01380.

$$Rev\ Requirement_t = \left(Rev\ Requirement_{t-1}\ x\ (1 + I_t - X - CD)\right) + Z_t + K_t + ESM_t \quad (1)$$

Where:

Rev Requirement$_t$ = the revenue requirement in the current (forecast) period

Rev Requirement$_{t-1}$ = the approved revenue requirement in the prior period

I = GDP-PI and must be non-negative

X = Zero

CD = 0.15 when I exceeds 2 percent

Z = an exogenous cost adjustment

K_t = a capital revenue adjustment

ESM = earnings sharing adjustment

Q. Please explain how PSNH has proposed to adjust rates under its "revenue cap" framework.

A. Setting aside the K-bar mechanism for the sake of simplicity, PSNH has proposed to set its rates according to a revenue requirement that adjusts each year according to the rate of inflation, as measured by the gross domestic product price index (GDP-PI). The billing determinants used to set rates, however, will remain static—equal to the test year billing determinants—over the PBR term. In other words, the revenue requirement will be adjusted by an inflation rate each year, but the test year billing determinants will not be updated for the most recent year. This approach differentiates the proposed plan for New Hampshire from Eversource's plan in place in Massachusetts, where Eversource operates under revenue decoupling. In Massachusetts, the Company's revenue decoupling mechanism effectively imposes a cap on revenue by adjusting customer volumetric charges each year such that revenue is set equal to the allowed revenue established by I-X.

Q. Given the rate-setting structure of the proposed framework, has Eversource filed a true revenue cap plan?

A. No. If PSNH sets its rates based on static historical test year billing determinants and updates the revenue requirement each year, the Company's prices, but not revenue, will be capped under its proposed plan. This is because, if billing determinants grow, realized revenues will also grow to be larger than the revenue requirement set by the I-X formula. Consider Table 2, which provides an illustrative demonstration of how a formula that caps a revenue requirement, but does not adjust for billing determinants, caps prices rather than revenues. The example uses simplified numbers and only one billing determinant (kWh). Column A depicts a prototypical company's revenue requirement under the framework proposed by PSNH: in Year 1 (for purposes of this example), the prototypical company's revenue requirement is equal to 1,000 and is adjusted each year only by a two percent rate of inflation. Column B depicts the company's test year billing determinants of 10,000 kWh. Importantly, this number is set equal to the test year value in all years—not just the first year—as defined by PSNH's proposed plan. Column C depicts the prototypical company's realized sales volumes in terms of kWh. This value varies year to year. Column D calculates the average rate faced by customers in each year of the PBR plan, equal to the company's revenue requirement—which is adjusted each year by inflation—divided by the test year billing determinant of 10,000 kWh, which is unchanging over the PBR term. Finally, column E calculates the company's actual revenues, equal to customer rates in column D multiplied by actual kWh in column C. Although customer *prices* in this revenue requirement are implicitly capped by the cap on the company's revenue requirement, realized *revenues* are not capped. As the table demonstrates, the company's actual revenues can exceed the so-

called "cap" on revenue requirements in each year of the plan. PSNH has filed a kind of price cap, not a revenue cap.

Table 2:

Demonstration that Proposed PBR Mechanism Does Not Cap Actual Revenue

	A	B	C	D=(A/B)	E=(C*D)
Term Year	**Revenue Requirement**	**Test Year kWh**	**Actual kWh**	**Rate ($/kWh)**	**Actual Revenue**
Year 1	1,000	10,000	10,000	0.100	1,000
Year 2	1,020	10,000	10,300	0.102	1,051
Year 3	1,041	10,000	10,609	0.104	1,105
Year 4	1,062	10,000	10,927	0.106	1,161
Year 5	1,089	10,000	11,255	0.109	1,225

Q. In general, does the specification of the PBR formula differ between a price cap and a revenue cap?

A. Yes. Both price and revenue caps rely on a formula that has the general form of "I – X," where I is a measure of input inflation and X is a measure of productivity growth. However, the X factor, which is determined through a calculation of total factor productivity (TFP) growth, generally differs between price and revenue caps. This is because the output measure used to calculate the X factor for a revenue cap is generally "annual growth in the number of customers served," while the output measure for a price cap should reflect the elements of output associated with customer prices—i.e., billed output—because those are the elements of output whose prices are being constrained by the cap.[10] If the growth rate in number of customers served differs from the growth rate of a weighted average index of billed output,

[10] For example, see Laurits R. Christensen, Philip E. Schoech, and Mark E. Meitzen, "Total Factor Productivity in the Telecommunications Industry," in *International Handbook on Telecommunications Economics*, G. Madden and S. Savage, eds., 2003.

which would include energy (kWh), demand (kW), and customers served, then the TFP growth measure will differ, and, consequently, the X factor will differ. Furthermore, as recognized by PSNH,[11] a principled revenue cap formula contains an additional factor to account for the growth rate in customers served, while a price cap formula contains no such explicit growth factor since under a price cap growth is accounted for in revenues through an increase in billing determinants. These differences in the specification of the PBR formula make sense: since prices and revenues are separate components of a utility's remuneration framework, the constraint on the growth of revenues should not be expected to be identical to the percentage change in prices.

Q. Should PSNH include a "customer growth" factor in its PBR formula if it operates without revenue decoupling?

A. No. Witness Augustin Ros is correct that a principled revenue cap formula includes a factor for the growth rate in number of customers served.[12] Witness Ros states that, "Without a customer growth factor in the PBR plan, the Company may be unfairly penalized (rewarded) for customer growth (declines)."[13] While this is true, it is not germane to Eversource's proposed PBR framework, which is a price cap. The PBR formula for a price cap does not include such a factor.

The Company has proposed not to include a "customer growth" factor in its plan, as filed. Therefore, the specification of the PBR formula is correct, as filed. However, it is important to understand the issue. The Company is not taking a voluntary reduction in revenue growth because of its proposal to exclude a factor for growth in the number of customers served. In

[11] Testimony of Douglas W. Foley, Robert S. Coates, and Douglas P. Horton. P. 87, Bates 01431.
[12] Attachment ES-AR-1, p. 21, Bates 01826.
[13] Attachment ES-AR-1, p. 41, Bates 01826.

other words, the absence of a growth factor should not be considered an implicit stretch factor in this case.

Q. Should PSNH include a "customer growth" factor in its PBR formula if revenue decoupling is imposed on the company?

A. Yes. If the Company operates under revenue decoupling, rates will be adjusted each year such that the Company earns the revenue requirement determined by the I-X formula. The PBR formula under this approach would be appropriately calibrated as a revenue cap. For the reasons provided in the testimony of Witness Augustin Ros, a customer growth factor is a component of a revenue cap plan.[14] Therefore, the Company's proposal to include a factor for the growth rate of customers served, if revenue decoupling is imposed, is correct.

Q. What tariff changes related to remuneration does PSNH propose in conjunction with its proposed PBR plan?

A. PSNH has operated with several cost trackers and reconciling mechanisms that it proposes to eliminate in its transition to PBR. The Company's Regulatory Reconciliation Adjustment (RRA) tracks the costs of six categories: (1) Regulatory Assessments and Consultant Costs; (2) Property Taxes; (3) Vegetation Management; (4) Storm Cost LTD True-Up; (5) Lost Base Revenues related to Net Metering; and (6) Rate Case Expenses. The Company is allowed to collect revenue through individual reconciliation mechanisms for each of these categories. Likewise, the Company's Pole Purchase Adjustment Mechanism (PPAM) annually reconciles costs resulting from the CCI pole purchase and specifically associated with pole replacement, inspections, pole attachment, and vegetation management. Finally, PSNH collects Lost Base Revenues associated with energy efficiency under a System

[14] Attachment ES-AR-1, p. 21, Bates 01826.

Benefits Charge. Under its proposed framework, the costs associated with most (but not all) of these categories would instead be included in base revenues and adjusted each year by the PBR formula.[15] For three cost categories—lost revenues associated with net metering and energy efficiency, as well as the PPAM—PSNH has proposed that these costs would not be included in base rates, nor would the corresponding reconciliation mechanisms continue.

Q. What are the expected consequences of eliminating these reconciling mechanisms?

A. The purpose of reconciling mechanisms is to provide a utility with the opportunity to track and eventually recover costs associated with specific spending categories. The removal of such mechanisms does two things. First, it increases the Company's base revenue requirement, as these costs are incorporated in the Company's revenue requirement rather than tracked outside of the revenue requirement. Witness Kolesar refers to this expanded revenue requirement as the "spending envelope" under PBR. Second, it introduces risk that the Company may incur higher than expected costs that can no longer be recovered through reconciling mechanisms. Thus, the increase in the Company's base revenue requirement is balanced by the removal of these tracking mechanisms. Under the proposed approach, such costs must instead be managed within the limits of the allotted spending envelope.

Q. Please summarize your findings regarding PSNH's proposed PBR formula.

A. Some of the supporting evidence behind PSNH's proposed PBR formula is not correct. As explained above, PSNH's plan is in fact a form of price cap, because prices are capped but revenues are not capped. However, the formula, as filed, is reasonable because the Company's prices are capped over the PBR term, and price caps are a reasonable form of PBR.

[15] Attachment NAC-DPM-4 (Data Request Response Attachment OCA 2-017).

Q. Why is the Company's proposed PBR formula reasonable, and why is it necessary to understand the underlying issues if it is reasonable?

A. A price cap is a widely accepted PBR mechanism, and it is an equally valid form of PBR relative to a revenue cap. It is important to recognize the differences between these PBR approaches, but one is not inherently superior to the other. We provide more detail on the difference between price caps and revenue caps later in this testimony.

The Company's PBR formula contains many common elements of price and revenue cap plans. As explained in Section 4, the proposed X factor of 0.00% is acceptable, because the empirical X factor is negative. The plan's additional elements are also discussed in subsequent sections of this testimony. It is important to understand the details because context is important and because setting a PBR plan according to economic principles is key to establishing just and reasonable rates under a construct that provides enhanced incentives. The proposed PBR formula is acceptable, but for the sake of precedent, technical issues with the methodology raised in later sections should not be implicitly accepted in the Commission's decision.

4. Assessment of the Total Factor Productivity and Benchmarking Studies

Q. What is the purpose of including a Total Factor Productivity (TFP) growth study as part of a PBR filing?

A. A TFP growth study measures the industry's annual average output quantity growth minus input quantity growth. This measurement of productivity provides the empirical basis for setting the X factor in a company's revenue or price cap formula (see Equation 1). Along with inflation, the X factor adjusts an indexed cap on an annual basis so that the utility is allowed to set prices in a way that mimics a competitive market. If the indexed cap was set

equal to the rate of inflation with no X factor, the utility would be adjusting prices according to the change in input prices, with no consideration for industry-wide changes in productivity (i.e., changes in output quantities relative to changes in input quantities). For example, if input quantities across the industry increase, perhaps because of major, necessary capital projects, while the input *prices* associated with installing that capital remain flat, the indexed cap plan would not allow for rate adjustments needed to cover the increased inputs put in place by the firm. This is particularly applicable to the electric distribution industry, which has faced growing input quantity needs in recent years. Therefore, TFP growth studies are necessary for the calibration of price and revenue cap formulas that reflect industry conditions.

Q. Does PSNH set its proposed X factor using a TFP growth study?

A. No. Witness Ros has filed a TFP growth study, but PSNH does not rely on this study to set the X factor. Instead, the Company has proposed an X factor of 0.00%, citing the TFP growth study by Witness Ros as evidence that the empirical X factor is negative.[16]

Q. Given that TFP growth studies are necessary for calibrating price cap formulas that reflect industry conditions, is it problematic that PSNH does not rely on a TFP study to set its X factor?

A. PBR frameworks across North America regularly deviate from the empirical X factor. This is because PBR frameworks generally include additional factors beyond I and X, like capital supplements, that affect rates each year in a way that does not precisely align with the underlying economic theory of price caps.[17] In setting the X factor equal to a value other than

[16] Testimony of Douglas W. Foley, Robert S. Coates, and Douglas P. Horton. P. 47, Bates 01391.
[17] See Mark E. Meitzen, Philip E. Schoech, and Dennis L. Weisman, "The Alphabet of PBR in Electric Power: Why X Does Not Tell the Whole Story," The Electricity Journal, 30 (2017) 30-37.

industry TFP growth (i.e., zero), PSNH has calibrated its PBR formula such that annual rate adjustments do not reflect industry productivity conditions, and instead would result in rates that increase more slowly than the broader distribution sector. However, PSNH has also included a capital supplement (K-bar) that is designed to provide additional revenue beyond the I-X adjustment. In taking this approach, PSNH has proposed that rate adjustments do not equal the rate growth that would be exhibited in a competitive market. Instead, the proposed formula used to adjust rates has been calibrated in the context of the Company's own cost experience.

As in other jurisdictions where PBR exists with capital supplements, the proposed PBR formula may still result in rates that are just and reasonable over the four-year term if each additional component of the PBR framework proves to be reasonable in the context of the whole plan. While a pure indexed cap approach would rely only on exogenous industry-wide information to adjust rates, a utility may have a cost experience that differs from that of the distribution sector, thereby warranting rate adjustments that deviate from the industry average in the short run. It is therefore acceptable that PSNH does not rely on a TFP study to set its X factor. However, this approach makes the evaluation of the Company's PBR framework less straightforward and shifts the focus of the analysis onto other elements of the proposed plan.

Q. Will PSNH customers experience slower rate growth than the industry average under the proposed PBR framework?

A. Not necessarily. Recent productivity studies indicate negative TFP growth in the electric distribution sector. As explained in Section 3, negative TFP growth generally corresponds to a negative X factor in a price cap formula, which means customer prices are permitted to

increase each year at a rate above the rate of inflation. Customer rates will increase more slowly than the industry average when the industry is experiencing negative TFP growth and the price cap X factor is set equal to 0.00%, all else equal.

However, PSNH has filed a capital supplement known as K-bar, which provides revenue support beyond the annual I-X adjustment. This capital supplement allows the Company to collect revenue such that rate growth may exceed the industry's average rate growth. This is explained in more detail in Section 5.

Q. Given that the X factor is not set using an empirical TFP growth study, does the proposed PBR formula generate the cost efficiency incentives that PBR is supposed to provide?

A. Yes. According to the principles of incentive regulation, a price cap will provide cost efficiency incentives to a regulated utility regardless of the value chosen to set the X factor. The purpose of calibrating the X factor with industry TFP growth data is to set price (or revenue) growth such that the utility is able to operate over an extended period of time without filing a rate application while maintaining just and reasonable rates. An X factor that is not calibrated correctly will not affect cost efficiency incentives, but it could result in rates that either do not grow quickly enough to support prudent spending or grow too quickly, resulting in unjust or unreasonable rates.

Q. Do you recommend changes to the TFP growth study or the proposed X factor?

A. As discussed in Section 3, if the Company were setting the X factor based on industry data rather than electing to set the X factor at 0.00%, the TFP growth study may need to be updated so that the output index reflects PSNH's billable outputs. In particular, the output index should be a weighted average of the growth in number of customers, sales volumes

(kWh), and peak demand (kW). However, since PSNH has proposed to set the X factor equal to 0.00%, such an adjustment to the TFP growth study is not necessary.

Q. What is the purpose of including a cost benchmarking study as part of a PBR filing?

A. Cost benchmarking studies are generally applied in PBR filings as a tool to establish a stretch factor (also known as a consumer dividend). A cost benchmarking study provides a means of understanding a particular company's level of efficiency by comparing the costs of its operations to the costs experienced by other utilities in the same industry, controlling for exogenous factors that influence cost. This information is useful in the context of calibrating a PBR formula because it can inform assumptions about what efficiency improvements might be expected under a more high-powered regulatory construct. If a utility under cost-of-service exhibits less efficient cost control relative to its peers, the regulator may assume that the company has the ability to find efficiency gains upon switching to PBR. If a utility appears to be more cost-efficient relative to its peers prior to beginning the PBR term, its ability to find efficiency gains may be more limited. This information translates into the magnitude of the utility's stretch factor.

Q. What is the purpose of including a stretch factor in a PBR framework?

A. As shown in Equation (1), a consumer dividend is an additional element of the PBR formula that adjusts the utility's allowed revenue on an annual basis. Specifically, a consumer dividend is a percentage value that, like the X factor, offsets inflation, slowing allowed revenue growth each year, thereby providing customers with immediate benefits over the PBR term. One rationale behind the consumer dividend is that it reflects the regulated utility's expected future gains in productivity resulting from the move from cost-of-service to incentive regulation.

Q. What are the results of PSNH's unit cost benchmarking analysis?

A. Witness Ros conducted two cost benchmarking analyses: a unit cost analysis and an econometric analysis. The unit cost approach simply calculates each company's total cost per customer and compares it to the industry average. According to the unit cost analysis, PSNH's unit cost between 2000 and 2022 averaged $332.62 per customer, while the electric industry average unit cost during the same period was $323.26 per customer. The analysis demonstrates PSNH's average unit cost was $9.35 per customer, or 2.89 percent higher, than the industry average. The workpapers underlying this analysis show that PSNH ranks 52 out of the 87 utilities in the sample, implying that approximately 60% of companies have lower unit costs than PSNH.

Q. What are the results of PSNH's econometric cost benchmarking analysis?

A. A correct econometric analysis isolates each company's level of efficiency relative to the industry average. In practice, it involves comparing PSNH's actual costs to the costs predicted by a model that accounts for cost-driving factors that PSNH cannot control. Dr. Ros estimates his econometric model using two different approaches. The result of this analysis, as reported by Witness Ros, is that the Company's performance is near the industry average. However, as discussed below, this analysis is flawed.

Q. What is your understanding of why Witness Ros conducted an econometric cost benchmarking analysis, rather than relying solely on a unit cost approach?

A. The goal of a cost benchmarking study for the purpose of setting a stretch factor is to estimate a company's level of efficiency relative to its peers. Witness Ros's unit cost analysis quantifies the cost burden borne by customers but does not measure efficiency as it does not account for factors outside of the utility's control that might explain the difference in costs

across companies. For instance, a utility might have a high cost per customer because it operates in a larger service territory area that requires more capital investment per customer. Dr. Ros's econometric analysis includes controls for utilities' total customers and MWh as well as the share of plant allocated to distribution. When all relevant controls are included, the implication is that the portion of cost that cannot be explained by these exogenous factors, known as the "residual," is due to differences in efficiency.

Q. How does Witness Ros estimate his econometric model?

A. Witness Ros estimates his model using an ordinary least squares (OLS) estimator as well as a fixed effects (FE) estimator. The FE estimator is Witness Ros's preferred approach.

Q. What is your understanding of why Witness Ros estimated his econometric model using two approaches?

A. OLS is a commonly used estimator in econometrics and has been used by experts in other proceedings to estimate cost benchmarking models for the purpose of setting stretch factors. However, Witness Ros claims that this approach may not control for many other factors that are outside of the utility's control and affect costs. He suggests that omitting these factors will lead to an "omitted variable bias" problem, which will lead to misleading benchmarking results that can be explained by these omitted factors. For instance, as mentioned above, a utility may operate in a larger service territory area, or an area with highly forested terrain that is costlier to maintain. If the model does not include these factors as controls, a utility will be assumed to be inefficient when its costs can be explained by factors outside of its control that are unrelated to its performance. Dr. Ros attempts to solve this omitted variable problem with a FE estimator, which controls for any omitted variable that is fixed over time.

Q. Is the fixed effects model employed by Witness Ros estimating PSNH's cost performance relative to the electricity distribution industry?

A. No. Instead of estimating the Company's unexplained cost relative to the industry average, the FE estimator employed by Witness Ros estimates the Company's unexplained cost relative to *its own* average. This is not useful from a cost benchmarking perspective.

Q. Please explain further how Witness Ros's fixed effects approach does not compare PSNH's cost performance to the industry, but instead compares its cost performance to its own average.

A. A FE estimator is used to obtain more accurate estimates of model coefficients. It is identical to OLS, with the exception that it analyzes the relationship between variables that have been demeaned; and, importantly, the mean that is subtracted from each variable is specific to the company. For instance, total costs for PSNH in 2023 are replaced by PSNH's total costs in 2023 minus the average of PSNH's total costs over the 2000-2023 sample period. One effect that results from demeaning the data in this way is that confounding factors that are fixed over time do not influence the coefficient estimates, as they do not vary within companies over time. However, Witness Ros is not using the FE estimator solely to obtain better estimates of model coefficients. For instance, he is not interested in simply obtaining a more accurate estimate of how changes in total customers influence total costs. The object of interest in a cost benchmarking model is the residual, as this represents the level of costs that are unexplained by the model's variables, yielding an estimate of the company's relative efficiency level. But because a company's data are adjusted so that they are defined relative to the company's own average, the interpretation of the residual in a FE regression changes: it is no longer the company's efficiency relative to the average efficiency in the industry, but

is instead the company's efficiency relative to *its own average efficiency*. Thus, in effect, it is not benchmarking PSNH's costs against the industry but rather, against itself. The numbers presented in the second column of Table 6 of Witness Ros's testimony are, with the exception of two erroneous modifications explained below, simply the difference between the Company's own cost performance in a given year and the Company's average cost performance in the sample. The bottom line of the table takes the average of this difference.

Q. If Witness Ros's preferred econometric approach simply compares PSNH's cost performance each year to PSNH's average cost performance over all years, why does Witness Ros's Table 6 report an average cost difference of +0.18%, rather than 0.00%?

A. By definition, the average difference between a variable and its average over a sample is zero, so the number on the bottom line of Witness Ros's Table 6, column 2, should equal zero. However, the presentation of results in Table 6 does not reveal the benchmarking study's obvious problem because the presentation is obscured by two inappropriate modifications. First, Witness Ros estimated his econometric model using years 2000 through 2022, but then omitted the year 2000 from the average of the differences presented on the bottom line of his Table 6. Omitting this year, or any year from the average, will result in an average difference other than 0.00%.[18] Witness Ros acknowledges there is no justification for excluding the year 2000, as shown in his response to Data Request No. DOE 8-183.[19] When the year 2000 is included, PSNH's average performance implied by the FE estimator changes from 0.18% to -0.51%. As shown in Table 3b (in Attachment NAC-DPM-18) this -0.51%

[18] This can be demonstrated with a simple example. Consider the average of three numbers: 1, 2, and 6. The average of these numbers is 3. The difference of each number from the average is -2, -1, and +3, respectively. The average of these differences is (-2-1+3)/3 = 0. If we remove one of these numbers and take the average, we obtain an average difference of something other than zero: (-1+3)/2 = 1.
[19] Attachment NAC-DPM-5.

score is identical for all companies. That the average performance implied by the model is -0.51% for all companies demonstrates an error, since, using Witness Ros's interpretation of the results, this would imply that each and every company performs better than the industry average.

In fact, were it not for an adjustment by Witness Ros that obfuscates this error, the calculation would result in an average of 0.00% for all companies—which is expected given that the model compares each company's cost experience with its own average. The reason that the average residual for each company is -0.51% and not 0% is because Witness Ros makes an adjustment to the fitted values of his regression model that is not reasonable. Witness Ros adds the mean squared error of the residuals divided by 2 to each fitted value of his model. Witness Ros estimates his model in logs, meaning each variable in the model is replaced with its natural logarithm before estimation. In response to Data Request No. DOE 8-182,[20] Witness Ros cited work that notes such an adjustment is necessary when the researcher desires a particular interpretation of the residuals when a log model is converted into a level model. However, the Company's performance is quantified in log terms, as shown in the last line of Dr. Ros's code in Data Request No. DOE 8-182, and so such an adjustment is not necessary or appropriate. Even if Witness Ros were correct that this adjustment is necessary, however, his analysis is still clearly incorrect, given that it generates identical cost benchmarking results for every utility in his sample (see Attachment NAC-DPM-18), which is a mathematical impossibility if each company were being compared with the average in the sample.

[20] Attachment NAC-DPM-6

Q. If the two modifications described above are reversed, what are the benchmarking results of the econometric model?

A. To demonstrate the error in Witness Ros's testimony, we have recreated his analysis showing the impacts of correcting these two modifications. The impacts to the FE and OLS results are shown in Tables 3 and 4, respectively. The first column of Table 3 reproduces the "% Difference (Fixed Effects)" column of Dr. Ros's Table 6. The second column removes Dr. Ros's adjustment to the fitted values. At the bottom of the table, the average is calculated over 2001-2022, as well as over all years (2000-2022). When the fitted value adjustment is omitted and the average is taken across all years, the average percentage difference between PSNH's cost and the model's prediction falls from 0.18% to 0.00%. Table 3a (found in Attachment NAC-DPM-18) shows that Dr. Ros's model predicts benchmarking results of 0.00% for all companies in the sample when these corrections are made. This shows that a fixed effects model used in this way will always erroneously show a company to be an average performer, because the company's performance in a given year is being compared to its own average performance. Furthermore, as noted above, if Witness Ros's adjustment to the fitted values of the regression is made, the results show that every company's average percent difference between its cost and the model's prediction is 0.51% instead of 0%, as shown in Table 3b (in Attachment NAC-DPM-18). This would imply that each and every one of the 87 companies in the sample is 0.51% less efficient than the average, which cannot be true. This clearly demonstrates that the fixed effects approach is fundamentally flawed as implemented.

We repeat this exercise for the OLS approach in Table 4, showing that the Company's level of inefficiency rises from 5.49% above the average to 8.16% above the average.

Table 3: Corrected Benchmarking Results for the FE Model

Year	% Difference (Fixed Effects) - Original	% Difference (Fixed Effects) – No Adjustment
2000	-15.56%	-15.06%
2001	-12.07%	-11.57%
2002	-10.24%	-9.73%
2003	-9.11%	-8.60%
2004	-7.47%	-6.96%
2005	-8.66%	-8.16%
2006	-8.93%	-8.43%
2007	-8.29%	-7.78%
2008	-2.85%	-2.34%
2009	-1.42%	-0.92%
2010	0.59%	1.10%
2011	2.37%	2.88%
2012	2.29%	2.80%
2013	5.28%	5.79%
2014	2.26%	2.76%
2015	5.34%	5.84%
2016	6.53%	7.03%
2017	7.53%	8.04%
2018	3.29%	3.80%
2019	7.19%	7.70%
2020	11.43%	11.94%
2021	12.37%	12.88%
2022	6.47%	6.98%
2000 - 2022 Avg.	-0.51%	**0.00%**
2001 - 2022 Avg.	**0.18%**	0.68%

Table 4: Corrected Benchmarking Results for the OLS Model

Year	% Difference (OLS) - Original	% Difference (OLS) – No Adjustment
2000	-6.09%	-2.91%
2001	-4.23%	-1.05%
2002	-2.55%	0.62%
2003	-2.51%	0.66%
2004	-5.00%	-1.82%
2005	-6.81%	-3.63%
2006	-6.66%	-3.48%
2007	-6.00%	-2.83%
2008	0.63%	3.81%
2009	4.37%	7.54%
2010	4.96%	8.14%
2011	9.20%	12.38%
2012	9.36%	12.53%
2013	12.38%	15.56%
2014	9.43%	12.60%
2015	12.92%	16.10%
2016	14.22%	17.40%
2017	15.11%	18.29%
2018	5.97%	9.15%
2019	10.87%	14.04%
2020	15.88%	19.06%
2021	17.12%	20.29%
2022	12.07%	15.25%
2000 - 2022 Avg.	4.98%	**8.16%**
2001 - 2022 Avg.	**5.49%**	8.66%

Q. Is there an alternative to the FE approach that produces valid results?

A. While a fixed effects approach used to compare performance in levels as Dr. Ros does is incorrect, a similar method can be used to benchmark a company's performance *growth* relative to the industry. This achieves the intended goal of controlling for unobservable time-invariant factors like terrain, since any variable that is fixed for a company over time will not affect cost growth and so is implicitly controlled for, but shifts the analysis to a performance

metric that is estimable when unobservable time-invariant factors are controlled for: efficiency growth. In other words, in order to control for more omitted variables without additional data as Dr. Ros attempts to do, the dimension of the benchmarking study must change from a levels comparison to a growth comparison for the results to meaningfully summarize productivity differences across companies.

Q. What are the results of this alternative econometric approach?

A. The cost growth benchmarking results are shown in Table 3c (in Attachment NAC-DPM-18). PSNH's inefficiency growth is higher than average at 1.2%, corresponding to a ranking of 78 out of 87. This implies that roughly 88% of companies in the sample had superior performance growth over the sample period of 2000-2022.

Q. What are the implications of the corrected benchmarking results, with respect to PSNH's stretch factor?

A. Because the Company is proposing an X factor of zero despite Dr. Ros's estimated X factor of -1.42%, we do not recommend a higher stretch factor be imposed, given the significant implicit stretch factor already present. However, the company's standing relative to the industry should be clarified. Our corrections to Dr. Ros's analysis suggest that PSNH is about 8.2% less efficient in level terms than the industry controlling for the observable exogenous factors included in Witness Ros's study, rather than Dr. Ros's estimate of 5.5%, implying that roughly 62% of companies are more efficient than PSNH. This result may be influenced by exogenous cost drivers that are fixed over time, such as terrain, weather, the regulatory environment, or the size of the service territory area, as Dr. Ros suggests. In order to control for these variables without additional data, growth rates must be studied rather than levels. Our results suggest that PSNH's cost growth has been higher than average and ranks near the

bottom of the sample of companies included in Dr. Ros's analysis: roughly 88% of companies had lower cost growth over the sample.

While the calibration of a company's stretch factor is often cited as the purpose of a cost benchmarking study, other reasons for benchmarking costs also exist. Cost comparison information can be used to assess progress on affordability and cost control. Therefore, it is important to get the methodology right.

Q. How does PSNH's proposed stretch factor compare to other stretch factors in the Northeast?

A. Table 4 shows a summary of stretch factors from recent PBR frameworks accepted in Massachusetts. PSNH has proposed a lower stretch factor than most that exist in Massachusetts. However, it is important to consider the context of these stretch factors. In the first four PBR frameworks listed in this table, the accepted X factor was based on empirical computations of total factor productivity, which were negative. In this case, PSNH has requested an X factor of 0.00%, which would result in a revenue adjustment each year that is slower than these plans, all else equal. On the other hand, the first four plans depicted in the table did not include a K-bar capital supplement. In addition, PSNH's proposed plan caps prices, rather than revenue. For these reasons, PSNH's proposed stretch factor is not directly comparable to those in Table 4. However, the table provides some context for a reasonable range.

Table 5: Summary of Recent Massachusetts PBR Frameworks

Decision	Distribution Service	Term (Years)	Exogenous Factors	Consumer Dividend (bps)	ESM (Cust/Firm/Dead)*
D.P.U. 17-05	Electricity	5	Yes	25	75/25/200
D.P.U. 18-150	Electricity	5	Yes	40	75/25/200
D.P.U. 19-120	Natural Gas	10	Yes	15	75/25/100
D.P.U. 20-120	Natural Gas	5	Yes	30	75/25/200
D.P.U. 22-22	Electricity	5	Yes	25	75/25/100
D.P.U. 23-80	Electricity	5	Yes	25	75/25/100

*The first two numbers presented in this column represent the profit split between customers and the firm, while the third number represents the deadband, or ROE threshold, over which the company must share. Note that NSTAR Gas (D.P.U. 19-120) has a tiered ESM for its 10-year plan, in which profits 150 basis points (bps) above the allowed ROE are shared 50/50, and profits 200 bps above the allowed ROE are shared 75/25.

Q. What is your recommendation for a stretch factor for PSNH if the proposed framework is accepted?

A. Judgement is often the primary basis for setting a utility's stretch factor under PBR, and given the nature of PSNH's proposed filing, which deviates from a pure price cap formula by including additional plan elements such as K-bar and an ESM, establishing a stretch factor directly from empirical analysis may not be possible. Based on our judgement, informed by the corrected benchmarking study and on precedent in other jurisdictions, we recommend a stretch factor range between 15 and 35 basis points, with a midpoint of 25 basis points, compared to PSNH's proposed stretch factor of 15 basis points only when inflation exceeds 2 percent.

5. Evaluation of the Proposed K-Bar Mechanism

Q. What is your understanding of why PSNH filed a capital supplement as part of its PBR framework?

A. Capital supplements are common in PBR plans across jurisdictions in North America. As discussed above, under cost-of-service regulation, utilities may file applications before their

regulatory authority to recover prudently incurred costs on an as-needed basis. Under PBR, on the other hand, the utility is not permitted to file a rate applications during an extended "rate stay-out period"—in this case, four years. The longer a utility refrains from filing a rate application, the more likely that costs and revenues differ. The I-X formula exists to provide attrition relief to utilities over the rate stay-out period, but in recent years, as utility capital inputs have grown faster than the historical average, capital-related revenue needs have exceeded what can be recovered under the I-X cap over a long period of time. As a result, regulators have accepted mechanisms that provide supplemental revenue to utilities operating under PBR. These mechanisms differ by jurisdiction, and include K-bar (in Massachusetts and Alberta), capital trackers (in Ontario and Hawaii), and capital forecasts (British Columbia). Each such approach to providing supplemental capital has potential benefits and potential drawbacks. These mechanisms are discussed in greater detail in Attachment NAC-DPM-17.

Q. What is the history of the K-bar mechanism?

A. K-bar originated in Alberta, where distribution utilities operate under a price cap. The initial idea behind K-bar came from a paper that proposed a forecasted capital approach, under which utilities would forecast their capital spending over the five-year PBR term, and then recover the difference between the forecast and actual revenue obtained under the I-X formula.[21] The Alberta Utilities Commission (AUC) adjusted this proposed approach by setting revenue recovery with the historically driven formula now known as K-bar, rather than relying on a forecast from each utility. The Alberta distributors began using this

[21] "Sappington, David and Weisman, Dennis, Assessing the Treatment of Capital Expenditures in Performance-Based Regulation Plans," September 1, 2015.

revenue adjustment mechanism in the second generation PBR framework, after a capital tracker approach in the first generation generated an excessive regulatory burden for both the companies and the AUC.[22] The goal of K-bar was to apply a formulaic approach to supplemental capital in order to simplify the capital recovery process relative to capital trackers.[23] In 2022, the Massachusetts Department of Public Utilities approved Eversource's proposed K-bar mechanism.[24] The mechanism was also approved for Unitil in Massachusetts in 2024.[25]

Q. How does K-bar differ from other forms of capital supplements?

A. In contrast to most mechanisms that provide supplemental revenue for capital spending under PBR, K-bar does not rely on actual spending in the current year to determine the utility's revenue requirement. Capital trackers, which are a common tool to provide utilities with additional revenue, set supplemental revenue equal to the utility's current year spending. A capital tracker reduces the cost efficiency incentives of PBR by nudging the utility back in the direction of cost-of-service regulation (i.e., if the utility spends on capital, it can recover the cost and place the associated plant into rate base; if it does not spend money, it does not collect revenue and does not place the plant into rate base). K-bar sets revenue according to historical spending, rather than current year spending. The assumption is that spending in recent history is representative of spending needs in the near future. By setting revenue according to a historical spending trajectory, the utility has a profit incentive to reduce capital spending over the PBR term. This is a cost efficiency incentive that capital trackers do not provide. In addition, K-bar has a relatively low administrative burden during the PBR term,

[22] AUC 20414-D01-2016, December 16, 2016, p. 7.
[23] Capital tracking mechanisms require a "mini rate case" each year in order to justify costs.
[24] Massachusetts D.P.U. 22-22, at 66.
[25] Massachusetts D.P.U. 23-80/81, at 44.

as annual capital tracker filings are not necessary. For these reasons, K-bar is seen as aligning with the principles of PBR.

Q. What are the risks associated with K-bar?

A. We note two risks associated with K-bar. First, because K-bar is based on historical spending, rather than current spending, the utility operating under K-bar may end up with costs that differ from allowed revenue. Much like PBR more broadly, K-bar reflects a tradeoff between providing cost efficiency incentives and separating the utility's spending from its allowed revenue for a period of time. From the customer perspective, this means that rates may be temporarily set at a level that is higher than necessary for the provision of safe and reliable service. The converse of this is a risk to the utility: that revenue could be temporarily insufficient. This risk can be mitigated by comparing K-bar revenue forecasts with the Company's actual spending forecast—as PSNH has done—and calibrating the K-bar formula accordingly.

Second, a risk associated with K-bar's incentive to reduce spending is that the utility might reduce spending to the detriment of customers. For example, a utility could determine that it can increase profits by eliminating spending that is necessary to provide safe and reliable service of electricity. This risk can be mitigated through the introduction of PIMs that penalize the utility for service quality degradation.

Q. Does PSNH need a capital supplement as a component of its PBR framework?

A. PSNH proposes to operate under a four-year PBR term in which rates are adjusted by an I-X formula, with an X factor equal to zero. As discussed, recent TFP growth studies indicate that the empirical X factor is in fact negative, reflecting input growth in the electricity distribution industry that have given rise to revenue needs that have grown faster than the

rate of economy-wide inflation. Based on these studies, a revenue cap with a zero X factor, as proposed by PSNH, would not be expected to provide the company with sufficient revenue support to make the PBR work over an extended stay-out period. In addition, the Company has outlined capital investment needs that will exceed the rate of GDP-PI inflation over the four-year PBR term.[26] Given these conditions, it is reasonable to include a capital supplement in PSNH's PBR framework.

Q. How does PSNH's proposed K-bar work?

A. The K-bar mechanism provides the Company with revenue beyond its base revenue requirement as adjusted each year by the I-X formula. The amount of additional revenue is calculated as follows:

Step 1: Calculate the "going in" capital-related revenue requirement that is recovered in the base rates under the I-X mechanism for the first year of the PBR term. This is the sum of the Company's depreciation expense, the return on rate base, and property taxes.

Step 2: Establish the percentage change in revenue collected under the I-X formula, which in this case is set equal to GDP-PI minus zero.

Step 3: Determine the capital recovery supported by I-X for a given year by inflating the "going in" capital revenue requirement by GDP-PI.

Step 4: Calculate the notional revenue requirement for capital expenditures the year, based on historical capital spending.

i. Obtain capital additions for each of the past three years.
ii. Inflate each of the capital additions to current dollars using the approved I-X formula, with the approved I factor for each year and the approved X factor for the prior generation PBR plan.
iii. Using the inflated capital additions, calculate the average K-bar capital additions over the historical three-year period.
iv. Inflate the average K-bar capital additions to the current year using the new approved I-X formula.

[26] Attachment NAC-DPM-7 (Data Request Response Attachment DOE 6-121, p. 2).

v. Calculate the amount of K-bar capital cost incurred for the current year as the sum of depreciation, return on rate base, and property taxes, based on the current year capital additions from the prior sub-step.

Step 5: Calculate the base K-bar. Calculate the difference between the current year K-bar capital-related revenue requirement required on a projected basis (from Step 4) and the current year K-bar capital-related revenue requirement recovered in the base rates (from Step 3). The result is the capital funding shortfall or surplus amount for the current year.

The Company will adjust rates according to the K-bar calculation as part of its annual rate adjustment filing each year of the PBR term. Determinations of prudency for capital spending during the PBR term will not occur until the Company's next rate application.[27] Revenue collected through K-bar will not be clawed back, even if projects are later deemed imprudent.

Q. Does this approach to K-bar differ from how K-bar is implemented in other jurisdictions?

A. Yes. The methodology differs from the implementation of K-bar in Alberta in three ways. First, PSNH's approach relies on a rolling average of historical capital additions for Step 4, whereas the methodology in Alberta uses a historical average of capital additions that remains fixed over the duration of the PBR term. Second, PSNH uses three years of historical data to calculate the K-bar revenue requirement in Step 4, whereas a five-year period is used in Alberta. Third, PSNH has proposed to cap the amount of capital additions eligible for inclusion in the K-bar historical average at ten percent the forecasted spending amount for that year, as set forth in the Company's four-year spending plan. PSNH's methodology also differs from the implementation in Massachusetts. In Massachusetts, Eversource and Unitil use a five-year rolling average of historical data to calculate the K-bar revenue requirement, rather than a three-year rolling average.

[27] Attachment NAC-DPM-8 (Response to Data Request No. DOE 6-125).

Q. What is your understanding of why the Company proposed a methodology that uses a three-year rolling average to set the K-bar revenue requirement rather than the five-year fixed average that is used in the original Alberta K-bar methodology?

A. Setting the K-bar revenue requirement using a three-year rolling average provides PSNH with more revenue than a fixed five-year average. The Company has demonstrated that a historical average of five years would result in insufficient revenue relative to the Company's capital spending forecast.[28] Furthermore, PSNH proposes to use a rolling average, rather than a fixed average, because "the rolling-average K-bar provides customers protection from annual rate increases that do not reflect recent capital investment levels and mitigates the magnitude of rate adjustments."[29] In other words, a rolling average provides the Company with a K-bar revenue requirement that is more reflective of current capital spending than an average that is fixed over a historical time period. In the Alberta methodology, a company's K-bar revenue requirement could be based on capital additions information that is as old as nine years prior to the current year, if the company is in year 4 of the PBR term. Whether more recent data is justifiable depends on whether recent spending data reflects future spending more accurately than older spending data.

Q. What is your understanding of why the Company proposed a cap on spending that can be included in the rolling average used to calculate the K-bar revenue requirement?

A. The Company stated that the cap on spending that can be included in the rolling average used to calculate the K-bar revenue requirement was included, to further protect customers from

[28] Attachment NAC-DPM-9 (Response to Data Request No. DOE 6-121).
[29] Testimony of Douglas W. Foley, Robert S. Coates, and Douglas P. Horton, p. 52, Bates 01396.

substantial rate increases in the event the Company is required to make significant capital investments in a single year.[30]

Q. From a theoretical standpoint, are PSNH's changes to the original Alberta methodology for K-bar reasonable?

A. A fixed historical average of five years provides similar, though not identical, cost efficiency incentives in comparison to a rolling three-year average. Both approaches provide superior incentives relative to traditional capital trackers. The rolling average provides a slight incentive for the Company to spend more capital during the PBR term, since the Company can recoup a fraction of the expenditure through the K-bar mechanism under this approach. However, under either approach, after the PBR term ends the Company will not recover capital-related revenue for projects deemed imprudent by the Commission at the end of the PBR term. Imprudent capital projects will not be included in rate base going forward. This means the Company will not be able to collect any revenue associated with the depreciation expense and return on rate base of imprudent projects after the conclusion of the PBR term. This provides consumers protection from possible gold-plating of long-lived assets by the Company.[31] The proposed cap on the amount of spending that can be included in the rolling average provides additional protection to consumers. From a theoretical perspective, the approach is reasonable.

[30] Testimony of Douglas W. Foley, Robert S. Coates, and Douglas P. Horton, p. 53, Bates 01397.
[31] One risk, however, is that short-lived capital investments could be fully recovered under K-bar before the end of the PBR term. If this occurs, the Company would effectively avoid a prudency review for these investments.

Q. From an empirical standpoint, are PSNH's changes to the original Alberta methodology for K-bar reasonable?

A. We must evaluate which methodology—a three-year rolling average or a five-year fixed average—more accurately provides the revenue necessary to meet the Company's prudent spending needs over the PBR term. A concern associated with using a three-year average to set K-bar revenue is that recent capital spending by the Company has been above average, and therefore not representative of future spending needs.[32] Indeed, the Company has shown that the three-year average will provide more revenue over the PBR term. Specifically, in response to Data Request DOE 6-121, the Company demonstrated that a five-year rolling average approach would not provide sufficient revenue relative to the PSNH spending plan. Regarding this concern, Witness Kolesar stated that the three-year rolling average "is reasonable given that the industry is in transition and capital additions are now more difficult to forecast; and recognizing that capital needs are growing to provide for grid modernization and other requirements to support the energy transition and decarbonization objectives."[33] We agree. However, the spending needs demonstrated in response to Data Request DOE 6-121 also demonstrate that a three-year average does not provide sufficient revenue relative to PSNH's spending plan, which calls into question whether any historical average would provide the Company with adequate revenue for its spending plan under PBR. Therefore, from an empirical perspective, the Company's proposed approach is questionable.

[32] Attachment NAC-DPM-9. Also see Attachment NAC-DPM-10 (Responses to Data Request No. DOE 6-121 and Data Request No. DOE 14-263).
[33] Attachment ES-MK-1, p. 19.

Q. Is K-bar the best form of capital supplement for PSNH?

A. As discussed, the K-bar approach offers a cost efficiency incentive advantage over capital trackers. As recognized by the Alberta Utilities Commission, K-bar also minimizes the Company's ability to "game" the PBR system because it uses historical data.[34] There is no risk of over-inflated forecasts driving up the Company's revenue requirement during the PBR term. A drawback to the proposed K-bar mechanism is that a company's historical capital spending may not accurately forecast future spending. While there is no theoretical reason that K-bar should be rejected, whether the mechanism is accepted should be based at least partially on the accuracy of the historical spending pattern to meet future spending needs. If the proposal is accepted, the Company will need to find a way to operate successfully under the restricted revenue trajectory, as it will not be able to request additional revenue during the PBR term. Given this concern, we offer an alternative approach that relies on the Company's current spending forecast as a basis for K-bar revenue, rather than the Company's historical spending data. We discuss this in more detail in Section 9.

6. Revenue Decoupling

Q. Has PSNH filed a revenue decoupling mechanism methodology as part of its rate application?

A. Yes, PSNH has filed a revenue decoupling methodology. However, the Company does not propose to implement this methodology.

[34] Alberta Utilities Commission, Decision 20414-D01-2016, December 16, 2016, p. 64.

Q. How does the implementation of revenue decoupling relate to PSNH's proposed PBR framework?

A. Revenue decoupling, as it is generally implemented, is not a requirement for implementing a revenue cap plan, nor for PBR frameworks more generally, but, if implemented, a revenue decoupling mechanism will affect rates set by the PBR formula. As explained in Section 3, if PSNH does not implement revenue decoupling, the Company's PBR framework, as proposed, will not be a revenue cap plan. Instead, the PBR framework will be a form of price cap. This is because PSNH has proposed that test year billing determinants will be used to set rates for all years of the plan. If the Company's revenue requirement is adjusted each year by I-X, but billing determinants do not change because they are fixed at the test year quantities, then higher sales during the PBR term could result in realized revenue above the revenue requirement adjusted by I-X. Therefore, revenue would not be capped, but prices would be capped. Under revenue decoupling, as applied in Massachusetts, the volumetric rate would be adjusted each year such that revenue is, in fact, capped.

Q. Does PSNH need to implement revenue decoupling in order to operate under a revenue cap?

A. Not necessarily. Revenue decoupling, meaning a framework that symmetrically returns to customers revenue above or below what is allowed, is not required for PSNH to operate under a revenue cap. However, by definition, if revenue is capped, the Company must have a mechanism to return revenue collected in excess of that cap. A decoupling mechanism is one option. A mechanism that returns excess revenues above the allowed revenue is another option (like an "asymmetric" decoupling mechanism that does not collect for under-recovery). An alternative to revenue decoupling that would allow PSNH to operate under a

near-revenue cap would be to set rates each year using updated billing determinants. Under this alternative, instead of using billing determinants that are fixed at the test year levels, billing determinants would be updated as part of the annual filing process in which revenue is updated. While this is not a true revenue cap, such an approach would approximate the outcome of a revenue cap.

Q. Do you recommend that PSNH operate under revenue decoupling?

A. Revenue decoupling is a viable option for PSNH, but it is not necessary. As discussed in Witness Mike Clark's testimony, one reason why revenue decoupling may be preferred is that the Company's test year billing determinants reflect an abnormal weather year.[35] Revenue decoupling would avoid locking in relatively higher rates that arise from this abnormal year. Alternatively, the Company could weather normalize its test year billing determinants to set initial cast-off rates.

The Company has stated a preference not to implement a revenue decoupling mechanism (RDM),[36] and the Department of Energy has voiced skepticism that an RDM would be beneficial for customers. Since revenue decoupling is not required for a utility to operate under PBR we do not recommend that PSNH implement an RDM. However, in Section 9 we provide an alternative approach to the Company's PBR framework, in which the Company would update its billing determinants each year in the process of setting rates so that it operates under a framework more like a true revenue cap.

[35] Testimony of Witness Mike Clark, p. 39.
[36] Testimony of Douglas W. Foley, Robert S. Coates, and Douglas P. Horton, p. 86, Bates 01430.

7. Assessment of Other Elements of PSNH's PBR Framework

Q. What are the components of PSNH's PBR framework, other than the I-X formula and K-bar?

A. PSNH has included in its PBR framework an earnings sharing mechanism (ESM), a Z factor for exogenous events, and performance incentive mechanisms (PIMs). The Company has also proposed an option to renew the PBR plan for five years after the initial four-year term is completed. This section will discuss the ESM, the Z factor, and the renewal option. The Company's proposed PIMs will be discussed in Section 8.

Q. In general, why are ESMs included in PBR frameworks?

A. ESMs can serve as guardrails to protect consumers and the utility in the event of dramatic deviations from the utility's allowed ROE. An oft-cited reason for including an ESM in a PBR plan is to provide customers with benefits if the Company exceeds its authorized ROE beyond some threshold. However, for reasons explained further below, customers may in fact not be better off under an ESM, because the Company has a dulled incentive to seek cost efficiencies if part of the gains from those efficiencies are immediately taken away.

Q. What are the incentive properties of ESMs, generally?

A. Although ESMs are a common feature of PBR frameworks, they induce the opposite cost efficiency incentives that PBR aims to generate. If the objective of PBR is to introduce cost efficiency pressure on the utility, symmetric ESMs reduce this pressure by allowing the utility to collect additional revenue if it is unable to achieve the level of efficiency assumed in its revenue forecast, and, conversely, forces the utility to give back a portion of the gains from efficiency improvements relative to the forecast. For this reason, the utility does not have a strong incentive to improve its productivity under an ESM, particularly as the

deadband shrinks. As Witness Kolesar writes, "a PBR plan without earnings sharing provides greater incentive effects than plans with earnings sharing."[37] To the extent that consumers obtain any shared earnings through the ESM, this benefit is likely to be a larger slice of a smaller pie. In many cases, consumers do not see any benefits from ESMs because the Company never exceeds the ROE deadband.

Q. Do all ESM designs have the same incentive properties?

A. No. ESMs may be designed to be symmetrical or asymmetrical, have deadbands of different sizes, and share earnings in different proportions depending on the deviation of earnings from the authorized rate of return. Calibrating these parameters changes the incentive structure of the ESM. For example, economist Dr. Dennis Weisman proposed a "high-powered" ESM in Alberta during the 2023 proceeding, which was designed to operate the same way as the standard ESM for returns within and below the deadband. The difference arises for returns above the upper bound on earnings above the deadband. The first one-hundred basis points of returns above the upper bound on the deadband accrue largely to consumers. The second one-hundred basis points above the upper bound on the deadband accrue largely to the regulated utility.[38] This provides the Company with continued incentive to seek efficiencies even after it crosses the sharing threshold.

Q. Please describe the Company's proposed ESM.

A. The Company proposes an asymmetric ESM with a deadband of 25 basis points (bps). If the Company's earned ROE exceeds the allowed ROE by more than 25 bps 75% of excess earnings are shared with customers and the Company retains 25% of these earnings. If the

[37] Attachment ES-MK-1, p. 3, Bates 01776.
[38] "Economic Tradeoffs in the Design of the Third-Generation PBR Regime," Dennis L. Weisman, PhD., January 27, 2023. Alberta Utilities Commission, Proceeding 27388.

Company fails to achieve the allowed ROE, the ESM does not recover any additional revenue from customers. Thus, customers have protection from earnings in excess of the allowed ROE, but the utility does not have protection from underearning. The Company states that the 25 bps deadband is consistent with the Company's 2009 rate case, Docket No. DE 09-035.[39]

Q. What is your assessment of the Company's proposed ESM?

A. The strict ESM proposed by the Company means that the PSNH has a limited opportunity to achieve profits above the allowed ROE. Because of this reduced opportunity for profit, the incentive properties of the PBR framework are reduced. However, customers receive an assurance through the ESM that the rates they pay will not result in outsized profits for PSNH during the PBR term.[40] Whether to include such a mechanism depends on whether the priority of the PBR framework is to provide incentives for productivity improvements in the form of cost efficiency, or to minimize risk. If the goal of the plan is to minimize risk over a long multi-year rate plan (MYRP) term, an ESM may be an appropriate element to include. Given that PBR is a new approach in New Hampshire, the risk reducing benefits of an ESM may be worth the dampening effect on efficiency incentives. In light of these considerations, and in light of precedent (Docket No. DE 09-035), we recommend that the ESM is approved as filed for the first generation PBR plan. We also recommend that PSNH consider an ESM with a larger deadband, or a PBR framework with no ESM at all, in its second generation PBR framework should it file one in the future.

[39] Testimony of Douglas W. Foley, Robert S. Coates, and Douglas P. Horton, p. 65, Bates 01409.
[40] Attachment NAC-DPM-11 (Response to Data Request No. DOE 6-114).

Q. What is an exogenous cost factor, and are they common in PBR frameworks?

A. An exogenous cost factor (also called a "Z factor") is often included in PBR frameworks to provide for one-time exogenous events that impose unforeseen costs on the utility. The Z factor allows for an adjustment to a company's rates to account for a significant financial impact (either positive or negative) of an event outside of the control of the company and for which the company has no other reasonable opportunity to recover the costs within the PBR formula. One commonly cited example of a Z factor could be an unexpected, one-time increase in tax rates during the PBR term. Another example of a Z factor could be construction projects required by the state, like the movement of utility plant to make way for a road. A materiality threshold, usually in the form of a dollar value associated with the exogenous event's cost, ensures that Z factor adjustments occur only when events have a significant influence on the operation of the utility. For example, in Massachusetts, the Z factor threshold value equals the product of 0.001253 and the Company's total operating revenue in the test year.[41]

Q. How does the Company propose to incorporate an exogenous cost factor into its PBR framework?

A. The Company has defined the exogenous cost factor for PSNH as positive or negative cost changes that are beyond the Company's control and not reflected in the calculation of GDP-PI.[42] The Company has proposed to include requests for exogenous event cost recovery in its annual PBR compliance filing. The Company's proposed exogenous cost factor may adjust rates upward or downward. In addition, the Company defines its exogenous cost factor to

[41] Massachusetts D.P.U. 22-22, Final Order, November 30, 2022.
[42] Testimony of Douglas W. Foley, Robert S. Coates, and Douglas P. Horton, p. 65, Bates 01409.

cover both non-recurring costs and ongoing costs. The proposed materiality threshold for this factor is $1.5 million, which is calculated as the total cost of all exogenous events in a single year. The Company proposes to include requests for exogenous event cost recovery in its annual PBR compliance filing.

Q. Does the Company's proposed exogenous cost factor differ from Z factors in other jurisdictions?

A. Yes. While there is not unanimity among the application of Z factors in PBR plans across jurisdictions, there are two differences between the Company's proposed exogenous cost factor and the generally accepted approach to Z factors. First, the Company has defined its proposed exogenous cost factor to pertain to both one-time events and ongoing events. In other jurisdictions, Z factors generally recover costs associated with one-time events, while Y factors recover ongoing costs outside of the utility's control. PSNH's exogenous cost factor combines these two separate mechanisms into one. Second, the materiality threshold is calculated as the sum of costs associated with all exogenous events, rather than single events. In other jurisdictions, such as Ontario[43] and Massachusetts,[44] the materiality threshold is applied to single events only, such that many small events may not result in any Z factor adjustment.

Q. What is your assessment of the exogenous cost factor proposed by PSNH?

A. The exogenous cost factor proposed by PSNH is reasonable despite differences with respect to other jurisdictions. An exogenous factor that combines the concept of a Z factor with a

[43] Report of the Board on 3rd Generation Incentive Regulation for Ontario's Electricity Distributors, Ontario Energy Board, Appendix p. V.
[44] Massachusetts D.P.U. 17-05, Final Order, November 30, 2017, p. 396.

Y factor results in a mechanism that operates not unlike what is done in PBR frameworks elsewhere. Also, a materiality threshold on the cumulative cost of exogenous events makes intuitive sense. If a state-initiated cost change were imposed on the Company at a cost of $1 million, and a federally initiated cost change were separately imposed on the Company at a cost of $1 million, it is reasonable that the utility would recover the sum of these costs rather than recover none of these costs. We also acknowledge that in 2010, the New Hampshire Public Utilities Commission found that exogenous cost factors could be applied to a series of events.[45]

Q. What is the Company's proposal to renew the PBR plan after the first four years?

A. PSNH has proposed to have the option to renew its PBR plan without rebasing at the conclusion of the first four years of the PBR term. If the Company requests, and the Commission approves, a four-year extension of the PBR term, starting on August 1, 2029, then the Company will file for a rate case for new permanent base distribution rates effective on August 1, 2033.[46]The Company has proposed that, should the PBR term be extended, PSNH would operate under the same PBR framework approved in this proceeding (the same X factor, the same PIMs, the same ESM, the same K-bar mechanism), with one exception: if the PBR term were extended, the Company would have the ability to request a base rate adjustment by filing a base rate case if its earned ROE falls below seven percent for two consecutive quarters, after the PBR Plan is allowed to be extended beyond the initial four-year stay-out. In other words, the Company would adopt an off-ramp that would apply only to the years of the extended PBR plan.

[45] "We understand that this provision is intended to allow PSNH to adjust its rates for the impact of an event or series of events that have a net distribution revenue impact in a given year of $1,000,000 or more." New Hampshire Public Utilities Commission, Order No. 25,123, June 28, 2010, p. 38.
[46] Attachment NAC-DPM-12 (Response to Data Request No. DOE 6-127).

Q. What is your assessment of the Company's PBR plan renewal proposal?

A. In principle, a four-year renewal after an initial four-year PBR term is reasonable if intervenors have the opportunity to submit an opinion between PBR terms and the Commission has the ability to determine whether a renewal is appropriate. One way to conduct such a renewal would be to update the X factor using more recent data at the renewal date but keep other elements of the plan the same.

For its PBR framework, PSNH has proposed a capital supplement in the form of K-bar that adjusts current year revenue based on a rolling average of past capital spending. Because of the mechanics of K-bar, if the Company renews its PBR framework after four years, revenue in the renewed PBR term may begin to deviate substantially from costs for reasons other than efficiency gains (for example, if the Company has invested heavily in capital during the first PBR term, and no longer requires a capital supplement in the second PBR term). The ESM would provide customers with protection against overearning in this case. However, the Company would have a longer period between prudency reviews of capital investments. Given that the K-bar mechanism allows recovery of some capital spending through the rolling average, allowing as many as seven years from the time of year one investments and a prudency review may be too long for a first generation PBR plan. Therefore, we recommend against the option to renew in this case. A renewal option may be more appropriate in other circumstances—such as if the Company operated under a pure PBR formula, rather than one with a K-bar capital supplement.

8. Assessment of the Proposed Performance Incentive Mechanisms

Q. What are performance incentive mechanisms (PIMs) and why are they applied to PBR frameworks?

A. The widely agreed-upon definition of a PIM is: a regulatory tool that ties financial incentives to identified benchmarks or targets. PIMs can be reward-only, penalty-only, or "symmetric," meaning they could result in both a reward and a penalty. Typically, PIMs operate by adjusting a utility's return on equity (ROE), though in some cases a pre-determined dollar value is used for a penalty or reward. Generally, the utility must have a measurable target, and it must be possible to recognize the achievement of this target using publicly available information at the end of each year when rates are set for the subsequent year of the PBR term. In addition, the financial penalty or reward associated with achievement of (or failure to achieve) the target must be known in advance. PIM penalties or rewards will be applied to rates each year as a rider, adjusting revenue according to performance in the most recent completed year.

PIMs are included in PBR plans to encourage achievement of new policy objectives and counter implicit negative incentives that a regulatory model creates. For example, given the cost reduction incentives of price cap plans, PIMs tied to safety and reliability can align incentives such that the utility does not reduce costs at the expense of safe and reliable service.

Q. What new metrics has PSNH proposed to track?

A. The Company has proposed two different sets of metrics: service quality metrics and reporting metrics. The service quality metrics will measure System Average Interruption

Duration Index (SAIDI)[47] and Months Between Interruptions (MBI).[48] Only the service quality metrics can be considered PIMs, as these metrics are tied to financial consequences. The reporting metrics do not result in financial rewards or penalties, but cover performance areas including customer satisfaction, solar interconnection, customer requested work, and active demand response. The Company is proposing to report on the progress of the proposed PBR metrics in a filing to the Commission in a report on or before May 15th each year. This report will document the performance of each metric for the calendar year prior.[49]

Q. What is your understanding of why the Company proposed to include PIMs in its PBR framework?

A. PSNH stated that it has included PIMs and reporting metrics to provide transparency in relation to the Company's performance under its first PBR framework. The Company also stated that both the PIMs and reporting metrics "will create greater alignment between the Company's business objectives and regional and state priorities as well as customer expectations," particularly with respect to service quality.[50]

Q. How will the service quality PIMs be implemented?

A. The SAIDI and MBI penalty-only PIMs are proposed to be structured as follows. First, a baseline for these metrics would be calculated using a five-year rolling average of each metric. Then, a lower bound target and an upper bound target would be set equal to two standard deviations above and below the baseline, respectively. If the Company's MBI

[47] SAIDI is calculated as System Average Interruption Frequency Index (SAIFI) multiplied by the Customer Average Interruption Duration Index (CAIDI). The Company proposes to adjust its SAIDI measure for the following items 1) Interruptions that are resolved within 5 minutes or less; (2) Private customer outages; (3) Planned outages; (4) Loss of External Supply; (5) Public Safety directed outages; (6) Major Event Days.
[48] Testimony of PBR Metrics Panel, p. 8, Bates 01921.
[49] Ibid, p. 11, Bates 01924.
[50] Attachment NAC-DPM-13 (Response to Data Request No. DOE 6-137).

performance falls below the lower bound target, a $1.5 million penalty will be imposed. This dollar value is approximately equal to 10 basis points of the Company's initial return on equity amount in its going-in revenue requirement.[51] If the Company's MBI performance exceeds the upper bound target, the Company will gain a $1.5 million credit that can be used to offset future penalties. The Company would not be provided a financial reward for exceeding the target.[52] The SAIDI PIM operates similarly.

Q. Did PSNH present any benefit-cost analysis used to establish the penalty value of its PIMs?

A. No. The penalty value is set equal to the exogenous cost threshold. The Company did not use an assessment of the dollar value of reliability (e.g., Value of Lost Load) to set the SAIDI or MBI penalty value.

Q. Did PSNH present any the reasoning for the baseline calculation and threshold values for its service quality PIMs?

A. Yes. The Company used the methodology from the Institute of Electrical and Electronics Engineers (IEEE), which developed a methodology to calculate Electrical Reliability Metrics both all-in, and normalized to exclude exceptional events (e.g., storms or natural disasters).[53]

Q. What is your assessment of PSNH's proposed service quality PIMs?

A. PSNH has proposed two penalty-only PIMs. The Company has not shown that the financial penalties associated with these PIMs bear any relationship to the marginal cost of reliability shortfalls below the PIM targets. As such, it is not possible to assess whether the financial penalties are priced according to the value that customers have for reliability. Because the

[51]Attachment NAC-DPM-14 (Response to Data Request No. DOE 6-132).
[52]Attachment NAC-DPM-15 (Response to Data Request No. DOE 6-128).
[53]Attachment NAC-DPM-16 (Response to Data Request No. DOE 6-134).

service quality PIMs are penalty-only PIMs that were volunteered by the Company, the importance of calibrating an accurate financial incentive is reduced. If the Company were to seek a PIM with a financial reward, it should provide some demonstration that the performance associated with that reward provides value to customers at least as high as that reward. Likewise, if a regulator were to impose a financial penalty for a certain level performance, that regulator would bear the burden of demonstrating that the penalty reflected lost customer value.

Q. What reporting-only metrics has PSNH proposed?

A. PSNH has proposed the reporting metrics in the following categories: customer satisfaction; solar generation, customer work requests, and demand response. These proposed reporting metrics report performance by PSNH relative to a benchmark but do not involve financial incentives.[54]

Q. Please summarize the Customer Satisfaction reporting metrics that PSNH has proposed.

A. PSNH has proposed two customer satisfaction reporting-only metrics.

(1) Number of Customer Complaints Reversed – measures complaints where an error by the Company is validated and acknowledged after investigation.

(2) Transactional Customer Satisfaction Index - this metric uses customer surveys to measure customer satisfaction after being restored from a blue-sky outage; satisfaction after interacting with the Company's phone customer service resources, either live-agent or interactive voice; satisfaction with the process of interconnecting solar resource at a customer's home; satisfaction with working to connect new construction to the grid; and

[54] Testimony of PBR Metrics Panel, p. 12, Bates 01925.

satisfaction after using the Company's website. The metric reflects the equal-weighted average of the relevant survey responses, (in which satisfaction is measured from 1 to 10).[55]

Q. Please summarize the Company's proposed solar generation metric.

A. In the interest of streamlining the connection of distributed energy resource customers, PSNH has proposed to collect data on the timeline for solar applications between the years 2025 and 2026. This data would be used for the purpose of establishing a baseline and a target by 2027 for simplified projects, standard projects, and standard projects requiring SIS. Until baseline data is complete, the Company proposes to report the annual timelines in the PBR metrics reports filed during calendar years 2025 and 2026.[56]

Q. Please summarize the Company's proposed customer work metric.

A. The Company's "Customer Work Request" metric would measure the percentage of work requests the Company completes within a target number of business days in specific types of service categories. Initial targets would be set equal to ninety percent multiplied by the average number of business days, excluding "hold days," that it took for the Company to complete the customer work requests in each category in New Hampshire in calendar year 2023. Since more data will be available in 2026, PSNH proposes to rely on the average of 2023 through 2025, rather than only calendar year 2023, to set the baseline and target values. The percentage of customer requests meeting the business day targets would be calculated by adding the number of requests that are completed within or under the target number of

[55] Ibid, p. 12, Bates 01925.
[56] Testimony of PBR Metrics Panel, p. 25, Bates 01938.

business days for each category and dividing that number by the total number of work requests across all measured categories.[57]

Q. Please summarize the Company's proposed demand response metric.

A. The Company has stated that peak demand is a major driver of costs experienced by the Company's customers and that efforts to reduce peak demand can generate significant reductions in system costs for customers. The Company's Active Demand Response metric would focus on PSNH's system peak, which occurs during the summer months. The metric would set a baseline demand reduction of 7.5 MW. PSNH has proposed to remain at or better than reductions of 14.5 MW annually for the PBR Term.

Q. What is your assessment of PSNH's proposed reporting-only metrics?

A. All four categories of reporting metrics are reasonable and well-constructed. It is not clear the extent to which reporting-only (i.e., reputational) metrics drive performance given that the outcomes do not have a financial consequence. If the Company has proposed these metrics because the proposed PBR framework does not otherwise adequately encourage the goals addressed by these metrics, it may be useful for the Company to consider converting these metrics into PIMs in subsequent generations of PBR. However, it is reasonable to apply these metrics with no financial rewards or penalties for PSNH's first PBR framework.

Q. What do you recommend as next steps for PSNH regarding PIMs?

A. The introduction of PIMs in other jurisdictions often involves a process of stakeholder engagement to evaluate the key policy objectives of all stakeholders, discuss how the current regulatory framework does not address those policy objectives, and collaborate on how PIMs could be used to align the utility's incentives with customer needs. We recommend that the

[57] Ibid, p. 28, Bates 01941.

Company engage with stakeholders to develop new PIMs and enhance existing PIMs. This would provide more assurance that the Company's PIMs address customer needs and have penalties (or rewards) that are priced appropriately.

9. Proposed Alternative PBR Framework

Q. What changes to PSNH's proposed PBR framework could be made to alleviate concerns about the way revenue is set over the four-year term?

A. We present three modifications to the way revenue is established under the Company's proposed PBR framework. First, we describe an alternative to K-bar that relies on the Company's capital spending forecast rather than the Company's historical capital spending to set revenue over the PBR term. Second, we present a true revenue cap, which modifies the Company's proposed PBR formula (which, as explained in Section 3, is in fact a price cap). These first two adjustments are not necessarily better, but they may be preferred for other reasons. Third, as this is a first generation PBR plan, we recommend including a reopener provision to provide the Company and stakeholders an opportunity to review the PBR plan before the completion of the four year term.

Q. What is a potential concern with the use of K-bar as a capital supplement?

A. The main concern with K-bar is that it relies on historical capital spending, which may not accurately forecast forward-looking capital-related revenue needs. Thus, in the absence of an ESM, K-bar could result in revenue collection that is too high or too low. This concern must be weighed against the risks that result from alternative approaches to capital recovery, such as capital trackers and forecasted revenue requirements, or for that matter, more frequent rate cases.

Q. If K-bar is not accepted, can the proposed PBR framework be modified to provide the Company with sufficient revenue while maintaining the same cost efficiency incentives?

A. Yes. An alternative to the K-bar mechanism that could be used to provide the Company with sufficient capital revenue is a forecast approach, known as an "F factor." This approach was a conceptual precursor to the K-bar mechanism described by Drs. Dennis Weisman and David Sappington in the Alberta Utilities Commission's second generation PBR proceeding.[58] Much like K-bar, the Sappington-Weisman F factor consists of a differential between the Company's forecast of expected capital expenditures and the actual revenue recovered through the I minus X formula (and not due to exogenous events). The difference is that whereas K-bar relies on a historical spending pattern to set forecasted capital needs through a formula, the F factor relies on the Company's own forecast of capital needs. Much like the annual K-bar calculation, the Company would make the F factor revenue adjustment each year as part of the annual PBR filing.

Q. Why is a forecast approach preferred over a capital tracker?

A. The F Factor approach retains the incentive properties of PBR by setting an allowed revenue equal to the Company's forecast, and allowing the Company to benefit from cost efficiencies relative to the forecast. In contrast, capital trackers do not provide the Company with an incentive to find cost efficiencies, since the tracker allows for recovery of—and subsequent inclusion into rate base of—any prudently incurred costs. Cost trackers are generally not considered to align with the characteristics of PBR, though they have in some cases been deemed necessary for sufficient cost recovery.

[58] "Sappington, David and Weisman, Dennis, Assessing the Treatment of Capital Expenditures in Performance-Based Regulation Plans," September 1, 2015.

Q. Do you recommend changes to the X factor if the F factor approach is adopted?

A. When a PBR framework is first designed, we recommend an approach that calibrates the plan's parameters using economic theory and standard practice. However, it may make sense to deviate from recommended parameters. For instance, the TFP study typically aims to estimate average productivity in the industry. A company may believe it can be more efficient than the industry with respect to inputs that it can adjust more readily, but is experiencing faster than average capital cost growth that is largely exogenous. Thus, it may recommend a higher (more positive) X factor, provided it receives sufficient revenue growth for rising capital investment over the term. The Commission and Company may agree that such deviations are feasible for the Company and in the best interest of customers. However, they should be viewed relative to the recommendation based on the theory and standard approach to calibrating plan parameters. When one portion of the plan changes, for instance, substituting K-bar for an F factor, we believe it is reasonable to reset the recommendation to what is implied by the empirical studies, and allow stakeholders the opportunity to advocate a deviation from that recommendation. Therefore, if the Company were to adopt the F factor approach, in lieu of K-bar, we recommend that PSNH adopt the empirical X factor of -1.67%. This is a 25 basis point adjustment downward from the Company's estimate, to account for the fact that this is a price cap and should therefore include an index of billable outputs instead of simply using customers as the output measure. Using an empirically calibrated X factor, the Company's revenue would adjust each year in accordance with the economic principles of incentive regulation and it would be clear to all stakeholders the magnitude of revenue adjustments arising from the F factor. In other words, by using the empirical X factor in the annual PBR revenue adjustment, F factor revenue would be plainly

defined as revenue provided to the Company in excess of revenue growth that would occur under a competitive market.

Q. What are the advantages and disadvantages of relying on a forecast to set allowed capital-related revenue?

A. The F factor uses the Company's actual forecasted revenue needs, rather than relying on an average of historical spending on capital to set revenue. An advantage to this approach is that the utility's spending forecasts may more accurately reflect revenue needs than a historical average over the PBR term. A drawback is that the reliance on a forward-looking capital spending estimate requires more trust in—or more critical evaluation of—spending forecasts at the outside of the PBR term.

Q. What are the implications of the F factor, relative to the incentives of K-bar, on the incentive to commit to capital expenditures?

A. A common concern under PBR is that a company could have an incentive to cut costs to the detriment of customers. Whereas a rolling average K-bar shifts the incentives marginally back toward more capital spending, the F factor removes the marginal incentive that a rolling average approach to K-bar provides. This could be viewed as both an advantage and a disadvantage. A marginal reduction in the incentive to spend on capital could be viewed as a disadvantage of the F factor if there is concern that, under PBR, the Company will reduce capital spending that is necessary for the provision of safe and reliable service. Conversely, if there is concern about overspending on capital during the PBR term, the F factor effectively caps capital recovery and incents capital spending efficiency.

Q. Can the PBR framework filed by PSNH be modified to be closer to a true revenue cap?

A. Yes. As explained in Section 3, the Company's proposed PBR formula is, in fact, a form of a price cap. If a revenue cap is the preferred approach, the Company needs a mechanism to return revenue above the cap to customers. A decoupling mechanism could be used for this purpose, as in Massachusetts. A one-way mechanism could return revenue above the cap, but not collect additional revenue if actual revenue falls below what is allowed. An alternative that is not a true revenue cap but approximates one would be that the Company updates its billing determinants each year such that rates reflect the current-year revenue requirement divided by current-year billing determinants. Under this approach, rates are adjusted each year to reflect allowed revenue and updated billing determinants, but no true-up occurs if actual revenue deviates from what is allowed. We refer to this as a "near" revenue cap.

Q. Is a revenue cap preferred to the Company's proposed approach?

A. Not necessarily. The cost efficiency incentives associated with revenue caps and price caps are similar. However, a revenue cap ensures that revenue will not exceed the capped amount. A price cap approach provides an opportunity to earn more revenue through increased sales. Outsized profits are less of a concern given the Company's proposed ESM, which shares 75% of profits above 25 basis points of the allowed ROE.

Q. What is a reopener, and why have you recommended including one in PSNH's PBR framework?

A. PBR plans are typically characterized by a longer period of time between traditional revenue requirement applications for the utility under the plan. This time between "rebasing" results in a prolonged separation of costs and revenues, providing the utility with enhanced efficiency incentives but also enhanced risk. Because costs and revenues are separated over

the PBR term by design (the automatic nature of the I-X formula does not adjust annual revenues for sustained changes in utility costs in the comprehensive manner that rate applications adjust revenues), a utility operating under PBR could potentially experience earnings that are dramatically higher or lower than the allowed ROE set at the beginning of the PBR term. To protect against an untenable divergence of costs and collected revenues resulting from problems with the PBR design, PBR plans include "re-openers," or mechanisms that allow for review of the regulated entity's PBR plan during the PBR term and potential relief in the form of adjustments to the PBR plan or exiting the plan completely in the event certain predefined conditions occur. We recommend that PSNH include a re-opener provision in this plan to provide the Company and stakeholders with an opportunity to review the PBR plan before the end of the four-year term. The re-opener could be triggered, for example, by a pre-determined number of basis points above or below the Company's allowed ROE after accounting for the ESM.

Q. Please summarize the two proposed alternatives to PSNH's proposed PBR framework.

A. The two possible modifications to PSNH's proposed PBR plan are not interdependent, which means the Commission could accept one of these alternatives, both, or neither. Table 5 summarizes these possible modifications. The table also notes that we recommend rejecting the Company's proposed option to renew its PBR plan for an additional four years.

Table 6: Elements of a Modified PBR Plan for PSNH

PBR Component	Proposed Approach	Possible Alternatives
Indexed Cap	"Revenue Cap"	True Revenue Cap, or a "Near" Revenue Cap
Inflation Measure	GDP-PI	
X Factor	0.00%	
Capital Supplement	K-Bar	F Factor
Exogenous Costs	Yes	
Earnings-Sharing Mechanism	75/25 split, 25 bps deadband	
Off ramp/Re-Opener	None	Included
Consumer Dividend	0.15%	0.15-0.25%
PIMs	Two penalty-only PIMs	
PBR Term	4 years	

*Indicates change from the Company's proposed framework.

10. Summary and Conclusion

Q. Could you please summarize your testimony?

A. PSNH has proposed a PBR framework that generally aligns with PBR plans currently in place in North America. In particular, the Company has filed an indexed cap plan with a formulaic capital supplement in the form of K-bar, along with an ESM and an exogenous cost factor. To set a proposed consumer dividend, the Company filed a cost benchmarking study. Although this benchmarking study is not correct, we have provided corrected results. The Company has also filed two penalty-only PIMs and four scorecard metrics, which are reasonable additions to the proposed PBR framework. We recommend accepting most aspects of the proposed PBR framework. However, we recommend against the four-year renewal option, for reasons stated in Section 8. We have also provided two modifications that could be considered: the F factor capital supplement in lieu of K-bar, and an adjustment to

make the proposed cap closer to a true revenue cap. We have also made recommendations for consideration in the future, including a wider deadband on the ESM and the consideration of attaching financial incentive to the reporting-only metrics.

Q. Does this conclude your testimony?

A. Yes it does.