Responses to Christensen Associates Analysis Regarding Hydro Ottawa's Proposed Custom IR Incentive Regulation Framework

(in reply to October 14, 2025 CA Report)

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1 CA Energy Consulting's New Analyses and Studies

Christensen Associates Energy Consulting, LLC ("CA Energy Consulting") delivered its *Evaluation of Hydro Ottawa's Proposed Custom Incentive Regulation Framework* report dated October 14, 2025 ("CA Report"), and provided its accompanying answers to interrogatories on October 28, 2025, in which CA Energy Consulting describes new analyses and studies it performed and raises certain other new issues. In the sections below we respond to CA Energy Consulting's issues raised in the CA Report, working papers, and interrogatory responses regarding the productivity factor, stretch factor, and growth factor.

2 Productivity Factor

Hydro Ottawa proposed using the standard 0.0% productivity factor that has been used in Ontario under the OEB's Renewed Regulatory Framework, including the custom IR rate-setting option, for the last decade. The custom IR precedents include using the 0.0% productivity factor in OM&A revenue escalation formulas.[1]

The CA Report states, on page 7, that the appropriate productivity factor should be based on its new analysis of the OM&A partial factor productivity ("PFP") growth rate. The CA Report recommends a 0.50% productivity factor based on CA Energy Consulting's analysis of the Ontario electric distribution industry's OM&A PFP trend from 2013 to 2023, after excluding 2020. Clearspring disagrees with CA Energy Consulting's recommendation for numerous reasons.

We do not agree with the merit of moving away from established precedent and disaggregating the total factor productivity trend into its sub-components, especially given the 0.0% floor already placed on the productivity factor. These new calculations and methodology are complex and should be considered and determined in a comprehensive proceeding where all parties have an opportunity to produce productivity studies, and review and comment on the studies of the other parties to assure the escalation parameters are consistently and properly calculated. As we will detail, there are important omissions, inconsistent assumptions, and improvement opportunities in the PFP analysis found in the CA Report and working papers. The Ontario PFP analysis conducted and the U.S. PFP analysis cited in the CA Report, after correcting for inconsistent assumptions and making improvements, do not in fact produce a positive PFP trend.

The disadvantages of using an OM&A PFP trend versus a total factor productivity ("TFP") trend for the productivity factor include increasing measurement error and significantly higher statistical variance.[2] Accounting and capitalization differences both between utilities and across different years can introduce

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[1] These include EB-2014-0116, EB-2015-0004, EB-2018-0165, EB-2017-0049, EB-2019-0261, EB-2021-0110, and EB-2023-0195.

[2] This is the same concern regarding using disaggregated cost benchmarking versus total cost benchmarking. As the analysis moves to more granular levels, accounting and substitution differences between utilities and over different time periods become far more pronounced. This increases both error and variance significantly.

error and impact the PFP findings far more than the TFP result. The capitalization differences can be known, as is the case with Hydro One Networks using a different accounting standard relative to the rest of Ontario.[3] There are also likely other unknown inconsistencies caused by accounting differences between utilities or from year-to-year for the same utility especially in cases of mergers and amalgamations.

PFP trends will tend to have substantially higher variance than TFP trends.[4] We clearly see this phenomenon in the CA Report PFP results for Ontario.[5] Over a ten-year period, the annual PFP growth rates varied from -2.87% to 8.38%. The annual growth rate standard deviation equals 3.8% with the ten Ontario industry observations. Even after the exclusion of the most extreme observation in 2020, the variance with the remaining nine observations equals 3.1%. In Clearspring's view, this high level of variance does not provide the confidence necessary to calibrate a new and unprecedented productivity factor in this case.

Another disadvantage of using PFP trends versus TFP trends is the increased departure from economic theory when put in the context of the 0.0% productivity factor floor imposed on the formula.[6] The X Factor has been constrained to be non-negative despite negative TFP trend findings in the 4th Generation IR proceeding.[7] This has added an implicit stretch factor to Ontario distributors. If productivity trends are parsed into sub-categories with the negative trend results set to zero and only the positive trend results used, this will create a further departure from economic theory and create a larger discrepancy between what productivity utilities should be reasonably expected to achieve per economic theory and the regulatory expectation being placed on them through rate-setting. Reasonable productivity targets help produce good efficiency incentives; however, unrealistic targets will tend to distort incentives to the eventual harm of consumers.

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[3] Hydro One Networks has several compatibility problems with Hydro Ottawa including using an entirely different accounting standard, multiple amalgamations, shared costs that are allocated between distribution and transmission services, ownership changes and PFP trends with extreme year-to-year variance. Despite these incompatibility issues, Hydro One is given the most weight in the CA Energy Consulting analysis due to the customer-weighting methodology implemented.

[4] For example, in CA Energy Consulting's cited U.S. research in Massachusetts we calculated a PFP trend standard deviation of 5.0% and its reported TFP trend in that testimony had a standard deviation of nearly half that amount at 2.6%.

[5] CA Energy Consulting agreed with this assessment in its IR response to VECC-1 when contrasting PFP to TFP growth rates, "However, we expect that annual TFP growth rates would have less variation and a lower (possibly negative) mean."

[6] In IR-HOL-4 CA Energy Consulting stated, "If accepted empirical methods produce a negative X factor from the data, then it is our view that a negative X factor should be adopted."

[7] Both Mr. Steve Fenrick, on behalf of the Coalition of Large Distributors and Pacific Economics Group (PEG) on behalf of Board Staff found negative Ontario industry productivity trends in the 4th Generation Incentive Regulation proceeding.

Productivity calculations are complex, there is lots of data processing, and they require the researcher to make several key decisions regarding methodology. Getting the productivity calculations accurate is critical to setting reasonable productivity expectations for utilities. Clearspring is of the view that any re-opening and examination of the productivity factor should be done in a comprehensive and thorough manner, with advance notice and sufficient opportunity for those affected by the results to conduct their own productivity trend research for consideration by stakeholders with ample time to review and comment on the research of other parties.

Furthermore, productivity targets should be constructed with a complete view towards the full revenue escalation formula that they are being inserted into. The productivity factor is only one component of a well-designed multi-year revenue plan. A key component, besides the productivity factor, is that the inflation factor needs to be properly calibrated to reflect industry input price inflation and the research for that calibration should be consistent with the productivity trend calculations. CA Energy Consulting agreed with this principle when commenting on its U.S. research in IR-HOL-3(f) it states, "In the cited PFP research, CA Energy Consulting proposed an I factor that aligned with input price inflation. This is the appropriate approach." To be a consistent formula, the inflation factor should either serve as the input price inflation assumption in the productivity trend research or an input price differential needs to be included in the formula. This is not the case in CA Energy Consulting's reported Ontario PFP trend research.

2.1   OM&A Partial Productivity Factor Analysis

Clearspring does not have the necessary time in this proceeding to conduct a thorough and comprehensive analysis of industry productivity trends. This would be required for us to provide a specific recommendation on the productivity factor and how that may affect other elements of the OM&A revenue escalation formula. However, we have been able to conduct a review of the CA Report and working papers and have found several areas of concern with the analysis that lead us to the conclusion that CA Energy Consulting's analysis does not properly substantiate the proposed OM&A productivity factor. As such, it is our view that there is no reliable basis to set an OM&A productivity factor applicable to Hydro Ottawa above zero.

Our review included both CA Energy Consulting's Ontario industry PFP trend findings and its cited research in the CA Report of its U.S. industry PFP trend findings.[8] Both reviews appear to reveal industry PFP trends which are not positive when omissions are corrected and reasonable adjustments made.

2.1.1 Ontario PFP Trend Concerns and Comments

In the CA Report, new Ontario distribution OM&A PFP trend research and results are provided. Based on the PFP trends, CA Energy Consulting recommends a new OM&A productivity factor of 0.50%. This flows

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[8] The U.S. research was cited on page 8 of the CA Report. The citation was to direct testimony given to the Massachusetts D.P.U. on August 17, 2023.

from CA Energy Consulting's finding that the Ontario electric distribution industry PFP trend from 2013 to 2023, but excluding the 2019 to 2020 growth rate, equaled 0.50%.

After review, Clearspring has the following concerns regarding the Ontario PFP analysis:

- Several omissions and inconsistent treatment of amalgamations are impacting the results,
- The input price inflation assumption in the PFP research does not match the inflation factor in the revenue escalation formula,
- The output quantity index is revenue-weighted rather than cost-weighted,
- Hydro Ottawa is included in the sample when they should be excluded,
- Amalgamations and merged utilities during the 2013 to 2023 period and the resultant cost savings from those mergers are partially included when a consistent, non-merger sample is most appropriate for Hydro Ottawa,
- The PFP trends are size-weighted instead of averaged, thus substantially increasing the impact of a few observations and the variance of the annual results, and
- The data set failed to include 2024 results which were available to CA Energy Consulting at the time their analysis was undertaken.

After addressing these concerns, Clearspring provides estimates showing that the Ontario PFP trend found in the CA Report would no longer be positive.

The following table displays each concern, its estimated impact on the PFP trend and the resulting PFP trend after each correction is made.[9] We show the estimated impact on the PFP trend both with 2020 not included and with 2020 included in the analysis. The CA Report PFP trend is estimated to change to -0.34% for the 2020 excluded result and to 0.00% for the 2020 included result.

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[9] The result of each changed concern is cumulative and builds on the prior ones. This allows for a final, adjusted result to be displayed. If some changes are made and others not, the impacts and results may be different.

	Estimated Impacts		Resulting PFP Trend	
PFP Analysis Concern	2020 Not Included	2020 Included	2020 Not Included	2020 Included
CA Energy Consulting Original			**0.50%**	**1.29%**
Fix Errors	-0.14%	-0.13%	0.36%	1.16%
Match Input Price Inflation to OEB's Inflation Factor	0.05%	-0.17%	0.41%	0.99%
Use Cost-Based Weights	-0.38%	-0.20%	0.03%	0.79%
Remove Hydro Ottawa from Sample	0.09%	0.10%	0.12%	0.89%
Non-Merger, Consistent Sample	-0.22%	-0.47%	-0.10%	0.42%
Average Sample Rather than Size-Weight	-0.06%	-0.20%	-0.16%	0.22%
Add 2024 to the Sample	-0.18%	-0.22%	**-0.34%**	**0.00%**

We address each concern below.

1. **Fix Omissions in the Analysis**

Clearspring found numerous omissions in specific year PFP trends in our review of the PFP trend analysis in the CA Report's working papers. These appear to primarily stem from name changes in the PEG 2024 Benchmarking file used by CA Energy Consulting as the data source for its analysis. These name changes caused several growth rates to be missed and not included in the analysis. Ten such omissions caused the 2016 to 2017 growth rate for that utility to not be included in the analysis.[10]

As an example, Toronto Hydro's PFP trends are included in the analysis in all years except its 2016 to 2017 trend. This appears to have been caused by Toronto Hydro's name in the 2024 PEG Benchmarking file being changed from "Toronto Hydro-Electric System Limited" in the years prior to 2017 and then changed to "Toronto Hydro Electric" starting in 2017. Given how the CA Energy Consulting working papers calculated the PFP trends, it treated these two names as separate utilities, instead of one. This means that the first name of "Toronto Hydro-Electric System Limited" had PFP trends calculated for 2014, 2015, and 2016. The second name of "Toronto Hydro Electric" had PFP trends calculated for 2018, 2019, 2020, 2021, 2022, and 2023. However, there is no 2017 PFP trend calculated for Toronto Hydro. It seems that the OM&A productivity growth from 2016 to 2017 for Toronto Hydro was excluded from the analysis only because the name was labelled differently in the raw data.

A second example is for Alectra Utilities. In the working papers data, when amalgamations occur with no name change, the data from the absorbed utility is merged into the utility data. This itself is a mistake, in our view, as it ignores the productivity trend of the absorbed utility since its pre-existing

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[10] These are Toronto Hydro, Entegrus, Erie Thames, Hearst Power, InnPower, Peterborough, Collus Power, Grimsby Power, Alectra, and Energy+.

data is being ignored in the first year it was absorbed. We address this further below when recommending a consistent, non-merger sample. However, there is a more obvious inconsistency occurring in the case when the utility changes its name due to a merger.

The inconsistency in the working papers occurs when a utility changes its name because of the new arrangement. This occurred for Alectra Utilities when it appeared in 2017 in the data file. Similar to Toronto Hydro, the working papers treated this name change as an entirely new utility and, thus, missed the productivity growth rate of 2016 to 2017 of all the predecessor utilities.[11] This misses the 2017 growth rate in a large portion of the Ontario industry and is inconsistent with how other mergers were handled if the resulting utility had taken on an existing name. If Alectra had maintained an existing name, such as Horizon Utilities, the working papers would have then included the 2017 growth rate.[12] This is an arbitrary and inconsistent exclusion of the industry data, in Clearspring's view.

2. **Match input price inflation assumption to inflation factor**

The input price inflation assumption in the PFP research should equal the input price inflation factor in the formula to be consistent with economic theory and how the I-X formula is designed to track the growth rate in costs. CA Energy Consulting seems to agree in its cited Massachusetts D.P.U. testimony. On page 18 it says, "*If the inflation factor does not reflect the firm's input prices, the X factor must be adjusted so that the I-X formula reflects the beginning assumption that changes in revenues equal changes in costs.*" CA Energy Consulting agreed with this principle again in IR-HOL-3(f), "I*n the cited PFP research, CA Energy Consulting proposed an I factor that aligned with input price inflation. This is the appropriate approach.*"

Therefore, the PFP research should have been calculated using the same assumptions and growth rates as the inflation factor found in the revenue escalation formula. Alternatively, CA Energy Consulting could have recommended an input price differential be added to the revenue escalation formula to account for the difference. Neither approach was done or suggested, however, which leaves its recommended productivity factor inconsistent with the I-X+G formula, and calls into question CA Energy Consulting's productivity factor analysis.

3. **Use cost-based weights for the output quantity index**

Using cost-based weights is important in both the PFP trend analysis and the growth factor. The CA Report used a revenue-weighted approach in its PFP research and recommends using a revenue-weighted growth factor. This results in producing a I-X+G formula that is not properly calibrated to

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[11] CA Energy Consulting noted this omission of the data in IR-HOL-10(b), "Furthermore, in cases where a new company is formed from a merger, the merger will not affect industry productivity in its first year of existence because of the structure of the data."

[12] Although it would have calculated it in an incomplete manner by not accounting for the prior year data of the other four merged utilities.

how growth in costs are expected to occur for a specific utility, such as Hydro Ottawa, when the proportionate growth between outputs for that specific utility is not expected to match the proportionate growth in outputs for the sampled utilities.

Using cost elasticity estimates for the output quantity index is how the productivity research was conducted in the 4th Generation IR proceeding by both PEG and Mr. Fenrick. Clearspring agrees with CA Energy Consulting that the growth factor and the output quantity index in the productivity research should match, however, to be properly applied to a specific utility both should be weighted based on cost elasticities. In responding to IR-HOL-9(a) which asked if cost-based weights are a reasonable alternative to revenue weights, CA Energy Consulting states, "Y*es, a revenue cap can be calibrated in this way provided that the productivity factor and growth factor are both calculated using cost-based weights.*"

The productivity trend is a measurement of how the ratio of outputs ("Y") to inputs ("X") changes over time. The industry trend in the Y/X ratio serves as the basis for setting the future productivity expectation of Hydro Ottawa during the CIR years. The drivers of "Y" need to match the drivers of "X" to consistently set that productivity expectation. How the growth in customers or peak demand impacts the output quantity index "Y" needs to match how those outputs increase the input quantity index "X". This is accomplished by using the cost elasticity for each output as the basis for the weight in the output quantity index.[13]

When using the cost elasticities for the output quantity index, the productivity trend and growth factor can then be applied to any utility in a revenue cap even when the growth rate proportions of the outputs for a specific utility differ from those of the industry sample. This is because the output quantity index sensitivity to each output component is weighted to match the input quantity sensitivity to that output component. When the weighting between outputs does not match the cost elasticity the formula will not necessarily track cost growth in alignment with economic theory. It will ONLY work mathematically when the utility it is being applied to has the same forecasted output component growth as what the industry experienced in the productivity calculation, which is not the case in the real world. Using cost elasticity weights will work under that circumstance AND when forecasted outputs differ from the industry.

Illustrative Example of Why Cost-Elasticity Weights are Required

An illustrative example may be helpful to explain why cost elasticity weights should be the standard approach for both the productivity research and growth factor calculations. Assume the industry sample during the sample period has annual customer growth of 2% and peak demand growth of 1%. During that same time, average industry input quantity grows at a 1% rate.[14] For simplicity in this

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[13] The cost elasticity equals the % change in cost given a % change in the output.

[14] Input quantities are inflation-adjusted such that it's the growth rate in the ratio of costs to input prices in each year.

example, assume the cost elasticity of customers is 50% and peak demand is 50%.[15] There are three utilities the formula is to be applied to. The first one (Utility A) is expected to have 2% customer growth and 0% peak demand growth. The second one (Utility B) is expected to have 2% customer growth and 4% peak demand growth. The third one (Utility C) is expected to have 4% customer growth and 0% peak demand growth.

Illustrative Example: Assumptions

➤ Industry Sample Customer Growth During Sample Time Period = 2%
➤ Industry Sample Peak Demand Growth During Sample Time Period = 1%
➤ Industry Input Quantity Index Growth During Sample Time Period = 1%

➤ Utility A Expected Customer Growth = 2%, Peak Demand Growth = 0%
➤ Utility B Expected Customer Growth = 2%, Peak Demand Growth = 4%
➤ Utility C Expected Customer Growth = 4%, Peak Demand Growth = 0%

*Customer Cost Elasticity = 50%, Peak Demand Cost Elasticity = 50%

Utility A's expected real cost growth is expected at 1% minus productivity.[16] This is calculated by taking the 2% customer growth multiplied by the cost elasticity of 50% plus 0% peak demand growth multiplied by the cost elasticity of 50%.

Utility B's expected real cost growth is expected at 3% minus productivity. This is calculated by taking the 2% customer growth multiplied by the cost elasticity of 50% plus 4% peak demand growth multiplied by the cost elasticity of 50%.

Utility C's expected real cost growth is expected at 2% minus productivity. This is calculated by taking the 4% customer growth multiplied by the cost elasticity of 50% plus 0% peak demand growth multiplied by the cost elasticity of 50%.

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[15] That is, if customers double, we'd expect real costs to increase by 50% or if peak demands doubled, we'd expect real costs to increase by 50%.

[16] The inflation factor is meant to escalate revenue for inflation, in line with the firm's input price inflation, the X and growth factors, therefore, are meant to calibrate the expected real cost increases of the firm.

The revenue escalation formula that is established must have the ability to track expected costs and provide the revenue in line with the cost growth expectations minus the productivity expectation.[17]

If the 50/50 cost elasticity weights are used in the industry productivity trend research, the productivity trend will equal **0.5%** (2%*50% + 1%*50% - 1%).[18] If, instead, we use "other" weights such as a 75% weight on customers and a 25% weight on peak demand, the productivity trend will equal **0.75%** (2%*75%+1%*25% - 1%). We assume that proper theory is followed, and the weights used in the productivity trend will flow to the growth factor calculations as well.

The following table shows how the I-X+G formula will escalate revenues relative to the expected costs for each utility under the use of cost elasticities versus the "other" weighting scheme.

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[17] If a stretch factor is desired, this should be set explicitly rather than implicitly and be a function of cost performance. The more cost efficient utilities should receive lower stretch factors, the least efficient utilities higher ones.

[18] 2% customer growth multiplied by the 50% cost elasticity plus 1% peak demand growth multiplied by the 50% cost elasticity minus 1% input quantity growth equals 0.5% productivity growth.

Illustrative Example Continued: Revenue Escalator Performance

Utility A Expected Real Cost Growth Before Productivity = 1%
Utility B Expected Real Cost Growth Before Productivity = 3%
Utility C Expected Real Cost Growth Before Productivity = 2%

Cost Elasticity Approach for I-X+G Revenues Before Inflation, X = 0.5%
Utility A Growth Factor = 1% (2% customer * 50% + 0% demand * 50%)
Utility B Growth Factor = 3% (2% customer * 50% + 4% demand * 50%)
Utility C Growth Factor = 2% (4% customer * 50% + 0% demand * 50%)

Utility A Revenues = Inflation − 0.5% + 1% = 0.5%. 0.5% below cost expectations
Utility B Revenues = Inflation − 0.5% + 3% = 2.5%. 0.5% below cost expectations
Utility C Revenues = Inflation − 0.5% + 2% = 1.5%. 0.5% below cost expectations

"Other" Weight Approach for I-X+G Revenues Before Inflation, X = 0.75%
Utility A Growth Factor = 1.5% (2% customer * 75% + 0% demand * 25%)
Utility B Growth Factor = 2.5% (2% customer * 75% + 4% demand * 25%)
Utility C Growth Factor = 3.0% (4% customer * 75% + 0% demand * 25%)

Utility A Revenues = Inflation − 0.75% + 1.5% = 0.75%, 0.25% below cost expectations
Utility B Revenues = Inflation − 0.75% + 2.5% = 1.75%, 1.25% below cost expectations
Utility C Revenues = Inflation − 0.75% + 3.0% = 2.25%, 0.25% ABOVE cost expectations

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The "effective" productivity expectations placed on each utility are shaded in green (cost elasticity approach) and red ("other" approach) above. For the cost elasticity approach, the productivity expectation of 0.5% remains steady regardless of the output growth. For the "other" approach, the "effective" productivity expectations range from +1.25% to -0.25% for the three other utilities depending upon the output component growth rates. The productivity required for the utility to match cost growth with revenue growth is equal to the productivity factor using cost elasticity weights but varies and is not equal to the productivity factor when using a different weighting scheme.

The example above illustrates why cost elasticity weights are imperative for both the productivity factor and the growth factor calculation. Under the cost elasticity approach, the revenue escalation formula tracks costs as it is designed to do with a predictable productivity expectation. That is, revenues grow at the expected cost increases minus the determined productivity factor. If some other weighting scheme is used, whether that be revenue weights, customer only, or anything else, then the revenue escalation formula is unstable in how it tracks costs and what the "effective" productivity expectation is for each individual utility.

CA Energy Consulting agreed that cost elasticities are a reasonable alternative to the productivity and growth factor calculations.[19] Clearspring's view is that they are not only reasonable but imperative to properly calibrate the revenue escalation formula, as clearly shown in the example above comparing these two approaches. Cost-based weights should be implemented both in the productivity research and the growth factor calculation.

4. **Remove Hydro Ottawa from sample**

Incentive regulation is based on the premise that the more a utility's allowed revenues can be reasonably uncoupled from its spending levels, the higher the cost efficiency incentives become. The productivity trend used to set the productivity factor should, therefore, not be influenced by the utility it is being applied to. This makes it a fully external benchmark. Hydro Ottawa's PFP trends should be excluded on this basis.

5. **Use a consistent, non-merger sample**

Through the 2013 to 2023 sample period, there have been several amalgamations and mergers within the Ontario electric distribution industry. These were not handled consistently, which resulted in the problems that we listed and discussed in point #1 when names changed, and caused several PFP measurement omissions due to the merged companies not being aggregated historically or absorbed utility data being ignored.

The PFP measurement omissions of absorbed utilities resulted from the CA Report working papers taking the data straight from the 2024 PEG Benchmarking Model with no aggregations made when an amalgamation/merger occurred but with no name change.[20] The problem occurs in that the utility's PFP trend after the amalgamation is based only on the successor utilities prior year's data compared to its current year data which is now comprised of the absorbed utilities data. This has the effect of putting the newly formed utility in the numerator (current year) and the prior years data of only the one successor utility in the denominator. This methodology ignores the data of the utility that was absorbed in the prior year. Implicitly this assumes the absorbed utilities productivity <u>level</u> in the prior year was the same as the successor utilities productivity level in the prior year, which is very likely a mistaken assumption and one that is not necessary to make since the data are available.

An example of this may help illustrate the issue. St. Thomas Energy was amalgamated into Entegrus Powerline's data in 2018. The CA Report working papers calculates the Entegrus Powerline output quantity index trend in 2018 as the following:

$$2017 \text{ to } 2018 \text{ } Output \text{ } trend = \ln \left(\frac{2018 \text{ } Entegrus \text{ } Outputs + 2018 \text{ } St.Thomas \text{ } Outputs}{2017 \text{ } Entegrus \text{ } Before \text{ } St. \text{ } Thomas} \right)$$

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[19] Please see the response in IR-HOL-9(a).

[20] When the name changed, the PFP growth rate for that year was entirely missed.

And the input quantity trend is calculated similarly. The calculated PFP trend is the output trend minus the input trend. The 2017 St. Thomas data is not included in the analysis at all. The data is ignored and the 2018 comparison of the integrated utility is entirely relative to the non-integrated Entegrus 2017 data with the 2017 St. Thomas data being ignored even though the data exists and was used in the 2016 to 2017 PFP calculations for St. Thomas.

Ignoring data, without cause, skews the industry PFP trend analysis. The best approach, especially in the case of Hydro Ottawa as we will discuss further below, is to take out all the distributors that experienced amalgamations during the study period. Another method would be to aggregate the data for the utilities involved in amalgamations to assure a consistent series where data is not being ignored and left out of the analysis.

Either of the two methods discussed above would be coherent. Given that Hydro Ottawa did not experience an amalgamation during the study period it is reasonable to only include the distributors in the sample that have not undergone mergers or amalgamations. This sidesteps the issues and PFP trend omissions in the analysis conducted by CA Energy Consulting caused by the mergers and produces a sample more appropriate for Hydro Ottawa.

Further, this adjustment recognizes that there is generally a higher expectation for cost savings that will eventually result from amalgamations and mergers.[21] The realization of those cost savings inflates the PFP trend. Hydro Ottawa does not have those merger savings available to it and should not be expected to achieve the productivity trend of utilities that had the merger cost savings advantage available to them during the sample period.

6. **Average PFP trends rather than size-weighting**

The CA Report PFP industry trend is calculated by weighting each utility PFP trend in each year by the proportion of customers for that utility in that same year. Other choices to use are the two other outputs or weighting by the OM&A costs or OM&A quantities.

With whatever aggregation approach is chosen, however, there are two main problems that are especially relevant in the Ontario distribution sample. The first is that the size-weighting causes one or two observations to swamp the entire PFP trend analysis. This is especially true for the Ontario industry given the wide spectrum of distributor sizes containing only a few large utilities. For example, Hydro One Network's 2015 PFP trend in that one year alone moves the CA Report's PFP trend from negative to positive for the entire sample period, minus 2020. This 2015 PFP observation coincided with Hydro One's initial public offering in that year. That one observation raised the industry PFP trend by 0.65%. It is not reasonable to place a new productivity target on Hydro Ottawa that is driven by one observation. The unreasonableness is compounded when that one observation is possibly driven

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[21] Please see the OEB 2024 MAAD's Handbook s. 4.2 at page 8: Handbook to Electricity Distributor and Transmitter Consolidations.

by an ownership change more than ten years ago, from a utility experiencing other mergers, and operating under a different accounting standard than Hydro Ottawa.

The second problem with the size-weighting approach is it contributes to the extreme variance in the annual results that we illustrated in the beginning of this section. While we believe that the 0% productivity factor should be used for the reasons cited before, if a PFP trend is studied it needs to be calculated in a way that significantly reduces the observed variance that is present in the CA Report results. The size-weighting approach used by CA Energy Consulting is producing a much larger variance than is necessary.

Clearspring is of the view that the best approach, if an Ontario industry PFP trend is to be studied, would be to average the PFP trends of each utility rather than size-weighting. When this is done, it significantly reduces the variance. Instead of the 3.8% variance displayed by the CA Report, the averaging technique reduces this to 2.3%. This is still higher than Clearspring believes is reasonable and higher than what a TFP trend would likely produce but is a necessary improvement if an Ontario industry PFP trend is to be studied.

7. Add 2024 to the sample

The 2024 data published on August 18, 2025 and falls within the scope and timeline of CA Energy Consulting's engagement but was not used by CA Energy Consulting in its PFP trend analysis. Using the latest available data information and productivity trends has the advantage of providing a larger data set of observations and being closer to the CIR period of 2026 to 2030, which in our view would improve the quality and applicability of the analysis. CA Energy Consulting in its response in IR-HOL-2(b) states, "*The productivity factor should be an estimate of expected productivity growth during the PBR term. A shorter historical sample period has the advantage of using observations that are closer in time to the PBR term but has the disadvantage of relying on fewer observations and may therefore lead to an imprecise estimate of productivity growth during the PBR term.*" We agree with this statement and believe it supports that adding 2024 to the PFP trend result is a clear improvement.

Based on the impact estimates of these seven correcting adjustments, the CA Report's PFP trend is no longer positive. The trend is estimated at a -0.34% when the 2020 growth rate is excluded and at 0.00% when the full 2013 to 2024 sample period is used.

2.1.2 U.S. CA Energy Consulting PFP Trend Concerns

The CA Report said that its Ontario PFP trend findings aligned with its recent research regarding US distribution PFP trends that it calculated in Massachusetts.[22] In that Massachusetts research, CA Energy Consulting found that a sample of 19 U.S. northeast utilities had a PFP trend of 0.21% from 2008 to 2022. Clearspring is unable to conduct a thorough review of that study, however, in examining the direct

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[22] Page 8 of the CA Report.

testimony it appears that with one necessary adjustment, to make the study consistent with how Ontario's I-X formula is calibrated, the U.S. PFP trend would be negative.

The inflation factor recommended by Hydro Ottawa is the traditional OEB inflation factor that is based on a 70% weight on the growth rate in GDP-IPI and 30% weight on average weekly earnings ("AWE"). This parameter measures the input price inflation within the escalation formula. Economic theory and proper formula mechanics dictate that the productivity factor should be calculated using this same input inflation assumption.[23] As cited previously, CA Energy Consulting agreed with this statement in IR-HOL-3(f).

Understandably, CA Energy Consulting's objective in that research was not to be consistent with Ontario's inflation factor, so rather than use an analogous U.S. inflation index to GDP-IPI and AWE with the 70/30 weights, CA Energy Consulting constructed a significantly faster growing composite input price index for both its X Factor research and consistent with its recommendation on the inflation factor in that case. On page 22 and 23 of its cited Massachusetts D.P.U. testimony they provide a figure showing its faster growing composite input price inflation assumption and a table comparing forecasts between GDP-PI and this composite index.

From CA Energy Consulting's D.P.U. Testimony, page 22

Figure 1: GDP-PI and Composite Input Price Inflation Factors (2008-2022)

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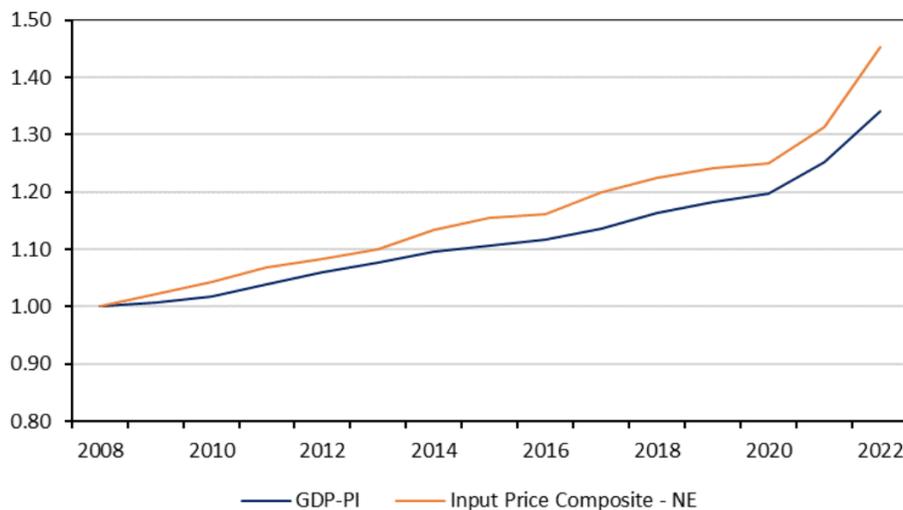
[23] The alternative would be to add an input price differential to the formula, something that neither Hydro Ottawa nor CA Energy Consulting recommended.

Table 1: Forecasted GDP-PI and Composite Input Price Inflation Results (2023-2027)

Year	GDP-PI	Input Price Composite - Northeast
2024	1.2%	3.5%
2025	2.0%	3.5%
2026	2.4%	3.4%
2027	2.3%	3.3%

As show in the table and figure above, the input price composite index that CA Energy Consulting constructed grew and is projected to grow at a far more rapid pace than what the analogous Ontario inflation factor indexes would grow at. This faster growing input price inflation assumption has the effect of raising the PFP trend estimate in the U.S. work.[24] The PFP trend estimate would have been negative if CA Energy Consulting had used a 70% weight on GDP-PI and a 30% weight on an AWE-analogous measure to be consistent with the Ontario inflation factor.

It is important to note that CA Energy Consulting correctly uses this input price inflation assumption in both its X Factor research and its recommendation for the inflation factor in its U.S. testimony. On page 23 of the D.P.U. testimony it was asked about its inflation factor recommendation and states, "*Although the composite measure of utility input price inflation has exceeded the inflation rate of the broader economy, and although this trend is expected to continue in the future, the Company's proposed revenue cap contains an X factor that adjusts for these differences. If the Company were to use an economy-wide measure of inflation like GDP-PI, it would have to adjust its X factor to account for the difference between this inflation measure and input prices within the electric distribution industry.*"

CA Energy Consulting had the necessary consistency between the inflation factor and productivity research in the above-referenced D.P.U testimony. The productivity factor in the I-X formula needs to have the same input price inflation assumption as the inflation factor in the formula to be consistent. However, in both its Ontario PFP analysis and this U.S. one, the input price inflation does not match the inflation factor in Hydro Ottawa's revenue escalation formula and no adjustment to this inconsistency, like adding an input price differential, is suggested. The way to achieve consistency is to insert the inflation factor assumption into the productivity calculation.

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[24] Clearspring has not reviewed and is not refuting the validity of the faster growing input price assumption. Only that the PFP finding resulting from it is not compatible with the Ontario inflation factor and, when made compatible, would show a negative PFP trend (or require an input price differential).

This one necessary change to align the input price inflation assumptions in CA Energy Consulting's cited U.S. PFP research would result in a negative U.S. PFP trend result.

Clearspring also has additional concerns with the U.S. PFP trend research. One is that it appears they used a customer-only output quantity index rather than a cost-elasticity one. We discussed the problems with that approach in the Ontario PFP section of this Reply Report. The sample ends in 2022, making it an older study that needs updating if it is to be used in this case, the sample is relatively small at 19 northeast utilities with the standard deviation of the annual results equaling 5.0%. These concerns and the high level of variance render the cited U.S. result not applicable for this application, in our view.

3   Stretch Factor

Hydro Ottawa suggested three adjustments to the PEG Benchmarking Model in its application. These three are: 1) correct the KM of line variable value for the Company to include primary plus secondary lines, 2) add in CDM-reduced volumes and demands, and 3) subtract Other Revenues from OM&A expenses of the Company.

CA Energy Consulting responded that these changes will overestimate Hydro Ottawa's performance.[25] It says on page 14, related to primary and secondary lines and CDM, "*However, if all data in the sample are "corrected" and the model is re-estimated to reflect the correct data, the Company's actual cost will be compared to the prediction based on the dashed blue line, not the dashed black line. Doing so will result in the exact same performance score as if no data had been corrected at all.*" It is important to point out that this statement is only correct if the entire sample has incorrect data in the same proportions as Hydro Ottawa. Clearspring does not see evidence presented by CA Energy Consulting that would lead us to believe all utilities have the same proportions as Hydro Ottawa regarding the corrections made by the Company. Absent that evidence, our view is that this statement is an unsubstantiated hypothetical that should not be relied on.[26]

CA Energy Consulting stated on page 14, *"In other words, because one would literally correct all sample data and re-estimate the model to reflect the correct data, the Company's performance before its input data are corrected is a better indicator of its actual performance than after its input data are corrected and the rest of the sample is left unchanged."* Absent evidence that most of the utilities require the same level of these corrections as Hydro Ottawa, we are unclear how CA Energy Consulting can say the input data before known corrections would be a "better indicator" of Hydro Ottawa's performance. This statement should not be presumed as true; it is a statement requiring investigation and evidence, absent which, the conclusion is unsubstantiated and, in our view, cannot be relied upon.

For several years, we have repeatedly stated our concern over the KM of line data found in both the Ontario and U.S. datasets. We have pointed out the inconsistency that some utilities report primary only lines and others include both primary and secondary lines and that the differences are stark and have a large impact on results. For this reason, Clearspring does not use KM of line as a variable in our benchmarking research. It skews the analysis, unfairly helping some utilities and unfairly harming others regarding their performance scores. In Ontario, there are some utilities reporting the correct data of

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[25] Page 11 of CA Report.

[26] On page 15 of it report, CA Energy Consulting acknowledges that several other companies have already corrected their data, and reconfirms this point and that the PEG model does include secondary lines, in its response to interrogatory HOL 6 (a).

primary plus secondary, others are only reporting primary line lengths. To Clearspring's knowledge, there is not evidence available to know how many distributors report rightly or wrongly.

What we do know is that Hydro Ottawa in its original reported data provided primary only KM of lines. This clearly disadvantages the utility when, at least some utilities within the sample, reports both primary plus secondary. In response to HOL 6(e) CA Energy Consulting confirms the performance of companies with understated kilometers will be negatively impacted.

The KM of line variable value is an important one and allowing Hydro Ottawa to correct the value and using the updated result seems like the right approach. Reverting to a model result that is knowingly incorrect and biased against the utility without investigating the extent of the problem is not a reasonable way, in Clearspring's view, to support a stretch factor recommendation. A thorough investigation of the merits of the Company's corrections to the model should have been undertaken by CA Energy Consulting to support its stretch factor recommendation. If the investigation dictates that the extent of the problem throughout the industry cannot be reliably estimated, then either a new benchmarking analysis that does not contain those inconsistencies should be undertaken or a stretch factor recommendation not provided.

Clearspring believes that a new benchmarking analysis is required to provide a supportable stretch factor recommendation. Unfortunately, it was not possible for Clearspring to undertake this analysis within the timelines of preparing this reply evidence. However, Clearspring notes that such an analysis was contemplated by CA Energy Consulting's proposal filed in response to interrogatory HOL-1(b). On page 3 under the "Evaluation of Cost Benchmarking Studies" section, point 3 states, "*If necessary, the Project Team could use the data to perform an alternative cost benchmarking analysis using a different econometric approach.*" This possibility is mentioned later in the proposal as well. It is noteworthy that "an alternative cost benchmarking analysis" was contemplated yet not pursued by CA Energy Consulting, despite the inconsistencies and bias to Hydro Ottawa's benchmarking results in the existing PEG Benchmarking model.

The PEG Benchmarking Model has several flaws, and in our view has become obsolete. The flaws include: (i) the KM of line issue and the inconsistent reporting of that important variable, (ii) no congested urban variable, (iii) the capital asset prices are set to be equal across the province when that is not the case, (iv) results appear to show a bias against the larger Ontario distributors, (v) other explanatory variables could be investigated and included. Further the PEG model is simply outdated. It was estimated on a 2002 to 2012 sample, its last sampled year being 18 years prior to 2030 (the last year of Hydro Ottawa's proposed CIR period). In our view, the outdated sample period is particularly relevant to understanding Hydro Ottawa's suggested CDM correction, since the model was estimated during a time of far less CDM activity within Ontario.

In summary, although we were unable to undertake a new benchmarking analysis within the timelines of preparing this reply evidence, we have notable concerns with the existing PEG Benchmarking Model based on the analysis we've undertaken in other studies. Given the PEG model limitations identified above and identified by Hydro Ottawa in its direct evidence, we find it concerning that CA Energy Consulting made a

stretch factor recommendation without undertaking an alternative cost benchmarking study as contemplated in its proposal or considering the merits of Hydro Ottawa's proposed adjustments to the PEG model. Instead, CA Energy Consulting's recommendation relies on the results of an uncorrected and outdated model with a known significant bias against the company. In our view, this is an unreasonable approach. CA Energy Consulting's stretch recommendation should not be relied upon as they have assumed too much regarding benchmarking results and/or provided too little evidence in the CA Report regarding what can be known of the hypothetical model result if the entire sample were able to make similar corrections.

In the absence of full benchmarking analysis, Clearspring is unable to provide a stretch factor recommendation for Hydro Ottawa. However, within the context of using the standard PEG model, Clearspring believes that the adjustments proposed by Hydro Ottawa warrant appropriate consideration in setting the stretch factor.

4   Growth Factor

Clearspring agrees with CA Energy Consulting that a growth factor is required in a well-designed revenue escalation formula. The CA Report on page 19 states, "A principled revenue cap formula includes a growth factor, in addition to the inflation and X factors." This requirement flows from economic theory.

In a revenue escalation formula, it is essential the growth factor uses cost elasticity weights to combine multiple outputs. Clearspring detailed the reason for this requirement in the PFP section and the need for the output quantity index in the productivity research and the growth factor calculation to align.[27] Please see Section 2.1.1, point 3, in the Reply Report for a detailed explanation and illustration of the importance of using cost-based weights for the growth factor.

The growth factor's purpose is to essentially allow revenues to track the cost growth that is expected due to output growth.[28] There is sometimes a misconception that the growth factor should be scaled for the potential for economies of scale or assumes a constant return to scale if it is not scaled. CA Energy Consulting stated this itself in its interrogatory response to CCC-4(f), "*If the PFP growth rate and the growth factor have been weighted by revenue, we do not recommend a scaling factor. However, if a cost-weighted average approach was used, a scaling factor could potentially be included if returns to scale were not constant. In such a case, the scaling factor should be informed by empirical findings on company returns to scale.*"

However, needing to scale the growth factor even if economies of scale are available is not the case. The productivity trend study that informs the productivity factor already accounts for the possible presence of economies of scale. If utilities can keep input cost growth lower due to economies of scale, that will then increase the productivity trend and be reflected in the productivity factor. A scaling of the growth factor is not a feature of the mathematical derivation of the revenue index formula and any scaling due to economies of scale will be a type of double-counting.

An argument could be made that a specific utility may have a higher availability for economies of scale relative to the productivity sample because it either is significantly smaller in size than the sample and/or will have significantly higher growth. Clearspring does not believe that the situation for Hydro Ottawa warrants the consideration or an investigation if economies of scale are higher than the Ontario sample.[29] We, therefore, recommend no scaling factor be placed on the growth factor.

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[27] On page 19 of the CA Report, they agree that the growth factor should reflect the outputs used in the productivity research used for the X Factor. "The correct growth factor value should reflect the outputs used in the measurement of productivity for the purpose of setting the X factor."

[28] We say "essentially" because there may be economies of scale which result from the output growth, however, as we further discuss economies of scale expectations are captured in the productivity factor not the growth factor.

[29] It is possible that Hydro Ottawa has less access to economies of scale relative to the Ontario sample due to its larger size.

Hydro Ottawa requested Clearspring calculate a growth factor using cost elasticity estimates based on the "Planning Forecast" detailed in technical conference undertaking response JT3.28, Table A. To calculate this, we will use the cost elasticities found in Clearspring's latest filed cost benchmarking report for Toronto Hydro.[30]

The 2026 to 2030 growth rates for the Planning Forecast equals 4.99%.[31] The customer growth over that period is forecasted to be 0.99%.[32] When combining using cost elasticity weights, the growth factor is 2.74%.

Output Component	Annual Growth Rate
2026-2030 Customer Growth	0.99%
2026 – 2030 Planning Forecast Growth	4.99%
Cost Elasticity Growth Factor	**2.74%**

Clearspring would typically recommend a growth factor based on system peak demand and customer growth forecasts. It is Clearspring's understanding from Hydro Ottawa that the "Planning Forecast" is a regionalized aggregation of demand forecasts that were used to formulate the system investment plans for each region, and that it is impractical for Hydro Ottawa to plan on a pure system-wide peak given the regionality of its system. The Company has also stated the need to use the Planning Forecast given the high level of "greenfield" development and the energy transition. In these circumstances, Clearspring believes it may be appropriate to use the Planning Forecast as a substitute for the system peak demand included in the growth factor. Doing so yields a cost elasticity growth factor of 2.74% that can be used to escalate the OM&A revenue.

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[30] EB-2023-0195. Cost elasticity weight of 56.3% on customers and 43.7% weight on demand.

[31] 1,947 MW in 2026 and 2,336 MW forecasted in 2030.

[32] From Table 7 in Exhibit 1, Tab 3, Schedule 1, page 23.

5 Concluding Remarks

The productivity factor of 0.5% recommended in the CA Report is not substantiated by their evidence and should not be implemented. Instead, we recommend continuing to use a 0.0% productivity factor in line with the many CIR precedents adjudicated under the RRF. Along with the problems of moving away from precedent without a thorough generic examination and opportunity for all parties to produce studies, there is no reliable evidence on the record that the PFP trend of the Ontario or U.S. distribution industries is positive. The Ontario study conducted by CA Energy Consulting had several omissions, inconsistencies, an input price assumption inconsistent with the inflation factor, revenue-driven output quantity weights, and was driven by a single observation of Hydro One in 2015 in the same year as Hydro One's initial public offering.

The stretch factor of 0.45% recommended in the CA Report is also not substantiated by their evidence and should not be relied upon. Given the PEG Benchmarking model limitations and identified by Hydro Ottawa in its direct evidence, we find it concerning that CA Energy Consulting made a stretch factor recommendation without undertaking an alternative cost benchmarking study as contemplated in its proposal or not properly investigating the merits of Hydro Ottawa's proposed adjustments to the PEG model. Instead, CA Energy Consulting's recommendation relies on the results of an uncorrected and outdated model with a known major bias against the company. In our view, they assumed too much regarding results and/or provided too little evidence in the CA Report, to formulate a reliable stretch factor recommendation. In the absence of full benchmarking analysis, Clearspring is unable to provide a stretch factor recommendation for Hydro Ottawa. However, within the context of using the standard PEG model, Clearspring believes that the adjustments proposed by Hydro Ottawa warrant appropriate consideration in setting the stretch factor.

We agree with the CA Report that the revenue escalation formula should include a growth factor. However, the growth factor needs to be based on cost elasticity weights to yield reasonable productivity expectations and to properly align revenue escalation growth with expected cost growth. This is discussed in detail and with an illustration in Section 2.1.1. There should be no scaling factor for economies of scale because any possible economies of scale should already be captured in the productivity factor in the formula. Using established cost elasticity weights applied to Hydro Ottawa's customer growth and system planning forecast yield a cost elasticity growth factor of 2.74%. This may be a reasonable option for a growth factor in this case.