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September 22, 2026

CPKC's Response to CTA Model Testing Results: Volume Related Composite Index (VRCPI), Consultation, 2025

CPKC has reviewed the testing results for the proposed forecasting methods published by the Canadian Transportation Agency (CTA) resulting from the 2025 VRCPI public consultation rounds one and two. Our response continues to be guided by a commitment to model accuracy while ensuring that revisions to the VRCPI provide reliable improvements and avoid adding unnecessary complexity. A more accurate VRCPI forecast is desirable for all stakeholders as it reduces the need for future error adjustments.

CPKC believes that railway rates should be determined in the market wherever possible and does not endorse the Maximum Revenue Entitlement (MRE) or the VRCPI. However, given the explicit legislation that exists governing these programs, the remainder of our comments should not be construed as support but merely in response to this consultation's purpose.

Accordingly, our review evaluates only the six forecasting methods as presented by the CTA, and any reference to an "optimal" method should therefore be understood as the optimal approach within this constrained set. CPKC will continue evaluating alternative forecasting methodologies over the coming years and does so without prejudice to its right to propose changes in any future consultations.

CPKC submits that any stakeholder-recommended revisions to the CTA's proposed forecasting methods arising from this consultation round would require an additional round of consultation for follow-up comments.

General Observations

Before addressing the substance of the CTA's test results, CPKC wishes to highlight several observations that we believe should be considered prior to any final determination.

Analysis Results Interpretation:

While insightful, the results from the back-casting exercise should be interpreted with caution. First, aggregate error metrics (e.g., cumulative error, mean error) calculated for a back-cast depend largely on the selected evaluation period. Second, a model's past performance is not necessarily indicative of how well it will perform in the future.

As such, CPKC has provided feedback on the six evaluated forecasting approaches based not only on the back-casting results but also based on their overall complexity and the extent to which they address our previously noted concerns with the status quo. We encourage the CTA to also consider factors outside of the statistical back-casting results.

Error Evaluation:

CPKC recommends that forecast errors should be evaluated using the most recent VRCPI tables available, ensuring that any subsequent revisions to historical actuals are appropriately reflected. As part of their back-casting analysis, the CTA has calculated errors based on the VRCPI determinations in which the evaluated crop years first became actualized, which corresponds to a two-year lag. However, the indices are often revised further in subsequent determinations to reflect the latest data. Evaluating errors against the most recent actuals would more accurately evaluate each model's true performance.

Flexibility for Anticipated Trend Disruptions:

If a backwards-looking forecasting method is selected for any of the indices, the CTA should consider how, and to what extent, known cost factors in forecasted years would be accommodated when they are expected to make the forecast trend inaccurate. For example, a signed labour contract could have measurable impact on the forecast but would not be reflected in the historical trend, resulting in a forecast miss.

This is a practical limitation that these methods, as proposed by the CTA, are unable to address. CPKC did not anticipate that the CTA would eliminate this model dexterity entirely under any proposed methodology and, therefore, believes that further consideration is required to incorporate such disruptions into forecast years, rather than only in the year in which the event is captured in the actualized data.

Method 6 Approach:

CPKC would like to highlight two concerns with Method 6 as proposed by CN and modelled by the CTA.

First, this approach would produce identical VRCPI escalation rates for both CPKC and CN, thereby failing to reflect each railway's unique inflation circumstances and effectively undermining the purpose of bifurcation.

Second, there is a fundamental issue with how Method 6 was modelled for each index in the back-casting exercise. Specifically, the approach was applied using information that would not be available when conducting VRCPI forecasts and produces artificially low error metrics as a result. In the CTA's description for Method 6, they include the following example:

$$2025-2026 \text{ forecasted LPI} = 2024-2025 \text{ actual LPI} \times \text{StatsCan} [2024/2023]$$

However, the 2024-2025 actual LPI would not have been available for the 2025-2026 forecast since *only the indices up to 2024 would have been actualized and known by that time*. The 2025 calendar year index would need to be forecasted first to calculate the 2024-2025 index. Given that this method was back-casted using an unfeasible approach, CPKC believes that it should be revised to incorporate a valid approach and re-tested for both railways before it is considered further.

For these reasons, CPKC wholly objects to the implementation of Method 6 for the LPI, FPI, and MPI and does not consider it in any further analyses below.

Labour Price Index (LPI)

Optimal Approach – Method 3: Three-Year Moving Average Growth Rate

Method 3 offers a simpler forecasting approach than the LPI's status quo methodology and yields more accurate forecasts on average, as indicated by the back-casting results (2.6% root mean squared error vs. 3.8%). It also corrects a fundamental mathematical flaw in the status quo's forecasting methodology

related to the application of its moving averages. Specifically, the status quo approach combines single-year observations with multi-year averages and treats them as a continuous time series. This systematically reduces the expected year-over-year inflation in the forecasted values, skewing results toward the midpoint of the time series and mis-stating inflation.

Compared to the other alternative methods, Method 3 boasts the highest forecasting accuracy (2.6% root mean squared error) and lowest error volatility (2.7% standard deviation). A three-year historical average is better suited than a five-year average for predicting labour inflation because it responds more quickly to recent cost pressures such as collective bargaining outcomes or pension adjustments. A shorter average gives more weight to recent events, whereas a longer average can dilute current trends with older, less relevant data.

Metric	Method 1: Status Quo	Method 2: Modified Status Quo	Method 3: 3-Year Moving Average Growth Rate	Method 4: 5-Year Moving Average Growth Rate	Method 5: 5-Year Average Growth Rate
Cumulative Error	-6.0%	49.2%	-3.6%	-0.0%	2.0%
Mean Error	-0.6%	4.9%	-0.4%	-0.0%	0.2%
Mean Absolute Error	3.2%	6.9%	2.3%	2.3%	2.3%
Root Mean Squared Error	3.8%	9.2%	2.6%	2.8%	2.6%
Standard Deviation	3.9%	8.2%	2.7%	2.9%	2.8%
Coefficient of Variance	1.24	1.19	1.19	1.28	1.22

Table 1 – LPI Back-Cast Error Metrics (Source: CTA)

Further consideration should be given to incorporate known disruptions to the calculated moving average growth rates. For example, where a signed labour contract is known to differ materially from the calculated moving average growth rate, there should be a mechanism to reflect that information in the forecast rather than knowingly relying on a forecast that is inaccurate.

Fuel Price Index (FPI)

Optimal Approach – Method 2: Modified Status Quo

Method 2 offers a simpler approach than the FPI's status quo methodology by removing the refiners' margin adjustment and condensing the regression data from monthly observations to annual averages. Removing the refiners' margin adjustment eliminates a considerable source of volatility that is present in the status quo, while annual averages reduce noise from monthly variances between WTI prices and CPKC fuel costs. According to the back-casting results, these modifications result in Method 2 producing more centered forecasts (-2.5% cumulative error vs. -10.8%) while maintaining a similar level of forecasting accuracy (13.8% root mean squared error vs. 13.6%).

The forward-looking forecasting approach maintained in Method 2 is well suited to predicting fuel inflation; it allows for anticipated fuel price shocks to be incorporated into the years in which they occur and mitigates their impact on subsequent forecasts. In contrast, the back-casting results indicate that backwards-looking historical averages (Methods 3, 4, and 5) are poor predictors of fuel inflation and often over-forecast to an extreme degree (67% to 121% cumulative errors).

Furthermore, Method 2 preserves the CTA's current approach for incorporating anticipated changes to federal and provincial fuel taxes, which are typically announced in advance. The historical averaging

approaches are not currently equipped to include any new or revised fuel tax rates or programs. If a moving average method is selected for the FPI, the CTA should consider how to incorporate these announced taxes.

Metric	Method 1: Status Quo	Method 2: Modified Status Quo	Method 3: 3-Year Moving Average Growth Rate	Method 4: 5-Year Moving Average Growth Rate	Method 5: 5-Year Average Growth Rate
Cumulative Error	-10.8%	-2.5%	121%	67%	77%
Mean Error	-1.1%	-0.3%	12.1%	6.7%	7.7%
Mean Absolute Error	10.7%	11.6%	41%	29%	30%
Root Mean Squared Error	13.6%	13.8%	45%	34%	35%
Standard Deviation	14.3%	14.5%	46%	35%	36%
Coefficient of Variance	1.33	1.25	1.11	1.18	1.20

Table 2 – FPI Back-Cast Error Metrics (Source: CTA)

Material Price Index (MPI)

Optimal Approach – Method 3: Three-Year Moving Average Growth Rate

Method 3, which has already been implemented to forecast the 2026-2027 MPI, offers a simpler forecasting approach than the MPI's status quo methodology and has a much lower tendency to mis-forecast, as indicated in the back-casting results (-1.8% cumulative error vs. -41.6%). It also addresses several flaws in the status quo's forecasting methodology, such as its weak regression models, incorrect foreign exchange adjustment, and over-representation of non-locomotive fuel. Together, these flaws have skewed the status quo to mis-state year-over-year material inflation over the ten years evaluated in the back-cast.

Compared to the other alternative methods, Method 3 produces the most centered forecast (-1.8% cumulative error) and maintains a similar level of forecasting accuracy (7.1% root mean squared error). A three-year historical average is better suited than a five-year average for predicting material inflation because it responds more quickly to changing market conditions such as supply chain disruptions, commodity price movements, and exchange rate fluctuations. A shorter average gives more weight to recent events, whereas a longer average can dilute current trends with older, less relevant data. We note that the MPI Method 3 still has the same challenges regarding incorporating known trend disruptors and more consideration should be given to any impacts that would render the forecast knowingly inaccurate.

Metric	Method 1: Status Quo	Method 2: Modified Status Quo	Method 3: 3-Year Moving Average Growth Rate	Method 4: 5-Year Moving Average Growth Rate	Method 5: 5-Year Average Growth Rate
Cumulative Error	-41.6%	-70.6%	-1.8%	-14.6%	-14.1%
Mean Error	-4.2%	-7.1%	-0.2%	-1.5%	-1.4%
Mean Absolute Error	5.3%	7.3%	5.4%	5.2%	5.0%
Root Mean Squared Error	6.8%	8.2%	7.1%	6.9%	6.8%
Standard Deviation	5.6%	4.3%	7.4%	7.1%	7.0%
Coefficient of Variance	1.06	0.60	1.38	1.35	1.38

Table 3 – MPI Back-Cast Error Metrics (Source: CTA)

Conclusion

CPKC maintains that rates are best determined by the market. So long as the MRE and VRCPI legislative frameworks remain in place, CPKC supports ongoing improvements to the existing models that enhance forecast accuracy without introducing unnecessary complexity. In comparison of the limited methods proposed by the CTA, CPKC has identified Method 3 as the optimal approach for the LPI and MPI, and Method 2 as the optimal approach for the FPI.

CPKC encourages the CTA to consider how to incorporate known cost factors within the moving average methodology. Additionally, changes to proposed methods should undergo a further round of stakeholder review and comment before a determination is made.

CPKC sincerely thanks the CTA for its continuing efforts to review and improve the models it currently employs in regulating the rail industry. We appreciate its proactive approach to incorporating, testing, and communicating stakeholder feedback.



Yours truly,
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