DATE:	July 20, 2026
TO:	Tom Armstrong, Portland Bureau of Planning and Sustainability
FROM:	ECOnorthwest
SUBJECT:	Memo 1: Parametrix Model Review and Policy Implications

Summary

The City of Portland (City) has been evaluating options to update its Comprehensive Plan policies and development regulations to address risks related to the bulk liquid fuel facilities at the Critical Energy Infrastructure (CEI) Hub in northwest Portland. The City is evaluating a proposed draft policy that would, among other changes, amend City code to require a 20 percent fuel storage capacity reduction ("drawdown") at each bulk fuel terminal by 2036. As part of the CEI Hub Policy Project, Parametrix developed a model to analyze the impacts of factors affecting fuel consumption in the future, to help policy makers understand future demand for fuel under various scenarios as it compares to CEI Hub capacity.

Bureau of Planning and Sustainability (BPS) asked ECOnorthwest (ECO) to independently review the fuel demand model designed by Parametrix and to provide an additional economic assessment to specifically address how the City's proposed regulations could affect Oregon's economy. BPS is interested in additional analysis to evaluate whether the demand analysis provided in the Parametrix model is sufficient to understand a comprehensive set of economic impacts of both the proposed fuel storage capacity regulations and the fuel storage capacity reduction program. **This memo provides ECO's independent review of the demand analysis undertaken by Parametrix** and elevates possible economic effects of a range of market dynamics that are indirectly modeled. A supplemental memo summarizes the results of economic modeling of incremental fuel price increases on Oregon's economy.

ECO finds that the Parametrix model is a necessary starting point for understanding the CEI Hub's ability to meet future liquid fuel demand. Challenges in data availability and limitations regarding the operations at the bulk fuel terminal required Parametrix to make assumptions around key model components. **Uncertainty in these assumptions limit the use of the model to evaluate potential economic consequences of the proposed regulations.** Our review identifies specific structural limitations in the model and presents a set of observations regarding key assumptions, their influence on model outputs, and the sensitivity of the model's conclusions to changes in those assumptions.

Given the data and modeling constraints identified above, the Parametrix model indicates that under baseline assumptions, demand is well within the Hub's throughput capacity over the analysis period, at approximately 70 percent of achievable annual throughput in 2023, declining to 56 percent by 2035 under the current adopted policies scenario. These results suggest spare capacity (if the model's key assumptions hold). Despite the limitations in the

model, the implications of the range of contemplated demand projections do not suggest a supply constraint. However, there remains uncertainty about what, if any, impact either of the proposed policies might have on fuel prices. A determination of excess capacity alone isn't a sufficient condition to understand if there are price (or other) impacts related to the proposed policy changes, and this is the primary limitation to the Parametrix study, and its use for conducting a comprehensive policy analysis.

An important analytical step in this memo is to apply an economic framework. When conducting policy analysis, having a framework of analysis is helpful because it acknowledges that in almost every instance, imposing an additional policy or regulation is going to have a price impact. As it relates to these proposed policy options, supply constraints are not the only determinant of price effects. Price impacts related to the proposed policy options cannot be ruled out if:

1) refueling throughput is constrained,

2) there is a cost associated with increased frequency of throughput,

3) there is a risk premium applied to less flexibility or decreased capacity.

These assumptions and implications will be explored in more detail in the rest of this memo. An accompanying second memo addresses the possible magnitude of economic impacts of a hypothetical range of fuel price increases.

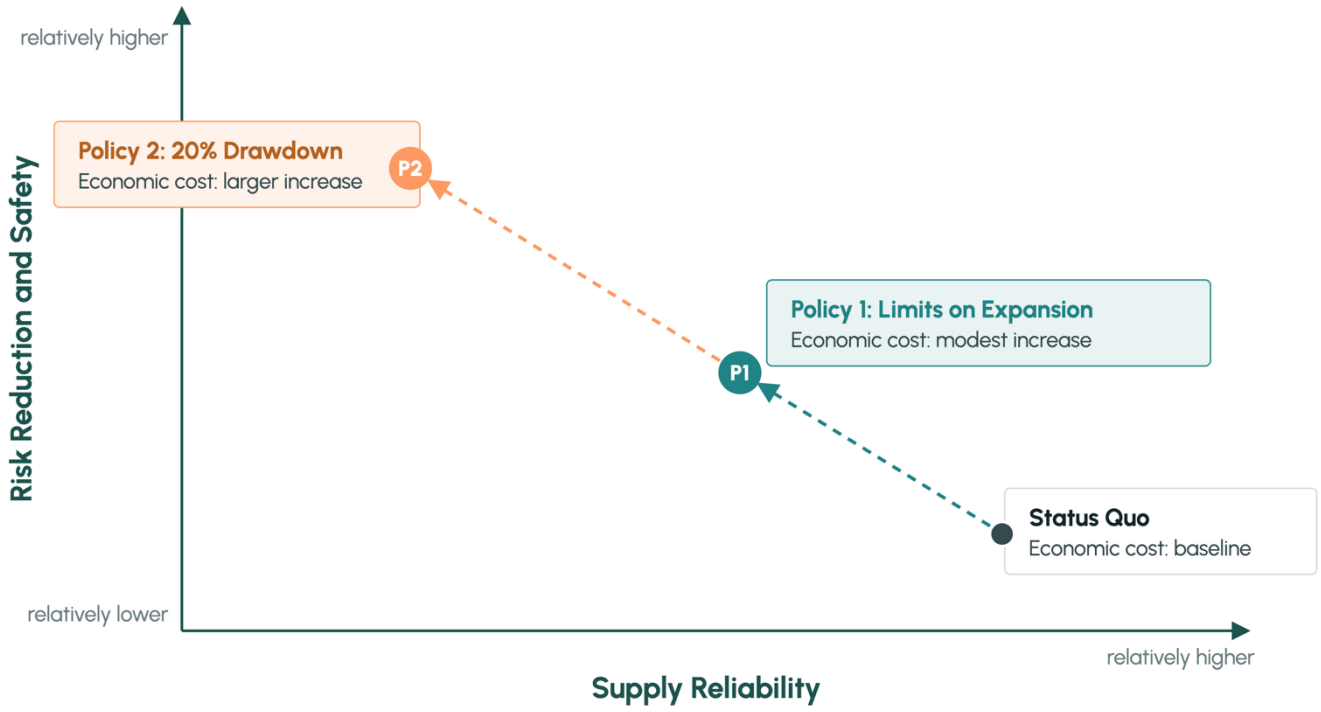
Economic Framework

Economic analysis of public policy typically begins with a framework for evaluating tradeoffs across a range of choices. A central concept is Pareto optimality: the idea that most policy decisions involve winners and losers. Some stakeholders benefit while others incur costs. True Pareto improvements, where a change makes at least one party better off without harming any other, are rare in practice. More commonly, policymakers must choose among options where gains on one dimension come at a cost on another, and the task of policy analysis is to make those tradeoffs explicit.

Policy 1 — Limits on Expansion: Policy 1 amends the zoning code to prohibit expansion of bulk fuel storage capacity and transloading facilities at existing CEI Hub terminals, freezing fuel storage at each terminal's current capacity level; with limited opportunities for expansion of transloading infrastructure and aviation fuel capacity, and transfers of storage capacity between sites through a discretionary land use review.

Policy 2 — 20% Drawdown: Policy 2 incorporates the expansion limits of Policy 1 and adds a requirement that each bulk fuel terminal in the CEI Hub reduce its total fuel storage capacity by 20% from current levels by 2036.

Exhibit 1: Illustration of possible tradeoffs under proposed policies



The graphic above maps the two primary tradeoff dimensions relevant to the CEI Hub policy options: safety and risk reduction on the vertical axis, and supply reliability on the horizontal axis. Both Policy 1 and Policy 2 move away from the status quo in the same general direction, trading some degree of supply reliability for greater safety and risk reduction. Economic cost is annotated alongside each policy position, reflecting that the burden on industry and the extent to which it is passed on to fuel consumers increases as policies move further from the status quo. The two policies differ in how far they travel along this tradeoff path: Policy 2 achieves a larger safety gain but at greater cost to both supply reliability and economic burden during the transition period.

Parametrix Model Review

The Parametrix model aims to evaluate whether existing storage capacity at the CEI hub would be sufficient to meet forecasted liquid fuel demand in Oregon under the proposed policies. They find that, “Despite population growth and increased renewable fuel usage, Oregon fuel demand volumes (fossil fuel plus renewable fuels) are expected to peak in all scenarios by 2029 or before” (Parametrix 2025, 1). They note that, “[the] model is purpose-built from the best available data, [and] the scope of this project is narrow, focusing purely on changing end-use liquid fuels in the state of Oregon” (Parametrix 2025, 3).

ECO's review of the model surfaced several key assumptions and model mechanisms that are pivotal to the model results and findings.

Limited Supply-Side Constraints

The Parametrix model does not include any constraints on ability to refuel (replenish) the hub. Effectively, the model assumes that fuel can be consistently delivered to the terminal and primarily evaluates whether the storage capacity is sufficient to meet forecast demand.

All storage and distribution infrastructure is constrained by three key elements:

1) import constraints -- how quickly and reliably can new fuel be brought into the Hub in each period
2) storage constraints -- how much of the fuel may be stored at any given time, and
3) export constraints -- how much of the fuel leaves the Hub in each period

Parametrix did not have access to (confidential) import or export rate data and thus generated estimates for these factors using inferences from tank storage capacity, and historic fuel demand.1

Specifically, Parametrix used dwell time – the time in which the equivalent of a full storage container of fuel passes through a storage container – as a proxy for these mechanisms. As a baseline assumption, the model uses a one-month dwell time assumption. Publicly available information or industry stakeholders did not provide data or validate this assumption.

While a one-month dwell time is a reasonable assumption, it encompasses a range of throughput scenarios. An assessment of possible economic impacts of the proposed policies is difficult without knowledge of the underlying constraints to the system. For instance, if because of either of the policy proposals, liquid fuel demand exceeds the storage tank capacity of the terminals, then one response could be increasing the frequency of refueling.[2] This scenario assumes there is spare refueling capacity in the system. A critical assumption within this scenario is an understanding of the marginal cost of using increased throughput. If there are no marginal costs associated with increased throughput, then the proposed policies are less likely to have an impact on supply or price, assuming there is an ability to increase refueling frequency.

Conversely, it is also possible that, 1) the refueling/pipeline system is capacity constrained, 2) there are increased marginal costs associated with more frequent replenishment, or 3) there is a risk premium associated with relying on more frequent refilling, related to pipeline disruptions, or exogenous price shocks that can't be as effectively mitigated by relying on

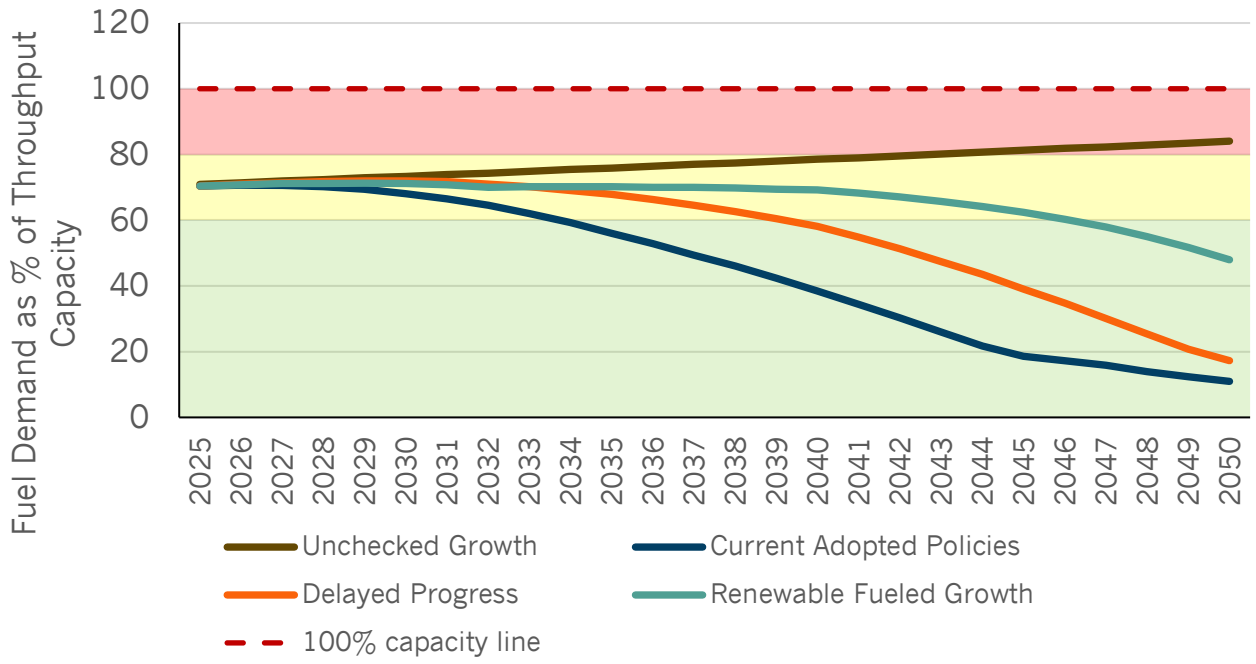
[1] "[N]o data could be obtained relevant to understanding throughput/import-export volumes or relevant operational profiles (maximum number of inbound and outbound shipments per year, pipeline flow capacity, shipment volumes, storage flexibility, etc.)" (Parametrix 2025, 4)
[2] See sections on seasonality and sensitivity to EV adoption curves below.

excess capacity. If any of these conditions hold, operators are likely to pass some the costs of increased refueling frequency and/or a risk premium to consumers.

Parametrix notes, "[t]he results of the modeling tool are highly sensitive to tank turns/dwell time. If one turn can be achieved every three weeks (21 days), that represents a 45 percent increase in annual throughput capacity compared to the one-month base. Achievable tank turns are dependent on a range of operational factors that could not be modeled, and few high-quality sources are available in the public domain" (Parametrix 2025, 5).

The model's baseline of one tank turn per month is calibrated from U.S. Energy Information Administration data reflecting an average fuel supply time of approximately 25 days, suggesting the baseline throughput assumption is achievable under normal operating conditions. Given that fuel demand forecast suggests peak demand for liquid fuels in 2029, the model also experiences no demand driven pressure, as demonstrated by Exhibit 1. There are a variety of alternative scenarios, or different assumptions that can delay peak demand beyond 2029. The next sections do a deeper dive into the alternative scenarios and their implications.

Exhibit 2: Scenario fuel demand as % of throughput capacity (Baseline 30.4-day dwell time)



Source: ECOnorthwest analysis of Parametrix Model

Aggregation Challenges

The Parametrix model relies on total storage capacity and aggregate fuel demand to analyze storage sufficiency. This introduces challenges to assess possible economic impacts of the proposed policies.

FUNGIBLE LIQUID FUEL STORAGE

Parametrix creates unique demand forecasts for different fuel types. They also standardize and aggregate storage capacity based on fuel types as far as possible. However, the results of the model aggregate across fuel demand and storage capacity to assess total storage sufficiency.[3] One implication of modeling total storage capacity is that the storage infrastructure is treated as substitutable between different liquid fuel types in the model.

Both proposed policies allow operators to convert between tank types, provided the total storage capacity is maintained at the proposed levels. Operators already convert between fuel tank types to respond to changes in fuel demand and prices. In a likely scenario, operators continue converting capacity to respond to changing market dynamics at a comparable frequency as they would without any policy change and the retail price of liquid fuels remains comparable to the counterfactual. In an alternative scenario, operators might need to increase the frequency of storage type conversion to meet increased demand for jet fuel (a baseline assumption) and might pass these incremental costs on to consumers.

ANNUAL AVERAGES NOT SENSITIVE TO SEASONALITY

The Parametrix demand analysis uses average annual fuel demand and does not capture the impact of seasonality within a year.[4] Liquid fuels have variable levels of seasonality in demand. For instance, retail gasoline demand peaks in the summer (on average over the last 20 years), the peak has been about 9 percent higher than the trough (U. S. Energy Information Adminstation 2024). Conversely, diesel demand has peaked in the winter months, with the highest average demand in winter months being about 10 percent higher relative to summer trough nationally (U. S. Energy Information Adminstration 2024). With a capped level of demand, even though aggregate demand is forecast to decline on average, there are still periods of increased demand throughout the year that vary by fuel type.

The constraints on substitutability between storage tanks means that some tanks might only be partially full for much of the year but require full operational capacity for a few weeks. For instance, gasoline tanks at the CEI Hub were only 40 percent full on an average day between 2020 and 2024, however were up to 80 percent full on the peak day across these years.[5] As

[3] "Though tanks have been categorized by the primary type of compound they store (fuels, fuel additives, crude oil, etc.), storage volumes are modeled in aggregate (individual tanks/terminals are not modeled separately)." (Parametrix 2025, 5)
[4] "This approach does not include other relevant operational considerations, including seasonality, pipeline and marine vessel capacity, shipping and transloading logistics, etc." (Parametrix 2025, 5)
[5] ECOnorthwest calculations based on estimated total capacity and fuel storage data used in Parametrix model.

discussed earlier in the memo, the marginal cost of increased replenishment is a key component to understanding the implication of peak seasonality demand.

LIMITED LNG MODELING

Liquefied Natural Gas (LNG) demand modeling is not undertaken in the Parametrix model.

Demand Scenario Sensitivity

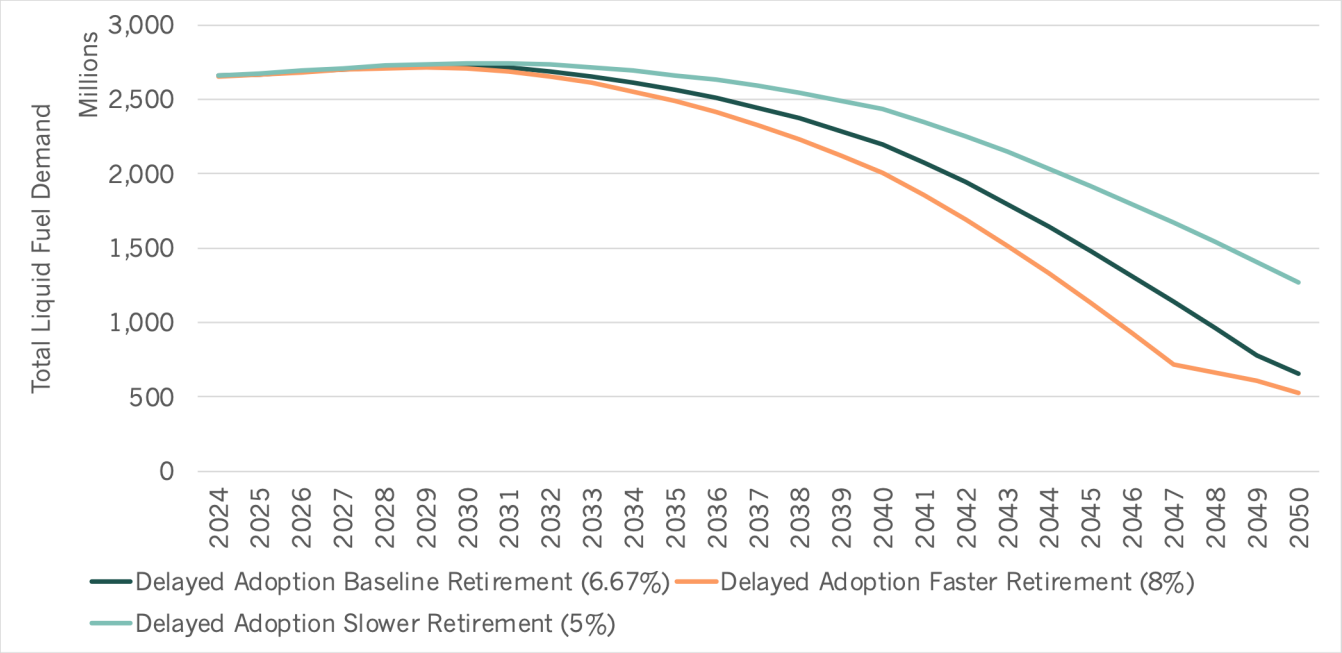
Vehicular fuel demand is a large driver of total fuel demand in the model, and the rate of electrical vehicle adoption and gasoline vehicle retirements is a critical assumption. While the various scenarios provide a meaningful range of target years by which all new car sales would be electric vehicles, the modeling of retirements of internal combustion engine (ICE) vehicles is simplistic and warrants further sensitivity analysis. The retirement rate of gas vehicles is held constant over time, which leads to significant churn and an expedited retirement of ICE vehicle stock.

As the share of ICE vehicles in the car stock reduces, the retirement rate of those vehicles is also likely to reduce. For instance, if 6% of the car stock is retired each year, it would make sense for almost all the retired cars to be ICE cars when these cars make up 98% of the car stock. In the future, if EVs become the predominant car type and ICE vehicles only account for 10% of the car stock, you would expect ICE vehicles to account for only a fraction of the retired cars. The current model framework does not model this reduction in retirement rate.

The sensitivity of the fuel demand forecast to EV adoption assumptions is also relevant considering recent federal policy changes. Rollbacks of EV purchase incentives and revisions to vehicle efficiency standards under the current federal administration introduce uncertainty into near-term EV adoption trajectories beyond the scenarios modeled here. The Oregon Department of Energy specifically noted these federal changes in its December 2025 comments on the proposed policy (Oregon Department of Energy 2025) and recommended that the City's modeling account for them.

As a sensitivity test, we modeled the impact of changing the retirement rate of the vehicles within the constant rate of retirement paradigm. Modeling a range of constant retirement rate (of 5% to 8%) in the delayed EV adoption scenario illustrates the sensitivity of the forecast fuel demand curves. As is expected with any forecast, the divergence increases over time due to compounding growth. Under the baseline conditions in this scenario, liquid fuel demand peaks in 2029 and is estimated to be 7% lower in 2036 than it would be in 2026. Increasing the rate of retirement to 8% also results in peak demand in 2029 with the 2036 value being 10% lower. Finally, reducing the retirement rate to 5% results in peak fuel demand in 2030 however the 2036 value is only 2% lower than the 2026 demand.

Exhibit 3: Fuel demand curve sensitivity to variable retirement rates



Source: ECOnorthwest analysis of Parametrix Model

There are multiple other input factors that could impact the demand forecast, the most important of which is the population growth forecast. Recent observed population growth has underperformed the forecasts over the past several years. A stagnant or declining population would have material impacts on the EV adoption curve, and more broadly the demand for fuel. Other considerations are the proliferation of self-driving vehicles, which could alter the demand for individual vehicle ownership and fuel consumption patterns. Any long-range forecast has uncertainty, but given current rates of demographic and technological change, this is a particularly challenging time to make long range projections.

No Modeling of Price Impacts

Parametrix notes, "the scope of this project is narrow, focusing purely on changing end-use liquid fuels in the state of Oregon" (Parametrix 2025, 3). **This model does not consider and cannot be used to evaluate possible prices effects of a change in liquid fuel storage capacity.**

Implications for Policy Evaluation

After finishing an independent review of the Parametrix model, ECO reviewed public comments provided by industry and public partners regarding the proposed policy. Several modeling considerations we identified and elevated in our review of the model were also themes presented in public commentary.

This memo has identified key assumptions that would impact potential price impacts. All these assumptions have uncertainty, and are therefore helpful for identifying potential mechanisms, but not able to provide a range likelihood. Given the available data and scenario analysis conducted to support this memo, it is a potential outcome that these proposed policies will not impact price if all the conditions identified in the memo are met. **A key takeaway, however, is that a reduction in supply or capacity is not the binding constraint.** There are other mechanisms through which price is impacted, and additional research or stakeholder engagement could help provide more certainty on the likelihood of these outcomes, and the extent to which they could increase prices.