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British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, BC V6Z 2N3

Attention: Patrick Wruck, Commission Secretary

Dear Sirs/Mesdames:

**Re: British Columbia Utilities Commission (“BCUC”) – An Inquiry into Gasoline and Diesel Prices in British Columbia – Project No. 1599007
Parkland Fuel Corporation (“Parkland”) Comments on BCUC Report**

Further to Parkland’s letter dated September 17, 2019, and in accordance with Order G-219-19, please find enclosed Supplemental Independent Expert Report of Dr. Henry Kahwaty, Managing Director of the Berkeley Research Group.

While the enclosed evidence addresses some of the items examined in the BCUC’s August 30, 2019 report (“Report”), the aggressive timelines (including allowing less than two weeks to provide evidence) preclude a comprehensive assessment and response. Accordingly, the absence of additional evidence should not be construed as Parkland’s agreement with the Report’s conclusions on any such matters.

Yours truly,

[original signed by]

Christy J. Elliott
VP, Senior General Counsel & Corporate Secretary

Enclosure

British Columbia Utilities Commission

**An Inquiry into Gasoline and Diesel Prices in British Columbia
Project No. 1599007**

Supplemental Report of Henry J. Kahwaty, Ph.D.

23 September 2019

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I. INTRODUCTION AND SUMMARY OF OPINIONS

1. My name is Henry J. Kahwaty. I am a Managing Director with Berkeley Research Group, LLC (“BRG”). BRG is an international firm providing expert analysis and management consulting services in the areas of economics, finance, accounting, and data analytics. My business address is 1800 M Street, N.W., Second Floor, Washington, DC 20036.
2. I have been retained by counsel to Parkland Fuel Corporation (“Parkland”) in this proceeding to provide independent expert evidence to the British Columbia Utilities Commission (the “Commission”) on the subject matter of this inquiry into gasoline and diesel prices in British Columbia (the “Inquiry”). I provided an Expert Report in this Inquiry on June 27, 2019 (the “Kahwaty Report”), provided hearing testimony on July 17, 2019 (the “Kahwaty Testimony”), and provided answers to follow-up questions from the Commission. My qualifications are detailed in the Kahwaty Report.
3. The Commission issued its Final Report on this Inquiry on August 30, 2019 (the “BCUC Report”). Counsel has asked me to address certain aspects of the BCUC Report, and I do so in this Supplemental Report. I have not attempted to provide a complete evaluation of the BCUC Report, however. My failure to comment on a part of the BCUC Report does not indicate that I agree or disagree with it. In particular, I am not endorsing the BCUC Report’s analyses and opinions that I do not address in this Supplemental Report.
4. In this Supplemental Report, I first address issues related to the BCUC Report’s analysis of wholesale gasoline and diesel markets. I then address the BCUC Report’s analysis of retail gasoline and diesel markets. The topics addressed in this Supplemental Report and my opinions on these topics are:
 - Joint Dominance of the Wholesale Market: The Commission stresses the importance of primary terminals and finds that because of barriers to entry and their high combined share, the wholesale market suppliers in BC have joint market power. I disagree. There are fewer market participants in other provinces, and these provinces also have lower refining margins. If market power were a concern in BC, it would be more of a concern in other provinces but is not. What distinguishes other provinces, such as Manitoba, from BC is the availability of low-cost pipeline transport capacity to allow refined products to be imported into the area from Edmonton. Relaxing this constraint on the wholesale market will result in lower refining margins in BC.
 - Wholesale Markets and Natural Monopoly: The Commission indicates that the wholesale market exhibits elements of natural monopoly. I disagree. A natural monopoly occurs when economies of scale are so large that one firm can supply the entire market at a lower cost than multiple firms. That does not describe the wholesale gasoline and diesel markets in BC.
 - Wholesale Prices and the Relationship between Vancouver Rack Prices and Pacific Northwest (“PNW”) Prices: The Commission’s analysis of the relationship between

PNW spot prices and Vancouver rack prices focuses too much on the mechanics of the price setting behaviour of market participants and not on the fundamental economic factors driving prices in the market. The Commission's analysis is based in part on a regression analysis that makes several fundamental statistical mistakes and is, therefore, not reliable. These mistakes include trying to model one endogenous variable (the Vancouver rack price) based on another endogenous variable (the PNW price) instead of on independent variables such as the various factors that drive supply and demand.

- **PNW Barged Product as the Marginal Supply Source:** The Commission misinterprets PNW barged product as the marginal supply source because this is the most prevalent means of transporting PNW gasoline and diesel to BC. Prevalence is not an economic criterion to determine a marginal supply source.
- **The 13-cent Unexplained Differential:** The Commission finds a 13-cent unexplained wholesale price differential between PNW and Vancouver prices. Its analysis is based on an apples-to-oranges comparison of products, comparing large volume, bulk PNW purchases of between 210,000 gallons and 2,100,000 gallons to much smaller Vancouver purchases of 8,000 gallons. Differences in the scale of the transactions alone would lead to price differentials. It also does not account for the provision of distribution services and therefore misses relevant costs and other factors. Therefore, any inferences or conclusions based upon the Commission's 13-cent unexplained differential analysis are unreliable.
- **Retail Price Cycles:** The Commission expresses concerns that price cycling may be evidence of tacit coordination. This is inconsistent with the economics literature which finds price cycling to be more common in gasoline markets with more suppliers. The literature also finds that price cycling leads to lower average prices. Both findings from the economics literature are inconsistent with the idea that price cycling may be evidence of tacit price coordination.
- **Retail Market Control:** The Commission suggests that links between wholesale and retail market suppliers could impact whether the retail market is competitive. The Commission should analyze competition in the retail market by asking the question of whether the retail market provides any additional market power to wholesale suppliers. I conclude it does not. The retail market is structured competitively, and wholesale market participants gain from having a competitive retail market downstream. Imperial Oil, for example, has no retail business in BC and cannot gain by having retailers exercise market power at that level of the vertical distribution chain.
- **The Evaluation of the Opportunity Cost of Land:** The opportunity cost of land is an important consideration in determining retail pricing and the evolution of retail prices over time. Even if market participants do not take opportunity costs into account daily

when setting their retail prices, the market reflects opportunity costs as retailers enter and exit the market due to their evaluation of the longer-term profitability of their operations. If retail prices do not earn a sufficient return on land, a retail gas station's owner would likely sell the site, which could then be put to its best alternative use. The sale and re-purposing of retail gasoline sites ultimately affect retail prices. An analysis of data on average retail margins from different cities in Canada demonstrates that retail margins are related to the opportunity cost of land.

5. I am aware that I have a duty to assist the Commission and that I am not to be an advocate for any party in this proceeding ("Duty of Independence"). I have prepared this Supplemental Report in accordance with this Duty of Independence.

II. PRIMARY TERMINALS AND JOINT DOMINANCE IN THE WHOLESALE MARKET

6. The BCUC Report explains that "primary terminals handle larger volumes and are typically the first point of storage and distribution after the refinery."¹ It indicates that there are 15 primary terminals in BC but that some of these are not relevant to the analysis in this Inquiry (*e.g.*, the Kinder Morgan terminal serves jet fuel).² Of these 15 terminals, nine have biofuel blending capabilities and therefore can be used to mix products for sale downstream in BC that meet local and national product specifications.³ These facilities can also be used to test whether imported products meet provincial and national specifications.⁴
7. The BCUC Report indicates that five companies own all of the primary gasoline terminals in BC: Parkland (two primary terminals), Husky Energy, Imperial Oil (three primary terminals), Shell, and Suncor (two primary terminals).⁵ Of these five suppliers, Husky Energy has the smallest share of sales: about 7%.⁶ Federated Co-operatives Limited ("FCL") is an additional supplier, though it does not use the primary terminals in BC but instead transports product via truck and rail from its primary terminals in Saskatchewan (Regina) and Alberta (Carseland) to its bulk terminals in BC.⁷ The BCUC Report indicates that FCL has a share of 5.6%.⁸ The Commission's analysis, therefore, is that the wholesale

¹ BCUC Report, p. 46.

² BCUC Report, pp. 46-47.

³ BCUC Report, pp. 46-47.

⁴ BCUC Report, pp. 46-47.

⁵ BCUC Report, Table 8.

⁶ BCUC Report, p. 56.

⁷ Exhibit E-66 – Email from Cal Fichter and Jodie Lacelle (Federated Co-operatives Limited) to Commission Secretary, British Columbia Utilities Commission re: An Inquiry into Gasoline and Diesel Prices in British Columbia, August 7, 2019, pp. 2 and 5.

⁸ BCUC Report, p. 57.

market in BC is a 6-firm market where the four largest suppliers have a combined share of approximately 88%.⁹ The Commission indicates that the five primary terminal operators might be “jointly” dominant due to their collective high share.¹⁰ It further finds that there are high barriers to entry¹¹ and, with high entry barriers and a high combined share, joint market power.¹² In addition, the Commission finds that this joint market power has been exercised because prices are elevated above a competitive level by 13 cents per litre.¹³

8. I do not agree with the Commission’s logic in reaching its conclusion. In this section of my Supplemental Report I address issues related to the structure of the wholesale markets in BC, and I address the Commission’s estimated 13 cent per litre effect in **Section VI**.
9. **Table 1** provides information on the number of primary terminal owners and operators by province, including the number of terminal operators with blending capabilities.

⁹ BCUC Report, p. 57.

¹⁰ BCUC Report, p. 57.

¹¹ “Thus, the Panel finds that significant barriers to entry would confront any new potential entrant into the wholesale [gasoline] and diesel market in BC.” BCUC Report, p. 60.

¹² “The Panel recognizes that in this case, not one firm but a group of firms may hold market power.” BCUC Report, p. 60. In addition, “However, the Panel already found that the wholesale gasoline market is highly concentrated and that multiple barriers to entry exist that prevent a potential new wholesaler from capturing any market share from existing suppliers. Put another way, there is no way that any party other than the companies that own the existing terminals can import gasoline into the wholesale system, unless they sell it to one of the five existing wholesalers. This further illustrates that the gasoline wholesale market is not fully competitive.” BCUC Report, pp. 79 – 80. As a result of the barriers to entry, the BCUC Report concludes the likelihood of new entrant supply response to be low. Which the BCUC Report says therefore “lends credence to the view that the incumbent suppliers of wholesale gasoline and diesel in BC have market power.” BCUC Report, p. 60.

¹³ “[T]here has been an increase in the differential between the wholesale price in the province, compared to prices in Seattle and Edmonton. This increase is more than can be explained by inflation, foreign exchange or any other factors. In early 2019, this unexplained difference was 13 cpl.” BCUC Report, p. 2.

**Table 1
Primary and Bulk Terminals by Province
2016**

Province	Number of Primary Terminals	Number of Primary Terminals with Biofuel Blending Capabilities	Number of Owners of Primary Terminals with Biofuel Blending Capabilities	Number of Bulk Terminals
Quebec	17	9	6	29
Alberta	9	6	5	166
British Columbia	13	8	5	54
Ontario	20	13	5	69
Nova Scotia	5	0	0	26
Newfoundland	5	0	0	9
Saskatchewan	3	3	3	76
Manitoba	3	2	2	37
New Brunswick	3	1	1	13
Prince Edward Island	1	0	0	4

Notes: 1) Certain terminals included in the source file were not included for the calculations in the table above: Two asphalt terminals owned by Irving Oil in Newfoundland (Botwood and Stephenville); two terminals that supply only aviation fuels (Kinder Morgan’s jet fuel pipeline terminal in BC, and Imperial Oil’s Edmonton aviation fuels terminal); Imperial Oil’s IOCO Distribution Terminal in Port Moody, BC, which only supplies marine fuel; and the West Coast Reduction terminal in Vancouver, BC, which only deals in canola and biodiesel. 2) Imperial Oil indicated in a response to the Commission that it no longer owns bulk terminals in BC. I have not been able to verify if these eight bulk terminals were closed or sold to another company. These bulk terminals are included in the count of terminals in the table above. 3) Four terminals are marked “n/a” in the source file under the “Renewable Fuel Blending” column. For the purpose of this table, those terminals are not considered to have biofuel blending capabilities.

Source: "2016 Report - Canada's Downstream Logistical Infrastructure: Refining, Biofuel Plants, Pipelines, Terminals, Bulk Plants & Cardlocks," Kent Group Ltd., October 20, 2017; "Imperial Oil Submitting comments on BCUC Consultant Report," British Columbia Utilities Commission An Inquiry into Gasoline and Diesel Prices in British Columbia Exhibit C8-3, June 27, 2019, p. 1; West Coast Reduction Ltd. – Vancouver Plant, available at <http://www.wcrl.com/vancouver>; "Imperial Oil Public response to Further Panel Questions," British Columbia Utilities Commission An Inquiry into Gasoline and Diesel Prices in British Columbia Exhibit C8-6-1, August 8, 2019, p. 8.

- The number of primary terminal operators in BC with blending capabilities is the same as (or greater) than the number of primary terminal operators with blending capabilities in all other provinces except for Quebec. Kent data indicates that five companies own all the primary terminals with biofuel blending capabilities in Alberta, three own all the primary terminals with blending capabilities in Saskatchewan, and two own all the primary terminals with blending capability in Manitoba. If the Commission’s premise is correct that having five wholesale rivals with local primary terminal capacity is sufficient to lead to joint or collective dominance in wholesale gasoline and/or diesel markets, then I would expect refining margins in Alberta, Saskatchewan, and Manitoba to be as high as or even greater than those in BC because the wholesale markets in these other three provinces

are as concentrated (or more concentrated) than the wholesale market in BC. In particular, Alberta has the same number of operators of primary terminals with biofuel blending capabilities as BC, and therefore based on the Commission's premise, refining margins in Alberta should be comparable to those in BC.¹⁴ Furthermore, refining margins in Saskatchewan and Manitoba should be even higher than those in BC because the number of wholesale market competitors is even lower in these provinces than in BC. I discuss refining margins in each of these provinces.¹⁵

Alberta

11. **Table 2** provides a summary of the primary and bulk terminals in Alberta. This table shows the same data and relies on the same source as Table 8 of the BCUC Report, but for Alberta instead of BC. There are only six primary terminals in the province that can blend biofuels, and these terminals are owned by five companies, as is the case in BC. These five companies are FCL, Imperial Oil, Parkland, Shell, and Suncor. This is the same list of wholesale market competitors as in BC, except for the exclusion of Husky Energy. FCL participates in the wholesale market in Alberta via an in-province primary terminal as opposed to serving the province via one or more primary terminals located outside of the province (which is how it operates in BC).

¹⁴ I note that BC does have an additional wholesale market competitor that participates in the market without having a primary terminal in the province (FCL). Based on the Commission's premise, this additional wholesale market competitor should reduce the refining margin in BC relative to that in Alberta.

¹⁵ BC has five wholesale market participants that have within-province primary terminals with biofuel blending capability, and FCL also competes in BC via a network of bulk terminals receiving supply from primary terminals located outside of the province. If the market is viewed as having six rivals due to FCL, then I note that Saskatchewan has three entities with primary terminals that have biofuel blending capability within the province and two rivals (Husky Energy and Parkland) with a network of bulk terminals but no primary terminal. Including Husky Energy and Parkland results in a total of five potential wholesale market participants in Saskatchewan. Manitoba has two entities with primary terminals that have biofuel blending capability within the province and three rivals (FCL, Husky Energy, and Suncor) with a network of bulk terminals but no primary terminal, which also gives a total of five potential market participants in the province. Including entities with networks of bulk terminals but no primary terminal in the analysis also results in there being fewer wholesale market rivals in Saskatchewan and Manitoba than in BC. Based on the Commission's analyses of market concentration, barriers to entry, and market power, I would expect refining margins to be higher in Saskatchewan and Manitoba than in BC.

Table 2
Count of Primary and Bulk Terminals in Alberta by Owner

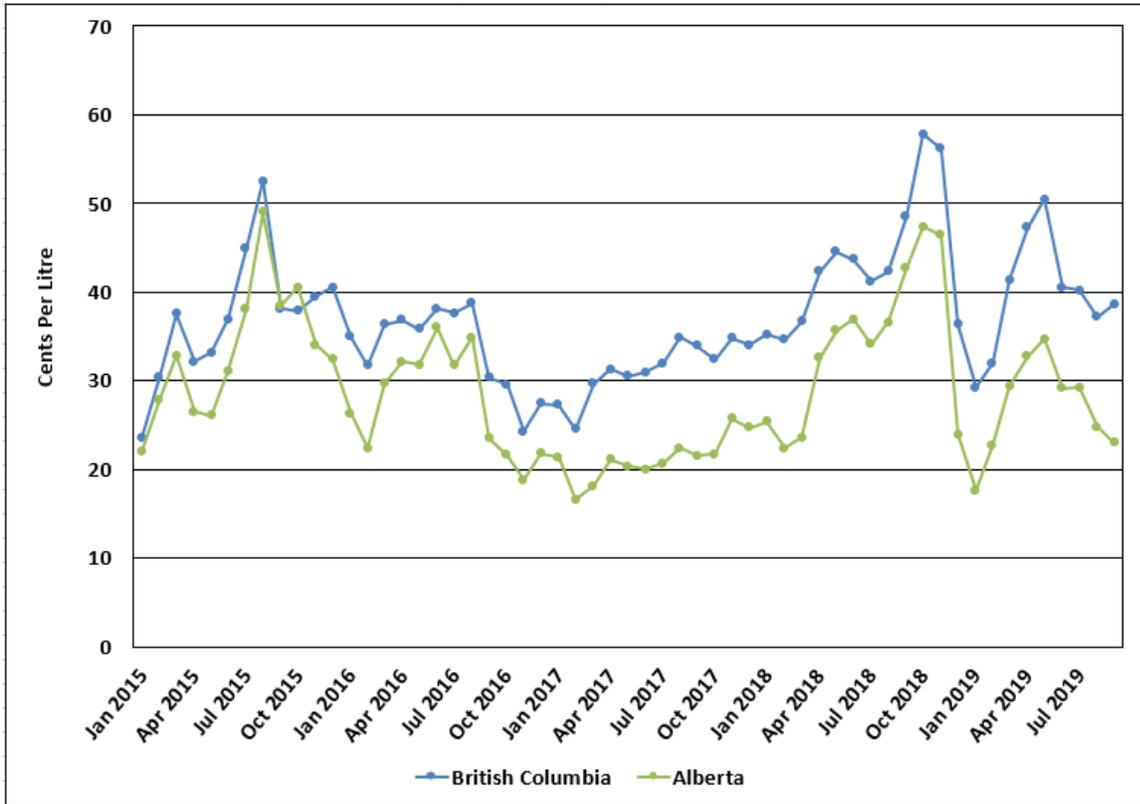
Owner	Primary Terminals	Primary Terminals with Biofuel Blending Capabilities	Bulk Terminals
Federated Co-operatives	1	1	32
Gibson Energy Ltd.	1	0	0
Imperial Oil Limited	2	2	14
Kinder Morgan	1	0	0
Parkland Fuel Corporation	1	1	9
Shell	2	1	0
Suncor Energy	1	1	32
Husky Energy	0	0	9
UFA	0	0	70
Total	9	6	166

Notes: 1) Imperial Oil's Edmonton aviation fuels terminal was not included in the calculations for this table because it supplies only aviation fuels. 2) One terminal in AB was marked "n/a" in the source file under the "Renewable Fuel Blending" column. For the purpose of this table, that terminal is not considered to have biofuel blending capabilities.

Source: "2016 Report - Canada's Downstream Logistical Infrastructure: Refining, Biofuel Plants, Pipelines, Terminals, Bulk Plants & Cardlocks," Kent Group Ltd., October 20, 2017

12. **Figure 1** indicates that refining margins are lower in Alberta than they are in BC. As in BC, Alberta has five companies that own all the primary terminals with biofuel blending capabilities. The Commission believes that having five wholesale rivals with local primary terminal capacity is sufficient to lead to joint or collective dominance in wholesale gasoline and/or diesel markets. Therefore, if the premise of the Commission's analysis were true, I would expect refining margins in Alberta to be comparable to those in BC. However, refining margins in Alberta are systematically lower than those in BC despite there being the same number of companies in both provinces that own primary terminals with biofuel blending capabilities.

Figure 1
Monthly Refining Margins for Regular Unleaded
Gasoline in British Columbia and Alberta
January 2015 – September 2019



Note: Monthly refining margins are calculated using simple average crude and wholesale prices. September 2019 margins are based on data through September 12, 2019.

Source: Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgroupltd.com/>

- The average monthly difference between refining margins in BC and Alberta over the period from January 2015 to September 2019 is 8.2 cents per litre.

Saskatchewan

- Table 3** provides a summary of the primary and bulk terminals in Saskatchewan. There are only three primary terminal operators in Saskatchewan: FCL, Imperial Oil, and Suncor. Each operates only one primary terminal.

Table 3
Count of Primary and Bulk Terminals in Saskatchewan by Owner

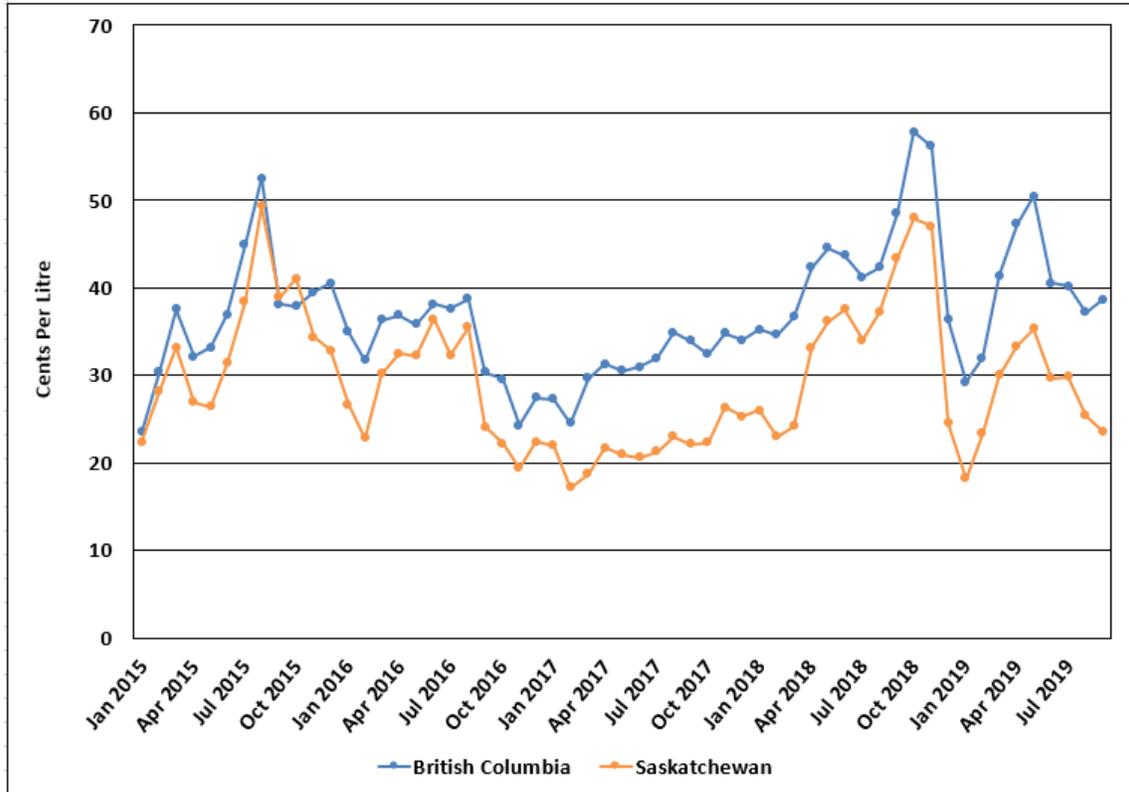
Owner	Primary Terminals	Primary Terminals with Biofuel Blending Capabilities	Bulk Terminals
Federated Co-operatives	1	1	43
Husky Energy	0	0	2
Imperial Oil Limited	1	1	9
Parkland Fuel Corporation	0	0	2
Suncor Energy	1	1	20
Total	3	3	76

Source: "2016 Report - Canada's Downstream Logistical Infrastructure: Refining, Biofuel Plants, Pipelines, Terminals, Bulk Plants & Cardlocks," Kent Group Ltd., October 20, 2017

15. **Figure 2** indicates that refining margins are systematically lower in Saskatchewan than they are in BC. The average monthly difference between the two refining margins is 7.7 cents per litre.¹⁶ With only three operators of primary terminals with biofuel blending capabilities in the province (as opposed to five in BC), under the Commission's reasoning, refining margins in Saskatchewan should be higher than those in BC.

¹⁶ If operators without a primary terminal but with bulk terminals are included in the wholesale markets, the list of wholesale market participants is the same in Saskatchewan as BC except for the absence of the Shell in Saskatchewan.

Figure 2
Monthly Refining Margins for Regular Unleaded
Gasoline in British Columbia and Saskatchewan
January 2015 – September 2019



Note: Monthly refining margins are calculated using simple average crude and wholesale prices. September 2019 margins are based on data through September 12, 2019.

Source: Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgroupltd.com/>

Manitoba

16. **Table 4** provides a summary of the primary and bulk terminals in Manitoba. Manitoba has the fewest primary terminals of the provinces considered; Imperial Oil and Shell each have only one primary terminal with biofuel blending capabilities in the province.

Table 4
Count of Primary and Bulk Terminals in Manitoba by Owner

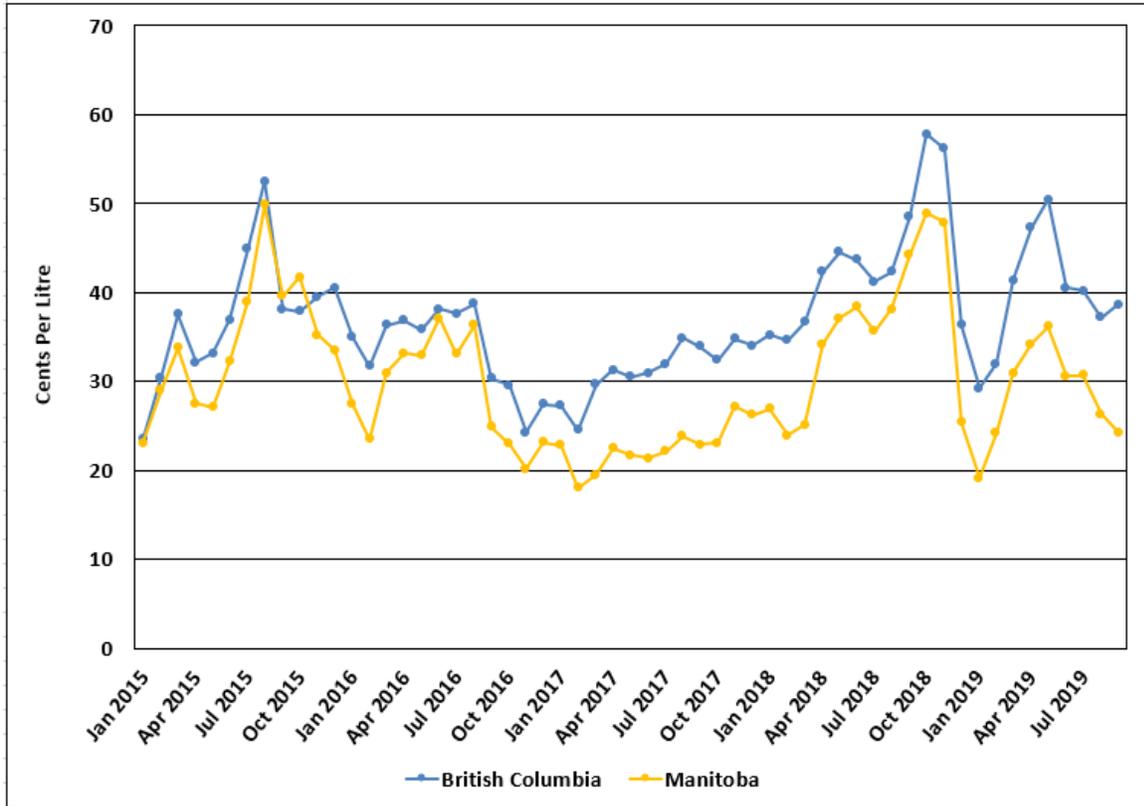
Owner	Primary Terminals	Primary Terminals with Biofuel Blending Capabilities	Bulk Terminals
Imperial Oil Limited	2	1	8
Shell	1	1	0
Suncor Energy	0	0	9
Federated Co-operatives	0	0	19
Husky Energy	0	0	1
Total	3	2	37

Source: "2016 Report - Canada's Downstream Logistical Infrastructure: Refining, Biofuel Plants, Pipelines, Terminals, Bulk Plants & Cardlocks," Kent Group Ltd., October 20, 2017

17. **Figure 3** indicates that refining margins are systematically lower in Manitoba than they are in BC. The average monthly difference between refining margins in BC and Manitoba between January 2015 and September 2019 is 6.8 cents per litre.¹⁷ Under the Commission's reasoning, refining margins in Manitoba (as in Saskatchewan) should be higher than those in BC given that there are only two owners of primary terminals with biofuel blending capabilities in the province.

¹⁷ If operators without a primary terminal but with bulk terminals are included in the wholesale markets, the list of wholesale market participants is the same in Manitoba as BC except for the absence of the Parkland in Manitoba.

Figure 3
Monthly Refining Margins for Regular Unleaded
Gasoline in British Columbia and Manitoba
January 2015 – September 2019



Note: Monthly refining margins are calculated using simple average crude and wholesale prices. September 2019 margins are based on data through September 12, 2019.

Source: Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgroupltd.com/>

Discussion

18. The Commission’s theory is that collective dominance or the joint exercise of market power is the reason why the wholesale market in BC appears to the Commission not to be operating in a competitive fashion. The refining margins in Alberta, Saskatchewan, and Manitoba (compared to BC) cast doubt on this conclusion. There are the same number of primary terminal-based operators in Alberta and BC, yet the refining margins in Alberta are significantly and systematically lower than in BC. There are fewer wholesale market participants with primary terminals in Saskatchewan and Manitoba than in BC. Indeed, in Manitoba there are only two primary terminal owners, and these two primary terminal operators (Imperial Oil and Shell) are also active in BC. Yet in both provinces, refining margins are significantly and systematically lower than in BC. These findings are strikingly at odds with the Commission’s theory and illustrate its implausibility. For example, in BC

the Commission's theory requires Imperial Oil and Shell to be effective at exercising market power jointly with Parkland, Husky Energy, and Suncor, but not effective at jointly exercising market power amongst just themselves in Manitoba. This suggests that something other than the number of firms owning primary terminals with biofuel blending capabilities is elevating BC's refining margins relative to those in these other provinces.

19. Competition analysis is predicated on the simple idea that it is easier to coordinate conduct or jointly exercise market power in a market the lower the number of participants in that market. Indeed, this is a central part of the competition analysis of the effects of mergers among horizontal rivals.¹⁸
20. There are no refineries in Manitoba. All gasoline and diesel sold downstream in Manitoba, therefore, need to be imported into the province from external sources. In BC, in addition to imports on the Trans Mountain Pipeline ("TMPL"), for example, there are two local refineries: Parkland Burnaby and Husky Energy Prince George. A principle of competition analysis is that coordinated conduct is easier to support when rivals have similar cost structures.¹⁹ Supply in Manitoba is from larger refineries transported into the province via pipeline and rail, while supply in BC is from these same refineries and smaller, local refineries. The wholesale market in Manitoba would appear to be more conducive to coordination than that in BC not only because it has fewer operators of primary terminals but also because there are fewer differences among the rivals in Manitoba than in BC.
21. If differences in competition due to the number of market participants do not explain why refining margins are higher in BC than in Alberta, Saskatchewan, and Manitoba, then there must be another explanation for this phenomenon. There are two primary distinctions among the wholesale markets in BC, Alberta, Saskatchewan, and Manitoba.

¹⁸ See, for example, Ivaldi, Marc, Bruno Jullien, Patrick Rey, Paul Seabright, and Jean Tirole, "The Economics of Tacit Collusion," Final Report for DG Competition, European Commission, IDEI, Toulouse, March 2003, p. 12. ("The number of competitors on the market is clearly an important factor. First, coordination is more difficult, the larger the number of parties involved Beyond the issue raised by the difficulty of reaching a consensus, there is another reason that makes it difficult to collude with too many competitors. Since firms must share the collusive profit, as the number of firms increases each firm gets a lower share of the pie. This has two implications. First, the gain from deviating increases for each firm since, by undercutting the collusive price, a firm can steal market shares from all its competitors; that is, having a smaller share each firm would gain more from capturing the entire market. Second, for each firm the long-term benefit of maintaining collusion is reduced, precisely because it gets a smaller share of the collusive profit. Thus the short-run gain from deviation increases, while at the same time the long-run benefit of maintaining collusion is reduced. It is thus more difficult to prevent firms from deviating." footnotes omitted.)

¹⁹ See, for example, Canadian Competition Bureau Merger Enforcement Guidelines, ¶ 6.30. ("When examining whether firms are likely able to independently recognize mutually beneficial terms of coordination, the Bureau considers, among other factors, the degree of product differentiation and cost symmetries among firms. Recognizing terms of coordination that all firms find profitable is easier when products are less differentiated and when firms have similar cost structures.")

The first is their status as either (net) importers or exporters of refined products, and the second is the availability of low-cost transportation capacity to facilitate the importation of low-priced products from elsewhere. I discuss both below and conclude that higher refining margins in BC are the result of the limited ability of large capacity refineries in Alberta to access the market in BC via low-cost pipeline transportation.

22. Alberta and Saskatchewan are net exporters of gasoline and diesel, whereas Manitoba and BC are (net) importers. There are four refineries in Alberta that produce gasoline and/or diesel: Edmonton (Suncor), Scotford (Shell), Strathcona (Imperial Oil), and Sturgeon (North West Redwater Partnership). These refineries produce substantially more refined products than are needed to satisfy local demand, and Alberta is a large exporter of both crude oil and refined products. In 2017, for example, Alberta refineries produced approximately 203,000 of motor gasoline, and 196,000 bpd of diesel.²⁰ In comparison, total demand for refined petroleum products in Alberta in 2017 was approximately 117,000 and 122,000 bpd of motor gasoline and diesel respectively.²¹
23. Like Alberta, Saskatchewan produces a surplus of refined products. There is only one refinery in Saskatchewan. This refinery is owned by FCL and located in Regina.²² The National Energy Board's ("NEB") Energy Profile for Saskatchewan states, "All of the gasoline consumed in Saskatchewan is refined within the province."²³ It also states, "Saskatchewan produces a net surplus of RPPs [Refined Petroleum Products]. Some RPPs are transferred to Alberta and Manitoba, and small volumes are also exported to the United States (U.S)." As shown by **Figures 1 and 2**, both Alberta and Saskatchewan have lower refining margins than BC; the refining margin in Saskatchewan is lower than that in BC even though there is only one refinery operator in Saskatchewan which apparently supplies all or nearly all of the province's gasoline and diesel needs.
24. Unlike Alberta and Saskatchewan, BC and Manitoba are both net importers of gasoline and diesel. Indeed, there are no refineries in Manitoba, and all gasoline and diesel

²⁰ May 2017 motor gasoline production was suppressed to meet the confidentiality requirement of the Statistics Act, therefore, motor gasoline production for this month was estimated as the average of all the other months in 2017. Statistics Canada – Table 25-10-0044-01: Supply and disposition of refined petroleum products, monthly, available at <https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=2510004401>.

²¹ Canada Energy Regulator – Provincial and Territorial Energy Profiles, Alberta, available at <https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/ab-eng.html>.

²² Kahwaty Report, p. 16 Table 1.

²³ Note that on August 28, 2019, the National Energy Board became the Canada Energy Regulator. To remain consistent with past submissions, the Canada Energy Regulator is referred to in this Supplemental Report by its previous name, the National Energy Board. Canada Energy Regulator – The new Canada Energy Regulator, available at <https://www.cer-rec.gc.ca/bts/bllc69/index-eng.html>; Canada Energy Regulator – Provincial and Territorial Energy Profiles, Saskatchewan, available at <https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/sk-eng.html>

consumed in the province must be imported from other provinces or countries.²⁴ The NEB's Energy Profile for Manitoba explains that "[t]he majority of the gasoline consumed in Manitoba comes from Alberta and Saskatchewan. RPPs from Alberta are mainly transported by the Enbridge Mainline, while RPPs from Saskatchewan and elsewhere are delivered primarily by rail."²⁵

25. BC and Manitoba both receive imports from Edmonton and Saskatchewan/FCL. Manitoba has fewer primary terminal owners and operators than BC: there are two primary terminal owners in Manitoba and five in BC. Economic theory predicts that, all else equal, in a highly concentrated market with significant barriers to entry, having fewer wholesale suppliers should result in higher wholesale prices and margins, and indeed this is a premise of the Commission's conclusions as well.²⁶ The implication is that refining margins should be higher in Manitoba than in BC. **Figure 3** shows, however, that refining margins are systematically lower in Manitoba than BC. Even taking a broader view of the number of wholesale market participants in a province by combining the lists of primary and bulk terminal operators in that province, the list of operators in the two provinces is identical except for the omission of Parkland from Manitoba.
26. Given the reliance on supply from Edmonton to meet a significant portion of demand in both BC and Manitoba and the common (but more narrow) list of wholesale distributors in Manitoba, the leading characteristic that distinguishes the two provinces that could cause refining margins to be greater in BC is the limited availability of low-cost pipeline capacity for shipping refined product (and crude oil) into BC. TMPL has been on apportionment, which means that the demand shippers place on the pipeline is greater than its available capacity, every month from January 2018 to the present.²⁷ Indeed, according to TMPL "Apportionment of the Trans Mountain Pipeline system has been a

²⁴ Canada Energy Regulator – Provincial and Territorial Energy Profiles, Manitoba, available at <https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/mb-eng.html>.

²⁵ Canada Energy Regulator – Provincial and Territorial Energy Profiles, Manitoba, available at <https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/mb-eng.html>.

²⁶ See, for example, BCUC Report, pp. 60-61. ("Generally, a market with many buyers and sellers and characterized by an ease of entry for new sellers will exhibit vigorous price competition and markets that lack one of these conditions may fail to achieve prices that could be seen under perfectly competitive conditions. The Panel previously found that the BC wholesale market is concentrated in the hands of a few firms and that significant barriers to entry exist that lower the likelihood that new entrants could supply the market and thus, 'discipline' the market if the incumbents were to abuse their market power.")

²⁷ Update: December 2018 Capacity Announcement for the Trans Mountain Pipeline System," Trans Mountain Pipeline System press release, November 29, 2018, available at <https://www.transmountain.com/news/2018/update-december-2018-capacity-announcement-for-the-trans-mountain-pipeline-system>; "Update: September 2019 Capacity Announcement for the Trans Mountain Pipeline System," Trans Mountain Pipeline System press release, September 4, 2019, available at <https://www.transmountain.com/news/2019/update-september-2019-capacity-announcement-for-the-trans-mountain-pipeline-system>.

regular monthly occurrence for the past decade.”²⁸ By comparison, the Enbridge Mainline Line 1 (the Enbridge pipeline used for refined products) has only been on apportionment in eight of the last 57 months.²⁹ The availability of capacity on the Enbridge Mainline pipeline to transport refined products to Manitoba is not a bottleneck like access to TMPL capacity is for transport into BC.³⁰ This results in BC needing to import more expensive product from the US Pacific Northwest and other areas (e.g., PADD 3).

27. If market power were a concern with the wholesale market structure in BC, it should be an even bigger concern in Manitoba. The refining margin data, however, show that this is not the case. The availability of sufficient low-cost transportation to facilitate imports of refined products from Edmonton for local consumption distinguishes Manitoba from BC. Devoting more capacity on TMPL to serve local needs or allocating some potential expansion capacity to serve the wholesale market in BC would result in lower wholesale prices and margins in BC.

²⁸ “Update: February 2019 Capacity Announcement for the Trans Mountain Pipeline System” Trans Mountain Pipeline System press release, January 31, 2019, available at <https://www.transmountain.com/news/2019/update-february-2019-capacity>.

²⁹ Bloomberg analysts publish updates each month that outline which lines on the Enbridge Mainline have been apportioned for the upcoming month. Line 1 is only mentioned as being apportioned in the following updates: Tuttle, Robert, “Enbridge Apportions Heavy Oil Lines 4/67 by 39%,” *Bloomberg*, January 21, 2019; Tobben, Sheela, and Catherin Ngai, “Enbridge Apportions Lines 4/67 by 42% in January,” *Bloomberg*, December 18, 2018; Tuttle, Robert, “Enbridge Apportions Line 4/67 46% at Kerrobert for Dec.,” *Bloomberg*, November 20, 2018; Ngai, Catherine, “Enbridge Apportions Heavy Oil Lines 4/67 by 47% in Nov.,” *Bloomberg*, October 19, 2018; Tuttle, Robert, and Catherine Ngai, “Enbridge Apportions Heavy Oil Lines 4/67 by 43% in Oct.,” *Bloomberg*, September 19, 2018; Kassai, Lucia, “Enbridge Apportions Space on North American Pipelines for Dec.,” *Bloomberg*, November 20, 2015; Powell, Barbara, “Enbridge Apportions Mainline System Pipeline for November,” *Bloomberg*, October 22, 2015; Cheong, Serene, “Enbridge Apportions Mainline System Pipeline for October,” *Bloomberg*, September 22, 2015.

³⁰ In addition, when Enbridge Line 1 has been on allocation, its allocation percentages have generally been lower than those on TMPL. Enbridge Line 1 apportionment rates over the last 57 months have been 14% in February 2019, 19% in January 2019, 29% in December 2018, 19% in November 2018, 9% in October 2018, 9% in December 2015, 24% in November 2015, and 3% in October 2015. When on apportionment, these average to 19% for 2018 and 16.5% for 2019, and it was not on apportionment for 16 of the 21 months during January 2018 – September 2019. By comparison, average TMPL apportionment rates were 40% in 2018 and 31% over January – September 2019. See Bloomberg articles listed in above footnote 29; Kahwaty Report, Table 13; “Update: September 2019 Capacity Announcement for the Trans Mountain Pipeline System,” Trans Mountain Pipeline System press release, September 4, 2019, available at <https://www.transmountain.com/news/2019/update-september-2019-capacity-announcement-for-the-trans-mountain-pipeline-system>; “Update: August 2019 Capacity Announcement for the Trans Mountain Pipeline System,” Trans Mountain Pipeline System press release, August 1, 2019, available at <https://www.transmountain.com/news/2019/update-august-2019-capacity-announcement-for-the-trans-mountain-pipeline-system-1>; “Update: July 2019 Capacity Announcement for the Trans Mountain Pipeline System,” Trans Mountain Pipeline System press release, July 3, 2019, available at <https://transmountain.com/news/2019/update-july-2019-capacity-announcement-for-the-trans-mountain-pipeline-system>.

28. The increase in refining margins found by the Commission is coincident with the reduction in BC supply via TMPL. The use of TMPL to import refined products into BC for local consumption was greater in 2015 than in any of the prior seven years and has fallen by about half since then.³¹ As lower-cost products are removed from the market due to pipeline constraints, BC is forced to rely on ever more expensive alternative sources of supply to meet provincial demand.
29. These results highlight a point discussed in my report³² and testimony:³³ the importance of addressing the conduct by which market power is exercised. The Commission's findings are that wholesale prices are 13 cents above a competitive level because wholesale market participants have joint or group market power in BC.³⁴ Assuming that the Commission's calculation of the 13 cent figure is correct, for it to be the result of an exercise of market power, Parkland, Imperial Oil, Shell, Suncor, Husky, and FCL must have taken actions that restricted the supply available in the marketplace. Parkland and Husky, for example, own within-market refineries that have high rates of capacity utilization.³⁵ An entity cannot be said to exercise market power when it operates at economic capacity because it is producing as much as it can and is not restricting supply in the market. Capacity limitations may lead to higher prices, but such higher prices are not a result of an exercise of market power.

III. WHOLESALE MARKETS AND NATURAL MONOPOLY

30. The Commission makes a comparison between the wholesale markets for gasoline and diesel and natural monopoly. The BCUC Report states:

The Panel has found that considering access to distribution infrastructure and our concerns about the price setting methodology, this market has the characteristics of a 'natural monopoly'.³⁶

31. I disagree. A natural monopoly is one where the economies of scale are so large that it is most efficient for only one firm to supply the whole market. For example, economist Gregory Mankiw describes a natural monopoly as:

³¹ Presentation of Henry J. Kahwaty, Ph.D., The Markets for Gasoline and Diesel in British Columbia, An Inquiry into Gasoline and Diesel Prices in British Columbia Project No. 1599007, July 17, 2019, Slide 12, available at https://www.bcuc.com/Documents/Proceedings/2019/DOC_54619_C5-9-Parkland-OralWorkshop-DrKahwatySlides.pdf (hereafter "Kahwaty Presentation").

³² Kahwaty Report, p. 76.

³³ Kahwaty Testimony, pp. 119-120. Kahwaty Presentation, p. 4.

³⁴ BCUC Report, pp. 79-80.

³⁵ Kahwaty Report, pp. 76-77.

³⁶ BCUC Report, p. 106.

[An industry where] a single firm can supply a good or service to an entire market at a lower cost than could two or more firms. A natural monopoly arises when there are economies of scale over the relevant range of output... In this case, a single firm can produce any amount of output at least cost... An example of a natural monopoly is the distribution of water. To provide water to residents of a town, a firm must build a network of pipes throughout the town. If two or more firms were to compete in the provision of this service, each firm would have to pay the fixed cost of building a network. Thus, the average total cost of water is lowest if a single firm serves the entire market.”³⁷

32. This fundamental characteristic of a natural monopoly – that a single firm can supply a good or service to an entire market at a lower cost than could two or more firms – does not describe the wholesale market for gasoline and diesel in BC. BC has five owners and operators of primary terminals. The BCUC Report indicates that several of these terminals operate at capacity.³⁸ Having multiple terminal operators does not result in excessive and duplicative capital investment, which would be the case if, for example, there were multiple firms distributing electricity in an area with each using only their own wires. Instead, increasing the volume of gasoline and diesel handled at a primary terminal requires additional storage and mixing tanks, among other facilities. These could be added to an existing facility or to a separate facility. I am aware of no reason why gasoline and diesel in BC could be distributed at a lower cost if the province was served by only one, large primary terminal.

33. The basic technological requirement for a natural monopoly – substantial economies of scale – is not present in gasoline refining and distribution. The economic logic typically used to support the regulation of a natural monopoly has no relevance to the wholesale gasoline and diesel markets in British Columbia.

IV. WHOLESALE PRICES, THE “MARGINAL BARREL”, AND THE CORRELATION BETWEEN VANCOUVER RACK PRICES AND PNW SPOT PRICES

34. The BCUC Report addresses how wholesale prices in Vancouver are set. The analysis of wholesale prices in the BCUC Report is focused too much on the mechanics of how individual prices are set and too little on the underlying forces that drive the level of prices in the market. The analysis of the formation of Vancouver wholesale prices is critical because it leads to the Commission’s wholesale price differential analysis and ultimately to the 13-cent differential identified by the Commission as being unexplained.

³⁷ Mankiw, Gregory N., Principles of Microeconomics, Cengage Learning, 2009, 5th ed., Chapter 15, p. 314.

³⁸ BCUC Report, p. 47.

35. The BCUC Report highlights statements from competitors regarding benchmark pricing based on the U.S. Pacific Northwest. It states that Imperial Oil uses PNW benchmark prices as a starting point for setting its rack prices³⁹ and that Parkland also uses PNW spot prices as benchmarks because these prices are from the closest actively traded marketplace.⁴⁰ Suncor uses both PNW and Chicago prices as benchmarks.⁴¹ Imperial Oil's evidence is that, like Suncor, it also refers to Chicago prices,⁴² and Parkland agreed with Imperial Oil's approach.⁴³
36. In addressing my evidence, the BCUC Report notes that I indicated that wholesale pricing is related to the "marginal barrel" but asks whose marginal barrel? An individual participant's? A global marginal barrel?⁴⁴ The BCUC Report also asks the question "How does the rack price match the cost of the marginal barrel – the barrel from the most expensive supply source – if there is no knowledge of what that supply source is?"⁴⁵
37. Markets like those for wholesale gasoline and diesel are in a constant state of flux, which economists call "disequilibrium". Changes in supply and demand conditions occur regularly. Some changes are anticipated (*e.g.*, planned refinery turnarounds), and others are not (*e.g.*, the very recent spike in crude oil prices due to global tensions, the October 2018 natural gas pipeline fire near Prince George). The economic analysis of wholesale pricing based on the cost of the marginal barrel should not be viewed as a precise calculation that market participants make daily but rather as indicating the dynamics driving price in one direction or another. Unlike financial instruments where arbitrage can occur nearly instantaneously, arbitrage across gasoline markets may play out over time as firms make production, purchase, and shipping decisions.
38. Individual firms can make pricing decisions in the manner described by Imperial Oil, Parkland, and Suncor's evidence while at the same time market pricing adjusts toward the cost of the marginal source of supply. Reference prices and rules of thumb are the starting point for decision-making on pricing, but they are not the determinants of actual market prices. Prices that are "out of line" will generate incentives for market participants to change production or shipping patterns to take advantage of the profit opportunities that arise. These profit opportunities relate to the "marginal barrel". For example,

³⁹ BCUC Report, p. 63.

⁴⁰ BCUC Report, p. 63.

⁴¹ BCUC Report, p. 64.

⁴² Imperial Oil Submitting Responses to BCUC Survey Questionnaire, British Columbia Utilities Commission An Inquiry into Gasoline and Diesel Prices in British Columbia, Exhibit C8-2, p. 6.

⁴³ Parkland Final Argument, British Columbia Utilities Commission An Inquiry into Gasoline and Diesel Prices in British Columbia, August 8, 2019, p. 46.

⁴⁴ BCUC Report, p. 66.

⁴⁵ BCUC Report, p. 66.

Parkland's evidence is that it brings in crude oil by rail if necessary to meet its demand for feedstock but that if the costs of transport by rail or of secondary market shipping on TMPL are too high to make additional production profitable, it will decline to bring in that additional crude oil.⁴⁶ It is decisions like these that tie pricing dynamics in gasoline and diesel markets to marginal sources of supply and the costs of those marginal sources.

39. The BCUC Report's confusion between the mechanics of price setting and the fundamental forces driving market pricing can be seen in its finding about the setting of rack prices:

"The Panel finds that the rack price is not set by the 'invisible hand', but by the refiners. However, we find that the rack price is not set according to Dr. Kahwaty's theory. If Dr. Kahwaty is correct, prices would converge on the cost of the most expensive source of supply. The evidence does not support this hypothesis."⁴⁷

40. In support of its conclusions, the Commission cites to the fact that rack prices are set by market participants at least on a daily basis as they observe a number of published prices – especially PNW prices.⁴⁸ The BCUC Report then provides a graph that purports to show that "80 percent of the variation in the Vancouver gasoline rack prices can be explained by the PNW spot prices as reported by OPIS."⁴⁹ This statement is based on the BCUC Report's Figure 26, which is reproduced below (footnotes omitted). The BCUC Report provides a similar plot and regression for diesel prices in its Figure 27.

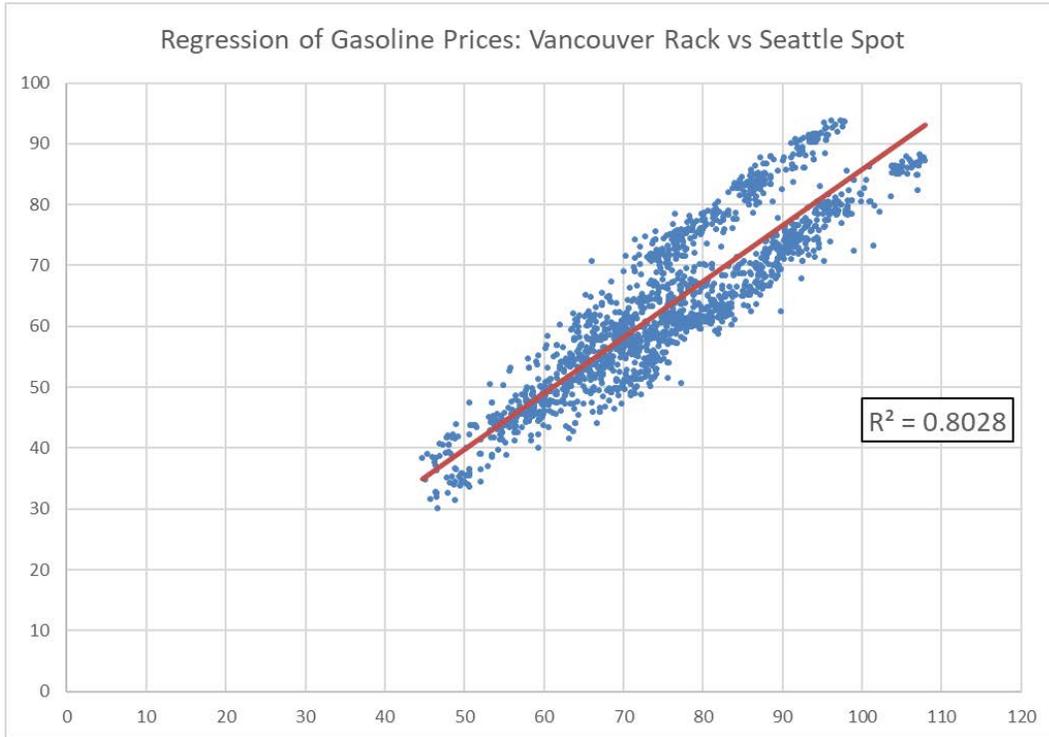
⁴⁶ Evidence of Parkland Fuel Corporation, Appendix A – Parkland's Responses to BCUC Questionnaire to Companies, British Columbia Utilities Commission An Inquiry into Gasoline and Diesel Prices in British Columbia, Exhibit C5-2, June 27, 2019, pp. 2-3.

⁴⁷ BCUC Report, p. 66.

⁴⁸ BCUC Report, p. 66.

⁴⁹ BCUC Report, p. 66.

**BCUC Report Figure 26: Regression of Gasoline Prices
Vancouver Rack vs Seattle Spot Prices**



41. The analysis in the BCUC Report’s Figure 26 is based on OPIS prices for both the Vancouver and the U.S. Pacific Northwest. The OPIS prices for PNW are for spot purchases. OPIS defines spot purchases as follows:

“‘Spot’ purchases refer to fuel that physically changes hands at a refinery gate or other major pricing hub for delivery on a pipeline or via barge or cargo. Deals are always done in bulk, typically 5,000 barrels (210,000 gallons) to 50,000 barrels (2.1 million gallons).”⁵⁰

42. The Vancouver prices used in the BCUC Report’s Figure 26 are rack prices. OPIS explains that “rack” or “wholesale” purchases are “made along a fuel distribution system – usually a pipeline” and that these purchases are made at terminals and are for “approximately 8,000 gallons.”⁵¹ The BCUC Report’s Figure 26, therefore, shows that average wholesale prices in Vancouver and PNW spot prices are closely related to each other. This is not a surprise because both are driven by oil prices, which the Commission acknowledges is

⁵⁰ Oil Price Information Service (OPIS) – Spot Market Pricing Overview, available at <https://www.opisnet.com/product/pricing/spot/>.

⁵¹ Oil Price Information Service (OPIS) – Wholesale Rack Pricing Overview, available at <https://www.opisnet.com/product/pricing/rack/>.

traded in a global market.⁵² Elsewhere, the BCUC Report finds that the Vancouver wholesale market is integrated with other wholesale markets,⁵³ and therefore price movements would be expected to be similar (but not necessarily identical) across the two. Another reason to expect common price movements between Vancouver rack and PNW spot prices is that the Burnaby refinery and the PNW refineries receive crude from Alberta transported on the TMPL. They, therefore, share related or common input costs.

43. Fundamentally, wholesale prices in Vancouver, the PNW, Chicago, Winnipeg, and elsewhere are driven by the price of crude oil. Even though Imperial Oil's evidence was that they do not consider the price of crude oil when setting rack prices,⁵⁴ the cost of crude oil represents a large fraction of the cost of a litre of refined gasoline or diesel.⁵⁵ This is true for all refiners. Economic theory indicates that common variable cost changes will affect prices for finished products. This makes economic sense. An increase in the price of crude oil represents an increase in the variable and marginal costs of production for gasoline and diesel. At existing market prices, an increase in these variable and marginal costs leads profit-maximizing suppliers to want to reduce their production, which leads to a reduction in the amount of gasoline and diesel supplied in the market and an increase in their market prices. Given this dynamic and the interconnected nature of wholesale markets in Canada and the U.S.,⁵⁶ I would expect rack prices in Vancouver to be related to spot and rack prices elsewhere in North America. As I show below, this is indeed the case.
44. I have created several comparisons of Vancouver rack prices to other rack and spot prices. My comparisons are similar to that presented in the BCUC Report's Figure 26. I provide comparisons of:
- Vancouver Rack/Seattle Rack,
 - Vancouver Rack/Los Angeles Rack,
 - Vancouver Rack/Winnipeg Rack,
 - Vancouver Rack/Edmonton Rack,

⁵² BCUC Report, p. 21.

⁵³ BCUC Report, pp. 70-72.

⁵⁴ BCUC Report, p. 63.

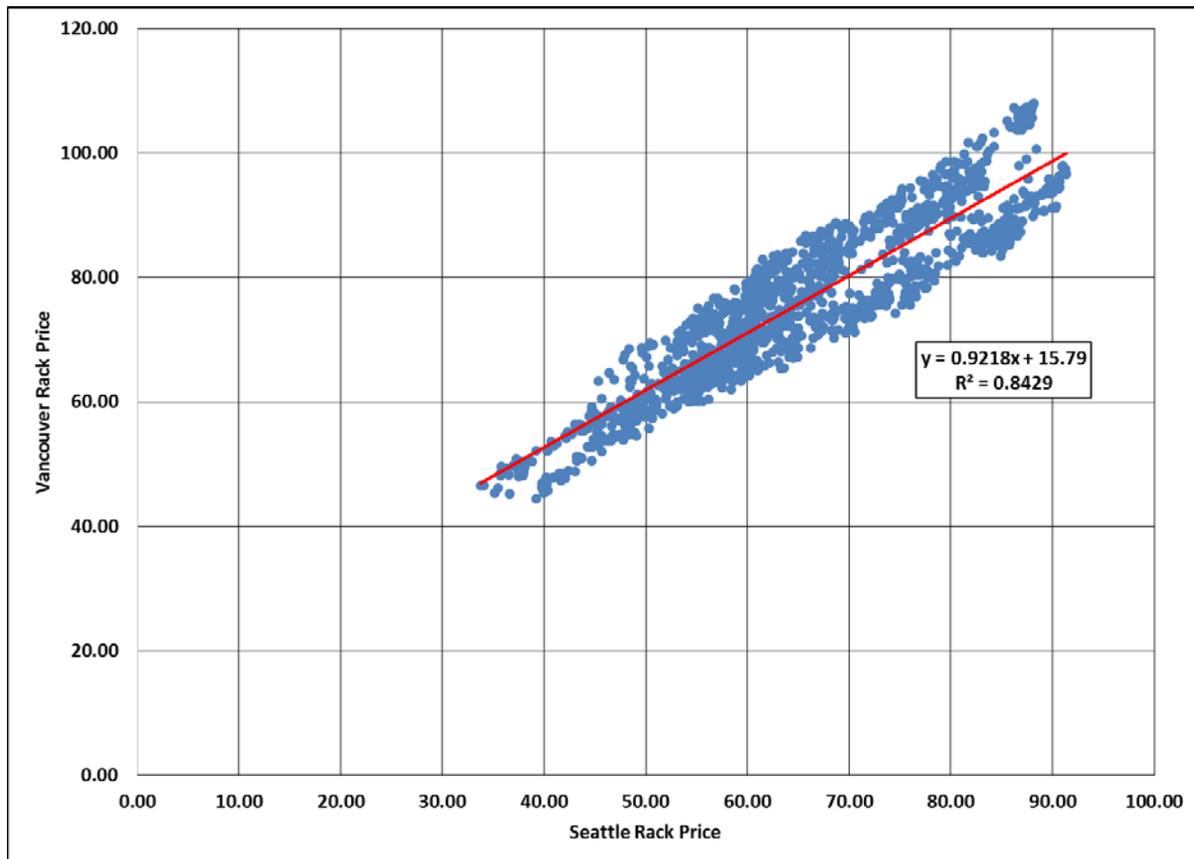
⁵⁵ As detailed in the Kahwaty Report, the cost of crude oil made up approximately 33 percent of the cost of a litre of gasoline in BC in Q1 2019. Kahwaty Report, Figure 11.

⁵⁶ For example, "**The Panel finds that the supply chain on the west coast of the U.S. and Canada is tightly integrated for supply.** So much so that any disruption in supply on either side of the border does affect the rack prices throughout the region." BCUC Report, p. 72 (emphasis in original).

- Vancouver Rack/PNW Spot (a re-creation of the BCUC's Figure 26),
- Vancouver Rack/Los Angeles spot, and
- Vancouver Rack/Chicago spot.

These comparisons are shown in **Figures 4 – 14**. **Figures 4 - 7** and **12 - 14** are for gasoline prices, and **Figures 8 – 11** are for diesel prices. **Figures 4 – 11** provide comparisons of Vancouver rack prices to other rack prices, and **Figures 12 – 14** compare Vancouver rack prices to different U.S. spot prices. The BCUC Report does not specify the date range covered by its Figure 26. Except as where otherwise noted, I use data from January 2014 to August 2019.

Figure 4
Relationship between Regular Unleaded Gasoline Prices
Vancouver Rack and Seattle Rack Prices
Cents Per Litre, January 2014 – August 2019

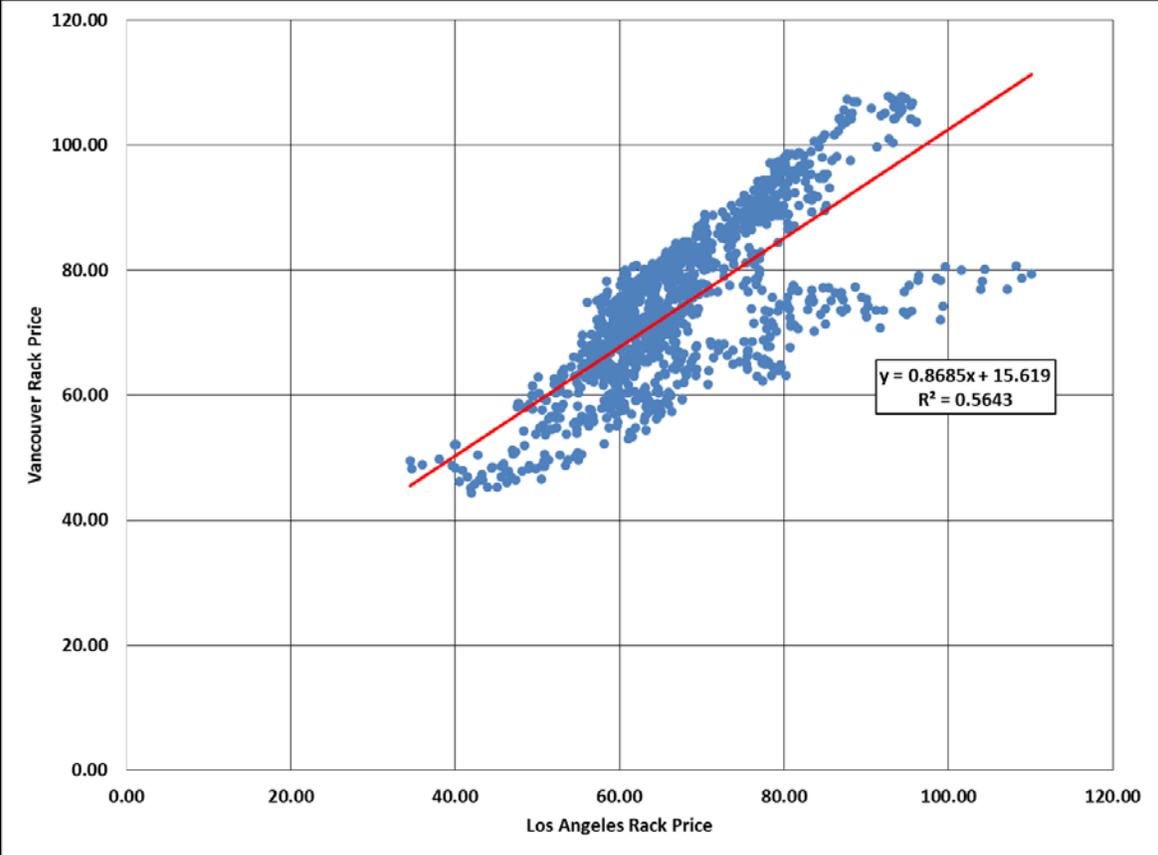


Note: Seattle prices are calculated at the average between the branded and unbranded CBOB Ethanol 10% Regular RVP 9.0 price.

Source: Gasoline and Diesel Rack Pricing Data, OPIS, for more information see <https://www.opisnet.com/about/rack-pricing-coverage-city/>; Kent Petroleum Price Data, Kent

Group Ltd., available at <https://charting.kentgrouppltd.com/>; "Canada / U.S. Foreign Exchange Rate," FRED Economic Research, available at <https://fred.stlouisfed.org/series/DEXCAUS>.

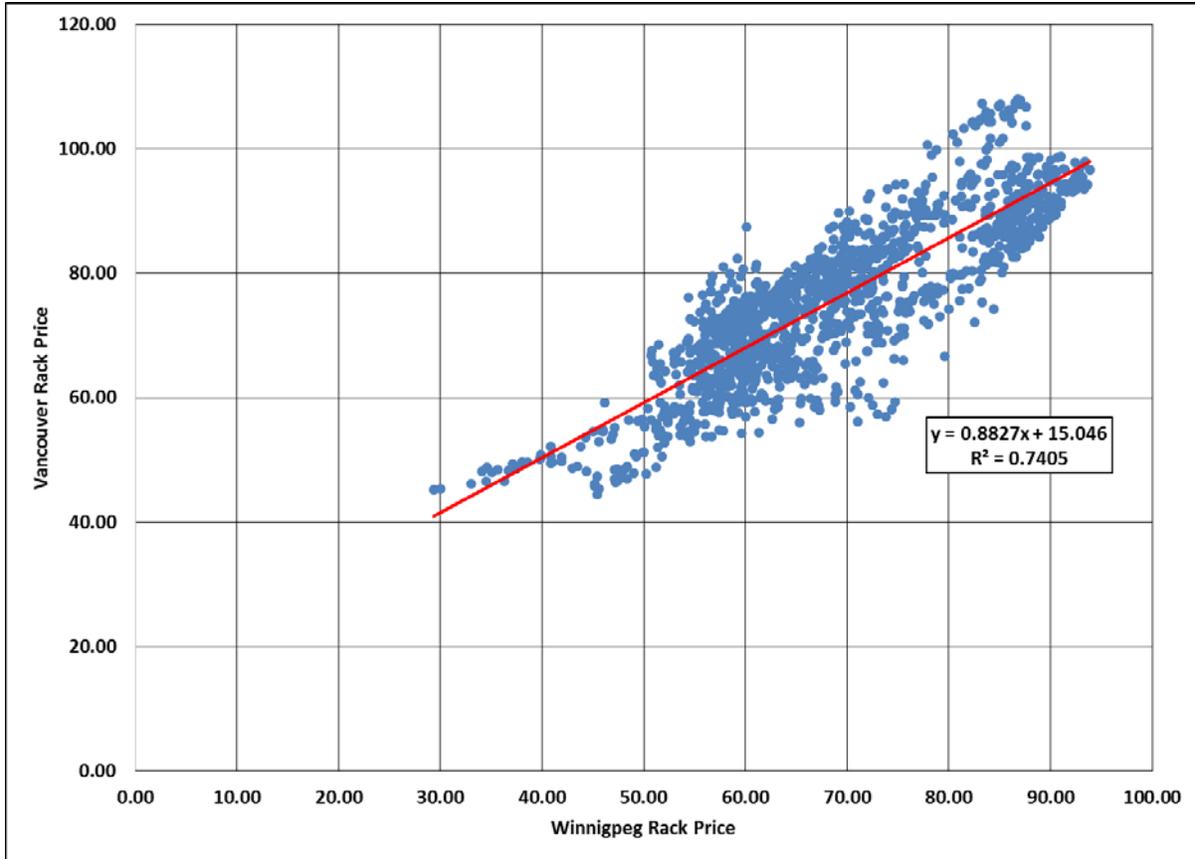
Figure 5
Relationship between Regular Unleaded Gasoline Prices
Vancouver Rack and Los Angeles Rack Prices
Cents Per Litre, January 2015 – August 2019



Note: Los Angeles prices are calculated at the average between the branded and unbranded CARFG Ethanol 10% Regular without CAR price. OPIS only reports CARFG Ethanol 10% Regular without CAR prices as of January 2015, and so January 2015 is used as the start date for **Figure 5**.

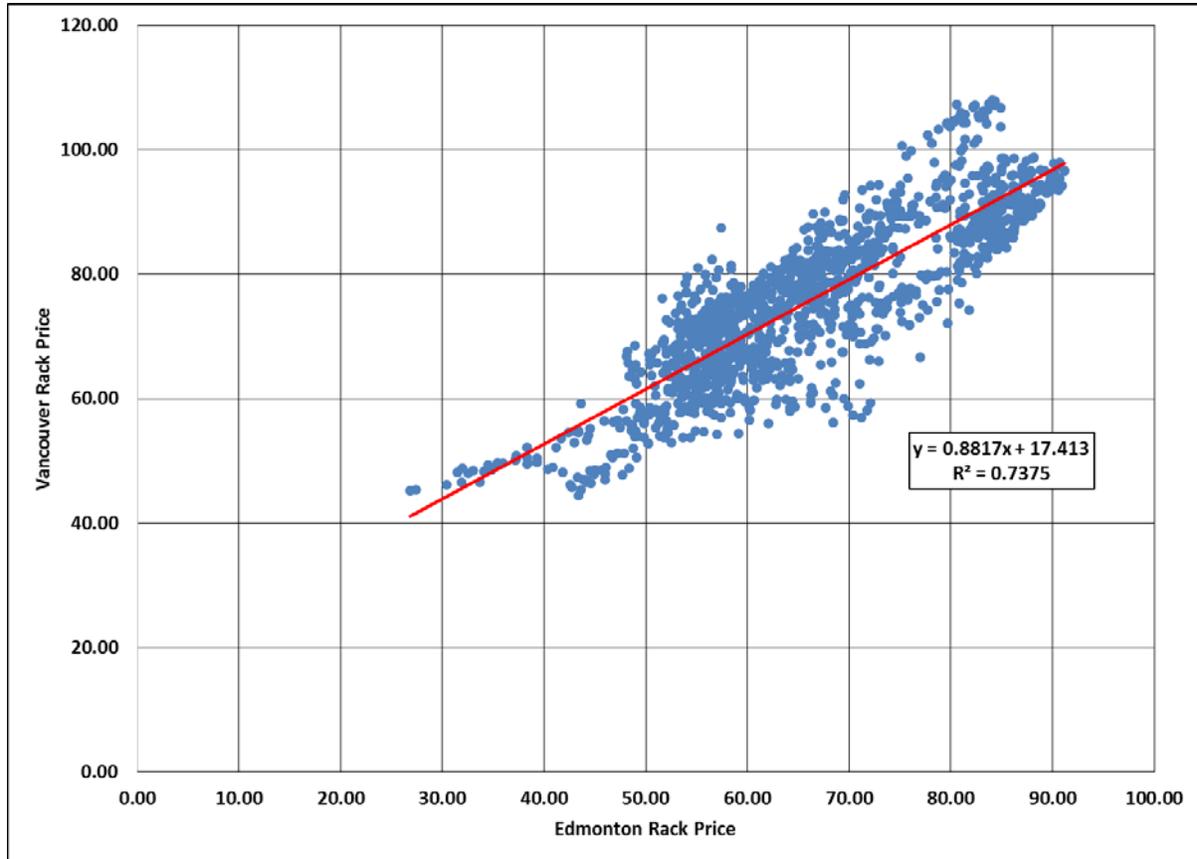
Source: Gasoline and Diesel Rack Pricing Data, OPIS, for more information see <https://www.opisnet.com/about/rack-pricing-coverage-city/>; Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgrouppltd.com/>; "Canada / U.S. Foreign Exchange Rate," FRED Economic Research, available at <https://fred.stlouisfed.org/series/DEXCAUS>.

Figure 6
Relationship between Regular Unleaded Gasoline Prices
Vancouver Rack and Winnipeg Rack Prices
Cents Per Litre, January 2014 – August 2019



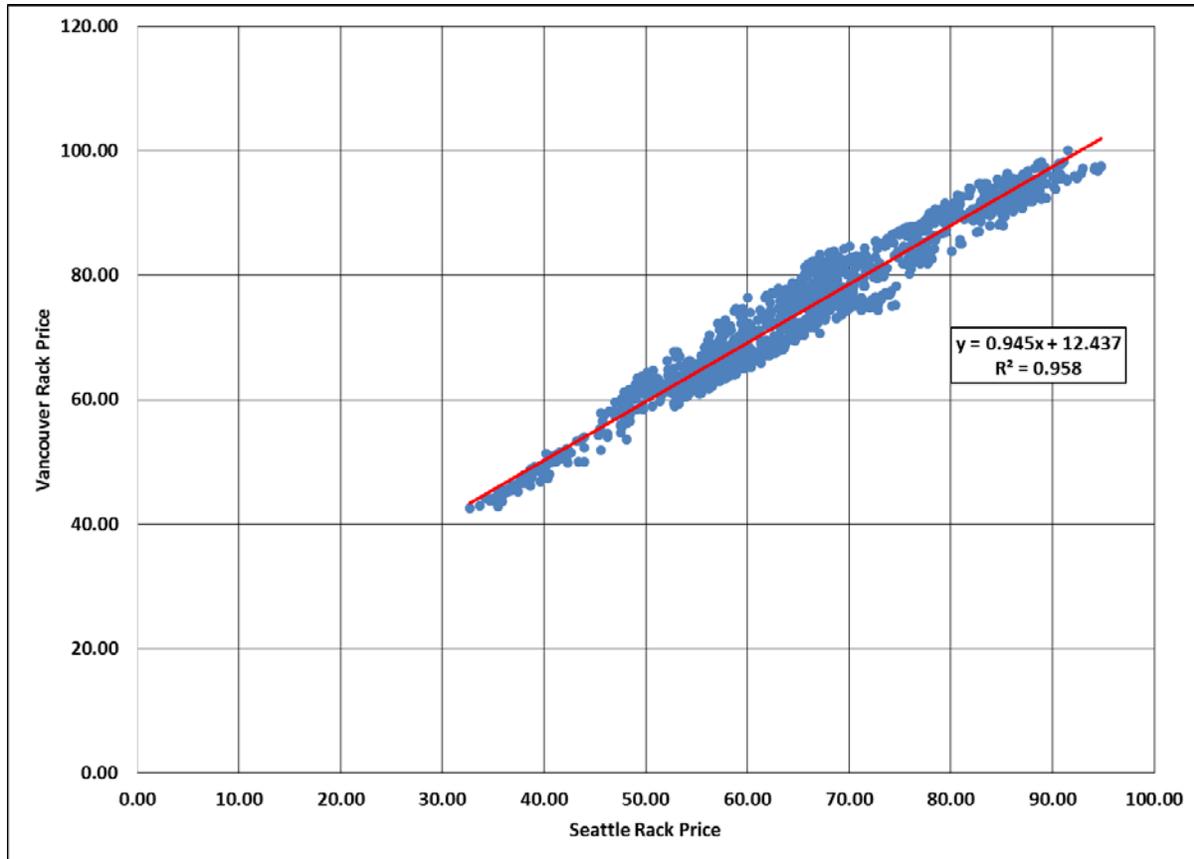
Source: Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgroup ltd.com/>.

Figure 7
Relationship between Regular Unleaded Gasoline Prices
Vancouver Rack and Edmonton Rack Prices
Cents Per Litre, January 2014 – August 2019



Source: Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgrouppltd.com/>.

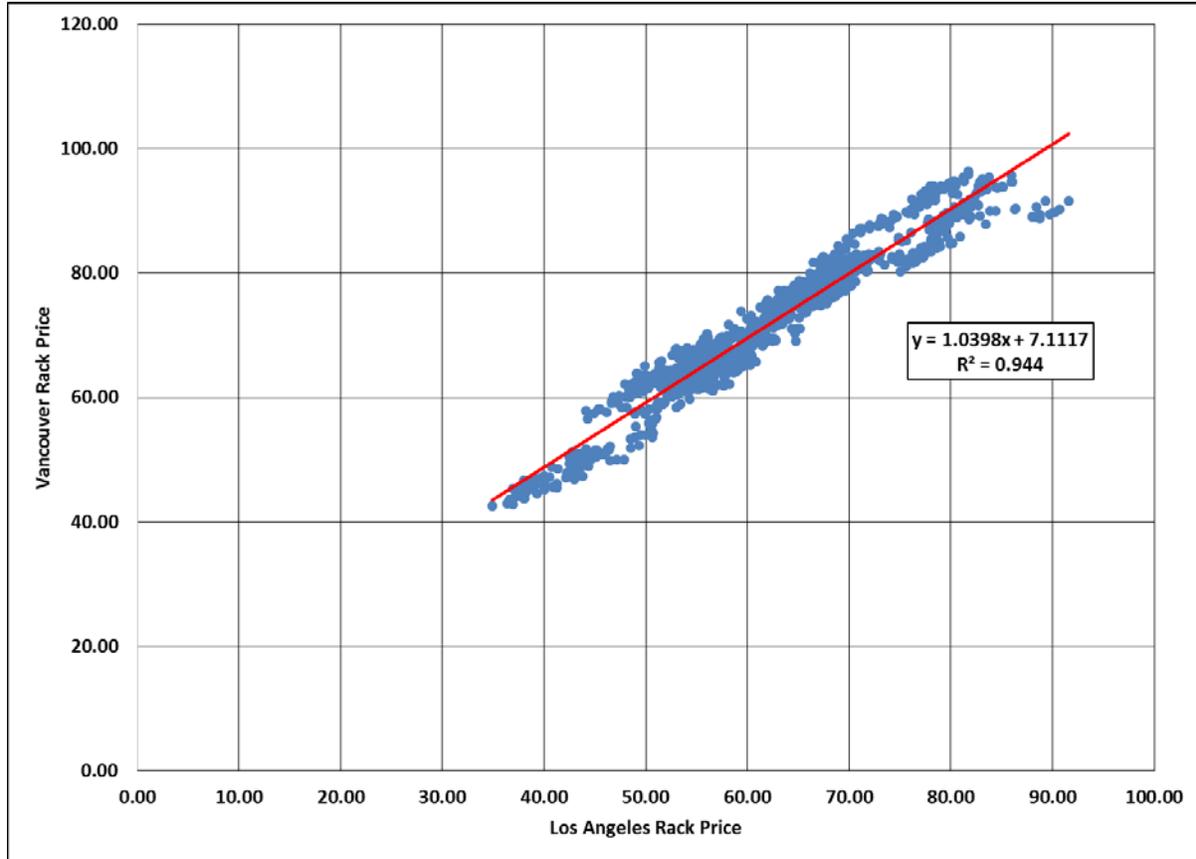
Figure 8
Relationship between Diesel Prices
Vancouver Rack and Seattle Rack Prices
Cents Per Litre, January 2014 – August 2019



Note: Seattle prices are calculated at the average between the branded and unbranded Ultra-Low Diesel price.

Source: Gasoline and Diesel Rack Pricing Data, OPIS, for more information see <https://www.opisnet.com/about/rack-pricing-coverage-city/>; Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgrouppltd.com/>; "Canada / U.S. Foreign Exchange Rate," FRED Economic Research, available at <https://fred.stlouisfed.org/series/DEXCAUS>.

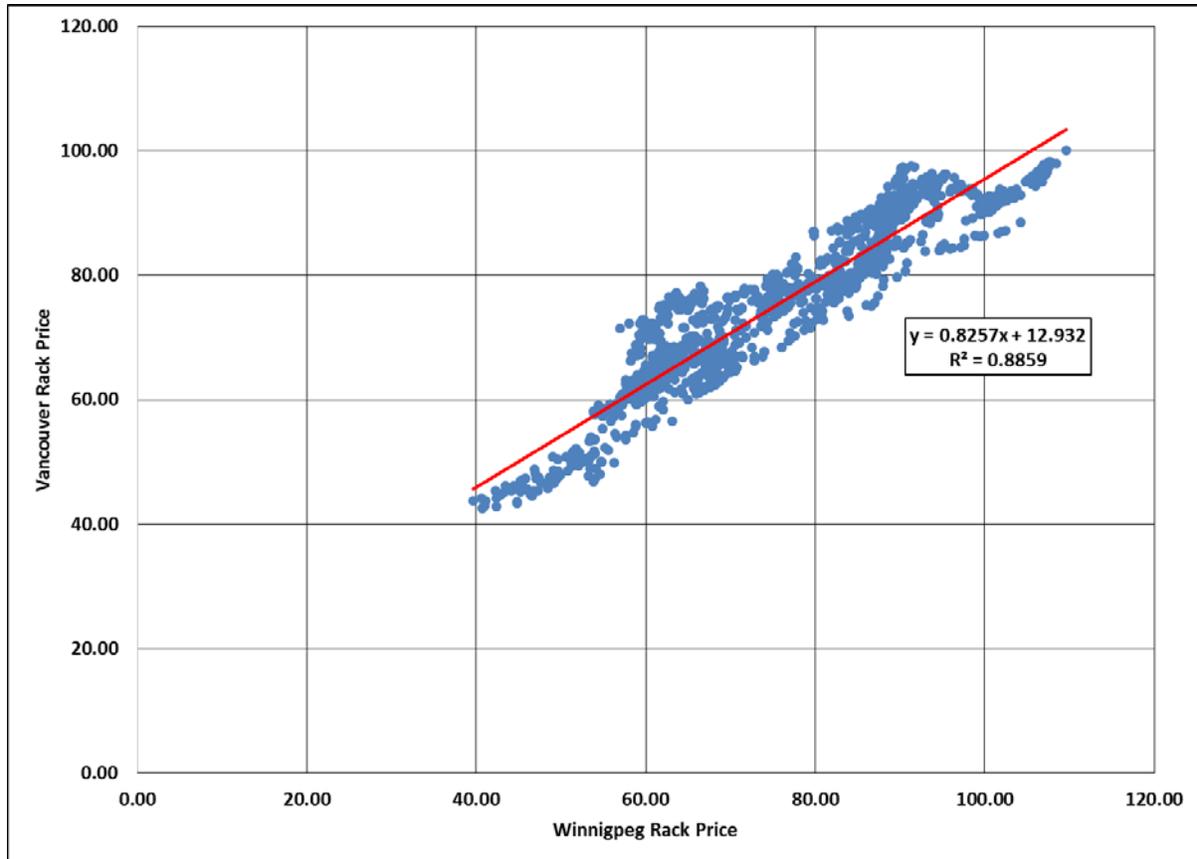
Figure 9
Relationship between Diesel Prices
Vancouver Rack and Los Angeles Rack Prices
Cents Per Litre, January 2015 – August 2019



Note: Los Angeles prices are calculated at the average between the branded and unbranded CARB Ultra-Low Diesel without CAR price. OPIS only reports CARB Ultra-Low Diesel without CAR prices as of January 2015, and so January 2015 is used as the start date for **Figure 9**.

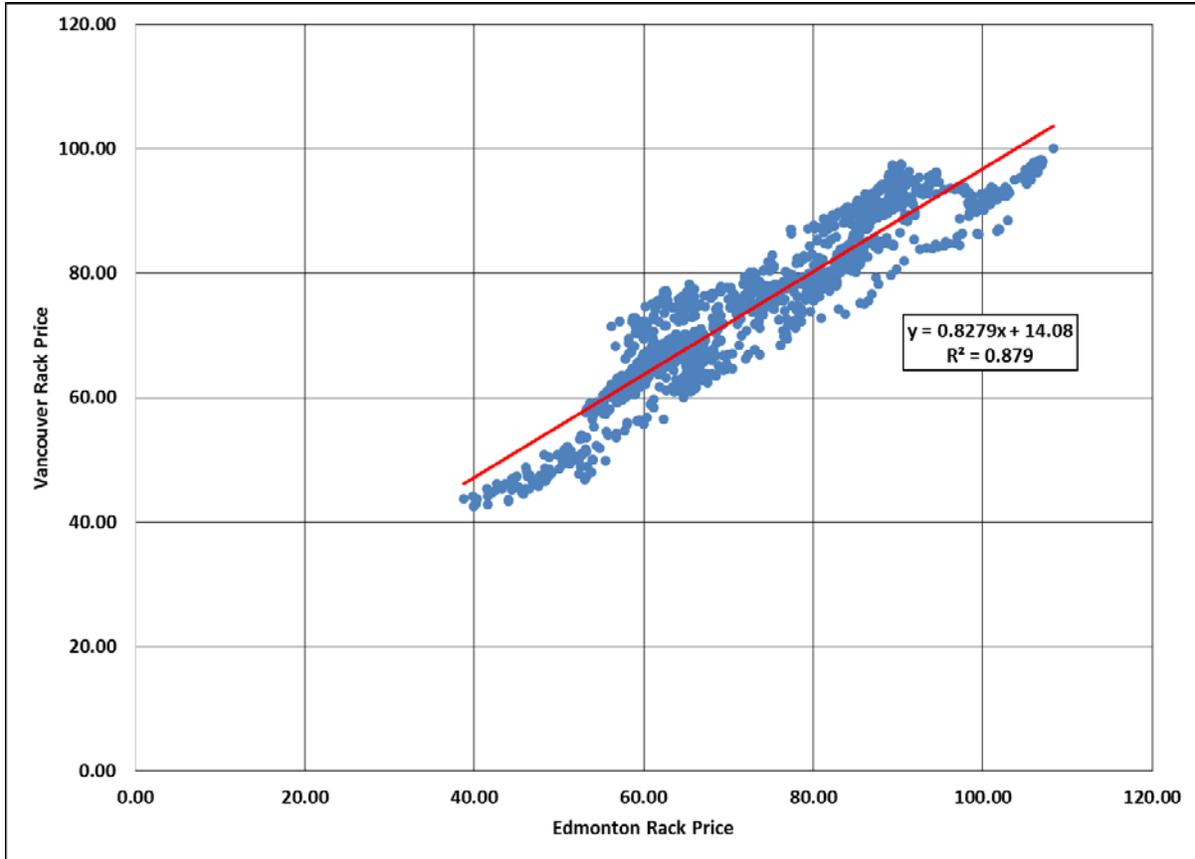
Source: Gasoline and Diesel Rack Pricing Data, OPIS, for more information see <https://www.opisnet.com/about/rack-pricing-coverage-city/>; Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgrouppltd.com/>; "Canada / U.S. Foreign Exchange Rate," FRED Economic Research, available at <https://fred.stlouisfed.org/series/DEXCAUS>.

Figure 10
Relationship between Diesel Prices
Vancouver Rack and Winnipeg Rack Prices
Cents Per Litre, January 2014 – August 2019



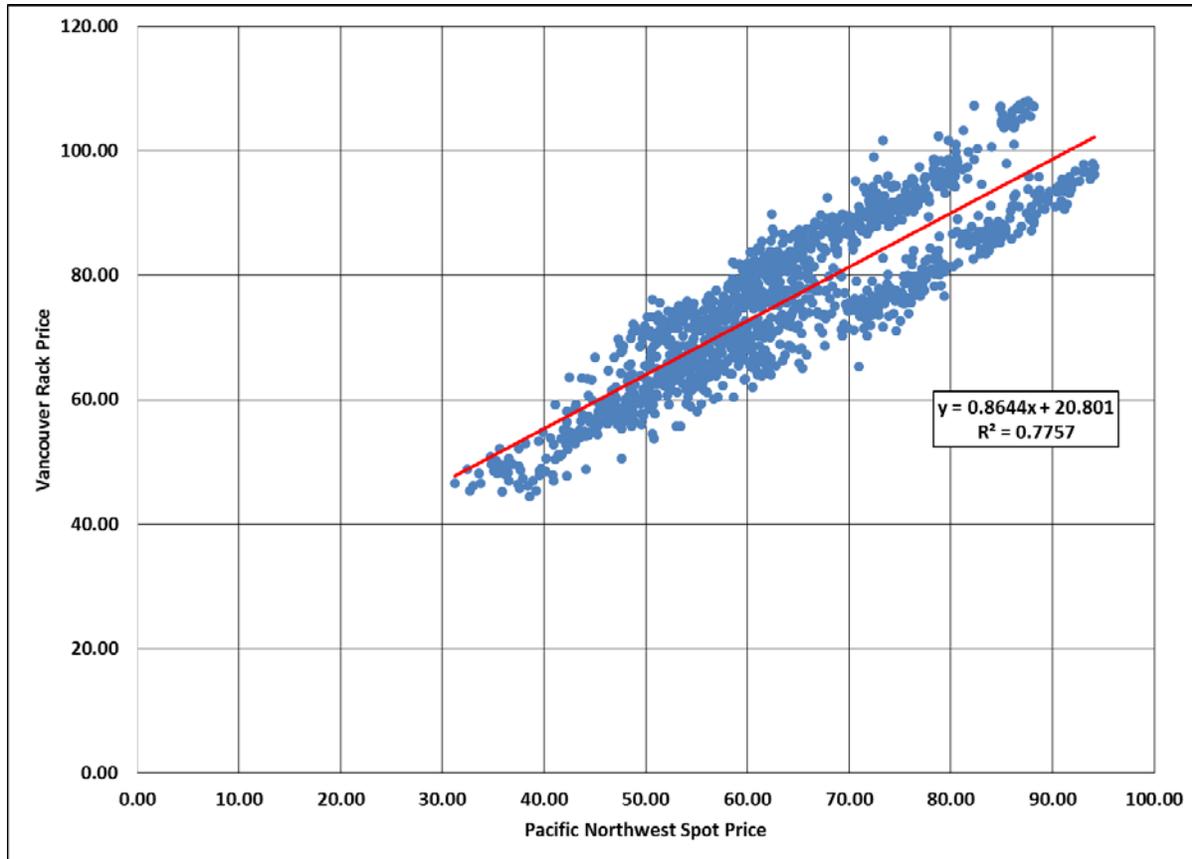
Source: Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgroup Ltd.com/>.

Figure 11
Relationship between Diesel Prices
Vancouver and Edmonton Rack Prices
Cents Per Litre, January 2014 – August 2019



Source: Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgroup ltd.com/>.

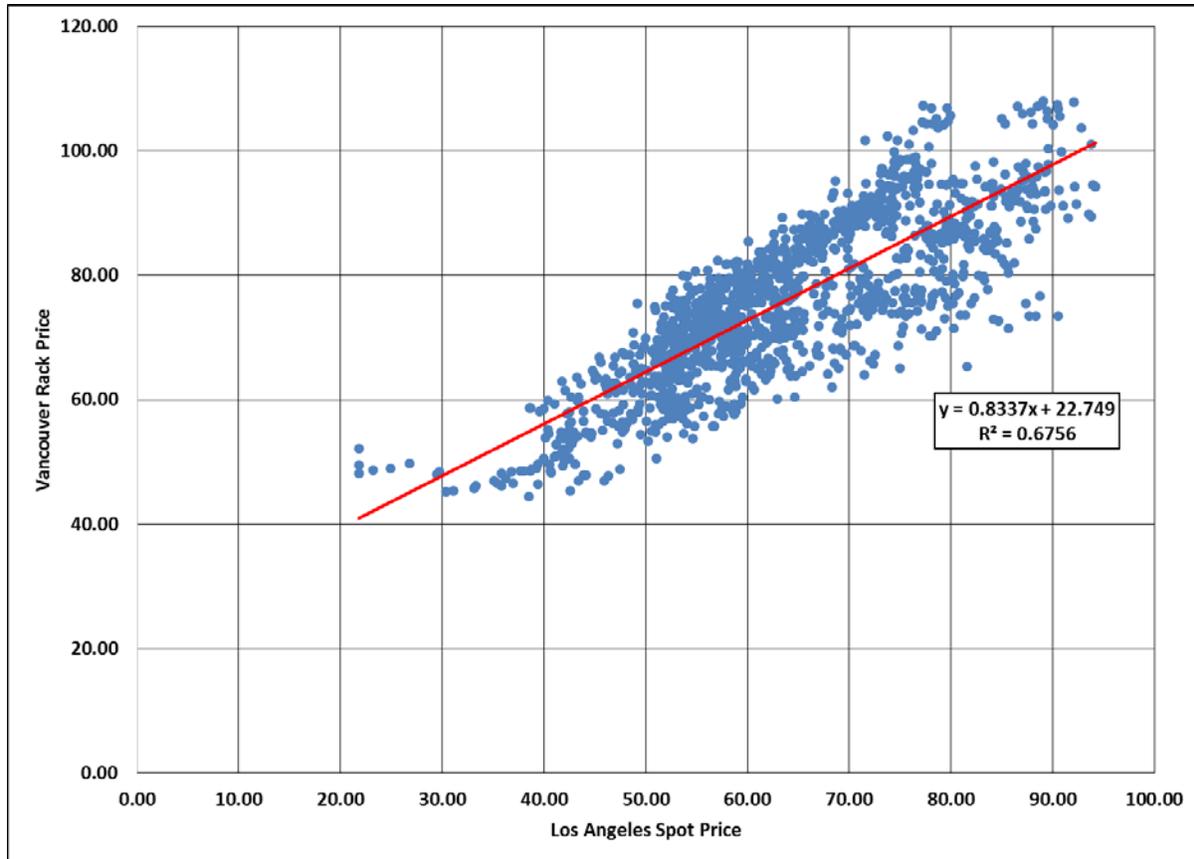
Figure 12
Relationship between Regular Unleaded Gasoline Prices
Vancouver Rack and Pacific Northwest Spot Prices
Cents Per Litre, January 2014 – August 2019



Note: Pacific Northwest spot prices are Sub-Octane Unleaded Regular Full Day Average prices as reported by OPIS.

Source: Gasoline and Diesel Spot Pricing Data, OPIS, for more information see <https://www.opisnet.com/about/methodology/#Refined-Spot>; Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgrouppltd.com/>; "Canada / U.S. Foreign Exchange Rate," FRED Economic Research, available at <https://fred.stlouisfed.org/series/DEXCAUS>.

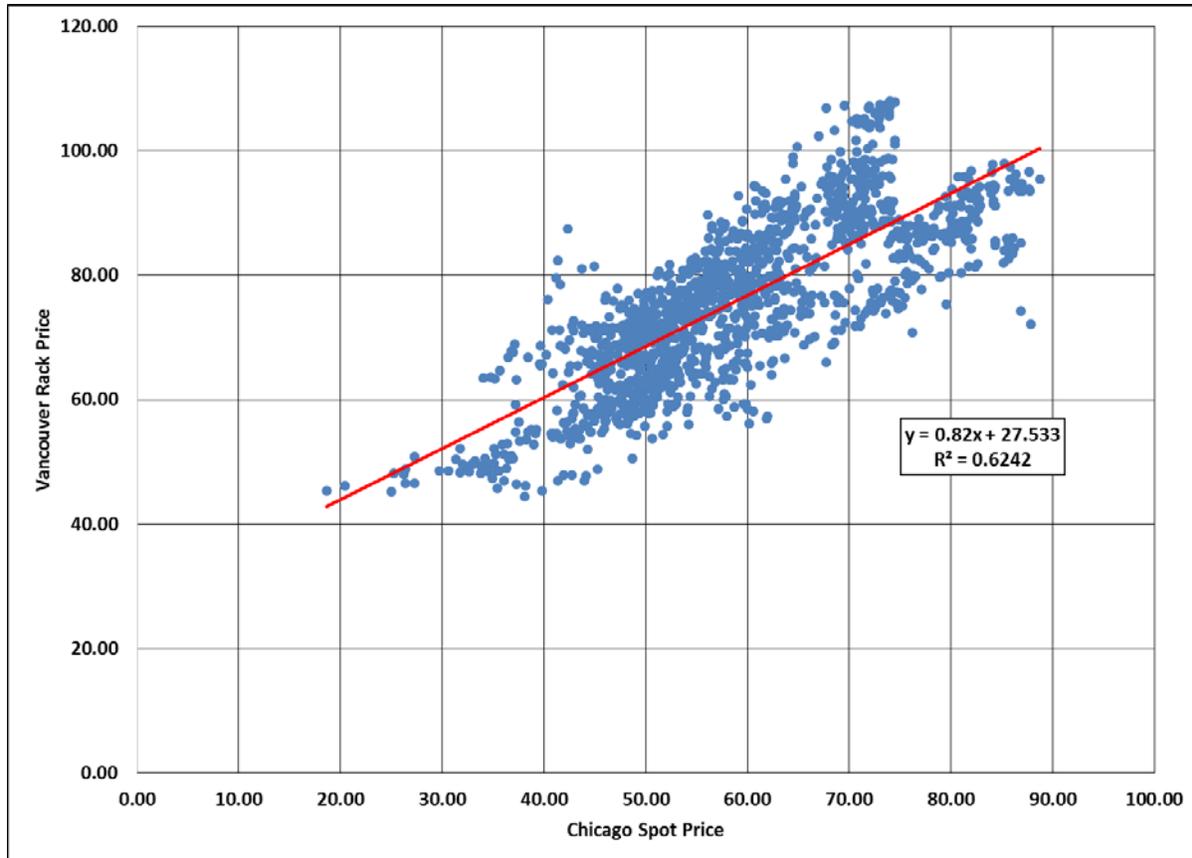
Figure 13
Relationship between Regular Unleaded Gasoline Prices
Vancouver Rack and Los Angeles Spot Prices
Cents Per Litre, January 2014 – August 2019



Note: Los Angeles spot prices are Sub-Octane Unleaded Regular Full Day Average prices as reported by OPIS.

Source: Gasoline and Diesel Spot Pricing Data, OPIS, for more information see <https://www.opisnet.com/about/methodology/#Refined-Spot>; Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgrouppltd.com/>; "Canada / U.S. Foreign Exchange Rate," FRED Economic Research, available at <https://fred.stlouisfed.org/series/DEXCAUS>.

Figure 14
Relationship between Regular Unleaded Gasoline Prices
Vancouver Rack and Chicago Spot Prices
Cents Per Litre, January 2014 – August 2019



Note: Chicago spot prices are CBOB Unleaded Regular Full Day Average prices as reported by OPIS.

Source: Gasoline and Diesel Spot Pricing Data, OPIS, for more information see <https://www.opisnet.com/about/methodology/#Refined-Spot>; Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgrouppltd.com/>; "Canada / U.S. Foreign Exchange Rate," FRED Economic Research, available at <https://fred.stlouisfed.org/series/DEXCAUS>.

45. The BCUC Report makes the following comments about its Figures 26 and 27:

The four companies participating in the Inquiry generally agree that the PNW spot price is the primary driver of the rack price for Vancouver and southern British Columbia. The graph below [Figure 26] shows that 80 percent of the variation in the Vancouver gasoline rack prices can be explained by the PNW spot prices as reported by OPIS...⁵⁷

⁵⁷ BCUC Report, p. 66 (emphasis added).

With respect to Vancouver diesel rack prices, a higher proportion of its variance can be explained by the PNW diesel spot prices than gasoline as shown in [Figure 27]...⁵⁸

The PNW spot price influence is significant as observed in the regression results of the Vancouver rack prices and the PNW spot price for both gasoline and diesel.⁵⁹

46. I have single underlined the quote from p. 66 of the BCUC Report because I start my analysis with this sentence. The regression offered in the BCUC Report's Figures 26 is not a valid regression. (This applies to the regression in Figure 27 as well.) A regression explains the variation in one variable (called the "dependent variable") based on one or more explanatory variables (called "independent variables"). Figure 26 purports show a regression where the dependent variable is the Vancouver rack price and the independent variable is the PNW spot price. Both the Vancouver rack and PNW spot price are related to the price of crude oil. As the price of crude oil changes, the Vancouver rack and PNW spot prices both change as well. To the regression, it may look like a change in the independent variable (PNW spot) is explaining a change in the dependent variable (Vancouver rack), but in reality both are being driven by something else. Any correlation found is spurious, the regression model is not properly specified, and as a result of this the reported R² value is invalid as well.
47. The Commission's finding that west coast gasoline and diesel markets are integrated also means that the regressions in the BCUC Report's Figures 26 and 27 are not valid. Prices in integrated markets are jointly determined, and modeling these as one price explaining the other is not proper as a matter of statistical inference. Instead, a regression should seek to explain both PNW spot and Vancouver rack prices based on independent, exogenous explanatory variables like production capacity, pipeline capacity, factors that affect demand (*e.g.*, the time of year due, for example, to the summer vacation driving season), regulatory costs, etc.
48. **Figure 4** shows that the Vancouver gasoline rack price is highly correlated with the Seattle gasoline rack price, and **Figures 5 – 7** similarly show that the Vancouver gasoline rack price is also highly correlated with rack prices for gasoline in other cities in both Canada and the United States. Similar results are found when studying Vancouver and other North American rack prices for diesel (**Figures 8 – 11**). In addition, **Figures 12 - 14** compare Vancouver rack pricing with PNW, Los Angeles, and Chicago spot pricing. These **Figures** indicate that the relationship between Vancouver rack prices and Seattle spot prices is not unique. Broadly speaking, these charts all tell the same story – that there is a positive relationship between Vancouver rack prices and other North American rack and spot

⁵⁸ BCUC Report, p. 67.

⁵⁹ BCUC Report, p. 68 (emphasis added).

prices.⁶⁰ This is to be expected because all of these are influenced by crude oil prices and the various wholesale markets are interconnected.

49. Regarding the quote above from p. 68 of the BCUC Report that I have double underlined, the Commission's regression analysis does not show that prices in the PNW gasoline and diesel wholesale markets affect or influence prices in the Vancouver gasoline and diesel wholesale markets. It is a common statistical error to confuse correlation with causation. Correlation or simple regression analysis only shows that a linear relationship exists between two variables. It does not explain how or why a relationship exists between those two variables. The Commission's simple regression analysis has no ability to deduce a cause-and-effect relationship between the two variables analyzed solely on the basis of an observed association or correlation between them.⁶¹ This also applies to the regressions detailed in **Figures 4 – 14** of this report – they show associations or correlations between the various prices analyzed, not causal relationships.
50. I recognize that the evidence from refiners like Imperial Oil and Parkland is that they look to PNW pricing and use it as a starting point when making their own pricing decisions for sales in BC. However, it is important to distinguish the process or mechanics of setting prices by individual wholesale market competitors from the fundamental market forces that drive market prices. Tight market conditions, for example, would tend to drive up prices in both Vancouver and the PNW; scarcity leads to price increases in both areas. This is quite different than saying that tight market conditions lead to PNW price increases, and that PNW price increases lead to Vancouver price increases. Instead, even if the tight market conditions are initially only in the PNW, an increase in PNW prices will cause suppliers to adjust production and sales to make more product available in the PNW where prices are now higher and less product available in Vancouver. These changes in economic decisions will lead to a reduction in the total volume supplied in Vancouver causing an increase in the price in Vancouver (all else equal). Furthermore, the evidence was not that Vancouver wholesale market suppliers price in lockstep with PNW pricing but rather that PNW pricing was the starting point for their review and setting of prices for Vancouver, and that adjustments are made to PNW pricing so as to reflect market conditions. Therefore, as both a matter of economic logic and of principles of statistical inference, the BCUC Report's Figure 26 cannot support the Commission's conclusion that the PNW spot price has a significant influence on Vancouver rack prices.⁶² Influence

⁶⁰ Note that while the BCUC uses OPIS prices for both Canadian and U.S. wholesale prices, Kent data are used for Canadian rack prices in **Figures 4 – 14**.

⁶¹ This is long recognized in the empirical economics literature. See, for example, Werden, G. and Froeb, L., "Correlation, Causality, and All that Jazz: The Inherent Shortcomings of Price Tests for Antitrust Market Delineation," *Review of Industrial Organization*, Vol. 8, 1993, pp. 329-353.

⁶² BCUC Report, p. 68 ("The PNW spot price influence is significant as observed in the regression results of the Vancouver rack prices and the PNW spot price for both gasoline and diesel." Emphasis added.).

implies causality. Rather, these prices are jointly determined by supply and demand conditions in the interconnected North American wholesale gasoline and diesel markets.

V. THE COMMISSION DOES NOT USE THE MARGINAL SOURCE OF SUPPLY

51. The Commission's analysis of wholesale market price differentials is based on barged product from the PNW because barged product is the predominant method of transport used to import PNW product into BC.⁶³ Just because a method of transport is the predominant method used does not make it the marginal supply source. Indeed, one would expect predominant transportation methods not to be the marginal supply source because the marginal method of transportation should be used by market participants as sparingly as possible. If barged supply is not the marginal supply source, then the Commission's analysis of unexplained wholesale price differentials (which is built on barged product) is mis-specified and is not probative.

VI. THE 13-CENT UNEXPLAINED WHOLESALE PRICE DIFFERENTIAL IS DERIVED FROM INAPPROPRIATE APPLES-TO-ORANGES COMPARISONS

52. The Commission is basing its price differential analysis on a comparison of OPIS PNW spot prices and OPIS Vancouver rack prices. In conducting its analysis, the Commission marked up the PNW spot price to reflect transportation costs and regulatory cost associated with compliance with the LCFS and federal fuel content standards.⁶⁴ It did not make any other adjustments or control for any other factors when estimating its differential between PNW spot and Vancouver rack prices.
53. As detailed in paragraph 41, OPIS spot prices represent pricing for large volume, bulk transactions (deals are "done in bulk, typically 5,000 barrels (210,000 gallons) to 50,000 barrels (2.1 million gallons).") Rack pricing, by comparison, is for smaller transactions (e.g., an 8,000-gallon truck load). Spot transactions are between 26 and 263 times larger than rack transactions. Comparing a PNW spot and Vancouver rack price, therefore, is not an apples-to-apples comparison, and differences in the scales of the transactions alone may lead the Commission to find a price differential.
54. An entity bringing in a barge full of fuel would not be in a position to sell that fuel in truck load quantities. The Commission's analysis reflects making a bulk fuel purchase, modifying that fuel to meet BC specifications,⁶⁵ and transporting the fuel to Vancouver in

⁶³ "In this regard, the Panel notes that one participant, Parkland, mentioned that it sometimes trucked refined products from the PNW. If a barrel trucked from PNW were to be the marginal barrel then Deetken's analysis, which compared the Vancouver rack to the tanker truck delivered wholesale from Seattle, would be of relevance. **That said, the Panel finds there to be sufficient evidence that the predominant mode of transport from the PNW is barge, and thus, the vast majority of the time, that will be the marginal barrel.**" BCUC Report, p. 79 (emphasis in original, footnotes omitted).

⁶⁴ BCUC Report, pp. 77-78.

⁶⁵ Modification could be done before purchase by the bulk seller or after purchase by the bulk buyer.

a barge. It does not make an allowance for actually distributing that fuel. This is not a valid arbitrage scenario. Instead, the arbitrage opportunity is making a bulk gasoline purchase in Seattle, formulating the gasoline for sale in BC, transporting it to BC, and then distributing it by storing it in tanks and loading it from the tanks onto trucks for delivery to a retail gas station.

55. The BCUC Report explains the importance of primary terminal functions but no allowance for these functions is included in its price differential analysis. PNW spot price volumes transported into BC are not ready for distribution. In particular, no allowance is made in the Commission's analysis for primary terminal storage and processing. Bulk volumes stored on a barge are not ready for loading onto individual trucks for distribution to gas stations. Primary terminal storage and processing is not without cost, and by failing to include any costs for primary terminal distribution services, the Commission is implicitly assuming that product is brought into the distribution system in the Vancouver area and handled free of charge. A wholesaler in Vancouver could not support its operations if it were unable to markup this fuel to cover distribution costs. The Commission has not prepared an apples-to-apples pricing comparison and therefore its estimate of a pricing differential of 13 cents lacks economic merit.
56. In addition, rack prices are list prices. Most transactions occur at discounts to rack. Transacting at discounts to a list price is common in this and other industries. For example, hotels have list prices for rooms, but few hotel stays are actually priced at list. (Note that hotel room list prices are also called "rack" prices.) Automobiles have list prices, usually called manufacturer's suggested retail prices or MSRPs. Few cars are sold at MSRP, however. By comparing spot prices, which are transactions prices, to rack prices, which are list prices, the Commission's analysis is designed to find an unexplained differential even if none exists.
57. I have attempted to make adjustments to the Commission's unexplained differential analysis. In what follows, I assume values for several important parts of the analysis. The Commission could substitute actual values from industry participants (which may be confidential) to update the analysis. My goal here is to provide a framework for the analysis so that it is clear how to update the Commission's work to make an apples-to-apples comparison between BC and PNW prices, not to provide an answer to the question of whether there is a differential, and, if so, to estimate its magnitude.
58. **Table 5** sets out the structure of the analysis, and **Table 6** attempts to replicate the Commission's analysis from 2015 – 2019 for comparison purposes. The top line in both **Tables** is the average Vancouver rack price. This information is from Kent Group and represents actual price data. Focusing on **Table 5** only, the next row is the average transaction discount off rack, which I assume to be 2.5 cents/litre for the purposes of constructing **Table 5**. The Commission can update this number using actual (potentially confidential) data. The next row is the PNW spot price, which is actual data from OPIS. The next three lines are the LCFS, federal fuel standards, and barge transport costs used

by the Commission. I have replicated the Commission's figures for these amounts and have not tried to verify their accuracy or to update them in any way. Finally, I include 6 cents/litre of distribution costs. This figure is an assumption that the Commission can update with actual (potentially confidential) data. The differential is the Vancouver rack price less all these other amounts. I provide the average of the annual price and cost figures during the years studied and the average differential. These are straight averages, not average weighted by volumes. I note that because **Table 5** is intended to detail the structure of the analysis, I selected 6 cents for the distribution cost estimate so that the 2015 – 2019 average would be small (so that **Table 5** does not show a significant positive or negative value of the unexplained differential). The Commission can make updates to this and other values presented in **Table 5** as appropriate to reflect actual market data.

Table 5
Illustrative Framework for Evaluating A Potential Wholesale Price Differential

Price/Cost	Formula	2015	2016	2017	2018	2019	2015-2019 Average
Vancouver Rack	A	66.56	61.31	74.28	87.88	86.66	74.53
Average Rack Discount [Illustrative Number]	B	2.50	2.50	2.50	2.50	2.50	2.50
PNW Spot	C	59.96	49.90	59.30	70.39	66.54	60.83
LCFS Cost	D	1.00	2.00	2.00	4.00	4.00	2.60
Federal Fuel Standard	E	0.50	0.50	0.50	0.50	0.50	0.50
Barge Transport	F	1.70	2.00	2.00	2.00	2.00	1.94
Distribution Costs [Illustrative Number]	G	6.00	6.00	6.00	6.00	6.00	6.00
Differential [Illustrative Number]	A - (B + C + D + E + F + G)	-5.10	-1.59	1.98	2.49	5.12	0.16

Note: The prices calculated above are based on daily prices, and represent the daily average annual price. PNW spot prices are Sub-Octane Unleaded Regular Full Day Average prices as reported by OPIS.

Source: Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgroup Ltd.com/Charting/FullMonty>; Gasoline and Diesel Spot Pricing Data, OPIS, for more information see <https://www.opisnet.com/about/methodology/#Refined-Spot.>; Deetken Group Phase 2: Analysis of Factors Contributing to BC's Gasoline and Diesel Price Behaviour, The Deetken Group, An Inquiry into Gasoline and Diesel Prices in British Columbia Project No. 1599007, July 10, 2019, p. 58, available at https://www.bcuc.com/Documents/Proceedings/2019/DOC_54513_A2-1-1-Deetken-IndependentConsultantReport-Phase2.pdf; "Canada / U.S. Foreign Exchange Rate," FRED Economic Research, available at <https://fred.stlouisfed.org/series/DEXCAUS>; BCUC Report, p. 77-78.

Table 6
Commission Framework for Evaluating Unexplained Differential Analysis

Price/Cost	Formula	2015	2016	2017	2018	2019	2015-2019 Average
Vancouver Rack	A	66.56	61.31	74.28	87.88	86.66	74.53
PNW Spot	B	59.96	49.90	59.30	70.39	66.54	60.83
LCFS Cost	C	1.00	2.00	2.00	4.00	4.00	2.60
Federal Fuel Standard	D	0.50	0.50	0.50	0.50	0.50	0.50
Barge Transport	E	1.70	2.00	2.00	2.00	2.00	1.94
Differential	A - (B + C + D + E)	3.40	6.91	10.48	10.99	13.62	8.66

Note: The prices calculated above are based on daily prices, and represent the daily average annual price. PNW spot prices are Sub-Octane Unleaded Regular Full Day Average prices as reported by OPIS.

Source: Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgroupltd.com/Charting/FullMonty>; Gasoline and Diesel Spot Pricing Data, OPIS, for more information see <https://www.opisnet.com/about/methodology/#Refined-Spot.>; Deetken Group Phase 2: Analysis of Factors Contributing to BC's Gasoline and Diesel Price Behaviour, The Deetken Group, An Inquiry into Gasoline and Diesel Prices in British Columbia Project No. 1599007, July 10, 2019, p. 58, available at https://www.bcuc.com/Documents/Proceedings/2019/DOC_54513_A2-1-1-Deetken-IndependentConsultantReport-Phase2.pdf; "Canada / U.S. Foreign Exchange Rate," FRED Economic Research, available at <https://fred.stlouisfed.org/series/DEXCAUS>; BCUC Report, p. 77-78.

59. The differences between the structures of **Table 5** and **Table 6** are the inclusion in **Table 5** of cost factors needed to make the Commission's comparison of large bulk and much smaller truck-load purchases an apples-to-apples comparison. Both are significant adjustments that the Commission should make based on accurate market data. These **Tables** also report data from the Inquiry's full study period and report averages over the full period instead of focusing on just one year of the study period. The wholesale gasoline and diesel markets in BC are dynamic and always in flux. The capacity on TMPL used to transport refined products, for example, changes regularly. Focusing on a broader time period helps to provide a view of the market less affected by individual supply and demand shocks.

VII. RETAIL PRICE CYCLES

60. Price cycling is common in retail gasoline and diesel markets. The BCUC Report explains that price cycles (called "Edgeworth Cycles" in the economics literature) involve firms incrementally undercutting each other with many small price reductions over time as they compete for customers or market share. Eventually, prices are driven down to very low levels. At some point, a firm stops trying to compete to take business from rivals but instead will increase its prices, allowing it to maximize profits with fewer unit sales but a higher margin on the units it does sell. Other firms then follow that price increase because they no longer need to lower prices to be competitive. The cycle then repeats, with prices

again being competed down to lower levels via a series of smaller price cuts made by market participants.⁶⁶

61. The BCUC Report suggests that price cycling could be a complicated way of coordinating prices:

However, the question arises as to whether much of this price cycling could be a form of unplanned ‘tacit coordination’ where in a given market the players operate independently yet in a predictably coordinated fashion. Prices move up and down in a manner that gives the appearance of a functioning competitive market but it is also possible this pricing behaviour is tacitly choreographed such that there are numerous price changes throughout the day with no stable price point being established. This scenario, if accurate, is not illegal but it does result in excessive daily volatility.⁶⁷

62. The Commission’s concern with excessive daily volatility overlooks the fact that the majority of the economic literature finds that, relative to markets with more stable and hence less volatile pricing, price cycles appear to lead to lower prices and are more common in markets with aggressive independent competitors.

- Noel (2007a) analyzed retail gasoline pricing cycles in Canada. Noel indicated that “[t]he theories of Edgeworth cycles further suggest that a greater penetration of small firms should lead to more cycling activity and less sticky pricing.”⁶⁸ Noel’s empirical results are consistent with Edgeworth cycles theory, *i.e.*, cycles were more likely the greater the penetration of smaller market participants.
- Eckert (2003) examined Canadian retail pricing patterns and found that “cycles seem more likely in cities with many independent brands or small chains.”⁶⁹
- A study by economic staff from the U.S. Federal Trade Commission (“FTC”), one of the two federal competition regulators in the U.S., examined the dynamics of gasoline prices and stated:

⁶⁶ BCUC Report, p. 95. I discussed Edgeworth price cycles in my response to Parkland Fuel Corporation Undertaking No. 3. For a discussion of Edgeworth cycles, see Noel, Michael D., “Edgeworth Price Cycles: Evidence from the Toronto Retail Gasoline Market,” *The Journal of Industrial Economics*, Vol. 55, No 1, March 2007, pp. 69-92.

⁶⁷ BCUC Report, p. 96.

⁶⁸ Noel, Michael D., “Edgeworth Price Cycles, Cost-Based Pricing, and Sticky Pricing in Retail Gasoline Markets,” *Review of Economics and Statistics*, May 2007, Vol. 89, No. 2, pp. 332, 334. Noel measured penetration of small firms as “the fraction of stations not operated by the largest four firms.” (p. 332).

⁶⁹ Eckert, Andrew, “Retail Price Cycles and the Presence of Small Firms,” *International Journal of Industrial Organization*, Vol. 21, 2003, p. 154.

With regard to cycling, there is tension between the hypotheses that cycling is a result of price leadership or market power and the fact that the average prices appear equal to or lower in cycling cities compared to non-cycling cities.⁷⁰

and

[T]here is no evidence that cycling in the United States is due to less competition. Indeed, most studies find that, on average, U.S. cycling cities tend to be more competitive and pass through wholesale price changes to retail prices more quickly, and have lower prices (or retail margins) relative to non-cycling cities.⁷¹

- Zimmerman, et al. (2013) reviewed gasoline price cycling in 350 metropolitan areas in the U.S. Midwest over a 15-year period.⁷² The authors of this study noted that the extensive amount of data allowed them to observe price levels before and after cycling occurred. The authors determined that “after cycling began, cycling [metropolitan areas] had lower prices from 0.5 cent to 1.5 cents per gallon.”⁷³
 - Siekmann (2017) reviewed “high-frequency price data [from] virtually all gasoline stations in Germany.”⁷⁴ This study found “broad evidence of intraday cycling across municipalities in Germany.” With regard to the price impact of cycling, the study found that “intraday cycles are a sign of competition with a price decreasing effect[.]”⁷⁵
63. Price cycling is associated with the greater presence of independent firms, which is inconsistent with the idea that such cycling is either a reflection of, or serves to facilitate, the type of coordination that raises competition policy concerns.
64. As discussed in paragraphs 19 and 20, tacit coordinated conduct is easier to support when there are fewer competitors in the market and when competitors have similar cost

⁷⁰ Gasoline Price Changes and the Petroleum Industry: An Update, Federal Trade Commission Bureau of Economics, September 2011, p. 45, available at <https://www.ftc.gov/reports/federal-trade-commission-bureau-economics-gasoline-price-changes-petroleum-industry-update>. (hereafter “2011 FTC Study”)

⁷¹ 2011 FTC Study, p. 44 (footnotes omitted).

⁷² Zimmerman, Paul R., John M. Yuan and Christopher T. Taylor, “Edgeworth Price Cycles in Gasoline Evidence from the United States,” *Review of Industrial Organization*, Vol. 42, 2013, pp. 297-320.

⁷³ Zimmerman, Paul R., John M. Yuan and Christopher T. Taylor, “Edgeworth Price Cycles in Gasoline Evidence from the United States,” *Review of Industrial Organization*, Vol. 42, 2013, p. 314.

⁷⁴ Siekmann, Manuel, “Characteristics, Causes, and Price Effects: Empirical Evidence of Intraday Edgeworth Cycles,” Discussion Paper No. 252, Düsseldorf Institute for Competition Economics, May 2017, p. 3.

⁷⁵ Siekmann, Manuel, “Characteristics, Causes, and Price Effects: Empirical Evidence of Intraday Edgeworth Cycles,” Discussion Paper No. 252, Düsseldorf Institute for Competition Economics, May 2017, p. 3.

structures. These factors make tacit coordinated conduct unlikely in BC. There are multiple retail competitors in most cities in the province. In addition, the business strategies and cost structures vary substantially across competitors. For example, a small independent gasoline station with limited in-store offerings has a substantially different business strategy and cost structure than a Costco or a higher-volume gasoline station with a large convenience store. Costco earns substantial revenues through membership fees, and access to Costco's relatively low gasoline prices are one of the reasons consumers are willing to pay an annual membership fee. Large convenience store margins are often derived from relatively high margin in-store offerings. These gasoline retailers will often adopt a low gasoline price strategy to increase in-store traffic at their locations. The cost structure and business model used by a retailer with a smaller (or no) convenience store differ substantially from those of these other retailers. Substantial differences in business strategies and cost structures across gasoline retailers make tacit coordinated conduct in BC unlikely.

65. I am aware no economic evidence that tacit price coordination among gasoline and diesel retailers occurs across such a large array of local retail markets that differ in terms of their numbers of competitors, identity of competitors, extent of vertical integration, market sizes, retail formats (*e.g.*, club stores selling gasoline, supermarkets selling gasoline, large convenience stores, small independent gasoline stations) and scales of operation for individual rivals.
66. There is no economic support for the BCUC Report's contention that price cycles may represent tacit coordinated conduct among gasoline and diesel retailers that generates excessive price volatility to the detriment of consumers. Indeed, the literature suggests that consumers benefit from price cycles. Because average prices are lower with cycles, Noel (2015) concludes that "absent Edgeworth price cycles as a whole actually being harmful to consumers, there is no consumer gain to be had by attempting to eliminate them or regulate them away. In fact, such efforts run the risk of doing more harm than good."⁷⁶ As discussed above, many other studies have found that price cycling, including intraday cycling, is associated with lower average retail gasoline prices.⁷⁷

⁷⁶ Noel, Michael D., "Do Edgeworth Price Cycles Lead to Higher or Lower Prices," *International Journal of Industrial Organization*, Vol. 42, 2015, pp. 81-93. This author uses a natural experiment concerning a refinery fire that occurred on February 15, 2007 in Nanticoke, Ontario, and analyzes retail prices (obtained from GasBuddy.com) and wholesale rack prices (obtained from Kent) for a cross-section of nine major Canadian cities over a period of two years (February 15, 2006 to February 14, 2008, one year on either side of the February 15th, 2007 event). He concludes that Edgeworth price cycles lead to lower retail and wholesale gasoline prices and margins.

⁷⁷ See, for example, Siekmann, Manuel, "Characteristics, Causes, and Price Effects: Empirical Evidence of Intraday Edgeworth Cycles," Discussion Paper No. 252, Düsseldorf Institute for Competition Economics, May 2017; and Zimmerman, Paul R., John M. Yun, and Christopher T. Taylor, "Edgeworth Price Cycles in Gasoline: Evidence from the United States," *Review of Industrial Organization*, Vol. 42, 2013, pp. 297-320.

67. The BCUC Report includes the consideration of retail price regulation as a potential “next step”, and on the plus side for such regulation states that this “[w]ill minimize retail price variability over a period (weekly, bi-monthly) of time[.]”⁷⁸ The finding in the economic literature that cycling leads to lower prices implies that limiting price variability would actually harm consumers, all else equal.

VIII. RETAIL MARKET CONTROL

68. The Commission has raised concerns about retail market competition. In particular, the BCUC Report acknowledges that concentration in retail markets is low,⁷⁹ but indicates that vertical integration between refiner-marketers and retail stations may have an impact on the retail market. It states:

However, the point can be also be made that a significant number of these independent [retail market] players are tied by brand to the 5 major refiner-marketers and along with dealer-controlled stations, are reliant on these refiner-marketers for supply. Since the rack price which for the most part is controlled by the five Oil Companies is a major part of the retail price at the pump and the brand agreements tie a large number of retailers to these major refiner-marketers, the closeness of these relationships cannot be ignored. **Accordingly, in spite of concentration levels within the retail market being low, the Panel finds the relationship of most dealers to the refiner-marketer may still have an impact on there being a fully competitive market.** Moreover, refiner-marketers have direct control over pricing in 33.6 percent of BC’s retail stations which is significantly higher than the average in Canada. **Therefore, the Panel finds that while the impact of this cannot be quantified, this relationship increases the opportunity for effective market control.**⁸⁰

69. As an initial matter, the BCUC Report does not explain why having “effective [retail] market control” is of economic significance. The panel concluded that there was joint market power over the wholesale market. In a vertical supply chain, entities at one level gain if other levels of the supply chain are competitive. With regard to the relationship between wholesale and retail markets, an effort to exercise market power by increasing prices at the retail level of the supply chain reduces demand at wholesale and does not benefit wholesale suppliers.⁸¹ Indeed, Imperial Oil has divested its retail gas stations and

⁷⁸ BCUC Report, p. 107.

⁷⁹ BCUC Report, p. 93.

⁸⁰ BCUC Report, p. 93 (emphasis in original).

⁸¹ In economics, this is known as there being only “one monopoly rent” available in an industry. In the absence of price discrimination, a firm controlling one market can do no better if it controls that market and another one upstream or downstream to it. Controlling both the upstream and downstream market can be profitable, however,

so is not even an active retail market participant. It has no incentives for market power to be exercised downstream from its parts of the supply chain. If there were excess profits to be earned downstream at retail, wholesale market participants would benefit from increasing the wholesale price and promoting increased competition downstream to reduce downstream margins and the price charged for retail services because that would avoid splitting the excess profits earned with independents.

70. The economic analysis of the retail market in this inquiry should be conditional on the wholesale market – given the level of upstream competition in the wholesale market, is the retail market structured to behave competitively? This is to focus the Commission’s policy recommendations at the proper part of the vertical chain of production – if the Commission’s concerns are at wholesale (retail), then there is no need to recommend regulation or other changes at the retail (wholesale) level of the supply chain.
71. Focusing just on the retail market, there are no economic indicators that this market is anything but competitive. There are numerous market players, and none of these players has a large share of the market. Indeed, Parkland controls pricing at more stations than any other retail competitor in BC, and it only controls pricing at 12.6% of the stations in the province.
72. The Commission’s retail market analysis does not appear to be conditional on the wholesale market. When the Commission states that “the relationship of most dealers to the refiner-marketer may still have an impact on there being a fully competitive [retail] market[,]”⁸² it does not explain any implications that follow from this. If the impact involves exercising market power over the retail function, the BCUC Report provides no reasons why exercising such market power would benefit wholesale suppliers.
73. Furthermore, even if refiner-marketers have direct control over pricing at 33.6 percent of retail gas stations in BC, and even if this percentage is significantly higher than the average in Canada, there is no economic reason why joint control over 33.6 percent of the market would be sufficient to provide “effective market control”. Joint or group control over one third of the market means that two-thirds of the market is outside of the group’s control. The 33.6 percent figure cited to by the Commission is simply too small a market share to raise concerns.
74. The Competition Bureau’s Merger Enforcement Guidelines (“MEGs”) provide market share and market concentration thresholds for when market power is not of concern in a merger analysis (the “MEG Safe Harbours”). The Commission’s inquiry into gasoline and

if joint control enables the firm to price discriminate by charging higher prices to customers that place a higher value on the product. Gas stations, however, have a posted price and sell to all customers at the same price and therefore do not charge more for customers that place a higher value on gasoline than those that place a lower value on the product.

⁸² BCUC Report, p. 14.

diesel markets in British Columbia is not a merger inquiry, but the MEG safe harbours are instructive nevertheless. The MEG Safe Harbours provide market shares and market concentration thresholds, and when shares and concentration are below these thresholds “effective competition in the relevant market is generally likely to constrain the creation, maintenance or enhancement of market power[.]”⁸³ The safe harbours are:

- A 35% market share for a firm to be able to exercise market power itself, meaning that when a firm’s market share is below 35% it is unlikely to be able to exercise market power on its own; and
- A four-firm concentration ratio of 65%, meaning that when the four firm concentration ratio is below 65% the competitors are not likely to be able to coordinate their conduct and exercise market power jointly.⁸⁴

75. With regard to unilateral effects, the largest retail market share in BC is 12.6%, which is below the 35% safe harbor threshold.⁸⁵ With regard to coordinated effects, the 4-firm concentration ratio is 36.9%, which is below the 65% safe harbor threshold.⁸⁶ There is insufficient market concentration for refiner-marketers to have “effective market control” over the retail market for gasoline and diesel in BC.

⁸³ Merger Enforcement Guidelines, ¶ 5.8.

⁸⁴ Merger Enforcement Guidelines, ¶ 5.9. The MEGs include a second safe harbor threshold for the exercise of coordinated market power, namely that the merged firm’s market share be no higher than 10%. In a merger analysis, the analytical question being considered is whether the change in market structure cause by a merger will create, enhance, or facilitate the exercise of market power. If the issue is whether there will be a unilateral exercise of market power in BC gasoline or diesel retail markets, the relevant consideration is the 35% single-firm threshold for unilateral effects. If the concern is coordinated conduct, the relevant consideration is the 65% 4-firm concentration ratio. In the merger context, if market concentration is above this this 65% threshold, then the safe harbours ask whether the merging parties have a combined share of 10% or more. If their combined share is below 10%, the change in market structure caused by the merger is not significant enough to trigger a concern regarding the coordinated exercise of market power. The issue of the impact of the change in market structure on the potential for coordinated conduct is not relevant to the Commission’s inquiry. The level of concentration, not the change in concentration, is the relevant analytical question for the Commission to consider.

⁸⁵ This is the market share for Parkland. See Kahwaty Report, Table 10.

⁸⁶ There are four refiner-marketers that control pricing at retail gas stations: Parkland, Suncor, Shell, and Husky. The 33.6% figure cited to by the Commission is their collective market share. The 4-firm concentration ratio is higher, however, because 7-Eleven Canada controls pricing at 124 stations, making it the second largest gasoline retailer in BC as measured by the number of stations at which it controls pricing. The 4-firm concentration ratio includes the stations of Parkland (173), 7-Eleven Canada (124), Suncor (116), and Shell (92). To be conservative, the station count for Shell includes both its 89 stations and the 3 stations in its JV with Flying J. I base my analysis on the 36.9% 4-firm concentration ratio rather than the 33.6% figure for refiner-marketers cited to by the Commission because it is the larger of the two figures.

IX. THE EVALUATION OF THE OPPORTUNITY COST OF LAND

76. The BCUC Report recognizes some role for the opportunity cost of land in the analysis of retail pricing but does not support the Deetken approach to estimating the effect of these opportunity costs because land values are not a direct input into the setting of retail prices by market participants. The BCUC Report states:

There is no evidence that marketers and retailers rely on the value of land in determining retail prices. The record is replete with evidence in support of the contention of many marketers that the retail price is based on strategies undertaken by retailers to capture a larger part of the competitive market. This is not to say that land value is not a consideration. Marketers and retailers universally seemed to agree that the value of land, while not a direct consideration in determining the retail price and the ultimate margin, was an important consideration in a broader sense. Therefore, the value of land was viewed in terms of whether they were earning an adequate return on capital or the value was such that a particular property should be sold. There was no evidence to suggest it was a direct consideration in price or margin setting.⁸⁷

77. This confuses daily price setting behavior with long-term market dynamics. In the short run, economists view individual firms as engaging in profit-maximizing behavior by setting their prices in a manner that considers the units they will sell to their customers and the variable costs they will incur to produce and sell those units. Fixed costs are not relevant when making such a decision because they cannot change in the short run. Though the physical plant and equipment available to a firm can be augmented, scaled back, or replaced over time, they cannot be adjusted immediately or over some shorter timeframe. Building, expanding, renovating, or selling a retail gas station takes time. It is, therefore, appropriate not to consider these costs when making day to day pricing decisions.⁸⁸

⁸⁷ BCUC Report, p. 102.

⁸⁸ Consider the following example: A store in a shopping mall is notified that its monthly rent will increase by 10% next month. Should it raise its prices next month to offset its rent increase? As a matter of economics, the answer is no. The 10% increase in rent is an increase in this store's fixed costs. A change in fixed costs does not alter the store's strategic decisions regarding its profit-maximizing output or price because it does not alter the firm's short-run profit maximizing condition (selecting its price and output so that its marginal revenue from selling an additional unit brings in just enough to offset its additional cost to produce that unit – if this is not the case, the firm's profits would increase by either increasing or decreasing its production). As a result, the firm should not alter its price (or quantity) next month because otherwise it would not be able to sell the same amount as prior to the rent increase (which presumably was already profit maximizing). In other words, while an increase in the firm's fixed cost will reduce its profits, it will not influence the firm's short run decision regarding its optimal price. However, over time it may choose to move to a smaller storefront or to a less expensive part of the mall, move to a different retail location, or even to close its store if it would no longer be profitable.

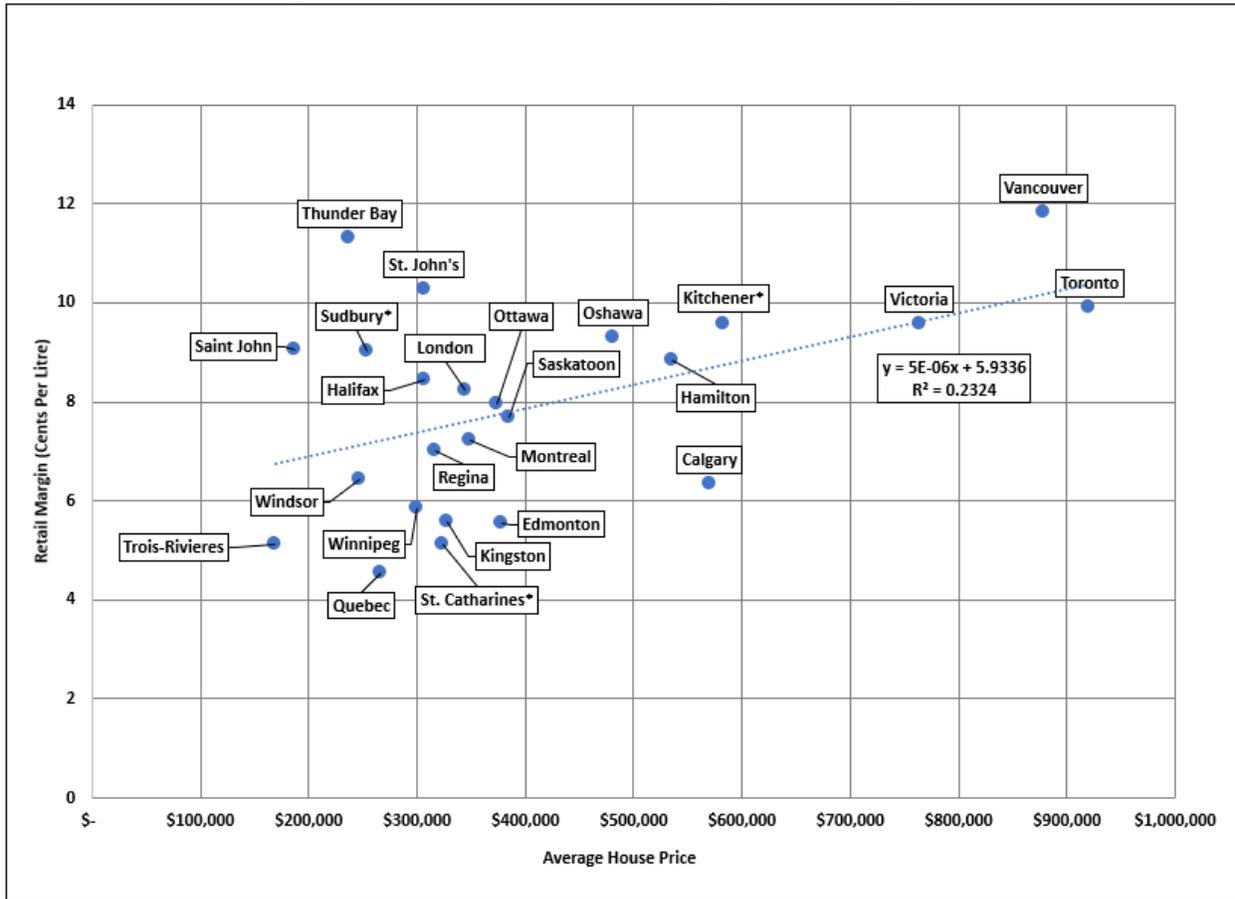
78. Over time, however, a firm can adjust its plant and equipment. A firm active in gasoline and diesel retailing can take actions like adding a new station, closing or selling an existing station, renovating a station, adding a car wash, adding or expanding a convenience store, replacing the canopy or pumps, etc. These all involve investments or disinvestments in a retail location, and when making such decisions, a gasoline and diesel retailer should consider whether the changes will improve the firm's profitability. The opportunity cost of land is a critical component of a decision related to opening a new gas station or closing an existing gas station, and the BCUC Report's discussion makes clear that gasoline and diesel retailers take factors like the cost of land into account when making such decisions.⁸⁹
79. Pricing, therefore, can reflect the opportunity costs of land even if it is not a factor considered when making day-to-day pricing decisions. If the gasoline retailer does not make a sufficient return on its investment – including the opportunity cost of land – it will eventually sell the facility. A sale could be to another gasoline retailer or to someone in a completely different business (*e.g.*, residential or commercial construction). My report cited examples of retail gas stations that have been sold and the land put to alternative, higher value uses. Selling a gas station and putting its site to an alternative use involves the exit of the retail gas station from the market. Selling a facility, however, takes time. As facilities exit the market, remaining gasoline and diesel retailers may – when making day-to-day pricing decisions – increase prices because the facilities that have exited the market no longer place competitive pressure on them. Therefore, even if the effects of opportunity costs are not factored into day-to-day pricing decisions, over time they are reflected in market prices. Detailed opportunity cost estimates provide information on the types of price changes to be expected in the market over time and should be included in the Commission's analysis.
80. Day-to-day price setting and decisions on whether to invest in a market or facility, maintain the firm's position in a market, or divest assets in a market all affect the actual prices achieved in that market and the dynamics of price changes over time. The opportunity cost of land is an important reason why gasoline and diesel have higher prices (net of taxes) and higher retail margins in certain urban environment, such as Vancouver and Toronto, and have lower prices in other area, even if individual firms do not calculate opportunity costs on a regular basis and incorporate these opportunity cost calculations into their actual, regular pricing activities.
81. **Figure 15** provides data on retail margins for gasoline and average house prices for 24 cities across Canada. Average house prices are a proxy for the value of land. **Figure 15** shows that there is a positive relationship between average house prices and retail gasoline margins. Consistent with economic theory, increased average house prices are generally associated with higher gasoline prices.

⁸⁹ BCUC Report, p. 5.

82. The Commission accepts that the opportunity cost of land may have an impact on gasoline prices in some markets but does not accept a methodology to quantify its effect and does not specifically accept that land values have an effect on gasoline and diesel prices in Vancouver. Therefore, instead of drawing conclusions on retail margins, the BCUC Report leaves the retail margin question open.⁹⁰
83. **Figure 15** and especially data for cities like Toronto show that Vancouver and Victoria retail gasoline margins are not somehow unique or different, and the Commission should accept that the opportunity cost of land has significant effects on gasoline and diesel prices in Vancouver, even if it cannot quantify the effects and even if market participants do not take opportunity costs into account when setting prices on a daily basis.
84. The regression model shown in **Figure 15** uses average house prices as the explanatory or independent variable to explain retail gasoline margins, which is the dependent variable. The regression in **Figure 15** only includes average house prices as an explanatory variable; it does not add other information to the model explaining retail margins (*e.g.*, the local cost of living, average gas station volume), and therefore there is unexplained variation in the data. Nevertheless, the point estimate for the coefficient estimating the effect of the average house price on retail margins suggests that the unexplained differential in Vancouver after accounting for only the opportunity cost of land is less than 2 cents per litre (the vertical distance between the Vancouver point and the regression line in **Figure 15**). Some of this differential would be explained by credit card fees. The Victoria point sits right on the regression line, meaning that the opportunity cost of land alone is sufficient to explain the retail margin in that city. The regression coefficient detailed in the model presented in **Figure 15** is statistically significant at the customary 95% level of confidence. The model detailed in **Figure 15** is indicative of the type of analysis that can be done to study the effects of the opportunity cost of land on retail gasoline pricing. Better measures of the value of land may be available for use, and other explanatory variables may be added to the model as well. I would expect these types of changes to improve upon the regression model. Nevertheless, the model shows the importance of including the opportunity cost of land in the Commission's analysis.

⁹⁰ BCUC Report, p. 102 (“**The Panel finds that while the value of land is not a direct driver of prices or margin the opportunity cost related to it might, in certain markets be used to justify a higher retail margin than in other regions with lower land values.** Because of this, the Panel accepts that some level of differential in retail margins between BC and the rest of Canada may be reasonable but cannot be specifically quantified as proposed by Deetken.” Emphasis in original.)

Figure 15
Relationship between Unleaded Retail Margin and Average House Prices



Note: Retail margins are calculated as the unleaded price before tax minus the wholesale price. The period used to take the average of retail margins was from September 1, 2016 to September 20, 2019.

*Retail margins for Sudbury, Kitchener, and St. Catharines from the Kent Data are plotted with the average housing prices in Greater Sudbury, Kitchener-Cambridge-Waterloo, and St. Catharines-Niagara respectively from the cited World Atlas article.

Source: Kent Petroleum Price Data, Kent Group Ltd., available at <https://charting.kentgroupltd.com/>; Bada, Oliver, "Home Prices In Major Canadian Cities," World Atlas, June 11, 2019, available at <https://www.worldatlas.com/articles/average-home-prices-across-canada.html>.