



# 2007-08 GAS PRICE STUDY

## Final Report

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## EXECUTIVE SUMMARY

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Washington state residents, along with the rest of the nation, saw gasoline prices climb dramatically in spring 2007. In response, the Attorney General's Office, Governor's Office and the Department of Community, Trade and Economic Development (CTED) announced in April 2007 they would investigate factors that influence regional prices throughout the state.

The last comprehensive study of Washington gas prices was published by the state Energy Office (now CTED) in July 1991. State leaders decided that new research would provide them with information needed to help the public and policy-makers better understand factors affecting current gasoline prices. This study will be useful in future policy decisions.

### Study Focus

The primary purpose of the investigation and this report is to inform consumers and policy-makers about factors that influence Washington's gasoline prices. In particular, the investigation focused on whether regional price differences can be identified and explained analytically, and if not, whether the differences suggested illegal activity.

The investigation was conducted in two phases. The first phase primarily centered on gathering facts and relevant information about historic and current gasoline prices in Washington. A Phase 1 report was published on August 16, 2007. It describes how gas prices have increased over the years and identifies the different components contributing to that rising price. The report also compares our state's gas prices to those in other states as well as across regions within Washington. It includes information about the state's sources of gasoline, Washington refinery capacity and consumer demand.

The Phase 2 investigation analyzed price data through March 2008. It included additional analysis related to differences in the wholesale cost of gasoline from various supply sources, transportation costs, retailing costs and diesel prices. Phase 2 also addressed anomalies in the data that were identified in Phase 1.

Results from both phases are included in this final report.

To conduct the research, state agencies retained Dr. Keith Leffler, a University of Washington professor and economist with expertise on the state's petroleum industry.

#### ● Price Data

The Attorney General's Office purchased retail and wholesale price data from the Oil Price Information Service (OPIS), for Seattle-Everett-Bellevue, Tacoma, Spokane, Bellingham, Bremerton, Olympia, Vancouver, Yakima, the Tri-Cities, Aberdeen, Clarkston, Ellensburg and Port Angeles. Data were purchased for the period April 2000 through December 17, 2007.<sup>1</sup>

#### ● Stakeholder Discussions

In addition to supervising the gas price data analysis, staff at CTED and the Attorney General's Office met with representatives of refineries, wholesalers and retailers to gather perspective and insight about gas prices.

#### ● Public Comments

The Attorney General's Office asked the public to provide information which might suggest price-fixing or other violations of Washington's consumer protection or antitrust laws. Public forums were held in Bellingham, Spokane and Bellevue. Although many comments were received during the forums and through other communications, none included facts that would implicate illegal activity.

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1 - Additionally, CTED conducted a jobber (independent wholesaler) survey to verify wholesale prices and gather additional information.

## Key Findings

- **This investigation did not uncover any illegal conduct in Washington regarding the pricing of gasoline during the period examined, 2000-2008.**
- **Regional retail price differences are explained in part by differences in wholesale prices and to a larger degree by differences in retail supply costs and retail competition.**

Wholesale price differences across the state are relatively small. On average, the range between the highest and the lowest wholesale prices is 3.4 cents per gallon. The varying costs to supply gasoline to wholesale distribution centers in each region with fuel largely explain the difference in the wholesale prices. These transport costs range from about 1 cent per gallon to Seattle (via pipeline) and 7.8 cents to Moses Lake when trucked from the Puget Sound.

Supply cost from the wholesale terminal to retail station explains significant differences in regional price in Washington state.

The nature and extent of competition at the retail level within a city or limited geographic area is also a major factor explaining the remaining price differences across Washington state. Competition can be particularly influenced by the number of hypermarketeters, which are large retailers such as Costco, Wal-Mart and Safeway, that sell gas in the market area. Other contributing factors include wages paid to station attendants, property values and the number of vehicles per station.

Bellingham was the only city in which prices were not well explained by wholesale price differences, retail supply costs and retail competition factors. Bellingham has below-average wholesale prices and above-average retail prices. Bellingham's consistently higher retail differentials may be due to the proximity to Canada.

- **Gas and diesel prices have become very volatile.** Gas prices have doubled since May 2003. Gas and crude oil prices are at an all-time high nationally and here in Washington. From June 2000 to June 2001, retail gasoline prices varied by only 11 cents. From February 2007 to September 2007, prices varied by 91 cents.

Retail diesel prices are increasing at a faster rate than gasoline. Increases in diesel can be attributed to increased consumption and increasingly stringent emission controls on vehicle diesel fuels that require the refining of more costly low-sulfur content diesel.

- **Recent historic highs are the result of record crude oil prices and increasing worldwide demand for oil products.** Crude oil costs increased by more than 76.5 cents per gallon from December 2003 to May 2007. Since May 2007, the cost of crude oil has risen an additional 93 cents a gallon. On March 13, 2008, Crude oil prices reached an all-time high of more than \$110 per barrel. Meanwhile, the price of gas has risen only 4 cents a gallon since May 2007.

The cost of crude accounted for about 39 percent of the price of a gallon of gas in May 2007, compared to 62 percent in December 2007.

- **Diesel consumption has risen significantly while demand for gasoline has declined slightly.** The amount of gas consumed by Washington drivers decreased by 1 percent between 2003 and 2007. Over the same period, diesel consumption increased by 31 percent. This increased diesel consumption results in part from the large growth in container traffic entering through the ports of Seattle and Tacoma and then being delivered by diesel-fueled semitrailers.

- **Volatility in refining differentials continues.** Refining differentials, defined as the difference between the cost of crude oil and the wholesale price of gasoline, went from a high of \$1.32 in April 2007 to a low of less than 16 cents in December 2007.

The observed increase in the volatility in refining differentials implies that Washington state wholesale gasoline prices have become less dependent on the cost of crude oil. This decreasing dependence is a consequence of the changing nature of the motor fuels situation in Washington, on the West Coast and even nationwide.

- **Refining costs continue to increase.** After accounting for crude oil costs and taxes, only about 67 cents of the current per-gallon price of gasoline remains to compensate refiners for production, transportation and other costs. The refining value of diesel has exceeded that of gas for the first time. Requirements for low-sulfur diesel have contributed to increased production costs.
- **Washington state has the highest gas tax.** Washington's combined state and federal fuel tax is 54.4 cents per gallon, the highest in the nation. Federal tax is 18.4 cents and state tax is 36 cents. Current Washington gasoline prices as of February 9, 2008, are 6th highest in the nation. When local, state and federal taxes are omitted, Washington ranks 24th. Diesel prices in Washington are 15th highest in the nation when taxes are included, and 26th net of tax. Unlike most states, Washington depends almost exclusively on the gas tax, as opposed to general tax revenue, to fund state highway maintenance and construction.
- **Supply constraints are the largest contributor to volatility.** Washington's five major refineries are running at capacity, as are other refineries along the West Coast. Washington refineries produce more motor fuel than is consumed in Washington; they serve Oregon and also supply some gasoline to California.

However, the West Coast refineries combined do not produce enough motor fuel to supply the demand of the region. This lack of adequate U.S. refining capacity has led to substantial increases in the amount of expensive foreign gas imported into our region. The need to import product into the West Coast to balance demand, impacts prices in Washington. As a consequence of the tight overall supply on the West Coast, any glitches in the system can cause significant price spikes. Comments from representatives within the petroleum industry indicate that only two to five days worth of gasoline is available to bridge short-term supply interruptions.

- **The price at which gas is sold at wholesale or retail is market-driven and varies by region.** Representatives of oil companies indicate that fuels are not sold at a "cost plus" price (an amount based on what it costs to refine, transport and market the product plus a percentage for profit). The results of this investigation support that claim and find that factors influencing retail competition affect the local prices.
- **Prices in Eastern Washington cities have been lower than prices in Western Washington cities on average.** CTED's 1991 study found that retail gasoline prices tended to be lower in Seattle than in Eastern Washington. That is no longer the case. Among the cities we studied, the highest prices are now found in Western Washington, with Bellingham, Bellevue and Port Angeles reporting the highest average price in recent years. Spokane prices were approximately 7 cents below the state average in 2007 due to access to multiple sources of gas supply. Among counties, however, there was a lesser discrepancy with roughly equal numbers of counties reporting high prices and low prices among the East and West sides.

## OVERVIEW OF REPORT

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Section 1 updates Washington state retail price information provided in Phase 1 through the end of 2007. Phase 1 focused exclusively on gasoline. Yet, diesel fuel accounts for about 29 percent of motor fuels consumed in the state. Diesel is also used for heating, electrical power generation and many off-road uses.<sup>2</sup> Therefore, section 1 extends the analysis to consider diesel prices.

Section 2 first updates the analysis of the relationship between the wholesale price of gasoline and the price of crude oil, the major cost component of making gasoline. The difference between these two variables (wholesale gasoline price minus per-gallon crude cost) is called the refining differential.<sup>3</sup> The analysis focuses on the increased volatility observed recently in this differential. The record-high differentials in spring 2007 have been reversed as recent crude oil price increases have substantially outpaced gasoline price increases. Section 2 explores, in some detail, the economic reasons for this substantial and recent volatility of the refining differentials for the Puget Sound refineries. This section also addresses the increased independence between changes in the Washington motor fuel prices and changes in the cost of the crude oil that was observed in 2007.

Section 3 documents county- and city-specific retail data for both gasoline and diesel, focusing on the variations in retail motor fuel prices across locations in Washington.

Section 4 examines the regional variations in the wholesale price -- the intermediate step between the refining of crude oil into motor fuels and the supply of product to consumers at the retail level. Generally, the regional variations in wholesale prices are found to be closely related to the variations in the cost of supplying motor fuels to the terminals, though exceptions are noted.

Section 5 explores other economic factors that underlie the regional variations in retail prices, and which are not explained by wholesale price variations. Empirical analysis of the regional price variations was conducted. This was done using the standard statistical methodology of multiple regression analysis. The analysis finds that the nature and extent of competition at the retail level within the city areas is the most important factor lying behind differences in regional prices not explained by wholesale cost and transportation costs differences.

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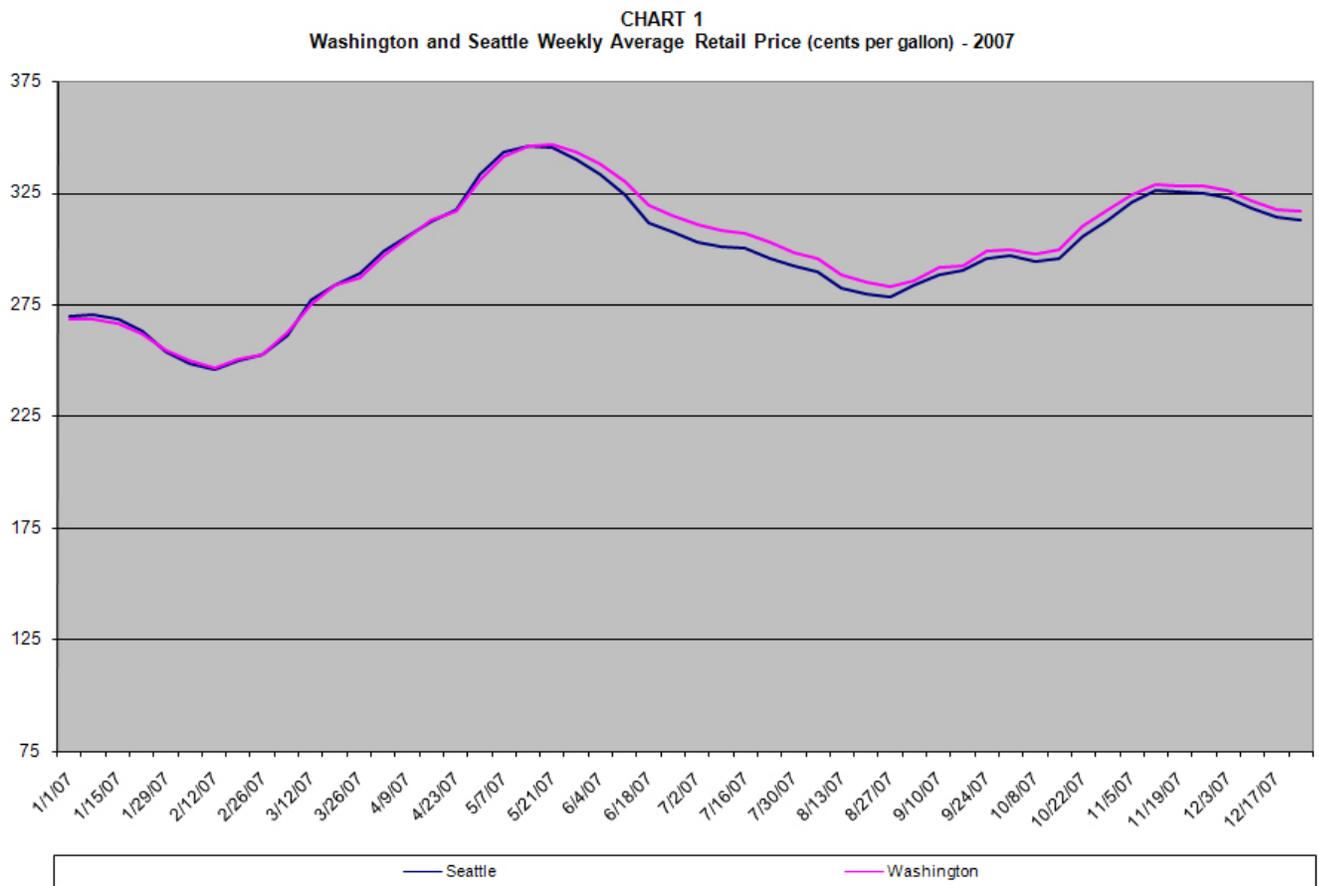
2 - Source: Energy Information Administration (EIA).

3 - Note that during Phase 1 the term "refining margin" was used. Industry representatives expressed concern that the term would erroneously be misinterpreted to mean profit margins. Consequently, this phase of the report uses the term "differential." This differential includes neither the costs of building and operating a refinery nor the costs of shipping crude oil or finished products and, therefore, is not equivalent to a profit margin. Nonetheless, since refining costs (other than crude oil) change only slowly over time, short-term changes in the refining differential will be closely related to changes in the returns to the refineries.

# 1: WASHINGTON STATE MOTOR FUEL PRICE TRENDS

This report begins by examining Washington’s average retail prices. Retail gasoline price data is updated through 2007. Data on the retail diesel prices for 2000 through 2007 are also shown, and comparisons between recent Washington state prices and the other 49 states are presented. Both gasoline and diesel prices began a steady climb in the early spring of 2002. Compared to other states, Washington state average retail gasoline prices are steadily increasing in rank. Retail diesel prices are increasing at a faster rate than gasoline. This increasing diesel price, relative to gasoline, is partly explained by the increase in diesel consumption as compared to gasoline consumption.

**Retail gasoline prices:** Chart 1 shows 2007 weekly average retail gasoline prices for both Seattle and Washington state. As seen, average gasoline prices in Washington declined for a few weeks after July 30 to a summer low of \$2.83 during the week of August 27. Subsequently, prices steadily increased, rising by about 43 cents per gallon to the early December prices.



As analyzed in the initial phase of this report, on July 31, 2007, Washington retail gas prices were on average the 16th highest in the nation. However, Washington has the highest state motor fuel taxes in the nation. Net of taxes, Washington’s gasoline prices ranked 29th of the 50 states.

Gasoline prices throughout the nation have increased since July, but other states have fared better than Washington. Table 1 updates these comparisons with retail price data from February 9, 2008.<sup>4</sup> Column 2 lists the average price per gallon for regular unleaded in Washington and column 3 lists the state ranking.

STATE	Regular Price per Gallon	Fuel Price Ranking	State plus Federal Fuel Tax per Gallon	State Tax Ranking	Additional State Sales Tax per Gallon	Fuel Price Net of Federal, State, and Sales Tax	Fuel Price Ranking Net of Tax
Alabama	\$2.881	40	0.3640	37		\$2.517	27
Alaska	\$3.204	3	0.2640	50		\$2.940	2
Arizona	\$2.878	41	0.3640	37		\$2.514	29
Arkansas	\$2.864	43	0.3990	23		\$2.465	44
California	\$3.125	5	0.3640	37	6%	\$2.574	15
Colorado	\$2.930	29	0.4040	21	3%	\$2.438	48
Connecticut	\$3.169	4	0.4340	11	5%	\$2.577	14
Delaware	\$2.892	37	0.4140	19		\$2.478	40
Florida	\$3.021	12	0.3370	46		\$2.684	4
Georgia	\$2.921	30	0.3360	47	4%	\$2.468	43
Hawaii	\$3.464	1	0.3440	44	4%*	\$2.995	1
Idaho	\$3.015	13	0.4340	11		\$2.581	12
Illinois	\$3.034	10	0.3850	27		\$2.649	6
Indiana	\$2.906	35	0.3640	37	5%*	\$2.415	49
Iowa	\$2.955	28	0.3940	25		\$2.561	19
Kansas	\$2.918	32	0.4240	16		\$2.494	36
Kentucky	\$2.905	36	0.3810	32		\$2.524	26
Louisiana	\$2.891	38	0.3840	28		\$2.507	32
Maine	\$3.062	9	0.4520	10		\$2.610	8
Maryland	\$2.918	32	0.4190	18		\$2.499	34
Massachusetts	\$2.979	23	0.3940	25		\$2.585	11
Michigan	\$2.957	27	0.3740	34	6%	\$2.406	50
Minnesota	\$2.914	34	0.3840	28		\$2.530	25
Mississippi	\$2.862	45	0.3680	36		\$2.494	36
Missouri	\$2.800	50	0.3595	41		\$2.441	47
Montana	\$3.012	15	0.4540	9		\$2.558	20
Nebraska	\$3.014	14	0.4640	7		\$2.550	23
Nevada	\$3.001	19	0.4321	13		\$2.569	18
New Hampshire	\$2.959	26	0.3803	33		\$2.579	13
New Jersey	\$2.826	48	0.3290	48		\$2.497	35
New Mexico	\$2.969	24	0.3728	35		\$2.596	10
New York	\$3.230	2	0.4305	14	4%	\$2.670	5
North Carolina	\$2.964	25	0.4855	6		\$2.479	39
North Dakota	\$3.031	11	0.4140	19		\$2.617	7
Ohio	\$2.920	31	0.4640	7		\$2.456	46
Oklahoma	\$2.863	44	0.3540	43		\$2.509	31
Oregon	\$2.980	22	0.4240	16		\$2.556	22
Pennsylvania	\$3.010	16	0.4960	4		\$2.514	29
Rhode Island	\$3.010	16	0.4940	5		\$2.516	28
South Carolina	\$2.819	49	0.3440	44		\$2.475	41
South Dakota	\$3.004	18	0.4040	21		\$2.600	9
Tennessee	\$2.861	46	0.3980	24		\$2.463	45
Texas	\$2.855	47	0.3840	28		\$2.471	42
Utah	\$2.999	20	0.4290	15		\$2.570	17
Vermont	\$3.069	8	0.3840	28		\$2.685	3
Virginia	\$2.865	42	0.3590	42		\$2.506	33
<b>Washington</b>	<b>\$3.077</b>	<b>6</b>	<b>0.5440</b>	<b>1</b>		<b>\$2.533</b>	<b>24</b>
West Virginia	\$3.071	7	0.4990	3		\$2.572	16
Wisconsin	\$2.995	21	0.5130	2		\$2.482	38
Wyoming	\$2.882	39	0.3240	49		\$2.558	20

\*Excludes federal and state tax.

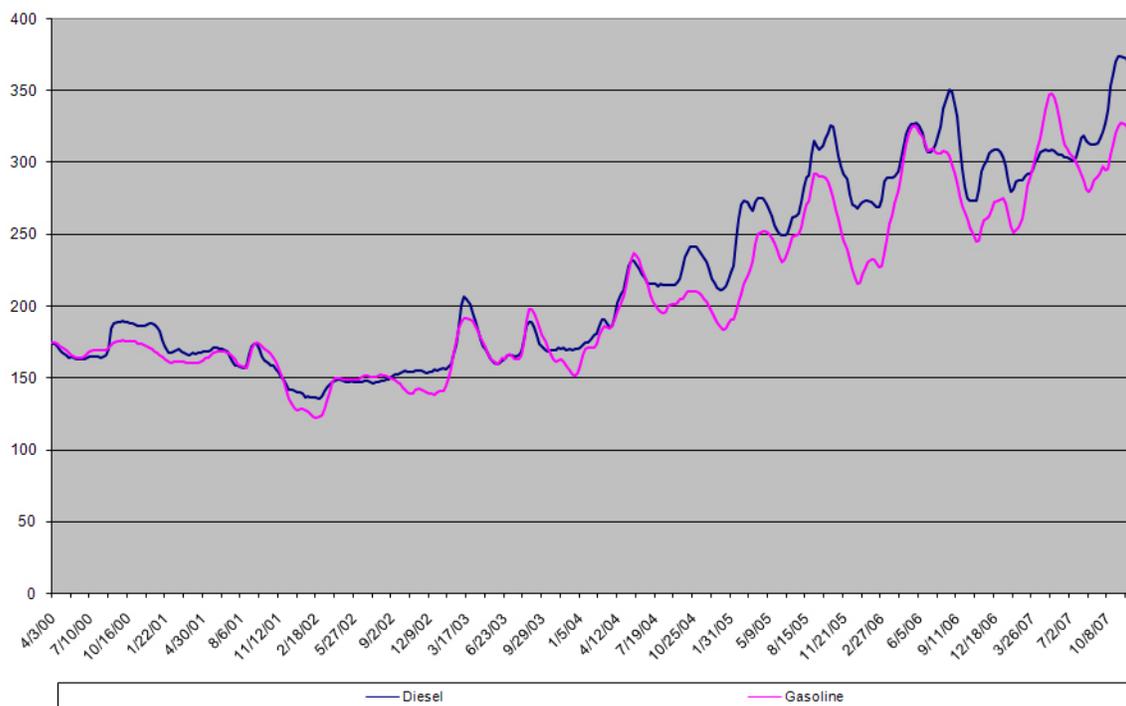
4 - The data are from <http://www.fuelgaugereport.com/>. The data on this Web site are supplied by OPIS.

On February 9, 2007, Washington retail gas prices were on average 6th highest in the nation. Column 4 lists the total taxes per gallon for each state followed by the ranking in column 5.<sup>5</sup> Column 7 shows the state retail prices net of taxes while column 8 provides the price rankings net of taxes. Net of taxes, Washington had the 24th highest average prices for regular unleaded gasoline on this date – up five places since the July comparison.

Washington State Ranking Average Retail Price – Regular Unleaded		
DATE	w/ Tax	w/o Tax
7/31/07	16 <sup>th</sup>	29 <sup>th</sup>
2/9/08	6 <sup>th</sup>	24 <sup>th</sup>

**Retail diesel prices:** Chart 2 shows average retail prices for diesel and gasoline in Seattle from May 2000 through December 2007.<sup>6</sup> Diesel prices increased in the same general trend as gasoline prices. The correlation coefficient between the weekly gasoline and diesel prices is .968, indicating the variations in their price series are very close. In other words, their respective prices go up and down at about the same time and about the same amount.<sup>7</sup> As shown, retail diesel prices are generally higher than retail gasoline prices; though for a period in 2001, the gap between diesel and gasoline prices was quite low with the two fuels being identically priced during the week of September 10, 2001. Since that time, the price gap between the retail diesel price and the retail gasoline price has generally widened. The largest price gap occurred during the week of February 28, 2005, when the retail diesel price was 61.6 cents per gallon greater than the retail gasoline price.

CHART 2  
Seattle Weekly Retail Diesel and Gasoline Prices (cents per gallon) - 2000-2007



5 - mentioned in Phase 1, the federal motor fuel tax is 18.4¢ per gallon.

6 - EIA does not provide Washington state average diesel data, thus Seattle is used as proxy. As shown in Chart 1 for gasoline, Seattle is representative of the state average prices.

7 - A correlation is a statistical formula used to determine the strength and direction of a linear relationship between two variables. The value of the correlation coefficient indicates that strength and direction of any relationship. A coefficient of 1.00 indicates a perfect positive relationship – as one variable increases, the other increases by given percent of the first change. A coefficient of -1.00 indicates a perfectly negative relationship. Correlations are used here to determine the strength of the relationships between various price series.

Table 2 compares the average Washington state retail diesel price to the average retail diesel price for each of the other 49 states on February 9, 2008.<sup>8</sup> Washington's retail diesel ranking on this date was 15th highest in the nation at \$3.47 per gallon. Net of taxes, Washington drops 12 spots to 26th at \$2.87 per gallon for diesel.

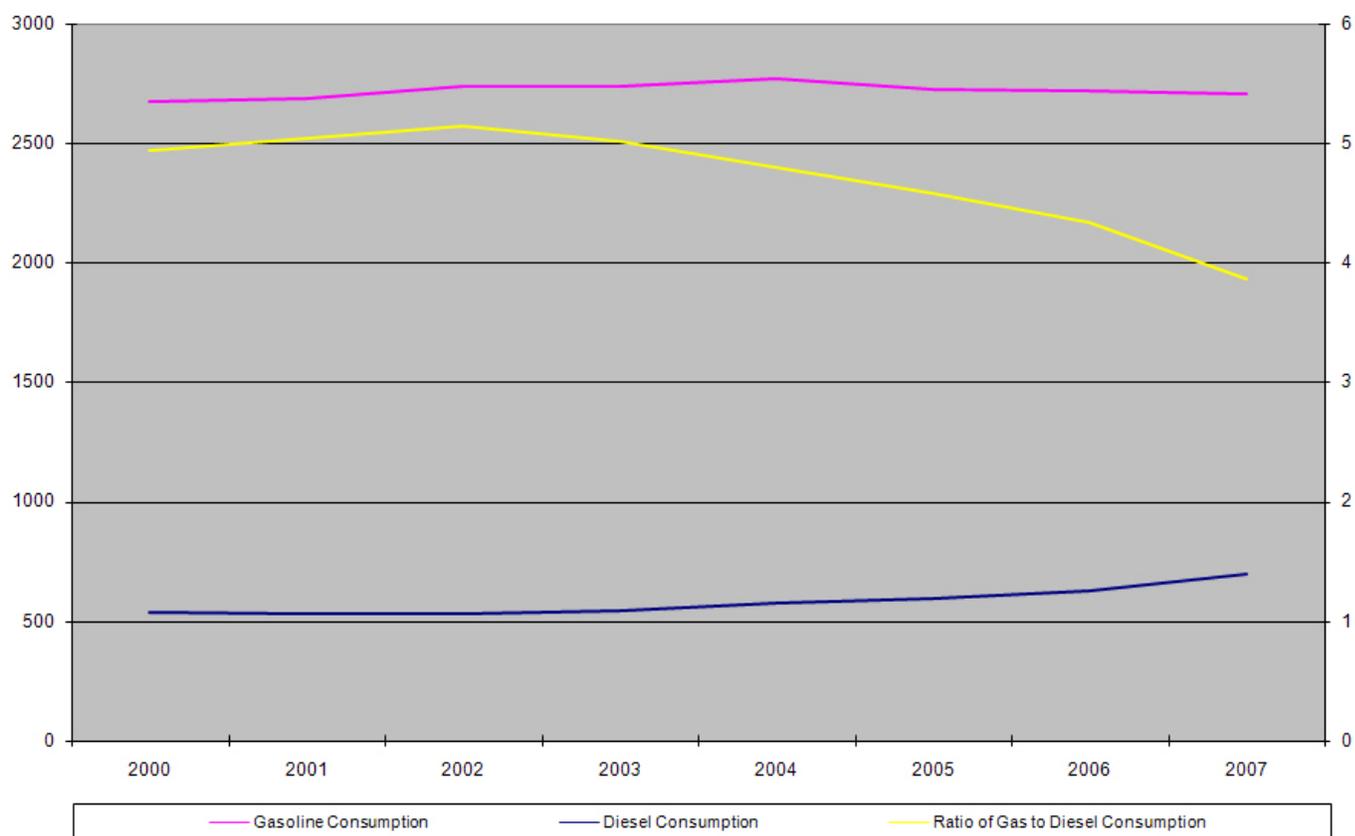
	Diesel Price per Gallon	Diesel Price Ranking	State Diesel Tax per Gallon	State Tax Ranking	Federal Diesel Tax per Gallon	Additional Sales Tax per Gallon	Fuel Price Net of Federal, State and Sales Tax	Diesel Price Ranking Net of Tax
Alabama	\$3.270	43	0.2100	27	0.244		\$2.816	42
Alaska	\$3.509	9	0.0800	49	0.244		\$3.185	2
Arizona	\$3.358	29	0.2600	12	0.244		\$2.854	30
Arkansas	\$3.254	45	0.2250	22	0.244		\$2.785	48
California	\$3.543	7	0.1800	35	0.244	6%	\$2.906	19
Colorado	\$3.376	25	0.2050	30	0.244	3%	\$2.826	39
Connecticut	\$3.570	5	0.2600	12	0.244	5%	\$2.888	22
Delaware	\$3.450	17	0.2200	24	0.244		\$2.986	13
Florida	\$3.384	23	0.1530	44	0.244		\$2.987	12
Georgia	\$3.330	34	0.0750	50	0.244	4%	\$2.878	24
Hawaii	\$3.893	1	0.1600	40	0.244	4%*	\$3.349	1
Idaho	\$3.382	24	0.2500	16	0.244		\$2.888	22
Illinois	\$3.477	14	0.2150	26	0.244		\$3.018	9
Indiana	\$3.369	26	0.1600	40	0.244	5%*	\$2.817	40
Iowa	\$3.330	34	0.2250	22	0.244		\$2.861	29
Kansas	\$3.320	37	0.2600	12	0.244		\$2.816	42
Kentucky	\$3.258	44	0.1670	39	0.244		\$2.847	31
Louisiana	\$3.279	41	0.2000	31	0.244		\$2.835	35
Maine	\$3.603	3	0.2790	8	0.244		\$3.080	4
Maryland	\$3.410	19	0.2425	18	0.244		\$2.924	18
Massachusetts	\$3.498	10	0.2100	27	0.244		\$3.044	8
Michigan	\$3.416	18	0.1500	45	0.244	6%	\$2.817	40
Minnesota	\$3.388	21	0.2000	31	0.244		\$2.944	15
Mississippi	\$3.203	48	0.1840	34	0.244		\$2.775	50
Missouri	\$3.197	49	0.1700	37	0.244		\$2.783	49
Montana	\$3.365	27	0.2775	9	0.244		\$2.844	32
Nebraska	\$3.326	36	0.2710	10	0.244		\$2.811	45
Nevada	\$3.352	30	0.2700	11	0.244		\$2.838	34
New Hampshire	\$3.490	12	0.1800	35	0.244		\$3.066	5
New Jersey	\$3.317	38	0.1350	47	0.244		\$2.938	16
New Mexico	\$3.360	28	0.2100	27	0.244		\$2.906	19
New York	\$3.676	2	0.2285	21	0.244	4%	\$3.056	6
North Carolina	\$3.343	32	0.3015	5	0.244		\$2.798	47
North Dakota	\$3.529	8	0.2300	20	0.244		\$3.055	7
Ohio	\$3.386	22	0.2800	7	0.244		\$2.862	28
Oklahoma	\$3.182	50	0.1300	48	0.244		\$2.808	46
Oregon	\$3.317	38	0.2400	19	0.244		\$2.833	37
Pennsylvania	\$3.494	11	0.3810	1	0.244		\$2.869	25
Rhode Island	\$3.552	6	0.3000	6	0.244		\$3.008	10
South Carolina	\$3.218	47	0.1600	40	0.244		\$2.814	44
South Dakota	\$3.457	16	0.2200	24	0.244		\$2.993	11
Tennessee	\$3.248	46	0.1700	37	0.244		\$2.834	36
Texas	\$3.271	42	0.2000	31	0.244		\$2.827	38
Utah	\$3.352	30	0.2450	17	0.244		\$2.863	27
Vermont	\$3.590	4	0.2600	12	0.244		\$3.086	3
Virginia	\$3.304	40	0.1600	40	0.244		\$2.900	21
<b>Washington</b>	<b>\$3.469</b>	<b>15</b>	<b>0.3600</b>	<b>2</b>	<b>0.244</b>		<b>\$2.865</b>	<b>26</b>
West Virginia	\$3.486	13	0.3150	3	0.244		\$2.927	17
Wisconsin	\$3.393	20	0.3090	4	0.244		\$2.840	33
Wyoming	\$3.340	33	0.1400	46	0.244		\$2.956	14

\*Excludes Federal and State Tax

8 - The data are from <http://www.fuelgaugereport.com/>.

Economic factors lie behind the recent increase in the relative price of diesel compared to gasoline fuels in Washington. Chart 3 shows the consumption of vehicle gasoline and diesel fuels in Washington from 2000 through 2007. As is apparent in Chart 3, diesel consumption in Washington has steadily increased since 2003, with a 31 percent increase from 2003 to 2007. Over the same period, state gasoline consumption has fallen by more than 1 percent. As shown by the "ratio of gas to diesel consumption" line in Chart 3, the relative consumption of diesel has increased from 20 percent in 2003 to 25 percent by 2007.<sup>9</sup> This increased diesel consumption results in part from the large growth in container traffic coming through the ports of Seattle and Tacoma and then delivered by diesel-fueled tractor-trailers. An additional factor explaining the relative increase in diesel prices relates to increasingly stringent emission controls on vehicle diesel fuels that require the refining of more costly low-sulfur content diesel. These rules took effect in October 2006.<sup>10</sup>

**CHART 3**  
Annual Washington Gasoline and Diesel Consumption (million gallons) - 2000-2007



9 - This means that in 2003, the amount of diesel consumed annually was 20% the amount of gasoline consumed. By 2007, diesel consumption was 25% the amount of gasoline consumed.

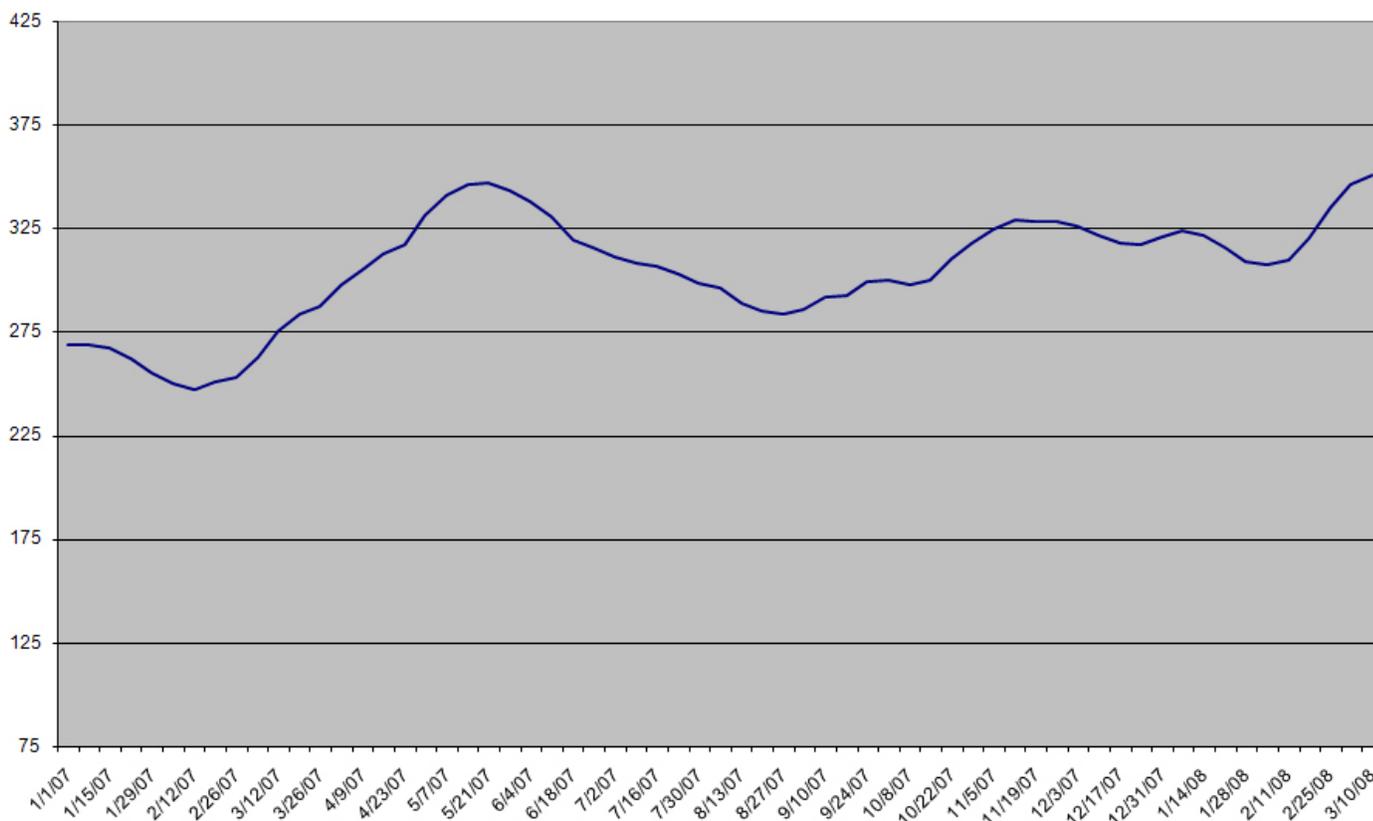
10 - U.S. refineries were built to optimize what was the most valuable and significant output -- gasoline. Recently, however, the refinery value of diesel fuel and its closely related products, jet fuel and heating oil, have exceeded that of gasoline.

**Taxes:** From 2000 through 2007, Washington has assessed the same state tax rate for both gasoline and diesel. Since 2000, taxes for both products have increased by 13 cents per gallon to their current amount of 36 cents per gallon. All increases occurred at the same time for both gasoline and diesel and thus are not responsible for any relative price changes between the two. The federal tax for both gasoline and diesel remained stable during the entire period; however, the federal diesel tax is 6 cents per gallon more than the federal gasoline tax.

**Volatility:** As mentioned, Chart 2 shows a general and substantial rise in the prices of both gasoline and diesel beginning in the spring of 2002. In addition, it is evident from Chart 2 that motor fuel prices have become increasingly volatile. For example, in the three months from February 2007 to May 2007, the state average gasoline price rose by 91 cents per gallon. In the next three months it fell by 64 cents. In comparison, during the year from June 2000 to June 2001, the gasoline price changed by only 11 cents per gallon.

In Chart 4, the focus is on recent price trends. This chart shows the state average retail gasoline price from the first week in 2007 through the week of March 10, 2008.<sup>11</sup> As seen, gasoline prices have steadily increased since early December and have reached all-time highs as this report is published. The next section of this report explores the cause of these record-high retail prices and examines the apparent increased volatility of gasoline motor fuel prices.

CHART 4  
Washington State Weekly Average Retail Gasoline Price (cents per gallon)  
January 2007 - March 2008

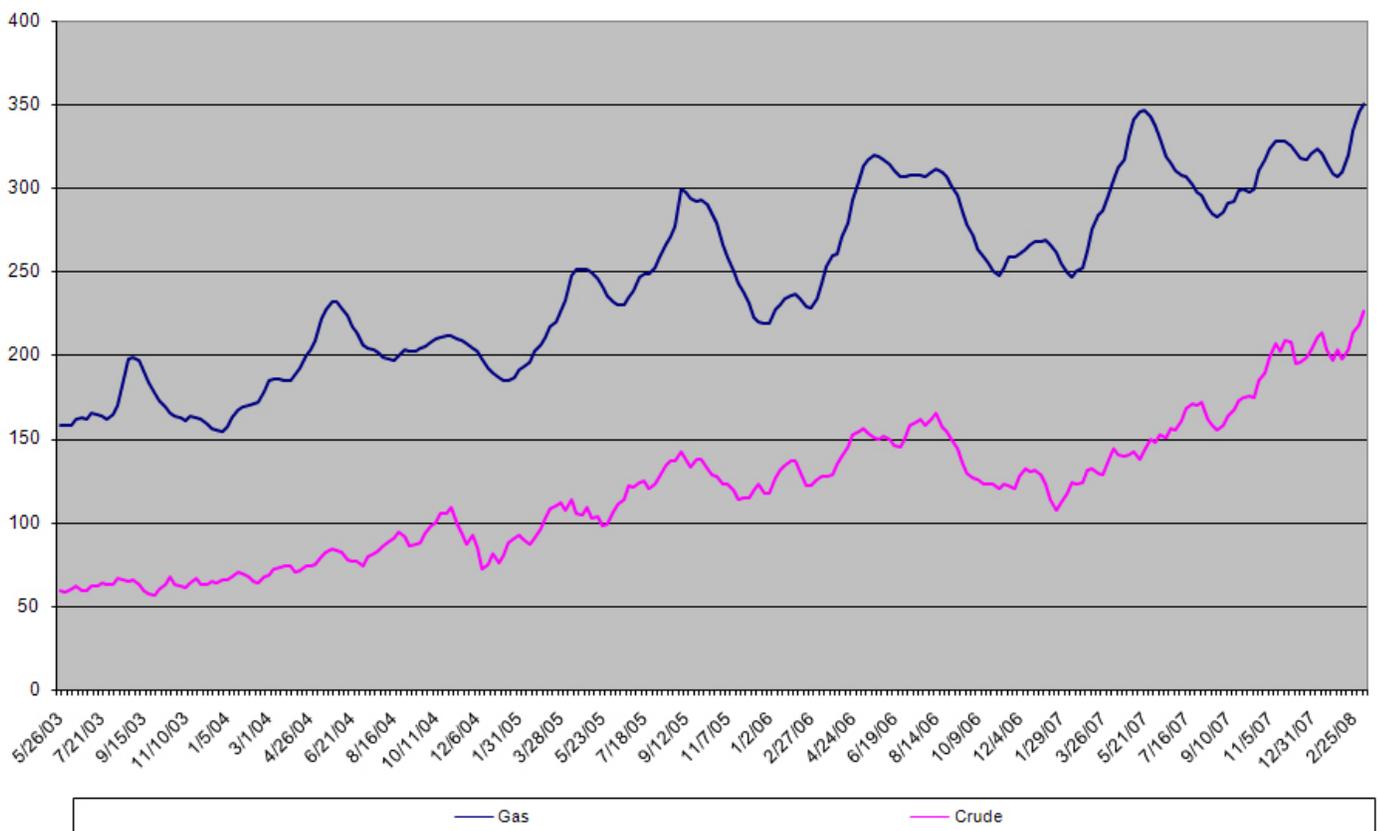


11 -OPIS is the major source for the data in this report. However, that data is only available to us through 2007. Chart 4 uses EIA as an alternative source. EIA retail price data are available only for gasoline as a Washington state average and for Seattle. Retail diesel prices are not available from EIA for the state or for Seattle.

## 2: THE INCREASED VOLATILITY OF WASHINGTON GASOLINE PRICES

Chart 5 shows the Washington average retail gasoline price and the cost of crude oil for the period May 2003 through March 10, 2008.<sup>12</sup> In addition to the generally rapid increase in retail prices, which have more than doubled since May 2003, there is also a striking volatility in gasoline prices in recent years. Of course, during this same period, crude oil has also increased substantially. The cost of crude, the major component of gasoline, has nearly quadrupled since May 2003. This section investigates the extent to which the increased costs of crude oil and changes in the other components of the retail gasoline prices lie behind both the increased volatility and the record-high gasoline prices.

CHART 5  
Washington State Weekly Average Retail Price and Crude Cost (cents per gallon)  
May 2003 - March 2008



12 - Source is EIA.

The Phase 1 report presented the components of the state average gasoline price for the week of May 21, 2007 which was the week with the highest retail prices at that time.<sup>13</sup> Chart 6 shows this component breakdown. As seen, crude oil cost was the major component of the retail price, accounting for 39 percent. The refinery differential, which is defined as the difference between the wholesale price of gasoline and the per-gallon cost of crude oil, was the next largest component at 36 percent, with combined state and federal taxes third, at 15 percent. Chart 7 shows the same information for the average state price during the week of December 10, 2007, which was the week when the recent surge in prices began. The crude oil cost component increased in importance for that week, accounting for about 62 percent of the retail price. However, the refining differential decreased substantially from \$1.24 per gallon for the week of May 21, 2007 to 32 cents per gallon for the week of December 10, 2007. The refining differential, which accounted for 36 percent of the retail price in May 2007, only accounted for 10 percent during the week of December 10, 2007. Chart 8 shows the component breakdown again for the week of February 25, 2008. As shown, the crude cost component continues to increase in importance, rising 3 percent from December 2007 to account for 65 percent of the February 25, 2008 retail price. The refining differential likewise rose 3 percent in importance to account for 13 percent of the total retail average price of gasoline for the week of February 25, 2008. The retail differential has absorbed most of the impact from the rise in both the crude cost and refining differential components, dropping 5 percent in importance from 9 percent for the week of December 10, 2007 to 4 percent for the week of February 25, 2008. The other components of the state average retail prices have remained relatively stable.

CHART 6  
Price Components of Washington State Average Retail Gasoline Price (cents per gallon)  
Week of May 21, 2007 - \$3.46 per gallon

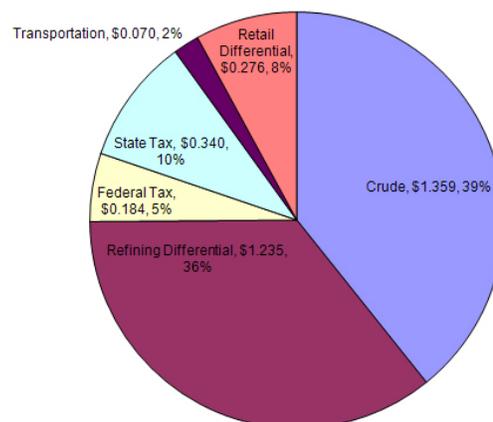


CHART 7  
Price Components of Washington State Average Retail Gasoline Price (cents per gallon)  
Week of December 10, 2007 - \$3.22 per gallon

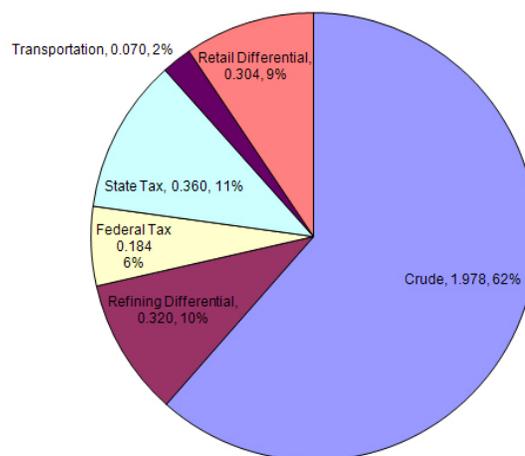
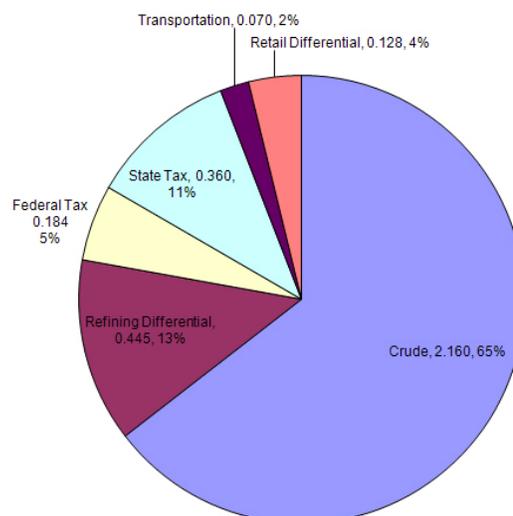


CHART 8  
Price Components of Washington State Average Retail Gasoline Price (cents per gallon)  
Week of February 25, 2008 - \$3.35 per gallon



13 - Since the Phase 1 publication, new record-highs have been set.

Table 3 extends the comparisons above to account for the current record-high gasoline prices of the week of March 10, 2008. This table compares the retail price, crude oil cost, tax and the overall combined refining and retailing differential for the weeks of May 21, 2007, December 10, 2007, and March 10, 2008.<sup>14</sup> As shown in the table, crude oil costs have increased by more than 93 cents per gallon since May 2007. However, the average retail price has risen by only 4 cents per gallon over the period since the high retail price set during the week of May 21, 2007 to the retail price for the week of March 10, 2008. Most of the increase in crude costs has been offset by reductions in the overall margins earned in the downstream refining, wholesaling and retailing segments of the industry. While the average price of gasoline is at a record high, after accounting for crude oil costs and taxes, only 67 cents of the per-gallon price remains to compensate refiners for transporting crude oil to the refineries, refining crude oil into gasoline, holding inventories, transporting gasoline to retail stations, and for the costs of the land and labor of retailing. In this regard, these record-high prices are not surprising and are well explained simply by the associated costs.<sup>15</sup>

	RETAIL GASOLINE	CRUDE	TAX	GROSS DIFFERENTIAL
May 21, 2007	346.4	135.9	52.4	158.1
December 10, 2007	321.6	197.8	54.4	69.4
March 10, 2008	350.4	229.2	54.4	66.8

The remainder of this section of the report delves in more detail into the economic factors underlying the high gasoline prices and the increasing volatility of gasoline prices.

**Refining differentials:** From May 2003 through December 2006, the difference between the cost of crude oil and the wholesale price of gasoline in Washington averaged 55.3 cents per gallon. However, in 2007 the average refining differential was 70.8 cents - more than 15 cents per gallon above the prior 3 1/2-year average.

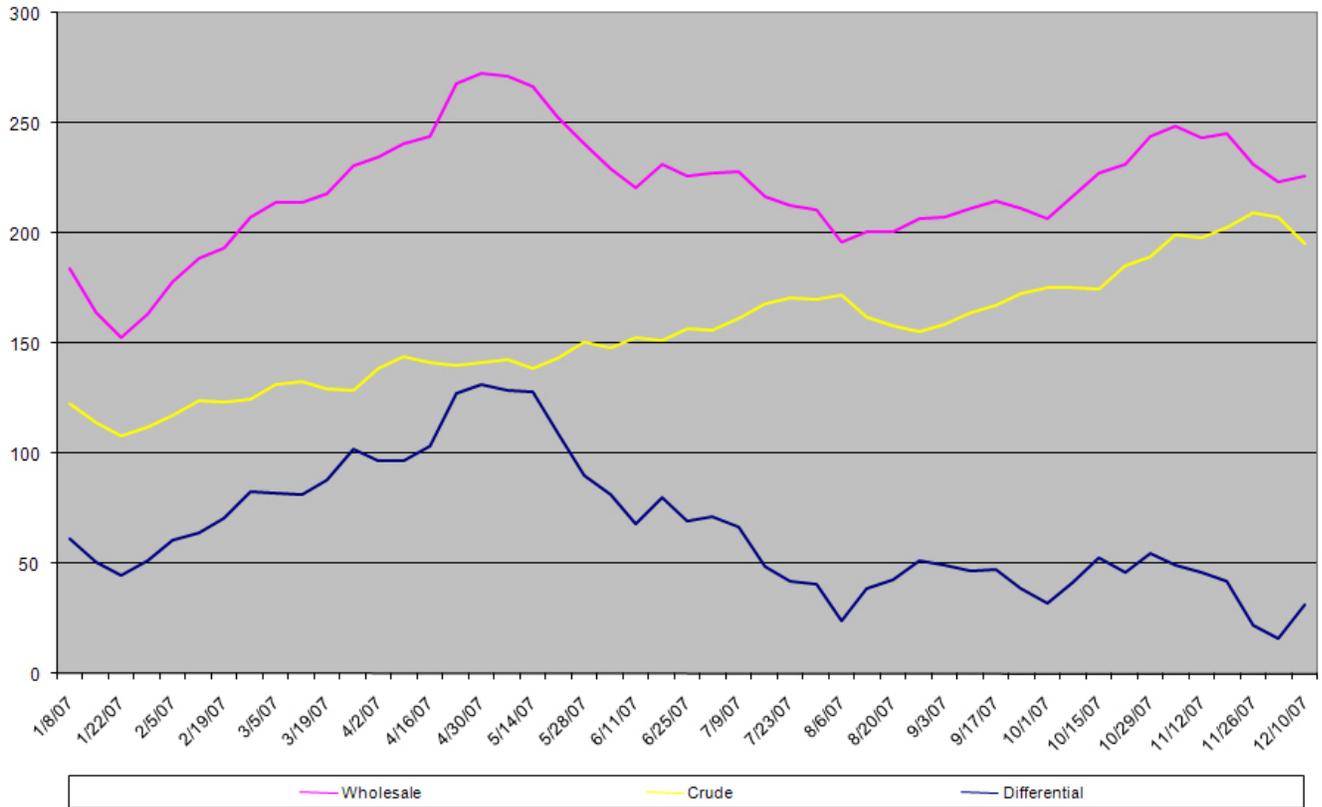
This volatility is apparent in Chart 9 which shows the weekly average wholesale price of gasoline, the weekly average cost of crude oil in 2007, and the difference - what is referred to in this report as the refining differential.<sup>16</sup> As noted above, on May 21, 2007, the gross refinery differential was \$1.24 per gallon, accounting for 36 percent of the retail price. During the week of April 30, with retail prices lower than the record-high May price and crude oil costs down as well, the refinery differential reached its

14 - Wholesale price data are not available yet for the week of March 10, 2008. The table therefore focuses on the difference between the retail (rather than the wholesale) gasoline price net of taxes and the cost of crude oil.

15 - It is also important to note that refiners manufacture other products from the crude oil as well.

16 - The wholesale price of gasoline is the rack price at the terminal closest to the Puget Sound refineries (Anacortes.) Sources: Retail - [http://tonto.eia.doe.gov/dnav/pet/pet\\_pri\\_gnd\\_dcus\\_nus\\_w.htm](http://tonto.eia.doe.gov/dnav/pet/pet_pri_gnd_dcus_nus_w.htm); Wholesale - OPIS (Anacortes); Crude - [http://tonto.eia.doe.gov/dnav/pet/pet\\_pri\\_wco\\_k\\_w.htm](http://tonto.eia.doe.gov/dnav/pet/pet_pri_wco_k_w.htm).

CHART 9  
Weekly Washington State Average Wholesale Gas Price, Crude Cost, and Refining Differential (cpg) - 2007



peak of \$1.32 per gallon and accounted for nearly 40 percent of the retail price. However, since spring 2007, refinery differentials have rapidly declined. For two weeks in October, the differentials were approximately 30 cents and the differential for the week of December 3 was less than 16 cents. Aside from these three weeks in 2007, differentials have not been as low as the 30-cent range since early 2006. These low refining differentials have occurred in the face of generally increasing costs of refining motor fuels.

The observed increase in the volatility in the refining differentials implies Washington state wholesale gasoline prices have become less dependent on the cost of crude oil. This decreased dependence is a consequence of the changing nature of the motor fuels situation in Washington, on the West Coast and even nationwide.

Washington state refineries produce more gasoline than our residents consume. As shown in Table 4, this is also true for diesel fuel.<sup>17</sup> The Washington refineries, however, also supply much of the motor fuels consumed in Western Oregon, with that supply supplemented by product shipped into Portland from both California and foreign refineries.

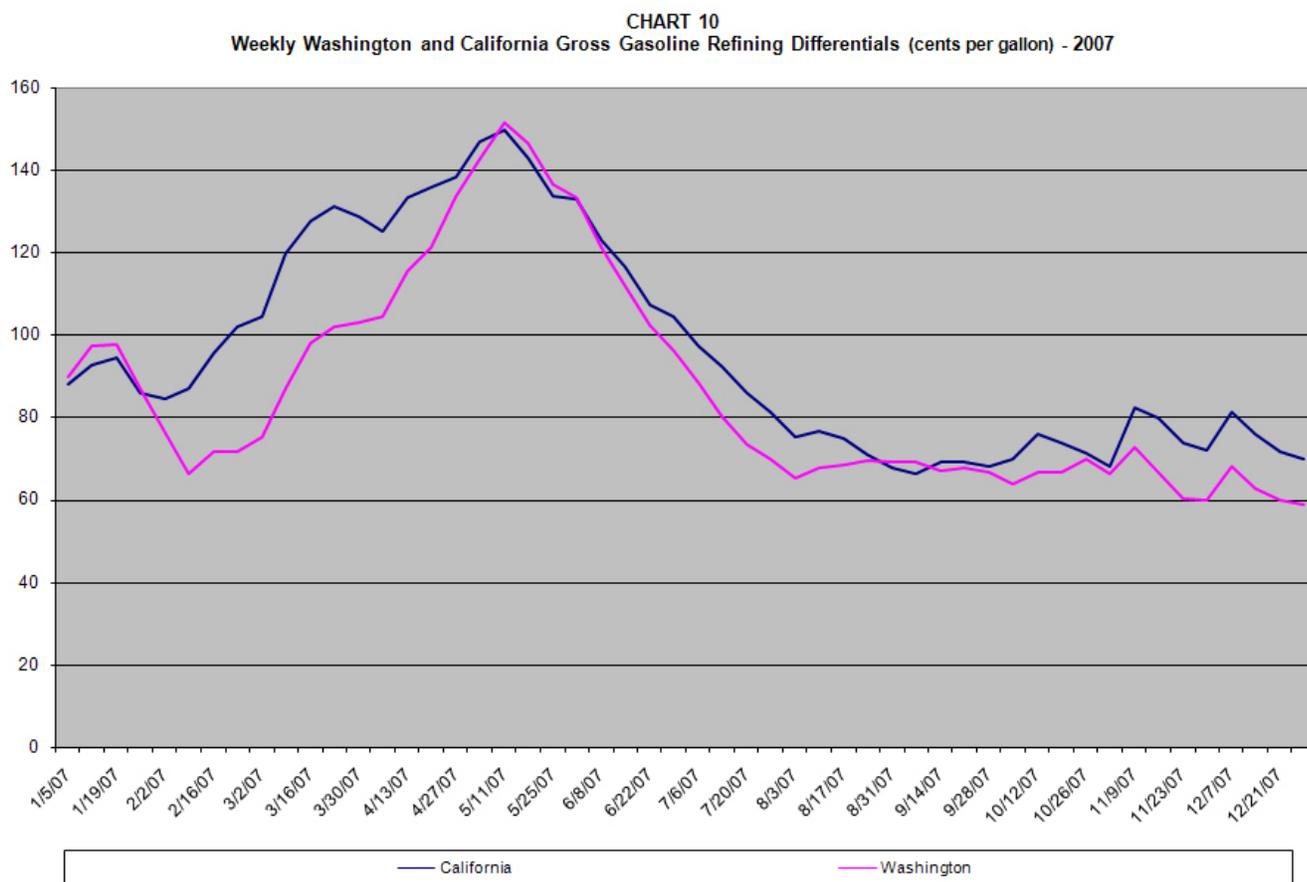
**TABLE 4**  
**Annual Average Diesel Consumption and Total Refining Capacity in Washington**

YEAR	Consumption - Barrels per Day		Refining Capacity - Barrels per Day	
	Washington	Change	Washington	Change
2000	58,115		600,720	
2001	62,662	7%	609,080	1%
2002	64,518	3%	618,350	2%
2003	58,185	-11%	621,350	0%
2004	59,084	2%	621,350	0%
2005	62,486	5%	616,150	-1%
2006	65,942	5%	623,850	1%
2007*	67,453	2%	623,850	0%
* Jan - Nov				

17 - Note that the refining capacity is for all products. On average, about 24 percent refinery yield is distillate fuels. (Source: EIA Production PADDV Percent).

In addition, some Washington refineries can also supply gasoline to California when it is available and when prices in California justify the shipments.<sup>18</sup>

As a consequence of the inter-dependence in refinery supply of product between Washington and California, prices in the West Coast region are highly related. This inter-dependence of the West Coast states for adequate supply is shown by Chart 10. This chart shows the overall gross crude oil to retail price differentials from gasoline sales in Washington and those in California.<sup>19</sup> As shown, both of these differentials generally move closely together. The reason is simply that as prices rise in one area compared to another, movement of motor fuels within the West Coast will be impacted with product tending to move from lower priced areas to the higher priced areas because it is profitable to do so.

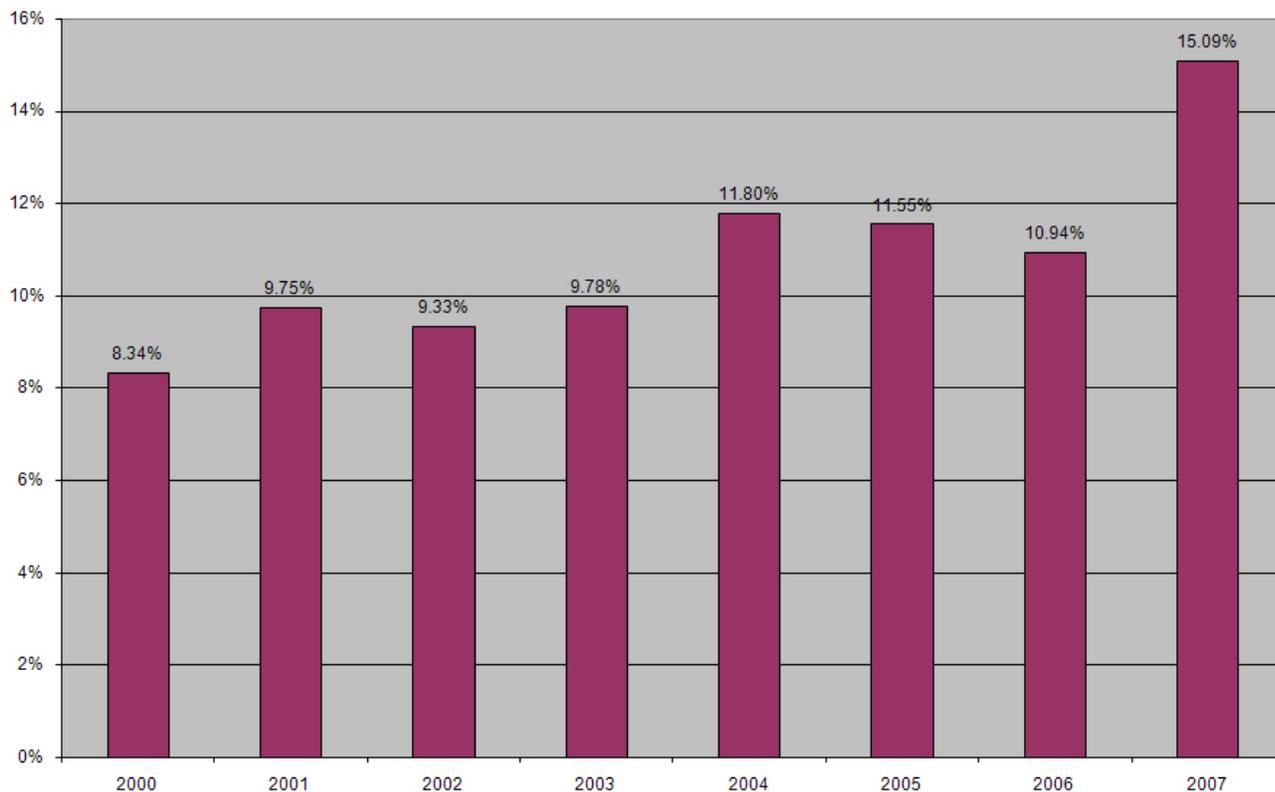


18 - The gasoline supplied to California by the Washington refineries is generally gasoline that meets the California Air Resources Board environmental standards (CARB gas) while the product coming from California to Portland is conventional gasoline.

19 - These differentials are the difference between the retail gasoline price net of taxes and the cost of crude oil.

**Sources of Supply:** As mentioned, the Washington refineries produce more motor fuel than is consumed in Washington. However, all the West Coast refineries combined do not produce enough motor fuels to supply the demand of the West Coast region as a whole. This, of course, implies that gasoline must be, and is, imported into the West Coast region. Chart 11 shows the annual imports of gasoline into PADD V<sup>20</sup> for 2000 through 2007.<sup>21</sup> As shown, gasoline imported from out of the area has increased substantially beginning in 2004 (which coincides with the banning of the use of the gasoline additive MTBE in California and Washington, two of the most significant states in PADD V). In 2007, total imports into PADD V accounted for 14.7 percent of gasoline consumed in PADD V.

CHART 11  
Annual Gasoline Imports into PADD V as a Percent of Consumption - 2000-2007



The need to import product into the West Coast to balance demand will have impacts on prices in Washington. When West Coast regional supply falls short of demand, the price will rise in the region where the shortfall first occurs. As that price rises, Washington prices will also be impacted because the Washington refiners will have an incentive to ship product to the high-price region to “arbitrage” any price differences.<sup>22</sup>

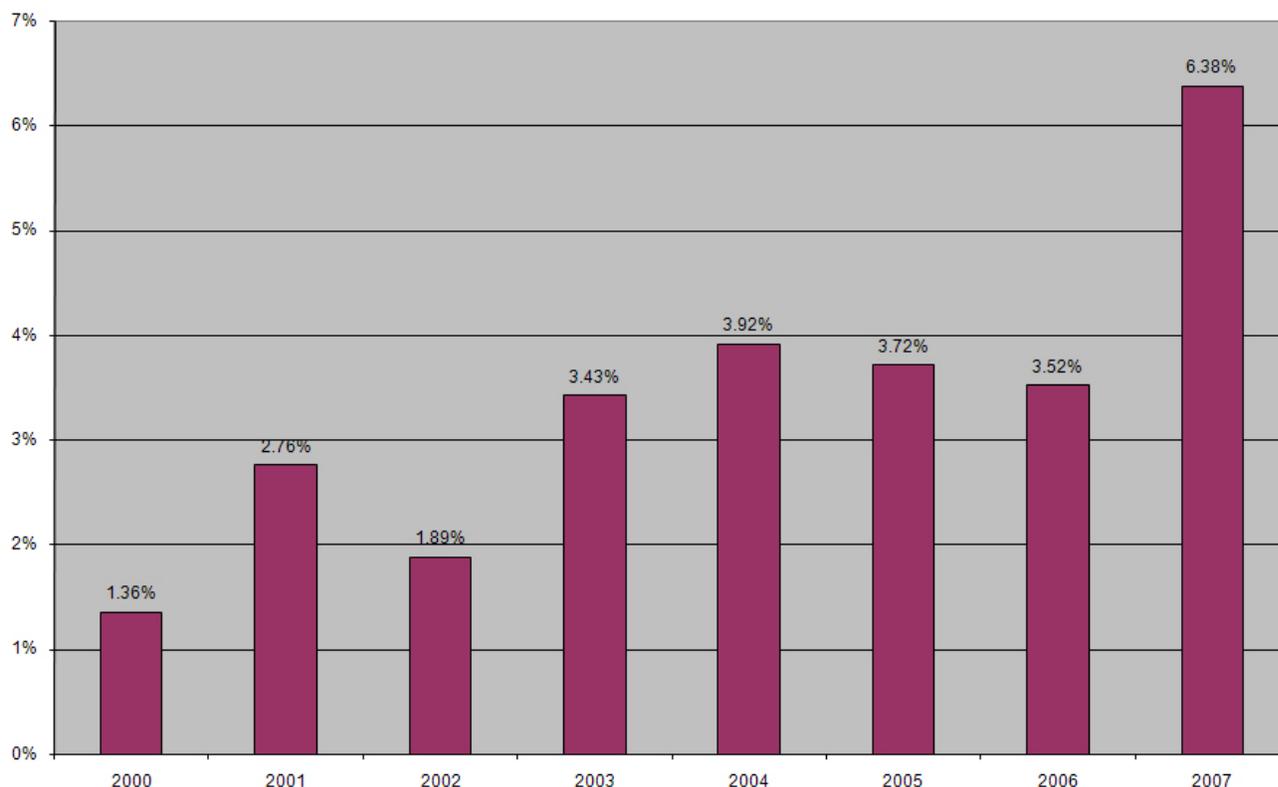
20 -PADD stands for Petroleum Administration for Defense District. PADDIII (Gulf Coast) consists of Alabama, Arkansas, Louisiana, Mississippi, New Mexico and Texas. PADDIV (Rocky Mountain) consists of Colorado, Idaho, Montana, Utah and Wyoming. PADDV (West Coast) consists of Alaska, Arizona, California, Hawaii, Nevada, Oregon and Washington. PADDV exchanges some motor fuels with PADDs III and IV but not with I or II.

21 - This data is available only at the PADD level. California accounts for 70 percent of gasoline consumption in PADD V in 2006, followed by Arizona (11 percent), Washington (10 percent), Oregon (4 percent), Hawaii (3 percent), Alaska and Nevada (1 percent).

22 - Some of this reduced supply to Washington can be offset with increased shipments into Eastern Washington from Montana refineries via the Yellowstone pipeline and from Salt Lake City into Pasco via the Chevron Pipeline (if pipeline capacity is available).

As the demand for motor fuels has grown throughout the United States, refining capacity increases have not kept pace. This reduces the availability of out-of-the-area domestic motor fuels to balance the West Coast regional demand. Consequently, for the West Coast region as a whole, foreign produced motor fuels are increasingly used to supplement domestic supply. Chart 12 shows the annual foreign imports of gasoline into PADD V, for 2000 through 2007. The striking fact from this chart is the increased reliance on foreign gasoline in 2007. The major foreign suppliers in 2007 included China/Taiwan, Saudi Arabia, South Korea, and Europe. Like out-of-area domestic suppliers, foreign refiners will be economically motivated to supply motor fuels to the West Coast only if the price is sufficiently high to compensate for the costs of such supply.<sup>23</sup>

CHART 12  
Annual Foreign Gasoline Imports into PADD V as a Percent of Consumption - 2000-2007



The high foreign motor fuel imports in 2007 were the result of special circumstances. In spring 2007, an unplanned outage occurred at Chevron’s refinery in Richmond, Calif.<sup>23</sup> that resulted in a reduction of supply in Northern California and led to significant price increases. In response, motor fuels shipments from California to Portland were curtailed. Suppliers in neighboring regions, including Washington, increased shipments to Northern California. Gasoline prices then rose throughout the West Coast region, including Washington. These high prices would then motivate suppliers from outside the region to consider supplying product.

23 - It is important to note that while the trend is indeed an increasing reliance on foreign imports, the significant increase in foreign imports into PADD V between 2006 and 2007 does not necessarily indicate such a high reliance in the future, absent unexpected refinery shutdowns.

24 - Chevron’s Richmond, CA refinery had a fire that caused a significant and unplanned outage – accounting for about half of the PADD V off-line capacity for the year. <http://tonto.eia.doe.gov/oog/info/twip/twiparch/080221/twipprint.html>.

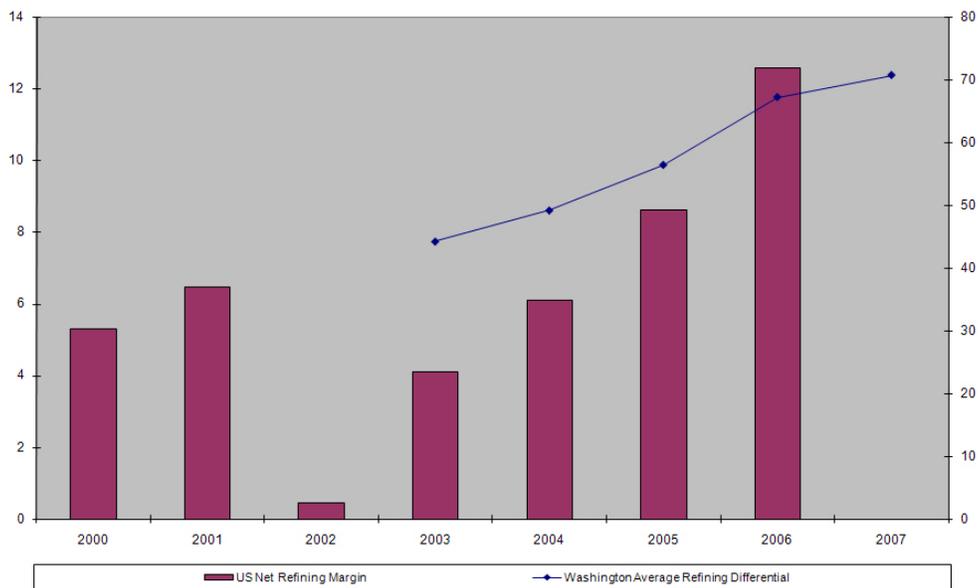
However, the supply of the reformulated “clean” motor fuels mandated in Washington and other parts of PADD V, can be expensive for foreign refineries to produce. Many foreign refineries are not optimized for the production of these types of clean motor fuels. In such cases, production of clean fuels can require the refineries to use the “lightest” and most valuable segment of the crude oil stream at significant opportunity costs of other foregone products. In addition, the supply of foreign produced fuel necessitates significant transportation cost, and significant risks of adverse price movements during the transit period. Hence, foreign refiners will be economically motivated to supply the expensive motor fuels to the West Coast only if they receive high prices. Absent that foreign supply, of course, prices would be even higher to balance demand and local supply.

Thus, as a consequence of the tight overall supply on the West Coast, any glitches in the system can cause significant price spikes that are not tempered by imports of lower-cost domestic supply. The prices of motor fuels in Washington and on the West Coast are becoming less dependent on the cost of supply from local and West Coast refineries, and even of other domestic refineries. Rather, the impact of increased demand and inadequate supply (in particular, any unplanned supply disruptions) results in price increases which can only be tempered by increased dependence on foreign imports into California and Portland. The result of this inadequate supply on the West Coast and the inability of other domestic refining centers in, for example, Texas, Utah, and Montana to make up the difference, causes the potential of increased volatility of the refining differentials and of retail prices in Washington. That is, when local and domestic product does not balance supply and demand, prices will rise until foreign supply is attracted to create the balance.<sup>25</sup>

The increased and relatively volatile refining differentials and retail prices are not unique to Washington or to the West Coast as nationwide demand is exceeding domestic supply and nationally we are increasing imports.

Chart 13 illustrates the net refining differential earned by refiners in the United States and in Washington.<sup>26</sup> From 2000 to 2006, refining differentials reported by U.S. refiners increased by 137 percent. As shown, the pattern of increasing differentials is not a phenomenon isolated to any single region but is partly a function of the lack of domestic refinery capacity and the need to attract imports to balance supply and demand.

CHART 13  
Annual US Net and Washington State Average Refining Differentials (cents per gallon) - 2000-2007



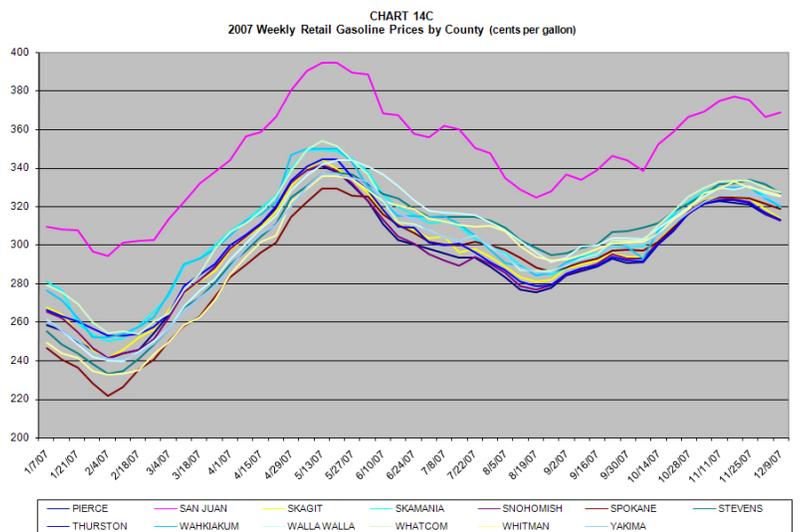
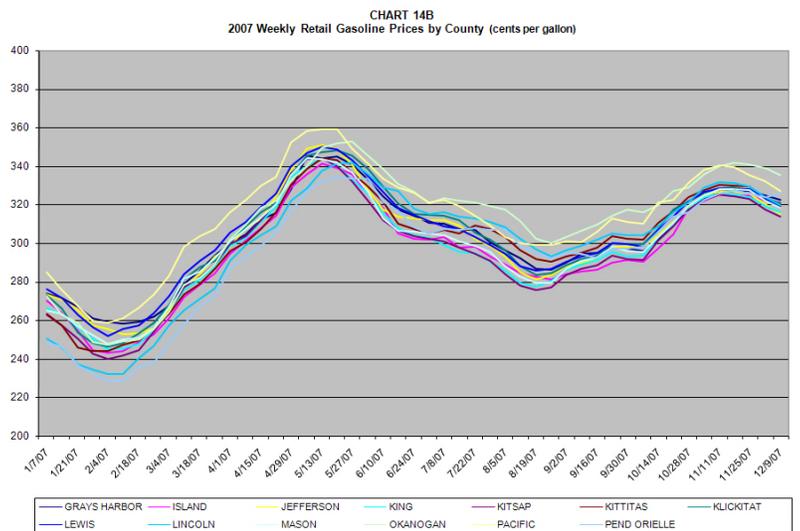
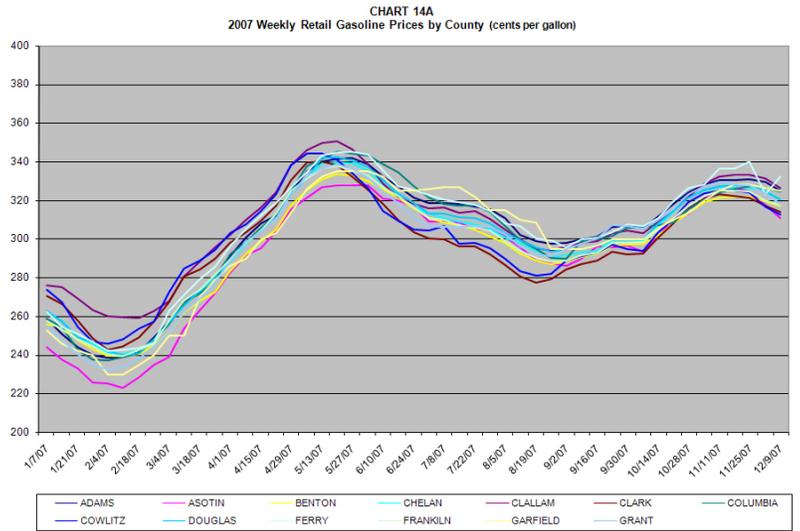
25 - In this situation, the Washington refiner’s profit margins increase because their costs have remained constant while wholesale prices rise.

26 - Source: EIA - Performance Profiles of Major Energy Producers - <http://www.eia.doe.gov/emeu/finance/histlib.html>. The U.S. refiners’ differential as reported to EIA takes into account operating and other expenses while the differentials generally discussed in this report do not.

### 3: REGIONAL VARIATIONS IN GASOLINE AND DIESEL PRICES WITHIN WASHINGTON

A major objective of this study is to document and understand regional variations in motor fuel prices within Washington state. This section provides county and city price data through 2007, for both gasoline and diesel. This information is used to document regional differences in prices, the causes of which will be explored in sections 4 and 5 below. Prices across the state are found to move closely together. This is not surprising because the cost of crude oil is a major common factor in the supply of both gasoline and diesel throughout the state. However, there is no apparent relationship between the relative retail gasoline price at a specific location and the same location's relative retail diesel price. For 2007, cities with above-average or below-average gasoline prices do not necessarily have corresponding above- or below-average diesel prices.

**Gasoline:** Charts 14A, 14B and 14C show weekly average retail gasoline prices by county for 2007. Table 5 shows average retail gasoline prices for each quarter in 2007, and the annual average for each county.<sup>27</sup>



27 - For Tables 5, 6, 7 and 9 – the low prices will be highlighted in blue and surrounded by a dotted line while the high prices will be highlighted in red and surrounded by a solid line.

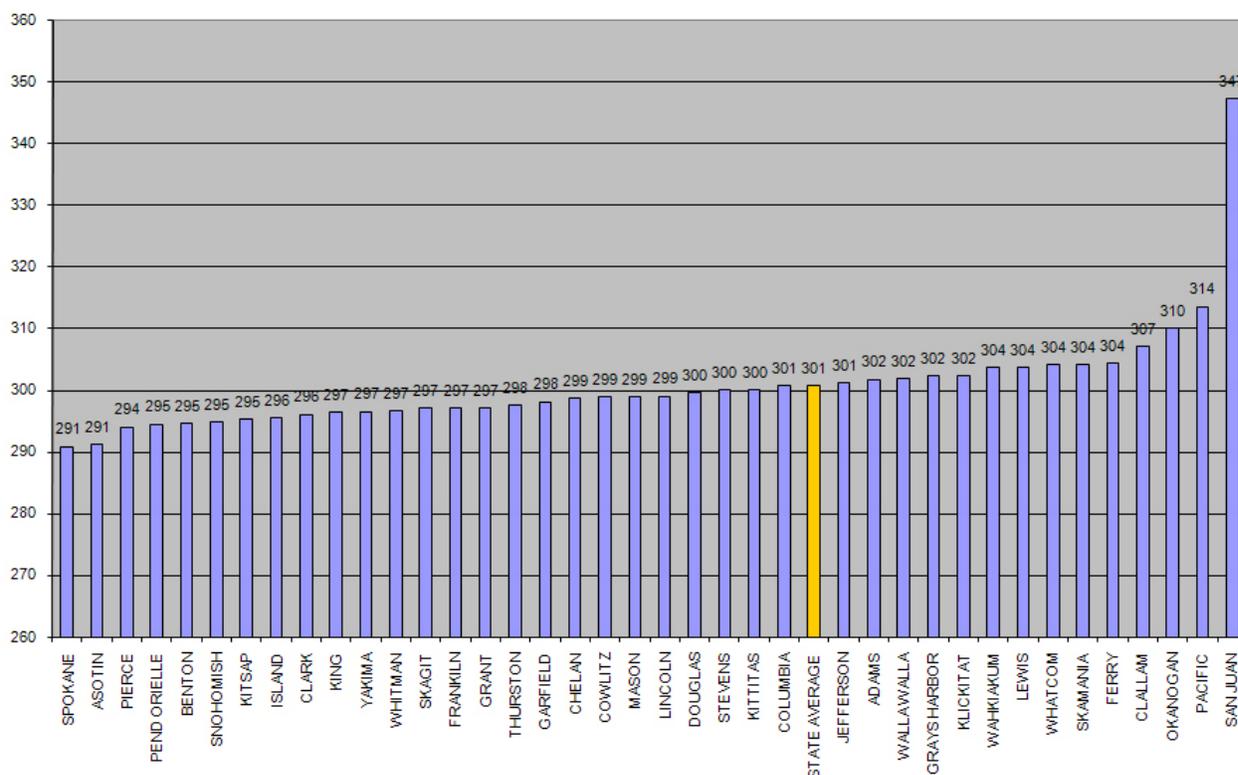
**TABLE 5**  
**Average Retail Gasoline Prices by County - 2007**

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	2007 Average
ADAMS	253.1	324.1	307.6	323.3	301.8
ASOTIN	<b>240.1</b>	313.5	298.1	314.3	291.3
BENTON	251.5	316.4	297.4	314.2	294.6
CHELAN	255.1	321.5	300.4	319.2	298.8
CLALLAM	271.4	330.0	304.6	323.4	307.1
CLARK	263.1	320.5	289.5	313.6	296.2
COLUMBIA	252.6	326.5	305.3	318.5	300.7
COWLITZ	265.7	323.3	293.0	315.3	298.9
DOUGLAS	255.3	322.3	302.3	319.6	299.6
FERRY	257.1	327.5	308.2	325.9	304.4
FRANKLIN	254.2	320.6	298.4	316.5	297.2
GARFIELD	247.0	318.2	309.3	318.1	298.2
GRANT	248.8	319.4	301.4	320.6	297.2
GRAYS HARBOR	269.9	325.1	298.2	317.8	302.4
ISLAND	259.9	319.2	290.6	314.9	295.6
JEFFERSON	267.0	326.6	296.0	317.2	301.3
KING	261.6	321.0	290.0	315.8	296.6
KITSAP	258.9	321.2	289.0	314.5	295.4
KITTITAS	259.2	321.4	300.4	321.1	300.1
KLICKITAT	264.6	328.5	298.1	320.0	302.4
LEWIS	270.0	329.5	297.5	319.4	303.7
LINCOLN	248.9	321.6	305.2	321.4	299.1
MASON	264.3	322.9	292.9	317.9	298.9
OKANOGAN	263.2	332.3	313.4	332.5	310.0
PACIFIC	278.1	339.4	308.5	329.8	313.6
PEND ORELLE	244.9	316.0	300.2	318.5	294.6
PIERCE	258.6	319.2	<b>287.5</b>	<b>313.2</b>	294.1
SAN JUAN	<b>310.6</b>	<b>373.5</b>	<b>342.2</b>	<b>364.6</b>	<b>347.4</b>
SKAGIT	261.3	321.5	292.2	315.4	297.1
SKAMANIA	270.7	330.2	297.5	320.4	304.3
SNOHOMISH	259.8	319.9	287.9	314.4	294.9
SPOKANE	243.2	<b>311.3</b>	295.2	315.7	<b>290.9</b>
STEVENS	251.5	320.4	305.8	324.0	300.1
THURSTON	265.2	322.9	290.3	313.5	297.5
WAHKIAKUM	270.2	329.0	297.7	319.5	303.7
WALLA WALLA	255.4	326.4	305.3	321.2	301.9
WHATCOM	269.3	329.0	296.6	323.9	304.1
WHITMAN	246.4	318.0	302.6	321.2	296.7
YAKIMA	254.7	319.2	296.1	318.1	296.6
AVERAGE	<b>260.1</b>	<b>324.3</b>	<b>299.8</b>	<b>320.2</b>	<b>300.7</b>
SPREAD	<b>70.5</b>	<b>62.3</b>	<b>54.7</b>	<b>51.4</b>	<b>56.4</b>

From the first to the second quarter, average prices increased approximately 64 cents per gallon. Prices then decreased almost 25 cents in the third quarter and averaged \$3 per gallon. Average prices rose again in the fourth quarter but remained lower than the spring prices. San Juan County maintained relatively high prices throughout 2007 as did Pacific, Okanogan and Clallam counties. All other counties with above-average prices in the first quarter dropped down to about or below average in two or more subsequent quarters. Spokane and Asotin counties had consistently low prices. Walla-Walla, Kittitas, Columbia, Adams, Stevens, Lincoln, Grant and Whitman counties, which started out with prices near or below average in the first quarter, jumped to above average in two or more subsequent quarters. The counties with the biggest price fluctuations between the first and second halves of the year were Garfield, Whitman, and Asotin with average price increases of 31.1 cents, 29.7 cents and 29.4 cents per gallon, respectively. The counties with the least change were Thurston, Skamania and Lewis with average increases of only 7.8 cents, 8.5 cents and 8.7 cents per gallon, respectively.

Chart 15 ranks the counties from lowest to highest average annual retail gasoline price. Chart 15 also includes the state average retail price for the year. Excluding the anomalous price for San Juan, the spread between the lowest and the highest average price is 23 cents per gallon. The high and low prices seem to be evenly distributed across the state, with about equal numbers of high-priced and low-priced counties among the East and West sides.

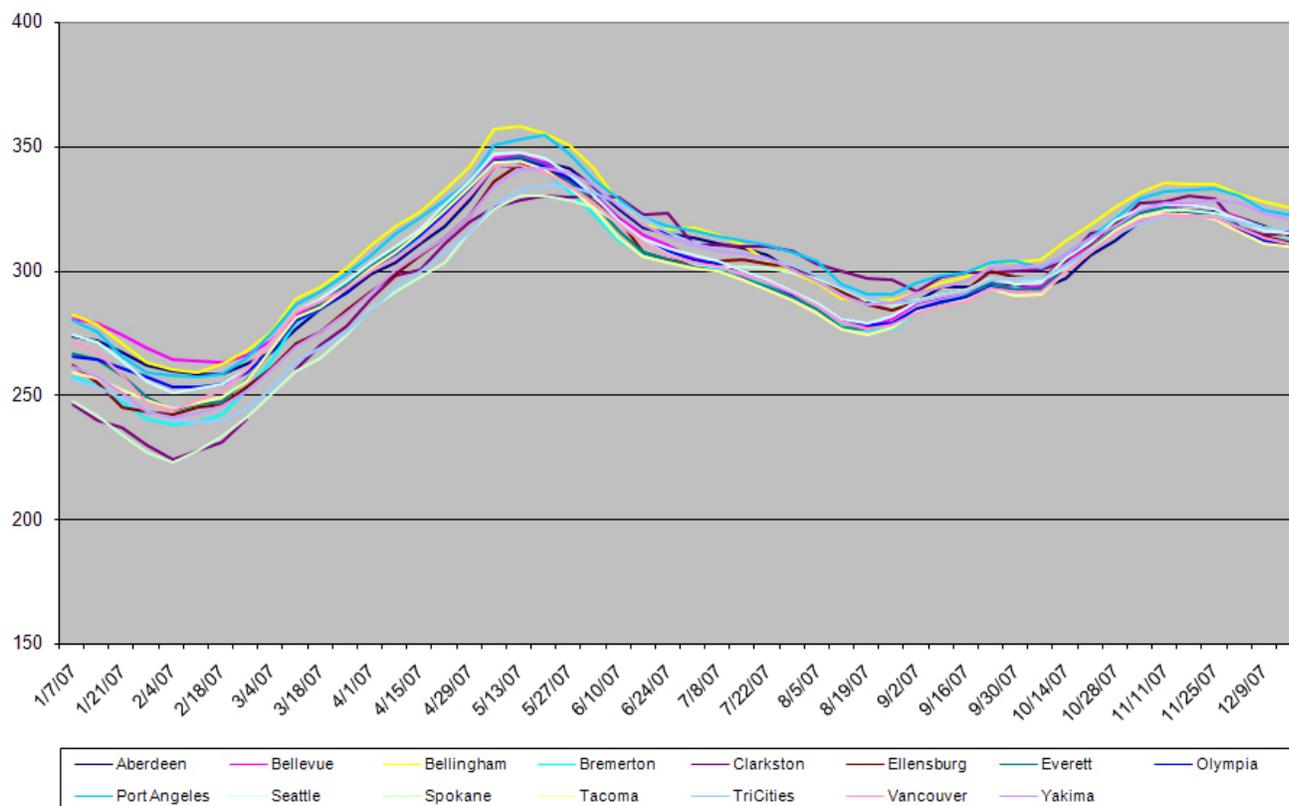
**CHART 15**  
2007 Average Retail Gasoline Prices by County (cents per gallon)



For the entire year, Spokane County had the lowest average retail price – approximately 10 cents below the state average. Of the five lowest-priced counties, three are counties which border Idaho. As mentioned, Washington state has the highest gas tax in the country, while Idaho’s state tax is 11 cents per gallon below Washington’s (though still relatively high at 11th nationwide). This likely contributes to the lower prices along the Idaho border as the retailers in these Washington counties will be competing with stations across the state line, which likely are able to attain the same retail differentials with prices more than 10 cents per gallon lower than those charged by Washington retailers.

Chart 16 graphs the weekly average gasoline prices for each of the 15 city regions in this study for 2007. Table 6 shows the average retail prices for each quarter in 2007, as well as the 2007 annual average.

CHART 16  
2007 Weekly Retail Gasoline Price by City (cents per gallon)

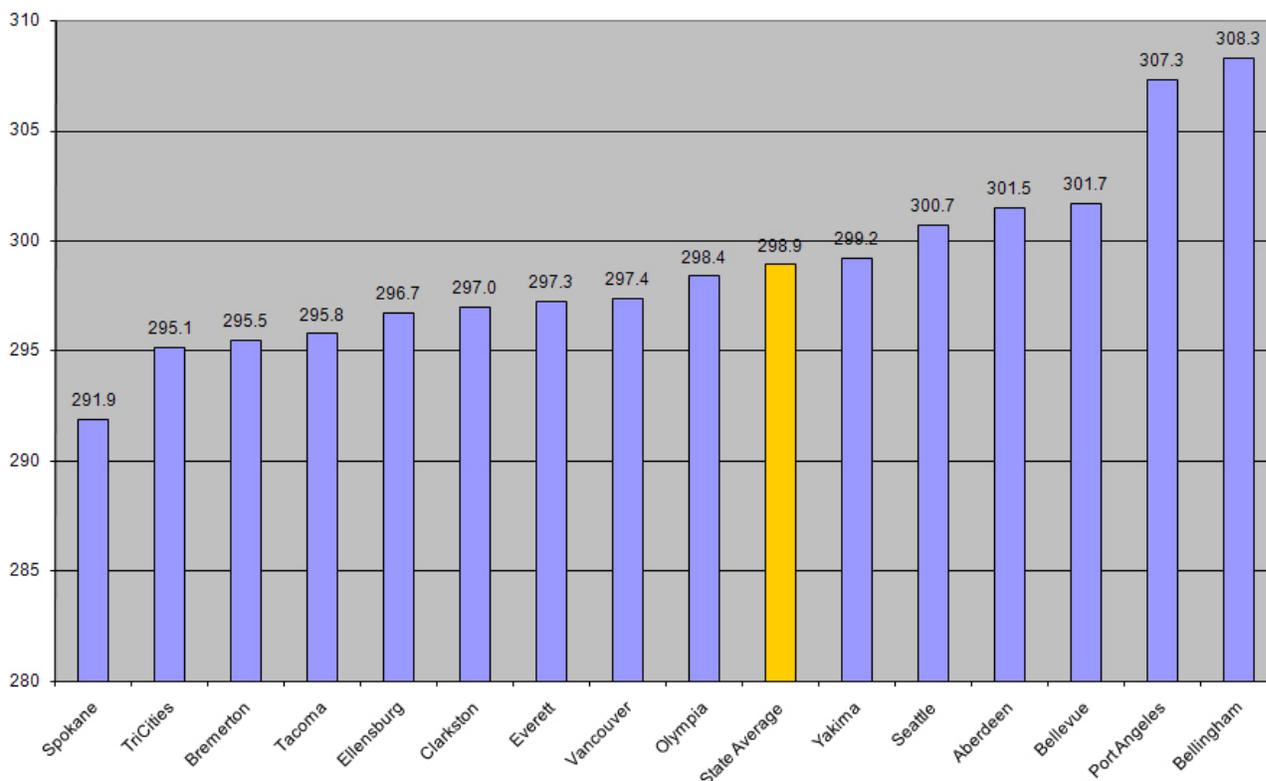


	Quarter 1	Quarter 2	Quarter 3	Quarter 4	2007 Average
Aberdeen	269.6	324.6	297.7	314.0	301.5
Bellevue	274.7	326.0	290.7	316.5	301.7
Bellingham	275.0	334.4	299.4	325.2	308.3
Bremerton	257.4	321.9	288.9	314.4	295.5
Clarkston	243.9	318.4	302.4	318.0	297.0
Ellensburg	256.7	319.0	295.8	315.2	296.7
Everett	263.3	323.6	288.9	313.9	297.3
Olympia	266.1	324.3	290.5	313.1	298.4
Port Angeles	272.5	332.0	302.7	322.1	307.3
Seattle	268.4	326.3	291.9	316.8	300.7
Spokane	243.5	313.1	295.3	315.4	291.9
Tacoma	261.4	322.3	287.6	312.4	295.8
TriCities	251.8	316.8	297.1	314.3	295.1
Vancouver	265.2	322.5	289.4	313.0	297.4
Yakima	257.0	321.8	298.1	320.0	299.2
<b>Average</b>	<b>261.8</b>	<b>323.1</b>	<b>294.4</b>	<b>316.3</b>	<b>298.9</b>
<b>Spread</b>	<b>31.5</b>	<b>21.3</b>	<b>15.1</b>	<b>12.8</b>	<b>16.4</b>

The city prices follow the same pattern as the county prices, rising a little more than 60 cents between the first and second quarters then dropping almost 30 cents between the second and third quarters. In the fourth quarter, the prices climb about 22 cents on average and end up about 55 cents higher than the prices in the beginning of the year. Bellingham and Port Angeles maintain consistently higher-than-average prices over the period, while Bremerton and Tacoma prices were consistently lower than average. The cities with the most significant price increases between the first and second halves of the year were Spokane (27.1 cents per gallon), Clarkston (29 cents per gallon) and Tri-Cities (21.4 cents per gallon). The cities with the least price increase were Bellevue (3.3 cents per gallon) and Olympia (6.5 cents per gallon).

Chart 17 ranks the cities in order of lowest to highest average price for the 2007 year. For comparison, the chart also includes the state average price. The spread between the highest and lowest average annual prices is 16.4 cents per gallon. With the exception of Yakima, which was about 0.1 cent above the annual average, all the study cities east of the mountains are below the state average for 2007. The same is true for the corresponding counties (Chart 15).

CHART 17  
2007 Average Retail Gasoline Prices by City (cents per gallon)



**Diesel:** Detailed data on diesel fuel prices by city area was purchased from OPIS. Charts 18A and 18B show the weekly average retail price for diesel for each of the 15 Washington city regions focused on in this study for the period of April 2000 through the week of December 17, 2007.<sup>28</sup> The diesel prices peaked for all cities in early November of this year and were highest in Spokane at \$3.84 per gallon during the week of November 19. The state average high price of \$3.73 in November is almost triple the low average price of \$1.27 during February 2002. While there is clearly variation in the prices among the cities, Charts 18A and 18B show that the prices move together. In fact, the correlation coefficient between the diesel prices in Bellingham (the city with the lowest price during the period - \$1.15 during the week of January 21, 2002) and those in Spokane (the city with the highest price during the period) is nearly perfect at .997. This indicates that the market is operating as it should be. If prices in different areas did not move together and had very low correlation coefficients, the expectation would be that factors other than wholesale price, retail transport cost and local market factors were driving the prices.

CHART 18A  
Weekly Average Retail Diesel Prices by City (cents per gallon)  
April 3, 2000-December 29, 2003

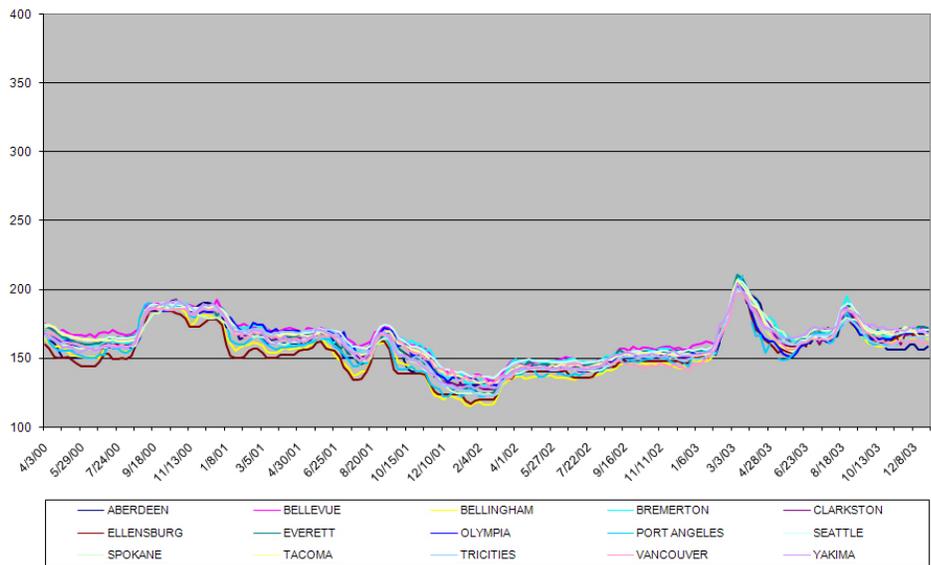
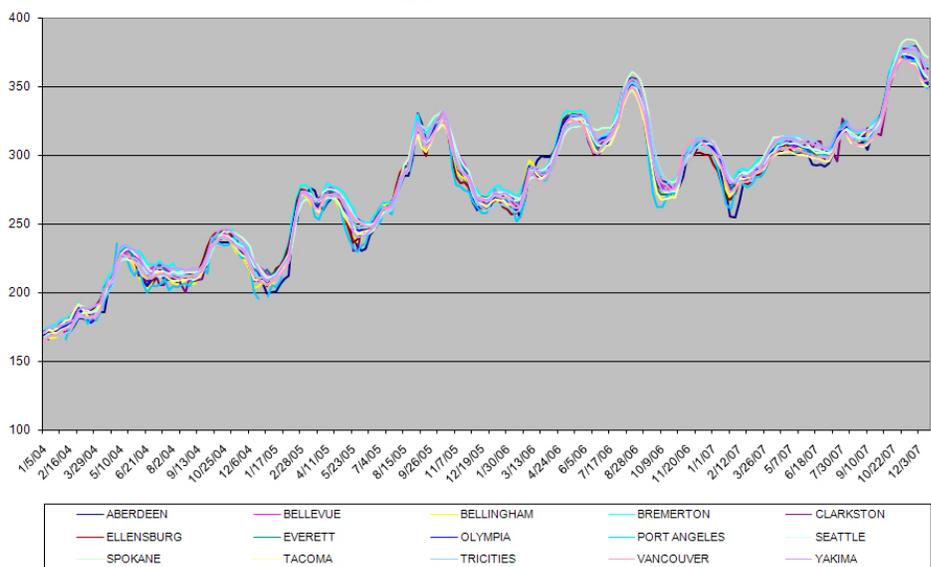


CHART 18B  
Weekly Average Retail Price by City (cents per gallon)  
January 5, 2004-December 17, 2007



28 - These cities are the same as those selected for gasoline analysis and were selected to show variance across the state.

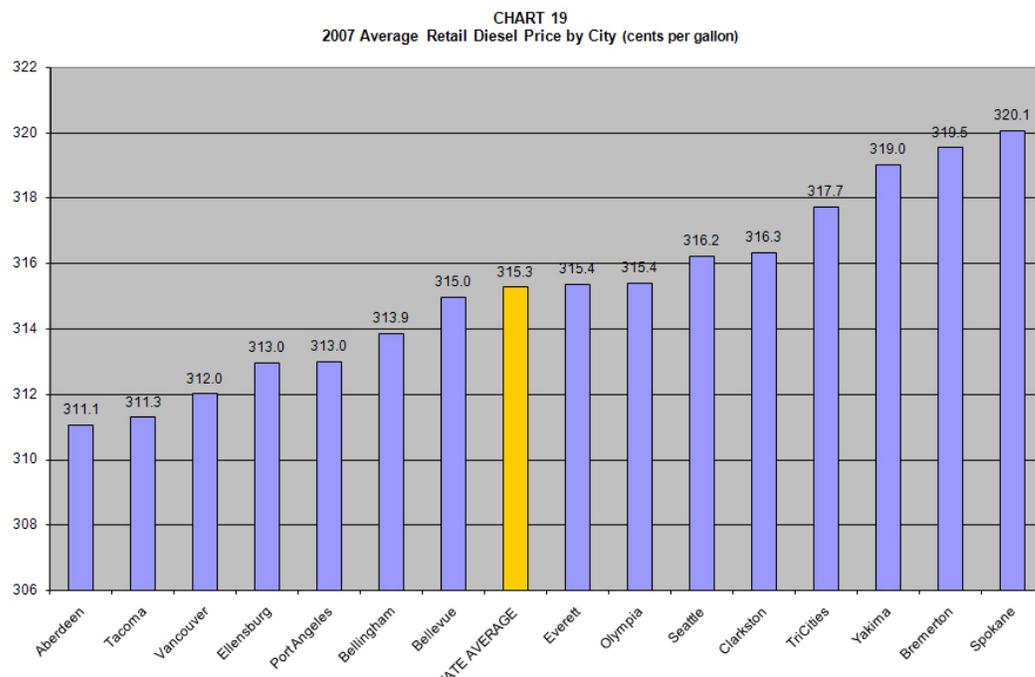
While the diesel fuel prices generally move together in the various city regions, there are significant differences in the levels of the prices. Table 7 focuses on these differences by showing average prices for each quarter in 2007, as well as the annual 2007 average. Unlike the gasoline prices that rose in the second quarter, dropped in the third quarter, then rose again in the fourth quarter, diesel prices have steadily climbed throughout the year. Overall, diesel prices increased an average of almost 75 cents per gallon

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	2007 Average
Aberdeen	280.1	300.8	309.1	357.8	311.1
Bellevue	289.1	304.1	311.5	358.5	315.0
Bellingham	285.7	302.7	312.5	357.9	313.9
Bremerton	291.7	307.7	316.3	366.1	319.5
Clarkston	288.1	306.9	310.9	363.1	316.3
Ellensburg	280.9	301.8	312.5	360.3	313.0
Everett	288.4	305.0	311.8	359.6	315.4
Olympia	288.7	305.1	312.7	358.3	315.4
Port Angeles	280.4	301.8	313.3	359.2	313.0
Seattle	291.0	305.6	311.8	359.8	316.2
Spokane	292.3	309.5	313.7	368.5	320.1
Tacoma	285.5	299.7	307.7	355.6	311.3
TriCities	289.1	311.1	310.9	363.4	317.7
Vancouver	285.5	302.0	308.6	355.3	312.0
Yakima	290.4	309.4	316.5	363.2	319.0
<b>Average</b>	<b>287.1</b>	<b>304.9</b>	<b>312.0</b>	<b>360.4</b>	<b>315.3</b>
<b>Spread</b>	<b>12.2</b>	<b>11.4</b>	<b>8.7</b>	<b>13.2</b>	<b>9.0</b>

from the first quarter to the fourth quarter. Bremerton, Spokane and Yakima had consistently higher than state average prices while Aberdeen, Tacoma and Vancouver had consistently lower than state average prices. Interestingly, Port Angeles' quarterly gasoline prices were consistently above-average yet the diesel prices were below-average for three of the four quarters in 2007.

Chart 19 ranks the cities according to annual average diesel price for 2007. The total difference between the lowest-average price (Aberdeen) and the highest-average diesel price (Spokane) was 9 cents per gallon. The spread in the diesel prices among the cities is considerably smaller than the gasoline spread. With the exception of Ellensburg, all of the cities with below-average diesel prices are located in Western Washington. The relatively higher diesel prices in Eastern Washington are likely the result of the closer link to supply from Utah and Montana. These mountain states use relatively more diesel compared to gasoline than is used in Washington.

Recent retail diesel prices are following the same escalating pattern as retail gasoline. One year ago, the average retail cost of diesel in Washington state was \$2.90. Today, the state average retail



cost is more than \$4 per gallon - \$4.12 on March 13.<sup>29</sup> This is an increase of more than \$1.22 per gallon over the past 12 months. Over the same period, crude oil costs have nearly doubled - increasing from \$1.38 per gallon to \$2.62 per gallon.<sup>30</sup> Crude oil cost accounted for approximately 48 percent of the March 2007 price while today those crude costs account for nearly 64 percent.

There are a number of economic reasons to expect variations in the motor fuel prices across the regions in Washington. The locations studied for this report vary from being quite close to the Puget Sound refining center (Bellingham), to cities that can be supplied only with significant trucking expense (e.g., Aberdeen). In addition, some of the cities have access to refined product from various regions, with varying transportation costs. For example, Spokane can receive product from refineries in Billings, Salt Lake City, the Puget Sound, or the San Francisco Bay area (via Portland). Other areas (e.g., Seattle) are effectively limited to receiving product from the Puget Sound refineries. Thus, the different locations are expected to have different prices, if only because of variances in the cost of shipping motor fuels to the wholesale terminals.

The next section of this study explores the wholesale prices across the various regions in the state and examines the significance of those wholesale price differences in explaining retail price disparities. After documenting the wholesale prices and their differences, the extent to which those differences result from varying supply opportunities and supply costs is examined.

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29 - Source of this retail data is [www.fuelgaugereport.com/](http://www.fuelgaugereport.com/).

30 - Source: EIA - WTI Spot price.

## 4: STATEWIDE WHOLESALE PRICE DIFFERENCES:

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Some of the variance in retail motor fuel costs is expected to result from differences in supply costs. Generally, the wholesale prices should approximate the refinery "gate" price<sup>31</sup> plus the transportation expense to the various regions where the fuel is sold at wholesale. Differences in wholesale prices across the Washington regions are analyzed in detail in this section. This section will also address the various transport routes and associated costs to each region.

**Wholesale distribution:** After crude oil is refined into finished motor fuel, gasoline and diesel are then transported to storage areas called terminals where they are sold at wholesale at what is historically called the "rack price"<sup>32</sup> for delivery to retail stations. Different locations in Washington are served by different terminals. In Washington state, there are nine areas with wholesale terminals.<sup>33</sup>

The wholesale prices that were used for the Phase 1 report were estimates provided by OPIS for each study city. During Phase 2 of the investigation, the actual rack prices were acquired for six terminals within Washington state as well as for Portland, Ore., in order to gain more precision.<sup>34</sup>

Additionally, a survey of jobbers was conducted by CTED to help verify the accuracy of the terminal-specific wholesale prices.<sup>35</sup> In this survey, the jobbers were asked the price they paid for gasoline and diesel on a specific date.<sup>36</sup> The differences in prices as reported by the jobbers in the survey and as reported by OPIS were found to be within the range expected when using data from different sources. This finding supports the accuracy of the wholesale price data purchased from OPIS.<sup>37</sup>

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31 - The refinery gate price refers to the price of bulk fuel sale from a refinery delivered to a pipeline just out of the refinery gate. For the purpose of this report, the Anacortes wholesale price is used as the price closest to the refineries. This price is expected to be higher than an actual refinery gate price because it includes some transportation to the Anacortes terminal and is also for truck load amount rather than a bulk sale.

32 - The "rack" was the piping from which tanker trucks were top loaded.

33 - Those areas are: The Refineries, Seattle-Renton, Tacoma, Olympia, Vancouver, Clarkston, Spokane, Moses Lake, and Pasco.

34 - The wholesale data used for Phase 1 was city-specific, yet many of those cities do not have terminals at which wholesale fuels are sold. Thus, for Phase 2 actual terminal data was acquired. The lowest of the unbranded, OPIS average, and branded wholesale prices was used. A comparison was done between the Phase 1 "estimated" wholesale and Phase 2 "actual" wholesale data. Some significant differences are noteworthy: In the original city-specific data, the 2007 wholesale prices indicated more than an 11¢ per gallon difference between the Ellensburg and Bellingham terminals. However, for the same period, the actual wholesale price data shows a difference between the Anacortes terminal prices (which supplies Bellingham) and the Moses Lake terminal (which is the closest to Ellensburg) of just over 1¢. The Phase 1 data also showed that in 2007, Spokane's wholesale price was on average almost 10¢ per gallon less than Seattle's wholesale cost. However, the actual wholesale data indicates that Spokane's wholesale price was only about .05¢ per gallon less than Seattle's wholesale price in 2007. This difference between the 2007 Seattle and Spokane wholesale prices is a reversal of the 2000-2005 period trend of Spokane having slightly higher wholesale prices than Seattle. With an exception for Moses Lake and Spokane (2007), all of the actual terminal wholesale prices are several cents lower than the OPIS estimated wholesale prices for each city and each year. For Moses Lake, the actual and OPIS estimated wholesale prices for each city are within 1¢ for each year except for in 2007 when the actual price is about 6¢ per gallon more than the OPIS estimated price. While it is important to note these differences between the different OPIS reported prices, they do not have any significant impact upon our study findings.

35 - A jobber is the industry term for an independent wholesaler which buys gasoline from a terminal and then delivers the product to retail outlets. Jobbers frequently have business relationships with one or more branded suppliers. Most jobbers also deal in unbranded motor fuels. Jobbers can own retail outlets or supply outlets owned by others.

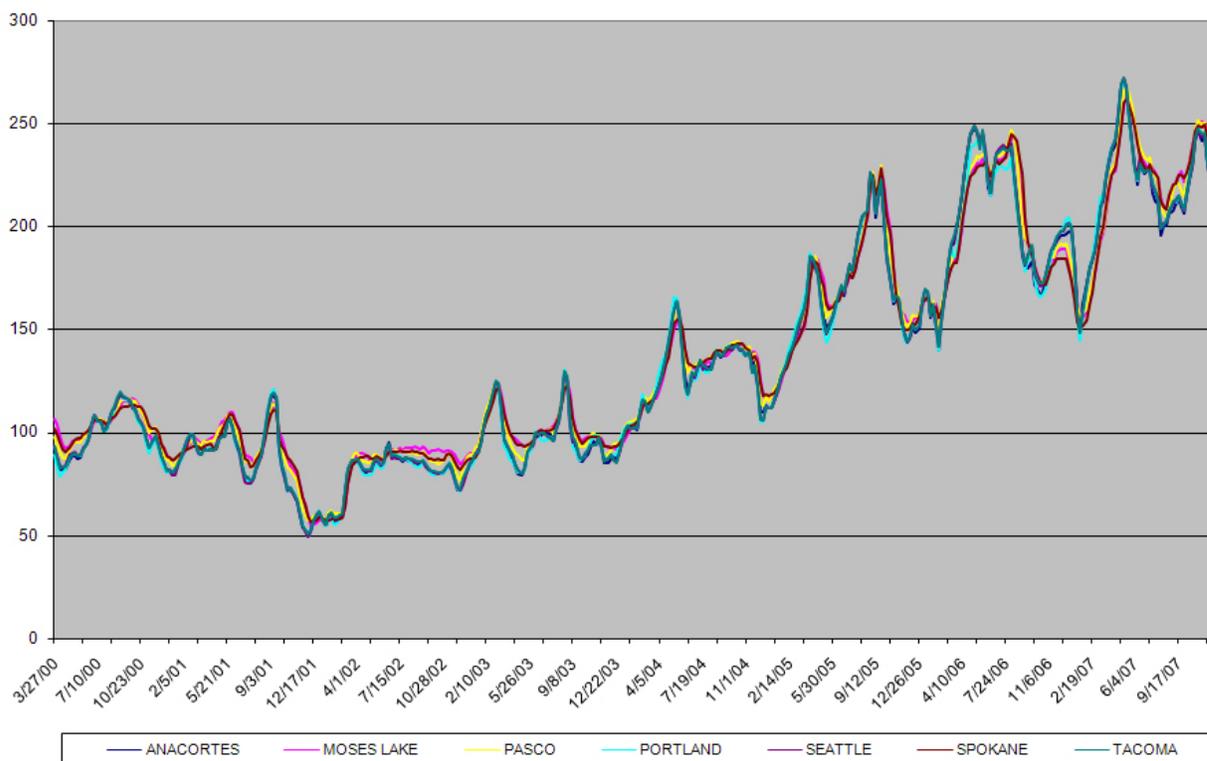
36 - The jobber survey was sent to 33 jobbers. 14 replies were obtained. The survey is attached to this report as Exhibit A. The actual results of the survey are confidential.

37 - The reported "actual" OPIS prices are an average for the week while the reported jobber prices are an average for a single date closest to October 1, 2007. For all terminals, the jobber purchase price reported in the survey is between 2¢ and 3.4¢ per gallon higher than the reported OPIS price for branded fuel purchases. Conversely, for the two jobber reported unbranded fuel purchases, the reported jobber wholesale price is lower (between 2¢ and 3.9¢ per gallon) than the reported OPIS price. The differences in these prices are within the expected variances of an average price (OPIS) and a specific brand or unbranded price. OPIS uses a weighted average methodology for calculating the weekly prices for each terminal. The prices reported by the jobbers are not weighted in any fashion, and they are for a specific day.

The wholesale prices reported by OPIS are the industry standard prices used for contracting and exchanging product. Using the OPIS actual terminal prices rather than the city-specific OPIS estimated prices avoids differences in regional prices which may arise simply from differences in the mix of branded and non-branded purchases, while also minimizing any problems from the under-reporting of branded discounts.<sup>38</sup> Therefore, for purposes of this report, the term "wholesale prices" refers to the OPIS actual wholesale prices.

The wholesale prices at the different terminals track each other very closely. This is shown in Chart 20 and is verified by the nearly perfect correlations among the rack prices in Table 8. There are, however, notable differences in the levels of the wholesale prices at the various terminals. Table 9 summarizes these differences by comparing the annual average prices for each of the seven terminals for which wholesale price data was obtained.

CHART 20  
OPIS Reported Wholesale Prices for Gasoline (cents per gallon) - March 2000 to December 2007



	ANACORTES	MOSES LAKE	PASCO	PORTLAND	SEATTLE	SPOKANE	TACOMA
ANACORTES	-	0.989	0.994	0.999	1.000	0.988	1.000
MOSES LAKE	0.989	-	0.998	0.988	0.989	0.999	0.989
PASCO	0.994	0.998	-	0.993	0.994	0.998	0.994
PORTLAND	0.999	0.988	0.993	-	0.999	0.987	0.999
SEATTLE	1.000	0.989	0.994	0.999	-	0.988	1.000
SPOKANE	0.988	0.999	0.998	0.987	0.988	-	0.988
TACOMA	1.000	0.989	0.994	0.999	1.000	0.988	-

38 - Fuel sold at wholesale can be either branded or unbranded. Branded gasoline adds proprietary additives to unbranded gasoline. Different prices are charged for branded and unbranded fuels. The OPIS estimated prices are an average of many branded and unbranded prices while the terminal specific prices are separately reported for each seller. In addition, as mentioned above, discounts on branded terminal sales are common but are not reported by OPIS.

	2000	2001	2002	2003	2004	2005	2006	2007	AVG
ANACORTES	98.7	85.4	79.4	97.0	128.2	166.7	199.5	217.1	134.0
SEATTLE	99.2	84.9	79.4	97.0	127.3	167.0	201.2	218.0	134.2
TACOMA	99.3	85.7	80.3	97.5	127.6	167.7	201.1	218.0	134.6
PORTLAND	97.8	84.7	78.6	96.5	127.7	167.0	197.0	218.3	133.5
SPOKANE	102.9	89.3	82.7	101.1	129.7	168.5	198.3	217.4	136.2
MOSES LAKE	102.8	90.2	84.0	101.7	128.7	169.2	198.3	218.4	136.7
PASCO	102.6	89.5	83.3	100.6	130.6	170.0	199.6	218.7	136.9
AVERAGE	100.5	87.1	81.1	98.8	128.5	168.0	199.3	218.0	135.2
SPREAD	5.1	5.5	5.4	5.2	3.3	3.3	4.1	1.6	3.4

**Statewide wholesale variations:** As shown in Table 9 above, variations exist in the wholesale prices around the state – as much as 5.5 cents per gallon in 2001. On average, the range between the highest and the lowest wholesale prices over the period is 3.4 cents per gallon. As explained further below, these regional wholesale price variations are primarily due to the different costs associated with supplying the different regions. Depending on the supply route, the supply costs range from just over 1 cent per gallon (to Seattle via the Olympic Pipeline) to almost 7.8 cents per gallon (to Moses Lake with fuels refined in the Puget Sound).

While some of the wholesale prices seem high in comparison to others, over the entire 2000 through 2007 period, all terminal prices were within, or even below, the expected range based on supply costs.

**Supply Costs:** Table 9 shows consistently lower-than-average wholesale prices at the Anacortes terminal. This is understandable because motor fuels are supplied to the Anacortes terminal directly from local Puget Sound refineries with very little supply expense.<sup>39</sup>

**Seattle/Tacoma/Portland:** The Olympic Pipeline runs the entire length of the state from the refineries along the I-5 corridor into Oregon. This pipeline is the source of motor fuels for supplying the Anacortes, Seattle, Tacoma and Portland area terminals. The wholesale price of motor fuels delivered from the Puget Sound refineries south on the Olympic Pipeline are, in essence, Anacortes wholesale price plus supply cost. For the Seattle and Tacoma terminals, the Anacortes price is considered the “base” price of comparison – meaning that the wholesale prices at these terminals should be directly based off the wholesale price at Anacortes.

Table 9 also shows that the wholesale terminal prices in Western Washington generally increase relevant to the distance from the refineries. For example, the average wholesale price at the Anacortes terminal was \$2.17 in 2007. Seattle had an average of \$2.18, Tacoma was \$2.18 and Portland was \$2.183.<sup>40</sup>

The Portland terminal is primarily supplied with motor fuels from the Puget Sound refineries, mostly via the Olympic Pipeline. However, the pipeline segment south of Olympia-Tumwater is frequently full, requiring fuel to be shipped by barge from the Puget Sound refineries. Additionally, Portland can

39 - The supply costs discussed in this section refer to the cent per gallon expense of supplying wholesale gasoline to the terminals via pipeline or barge.

40 - There are however, several periods where this is not the case -- most notably in 2001 and 2004 when the Anacortes terminal prices are 0.5 and 0.9¢ above the Seattle terminal prices respectively. The Portland terminal is supplied by both the Olympic Pipeline and by tanker. The Olympic Pipeline is frequently capacity constrained to Portland such that the costs of tanker supply can be the relevant “marginal supply” costs.

and does receive shipments of motor fuels from the San Francisco Bay area by large tanker and, on the occasions when profitable trading opportunities exist, from the Far East. These different supply opportunities lead to some independence of the Portland price compared to the Anacortes price. Nonetheless, the Portland wholesale prices are generally closely tied to the wholesale cost of gasoline at the Puget Sound refineries, with a difference for 2007 of about 1.2 cents per gallon.

**Eastern Washington:** As shown in Table 9, the three terminals in Eastern Washington had consistently high wholesale prices through 2005. Pasco and Moses Lake each had the highest wholesale prices in three of the eight years studied and Spokane had the highest price in one year, 2000. While Pasco wholesale prices remained high in 2006 and 2007, the Moses Lake price dropped below average in 2006 and the Spokane wholesale price dropped below average in both 2006 and 2007.

It is generally more expensive to supply motor fuels to locations further from the refineries. Table 10 shows the cost of supplying gasoline from Anacortes to the Seattle, Tacoma and Portland terminals in 2007. Table 10 also shows the nominal transportation costs to supply the Eastern Washington terminals with fuel from the Puget Sound refineries as well as from their alternative supply sources.

Table 11 shows the average difference between the wholesale prices in these terminals and base prices for Anacortes and Portland.<sup>41</sup> Even though the Puget Sound refineries do not usually supply fuel to Spokane and Moses Lake, the Anacortes wholesale price can still be used as a base for comparison. If the supply cost out of other refineries to these locations is more than the Anacortes wholesale price plus the supply cost, then they will choose to be supplied out of the Puget Sound.

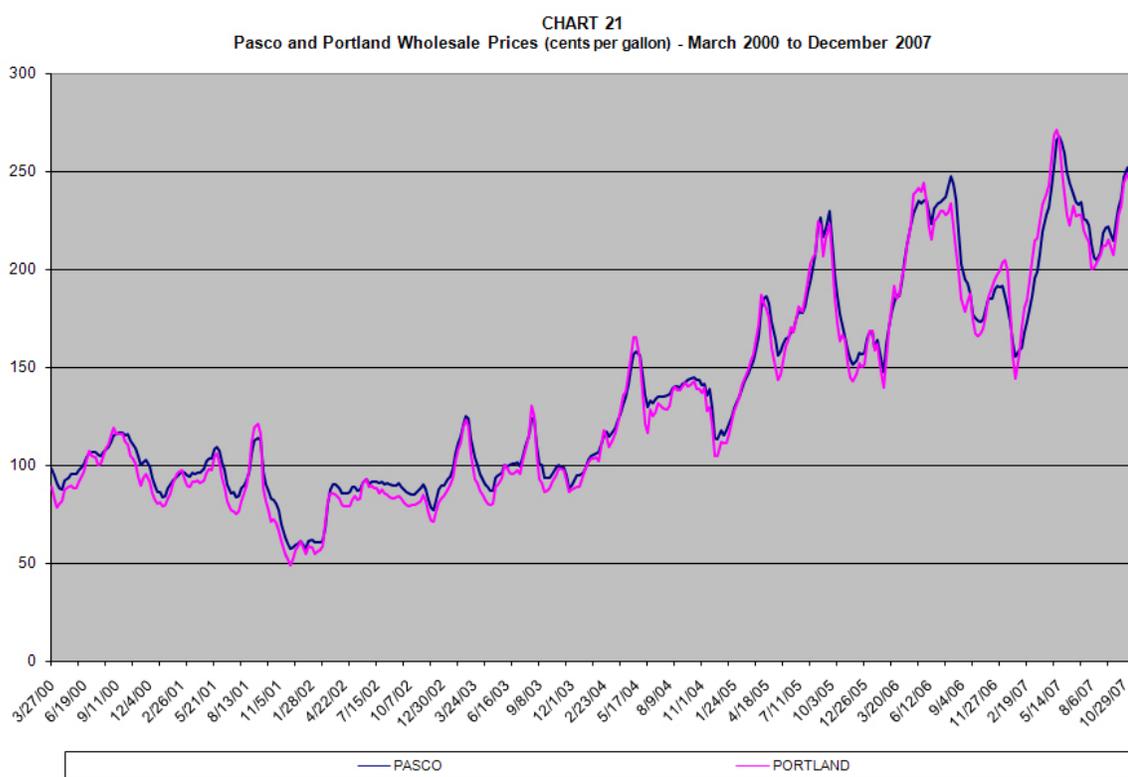
TERMINAL	SUPPLY ROUTE	SUPPLY COST
SEATTLE	Olympic Pipeline to Seattle Terminal	1.067
TACOMA	Olympic Pipeline to Tacoma Terminal	1.197
PORTLAND, OR	Olympic Pipeline to Portland Terminal	2.377
SPOKANE	Yellowstone Pipeline to Spokane Terminal	3.433
	Chevron Pipeline to Spokane	4.398
	Olympic Pipeline to Portland, Barge to Pasco, Chevron Pipeline to Spokane	7.224
MOSES LAKE	Yellowstone Pipeline to Moses Lake Terminal	3.997
	Chevron Pipeline to Spokane Terminal, Yellowstone Pipeline to Moses Lake Terminal	4.962
	Olympic Pipeline to Portland, Barge to Pasco, Chevron Pipeline to Spokane, Yellowstone Pipeline to Moses Lake	7.787
PASCO	Chevron Pipeline to Pasco	3.576
	Olympic Pipeline to Portland, Barge to Pasco	6.401
	BARGE - Portland to Pasco	4.024

	2000	2001	2002	2003	2004	2005	2006	2007	Period Average
SEATTLE	0.50	-0.49	0.02	0.03	-0.90	0.30	1.62	0.85	0.24
TACOMA	0.60	0.36	0.84	0.48	-0.55	1.00	1.58	0.87	0.65
PORTLAND, OR	-0.94	-0.62	-0.85	-0.47	-0.46	0.36	-2.51	1.15	-0.54
SPOKANE	4.21	3.97	3.23	4.07	1.53	1.79	-1.21	0.29	2.23
MOSES LAKE	4.06	4.84	4.56	4.75	0.52	2.49	-1.20	1.27	2.66
PASCO	4.86	4.75	4.71	4.13	2.88	2.95	2.59	0.42	3.41

41 - The "base" price for Pasco is the Portland wholesale price.

Overall, the wholesale price differences at these terminals are well explained by the differential costs of supply. Generally speaking, for the Western Washington terminals, the base differential in prices approximate the supply costs (shown previously in Table 10). For Seattle and Tacoma, the overall price differential shown for 2000 through 2007 is lower than expected with average differentials for the period of less than 1 cent per gallon. Portland also has lower prices than would be expected if the Puget Sound refineries were the only supply source. However, as discussed above, Portland has some unique supply opportunities which lend more independence from the Puget Sound refinery prices.

**Pasco:** The relatively high wholesale prices in Pasco are expected. Gasoline sold at the Pasco terminal is primarily supplied by the Puget Sound refineries via barge from Portland up the Columbia River. Chart 21 focuses on the wholesale prices in Pasco as compared to Portland. As seen, there is a close relationship (correlation coefficient of .993 as previously shown in Table 8). Since the Portland terminal is used as the base for Pasco, one could reasonably expect the difference between the Pasco wholesale price and the base to be approximately the cost of barging between the two locations (about 4.024 cents per gallon per Table 10).



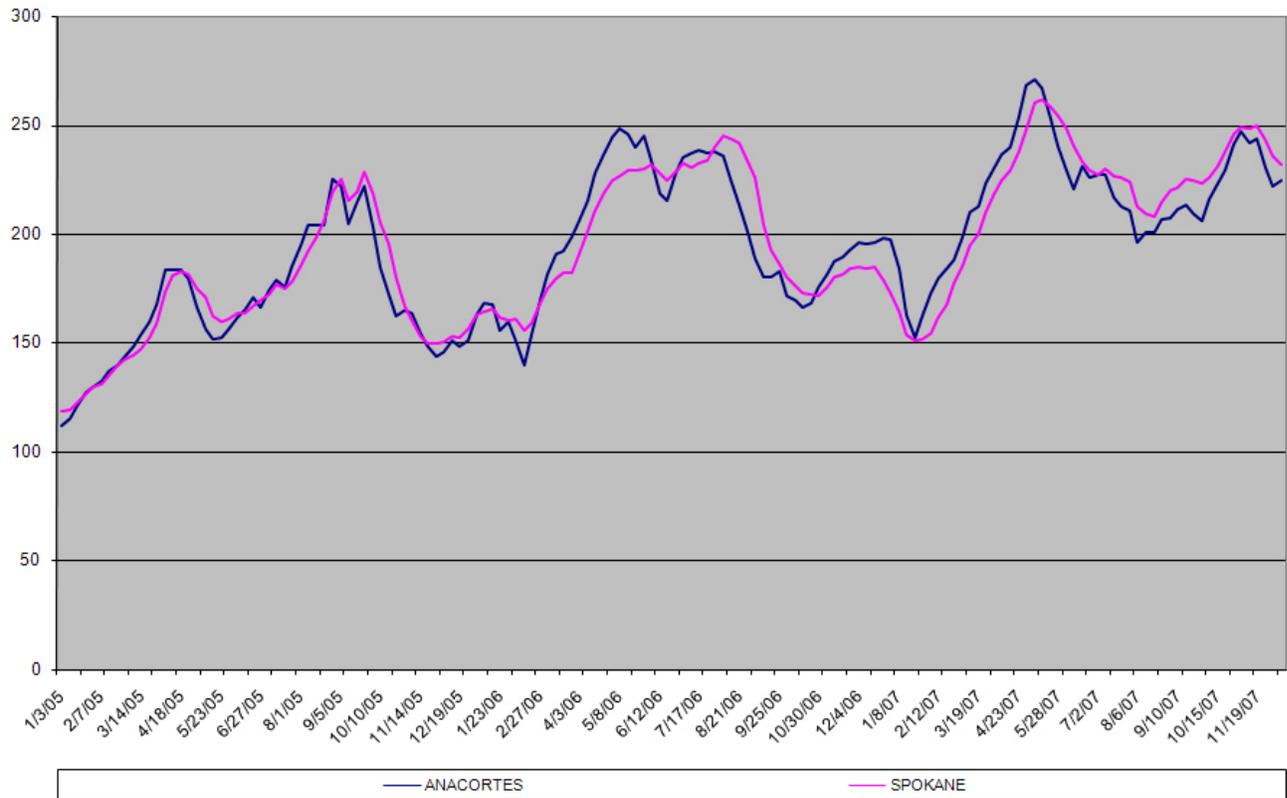
Transportation of motor fuels by barge is considerably more costly than transport by pipeline. This differential in costs compared to the Portland wholesale base price explains 90 percent (all but about .6 cents per gallon) of the Pasco differential for the 2000 to 2003 period. In 2004, the Pasco differential dropped considerably and has remained below that barge transportation cost. For the entire 2000-2007 period, the Pasco-Portland differential averaged 3.41 cents per gallon which is about .6 cents per gallon below the estimated barge supply cost.

A likely explanation of the "low" Pasco wholesale prices relates to the possible supply source of Salt Lake City. Over the 2000-2007 period, the gasoline shipped to Pasco from Utah was approximately 11 percent of gasoline consumption in Eastern Washington.<sup>42</sup> While this product must also be shipped a substantial distance at a cost of about 3.8 cents per gallon, if wholesale prices are relatively low in Salt Lake City and Boise, Idaho, compared to the wholesale price from the Puget Sound refineries, it would be economically reasonable to use this alternative source of supply.

**Spokane:** Wholesale prices in Spokane and Anacortes for 2005 through 2007 are shown in Chart 22. The prices generally move together (with a correlation coefficient of .947 for the 2005-2007 period). However, the wholesale prices at terminals within Western Washington follow each other even more closely. This is expected since alternative supply sources are available in Spokane. In 2005, Spokane wholesale prices were on average slightly greater than the Anacortes prices. In 2006, that pattern reversed itself with Anacortes wholesale prices being generally higher than Spokane prices except for a period between late summer and early fall. In 2007, Anacortes began the year with higher prices, then for the remainder of the year Spokane maintained higher wholesale prices than Anacortes.

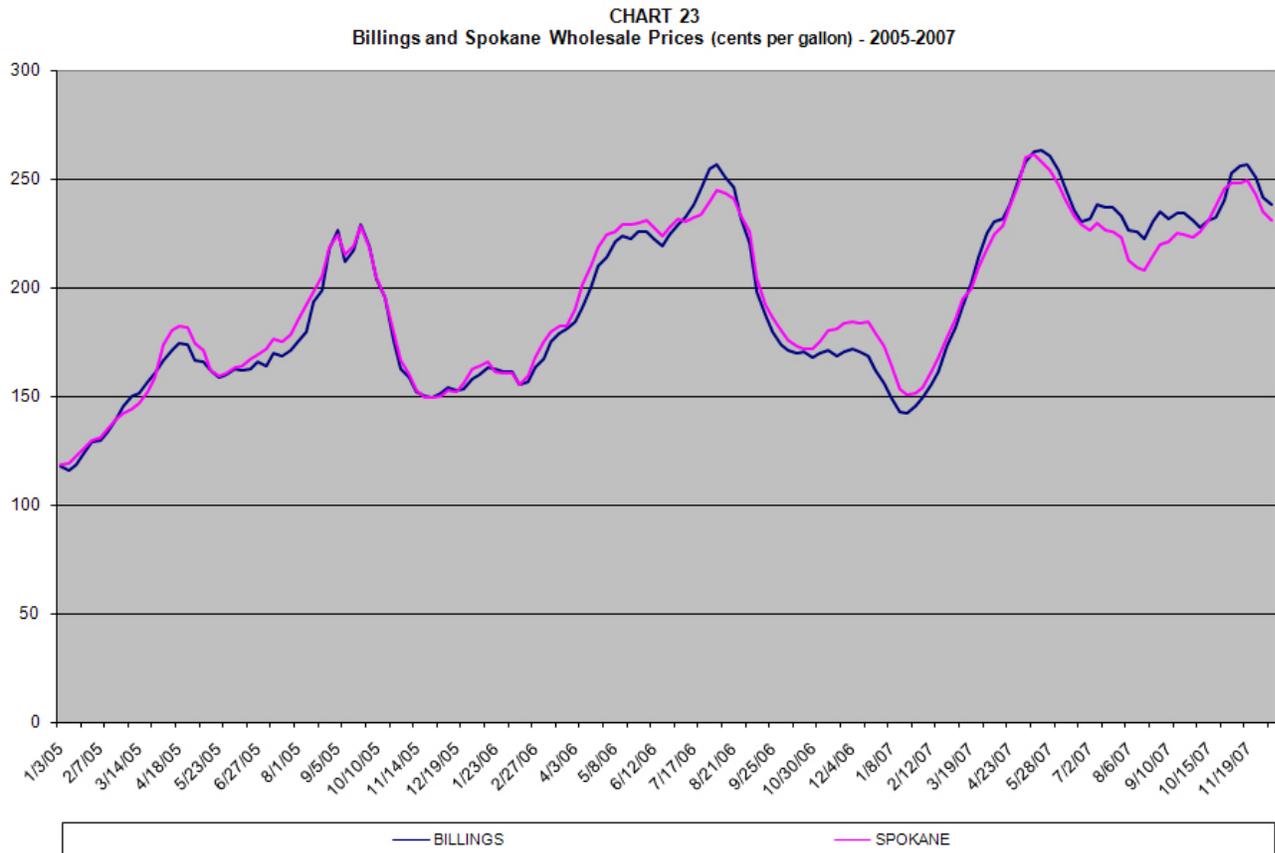
Motor fuels sold at the Spokane terminal can be supplied in three alternative ways. Product from the Puget Sound refineries can be transported to Portland then barged to Pasco, and then shipped on the Chevron Pipeline which continues on to Spokane. As shown in Table 10, this involves significant supply costs of about 7.2 cents per gallon. Alternatively, product from the Utah refineries can be sent to Pasco and then further shipped on the Chevron Pipeline to Spokane. When available, it costs about 4.4 cents per gallon to transport product on this route. Finally, the greatest portion of Spokane supply is obtained from Montana refineries and shipped via the Yellowstone pipeline. This source also involves substantial supply costs of about 3.4 cents per gallon.

CHART 22  
Anacortes and Spokane Wholesale Prices (cents per gallon) - 2005-2007



42 - The approximate consumption of gasoline in Eastern Washington is calculated by the ratio of the population in Eastern Washington to the statewide population, multiplied by the total state consumption. Of course, some motor fuels reaching Pasco will also supply Eastern Oregon.

Given that the primary source of gasoline in Spokane is from Montana refineries, it might be expected that the Spokane wholesale price tracks the Montana wholesale price most closely. Chart 23 shows the wholesale prices in Billings, Mont., and those in Spokane for 2005 through 2007. As shown, there is substantial inter-dependence in these prices; they have a correlation coefficient of .986 which is about the same as that between Spokane and Seattle. It is striking that regardless of the costs of shipping gasoline from Billings to Spokane, the wholesale prices were generally lower in Spokane between 2005 and 2006 than in Billings. This is likely explained by the alternative source of product from the Puget Sound and Utah refineries, a supply source unavailable in Billings.

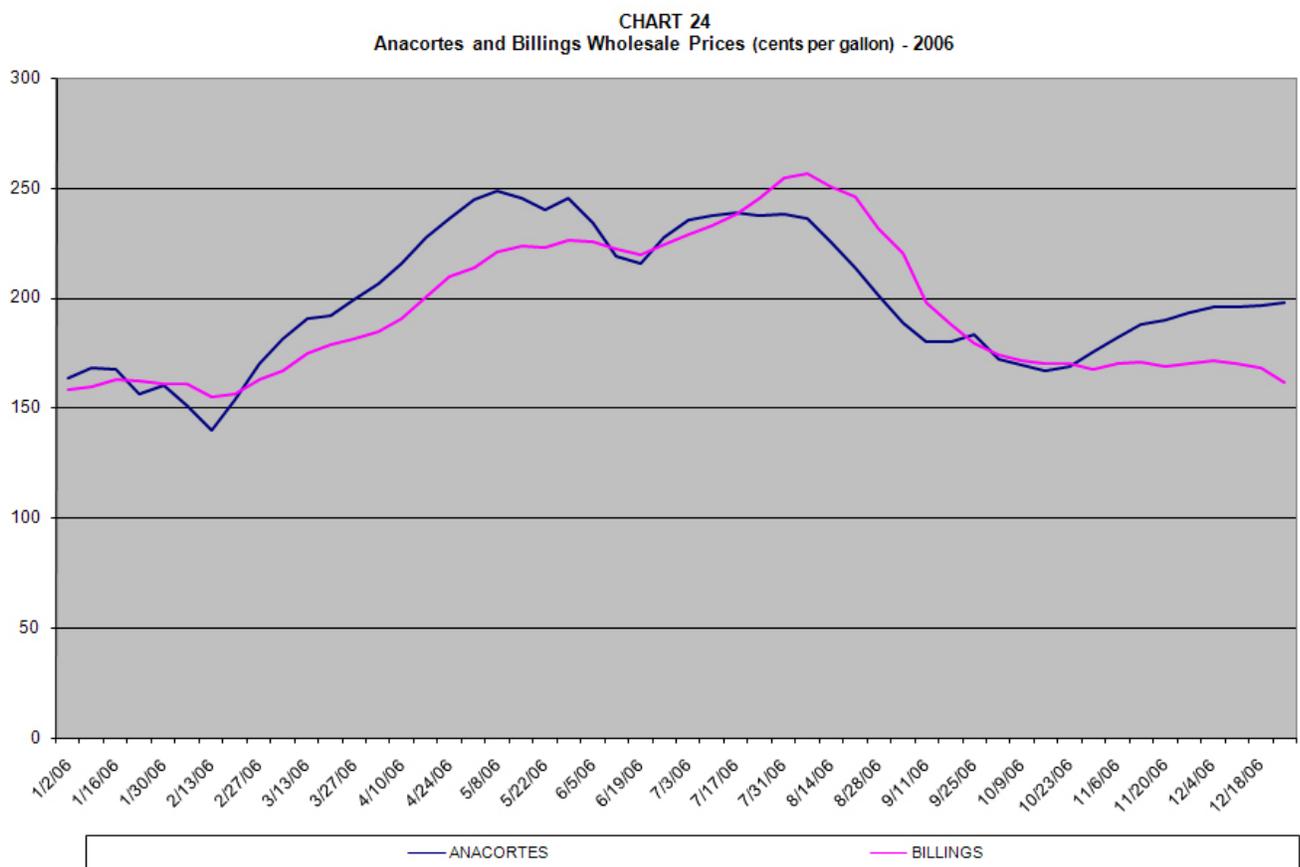


The Spokane wholesale price differences from either the Portland or Anacortes prices are within expected range of the supply costs associated with of the movement of product from those terminals to Spokane. In 2000, the Spokane price – more than 4 cents per gallon above the Anacortes price – is at its greatest differential from the Anacortes price over the period, but is still well below the Puget Sound transportation cost of 7.2 cents per gallon. It is even below the alternate Chevron pipeline supply price of about 4.4 cents per gallon.

The wholesale prices in both Pasco and Spokane indicate that supply out of Portland (either via tanker or the Olympic Pipeline from the Puget Sound refineries) will frequently provide an alternative supply source when the prices at the Montana or Utah refineries exceed the cost of the Puget Sound product plus transportation, or because there are capacity constraints on either the Yellowstone or the Chevron pipelines.

**Moses Lake:** Moses Lake is supplied primarily out of Spokane via a continuation of the Yellowstone pipeline. Product sold at the Moses Lake terminal may originate in any location that supplies Spokane.<sup>43</sup> As shown previously in Table 11, the Moses Lake base price differential, while seemingly high from 2000 through 2003, is below the cost of any alternative supply route.

While the Spokane and Moses Lake price differentials (compared to Anacortes) are high early in the period, they both drop significantly in 2004 and remain low through 2007. In 2004, there was a corresponding change in Billings wholesale prices. Prior to 2004, Billings wholesale prices are between 5 and 10 cents per gallon above Anacortes wholesale prices. However, that trend reverses in 2004 and the Billings prices fall below Anacortes until late May of 2007 when they again rise above. For both the Spokane and the Moses Lake terminals, the 2006 average OPIS wholesale price was below the Anacortes base price. As shown in Chart 24, the Billings wholesale price was below the Anacortes wholesale price for the majority of 2006. Thus the Billings wholesale plus supply costs remained lower than the Anacortes base cost.<sup>44</sup>



43 - Product can also be supplied by truck from Seattle. The estimated costs of trucking gasoline from Seattle to Moses Lake is about 7.2¢ per gallon.

Even during periods when the price differential for Spokane and Moses Lake compared to Anacortes was seemingly high, it was several cents below the cost of supply from the Puget Sound refineries. Over the entire 2000-2007 period, the average differential was only 2.23 cents per gallon above the Anacortes base price for Spokane and 2.66 cents per gallon for Moses Lake.

This section has examined the first factor important in understanding regional differences in gasoline prices in Washington state – differences in the wholesale costs of gasoline at different terminals across the state. In general, the differences in supply costs and supply opportunities well explain the regional variations in the wholesale costs of gasoline.

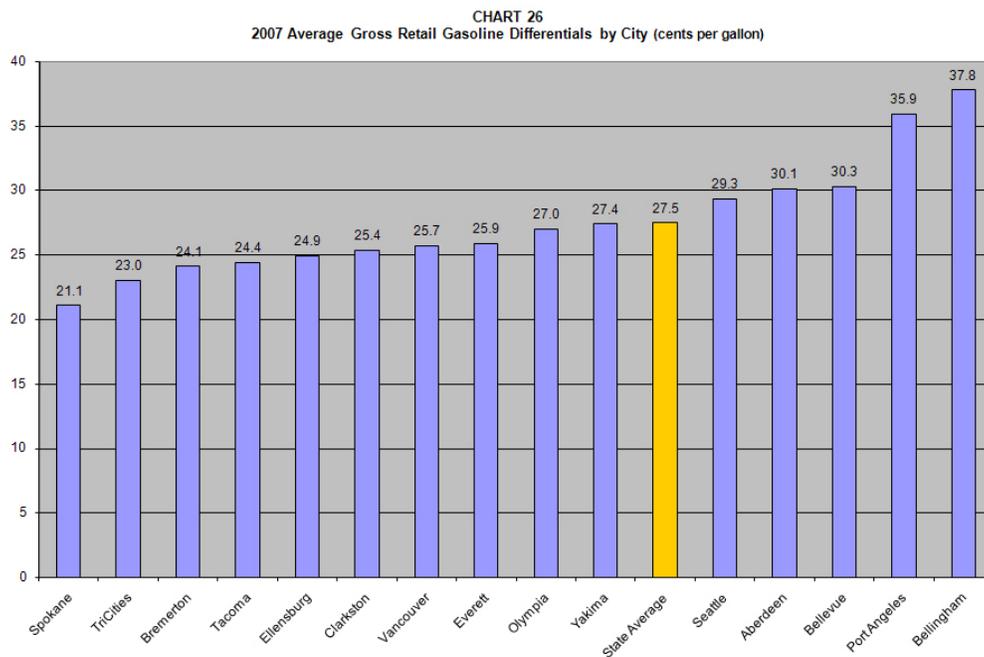
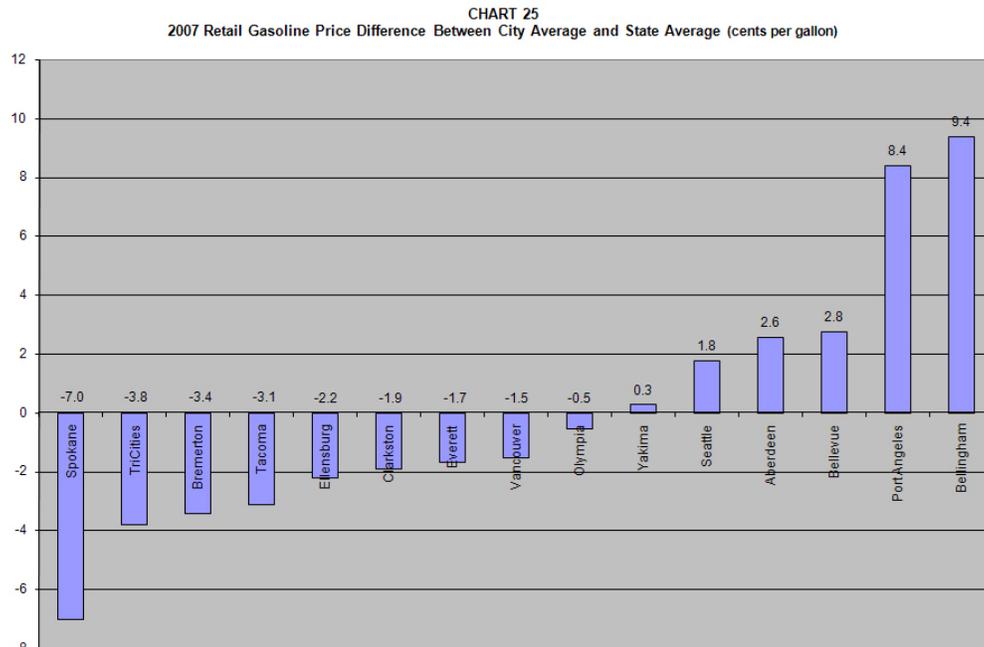
Section 5 below investigates retail price differences across the regions in Washington state. The beginning point in understanding the retail differences is to understand the wholesale differences as explored above. The following analysis will therefore be focused on the “wholesale to retail differential” – that is, the difference between the retail price and the wholesale cost of the gasoline in each studied location.

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44 - The 2006 average wholesale price for Anacortes was \$1.995 per gallon. For Billings, it was \$1.940.

## 5: REGIONAL RETAIL PRICE DIFFERENCES

This section of the report explores the economic factors which help to explain the regional variations in retail prices in 2007. Chart 25 summarizes the differences in retail gasoline prices across the 15 study cities as compared to the state average for 2007. Part of these differences results from the terminal wholesale price differences previously discussed. Accounting for the regional wholesale price differences, Chart 26 shows the “gross retail differentials” by city. These gross retail differentials are the retail prices (net of taxes) less the terminal wholesale prices at the closest terminal to each location. Some of the locations identified in Chart 26 are within the same city boundaries as terminal locations (e.g., Seattle, Tacoma, Spokane, Pasco). However, others (e.g., Port Angeles, Yakima, Ellensburg), are at significant distances from a terminal. Therefore, variances in these gross retail differentials are expected to result simply from the costs of transporting the motor fuels from the terminals to the retail stations. These varying retail transportation costs are first addressed.



**Transportation:** Table 12 shows the distance from the nearest terminal to the nearest city center for each of our study locations. Additionally, Table 12 gives the estimated transportation cost to truck motor fuels from the nearest terminal to the city center for each study city.<sup>45</sup>

As seen in Table 12, for those locations with terminals located within the city limits, there will be minimal trucking expenses of about 1.59 cents per gallon. However, to supply Port Angeles, for example, fuel must be trucked about 120 miles from the Olympia terminal at an added cost of almost 5 cents per gallon. To supply Yakima from Moses Lake, fuel must be trucked about 103 miles at an additional expense of almost 4.5 cents per gallon. Motor fuels supplied to Aberdeen must be trucked about 79 miles at an additional expense of almost 3.6 cents per gallon.

Tables 13A and 13B compare the 2007 wholesale price plus transportation cost to the average retail price net of taxes for each of the study locations for gasoline and

diesel. The data in Tables 13 is broken down by quarter. The tables also provide the estimated average gross retail differential for each city (retail price less wholesale price and transportation).

	<b>TERMINAL /RACK</b>	<b>MILES</b>	<b>TRUCK TRANSPORTATION cents per gallon</b>
<b>Aberdeen</b>	Tacoma	79	3.58
<b>Bellevue</b>	Renton	13	1.59
<b>Bellingham</b>	Ferndale	9	1.59
<b>Bremerton</b>	Tacoma	35	2.09
<b>Clarkston</b>	Clarkston	-	1.59
<b>Ellensburg</b>	Moses Lake	72	3.33
<b>Everett</b>	Seattle	30	1.92
<b>Olympia</b>	Olympia	-	1.59
<b>Port Angeles</b>	Olympia	120	4.96
<b>Seattle</b>	Seattle	-	1.59
<b>Spokane</b>	Spokane	-	1.59
<b>Tacoma</b>	Tacoma	-	1.59
<b>TriCities</b>	Pasco	-	1.59
<b>Vancouver</b>	Vancouver	-	1.59
<b>Yakima</b>	Moses Lake	103	4.46

45 - These estimates were obtained confidentially from a major jobber. This includes a normal profit margin for the jobber functions.

TABLE 13A - GASOLINE 2007						
Average Retail Price, Wholesale Price, Transportation Cost, Net Price and Estimated Differential for Each Study City						
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	2007 Average
ABERDEEN	Retail	269.61	324.58	297.66	313.96	301.51
	Wholesale	185.98	244.16	212.96	230.86	217.99
	Transportation	3.58	3.58	3.58	3.58	3.58
	Net	217.21	272.18	243.26	259.56	248.11
	Retail Differential	27.65	24.45	26.71	25.12	26.54
BELLEVUE	Retail	274.66	325.95	290.69	316.48	301.68
	Wholesale	185.81	244.94	212.90	230.13	217.98
	Transportation	1.59	1.59	1.59	1.59	1.59
	Net	222.26	273.55	236.29	262.08	248.28
	Retail Differential	34.86	27.03	21.80	30.35	28.72
BELLINGHAM	Retail	274.99	334.39	299.42	325.22	308.32
	Rack	186.66	243.56	210.65	229.53	217.12
	Transportation	1.59	1.59	1.59	1.59	1.59
	Net	222.59	281.99	245.02	270.82	254.92
	Retail Differential	34.33	36.84	32.78	39.70	36.21
BREMERTON	Retail	257.37	321.90	288.88	314.35	295.51
	Wholesale	185.98	244.16	212.96	230.86	217.99
	Transportation	2.09	2.09	2.09	2.09	2.09
	Net	204.97	269.50	234.48	259.95	242.11
	Retail Differential	16.90	23.26	19.43	27.00	22.02
CLARKSTON	Retail	243.94	318.38	302.36	318.02	297.01
	Wholesale	172.63	241.53	220.54	238.13	217.41
	Transportation	1.59	1.59	1.59	1.59	1.59
	Net	191.54	265.98	247.96	263.62	243.61
	Retail Differential	17.31	22.86	25.82	23.90	24.61
ELLENSBURG	Retail	256.70	319.05	295.76	315.20	296.72
	Wholesale	174.54	242.22	220.65	239.40	218.39
	Transportation	3.33	3.33	3.33	3.33	3.33
	Net	204.30	266.65	241.36	260.80	243.32
	Retail Differential	26.43	21.10	17.39	18.07	21.60
EVERETT	Retail	263.28	323.57	288.91	313.87	297.26
	Wholesale	185.81	244.94	212.90	230.13	217.98
	Transportation	1.92	1.92	1.92	1.92	1.92
	Net	210.88	271.17	234.51	259.47	243.86
	Retail Differential	23.15	24.31	19.70	27.42	23.97
OLYMPIA	Retail	266.13	324.33	290.46	313.07	298.40
	Wholesale	185.98	244.16	212.96	230.86	217.99
	Transportation	1.59	1.59	1.59	1.59	1.59
	Net	213.73	271.93	236.06	258.67	245.00
	Retail Differential	26.16	26.18	21.50	26.22	25.42
PORT ANGELES	Retail	272.51	331.97	302.72	322.10	307.34
	Wholesale	185.98	244.16	212.96	230.86	217.99
	Transportation	4.96	4.96	4.96	4.96	4.96
	Net	220.11	279.57	248.32	267.70	253.94
	Retail Differential	29.17	30.46	30.40	31.88	30.98
SEATTLE	Retail	268.43	326.32	291.91	316.85	300.71
	Wholesale	185.81	244.94	212.90	230.13	217.98
	Transportation	1.59	1.59	1.59	1.59	1.59
	Net	216.03	273.92	237.51	262.45	247.31
	Retail Differential	28.63	27.39	23.03	30.72	27.74
SPOKANE	Retail	243.45	313.10	295.32	315.41	291.91
	Wholesale	172.63	241.53	220.54	238.13	217.41
	Transportation	1.59	1.59	1.59	1.59	1.59
	Net	191.05	260.70	240.92	261.01	238.51
	Retail Differential	16.83	17.58	18.78	21.29	19.51
TACOMA	Retail	261.39	322.30	287.64	312.39	295.80
	Wholesale	185.98	244.16	212.96	230.86	217.99
	Transportation	1.59	1.59	1.59	1.59	1.59
	Net	208.99	269.90	233.24	257.99	242.40
	Retail Differential	21.43	24.15	18.69	25.54	22.81
TRICITIES	Retail	251.81	316.84	297.13	314.26	295.15
	Wholesale	176.67	245.58	219.10	236.13	218.70
	Transportation	1.59	1.59	1.59	1.59	1.59
	Net	199.41	264.44	242.73	259.86	241.75
	Retail Differential	21.15	17.28	22.04	22.14	21.46
VANCOUVER	Retail	265.20	322.48	289.41	313.02	297.39
	Wholesale	186.41	244.23	212.94	231.56	218.27
	Transportation	1.59	1.59	1.59	1.59	1.59
	Net	212.80	270.08	235.01	258.62	243.99
	Retail Differential	24.80	24.26	20.48	25.47	24.13
YAKIMA	Retail	257.02	321.78	298.09	319.98	299.21
	Wholesale	174.54	242.22	220.65	239.40	218.39
	Transportation	4.46	4.46	4.46	4.46	4.46
	Net	204.62	269.38	243.69	265.58	245.81
	Retail Differential	25.62	22.70	18.58	21.72	22.95

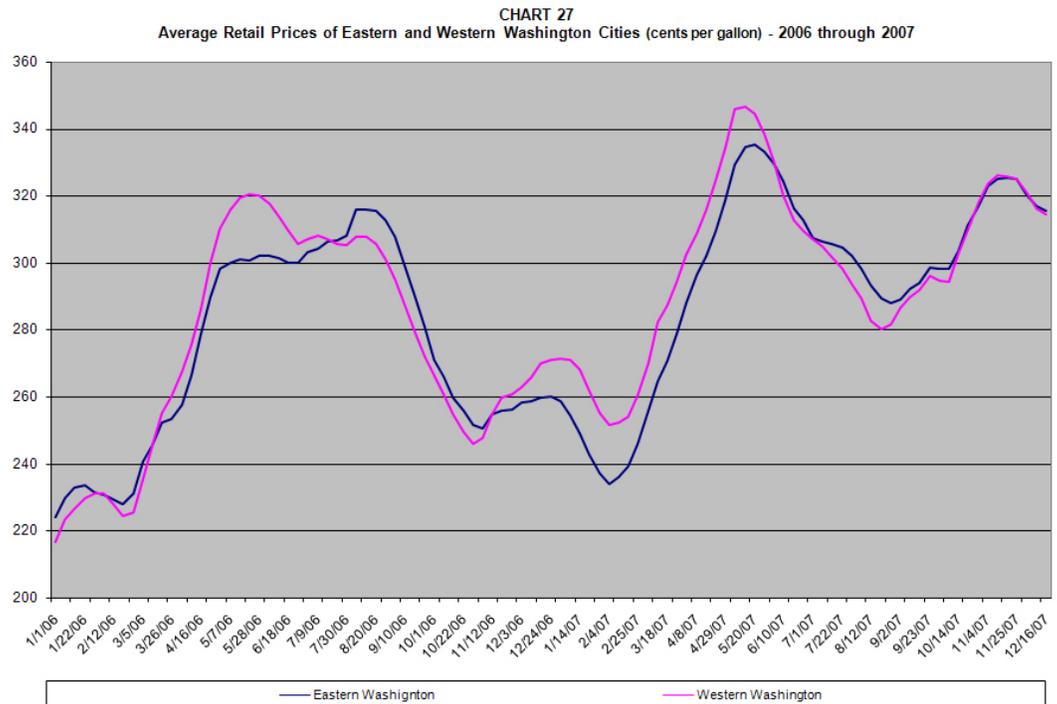
TABLE 13B - DIESEL 2007						
Average Retail Price, Wholesale Price, Transportation Cost, Net Price and Estimated Differential for Each Study City						
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	2007 Average
ABERDEEN	Retail	280.12	300.79	309.09	357.82	311.05
	Wholesale	188.20	211.47	222.35	271.46	221.45
	Transportation	4.08	4.08	4.08	4.08	4.08
	Net	221.72	242.39	250.69	299.42	252.65
	Retail Differential	29.44	26.84	24.26	23.88	27.13
BELLEVUE	Retail	289.06	304.14	311.50	358.50	314.96
	Wholesale	192.31	215.05	221.59	265.29	221.89
	Transportation	1.85	1.85	1.85	1.85	1.85
	Net	230.66	245.74	253.10	300.10	256.56
	Retail Differential	36.51	28.84	29.66	32.95	32.82
BELLINGHAM	Retail	285.74	302.70	312.48	357.94	313.87
	Rack	187.36	210.85	220.07	264.55	218.95
	Transportation	1.85	1.85	1.85	1.85	1.85
	Net	227.34	244.30	254.08	299.54	255.47
	Retail Differential	38.13	31.61	32.16	33.15	34.67
BREMERTON	Retail	291.71	307.73	316.26	366.07	319.55
	Wholesale	188.20	211.47	222.35	271.46	221.45
	Transportation	2.40	2.40	2.40	2.40	2.40
	Net	233.31	249.33	257.86	307.67	261.15
	Retail Differential	42.70	35.46	33.11	33.81	37.30
CLARKSTON	Retail	288.14	306.87	310.89	363.09	316.35
	Wholesale	203.61	225.79	237.12	290.47	237.20
	Transportation	1.85	1.85	1.85	1.85	1.85
	Net	229.74	248.47	252.49	304.69	257.95
	Retail Differential	24.28	20.83	13.52	12.37	18.90
ELLENSBURG	Retail	280.93	301.80	312.51	360.30	312.97
	Wholesale	205.14	226.66	235.09	283.80	235.83
	Transportation	3.89	3.89	3.89	3.89	3.89
	Net	226.53	247.40	258.11	305.90	258.57
	Retail Differential	17.49	16.85	19.13	18.21	18.86
EVERETT	Retail	288.40	305.00	311.85	359.57	315.36
	Wholesale	192.31	215.05	221.59	265.29	221.89
	Transportation	2.25	2.25	2.25	2.25	2.25
	Net	230.00	246.60	253.45	301.17	256.96
	Retail Differential	35.45	29.30	29.61	33.63	32.81
OLYMPIA	Retail	288.75	305.14	312.65	358.35	315.39
	Wholesale	188.20	211.47	222.35	271.46	221.45
	Transportation	1.85	1.85	1.85	1.85	1.85
	Net	230.35	246.74	254.25	299.95	256.99
	Retail Differential	40.29	33.41	30.05	26.64	33.70
PORT ANGELES	Retail	280.42	301.80	313.25	359.21	313.00
	Wholesale	188.20	211.47	222.35	271.46	221.45
	Transportation	5.64	5.64	5.64	5.64	5.64
	Net	222.02	243.40	254.85	300.81	254.60
	Retail Differential	28.17	26.29	26.87	23.72	27.51
SEATTLE	Retail	291.02	305.61	311.81	359.83	316.23
	Wholesale	192.31	215.05	221.59	265.29	221.89
	Transportation	1.85	1.85	1.85	1.85	1.85
	Net	232.62	247.21	253.41	301.43	257.83
	Retail Differential	38.46	30.31	29.97	34.29	34.09
SPOKANE	Retail	292.33	309.53	313.67	368.50	320.08
	Wholesale	203.61	225.79	237.12	290.47	237.20
	Transportation	1.85	1.85	1.85	1.85	1.85
	Net	233.93	251.13	255.27	310.10	261.68
	Retail Differential	28.47	23.49	16.30	17.78	22.63
TACOMA	Retail	285.51	299.72	307.72	355.64	311.30
	Wholesale	188.20	211.47	222.35	271.46	221.45
	Transportation	1.85	1.85	1.85	1.85	1.85
	Net	227.11	241.32	249.32	297.24	252.90
	Retail Differential	37.06	28.00	25.13	23.93	29.60
TRICITIES	Retail	289.13	311.09	310.91	363.35	317.74
	Wholesale	198.27	211.14	229.69	275.48	226.77
	Transportation	1.85	1.85	1.85	1.85	1.85
	Net	230.73	252.69	252.51	304.95	259.34
	Retail Differential	30.61	39.69	20.97	27.63	30.72
VANCOUVER	Retail	285.54	302.00	308.58	355.27	312.01
	Wholesale	190.66	210.53	224.99	269.38	222.07
	Transportation	1.85	1.85	1.85	1.85	1.85
	Net	227.14	243.60	250.18	296.87	253.61
	Retail Differential	34.63	31.22	23.33	25.64	29.69
YAKIMA	Retail	290.38	309.43	316.45	363.23	319.02
	Wholesale	205.14	226.66	235.09	283.80	235.83
	Transportation	5.08	5.08	5.08	5.08	5.08
	Net	231.98	251.03	258.05	304.83	260.62
	Retail Differential	21.76	19.30	17.89	15.95	19.72

Table 14 ranks the estimated retail differentials for the last quarter of 2007. For gasoline, the five cities with the lowest differentials are all in Eastern Washington. For diesel, only one study region in Eastern Washington, Tri-Cities, has higher than average differentials.

As discussed, motor fuel retail prices in Washington are determined by supply and demand rather than directly by costs. Nonetheless, in a limited number of cases where the supply costs are substantially greater to one area than to others, the elevated retail price does in fact reflect the higher transportation supply costs. In Yakima, for example, high retail gasoline prices are reasonably explained simply by the high costs of supplying fuel to the retail stations. While Yakima's gasoline prices were above the average for 2007, the retail differentials net of transportation are, in fact, below average; that is, much of the higher retail cost in Yakima can be attributed to the relatively high 4.46 cents per gallon trucking expense. In most cities, however, the transportation expenses are negated by other variables.

GASOLINE		DIESEL	
Ellensburg	18.07	Clarkston	12.37
Spokane	21.29	Yakima	15.95
Yakima	21.72	Spokane	17.78
TriCities	22.14	Ellensburg	18.21
Clarkston	23.90	Port Angeles	23.72
Aberdeen	25.12	Aberdeen	23.88
Vancouver	25.47	Tacoma	23.93
Tacoma	25.54	Vancouver	25.64
Olympia	26.22	Olympia	26.64
Bremerton	27.00	TriCities	27.63
Everett	27.42	Bellevue	32.95
Bellevue	30.35	Bellingham	33.15
Seattle	30.72	Everett	33.63
Port Angeles	31.88	Bremerton	33.81
Bellingham	39.70	Seattle	34.29
<b>AVERAGE</b>	<b>26.43</b>	<b>AVERAGE</b>	<b>25.57</b>

As discussed in Section 4, the wholesale prices in Eastern Washington are generally higher than in Western Washington. However, as shown in Chart 27, the retail prices in Eastern Washington have in recent years been generally lower than in Western Washington. The explanation for this reversal is the relatively low (net of transportation), gross retail differentials in Eastern Washington which in 2007 averaged about 21 cents per gallon (22 cents per gallon for diesel) as compared to much higher gross retail differentials in Western Washington (average of about 26 cents for gasoline and 32 cents for diesel). This can only be due to local differences in Eastern Washington versus those in Western Washington.



## **Understanding Retail Differentials**

From Tables 13 and 14, it is clear that factors other than terminal supply costs, wholesale prices and the cost of transportation to the retail stations are important in determining the price of motor fuels at the retail level. Additional factors considered during this investigation include differences in the land costs, the costs of labor, supply source (direct refiner versus jobber) and the extent or nature of retail competition. To investigate these factors, a data set was assembled that includes the following for each studied city for each year 2000 through 2007: average value of properties sold in the county, average wages of service station attendants in the county, number of motor vehicles per gasoline station in the county, population per gasoline station in the county, whether the retail area is served directly by the refineries or by jobbers and the percent of stations per county that are hypermarketers.

The property value and wage variables are included as a measure of differences in the economic costs of retailing gasoline. The economic expectation is that the higher these costs, the more money must be earned (higher retail margin) to attract economic resources into the retailing of motor fuel. The number of vehicles and population per station are included as possible measures of the intensity of retail competition in the city. These variables can have contrary effects on the expected equilibrium gross retail differentials.<sup>46</sup> First, where the number of vehicles and/or population per station is lower, the intensity of competition at retail is expected to be greater - leading to higher equilibrium retail differentials. However, to the contrary, if an area has many smaller and less efficient retail stations, the costs of operating the stations on a per-gallon basis will be higher.

Motor fuel retailers in Washington obtain their supply in one of two ways. In the greater Seattle area most of the retailers are major brand dealers supplied directly by integrated petroleum companies such as Shell, Chevron, ARCO and 76 (Conoco/Phillips).<sup>47</sup> Branded dealers operate service stations either owned or leased by the refiner. These dealers receive product at a delivered price (historically called the dealer tank wagon price or DTW). Outside of the greater Seattle area, motor fuel retailers are typically supplied by jobbers.<sup>48</sup>

The final variable concerns hypermarketers. Hypermarketers are a relatively new phenomena in gasoline retailing. Hypermarketers refer to large retailers such as Costco, Walmart, Fred Meyer, Safeway and Albertsons, which have added gasoline facilities to their retailing operations. Such gasoline retailers tend to compete aggressively on price. Therefore, the expectation is that as hypermarketers become more important in a city, the intensity of retail competition will increase and the equilibrium gross retail differential will fall.

### **The variables used in the analysis are defined as:**

**GROSS RETAIL DIFFERENTIAL:** This variable is the “dependent variable” in this analysis; that is, the variable to be explained. The retail differential variable is the monthly simple average of the weekly retail differentials (the difference between the retail price net of tax and the wholesale cost at the nearest terminal) as described previously. Note that this variable is not the margin earned by retailers as it includes transportation costs and the margin earned by jobbers (and/or refiners with direct supply).

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46 - The gross retail differential is the difference between the retail price (net of taxes) and the wholesale price at the nearest terminal.

47 - There are also a few major brand company operated retail stations in the greater Seattle area.

48 - One reason to include this variable concerns the wholesale price. Direct supplied dealers pay a price usually called a Dealer Tank Wagon or DTW price. While the DTW price typically is closely related to the wholesale price, in periods of rapidly rising prices or refinery supply problems, there can be significant deviations in these two prices.

**DIRECT SUPPLY:** The direct supply variable is a 0/1 indicator (dummy) variable. The cities which are directly supplied (Bellevue, Everett, Seattle and Tacoma) have a value of 1, all other cities have a 0.<sup>49</sup>

**HYPERMARKETERS:** The hypermarketer variable is the percentage of stations in the county of the study city which are hypermarketers, based on 2007 station data.<sup>50</sup>

**POPULATION PER STATION:** The population per station variable changes annually. This variable is calculated based upon the annual population for the county of the study city, divided by the number of stations in that county based on the 2007 data.<sup>51</sup>

**VEHICLES PER STATION:** The vehicles per station variable changes annually. It is calculated by dividing the annual number of vehicles in the county of the study city by the number of stations in that county, based on the 2007 station data.<sup>52</sup>

**WAGE PER MONTH:** The wage variable changes quarterly. It is calculated using the wages paid to gasoline station employees and the number of persons employed per quarter per county. The average wage for November 2004 for service station attendants was \$1,307.<sup>53</sup>

**PROPERTY VALUE:** The property value variable changes annually and is based on county data.<sup>54</sup>

**TRUCK TRANSPORTATION:** The truck transportation variable, which has been previously discussed, is city-specific and is a single number for the entire period based on 2007 expenses.

The values of each of the variables for November 2004 (approximately the mid-point of the data) are shown in Table 15.<sup>55</sup>

In order to assess the impact of these variables on the gross retail differential, a statistical technique called multiple regression analysis was applied. Multiple regression analysis is a widely used and accepted statistical method to determine the relationship among multiple variables. In this case, the regression results indicate whether changes in one of the eight factors (called independent variables) mentioned above are related to changes in the gross retail differential.

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49 - Since the Direct Supply variable also corresponds to the major metropolitan region of Washington, this variable will also measure any factors that are related to supplying motor fuels in a major metropolitan region that are not accounted for by the other variables.

50 - Aberdeen has the lowest percentage of hypermarketers with 1.6 percent and Port Angeles has the highest with 9.5 percent.

51 - For 2004, the population per station ranges from a low of 833 people per station in Ellensburg to a high of 2,061 in Vancouver. The average is 1,436 persons per station for 2004.

52 - Vancouver has the highest number of vehicles per station with 1,995 and Tri-Cities has the fewest with 1,088 in 2004.

53 - For this month, Bellevue/Seattle (the same since the data is county data) has the highest wage with \$1,589 and Clarkston has the lowest with \$754.

54 - The average property value for 2004 is \$123,624. The Seattle-Bellevue area has the highest property value, \$252,242, while Aberdeen has the lowest, \$55,224.

55 - The sources for the data are:

**Stations and Hypermarketers:** Department of Ecology - <http://www.ecy.wa.gov/programs/tcp/ust-lust/tags061106.pdf>

**Population:** Washington State Office of Financial Management - [www.ofm.wa.gov/pop/cociseries/default.asp](http://www.ofm.wa.gov/pop/cociseries/default.asp)

**Wage:** [www.workforceexplorer.com](http://www.workforceexplorer.com)

**Vehicles:** Washington State Department of Licensing - [www.dol.wa.gov/about/vehvesselreports.html](http://www.dol.wa.gov/about/vehvesselreports.html)

**Transportation:** See footnote 42. This data was obtained confidentially from a major jobber.

**Property Value:** Washington State Department of Revenue - [http://dor.wa.gov/Content/AboutUs/StatisticsAndReports/stats\\_proptaxstats\\_report.aspx](http://dor.wa.gov/Content/AboutUs/StatisticsAndReports/stats_proptaxstats_report.aspx)

	DEPENDENT VARIABLE	INDEPENDENT VARIABLES						
	Gross Retail Differential (cpg)	Direct Supply Dummy	Hyper Marketers	Population per Station	Vehicles per Station	Wage	Property Value	Truck Transportation (cpg)
ABERDEEN	\$ 18.89	0	1.6%	1,116	1,223	\$ 1,211.82	\$ 55,224.32	\$ 3.58
BELLEVUE	\$ 28.23	1	2.6%	1,762	1,680	\$ 1,588.60	\$ 252,241.60	\$ 1.59
BELLINGHAM	\$ 26.63	0	1.8%	1,088	1,154	\$ 1,185.75	\$ 117,862.15	\$ 1.59
BREMERTON	\$ 17.12	0	4.3%	1,460	1,510	\$ 1,277.89	\$ 105,450.16	\$ 2.09
CLARKSTON	\$ 14.77	0	5.6%	1,150	1,302	\$ 753.87	\$ 58,736.23	\$ 1.59
ELLENSBURG	\$ 18.78	0	2.3%	833	1,105	\$ 1,327.36	\$ 98,813.87	\$ 3.33
EVERETT	\$ 20.45	1	3.6%	1,791	1,835	\$ 1,283.93	\$ 184,436.80	\$ 1.92
OLYMPIA	\$ 21.05	0	4.8%	1,316	1,645	\$ 1,318.70	\$ 124,477.51	\$ 1.59
PORT ANGELES	\$ 28.98	0	9.5%	1,046	1,337	\$ 1,193.49	\$ 87,043.85	\$ 4.96
SEATTLE	\$ 25.77	1	2.6%	1,762	1,680	\$ 1,588.60	\$ 252,241.60	\$ 1.59
SPOKANE	\$ 16.39	0	3.0%	1,594	1,736	\$ 1,397.81	\$ 89,023.86	\$ 1.59
TACOMA	\$ 17.43	1	3.9%	1,927	1,767	\$ 1,357.01	\$ 143,511.82	\$ 1.59
TRI CITIES	\$ 15.17	0	4.3%	963	1,088	\$ 1,541.61	\$ 89,051.82	\$ 1.59
VANCOUVER	\$ 15.56	0	4.3%	2,061	1,995	\$ 1,219.13	\$ 126,909.29	\$ 1.59
YAKIMA	\$ 23.66	0	4.4%	1,673	1,782	\$ 1,352.71	\$ 69,328.80	\$ 4.46

The regression equation is:

$$GRM_{t,r} = c + a1*TCr + a2*SD_{t,r} + a3*W_{t,r} + a4*LC_{t,r} + a5*DSr + a6*HM_{,r} + E_{t,r}$$

**Where:**  $GRM_{t,r}$  is the Gross Retail Differential at time t in region r

c is a constant term

a1 through a6 are the estimated coefficients

TCr is the transportation costs from terminal to station for region r

SD<sub>t,r</sub> is the station density (population or vehicles per station) at time t in region r

W<sub>t,r</sub> is the service station Wage at time t in region r

LC<sub>t,r</sub> is the Land Cost at time t in region r

DSr is a 0/1 variable with 1 indicating Direct Refiner Supply in region r

HM<sub>,r</sub> is the percent of stations that are Hypermarketers in region r

E<sub>t,r</sub> is an error term

This equation summarizes the tested statistical relationship between the factors examined and the monthly average gross retail differential at each location for the period of January 2002 through December 2007.<sup>56</sup>

56 - Wage data for Clarkston (Asotin County) past December 2004 is unavailable. Thus, the Clarkston data are only used through that date.

Table 16 presents the results of the regression analysis. Of the independent variables, six are statistically significant at the 95 percent level in explaining the variation in the retail differentials across the studied locations.<sup>57</sup> The statistically significant variables are:

- Percent of Hypermarketers per Station**
- Population per Station**
- Wage**
- Number of Vehicles per Station**
- Property Value**
- Truck Transportation Expense**

SUMMARY OUTPUT									
<i>Regression Statistics</i>									
Multiple R	0.514								
R Square	0.265								
Adjusted R Square	0.257								
Standard Error	9.110								
Observations	1044.000								
ANOVA									
	df	SS	MS	F	Significance F				
Regression	10.000	30830.700	3083.070	37.150	0.000				
Residual	1033.000	85727.499	82.989						
Total	1043.000	116558.199							
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%	
Intercept	7.694	3.064	2.511	0.012	1.682	13.707	1.682	13.707	
WINTER dummy	-3.811	0.801	-4.757	0.000	-5.383	-2.239	-5.383	-2.239	
SPRING dummy	-1.428	0.809	-1.764	0.078	-3.016	0.160	-3.016	0.160	
SUMMER dummy	-2.038	0.803	-2.538	0.011	-3.614	-0.462	-3.614	-0.462	
DIRECT SUPPLY Dummy	-0.911	1.033	-0.882	0.378	-2.939	1.117	-2.939	1.117	
HYPERMARKETERS	-48.509	19.189	-2.528	0.012	-86.163	-10.855	-86.163	-10.855	
POPULATION per STATION	-0.012	0.003	-3.571	0.000	-0.019	-0.005	-0.019	-0.005	
WAGE per MONTH	0.004	0.002	1.846	0.065	0.000	0.009	0.000	0.009	
VEHICLES per STATION	0.009	0.004	2.204	0.028	0.001	0.017	0.001	0.017	
PROPERTY VALUE	0.000	0.000	12.090	0.000	0.000	0.000	0.000	0.000	
TRUCK TRANSPORT	2.693	0.310	8.684	0.000	2.085	3.302	2.085	3.302	

The statistical results show that, as expected, in locations where there are more hypermarketers per retail service station, the average retail differential is lower<sup>58</sup> The regression analysis shows that as the percentage of hypermarketers increases from its low value in November 2004 (shown in Table 15) of 1.6 percent in Aberdeen to its high value of 9.5 percent in Port Angeles, the average retail differential for gasoline is expected to decrease by 3.8 cents per gallon.<sup>59</sup>

57 - Statistically significant at the 95 percent level means that there is only a 5 percent or less chance that the estimated relationship between the variables is due to random variation in the data; that is, there is a 95 percent probability that an actual statistical relationship between the retail differential and the independent variable exists.

58 - Our data indicates the following number of hypermarketers for each of our study locations:  
 Aberdeen (Grays Harbor County) 1; Bellevue and Seattle (King County) 26; Bellingham (Whatcom County) 3; Bremerton (Kitsap County) 7; Clarkston (Asotin County) 1; Ellensburg (Kittitas County) 1; Everett (Snohomish County) 13; Olympia (Thurston County) 8; Port Angeles (Clallam County) 6; Spokane (Spokane County) 8; Tacoma (Pierce County) 15; Tri-Cities (Benton and Franklin Counties) 7; Vancouver (Clark County) 8; Yakima (Yakima County) 6.

59 - For the following regression result examples, the data described is the November 2004 data shown in Table 15.

The Population per Station and the Vehicles per Station variables are both significant. Due to the high inter-relationship between these variables, known as the “degree of co-linearity”, they should be interpreted together.<sup>60</sup> Using the values of these variables in Table 15, Vancouver has the lowest station density, while the Tri-Cities has the highest station density. The joint impact of these station density variables “explains” a difference in the gross retail differential of -4.1 cents between Vancouver and the Tri-Cities; that is, a differential of 4.1 cents per gallon less is predicted for Vancouver because of its lower station density. This suggests that a lower value of these variables (greater demand per station) causes lower prices because of increased station efficiency rather than any effect of increased competition (because of more stations relative to demand).

The regression analysis also confirms that the average wage paid to retail gasoline station employees is related to higher average retail differentials. As the wage increases from a low of \$754 per month in Clarkston to a high of \$1,588 in Seattle and Bellevue, the average retail differential is found to increase by about 3.5 cents per gallon.

Property Value was also statistically significant in the regression analysis. Again, as expected, higher property values are statistically related to higher gross retail differentials. The results indicate that as property value increases from a low of \$55,224 in Aberdeen to a high of \$252,242 in Bellevue/Seattle, the impact on the expected retail differential is 12.3 cents per gallon.

The final statistically significant independent variable is the cost to transport product by truck from the terminal to the destination city. The transportation cost variable is measured in cents per gallon as is the gross retail differential. If the jobbers and retailers simply passed on the higher transportation costs, then the expectation is that higher transportation costs would impact the retail price by exactly the amount of the cost increase. However, the regression results find that for each 1 cent per gallon change in the truck transportation costs, the gross retail differential increases by 2.70¢. This can be the result of either an underestimate of the transportation costs or the differences in competition related to the distance from a terminal. The transportation cost estimates imply that, on average, the gross retail differentials increase by about 9 cents per gallon in the most distant location, Port Angeles, as compared to those locations adjacent to terminals (Bellevue, Bellingham, Clarkston, Olympia, Seattle, Spokane, Tacoma, Tri-Cities and Vancouver).

In any of our study cities at any given time, these “statistically significant” variables are affecting the value of the average gross retail differentials.<sup>61</sup> From the results of the regression analysis, the “expected” gross retail differential for each region can be estimated. The actual annual average gross retail differentials and the predicted differentials are shown in Table 17.<sup>62</sup> Table 18 shows the difference between the actual gross retail differentials and the predicted differentials for each city. While the difference between the actual average differentials and the predicted differentials follow no consistent pattern from year to year, over the entire period, most of the cities are within 2 cents per gallon of the predicted differential.

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60 - Co-linear variables are variables that move together. In this case, in the regions where there are more vehicles per station there is also greater population per station. This is demonstrated by the correlation coefficient of .95 for the value of these two variables for November 2004 as in Table 15.

61 - While the statistical results find expected and significant relationships between the gross retail differentials and the independent variables, it is important to note that the independent variables “explain” only about 27 percent of the variation in the gross retail margin over time and region.

62 - The 2007 actual gross retail differentials do not exactly match the retail differentials shown in Table 13A. The differentials in Table 13A subtract transportation costs while the gross differentials in Table 17 do not – since transportation cost was used as one of the independent variables in the regression analysis. Additionally, one data set is based off weekly averages while the other is based off monthly averages.

TABLE 17							
Annual Average Residuals							
CITY	GROSS RETAIL DIFFERENTIAL	2002	2003	2004	2005	2006	2007
Aberdeen	ACTUAL	0.43	20.56	22.60	23.39	26.18	30.54
	PREDICTED	19.46	19.51	20.56	20.51	22.05	23.06
Bellevue	ACTUAL	20.22	26.10	29.37	30.50	27.79	30.87
	PREDICTED	20.85	21.71	23.57	27.76	31.44	34.17
Bellingham	ACTUAL	8.14	24.02	27.33	32.45	37.95	38.24
	PREDICTED	16.59	16.76	18.27	20.06	21.92	23.88
Bremerton	ACTUAL	3.79	18.31	20.13	14.99	14.75	24.43
	PREDICTED	15.64	16.90	16.70	27.66	22.49	25.51
Clarkston	ACTUAL	3.31	14.43	16.22			
	PREDICTED	11.50	14.83	12.09			
Ellensburg	ACTUAL	18.31	22.86	21.92	24.33	27.32	24.90
	PREDICTED	22.20	22.66	24.57	27.38	29.18	31.71
Everett	ACTUAL	9.58	21.60	23.20	24.91	18.76	26.26
	PREDICTED	17.11	17.47	19.56	21.78	24.99	27.10
Olympia	ACTUAL	4.00	18.83	22.85	20.48	20.84	27.38
	PREDICTED	17.13	18.58	19.58	21.29	22.65	24.34
Port Angeles	ACTUAL	22.07	26.20	27.47	31.52	35.28	36.33
	PREDICTED	21.63	26.97	23.93	24.84	29.86	34.03
Seattle	ACTUAL	16.80	26.79	26.54	27.21	24.19	29.77
	PREDICTED	20.85	21.71	23.57	27.76	31.44	34.17
Spokane	ACTUAL	3.15	15.44	18.13	21.59	21.17	21.30
	PREDICTED	13.95	14.18	16.01	16.75	18.54	20.14
Tacoma	ACTUAL	6.66	17.46	18.57	15.59	14.32	24.73
	PREDICTED	11.11	12.12	13.91	15.66	18.13	19.83
TriCities	ACTUAL	7.09	17.98	16.51	20.43	21.77	23.32
	PREDICTED	16.61	23.13	17.29	17.69	18.96	20.56
Vancouver	ACTUAL	5.27	18.76	18.17	15.05	18.29	26.13
	PREDICTED	12.04	18.60	13.65	15.52	18.40	20.82
Yakima	ACTUAL	3.51	17.96	22.23	25.88	27.11	27.56
	PREDICTED	19.26	20.08	21.12	21.90	22.10	23.13

TABLE 18							
Annual Difference Between Actual and Predicted Retail Differential							
	2002	2003	2004	2005	2006	2007	PERIOD AVERAGE
Aberdeen	-19.03	1.05	2.04	2.88	4.12	7.48	-0.24
Bellevue	-0.63	4.39	5.80	2.73	-3.64	-3.30	0.89
Bellingham	-8.46	7.26	9.06	12.39	16.03	14.36	8.44
Bremerton	-11.85	1.41	3.43	-12.67	-7.73	-1.07	-4.75
Clarkston	-8.19	-0.40	4.13				-1.49
Ellensburg	-3.89	0.20	-2.65	-3.05	-1.86	-6.81	-3.01
Everett	-7.53	4.13	3.63	3.12	-6.24	-0.84	-0.62
Olympia	-13.13	0.25	3.27	-0.82	-1.80	3.03	-1.53
Port Angeles	0.44	-0.76	3.54	6.68	5.42	2.30	2.93
Seattle	-4.05	5.08	2.97	-0.55	-7.25	-4.40	-1.37
Spokane	-10.79	1.26	2.12	4.84	2.63	1.16	0.20
Tacoma	-4.45	5.33	4.66	-0.06	-3.80	4.90	1.10
TriCities	-9.51	-5.15	-0.78	2.74	2.81	2.77	-1.19
Vancouver	-6.77	0.16	4.52	-0.46	-0.11	5.31	0.44
Yakima	-15.75	-2.12	1.11	3.98	5.01	4.43	-0.56

**Local findings:** For the entire period, the Port Angeles gross retail differential is higher than expected given the values of the Port Angeles independent variables and the regression results. However, while the Port Angeles retail prices are significantly above those of other cities in the state, the independent variables do explain most of the average difference. In fact, for the 2002-2007 period, the Port Angeles gross retail differentials are less than 3 cents per gallon above what would be economically expected. In contrast to Port Angeles, Ellensburg and Bremerton both have lower than predicted differentials (averages of 3.01 cents per gallon and 4.75 cents per gallon lower, respectively).

Bellingham stands alone as the only city in our study with differentials consistently and significantly above what can be explained analytically by the independent variables previously discussed. For the entire 2002-2007 period, Bellingham's gross retail differentials average nearly 8.5 cents per gallon above what can be explained by the economic variables analyzed here. Located the closest to the Puget Sound refineries, Bellingham has below average rack prices (\$2.17 – the lowest of the study's wholesale prices for 2007) and minimal transportation costs to the retail stations (1.59 cents per gallon). Yet, Bellingham has the highest retail prices of the cities studied because of its high gross retail differentials. Bellingham's estimated gross retail differential for the fourth quarter of 2007 is almost 40 cents per gallon. This is nearly 8 cents per gallon above the next closest gross retail differential (Port Angeles) and almost 13.3 cents per gallon above the state average of 26.43 cents per gallon for the quarter.

One factor unique to Bellingham, that was not included in our regression analysis, is the possible effect of the Canadian border and the higher demand that might result from the international traffic. In December 2007, the price of gasoline in Vancouver, B.C. was about \$1 per gallon above that in Bellingham. Given this price difference, it is likely that both U.S. visitors to Canada and Canadian residents returning home would fill up with gasoline before crossing the border back into Canada. This may lead to both high demand per station (not measured by our station density variables) and "inelastic" or price-insensitive average demanders.<sup>63</sup> Data on the total gasoline demand compared to what is expected from local users is not readily available.

To the extent to which cross-border traffic explains high Bellingham prices, a differential impact on the stations at I-5 exits should exist. To test this possibility, informal surveys of 28 individual station prices, both on and off the freeway, were conducted on October 1, 2007 and again on January 7, 2008. On both occasions, prices at branded stations adjacent to I-5 were consistently higher between Bellingham and the Canadian border. Lower prices were found at a hypermarketer in Bellingham and independent gas stations further from the freeway off ramps. This provides some support for the high Canadian gasoline prices explaining in part the exceptionally high gross retail margins found in Bellingham.

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63 - Out of the area travelers will not be familiar with local prices and with the differences in prices among stations.

## 6: CONCLUSION

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There are a number of “components” which make up the retail price of a gallon of fuel. The cost of crude oil, which historically accounted for about 40 percent of the retail gasoline price, has escalated significantly and is now responsible for approximately 65 percent of the pump price of gasoline. While federal taxes have not changed in recent years, Washington state gasoline taxes have increased. Together, the federal and state taxes account for about 16 percent of the current retail price.

This report has found that the refining differential has varied significantly over the study period. The refining differential as recently as February 25, 2008 accounted for 13 percent of the \$3.35 retail gasoline price. For the week of December 10, 2007, the refining differential accounted for only about 10 percent of the state average retail price. Only seven months earlier, for the week of May 21, 2007 when the record-high retail price of \$3.46 per gallon was recorded, the refining differential accounted for 36 percent of the retail price of gasoline.<sup>64</sup>

The analysis has also shown that the gross retail differentials vary substantially from location to location. On average, the gross retailing differential accounts for about 9 percent of the current retail price. However, some locations in our state have considerably higher-than-average gross retailing differentials. The state average gross retailing differential for 2007 was 27.8 cents per gallon. For 2007, Bellingham and Port Angeles were most significantly higher than average with gross retail differentials of 38.2 cents per gallon and 36.3 cents per gallon respectively. Regression analysis of the gross retail differentials against regional variables leads to this conclusion: While for some cities the 2007 gross retailing differentials are higher than can be explained economically via the independent variables studied in this report, for most cities the gross retailing differentials are close to or often lower than the expected differentials for most of the 2002-2007 period. Port Angeles and Bellingham are the notable exceptions where the gross retail differentials for the 2002-2007 period are more than 2 cents per gallon above expected levels. The Port Angeles differential was almost 3 cents per gallon above the expected retail differential for the period. Bellingham’s gross retail differential was considerably higher with an overall average of almost 8.5 cents per gallon above the expected differential.

A significant portion of the increase in gasoline and diesel prices over the past five years has been due to the increasing price of crude oil. Factors typically cited to explain the increase in crude oil prices include:

- 1) Increasing global demand for oil (with China and India often referenced)
- 2) Limited investment in new field development from 1990 through 2002
- 3) Increase in OPEC’s market share placing them back in command of the market
- 4) Energy nationalism. Oil-producing countries such as Russia and Venezuela, in particular, are seizing domestic resources which were once shared with international oil companies, breaking up contracts in a capricious way and flexing their muscles in foreign markets. This, in turn, has slowed fuel development and kept oil prices high.
- 5) The declining value of the U.S. dollar. Over the past couple of years this has played an important factor in the rising price of crude oil. Since the 1940s, oil has been priced primarily in U.S. dollars, with

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64 - Retail prices have reached new record highs since this date.

many oil-producing nations pegging their currency to the dollar. The recent crisis in the housing and financial markets, compounded by our nation's continuing trade and federal deficits, has undermined the value of the U.S. dollar. Consequently, the United States now has to bid more dollars to secure imported oil or refined products.

Consider the spot price of crude oil (West Texas Intermediate) from 2003 through March 2008: The price, expressed in Euros and not adjusted for inflation, has more than doubled from 30.6€ per barrel to 67.7€. However, when expressed in U.S. dollars, the price has more than tripled from \$32 to \$103.5 per barrel. Because of the weak U.S. dollar, many investors are shying away from the U.S. stock market and securities and are using oil futures as a short-term financial hedge, consequently bidding up the short-term price of oil.

## 7: PUBLIC COMMENTS

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As part of the study of gasoline prices, the Attorney General's Office asked the public to provide information that might suggest price-fixing or other violations of Washington's consumer protection or antitrust laws. None of the comments received during the investigation included facts that would implicate illegal activity.

### Written Comments and Calls

The office received a total of 101 letters, e-mail messages and telephone calls from the public during the investigation. These included 56 comments during Phase 1 and 45 during Phase 2.

- 75 were from Washington residents who largely expressed concerns that gas prices were excessive and rising too quickly.
- 10 were from individuals who work in the petroleum industry, primarily at the retail level. They provided personal perspectives on the price run-up that occurred in the spring of 2007.
- Three were from Washington residents who expressed concern about the high price of diesel.
- Two were from Washington residents who believed the pumps were not calibrated correctly at the stations where they purchased gas. Those were referred on to the Weight & Measures section of the Washington state Department of Agriculture.
- One was from a Washington resident who believed there were unauthorized charges on his debit card right after purchasing gasoline.
- One was from a Washington resident who believed the gasoline he purchased shortly after the December storm was contaminated with water and subsequently led to expensive engine repairs. The Attorney General's Office contacted the station operators and was told that no customers had contacted the station concerning water; that the station uses electronic tank monitors which would alert them of problems, and that a stick is inserted in the tank to detect water each time a delivery is made.
- One was from a Washington resident who complained that the advertised price on the sign was not the price charged at the pump.
- One was from a Washington resident who asked for clarification of information from the Phase 1 report.
- Two were from individuals who expressed opinions about how an economist should be chosen for the study.
- One was from a private organization that wanted political factors including tax decisions to be considered.
- One was from a Washington resident seeking information for a greenhouse gases study.
- One was from a Washington resident asking about any law that caps the quantity of gasoline that may be purchased.
- The Attorney General's Office also received two inquiries from students seeking information for research papers on gasoline prices.

## Public Forums

Attorney General Rob McKenna and Dr. Keith Leffler discussed results from the first phase of the state's ongoing investigation during three public forums. The first of these forums was held January 9 in Bellingham, the second on January 17 in Spokane and the third on February 5 in Bellevue. Members of the public as well as local, state, and federal government officials were invited to learn about factors influencing gas prices in Washington state and in these individual communities. Attendees were given the opportunity to ask questions and provide information that may be relevant to the state's investigation.

Following is a summary of questions raised and responses given during the forums.

- **Bellingham:** Approximately 45 people attended.

**Q. How do dealer incentives impact the price of gas? Do oil companies own their own stations, allowing them to "manipulate" prices?**

A. Historically, gas stations that were owned by oil companies but operated by private individuals did receive a special price for fuel. Those stations that received such price incentives and were supplied by Whatcom County refineries were generally located in Seattle. Today, most branded stations are independent businesses and are supplied by jobbers. Refiners have told us that they no longer offer a special dealer price and instead charge comparable prices for dealers and jobbers. The wholesale price charged to jobbers is similar because stations can and do change brands. The delivered price charged to branded stations varies depending on the business structure. It may include rent, for example, which will increase the price the station pays for the gasoline.

**Q. Given the proximity of the refiners to Bellingham and the fact that residents have to put up with the air and noise pollution, why don't Bellingham residents get lower prices? Several attendees felt that the higher prices in Bellingham are harmful to the community and unfair.**

A. The price phenomenon is not caused by the refineries, which are owned by shareholders located all over the world.

**Q. Why is Canada not listed as a foreign gasoline importer in our presentation?**

A. We import crude from Canada but we do not import finished product. Small shipments of gasoline are sometimes shipped from Washington to British Columbia, to supply that area.

**Q. Please explain a chart titled "Annual Imports Into PADD V (as a Percent of Consumption)" which showed a marked 4 percent increase in domestic and foreign imports from 2006 to 2007.**

A. The increase was significant and likely due to refinery outages on the West Coast that led to increased imports.

**Q. Transportation doesn't explain retail prices between Bellingham and other areas, so what else is causing the high prices?**

A. It's true that that transportation costs and refinery prices don't explain the higher prices in Bellingham versus Seattle or Spokane. Wholesale prices reflect the supply cost. The markup is happening at the retail level.

**Q. Does Seattle receive gasoline by vessel? Are there racks at the Ferndale and Cherry Point refineries?**

A. There are no reports of regular, non-emergency gasoline shipments to Seattle by vessel. While the refineries have racks, there is no data reported on those racks. Additionally, some of the racks might be proprietary and not available to jobbers.

**Q. Why are prices so volatile?**

A. Retail prices are volatile because of the changing nature of the of the motor fuels situation in our state and even nationwide. While demand continues to rise, production remains essentially stable. The West Coast refineries as a whole do not produce enough motor fuels to supply the region, thus we rely on imports. These imports are often more expensive. When unexpected supply disruptions occur, we must rely even more heavily on imports.

- **Spokane:** Eight people attended.

**Q. Is the refining margin volatility nationwide?**

A. We didn't study the data nationwide, but it is believed to be a West Coast issue since this region is short on gasoline. Other regions are believed to have less volatility.

**Q. Is it common for gas prices to be higher at stations near refineries, as is seen in Bellingham? Why are prices at stations in Laurel, Mont., near the Montana refineries higher than in Joliet, a small town to the southwest.**

A. Bellingham prices are likely caused by unique conditions, which include proximity to the Canadian border. We do not have retail price data for Montana stations. We do know that wholesale prices in Billings are sometimes higher than Spokane wholesale prices, which seems anomalous since there are refineries near Billings. We aren't studying industry conditions in Montana and don't have enough data to be able to offer an explanation.

**Q. Why are foreign gasoline imports increasing?**

A. We haven't built a new refinery in the United States in many years. As population and consumption increase, so does the demand for fuel. U.S. refineries do expand and increase efficiency, but still cannot produce enough gasoline to meet U.S. demand; thus the need for foreign imports increases. Expanded U.S. refinery capacity would be the answer to the price volatility.

**Q. How is Alaska North Slope (ANS) crude oil distributed?**

A. The amount of ANS crude oil into Washington is decreasing. In the early 1990s, about 90 percent of crude oil coming into Washington refineries was from the ANS. Today, ANS makes up about 70 percent of Washington refineries crude oil. Of all the crude oil the U.S. imports from foreign sources, the greatest percentage comes from Canada.

**Q. How much profit do retailers make?**

A. We don't have data on profits, but we can talk about retail differential, which is the difference between the wholesale price that the retailer pays and the retail price paid at the pump, net of taxes. The retail differential has increased over the years, as you would expect due to inflation. Thirty years ago, the retail differential was commonly in the 5 to 8 cents per gallon range. Today, the retail differential is commonly 20-25 cents per gallon. It is important to note that this is not profit as it does not account for the cost of running the retail stations.

**Q. What is the impact of different regional fuel blends on the price of gasoline?**

A. Regional fuel blends, sometimes referred to as boutique fuels, are mandated for air quality reasons. These blends increase refining costs and lead to less flexibility in the system because of differing standards from one region to the next. Special gasoline blends are not fungible. Beginning December 1, 2008, a state-mandated standard will require that 2 percent of gasoline sold by volume must contain ethanol.

- **Bellevue.** Approximately 10 people attended.

**Q. How do prices in Oregon compare to those in Washington?**

A. On average, Oregon prices, even without self-serve stations, are slightly lower than Washington. Oregon also has a lower gas tax than Washington, which may contribute to the difference.

**Q. Who determines the price at the pump?**

A. There are three types of gasoline stations:

- Those owned and operated by refiners. There are few of these in Washington and they are mainly in the Seattle area. The refiners determine the prices at these locations.
- Those owned by dealers. Refiners lease or own the property on which dealer stations are located and supply dealers at a price commonly referred to as the dealer tank wagon price. Station operators determine the retail price.
- Those operated by independent businesses. These receive their fuel supplies from wholesalers called jobbers. In some cases, jobbers also own and operate stations. Station operators determine the retail price.

**Q. Can the higher prices found in Bellevue or Mercer Island be made more equitable to prices in other areas?**

A. Government is unable to regulate retail prices, short of creating price controls. Ultimately, consumers determine supply and demand. Because the median income for Bellevue is higher than average, businesses may be able to charge more and people are willing to pay the higher price for the convenience of filling up closer to home. If enough drivers opted to fill up at lower-priced stations such as those in Renton, for example, then prices in Bellevue would come down. Property values must also be considered. Recouping costs of operating a station on expensive property in downtown Bellevue or on Mercer Island means that prices will have to be higher. Clearly, the presence or absence of competition determines how high prices will go. For example, having a Costco in the neighborhood has a dramatic effect on the posted prices at surrounding stations. Having other retail stations in close proximity also helps keep prices in check.

## 8: STAKEHOLDER DISCUSSIONS

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Staff from CTED's Energy Policy Division and the Attorney General's Office Consumer Protection and Antitrust divisions met with industry and retailer stakeholders during the two phases of the investigation into gasoline prices. Meetings were held with representatives of refineries, wholesalers, other organizations connected to the industry, and retailers to gather perspective and insight about the petroleum industry and gas prices, in particular. In some instances, answers and data were provided under civil investigative demand, to protect confidential and proprietary business information. The meetings were held between June and November, 2007, which was a period when gasoline prices were coming down from the highs reached in May 2007 and holding relatively steady.

### **Representatives of the following organizations participated in the discussions:**

- **Western States Petroleum Association**, a trade association which represents 26 companies involved in exploration, production, transportation, refining and selling of petroleum products.
- **Washington Oil Marketers Association**, a statewide trade association which represents 93 regular members and 65 associate members involved in petroleum marketing and related businesses.
- **Automotive United Trades Organization**, a trade association which represents 400 independent gasoline retailers in Washington.
- **Tesoro Refining and Marketing Company**, which operates the Tesoro refinery at Anacortes, Wash.
- **BP America, Inc.**, which operates the BP refinery at Cherry Point in Ferndale, Wash.
- **ConocoPhillips**, which operates the ConocoPhillips refinery at Ferndale, Wash.
- **Royal Dutch Shell**, which operates the Shell refinery at Anacortes, Wash.
- **Chevron U.S.A. Inc.**, which has 250 retail outlets in Washington.
- **Safeway**, which has 60 store outlets selling gasoline and diesel in Washington.
- **Costco**, which has 24 store outlets selling gasoline, but not diesel, in Washington.
- **U.S. Oil and Refining**, Tacoma, provided written comments and data.

In addition, CTED sent surveys to 33 distributors of gas and diesel fuel who operate in the counties where our 15 study cities are located. Fourteen of these jobbers, or 42 percent of those who received the survey, responded. Only one county with a study city was not represented in the survey results.

Respondents generally answered all the questions (see survey form attached as Exhibit A), providing extensive information about their sources of supply, the extent and nature of their distribution service, and selected purchase and resale data. From the survey, we were able to better understand the extent of competition in the marketplace, determine whether variables correlated with prices, estimate (to a very limited degree) distributor margin and validate that the estimated OPIS wholesale prices were reasonably accurate.

Comments from industry representatives are grouped by topic and summarized below. Due to the nature of these discussions and the necessity to preserve competition among industry stakeholders, the report does not attribute comments to specific organizations or their representatives. Confidentiality laws also prohibit us from publishing the jobber survey responses. It is important to recognize these are comments from industry representatives and not “findings” from an independent investigation or economic study. Comments presented here also do not necessarily represent the opinions or conclusions of the authors of this report.

### **Supply and Demand**

- In spite of record gas prices nationally in 2007, gas demand in the U.S. increased 1 percent from May 2006 to May 2007.<sup>65</sup> Gasoline demand in the state of Washington appears to be stable over the past several years.
- Washington refineries are operating profitably and near capacity much of the time. Small increases (4 percent overall) in refinery capacity have occurred over the last seven years with updates, efficiencies and new equipment being brought online. Washington refineries routinely produce enough gasoline and diesel to meet Western Washington and Oregon demand when combined with some product coming up to Portland from California. However, two of the Washington refineries (BP and Tesoro) produce gasoline made to comply with California’s air quality regulations. This California Air Resources Board (CARB) quality gasoline is exported to California.
- Crude oil comes to Washington’s refineries primarily from Alaska and Canada with lesser amounts from other oil fields around the world. Alaska North Slope crude oil is most desirable because the Washington refineries were optimized for its characteristics and it has intermediate sulfur content. But Alaska’s North Slope oil field is in decline, which will mean more reliance on Canadian crude and other foreign sources. Washington refiners are adapting to receive crude from different countries.
- Several regulations increase the cost of shipping crude oil to Washington refineries. The Magnuson Amendment (33 U.S.C. § 476) and cases interpreting the amendment state that a permit cannot be issued that allows the construction, renovation or modification of a dock, terminal or other facility on or adjacent to Puget Sound if construction will allow that facility to handle a higher volume of crude oil than it was capable of handling in October 1977. A state statute (RCW 88.16.190) limits the capacity of tankers headed for Puget Sound refineries to 125,000 dead weight tons. Specifically, the statute prohibits tankers larger than 125,000 deadweight tons from passing east of a line between the Discovery Island lighthouse south to the New Dungeness lighthouse. The Jones Act (47 U.S.C. § 55102) states that cargo may not be transported between two U.S. ports unless it is transported by vessels built in the U.S. and owned by U.S. citizens. The Jones Act has been waived occasionally in times of supply emergencies.
- The preferred method to transport refined products is through a pipeline but space is limited on the few pipelines that supply Washington. If pipeline space is not available, refined product may be barged or trucked at higher costs, typically an additional 3 or 4 cents per gallon.
- Gasoline and crude oil storage capacity, like pipeline capacity, is limited. Regulations and demand dictate different gasoline blends for different seasons and for pockets within larger areas. Without additional storage, the amount of gasoline in reserve shrinks, putting pressure on available supply.

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65 - Consumption data for 2008 was not available at the time of publication.

Any disruption in the refined product distribution chain, such as a seasonal refinery turnaround, a shutdown of a pipeline, or inability to barge due to bad weather, may create temporary shortages.<sup>66</sup>

- At the same time, the inventory philosophy of producers is “just in time” to have adequate supplies to meet expected demand. Only two to five days of finished product is available to bridge short-term supply interruptions.
- Federally mandated Corporate Average Fleet Economy (CAFE) standards, intended to improve the average fuel economy of vehicles, may have a significant impact on demand in the next several years. Meanwhile, the impact of Washington’s new biodiesel regulations is unknown. There are no standards set yet, and little infrastructure to distribute it.
- While producers have plans for updating refineries to increase efficiency and meet future requirements for reducing sulfur and benzene, for example, most don’t have major expansion plans. It is difficult and expensive to find a suitable site for a refinery, the permitting process takes years and there must be an assured long-term supply of crude oil. These risk/cost factors make it unlikely that companies will invest in new refineries to be built in Washington or elsewhere in the U.S.
- There has been much volatility in the diesel market. The global trend is that diesel, used more widely overseas, is higher priced and in greater demand than gasoline. Demand in China is growing rapidly. The U.S. has been slow to catch up, but diesel demand is growing and will create a long term imbalance. Although 20 percent of refined product is diesel, ultra-low sulfur diesel is in short supply. The transition to ultra-low sulfur diesel made the price spike. The increase of imports of Canadian oil sands, which create a higher yield of diesel, into the mountain states should help the Spokane diesel prices. Diesel prices are generally higher than gasoline during winter and lower than gasoline during summer.

### **West Coast Characteristics**

- Washington refiners cannot be reviewed entirely in a vacuum. California, with its huge population, has the highest demand and is chronically short of supply year- round. The price has to rise to get importers to bring in product to California and that has to include supply costs. Imports of refined gasoline to California come from the Middle East, Europe and Asia. Although the West Coast supply used to be in balance with some seasonal shortages, it has been chronically short for the past four years.
- With the reduction of available gasoline being refined on the West Coast, foreign imports have increased, which in turn has increased refining profitability. Foreign imports are generally priced higher due to the need to transport product here. These imports are in effect the incremental supplier of gasoline and thus their price affects the market price. Refiners here can charge the same price as the foreign supply, which means their profits have increased as a result.
- In turn, Washington’s average wholesale price is generally within 2 to 6 cents of the average wholesale price of gasoline in California. If Washington refiners are not able to obtain the desired price by selling in Washington, more gasoline would be manufactured and shipped to California where it could be sold for a higher price. Additionally, Washington has some specific taxes or

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66 - Refineries change the formulation of gasoline they produce in response to climate/temperature changes and conduct routine maintenance.

requirements that increase the cost. For example, there is an oil spill tax of up to 5 cents per barrel of crude and the Model Toxics Control Act tax is 0.7 percent on the wholesale value imposed on the first in-state possessor of crude oil. Washington's (prior) booming real estate market also caused increased tax burdens and land costs.

- The Olympic pipeline is at capacity. Some refiners have to barge product to Portland because the pipeline is full. Floating storage, on boat or barge, is expensive, although refiners occasionally do offload onto barges temporarily to free up some other space. Companies don't try to store more refined product as a cushion, even if appropriate locations could be found. Storage tanks typically hold 100,000 barrels and cost \$40-\$90 a barrel to build. A "just in time" supply level actually saves consumers substantial money, stakeholders claim. Costs for storing excess product would be passed on to consumers.
- Regulatory impediments can also create supply, transportation and storage challenges. These include inconsistent fuel specifications, such as three different ethanol blend mandates; one for Portland, one for the rest of Oregon and one for Washington.

### **Refining Costs**

- Refining costs have increased substantially since 2003, with estimated increases ranging from 40 to 200 percent. A number of changes have affected production costs. These include fluctuations in the price of crude, increased electricity costs, environmental regulations, equipment maintenance, wages, chemicals and catalysts needed to process crude oil. There have been significant increases in labor costs because refineries are competing with other industries for skilled tradesmen.
- Some report that capital improvement costs have tripled.
- A gallon of gasoline used to contain 12 percent MTBE (Methyl tertiary-butyl ether) as an oxygenate and to increase octane, but MTBE pollutes ground water and was outlawed in California and Washington. As of December 31, 2003, the intentional addition of MTBE to gasoline, motor fuel, or clean fuel for sale or use in Washington is prohibited. The MTBE may not be knowingly mixed in gasoline above six-tenths of 1 percent by volume. Ethanol, which replaced MTBE, is generally about 5.7 percent of a gallon of gasoline. Higher ethanol content would make up some of the difference, but ethanol combustion produces less BTUs and lower octane. Higher ethanol content may also void most car warranties. So there has been a net reduction of about 10 percent in available gasoline. Low carbon fuel standards may also have unintended consequences of reducing supply and raising prices. Upcoming fuel specification changes related to benzene and a CARB IV gasoline will add to refining costs.
- All refiners tend to increase capacity at the same time so margins have been cyclical. Over the last twenty years, only incremental expansion has been affordable. However, given current prices and demand, refiners are planning expansion projects, especially overseas.
- Refiners experience planned and unplanned supply disruptions or outages. "Turnaround" is the large scale planned maintenance that occurs every 3-4 years, usually in the winter, when gasoline demand is down. Turnarounds are major and very disruptive so they are scheduled years in advance. During these periods, refiners buy and trade product from others to meet contractual obligations.

## **Pricing and Profit**

- Refiners stated that using the term “refining margin” was a misnomer as it implies a profit margin, which would be incorrect. Refiners observed that only about 4 percent of the price of a gallon of gasoline is profit or is available for expansion investment. Gas and diesel prices need to be about 20 percent above the price of crude in order to cover losses on other refined products. That percent has not changed in the last five years. Approximately 15 percent of the crude oil refining process results in byproducts such as fuel oil, bunker oil, propane, butane and asphalt, which sell for less than the price of crude or below the price to refine the product.
- Crude prices around the world move together, with regional differences. Prices for crude oil in Singapore, Rotterdam and the U.S. are generally moving together because crude oil is being used similarly throughout the world. Margins are increasing globally. The short run price is never at equilibrium. Commoditization of product markets has changed in the last five years, it has increased.
- Gas prices are generally set daily. The price at which gasoline is sold at wholesale or retail is market-driven and varies by region. Gasoline is not sold purely at a “cost plus” price (an amount based on what it costs to refine, transport and market the product plus a percentage for profit).
- When setting the daily price of gas, companies often look to the reported spot price (latest reported wholesale price) in Portland, wholesale price of competitors, volumes of their own sales (current inventory) and how their retail prices compare to their competitors. This produces a tier of prices from a low usually set by cash-only sales and hypermarketeters.
- If supply tightens, prices generally will rise. If inventories rise, prices generally fall. Gas pricing also has a seasonal component; prices are typically lower in the winter when there is less driving and higher in summer when there is more recreational/vacation driving. Unanticipated supply interruptions can have a significant impact on prices. Regional price spikes generally do not last longer than a few weeks, however, as the problem is resolved or arbitrage (the movement of gas from other areas where the price is lower) catches up.
- Major oil companies are reducing their ownership of retail outlets. This means that fewer retailers are controlled directly by major oil companies.
- When gas sells for approximately \$3 a gallon, retailers might pay up to 12 cents per gallon in credit card processing fees. This can affect how retailers who accept credit payments are able to compete with cash-only sellers. Some stations that accept credit may charge a higher price in the hope that consumers will choose their brand, resulting in a wider spread between these stations and those that accept only cash. Other retailers who accept credit may opt to make a smaller profit.
- Wholesalers and retailers would like to see greater transparency in wholesale pricing and timely information on issues which affect supply.
- Index analysts say that the market has become more volatile.

## **Hypermarketer Influence**

- The term “hypermarketer” has developed to describe retailers who sell gasoline along with other grocery items on a large scale. They are the fastest-growing retailers. Costco, Sam’s Club, Wal-Mart, Fred Meyer and Safeway are examples of hypermarketers. Hypermarketers may sell only to members, and may not offer any discounts based on store purchases. Some control costs by accepting few credit cards or not handling cash. Others offer discounts for possessing and using a store club card and for volume of store purchases.
- There are no state or local regulations in Washington that place restrictions on when fuel supplies can be delivered or delivery quantity. No major barriers, such as regulatory requirements or costs, interfere with hypermarketers selling gasoline, although local zoning does limit where gasoline stations may be located.

## **Petroleum Pricing Information**

Due to concerns about market manipulation, information was obtained from several companies that publish daily petroleum pricing information and the spot price, on which many supply contracts are based. The Attorney General’s Office spoke with representatives of OPIS (Oil Price Information Service) and Platts, a division of The McGraw-Hill Companies that compiles and sells industry data, including data related to the daily spot price of gasoline. Representatives believe that they would be able to detect and stop market manipulation.

Both companies have published methodology statements available online which explain how they operate and describe how they prevent manipulation of the numbers they report. Their analysts talk to buyers, sellers, refiners, trading companies, end users, large jobbers with retail stations, and others every day to find out what deals were made. Specific information on deals is not published. Industry representatives cooperate with the pricing information services because they want honesty in the reporting so the prices will be reliable. Refiners do not usually report deals to the pricing information services, but those who buy from refiners usually report transactions. In the Northwest, prices are often quoted at FOB Portland – Olympic Pipeline.<sup>67</sup> Analysts do not learn about all deals but believe they capture approximately 80 percent of the traffic in the Northwest.

The number of deals in a week varies. In a flat market, there may be fifteen or fewer deals in a week. In the event of a refinery disruption or other problem, thirty deals may be made in a week. Not every commodity has deals completed every day. If there are no deals, analysts do not simply use the numbers from the day prior. Instead, they look at related markets and the futures market and consider other factors to impute the price. However, they do not use numerical formulas to set prices.

Analysts determine if the price rises, decreases, or remains the same based on many factors. One deal could influence the prices significantly. Analysts trust reports given to them and use common sense in reporting deals.

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67 - FOB is an abbreviation for “Free on Board,” which indicates that this is the delivered price of the commodity.



# EXHIBIT A: JOBBER/DISTRIBUTOR SURVEY FORM

Please provide answers to all questions. Your proprietary business information will be kept confidential to the extent the law allows and will only be shared with staff from the Washington State Department of Community, Trade & Economic Development, Energy Policy Division, the Attorney General's Office and the economist hired as an expert to assist with the gasoline prices study. Please use the backside or add sheets of paper if you need more space and put the question number next to the text to which it responds.

1. We distribute (Circle all that apply):      a. Gasoline      b. Diesel      c. Biofuel
  
2. Indicate service account types (Circle all that apply):  
a. Wholesale      b. Retail outlets      c. Agricultural      d. Municipal      e. Fleets  
f. Other (Specify) \_\_\_\_\_
  
3. a. Percent of total gasoline volume distributed through retail outlets \_\_\_\_\_%  
b. Percent of diesel volume distributed through retail outlets \_\_\_\_\_%
  
4. Number of retail outlets served: \_\_\_\_\_
  
5. Which brands do you distribute? \_\_\_\_\_
  
6. Have you changed brands or added brands in the last five years?      \_\_\_\_\_ YES      \_\_\_\_\_ NO  
Added \_\_\_\_\_ date \_\_\_\_\_  
Changed from \_\_\_\_\_ to \_\_\_\_\_ date \_\_\_\_\_
  
7. At which terminals do you pick up product? \_\_\_\_\_  
\_\_\_\_\_
  
8. In what counties do you supply gasoline and diesel for retail sales? \_\_\_\_\_  
\_\_\_\_\_
  
9. a. What percent of your gasoline do you purchase under contract? \_\_\_\_\_; at spot \_\_\_\_\_  
b. What percent of your diesel do you purchase under contract? \_\_\_\_\_; at spot \_\_\_\_\_
  
10. A. On a daily basis we purchase gasoline from (Circle one):  
a. 1 terminal      b. 2 terminals      c. 3-5 terminals      d. More than 5 terminals  
  
B. On a daily basis we purchase diesel from (Circle one):  
a. 1 terminal      b. 2 terminals      c. 3-5 terminals      d. More than 5 terminals
  
11. If purchasing from more than one terminal, the decision on where to purchase gasoline is based on (Circle the most important):  
a. Guaranteed supply      b. Location      c. Cost of gasoline  
d. Past experience with suppliers  
e. Other costs (Explain) \_\_\_\_\_  
\_\_\_\_\_  
f. Other issues (Explain) \_\_\_\_\_  
\_\_\_\_\_

12. On a daily basis we purchase gasoline from (Circle one):  
 a. 1 brand                      b. 2 brands                      c. 3-5 brands                      d. More than 5 brands
13. The jobber mark-up of our gasoline is determined by (Circle one):  
 a. Owner                      b. Manager                      c. Other (Specify): \_\_\_\_\_
14. We change our selling price due to: \_\_\_\_\_  
 \_\_\_\_\_
15. Do you provide your own transportation terminal to stations? \_\_\_\_\_ Yes \_\_\_\_\_ No
16. Do you typically receive a competitive price rebate (Temporary Competitive Assistance) from your supplier?    Yes \_\_\_\_\_                      No \_\_\_\_\_  
 If YES, describe the arrangement: \_\_\_\_\_  
 \_\_\_\_\_
17. Do you have a discount or rebate arrangement (other than indicated in the previous question) with your supplier for gas or diesel?                      Yes \_\_\_\_\_                      No \_\_\_\_\_  
 If YES, describe the arrangement: \_\_\_\_\_  
 \_\_\_\_\_
18. Our terminal purchase price (excluding taxes but including any allowances or rebates) on the date closest but prior to October 1 for the terminal and brand for which the most product was purchased:  
 \_\_\_\_\_cents/gallon premium unleaded                      \_\_\_\_\_cents/gallon mid-grade unleaded  
 \_\_\_\_\_cents/gallon regular unleaded                      \_\_\_\_\_cents/gallon diesel
- Indicate date: \_\_\_\_\_ Terminal Location: \_\_\_\_\_ Brand: \_\_\_\_\_
19. Our lowest supply price for delivery to retail stations on October 1 for the brand in and terminal in answer 18 above was:  
 \_\_\_\_\_cents/gallon premium unleaded                      \_\_\_\_\_cents/gallon mid-grade unleaded  
 \_\_\_\_\_cents/gallon regular unleaded                      \_\_\_\_\_cents/gallon diesel
- Indicate date: \_\_\_\_\_ Terminal Location: \_\_\_\_\_ Brand: \_\_\_\_\_

**Thank you for your assistance.**

Send to:

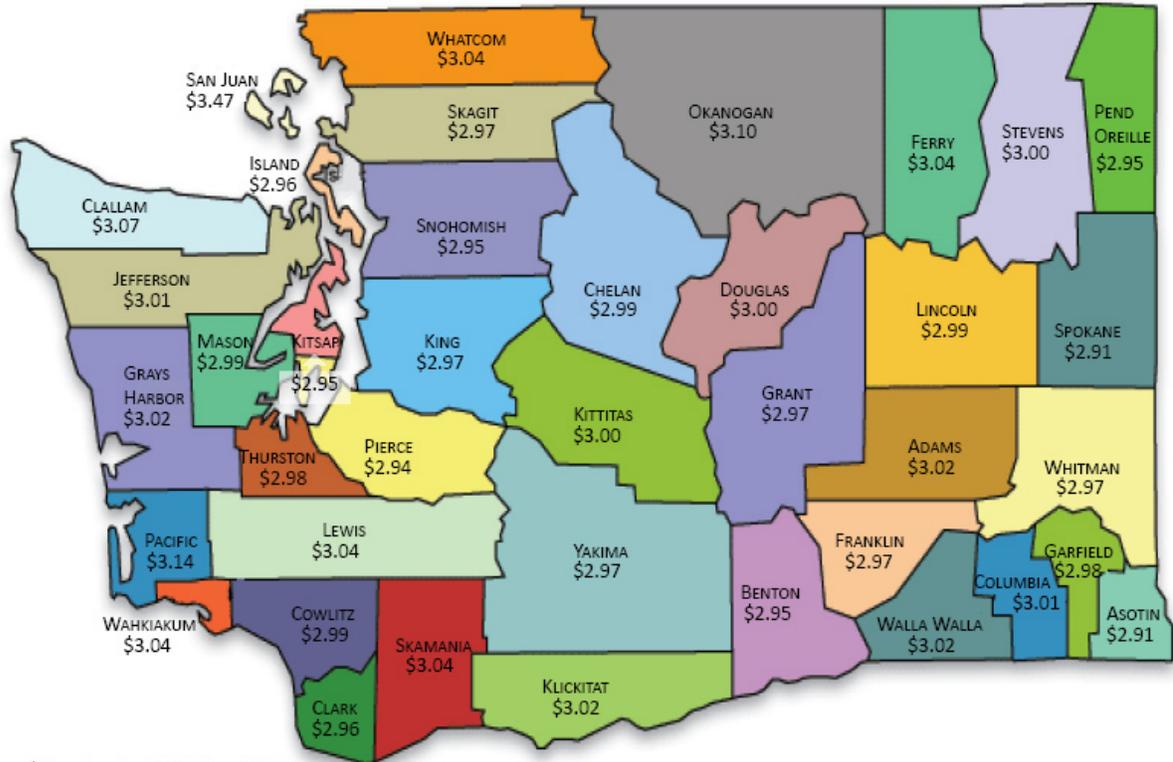
**Department of Community, Trade & Economic Development**

Attn: Mark Anderson, Sr. Energy Policy Specialist  
 906 Columbia St. SW  
 PO Box 43173  
 Olympia, WA 98504-3173

**If you would prefer to do the survey by email, send request to: marka@cted.wa.gov**

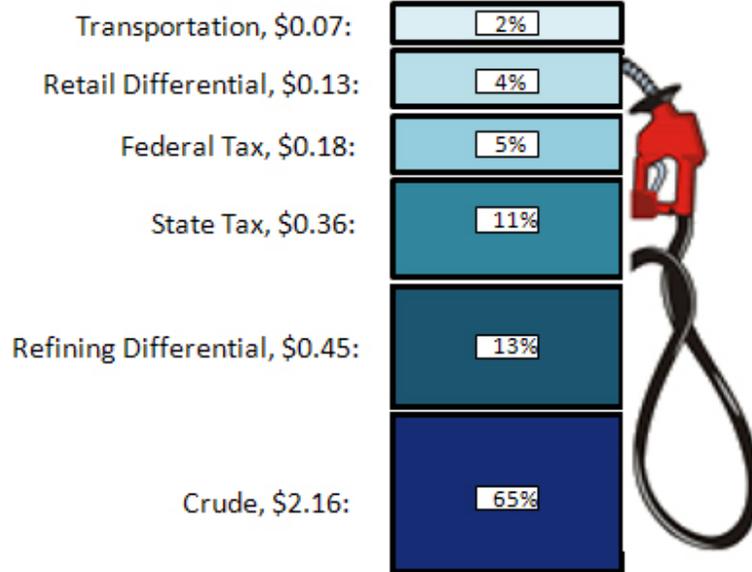
# EXHIBIT B: ADDITIONAL GRAPHICS

WASHINGTON AVERAGE RETAIL GASOLINE PRICES BY COUNTY FOR 2007\*



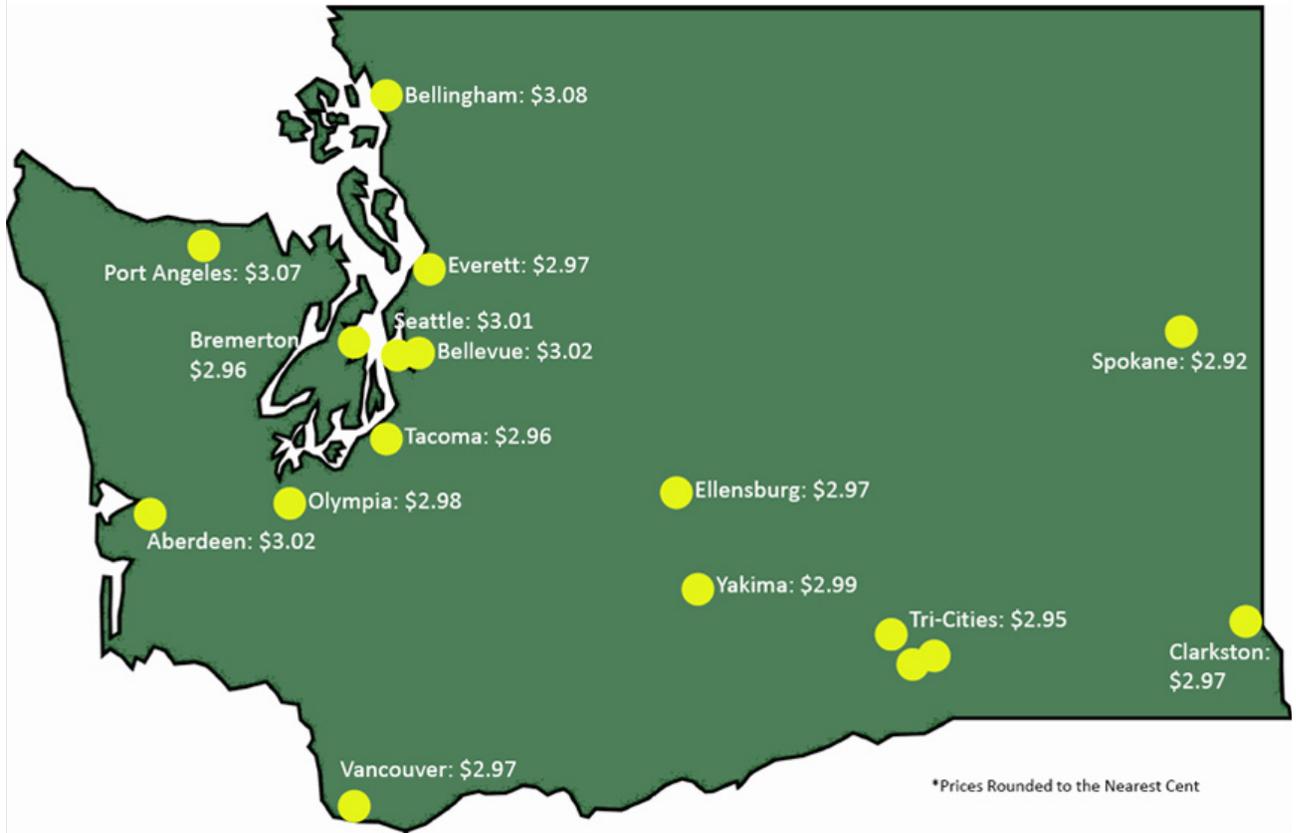
\*Prices Rounded to the Nearest Cent

## Price Components of Washington State Average Retail Gasoline Price The Week of February 25, 2008 - \$3.35 Per Gallon\*

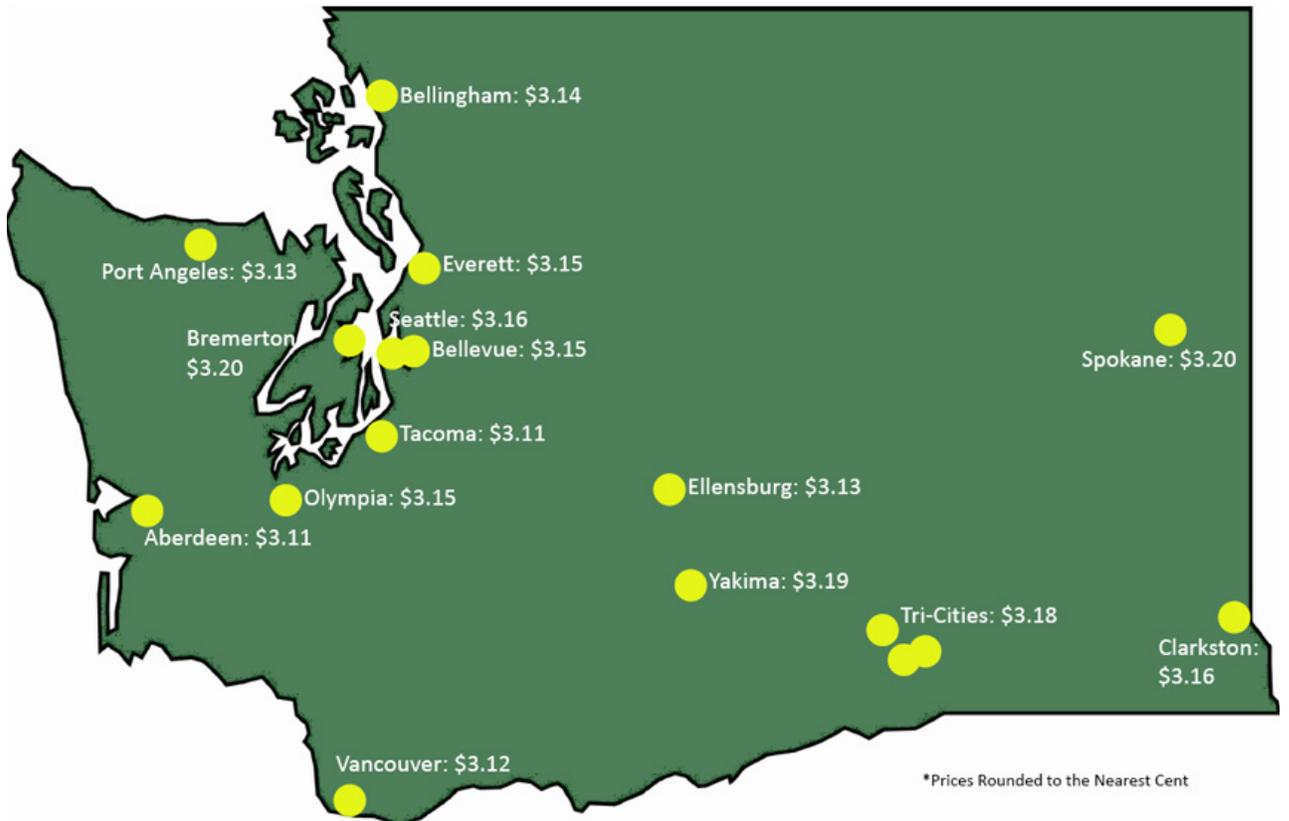


\*Prices Rounded to the Nearest Cent

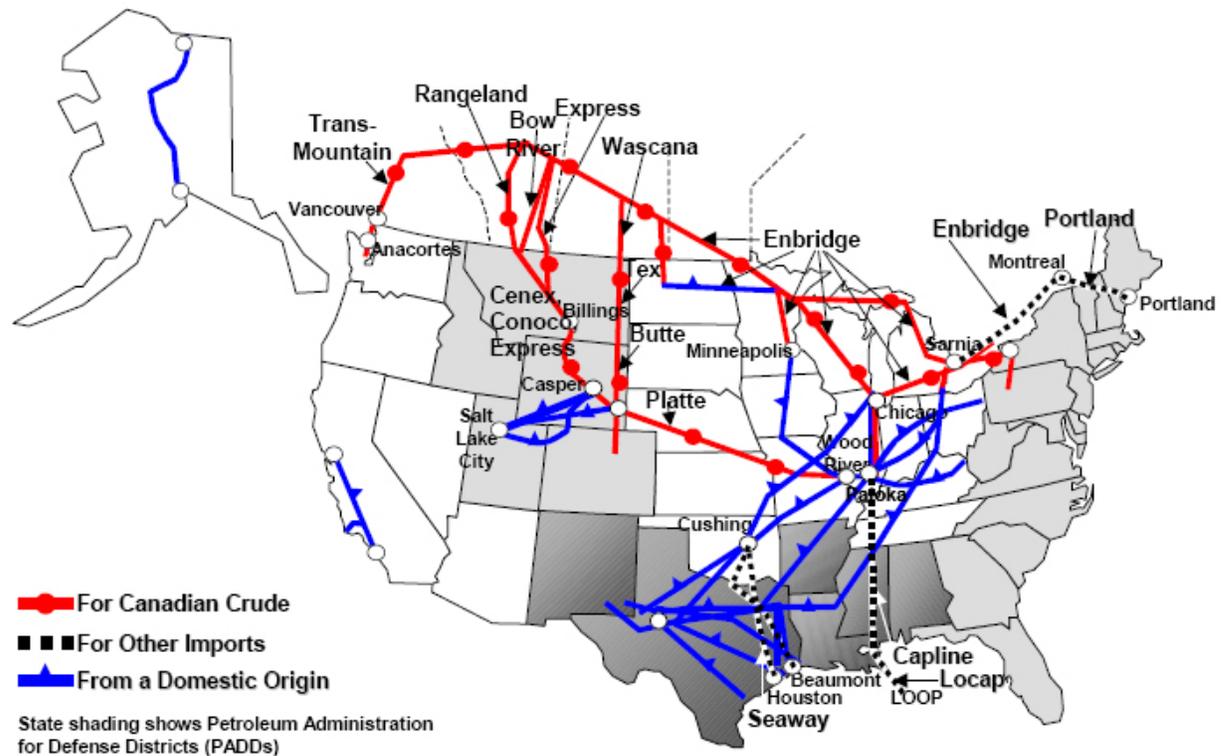
### Average Retail Gasoline Prices by City for Year 2007\*



### Average Retail Diesel Prices by City for Year 2007\*

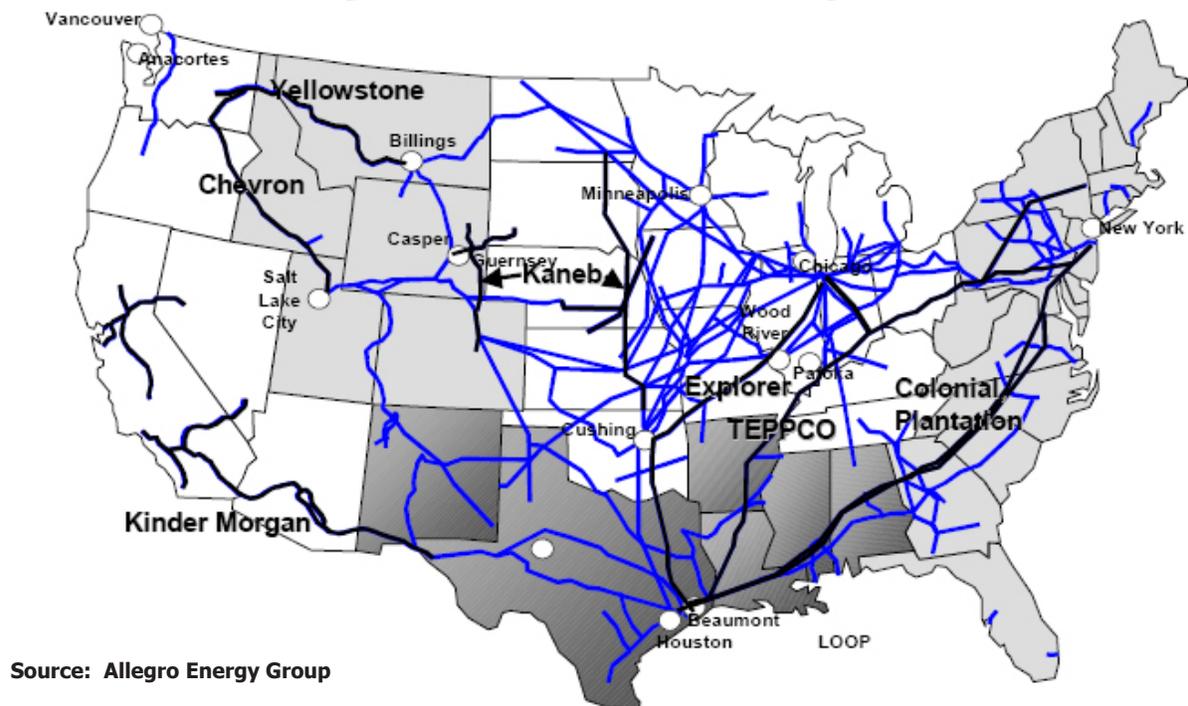


## Selected Crude Oil Trunkline Systems



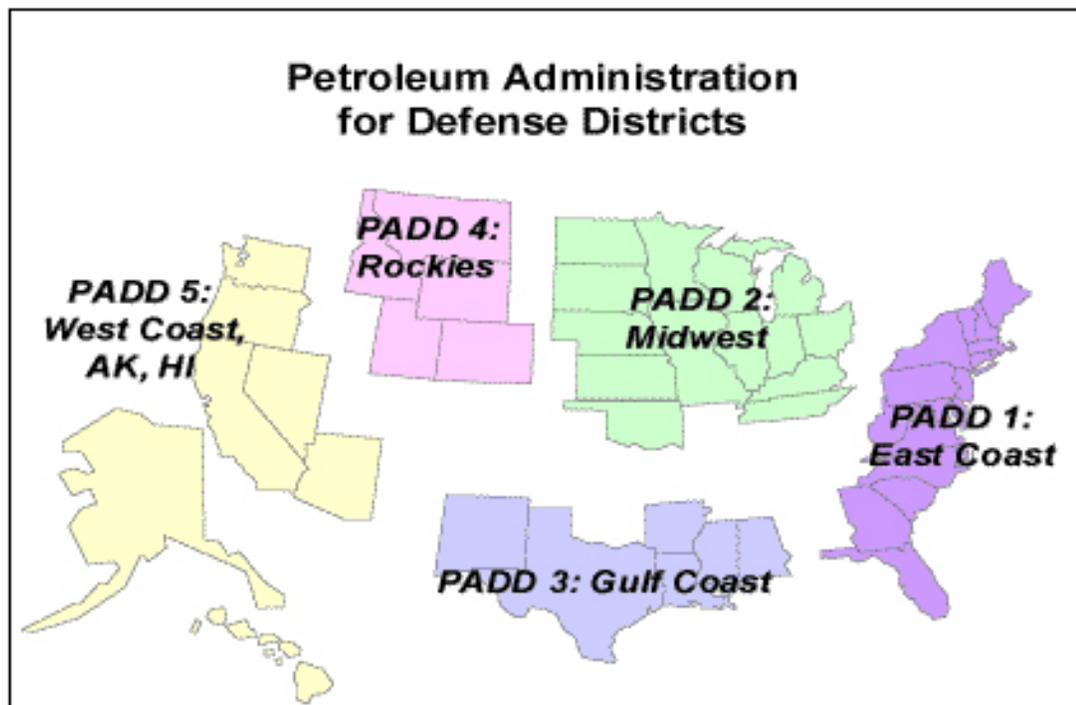
Source: Allegro Energy Group

## Major Refined Product Pipelines



Source: Allegro Energy Group

**FIGURE 3**  
**Gasoline Supply System for Washington and Oregon**



PADD's were delineated during World War II to facilitate oil allocation.

Source: U.S. Energy Information Administration

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