

**STUDY OF THE COMPONENTS OF
DELIVERED FUEL COSTS IN ALASKA
JANUARY 2009 UPDATE**

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Introduction

This is an update of our previous report titled “Components of Delivered Fuel Prices in Alaska.”¹ We provide more recent data on actual fuel prices in ten rural communities that we first examined in fall 2007.

Rural communities across Alaska face extremely high fuel prices. People in these remote, cold places need large quantities of fuel for heat, electricity, and transportation. The estimated household cost for energy use in remote rural Alaska has increased significantly since 2000—increasing from approximately 16% of total household income to 47% in 2008 for the lowest income households. It is a higher portion of income for all income levels in remote rural Alaska as compared to Anchorage.² In addition to the high price of fuel in rural Alaska, villages and communities have high unemployment rates, limited local economic bases, and local governments that are struggling to provide basic services to residents and businesses.³ A 2008 report done by the Alaska Division of Community Advocacy stated that the price of gasoline in 100 Alaska communities ranged from \$2.75 (Fairbanks) to \$9.00 (Arctic Village) per gallon with a mean of \$5.80.⁴

In many areas of Alaska, transporting bulk fuel by air, barge, truck or a combination of these methods increases the price of fuel, most of which must be purchased prior to “freeze up” in cold winter months in order to allow time for delivery to remote villages. High remote rural fuel prices appear to be the result of a number of factors. These include high transportation costs to remote locations, limited and costly storage, small market size, and the financing costs associated with holding large inventories.

The main purpose of this research is to identify the components of the cost of delivered fuel across rural Alaska. By understanding these cost components, it may be possible to identify opportunities to address them and reduce the overall cost of fuel.

Methods

Communities/villages across the state were selected to represent different conditions (social, economic, geographic, climate) likely to affect the cost of delivered fuel. In consultation with the Alaska Energy Authority (AEA), ten communities were chosen for data collection:

¹ <http://www.iser.uaa.alaska.edu/Publications/Finalfuelpricedelivered.pdf>

This updated report is available at:

<http://www.iser.uaa.alaska.edu/Publications/fuelpricedeliveredupdate.pdf>

² Ben Saylor, Sharman Haley, and Nick Szymoniak, *Estimated Household Costs for Home Energy Use*, May 2008, Note No. 1 Revised June 24, 2008.

<http://www.iser.uaa.alaska.edu/Publications/webnote/LLFuelcostupdatefinal.pdf>

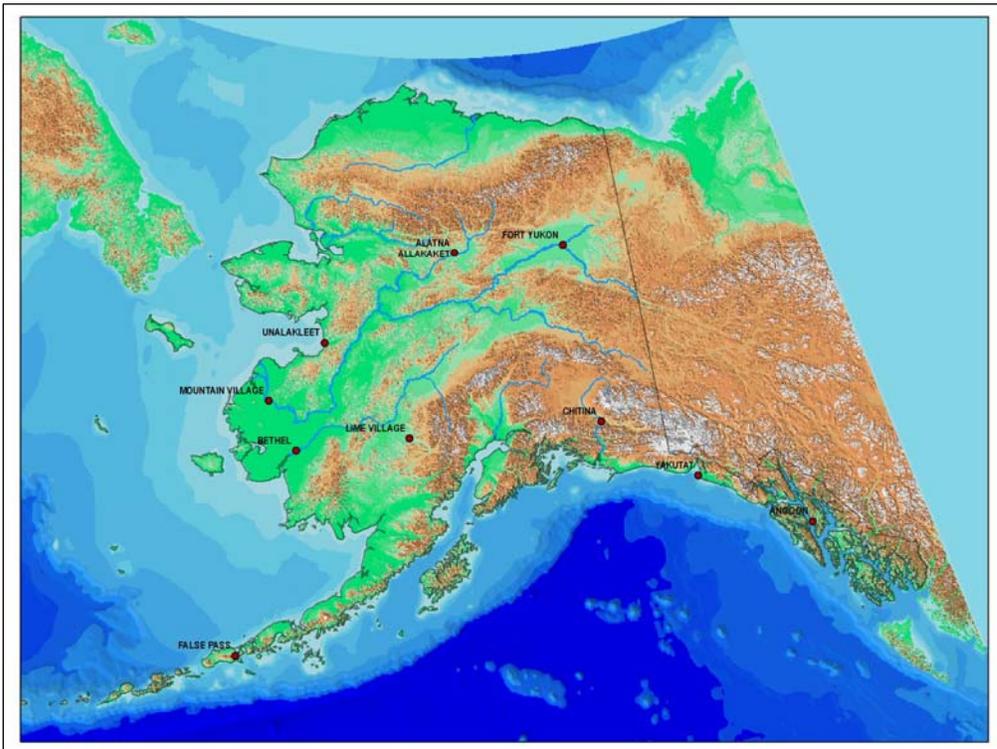
Ben Saylor and Sharman Haley, *Effects of Rising Utility Costs on Household Budgets, 2000-2006*, March 2007. See www.iser.uaa.alaska.edu/Publications/risingutilitycosts_final.pdf

³ Division of Community Advocacy – Report to the Commissioner. January 2007. Current Community Conditions – Fuel Prices across Alaska Fall – Winter 2006 Update.

⁴ Division of Community Advocacy – Report to the Commissioner. November 2008. Current Community Conditions: Fuel Prices across Alaska.

1. Allakaket/Alatna
2. Angoon
3. Bethel
4. Chitina
5. False Pass
6. Fort Yukon
7. Lime Village
8. Mountain Village
9. Unalakleet
10. Yakutat

Figure 1. Map of 10 Case Study Communities



Data on the price of fuel and the components of that price were collected for the ten communities in November 2007. In January 2009 updated fuel price data was collected for the ten communities. We also confirmed that many of the characteristics of fuel purchases and sales remained the same as in fall 2007, and we recorded any significant changes. We used the same methods and questions about fuel prices that we used in November 2007. A copy of the January 2009 survey instrument is attached to this update. The previous report on the components of delivered fuel costs in Alaska released in June 2008 can be viewed on the ISER webpage:

(<http://www.iser.uaa.alaska.edu/Publications/Finalfuelpricedelivered.pdf>). A research summary with interactive maps and maps of fuel delivery to each study community can be viewed at: <http://www.iser.uaa.alaska.edu/Home/ResearchAreas/fuelcosts2.html>

One change in methodology for this update is the way we selected dates for determining the “relevant” crude oil and refined oil prices used as components of delivered fuel prices. In the November 2007 analysis, crude oil and refinery gate prices were relatively stable and communities had received their winter fuel supplies. As a result, we did not ask for specific fuel delivery dates for each community. Given crude oil prices from July to November 2007, there should not have been much variability in final retail prices of fuels for each community based on when fuel was delivered.

In contrast, given the dramatic escalation of crude oil prices peaking in July 2008 (~\$140/barrel) and the crash in prices over the fall (~\$34 in January 2009), communities appear to have shifted their fuel purchasing strategies to better time fuel deliveries to take advantage of falling prices, to the extent possible. Given the variability in both delivery timings and rapidly changing prices, for this update we recorded the most recent fuel delivery date and collected crude oil and refinery gate prices for that month. While we do not know community fuel tank inventories at the time of delivery or the lags between orders and deliveries among the communities, this simple approach attempts to determine the extent to which rapidly changing crude oil and refinery gate prices affect delivered retail fuel prices.

We also used different data sources for crude oil and refinery rack wholesale prices. In the initial report, we used Refiner Acquisition Cost of Crude Oil for PADD 5 (West Coast), and Refiner Petroleum Product Prices by Sales Type, Sales for Resale, Alaska, both from the U.S. Energy Information Administration. However, these data series at the time of this writing are complete only through October, 2008. Therefore, for this update we used the best available data available through January 2009: weekly spot prices for U.S. crude oil from EIA, and wholesale rack prices for Anchorage from the Oil Price Information Service. For consistency, we changed the 2007 numbers in the matrix and charts to use the same datasets. We believe this approach allows for a fair comparison of figures for 2007 to the same data for 2008/2009.

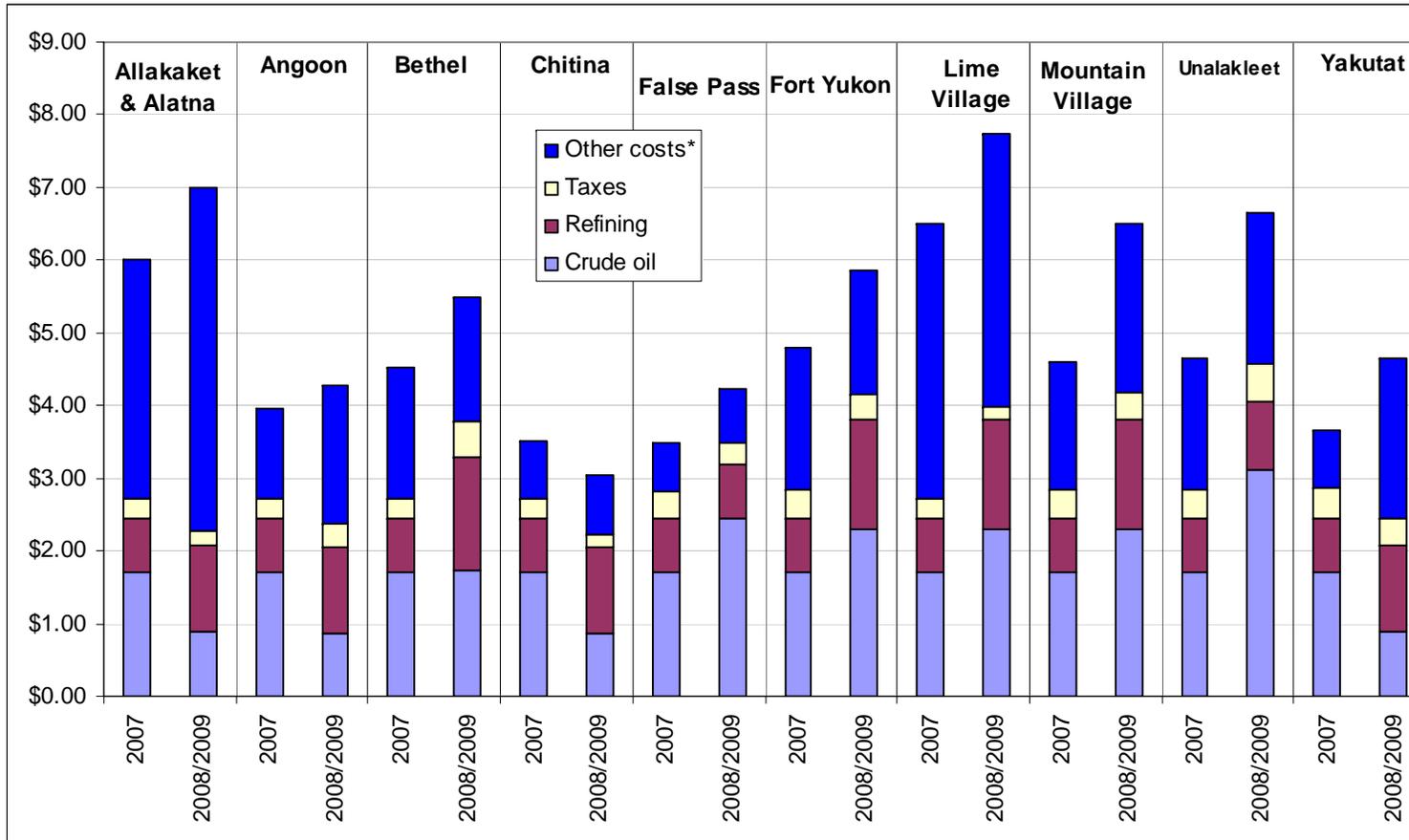
Table 1 provides a summary matrix of the factors affecting fuel prices in the ten case study communities. The table includes previous and current prices of fuel (gasoline, diesel fuel (DF) #1 and diesel fuel #2) as well as updated local tax and recent delivery information. Unless otherwise noted, other data are from the original 2007 study and not updated.

Figures 2 and 3 provide summary comparisons of fuel prices in 2007 and 2008/2009. These figures are followed by community summaries and figures. The final sections discuss major findings and present policy implications.

Table 1.

Components of Fuel Prices Analysis Ten Community Case Study Results										
	Community									
	Allakaket & Alatna	Angoon	Bethel	Chitina	False Pass	Fort Yukon	Lime Village	Mountain Village	Unalakleet	Yakutat
Population	125	478	5653	105	46	591	26	784	724	621
Fall 2007 Prices										
Crude (Sep 2007)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Refining Cost (Sep 2007)										
gasoline	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
diesel # 1	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
diesel # 2	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Retail (Nov 2007)										
gasoline	6.00	3.96	4.52	3.52	3.49	4.79	6.50	4.60	4.65	3.67
diesel # 1	5.50	3.79	4.25	3.41	2.90	4.12	6.25	4.92	4.58	3.72
diesel # 2	NA	NA	4.54	NA	2.85	3.65	NA	NA	4.58	NA
Winter 2008-2009 Prices										
Crude (Month of delivery)	0.88	0.87	1.72	0.87	2.45	2.31	2.31	2.31	3.12	0.88
Refining Cost (Month of delivery)										
gasoline	1.20	1.18	1.57	1.18	0.73	1.49	1.49	1.49	0.93	1.20
#1 diesel	1.00	0.98	1.19	0.98	1.07	1.23	1.23	1.23	1.14	1.00
#2 diesel	1.00	0.98	1.19	0.98	1.03	1.23	1.23	1.23	1.14	1.00
Retail (Jan 2009)										
gasoline	7.00	4.27	5.48	3.03	4.23	5.85	7.75	6.50	6.64	4.64
diesel # 1	6.50	3.82	5.58	2.79	NA	5.87	7.80	7.02	NA	4.98
diesel # 2	NA	NA	NA	NA	4.18	5.86	NA	7.28	6.49	4.85
Most recent fuel delivery	Dec-08	Jan-09	Oct-08	Jan-09	Apr-08	Sep-08	Sep-08	Sep-08	Jul-08	Dec-08
Taxes										
Federal/gal.										
gasoline	0.184	0.184	0.184	0.184	0.184	0.184	0.184	0.184	0.184	0.184
State/gal.										
gasoline	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
2007 Local (%)	0%	0%	0%	0%	3%	3%	0%	3%	3%	4%
2008-2009 Local (%)	0%	3%	6%	0%	3%	3%	0%	3%	5%	4%
Local tax included in retail price		No	Yes		No	Yes		No	No	No
Transportation										
State contract delivery price	0.57	0.21		0.04		0.40			0.63	0.53
Transfer points	4	4	4	2.5	4	4	8	4	5	2.5
Deliveries per year	2	8	10+	52	1	2		2	3	4
Quantity per year	7500	88,000		132,600	300,000		1,800	200,000	270,205	
Number of suppliers	2+	1	2	2	1	1	2	2	2+	1
Market contestability	y	y	y	y	y	n	y	y	y	y
Storage										
Capacity	16000	34,000	14,830,000	100,000	330,000	660,000	5,000	200,000	421,200	6,468,000
Owner	public	public	private	public	private	private	public	public	public	private
Financing	y	n	n	n	n	n	y	y	y	n
Annual O&M + R&R costs per gallon throughput	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction cost	\$326,583	\$693,989	\$42,041,925	\$1,360,764	\$3,180,785	\$4,864,730	\$102,057	\$2,154,542	\$3,582,210	\$18,336,289
Transportation Method										
Air		Barge	Barge	Road	Barge	Barge	Barge/Air	Barge	Barge	Barge
Runway	Long						Short			
Flight time (hours)	2						2			
Price/gal	1.5						1			
Barge										
Ice-free	n/a	y	n	n/a	y	n	n	n	n	y
Moorage/header	n/a	y	y	n/a	y	y	n/a	y	y	y
Tides	n	n	n	n	n	n	n	n	n	n
Ligherage	n/a	y	y	n/a	y	y	y	y	y	n
Navigational risk	n	n	n	n	n	n	n	n	n	n
Wharfage fee	n	y	y	n	y	n	y	n	y	y
Barge distance		990	1,800		850	440		750	1,880	680
Road distance				247		415		415		
Road+Barge distance		990	1,800	247	850	855		1,165	1,880	680
<i>Notes: Italic = estimate</i>										
<i>NOTE: State Gasoline tax was suspended in 2008</i>										
Bold = proxy from similar communities with state fuel contracts										
Sources:										
U.S. Energy Information Administration: Weekly United States Spot Price FOB Weighted by Estimated Import Volume (Dollars per Barrel)										
http://tonto.eia.doe.gov/dnav/pet/hist/wtotusaw.htm										
Oil Price Information Service: Wholesale Rack Prices for Anchorage										

Figure 2. Gasoline



Notes: *Other costs include transportation, storage and retailer markup.

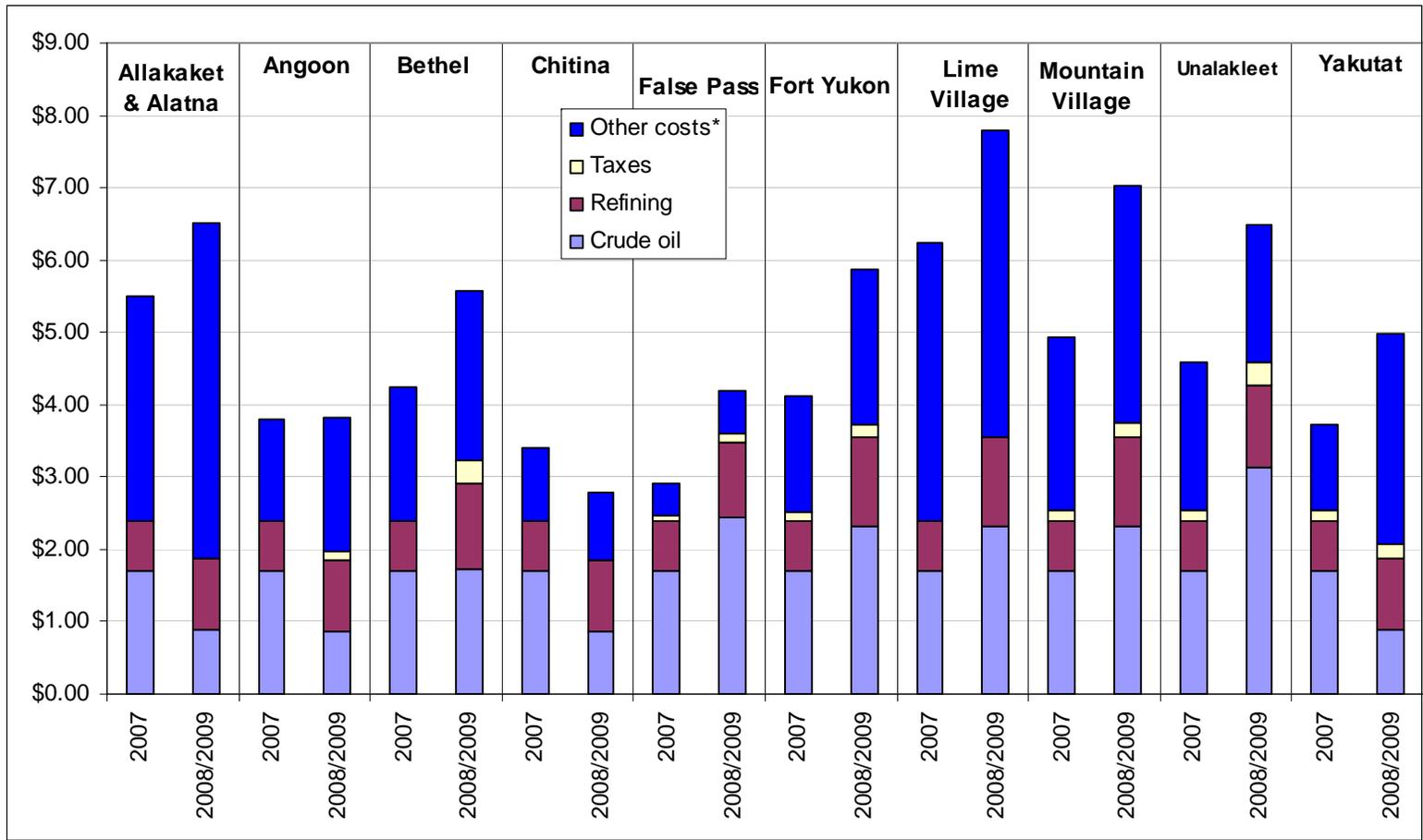
The "refining" component is calculated as the difference between the OPIS wholesale rack price (measured in Anchorage) and the EIA reported U.S. crude price.

Sources: U.S. Energy Information Administration: Weekly United States Spot Price FOB Weighted by Estimated Import Volume (Dollars per Barrel)

<http://tonto.eia.doe.gov/dnav/pet/hist/wtotusaw.htm>

Oil Price Information Service: Wholesale Rack Prices for Anchorage, 1987-2009.

Figure 3. Diesel Fuel



Notes: *Other costs include transportation, storage and retailer markup.

The “refining” component is calculated as the difference between the OPIS wholesale rack price (measured in Anchorage) and the EIA reported U.S. crude price.

Sources: U.S. Energy Information Administration: Weekly United States Spot Price FOB Weighted by Estimated Import Volume (Dollars per Barrel) <http://tonto.eia.doe.gov/dnav/pet/hist/wtotusaw.htm>

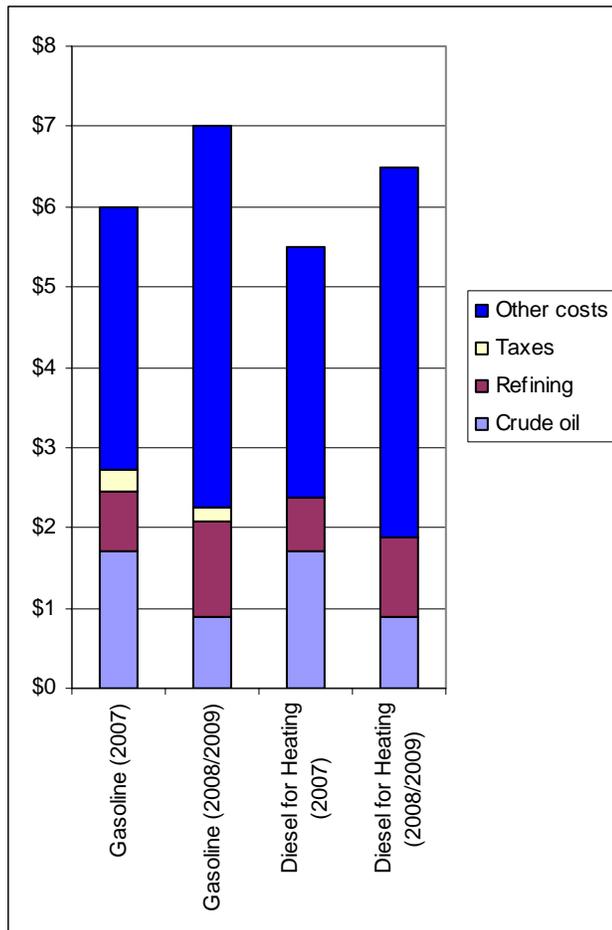
Oil Price Information Service: Wholesale Rack Prices for Anchorage, 1987-2009.

Allakaket/Alatna

Together, the neighbor communities of Allakaket and Alatna (across the Koyukuk River from each other) have a total population of about 125. They are in northern Alaska, above the Arctic Circle. They receive their fuel by airplane, because fuel barges cannot navigate the upper Koyukuk River.

In November 2007 gasoline retailed for \$6.00 per gallon and diesel for heating (DF #1) was \$5.50 per gallon in Allakaket/Alatna. In January 2009 gasoline retailed for \$7.00 per gallon and diesel for heating (DF#1) was \$6.50 per gallon. There is no local sales tax in either community. Several factors tend to increase or ameliorate the “other” fuel prices in these locations:

- Only method of transportation is by air. Everts Air or Brooks Fuel usually deliver fuel to community.
- Because of small population, delivered quantities are small and so the delivery charge is spread across fewer gallons, raising the price per gallon.
- Storage capacity is only 16,000 gallons, but this does not seem to be a constraint on deliveries, because the quantity delivered in 2007 was only 7,500 gallons.
- There are at least two suppliers to the community, and barriers to entry in air transportation are low compared with those in barging—so there is potential for competition.
- Allakaket/Alatna get fuel about once a month. The last shipment of DF#1 was received December 16th, 2008 and gasoline delivery was in November 2008.
- Crude oil prices were significantly higher during fall 2007 accounting for \$1.70 of the final retail refined product price as compared to \$0.88 in December 2008—a \$0.82 or 48% decline per gallon. Despite this decline in crude oil prices, the price of gasoline increased \$1.00 or 17% per gallon and diesel #1 increased \$1.00 or 18% per gallon.

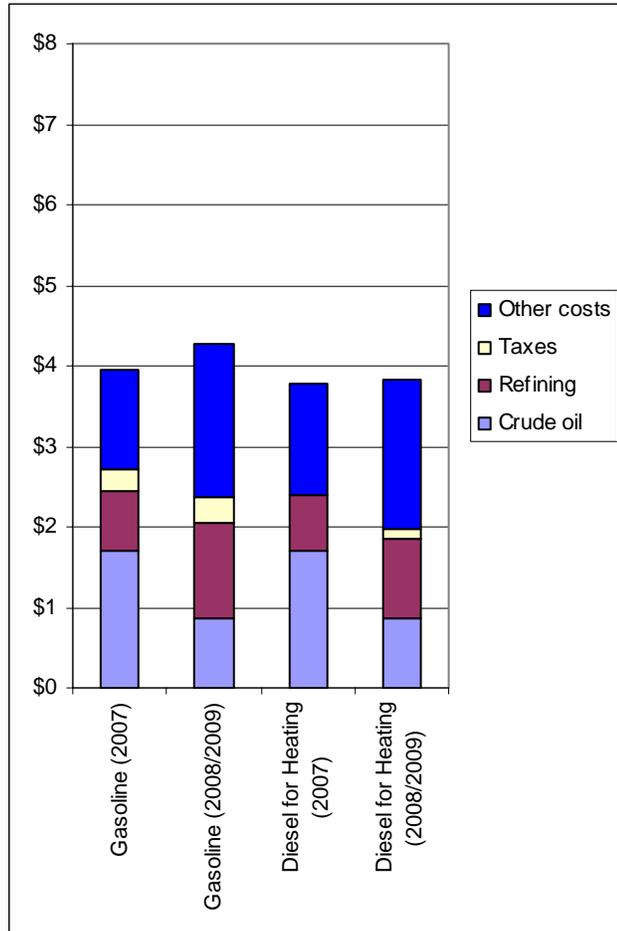


Angoon

Angoon is located on Admiralty Island in Southeast Alaska, south of the capital city of Juneau. Angoon has a current population of 478; the population has decreased over the past few years. All fuel is barged to Angoon by Petro Marine.

In November 2007, gasoline retailed for \$3.96 per gallon and fuel oil (DF #1) for \$3.79 per gallon. In January 2009, gasoline retailed for \$4.27 per gallon and fuel oil (DF #1) for \$3.82. Factors tending to increase or ameliorate these “other” costs include:

- Only fuel delivery method is by barge from Petro Marine about every three weeks. Most recent shipment was January 5th, 2009.
- Ice-free port in Southeast Alaska, roughly 900 miles from both Anacortes and Anchorage.
- Fuel can be delivered any time; typically there are eight deliveries per year.
- Tlingit/Haida Energy program is helping to provide fuel in community.
- Additionally, the Inside Passage Electric Cooperative are upgrading and renovating the power plant (including the generation equipment and heat recovery system). The power plant provides waste heat for the school. The school is currently using more than expected amounts of DF#1 given school square footage and heating degree days.
- Petro Marine is currently delivering to community; Angoon is negotiating with Delta Western to deliver fuel to introduce price competition into the market.
- Similar to Allakaket and Alatna, crude oil prices were significantly higher during fall 2007, accounting for \$1.70 of the final retail refined product price as compared to \$0.87 in January 2009—a \$0.83 or 49% decline per gallon. Despite this crude oil price decline, gasoline in January 2009 was \$0.31 or 8% per gallon higher than fall 2007. Diesel #1 was \$0.03 or less than a 1% increase.

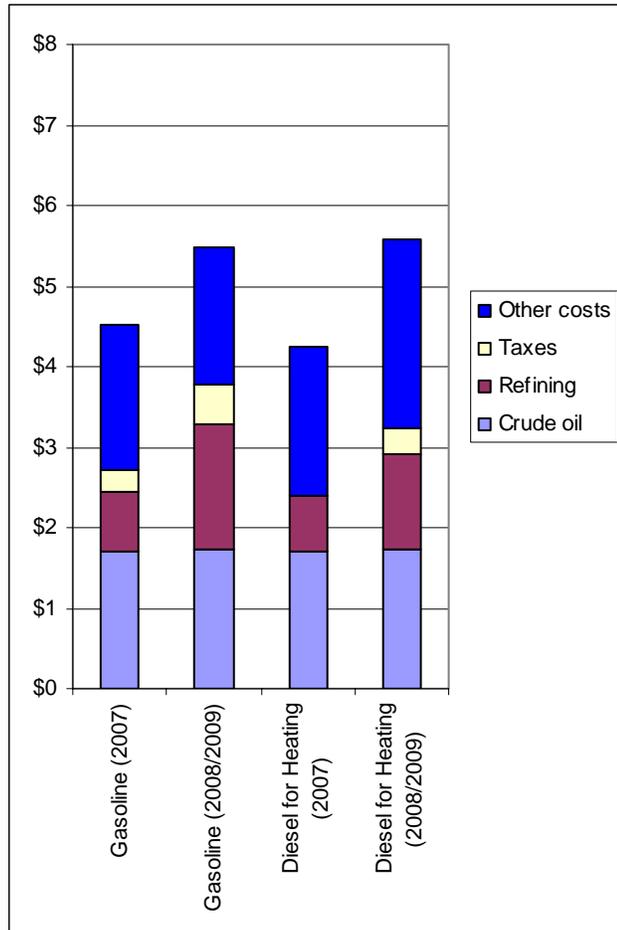


Bethel

Bethel is located at the mouth of the Kuskokwim River and has a population of 5,653. All fuel for Bethel is barged on the Kuskokwim River. It is a regional fuel distribution hub and has a storage capacity of almost 15 million gallons.

In November 2007 gasoline retailed for \$4.52 per gallon and diesel for heating (DF #1) for \$4.25 per gallon. In January 2009, gasoline retailed for \$5.48 per gallon and diesel for heating (DF #1) for \$5.58 per gallon. Factors affecting the costs include:

- Large fuel hub community and large storage facility owned by Crowley Marine. We do not know how much fuel stored in the community is distributed to other regional communities and how much goes to Bethel residents.
- Port and river both freeze up in winter.
- Can receive multiple shipments (10+) per year when river is not frozen.
- In contrast, to Allakaket/Alatna and Angoon, Bethel's October 2008 fuel delivery coincided with higher



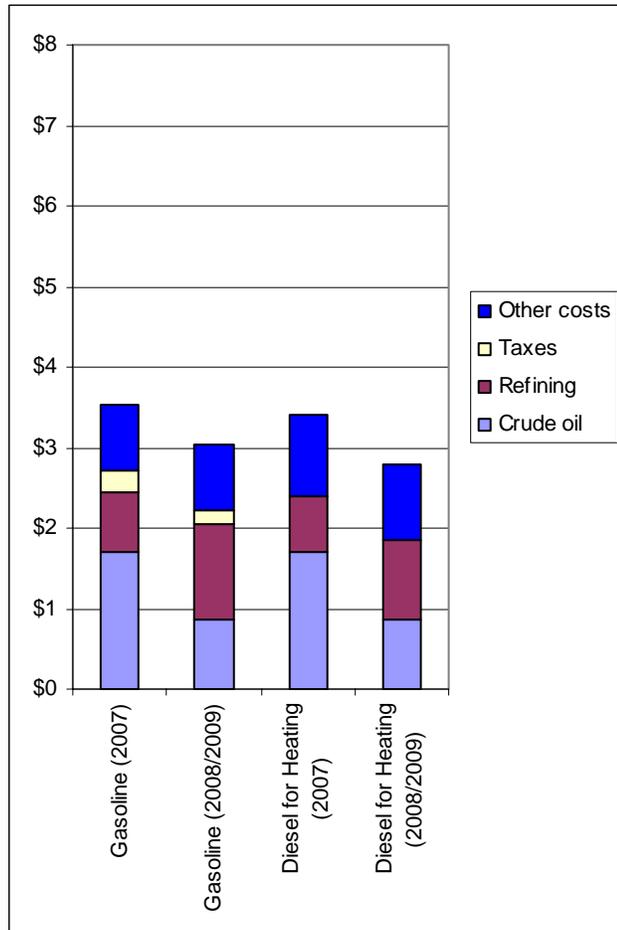
crude oil prices as compared to fall 2007. The estimated October 2008 crude oil component of final retail fuel prices is \$1.72 as compared with \$1.70 per gallon—a \$0.02 per gallon – a 1% increase. In addition, the October 2008 refinery gate fuel price was \$0.82 per gallon higher on gasoline and \$0.50 per gallon higher on diesel #1 than fall 2007. The price per gallon of gasoline was \$0.96 or 21% than fall 2007. Diesel #1 was \$1.33 per gallon, or 31%, higher than fall 2007.

Chitina

Chitina is on the road system in Southcentral Alaska. Chitina has a population of 105. All fuel in Chitina is transported by road from Anchorage via Glenallen.

Gasoline retailed for \$3.52 per gallon and diesel for heating (DF #1) is \$3.41 per gallon in November 2007. The price in January 2009 for gasoline is \$3.03 per gallon and \$2.79 per gallon for heating fuel (DF #1). Various factors tend to increase or decrease the “other costs” components:

- Chitina One Stop (only gasoline retailer in community) shut down for the winter because of high gasoline prices. Now, residents purchase their gasoline at the Kenny Lake Mercantile, 23 miles away. Fuel Prices in Kenny Lake track closely with Chitina and other surrounding communities.
- On the road system only 247 miles from Anchorage.
- Can receive fuel any time; not weather dependent. Fuel comes by truck.
- Similar to Angoon, Chitina had fuel deliveries in January 2009 when crude oil prices had dropped. Crude oil prices were significantly higher during fall 2007 accounting for \$1.70 of the final retail refined product price as compared to \$0.87 in January 2009—a \$0.83 or 49% decline per gallon. The price of diesel declined \$0.49 or 14% and diesel # 1 declined \$0.62 or 18%.
- Chitina prices did fall with crude oil prices but at a lower rate of decline.

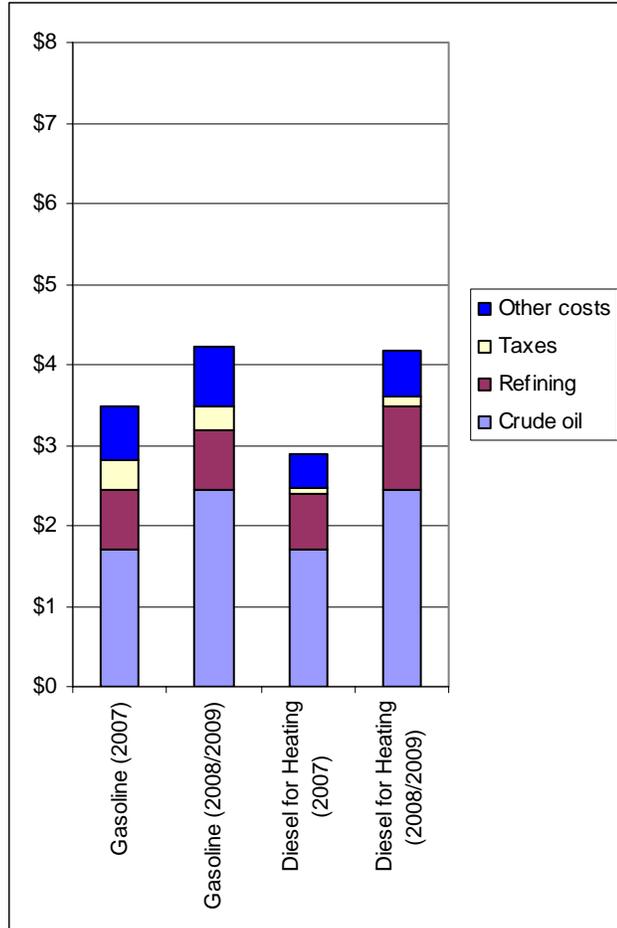


False Pass

False Pass is on Unimak Island in the Aleutian Chain. It has a year-round population of about 46, the population increases when fishermen and fish processors arrive for the fishing season. All fuel for False Pass is barged.

In November 2007 gasoline retailed for \$3.49 per gallon and fuel oil (DF #2) for \$2.90 per gallon. In January 2009 gasoline retailed for \$4.23 per gallon and fuel oil (DF#2) for \$4.18 per gallon. Several factors tend to increase or hold down costs:

- Can only receive fuel by barge.
- Ice-free port.
- Relatively close to large ports (Dutch Harbor and Anchorage).
- Small marine distance from larger facilities.
- Only receives one delivery per year but has a large storage capacity to serve many commercial fisherman and fish processors in the area.
- Storage facility is owned by Peter Pan Seafood, a private company. Large throughput due to fishing fleet and location near multiple fishing grounds.
- Most recent delivery was April 2008.
- The April 2008 delivery was prior to the July peak in crude oil prices but still higher than fall 2007 when the crude oil component of delivered fuel prices was an estimated \$1.70 rather than the April 2008 estimate of \$2.45, a \$0.75 per gallon or 44% increase. The price of gasoline increased \$0.74 per gallon or 21%; diesel #2 increased \$1.33 per gallon or 47%. Compared to the other communities surveyed, the fall 2007 False Pass diesel fuel price was a comparatively low price.

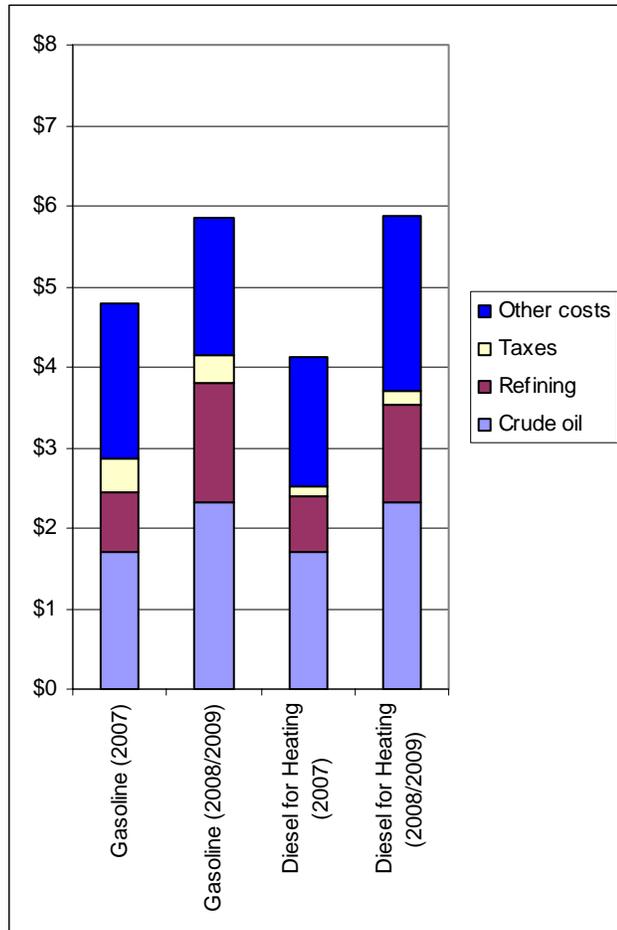


Fort Yukon

Fort Yukon is on the upper Yukon River northeast of Fairbanks and has a population of about 591. All fuel for Fort Yukon is barged upriver from Nenana by Crowley Marine.

Gasoline retailed for \$4.79 per gallon and fuel oil (DF #1) for \$4.12 per gallon in November 2007. In January 2009, gasoline retailed for \$5.85 per gallon and fuel oil (DF #1) for \$5.87 per gallon. Costs can largely be attributed to several factors:

- Fuel barged 400 river miles upriver from Nenana.
- River and port freeze up during winter.
- Fort Yukon's most recent fuel delivery was September 2008 when crude oil prices are estimated to account for \$2.31 per gallon of refined fuel prices as compared to \$1.70 in fall 2007—a \$0.61 per gallon or 36% increase. In January 2009 the price of gasoline was \$1.06 per gallon higher or 22% higher and diesel #1 was \$1.75 per gallon or 42% higher.

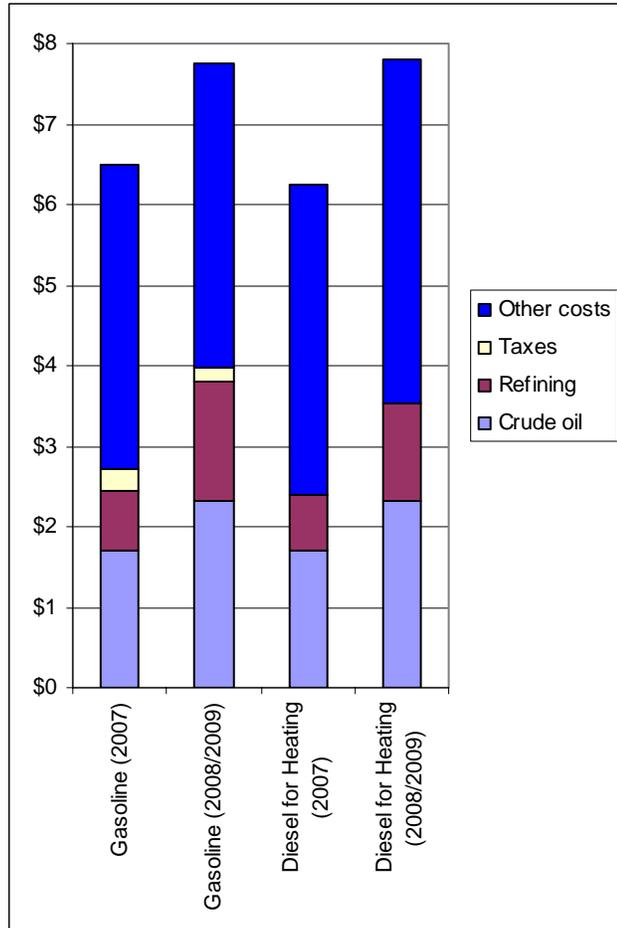


Lime Village

Lime Village is on the Stony River in the Kuskokwim Delta of western Alaska. It has a total population of just about 26; the population has declined over the past few years due to lack of jobs and the school closing. All fuel for Lime Village is delivered by air.

In November 2007 gasoline retailed for \$6.50 per gallon and fuel oil (DF #1) for \$6.25 per gallon. In January 2009 gasoline retailed for \$7.75 per gallon and fuel oil (DF #1) for \$7.80 per gallon. Several things make those costs high:

- All fuel has to come by air, because barges can not navigate the Stony River to Lime Village
- Very short runway for airplanes; can only handle small shipments per trip.
- Fuel is barged from Bethel to Sleetmute and then transferred to planes for delivery to Lime Village.
- Can receive fuel shipments any time of the year.
- Storage facility is publicly owned, but is very small (only 1,800 gallon capacity for the community).
- Small population means delivery charges are spread over fewer gallons.
- Community is currently evaluating having fuel flown in directly from Anchorage. The community is not sure if this will save money. Currently, fuel is being barged to Sleetmute and then flown into Lime Village.
- Lime Village's most recent fuel delivery was November 2008 when crude oil prices were falling. However, Lime Village receives fuel that is first barged to Bethel, then barged to Sleetmute, before being flown to Lime Village. As a result, the fuel most likely was purchased by September to make it to Sleetmute before freeze up. The September crude oil component of fuel prices increased from \$1.70 in fall 2007 to \$2.31 per gallon, a \$0.61 per gallon or 36% increase. Gasoline prices increased \$1.25 per gallon or 19%. Similarly, the price of diesel #1 increased \$1.55 per gallon or 25%.



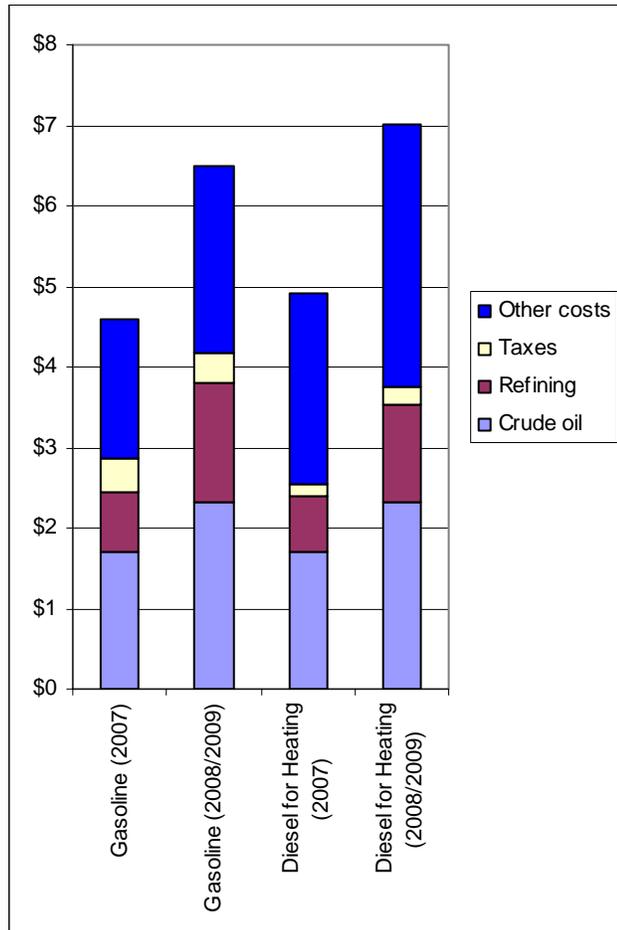
Mountain Village

Mountain Village is on the Yukon River in Northwest Alaska, close to Norton Sound and the Bering Sea. About 784 people live there. Most fuel for Mountain Village is barged down the Yukon River from Nenana, but occasionally deliveries are lightered from ocean-going vessels at the mouth of the Yukon and shipped upstream.

In November 2007 gasoline retailed for \$4.60 per gallon and fuel oil (DF #1) for \$4.92 per gallon. In January 2009, gasoline retailed for \$6.50 per gallon and fuel oil (DF #1) for \$7.02 per gallon. Several things tend to increase or hold down costs:

- Can only deliver during times of the year when river is not frozen.
- Fuel has to be transported in a shallow draft barge; Nenana is main hub port, roughly 1,200 miles upriver.
- Publicly-owned storage facility, with a capacity of 200,000 gallons.
- Similar to Fort Yukon, Mountain Village received its most recent fuel delivery in September 2008 when crude oil prices are estimated to account for \$2.31 per gallon of refined fuel prices as

compared to \$1.70 in fall 2007—a \$0.61 per gallon or 36% increase. However, in January 2009 the price of gasoline was \$1.90 per gallon or 41% higher as compared to the \$1.06 per gallon higher or 22% higher increase in Fort Yukon. For diesel #1, the price increased \$2.10 or 43% in Mountain Village compared to Fort Yukon’s \$1.75 per gallon or 42% higher.



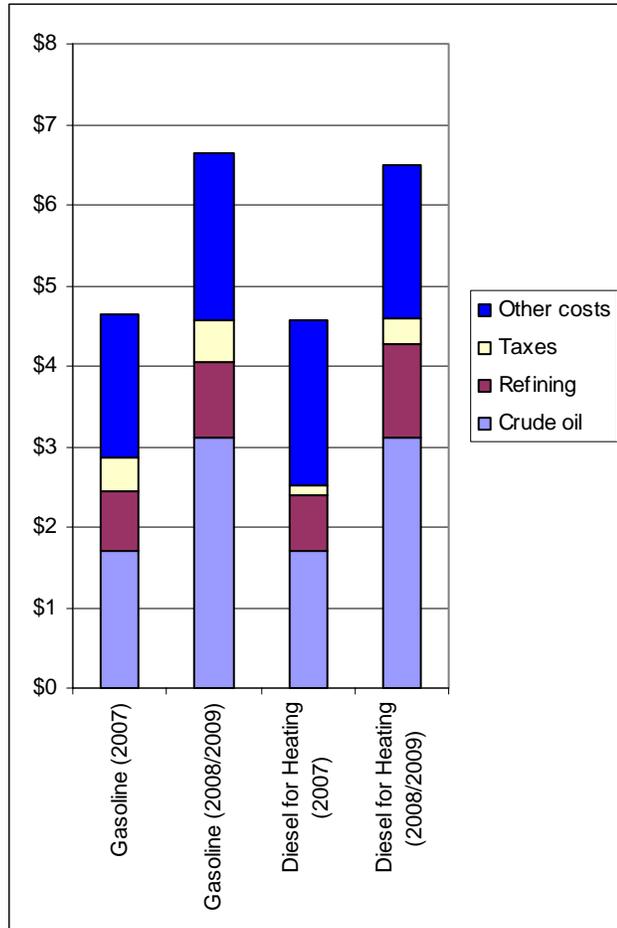
Unalakleet

Unalakleet is in northwestern Alaska, on Norton Sound. Unalakleet has about 724 residents. All fuel is first barged to Nome in a line-haul vessel and then transported to Unalakleet in a shallow draft lighterage vessel.

Gasoline retailed for \$4.65 per gallon and fuel oil (DF #2) for \$4.58 per gallon in November 2007. In January 2009, gasoline retailed for \$6.64 per gallon and fuel oil (DF #2) for \$6.49 per gallon. Several things tend to add to or hold down those other costs:

- Barge is the only method of fuel delivery.
- Norton Sound freezes in winter; deliveries only during ice-free months.
- Fuel is transported from Nome in a lighterage vessel and pumped directly to a storage facility.
- Community receives three or more shipments per year during ice-free months.
- Publicly-owned storage facility with a capacity of 420,000 gallons.
- Of the study communities, Unalakleet was the unfortunate community that

took delivery of fuel at peak crude oil prices in July 2008. The crude oil component of fuel prices reached \$3.12 per gallon as compared to \$1.70 in fall 2007, a \$1.42 or 84% increase. Gasoline prices increased \$1.99 or 43% per gallon. Diesel #2 increased \$1.91 or 42% per gallon.

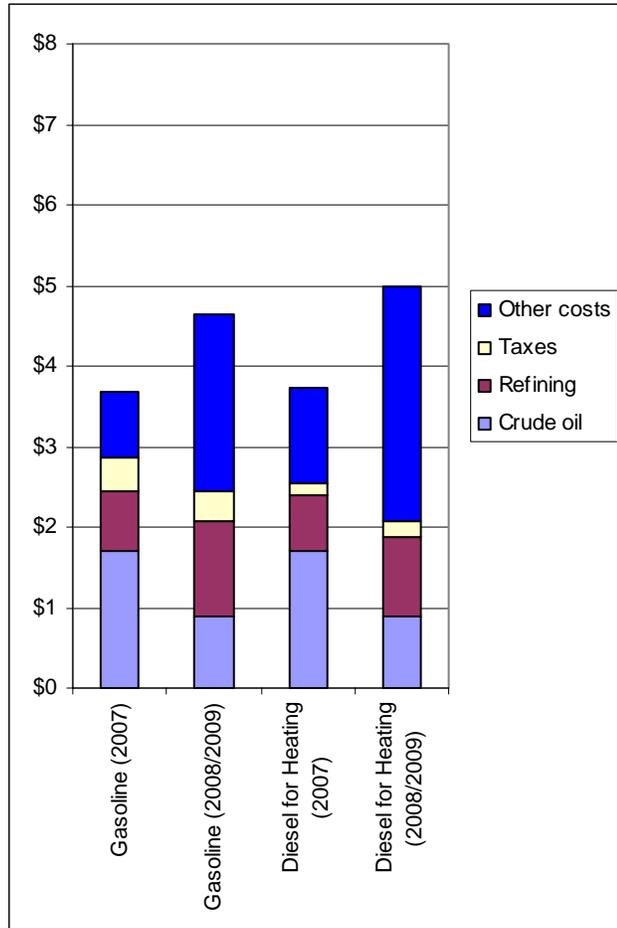


Yakutat

Yakutat is in Southeast Alaska, on the Gulf of Alaska north of the capital city of Juneau. Yakutat has about 621 residents. All fuel is barged to Yakutat by Delta Western, which also owns a 6.5 million gallon storage facility in the community.

In November 2007 gasoline retailed for \$3.67 per gallon and fuel oil (DF #1) for \$3.72 per gallon. In January 2009, gasoline retailed for \$4.64 per gallon and fuel oil (DF #1) for \$4.98 per gallon. Price quoted is for purchases of 0-50 gallons Fuel is less expensive in Yakutat than in many other places in Alaska because:

- Fuel transportation method is by barge, but no river barging is required and Yakutat can receive shipments from either Anchorage or Seattle, allowing for more potential fuel sources and thus, competition.
- Ice-free port allows year-round fuel deliveries.
- Deeper harbor accessible by larger shipments.
- Large storage facility maintained by one transportation company. Large volume of fuel throughput due to Alaska Airlines' twice daily service to the community.
- Yakutat's most recent fuel delivery was in December 2008. Crude oil prices were significantly higher during fall 2007 accounting for \$1.70 of the final retail refined product price as compared to \$0.88 in December 2008—a \$0.82 or 48% decline per gallon. Despite this decline in crude oil prices, the price of gasoline increased \$0.97 or 26% per gallon and diesel #1 increased \$1.26 or 34% per gallon.



Discussion

Commercial fuel suppliers consider a number of costs that contribute to the final retail price of fuel. Many of these are proprietary, making it difficult to accurately quantify the components of fuel prices. In addition, there is limited competition in some markets, which makes it difficult to separate legitimate costs from high profits. Competition may be limited because the market can only support a small number of suppliers, each of whom must spread their fixed costs over some minimum sales volume.

Despite these limitations, this analysis does provide useful information about fuel prices in Alaska:

- World and Alaska crude oil prices are set in the global market and reflect both crude oil supply and demand and international global events that influence the real and perceived stability of oil supplies.
- Alaska can do little (or nothing) to influence world crude oil prices. Therefore, these are a relative fixed component of overall fuel prices. In late 2007, costs of crude oil made up approximately \$1.70 per gallon of final fuel retail prices.
- In this update, the crude oil component varied from \$3.12 per gallon in July 2008 (~\$140 per barrel of crude) to \$0.87 in January 2009 (\$35 per barrel of crude). The crude component dropped by \$2.25 in that time frame. The crude component was nearly 3.5 times higher in July 2008 than in January 2009.
- A significant portion of fuels used in Alaska are refined by in-state refineries. The balance is refined primarily in Washington.
- While the costs of fuel from Alaska refineries might be somewhat higher than from West Coast refineries, the additional transportation costs from West Coast refineries to Alaska traditionally have balanced out the costs of in-state refining. As a result, the combined crude oil and refinery components have tended to total the same amount, regardless of fuel refinery source.
- Refinery wholesale prices closely track crude oil prices. The difference tends to be constant rather than a percentage, which suggests it is based on actual costs.
- The average refinery component for gasoline in September 2007 was about \$0.59 and for #2 diesel was \$0.53.⁵ The refinery component for gasoline ranged from \$0.73 in April 2008 to \$1.57 in October 2008. The refinery component for #2 diesel ranged from \$0.98 in January 2009 to \$1.23 in September 2008.
- The refinery component of final fuel prices increased for both in-state and out of state refineries; this was especially true for diesel fuels.
- The mix of refined products appears to be in flux both in Alaska as well as nationally. A shifting product mix could be caused by rapid changes in the price of crude oil or changes in the relative demand for petroleum products (e.g. the demand for gasoline has declined more rapidly than the demand for diesel as a result of the drop in vehicle miles driven).

⁵ These figures are different than the original publication because we changed the source of our refinery information from OPIS (Oil Price Information Service) rather than the PADD 5 because the latter information was only available through October 2008.

- State and federal taxes are a relatively constant component of fuel prices. Some communities charge local sales taxes, which increase final consumer prices.
- The state motor fuel tax (\$0.08 is for gasoline) was suspended September 1, 2008 through August 21, 2009. In this update we only investigated one community on the Railbelt road system; therefore it is unknown what impact the state motor fuel tax suspension has had on communities.
- For the communities that have roads and gasoline subject to the state motor fuel tax (Angoon, Bethel, Chitina, Yakutat), only Chitina saw a decline in the price of gasoline as a result of lowered crude prices. Chitina is also the only community with any significant potential for market competition. This suggests that the “other factors” have more impact on the final price of fuel than the price of crude. These are small non-competitive fuel markets and as a result a suspension of taxes may or may not be passed on to final consumers.
- The mechanisms for charging federal fuel taxes are complex and obtaining refunds for federal taxes on exempt fuels is cumbersome for consumers.
- Communities closer to refineries and with road, pipeline, or railroad access enjoy the lowest fuel prices. Variations in prices in those locations tend to reflect market competition.
- Communities that rely on air delivery of fuel face the highest prices depending on the community’s population and runway length—which determines the gallons flown in per delivery.
- Barge fuel delivery tends to cause the most variability in fuel prices and reflects in part the complexities of delivery, with seasonal ice being a major concern.
- Seasonal ice that limits deliveries also increases the need for storage capacity and the costs of maintaining inventories.
- In addition to seasonal ice that limits the number and timing of deliveries, the depth and characteristics of ports dictate the type of barge that can deliver to communities. The need for custom-built barges for deliveries to communities on shallow stretches of river that freeze up in the winter also increases delivery costs. The short season during which transporters need to recover the capital costs of these barges also increases the delivered price per gallon.
- In general, distance and population are major factors in final fuel prices, because much of the cost of delivering fuel is relatively fixed. Larger deliveries allow these fixed costs to be spread across more gallons.
- The “other costs” component of Alaska fuel prices is the most variable and reflects the wide variations among Alaska communities in distance from refineries, delivery methods, market competition, financial solvency, and many other factors.
- In this update, “other costs” are on average a larger portion of final retail prices than they were in 2007.
 - This could be caused by the inherent cost of price volatility, which raises uncertainty for communities regarding how much fuel to purchase and when, raising their transaction and financing costs.
 - So far, retail prices have tended to rise more rapidly as crude oil prices increased than they have fallen with the decline in crude prices.

- Accounting practices to address pricing for fuels bought at different times and crude oil prices, the size of fuel storage facilities, and the size of inventory remaining at the time of price changes may vary from community to community, thus changing the response time to changes in crude oil prices.
- Since fuel tends to be priced when it leaves the refinery, distance from refineries has an even greater impact on final retail prices under volatile market conditions. Communities that faced the highest prices due to their remoteness, also tend to be the last to experience current price declines. Lime Village illustrates this point with fuel first barged to Bethel, then barged to Sleetmute before being flown to Lime Village. Fuel received in November was probably shipped to Bethel back in the summer, when refinery gate prices were much higher.
- Communities that effectively enlarge their populations or increase their market size through fishing fleets or airline traffic offset the higher prices caused by small market sizes. Case study communities that strongly illustrate this point are False Pass and Yakutat in 2007. It is unclear why Yakutat prices are so much higher in January 2009 given crude oil prices in December 2008, when Yakutat received its most recent delivery.
- The small size of the markets and high cost of entry in terms of capital and skills, reduces the number of suppliers that can be supported. The information we would need to distinguish costs from profits is proprietary.
- In 2007, the wide variation in final prices to communities suggests that prices at least in part reflect the differing costs of delivering and storing fuel. The situation is less clear under current volatile fuel market conditions.

Policy implications

State policies and actions cannot change many of the factors that influence final fuel prices. There are, however, a number of actions that may affect prices. These include:

- The State of Alaska could provide crude oil feedstock to Alaska refineries through royalty oil sales at reduced prices, to lower the crude oil component of fuel prices. But without continued control of “downstream” cost components, it is not clear whether the lower crude oil feedstock prices would be passed on to final consumers or be taken in higher profits by all the “handlers” between the refinery and the end user. It is also unclear whether direct assistance to the communities and households with the highest fuel costs would be a more efficient and fairer practice, since state petroleum revenues to fund such programs would increase with the price of crude oil.
- The State of Alaska could take a portion of its oil in-kind and contract for its refining and delivery through its fuel purchase contracts. This could increase the effective market size and influence of small remote villages.
- Fuel prices tend to reflect market size, so cooperative buying to increase the total volume per purchase may reduce prices. It is unclear the extent to which communities coordinate deliveries, or whether entities within communities—such

as electric utilities, schools, and others—coordinate their fuel purchases. The State of Alaska could more actively facilitate cooperative purchasing.

- The lack of cash to purchase fuels seems to inhibit some buyers from timely, coordinated purchases. A non-profit broker to coordinate and fund collective fuel purchases could further reduce prices if that broker had access to low-cost capital financing.
- Higher fuel prices disproportionately affect lower income communities and raise the risk of non-payment for fuel purchases. Therefore, a “risk premium” is added to the price of fuels for those communities who can least afford it. The State of Alaska could share the risk by expanding loan guarantee programs.
- The equipment and infrastructure for fuel delivery—such as docks, moorages, and marine headers—influence the costs of delivery. Ownership of these facilities links a responsible party to fuel spills. Facilities tend to be lacking in some communities in order to limit liability—but that results in higher delivery costs and increased risks of spills. Addressing this issue could lower both prices and environmental risks.
- While it would not directly impact prices, increased funding for the Low Income Energy Assistance Program (LIEAP) would address the high cost of home heating. In the locations with the highest fuel prices and lowest incomes, the program would directly relieve the costs to those most burdened by high fuel prices. From an economic and administrative perspective, increased LIEAP funding would probably be the most efficient way to address the short-run burden of sudden fuel price increases. In combination with the energy efficiency and weatherization programs funded by the Legislature in 2008, LIEAP funding is an efficient part of a longer-term solution.

Attachment: Fuel Cost Update Survey Form

AEA Delivered Fuel Cost (Part 2)

COMMUNITY: _____

Phone Number: _____

Contact Name: _____

Date Contacted: _____

Type of Fuel	Previous Price (per gallon)	Price (cost per gallon)	Delivery Method	Date of Delivery	Fuel Distributor Name

Who files the paperwork for Taxes?

How many times a year are you being asked to complete similar fuel surveys?

Notes: