2022

Utah Gasoline Prices

UTAH DNR NATURAL RESOURCES

UTAH OFFICE OF ENERGY DEVELOPMENT

UTAH DNR GEOLOGICAL SURVEY

UTAH DNR OIL, GAS & MINING

UTAH DEPARTMENT OF COMMERCE
Division of Public Utilities

UTAH STATE TAX COMMISSION SEAL

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Introduction

Motor gasoline prices in Utah have trended higher than the national average for the last few years. Previously, Utah prices often fell in line with or below the national average. To determine the cause of this paradigm shift, this report breaks down Utah's petroleum supply chain and analyzes each piece's contribution to the total cost of a gallon of gasoline.

This report is a result of a request from the Governor's Office to help develop a better understanding of Utah's petroleum market. Given time constraints, it is not exhaustive. This document is a working draft and not a formal academic report.

Where the data present price anomalies, they are noted, but this report does not necessarily determine why those prices are higher, just that they are.

The petroleum supply chain is a long-matured market that has evolved over the years. It is a complex system that is globally influenced, and economies have adapted to the convenience of readily available refined products that power modern life.

As economies grow and shrink, so does the consumption of these fuels. The market subsequently reacts to balance supply and demand appropriately to maintain the system's integrity.

Any artificial manipulation of this system will present unintended consequences, like higher gasoline prices.

Utah's petroleum supply chain can be explained in three steps: Production, Refining, and Retail.

Production is the first step in the supply chain. Operators drill and extract crude oil from the ground and sell it for refining into gasoline and other products.

Refining is the process of removing the impurities or unwanted substances from crude oil and breaking it down chemically to make various refined products, from unleaded gasoline to diesel.

Retail is the means of distributing refined products to consumers. Within retail are the costs associated with distribution and marketing, as explained further in this report. Some retail outlets are owned and operated by refiners, while others are independent.

This report contains three major sections. ***Utah's Petroleum Market*** establishes a baseline for understanding the petroleum supply chain in the state and introduces concepts and definitions that will be discussed further in the report.

Utah Compared to Other Markets compares the average prices of each step along the petroleum supply chain in Utah against the U.S., Wyoming, Colorado, Nevada, Washington, California, and Texas. Idaho is excluded because its fuel market is tied closely to Utah's.

Possible Solutions & Next Steps is the next section, followed by a ***Conclusion & Appendix.***

Executive Summary

To determine why Utah's gasoline prices are higher than the national average, the Utah Office of Energy Development, along with supporting agencies, analyzed Utah's petroleum supply chain to determine what factors may be contributing to the problem.

After a thoughtful analysis, a primary theme emerged. ***West Coast demand for Utah refined products has increased because of diminishing supply in the West due to refinery closures and biofuel conversions***. This increased demand for Utah products from markets that experience higher prices, has resulted in higher rack prices at Utah refineries. In short, while demand pressures continue to grow, supply is dropping in other markets where Utah products are sold, creating pricing pressures.

Supply and Demand

Utah's refining capabilities are at or near their maximum capacity, and as out-of-state markets continue importing Utah's cheaper refined products, the market price for Utah's gasoline goes up. Subsequently, the state will either pay higher prices for gasoline or must source it elsewhere. ***The West Coast and the Intermountain Region (except Utah) are seeing an overall decrease in the supply of refined products without seeing a decrease in demand***. ***This decrease in supply is caused by refinery closures or conversions to produce biofuels, both of which are heavily incentivized by state and federal regulations***. These regulations are attributed to the decarbonization efforts of governments across the energy market. Consequently, Utah refineries now supplement out-of-state markets that are experiencing diminishing supplies, adding pressure to Utah's traditionally cost-effective product.

Rack Prices

Because the supply of gasoline has decreased in the West, the market price for refined product, i.e. gasoline, has increased in the region. The "rack" is the first place where refined product is sold – the rack price includes the price of crude oil at the wellhead and all other refinery costs and profits. ***Rack prices are where Utah first sees higher-than-average prices along the supply chain.*** Rack pricing details are not explored in this report, but it alludes to either higher-than-average costs or profits at Utah's refineries or both. It should be noted that rack prices are an indicator of market influences surrounding a tightening of supply.

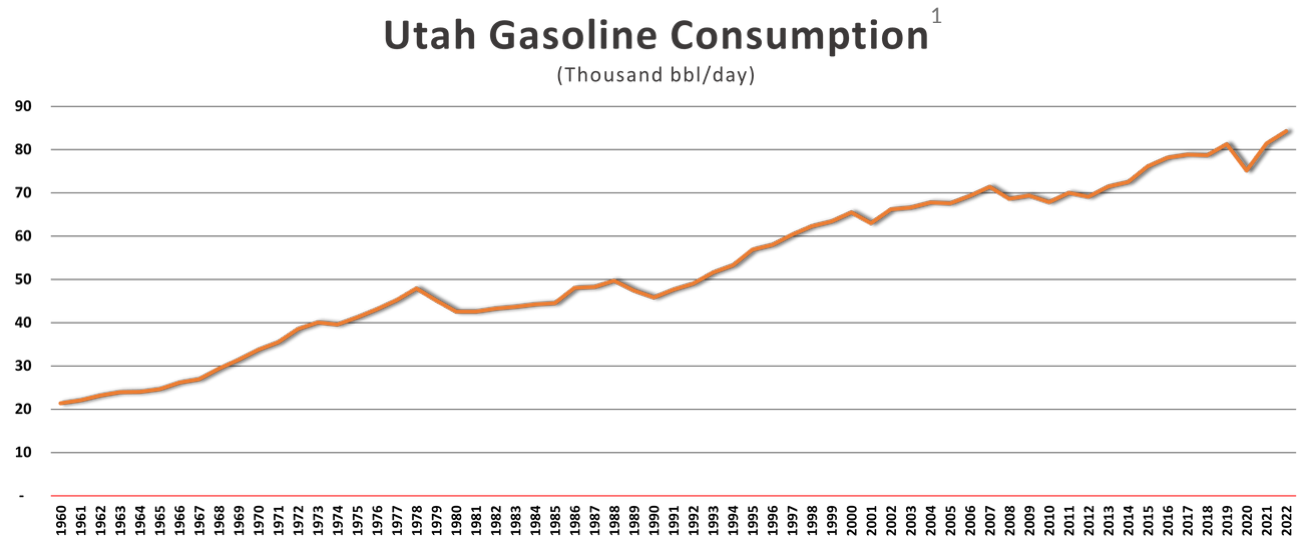
In Utah, the price of an average gallon of gasoline comprises roughly 10% distribution and marketing costs, 15% taxes and fees, 28% refining costs and profits, and 47% for the price of crude oil. As discussed in the report, ***refining accounts for more of the average cost than the U.S. average, while Utah's crude mix cost accounts for less***.

It is recommended that industry be involved in crafting potential solutions given their partnership with the state and because they are most acutely aware of the cross-market interplays affecting the supply and demand imbalance.

Utah's Petroleum Market

Supply/Demand

Utah's gasoline consumption (demand) has steadily increased over the past 60-plus years, mirroring population increases. So far, Utah refineries have kept up with growing demand, but due to capacity limits at Utah's refineries, not much more supply growth is expected within the state. Utah operators can increase oil production, but local refineries cannot handle the additional loads, compelling Utah crude oil operators to slow production or sell out-of-state. Future reductions in refining capacity would exacerbate this condition. The following graph is in thousands of barrels per day (bbl/day).



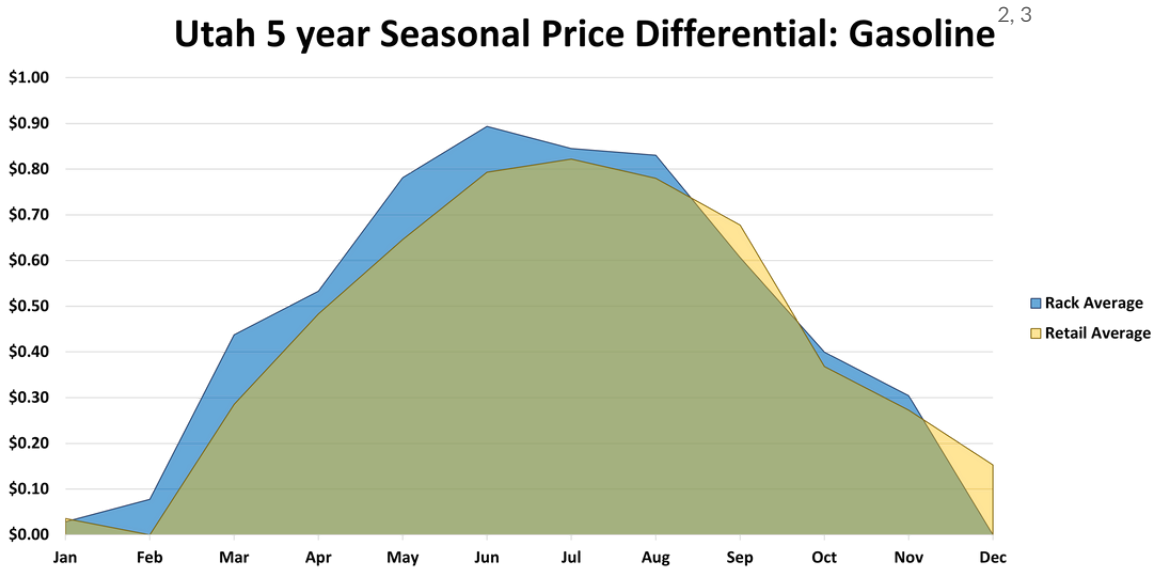
Demand for gasoline in the state is projected to continue its upward trend. The additional demand can be attributed to Utah's population growth which has increased by 18.4% over the last 10 years – the fastest in the nation. Over that same period, Utah's gasoline consumption has increased by 22%.

Seasonal supply and demand pressures also affect the price of gasoline. The graph on the following page shows the seasonal price changes of a gallon of gasoline, which are due to increased demand in those summer months.

It should be noted that refineries are required by federal regulation to do a "turnaround" (TAR) every year. Refineries shut down for an extended period for maintenance and other regulatory requirements. In Utah, this is typically done in the winter when demand is low.

In Utah, peak seasonal demand increases the price of gasoline by 90 cents per gallon, which is among the highest in the nation, with rack price increases accounting for the majority of the cost. The U.S. averages a 56-cent increase at summer peak, and Colorado comes closest to Utah in the region with a peak seasonal price increase of 81 cents per gallon.

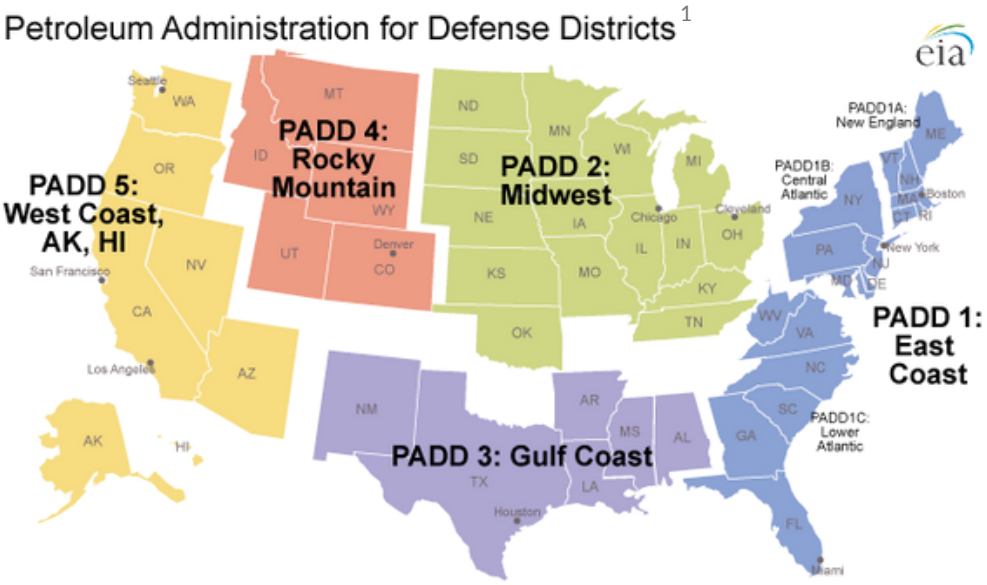
1: U.S. Energy Information Administration https://www.eia.gov/



It should be noted that when rack averages in the above illustration are higher than retail averages, it means retailers are absorbing more of the price increase. As suggested, ***when demand for gasoline increases, so does the price***.

In addition to increased demand within the state, there are regional decreases in supply. Utah is part of a region called Petroleum Administration for Defense Districts (PADD) 4, which is the Intermountain West area, and the West Coast is part of PADD 5. ***Several refineries have closed their operations between the two regions, decreasing the ability of regional refineries to meet their local demand***. Additionally, a few refineries in these two regions converted their operations to produce biofuels, a modification that significantly decreases their output and only enables them to produce distillates, not gasoline; again reducing local supply.

PADD 4 and PADD 5 have lost a combined 250,000 barrels per day (bbls/day) of net refining capacity since 2019 due to shutdowns and conversions, meaning there is less supply in the regions compared to pre-pandemic levels, even as gasoline demand is normalizing and increasing.

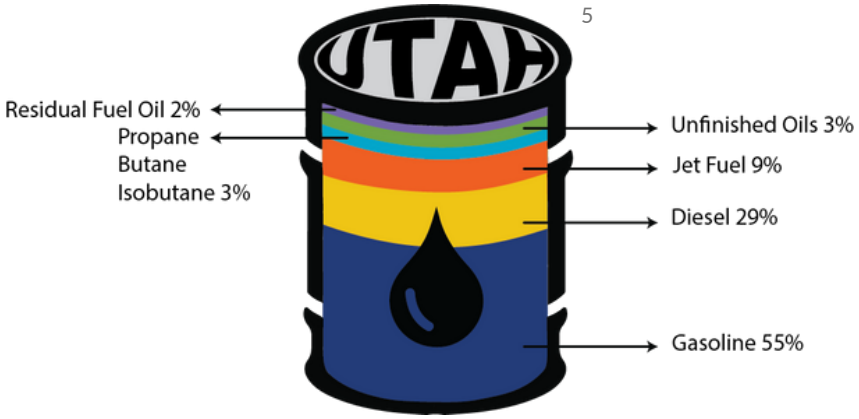


1: U.S. Energy Information Administration https://www.eia.gov/
2: Oil Price Information Service, LLC (OPIS) https://www.opisnet.com/
3: DTN Fastracks https://www.dtn.com/refined-fuels/

Utah's Supply Chain

Crude Oil

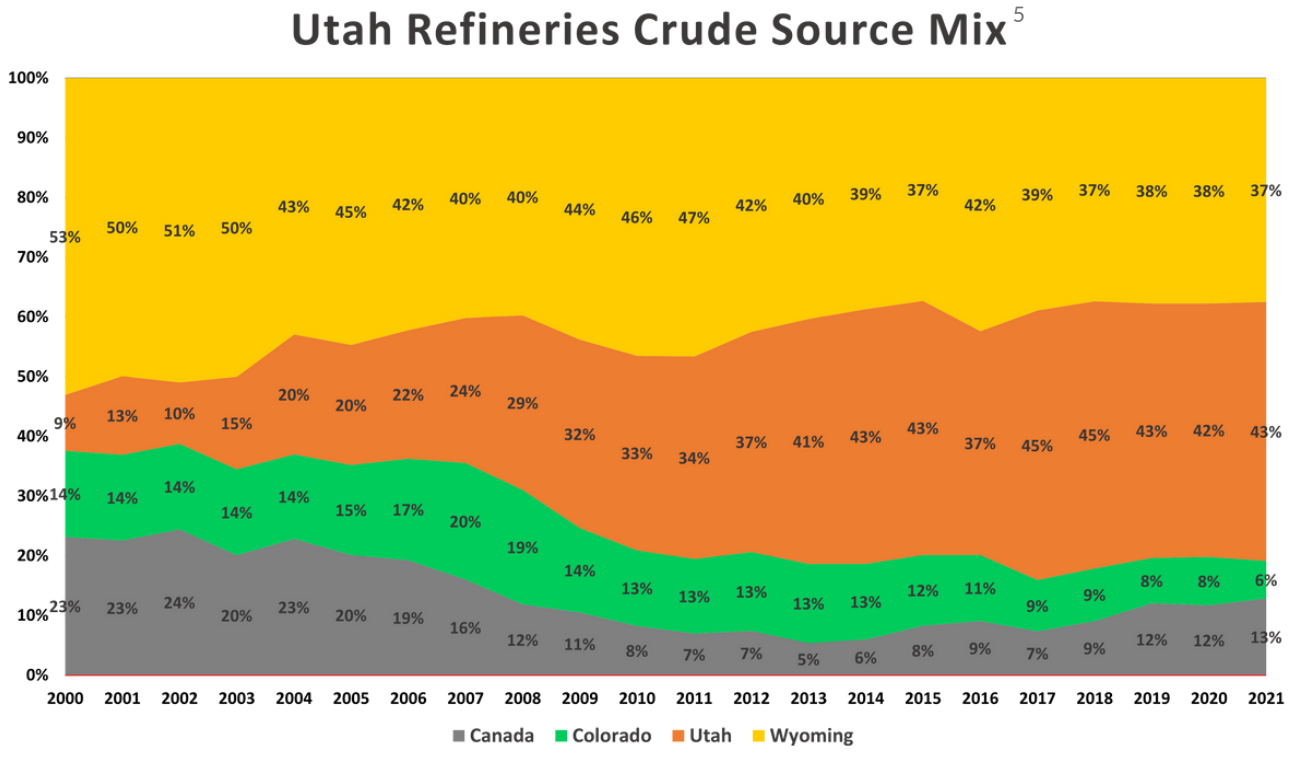
A barrel of crude oil is 42 gallons, but due to processing gains, it produces about 45 gallons of refined product. The accompanying graphic shows the percentage of refined products Utah refineries produced in 2021.



Crude oil prices are responsible for the largest share of the overall cost of a gallon of gasoline. Over the last two years, crude prices have increased significantly worldwide. This report does not address those causes, but crude price increases are mostly responsible for the current high prices of gasoline.

To understand crude prices in Utah to determine if they are higher than the national average, we must know where Utah refineries get crude from and how much they get from each place. We can then generate an average price for the total mix of crude oil going to Utah's refineries.

The chart below shows that ***Utah refineries source crude oil primarily from four places: Utah, Wyoming, Canada, and Colorado.*** Since about 2003, Utah operators have steadily supplied more crude to Utah refineries. The bulk of Utah's crude comes from the Uintah Basin, and Wyoming is the largest out-of-state contributor.



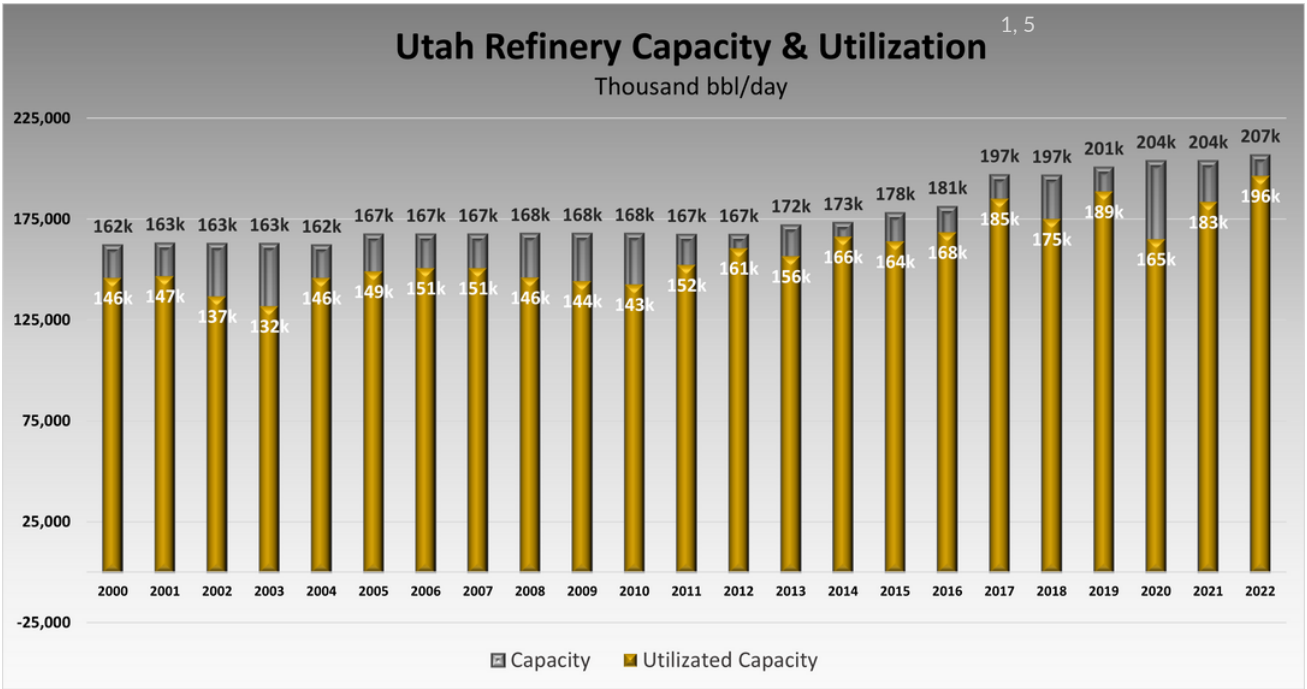
5: Utah Geological Survey

The most recently available data on the price of Utah's crude source mix is from the first six months of 2022. The estimated average cost in that timeframe was almost $93 per barrel.

Refined Product

Utah has five refineries north of Salt Lake City. Their combined total capacity for refining oil is about 207,000 bbl/day. Average refinery utilization in Utah is about 95%, meaning that though Utah refineries are capable of producing up to 207,000 bbl/day, they average about 196,000 bbl/day, as shown in the graph below. This level of utilization is around the maximum that refineries can consistently maintain.

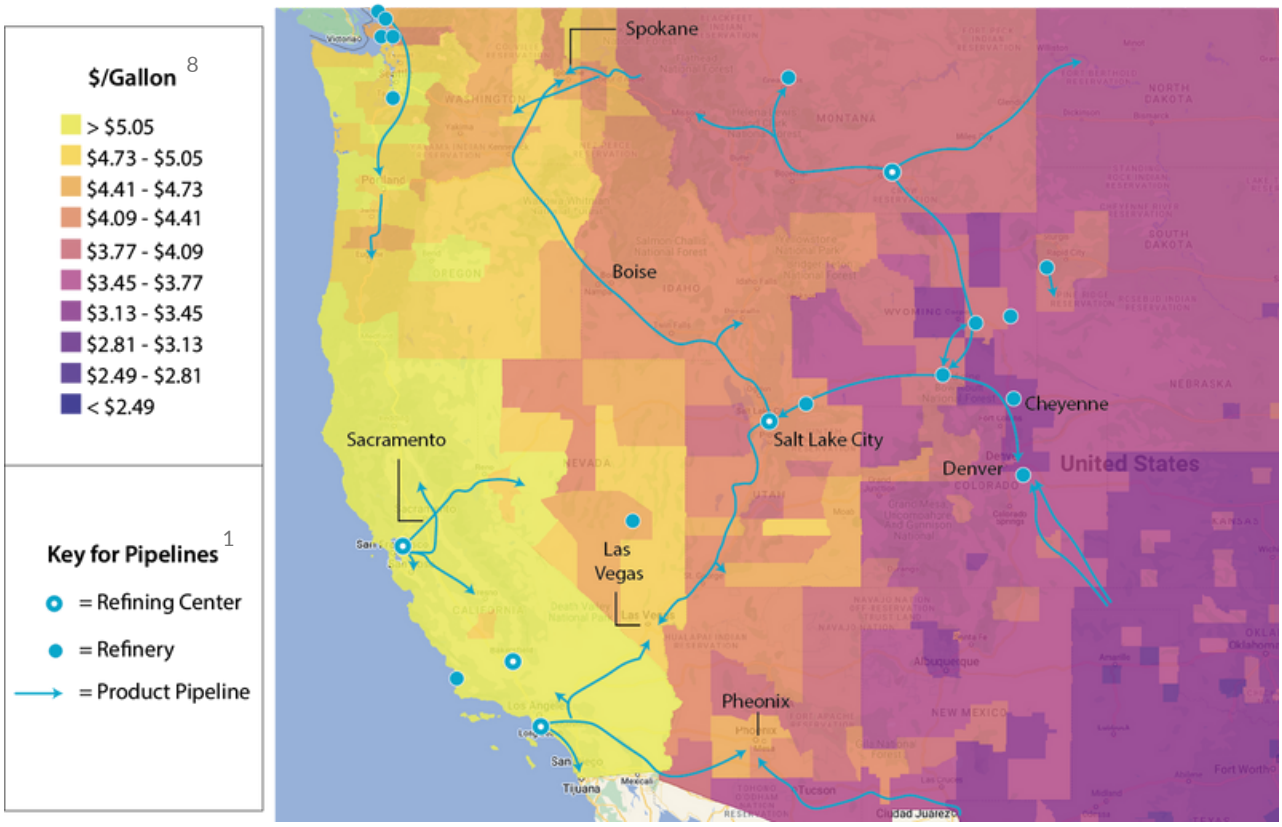
The 10-year average for refining utilization in PADD 4 is 89%, and Utah's refineries have a 10-year average of 92%.



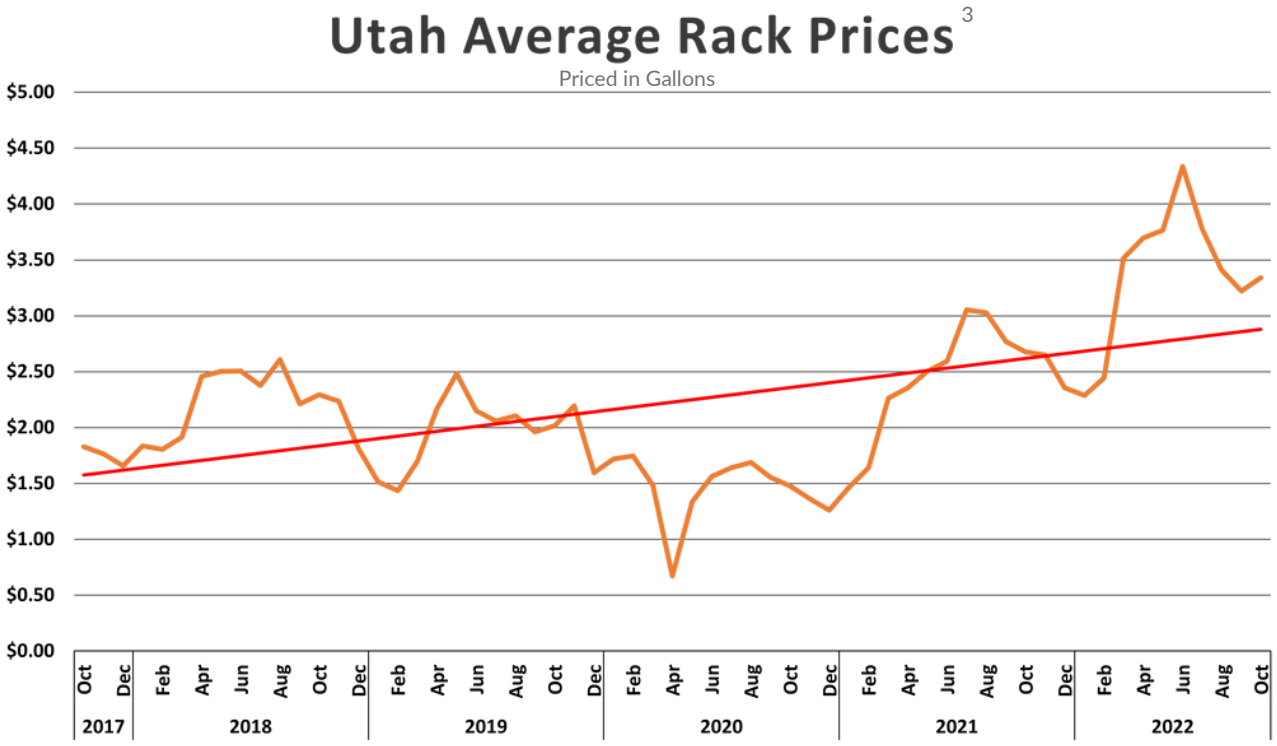
Utah has two pipelines that export refined petroleum products, one ending in Las Vegas, Nevada, and the other ending in Spokane, Washington. The southern pipeline, known as UNEV, has a rack terminal in Cedar City and Las Vegas. The northern pipeline, known as the Northwest Products Pipeline, has rack terminals in Pocatello, Boise, and Spokane. One pipeline also carries refined product from Sinclair, Wyoming, into the Salt Lake area called the Pioneer Pipeline, which also connects to additional refined product pipelines from Montana.

The heat map on the following page shows refined product flow, via pipeline, in and around the state. Areas shaded in purple have the lowest gasoline prices, and areas shaded in yellow have the highest. Refined products typically flow out of places with lower gasoline prices and into places with higher gasoline prices. This is especially true for Utah – none of Utah's export pipelines flow east where gasoline prices are lower.

1: U.S. Energy Information Administration https://www.eia.gov/
5: Utah Geological Survey



After crude oil is refined, internal refinery marketers distribute refined product to their retail sites or sell them to independent marketers who then distribute the products, like gasoline, to other retail sites. The average price independent marketers pay for gasoline from Utah refineries, known in the industry as rack price, is described in the following graph. This does not take into consideration private contract prices, which are often lower than the rack price.



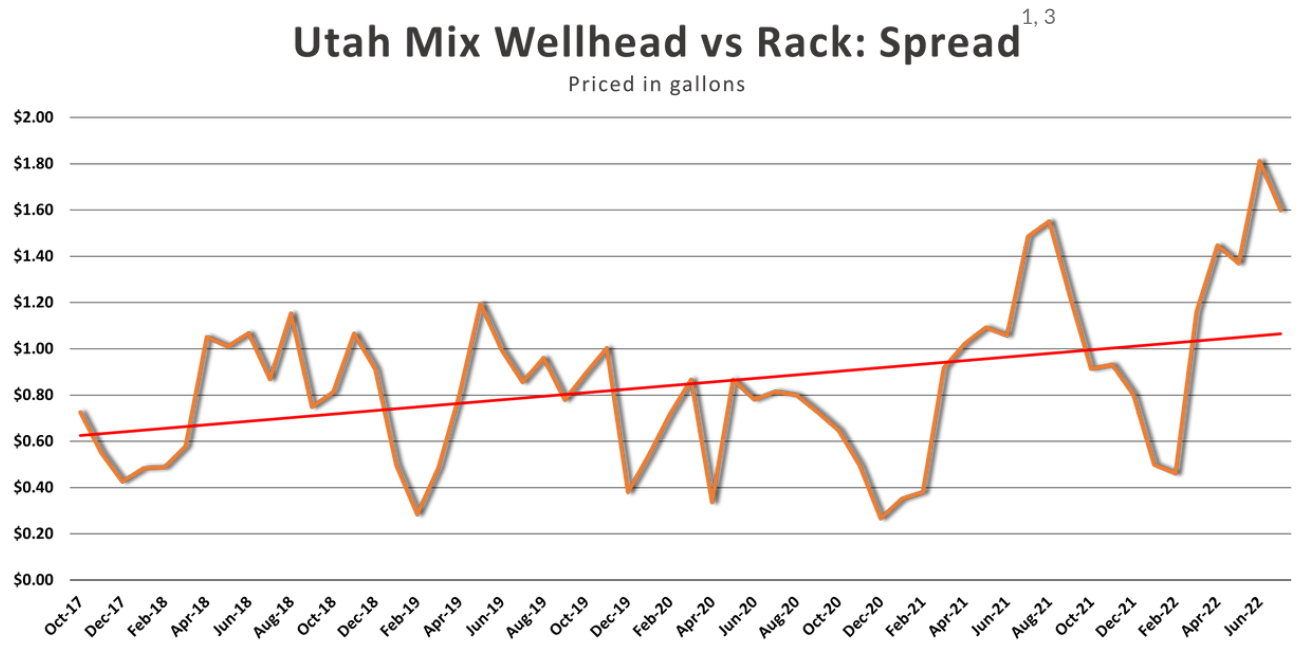
1: U.S. Energy Information Administration https://www.eia.gov/
3: DTN Fastracks https://www.dtn.com/refined-fuels/
8: GasBuddy https://https://www.gasbuddy.com/gaspricemap

It should be noted that some of Utah's Uintah Basin crude (black and yellow wax) possess unique characteristics compared to other crudes in North America, presenting some challenges and opportunities in refining.

Uintah Basin waxy crude contains high amounts of paraffin and low levels of sulfur, making it as "sweet" of crude as possible. These are desirable characteristics in both processing and product quality. Uintah Basin crude also contains lower amounts of undesirable impurities like acid and heavy metals.

However, because of its higher paraffinic content, this oil is semi-solid at ambient temperatures, requiring heat to liquefy the resource for transportation, bringing additional storage and processing challenges. Another challenge is that about half of a barrel of waxy crude requires different equipment to refine for fuels.

It is also a relatively "light" crude oil, requiring less processing to make transportation fuels and other petroleum-based products. Its qualities make it more economical to produce tier-3 fuels, and it can produce a higher percentage of low-sulfur diesel per barrel. Additionally, its high wax content makes it desirable for the production of wax products, while its low percentage of aromatic hydrocarbons is ideal for making lubricants.



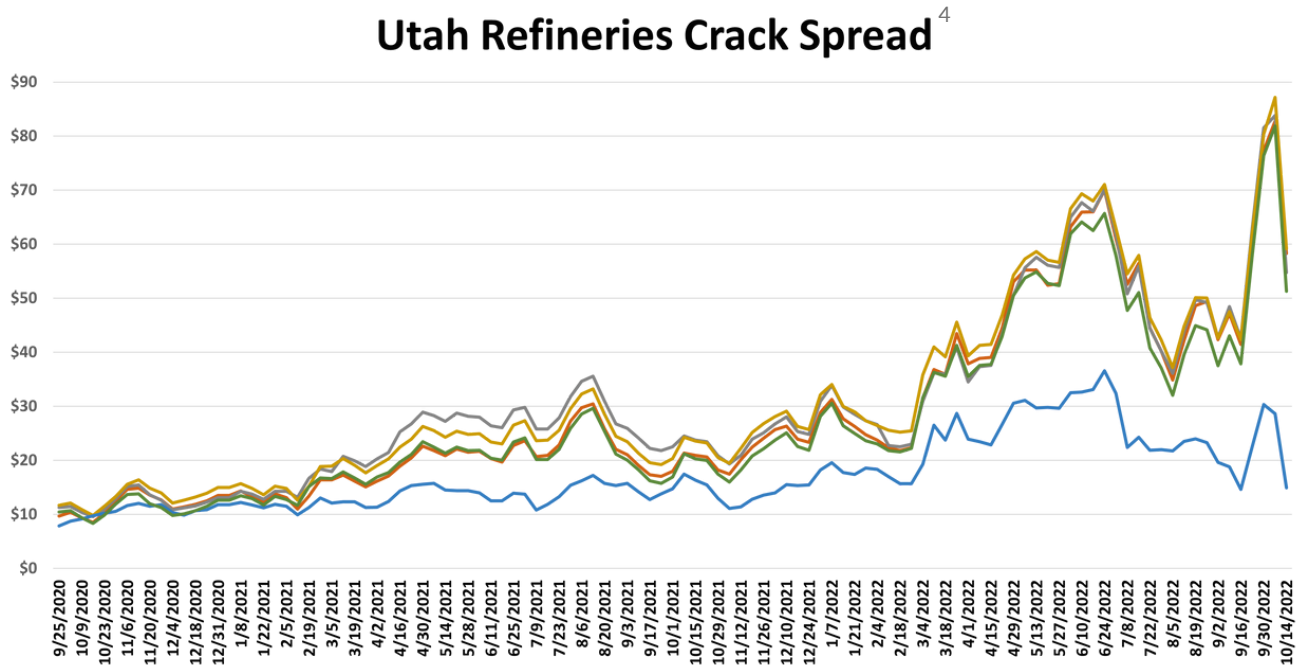
Business costs and profits are proprietary, but it helps to estimate them to identify price disparities along the supply chain. One way to do this is to review the cost refineries paid for crude oil (wellhead price) and how much they sold their refined product for (rack price). The difference between those numbers is the costs plus the profits of refineries, as shown in the graph above. For the past year, the average total costs and profits for Utah refineries are $1.17 per gallon.

1: U.S. Energy Information Administration https://www.eia.gov/
3: DTN Fastracks https://www.dtn.com/refined-fuels/

Taking the difference between wellhead price and rack price is a good indicator of total costs and profits, but a better indicator is what's known in the industry as the "crack spread." Crack spreads are often used to estimate refining costs and profits because they can analyze just one or two refined products at a time as opposed to the whole conglomerate of what a barrel of crude oil can produce. In the following analysis, the crack spread is based on gasoline and diesel fuels only. For this report, crack spreads are used for benchmarking the competitive performance of Utah refineries.

The average crack spread, meaning the costs plus profits of gasoline and diesel, for Utah refineries over the past year is $36.78 per barrel.

However, one of Utah's five refineries has a different business model as it relates to motor fuel sales. Its numbers are lower than the other refineries, bringing down the overall average, as seen in the graph below. Prices are per barrel.



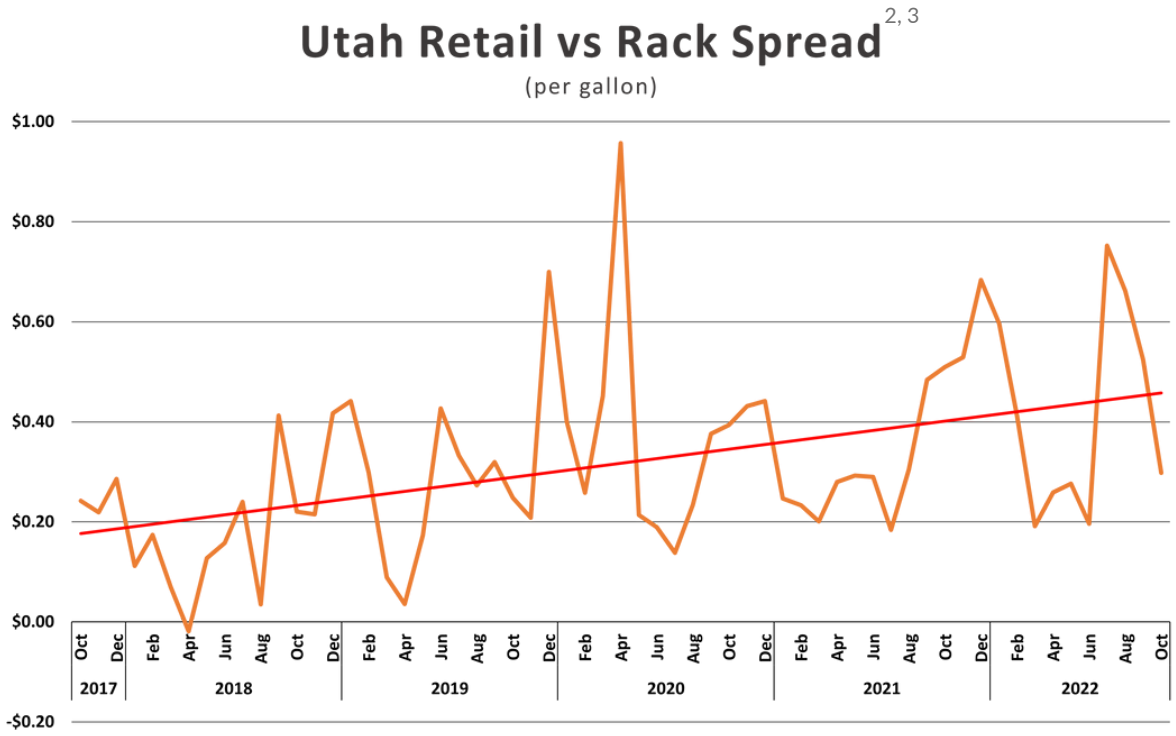
Retailers

Many contributing factors go into the cost of distribution and marketing, so for simplicity's sake, most of the available data combines all the costs and profits between rack price and retail price at the pump to determine the costs plus the profits of retailers, as shown in the graph on the next page.

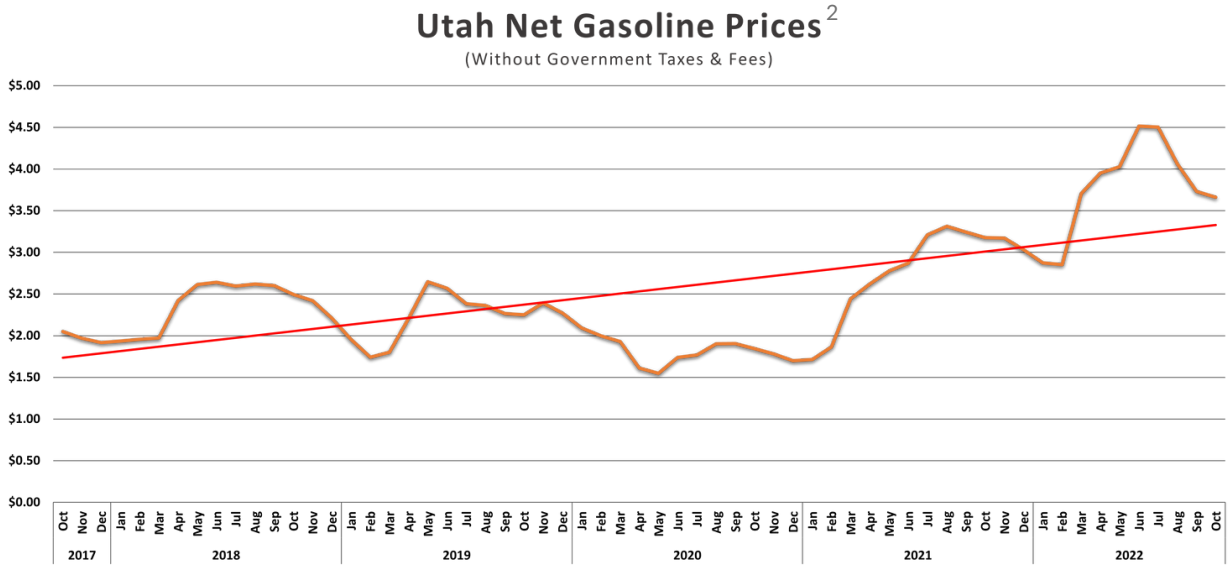
In Utah, distribution and marketing costs – the difference between rack and retail prices – averaged .32 cents per gallon for the past five years. For the past year, the average has been .46 cents per gallon.

Oftentimes, refiners sell product on private contracts that are typically priced at less than the advertised rack price, offering additional advantages to retailers. To compare all refineries and retailers against a similar benchmark, contracts are not considered.

4: RBN Energy https://rbnenergy.com/



Net retail prices, as shown in the graph below, are what Utahns would pay for gasoline if there were no government taxes or fees. This includes all other costs and profits along the petroleum supply chain. In Utah, the average net retail price of gasoline over the past five years has been $2.53 per gallon and $3.63 per gallon for the past year.



Taxes

Utah's fuel tax is currently set at 32 cents per gallon. Federal taxes per gallon are 18 cents, so in total, Utah pays about 50 cents per gallon between state and federal taxes.

2: Oil Price Information Service, LLC (OPIS) https://www.opisnet.com/
3: DTN Fastracks https://www.dtn.com/refined-fuels/

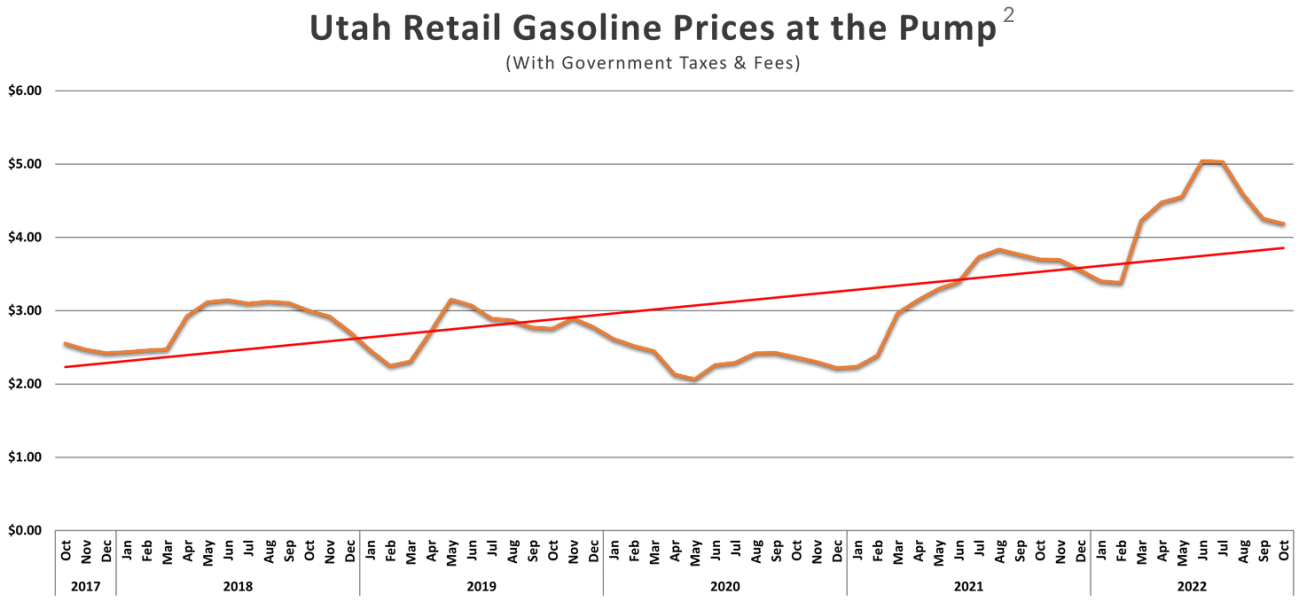
However, residents of Salt Lake and Davis Counties pay 3-4 cents more per gallon because of Environmental Protection Agency (EPA) regulations. The EPA requires those county's fuels to have a 7.8 Reid Vapor Pressure (RVP) as opposed to the traditional 9 RVP because they are labeled as nonattainment areas as it relates to ozone standards.

The RVP is relevant to summer and winter blends. A lower RVP means the fuel is less likely to evaporate, and the process of refining fuels to that level creates an additional cost. In short, Salt Lake and Davis counties are required to consume a summer blend that costs 3-4 cents more per gallon than the winter blend.

It should be noted that Utah's fuel tax has an inflationary trigger, so it is scheduled to go up by 4.5 cents per gallon starting in January 2023.

Consumer Prices at the Pump

When adding in federal, state, and local government taxes, ***the total cost of gasoline that Utah consumers pay at the pump averages $3.07 per gallon over the past five years and $4.17 per gallon over the past year.***



2: Oil Price Information Service, LLC (OPIS) https://www.opisnet.com/

Utah Compared to Other Markets

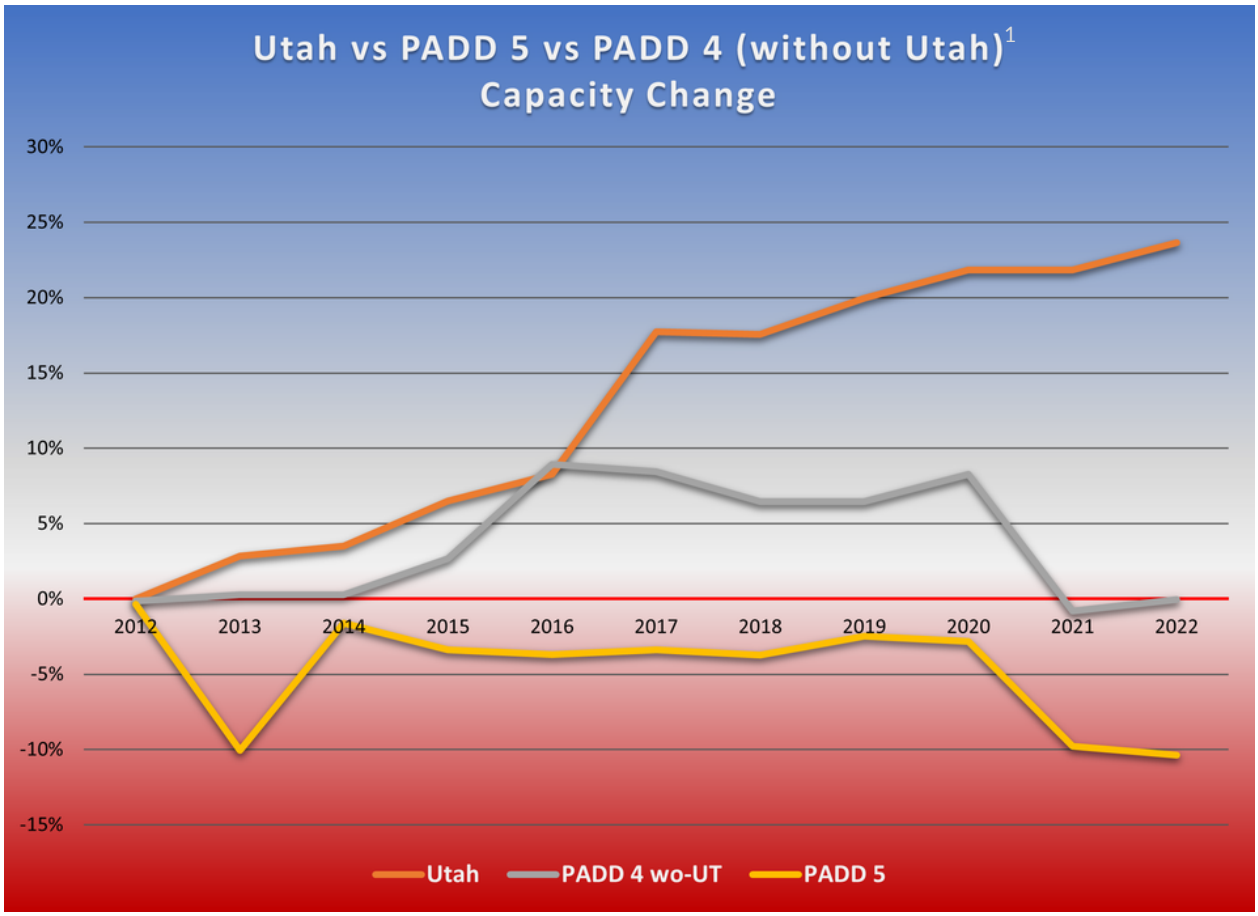
Demand vs. Capacity

Over the past decade, Utah refineries have outpaced the PADD 4 and PADD 5 regions in increasing refining capacity, with the PADD 5 region actually seeing a decrease in overall capacity during that timeframe.

PADD 5 has seen a capacity decrease of 295,000 bbls/day, a 10% reduction, and PADD 4 (without Utah) has remained relatively flat, as shown in the graph below. Over that same 10-year period, ***Utah refineries have increased their capacity by about 40,000 bbls/day, a 24% increase***.

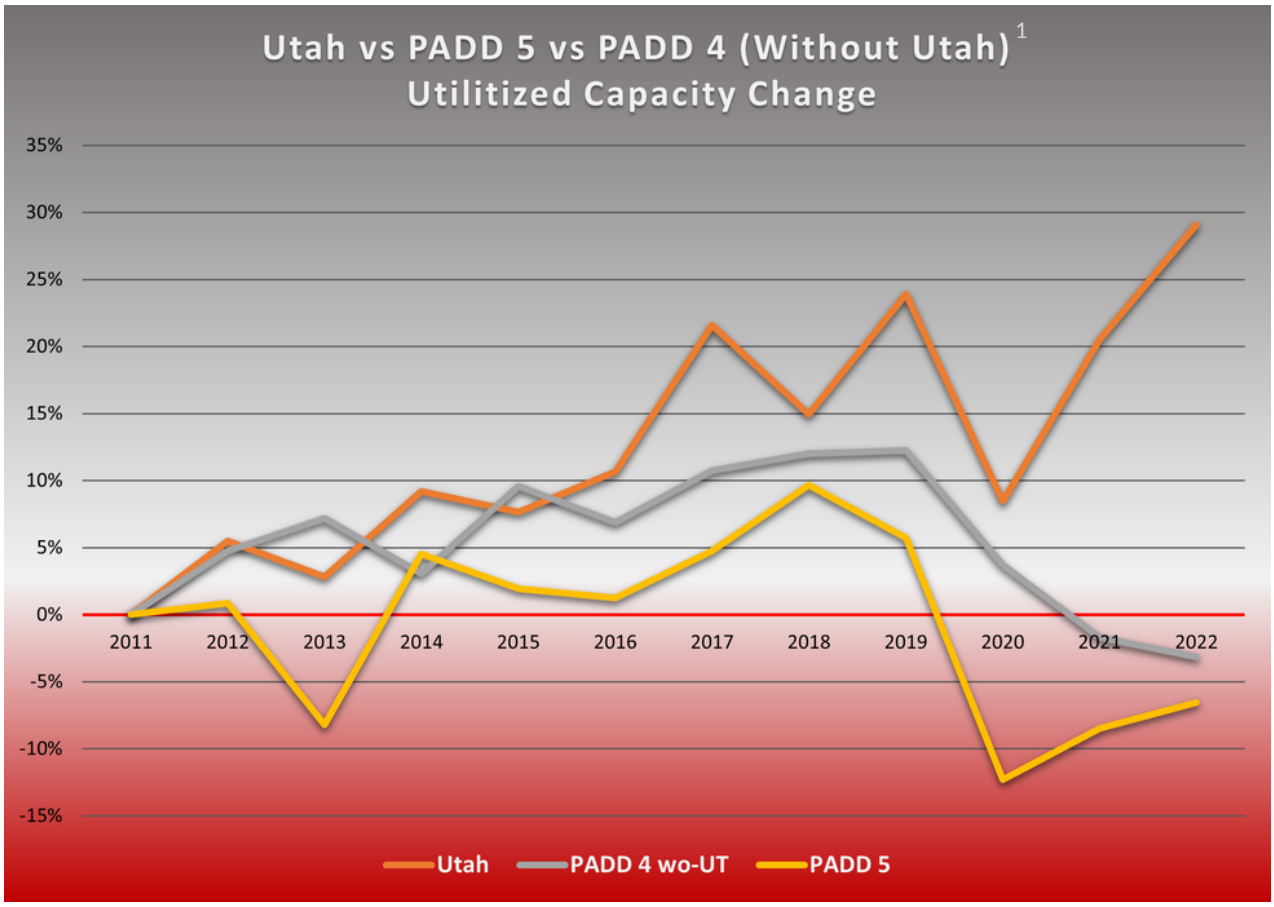
Combined, PADD 5 and PADD 4 capacities have decreased by roughly 255,000 bbls/day over the last decade, which is significantly more than the total refined product Utah consumes per day (165,000 bbl/day). Curiously, it is over this same period that Utah saw gasoline prices start ranging at or above the national average – the biggest price jumps started around 2017.

As previously discussed, Utah's refineries are at capacity as it relates to the total amount of product they can refine, along with their level of utilization.



1: U.S. Energy Information Administration https://www.eia.gov/

When looking at utilized capacity – are refineries refining as much oil as they are capable of – the story is much the same. ***Utilization at Utah's refineries has increased by 29% over the past 10 years***. ***PADD 5 has dropped utilization by 10% over the same period which decreases overall supply***, and PADD 4 (without Utah) has also decreased utilization, but not by much, as shown in the graph below.



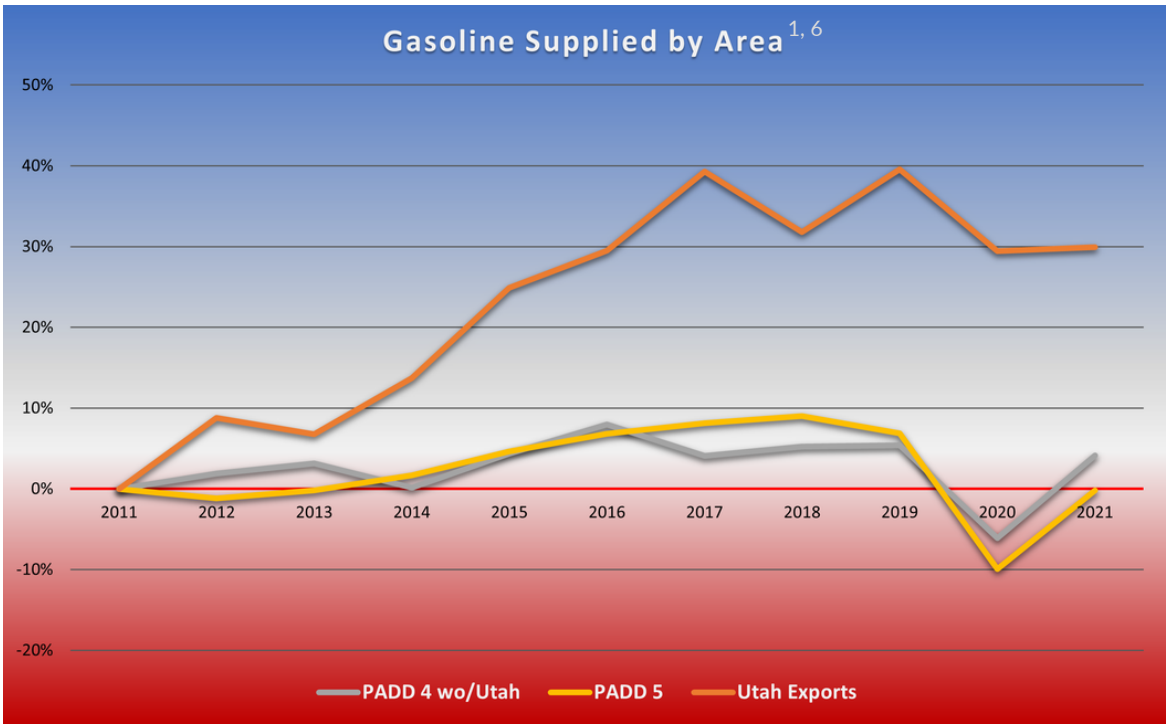
Demand for refined products is returning to pre-pandemic levels, both in the U.S. and elsewhere, but ***there is a national trend of decreasing capacity and utilization, ever adding to the disparity of gasoline supply and demand, causing prices to increase as less supply is available***.

Traditionally, the fuels industry needed to focus only on supplying enough product to meet demand; however, a new variable has emerged over the past decade, and efforts have dramatically increased over the past few years. ***National rhetoric and government involvement around decreasing the use of fossil fuels have placed the petroleum industry in a position where it is encouraged to remove supply from the market***, even before demand is curbed or a suitable alternative is supplied.

This encouragement – through regulations, fees, and incentives to close operations – has created a paradigm where ***the amount of supply that is removed from the market is outpacing the removal of demand, creating an artificial shortage***. And in many cases, gasoline demand is still increasing as supply is terminated. This removal of supply is happening through refineries limiting their capacities or utilization, refinery closures, and refinery conversions to produce biofuels – conversions to biofuels eliminate a refinery's gasoline supply because they produce only distillates, not gasoline.

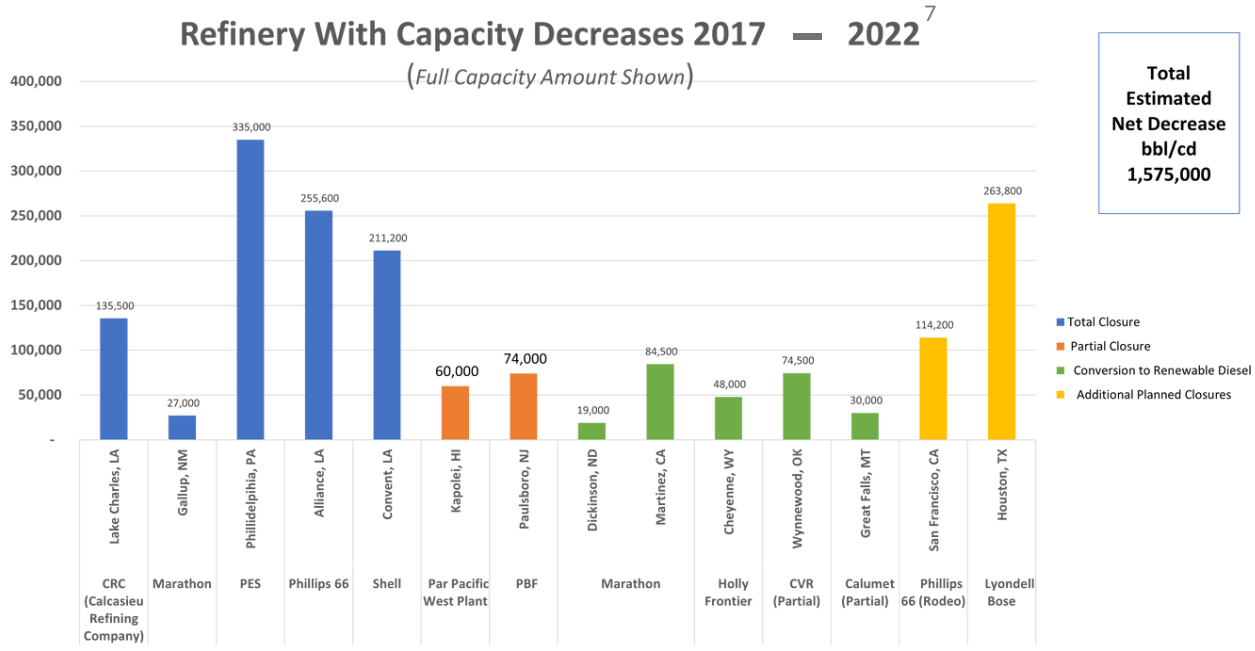
1: U.S. Energy Information Administration https://www.eia.gov/

Utah specifically seems to be supporting the demand of the PADD 4 and PADD 5 regions as a whole, resulting in a market price for refined product that often trends higher than the national average.



The above graph shows that ***Utah is now exporting more of its refined product than it has in the past 10 years or more***, providing additional clarity that Utah is in fact supplementing the gasoline demands of the West as those refineries continue to close or convert their operations.

As the graph below shows, there is a current and future trend of decreasing capacity across the nation through closures, biofuel conversions, and partial closures.

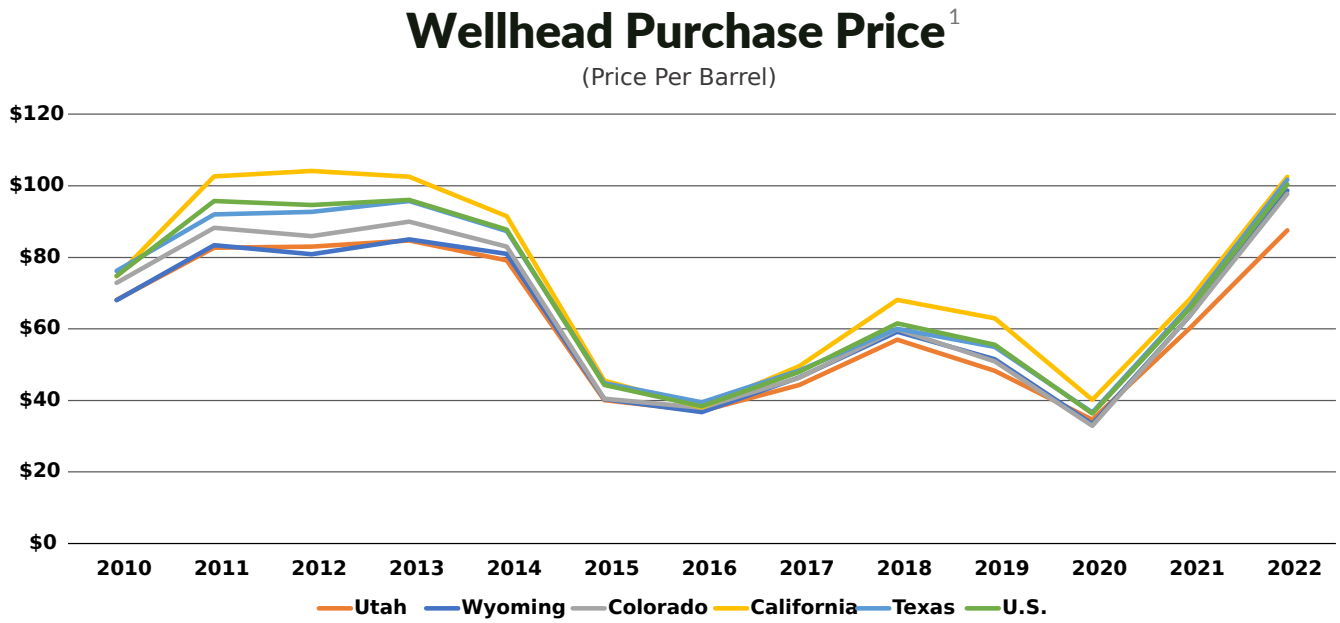


1: U.S. Energy Information Administration https://www.eia.gov/
6: Utah Tax Commission
7: Utah Department of Commerce

Crude Prices

The average crude oil mix that Utah refineries obtain comes from within the state, Wyoming, Colorado, and Canada. Each of these sources sell a barrel of crude oil for less than average when compared to the United States, as depicted in the graph below. The wellhead is where crude oil is first purchased along the supply chain, typically by refineries. The graph includes California and Texas, which will be used as benchmarks for high and low crude oil prices respectively.

It should be noted that Utah's waxy crude is transported by truck to Utah refineries instead of cheaper alternatives like pipe. This is due to its unique characteristics and because Utah refineries do not have the infrastructure for alternative methods.

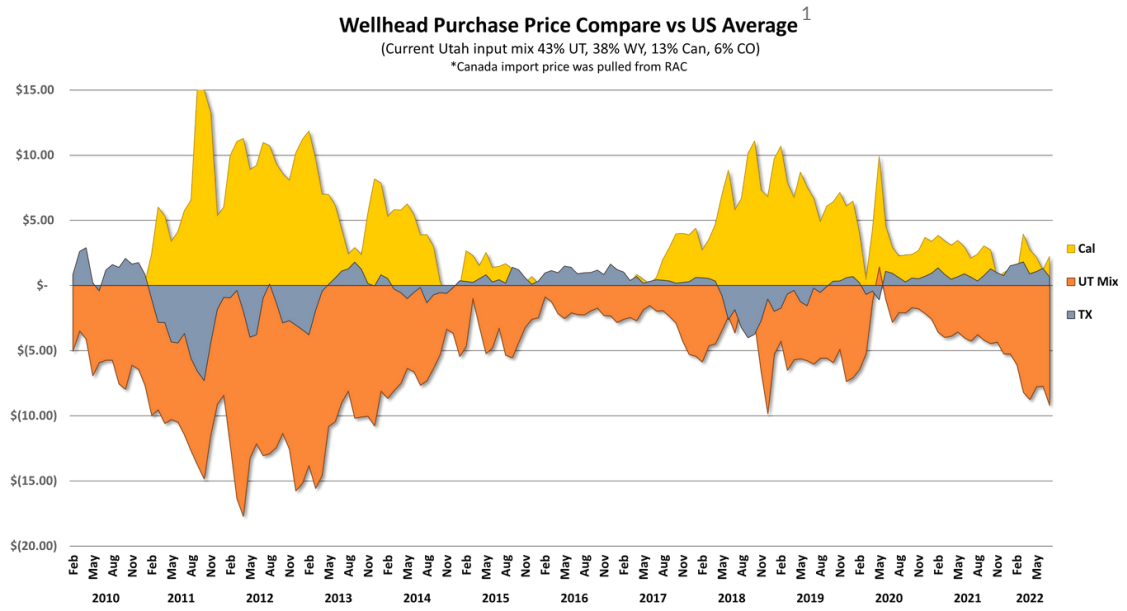


Utah crude, Wyoming crude, and Colorado crude are consistently lower than average U.S. crude prices which still holds true today. Considering Utah refineries get the large majority of their crude from these states, it preemptively means Utah's higher-than-national-average gasoline prices are not caused by the cost of crude oil.

To bring added clarity, the graph on the following page compares Utah's, Texas', and California's wellhead purchase prices against the U.S. average.

As the graph shows, ***the wellhead price of Utah's crude source mix has historically been and continues to be around $5.00 per barrel less than the national average***, and California is just the opposite, consistently being around $5.00 more per barrel than the rest of the nation. A special note should be made to acknowledge that Utah's wellhead purchases are consistently at par with or lower than Texas', meaning the Utah mix of crude is priced cheaper than oil from the Gulf area.

1: U.S. Energy Information Administration https://www.eia.gov/

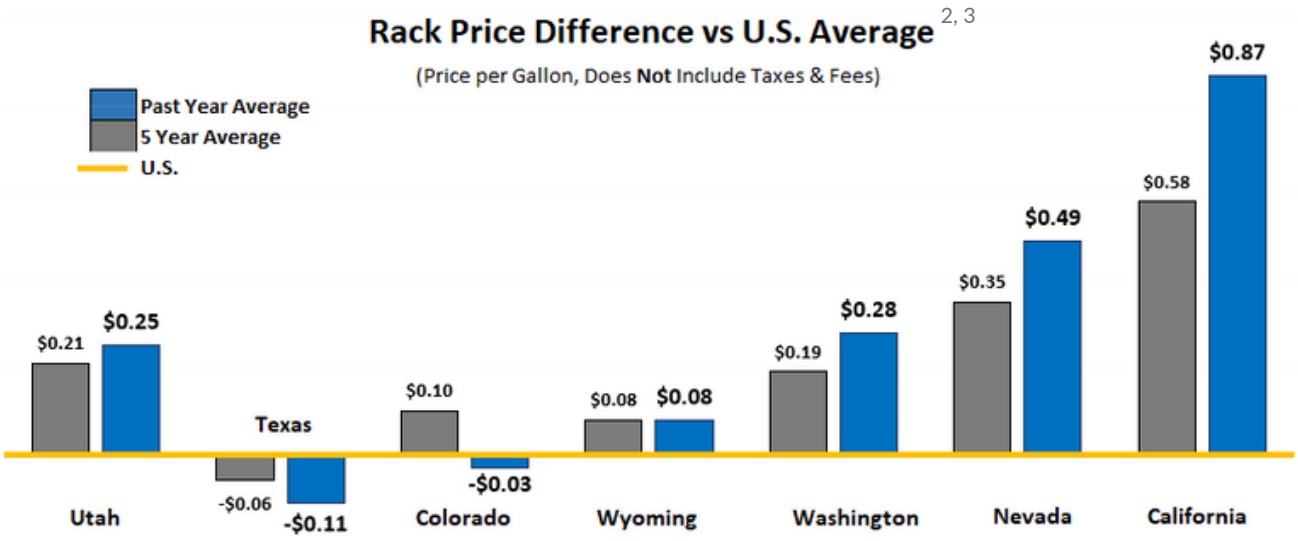


In conclusion, ***data indicates that Utah's higher-than-national average gasoline prices do not stem from the price of crude oil***. Utah refineries get most of its crude from within the state, Wyoming, Canada, and Colorado, all of which have lower crude prices when compared to surrounding states and the rest of the nation.

Rack Prices

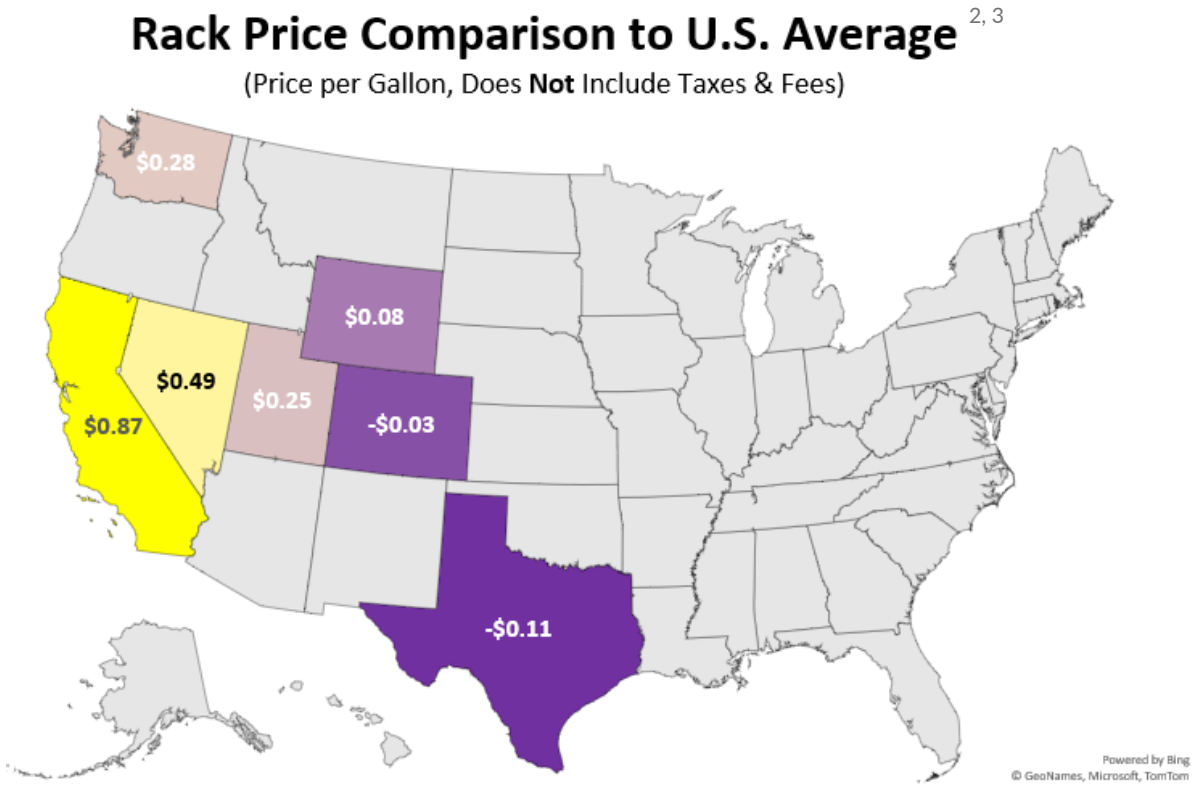
This section of the report will show the differences in rack prices for Utah, the U.S., and some surrounding states. Again, the rack price is the price refineries sell refined product. For this report, the refined product referred to is gasoline.

As depicted in the chart below, average rack prices for gasoline in Utah are higher than the national average. ***This is also the first place along the petroleum supply chain where Utah sees a higher-than-national-average price***.



1: U.S. Energy Information Administration https://www.eia.gov/
2: Oil Price Information Service, LLC (OPIS) https://www.opisnet.com/
3: DTN Fastracks https://www.dtn.com/refined-fuels/

The graph on the previous page puts the average U.S. rack price at $2.00 per gallon for the past five years and $2.95 over the past year. Utah's average rack prices are higher than the U.S. average, bringing Utah's totals to $2.21 for the past five years and $3.20 for the past year. Texas is lower than the U.S. average. The heat map below is provided as another way to view the data for average rack prices over the past year.



To further determine if Utah's rack prices are contributing to Utah's higher-than-national-average gasoline prices, the graphs on the following pages illustrate the crack spread of Utah refineries compared against the U.S. average as well as select states.

The crack spread is the difference between the spot price (similar to wellhead price) of crude oil and the rack price of refined products, controlled in this case for gasoline and diesel fuels.

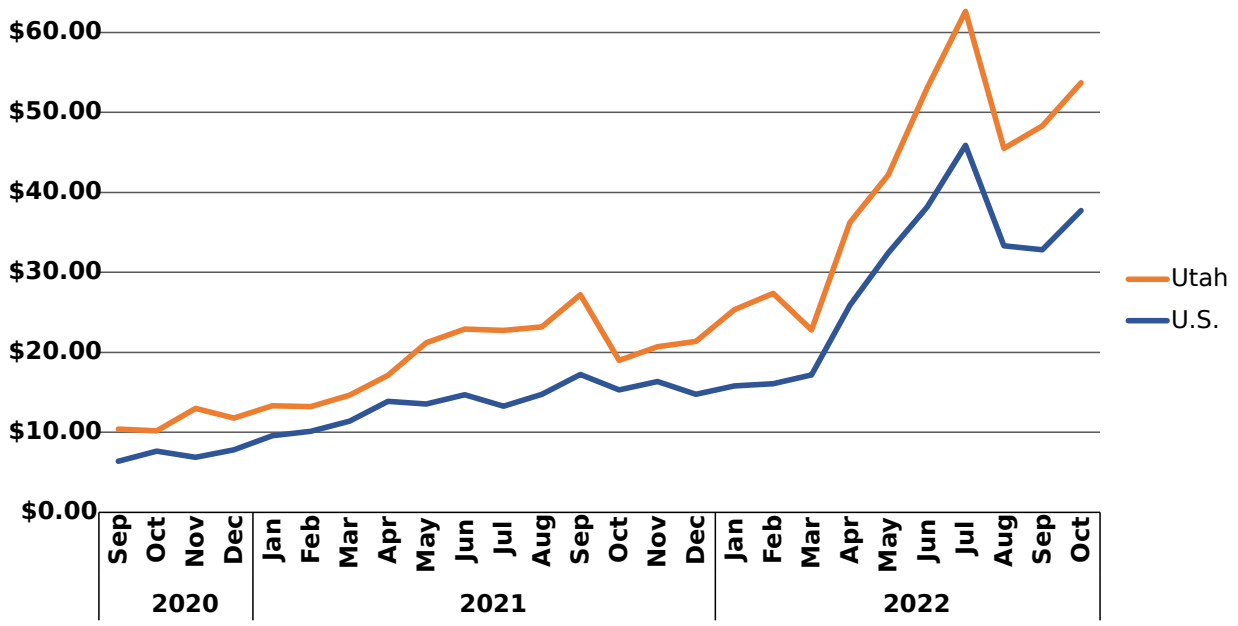
Because Utah refineries are smaller than the U.S. average, the first graph is controlled for refineries in the U.S. with capacities of less than 75,000 bbls/day. (Utah's largest refinery produces less than 70,000 bbls/day.) This is necessary to ensure any potential disparities are not due to Utah's small refineries being compared against refineries that are many times larger.

Since crude oil is sold in barrels, the comparisons are per barrel to maintain unit integrity. What should be noted here is not the total dollar amounts per barrel, but if and by how much Utah's prices differ from the rest of the nation.

2: Oil Price Information Service, LLC (OPIS) https://www.opisnet.com/
3: DTN Fastracks https://www.dtn.com/refined-fuels/

Utah vs Averages: Crack Spread[4]

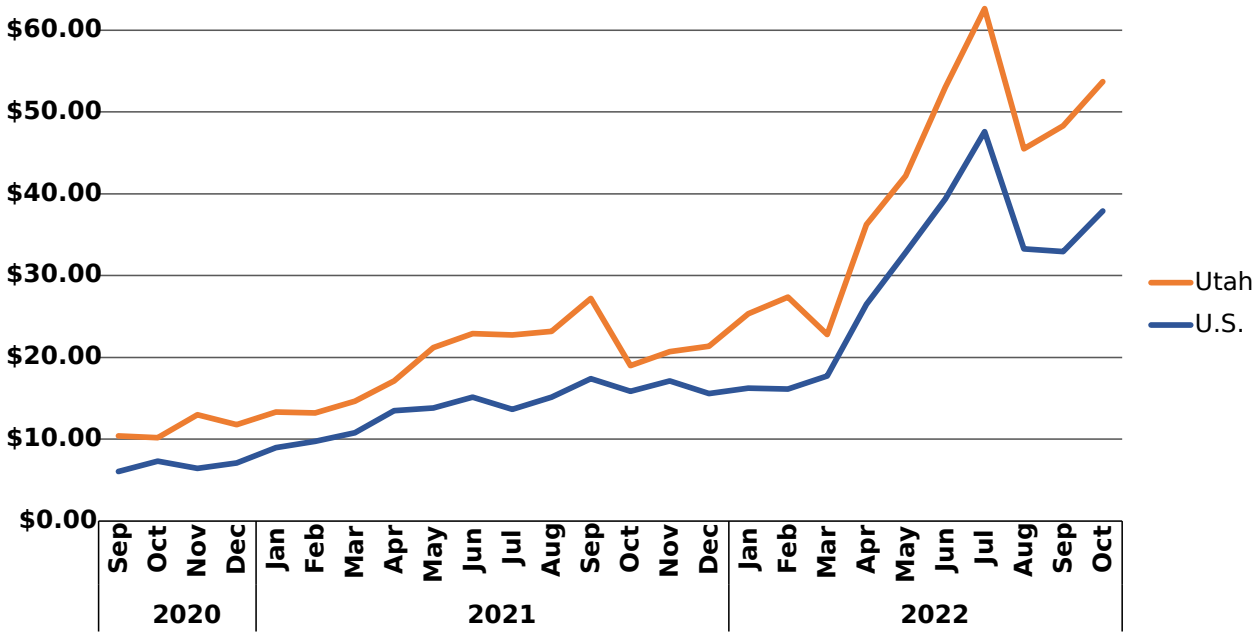
Small Refineries <75,000 bbl/day



Utah refineries have averaged $8.48 per barrel higher than the U.S. small refinery average for the past two years and $10.85 higher year over year. To determine a strict average, the following graph compares Utah refineries against all refineries in the U.S., whether they are small or large.

Utah vs Averages: Crack Spread[4]

All Refineries



4: RBN Energy https://rbnenergy.com/

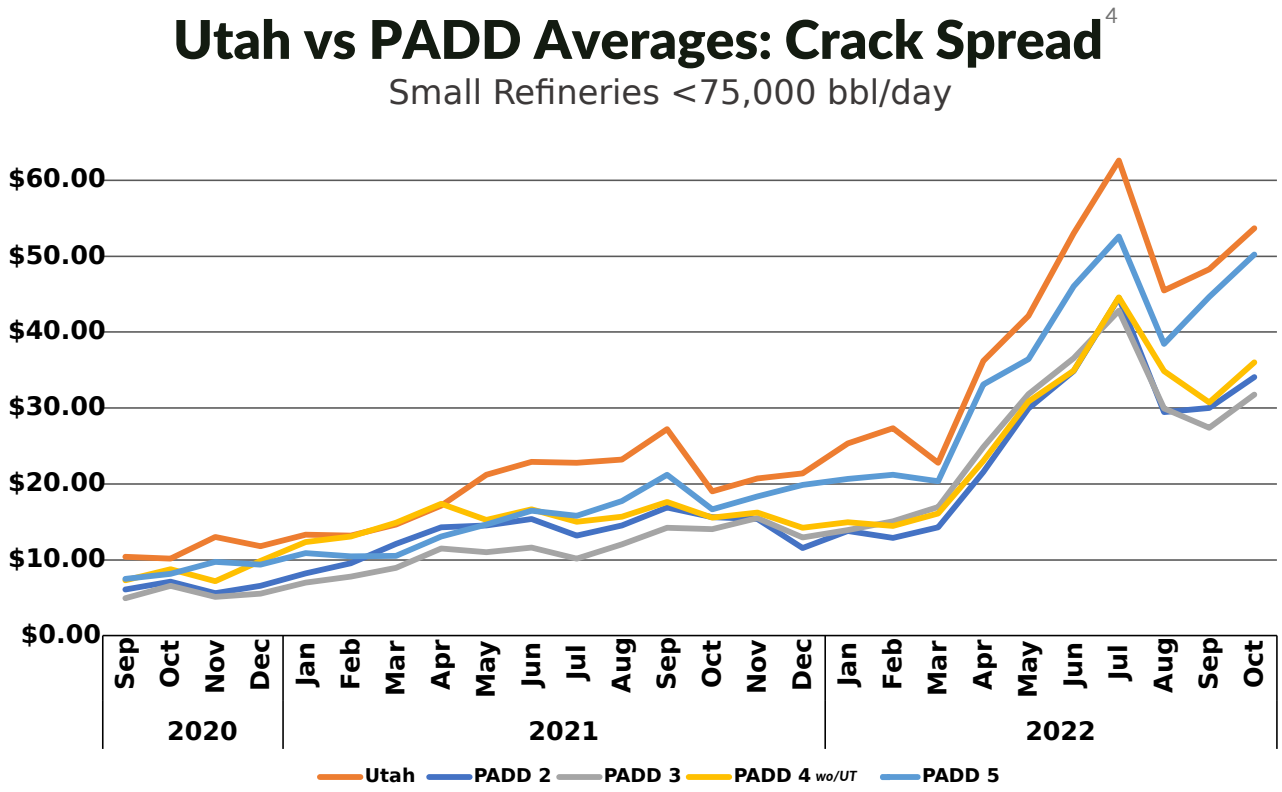
Utah refineries have averaged $8.24 per barrel higher than the U.S. average for the past two years and $10.34 higher year over year.

Between the two graphs, it is clear that Utah refinery crack spreads are higher than the national average, small and large refineries included.

To break down the numbers in even more detail, the following graphs compare Utah against multiple PADD regions. The same process is followed as before, comparing Utah refinery crack spreads against each PADD's small refineries only, followed by an overall comparison that includes all refineries in those regions.

It should be noted that the PADD 4 numbers exclude Utah refineries so Utah can be compared against other refineries in its own region.

As depicted in the graph below, Utah refinery crack spreads are higher than the averages of every other PADD region, including within its own PADD (PADD 4).

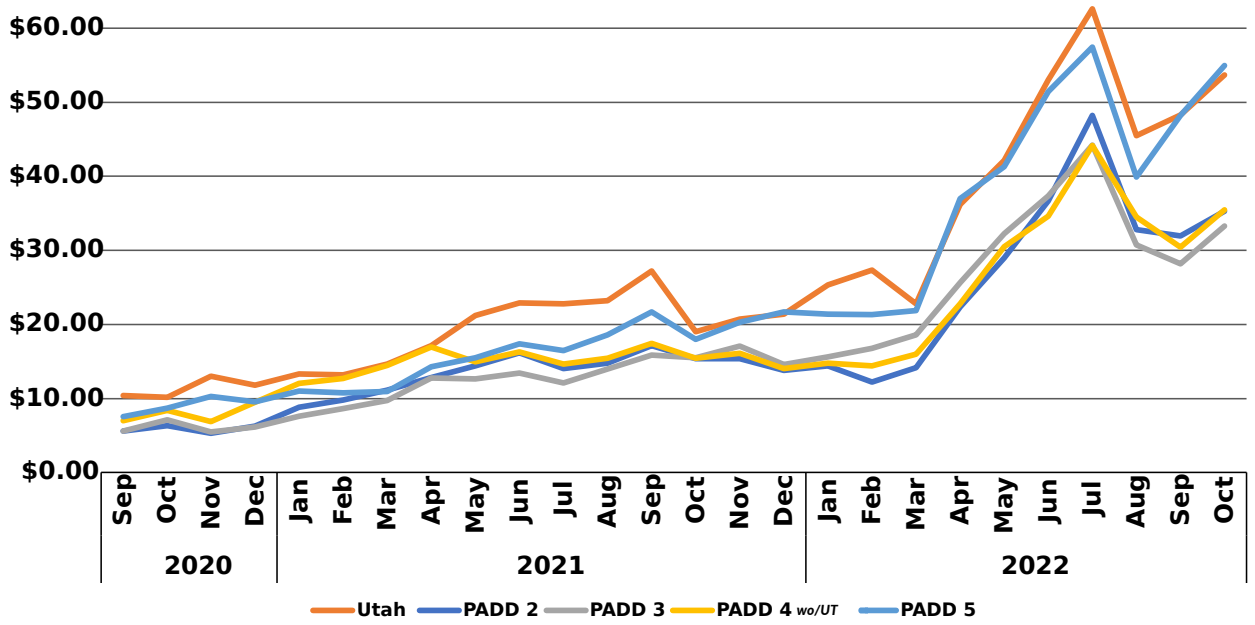


In the next graph, the same holds true when compared against all refineries in the PADD regions, large or small. However, larger refineries in the PADD 5 region have slowly raised their averages and surpassed Utah over the past year.

4: RBN Energy https://rbnenergy.com/

Utah vs PADD Averages: Crack Spread[4]

All Refineries



In conclusion, Utah refinery crack spreads are higher than nearly every other group they are compared against. This is also where Utah sees its first instance of higher prices, which further reinforces that ***rack prices are, in fact, an area where Utah sees higher-than-national-average prices***.

It should be noted that ***rack prices are a symptom of the overall problem, not the problem itself***. ***The problem stems from a supply and demand imbalance in the West, caused by government interference in the free market***, primarily by coastal states and the federal government. These actions have created an environment where Utah is supplying product to higher-priced coastal markets, which ripples back into Utah, affecting local prices.

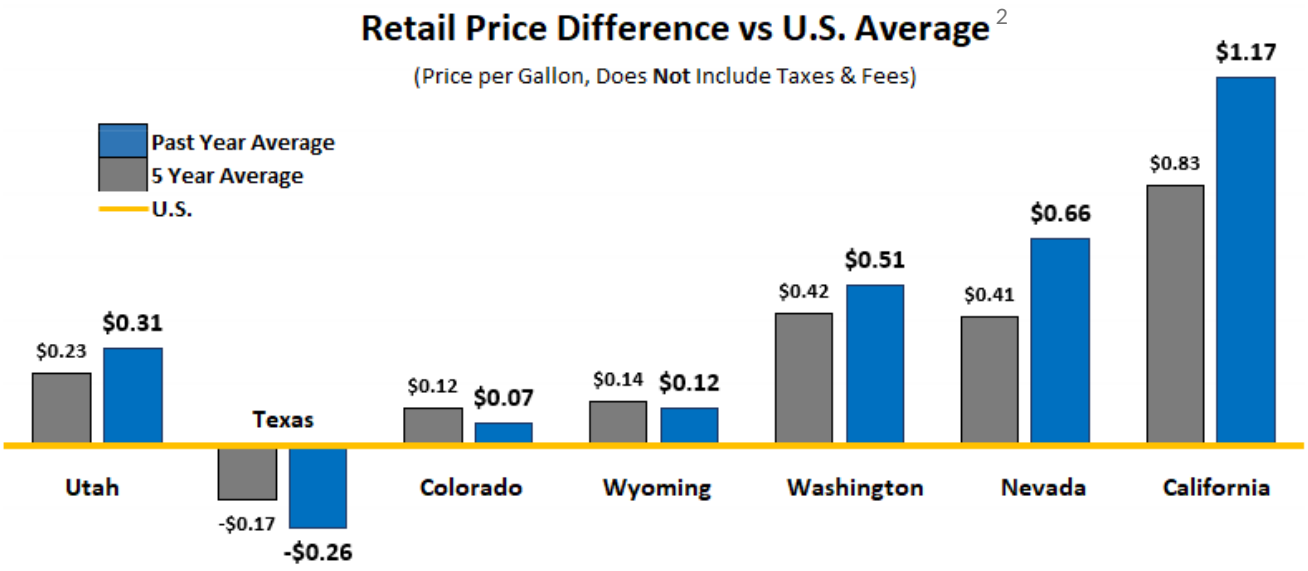
Retail Prices

Retail prices are the next point along the supply chain to see higher-than-national-average prices. However, when accounting for the increases in rack price, it is apparent that retail prices have a much smaller effect on Utah's higher gasoline prices.

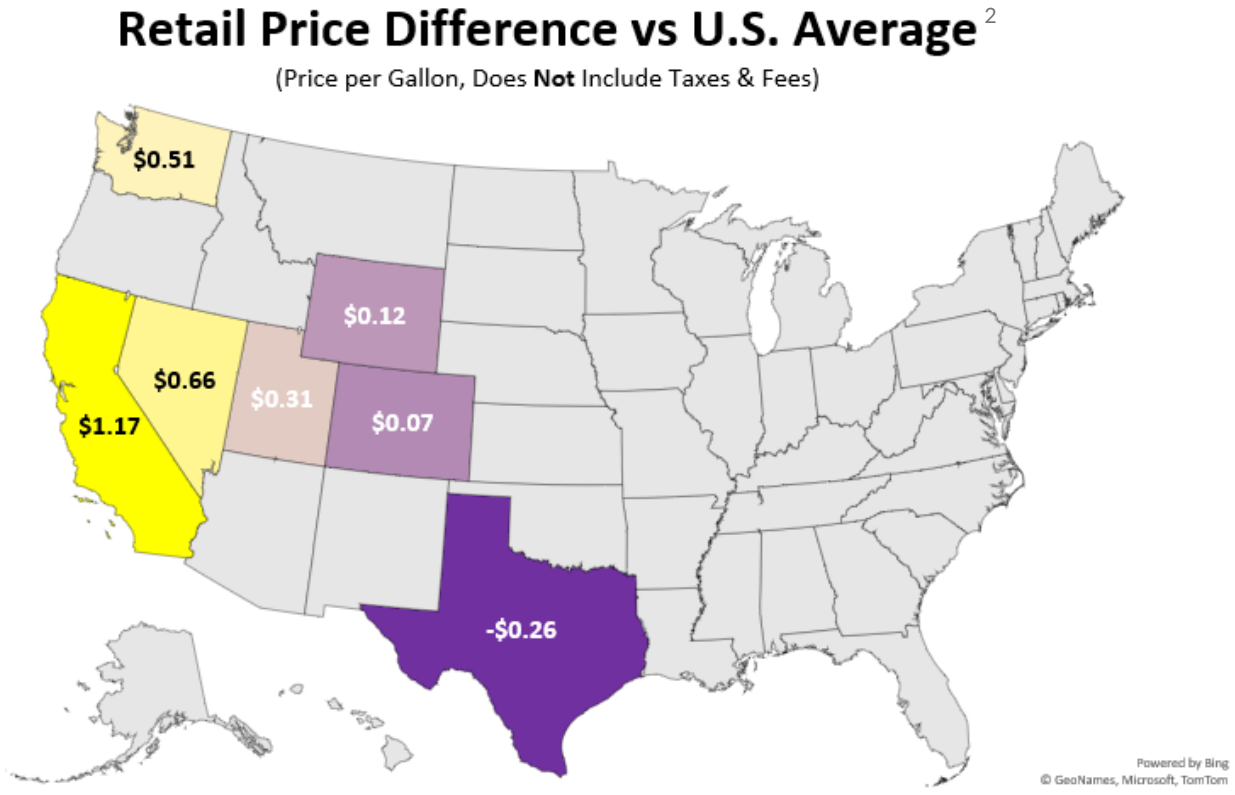
For example, Utah rack prices over the past five years are 23 cents higher than the national average, and consequently, Utah retail prices are also 23 cents higher than the national average during the same period.

The graphs on the following page illustrate the difference in Utah's retail prices compared to the U.S. average, along with a few other states. It should be noted that the provided retail prices do not account for government taxes as they vary from state to state.

4: RBN Energy https://rbnenergy.com/

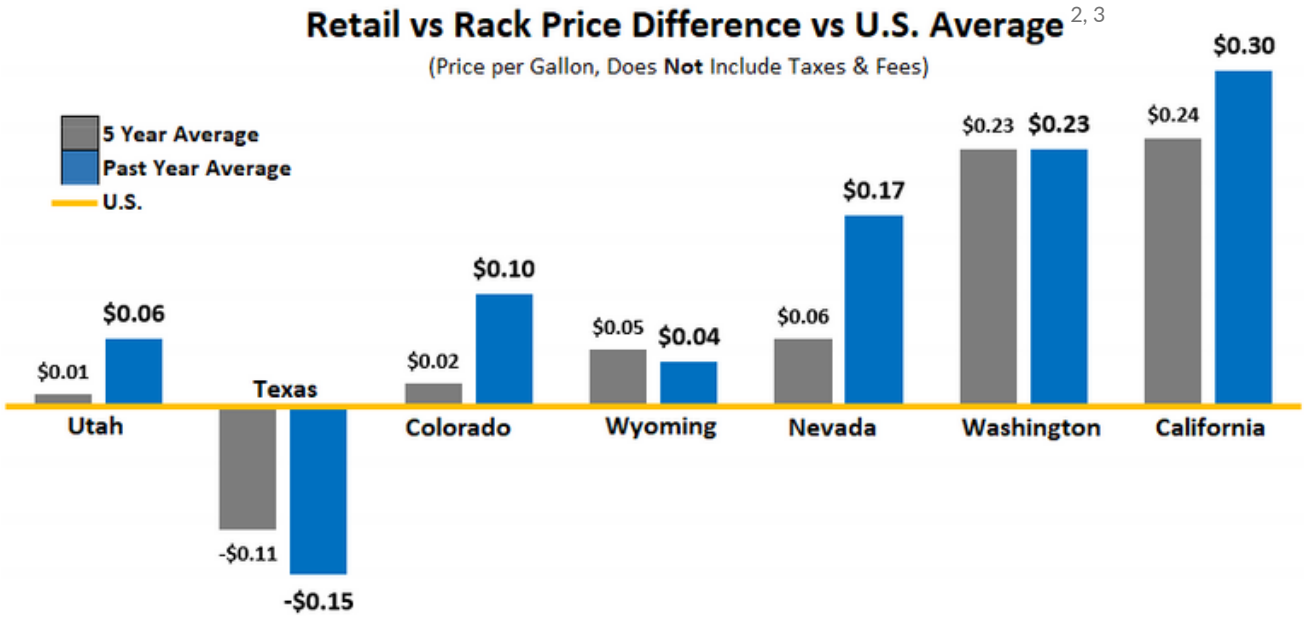


The graph above puts the average U.S. net retail price at $2.31 per gallon for the past five years and $3.34 over the past year. Utah's average net retail prices are higher than the U.S. average, bringing Utah's totals to $2.54 for the past five years and $3.65 for the past year. Texas is lower than the U.S. average. The heat map below is another way to view the data for average retail prices over the past year.

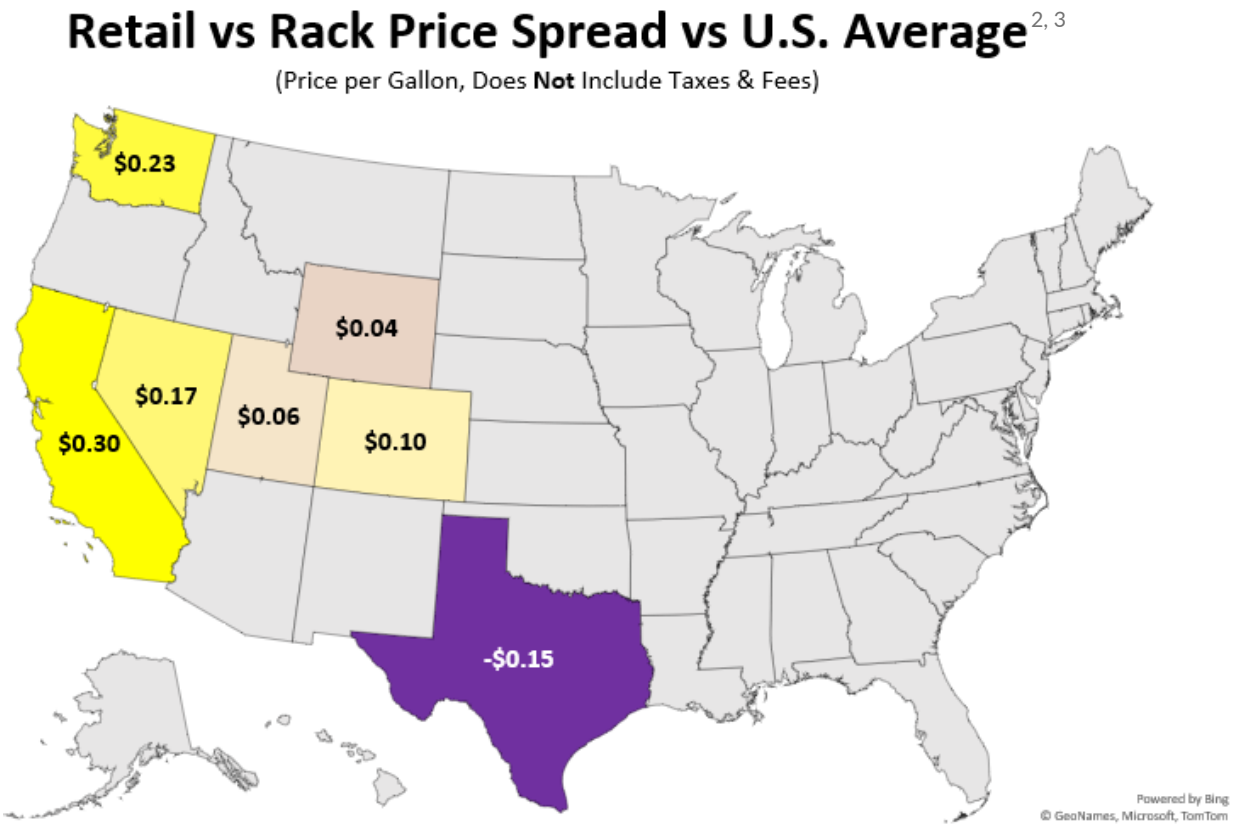


To further determine if Utah retailers contribute to the higher-than-national-average prices, the graphs on the following page illustrate the difference between rack and retail prices (without government taxes). Utah's numbers are compared to the U.S. average as well as a few surrounding states.

2: Oil Price Information Service, LLC (OPIS) https://www.opisnet.com/



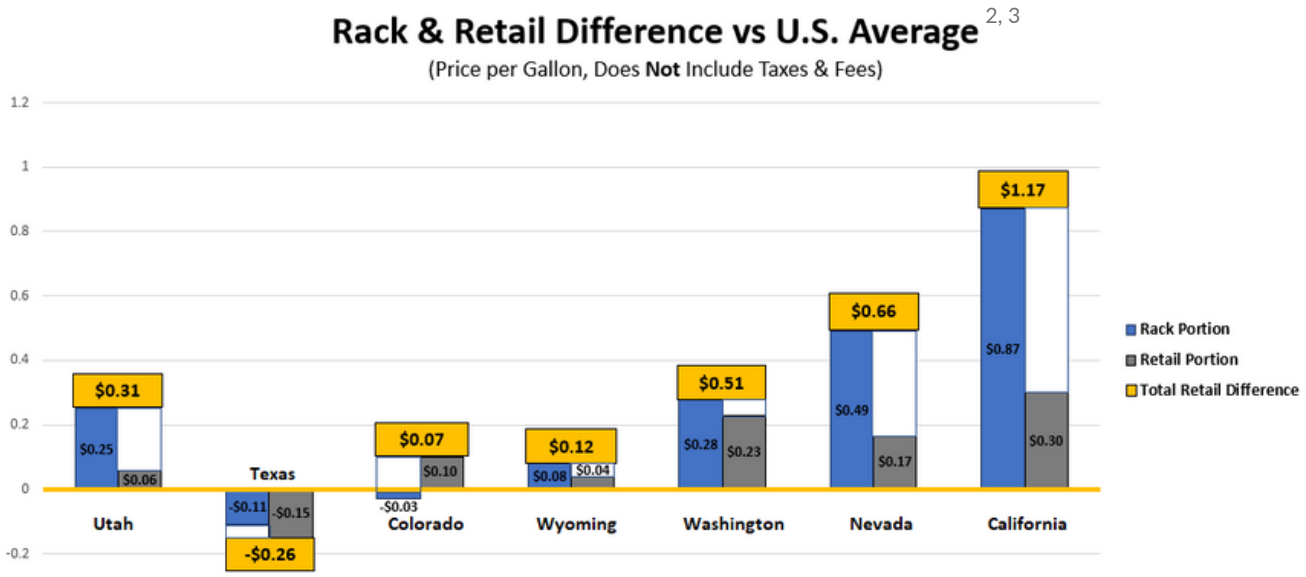
The U.S. average for the difference in rack and retail prices is 30 cents over the past five years and 39 cents over the past year. Utah's average difference is slightly higher than the U.S. average, bringing Utah's totals to 31 cents for the past five years and 45 cents for the past year. The heat map below is another way to view the data for the averages over the past year.



In conclusion, when taking the difference between rack and retail prices, ***Utah retailers average about the same as our neighboring states that have lower gasoline prices***.

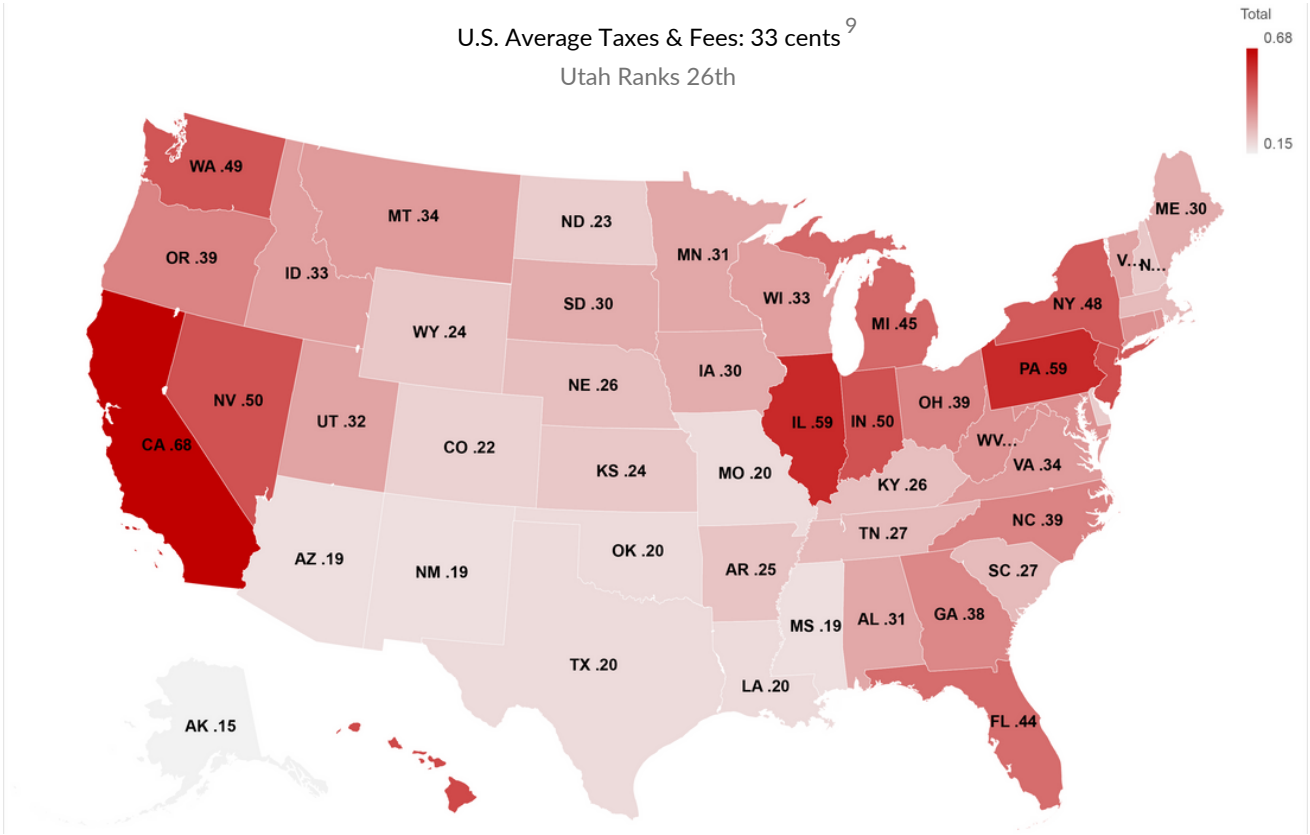
2: Oil Price Information Service, LLC (OPIS) https://www.opisnet.com/
3: DTN Fastracks https://www.dtn.com/refined-fuels/

The following graph combines total rack and retail price averages over the past year compared to the U.S. average. Rack prices account for 25 cents of Utah's higher-than-national-average prices, while retail prices account for 6 cents, bringing the total to 31 cents higher than the U.S. average.



Cost of Governance

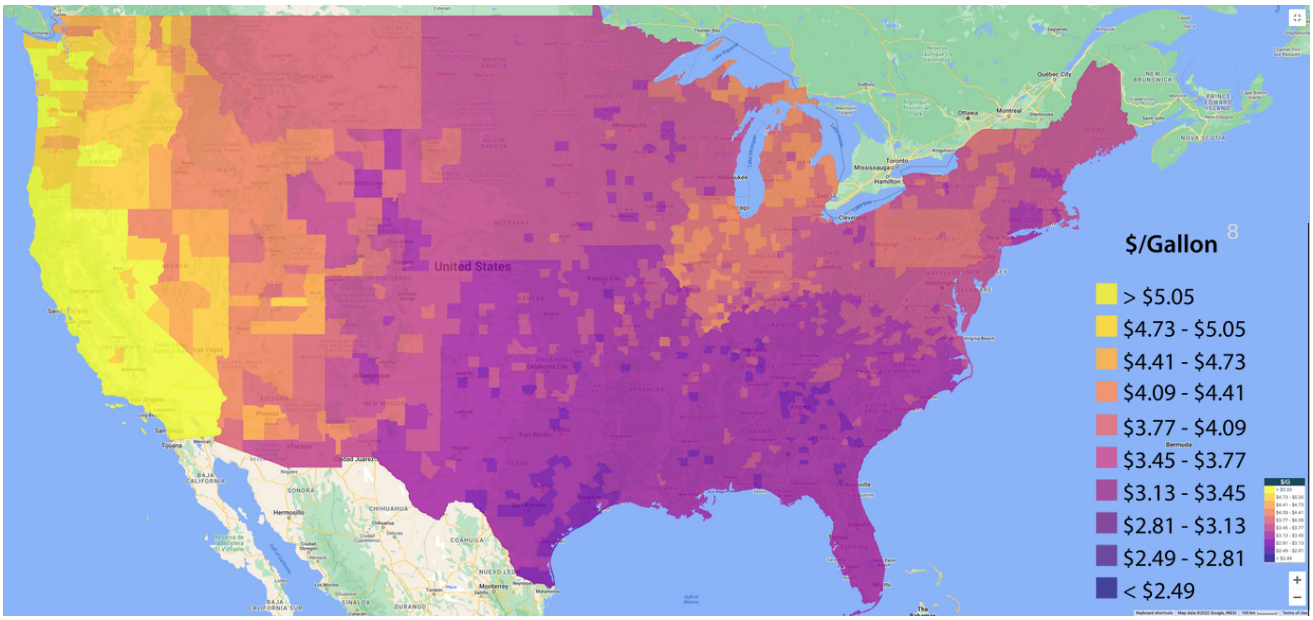
Utah's share of taxes on gasoline is higher than the national average, but not by much. However, ***when calculating government taxes and also fees, Utah is slightly lower than the national average, being the 26th highest.*** California is the nation's highest while Alaska is the lowest.



2: Oil Price Information Service, LLC (OPIS) https://www.opisnet.com/
3: DTN Fastracks https://www.dtn.com/refined-fuels/
9: Penn Wharton University of Pennsylvania

The heat map on the previous page shows total government taxes and fees across the nation, and the heat map below shows the highest (yellow) and lowest (purple) gasoline prices across the nation. Comparing both maps shows a correlation between higher government taxes and fees and higher overall gasoline prices. However, there are notable expectations.

When looking at the western U.S., higher taxes and fees seem to contribute to higher gasoline prices but do not explain the whole story. For example, the southeast on average has higher taxes and fees but experiences some of the lowest prices at the pump.



The map above was pulled from www.GasBuddy.com in October 2022

Utah's taxes are 4 cents more than the national average. However, when accounting for government taxes as well as fees, in total, Utah is lower than the national average, being 1 cent less. In conclusion, ***Utah's taxes and fees do not contribute to Utah's higher-than-national-average gasoline prices***.

Regulations

Taxes are not the only governmental costs that should be accounted for. Many regulations result in increased gasoline prices. Some are justifiably focused on addressing the state's air quality challenges, but many are federally required and not within the control of the state. There are also other regulations that do not focus on local air quality improvements, some federal, but many are developed at the state level, particularly in California. Regulations that increase the cost of production in California result in more costly operations and, in some cases, refinery closures. These policies reduce the supply of gasoline, which increases prices regionally, including in Utah. California regulatory requirements, therefore, increase prices here in Utah and serve as a cautionary example.

There are also proposed regulations, like the Ozone Transport Rule, that would bring significant burdens to the state. Because they are currently just proposals, they will not be explored.

8: GasBuddy https://https://www.gasbuddy.com/gaspricemap

Green House Emissions

Federal – Renewable Fuels Standard (RFS)/RIN

The EPA requires refineries to produce a certain amount of renewable fuels, with a compliance mechanism called RINs (credits used for compliance – the "currency" of the RFS program). Price volatility in the tradeable RINs market has created a significant burden to U.S. refineries, several of which are forced to pay more today to acquire compliance credits than they spend on their payroll (typically the largest operating expense after crude purchases). Industry experts estimate that the RFS increases gasoline prices by roughly 20-30 cents per gallon.

Air Quality

Federal – Air Quality Related Regulations and Permit Limits

Due to the mountain topography that traps emissions from vehicles, homes, and industrial facilities, the Wasatch Front struggles to meet federal requirements for PM 10, PM 2.5, and volatile organic compounds (VOCs). As a result, Utah's refineries have strict emission limits that prohibit them from increasing capacity. Federal standards are consistently becoming more stringent, requiring additional investments without capacity increases. As Utah continues to grow, this spells challenges in providing adequate supply.

The Wasatch Front is currently in "moderate" non-attainment for ozone. If that moves up to a severe status, Utah would be required to have reformulated gasoline in the non-attainment areas. This would add up to 36 cents more per gallon of gasoline.

Federal – Reid Vapor Pressure (RVP)

The EPA requires certain areas around the U.S., including Salt Lake and Davis counties, to consume gasoline with a 7.8 RVP (summer blend) instead of the typical 9 RVP (winter blend). Reid Vapor Pressure measures gasoline volatility, or how it evaporates. Lower RVP fuel results in fewer emissions and less air quality impact. This added processing increases the price of gasoline by 3-4 cents per gallon. Additionally, decreasing the RVP from 9 to 7.8 reduces the available gasoline pool, further stressing gasoline supplies. While this is an important component of reducing emissions, especially as the Wasatch Front works to improve air quality, it is anticipated that further reductions in RVP will be required, further increasing production costs.

Capacity Reduction Incentives

Federal – Capital Restrictions Due To Climate-Related Financial Risks and the Social Costs of Carbon

The Biden Administration issued an executive order on climate-related financial risk that increases regulatory burdens on the oil and gas industry by increasing the "risk" the federal government takes on by working with them. Several policy positions of this administration have resulted in either less capital available for fossil fuel project financing or more expensive terms for access to capital, resulting in fewer dollars to invest in producing more crude or refinery capacity expansions. The Bureau of Land Management announced the use of social costs of carbon in decision-making for approving permits for oil and gas drilling. This further increases the cost of producing crude oil in the U.S.

Federal – Crude Leasing and Production Cost Increases
In 2022, the Biden Administration increased royalty payments due on federal oil and gas leases from 12.5% to 18.75%, a 50% increase, while the Department of Interior subsequently reduced the fees of renewable projects on federal lands. Other increases on the cost of producing crude on federal lands include increasing the minimum bid from $2/acre to $10/acre, increasing rental rates from $1.50-$2/acre to $3-$15/acre, and a new Expression of Interest fee at a floor of $5/acre. These changes make the cost of producing on federal lands significantly higher. Given that more than 66% of the state of Utah is federally owned and the bulk of the state's crude production involves federal land or minerals, these policies particularly challenge the state's ability to attract capital to increase crude production.

IRS Biodiesel Blenders Tax Credit
An incentive that aims to supplement the high-cost operations of producing biofuels.

Inflation Reduction Act
Extends the biodiesel credit and adds a new tax credit for "sustainable" aviation fuels.

California's Regulatory Environment Increases Utah's Prices
California's policies make it the most expensive operating environment in the country.

Most significantly, California has enacted a cap and trade system that adds an estimated 25 cents per gallon and a low carbon fuel standard (LCFS) that adds an additional 22 cents per gallon (Oregon has a similar one called the Clean Fuels Program). The LCFS has also incentivized the conversion of refineries to produce biodiesel. These conversions typically result in the loss of 40-60% of capacity and a switch in the final product to only diesel, with no gasoline or jet fuel produced.

Southern California also recently put in place a new rule that requires unprecedented nitrogen oxide (NOX) limits on boilers, requiring technology that is not yet proven, requiring significant investment. Policies like this come at great costs to refineries. At the same time, California state has banned sales of cars with internal combustion engines by 2035 and 2040 for diesel. California refineries are now questioning the financial justification to make these significant investments or to continue operating. If they close, it will only add more pressure to Utah's refineries and more price increases in gasoline.

These California policies all result in either direct increases in the cost to produce gasoline or significant reductions in the amount of gasoline produced, increasing prices for neighboring states, including Utah.

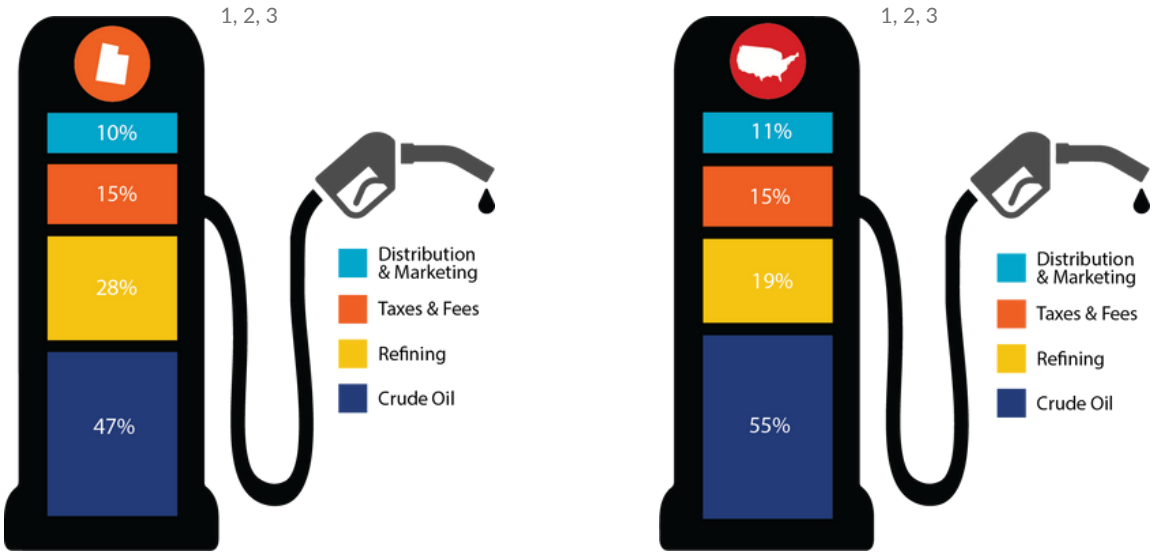
When crafting state policies to address gasoline supplies, an approach of what can be undone is likely to be more friendly to the free markets than what can be done. This approach can also include conscious efforts to improve air quality without going to extreme methods of trying to manipulate greenhouse gasses.

Consumer Prices at the Pump

Utah gasoline prices at the pump have averaged $3.07 over the past five years and $4.17 over the past year.

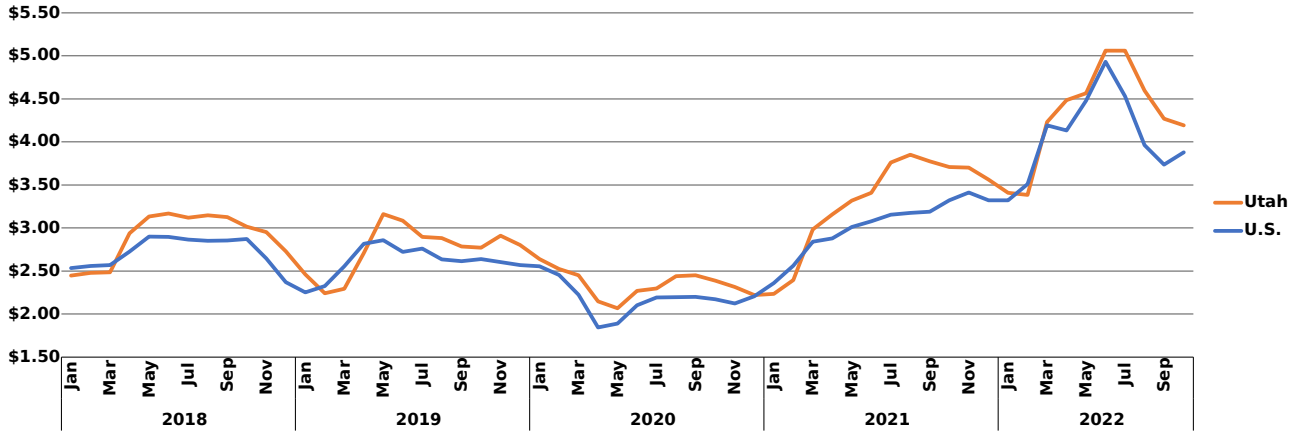
U.S. gasoline prices at the pump have averaged $2.84 over the past five years and $3.90 over the past year.

When analyzing all the data, a clear picture of what costs go into a gallon of gasoline comes into view. Below is an illustration representing what an average gallon of gasoline in Utah costs compared to the U.S. over the past year.



Utah vs U.S. Retail Gasoline Price[9]

(price per gallon, with Taxes and Fees)



1: U.S. Energy Information Administration https://www.eia.gov/
2: Oil Price Information Service, LLC (OPIS) https://www.opisnet.com/
3: DTN Fastracks https://www.dtn.com/refined-fuels/
9: Penn Wharton University of Pennsylvania https://budgetmodel.wharton.upenn.edu/issues/2022/3/11/effects-of-a-federal-gas-tax-holiday

Possible Solutions & Next Steps

Free Market Solutions

Enterprise Products Partners presented at its analysts meeting in April 2022 its plan to repurpose its Mid-America and Chaparral pipelines that currently transport natural gas liquids to the newly announced Texas Western Products System pipeline. This will allow up to 60,000 bbl/day of gasoline and diesel to be delivered to the Rockies (New Mexico, Colorado, and Utah). Enterprise recognized and pointed to the gasoline retail price spread between the Gulf Coast market and the Rockies, citing the cost spreads as substantial.

Pioneer Pipeline is the only pipeline bringing refined product into the state. Efforts to explore the feasibility of importing more refined product through it could bring cheaper refined product from Wyoming into Utah.

Utah Energy Oversight Group

Additional analysis and research by qualified experts, including economists, scientists, and business analysts, are needed. The complexity of the fuel supply chain and the market forces on the separate and independent business units of that supply chain makes it extremely difficult to establish effective solutions without further study. Potential next steps include:

- Establish a market analysis and planning team that can project impacts from any specific policy action or set of actions.
    - Efforts should be made to ensure a prudent balance of traditional energy with emerging energy and technology, and alternative fuels. Utah should work toward maintaining its gasoline supply as we identify and pursue alternatives that are in the developmental stages.
    - The team could provide trailing evaluations rather than leading indicators – rather than trying to identify actions that could lead to a certain outcome (such as lowering fuel prices), the team would provide a range of outcomes that might result from a specific action.
- Additional analysis and research in cooperation with industry to further understand refinery costs and crack spread comparisons.

Demand-side Management

Utah may wish to consider methods of curtailing the current trend of increasing demand such as providing more efficient options for public transportation, establishing government messaging and programs promoting lower fuel consumption, or minimizing commute trips by contracting the work week. All such actions should focus on getting vehicles off the road.

Gas Tax Inflationary Freeze

Under HB 362, passed in the 2015 legislative session, Utah motor fuels taxes were changed from an excise tax to a modified sales tax. This allowed the taxes on gasoline to be increased or decreased each year based on the average price per gallon in the state. This bill also established a minimum tax of 29.4 cents per gallon; however, it never created an inflationary breaker. In January 2023, because of historically high inflation, Utah's motor fuel tax on gasoline is scheduled to go up by 4.5 cents per gallon. Freezing this automatic price increase would not bring relief to Utahns, but it would remove the addition of an automatic burden that would otherwise compound onto an already-burdensome price.

Utah Should Maintain its "Any-of-the-Above" Approach

Policy actions should be avoided that could ultimately increase fuel costs to consumers, as we have observed in other markets such as the West Coast. Utah should maintain its **"any of the above"** approach to energy supplies and allow the free market to find the most efficient methods of providing fuel at the lowest possible cost. Utah has witnessed significant supply-side growth in the upstream petroleum industry that will continue as long as the state does not create policies that inhibit such growth.

The One Utah Way

Producers, refiners, and retailers are all part of the solution. Their partnership with the state has served Utah citizens well, and their input is needed to ensure their stability in the market. They are most acutely aware of the cross-market interplays affecting the supply and demand imbalance, and their expertise will help the state craft effective policies or solutions to bring down prices while ensuring the integrity of the free market.

Storage

Utah could encourage refineries to produce summer-grade gasoline in the winter when demand is low and fund efforts to store it with the intention of releasing that supply in summer months when demand, and therefore prices, are high. This could also serve as a gasoline reserve for the state. The UNEV pipeline is just a few miles from competent salt dome storage – a unique geologic formation for a landlocked state, providing an opportunity to store petroleum products on a large scale.

Conclusion & Appendix

As this report demonstrates, many factors contribute to the price consumers pay at the pump. In Utah, however, it is apparent that an imbalance of supply and demand throughout the West is the largest contributing factor causing higher-than-national-average prices throughout the state.

Demand for gasoline and other motor fuels continues to rise in the West, while government incentives and other political pressures encourage supply termination – a variable that is relatively new in petroleum market forces. The current paradigm positions the West in a circumstance where local demand, particularly along the West Coast, is outstripping local supply, leaving out-of-state supplies, like those coming in from Utah, to fill in the void.

These market forces create an environment where the market price for refined product is heightened. Utah refineries, pressured to fill in the supply and demand gap, have increased their capacity and utilization, supplementing the demand of those out-of-state markets where supply has been removed. This connection to higher-priced markets has rippled back into Utah, creating local prices that trend higher than the national average.

The place along the supply chain where Utah sees higher-than-average prices is at the rack, again, due to a market environment across the PADD 4 and PADD 5 regions that compel those prices.

To prevent further exacerbation of this problem, supply and demand pressures must be monitored to ensure the state is not encouraging the removal of gasoline supply, especially as demand continues to grow throughout the state and the PADD 4 and PADD 5 regions.

Methodology

As we looked for the price divergence across Utah's petroleum supply chain, we found the signal surfacing in two places. The retail pump price and the rack price. From here, we broke down the retail pricing components and the rack pricing components to identify the cause.

The first place where the price divergence showed was in Utah rack prices. To verify that the price difference was not caused further up the supply chain, we compared the cost of crude streams paid at the wellhead. Higher prices were not found here, so we focused our efforts on understanding the influences of the rack price.

We used the crack spread as a benchmarking tool to compare Utah to other refineries. The comparisons showed the crack spread to be favorable to Utah refineries which outperform the national average.

Causes for an outperforming crack spread include strong demand for refined products and/or insufficient supply.

We first looked at Utah's refineries to see if they could be the cause of the tightening of supply by looking at their utilization rates and operational capacities. We found that Utah refineries have consistently added capacity to meet demand over the years, and they are maximizing their available capacity with a high utilization rate. When compared to other refineries, we found that Utah refineries again outperformed those they were compared against.

We determined that reduced capacity in the PADD 4 and PADD 5 regions were causing the waning supply. After reviewing consumption data, we also found that the region's demand for refined products remained strong, a combination that puts upward pressure on pricing.

We then reviewed possible causes in the region that contributed to the waning supply. Of the influences we considered, capacity reductions were by far the largest contributing factor. This is caused by refineries shutting down or converting to biofules, both of which pull supply off the market.

Further analysis revealed that increasing regulatory pressures significantly contributed to these changes. Specifically, policies around the decarbonization of the energy industry compelled refineries to close or convert. These policies have increased exponentially over the last few years.

It was also discovered that increased costs from state regulations in the PADD 5 region made their refineries less competitive, giving way to external supplies (Utah) being imported to meet the demand for less expensive product.

Data Sources

Note: All data in this report is from public sources or was purchased from industry data suppliers

1: U.S. Energy Information Administration https://www.eia.gov/
2: Oil Price Information Service, LLC (OPIS) https://www.opisnet.com/
3: DTN Fastracks https://www.dtn.com/refined-fuels/
4: RBN Energy https://rbnenergy.com/
5: Utah Geological Survey
6: Utah Tax Commission
7: Utah Department of Commerce
8: GasBuddy https://https://www.gasbuddy.com/gaspricemap
9: Penn Wharton University of Pennsylvania https://budgetmodel.wharton.upenn.edu/issues/2022/3/11/effects-of-a-federal-gas-tax-holiday