



WHY PRICES HISTORICALLY GO UP IN THE SPRING

We all know that gas prices go up each spring, and generally seem to peak around Memorial Day. Most consumers assume that prices peak at this point because of the advent of the summer-drive season. Is that the case?

To a certain extent, demand is a factor. But there are a number of other events that collectively have a bigger effect on prices each spring, leading to price peaks right before Memorial Day. In six of the past 12 years, the seasonal peak was in the time period between May 9 and May 24.

Crude oil prices are the biggest factor driving gas prices, but how the crude oil is processed can also play a significant role in price increases. The petroleum industry's switchover to summer-blend fuels, a process that begins each February and ends June 1, creates challenges that also affect retail fuels prices. Since final implementation of the Clean Air Act Amendments in 2000, the seasonal transition to summer-blend fuel has helped gasoline prices climb significantly before they reached their peak. Comparing prices the first week in February to their seasonal peak, increases have ranged from a low of 20 cents in 2003 to a high of \$1.13 in 2008; on average, the average annual increase is 54 cents per gallon.

Refinery Maintenance During the First Quarter

Refineries convert the raw material of crude oil into a variety of products, including gasoline, diesel fuel (known as "distillates"), and jet fuels, among other products. In the United States, refineries are optimized to produce gasoline, and their maintenance schedules are based on gasoline demand. Demand for gasoline in the United States is generally lowest in the first two months of the year, so refinery maintenance, known as a "turnaround," is often scheduled during the first quarter of the year. Another reason for scheduling turnarounds in this period is that it is the time between peak heating oil season and peak summer drive season, allowing refineries to retool for summer-blend fuels.

A turnaround is a planned, periodic shut down (total or partial) of a refinery process unit or plant to perform maintenance, overhaul and repair operations and to inspect, test and replace process materials and equipment. Industry standard is that

turnarounds are performed about every four years on a refinery, meaning about one quarter of the country's refineries experience a turnaround in a given year. These turnarounds are scheduled at least one to two years in advance, and can be from one to four weeks in duration.

Because of the long lead time required to plan turnarounds, they are costly to reschedule, even if refining capacity is tight because of unplanned refinery shutdowns elsewhere. Add to this mix the reduction in the number of refineries throughout the country – there are currently 148 operable refineries in the United States, about half the total in 1980 – and any unanticipated refinery shutdowns can have a ripple effect on supply. Further, like any maintenance, some turnarounds may not go as planned, and take longer or be more complex than originally anticipated, further stressing the system. To minimize the impact of turnarounds on overall supply, they are staggered through a roughly three-month window.

Refineries Switch to Summer-blend Production in March

The blends of gasoline used in the summer months are different than the blends used in the winter. The Clean Air Act Amendment, which had final implementation in 2000, requires that different fuels be used in the summer months in many metropolitan areas, affecting 30 percent of the gas purchased in the country. Reformulated gas, known as "RFG," is required in cities with high smog levels and is optional elsewhere. It is currently used in 17 states and the District of Columbia. (EPA publishes a [listing](#) of where these fuels are required.) In the winter, fuels have a higher Reid Vapor Pressure, meaning they evaporate more easily and allow cars to start in colder weather. (Remember, cars are powered by fuel vapors, not the liquid itself.) In the warm summer months, these evaporative attributes would lead to the formation of smog.

The U.S. Environmental Protection Agency (EPA) defines April to June as the "transition season" for fuel production as refineries switch over to summer-blend production in March and April.

Adding to the complications of producing new fuels, there are more of them. In the winter months, only a few fuels are used across the country. However,



because of various state or regional requirements, around 18 different fuel specifications are required for the summer months. Refineries must produce enough for each area to ensure that there are no supply shortages.

Summer-grade fuel is more expensive for two reasons. First, the process to produce it takes longer and is costlier. Second, the overall yield of gasoline per barrel of oil is lower than during the winter months. Estimates vary as to the added cost per gallon for summer fuel, ranging from around 3 cents to as much as 15 cents per gallon to produce these higher-grade fuels.

Whatever the difference in production cost is, the price of this fuel is magnified by increased demand, maintenance costs and capacity decreases.

Retail Deadlines Go Through June

In most areas of the country that require summer-blend fuels, retailers have until June 1 to switch to selling summer-grade gas. This is the end point in a series of handoffs.

Some retailers must sell summer-blend fuels much earlier. California, which has one-eighth of the country's population, has among the most stringent requirements, both in terms of the complexity of the fuel and the date at which summer-blend fuel must be sold. In Northern California, retailers must sell summer-blend fuel a month earlier than the rest of the country: May 1. In Southern California, the deadline is two months earlier: April 1.

There are other key deadlines that additionally put stress on the system. Nationwide, refiners must produce summer-blend fuel no later than April 1. (Obviously, deadlines are earlier for California's fuels.) From refineries, fuels travel through pipelines at about 4 miles per hour, or 100 miles per day. Fuels refined in the Gulf Coast can take several weeks to reach storage terminals throughout the country. That's why there is a May 1 deadline for terminals and other facilities that store or transport fuel to switch over and fully purge their systems of winter-blend fuels.

The May 1 deadline for terminals is considered one of the biggest factors in the seasonal price increases. Terminals have to be near empty to make the

transition and be in compliance. Those out of compliance face stiff penalties, so most terminal operators would rather be out of inventory than out of compliance.

Demand Increases, Beginning in February

Demand is often cited as the main reason for spring price increases. It is a factor, but one of many. U.S. gasoline demand is significant – in 2011, U.S. demand averaged around 8.9 million barrels per day. But world demand for petroleum is around 90 million barrels per day, 10 times total U.S. demand for gasoline. In the early months of 2012, U.S. demand for gasoline had declined, but world demand for oil increased, and that has elevated oil prices, which drive gas prices.

Still, U.S. gasoline demand is a factor in the annual spring increase. Demand increases every year beginning in February, and typically peaks in August. (In 2011, U.S. demand peaked early, in June.) The common misperception is that there is a huge increase in demand for the Memorial Day weekend and the official beginning of the summer-drive season. There is an increase, but it is only a few percent per month. The problem is that this demand occurs when the system is most vulnerable to demand increases.

Month in 2011	Gasoline demand (million barrels/day)	Change from month prior
January	8.693	-6.4%
February	8.899	+2.4%
March	8.991	+1.0%
April	9.037	+0.5%
May	9.082	+0.5%
June	9.278 (high)	+2.1%
July	9.113	-1.8%
August	9.169	+0.6%
September	8.917	-2.7%
October	8.657 (low)	-2.9%
November	8.664	+0.0%
December	8.720	+0.6%

AS Slight Bump in the Fall

As demand decreases and temperatures cool, retailers can switch over to selling winter-blend fuel, beginning September 15. While these winter-blend fuels are cheaper to produce, the complications of the switchover often lead to a temporary bump in price, usually a few cents per gallon.



Unlike in the spring, the change to winter-blend fuel is not required. However, because it costs less, retailers obviously want to sell the cheaper fuel so they can be as price competitive as possible.

Not all retailers begin selling this fuel on September 15; most wait to make the switch until their inventories are low and need a new shipment. A retailer's volume will dictate how often a station gets deliveries, with some stores getting multiple deliveries per day and others getting one or two deliveries per week.

By the end of September, gas prices generally decrease as the complications from this switchover are worked through and demand continues to fall. Despite what conspiracy theorists believe, price decreases in the fall have everything to do with a decrease in demand (in 2011, weekly demand was at its lowest the week of October 21) and nothing to do with pre-election politics.

Also, California's summer-blend fuels season is longer than the rest of the country, on both the front end and the back end. Both Northern and Southern

California's summer-blend requirements go through the end of October. There is one downside to winter-blend fuel (and upside to summer-blend fuel): Overall fuel economy takes a slight hit. Generally, a lower Reid Vapor Pressure means a higher fuel economy.

Exceptions to the Rule

Summer-blend fuel requirements may be relaxed in times of emergencies or when potential shortages are possible. That was the case in 2005 as Hurricane Katrina made landfall in Louisiana at the end of August and significantly affected Gulf Coast refining operations. Several states successfully petitioned for waivers to temporarily exempt retailers from RFG requirements through September 15.

The Bottom Line

Combined with world demand for crude oil, the patchwork of summer-blend fuels requirements places enormous stress on the fuels distribution system each spring. It's often easy to have gas; the challenge is to have the right gas at the right place. And with different requirements across the country, you also need to have it there at the right time.