Summer Gasoline is Here Again

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Topic: Economics/Finance

We run a version of this post each year, since it is an issue that comes up each year. It is obviously not the only factor affecting gasoline prices. The recent decrease in oil prices from $85+ per barrel to around $72 per barrel will tend to act in the opposite direction. - Gail

Just what is summer gasoline? Twice a year, in the fall and in the spring, you hear about the seasonal gasoline transition. However, most people probably don't understand what this actually means. AAA published a Top 10 list explaining the seasonal rise in gasoline prices, and summer gasoline checked in at #7:

> 7. The summer blend switchover. This transition from winter-blend to summer-blend fuel, a concoction that causes less smog, occurs every spring. It causes a dip in gasoline supplies as refineries in the U.S. shut down temporarily to retool their production facilities.

That's only partially correct, and is probably the extent of most people's understanding of this transition. But given that I am very keen that people should understand the energy industry, it is worth a review, and a layman's explanation. I explained the details behind this transition in Refining 101: Winter Gasoline. But let's review some concepts.

There are two key (although not the only) specifications that refiners must meet for gasoline. The gasoline needs to have the proper octane, and it needs to have the proper Reid vapor pressure (RVP). While the octane of a particular grade is constant throughout the year, the RVP spec changes with the seasons.

The RVP is based on a test that measures vapor pressure of the gasoline blend at 100 degrees F. Normal atmospheric pressure varies, but is usually around 14.7 lbs per square inch (psi). Atmospheric pressure is caused by the weight of the air over our heads. If a liquid has a vapor pressure of greater than normal atmospheric pressure, that liquid boils. For example, when you heat a pan of water, the vapor pressure increases until it reaches atmospheric pressure. At that point, the water begins to boil.

In the summer, when temperatures can exceed 100 degrees F in many locations, it is important that the RVP of gasoline is well below 14.7. Otherwise, it can pressure up your gas tanks and gas cans, and it can boil in open containers. Gas that is vaporized ends up in the atmosphere, and contributes to air pollution. Therefore, the EPA has declared that summer gasoline blends may not exceed 7.8 psi in some locations, and 9.0 psi in others. The particulars vary, but key considerations are the altitude and motor vehicle density of a specific location. The EIA summarizes the key points:

> As gasoline evaporates, volatile organic compounds (VOC's) enter the atmosphere and contribute to ozone formation. Gasoline's propensity to evaporate is measured by Reid vapor pressure (RVP). In order to control VOC emissions, the Federal Clean Air Act Amendments of 1990 require that all gasoline be limited to an RVP maximum of 9.0 psi during the summer high ozone season, which the Environmental Protection Agency (EPA) established as running from June 1 to September 15. The Act also authorized the EPA to set more stringent standards for nonattainment areas. As a result, EPA limits areas designated as "high volatility non-attainment" to a maximum RVP of 7.8 psi during the high ozone season. Some States elected to require even more stringent restrictions to achieve local clean air goals, and require 7.2- and 7.0-psi gasolines.

Butane, which has an RVP of 52 psi, can be blended into gasoline in higher proportions in the winter because the vapor pressure allowance is higher. There are two advantages in doing this. First, butane is a cheaper blending component than most of the other ingredients. That makes fall and winter gasoline cheaper to produce. But butane also adds to the total gasoline pool, so that means that gasoline supplies increase in the winter as more butane is thrown into the mix. Not only that, but this all takes place after summer driving season, when demand typically falls off. These factors normally combine each year to reduce gasoline prices in the fall (even in non-election years). The RVP is stepped back down to summer levels starting in the spring, and this usually causes prices to increase.

There are some common misconceptions about this seasonal transition. One is that it is the reason that spring and fall maintenance are done. That is not the case. Most, if not all refineries can carry out this transition without shutting down or interrupting production. The reason that maintenance is done in the spring and fall is that it provides a combination of moderate weather (the inside of a vessel can be unbearable in the summer) and off-peak demand. Vessels must be inspected, new equipment must be installed, catalyst change-outs occur, etc. This is similar to tuning up your car to keep it in proper running condition. But the seasonal maintenance is unrelated to the gasoline transition. In fact, for reasons I won't get into here, seasonal maintenance often complicates the transition.

Another misconception that some have is that they can save money by buying cheap gas in the winter and storing it for the summer. Remember that winter gasoline will pressure up as the weather heats up, and the contained butane will start to vaporize out of the mix. You will end up with less gasoline than you paid for, and you will be contributing to the air pollution problem that summer gasoline was designed to avoid. If, on the other hand, you were to buy summer gasoline and try to store it until winter, you might find yourself having problems getting the fuel to ignite, due to the lower vapor pressure. This would be like putting a little bit of diesel in your gasoline – not very good for your car. So buy and use gasoline in the correct season.

Transition Schedule

The EPA publishes a schedule for the RVP transition:

Guide on Federal and State Summer RVP Standards for Conventional Gasoline Only

The schedule varies somewhat from region to region, but in general is as follows. After allowing vapor pressures as high as 15 psi in the winter, the limit drops on May 1st:

May: 9.0 psi
June – Sept. 15: 7/7.8 psi

More congested areas and hotter areas will tend to have a limit of 7.0 psi, while cooler climates generally opt for 7.8 psi. Some cooler climates don't even require a reduction, and have a 9.0 psi limit throughout the summer.

Refiners will start to pull down their inventory of winter gasoline well in advance of the May 1st deadline. On that date, all gasoline in the system has to meet the stricter requirements. This is a key reason that gasoline starts to become more expensive in the spring.

One of the disadvantages of having different requirements for different areas is that summer gasoline is less fungible. This can cause price imbalances in different areas, and sometimes prevents product from flowing from one area into another to ease the shortage.

Conclusion

Hopefully that was an easy-to-understand explanation of the seasonal gasoline transition in the U.S. The purpose of the transition is to curb pollution as the weather turns warmer. Now the next time you hear "season gasoline transition", you will know exactly what they are talking about and what the expected impact on supply and price will be.