A brighter tomorrow begins with better demand data

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The ongoing COVID-19 pandemic has shown us that historical data means little when the present doesn't look like the past.

The standard metrics, KPIs, and assumptions traditionally used to make key business decisions have fallen short of the unprecedented realities of this new economic landscape. When the models, processes, and information you previously depended on are no longer sufficient, how do you plan, prepare, and effectively manage your fuel business?

Let's look at the early impacts of the pandemic, what we can learn from them, and how you can monitor demand more accurately — and in near real time.

A new world

In the spring of 2020, as states shut down to slow the transmission of COVID-19, the United States observed dramatic, negative impacts on its economic activity, including fuel demand destruction. In the percentage of expected weekly demand chart, you can see the deviation from expected demand, as forecast, based on volume from the prior year. In a single month, most states dropped to 50-70% of expected demand. How could the forecasts be so far off?
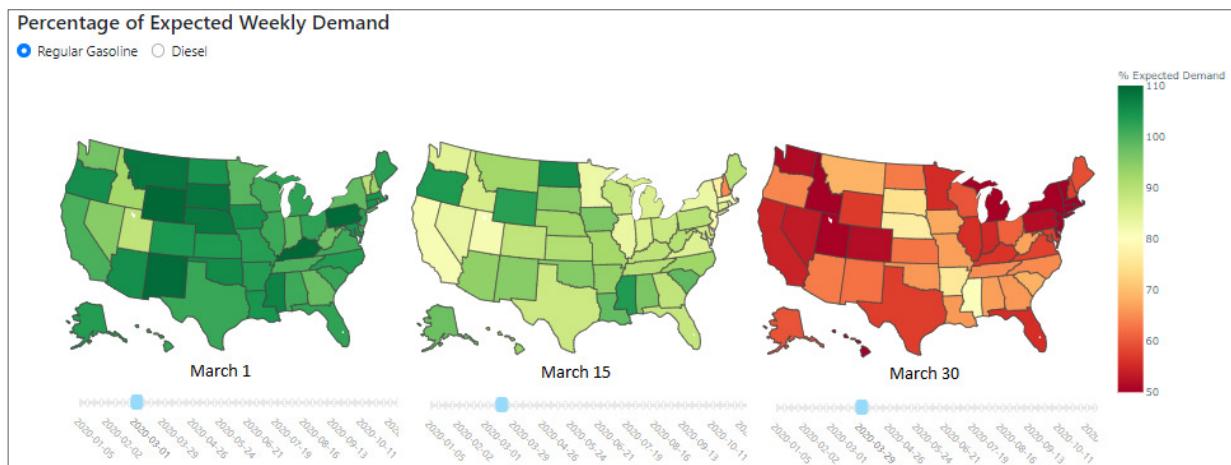
Declining expected weekly demand during March 2020.

We've all heard the age-old investment disclaimer, "past performance does not guarantee future results." While this disclaimer is wisely wielded by investment advisors to absolve themselves of responsibility should performance vary, past performance is still very much a key factor when attempting to predict demand for refined fuels. And why not? Historically, it's been a great place to start.

One of the easiest forecasting methods is to look at the results for the same day or same week of the previous year and adjust. Below is a 2019 chart of daily regular gasoline volume for Chicago from our new solution, DTN Refined Fuels Demand. While it looks quite noisy on the surface, anyone familiar with gasoline marketing recognizes the familiar spikey intra-week pattern associated with the various days of the week.
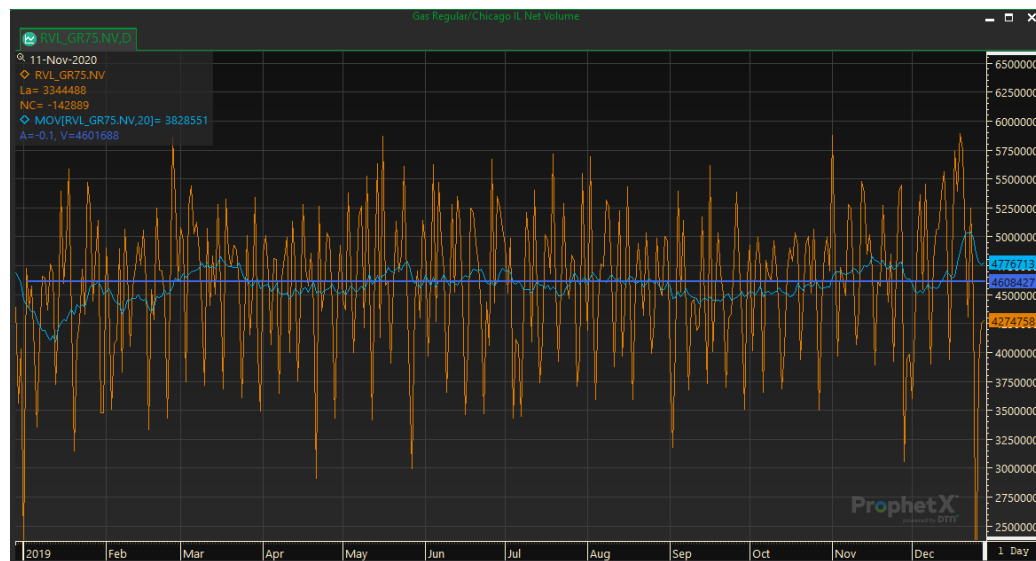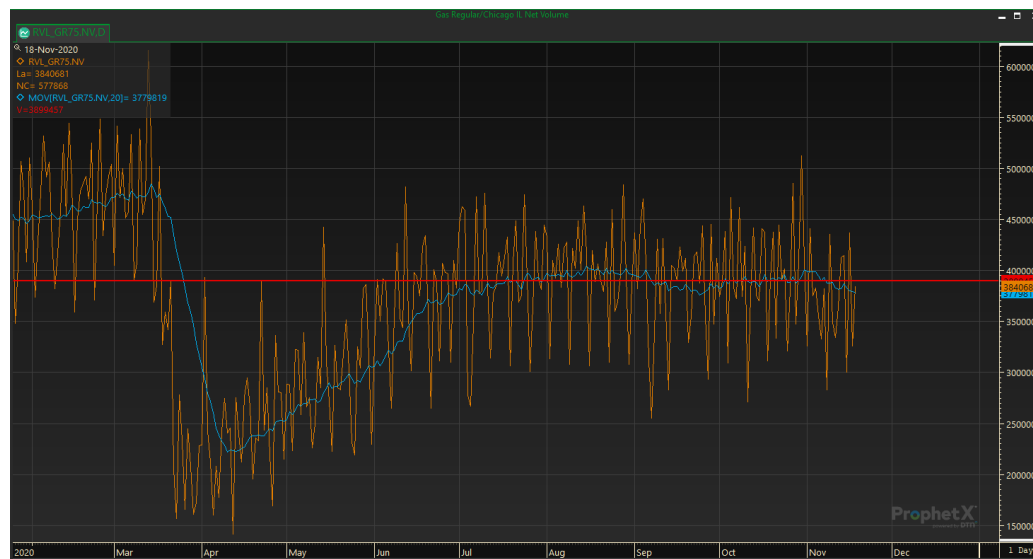

Moving averages for Chicago regular gasoline in 2019, shown in DTN ProphetX®.

When we put on our forecasting hat, we can "smooth" much of that daily noise with a 20-day moving average showing us that Chicago moved about 4.6 million gallons of regular gasoline per day in 2019.

As defined here, "Chicago" is just one of several supply points serving the metropolitan area. In looking forward, you might ask how much of that volume is yours? How have you performed this year relative to last? How do your internal trendlines and moving averages look? Were there event-based impacts on last year's performance — such as storms, outages, or holidays — that will or won't reoccur this year? Under typical circumstances, you could build such a forecast for the following year, and it would perform with a reasonably high degree of certainty.

And then in 2020: an unforeseeable global pandemic. On March 9, all Illinois counties were declared disaster areas. By March 20, executive stay-at-home orders were issued for residents. Suddenly, our 2020 chart looks a lot different than we thought it would, dramatically departing from the actual consumption volumes of 2019 — rendering the 2020 projections, based upon 2019, virtually useless.

Moving averages for Chicago regular gasoline in 2020, shown in DTN ProphetX.

Without a crystal ball, how can new projections be trusted? With the benefit of hindsight, we now know that demand destruction from the COVID-19 pandemic was still present, but less severe than in 2020. Even with the incremental improvement, the question remains, how can historical models guide our way into the future during unprecedented times? Perhaps, the answer is clear? They can't.

What is becoming painfully obvious is that previous methods for forecasting and determining demand impact are no longer sufficient, and the challenge is clear. Even if the direct effects of the pandemic disappear, other factors will likely take their place. Electric vehicle adoption rates are increasing as commuters re-think mass transit while fleeing densely-populated urban areas. Refiners themselves have made big COVID-19-induced pushes toward the tax-favored increased margins associated with bio-based refining. These trends will continue to impact gasoline and diesel demand. Energy companies need a new way to make better decisions. How can refined product demand be forecast more accurately?

A new way forward

To make better decisions, you need better data. What do we mean by better data? It can mean a lot of things. It can mean that your data is "fresher." It can mean that it represents a greater sample size. It can also mean it is more accurate. Better yet, it should capture all of these traits.

Year-over-year data will always have value in the forecasting process as it captures calendar events like seasonality and fuel specification changes. However, "nearby" data is critical for successful demand management. Market participants have long searched for the intelligence necessary to adapt to rapidly-changing market conditions; for example, access to daily city-level demand data, which had never been available before.

Now, imagine a tool that could provide demand volumes, measured down to the grade, meaning actionable strategies could be executed against independent regular, midgrade, and premium gasoline objectives. What's more, imagine the same detail expressed in distillate grades. Perhaps most important is that this intelligence is derived by electronically capturing nearly 85% of U.S. downstream petroleum transactions. Picture the possibilities. This exclusive capability eliminates sampling bias and manual survey errors translating into actual market measurements.

With such detail and accuracy, the opportunities for managing and forecasting your business grow exponentially. Consider these scenarios:

Assess market share

In an attempt to increase market share, you can aggressively reduce pricing, yielding a 4% increase in gasoline volumes over four days. However, better demand intelligence indicates that total market volume increased by 6.4% over the same period. Aware that market share was actually lost, you can promptly adjust your strategy.

Avoid run-outs

Nearby trending data shows distillate volumes skyrocketing at a rate that will exceed pipe replenishment capacity. Racks are soon destined for outages during peak agriculture demand. Management has the foresight to pull as much product into storage as possible ahead of the market. Additionally, barge deliveries to nearby waterborne terminals may be possible, or additional capacity on adjacent pipelines may be available.

Increase profitability

A company's trading shop has seen daily regional and national gasoline volumes accelerate dramatically over the previous week and above last year's level. It is very likely the market will react to the resulting EIA Weekly Petroleum Status Report with surprise, pushing NYMEX and corresponding physical market values higher. The shop uses better demand intelligence to position itself, protecting margins and potential profits from the move.

Better demand intelligence already exists. With solutions like the new Refined Fuels Demand from DTN, companies up and down the supply chain will soon be better equipped to manage physical supply and address long-standing challenges in new ways.

A step further

We know more accurate, timely data improves your nearby decisions, and we've just discussed some of the ways it can help your business. As we reset our discussion on forecasting, better, more flexible data can also improve your analysis by layering your enhanced demand data with additional data sets to provide deeper insights and more meaningful context.

To illustrate what better analysis might look like, let's compare a baseline forecast for 2020, utilizing five years of DTN historical demand data to build a naïve forecast that uses classic analytics and no other outside data. Put another way, imagine it is 2019, and you're building your 2020 forecast. When applied to our state of Illinois example, we get a naïve forecast that looks like this:
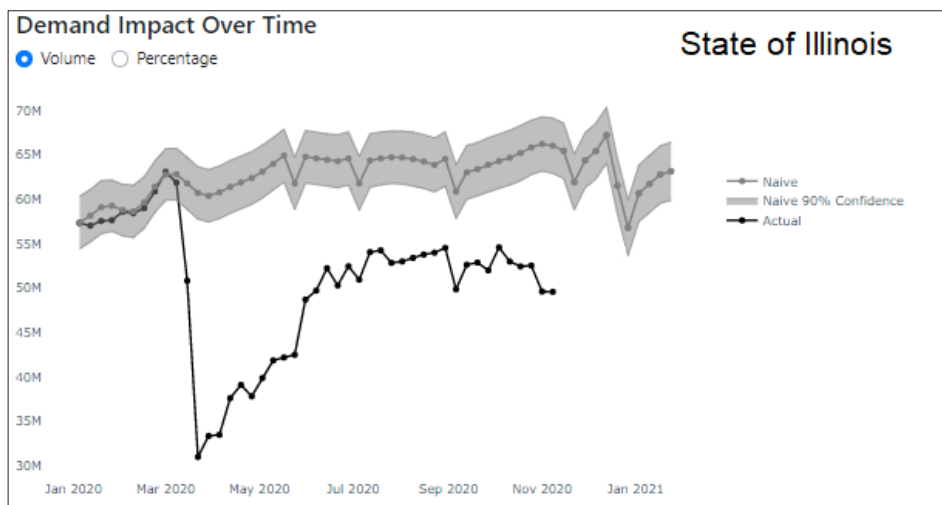
The gray-dotted naïve line is banded by the 90% confidence level. The black dotted line is the actual regular gasoline demand for Illinois in 2020. After getting pummeled in March, demand was steadily advancing its way back to the naïve expectations for 2020 — until September, when the line begins to flatten and diverge. Part of the downturn was expected, as it can be seen in the November naïve downturn. But, the divergent trend is troubling. All of this then brings us back to forecasting and what will happen next.

Let's explore two potential paths forward and what impacts they might have on the market. The first is that restrictions will continue to ease, and the second is that lockdowns will return. Combining the DTN historical Refined Fuels Demand intelligence and health metrics from the Institute for Health Metrics and Evaluation (IHME), the following chart shows Illinois with the two added perspectives mentioned.
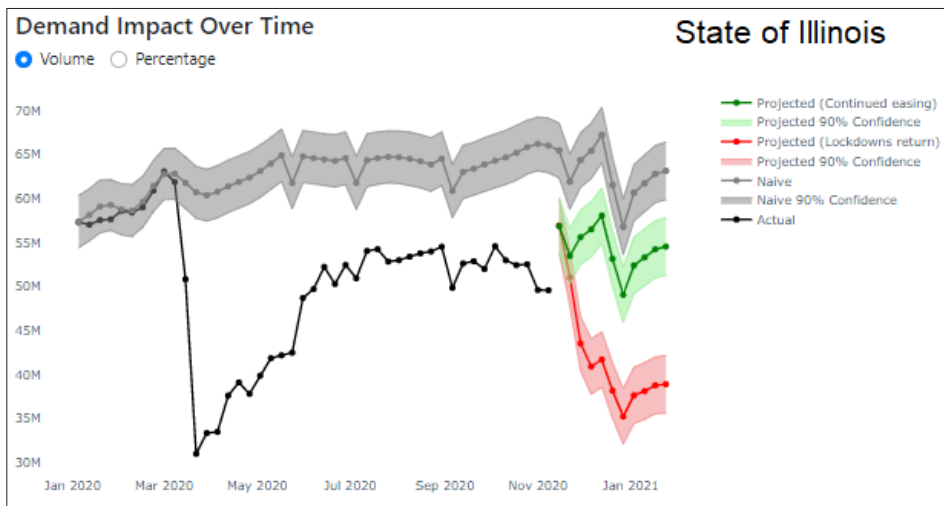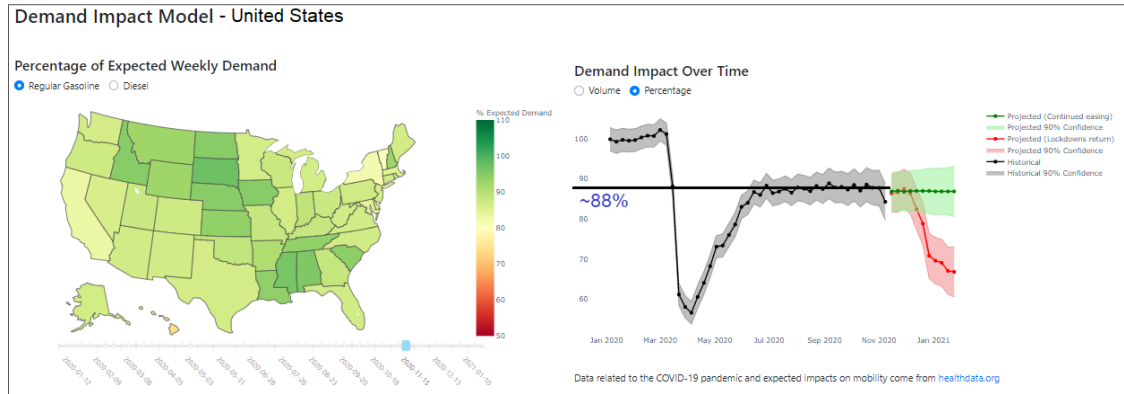
The two forecasts are added to the chart, bounded by their 90% confidence levels. The green dotted line is the model's expectation for demand in Illinois if the state moves toward continued easing. That divergent quality discussed earlier disappears, and the line moves closer to the naïve forecast of a "normal" 2020. This would be the case if restrictions continue to abate, businesses are allowed to return to normal practices and occupancies, and public mobility trends back to 2019 levels. On the other hand, the red dotted line represents demand should current health trends and forecasts result in the return of lockdowns and stay-at-home orders. Sadly, the actual numbers are trending toward the lockdowns' return forecast, which is not surprising given the staggering return of COVID-19's second wave.

Nationally, the chart of expected demand shows the country at a pivotal crossroads, where demand could head down either path, depending on the direction of its health trends.
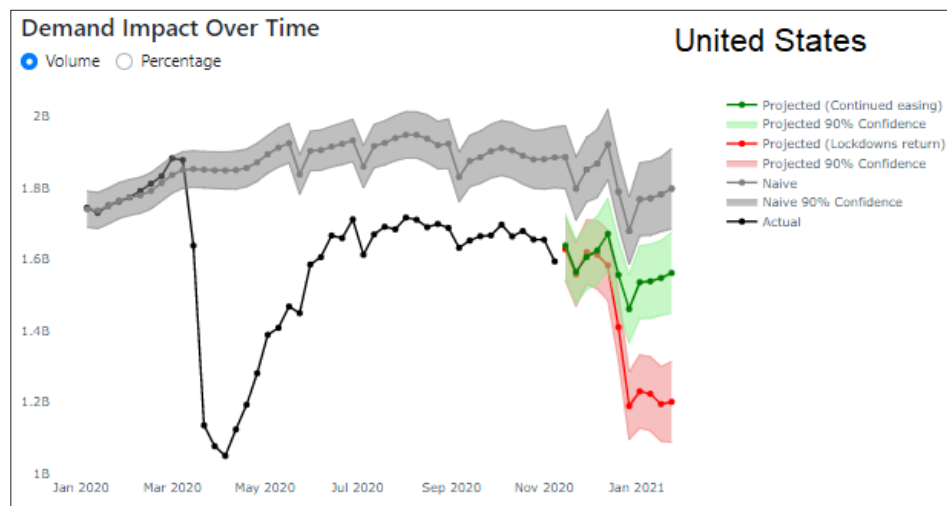
Since July 2020, actual demand has very closely followed along the pattern established by the DTN naïve forecast — albeit at reduced levels. Nationally, regular gasoline demand is running at about 88% of expectations.

Demand Impact Model - United States

Percentage of Expected Weekly Demand

Demand Impact Over Time

The DTN naïve forecast model uses its proprietary market-level demand data.

The model uses proprietary market-level demand data from DTN and is processed against six health-related metrics from all 50 states. It demonstrates that energy companies could have the capability to position the right amounts of the right products, at the right places, at the right time. Better data can deliver greater insight and more powerful context to guide better decisions.

Planning, managing, and profitably operating a business is challenging under the best of circumstances. Despite huge gains in data science and analytics over the last 10 years, outcomes are still limited by the quantity and quality of available data. The addition of daily, market-specific demand data is a game-changer in providing a critical perspective to any commodity-based business. But in the downstream petroleum market, whose best alternatives have been months-old or spotty in coverage,

Refined Fuels Demand from DTN is a paradigm shift. The intelligence enhances business decisions up and down the vertical from supply and distribution to trading to sales and marketing. Surviving in the chaotic world of a global pandemic requires every advantage one can muster. Thriving in the aftermath will be left to those best equipped with the intelligence to manage their success.

Learn more about Refined Fuels Demand today!