ENVERUS
Trading & Risk

MITIGATING FORWARD CURVES RISK THROUGHOUT & AFTER A PANDEMIC

EBOOK GUIDE FOR RISK ANALYSTS
2020 MID-YEAR REPORT

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CHAPTER 1 | EXECUTIVE SUMMARY

The world is transforming before our eyes. New market realities at play for energy risk managers were unthinkable before the emergence of COVID-19 and risk management has never been more important to energy and commodity traders.

From 2020 onward, the people who analyze price risk will throw away their old playbooks. Risk analysts must push boundaries to protect their companies from the unforeseen risks and drastic price volatility that comes with surviving the market conditions of a pandemic.

When COVID-19 first spread across the globe, companies transitioned to remote trading operations. Workforces are now acknowledging that employees will have more flexibility to work remotely–or some hybrid of remote and in-office–for the foreseeable future.

IT departments are stretched especially thin and forced to put projects on hold. The new working environments have exposed antiquated curves and dataflow processes managed out of Excel. On top of that, many shops have only one or two key people that know the ins and outs of that process—a big risk. Data lineage issues could completely throw off an entire system if a formula or data point is off in any way.

Now that we have seen the worst of market volatility and negative WTI futures, we know that the impossible can happen. Intraday price changes are bigger and volatility is expected to continue to roil markets for at least the next two years. Risk management and forward curves management just became monumentally more important.

Companies really want that out-of-the-box, easily customizable technology that can help them simplify their forward curves process without significant internal IT support or maintenance. They also want to partner with an expert team that can handle most of the integration and management—avoiding additional workload for internal IT—to make it as painless as possible.

This ebook aims to give risk managers a comprehensive, macro view of oil markets and how volatility could impact risk management. It also provides first-hand perspective from experts who build customized and automated forward curve risk management systems every day.

CHAPTER 2 | MACRO OVERVIEW

By Rob McBride, Senior Director of Strategy & Analytics at Enverus

RISK ANALYSTS TAKE NOTE—HIGH OIL MARKET VOLATILITY IS HERE TO STAY

2020 has been quite a roller coaster ride—and it's not even halfway over yet.

In recent weeks, WTI crude reached a bit of oil price stability compared to what we have been experiencing. But market volatility is by no means in the rearview mirror. In fact, the kind of volatility WTI experienced is likely here to stay for the rest of this year and next.

Volatile market ripples are spreading these effects across all commodities. Trade shops that manage risk across multiple commodities will find that these issues only compound themselves and continue to add to confusion and volatility.

What are the key energy market themes today?

- Unprecedented times. You must use the phrase "unprecedented times." There is no measurement stick in history to compare what we are currently going through.
- Remember OPEC and the price war? The Saudi-Russia price war has ended, but it was the catalyst for the market volatility this year.
- Demand-destroying impacts of COVID-19. Most of us did not travel anywhere for weeks, as global lockdowns were in effect.
- Prisoner's dilemma amid breakeven crude prices. We have seen green shoots of demand returning. The market is rallying back into the $40s—is the enthusiasm too soon?
- Forty dollar oil—to drill or not to drill? In the $40 price range, operators will go forward with drilling. Forty dollars does not solve all problems.
- Uncertainty will lead to "unprecedented" volatility...and managing forward curves will be more important than ever.

HOW WILL OIL PRICES RESPOND TO A SITUATION THAT DWARFS EVERYTHING THAT CAME BEFORE IT?

Run crude production models under different crude price assumptions.Learn more about **ProdCast** and read our **outlook for recovery** on the Enverus blog.

CHAPTER 3 | THE VOLATILITY IS NOT MEASURED IN MONTHS OR YEARS, BUT IN DAYS, HOURS, & MINUTES

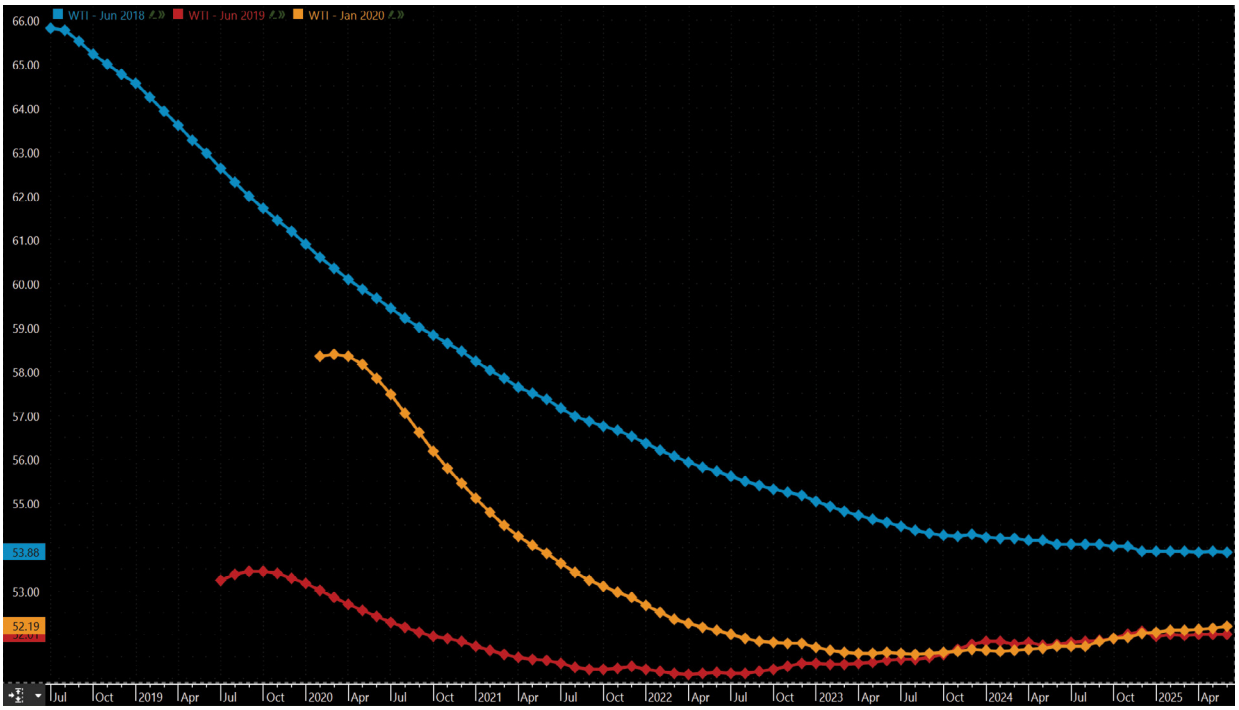
FIGURE 1 | Front Month NYMEX WTI Futures Daily Settlements (Continuous)

Source | Enverus

Crude oil prices have had a year to remember. We started out the year at healthy near-term prices of more than $60 a barrel. The Saudi-Russia oil price war began around March, causing a huge collapse. But even a nearly 50% drop in prices does not look too astounding when compared to the historic negative price plunge in mid-April.

Figure 1 offers a little historical perspective of the volatility experienced in WTI markets.

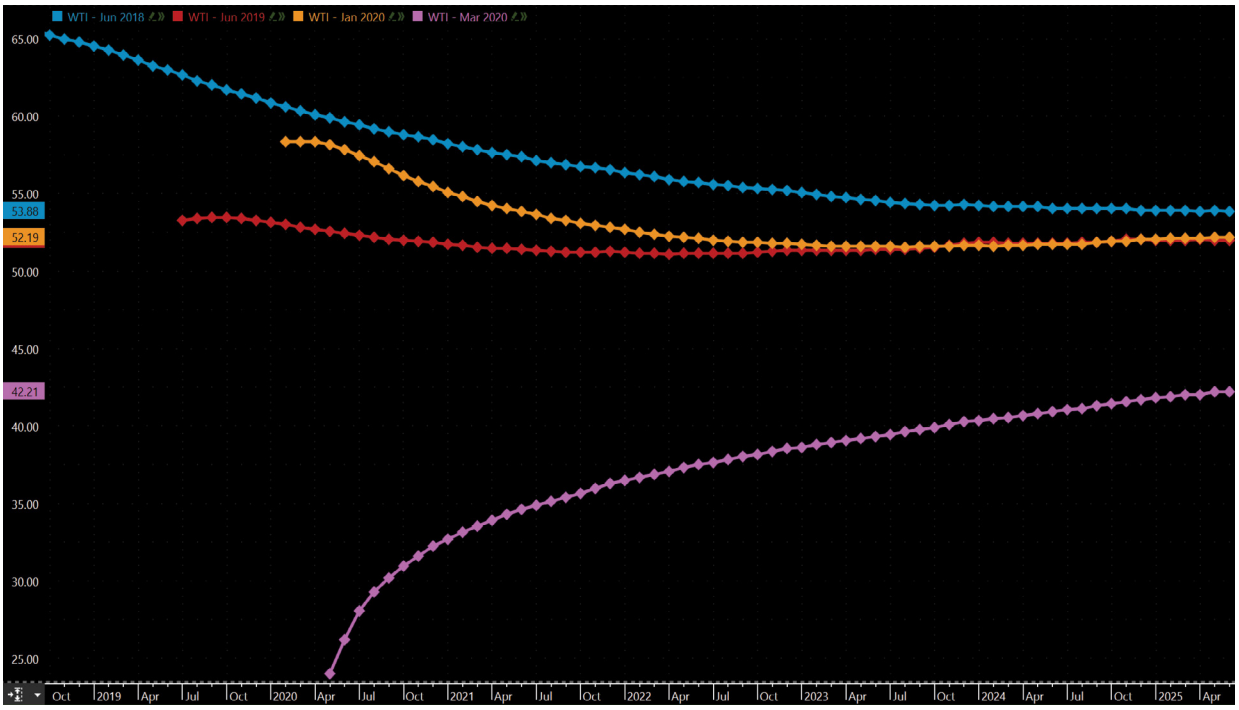
FIGURE 2 | Crude Oil Prices: A Year To Remember



Source | Enverus

In **Figure 2**, you see the 2018 forward curve in blue, the 2019 forward curve in red, and 2020 in orange. For 2018 and 2019, the forward curve snapshot was gathered mid-year. In all three cases, the forward markets indicated a strong and steep backwardation, or a market where forward prices are weaker than prompt-delivered supplies, which is often the case when demand is expected to continue to grow.

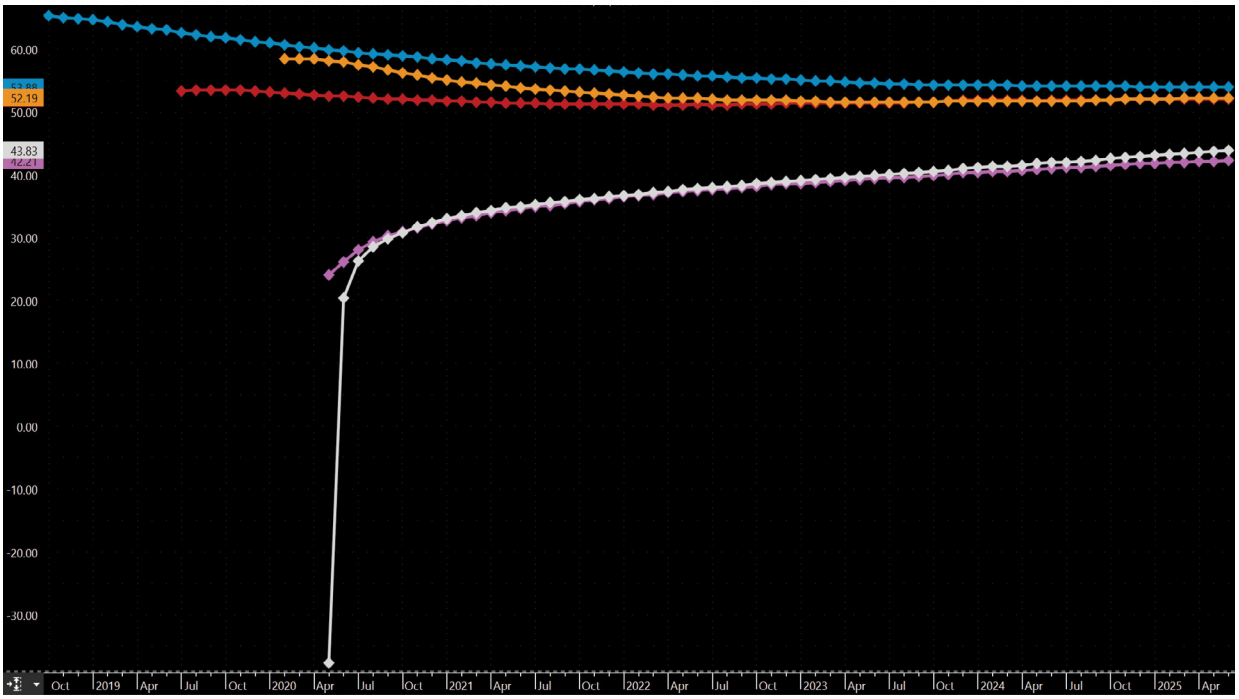
FIGURE 3 | Crude Oil Prices: A Year To Remember



Source | Enverus

Here's what happened next. **Figure 3** above introduces the WTI forward curve in March 2020 (purple line)—the volatility that seemed strong previously was suddenly dwarfed by what came next. The Saudi-Russia price war brought on an extreme contango, which means that market is expecting near term oversupply necessitating the incentive to store for future use.

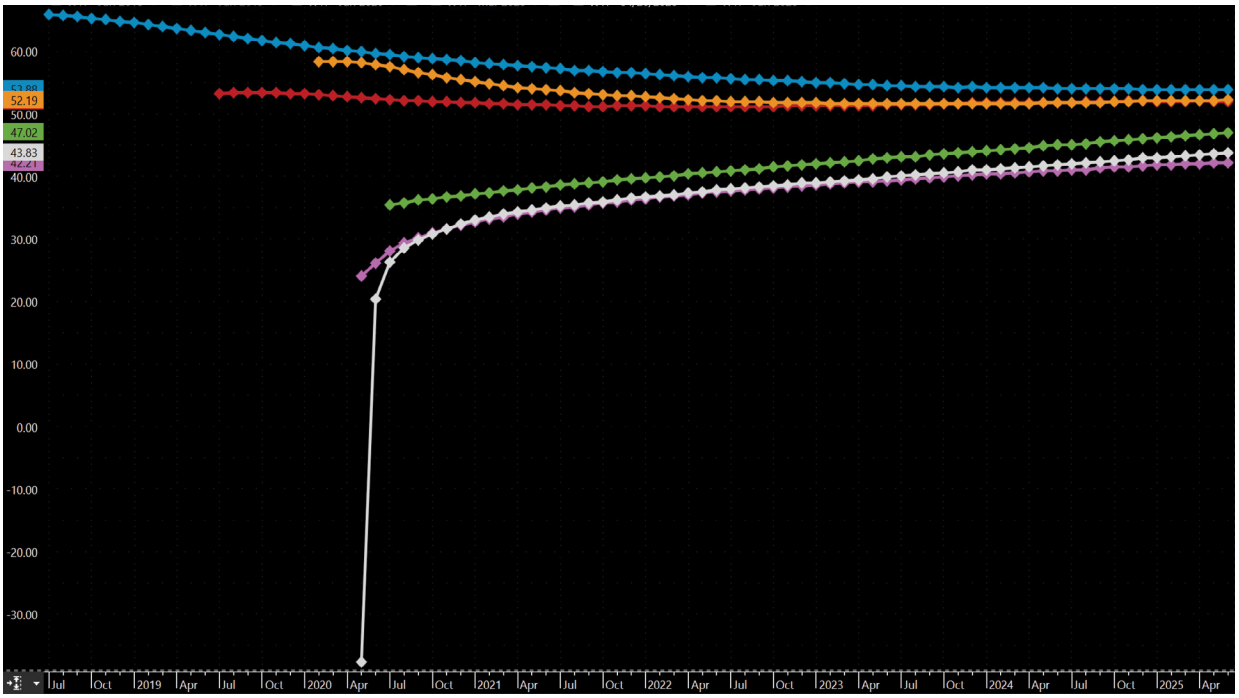
FIGURE 4 | Crude Oil Prices: A Year To Remember



Source | Enverus

Let's now introduce **Figure 4**, the May WTI futures contract on its expiration date (white line)—April 20, 2020. By this point, the COVID-19 pandemic had set in and obliterated demand. What we once thought was very strong volatility looks very tame compared to what we are seeing nowadays.

FIGURE 5 | Crude Oil Prices: A Year To Remember



Source | Enverus

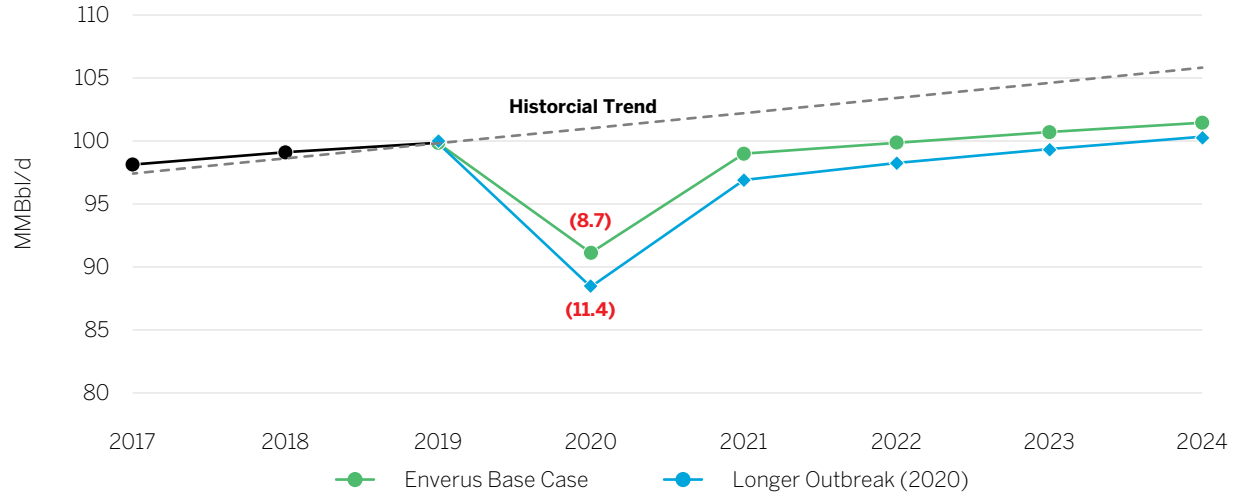
The final chart in **Figure 5**, shows where the WTI futures market returned to in June (green line). It appears to be a recovery at the moment, but it's too early to say with certainty that demand has returned.

So, where does that leave us today? Managing your volatility and risk is literally more important today than it ever has been before. These events are likely to repeat themselves over the next 12 months. While we may not see another negative futures settlement, it is not necessarily ruled out. It had never happened before, but it may happen going forward. And we certainly could experience negative physical prices again in the field.

CHAPTER 4 | BACK TO FUNDAMENTALS: SUPPLY & DEMAND

We continued to see a very steady increase in demand in 2019. The dotted line in the chart below shows where that historical trend was expected to lead. Of course, what was expected to happen—a continuation to the slow growth—was obliterated.

FIGURE 6 | Scenarios of Global Petroleum Liquids Demand: 2020-2024

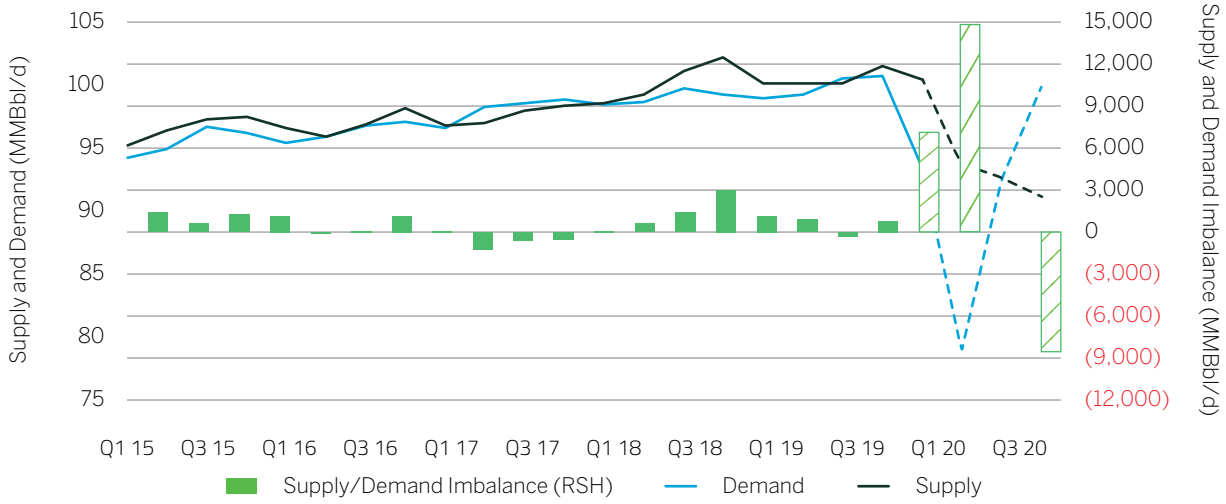


Source | Enverus

Figure 6 above shows the Enverus base case, as well as the more bearish demand case, if the global pandemic is extended and lockdowns are re-imposed.

The annual demand destruction we expect for 2020 has never happened before. Our Enverus base case now indicates a total 8.7 MMBbl/d hit to global crude demand. A longer outbreak in 2020 could drop demand by a stunning 11.4 MMBbl/d. Three to five years out, we are still not likely to have recovered to the demand levels we expected before the pandemic hit.

FIGURE 7 | Global Petroleum Supply & Demand (Base Case)



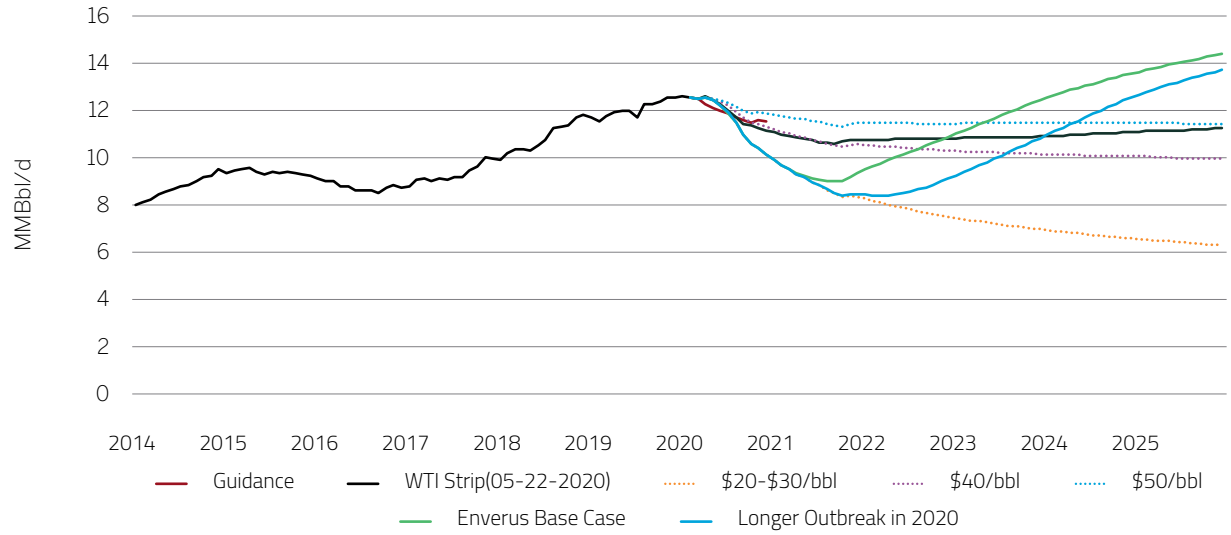
Source | Enverus

This chart (**Figure 7**) adds global supply into the picture.

What is most striking about this chart? The chart dates back to 2015 and 2016, when we had a massive oversupply and a very troubling time for the industry. These green bars indicate the supply/demand imbalance. Now compare this to what has happened in 2020 and see how drastically different the scenario is today. This has never happened anywhere at this scale.

Even more striking is this: if you do bring demand back online and economics beign to open, the supply response needed will be so drastic that the market will flip from oversupply to an undersupply on a scale that we haven't ever seen before. What does that mean? That means risk needs to be managed because volatility will be extreme.

FIGURE 8 | US Crude & Condensate Production Under Different Price Scenarios



Source | Enverus

If there is one thing Enverus is most renowned for, it's our ability to forecast production going forward in the oil, gas, and NGL markets. The chart above (**Figure 8**) shows the U.S. crude oil forecast outlook, with the Enverus base case in green. The Enverus extended case, our short-term outlook, and the dotted lines are actually outlining what different economic assumptions of the WTI forward curve would imply, all balanced around the current forward curve in the black line.

The biggest point to take home from this is that strong volatility will likely repeat itself. The OPEC+ production cuts that came in May and June, after the price war, had to be put on hold. That will not be enough to offset the near-term demand destruction we saw in Q2. They came in too late to make the difference, which is why we saw the negative price settlements and the extreme volatile prices of the April-May timeframe.

Substantial price increases will be required to send the signal to bring supply back online. This means is we are in a situation where price swings will likely rise and fall for at least the next twelve months in ways that we have not ever seen before.

PART II | MANAGING PRICE RISK & DISTRIBUTED TRADEFLOORS IN A PANDEMIC

Q&A interview led by Wendi Orlando, Vice President of Product Management at Enverus Trading & Risk

Featuring risk management technology experts:

Ben Golden, Director of North American Professional Services at Enverus Trading & Risk

Travis Nadelhoffer, Subject Matter Expert at Enverus Trading & Risk

John Kollus, North America Sales Manager at Enverus Trading & Risk

CHAPTER 5 | CAN TECHNOLOGY MANAGE INCREASED VOLATILITY & PRICE RISK?

Wendi Orlando: Let's start on the topic of price volatility and the rapid price collapse. How are trading companies ensuring that solutions and calculations are stress tested for the unknowns like the negative WTI futures price?

Travis Nadelhoffer: It's not only important to stress test for market events, but also unlikely prices or extreme price events that could end up disrupting a trade floor's risk management and end of day processes.

In a classic risk management scenario, one of the key features of stress testing a portfolio the right way is to see how unforeseen events could impact a company's profits, losses, and positions. Today, it is evident that processes need to be stress tested, too. Whether it's calculations, connectivity, or even the methodologies to actually compute, or the input price series—these need to be stress tested under certain extreme events.

The negative WTI futures are a good example. As negative prices hit for front month crude futures, companies that used that price as a component in a formula to calculate a derived curve may have run into serious issues. Or say a company is using that contract as a component, a differential, and maybe a system's methodology wasn't handling negative prices. Any of those scenarios could cause extreme problems that would likely impact profits and losses or calculations for the day. This means it's not only important to stress test market events, but extreme price events that may disrupt or take down a company's processes.

Wendi Orlando: So, to follow up, how do companies ensure that quality checks come into play with such a volatile price and intra-day moves as large as 25%? I mean, you would think that would be out of the question. And it occurred.

Ben Golden: It's a must for companies to monitor their data from a proactive perspective. Quality data is the foundation for all decisions, but companies also want to be proactively triggered for an extreme scenario. So, as risk managers are watching the market, as it's moving, technology should be leveraged, and processes in place that will notify their team members for those anomalies that, again, allow them to proactively review or monitor their data.

Wendi Orlando: Let's talk about real-time price risk. We all know that ETRM providers advertise their solutions as real-time, but in reality, ETRM solutions are clunky. The reality is they do not really work in real time. So, Travis, how does Enverus support risk managers and real-time risk calculations, especially in an environment like this, where having that information easily accessible is so important?

Travis Nadelhoffer: What makes the Enverus solution unique is its ability to calculate real-time curves based on input, data, and methodology for a component of your risk assessment. And again, the input data could be exchange related. The data could be broker data. But the ability for that data to stream in and calculate those curves based on your methodology is available today and is used by clients today. And obviously, there are some dependencies there and the ability to calculate the downstream risk from that. We have clients using that for pre- and post-trade decision making today.

CHAPTER 6 | MAINTAINING DATA INTEGRITY & FINDING A SINGLE SOURCE OF TRUTH

Wendi Orlando: So, Ben, as people are working from home around the globe, how do you maintain that single source of the truth? How can users trust the prices that they're looking at or the forward curves that they're analyzing?

Ben Golden: I'll start by saying that it can be difficult, but people innately want to trust the data they're seeing. So now, more than ever, a single source of the truth is even more critical.

That has always been, and remains to be, Enverus' approach for delivering forward curve risk management systems. It's now even more critical in today's market, with distributed teams, to have the ability to maintain a single set of prices to run quality checks and metrics the trade floor requires. Teams must have quality data all around and be able to centrally provide that to traders and analysts that are in different spots. From there, the single source of truth extends to risk analysts that are running the end of day reports, and ultimately to the back office for settlements. It's absolutely key.

Wendi Orlando: I think this is important regardless if you're working from home or you're in a normal environment. On this topic, Travis, what's an acceptable way for companies to modify their methodologies to better understand prices, have an auditable solution, while maintaining the flexibility to easily change those methodologies without rewriting code?

Travis Nadelhoffer: That's an interesting question—what kind of processes should we think about being in place when we are required to ultimately change a methodology, relatively quickly, to adapt to daily needs right now? I think this to that point, it was probably very evident with some of the extreme prices and some of the breakdown in correlations and the breakdown in the benchmarks that happened, especially in crude over the last couple of months.

Whatever your process, a reset needs to be accessible for an end user, an empowered user to make that change. And then the other part that is equally as important, if not more important, is that that change and how that change was made is documented and available for audits to look back.

In the future, some of these numbers may come up and some of these discussions may come up without the ability to prove to what has been done and what has been reverted back, right? So, if you're changing your processes as part of these kind of extremes, the key must be that users are empowered to do that and there are correct controls and audits collected, documenting what they've done.

Wendi Orlando: Thanks. And speaking of trusting pricing data, we understand the importance of giving customers access to the most trustworthy market data, particularly in times of high risk and uncertainty. We helped our customers stay connected to the market by giving access to S&P Global Platts oil price data for their forward curves. Can you discuss that partnership and how clients have been able to utilize some of the tools that Enverus is providing for them?

Ben Golden: People need access to quality data, but also the analytical tools to be able to view that pricing differently to a certain extent, especially if they have a hedging strategy in place. But to me, their companies and their jobs are dependent on access to this data. The other part of it is: how can this feed into their curve calculations?

Everything depends on access to market data. That is why we teamed up with Platts to offer clients free access to their data via our MarketView Desktop to help them get through this time. But let's not forget the masses of proprietary data analysts are examining on a daily basis. Maybe it's their internal trader marks or taking in broker sheets or broker quotes. Those are all services that we offer to our clients. We can scrape that data and help you with your curve calculations to speed up processes and visibility.

Wendi Orlando: Great points. And to follow up on that—with most brokers and exchanges holding the data close to their chests and not distributing it through any system, how does Enverus feed that data into traders' system?

Ben Golden: How we operate is that we treat those datasets as the client's proprietary data. They have the relationship with the broker. Again, I'll use the previous scenario. Just like their proprietary marks, we automatically load that data from their proprietary data feed–it's specific to them. We have security and policies in place that permission that data specifically for them. It is not redistributing data by any means. It's just making that data available in a single system for that end user.

Travis Nadelhoffer: One of our goals is to help with transparency, right? Can we act as an advocate on behalf of our clients to provide a single source of the data? That is one of the ways that we can help to loosen some of the challenges in this market. As you know, the data is held close to certain vendors. But, as you know, there is power in numbers and also working with regulators to make this method more and more available to you on the risk side, where risk analysts do calculations.

CHAPTER 7 | CONCLUSIONS & KEY TAKEAWAYS

By John Kollus, North America Sales Manager at Enverus Trading & Risk

Throughout the ongoing COVID-19 pandemic, the Enverus team has interacted with trading and risk business units within several companies in a whole new way. We have witnessed a few key trends related to risk management emerging throughout these last few months.

When COVID-19 first hit North America, companies started to transition their desks in trading operations to remote environments. Today, companies all agree that some sort of hybrid work from home and office environment is here to stay. However, here are the impacts of that decision:

- IT resources are stretched thin at every firm. IT is forced to reprioritize projects and even put some things on hold. It has definitely been tough in that regard.
- Many companies have complex—and sometimes antiquated—curves and dataflow processes that are mainly derived from Excel and managed out of Excel. That leaves huge exposure for trade floors and causes issues.
- Most shops have only one or two key people that know the ins and outs of that process, which is a big risk. Data lineage issues could completely throw off an entire system if a formula or data point is off in any way. It's also really tough to manage, automate, and monitor an Excel-based process remotely.
- As companies have struggled with Excel-based risk management solutions, we've had a lot of companies approach us. That is because our CurveBuilder and data management solution is so easy to set up and use.
- Companies really want that out-of-the-box, easily customizable technology that that can help them simplify their curves process without significant internal IT support or maintenance. They also want to partner with an expert team that can handle most of the integration and management—avoiding additional workload for internal IT—to make it as painless as possible, especially as Enverus is integrating solutions with a company's EMS and other systems in the back office.
- Risk managers want their curve data to flow seamlessly from the mid and back office all the way through to the front office trading applications, like MarketView.

BOTTOM LINE: Enverus customers want to be able to manage massive amounts of data, seamlessly monitor it, audit it, and easily visualize it. In the end, it's all about having that single source of truth.