drillinginfo
better, faster decisions

SPEED UP DAILY FORWARD CURVE MANAGEMENT WITH DRILLINGINFO COMMODITY DATA SOLUTIONS

Cut hours off the daily curve-creation process using CurveBuilder from MarketView with real-time capabilities.

Use Case

In this study, we follow a risk analyst at a Houston-based integrated global oil company. The risk analyst needs to submit more than a thousand different calculated forward curves to the company's CTRM every night by 9:00 Central time. To do this, she watches a custom-built Excel spreadsheet that is comprised of five thousand plus lines of VBA. She is often at her desk until 7:00 p.m. and still checks her desktop remotely until 9:00 p.m. On average, once a month she will stay at the office until 11:00 p.m. working with her team members in Singapore to resolve any data issues. When this happens, the company misses the risk run for the day. This risk analyst would like to leave the office by 5:00 p.m. with the assurance that the curve process will continue to run.

The Challenge

The creation of forward curves enables companies and traders to deal with the lack of repressive curves traded on exchanges. Many companies' forward curve management strategy begins with an internal custom process often in Excel, because of time constraints and the early simplicity. The calculations start off very simple but over time the complexity grows, as does the cost of supporting the process, the time it takes to run the curves, and often costly errors are made. Common issues include not catching a holiday, delay in vendor data, errors in input data, a computer restart, and broken VBA in Excel. The time it takes to run and re-run a curve process requires employees to work well into the evening and might cause the company to miss the end-of-day process cut off.

Delays in the curve process leave companies at a disadvantage when compared to companies that process their curves in real-time. As the commodity markets trade 6 days a week, 24 hours a day, combined with high volatility, it's paramount that companies have a clear view of their risk throughout the day.

The Solution

There are software providers who offer tools that help with curve management, but it is important to collaborate with one that can produce the daily curves in a timely manner. Real-time calculation of curves allows companies to see their risk and profit earlier in the day, thus allowing them to make informed decisions faster. This real-time visibility empowers companies to scale up or down portions and Value at Risk (VaR). Drillinginfo's Curves-as-a-Service (CaaS), which is powered by the MarketView CurveBuilder, and accessed using the MarketView® Desktop™, enables real-time calculations that expedite the curve calculations giving companies transparency into risk earlier each day.

With Drillinginfo's CaaS, the risk analyst follows a simple workflow to automate the real-time curve process. Using the MarketView CurveBuilder software and global curve implementation team, the new process for curve is set up in hours. Our implementation team is the largest team, with the most experience, and longest list of clients.

CaaS Workflow Example

To demonstrate how easily CaaS solves our risk analyst's problems, let's go on the journey of creating a Fuel Oil 1% USAC (U.S. Atlantic Coast) crack forward curve.

A crack is a product differential between a product (here Fuel Oil 1% USAC) and the underlying crude (here WTI). WTI future data are published by CME whereas forward contract data for Fuel Oil 1% USAC are published by Platts, for example. It may seem like we can build a simple curve by subtracting the difference between the WTI and Fuel Oil curves, however checking market data sources for the two products reveals different granularity of the raw price data, as well as different expiry periods of the contracts.

Adjust Both Curves to Show Monthly Prices with Month-end Expiration

How can things be aligned to create a crack forward curve on monthly granularity where contracts are expected to expire at the end of the month?

1. WTI contracts are monthly, but they expire mid-month and we need them to price a month-end expiration.
2. Fuel Oil swaps expire at the end of the month, but contracts are quoted in quarters, which need to be split into monthly prices.

Figure 1 is a schematic summary of the steps to be taken to align the WTI and Fuel Oil curves and enable calculation of the crack curve.

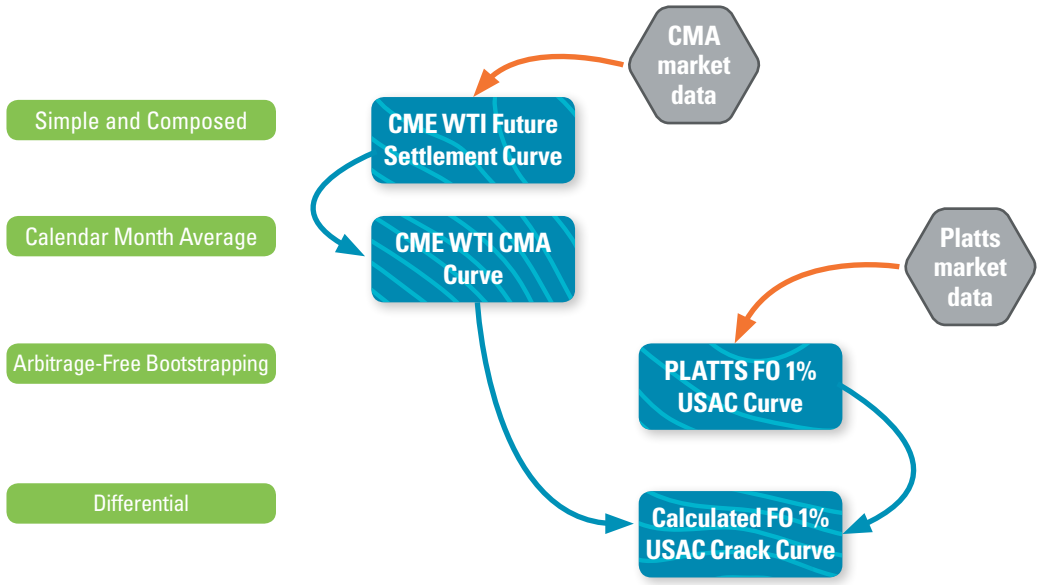

Figure 1 – Schematic alignment summary

Figure 2 shows the new curve defined in MarketView CurveBuilder. The user has the ability select the correct holiday calendar, units of measure, and target system to name a few of the attributes that can be configured via a drop down menu. With this tool, the user does not have to maintain custom calendars in Excel that increase the likelihood of costly errors over time. Users uniformly inspect and edit the meta data of each curve. This allows new employees to swiftly come up to speed and mitigates key employee risk.

SPECIFICATION	
Commodity	Oil Product Differential
General name	Fuel Oil 1% USAC Crack vs WTI
INPUT SOURCE	
Input Currency	USD
Input Unit	BBL
Input Data Source	WTI: CME and FO 1% USAC: PLATTS
Input Data Product	WTI: CME and FO 1% USAC: PLATTS
Input Data Update	EOD
Input Data Price Side	Mid
Input data exceptions	No, all provided contracts
Input Data Contracts	Pre-calculated monthly curves
Holidays	US Holiday
Expiry	End of Months as swaps
CURVE OUTPUT	
Curve generation purpose	EOD curves serve for EOD process
Target System	ETRM system
Output Currency	USD
Output Unit	BBL
Curve generation frequency	Automized EOD
Curve generation triggering event	
Curve Tenor Granularity	Monthly
Expected no of tenors	37
First tenor	M00
Last tenor	M36
METHODS	
Currency Conversion	Not needed
Unit Conversion	Not needed
Handling Gaps	If there are any gaps (missing monthly contracts etc.), fill the gap by forward fill from previous month
Extrapolation	37 curve tenors are expected as a minimum. If less data are published use the forward fill method to create the outstanding.
Special Daylight Saving Treatment	No
Digits and Rounding	Rounding up to 2 digits
Curve building logic	On a per forward curve tenor basis substract WTI CMA from FO1% USAC.
Curve logic exception	Only subtract if both sides (legs) are available.

Figure 2 – MarketView CurveBuilder definitions

In figure 3, you see the output using the MarketView CurveBuilder. Within this view a user sees the curve shape and how each data point on the curve is calculated. The ability to see how each point is calculated saves hours when trying to understand the shaping of the curve.

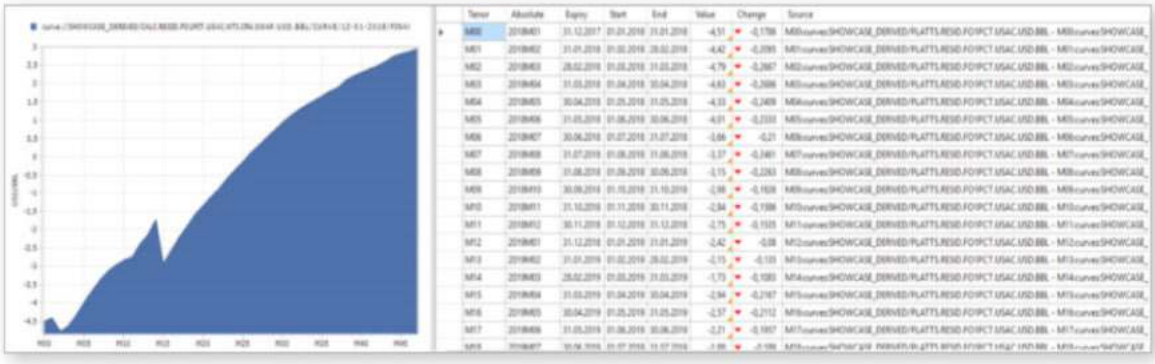

Figure 3 – CurveBuilder output

Next let's look at an interactive relationship diagram for a curve. In Figure 4, it shows a view in which a user can trace back to the input data and understand exactly how a curve is being built. The relationship diagram allows the user to understand, with transparency, the data dependencies throughout thousands of curves. This provides the user clarity that if a particular gas data point is late from a broker, additional curves will also be late that day. Without this tool a user might have late curves and spend hours or days trying to understand the reason.

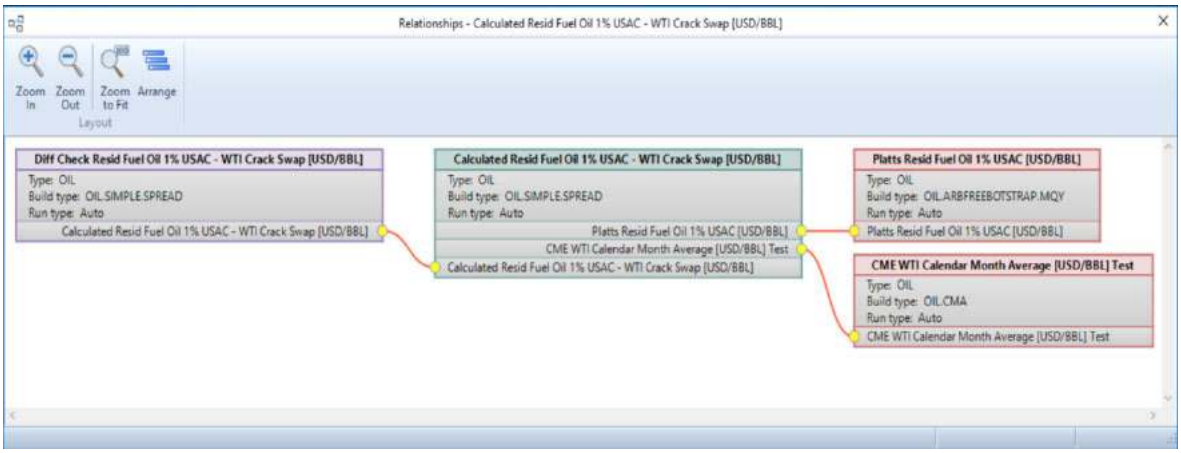

Figure 4 – Interactive relationship diagram

The end result is the curve output of MarketView® Desktop™, shown in Figure 5. This software tool allows front-office users to see the many curves that were created for their firm. The MarketView® Desktop™ presents the single source of truth to front, middle, and back-office personnel. This single source of truth cuts down on the back and forth data questions and assures that your organization makes decisions off the same data points.

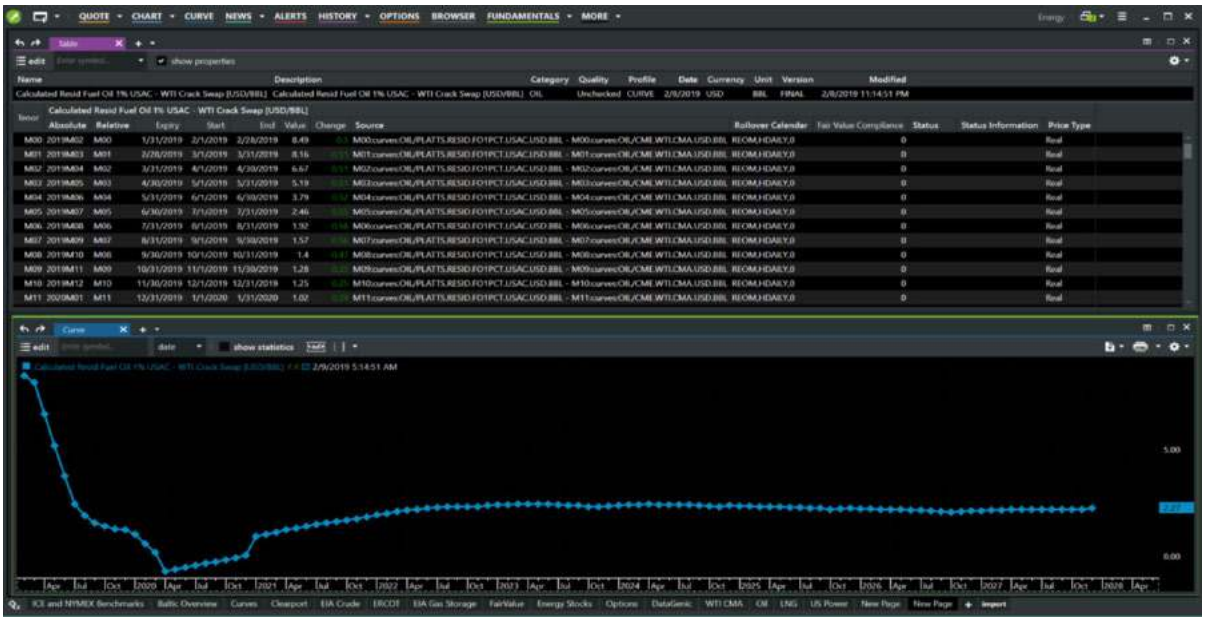

Figure 5 – Curve output shown on MarketView® Desktop™

Results

This is a sample curve that was automated using the MarketView CurveBuilder by Drillinginfo. After all of the one thousand plus curves were automated, the risk analyst saw an average daily time savings of more than one hour on the curve process, and a reduction of the late nights in the office. Drillinginfo's Curve-as-a-Service had a positive impact on her company and her work-life balance.

DI offers a fully managed CaaS that automates the collection of input data, includes clients business logic, runs the curve calculations, and distributes the curves to the desired target system in real-time including a transparent audit trail and detailed quality checks.