



RystadEnergy

Deriving refinery margin signals for profitable decision-making in oil trading with AVEVA Unified Supply Chain: Plan AVEVA World Paris

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Oil Trading Solution

October 2024

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- I Who is Rystad Energy?
- II What is Oil Trading Solution?
- III What was the challenge to be addressed?
- IV How did we resolve the challenge?
- V Results and observations
- VI Applications



Global presence



EMEA

- Aberdeen
- Brussels
- Cape Town
- Copenhagen
- Dubai
- London
- Madrid
- Oslo
- Paris
- Stavanger

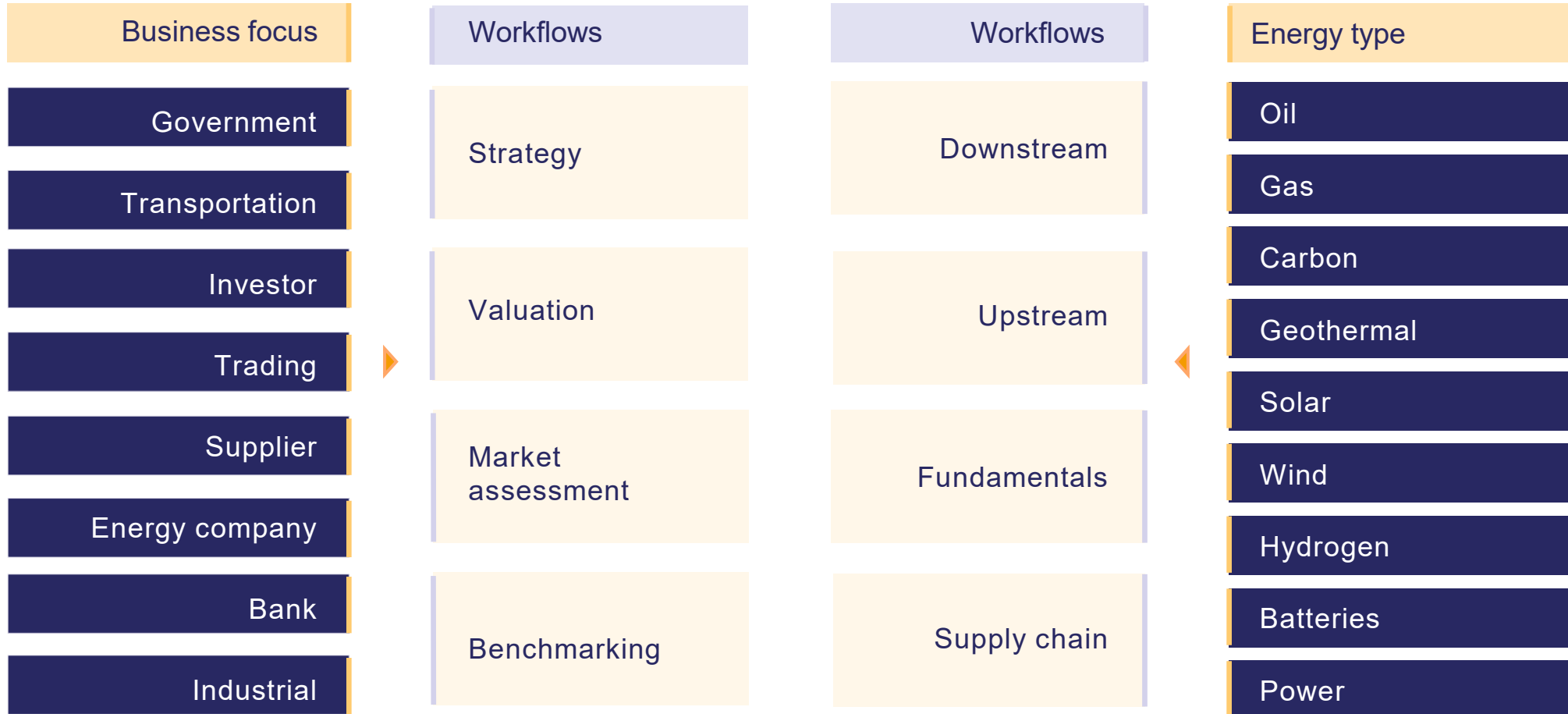
Americas

- Bogota
- Buenos Aires
- Calgary
- Houston
- Los Angeles
- Mexico City
- New York
- Rio de Janeiro
- Sao Paulo
- Washington DC

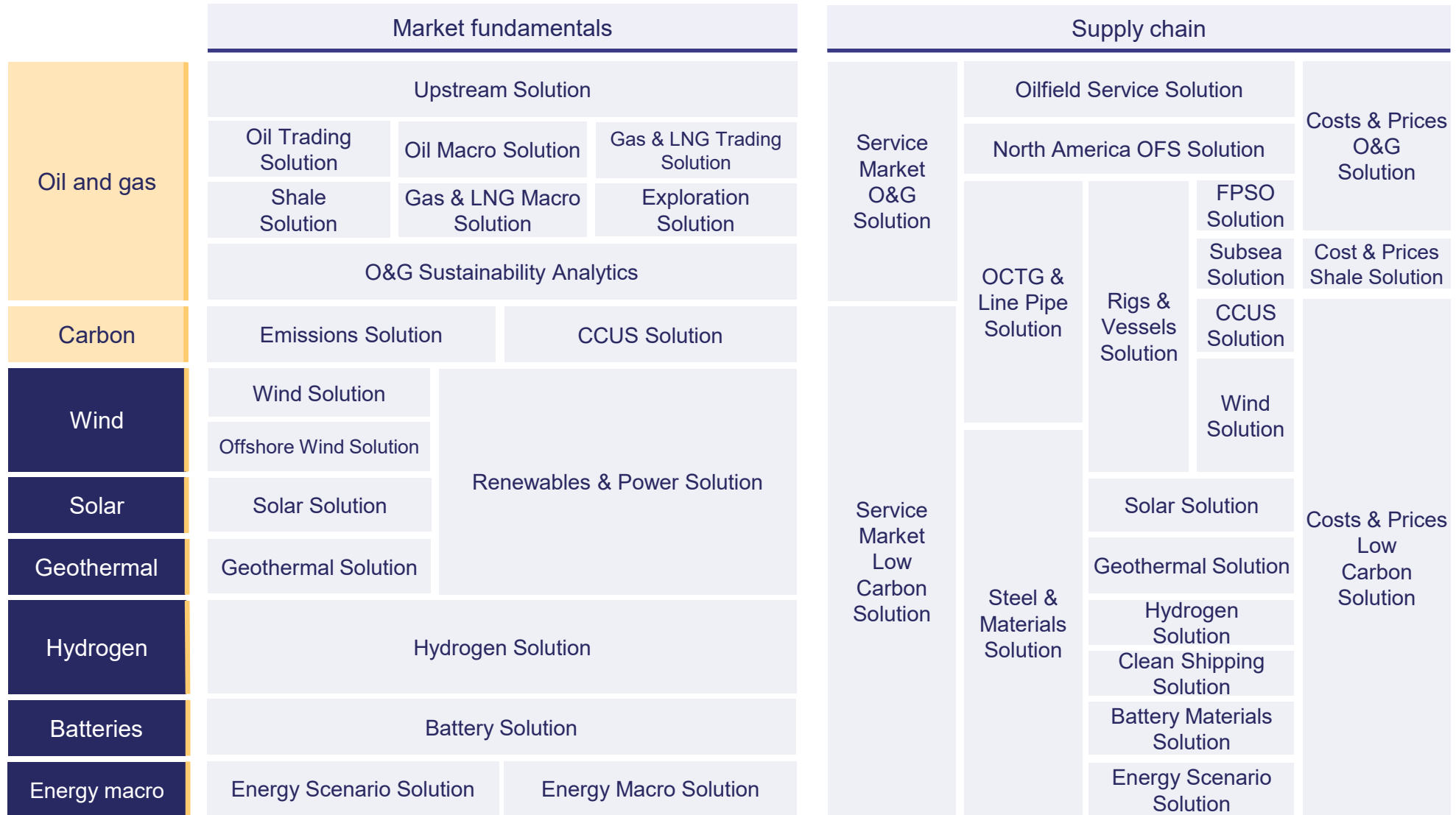
APAC

- Bangalore
- Bangkok
- Beijing
- Jakarta
- Kuala Lumpur
- Perth
- Seoul
- Shanghai
- Singapore
- Sydney
- Tokyo

Tailoring our delivery to your needs



Spanning the entire energy map



Customized delivery methods

Data 	Cube browser Our proprietary databases enable you to obtain detailed and comprehensive insights.	Dashboards Access data easily through user-friendly interfaces designed for your workflows.	Datafeed Datafeed through FTP, OData or Snowflake for use in standard or custom build analysis tools.
Models 	Modelling Enhance your decision-making process with our transparent and editable Excel models.		
Analytics 	Reports Comprehensive and up-to-date reports on the world of energy.	Commentaries Get expert analysis on the energy sector events and market trends.	Alerts Receive timely alerts about market movements through our updates.
Advisory 	Tailor-made advisory Customized advisory services by energy specialists and consultants.		
Education 	Training work processes Organizations and professionals need unique tailor-made and open-enrolment industry and product training courses to navigate the energy transition better.		

Oil	Gas	Carbon	Geothermal	Solar	Wind	Hydrogen	Batteries	Power
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Oil Trading Solution Overview

What is it?

- **All-in-one oil short-term analysis:** Comprehensive oil trading insights, supply-demand data, and trading strategies.
- **Detailed market data:** In-depth information on the oil value chain for global market analysis.
- **Expert-crafted:** Combines industry expertise with user intelligence for strategic trading.

What can I achieve?

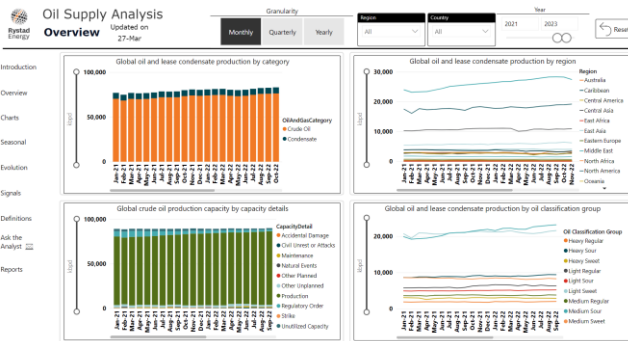
- **High data granularity and high update frequency** as input to client data systems to enable building of independent views.
- **Global market analysis:** Assess worldwide shifts in oil supply, demand, refining, and marketing.
- **Enhanced trading signals:** Provide precise signals and valuable trade ideas.
- **Informed perspectives:** Incorporate detailed, consistent data for unique internal analysis.

Who is it for?

- Clients active in short-term oil market analysis.
- Traders looking to build trade strategies.
- Trading analysts looking to build own data systems and analysis.

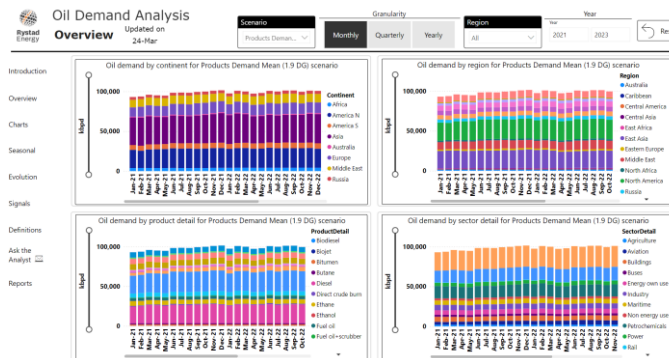
Oil Supply

Global Oil Production: Supply, Outages, Quality, Revisions, Seasonality.



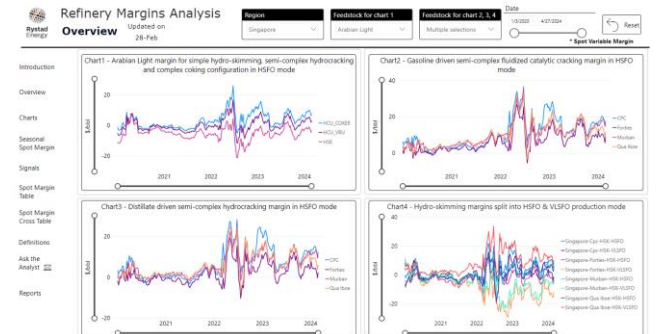
Oil Products Demand

Global liquids demand data by product and sector.



Refinery

Monthly refinery data by country up to 2030, including scenarios and key metrics.



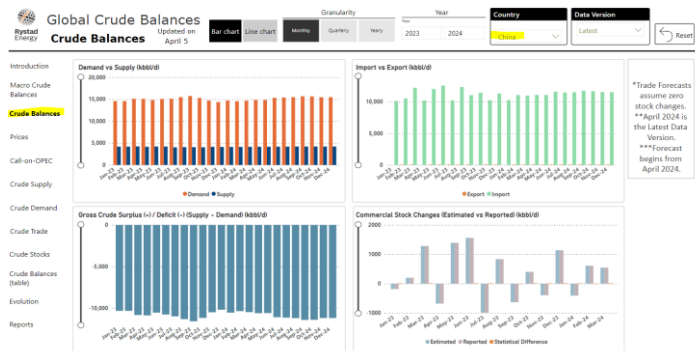
Crude & Product Trade flows

Key oil trade data, covering supply, qualities, flows, and major country import/export details.



Oil Balances

Crude and Product balances data



Access to Alerts/commentaries/reports

Weekly signals: Oil demand dampening, OPEC+ in no rush to unwind cuts

9 April 2024 / by Oil Trading Analysts

Oil demand from month futures are touching 50% per barrel on 3 April, a price increase supported by reduced US crude and gasoline inventories, higher refinery utilization rates and a stronger than...

[PDF](#)

Widening European 95R/91R mogas spread provides floor to Asian naphtha crack

8 March 2024 / by Oil Trading Analysts

Across the three major regions, the US, Europe and Asia, naphtha cracks have all strengthened since early November, which resembles a pattern from early 2023. The US has been leading the price rally and now faces a naphtha crack below zero, while...

[PDF](#)

Turkey's halt of Russian diesel transits to Europe unlikely to have an impact

9 April 2024 / by Oil Trading Analysts

Since the 2022 market shock, caused by the Russia-Ukraine conflict, Turkey has increased its imports of Russian oil products and increased its exports of oil products to Europe. Recently, Global Terminals...

[PDF](#)

Lower supply, stronger demand provide support to Asian gasoline cracks

1 February 2024 / by Oil Trading Analysts

An earlier than expected gasoline cracks rally has surprised the market. Rystad Energy analysis suggests lower supply is the main reason behind the move, both from within Asia and the Middle East. Mexico, strong regional demand may support...

[PDF](#)

Alert: Indian refinery runs set to hit 5.8 million bpd on product export growth

28 March 2024 / by Oil Trading Analysts

India's refining runs are poised to reach 5.8 million barrels per day (bpd) in May this year as demand for products and exports surge, positioning the country as a significant player in global markets.

[PDF](#)

Has Covid-19 pandemic caused oil demand to decouple from GDP?

22 November 2022 / by Oil Trading Analysts

The Covid-19 pandemic, which unfolded from early 2020, temporarily upended travel dynamics by fast-forwarding trends such as remote working that may have transpired in any case in the near future, as Rystad Energy highlighted in a previous note...

[PDF](#)

Refinery Margin Analysis

Actively tracking and analyzing refinery margins for informed decisions

Market challenge:

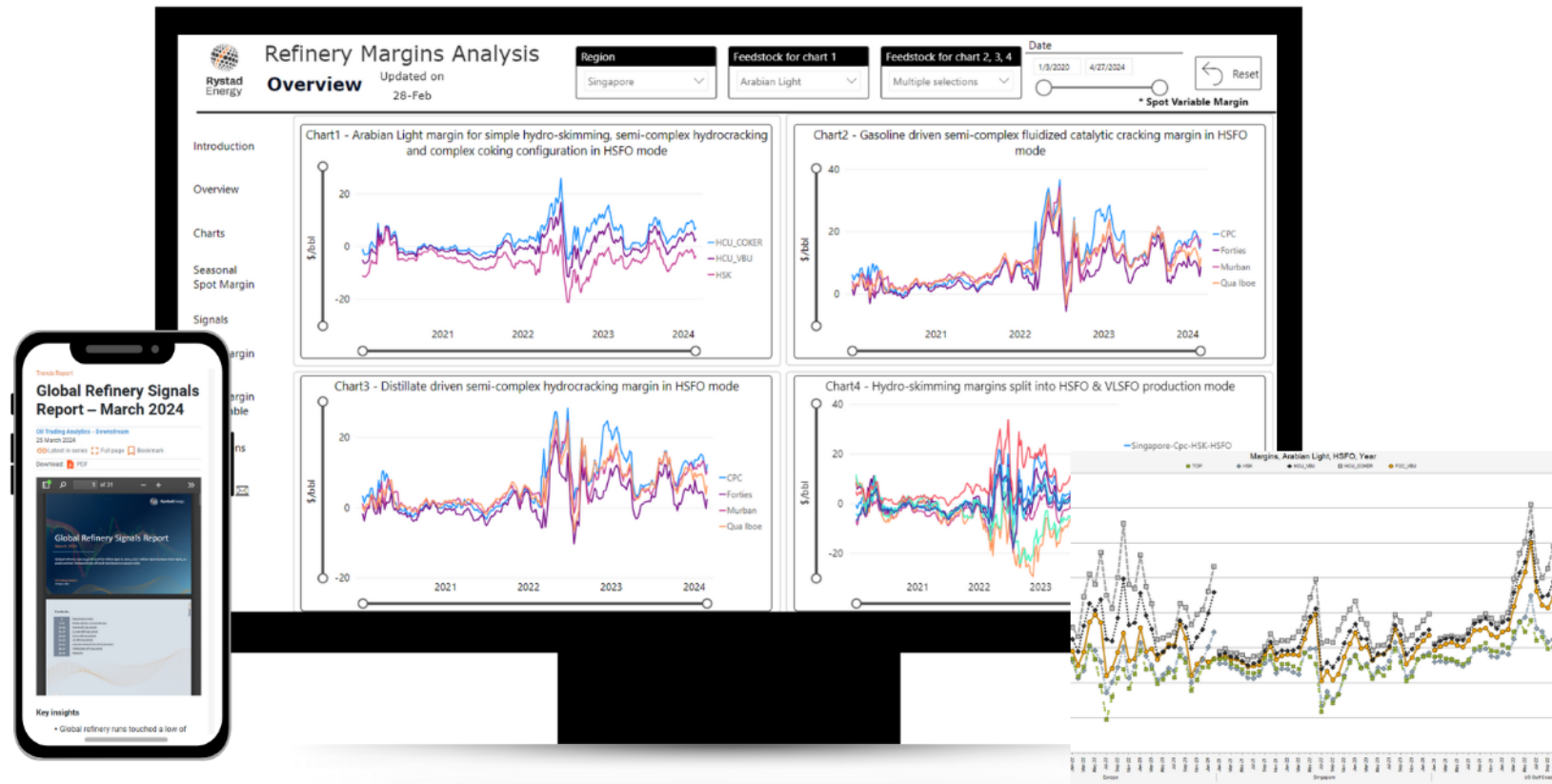
- Refiners face challenges managing yields across diverse crude types and refinery complexities.
- Difficulty in predicting crude demand and price movements affects profitability.
- Lack of targeted insights for refining assets and trade flow adjustments.

Our solution:

- Market-leading linear programming software analyzing extensive refinery yields.
- Utilizes nine unique refinery configurations for comprehensive classification.
- Rystad Energy's expert methodology aligns crude buying workflow with refinery operations.

Benefit:

- Boosts refinery profitability by aligning with crude demand.
- Enhances decision-making with price movement insights and intrinsic value analysis.
- Predicts diet evolution and trade flow changes, optimizing asset performance.



Global database of 125+ countries, 1,000+ refineries, 30+ unit types, 2,500+ refinery margin indicators



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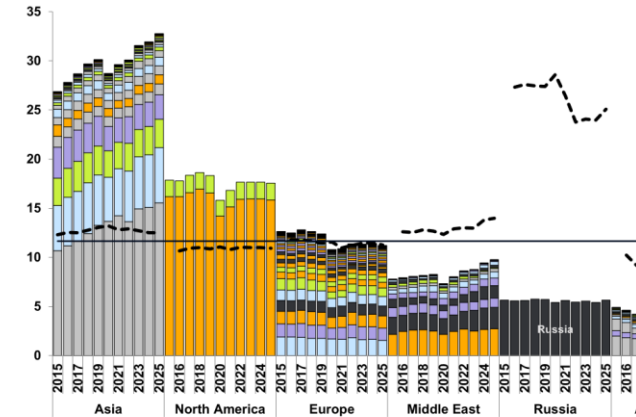
Challenge and solution



Increased volatility and shifting flows show the need for high-frequency data updates

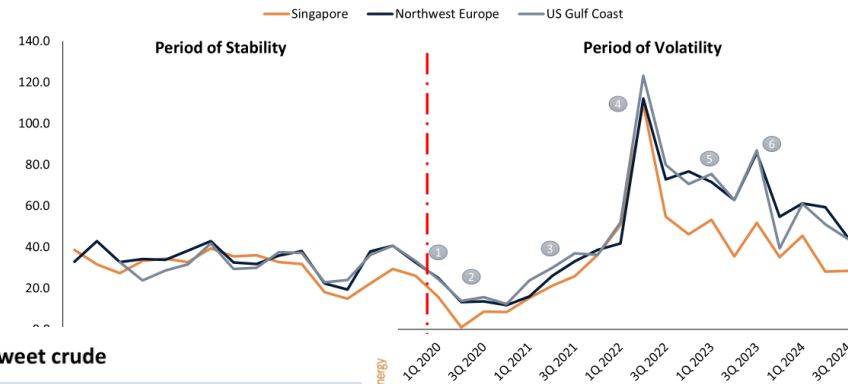
Refineries challenge – China & OPEC+ emerging Product Exporters club

Refinery crude processing rate
Million barrels per day (bpd)



Run rate/Products demand ratio

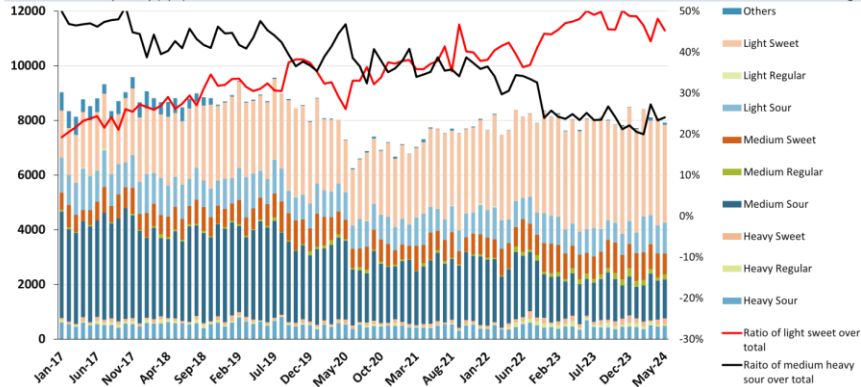
Global spot 3-2-1 crack spreads and significant events, 2016 to 2024
US dollar per barrel



51 Source: Rystad Energy research and analysis, Oil Trading Solution; RefineryCube

Europe importing much higher proportion of light sweet crude

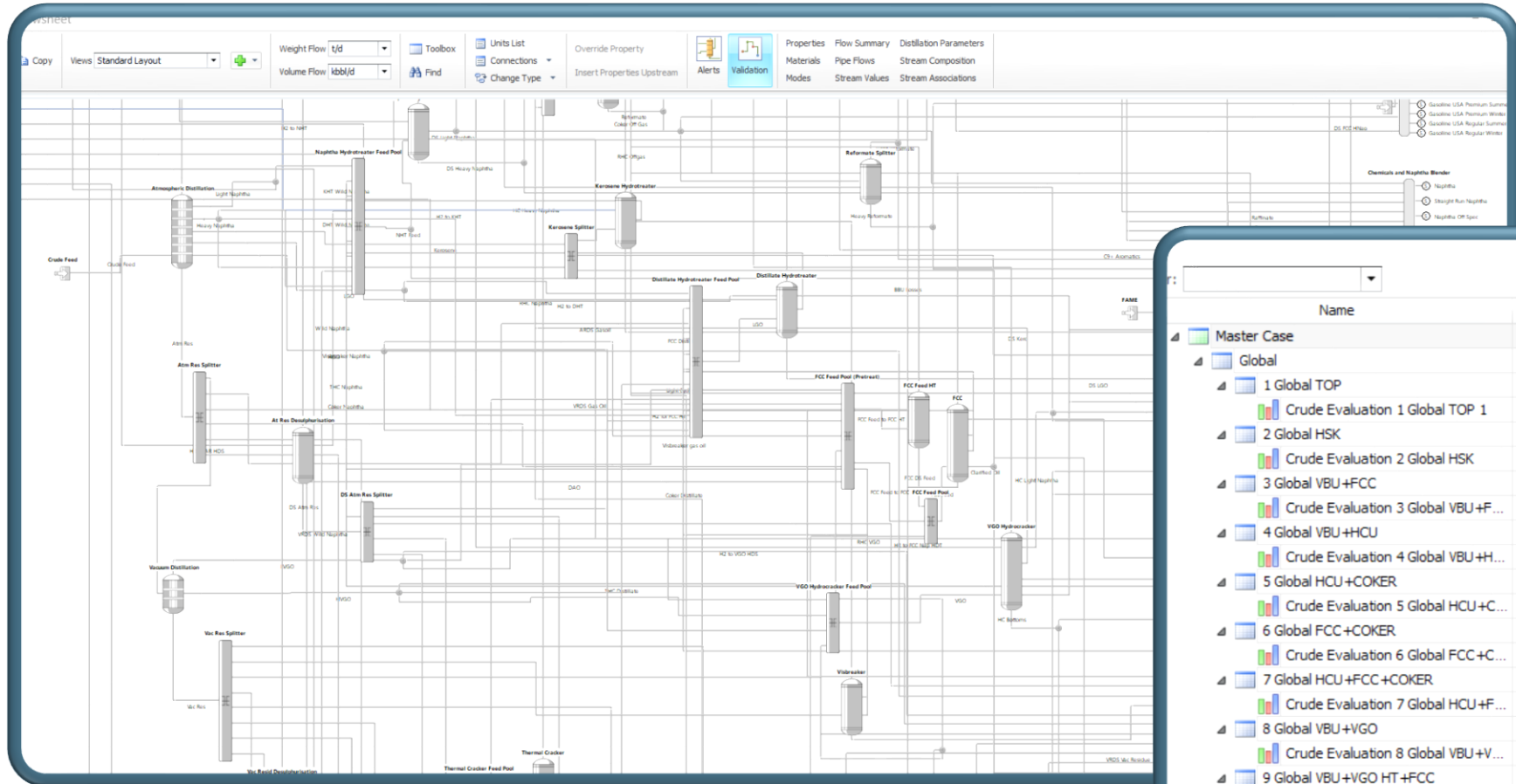
Europe crude oil imports by grade
Thousand barrels per day (bpd)



53 Source: Rystad Energy research and analysis, Oil Trading Solution; CrudeCube; Vortexa

- High volatility in the oil market has increased the requirement to update yield profiles to reflect current market conditions.
- Rebalancing of flows due to embargoes and unrest requires crudes to be assessed in new markets.
- Increasing influence of China and the Middle East on the oil market called for more understanding of their refining businesses.
- Rystad Energy's database of crude yield profiles for different refinery configurations remained static due to lack of software support.

In September 2023, Rystad Energy acquired licenses to AVEVA Unified Supplied Chain: Plan and Assay Solutions to improve refinery yield modelling

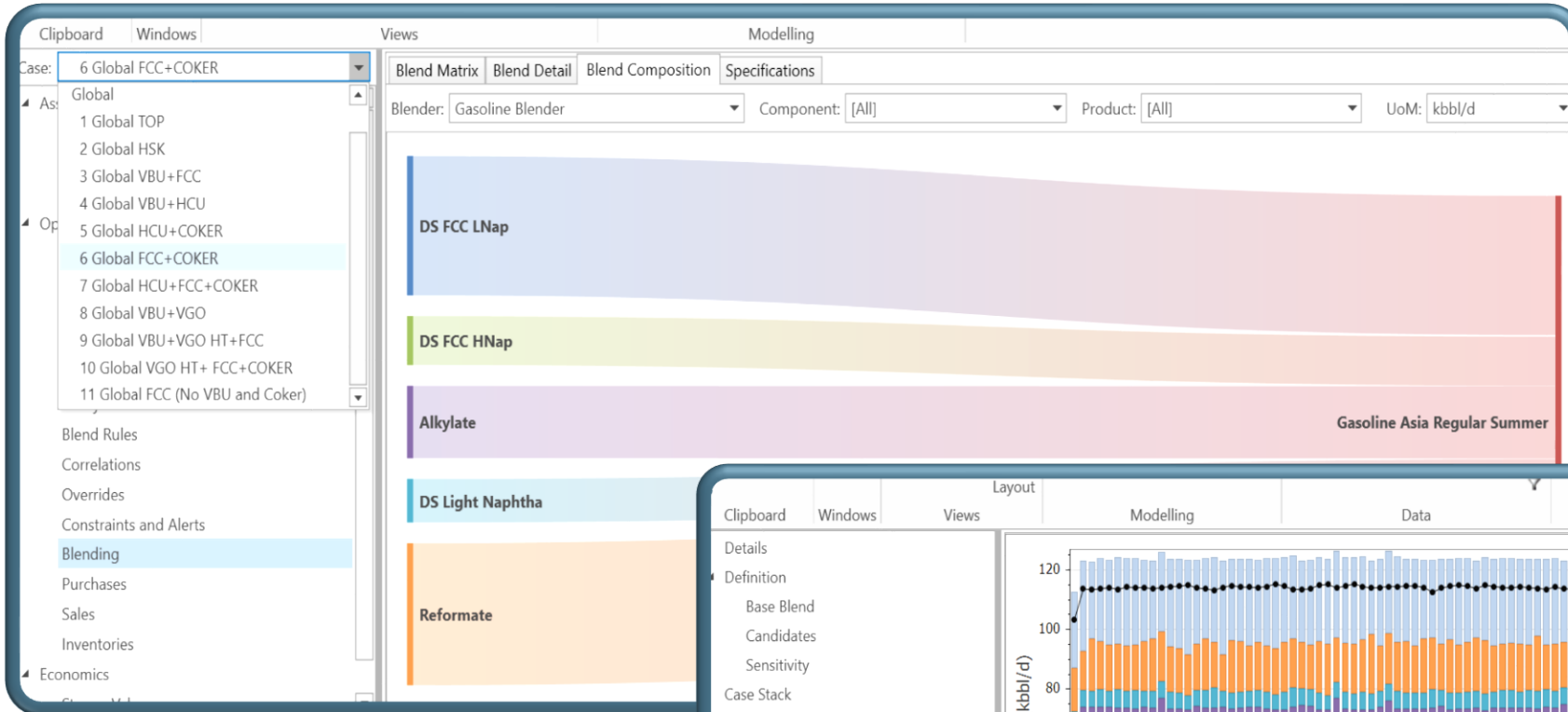


New models were built from scratch due to lack of support from previous provider.

Europe_Summer_VLSFOV1

Name	Description	Last Modified	Last
Master Case		2/16/2024 10:02...	Uthra SS (
Global		2/14/2024 7:09 PM	Uthra SS (
1 Global TOP		2/16/2024 10:12...	Uthra SS (
Crude Evaluation 1 Global TOP 1		2/14/2024 7:49 PM	Uthra SS (
2 Global HSK		2/16/2024 10:12...	Uthra SS (
Crude Evaluation 2 Global HSK		2/14/2024 7:49 PM	Uthra SS (
3 Global VBU+FCC		2/16/2024 8:54 ...	Uthra SS (
Crude Evaluation 3 Global VBU+F...		2/16/2024 9:21 ...	Uthra SS (
4 Global VBU+HCU		2/16/2024 8:54 ...	Uthra SS (
Crude Evaluation 4 Global VBU+H...		2/14/2024 7:50 PM	Uthra SS (
5 Global HCU+COKER		2/14/2024 7:06 PM	Uthra SS (
Crude Evaluation 5 Global HCU+C...		2/14/2024 7:51 PM	Uthra SS (
6 Global FCC+COKER		2/14/2024 7:06 PM	Uthra SS (
Crude Evaluation 6 Global FCC+C...		2/14/2024 7:51 PM	Uthra SS (
7 Global HCU+FCC+COKER		2/14/2024 7:06 PM	Uthra SS (
Crude Evaluation 7 Global HCU+F...		2/14/2024 7:44 PM	Uthra SS (
8 Global VBU+VGO		2/14/2024 7:06 PM	Uthra SS (
Crude Evaluation 8 Global VBU+V...		2/14/2024 7:47 PM	Uthra SS (
9 Global VBU+VGO HT+FCC		2/16/2024 8:53 ...	Uthra SS (
Crude Evaluation 9 Global VBU+V...		2/14/2024 7:48 PM	Uthra SS (
10 Global VGO HT + FCC+COKER		2/14/2024 7:06 PM	Uthra SS (
Crude Evaluation 10 Global VGO ...		2/14/2024 7:52 PM	Uthra SS (
11 Global FCC (No VBU and Coker)		2/16/2024 10:04...	Uthra SS (
Crude Evaluation 11 Global FCC (...)		2/14/2024 7:52 PM	Uthra SS (

11 Refinery configurations x 2 modes of operation x 3 trading regions

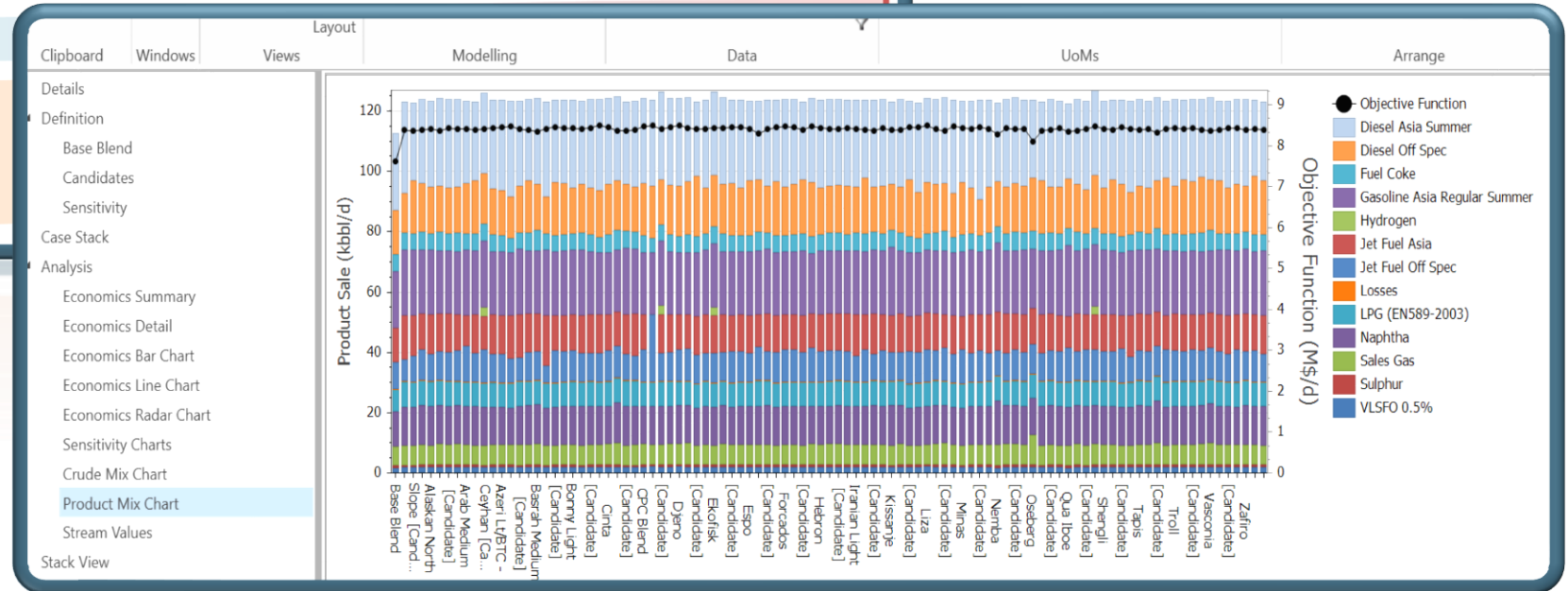


2 modes of operation

- High-sulfur fuel oil
- Very low sulfur fuel oil

3 trading regions

- Singapore
- Northwest Europe
- US Gulf Coast



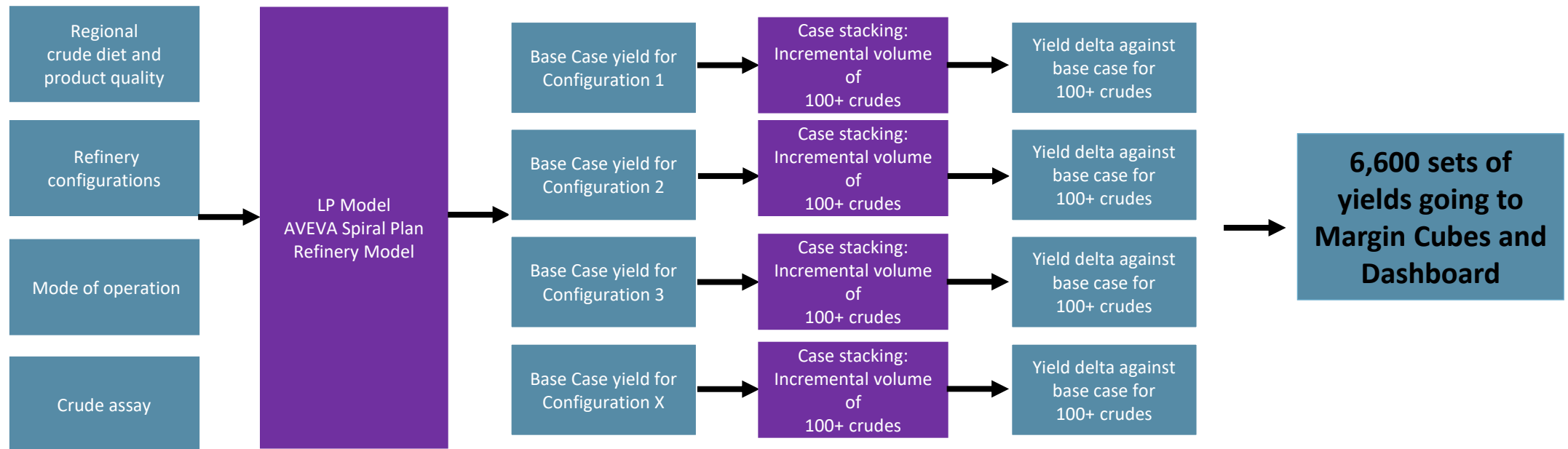
Generate yield profiles for 100+ crude grades with AVEVA's Crude Evaluation feature

Major update

- ✓ Cut points are adjusted to reflect actual yield
- ✓ Outdated assays are updated
- ✓ Basic data update using Aveva's generic model

Result

- ✓ Base yield matches with JODI (benchmark for regional yields)
- ✓ Netback values match more closely with Argus data
- ✓ Margin matches more closely with other sources such as IEA, Bloomberg, Refinitiv





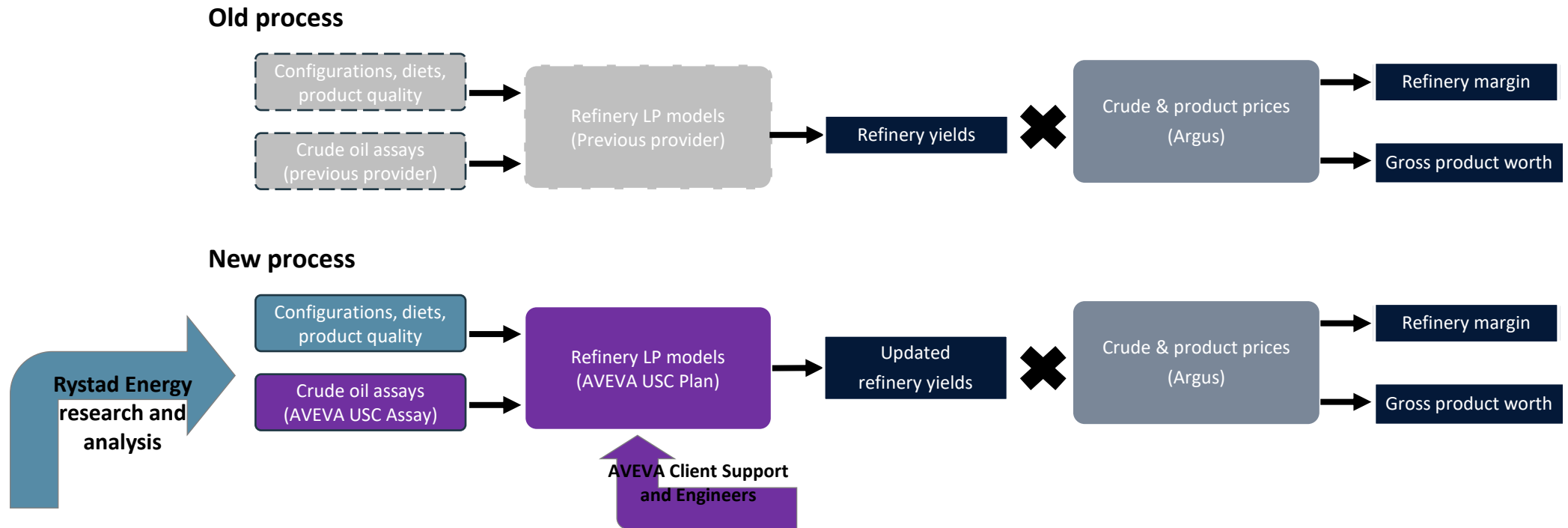
RystadEnergy

Results and observations



Collaborative work between Rystad Energy and AVEVA is key to success

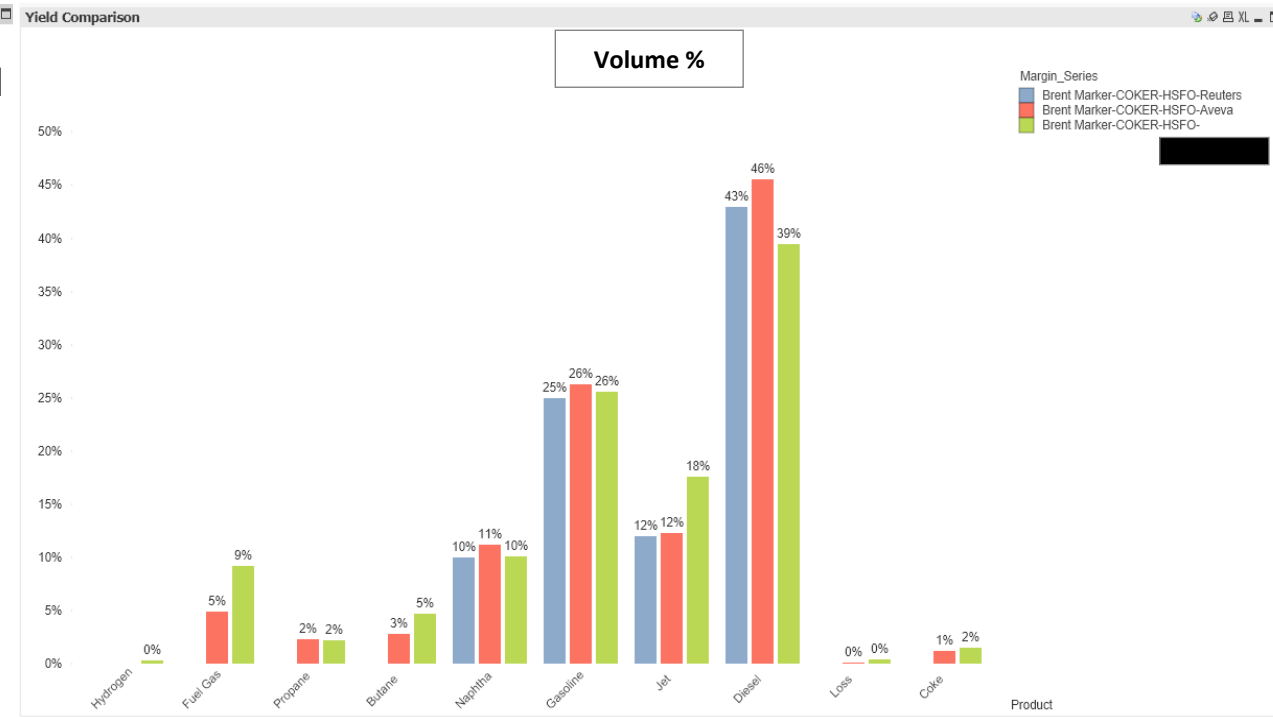
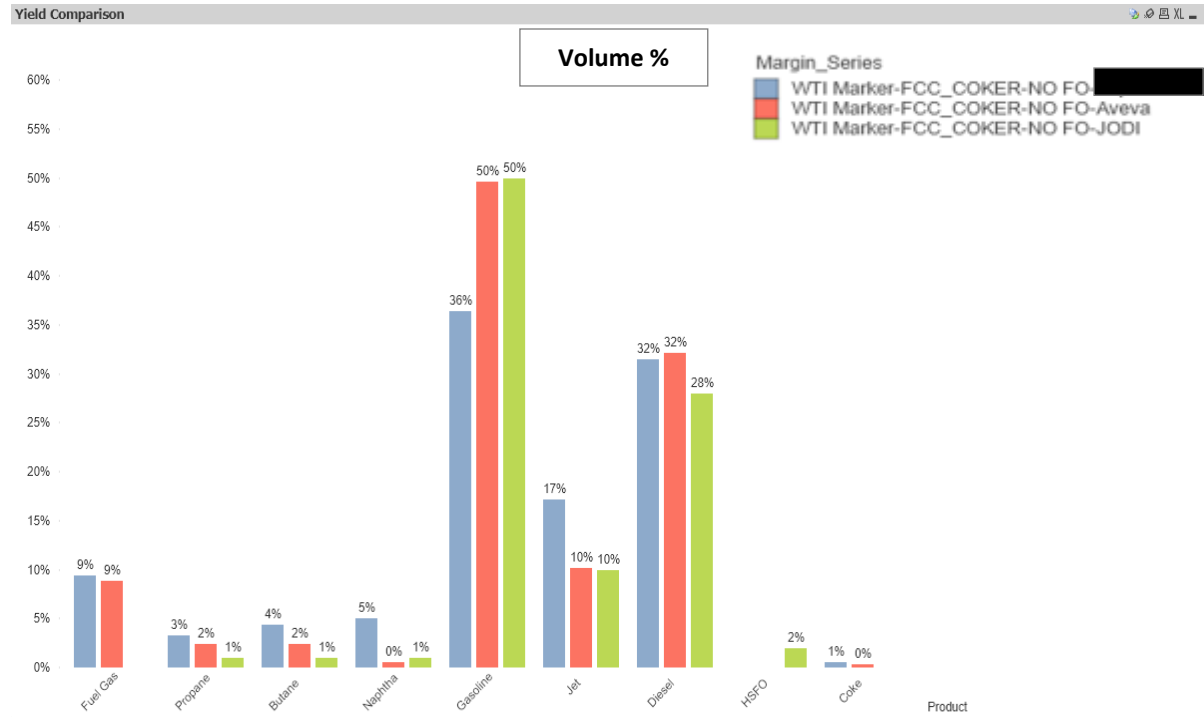
- ✓ Improved margin estimates
- ✓ Built capability for new crude evaluation, update assay, build country-wide/key refinery models
- ✓ Able to support advisory team in crude valuation



LP – Linear Programming; USC – Unified Supply Chain

Base case yield comparison for complex configuration

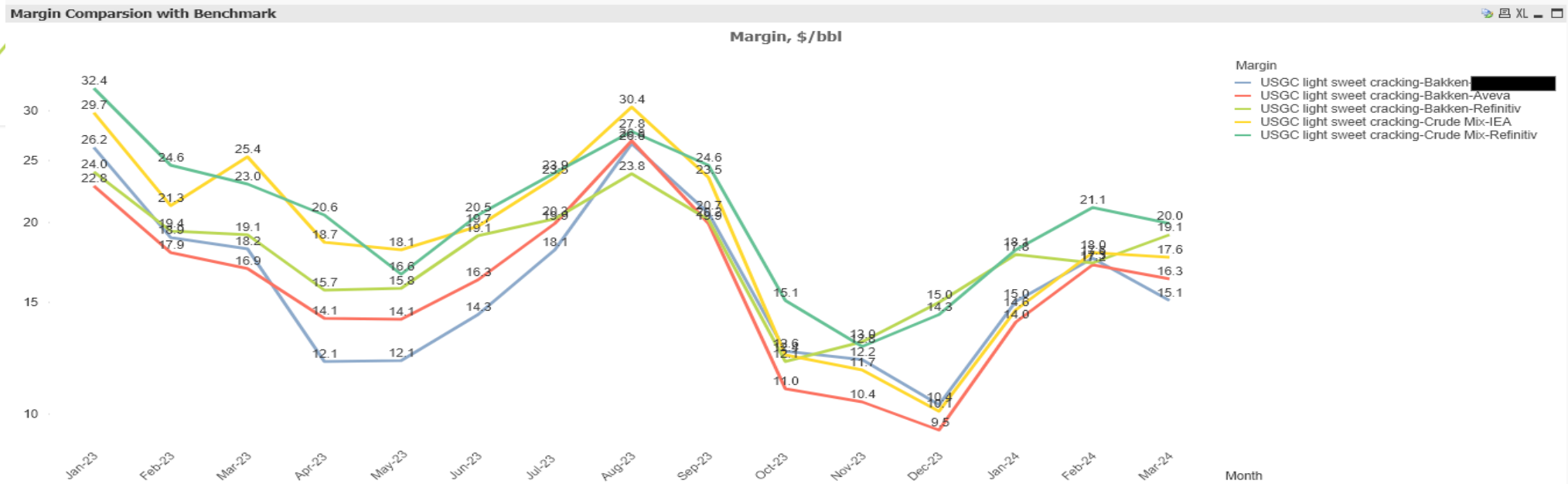
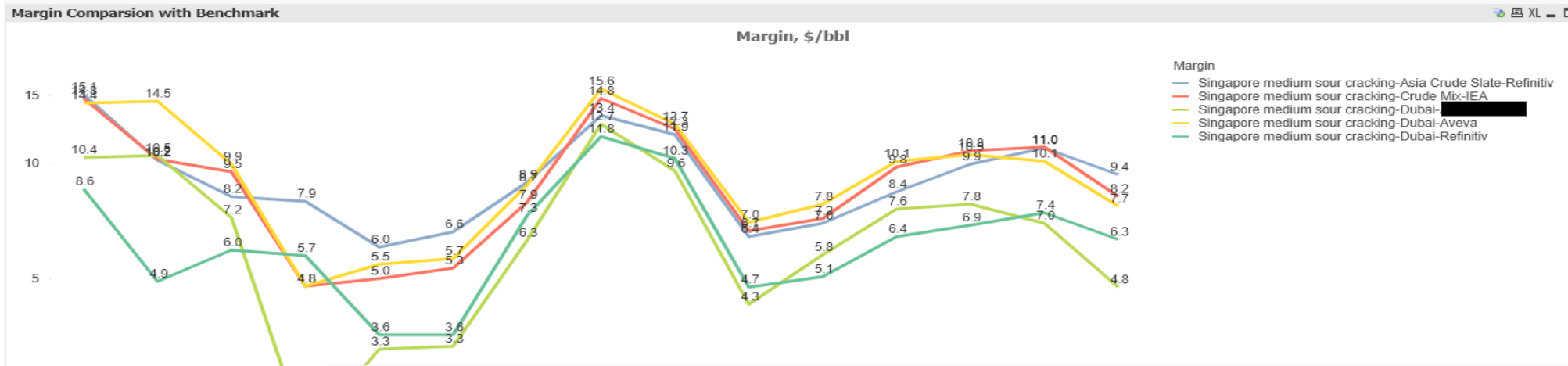
AVEVA yields matches more closely with known benchmarks than previous data



- Significant alignment in yields with published data such as JODI, Reuters, Refinitiv, etc.
- Closed significant gasoline yield gap in US Gulf Coast FCC coker configuration
- Improved diesel prediction in European complex configuration

Margin comparison with benchmark for various crude oil baskets

AVEVA margins trend closely with both IEA and Refinitiv, indicating alignment of signals





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Application



Refinery margin analysis dashboard

Provides signals on refinery profitability to relate to refiners' crude demand



Refinery Margins Analysis

Overview

Updated on
2-Oct

Region

Europe

Feedstock for chart 1

Brent blend

Feedstock for chart 2, 3, 4

Multiple selections

Date

1/1/2022

12/1/2024



* Spot Variable Margin

Introduction

Overview

Charts

Seasonal
Spot Margin

Signals

Spot Margin
Table

Spot Margin
Cross Table

Definitions

Ask the
Analyst

Reports

Chart1 - Brent blend margin for simple hydro-skimming, semi-complex hydrocracking and complex coking configuration in HSFO mode

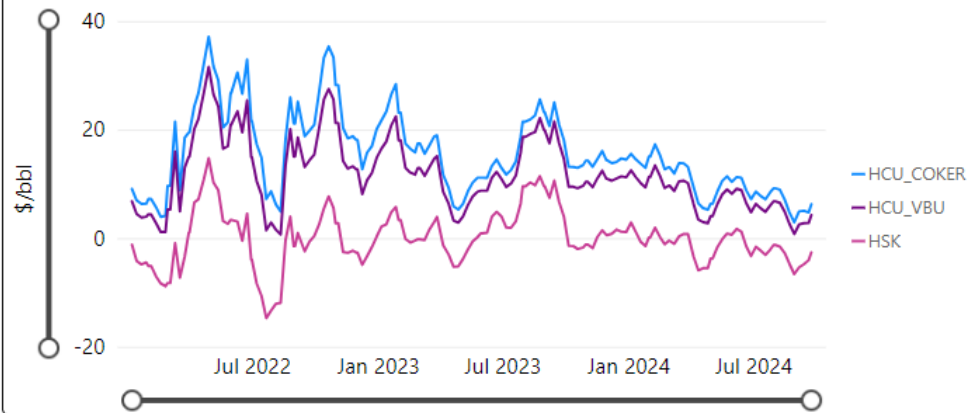


Chart2 - Gasoline driven semi-complex fluidized catalytic cracking margin in HSFO mode

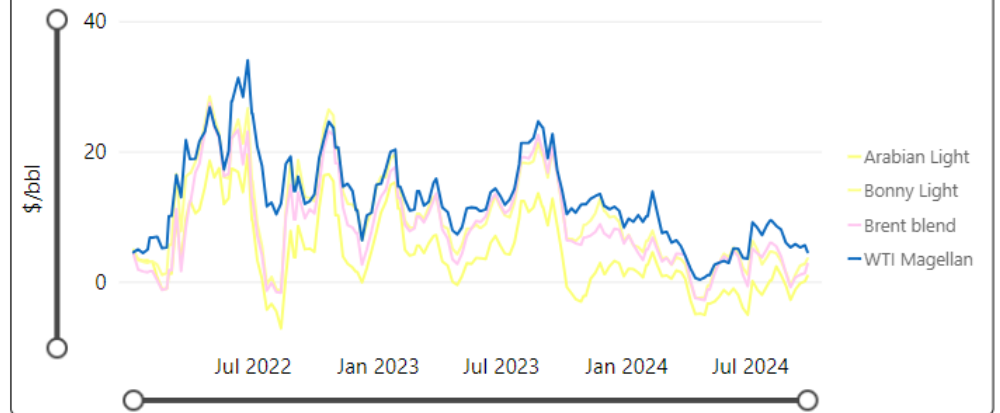


Chart3 - Distillate driven semi-complex hydrocracking margin in HSFO mode

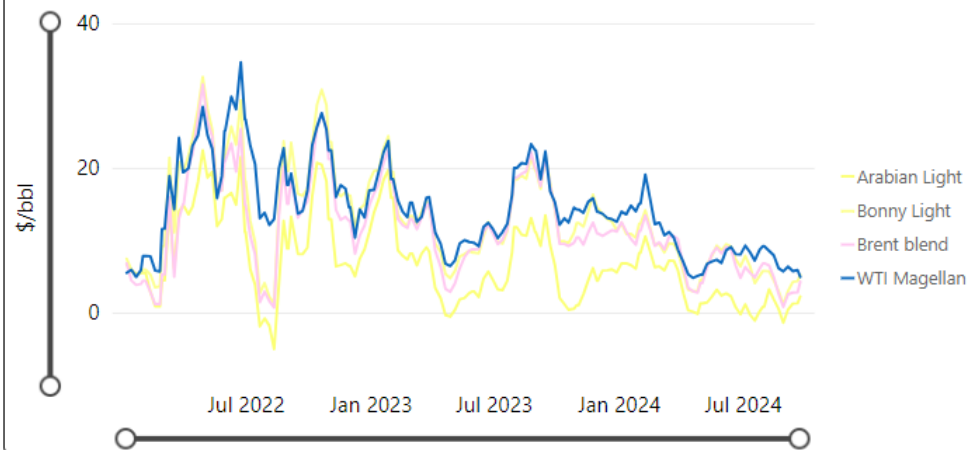
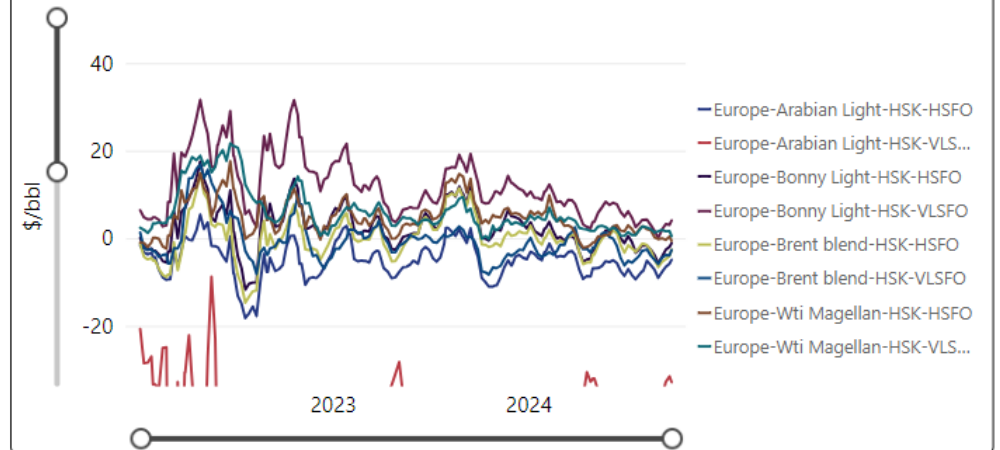


Chart4 - Hydro-skimming margins split into HSFO & VLSFO production



Refinery margin analysis dashboard

Allows users to track and compare margins across three regions and analyze seasonal patterns

Feedstock
Arabian Light

Margin type
Variable

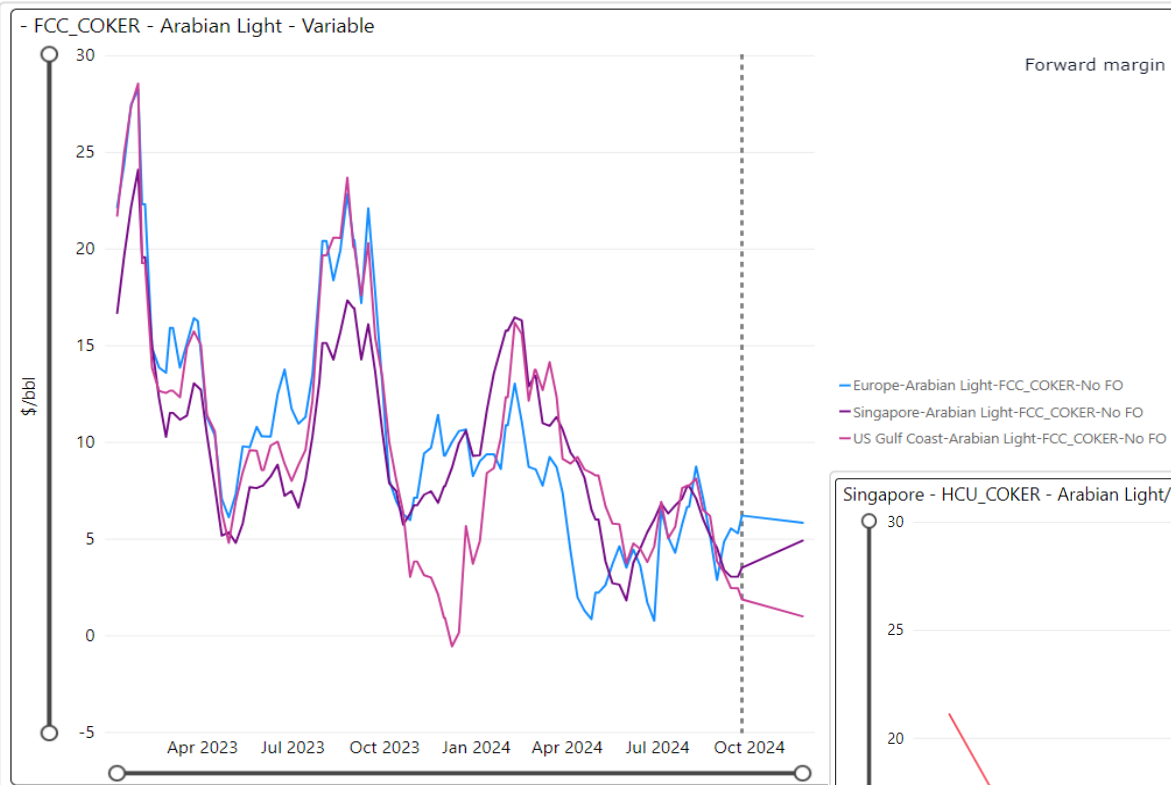
Region
All

Complexity
All

Configuration
FCC_COKER

Operational mode
All

Margin Series
All

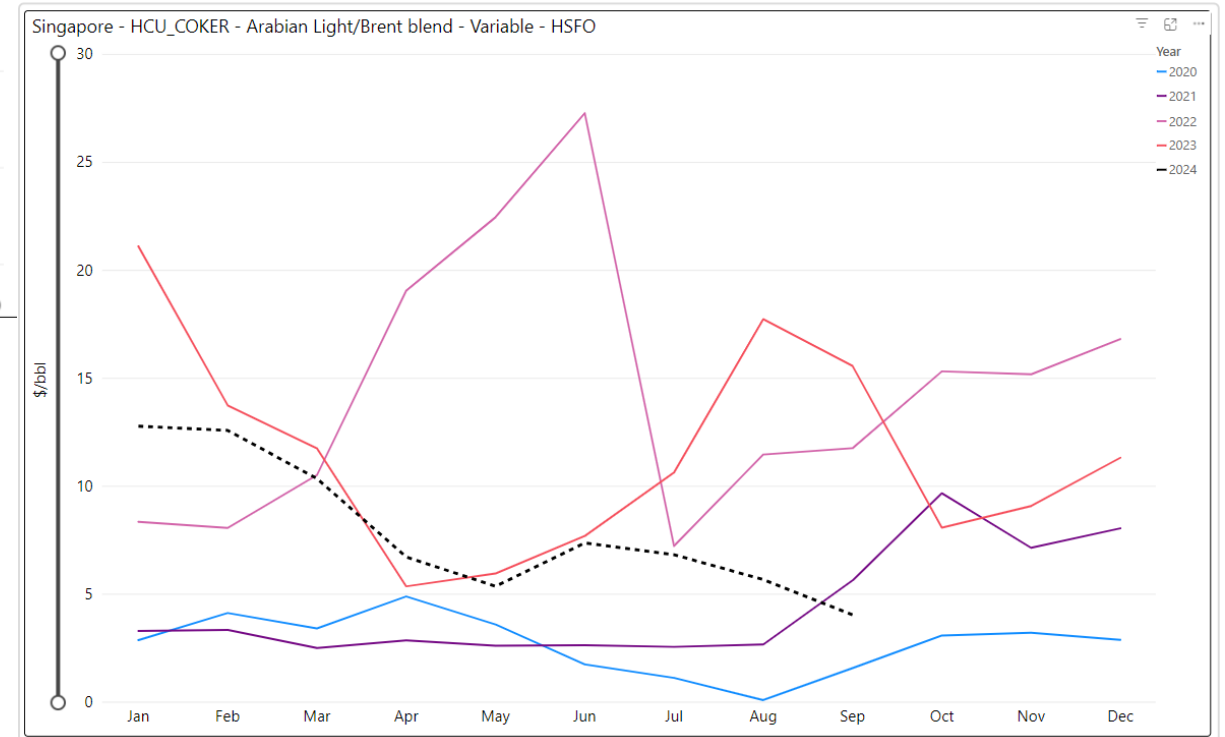


Signals (sample)

- Weakening complex margins in Asia and US Gulf Coast signal possible refinery run cuts
- European FCC coker margins remain supported and point to some strength in gasoline cracks
- Singapore hydrocracking margins approach pandemic levels, pointing to weakness in middle distillates
- Fall maintenance schedule in the Northern Hemisphere can create tightness in products supply

Signposts (sample)

- Impact of Chinese economic stimulus on oil demand – will it be enough to buck the downtrend?
- Escalation of tensions in the Middle East could result in crude supply disruptions and more challenges along the Red Sea route
- Result of US presidential elections may have significant impact on energy policies



M+2 Crude Valuation Signals Dashboard (to be released)

Provides economic comparison of different crudes to help decision-making around crude selection

M+2 Crude Valuation Signals

Updated on
September 10

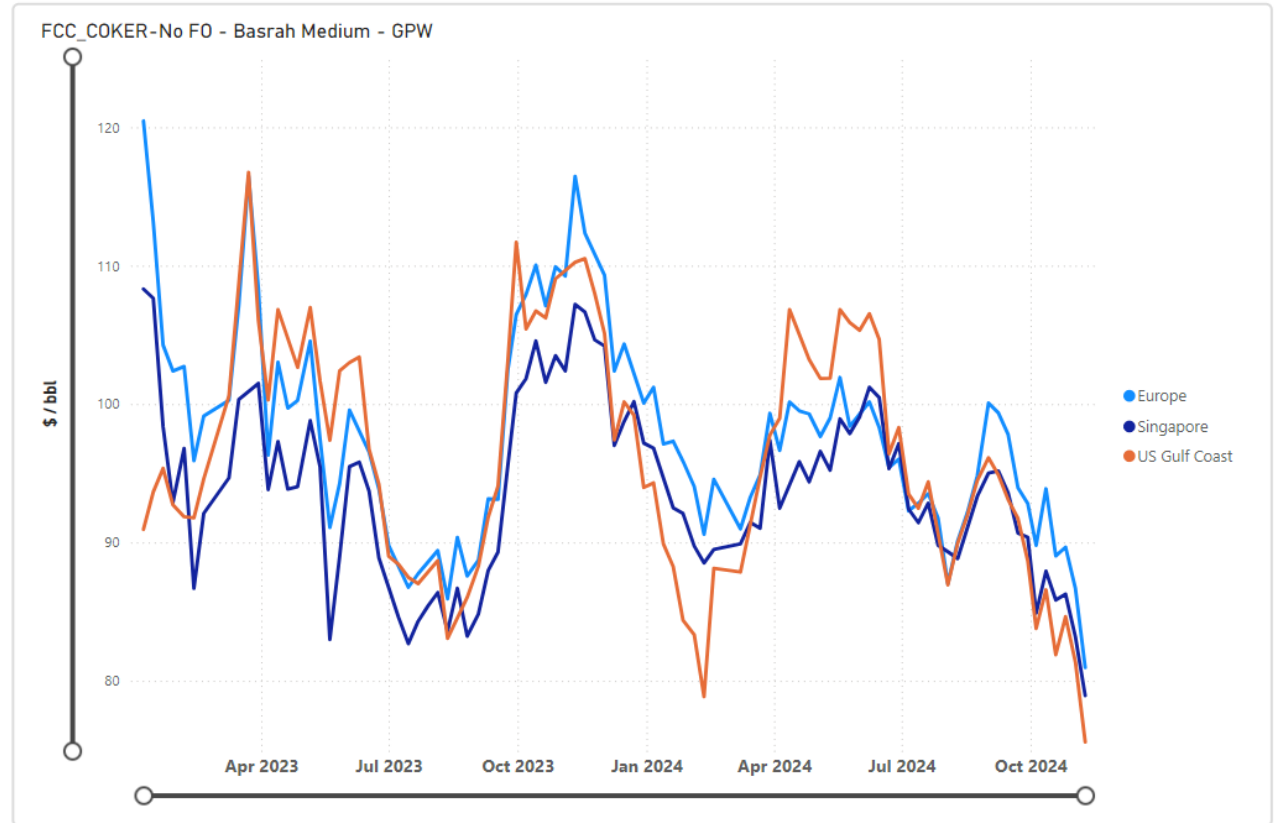
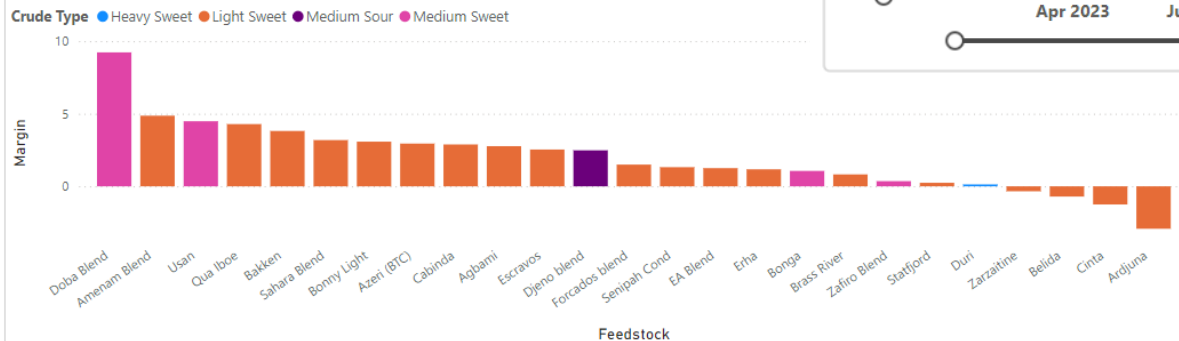
Region
Europe

Refinery Configuration
HSK_VLSFO

Published Date
Friday, September 2...

Crude Type	Feedstock	Friday, September 27, 2024	Friday, September 20, 2024	Friday, September 13, 2024
Heavy Sweet	Duri	-0.18	0.13	0.13
Light Sweet	Agbami	2.30	2.77	2.77
	Amenam Blend	4.37	4.87	4.87
	Ardjuna	-0.58	-2.92	-2.92
	Azeri (BTC)	2.91	2.94	2.94
	Bakken	2.58	3.81	3.81
	Belida	-0.71	-0.70	-0.70
	Bonny Light	2.42	3.08	3.08
	Brass River	-0.08	0.82	0.82
	Cabinda	2.39	2.88	2.88
	Cinta	1.40	-1.25	-1.25

Margin by Feedstock and Crude Type - HSK_VLSFO - 20-Sep-2024



- Top 25 crude grades per configuration for each region
- Gross product worth of different crude oils across different regions

M+2 Crude Valuation Signals Dashboard (to be released)

Use of gross product worth to establish price floors and ceilings as a proxy for grade-level balance

Feedstock

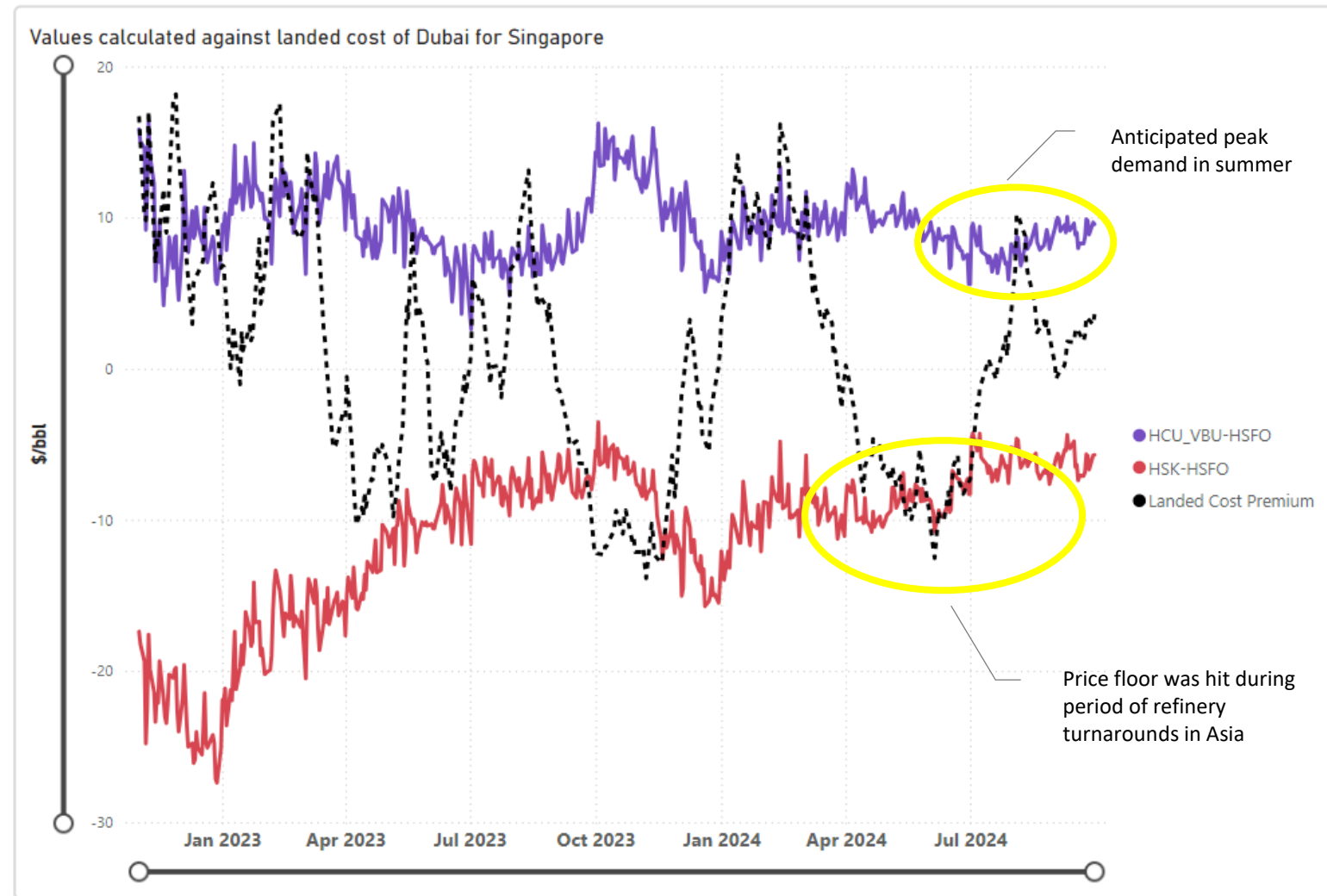
Basrah Heavy ▾

Configuration

Multiple selections ▾

Operation Mode

Multiple selections ▾



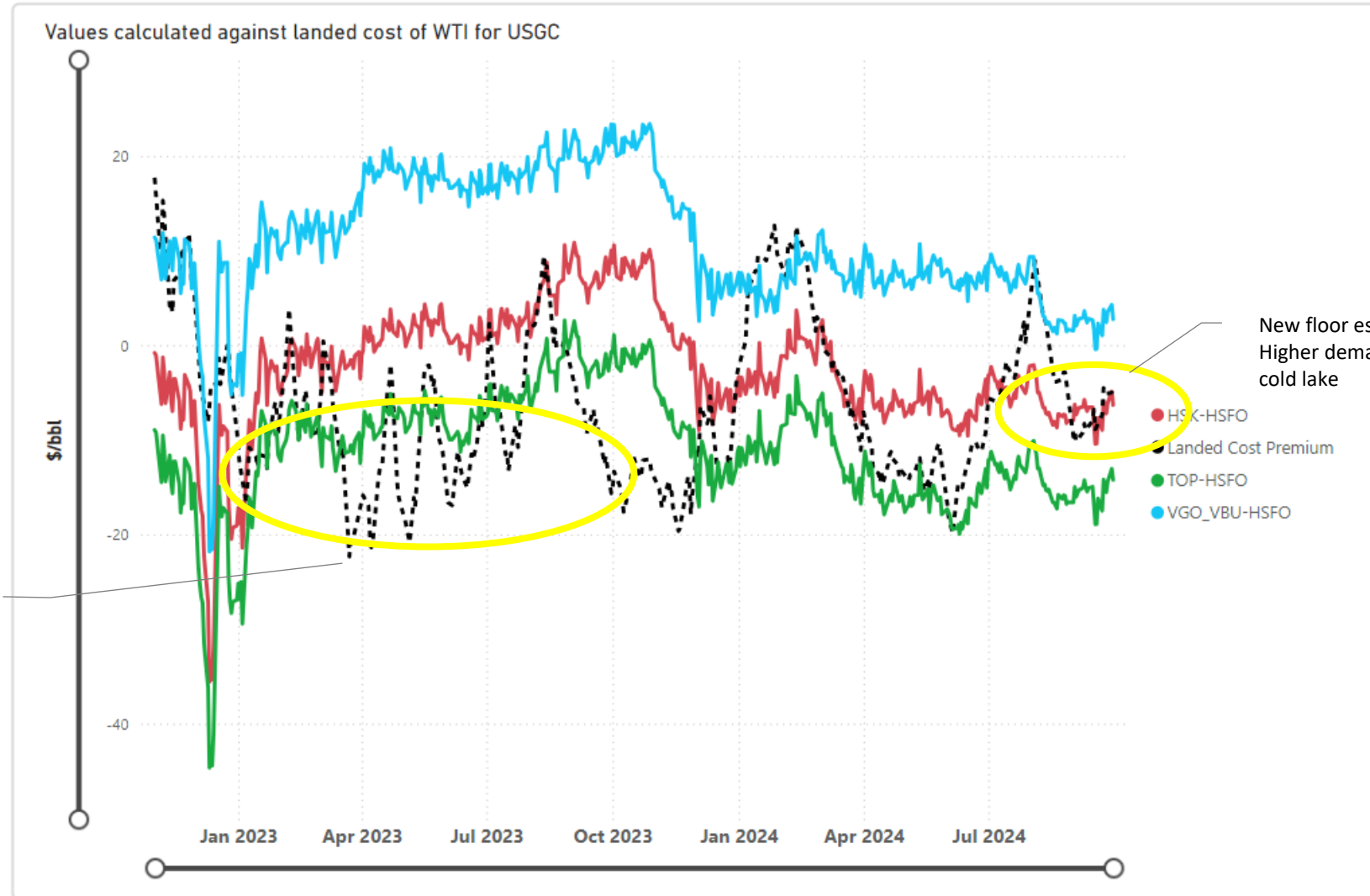
M+2 Crude Valuation Signals Dashboard (to be released)

Use of gross product worth to establish price floors and ceilings as a proxy for grade-level balance

Feedstock
Cold Lake Blend ▾

Configuration
Multiple selections ▾

Operation Mode
Multiple selections ▾



Crude is possibly undervalued due to some logistics constraints/poor properties?

Oil Trading Signals: Exclusive insights – stay ahead of the market

1 **China oil trading alert: Renewed export quota lacks support for refinery runs**

Summary

- Export quota remains at similar level to last year; not expected to meet the request from domestic refiners to boost their refinery runs amid weak domestic gasoline and diesel demand.
- We keep our China refinery runs forecast unchanged as 8 million tonnes were allocated to refiners, with our estimation similar at 7 million tonnes..."

[Sign up](#) to receive the full version in the future. (You will receive a selection of signals directly in your mailbox.)

2 **Oil Trading Alert: More Rain, More Pain – 300,000 bpd capacity at risk in Europe**

"Refineries in central and eastern Europe are on alert as rising water levels and possible evacuation orders may lead to temporary halts in operations amid heavy rainfall. Those facing the highest risk include PNL Kralupy and Litvinov in the Czech Republic and Slovnaft Bratislava in Slovakia, with crude distillation capacities of 60,000, 108,000, and 124,000 barrels per day (bpd), respectively..."

[Sign up](#) to receive the full version in the future. (You will receive a selection of signals directly in your mailbox.)

3 **Russia Oil Trading Update: Exports by sea continue to confirm Russian compliance**

- "Russian seaborne oil and oil product exports average 390,000 bpd between 19 August and 15 September
- Overproduction against OPEC+ target assessed at 50,000 bpd; target set to be reached in September
- Refinery runs seen at 5.52 million bpd in August, to decrease in September by 300,000 bpd..."

[Sign up](#) to receive the full version in the future. (You will receive a selection of signals directly in your mailbox.)

4 **New storm, same trouble: Francine risks 2.7 million bpd of PADD 3 capacity**

- "Francine expected to hit PADD 3 refinery capacity to tune of 2.7 million bpd
- Hurricane set to provide support to margins
- Runs set to drop, with US running above 16.6 million bpd for four straight months..."

[Sign up](#) to receive the full version in the future. (You will receive a selection of signals directly in your mailbox.)



Rystad Energy augments Refinery Margin Analysis, improves distillate yield prediction by 8% to 9%

Challenge

- Rystad Energy's database of crude yield profiles for different refinery configurations remained static due to lack of software support.
- High volatility in the oil market has increased the requirement to update yield profiles to reflect current market conditions.
- Rebalancing of flows due to embargoes and unrest requires crudes to be assessed in new markets.

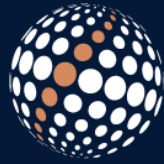
Solution

- New refinery models representing Europe, Asia, and the US Gulf Coast markets were built in AVEVA USC Plan, and with the use of the Crude Evaluation analytic, 6,600+ new yields were generated.

Results

- Refinery yield prediction improved by an average of 8% for gasoline and 9% for diesel
- Calculated margins improved by \$0.8 to \$2.5 per barrel and are aligned with known benchmarks
- New business opportunities arose, particularly in Advisory





RystadEnergy

Navigating the future of **energy**

Rystad Energy is an independent energy consulting services and business intelligence data firm offering global databases, strategic advisory and research products for energy companies and suppliers, investors, investment banks, organizations, and governments.

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