Downstream Oil & Gas in the "Perfect Storm"

ADI Weekly Webinar Series

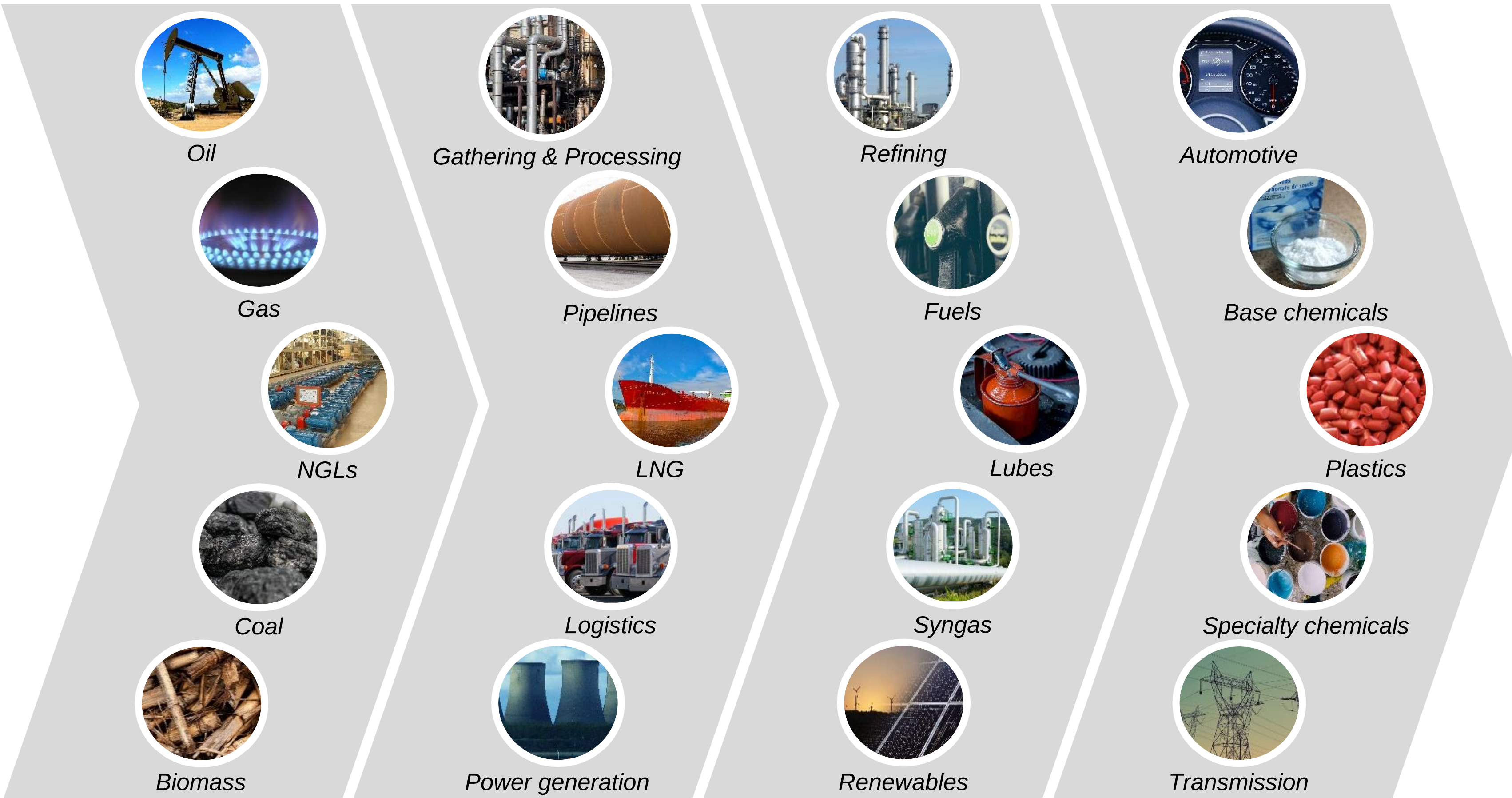
April 23, 2020

ADI Analytics
OIL & GAS • ENERGY • CHEMICALS
CELEBRATING 10 YEARS

+1.832.768.8806
info@adi-analytics.com
www.adi-analytics.com

ADI Analytics is a consulting firm serving oil and gas, energy, and chemical companies with passion, expertise, and rigor

Operating companies | *Service providers* | *Equipment manufacturers* | *Investors* | *Traders* | *Government*



Markets | *Operations* | *Technology* | *Finance* | *Organization* | *Policy*

Our value proposition—expertise, analytics, and client-centric owner’s mindset—is designed to help clients succeed

Lead with frontline **industry expertise** — **11** years

Drive with data and **proprietary analytics** — **150+** clients

Client-centric **owner’s mindset** — **450+** projects

Fortune 500 and mid-sized companies, start-ups, investors, and governments have hired us to shape decisions globally

How are we helping clients navigate the oil price crash and COVID-19 impacts?

Target the right customers and market segments

Reorient offerings and value props for recovery phase

Benchmark and quickly cut costs to cope with the crisis

Support M&A strategy and due diligence

Reshape go-to-market plans with voice-of-customer research

Refine pricing and sales strategies via market-backed insights

Revisit customer and channel engagement models for recovery

Revisit R&D, innovation, and product devpt. portfolios

Clients can also accelerate decisions by subscribing to our research services, databases, and industry reports

Downstream Market Advisory

Subscription service for research, intelligence, analytics, and insights on North American downstream oil markets.

Helps subscribers identify and act on opportunities, trends, and risks in refining and petrochemicals with clear, concise market intelligence, analytics, industry fundamentals, project updates, and forecasts.

www.adi-analytics.com/products/

Gas Monetization Advisory

Subscription service for research, intelligence, analytics, and insights on natural gas utilization options and markets.

Helps subscribers identify and act on opportunities, trends, and risks in gas use for power, LNG, fuels, chemicals, and transportation with market intelligence, cost / economic analytics, project news, and forecasts.

www.adi-analytics.com/products/

Databases

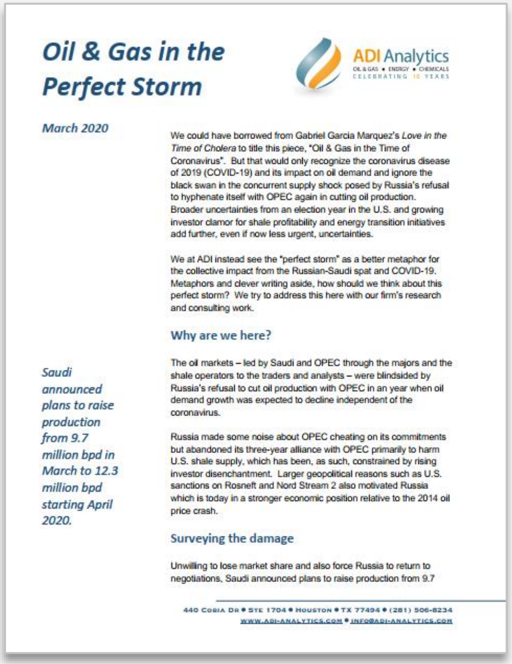
- Crude oil by type
- Natural gas and LNG
- Refined products
- Natural gas liquids
- Methanol
- Ammonia
- Hydrogen plants
- Petrochemicals
- Polymers by grade
- Oil reserves/fields
- Well counts by type
- Completions by type
- EOR, gas, artificial lift
- Production facilities
- Pipelines by mile / dia
- Compression stations
- Gas processing plants
- LNG / regas plants
- Methanol/ammonia units
- Refineries, terminals
- Heavy oil upgraders
- Thermal/met coal mines
- Coal processing assets
- Power plants by type
- Water treatment plants

Market Studies

- Well automation
- Shape charge liners
- Offshore pipelines
- Chemical inj pumps
- Oilfield chemicals
- Maint. drones
- Condensate splitter
- LACT / GPU units
- Compressor services
- Cryogenic plants
- Drag reducers
- Corrosion inhibitors
- Pipe coatings
- Process automation
- Flare gas recovery
- Refining catalysts
- Tower internals
- Micro GCs
- Frac sand
- Compressor drives
- H2S scrubbers
- LNG storage tanks
- Lube/fuel additives
- Lube recycling
- Compressor valves

Oil & gas in a "perfect storm" from price crash and COVID-19

Oil & Gas in the Perfect Storm



Oil & Gas in the Perfect Storm

ADI Analytics
OIL & GAS • ENERGY • CHEMICALS
CELEBRATING 10 YEARS

March 2020

We could have borrowed from Gabriel Garcia Marquez's *Love in the Time of Cholera* to title this piece, "Oil & Gas in the Time of Coronavirus". But that would only recognize the coronavirus disease of 2019 (COVID-19) and its impact on oil demand and ignore the black swan in the concurrent supply shock posed by Russia's refusal to hyphenate itself with OPEC again in cutting oil production. Broader uncertainties from an election year in the U.S. and growing investor clamor for shale profitability and energy transition initiatives add further, even if now less urgent, uncertainties.

We at ADI instead see the "perfect storm" as a better metaphor for the collective impact from the Russian-Saudi spat and COVID-19. Metaphors and clever writing aside, how should we think about this perfect storm? We try to address this here with our firm's research and consulting work.

Why are we here?

Saudi announced plans to raise production from 9.7 million bpd in March to 12.3 million bpd starting April 2020.

The oil markets – led by Saudi and OPEC through the majors and the shale operators to the traders and analysts – were blindsided by Russia's refusal to cut oil production with OPEC in an year when oil demand growth was expected to decline independent of the coronavirus.

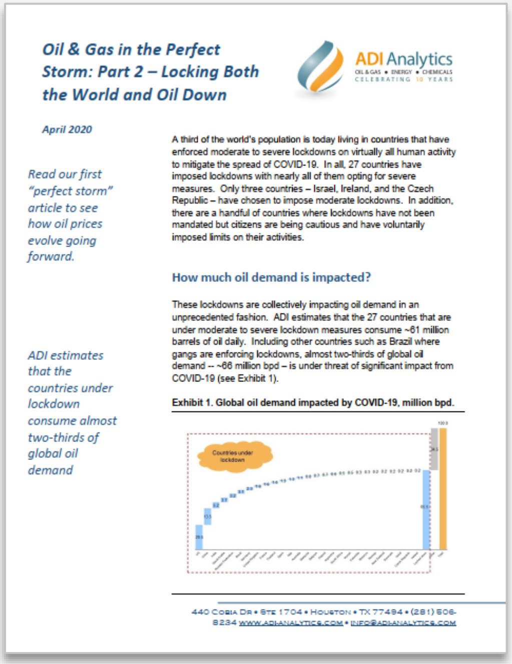
Russia made some noise about OPEC cheating on its commitments but abandoned its three-year alliance with OPEC primarily to harm U.S. shale supply, which has been, as such, constrained by rising investor disenchantment. Larger geopolitical reasons such as U.S. sanctions on Rosneft and Nord Stream 2 also motivated Russia which is today in a stronger economic position relative to the 2014 oil price crash.

Surveying the damage

Unwilling to lose market share and also force Russia to return to negotiations, Saudi announced plans to raise production from 9.7

440 Cobia Dr • Ste 1704 • Houston • TX 77494 • (281) 506-8234
www.adi-analytics.com • info@adi-analytics.com

Locking Both the World and Oil Down



Oil & Gas in the Perfect Storm: Part 2 – Locking Both the World and Oil Down

ADI Analytics
OIL & GAS • ENERGY • CHEMICALS
CELEBRATING 10 YEARS

April 2020

Read our first "perfect storm" article to see how oil prices evolve going forward.

A third of the world's population is today living in countries that have enforced moderate to severe lockdowns on virtually all human activity to mitigate the spread of COVID-19. In all, 27 countries have imposed lockdowns with nearly all of them opting for severe measures. Only three countries – Israel, Ireland, and the Czech Republic – have chosen to impose moderate lockdowns. In addition, there are a handful of countries where lockdowns have not been mandated but citizens are being cautious and have voluntarily imposed limits on their activities.

How much oil demand is impacted?

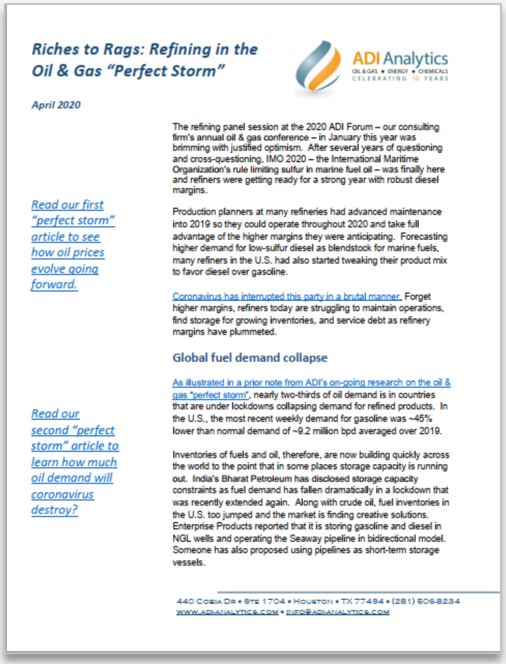
ADI estimates that the countries under lockdown consume almost two-thirds of global oil demand

These lockdowns are collectively impacting oil demand in an unprecedented fashion. ADI estimates that the 27 countries that are under moderate to severe lockdown measures consume ~61 million barrels of oil daily. Including other countries such as Brazil where gangs are enforcing lockdowns, almost two-thirds of global oil demand -- ~66 million bpd – is under threat of significant impact from COVID-19 (see Exhibit 1).

Exhibit 1. Global oil demand impacted by COVID-19, million bpd.

440 Cobia Dr • Ste 1704 • Houston • TX 77494 • (281) 506-8234 www.adi-analytics.com • info@adi-analytics.com

Riches to Rags: Downstream O&G in Perfect Storm



Riches to Rags: Refining in the Oil & Gas "Perfect Storm"

ADI Analytics
OIL & GAS • ENERGY • CHEMICALS
CELEBRATING 10 YEARS

April 2020

The refining panel session at the 2020 ADI Forum – our consulting firm's annual oil & gas conference – in January this year was brimming with justified optimism. After several years of questioning and cross-questioning, IMO 2020 – the International Maritime Organization's rule limiting sulfur in marine fuel oil – was finally here and refiners were getting ready for a strong year with robust diesel margins.

Read our first "perfect storm" article to see how oil prices evolve going forward.

Production planners at many refineries had advanced maintenance into 2019 so they could operate throughout 2020 and take full advantage of the higher margins they were anticipating. Forecasting higher demand for low-sulfur diesel as blendstock for marine fuels, many refiners in the U.S. had also started tweaking their product mix to favor diesel over gasoline.

Coronavirus has interrupted this party in a brutal manner. Forget higher margins, refiners today are struggling to maintain operations, find storage for growing inventories, and service debt as refinery margins have plummeted.

Global fuel demand collapse

Read our second "perfect storm" article to learn how much oil demand will coronavirus destroy?

As illustrated in a prior note from ADI's on-going research on the oil & gas "perfect storm", nearly two-thirds of oil demand is in countries that are under lockdowns collapsing demand for refined products. In the U.S., the most recent weekly demand for gasoline was ~45% lower than normal demand of ~9.2 million bpd averaged over 2019.

Inventories of fuels and oil, therefore, are now building quickly across the world to the point that in some places storage capacity is running out. India's Bharat Petroleum has disclosed storage capacity constraints as fuel demand has fallen dramatically in a lockdown that was recently extended again. Along with crude oil, fuel inventories in the U.S. too jumped and the market is finding creative solutions. Enterprise Products reported that it is storing gasoline and diesel in NGL wells and operating the Seaway pipeline in bidirectional model. Someone has also proposed using pipelines as short-term storage vessels.

440 Cobia Dr • Ste 1704 • Houston • TX 77494 • (281) 506-8234
www.adi-analytics.com • info@adi-analytics.com

Download at www.adi-analytics.com/covid-19

ADI is offering a new research service to help clients navigate the "perfect storm" from the oil price crash and COVID-19

ADI "Perfect Storm" Research Service

#	Topic	#	Topic
1	Oil & gas price updates and outlook	**7**	Deep dive into fuels and refining
2	COVID-19-related oil demand impact / recovery	**8**	Deep dive into natural gas and LNG markets
3	Deep dive into upstream incl. shale, conv., offshore	**9**	Deep dive into petrochemicals
4	Oil supply-demand balance and inventories	**10**	Oil & gas capital spend (CAPEX) outlook
5	Oil price forecasts, scenarios, and outlook	**11**	Oil & gas operating spend (OPEX) forecast
6	Deep dive into midstream and NGLs	**12**	Investor implications and opportunities

Service Deliverables
Weekly markets review
In-depth segment reports
Market data spreadsheets
Monthly workshop calls
On-demand analyst time / calls

Contact us at
+1 (832) 768-8806 or
info@adi-analytics.com
to learn more

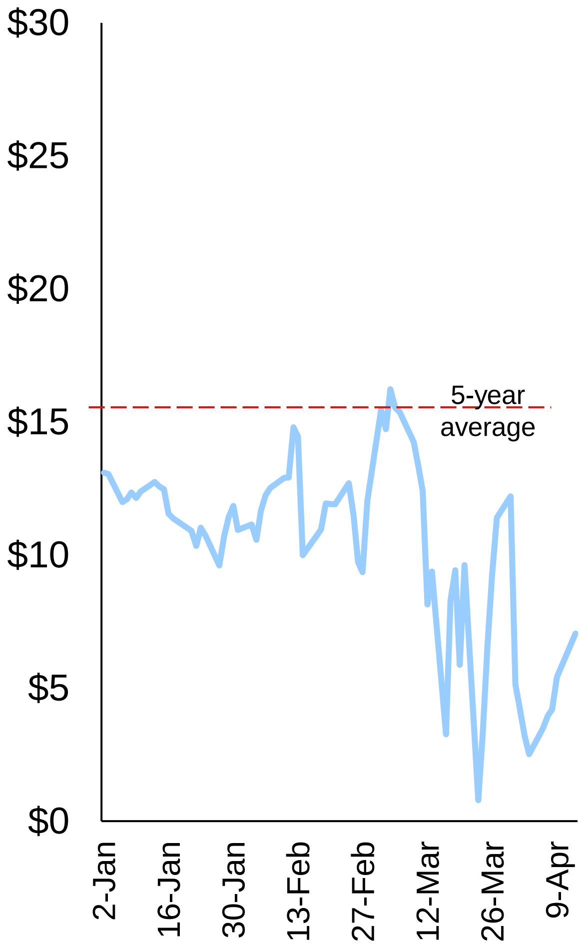
Uday Turaga
ADI Analytics
CEO

Swati Singh
ADI Analytics
Analyst

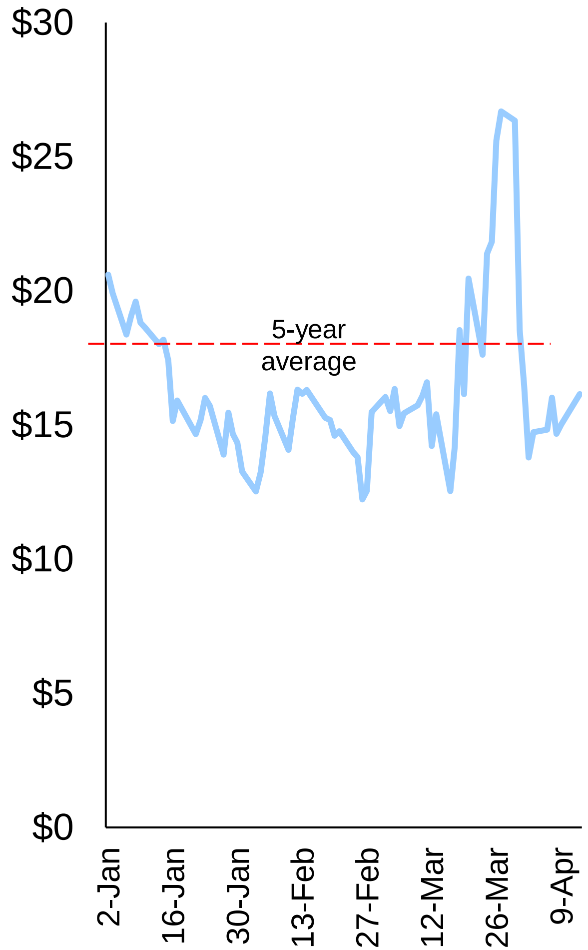
Utkarsh Gupta
ADI Analytics
Analyst

U.S. Gulf Coast crack spreads fell significantly in March 2020 below five-year averages with only diesel holding up

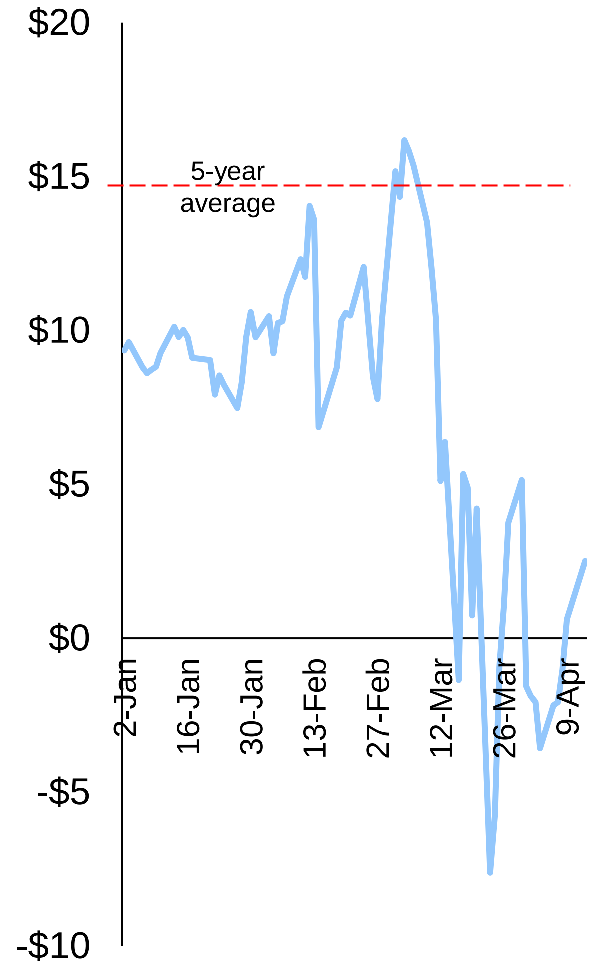
USGC 3-2-1 Crack Spread
(USD Per Barrel)



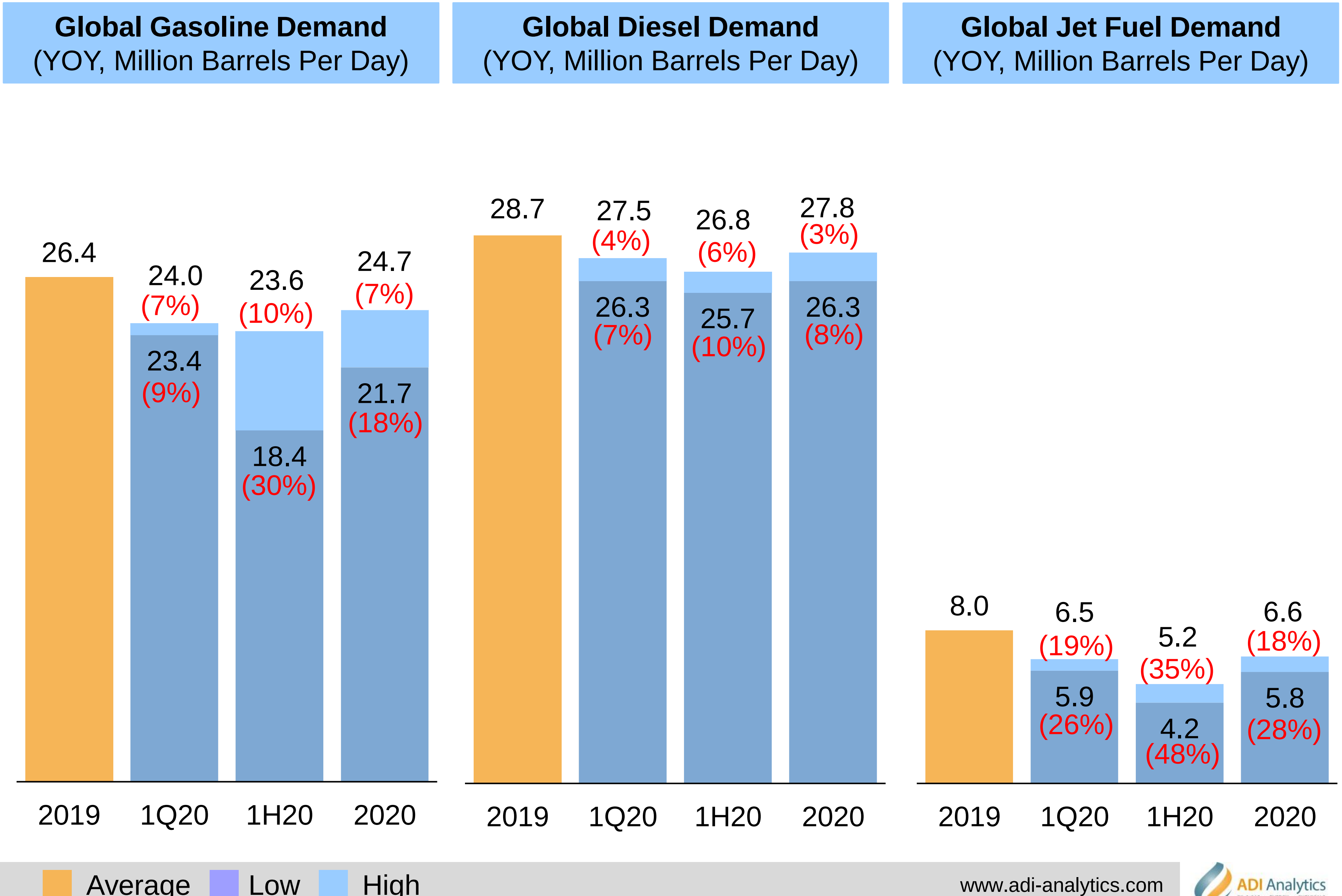
USGC Diesel Crack
(Dollar Per Barrel)



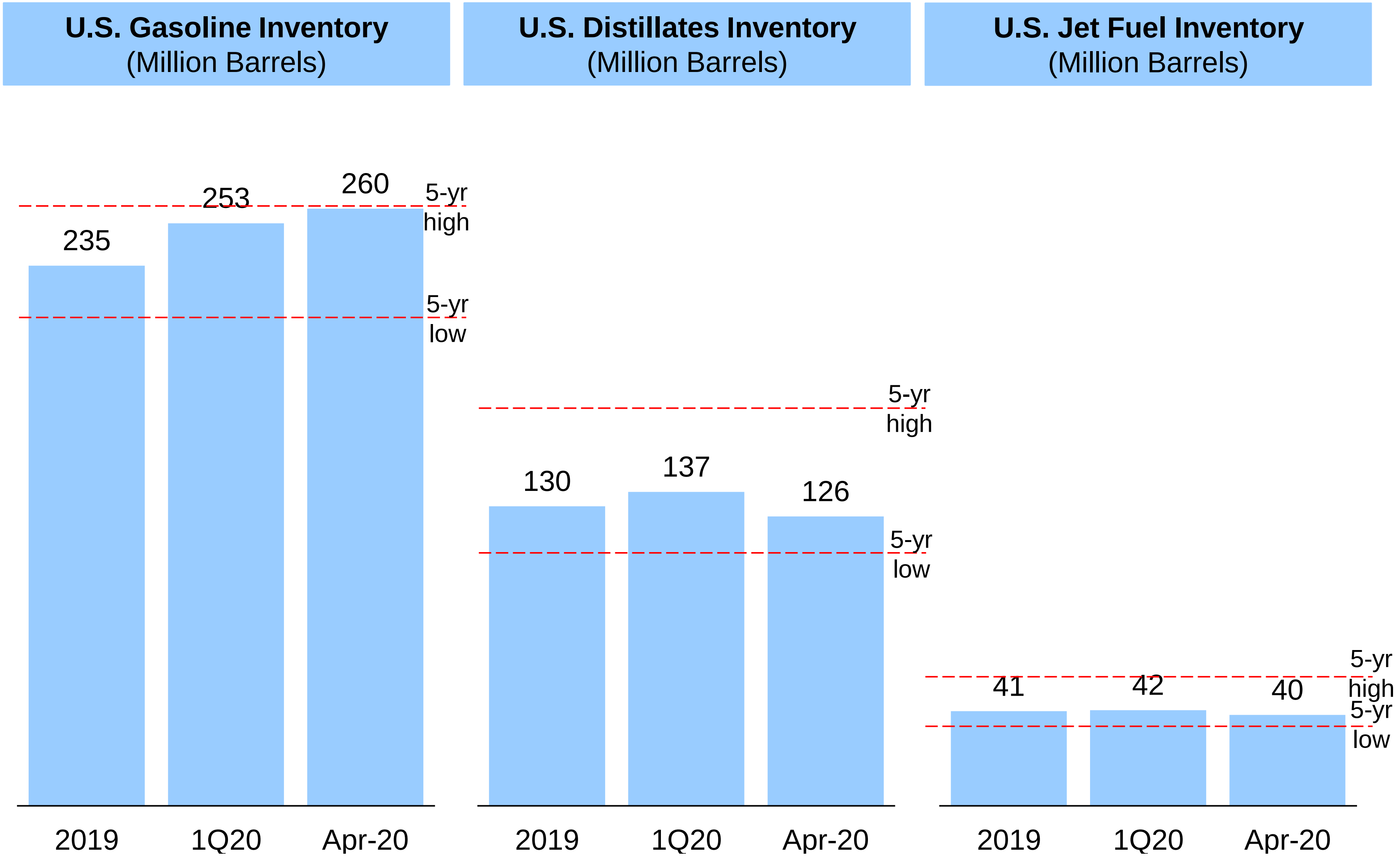
USGC Gasoline Crack
(Dollar Per Barrel)



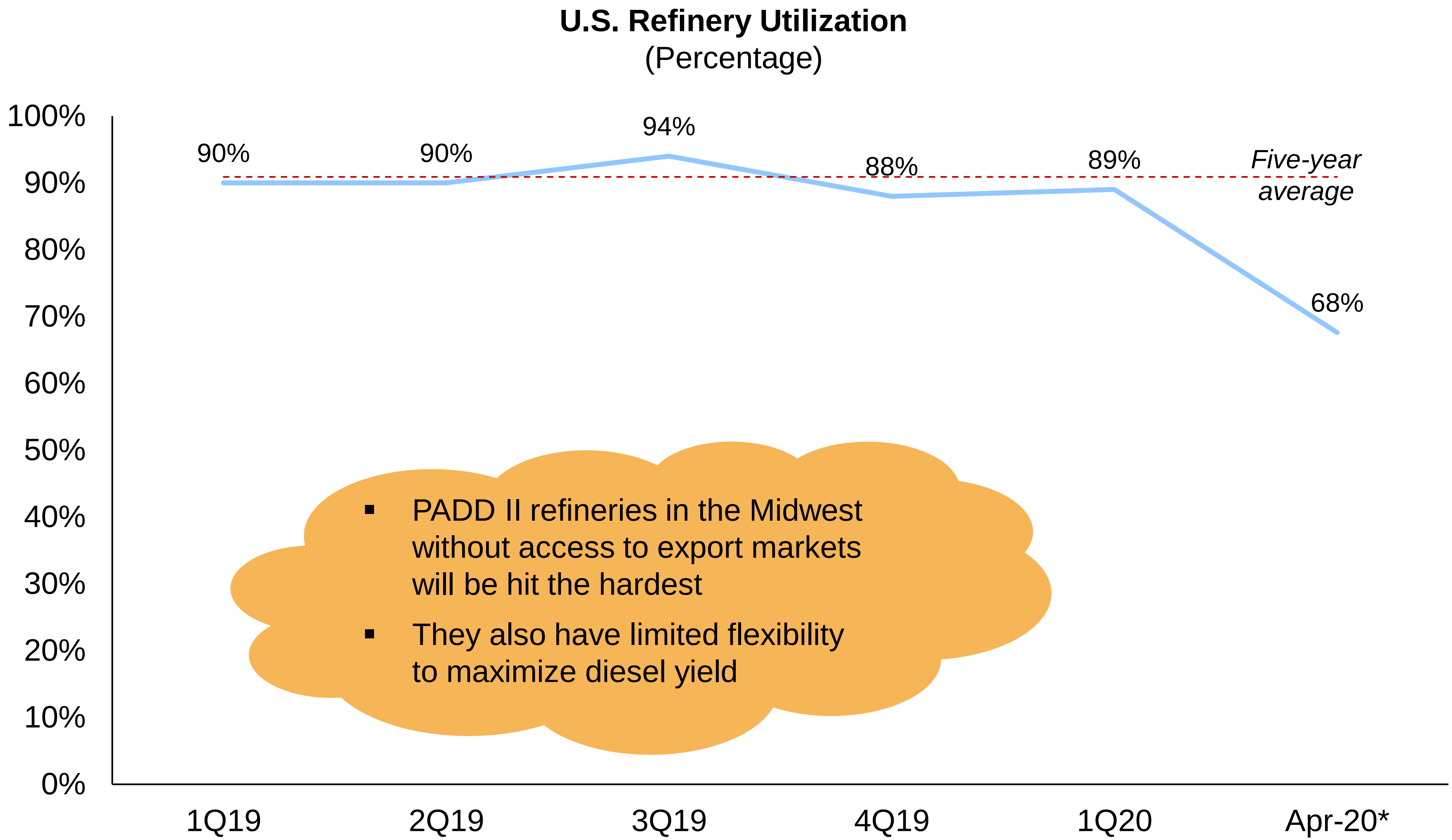
Demand for jet fuel followed by gasoline will fall in 1H 2020 amid COVID-19 lockdowns while diesel will be less impacted



Gasoline inventory continues to rise but those of diesel and jet are falling due to demand and supply cuts, respectively

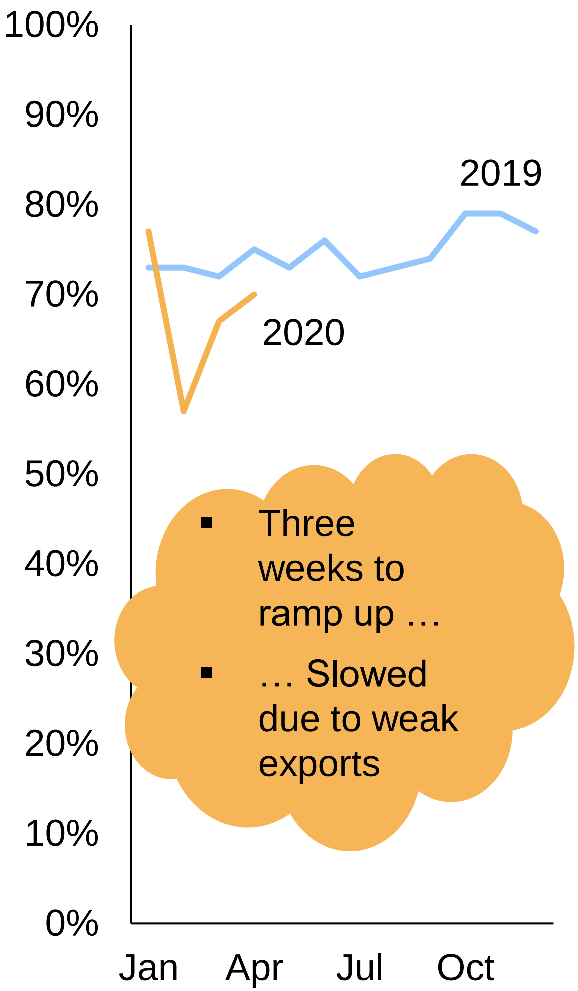


U.S. refiners have begun to cut runs and utilization as they step into a fuel demand collapse in 2Q 2020

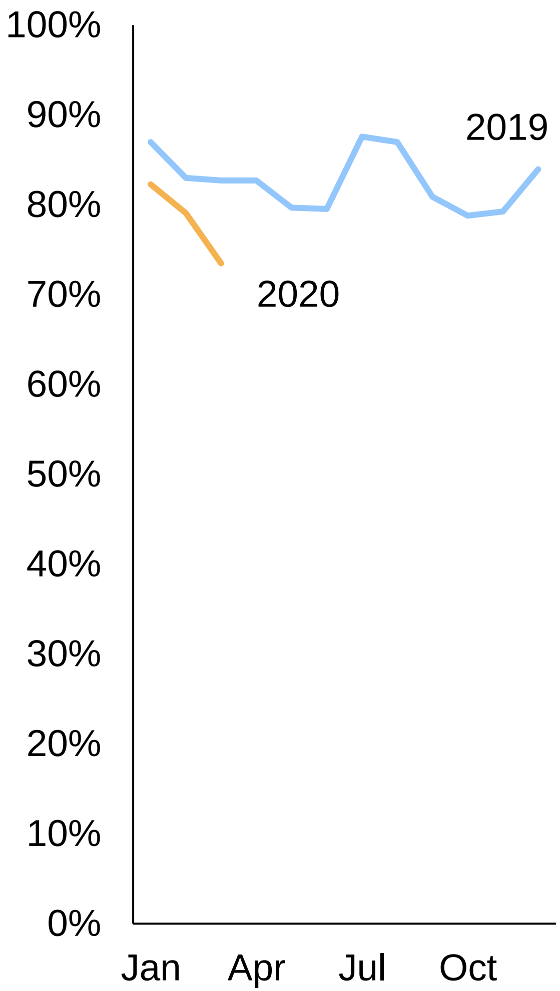


Asian refinery utilization rates started to pick up in April but European refinery throughput continues to decline

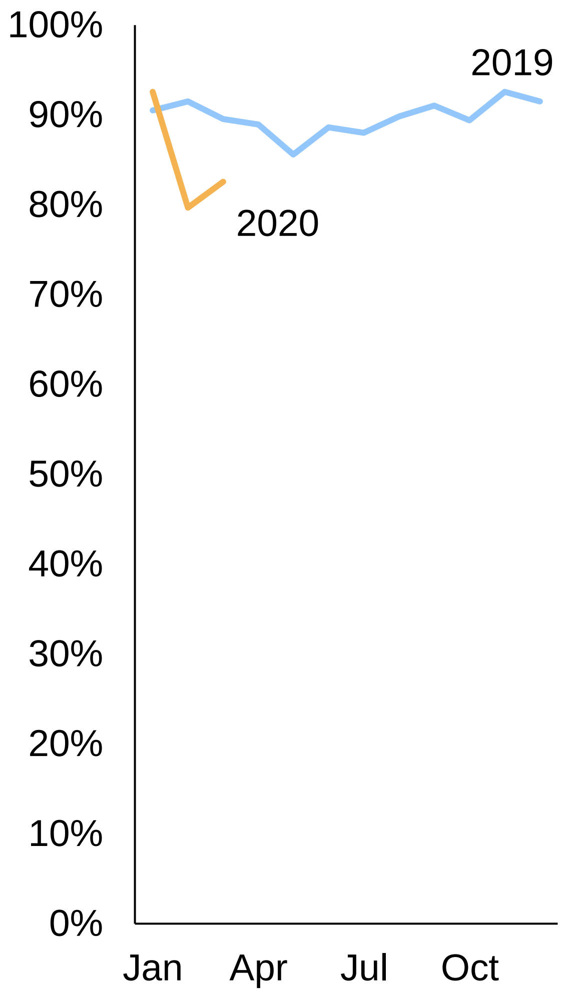
China Refinery Utilization
(Percentage)



EU-16 Refinery Utilization
(Percentage)



Asia* Refinery Utilization
(Percentage)



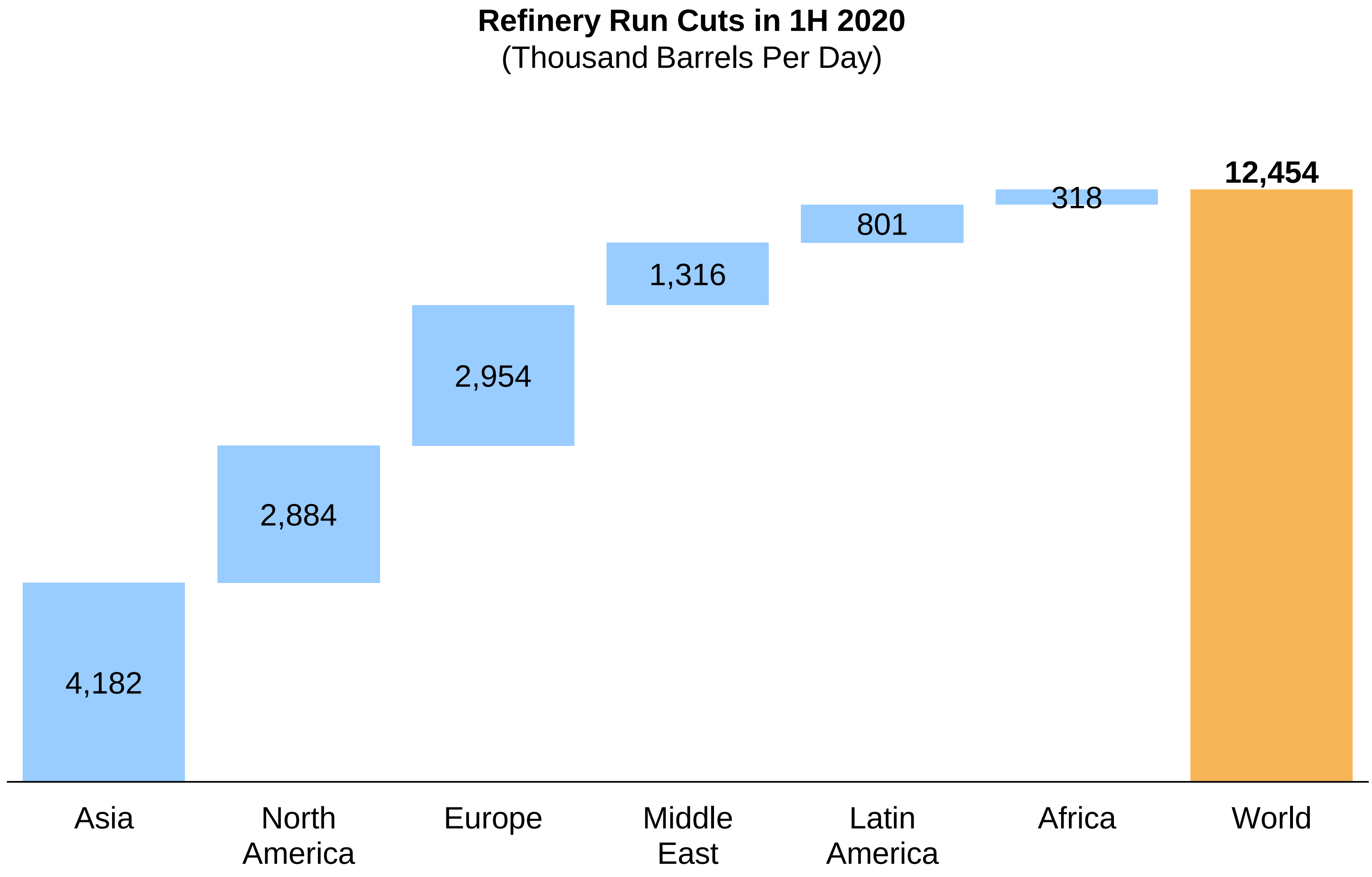
Note: *Includes Japan, China, India, Singapore, and South Korea

Many refiners have cut runs and utilization rates globally …

Country	Company	Run cuts	Discussion
China	Sinopec	10-20%	Announced refinery run cut by 600 kbpd
China	CNOOC	15-20%	Cut runs by 410 kbpd at Huizhou refinery
China	Petrochina	10-20%	Shut its 580 kbpd Gaungxi and Dalian refineries
India	BPCL	10-20%	BPCL operates 4 refineries with 750kbpd
India	Indian Oil	25-30%	Reduced rates across its refineries
South Korea	S.K. Energy, Thai Oil	15-20%	Reduced run rates across their refineries
Thailand	SPRC, PTT, and IRPC	10-20%	Reduced refinery run rates
Canada	Suncor Energy	10-15%	Reduced refinery run rates
U.S.	Phillips 66	15-20%	Reduced refinery rates at Bayway and Los Angeles refinery
U.S.	ExxonMobil	10-15%	Reduced refinery runs at Baton Rouge, Baytown, and Joliet refineries
U.S.	Valero	15-18%	Run cuts at Benicia, Wilmington, Memphis, St. Charles and other refineries
U.S.	Marathon	10-15%	Reduced refinery runs at Catlettsburg and Los Angeles refinery
U.S.	Chevron	15-20%	Reduced refinery runs at El Segundo refinery
U.S.	Par Pacific	20-25%	Reduced refinery runs at Hawaii refinery
U.S.	PBF Energy	15-20%	Reduced refinery runs at Torranec refinery
Germany	BP	15-20%	Shut down its Gelsenkirchen (Scholven) oil refinery
Britain	INEOS	15-20%	Shut down a crude unit at its Grangemouth refinery
France	ExxonMobil, Total	10-20%	Run rate cut at Gravenchon and Fos refinery, Grandpuits refinery restart postponed
Brazil	Petrobras	20-25%	Reducing run rates across its refineries
Italy	API		Temporary shut-downs of Ancona refinery
South Africa	Engen		Temporary shut down of Engen refinery
Canada	North Atlantic Oil		Temporary shut down of Come by Chance refinery in Newfoundland and Labrador

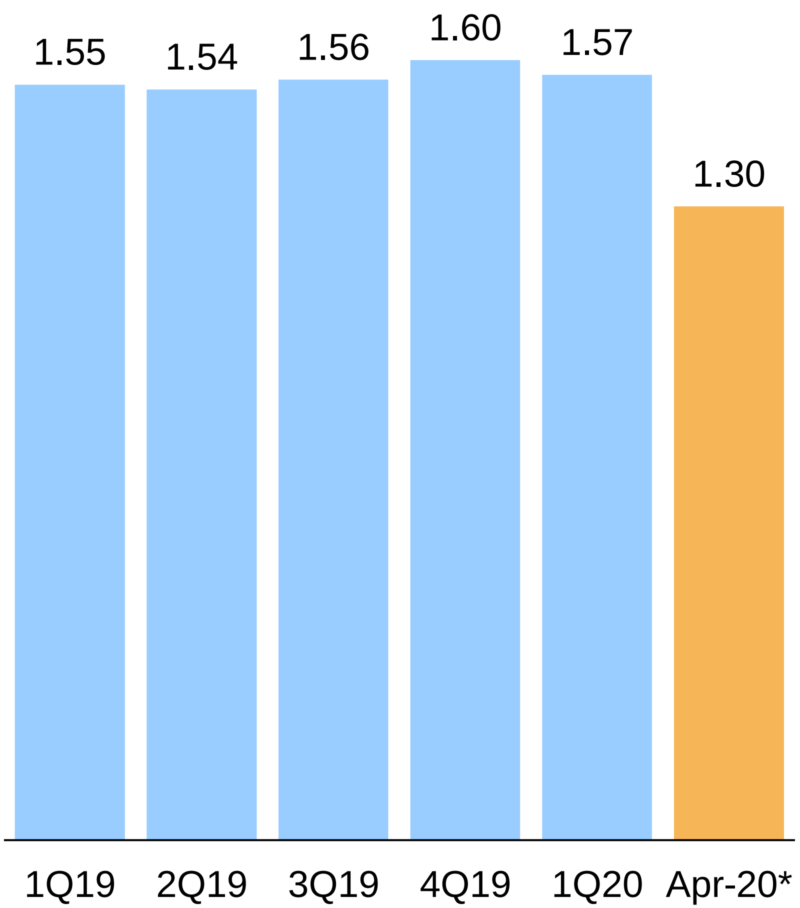
Refiners are globally on average cutting utilization by 15% to 20%

… Amounting to ~15% of global refining capacity

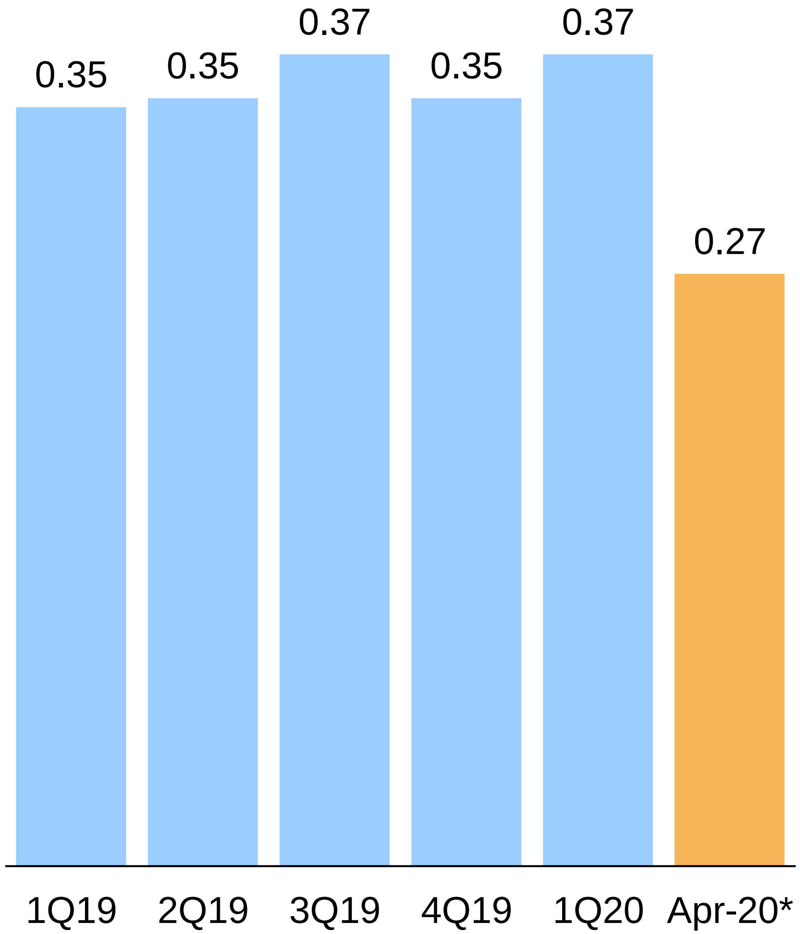


Also, U.S. refiners have started reducing gasoline and jet fuel production amid increasing inventory builds

U.S. Gasoline-Diesel Production Ratio



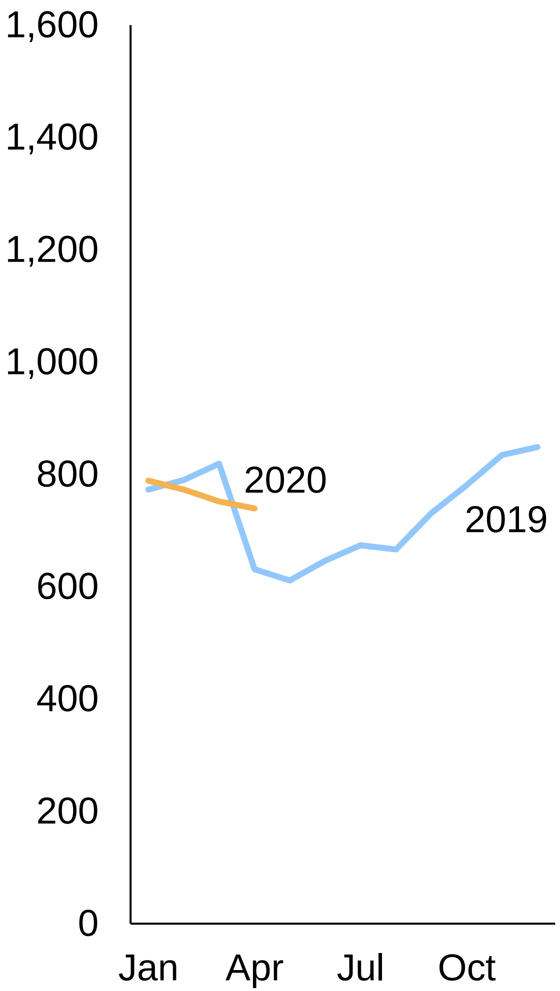
U.S. Jet Fuel-Diesel Production Ratio



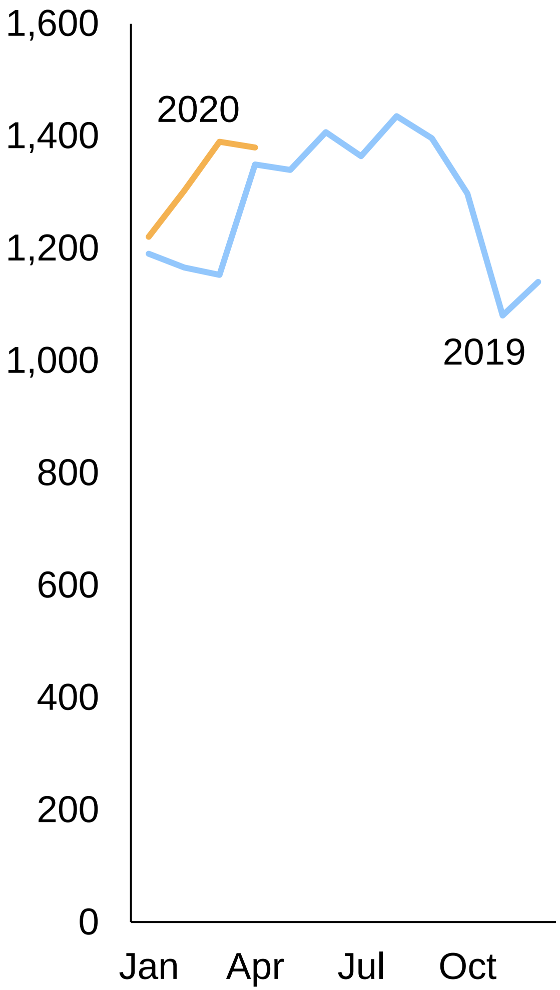
Note: *end of first week

In February and March 2020, U.S. distillates and jet fuel exports picked up year over year by 16% and 33%, respectively

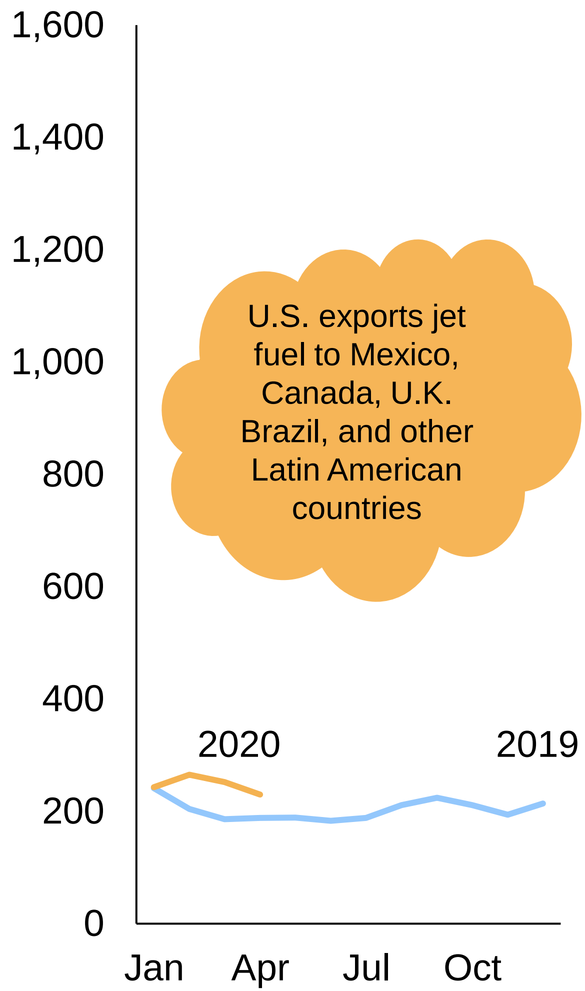
U.S. Gasoline Exports
(Thousand Barrels Per Day)



U.S. Distillates Exports
(Thousand Barrels Per Day)



U.S. Jet Fuel Exports
(Thousand Barrels Per Day)



Pipelines, terminals, traders, wholesalers, and retail – are all planning for demand cuts and storage opportunities

Segment	Discussion
Pipelines and terminals	▪ Fuel pipelines are likely to cut capacity amid falling demand ▪ For example, Colonial Pipeline warned of a 20% cut in capacity due to lack of buyers on the U.S. East Coast, ▪ Terminals and storage tanks as well as pipelines are getting full of fuels amid declining demand and delayed offtakes
Traders	▪ Winter-grade gasoline with higher Reid vapor pressure has not left tanks but summer-grade gasoline supply has begun ▪ Traders are working with government agencies to allow the sale of winter-grade gasoline in the upcoming months
Wholesale and retail	▪ Magellan has reported a 10% and 15% reduction in gasoline and jet fuel demand in the 15 states they serve as a fuel distributor ▪ Traditional price relationships may get weakened amid regional supply and demand imbalances

Q&A session

Uday Turaga
ADI Analytics
CEO

Swati Singh
ADI Analytics
Analyst

Utkarsh Gupta
ADI Analytics
Analyst

Please type your questions / comments
in the chat box

Key questions in fuels and refining markets

1. Operationally, how low can refinery utilization drop?
2. How are some other ways in which refiners' operations are being impacted?
3. What does it take to bring a refinery back online?
4. How will recovery in fuels demand look like?
5. Where will recovery happen first in fuel and refining markets?

ADI webinar series on oil & gas in the "perfect storm"

April 17	Midstream (pipelines, gas processing, NGLs)	May 21	Industrials & OEMs - How to prepare for the downturn?
April 23	Downstream (refining and fuels)	May 28	Capital projects and engineering, procurement, and construction (EPC) in the oil & gas downturn
April 30	Natural gas and LNG	June 04	What will the new "normal" look like in oil and gas?
May 7	Petrochemicals and plastics	June 11	Renewable and low-carbon power markets in a post-COVID world
May 14	Power and utilities	June 18	Oilfield services: Survival outlook in the oil & gas downturn

Sign up at www.adi-analytics.com/covid-19

ADI is offering a new research service to help clients navigate the “perfect storm” from the oil price crash and COVID-19

ADI “Perfect Storm” Research Service			
1	Oil & gas price updates and outlook	**7**	Deep dive into fuels and refining
2	COVID-19-related oil demand impact / recovery	**8**	Deep dive into natural gas and LNG markets
3	Deep dive into upstream incl. shale, conv., offshore	**9**	Deep dive into petrochemicals
4	Oil supply-demand balance and inventories	**10**	Oil & gas capital spend (CAPEX) outlook
5	Oil price forecasts, scenarios, and outlook	**11**	Oil & gas operating spend (OPEX) forecast
6	Deep dive into midstream and NGLs	**12**	Investor implications and opportunities

Service Deliverables
Weekly markets review
In-depth segment reports
Market data spreadsheets
Monthly workshop calls
On-demand analyst time / calls

Contact us at
+1 (832) 768-8806 or
info@adi-analytics.com
to learn more

ADI Analytics

OIL & GAS • ENERGY • CHEMICALS

CELEBRATING 10 YEARS

440 Cobia Drive
Suite 1704
Houston, Texas 77494

+1.832.768.8806
info@adi-analytics.com
www.adi-analytics.com