

Searching for Stability: Exploring the Challenges in the U.S. Refining Sector

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Disclaimer

This presentation contains forward looking projections from independent consultants about global or regional refining capacity, utilization, supply and demand for commodities or products. This information is provided solely for educational purposes. The projections do NOT reflect the large variability among industry participants nor the unique market conditions facing individual facilities. **Each company is expected to make individual decisions on how it may respond to the unique market conditions they face.**

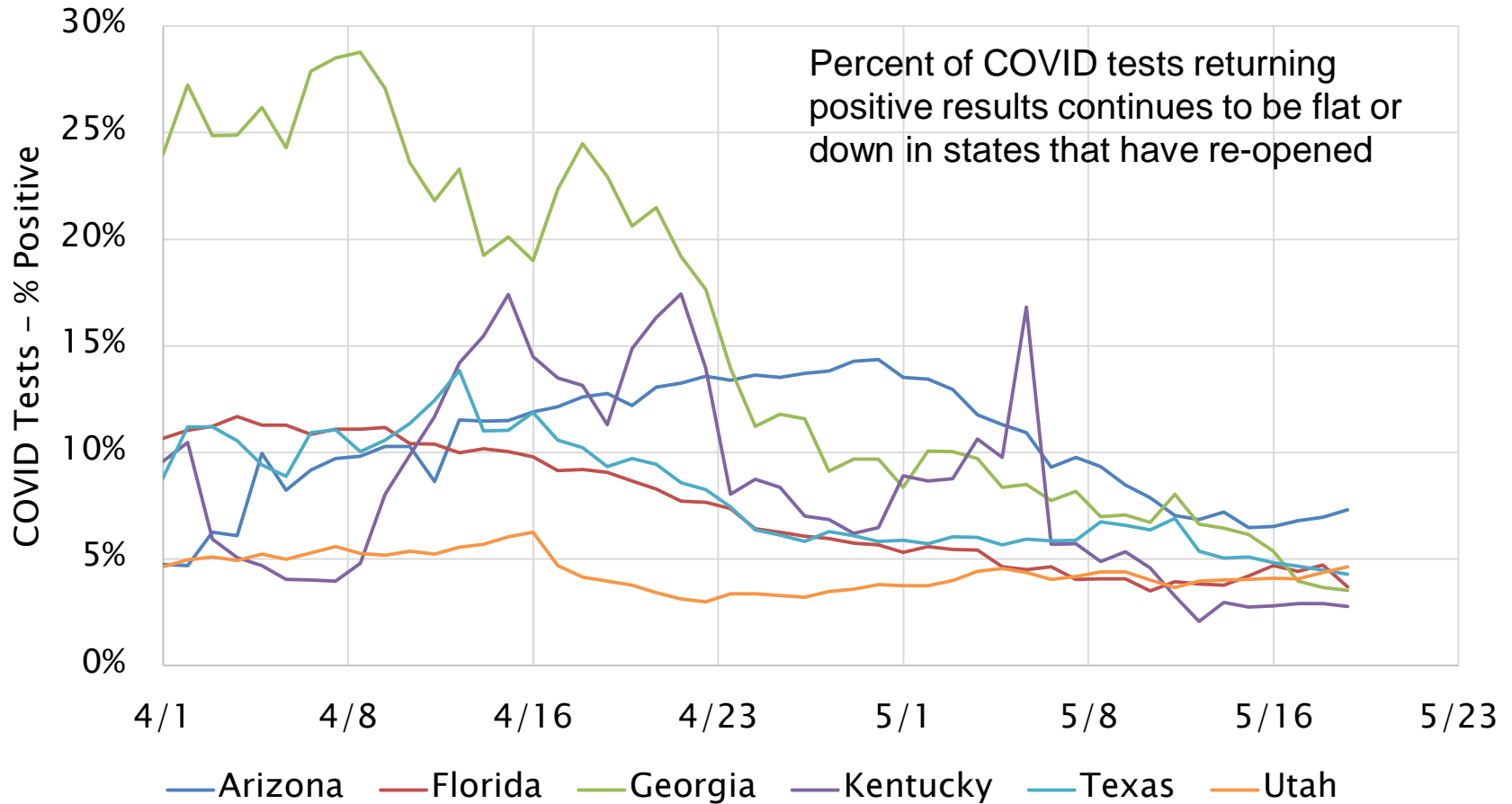
Agenda

- Product Demand: Prospects for Recovery
- Other Issues: Capacity, Crude Supply and Regulations

COVID-19/Reopening Assumptions

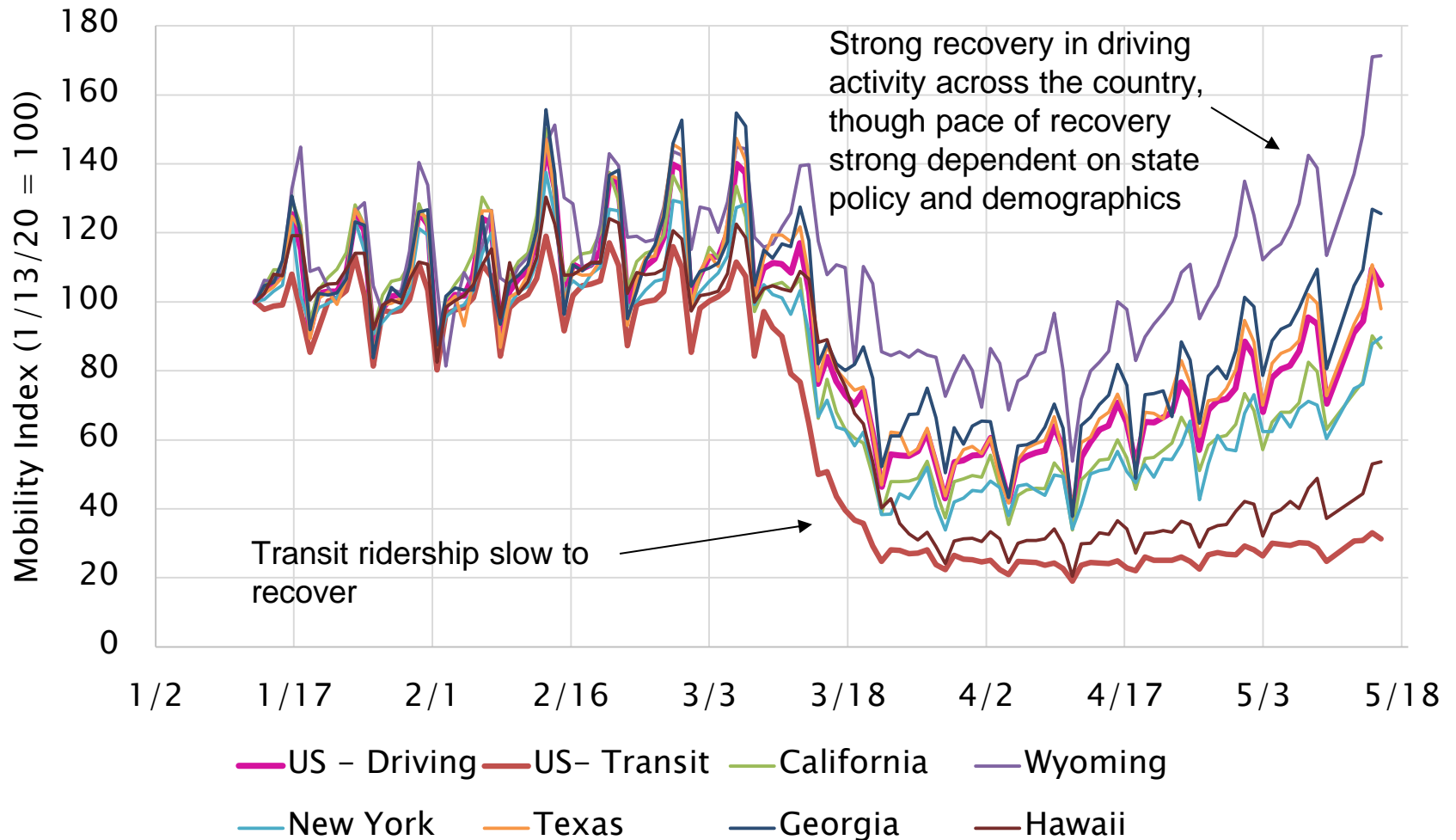
- COVID-19 lockdown measures in the U.S. to be substantively removed over next two to three months
- Regional variation in reopening speed but public pressure will accelerate timing; activity resuming before formal relaxation
- Limited impacts from a “Second Wave”
- No major post-COVID recession (though risk remains) – GDP growth will be impacted by lockdown fallout
- Gasoline demand will recover most rapidly
- Jet demand will be a laggard – could take years to **fully** recover, but bounce back from unsustainable lows has already begun
- Diesel demand growth between gasoline and jet – impacted by slow economic growth and most at risk from a recession
- More downside than upside possibilities

COVID Testing Results – Rolling 7 Day Average



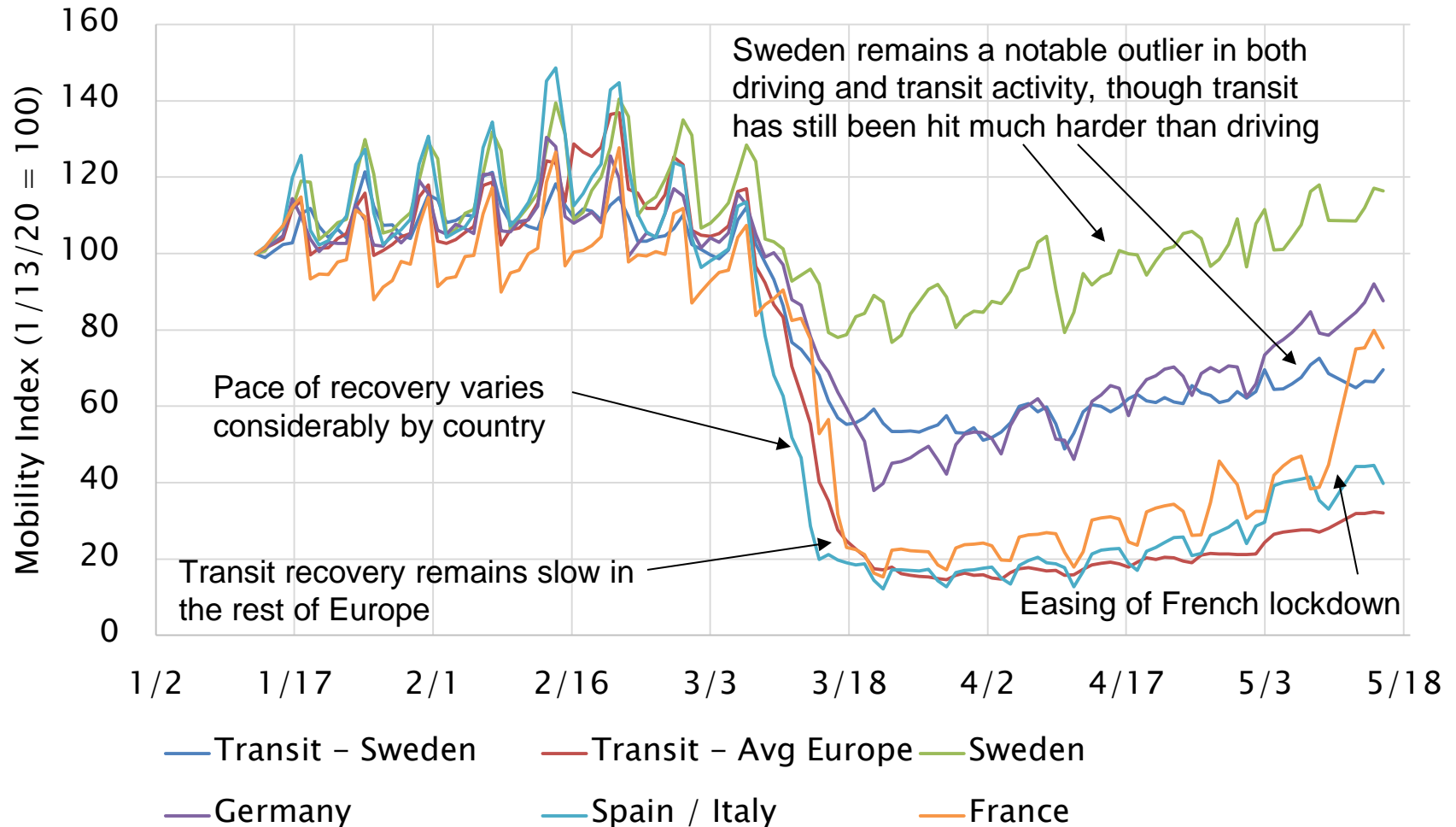
Apple Mobility Data – U.S.

Unless otherwise specified, all data represents driving activity



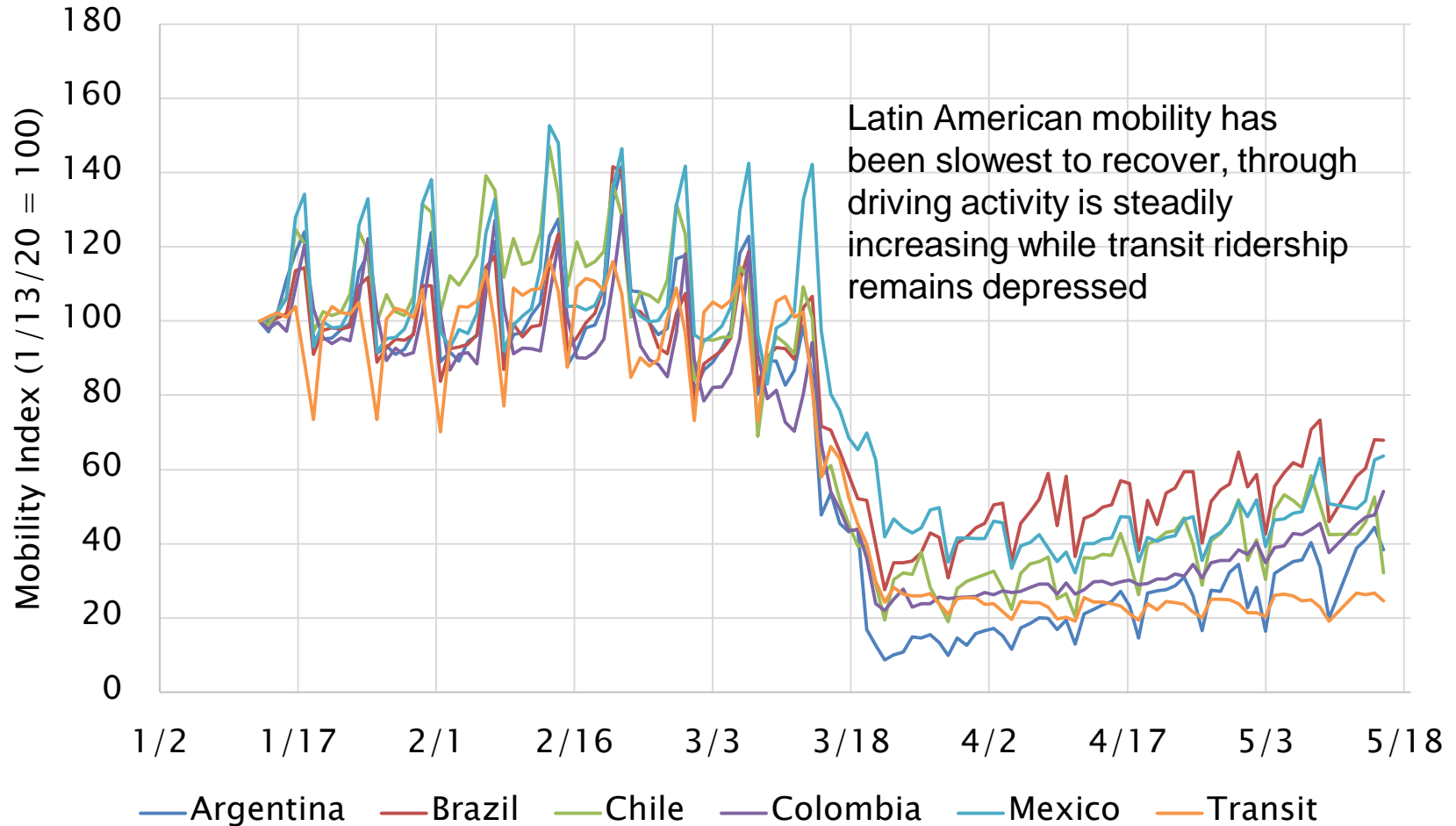
Apple Mobility Data - Europe

Unless otherwise specified, all data represents driving activity



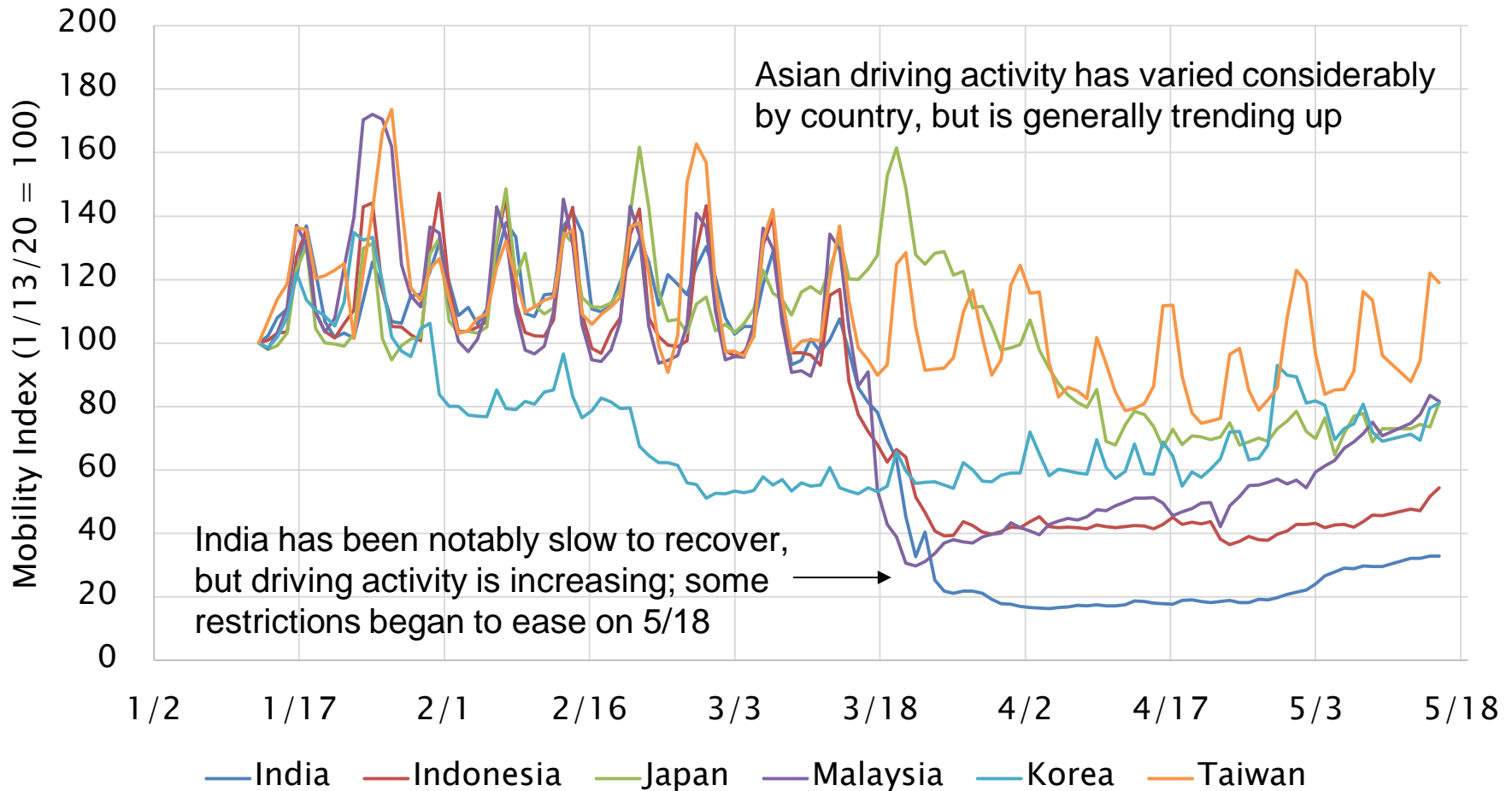
Apple Mobility Data – Latin America

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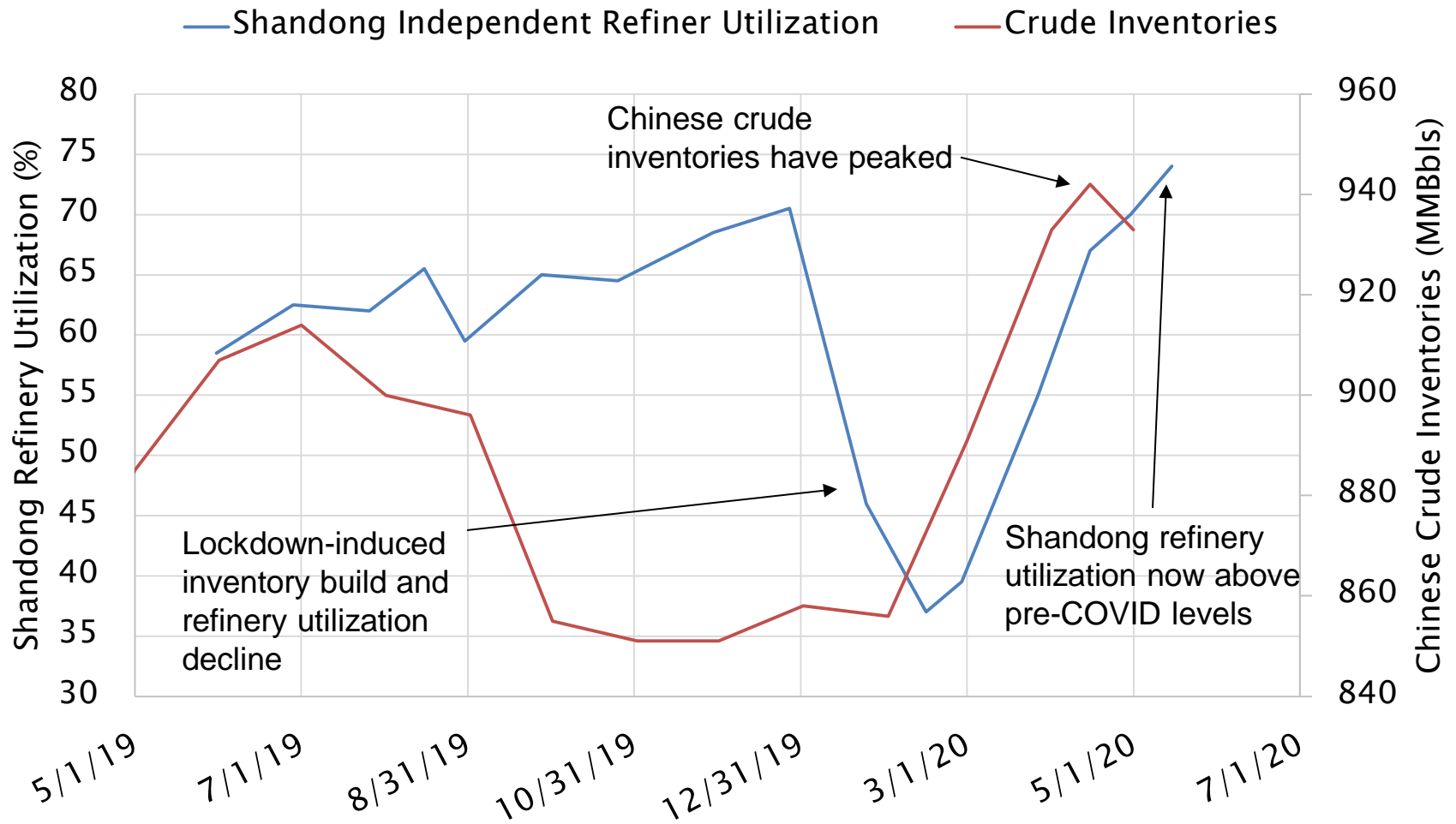


Apple Mobility Data – Asia

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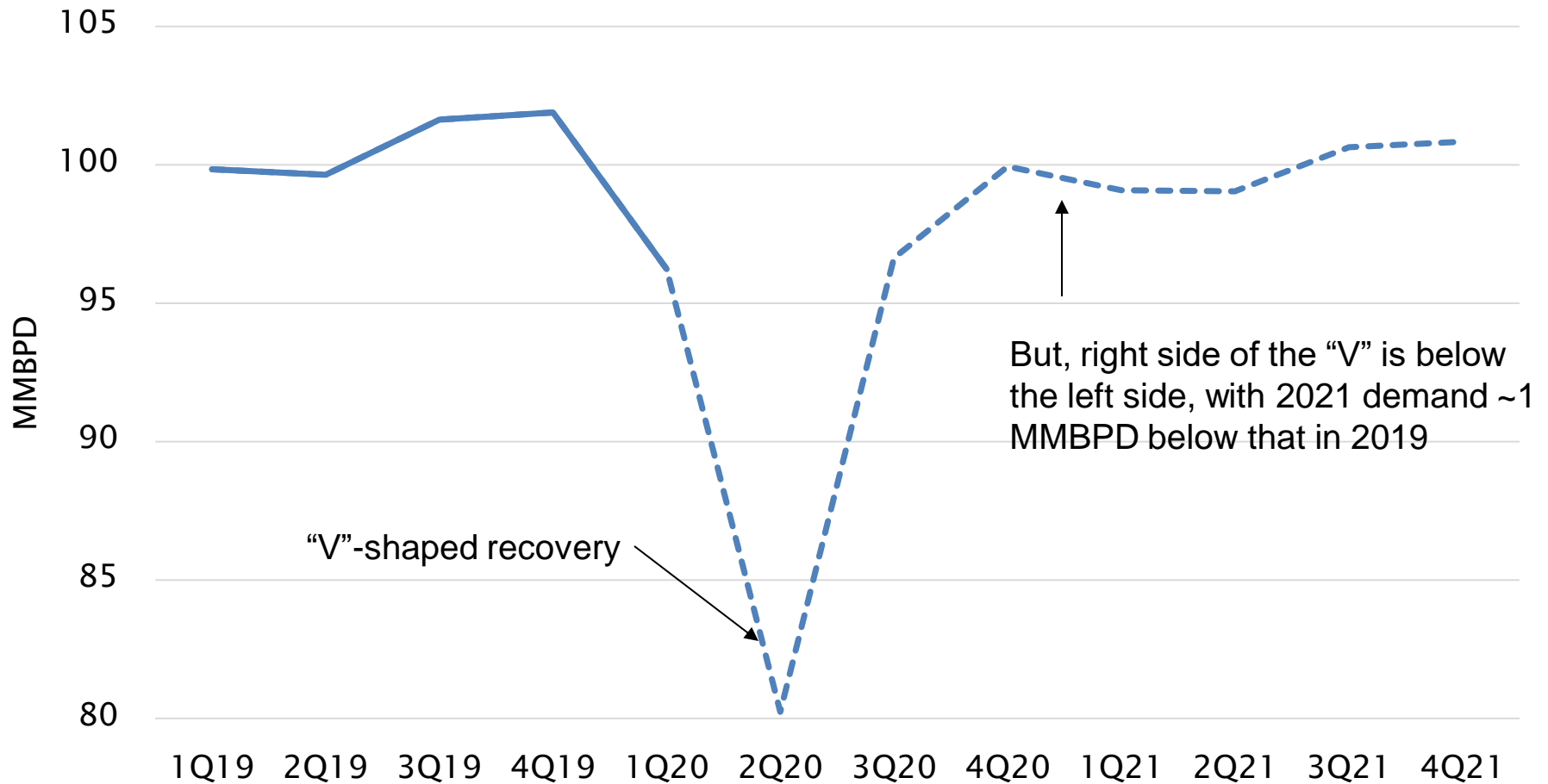


Chinese Recovery

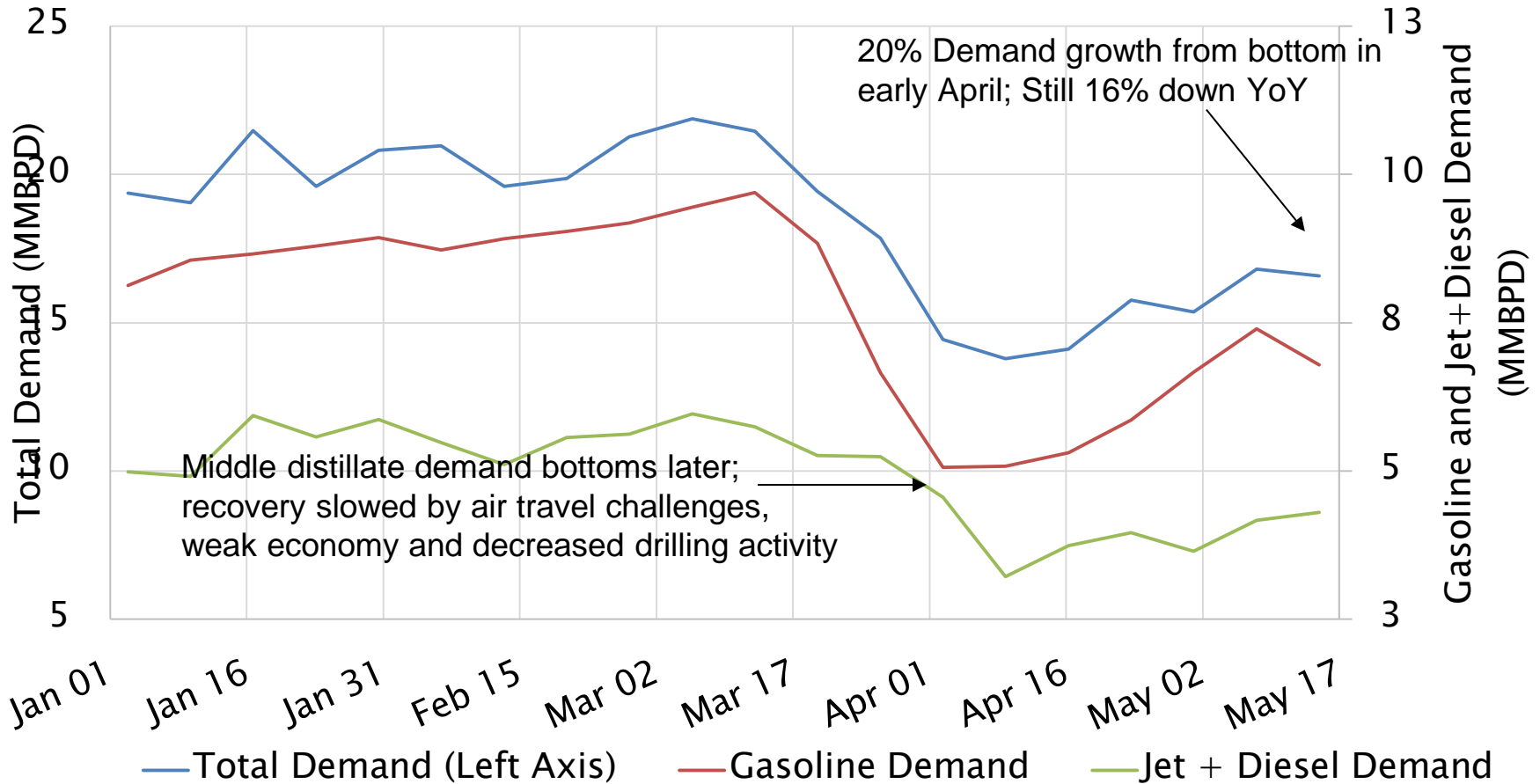


Short-Term Global Demand Outlook

Global Demand for All Petroleum Products

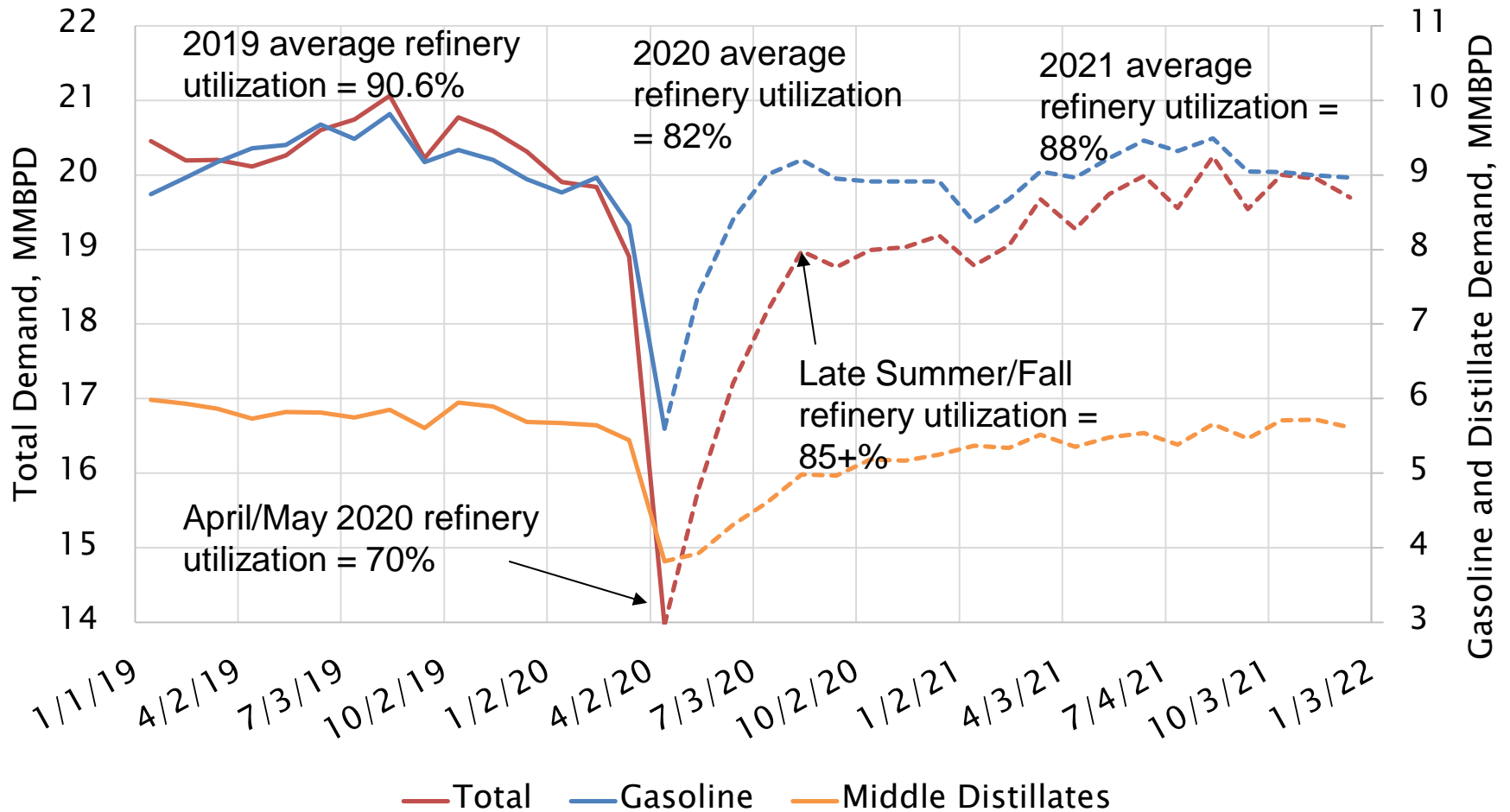


U.S. Demand has Bottomed



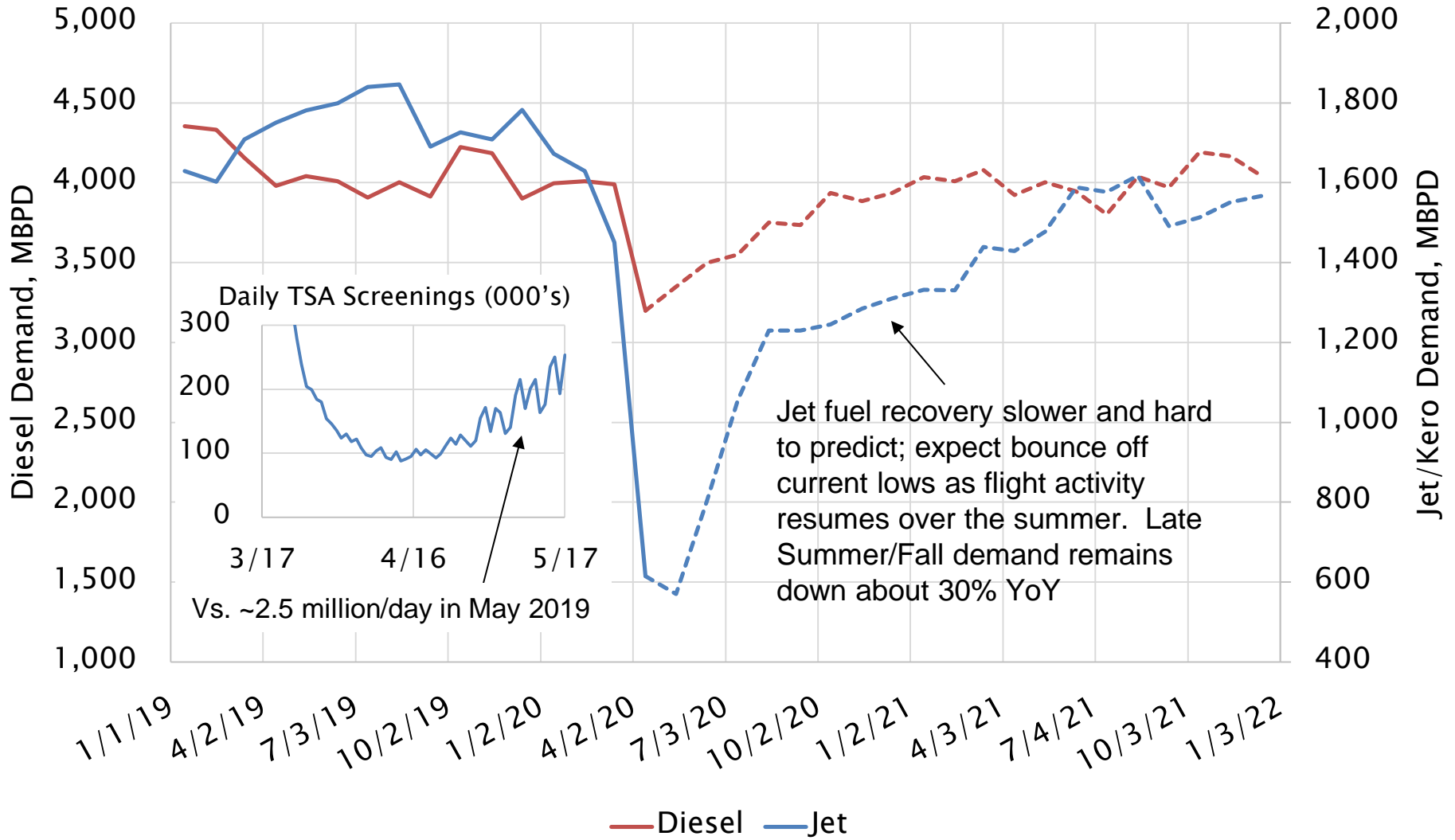
Note that this data is preliminary and subject to revision. We believe actual demand, particularly for gasoline, was lower than reported by EIA for the weeks ending between April 24 and May 8; We believe actual gasoline demand for the week ending May 15 was slightly higher than reported by the EIA.

Short Term Outlook

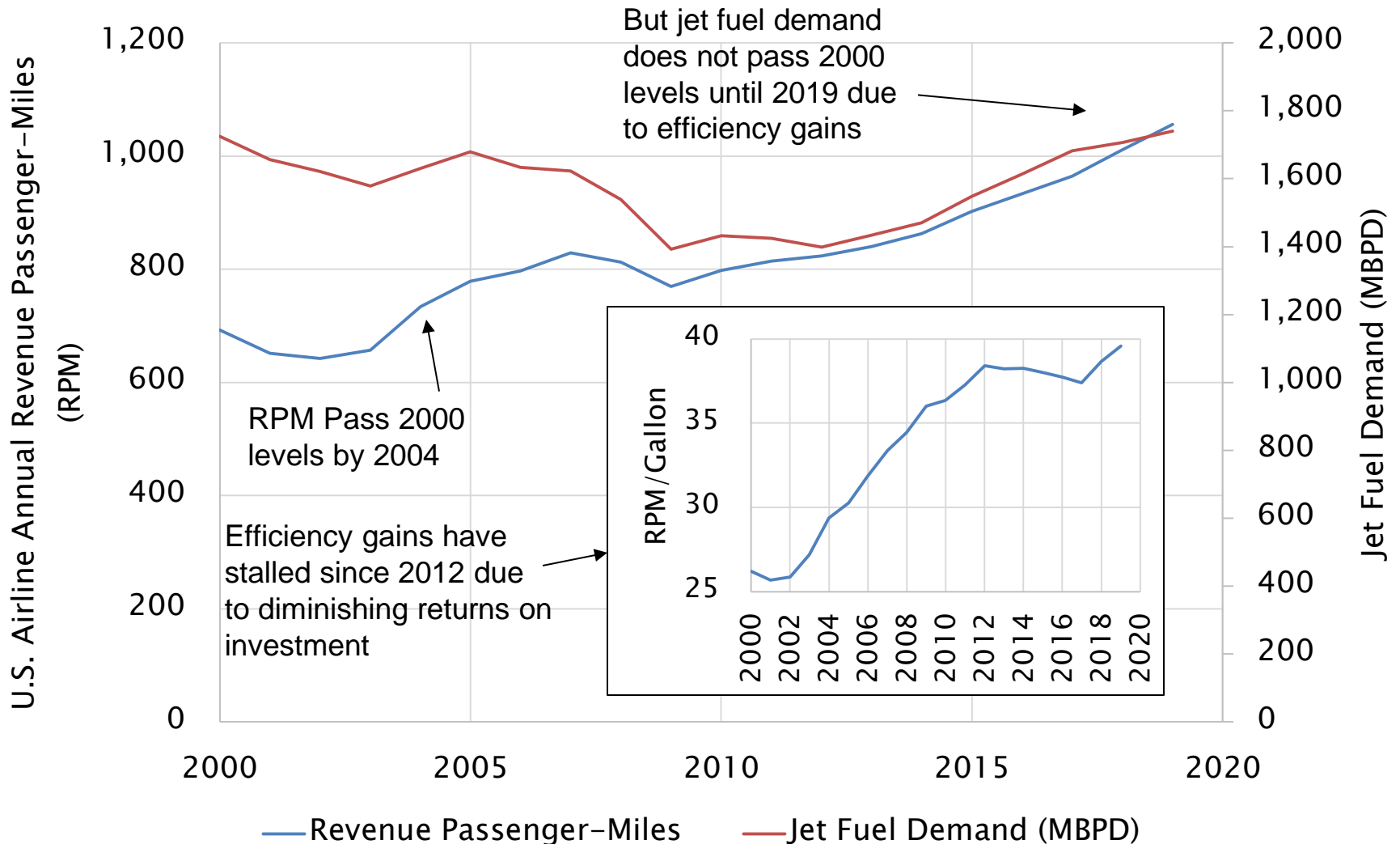


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Diesel / Jet Outlook

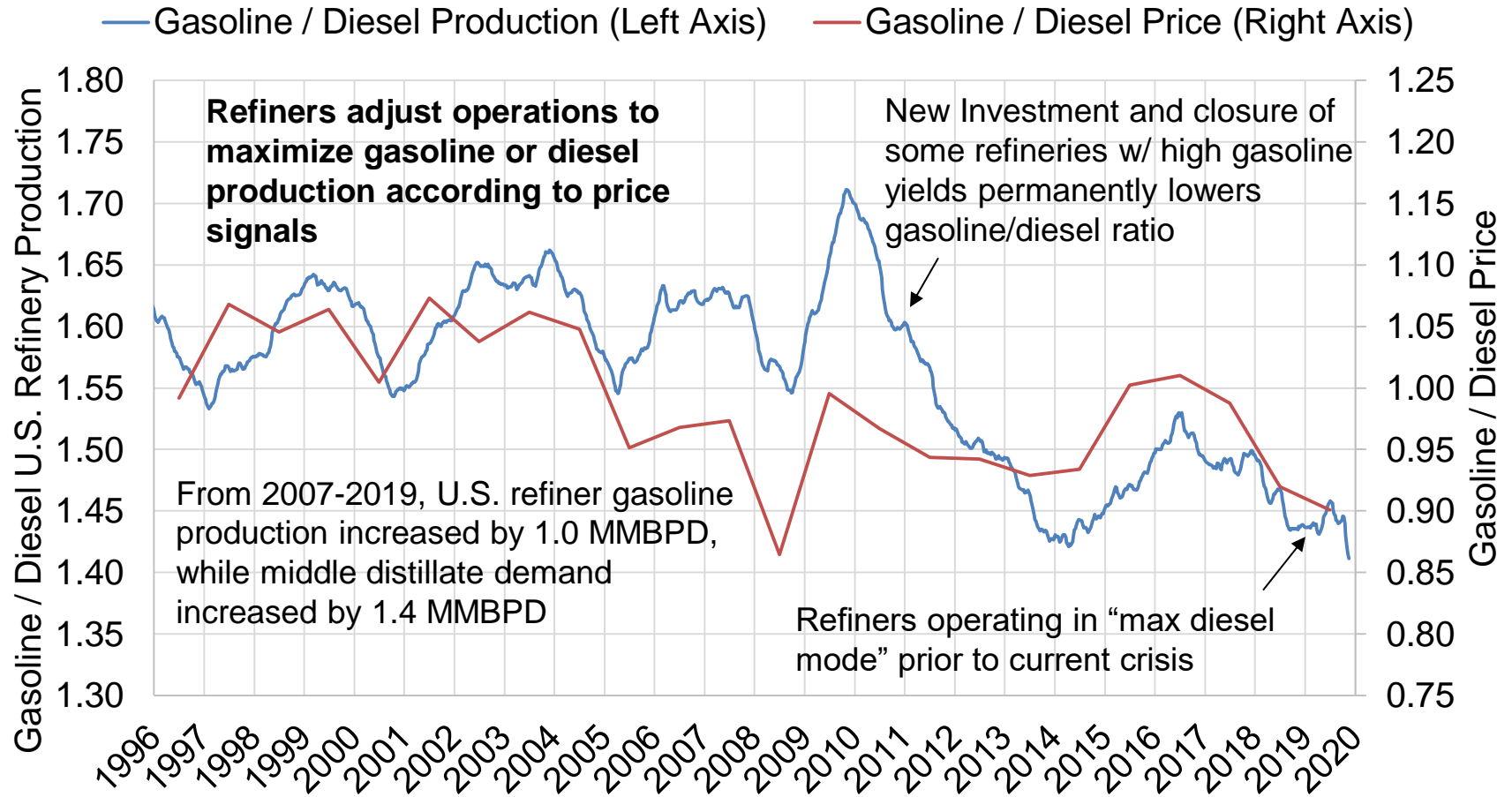


Jet Demand Recovery Post-9/11

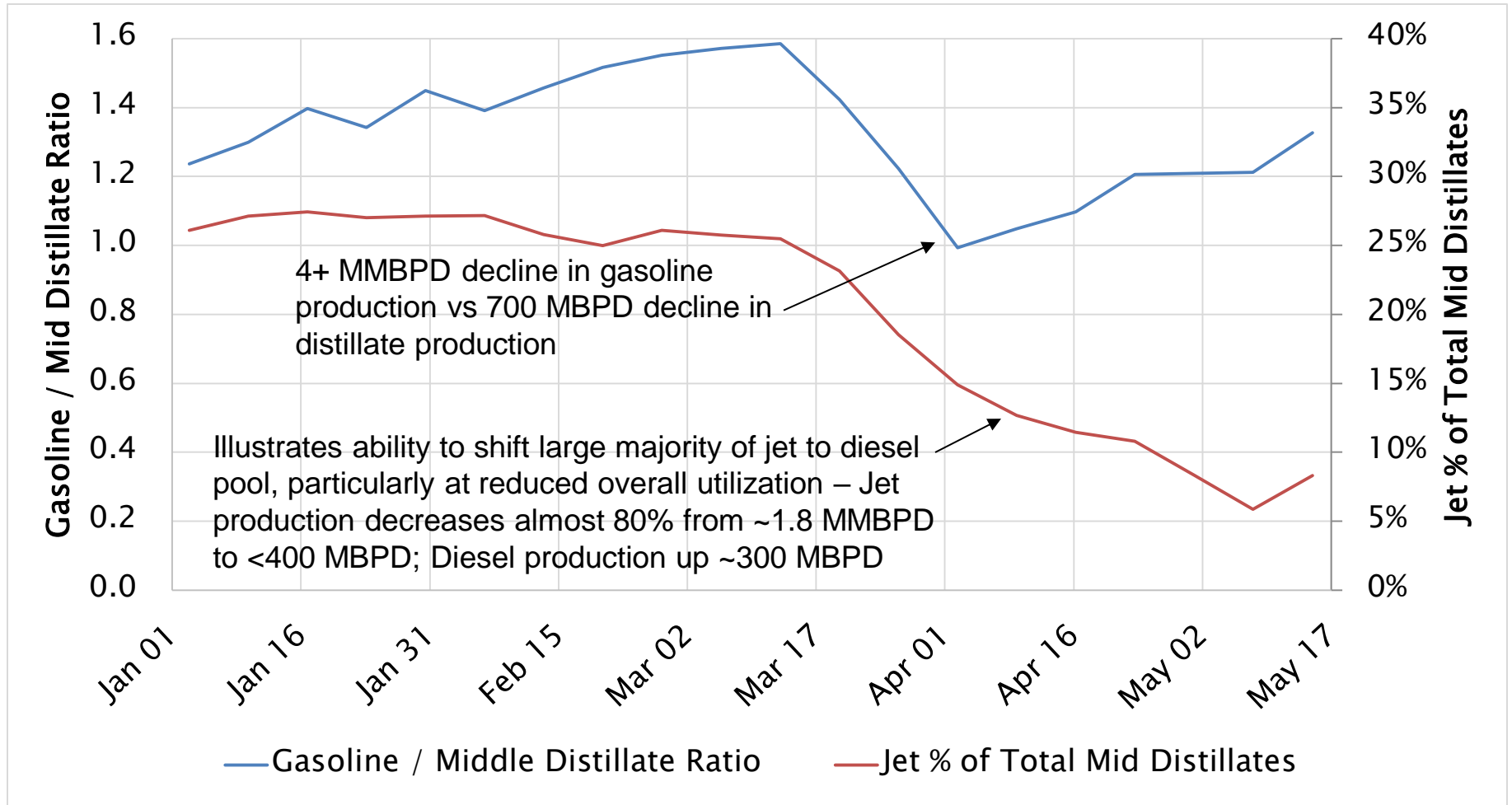


Product Flexibility/Move Towards Diesel

U.S. Refinery & Blender Gasoline / Diesel Production vs. Price

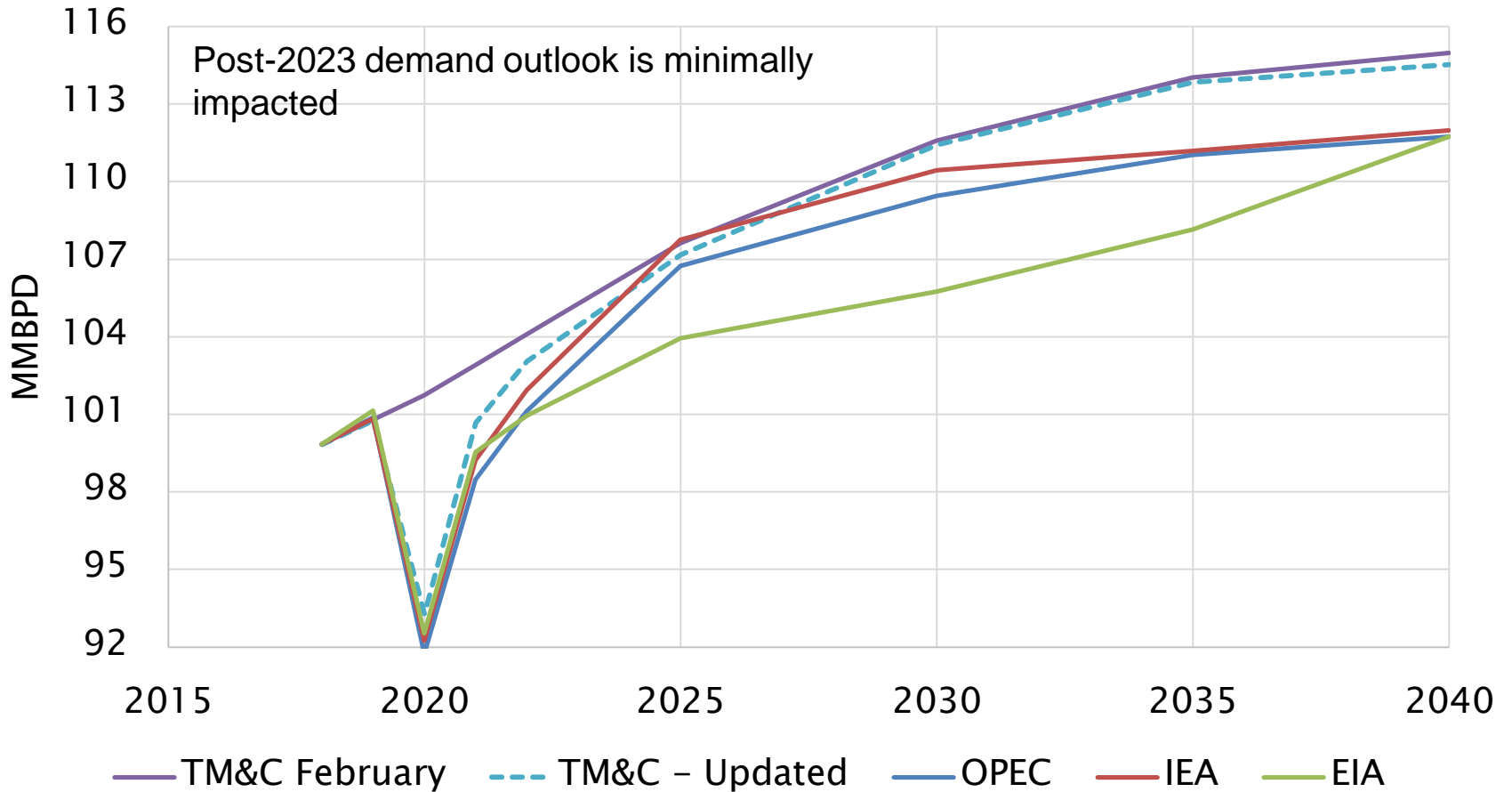


Yield Adjustments – COVID Response



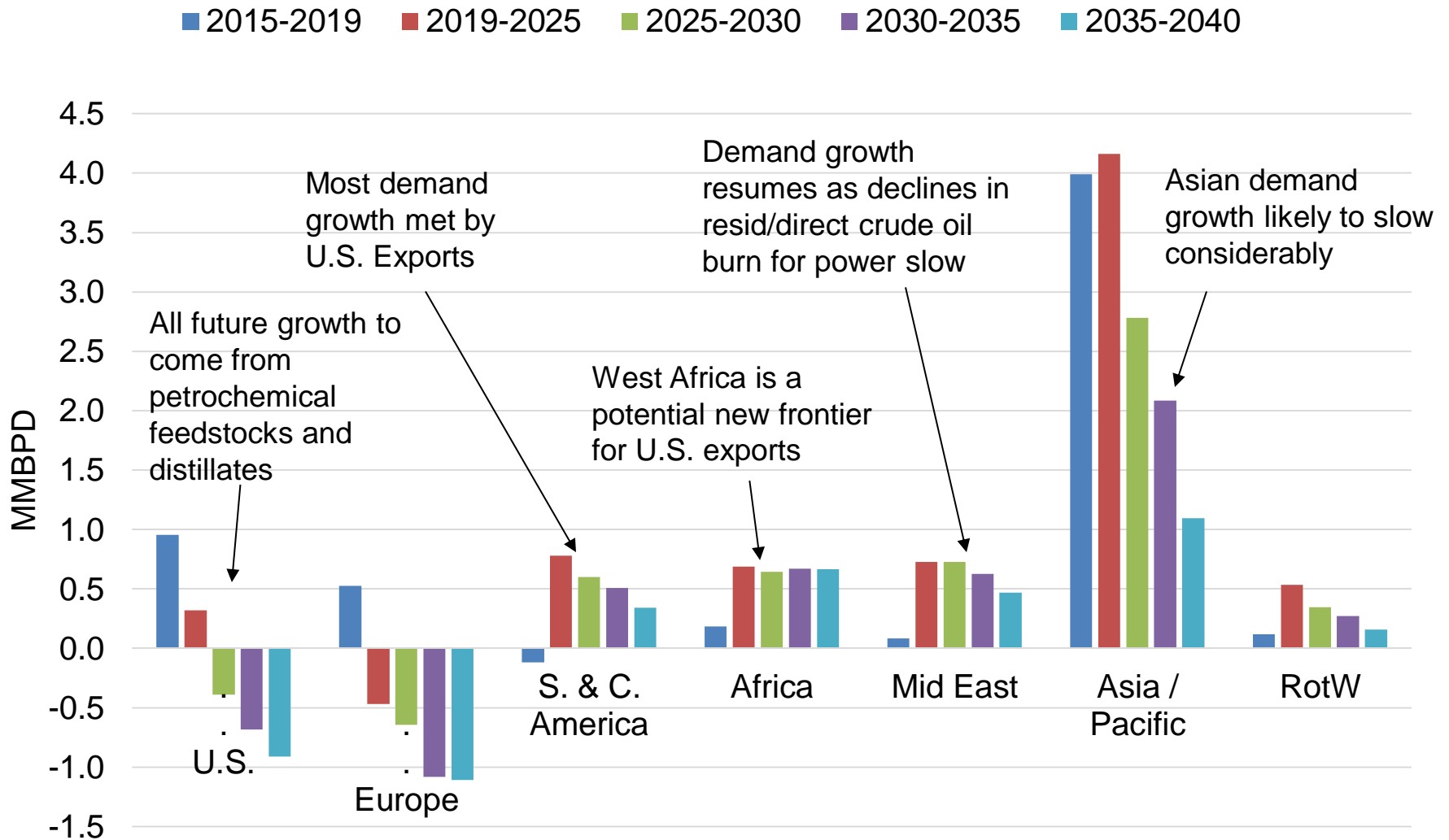
Global Demand Outlook

Global Demand Outlook Comparison

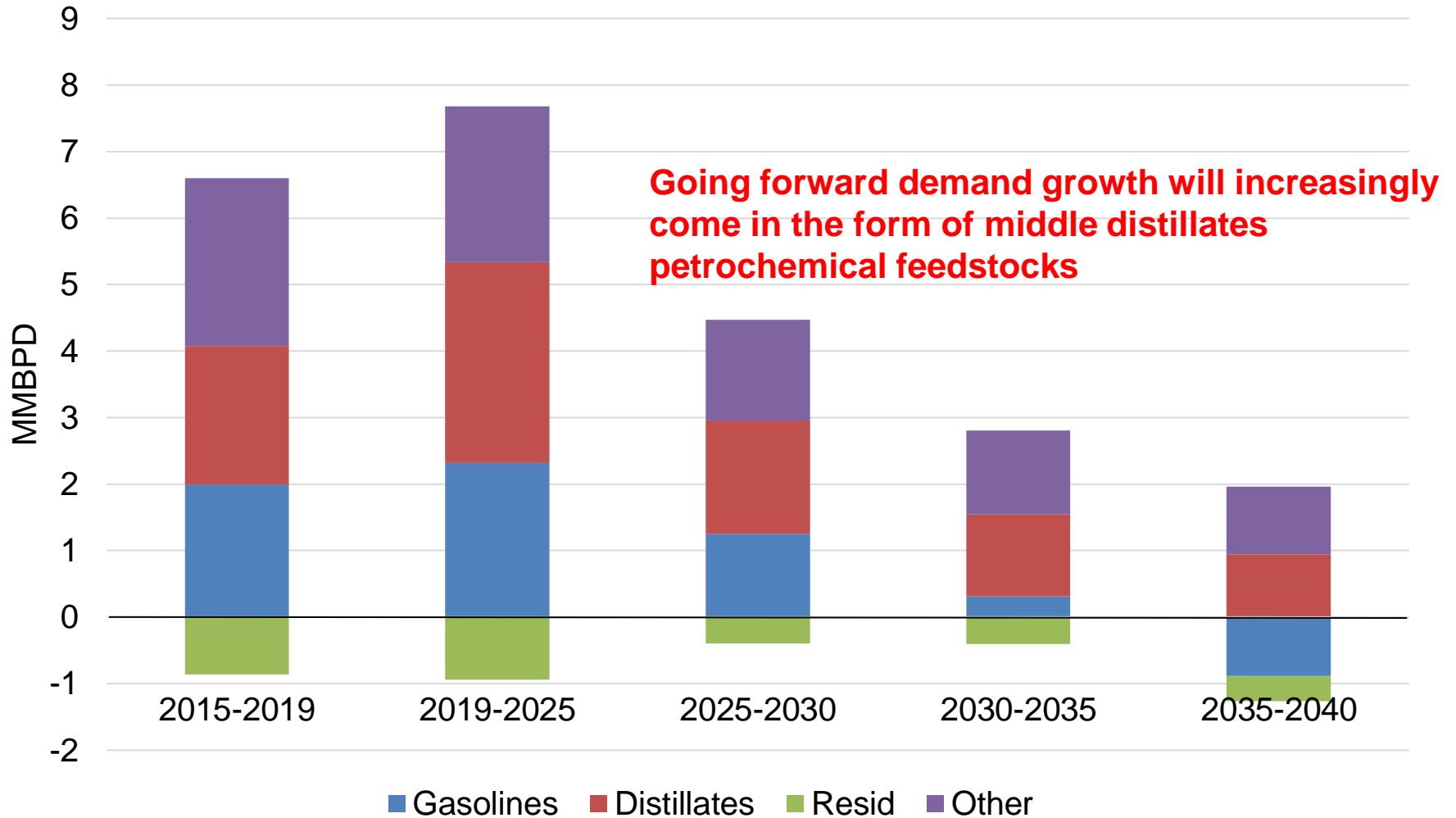


*2018 data normalized to 99,843 MBPD for all sources; EIA, OPEC and IEA forecast utilize of hybrid of short & long term forecasts

Regional Demand Growth



Demand Growth by Product Category



Proposed ICE Bans

Location	Target Date	Comments
Norway	2025	
Germany	2030	
Ireland	2030	
Israel	2030	Has expressed strong support for CNG to replace petroleum
Netherlands	2030	
Slovenia	2030	
Sweden	2030	
India	2030	Plan will depend on whether or not EVs are economical
France	2030	
Denmark	TBD ⁽¹⁾	
United Kingdom	2035	Also bans HEVs and PHEVs
Taiwan	2040	All-electric motorcycles by 2035
Eight ⁽²⁾ U.S. States	2050	100% EV fleet by 2050

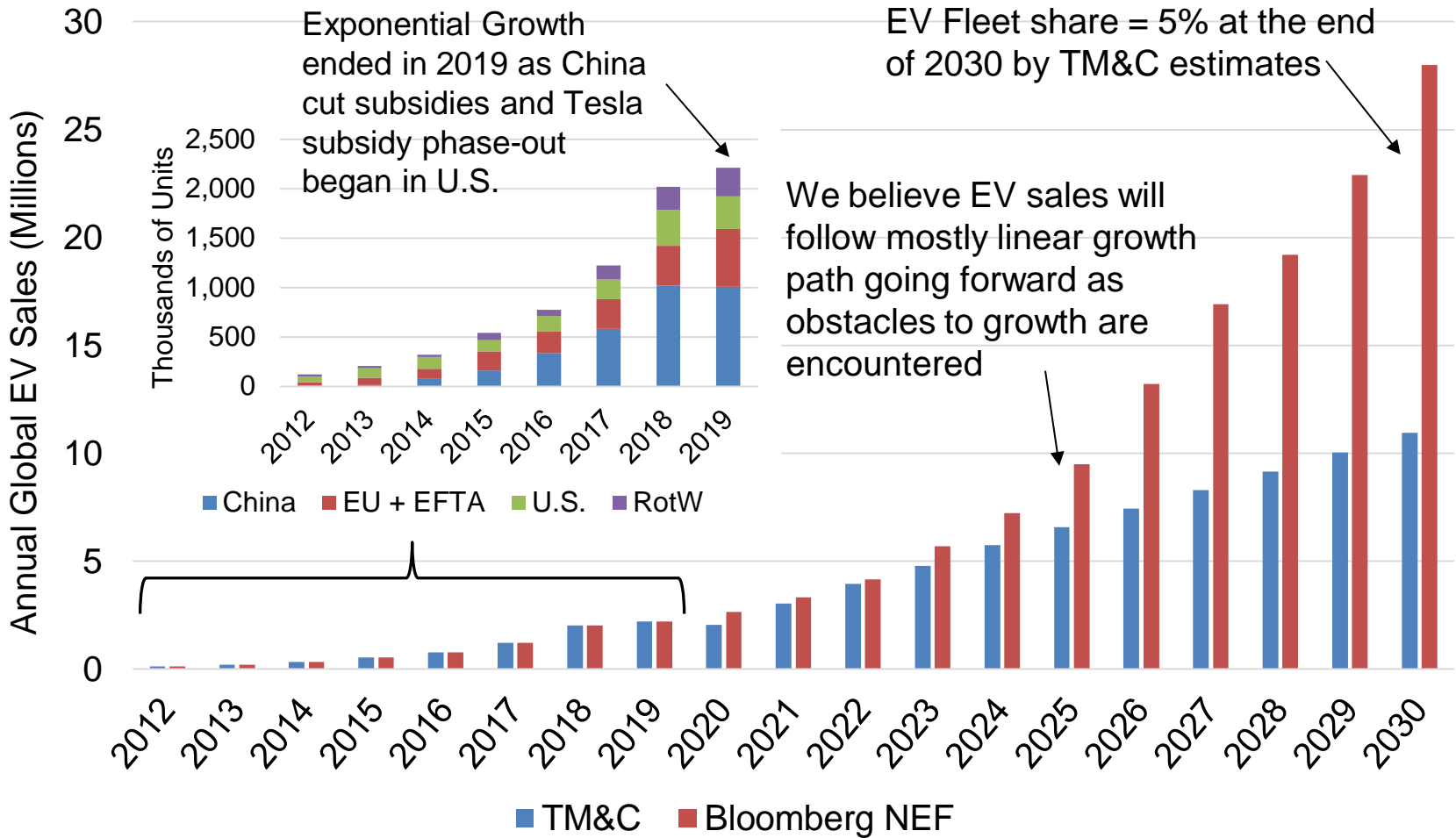
⁽¹⁾Originally set at 2030 date, but withdrew plan as it reportedly violated EU rules; has called for the EU to ban new ICE car sales by 2040.

⁽²⁾California, Connecticut, Maryland, Massachusetts, New York, Oregon, Rhode Island, & Vermont

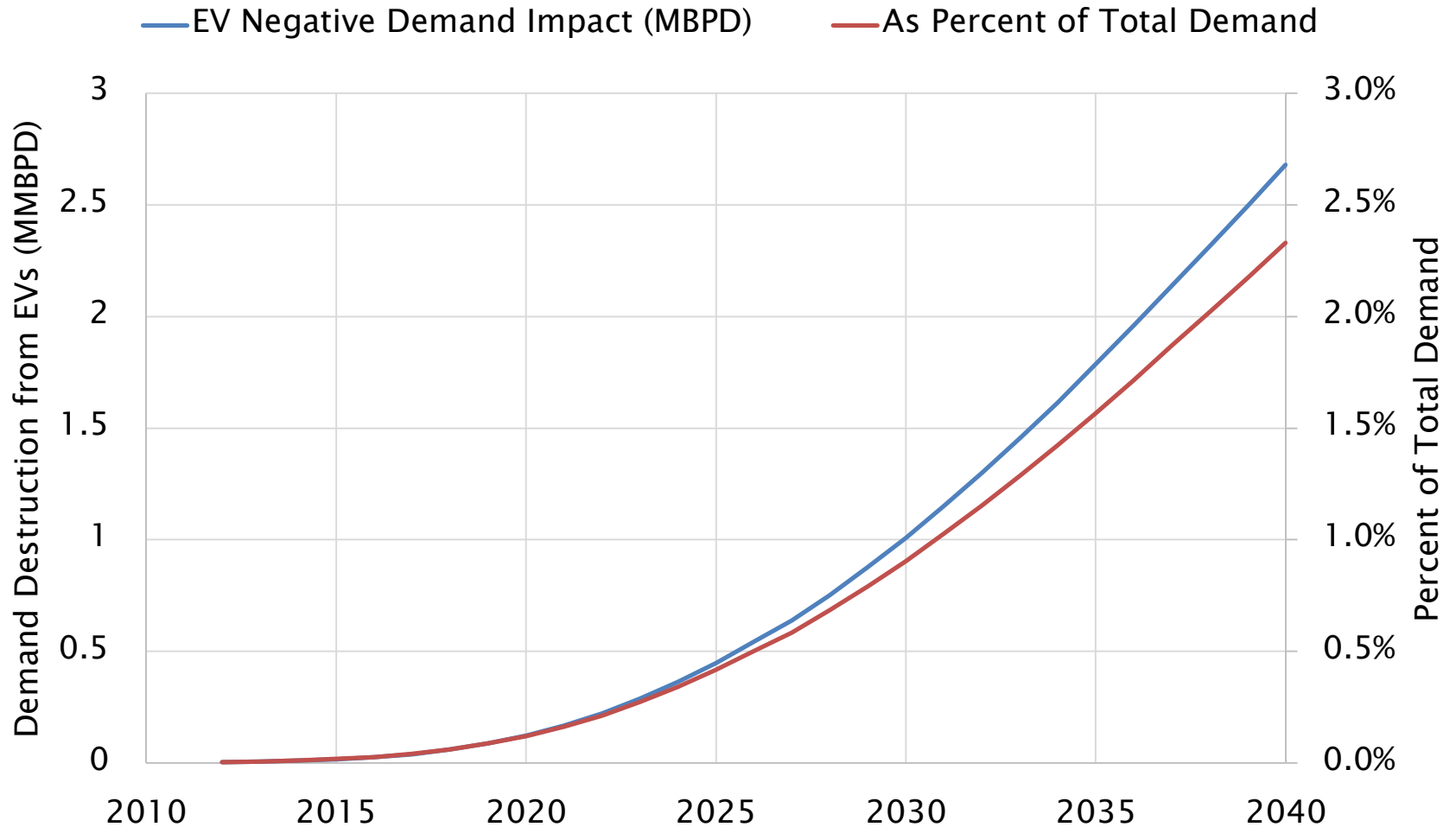
Proposed ICE Bans - Questions

- Dates remain far out into the future – Norway is the only large country to propose a ban before 2030
- New administrations and legislatures will be responsible for upholding or changing these timelines
- Will depend upon economics and availability (India specifically states that ban is subject to economic feasibility)
- Most provide little specificity as to what will be allowed (some imply that hybrids will qualify and Israel has pushed for CNG)
- Denmark's plan withdrawal due to a reported violation of EU rules brings the other proposed European bans into question as well

EV Sales Forecast



Expected Global EV Demand Impact

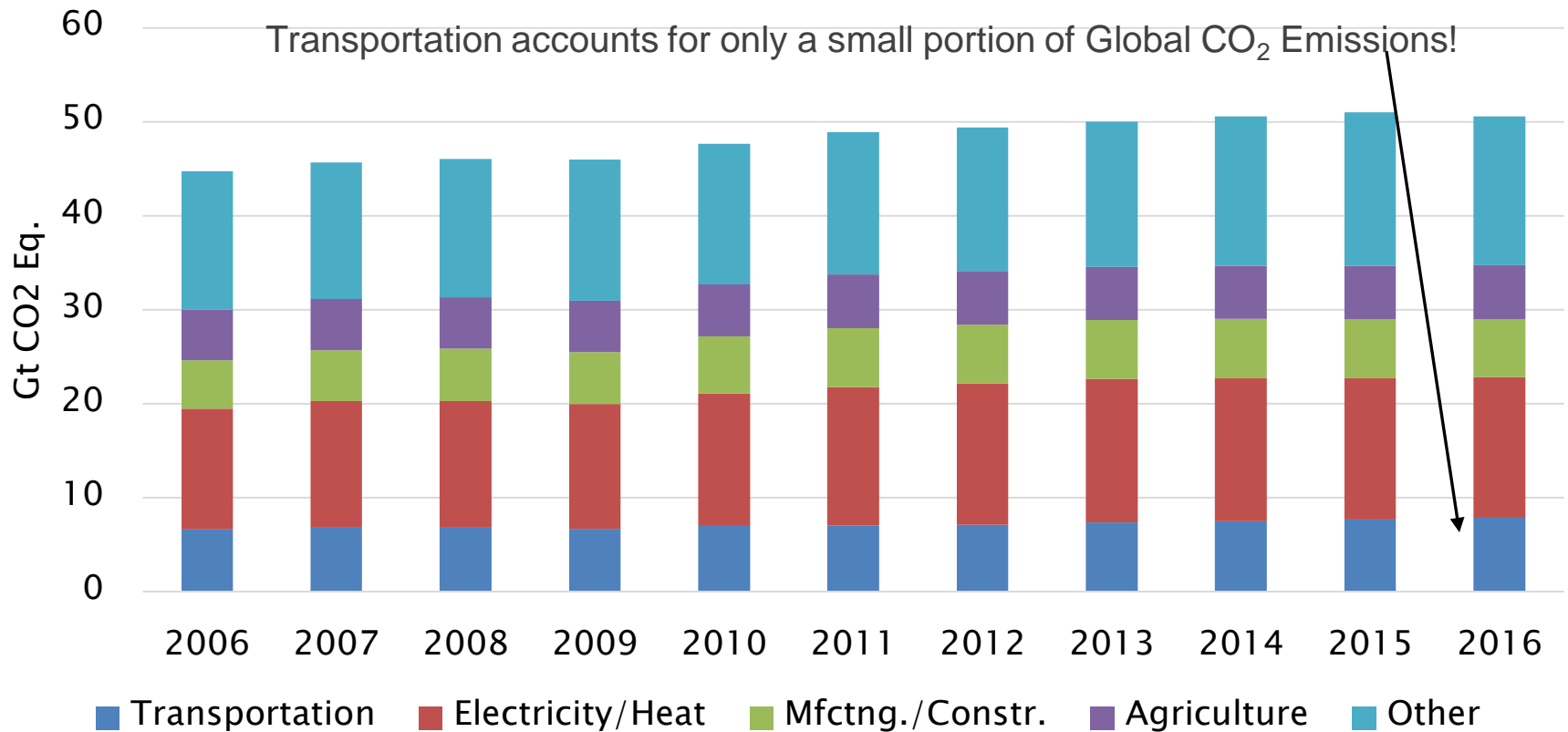


Obstacles to EV Sales Growth

- Cost – w/o subsidies EVs will remain more expensive for the foreseeable future. One exception may be short-range city cars, which have struggled to sell well thus far outside China
- Home Charging – 30% of Americans 42% of Europeans live in Apartments, Flats or Condos
- Cold weather performance – Battery performance significantly declines in cold weather
- Charging Infrastructure – Due to long charge times, significantly more charging infrastructure will be needed than is currently needed for ICEV fueling
- Environmental – at current U.S. electrical grid CO2 intensity, an EV provides only a minimal decrease in lifetime CO2 emissions compared to a conventional hybrid. If electrical grid CO2 intensity decreases by 40% from current levels, lifetime CO2 emissions are still only reduced by ~20%, due largely to energy intensive mining and manufacturing processes associated with battery production

EVs Will Not Have a Meaningful Impact on Reducing CO₂

Global GHG Emissions by Source



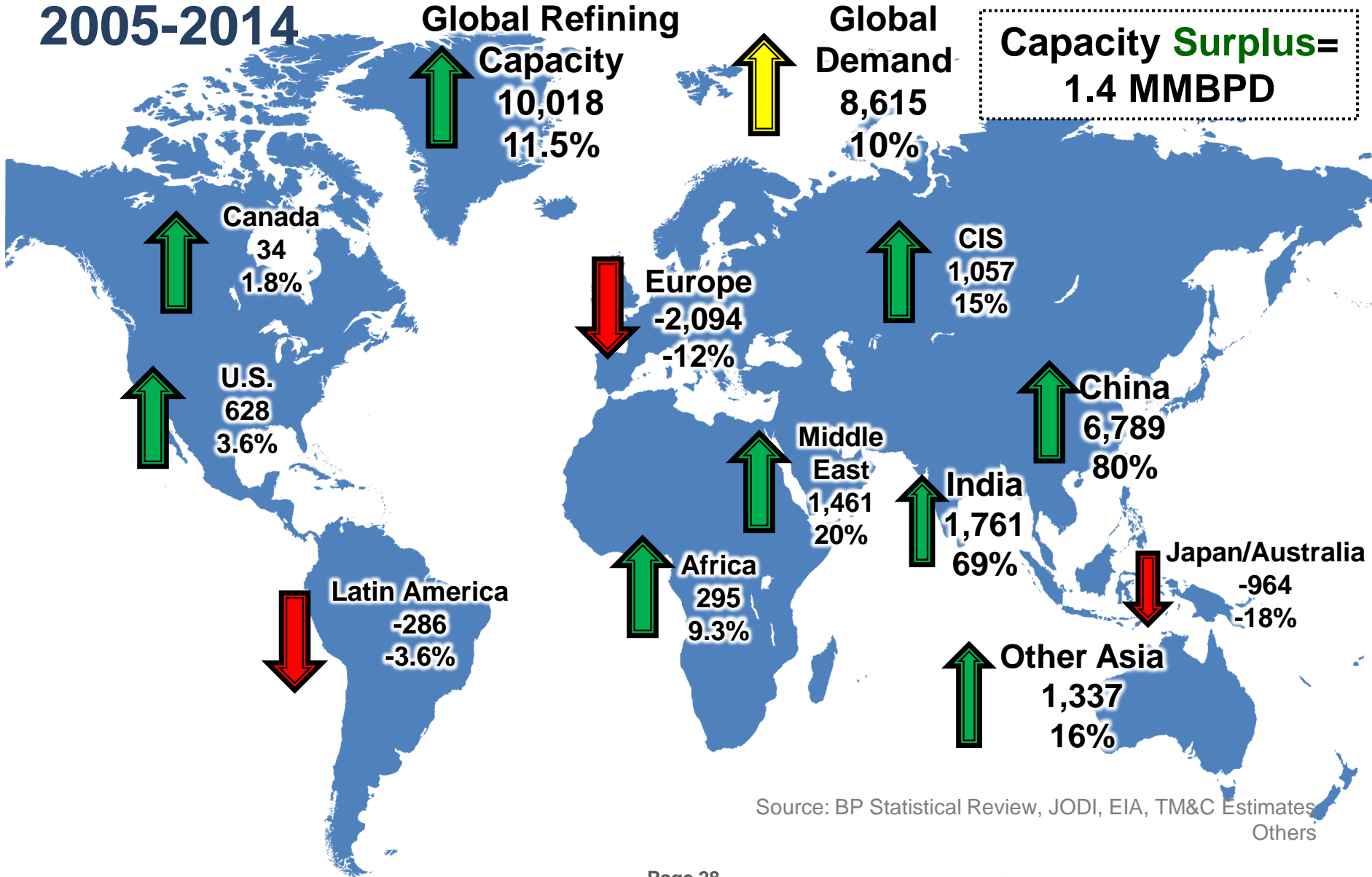
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- Other Issues: Capacity, Crude Supply and Regulations

Global Refining Capacity Shifts, MMBPD

2005-2014



Source: BP Statistical Review, JODI, EIA, TM&C Estimates, Others

Global Refining Capacity Shifts, MMBPD

2014-2019

Global Refining Capacity
3,742
3.4%

Global Demand
7,563
8.1%

Capacity Deficit = 3.8 MMBPD

1 -2 Million BPD under threat

Canada
121
6.2%

U.S.
546
1.1%

Latin America
-369
-6.5%

Europe
-7
0%

Africa
72
2.1%

Middle East
1,577
13%

India
702
7.2%

Other Asia
502
7.1%

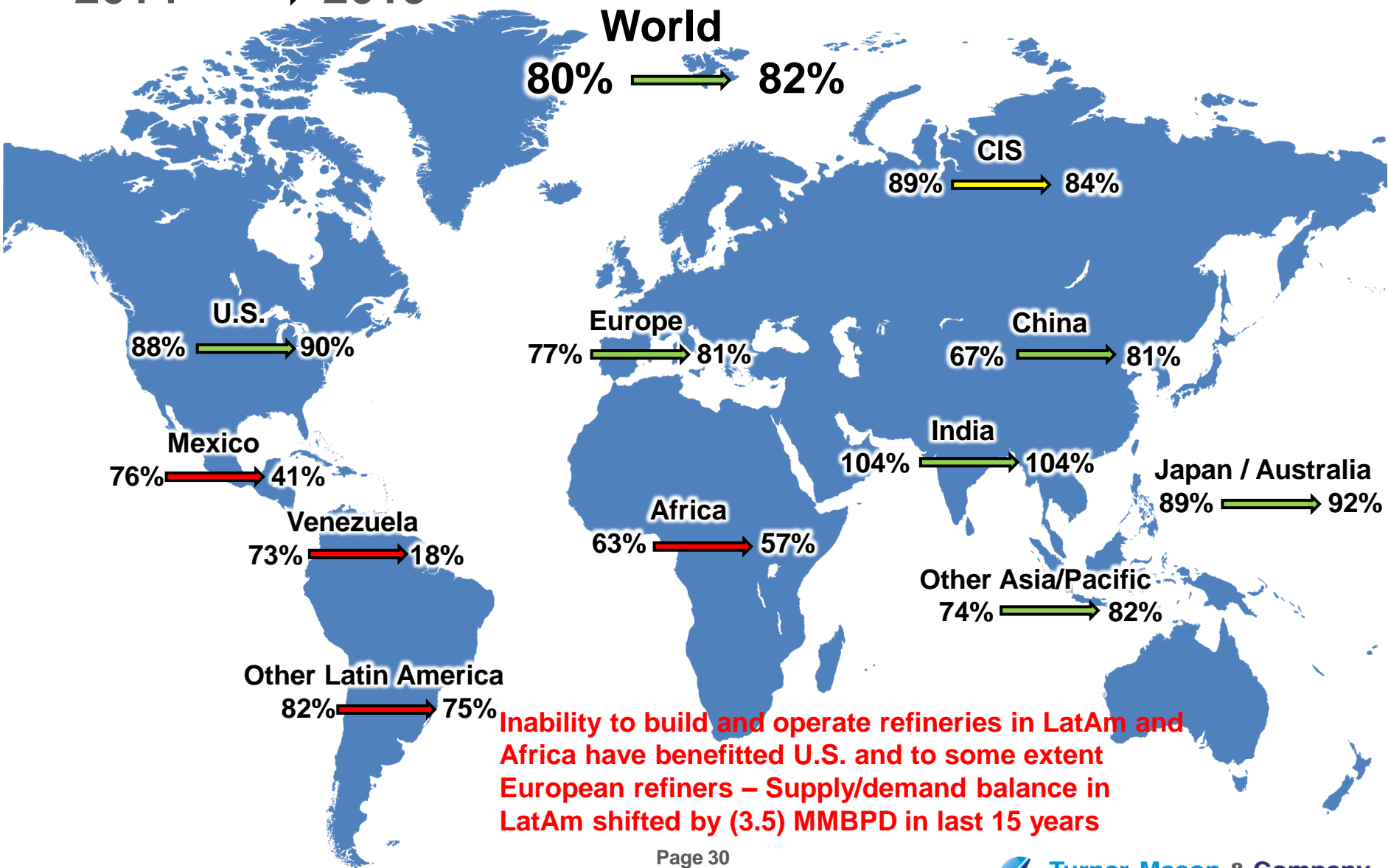
CIS
223
1.1%

China
863
7.3%

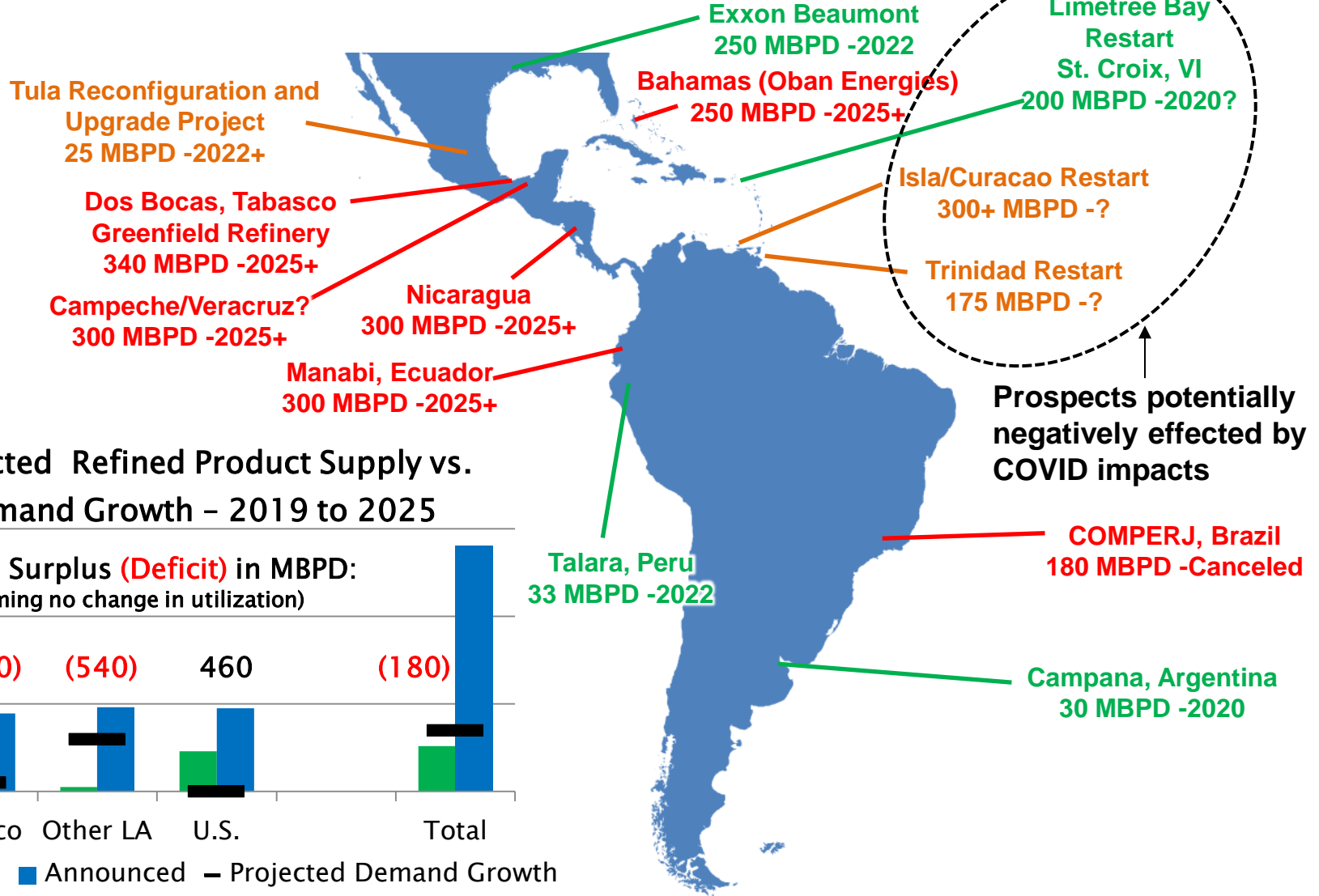
Japan/Australia
-489
-9%

Global Refining Utilization

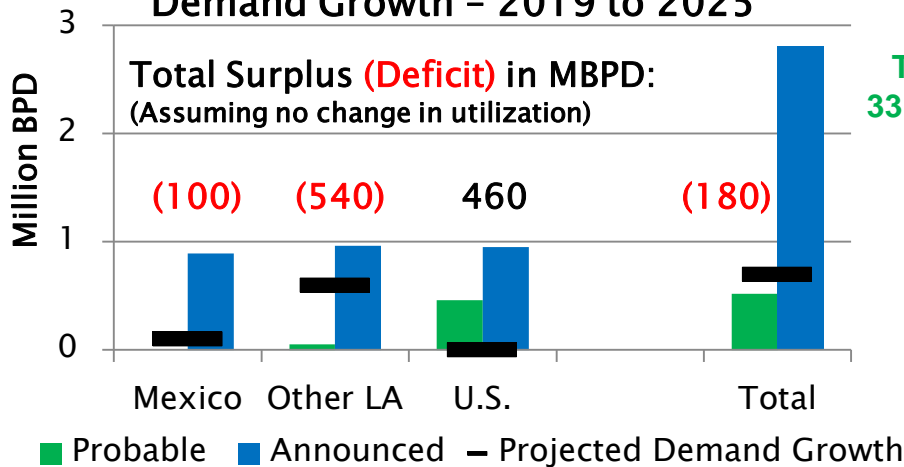
2014 \Longrightarrow 2019



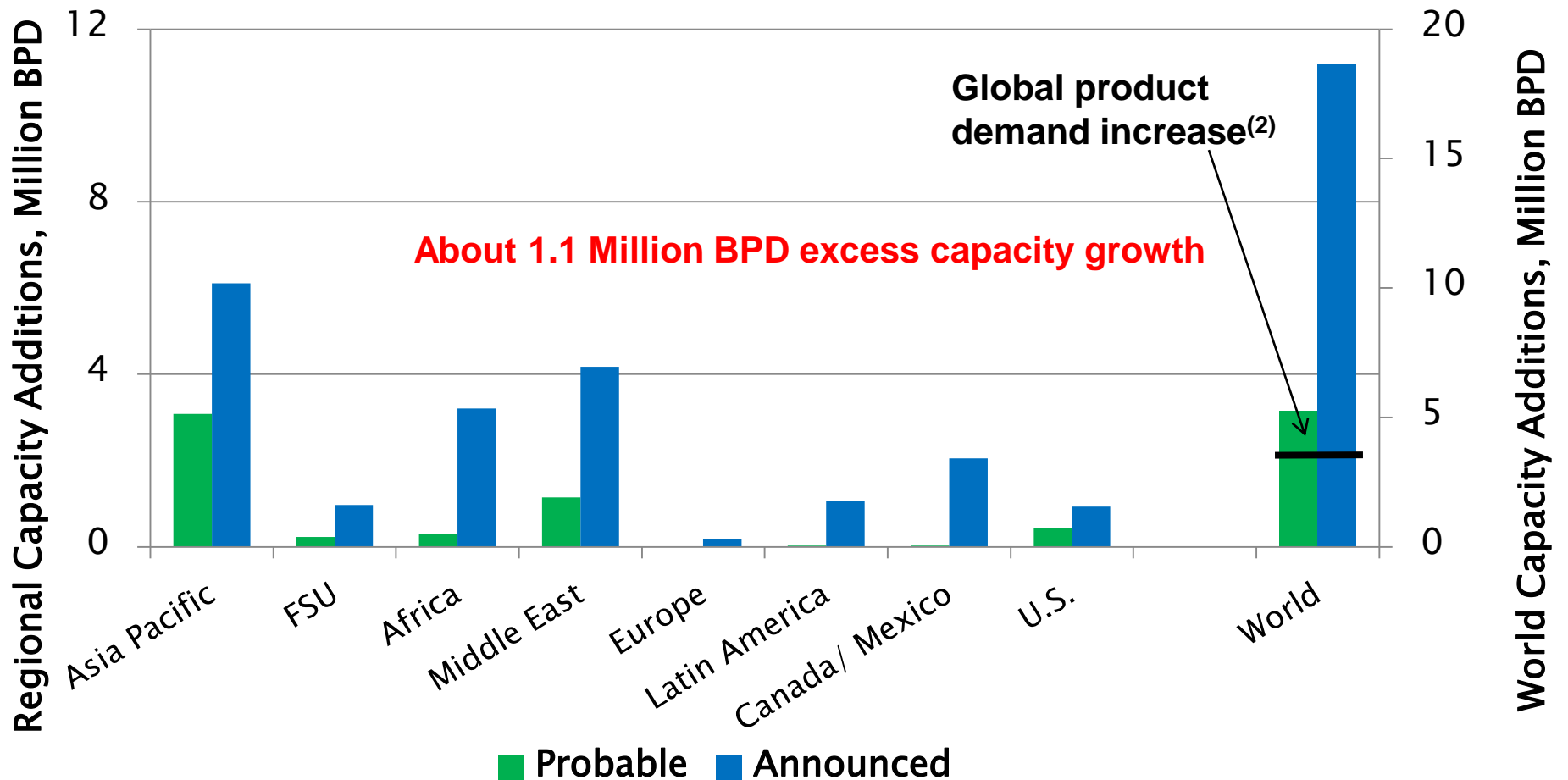
Latin American Projects – The Next 5 Years



Projected Refined Product Supply vs. Demand Growth – 2019 to 2025



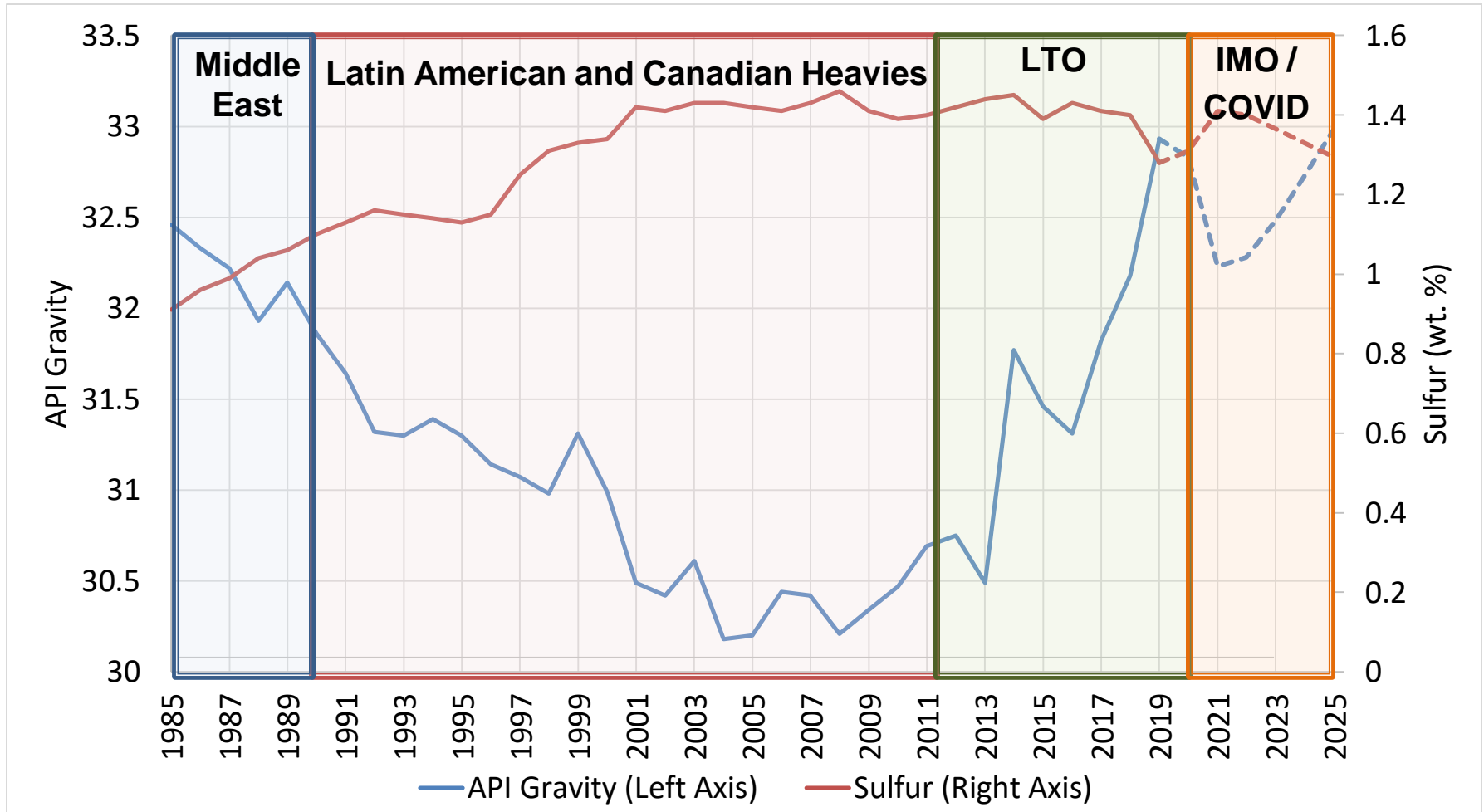
Global Crude Capacity Additions 2020-2024⁽¹⁾



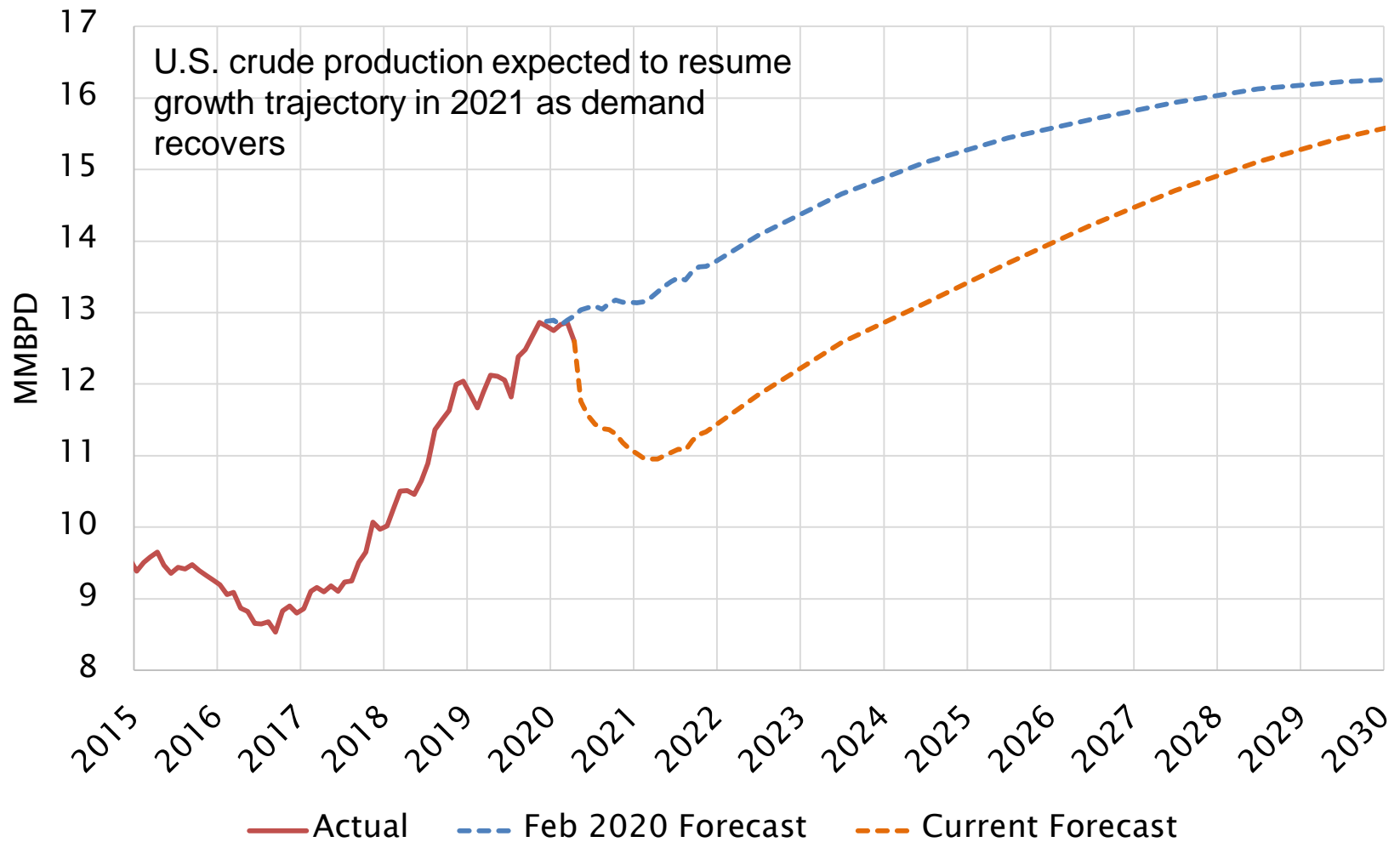
(1) Adjusted for projected utilization of 88%

(2) Adjusted for non-petroleum fuels

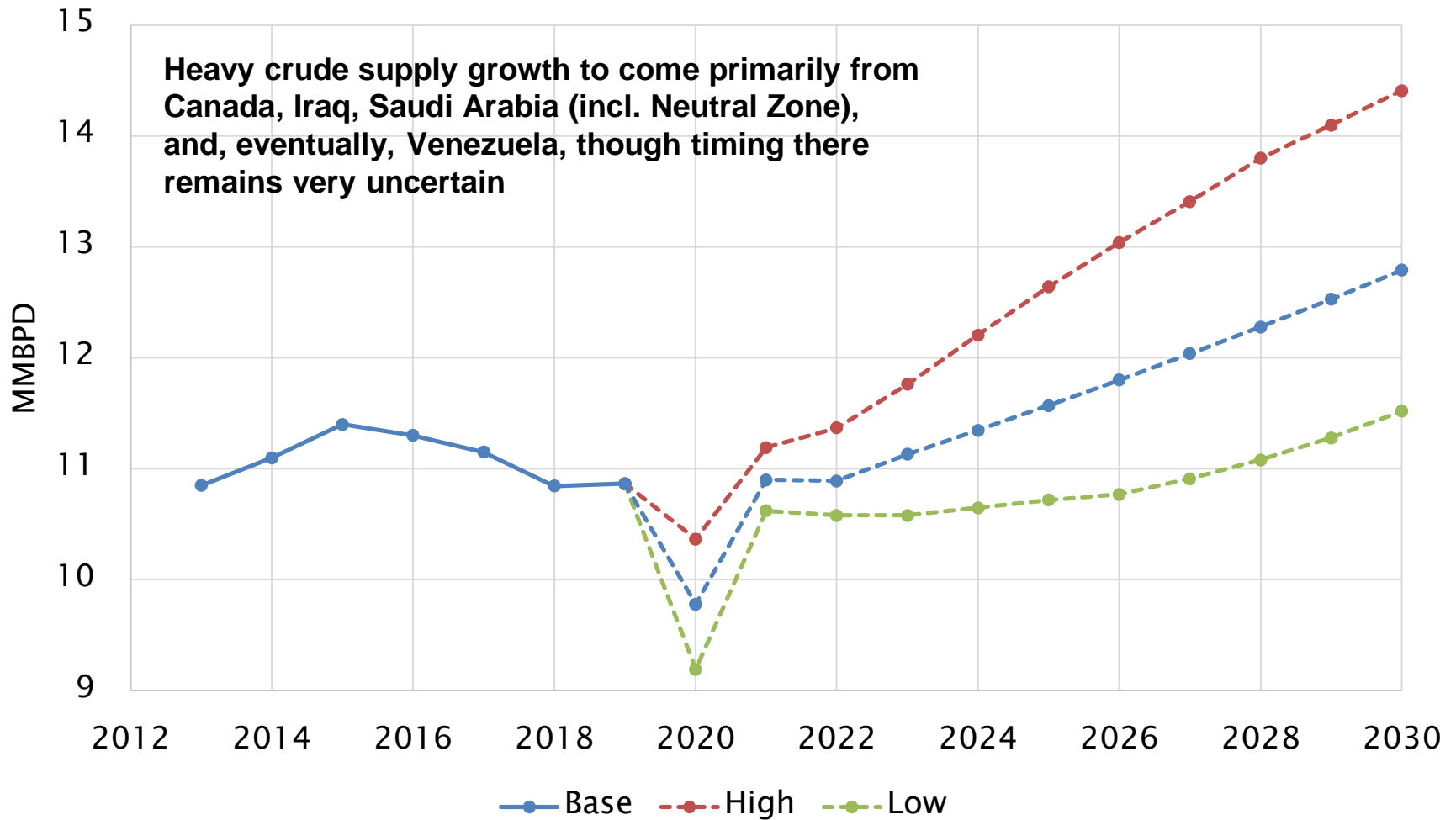
Evolving U.S. Refinery Crude Slates



U.S. Crude Oil Production Outlook



Global Heavy Crude Production



IMO 2020: Where did the Distillate Bump Go?

Expected: Increased flow of distillates into the bunker market would significantly boost distillate cracks

Reality:

- Reasons for No Bump

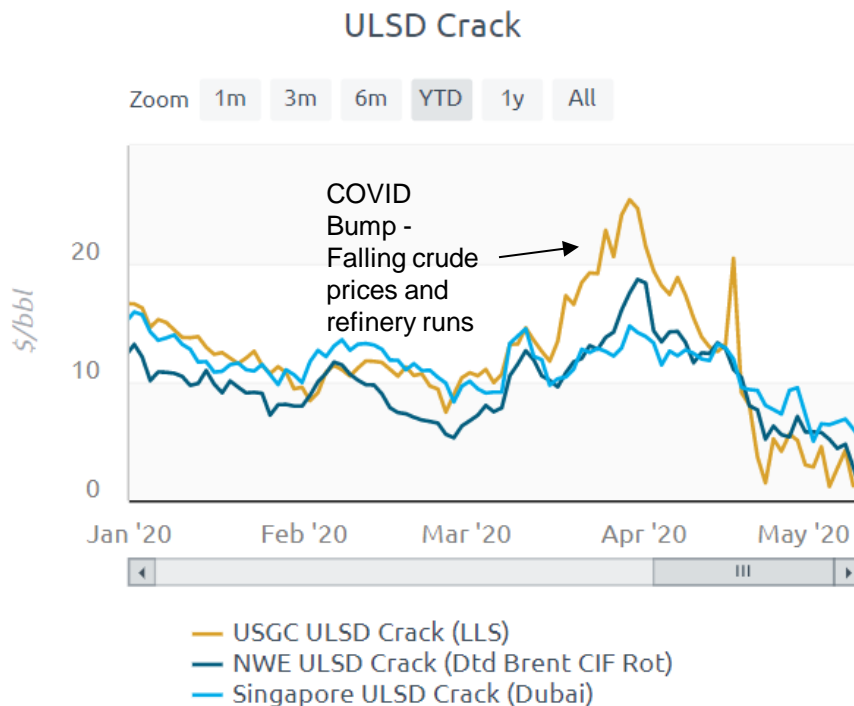
- Stockpiling of VLSFO
- Warm Winters/Lower Heating Oil Demand

- COVID-19/Price War Impacts

- Crude prices fall rapidly
- Distillate demand less impacted than supply
- Temporary bump disappears as distillate demand falls
- Slowdown in scrubber installations

- Post- COVID Forecast

- Eventual MGO demand bump likely as demand returns; aided by lack of scrubber capacity

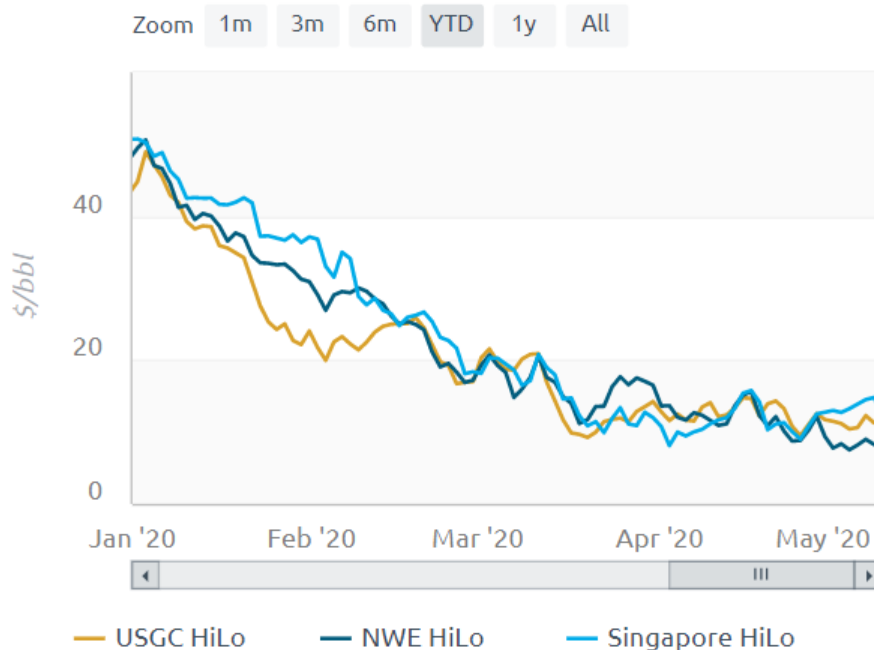


IMO 2020: HSFO vs LSFO Price Dynamics

Expected: LSFO would become in high demand while non IMO compliant HSFO would fall resulting in a large premium of LSFO

Reality:

Fuel Oil High - Low Spread (0.5%S - 3.5%S)



- Crude prices nosedived dragging down product pricing and compressing product spreads
- Ports already transitioned tanks over to LSFO realized over supply
- HSFO less affected due to decreasing refinery production
- Expect widening as lockdowns ease, demand returns and refiners produce more HSFO

A Tale of Two Parties

Climate Change/Carbon Policy:
Pulled U.S. from Paris Agreement
Pro pipeline/KXL
Pro drilling on and offshore
Expect continuation of similar policies

RFS Program:
Supports maintaining the RFS, but has notably expanded the used of small refinery exemptions. Has sought to balance desires of biofuels proponents and refiners

EPA:
Focus on Superfund sites; Continued relative flexibility on regulations

General Industry Viewpoint:
Pro-oil/fossil fuels, low taxes.

Climate Change/Carbon Policy:
Supports “Green New Deal”
Net-zero emissions by 2050
\$1.7 trillion of federal investment in clean energy over 10 years
Mixed signals regarding KXL
Rejoin Paris Climate Agreement

RFS Program:
As Vice President, he pushed for reduced ethanol blending mandates in 2014, but has more recently expressed strong support for biofuels, including ethanol

EPA:
Return to aggressive regulation
Likely reinstates CAFÉ standards

General Industry Viewpoint:
Moderately anti oil/fossil fuels
Moving further left

Ultimately, most policies require legislation and control of Senate/House will be just as important

?



Final Thoughts

- COVID-19 Is Not a “Game Changer” by Itself
 - While significant uncertainty remains, we expect demand recovery to continue
 - Accelerated some demand destruction trends, but slowed others
 - Investment delays/project cancellations may mitigate supply/demand imbalance
 - World/Industry will be better prepared for future pandemics; Apply more targeted policies
 - Our post-2023 outlook for the industry is minimally impacted
 - Increased potential for crude price “spike” due to supply destruction
- Other “Black Swan” Events/Dynamics/Outfall from COVID-19
 - Threats to economic growth (recession, US/China “cold war”, excess Govt. spending, etc.)
 - Increased government propensity for overreaching regulation and the urge to apply the COVID example to Climate Change or other “existential” fears.
 - COVID experience might decrease this but dependent on how public opinion is affected
- Key Question – Will Policymakers Learn to Use “Experts” and “Models” More Effectively

TM&C Industry Analysis and Research Reports

Crude & Refined Product Outlook

- Global crude supply outlook from major producing regions
- Price forecasts for 24 marker crudes in base subscription
- Supply/demand balances for refined products covering North America, Europe and Asia
- Forecasts of regional product prices and analysis of key price drivers
- Assessments of refinery expansions/additions and other relevant industry developments, including changes in product specs



Worldwide Refinery Construction Outlook

- Global overview of announced refinery investment projects by region
- Probability index assessment for completion of each project
- Assessment and ranking of probable projects
- Detailed project parameters such as costs, impacts on crude slate and product yields, and estimated completion date



The Speaker



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