APERC Oil Report 2020

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Foreword

The APERC Oil Report 2020 is designed to explore recent and emerging trends in APEC and global oil markets and their implications for policymakers around the region. The analysis was performed when the COVID-19 pandemic started at the beginning of 2020 and the world has been focusing on how to tackle it ever since.

Global oil markets find themselves in a state of unusual uncertainty and concerns over both political and non-political dynamics, such as the continuing shale oil boom in the USA and the OPEC+ movement. The impact of COVID-19 has caused transportation activity to fall dramatically and subsequently reduce global oil demand causing oil futures prices to fall by 40% in March 2020.

This study analyses several key issues in the oil market over the past decade (2008-17) and provides a short-term outlook (for the next five years, 2018-22). In doing so, it seeks to highlight key emerging threats and opportunities so that APEC members can integrate these early indications into policy strategies.

I hope that the APERC Oil Report 2020 will help policymakers across APEC improve their understanding of the oil market and assist in their efforts to improve the sustainability, security, and affordability of their energy systems.

I would like to express my sincere gratitude to the authors and contributors for their time and effort in writing and publishing this report.

Kazutomo IRIE

President
Asia Pacific Energy Research Centre

September 2020

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Abbreviation and acronyms

Abbreviation

b/d	barrels per day
bbl	barrel
Mtoe	million tonnes of oil equivalent

Acronyms

APEC	Asia-Pacific Economic Cooperation
APERC	Asia Pacific Energy Research Centre
EIA	Energy Information Administration
EU	European Union
IEA	International Energy Agency
OPEC	Organization of the Petroleum Exporting Countries
USA	United States of America

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Summary and key trends

- APEC oil demand accounted for 53% of total world demand of 3,985 Mtoe in 2017. Since 2013, the global oil consumption has increased at between 1.6%-2.5% because of lower oil prices.
- Transportation has been both the dominant and growing sector in APEC during the period. Demand in the sector has increased by 1.7% annually since 2008 and reached 1,302 Mtoe in 2017 or 61% of the total oil demand in the APEC region.
- Oil demand in the APEC region is projected to increase by 0.60% annually to reach 2,196 Mtoe in 2022 led by China and southeast Asia.
- Global oil supply has been increasing slightly faster than demand with an annual growth rate of 0.96% since 2008. The APEC region including its largest oil producing economies like the USA and Russia accounted for 41% of global production. Over the past 10 years, the APEC region surpassed the rest of the world in production growth because of the contribution from the USA, Canada, and Russia.
- Within the APEC region, the USA and Russia were the largest oil producing economies with 591 and 549 Mtoe in 2017, respectively. These two economies had a production share of 62% in the APEC region in 2017. In terms of production growth, the USA was by far the highest with an annual rate of 7.5% from 2008 to 2017. The incremental production increase in the USA since 2008 was 278 Mtoe, which was greater than the production of either Canada (249 Mtoe) or China (192 Mtoe), and more than double of the total southeast Asia production (117 Mtoe) in 2017.
- Oil supply in the APEC region is projected to grow by 1.9% annually from 2017 reaching 2,013 Mtoe in 2022, but demand reaches higher, 2,196 Mtoe in 2022.
- APEC's import dependency on crude oil has improved (decreased) over the years from 37% in 2007 to 28% in 2017, because of the indigenous production increase by the USA, Canada and Russia.
- Significant installation of new refining capacity is noticeable in all regions including China and non-OECD Asia, as well as the Middle East, to catch up with surging oil demand in these regions.
- The trade conflicts between the USA and China has changed the destination of US crude exports. US crude exports to China, which had witnessed strong growth since 2017, plummeted to zero in August 2018 although they have since resumed. The imports by Japan, Korea, Chinese Taipei, and Singapore from the USA, alternatively, hit a record high in the last half of 2018. The future of the trade conflicts is a major uncertainty for crude oil flows in the world in the future.

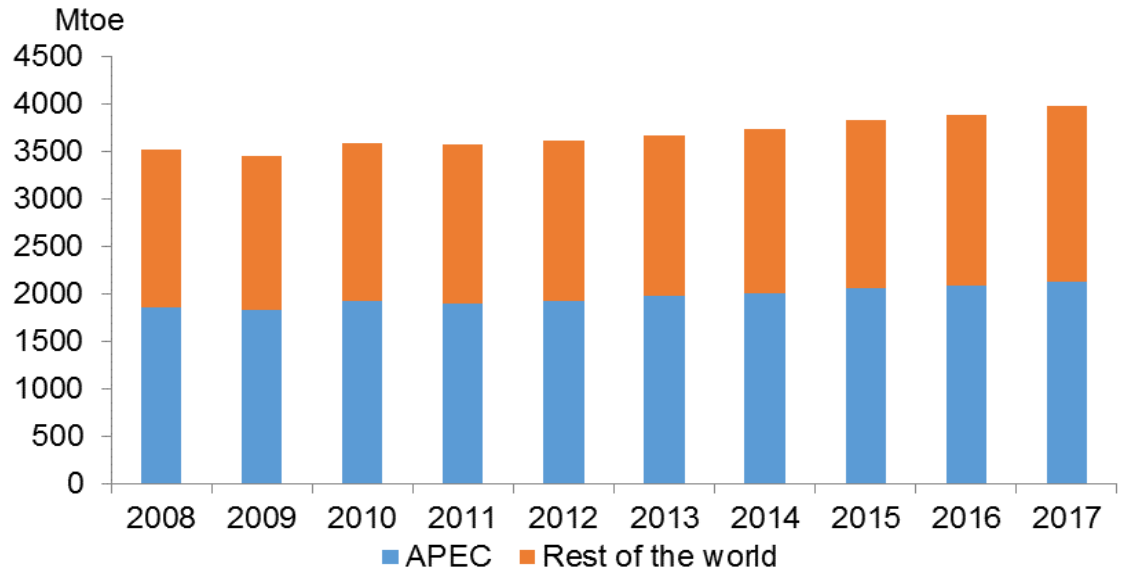
- The oil trade situation deteriorated with the new coronavirus (COVID-19) outbreak at the end of 2019. The impact of containment measures caused activity in the transportation sector to fall dramatically. Global oil demand in 2020 is expected to decline by 9.3 million barrels a day (mb/d) from 2019 as the impact of the COVID-19 causes demand to drop for the first time since 2009.
- From an oil consumer's perspective, the low oil prices as a result of COVID-19 might appear to be attractive. However, they were of little benefit to the approximately four billion people living under some form of lockdown. There is clearly a long way to go before the oil market can put the COVID-19 crisis behind itself and stabilize again. It is anticipated that the easing lockdown measures in some countries will provide support to gasoline and diesel markets. However, jet fuel sales have not recovered as aviation industry remains depressed.
- Since the beginning of the implementation of the IMO 2020, the trade flows started to change as regional disparities in compliant bunker fuel output occured. However, the expected significant disruption from the IMO 2020 turned out to be manageable because of the careful planning in preparation for IMO 2020 and the COVID-19 impact that weakened demand for bunker oil.
- With the COVID-19 impact at the start of 2020, the decision taken by OPEC+ may or may not help both OPEC+ and the US tight oil producers. Yet strong demand growth and a corresponding supply balance are increasingly questioned. Many uncertainties remain and whether OPEC+ and US shale oil producers will be able to convincingly survive the coming tough years is yet to be seen.

Chapter 1: Demand

Global context (2008-2017)

Global oil consumption has been growing 1.4% annually since 2008 and reached 3,985 Mtoe in 2017 (Figure 1.1). APEC, with about 53% of the world oil demand, grew at 1.7% while the rest of the world grew at 1.3%. The high growth in APEC was mainly in China (5.3%) and southeast Asia (4.2%) while demand declined in Japan (-0.91%) and the USA (-0.40%).

Figure 1.1: Global oil demand, 2008-2017



Source: APERC analysis and IEA (2019)

Since 2013, the global oil consumption has increased at between 1.6%-2.5% because of lower oil prices. APEC growth accounted for an average of 55% of the global growth from 2013-2017 while the rest of the world was responsible for the other 45%.

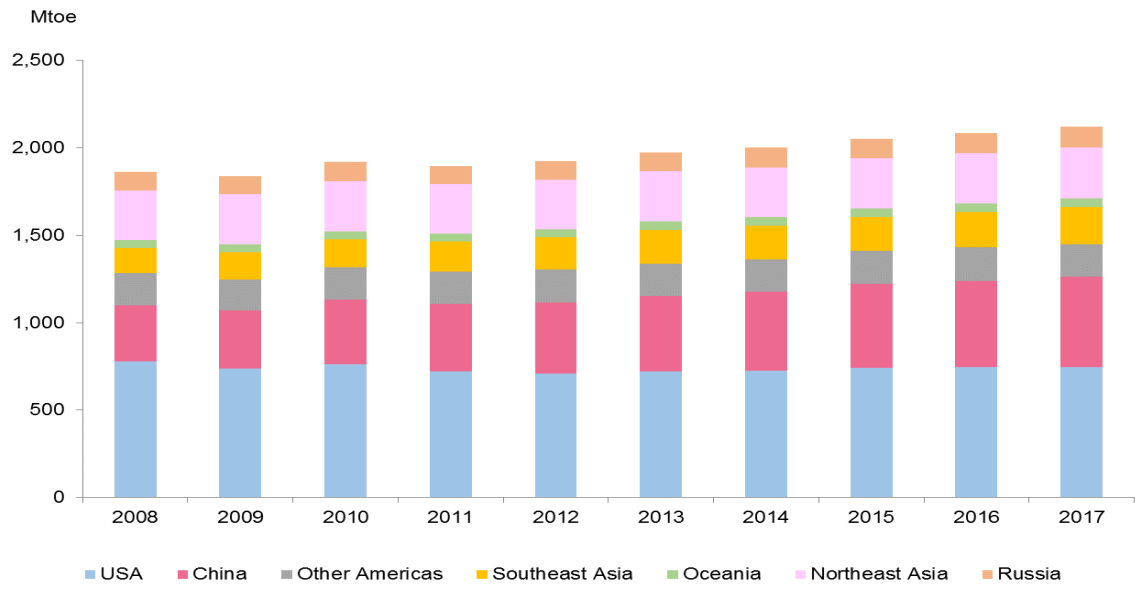
Demand trends in APEC (2008-2017)

Within the APEC region, the USA remained by far the largest oil-consuming economy with 748 Mtoe or 41% of the APEC total demand in 2017 (Figure 1.2) and China was the second-largest with 514 Mtoe or 28% of the region's demand. These two economies accounted for as much as 69% of the APEC total. While the USA has maintained about a 40% share from 2008-2017 throughout, China increased its demand by more than 60% (192 Mtoe) during this period and its share of APEC demand has been on the rise from 18% in 2008 to 28% in 2017. By contrast, US demand has slowly

declined by 0.40% annually from 778 Mtoe in 2008 to 748 Mtoe in 2017. If the trend continues, China demand may become the highest in APEC within the next decade. Japan has steadily decreased its demand at an annual rate of -0.91% over the past 10 years. Japan's share in APEC total demand fell from 8.9% in 2008 to 8.2% in 2017. On the other hand, southeast Asia demand grew to 212 Mtoe in 2017. Its demand increase of 4.2% annually was the second-highest in the APEC region after China during this period.

For the past decade, the US oil demand has fluctuated and decreased year-by-year to reach 748 Mtoe in 2017, while China's demand grew above 500 Mtoe for the first time in 2017 (513 Mtoe). The difference between the two economies' oil consumption has diminished over the years and is about half what it was in 2008.

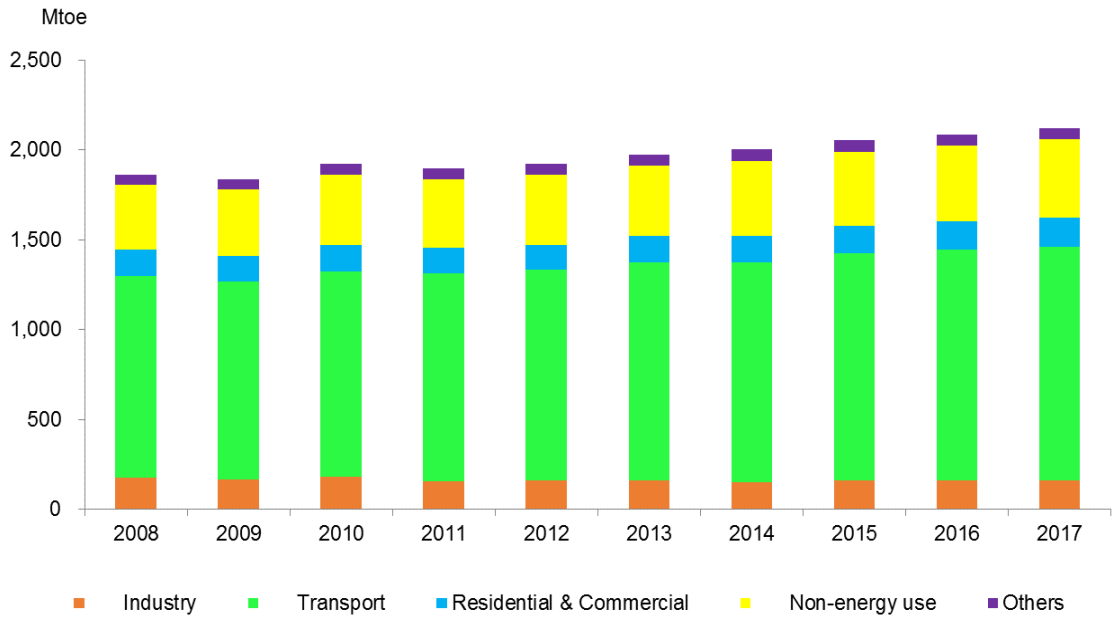
Figure 1.2: Oil demand in APEC, 2008-2017



Source: APERC analysis and IEA (2019)

Figure 1.3 represents APEC's oil demand by sector since 2008. Transportation has been both the dominant and growing sector during the period. Demand in the transportation sector has increased by 1.7% annually since 2008 and reached 1,302 Mtoe in 2017 or 61% of the total oil demand in the APEC region. Non-energy use, mainly feedstock for petrochemicals, is the second-largest demand sector with 436 Mtoe. Backed by a strong, growing demand for petrochemical products in the APEC region, oil used at petrochemical plants has increased by 2.2% annually and represented 21% of the total APEC oil demand. During 2008-2017, industry decreased slightly at the rate of -0.85% per year from 174 Mtoe in 2008 to 159 Mtoe in 2017, while the residential sector has had annual demand growth of 1.0%, increasing from 150 Mtoe in 2008 to 164 Mtoe in 2017.

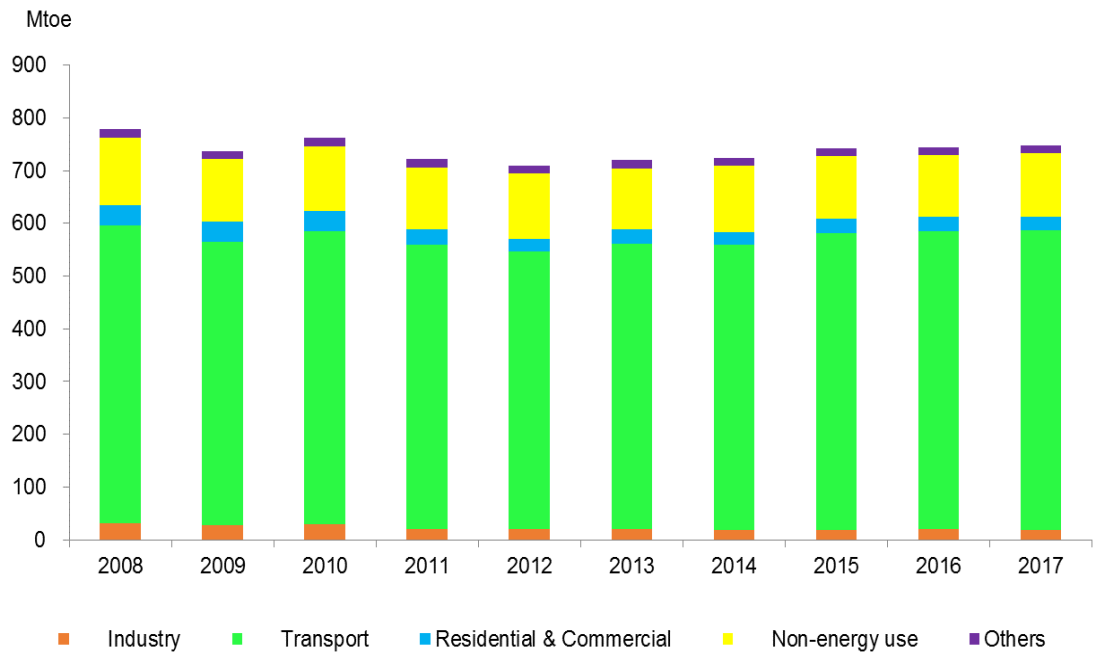
Figure 1.3 Oil demand in APEC by sector, 2008-2017



Source: APERC analysis and IEA (2019)

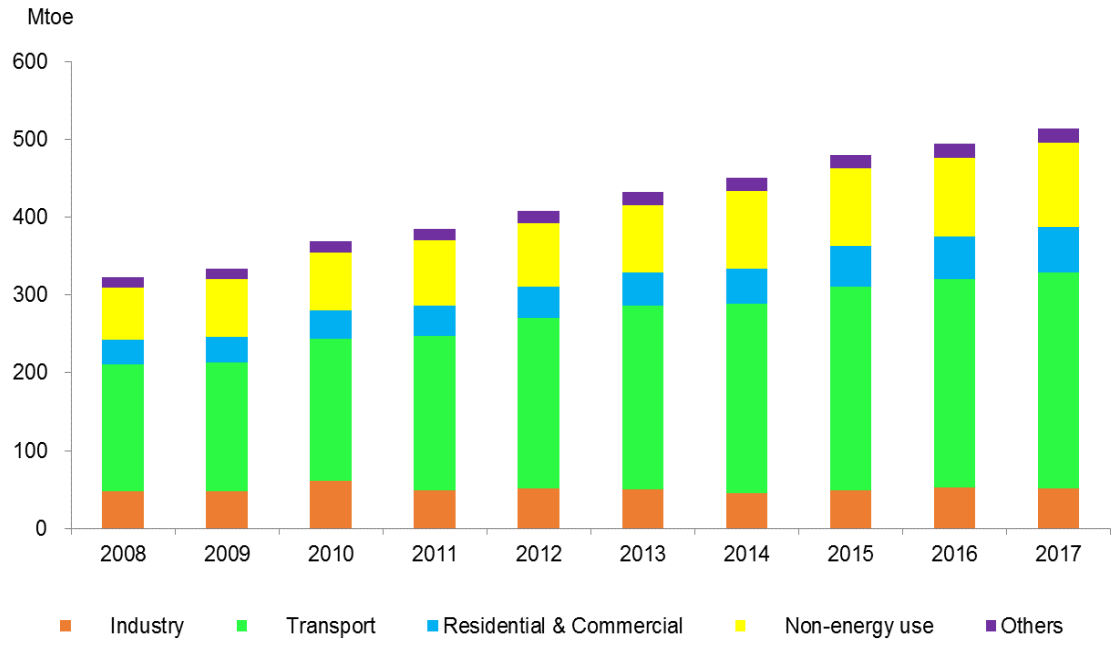
Sectoral demand in the USA and China reflects their very different market structures. In the USA, oil consumption is heavily concentrated in the transportation sector and increased from 73% in 2008 to 76% in 2017 (Figure 1.4). Similar to the USA, China's transportation sector consumes the largest portion of its oil demand but the overall oil utilisation is more diversified (Figure 1.5). The oil consumption in the transportation sector has increased over the years from 51% of the total oil demand in 2008 to 54% in 2017. China's second-largest consuming sector is non-energy, share which is mainly used to produce a variety of petrochemical products. It maintains a 21% of the total oil demand. In China, demand for transportation and non-energy use increased by 6.1% annually and 5.6% annually, respectively for the past 10 years, while the industry sector increased by 6.1% annually.

Figure 1.4: Oil demand in the USA by sector, 2008-2017



Source: APERC analysis and IEA (2019)

Figure 1.5: Oil demand in China by sector, 2008-2017

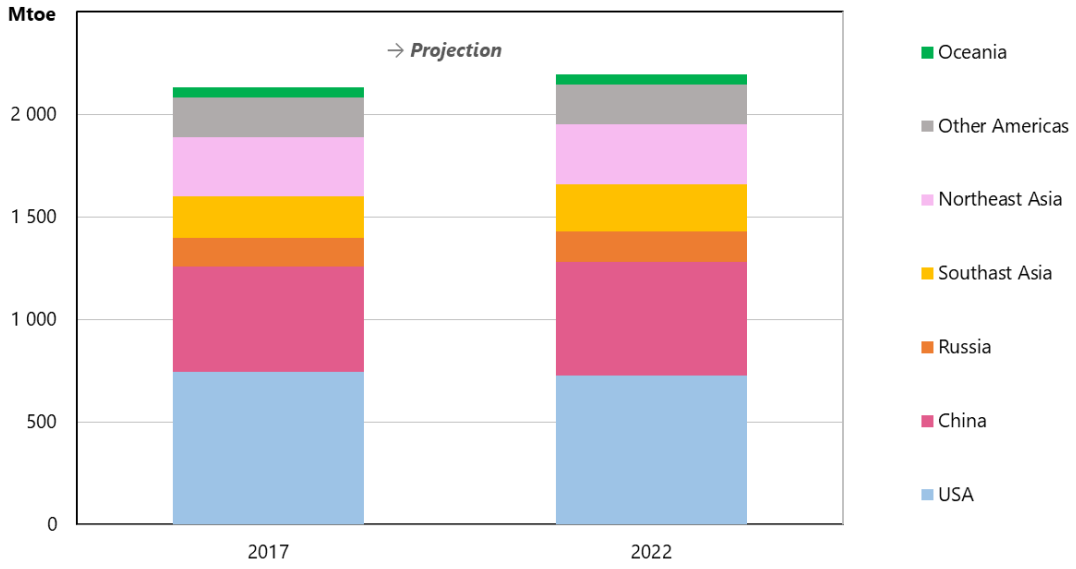


Source: APERC analysis and IEA (2019)

Demand outlook

Within the APEC region, oil demand is projected to increase by 0.60% annually to reach 2,196 Mtoe in 2022. China's growth (45 Mtoe or 1.7% annually) will be by far the largest share (69%) of the APEC growth (65 Mtoe) in the five years from 2017 to 2022. Another growth engine is southeast Asia APEC (7 of 10 ASEAN members) where its total growth will increase by 25 Mtoe or 2.3% annually during the same period. On the other hand, the demand in the USA and Japan is likely to decline by 21 Mtoe (-0.56% p.a.) and by 5.5 Mtoe (-1.1% annually), respectively. The average demand growth in Oceania is 0.52% and other Americas is 0.28% while the northeast Asia demand growth is relatively stable in this period. As a result, the share of China and southeast Asia demand in the APEC region will expand, albeit slightly, from 34% in 2017 to 35% in 2022, respectively. Likely, the share of APEC oil demand will gradually shift towards Asia in the coming years.

Figure 1.6: Oil demand outlook in APEC, 2017 and 2022



Source: APERC analysis (2019)

Box 1 • The impact of China's strategic petroleum reserve on oil demand

Apart from economic slowdown and the U.S.-China trade conflicts, another risk to global oil demand might be the China could slow down building its strategic petroleum reserve (SPR). Since 1993, China has been building an SPR to ensure its oil supply in case of serious disruptions. The economy became a net oil importer in 1993 and began to discuss the establishment of SPR. In 2003, the government announced the construction of four stockpiling facilities: Dalian; Qingdao; Zhenhai; and Zhoushan, as the first phase of its SPR plan, and established The National Petroleum Reserve Center (NPRC) under the National Development and Reform Commission (NDRC). The 11th-Five Year Plan adopted the expansion of SPR construction in 2006 and Phase I of the SPR was completed in 2009. NDRC started to oblige refineries to hold at least 15 days of crude oil reserves based on daily processing capacity in 2015. Now, the second phase of construction is under way.

According to China's stated policy on its SPR, the economy is expected to build storage capacity equivalent to 90 days of its net imports or more. As far as the actual inventory is concerned, China has rarely made public when filling its storage, leaving the global oil market in uncertainty. In December 2017, China's National Bureau of Statistics reported that the SPR stood at 274 million barrels at the end of June 2017, some of which was stored at commercial facilities on behalf of the government. In the wake of the attacks on Saudi oil infrastructure that took 5% of global oil supply offline, China's National Energy Administration (NEA) said, in September 2019, that it had enough oil in storage to cover 80 days of imports. The exact amount of crude oil storage has not been disclosed, but the economy imported an average of 9.85 mb/d in the first eight months of 2019.Eighty says of oil import would translate into around 788 million barrels. The announcement likely surprised the market, because forecasts were for around 40 to 50 days of import. Eighty days is quite close to the 90 days of import cover recommended by the International Energy Agency (IEA).

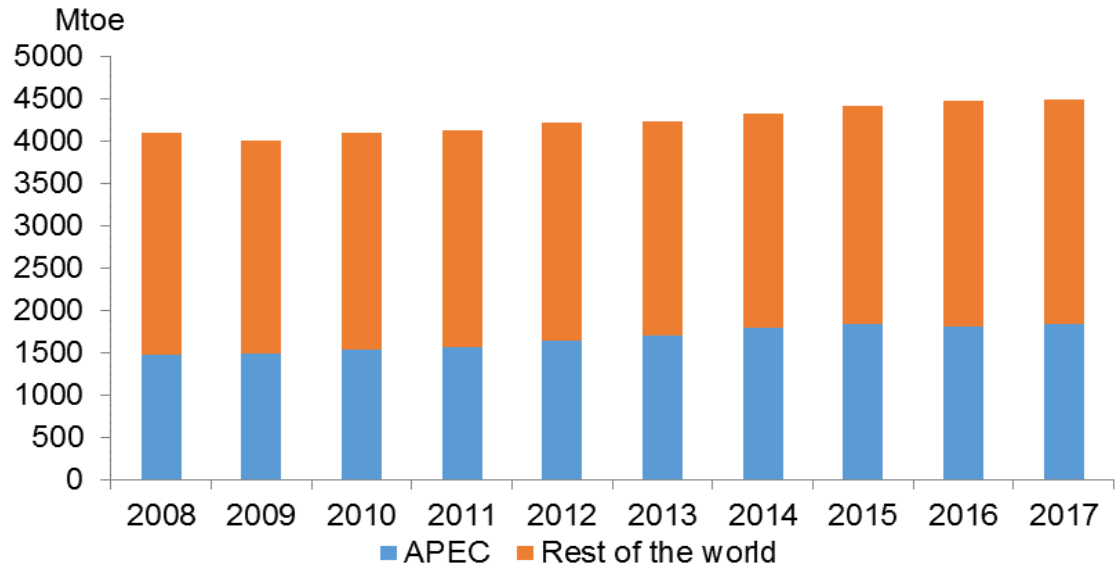
The year 2020 marks a milestone for China to complete the construction of the second phase of its SPR. It is well reported that in the global oil market, so far, China's SPR played the role of wild card, which is one of the factors that made it difficult to predict the future. It is, of course, uncertain that China will continue to build its SPR at the same pace as before, or it will stop when it reaches 90 days of oil imports cover or comes closer to filling up its storage. If China does ease purchases of oil for SPR, it will put the significant pressure in global and APEC oil demand growth.

Chapter 2: Supply

Global context (2008-2017)

Global oil supply has been increasing slightly faster than demand with an annual growth rate of 0.96% since 2008 (Figure 2.1). The global supply in 2017 was 4,454 Mtoe. The APEC region, including its largest oil-producing economies like the USA and Russia, grew at an annual rate of 2.4% accounted for 41% of global production or 52% of global supply. The rest of the world recorded slow growth at only 0.17% per year. Over the past 10 years, the APEC region surpassed the rest of the world in production growth because of the contribution from the USA, Canada, and Russia. This boosted APEC's production share in the global market from 36% in 2008 to 41% in 2017. However, the supply ratio of APEC over the global has consistently remained in the range of 52-53% for the past decade.

Figure 2.1: Global oil supply, 2008-2017



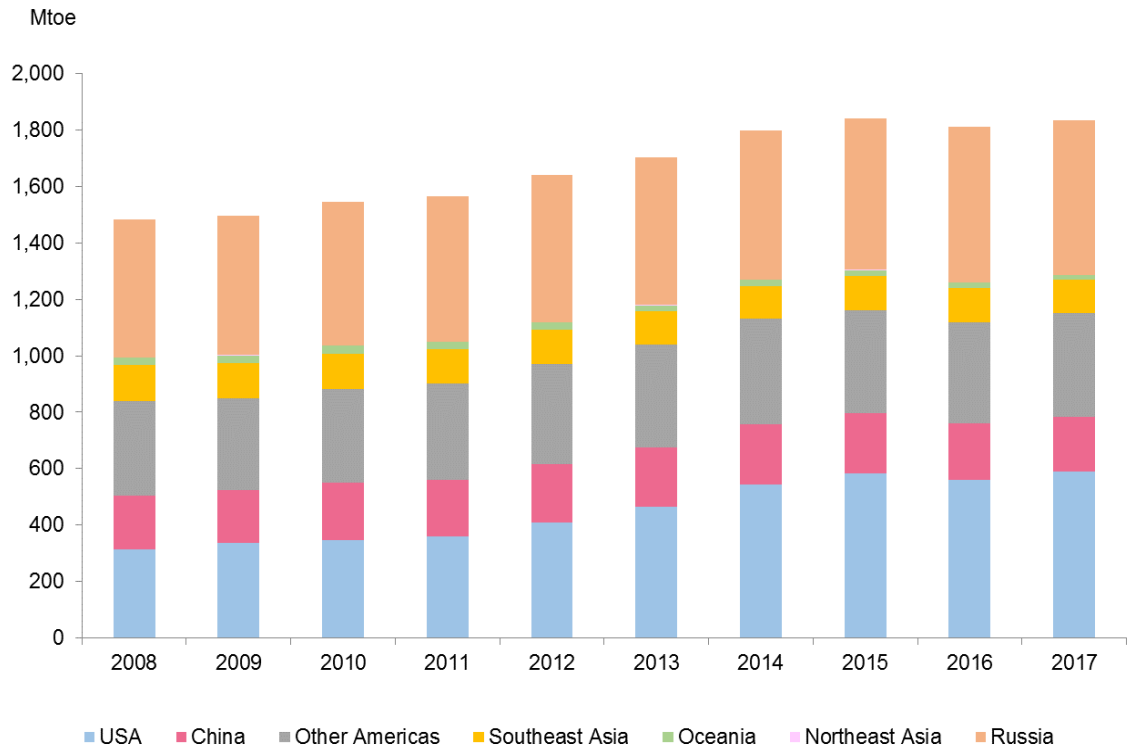
Source: APERC (2019), IEA (2019a)

Supply trends in APEC (2008-2017)

Within the APEC region, the USA and Russia were the largest oil producing economies with 591 and 549 Mtoe in 2017, respectively (Figure 2.2). These two economies had a production share of 62% or a supply share of 40% in the APEC region in 2017. In terms of production growth, the USA was by far the highest with an annual rate of 7.5% from 2008 to 2017. The incremental production increase in the USA since 2008 was 278 Mtoe, which was greater than the production of either

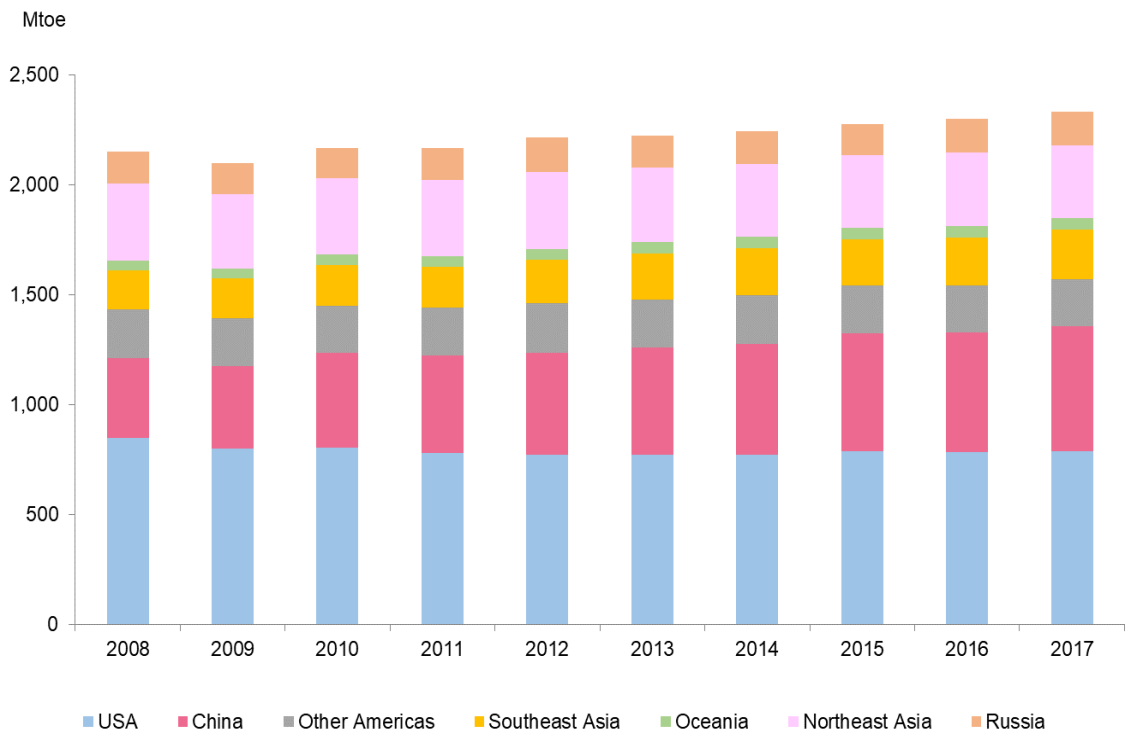
Canada (249 Mtoe) or China (192 Mtoe), and more than double of the total southeast Asia production (117 Mtoe) in 2017. Many APEC regions showed declining annual production growth rates including Oceania at -4.8%, northeast Asia at -0.65%, and southeast Asia at -0.93%. On the other hand, Russia showed slight production growth, at an average of 1.3% per year during 2008-2017. However, when considering the supply share, the USA and China turned out to be the two largest oil supplying economies that had a supply share of 58% of APEC in 2017, followed by northeast Asia (14%) and southeast Asia (10%) while Russia had only a 6.6% supply share in APEC (Figure 2.3).

Figure 2.2: Oil production in APEC region, 2008-2017



Source: APERC (2019)

Figure 2.3: Oil supply in APEC region, 2008-2017



Source: APERC (2019)

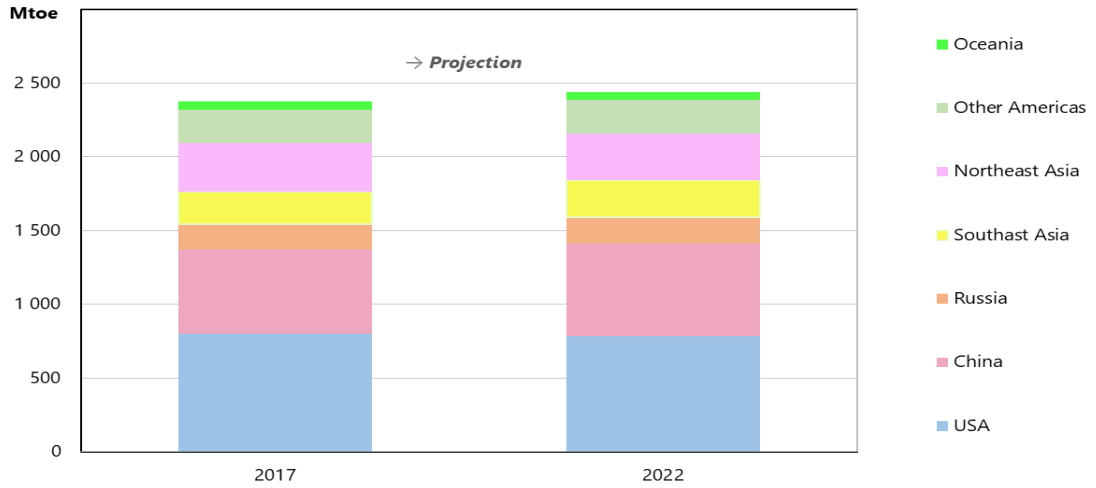
Supply outlook

Oil supply in the APEC region is projected to grow by 0.56% annually from 2017 reaching 2,467 Mtoe in 2022 and its oil production is increased to 2,013 Mtoe in 2022 (2.0% annually) while APEC demand reaches 2,196 Mtoe in 2022 (Figure 2.4). The APEC supply gap (demand-production) is projected to improve from 302 Mtoe (2,131 vs 1,829 Mtoe) in 2017 to 183 Mtoe (2,196 vs 2,013 Mtoe) in 2022. On the other hand, on a global scale and the rest of the world, the supply gap was at -496 Mtoe (3,985-4,481 Mtoe) and at -784 Mtoe (1,862-2,646 Mtoe), respectively, in 2017. So, production was higher than consumption and balanced out better in the rest of the world than in APEC (Figures 2.5 and 2.6).

Only three economies, the USA (5.3% annually), Canada (3.0 annually), and Peru (3.6% annually) are projected to achieve higher production growth rates than the APEC region's average in the five years from 2017 to 2022, while the other economies sustain or decrease their production. On a production share basis in the APEC region, the top three producers, the USA, Russia, and Canada, are projected to increase their supply to more than three-quarters of APEC total production and maintain their dominant positions until 2022. However, while the USA and Canada increase their shares respectively from 32% and 13% in 2017 to 37% and 14% in 2022, Russia decreases from

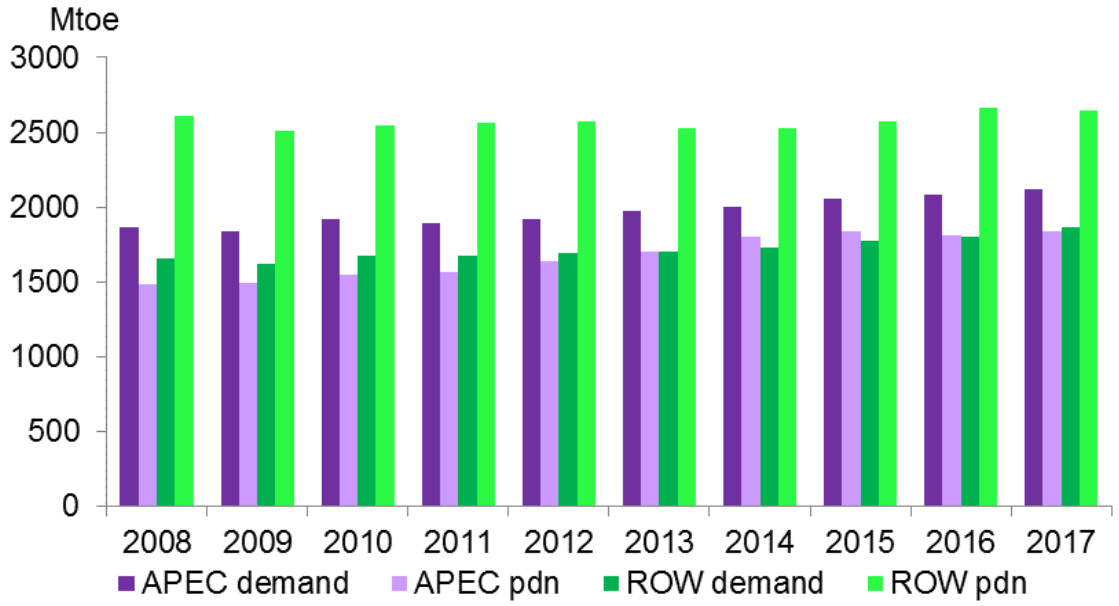
30% in 2017 to 27% in 2022. The combined 206 Mtoe production increase in the USA and Canada is expected to be boosted by the development of unconventional oil resources, while China, Oceania, northeast Asia, and southeast Asia will show a decline of 19 Mtoe altogether for the period 2017-2022. As a result, unlike demand, the supply center in the APEC region will shift more to North America in the future.

Figure 2.4: Oil supply outlook in APEC, 2017 and 2022



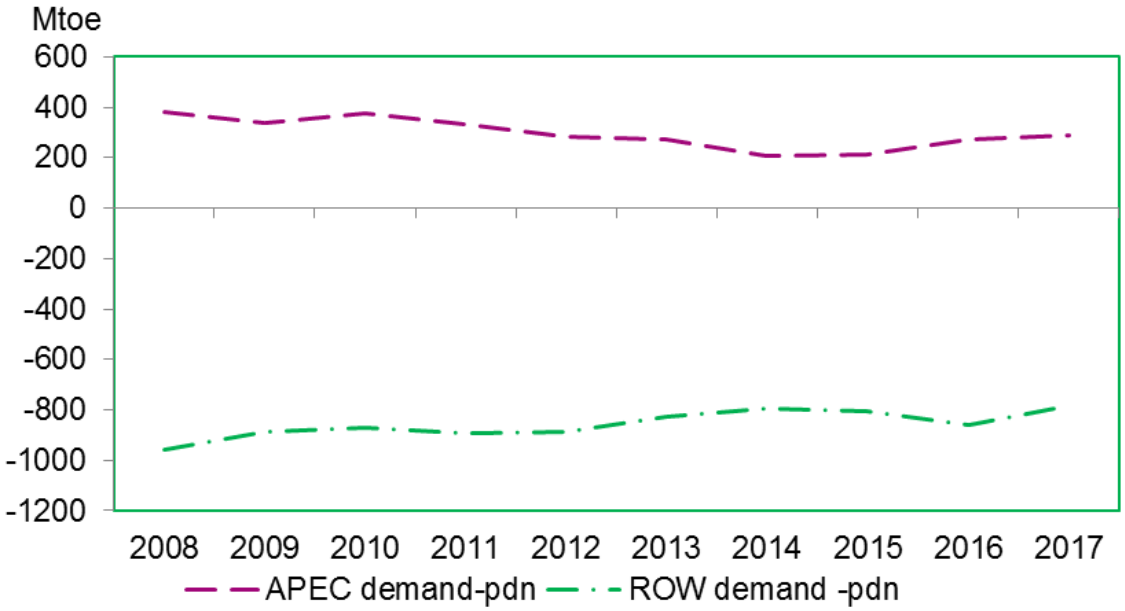
Source: APERC (2019)

Figure 2.5: Oil demand and production: APEC vs rest of the world, 2008-2017



Source: APERC (2019)

Figure 2.6: Oil demand-production gap: APEC vs rest of the world, 2008-2017



Source: APERC (2019)

Chapter 3: International trade

APEC's oil trade flows are significantly affected by demand growth, production and diplomatic tensions. This chapter discusses APEC import dependency of both crude oil and oil products, followed by the key factors that influence oil trade movement such as the US-China trade conflicts and the coronavirus pandemic.

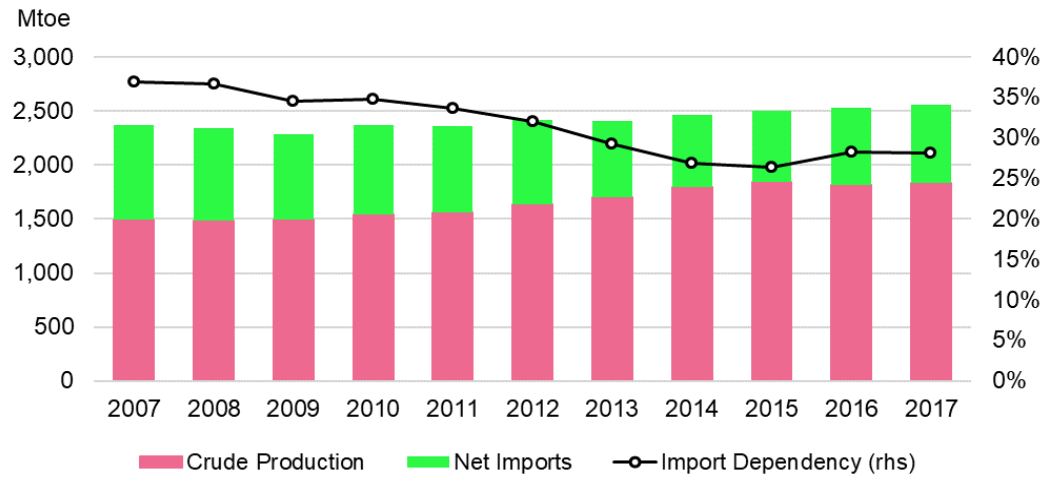
Other important factors affecting global oil trade, specifically the significant increase in US tight oil production and the supply cuts by OPEC and its non-OPEC allies, are presented in Chapter 5.

APEC import dependency

APEC's import dependency on crude oil has improved (decreased) over the years from 37% in 2007 to 28% in 2017 (Figure 3.1), because of the indigenous production increase by the USA, Canada and Russia. However, while the overall APEC crude production has continuously increased since 2007, it started to decline and taper off in 2017 resulting in a surge in APEC import dependency. The key driver was the production declines in the USA and China along with low international oil prices.

The USA, APEC's largest oil consumer, accounted for 38% of total APEC crude imports in 2008. However, the economy's increased output of tight oil has mitigated its dependence on imports, and its share of crude imports in APEC decreased to 25% in 2017.

Figure 3.1: APEC crude oil import dependency, 2007-2017

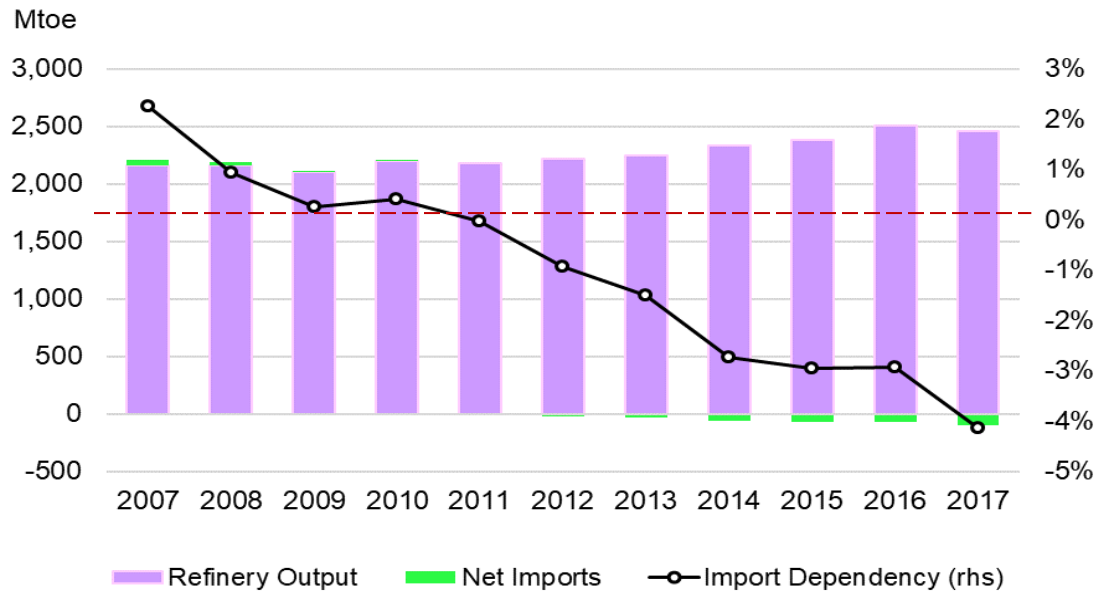


Note: Import dependency = net imports / (production + net imports).
Net Imports include intra-APEC trades.
Source: APERC analysis and EGEDA (2019)

Unlike the decreasing US share in APEC crude imports, China's share climbed to 24% in 2017 from 13% in 2008 as its oil demand soared at an annual average rate of 5.3% in line with strong economic growth.

In contrast to crude oil, APEC has been self-sufficient and a net-exporter of oil products since 2011 (Figure 3.2). Looked at by economy, on the one hand, massive crude producers like the USA and Russia, and economies with substantial refining capacity like Korea are primarily oil-exporters. On the other hand, economies like Australia and Mexico are highly dependent on imports.

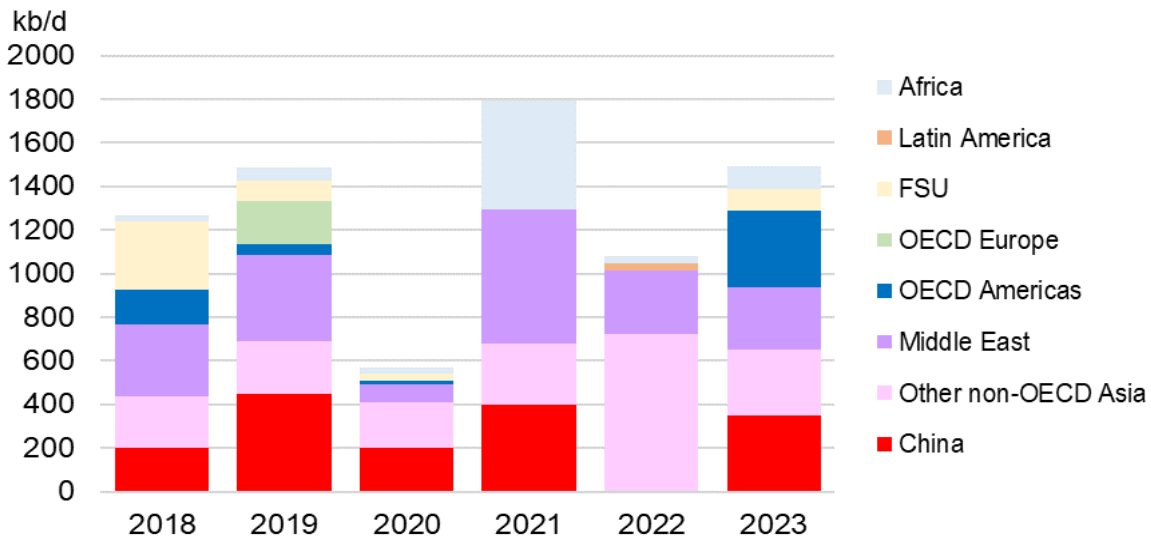
Figure 3.2: APEC oil products import dependency, 2007-2017



Note: "Net Imports" include intra-APEC trades
Source: APERC analysis and EGEDA (2019)

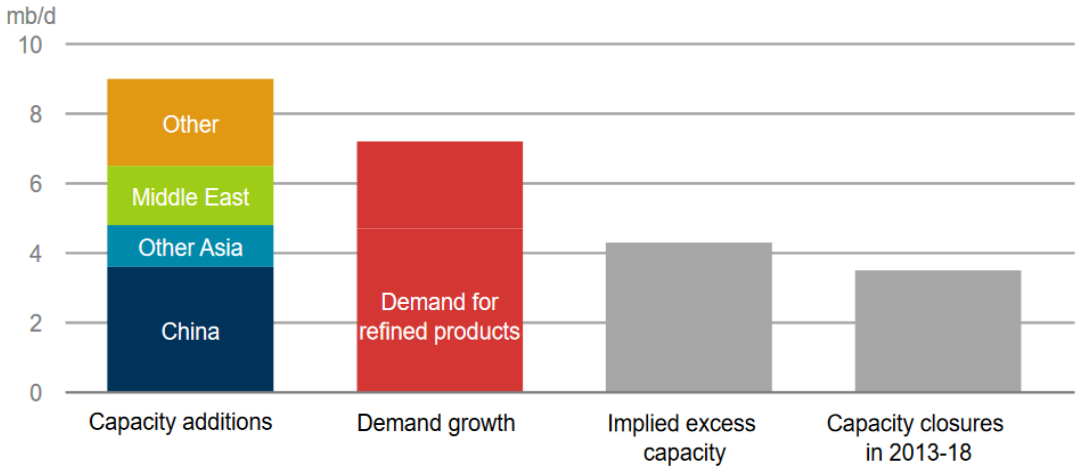
Significant installation of new refining capacity is noticeable in all regions including China and non-OECD Asia, as well as the Middle East, to catch up with surging oil demand in these regions (Figure 3.3). Even with the capacity closure of around 3.5 mb/d during 2013-2018, it is anticipated that the refining capacity growth from 2019 to 2023 (~9 mb/d) will still be exceeding refined products demand growth (Figure 3.4) and result in excess capacity (~4.2 mb/d). China, the world's largest crude importer, is expected to continue to increase its refining capacity by approximately one mb/d in the four years from 2019. With the second largest throughput capacity in the world, China has already increased oil-products exports such as gasoline and diesel oil mainly to the Asian market. Of the total increase in non-OECD Asia from 2019 to 2023, southeast Asia accounts for approximately 65% (IEA, 2019b), striving to be self-sufficient in products by using its own refineries instead of depending on imports.

Figure 3.3: World refinery capacity additions, 2018-2023



Source: IEA (2019b)

Figure 3.4: Global refining capacity growth, 2018-2023

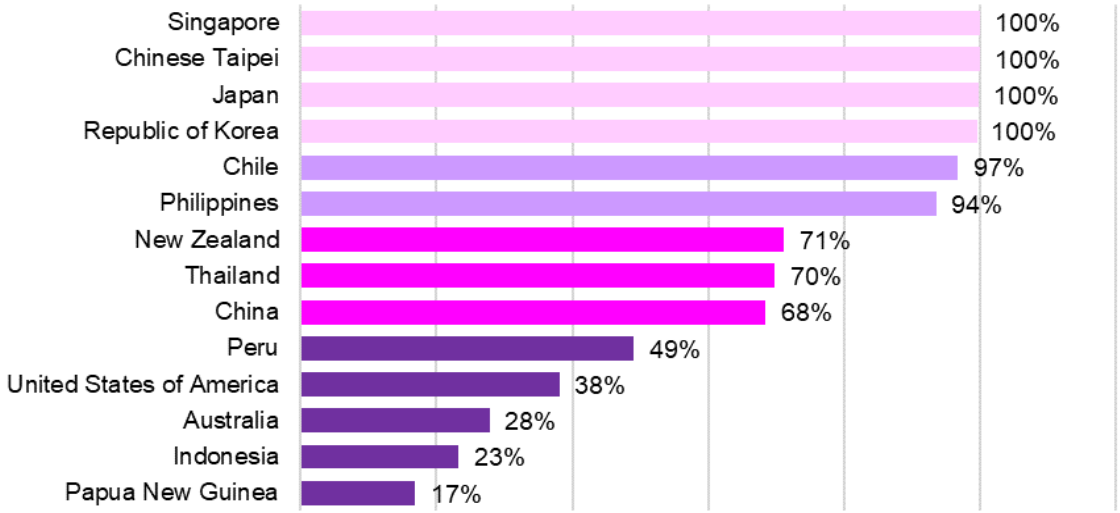


Source: IEA (2019b)

The status of crude oil import dependency in APEC varies among economies; e.g., some Asian economies have relied almost entirely on imports for their oil use (Figure 3.5), because of the lack of domestic crude production. China's import dependency in 2017 stood at 68%, up from 50% in

2007, driven by a considerable demand surge and relatively stable domestic production. The increase in oil dependency drove the economy's growing focus on overseas upstream investment. The USA, on the other hand, has experienced improvement in self-sufficiency: import dependency has decreased in the 10 years to 38% in 2017. Five economies in APEC, namely Brunei, Canada, Malaysia, Mexico, and Russia maintained their oil self-sufficiency status during 2007-2017.

Figure 3.5: APEC oil import dependency by economy, 2017



Note: Net-exporters: Brunei (≤500%), Mexico (-133%), Canada (-118%), Russia (-86%), and Malaysia (-16%)
Source: EGEDA (2019), APERC (2019)

The effect of the trade conflicts between the USA and China

The years 2018-2019 saw the escalation of the trade conflicts between the USA and China, and certain impacts on oil trade. On July 6, 2018, the US Customs and Border Protection (CBP) of the USA imposed a 25% tariff on USD 34 billion worth of imports (machinery and equipment in energy industry) from China in light of alleged intellectual property theft and trade deficits. In response to the imposition, China immediately levied the same amount of counter tariffs on 545 US products (agriculture, automobile and seafoods). On August 7, 2018, the USA imposed an additional 25% tariff on USD 16 billion worth of imports (steel, electric equipment and train spare parts) while China imposed a 25% tariff on USD 16 billion worth of oil products. The conflict escalated until December 2, 2018, when the two economies agreed at a post-G20 meeting in Argentina to pause new trade tariffs for 90 days. However, on May 10, 2019, the USA raised tariffs to 25% from 10% on USD 200 billion worth of Chinese goods.

In January 2020, trade tensions eased between the USA and China with the signing of a phase one trade agreement. China has agreed to buy energy products above the 2017 baseline totalling USD

18.5 billion in 2020 and USD 33.9 billion in 2021. (USTR, 2020). In February 2020 China began implementing the trade agreement by cutting tariffs on ethanol, liquefied natural gas, propane, crude oil, metallurgical coal and sub-bituminous coal (CEC, 2020).

The escalated trade conflicts could slow down global economic growth and tariff-driven higher prices of consumer goods could cause an oil demand decline through the reduction of household purchasing power. In January 2019, the International Monetary Fund downgraded the global growth outlook for 2019 to 3.5% from 3.7%, warning the trade conflicts may damage global trade. The dispute has changed the destination of US crude exports. US crude exports to China (Figure 3.6), which had witnessed strong growth since 2017, plummeted to zero in August 2018 although they have since resumed. The imports by Japan, Korea, Chinese Taipei, and Singapore from the USA, alternatively, hit a record high in the last half of 2018. The future of the trade conflicts is a major uncertainty for the crude oil flows in the world in the future.

The effect of the COVID-19 on APEC trade

The oil trade situation deteriorated with the new coronavirus (COVID-19) outbreak at the end of 2019. Billions of people around the world were affected by one of the worst health crises of the century and the global economy declined. The impact of containment measures caused activities in the transportation sector to fall dramatically. The coronavirus crisis is affected a wide range of energy markets – including coal, gas and renewables – but its impact on oil markets was particularly severe because it stopped people and goods from moving around, causing disruptions to global transport and trade.

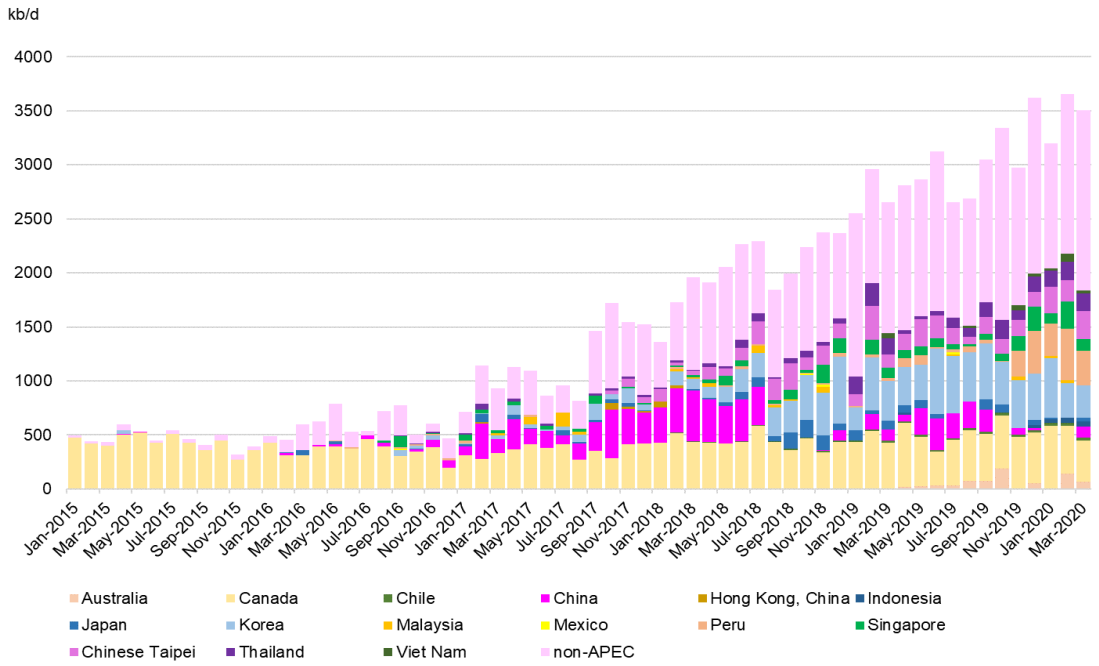
Global oil demand in 2020 is expected to decline by 9.3 mb/d from 2019 as the impact of the COVID-19 causes demand to drop for the first time since 2009. The contraction in oil consumption in China, the largest energy consumer in the world, which has accounted for more than 80% of global oil demand growth, has contributed to the slowdown of global energy and oil markets. It is anticipated that the recovery in the next few years beyond 2020 will be gradual, but the speed of recovery is still uncertain.

From an oil consumer's perspective, the low oil prices as a result of COVID-19 might appear to be attractive. However, they are of little benefit to the approximately four billion people living under some form of lockdown. On top of that, the low oil prices affect the livelihood of workers employed along the oil industry's extensive value chain.

The challenge that oil companies are facing is also the momentum of the investment to offset natural production declines and to meet future growth. Global capital expenditure by exploration and production companies in 2020 is projected to drop by about 32% from 2019 to USD 335 billion, the lowest level for 13 years. This reduction of financial resources also jeopardizes the ability of the oil industry to develop some of the technologies needed for clean energy transitions around the world.

It seems inevitable for energy policy makers and central banks in many governments to come up with massive emergency fiscal plans including monetary stimulus programs to support workers and revitalize businesses. There is clearly a long way to go before the oil market can put the COVID-19 crisis behind itself and stabilize one more time.

Figure 3.6: US monthly crude exports, 2015-2020



Source: EIA (2019) and EIA (2020)

Chapter 4: Price

Crude oil prices have fluctuated widely since 2007 (Figure 4.1). After hitting an all-time high of USD 147/bbl in July 2008, the WTI price nosedived to USD 33/bbl in February 2009 because of the global economic downturn triggered by the bankruptcy of Lehman Brothers. In the subsequent five years, economic recovery together with heightened geopolitical tensions supported prices. Prices were relatively stable in the range of USD 80-120 between 2011 and the first half of 2014. This period of stable high prices witnessed rise of US shale oil, which became very competitive because of its efficient production technique.

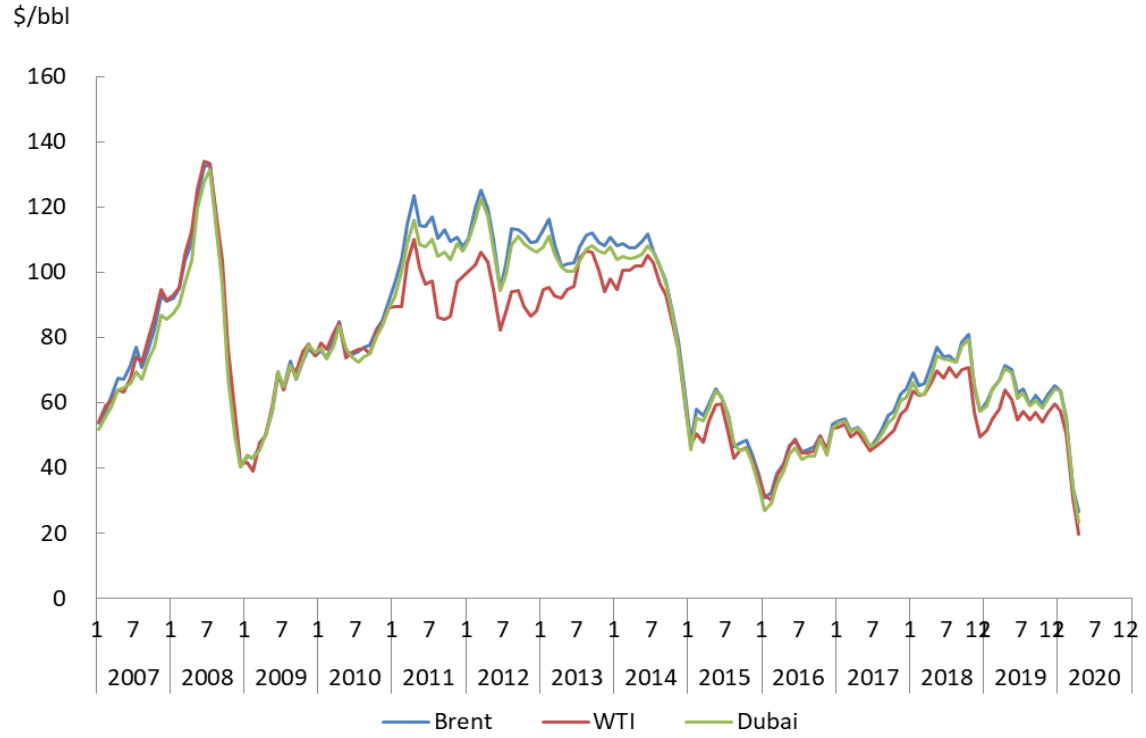
To deal with the shale expansion, OPEC decided to end its production adjustment in November 2014 to regain market share. The result was another nosedive of crude prices, which eventually fell below USD 30 in February 2016. OPEC once again returned to production cuts in November 2016, this time with some non-OPEC economies including Russia. OPEC/non-OPEC (OPEC+) joint production cuts rebalanced the market and concern about Iranian oil export declines because of US sanctions pushed up prices. Brent surged to above USD 86/bbl in early October 2018 for the first time since October 2014.

However, the market seems to have turned into another downturn cycle since October 2018. A weak stock market worsened investor sentiment. Brent fell around 40% in about three months to USD 50.47/bbl on December 24, 2018. Since the beginning of 2019, the market moved back into upward trend. OPEC+'s new production cut of 1.2 mb/d for six months started in January and OPEC's output in March hit a four-year low as Saudi Arabia reduced output to below their quota. The USA announced in late April that there would be no additional waivers for Iranian oil imports to eight countries after May 2 and the announcement sent Brent to new highs, USD 74.57/bbl on April 24. Volatility returned to oil markets with a dramatic sell-off in late May seeing Brent prices fall from USD 70/bbl to 60/bbl.

The US-China trade dispute continued and led to more trade tariffs, resulting in an oil price drop to below USD 57/bbl in August 2019. ICE Brent futures prices increased on positive news on the US-China trade talks and reached USD 64/bbl following the OPEC+ meetings.

Unexpectedly and without any warning, a coronavirus outbreak at the end of 2019 shook the world. The pandemic turned the world economy upside down and the energy market was no exception. Global oil demand decreased drastically, as people all over the world were quarantined and avoided travelling. Planes stopped flying, airports stopped operations and so did buses, cars, and trains. According to IEA, oil demand is expected to fall by 435 kb/d year over year in the first quarter of 2020, the first quarterly contraction in more than 10 years. IEA also cut its 2020 growth forecast by 365 kb/d to 825 kb/d, the lowest since 2011.

Figure 4.1: Crude oil prices, 2007-2020



Source: IEA (2020)

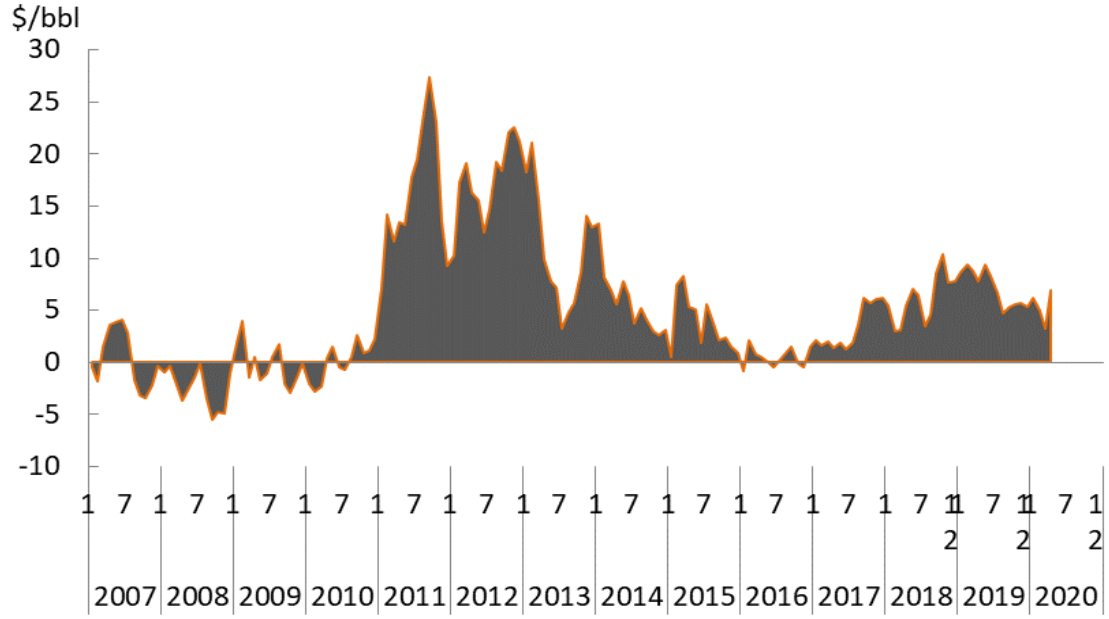
As global refinery runs are forecasted to expand by just 0.7 mb/d in 2020, crude oil futures tumbled by USD 10/bbl during January in anticipation of a negative impact on demand from COVID-19. As a matter of fact, even before the COVID-19 outbreak, the global oil supply was already 1 mb/d higher than demand because of continued oil production in the USA, Brazil, Canada, and Norway. The oil market situation worsened as demand weakened and oil prices collapsed.

To stabilize the unsteady oil price, the OPEC+ countries planned on an additional 0.6 mb/d cut to their oil production as an emergency measure on top of the 1.7 mb/d already agreed. However, the outcome of the OPEC+ meeting in March was not enough to relieve the negative impact on demand of the coronavirus and ICE Brent fell down further to below USD 46/bbl.

The impact of containment measures in 187 countries has restricted travel and lowered industrial activity that subsequently decreased global oil demand by a record 9.3 mb/d year-on-year in 2020 causing oil futures prices to fall by 40% in March. Brent has recovered modestly from an 18-year low as producers reached agreement to curtail output and traded at USD 31/bbl. Weak demand pushed prices for crude grades such as WTI Midland and West Canadian Select below USD 10/bbl. Oil prices fell further in April on weak demand because of COVID-19 and negative oil futures prices were seen for the first time when NYMEX WTI settled at USD -37/bbl the day before the May contract expired.

It is anticipated that the easing lockdown measures in some countries will provide support to gasoline and diesel markets. However, jet fuel sales have not recovered as aviation industry remains depressed.

Figure 4.2: Brent-WTI spread, 2007-2020



Source: IEA (2020)

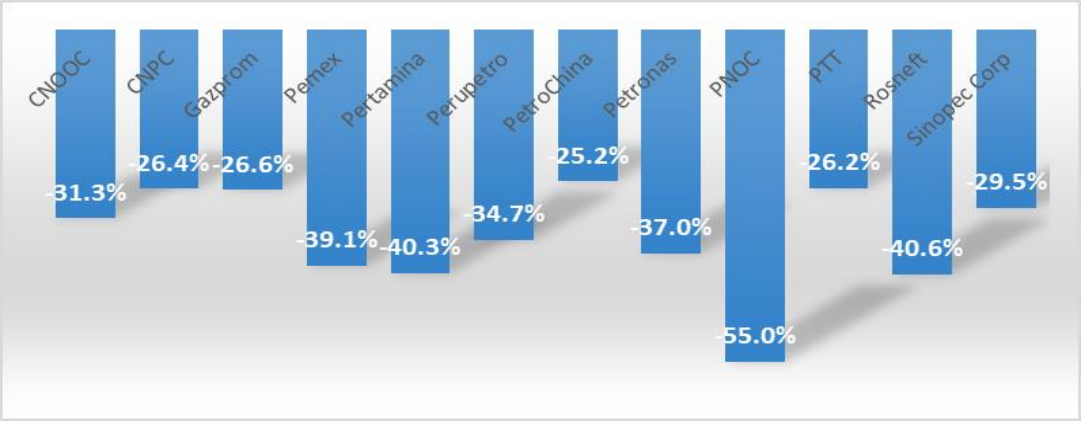
Meanwhile, the spread between Brent and WTI has varied substantially since 2011 as presented in Figure 4.2. The unprecedented spread in 2011-2013 is largely explained by a build-up of crude oil stocks in the USA because of the shale revolution and limited takeaway capacity, and the so-called Arab Spring – the former suppressed WTI and the latter inflated Brent. The spread temporarily widened since mid-2017 because of a shortage of pipelines to carry oil out of the Permian basin in West Texas in the USA. However, the WTI-Brent differential has narrowed as new pipelines to transport crude from the Permian Basin came online.

Box 2 • Transformation of National Oil Companies in APEC

National Oil Companies (NOCs) are major players in the global oil industry. The NOCs oil production accounted for 39.9% of the total world production of 95.0 mb/d in 2017. APEC NOCs also act as significant producers with 16.5 mb/d in 2017 or 17.4% of the total world supply. Rosneft (Russia) and CNPC (China) were the largest oil producers, with 4.5 and 3.4 mb/d in the APEC region. These two companies share as much as 47.9% of the total APEC NOCs supply.

The combination of increasing oil supply and global demand slowdown has created a sharp decline in international crude oil prices. After hitting its last peak in 2014, crude oil prices declined below USD 30/bbl in February 2016 and fluctuated in the range of USD 40-60/bbl between 2017 and 2019. Such a sharp drop in global crude oil prices has hit NOCs earnings as shown in Figure 4.3 and created significant financial stress for some oil-dependent emerging economies.

Figure 4.3 Decrease in NOCs revenues, 2015 vs. 2014



Source: National Oil Company Database (2019)

A significant drop in business profits associated with low oil prices has put the financial pressure on NOCs and triggered transformational changes in these state-controlled companies. Most notable developments in their recent restructuring are as follows:

First, NOCs in many economies began to adopt disciplinary measures to reduce the debt, raise capital or attract new investment. To illustrate, the state-run Korea National Oil Corp (KNOC) declared 2019 as the Year of Emergency Management. KNOC decided to focus on streamlining its operation for capital discipline, attracting foreign investments, and disposing of non-core projects. KNOC has been trying to find a financial partner for a 30% stake in its British subsidiary Dana Petroleum, while restructuring assets of a wholly-owned western Canadian firm, Harvest Oil Operations.

Second, NOCs are looking for ways they can diversify their existing fossil-energy-dominant portfolios into those with more alternative energy. For example, Pertamina, the Indonesian NOC, aimed to increase its investment spending for renewable energy to around 15% of its total capital expenditure by 2030 from 1% in 2018. Another southeast Asian oil firm, Malaysian state-owned Petronas, set up a new business group for renewables in 2018 and acquired a Singapore-based solar energy company as part of its strategy to move into renewable energy in 2019.

Finally, yet importantly, NOCs began to apply innovative digital information and communications technology in their upstream operations to improve production efficiency. A good case in point is Rosneft. Based on its annual report 2018, its 20 subsidiaries tested 149 new technologies in pilot projects and adopted a significant number of them in the field that the company successfully recovered additional 119,000 tonnes of oil. Also, Inpex, of which majority share is owned by Japanese government, declared digitization as a means to reinforce competitiveness in its long-term strategy, vision 2040, and established a digital transformation unit in 2019.

In summary, how to secure and earn high profits has become the centerpiece of the NOCs' strategy for survival and prosperity. Notably, in some APEC economies that are highly dependent on oil income, NOCs transformation will undoubtedly become a significant policy issue.

Chapter 5: Highlights

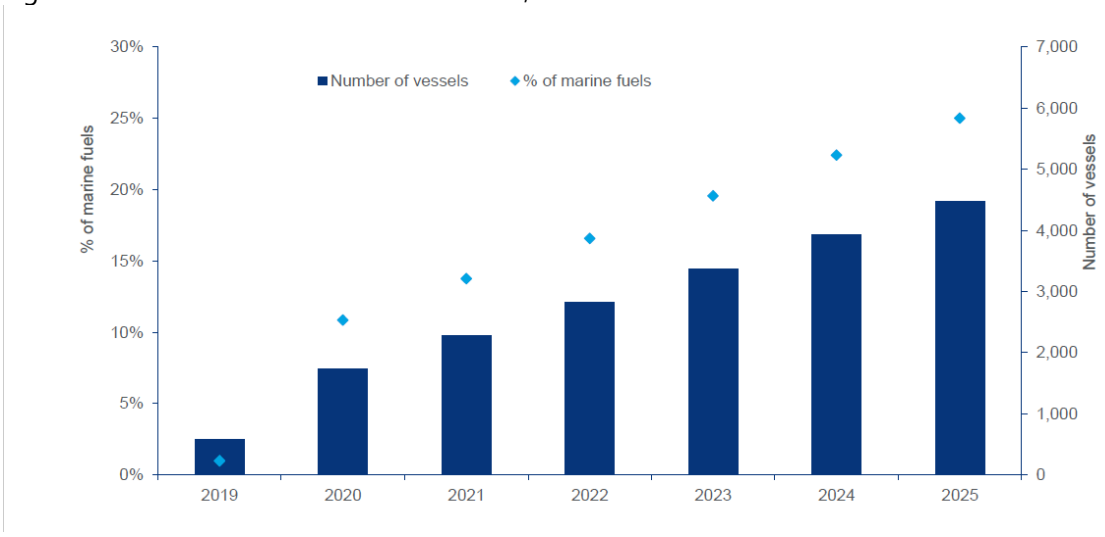
Impact of IMO 2020-sulfur cap regulation

In October 2016, the International Maritime Organization (IMO) decided to tighten the sulphur content regulation from 3.5% to 0.5% starting January 1, 2020 (IMO 2020). The IMO decision was based on the fact that bunker fuel accounts for 40% of the global sulphur emissions from oil, and the recognition that tightening the emission standard is necessary to mitigate the environmental impact stemming from bunker fuel.

The implementation of IMO 2020 on marine fuels in January 2020 presented a sudden change in the very low sulfur fuel oil (VLSFO) market and prices. Several technologies to produce VLSFO were introduced (e.g., cracking high sulphur fuel oil (HSFO) into VLSFO, changing refinery feed to sweeter crude, and installing scrubbers) and inevitably led to higher costs of production. The premium for a 0.5% blend over the 3.5% HSFO was in the range of $30/mt and was mainly borne by refiners, crude producers, ports, ship owners, and bunker suppliers who have stepped up their activities to set the stage for a smooth transition in January.

It was noticeable that the number of scrubber installations increased significantly before IMO 2020, as well as the percentage (Figure 5.1) of the new compliant fuel oil (Wood Mackenzie, 2019). Furthermore, the strategic hubs such as Fujairah, Rotterdam, and Singapore also stockpiled large volumes of compliant fuel ahead of and after the transition.

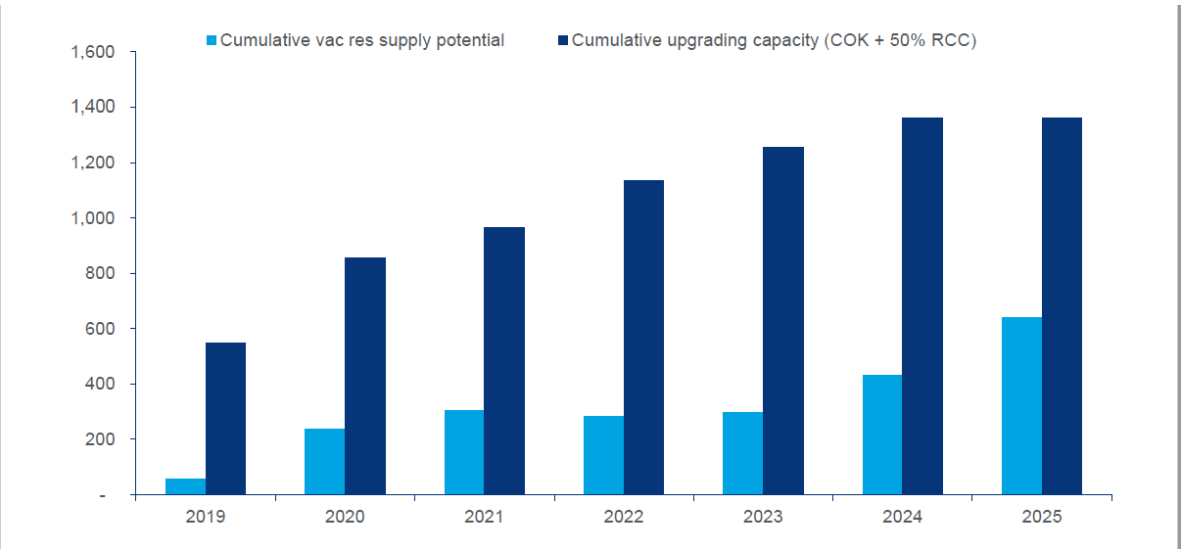
Figure 5.1: Outlook for scrubber installations, 2019-2025



Source: Wood Mackenzie (2019)

As the need for IMO 2020-compliant VLSFOs approached, the refineries running sweet crudes had the opportunity to enjoy additional refining margins based on sweet crudes while other refiners chose to invest in the residue upgrading units to capture the evolving VLSFO market (Figure 5.2).

Figure 5.2: Global supply of vacuum residue from crude production versus capacity to upgrade it, kb/d



Source: Wood Mackenzie (2019)

Cracks for compliant VLSFO made large gains while the price of HSFO was nose-diving with cracks in Rotterdam falling under -USD 30/bbl, the lowest in over 10 years. HSFO drew some support on demand from ships fitted with scrubbers. Freight rates strengthened because of the IMO 2020 transition to more expensive shipping fuels.

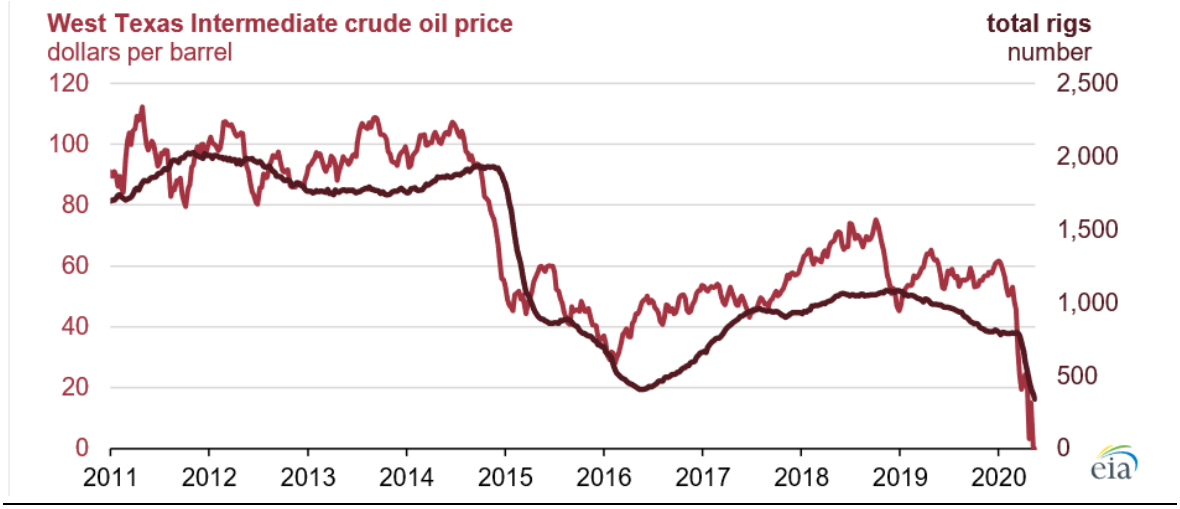
Since the beginning of the implementation of the IMO 2020, the trade flows started to change as regional disparities in compliant bunker fuel output occured. However, the expected significant disruption from the IMO 2020 turned out to be manageable because of a few counter-effects. These included the careful planning in preparation for IMO 2020 and the COVID-19 impact that weakened demand for bunker oil.

Depending on the success of the IMO 2020 implementation, IMO may consider taking further steps to reduce carbon emissions in the next generation's marine fuels, in addition to the sulfur reduction already implemented by the IMO 2020 measure.

US shale oil production increases versus OPEC+ cuts

It is well reported that the remarkable growth in the US shale oil production has influenced the global demand-and-supply balance as well as international crude oil prices. US crude oil production in 2019 hit 12.2 mb/d, up by 1.2 mb/d year-on-year with the number of operating rigs hovering around 1 000 during the period (Figure 5.3). Exports increased in 2019 to 3.0 mb/d from 2.0 mb/d in 2018 and the majority of them headed to APEC economies (Figure 3.6).

Figure 5.3: Weekly WTI crude oil price and total rig count, January 2011-May 2020



Sources: EIA (2020)

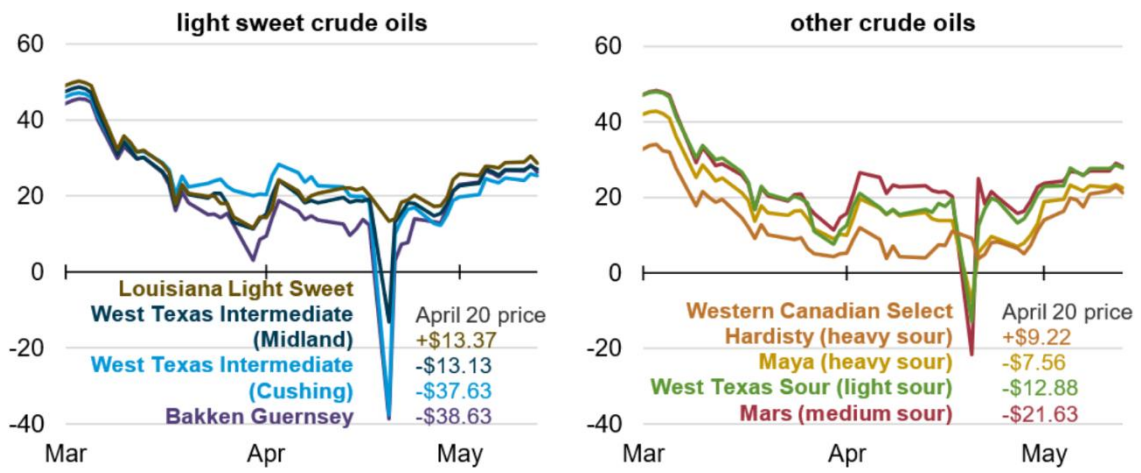
Meanwhile, OPEC, which had aimed at maximizing its market share in 2014, was forced back to the old strategy of production cuts in November 2016. This policy change was mainly driven by the tight oil expansion in the USA. The informal alliance by OPEC and non-OPEC producers (OPEC+) to cut oil production since January 2017 rebalanced the market. The OPEC compliance rate was maintained well over 100%, and oil prices surged from mid-2017 till mid-2018 when the market was quickly becoming oversupplied. The low oil prices forced OPEC+ to call for a new production cut scheme in December 2018, this time -1.2 mb/d for six months, starting January 2019. The US signal of no additional waivers for Iranian oil imports also stirred up oil prices for a short period. But the dramatic crude sell-off in late May 2019 sent crude oil prices back down again, this time to USD 60/bbl level. Prices collapsed to lowest level in years, around USD 30-40/bbl at the beginning of 2020, when the world was attacked by COVID-19. Starting in 2020, US exploratory drillers have been running rigs at the lowest level on record, 339 rigs in May, down sharply from 772 rigs in March.

As a result of falling global oil demand in both industry and transportation and sharply falling oil prices, on 5 March 2020 OPEC agreed to cut oil production by an additional -1.5 mb/d through the second quarter of the year (a total production cut of 3.6 mb/d from the original 2016 agreement) and called for non-OPEC members of OPEC+ to abide by the OPEC decision. However, Russia

rejected the OPEC request on the ground that the real impact of COVID-19 crisis on oil demand had not been assessed before the production cuts proposal and the cuts by OPEC+ would only benefit US shale oil producers. The end of the dialogue between OPEC and Russia provoked Saudi Arabia to initiate an oil price war on 8 March 2020 by offering a price discount of USD 7-8/bbl on its Official Selling Price (OSP) to customers in Europe, Asia, and the USA. The announcement triggered a free fall in oil prices; i.e., Brent and WTI falling by 30% and 20%, respectively (Figure 5.4). Moreover, Saudi Arabia announced it would increase its production from 9.7 mb/d to 12 mb/d to secure its market share.

As demand continued to fall dramatically, oil prices went down further, reaching a 17-year low on 18 March 2020, when Brent was priced at USD 24.72/bbl and WTI at USD 20.48/bbl (Figure 5.4).

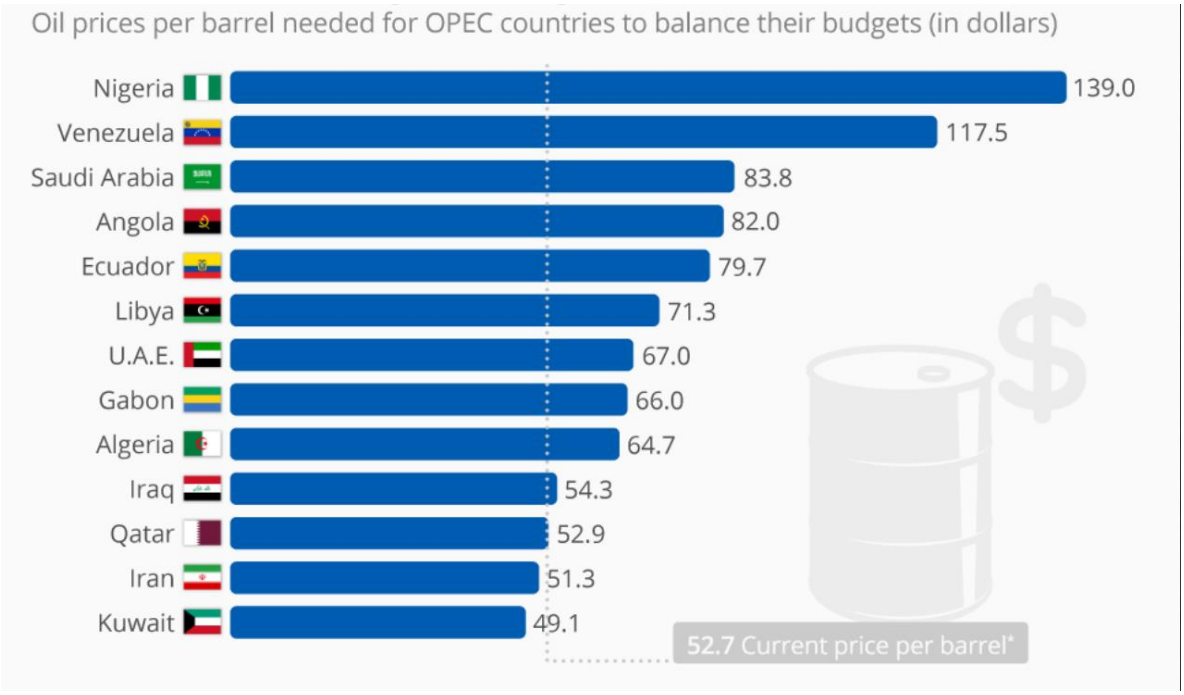
Figure 5.4: Selected North American crude oil prices, March 1-May 13, 2020



Sources: EIA (2020)

While the impacts on OPEC+, the USA, and others were diverse, they have all undoubtedly been hit hard by the demand drop and the oil prices collapse. As shown in Figure 5.5, crude oil prices higher than USD 50/bbl are typically the minimum requirement for most OPEC countries to balance their budgets. Facing such pressure, the resolution for OPEC+ finally came on 9 April 2020 when OPEC and Russia returned to negotiation and this time around, agreed to cut their production by as much as 9.7 mb/d, hoping to stabilize the oil market.

Figure 5.5: The price of OPEC oil dependency



*Note: * = closing price for a barrel of Brent on 31 July 2017*

Sources: Statista (2017)

With the COVID-19 impact at the start of 2020, the decision taken by OPEC+ may or may not help both OPEC+ and the US tight oil producers. Although the battle between OPEC+ and US tight oil has abated, all are searching for a better global economy. Yet strong demand growth and a corresponding supply balance are increasingly questioned. Many uncertainties remain and whether OPEC+ and US shale oil producers will be able to convincingly survive the coming tough years is yet to be seen.

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