MARKET REPORT SERIES

International Energy Agency
Secure Sustainable Together

OIL 2018

Analysis and Forecasts to 2023

EXECUTIVE SUMMARY

MARKET REPORT SERIES

International Energy Agency
Secure Sustainable Together

OIL 2018

Analysis and Forecasts to 2023

EXECUTIVE SUMMARY

INTERNATIONAL ENERGY AGENCY

The IEA examines the full spectrum of energy issues including oil, gas and coal supply and demand, renewable energy technologies, electricity markets, energy efficiency, access to energy, demand side management and much more. Through its work, the IEA advocates policies that will enhance the reliability, affordability and sustainability of energy in its 30 member countries, 7 association countries and beyond.

The four main areas of IEA focus are:

- **Energy Security**: Promoting diversity, efficiency, flexibility and reliability for all fuels and energy sources;
- **Economic Development**: Supporting free markets to foster economic growth and eliminate energy poverty;
- **Environmental Awareness**: Analysing policy options to offset the impact of energy production and use on the environment, especially for tackling climate change and air pollution; and
- **Engagement Worldwide**: Working closely with association and partner countries, especially major emerging economies, to find solutions to shared energy and environmental concerns.

IEA member countries:

Australia
Austria
Belgium
Canada
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Ireland
Italy
Japan
Korea
Luxembourg
Mexico
Netherlands
New Zealand
Norway
Poland
Portugal
Slovak Republic
Spain
Sweden
Switzerland
Turkey
United Kingdom
United States

The European Commission also participates in the work of the IEA.

International Energy Agency
Secure
Sustainable
Together

International Energy Agency
Website: ***www.iea.org***

EXECUTIVE SUMMARY

The journey to 2023 is starting from a relatively comfortable place. An overhang in global oil stocks has all but disappeared and oil prices have recovered. The oil price rally has rewarded those taking part in output cuts and has also unleashed a new wave of growth from the United States. Coupled with gains from Brazil, Canada, and Norway, oil markets now look adequately supplied through 2020. There is no call for complacency, however, and more investment is needed now to ensure secure supplies to meet robust demand growth.

Oil demand growth in the next five years rests on solid outlook for the global economy

A strong world economy is expected to underpin solid increases in oil demand. The International Monetary Fund sees global economic growth at 3.9% in the early part of our forecast period with all regions expected to perform well. Strong economies will, in turn, use more oil and we expect demand to grow at an average annual rate of 1.2 mb/d. By 2023, oil demand will reach 104.7 mb/d, up 6.9 mb/d from 2017. As has been the case for some years, China and India together will contribute nearly 50% of global oil demand. As China's economy becomes more consumer-oriented, the rate of growth in oil demand slows down to 2023, compared with the 2010-17 period. In contrast, the pace of oil demand growth will pick up slightly in India.

While there is no peak oil demand in sight, the pace of growth will slow down to 1 mb/d by 2023 after expanding by 1.4 mb/d in 2018. There are signs of substitution of oil by other energy sources in various countries. A prime example is China, which has some of the world's most-stringent fuel efficiency and emissions regulations. As the country recognises the urgent need to tackle poor air quality in cities, efforts are intensifying. Sales of electric vehicles are rising and there is strong growth in the deployment of natural gas vehicles, particularly into fleets of trucks and buses. Our analysis shows that a rising number of electric buses and LNG-fueled trucks in China will significantly slow gasoil demand growth.

Petrochemicals are a key driver of oil demand growth

The fastest-growing source of global oil demand growth are petrochemicals, particularly in the United States and China. The shale revolution in the United States has opened up a major source of cheap domestic feedstock. About 1.7 mb/d, or 25%, of our total demand growth to 2023 is taken up by ethane and naphtha. Global economic growth is lifting more people into the middle class in developing countries and higher incomes mean sharply rising demand for consumer goods and services. A large group of chemicals derived from oil and natural gas are crucial to the manufacture of many products that satisfy this rising demand. Examples include personal care items, food preservatives, fertilisers, furnishings, paints and lubricants for automotive and industrial purposes.

One of the biggest and most pressing issues is the implementation of major changes to marine fuel specifications mandated by the International Maritime Organisation (IMO). The new rules loom ever closer and the maritime and refining industries face a huge challenge to implement them. From the vantage point of early 2018, it is not clear how successful they will be, especially as demand for non-marine gasoil grades is growing steadily. The new regulations will cause a

massive switch out of high sulphur fuel oil demand and into marine gasoil or a new very low sulphur fuel oil. The *total* demand for oil products will not be dramatically altered, but the impact of the changes on the product mix is a major uncertainty in our forecast.

Investment in the upstream sector shows only modest signs of recovery

With global demand rising steadily, the response from the supply side is crucial. The recovery from the historic drop-off in investments by 25% in both 2015 and 2016 has barely started. Investment was flat in 2017, and early data suggests only a modest rise in 2018. This is potentially storing up trouble for the future. An added concern is that investment is overwhelmingly focused on the light tight oil (LTO) sector in the United States. As a result, upstream investment may be inadequate to avoid a significant squeezing of the global spare capacity cushion by 2023, even as costs have fallen and project efficiency has improved.

Natural production declines are slowing, but more investment will be needed. Each year the world needs to replace 3 mb/d of supply lost from mature fields while also meeting robust demand growth. That is the equivalent of replacing one North Sea each year. Investment in maintaining current production is one challenge, investing in future demand growth is another. Our analysis shows that discoveries of new oil resources fell to another record low in 2017, with less than 4 billion barrels of crude, condensate and NGLs found.

In the past three years we have seen oil production from China, Mexico and Venezuela fall by a combined 1.7 mb/d as a consequence of lower investment. China's decline has slowed; in Mexico, impressive reform proposals are being developed and production could return to growth by 2023. Meanwhile, Venezuela remains a wild card. In the twenty years since former President Chavez first came to power, oil production has more than halved to below 1.6 mb/d, and capacity will plunge by nearly 700 kb/d more by 2023, a major acceleration of the decline we expected a year ago.

With Venezuela in crisis, the net growth in total OPEC production capacity will be only 750 kb/d, and this number includes an assumption that shut-in production of around 500 kb/d from the Neutral Zone is finally re-started. It also depends on some degree of stability in Iraq, Libya, and Nigeria.

The United States dominates oil supply growth as non-OPEC countries meet all demand growth through 2020

With OPEC capacity growing only modestly, more attention is focussed on the non-OPEC countries, led by the United States, which is becoming ever more dominant in the global oil market. Driven by LTO, by 2023 United States output grows by 3.7 mb/d, more than half of the total global production capacity growth of 6.4 mb/d expected by then. Total liquids production in the United States will reach nearly 17 mb/d, easily making it the top global producer, and nearly matching the level of its domestic products demand. US production could be even higher by 2023 if prices rise above the assumptions made in this report, which is based on the current forward price curve.

Brazil, Canada and Norway will also contribute to supply growth. Along with the United States, they provide nearly all of the non-OPEC increase. Production of *conventional* crude oil in non-OPEC countries, which excludes US LTO, will actually decline to 2023.

Excess global refining capacity grows, but Asian refiners need more crude

The downstream sector will see major change during our forecast period. Excess global refining capacity is set to increase due to the slowdown in refined product demand growth. Global refining capacity additions to 2023 are forecast to amount 7.7 mb/d. At the same time, the rate of growth of refined product demand is slowing to 5 mb/d. The growing excess refining capacity will eventually put pressure on margins. The Middle East sees the biggest growth in capacity and national companies in the region are venturing into international markets, targeting joint ventures, particularly in Asia. Even though Chinese capacity additions slow, the country maintains its recently acquired role as a net product exporter.

With growing refining throughput, Asian import requirements grow by over 3.5 mb/d. The Middle East countries will remain the largest suppliers, but their exports will only grow by 1 mb/d, given their focus on domestic refining. Other sources such as Angola and Nigeria will have lower availabilities as, respectively, their output dwindles and they process more crude locally. This provides opportunities for new suppliers, mainly the US.

The US has a growing role in crude trade and its oil will meet refiners' needs

The United States is also making its mark in the refining industry. Conventional wisdom has it that rapidly rising LTO production is incompatible with the need of refiners to process heavier, sourer crudes, given earlier investments. This will not, in fact, be the case. With Asian import requirements growing there will be opportunities for new suppliers. As Canadian shipments to the United States grow, this frees up lighter US crude for export, particularly to meet Asian demand for petrochemical feedstocks. Shipments of oil from the United States to China are already significant. US exports will also be ideally placed to meet the need, post-IMO, for more low-sulphur crude, with a low yield of fuel oil.

The United States is well-placed to increase its role in global markets. Since the ban on exporting crude oil was lifted at the end of 2015, volumes have increased sharply, reaching 2 mb/d in some weeks. In 2018 and 2019, there might be bottlenecks in pipeline capacity for moving oil from Canada and the Permian Basin. But a close look at investment in logistics finds that after 2019, on the assumption that new projects being considered are actually commissioned, constraints will ease. This includes major Canadian projects such as Trans Mountain and Keystone XL pipeline, and the TexStar Logistics' 550 kb/d EPIC pipeline, due to be up and running in 2019 in Texas. Ten crude oil export facilities are either being upgraded or built. As a result, by 2023 capacity is expected to more than double from current levels to about 4.9 mb/d. Corpus Christi will become the main export hub in the Gulf Coast.

Oil market likely to tighten by 2023 with increased risk of price volatility

The upshot of our analysis is that the market could go through two phases during the next six years. Through 2020, record supply from non-OPEC countries more than covers expected demand growth. But by 2023, if investments remain insufficient, the effective global spare capacity cushion falls to only 2.2% of demand, the lowest number since 2007. This raises the possibility of oil prices becoming more volatile until new supplies come on line.

The US shale sector responded quickly to rising prices both in 2010 and in 2017 and it will continue to adjust to price signals in the future. But there will still be a continued reliance on

OPEC countries for a major share of global supply. Within OPEC, more than 2 mb/d of spare capacity is held in Saudi Arabia. In turn, this emphasises the crucial role OPEC's largest producer continues to play in providing stability to global oil markets.


Online bookshop
www.iea.org/books
PDF versions at 20% discount
International Energy Agency
iea
Secure Sustainable Together
E-mail: books@iea.org
Global Gas Security series
Energy Technology Perspectives series
Energy Statistics series
Energy Policies Beyond IEA Countries series
Gas
Coal
Oil
World Energy Outlook series
Renewable Energy
Energy Efficiency
Energy Policies of IEA Countries series
World Energy Investment series
Market Report Series

IEA/OECD possible corrigenda on: www.oecd.org/about/publishing/corrigenda.htm

-

IEA Publications
International Energy Agency
Website: www.iea.org
Contact information: www.iea.org/about/contact
Typeset in France by IEA - March 2018
Cover design: IEA; Photo credits: © Shutterstock

OIL 2018

Analysis and Forecasts to 2023

Oil 2018 is the IEA's annual five-year forecast of global oil demand, supply refining, and trade.

Global oil demand growth remains healthy driven by developing countries in Asia, even as oil consumption growth slows down in China thanks to new environmental policies designed to curb air pollution. Strong growth in petrochemicals demand globally is another key area of growth.

Upstream investments have not rebounded from the historic two-year decline seen in 2015-2016 except in the United States which dominates the supply growth story. Meanwhile, there is uncertainty over the longer-term prospects of the successful OPEC and non-OPEC market management policy.

These strands set the scene for *Oil 2018*'s analysis of the market, which examines a wide range of other important issues and uncertainties, including:

- The implications for oil demand of the 2020 IMO marine fuel regulations.
- The growth of the global petrochemicals sector.
- The rise of electrification in China's transport fleet.
- Decline rates in key oil producing countries.
- Crude quality issues arising from the rapid increase in US production.
- Investment needs in North American takeaway capacity.
- Implications for global refining of the looming capacity surplus.
- Trends in global oil trade.

MARKET REPORT SERIES