International Association of Oil & Gas Producers

www.iogp.org

Global Production Report 2018

2nd edition

Crew change on the Chevron-operated Erawan platform in the Gulf of Thailand. Photo courtesy of Chevron

Contents

Photo courtesy of Maersk Oil - Photographer Morten Larsen

IOGP Production Report 2018 2nd edition

Record levels of production & demand against a background of depleting fields

In a world making progress along a lower carbon emission path, oil and gas remain the leading energy sources. They are plentiful, accessible, cost-effective and – especially in the case of natural gas – cleaner-burning. That is why oil and gas provide about half of the world's energy today and will continue to do so, according to the International Energy Agency's most likely scenario for the decades ahead. Currently we see natural gas demand increasing in most places in the world. Demand for oil is increasing as well. In 2018, global oil supply surpassed the 100 million-barrels-per-day mark for the first time ever.

Our industry needs to invest to keep up with this rising demand, but there is also another challenge: field depletion. Historically, oil and gas fields outside OPEC have depleted by about 6% per year. Average OPEC field depletion is generally lower at 2% annually.
See page 34 for a more in-depth view of depletion by Wood Mackenzie's Pat Gibson.

Investments in enhanced recovery in depleting fields and the discovery and development of new fields can keep such production losses at bay.

Those are facts to bear in mind when reading this update of a report IOGP first produced in March, 2018. This second edition is based on more recent data drawn from the latest *BP Statistical Review of World Energy* of June, 2018, covering the previous year.

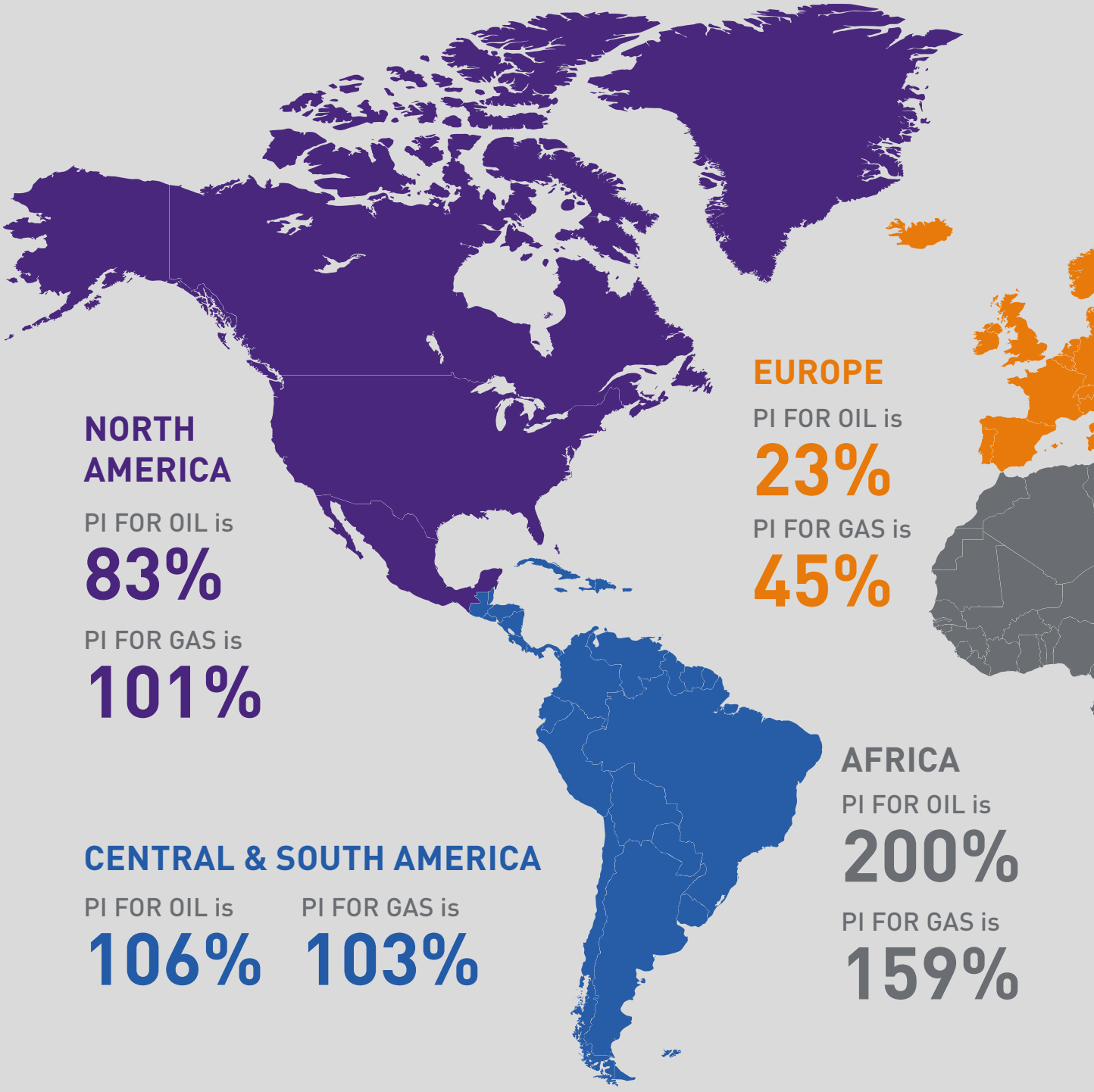
BP is an IOGP member, along with scores of other energy companies that together produce 40% of the world's oil and gas. They operate in all producing regions: Africa, Asia Pacific, the CIS, Europe, the Middle East, North America and Central and South America. Like its predecessor, this report looks at regional production and demand figures for both oil and gas.

The specially-devised IOGP Production Indicator© for oil and gas shows to what degree a region can meet its own demand through indigenous production.

Once again, IOGP is grateful for the data and insights that our members have provided for this report. As the figures and commentary show, for long-term prosperity and security of supply, the world needs further investment for responsible oil and gas production in each of the seven regions covered.

Gordon Ballard
Executive Director

Production Indicator Map



NORTH AMERICA

PI FOR OIL is
83%

PI FOR GAS is
101%

EUROPE

PI FOR OIL is
23%

PI FOR GAS is
45%

CENTRAL & SOUTH AMERICA

PI FOR OIL is
106%

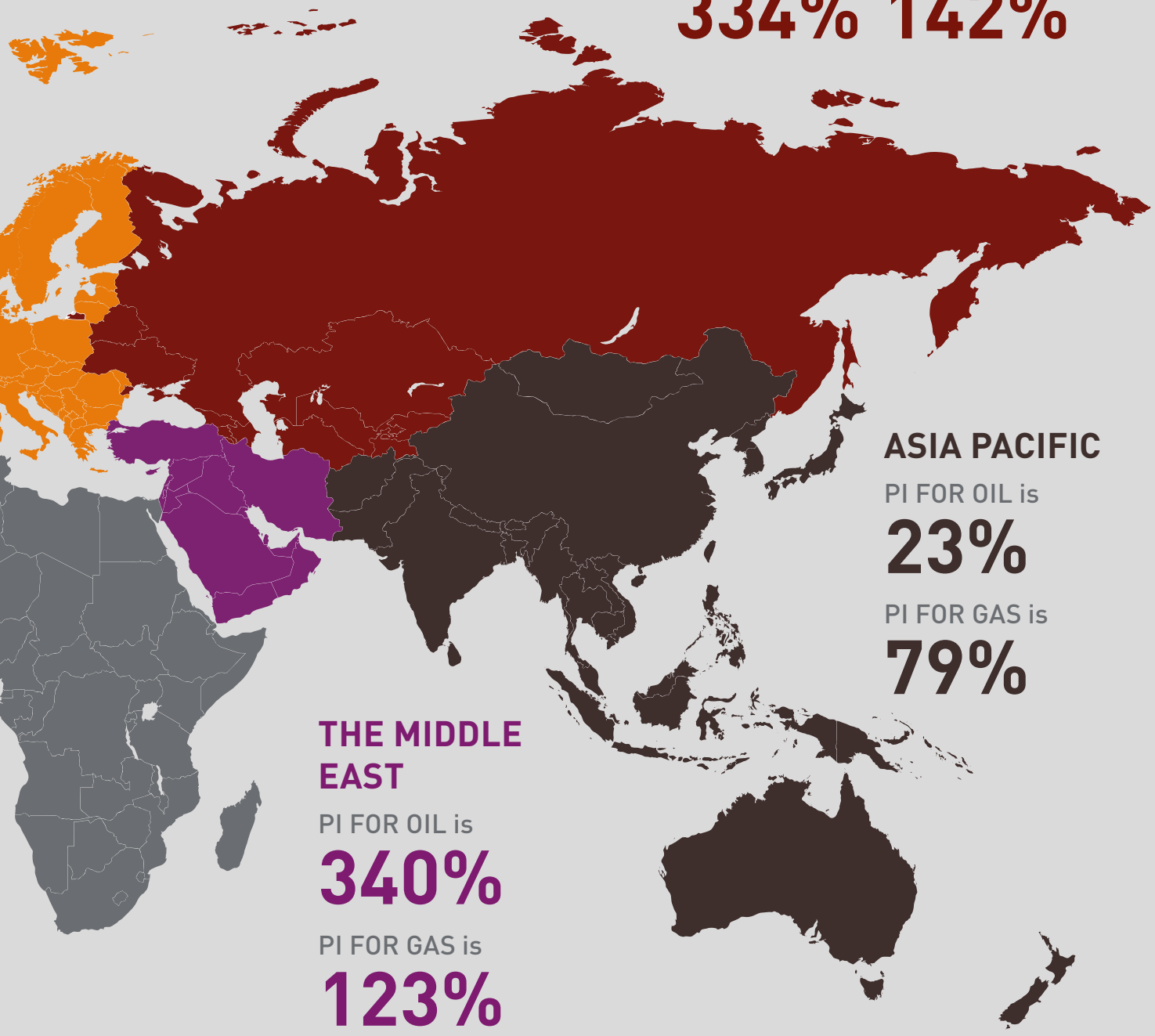
PI FOR GAS is
103%

AFRICA

PI FOR OIL is
200%

PI FOR GAS is
159%

The map above shows the division of the world into seven regions.
The delineation of zones is not intended to reflect offshore boundaries.



IOGP Production Indicator© (PI)

The IOGP Production Indicator© (PI) for oil is based on dividing daily production in thousands of barrels (or, for gas, billion cubic metres per year) by demand. The Production Indicator indicates the level of a region's self-sufficiency (and export potential). A Production Indicator above 100% demonstrates the ability to export; below 100% shows the need to import.

Tullow Oil's TEN FPSO offshore Ghana. Photo courtesy of Tullow Oil

Still self-sufficient – but for how long?

Africa's oil demand is increasing, along with growth in prosperity and population.

Production in decline

In 2017, Africa produced 8 million barrels of oil per day, down 2 million barrels per day during the course of a decade.

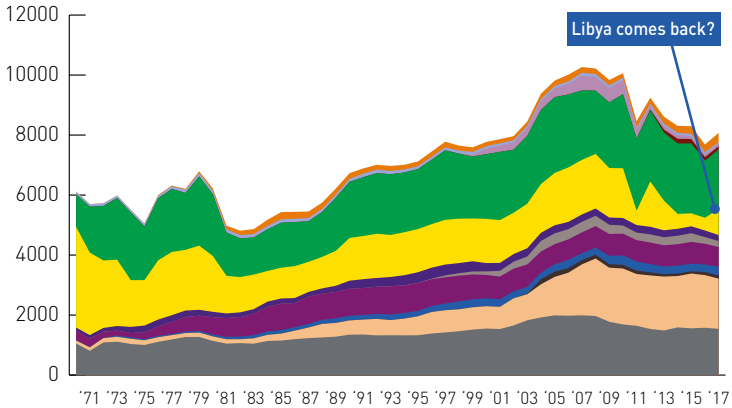
A decade before, Africa's Oil Production Indicator was 334%. In 2012 it was 260%. Today it is 200%. This means that the region's export potential is down to 4.0 million barrels per day, compared to 5.7 million barrels per day in 2012 and 7.1 million barrels per day in 2007. A reduced export potential of more than 3 million barrels per day translates into a reduced revenue income of USD 150 million per day – income the region desperately needs.

Africa's biggest producer is Nigeria, accounting for 25% of the region's volume. Nigeria's 2017 production of almost 2 million barrels per day is slightly above the 2016 level, but about 10% below the average of the last 10 years.

Africa's next-biggest producers are Angola and Algeria, each of which has 20% of production. Whereas Angola's production is stable at about

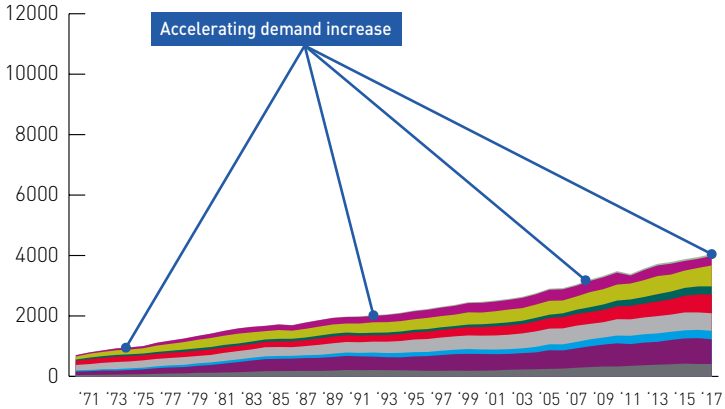
Signs of recovery after a significant production fall

Oil production in kbd by country



A half-century trend of rising demand

Oil demand in kbd by country

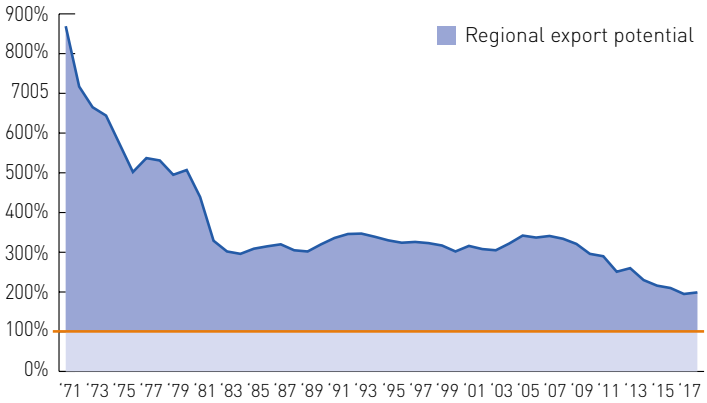


Algeria Angola Chad Republic of Congo Eastern Africa Egypt Equatorial Guinea Gabon Libya Middle Africa Morocco
Nigeria Other Africa Other Northern Africa Other Southern Africa South Africa South Sudan Sudan Tunisia Western Africa

Source: BP Statistical Review of World Energy 2018

A decade of decline

Oil: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

Africa's **PRODUCTION INDICATOR FOR OIL** is static at

200%

While Africa remains a significant oil exporter, falling production combined with rising indigenous demand could jeopardize that position.

1.7 million barrels per day, the production in Algeria was down by 0.5 million barrels per day versus 10 years ago.

Libya, which in the early 1970s led African oil production with 50% of the total, accounted for only 10% of production in 2017.

A demand milestone

African oil demand continued its upward trajectory in 2017, surpassing 4 million barrels per day. In 2007 the continent needed only 3 million barrels per day.

Impressive though this increase is – particularly compared to a demand of 1 million barrels per day in 1975 – the 4 million barrel daily rate of consumption is only equivalent to the combined demand of Germany and France. Together, those countries have a population of 150 million. Africa's population exceeds one billion.

The demand leader in Africa is Egypt, which consumes 0.8 million barrels per day. South Africa follows with daily demand of 0.6 million barrels.

What remains and where

There is enormous scope to meet Africa's rising demand for oil. The region holds 7.5 % of the world's reserves. Libya has the largest, with 48 billion barrels of proved reserves. Nigeria follows with 38 billion barrels. The challenge will be in attracting the investment needed to bring the region's oil to the surface.

Future of oil in Africa

With global oil demand set to keep rising for the foreseeable future, Africa will play an important role in meeting that need. One of our objectives is to build on the success of the TEN Field in Ghana, which first produced in 2016. We also believe that our flagship development, the Jubilee Field, also offshore Ghana, has much more to offer after 8 years of production. By early 2019, we aim to get production in Ghana up to 180,000 barrels per day.

There are also 100s of millions barrels of yet-to-be developed resources in Ghana, with further upside potential. Over the years, we have been highly successful in Ghana and we expect that trend to continue.

Elsewhere in Africa, significant oil discoveries in Kenya and Uganda demonstrate major development potential and we see these projects coming on stream and delivering around 300,000 bopd gross in the early 2020s. New technology is enabling us to make the most of what we find. In Cote d'Ivoire, for example, full tensor gravity gradiometers have proven to be very helpful.

Of course, Africa continues to present significant challenges as well as opportunities. These include access to exploration acreage for credible exploration companies, difficult licence terms and complicated tax regimes. But increasingly, governments are willing to discuss these challenges and the best ways to overcome them. This sort of progress is enhancing the prospects of finding and producing more oil in Africa.

Robin Sutherland, General Manager New Ventures Africa, Tullow Oil

Artist's impression of the Tortue/Ahmeyim project FLNG hub offshore Mauritania/Senegal. Photo courtesy of BP

Increased production helps to boost export potential

But with local demand rising, how long can exports continue?

Highest ever production

In 2017, Africa produced 225 billion cubic metres of gas – the region's all-time high. The biggest producer, responsible for 41% of Africa's output, was Algeria. Egypt and Nigeria are Africa's next-largest producers, with each accounting for 20% of the region's total.

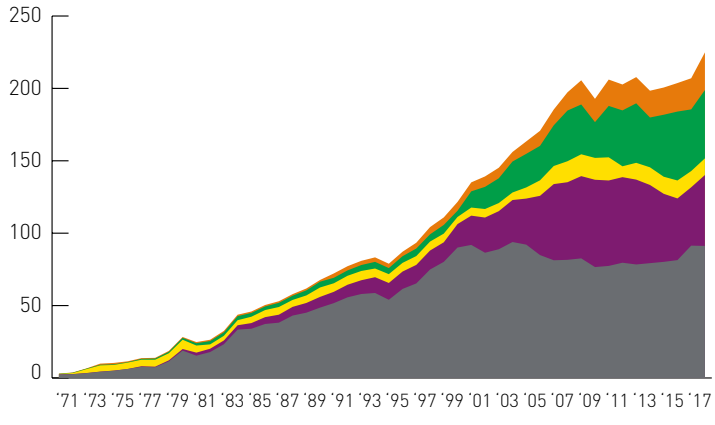
However, while Algeria was able to export more than half of the 91 billion cubic metres it produced, Egypt needed all of its 49 billion cubic metres to meet domestic demand.

A continent increasingly using gas

Elsewhere in Africa, demand is also rising. Just as production levels are unsurpassed, so are demand figures. In 2017, the region needed 142 billion cubic metres of natural gas to satisfy the demands of consumers and industry. The level of demand has risen by 50% in the past decade.

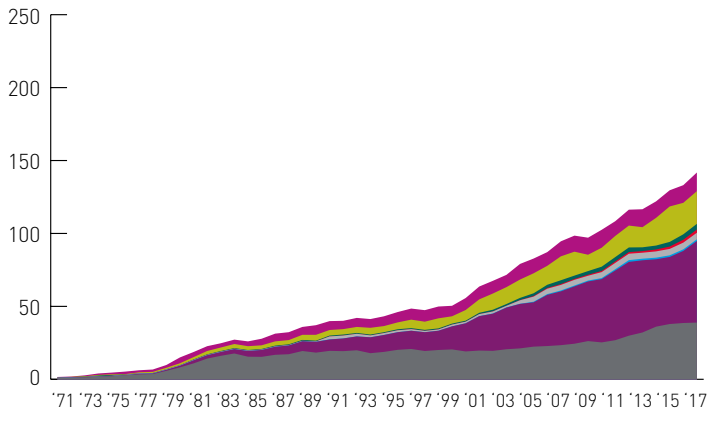
Focussed on North Africa and Nigeria

Gas production in Bcm by country



50% increase in just 10 years

Gas demand in Bcm by country

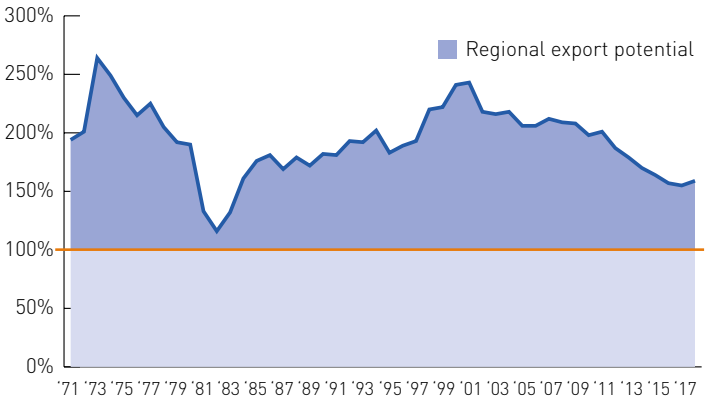


Algeria · Eastern Africa · Egypt · Libya · Middle Africa · Morocco
Nigeria · Other Africa · Other Northern Africa · South Africa · Western Africa

Source: BP Statistical Review of World Energy 2018

Progress through investment

Gas: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

Africa's **PRODUCTION INDICATOR FOR GAS** is marginally up at

159%

This increase shows the beneficial effect of recent investments, although it has not yet reversed the significant decline from a decade ago.

Most of this demand is centred in North Africa. Egypt accounts for 40% of Africa's gas requirements, followed by Algeria with 27%. The other North African nations collectively account for another 10% of overall regional demand.

What remains and where

Fortunately for future demand, the resources are there to meet a substantial portion of projected needs. Africa holds 7.1% of the world's gas reserves.

Nigeria has the largest reserves in Africa, accounting for 38% of the total. Algeria is a close second with 32%. Egypt holds 13% and Libya is fourth with 10% of African gas reserves.

Future of gas in Africa

Significant changes are ahead when it comes to the pattern of global energy supply and demand – and Africa is no exception. BP's Energy Outlook *shows that demand for energy in Africa is well ahead of the world average – forecast to grow by 3.5% each year over the next two decades.*

Alongside that comes a rapid rise in energy production – we forecast that energy production in Africa is likely to grow by around 60% by 2040, which is almost twice the global rate. In terms of gas, Africa could add a further 22bcf/d to the global supply over the next two decades.

BP's Tortue project, located on the maritime border between Mauritania and Senegal, will play a role in delivering that supply through an innovative floating LNG concept designed to support both domestic energy and LNG export. And the region is still seeing new discoveries – for example 2017's Yakaar gas discovery which was the largest in the industry for that year.

At BP we see gas as an important transition and destination fuel which can bring real benefits to these countries in terms of trade balance, reduced emissions, lower cost domestic energy, improved energy access and fiscal revenues for reinvestment in society.

It's a privilege to be working in West Africa and seeing first-hand the exciting potential the region represents both to the industry and our national partners.

Emma Delaney, Regional President, BP West Africa

CNOOC offshore operations. Photo courtesy of CNOOC

More imports than ever

Asia Pacific produces little more than a fifth of the oil it needs to meet its growing requirements

A population powerhouse with increasing oil demand

Well over half of the world's population lives in Asia Pacific. But the region accounts for only 8% of global oil production.

Current production of 7.9 million barrels per day is roughly equivalent to the region's output of a decade ago and slightly below the regional average of the past 20 years. It is 5% below the peak production reached in 2015.

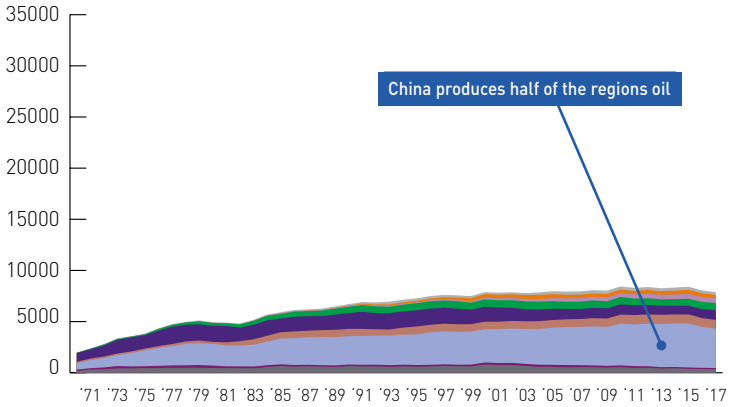
Within Asia Pacific, both China and Thailand have increased their flows of oil since 2007. Australia's production has dropped during that period.

China is Asia Pacific's largest oil producer by far. Its output of 3.8 million barrels per day gave it a 49% share of the region's total. The other biggest producers were Indonesia with a 12% share, India with 11% and Malaysia with 9%.

In terms of self-sufficiency, the most dramatic decline was in Australia. At the turn of the century, Australia, with a Production Indicator of 90%, was able to meet almost all of its oil demand through indigenous production. In 2017, its Production Indicator was 32%, meaning that it must import more than two thirds of its oil.

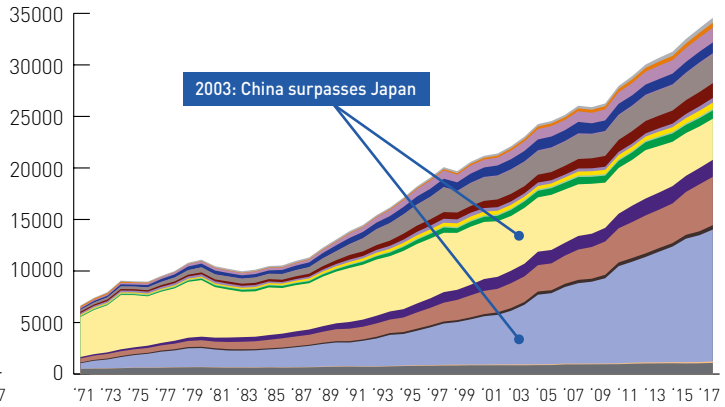
A slight decline consistent with recent history

Oil production in kbd by country



China's oil demand more than doubled since 2003

Oil demand in kbd by country

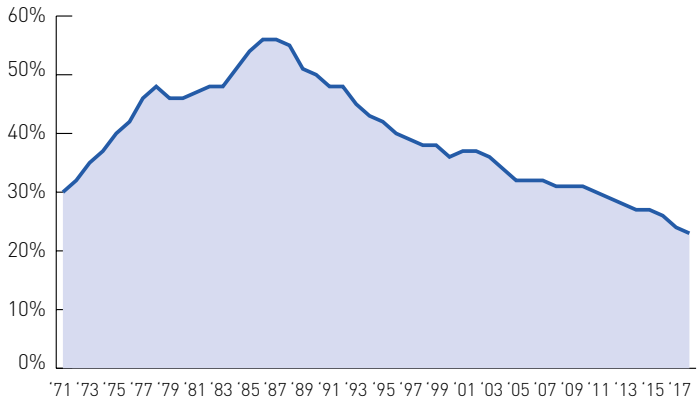


Australia Bangladesh Brunei China China Hong Kong SAR India Indonesia Japan Malaysia
New Zealand Pakistan Philippines Singapore Sri Lanka South Korea Taiwan Thailand Vietnam Other Asia Pacific

Source: BP Statistical Review of World Energy 2018

Reliance on imports grows

Oil: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

Asia Pacific's **PRODUCTION INDICATOR FOR OIL** is

23%

A booming regional economy increasingly looks elsewhere for more than three quarters of the oil it needs for continued growth and prosperity.

In volume terms, however, China – despite its status as a production leader – is obliged to import more oil than any of its neighbours. In 2017, China required 9.4 million barrels of foreign oil per day to meet its growing local demand. This contrasts with 20 years ago, when China imported only 1 million barrels of oil per day. In other words, on average, every two and a half years China has needed to import an additional 1 million barrels daily.

Regional demand for oil at its highest ever

Asia Pacific consumes 35% of the world's oil, getting through 34.6 million barrels per day. This consumption has risen by a third over the past decade.

China is the region's biggest consumer. Its more than 13-million-barrels-per-day requirement is 38% of Asia Pacific's total demand. Second among regional consumers is India, where rising prosperity and industrialization account for 14% of Asia Pacific's total oil demand. Japan is the region's third largest consumer at 12%, followed by South Korea, which requires 8% of the region's total oil consumption. With the exception of Japan, demand throughout Asia Pacific in 2017 was at or above record level.

What remains and where

Asia Pacific holds 3% of the world's proven oil reserves. The proven reserves of the region stand at 48 billion barrels, hardly changed in the last decade following continuous investments. Half of Asia Pacific's reserves are in China.

The future for oil in Asia Pacific: rebounding to meet growing demand

The upstream oil industry in the Asia Pacific region is struggling out of its slump; having bottomed out, it is now rebounding. From the perspective of demand side, as driven by the economic growth in Asia Pacific emerging economies and OECD countries like China and India, the energy demand in the Asia Pacific region will be maintained in a steady and sustained growth in the next two years. This will encourage investment.

From the supply side, major oil producers like China, India, Indonesia and other countries reduced their upstream investment during the recent period of lower oil prices. Currently, exploration and producing companies are keeping a close watch on the oil price trends and exploration costs. Although the development pace of new projects will not accelerate sharply, a gradual increase in E&P investment and expenditures is likely in the coming years.

Xie Yuhong, Executive Vice President, CNOOC limited

In March 2016, the first shipment of LNG from the Chevron-operated Gorgon Project set sail for Japan from Barrow Island off Western Australia. Photo courtesy of Chevron

Slight production rise helps meet record gas demand

Asia Pacific prosperity still depends on gas imports

Production increases lag behind growing demand

Since 2011, Asia Pacific's Gas Production Indicator has fluctuated only slightly within a 76% - 80% range. A decade ago, it stood at 86% and was 92% in 2002.

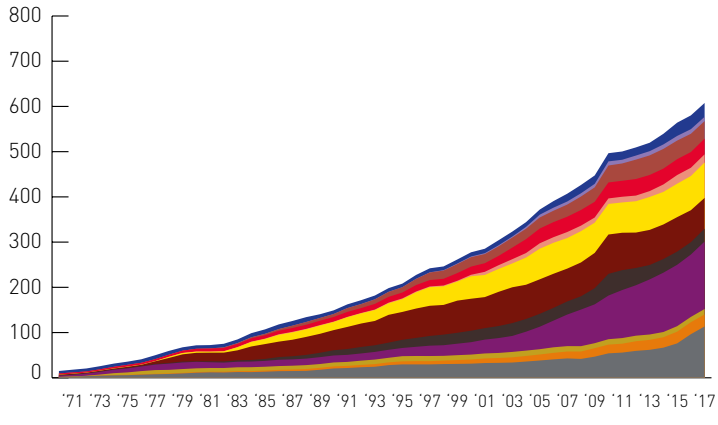
Shortfall notwithstanding, Asia Pacific is actually producing more gas than ever before. Production in 2017 was more than 600 billion cubic metres, an increase of about 200 billion cubic metres during the course of a decade.

As in previous years, the biggest regional gas producer was China, with 149 cubic billion metres, up 80 billion since a decade ago. China had been self-sufficient in gas until 2005, when its economic expansion created greater demand than indigenous production could supply. Most recently, in 2017, China had to import 90 billion cubic metres of gas to meet its own demand.

Australia was Asia Pacific's second largest gas producer in 2017. Its output was 114 billion cubic metres, a 61% increase compared to a decade before and 19% of the region's total. This

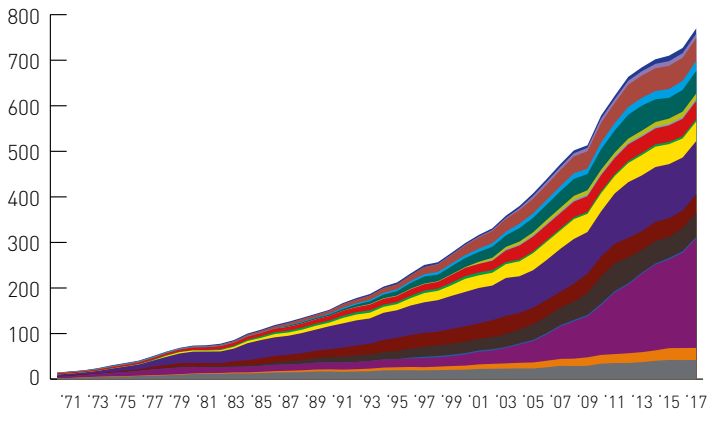
Hitting an all-time high

Gas production in Bcm by country



China's gas demand tripled

Gas demand in Bcm by country

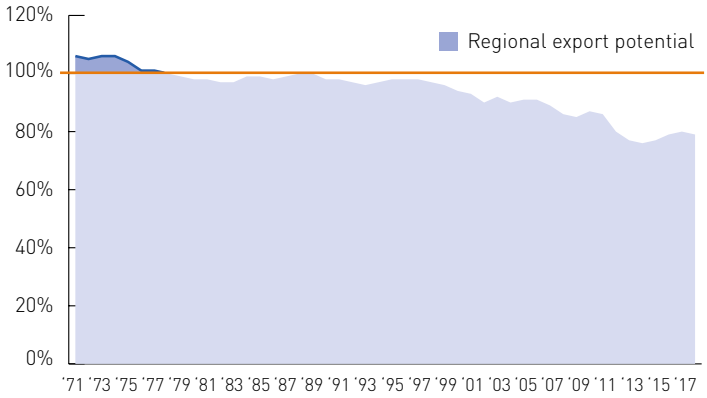


Australia Bangladesh Brunei China China Hong Kong SAR India Indonesia Japan Malaysia Myanmar
New Zealand Pakistan Philippines Singapore South Korea Sri Lanka Taiwan Thailand Vietnam Other Asia Pacific

Source: BP Statistical Review of World Energy 2018

The gap is getting wider between supply and demand

Gas: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

Asia Pacific's **PRODUCTION INDICATOR FOR GAS** is

79%

Despite growing volumes of indigenous supplies, the region is increasingly reliant on imports to fuel its growing population and economy.

gave Australia an export potential – primarily to Asia – of 72 billion cubic metres, more than three times the volume it could export in 2011.

Third-ranking Malaysia produced 78 billion cubic metres, a 13% share of the region's gas. This gives Malaysia the ability to export about 35 billion cubic metres per year.

Fourth-ranking Indonesia saw its export potential drop to below 30 billion cubic metres for the first time since 1991.

Gas demand up 67% in a decade

In 2017, Asia Pacific recorded its highest ever demand for gas: 770 billion cubic metres. The largest demand by far came from China, which accounted for 31% of the total. Japan's 117 billion cubic feet was 15% of the total.

The rest of the region's demand was fairly evenly split among India, Thailand, South Korea, Pakistan, Malaysia, Indonesia and Australia – all with shares of between 5%-7% of total demand and annual volumes ranging between 40-50 billion cubic metres.

To meet demand, Asia Pacific imported a total of 160 billion cubic metres of gas during 2017. Big importers are Japan, China and South Korea.

What remains and where

Asia Pacific holds 10% of the world's proven gas reserves, with China holding the lion's share of 28% of the regional total.

Australia follows with 19% and Indonesia and Malaysia have 15% and 14% respectively.

Scrutiny on SOCAR's Oil Rocks (Neft Dashlan) facility. Photo courtesy of SOCAR

Producing more oil than ever

Export potential is virtually unchanged in a decade

High production ensures a strong CIS export position

CIS oil production hit a new high of 14.3 million barrels per day in 2017. This was an increase of 12% over the region's output a decade ago.

By far the biggest producer is the Russian Federation. It produced 11.3 million barrels per day, giving it a 79% share of the CIS total. Russia's production was 1.2 million barrels ahead of its output in 2007 and consistent with the previous year's output – the highest since 1988.

Kazakhstan was the next-largest producer with 1.8 million barrels per day, giving it a 13% share of CIS production. The nation's volumes were up by 30% over the previous decade. Its production level is now comparable to Norway's.

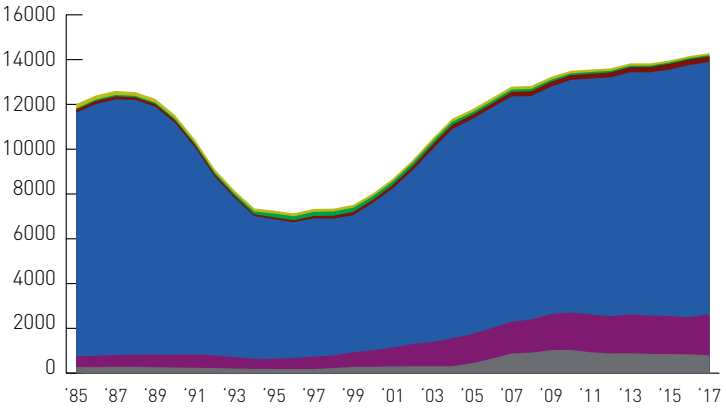
The third-most important CIS producer is Azerbaijan, with a 6% share based on daily production of 0.8 million barrels.

Demand stagnation continues

The CIS consumes 4.4% of the world's oil – about 4.3 million barrels per day. This is half of what

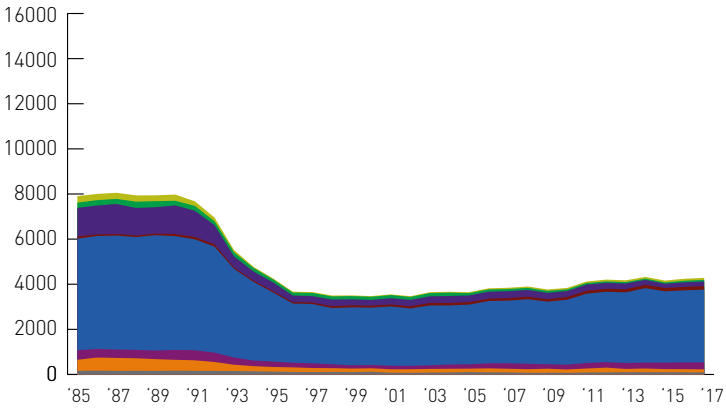
Production highs and lows

Oil production in kbd by country



Demand stagnates after a dramatic drop

Oil demand in kbd by country

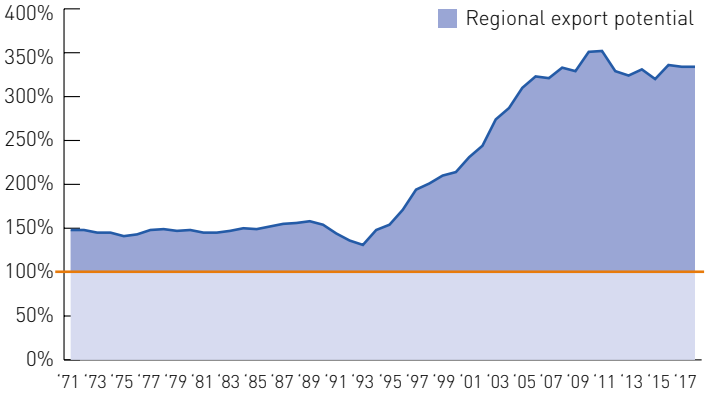


Source: BP Statistical Review of World Energy 2018

The earliest reliable production data date only from 1985.

Consistently producing more than three times its needs

Oil: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

The CIS PRODUCTION INDICATOR FOR OIL is

334%

Since 2004, the Production Indicator has stabilized at above 300%

the USSR required in the early 1980s before its political collapse at the end of that decade.

It was not until the early part of the 21st century that demand in the region began to recover, although it is still well below its Soviet peak.

Now, as then, the bulk of demand is Russian. In 2017, Russia consumed 3.2 million barrels of oil per day – equivalent to 75% of regional demand. The next highest levels of consumption were in Kazakhstan, with 7% and Ukraine at 5%.

With relatively low levels of demand the CIS has significant export potential. In 2017, Russia could export 8.0 million barrels per day, up from 7.3 million barrels per day a decade earlier. Kazakhstan's export potential in 2017 was 1.5 million barrels per day, while Azerbaijan's was about half that.

What remains and where

The CIS has access to 9% of the world's proven oil reserves. Russia holds 73% of regional reserves. Kazakhstan has 21% and Azerbaijan 5%.

Investment expresses confidence in the region's oil future

SOCAR

The level of SOCAR's confidence in regional oil production can be determined by the nature of the upstream challenges we are glad to tackle. Our operated assets include some of the region's – and the world's – most challenging wells. The Bulla-Deniz and Umid Fields, for example, are at a pressure of more than 15,000 pounds per square inch, with depths to 6,700 metres.

SOCAR is also a shareholder and state representing body in the Azeri-Chirag-Deep Water Gunashli and Shah-Deniz mega fields operated by BP-led consortiums. ACG produces around 600,000 barrels daily exported to the world markets through two oil pipelines – Baku-Tbilisi-Ceyhan and Baku-Supsa. Shah-Deniz produces 10 billions of cubic meters of gas per annum from the first stage of the project; second stage at plateau is going to produce other 16 billions of cubic meters annually. Production from Shah-Deniz is delivered to Azerbaijani local market, as well as to Turkey and Europe through the Southern Gas Corridor pipeline infrastructure.

Other examples of SOCAR's commitment to regional hydrocarbon developments are the Garabagh and Absheron Fields, being developed jointly with Equinor and Total respectively. Production is expected to start in 2020-2021. Looking beyond that milestone, SOCAR is also planning the second stage of development of the Umid Field and exploration wells on the adjacent Babek prospect.

In 2017, SOCAR and partners produced jointly 283.6 million barrels of oil and 28.6 billions of cubic meters of gas in Azerbaijan.

Yashar Latifov, Vice President for Field Development, SOCAR

Photo courtesy of Vladimirovic/iStockphoto

Another year of record gas production

Exports continue to grow

The world's biggest gas exporter retains its lead

CIS gas production is at its highest ever: 815 billion cubic metres. This volume, combined with comparatively low domestic demand, enabled the region to export 240 billion cubic metres in 2017 – compared with only 170 billion cubic metres a decade before.

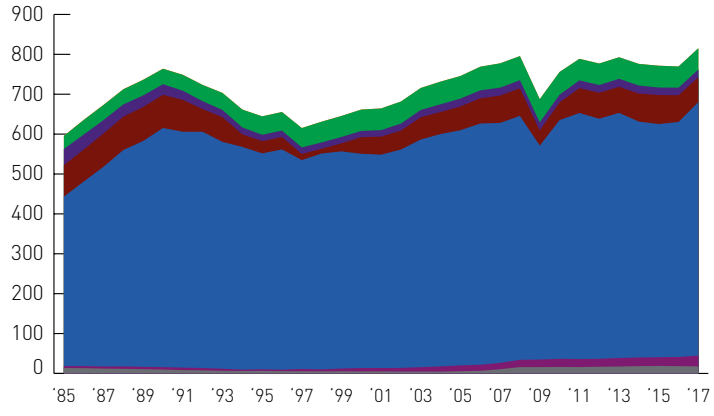
The region's leading gas producer is the Russian Federation, which accounts for 78% of CIS production. This gives Russia an export potential of 210 billion cubic metres. Turkmenistan follows with 8% of production, of which it could export 30 billion cubic metres in 2017. Uzbekistan is the region's third ranking gas power, with 7% of production.

Stable regional demand

Demand from CIS states in 2017 was 575 billion cubic metres. This accords with the average for the past five years, but is some 3% lower than the average of the previous five years.

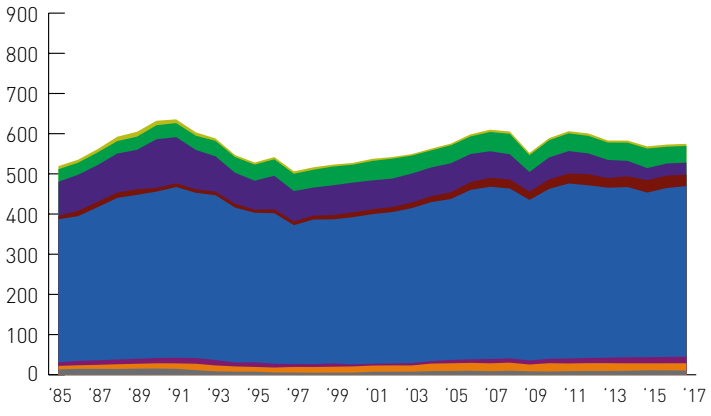
Producing at all time high

Gas production in Bcm by country



Ukraine unrest holds back overall demand

Gas demand in Bcm by country

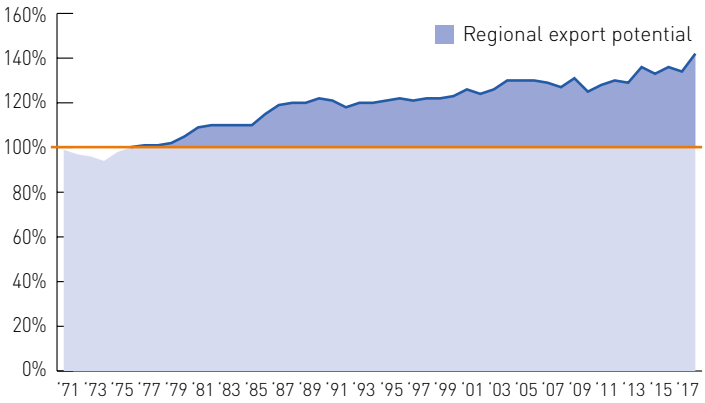


Azerbaijan Belarus Kazakhstan Other CIS Russian Federation Turkmenistan Ukraine Uzbekistan

Source: BP Statistical Review of World Energy 2018

Increasing export opportunities

Gas: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

The CIS PRODUCTION INDICATOR FOR GAS is

142%

As production rises and demand stagnates, CIS Production Indicator is steadily increasing

As with production, Russia accounts for the bulk of CIS gas demand. In 2017, Russia consumed 74% of the region's gas, or 425 billion cubic metres. This was slightly below Russia's level of demand a decade before of 429 billion cubic metres.

The second ranking gas user is Uzbekistan, accounting for 7% of the CIS total. Turkmenistan had 5%, as did Ukraine.

While there was demand growth in Turkmenistan and Kazakhstan when compared to 2007 figures, this was more than offset by the consumption decline in Ukraine, which more than halved in a decade from 66 billion cubic metres in 2007 to only 30 billion cubic metres in 2017.

What remains where

The CIS is well-placed to continue its prominence in gas exports. It holds 31% of the world's proven reserves, with Russia having 60% of the regional total. Turkmenistan has 33%.

Historically high levels of CIS gas production and availability for exports beg the question: is the upward trend likely to continue?

The proven reserve base is large enough to accommodate a further increase in CIS gas output and export opportunities. But there are other elements to be considered. These include the future levels of essential domestic demand, the timely availability of well-functioning infrastructure throughout the value chain, and demand in the export destination markets. With such important variables one might be able to make widely diverging scenarios for future production and exports. However, the basic assumption can be that the drive to maintain or increase exports will continue to be strong for the near and medium term and, with stable or moderately rising domestic demand, the room for exports will be there if the commercial terms are acceptable.

On the infrastructure front we see significant expansions of the capability to take CIS gas abroad. These include new routes to Europe and Asia (e.g. Power of Siberia). Asia's appetite for natural gas is expected to remain strong as energy demand grows and environmental challenges, mostly due to coal use for power generation, persist. In Europe, there may well be room for more gas use in the power sector, partly resulting from increased power needs and pressure on coal due to policies and CO_2 pricing. So can CIS gas production and trade increase?

Yes they can. Will they? Watch the demand and infrastructure developments and you will have at least half the answer!

Marcel Kramer, Regional Coordinator for Russia, the Black Sea and the Caspian, IGU

IGU
INTERNATIONAL GAS UNION
UNION INTERNATIONALE DU GAZ

The Valhall field in the southern Norwegian North Sea. Photo courtesy of Jan Arne Wold/Aker BP

Demand picks up, raising imports

Greater investments, improved efficiencies and new licences could boost share of indigenous supplies

Sustained growth in demand keeps import levels stable

With only 4% of the world's production but 15% of demand, Europe has long imported most of the oil it needs to maintain the region's prosperity and well-being.

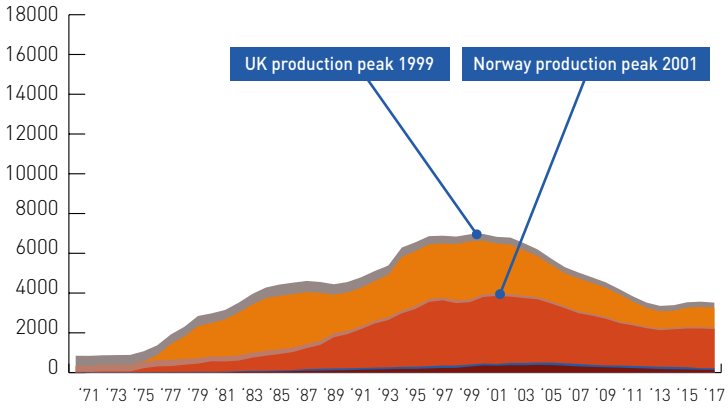
For the last five years, Europe's Production Indicator for oil has remained in the 23-25% range, requiring Europe to import three quarters of its oil needs. Only between 1994 and 2003 did the region maintain a Production Indicator of more than 40%, when both Norway and the UK were producing oil from the North Sea at close to record levels. Europe produced its highest volumes of oil in the early 2000s, with almost 7 million barrels per day of indigenous crude.

In 2017, European production stood at 3.5 million barrels per day, 30% less than in 2007.

For decades, volumes of imported oil were about 10–11 million barrels per day. In 2017, rising demand pushed import levels marginally higher to 11.5 million barrels of oil per day.

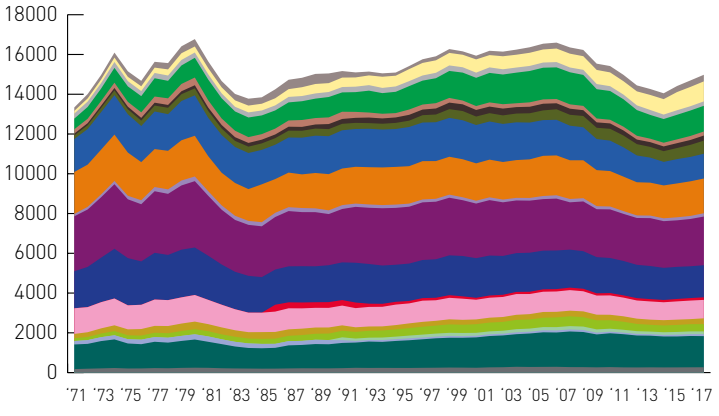
UK and Norway produce more than 80% of Europe's oil

Oil production in kbd by country



A high level of demand continues

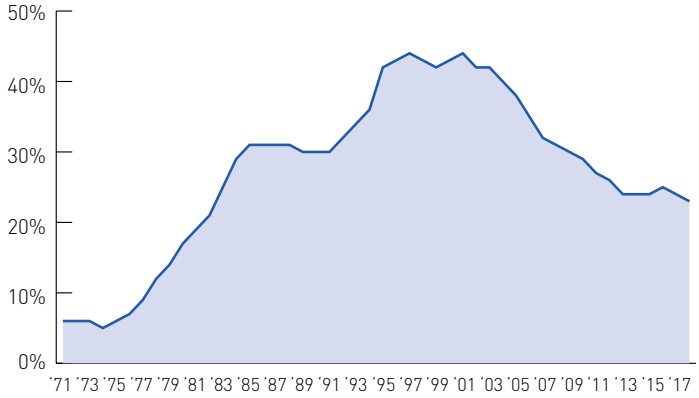
Oil demand in kbd by country



Source: BP Statistical Review of World Energy 2018

A setback, but not necessarily a reversal

Oil: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

Europe's PRODUCTION INDICATOR FOR OIL is

23%

This is a slight reduction from the previous year.

The biggest oil producer in Europe is Norway. With almost 2 million barrels per day, it has a 56% share of the region's total. The UK is the second largest producer, accounting for 28%, equivalent to about 1 million barrels per day.

A major oil consumer

Europe's appetite for oil is getting more robust. In 2017, the region got through around 15 million barrels of oil per day, the highest rate of consumption since 2010.

Germany is Europe's largest user of oil, accounting for 16% of the region's demand in 2017, equivalent to 2.4 million barrels per day.

The UK and France are joint second highest users, accounting for 11% of Europe's total consumption each. While the UK had achieved oil self-sufficiency thanks to North Sea production, since 2006 it has increasingly relied on imports to meet demand. In 2017, the UK's Oil Production Indicator was down to 63%, meaning that over a third of its oil now needs to come from elsewhere.

Spain is Europe's third-ranking nation in terms of oil demand, accounting for 9% of the total, followed by Italy with 8%.

What remains and where

According to Wood Mackenzie, Europe holds 32 billion barrels of recoverable oil in reserve. This could sustain current production levels for another 15-25 years. Continuing development, however, would rely on responsive fiscal frameworks and strong cooperation between regulators and industry.

Europe: a competitive oil producer with a lower carbon footprint

It is interesting to see that despite the demand drop which begun a decade ago, we are now back to the average level seen over the past 50 years in Europe. The manufacturing sector's needs are driven by demand for petrochemicals, accompanying the region's economic recovery. Parallel to its use as feedstock for high-tech polymers and advanced materials needed for the energy transitions, oil remains an affordable mobility option for millions of Europeans, even as alternative methods emerge.

Companies can be proud of what they've achieved in Europe. The efficiency gains of the past few years in the exploration & production sector are paying off. The region remains competitive from a production perspective and its carbon footprint is among the lowest in the world: one barrel of oil produced in Europe has a 30% lower carbon footprint compared to an imported barrel of oil. Policies incentivizing production, such as the ones put in place by the UK, have had a strong and positive impact. By working closely with governments, our industry can help them sustain this healthy share of domestic production as long as possible.

François-Régis Mouton, Director European Affairs, IOGP

Platform at Tyra West. Photo courtesy of Maersk Oil - Photographer Morten Larsen

Stabilizing production offset by higher rise in gas demand

Despite stable production levels, a third consecutive year of demand growth signals the need to keep up strategic investments in natural gas exploration & production.

Record imports a consequence of higher demand

As recently as 2012, Europe could rely on indigenous natural gas production to meet just over half of its needs. That is no longer the case.

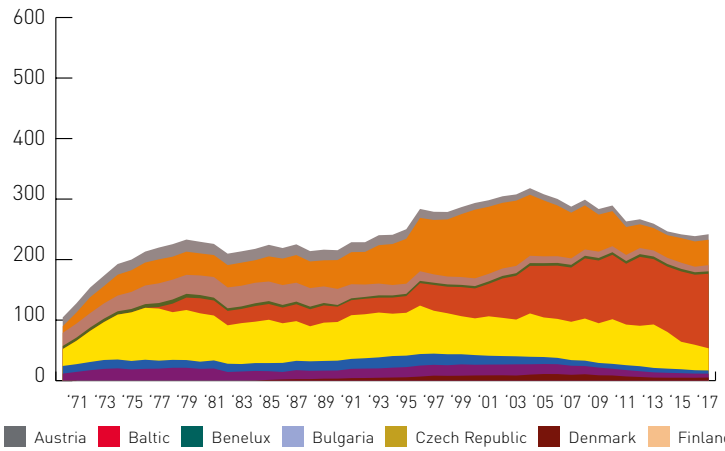
However, the cause of this trend has changed – unlike previous years, it is no longer falling production but a rise in demand, driven by industrial use and higher demand in power generation. Gas is replacing coal in parallel with the rise of renewable energies in response to climate change concerns.

Europe's own natural gas production rose from 238 billion cubic metres in 2016 to 242 billion cubic meters (bcm) in 2017.

Looking back 10 years, production is 16% lower today than in 2007. Peak natural gas production for Europe was in 2004, when the region produced 318 billion cubic meters.

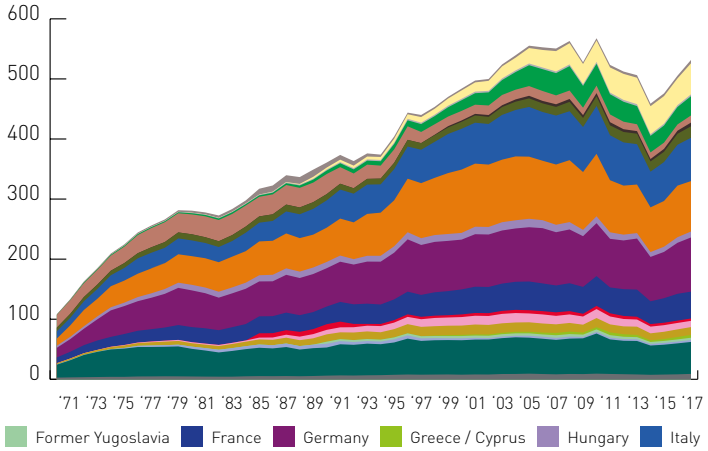
Norway produces more than half of Europe's indigenous gas

Gas production in Bcm by country



Demand on the rise again

Gas demand in Bcm by country

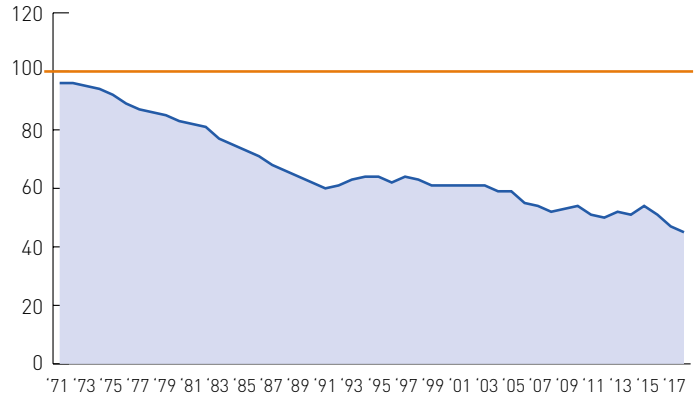


Austria Baltic Benelux Bulgaria Czech Republic Denmark Finland Former Yugoslavia France Germany Greece / Cyprus Hungary Italy
Lithuania Netherlands Norway Poland Portugal Romania Scandinavia/Iceland Slovakia Spain Sweden Switzerland Turkey UK Other Europe

Source: BP Statistical Review of World Energy 2018

Growing reliance on imported gas

Gas: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

Europe's PRODUCTION INDICATOR FOR GAS is

45%

While this is lower than last year, it is mostly due to a rise in demand. It shows that Europe is still managing to produce almost half of its annual consumption – an achievement that can continue with the right policies in place for this cleaner-burning fuel.

Only Norway has bucked the depletion trend. While UK gas production dropped by 44% in a decade and the Netherlands' went down 42%, Norway actually produced more gas in 2017 than it did in 2007: 123 billion cubic metres versus 90 billion cubic metres – an increase of 38%. As a result, Europe's biggest producer has a 51% share of production for the region: It produces more than all the other European nations combined.

In 2017, the UK produced 17% of Europe's gas and the Netherlands' share was 15%. Other producers are Germany, Italy and Poland.

A fuel increasingly in demand

Europe consumes about 15% of the world's gas production.

In 2017, gas demand was 530 billion cubic metres – considerably higher than the 460 billion cubic metres consumed in 2014 but marginally less than just before the financial crisis of a decade ago.

Germany is Europe's largest gas consumer, with 17% of the total. The UK came a close second with 15%, followed by Italy with 14%.

Looking at ten-year averages in demand, Europe's appetite for gas has risen constantly, going from 290 billion cubic meters in the decade from 1978 to 1987 to an average of 520 billion cubic metres in the period from 2008-2017.

What remains and where

Europe's gas resources are equivalent to 1.5% of the world's proven reserves.

Norway holds the lion's share of European resources, with 58%. Second place goes to the Netherlands with 22% and the UK is third with 6% of the region's total.

Gas demand & production: a positive development for Europe

The rise in natural gas demand and production is a near-term positive development for Europe. It helps lower the carbon intensity of the energy mix when and where gas replaces more polluting energy sources such as coal, while reaping all the benefits that come with domestic production. However, the industry also needs to look at the long-term and work with policymakers to ensure progress on technological and regulatory solutions whereby gas can contribute to deep decarbonisation of our societies.

Companies' exploration efforts over the past few years are paying off. The fact that this year three major gas discoveries have happened in Europe (Cyprus, Norway and UK) shows there is still strong potential not only in new areas such as the Eastern Mediterranean and the Black Sea, but also in mature ones such as the North Sea and the Norwegian Continental Shelf.

Olav Aamlid Syversen, Chair of IOGP's EU Committee

Kuwait Oil Corp, offshore production platform. Photo courtesy of SPE

Export potential continues to grow

The Middle East produces more than a third of the world's oil

Daily exports of more than 22 million barrels earned the region US$1 billion a day

The Middle East's ability to export oil has doubled since the 1980s. The average for that decade was 11 million barrels per day. It rose to 15 million barrels per day in the 1990s and in the first decade of the 21st century average daily export potential was 18 million barrels.

The world relies on these export volumes for more than a third of its oil.

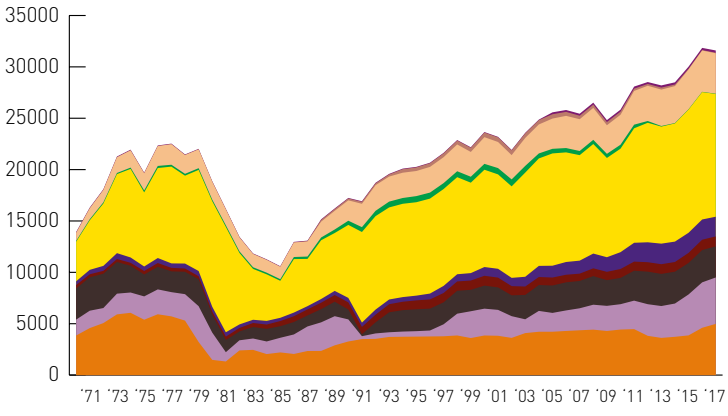
Total production in 2017, including volumes needed to meet regional demand, was 31.6 million barrels per day, just short of the previous year's daily production record of 31.8 million barrels. During the course of the past decade, regional output has increased by 24% or 6.1 million barrels per day.

Saudi Arabia remained the biggest regional producer in 2017. Its 11.9 million barrels accounted for 38% of the Middle East's oil. Iran came next, with 5.0 million barrels per day, or 16% of the total.

Iraq is the region's third largest producer, with 4.5 million barrels per day – an all-time high – giving it a regional share of 14%. Other significant producers are the United Arab

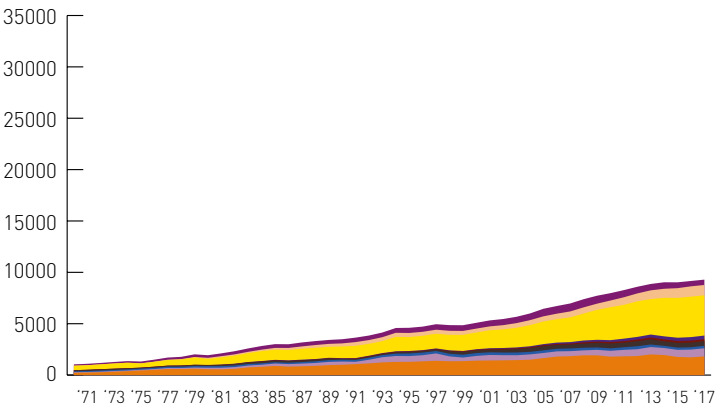
High output remains constant from the world's most prolific region

Oil production in kbd by country



Saudi Arabian demand continues to dominate

Oil demand in kbd by country

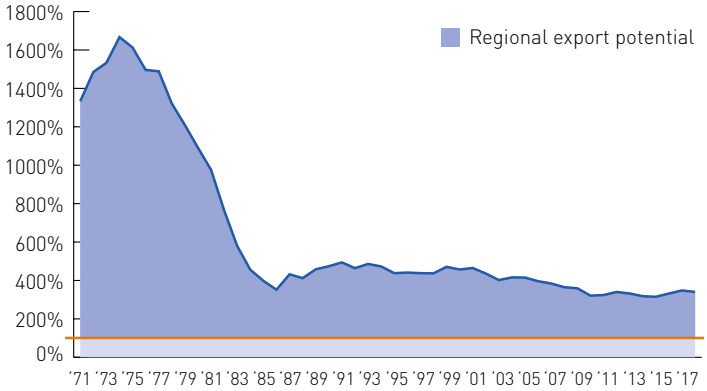


Iran · Iraq · Israel · Kuwait · Oman · Qatar
Saudi Arabia · Syria · United Arab Emirates · Yemen · Other Middle East

Source: BP Statistical Review of World Energy 2018

30 years of stability in export potential

Oil: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

The Middle East's **PRODUCTION INDICATOR FOR OIL** is

340%

A marginally higher Production Indicator confirms the region's role as the world's major oil exporter.

Emirates with a 12% share, Kuwait with 10% and Qatar, accounting for 6% of the region's oil.

Demand reaches new high – but remains disproportionate to production

Considering that the Middle East produces more than a third of the world's oil, its consumption is relatively low: a mere 10%. However, with demand at 9.3 million barrels per day, it is at its highest level ever. In a decade, regional oil consumption has grown by one third.

In 2017, Saudi Arabia consumed 42% of the region's oil, equivalent to 3.9 million barrels per day. This reflected, at least in part, the nation's economic diversification, including major investments in the petrochemicals industry. In the course of a decade, Saudi demand went up by more than 60%.

Iran came second in the consumption stakes, with demand at 1.8 million barrels per day, or 20% of the region's total. Iran's demand level has remained fairly static for the past ten years.

What remains and where

The region's dominance in production is likely to continue. The Middle East holds 48% of the world's proven oil reserves.

Saudi Arabia has a third of that. Iran and Iraq account for 20% and 18% of regional reserves. Kuwait has 13% and the UAE 12%.

Future of oil in the Middle East

The Middle East remains a power house of the global oil and gas industry. Long-term prognosis for the region remains very positive. Vast proven reserves and low depletion rates mean the region will retain, and indeed grow, its strategic importance in the global energy market.

But the region does not rest on its laurels; its countries recognize the need for diversification of their oil economies building resilience against future oil market volatility. The energy sector is one of the main drivers and enablers of this transformation.

Business sustainability is a focal point as national oil & gas companies look to leverage operational efficiencies and reduced capital costs against a growing portfolio of major infrastructure projects and capital investments. New strategic alliances are helping to expedite long-term business transformation goals.

SPE is supporting the region by developing and implementing a robust industry programme in the Middle East. Pivotal events include: the first International Petroleum Technology Conference to be organized in Saudi Arabia in January of 2020, the SPE Annual Technical Conference & Exhibition in Dubai, Abu Dhabi International Petroleum Exhibition and Conference and the March 2019 SPE Middle East Oil Show in Bahrain. Other major new technology events include the SPE International Hydraulic Fracturing Technology Conference and Exhibition in Oman, the 2019 Middle East Artificial Intelligence Symposium in Saudi Arabia, and the Unconventional Oil and Gas Symposium in Bahrain in 2019.

Dr. Sami Alnuaim, 2019 Society of Petroleum Engineers (SPE) President

SPE International
Society of Petroleum Engineers

An exercise at OPITO-approved Falck Safety Services in Dubai. Photo courtesy of OPITO

Production soars to historic high

But regional demand is rising as well

Record production yields export potential of 120 billion cubic metres

In 2017, the Middle East produced more gas than ever – a total of 660 billion cubic metres. This was an 80% increase during the course of a decade. The most significant increases were in Qatar, which added 110 billion cubic metres and Iran, which increased its output by 100 billion cubic metres.

Within the region, virtually every producing country surpassed its previous output. Only Qatar's fell just short of its previous record output in 2016.

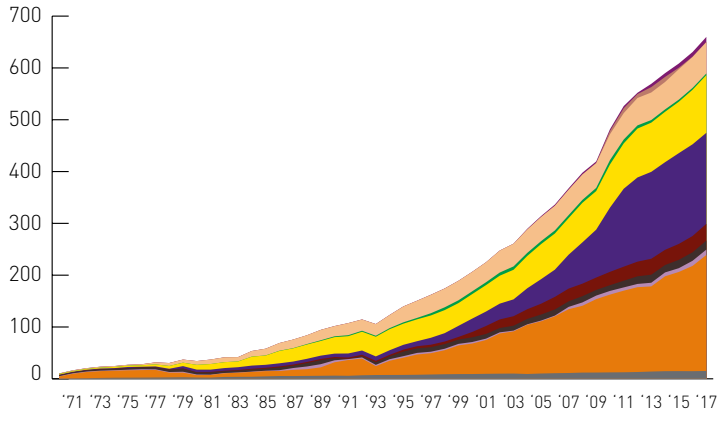
As in previous years, the region's biggest producer was Iran, accounting for 34% of Middle Eastern gas. Qatar was second with 27% and Saudi Arabia followed with 17% of the total. The United Arab Emirates (UAE) produced 9% of the regional total.

Volumes of this scale enable massive exports. In 2017, Qatar was the region's largest exporter, averaging 150 billion cubic meters in foreign sales over the past five years.

Iran retains about three quarters of its production to satisfy its domestic demand. Every year, for the past decade, Iran has had an export potential of more than 40 billion cubic meters.

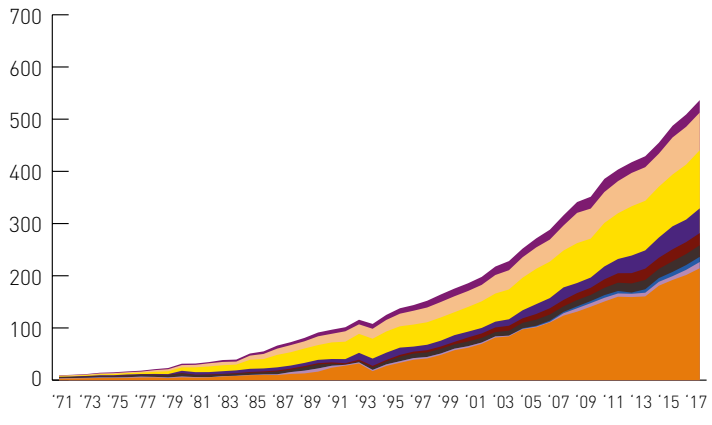
Iran and Qatar lead production in a gas-rich region

Gas production in Bcm by country



Iran consumes the largest share of the region's gas

Gas demand in Bcm by country

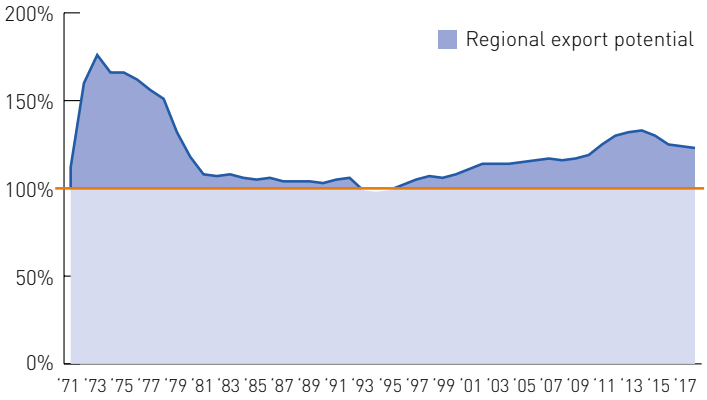


Bahrain · Iran · Iraq · Israel · Kuwait · Oman · Qatar
Saudi Arabia · Syria · United Arab Emirates · Yemen · Other Middle East

Source: BP Statistical Review of World Energy 2018

Enough gas to continue as a major exporter

Gas: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

The Middle East's PRODUCTION INDICATOR FOR GAS is

123%

Despite a slight decline, the region is still well-placed for self-sufficiency and significant exports.

Record regional demand provides new challenges

Increasing prosperity and diversification have raised regional demand for gas to unprecedented levels. In 2017, the region consumed 536 billion cubic metres – an increase of 70% in the past 10 years.

Iran is the region's largest gas consumer, accounting for 40% of demand in 2017.

Saudi Arabia, which consumes 21% of gas in the region, has increased production to meet its own demand yet its Production Indicator has dropped from 131% in 2007 to 118% in 2017.

In 2017, The UAE, as a result of demand that has grown by 33% in five years, has seen its Production Indicator drop from 110% to 95% in 2017. In consequence, it is now a net importer of natural gas and accounts for 14% of regional consumption.

Qatar, the largest producer, is consuming 9% of the region's gas.

What remains and where

All told, the Middle East holds 41% of the world's proven gas reserves.

Iran has 42% of that regional share. Qatar is in second place with 32%. Saudi Arabia's share is 10%, while the UAE has 8%.

Growth in gas stimulates training expansion

Over the last 10 years, the oil and gas industry has experienced continued growth in the utilisation of OPITO training in the Middle East region as employers continue to recognise the value of consistent Industry recognised Training Standards and adopt these standards within their own organisations and across the region as a whole.

For example, in 2017, over 116,000 people were trained using OPITO Standards at OPITO approved training centres across the Middle East region. This figure shows an increase of 12% over the last 2 years. At OPITO, we expect this growth trend to continue in 2019.

The training market in the region has continued to adapt to the demand from employers for a wider range of OPITO Standards to be made available which has resulted in over 20 new training centre approvals in the last 12 months. Approved OPITO training centres continue to expand the range of standards that they are able to offer.

OPITO continue to support the stakeholders in the Middle East region primarily through our base in Dubai, UAE and through our Employer and Training Provider networks. To ensure that activity in the region continues to meet the requirements of employers, 2018 saw the appointment of OPITO's first Middle East and Africa Vice President whose role is to focus on the strategic development of industry recognised training across the region.

John McDonald, Chief Executive Officer, OPITO

ExxonMobil subsidiary XTO Energy ramps up drilling and production activities in the Midland and Delaware basins. Photo courtesy of ExxonMobil

Production growth continues

Greater self-sufficiency is the result

North American production hits a record high

Thanks to the continuing growth of North American oil production, the region's annual import bill has gone down by USD 130 billion in just a decade.

In 2017, North America produced 20.1 million barrels of oil per day – a 48% increase versus output in 2007.

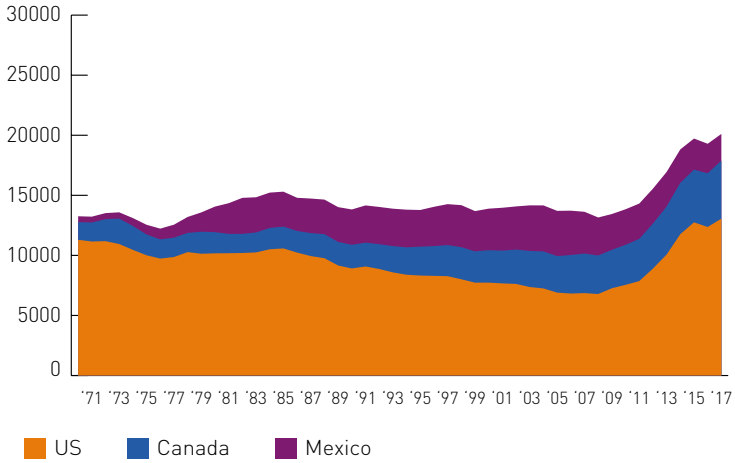
The US has enjoyed the lion's share of that increase. Its production has gone up by 90% in a decade. Its Production Indicator also shows a dramatic improvement, having gone from 33% in 2007 to 66% in just 10 years.

Canada has also benefited from a significant production increase, with a 47% rise during the course of a decade. As a result, its Production Indicator is 199% versus 141% previously.

Within the region, only Mexico has seen a drop in production to a 25-year low. While it once equaled Canada in its output, Mexico now produces only half of Canada's volume. The nation still remains an oil exporter, but with a Production Indicator of 116%, its position is considerably weaker than 10 years ago, when the Mexican Production Indicator was 167%.

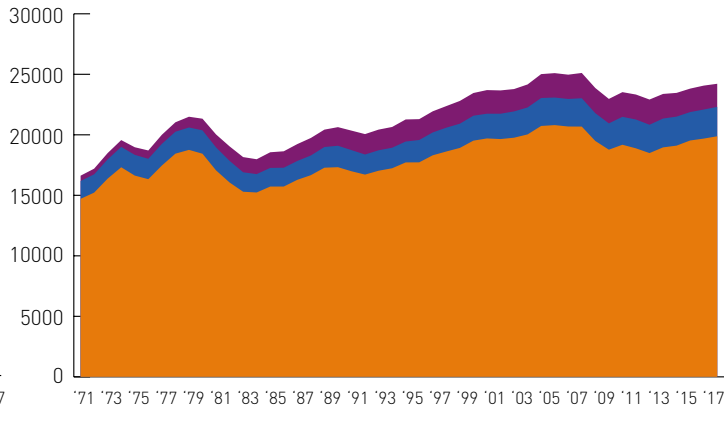
US hits an all-time high

Oil production in kbd by country



The US continues to lead in demand, which is rising

Oil demand in kbd by country

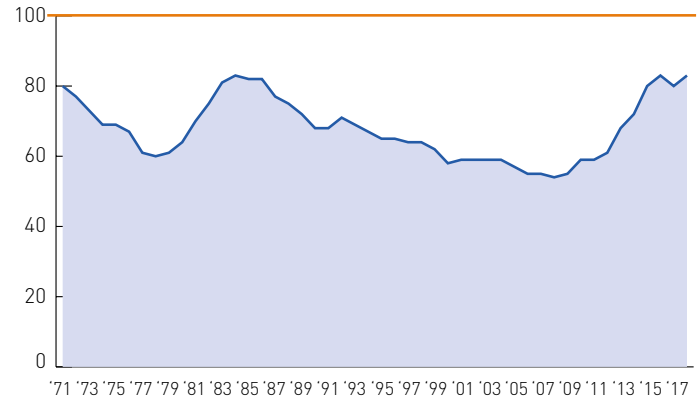


US Canada Mexico

Source: BP Statistical Review of World Energy 2018

Self-sufficiency in sight?

Oil: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

North America's **PRODUCTION INDICATOR FOR OIL** is

83%

Continuing progress on the path to regional self-sufficiency

Consuming every forth barrel the world produces

North America is the world's second largest consumer of oil, accounting for 25% of demand in 2017. This level of consumption has been fairly steady for the past 15 years, with upward trends in the two largest regional consumers, the US and Canada.

The US share of regional demand is 82%, equivalent to 19.9 million barrels per day. Canada accounts for 10% of regional oil use at 2.4 million barrels per day – an all-time high. Its oil use is equivalent to that of Germany, despite having a population less than half the size.

Mexico's demand is 1.9 million barrels of oil per day, or 8% of regional consumption.

What remains and where

North America holds 13% of the world's proven oil reserves.

Most of those reserves are in Canada, with a 75% regional share. The US follows with 22%. Mexico holds 3% of the region's reserves.

Future of oil in North America: a remarkable transformation

ExxonMobil

North American oil supply is in the midst of a remarkable transformation. A decade of significant growth, fuelled by unconventional resources such as shale and tight oil, has brought major economic benefits to the region and put the United States on the path to being a net exporter of oil for the first time in decades.

ExxonMobil is proud to be part of this story. Our major, ongoing investment in the Permian basin in West Texas and New Mexico is a great example. Subsidiary XTO Energy has announced plans to triple its daily production from the area to more than 600,000 oil-equivalent barrels by 2025. Tight oil production from the Delaware and Midland portions of the basin will increase five-fold in the same period.

As part of this ambitious expansion plan, we will be investing more than $2bn in terminal and transport infrastructure to help get the increased supplies to where they are needed. This includes our Gulf Coast refineries and chemical facilities that manufacture high-value products, such as polyethylene for high-performance plastics and advanced synthetic lubricant base stocks.

Technology is key to these ambitious plans. Technology improvements have helped double our footage drilled per day on horizontal wells in the Permian since early 2014, and reduced our per-foot drilling costs by about 70%. At the same time, XTO Energy has cut methane emissions from its operations by 9% since 2016 as result of a focused mitigation programme that includes deployment of low-emission design technologies across its facilities.

Staale Gjervik, Senior Vice President, Permian Integrated Development, XTO Energy Inc.

US onshore gas operations. Photo courtesy of CAPP

North America produces more gas than ever before

Growth in US volumes predominates

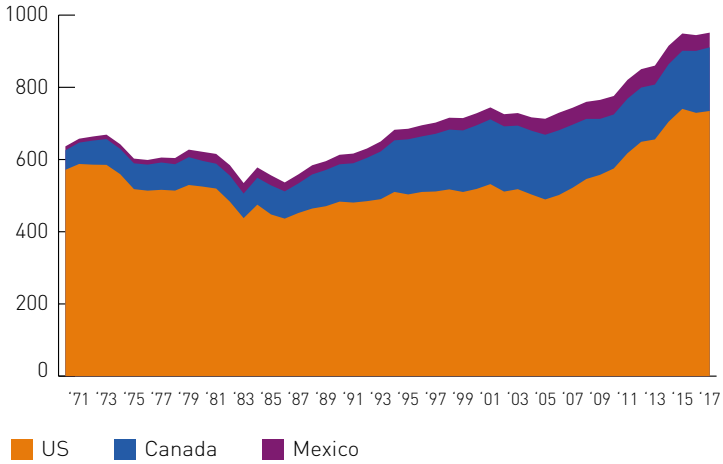
North America's gas production exceeds its gas needs. In 2017, the region produced more than 950 billion cubic metres of gas – a record output. Compared with 2007, this was an increase of 210 billion cubic metres (or 28%) – equivalent to more than the combined gas output of Norway, the Netherlands and the UK.

The growth in North American gas production is entirely attributable to the US. It was the region's biggest producer by far, with a regional share of 77%. US output boosted its Production Indicator to 99%. Various projects are underway to establish the US as a major exporter of Liquefied Natural Gas (LNG).

Canada is North America's second-largest gas producer. In 2017 its regional share was 19% based on production of 176 billion cubic metres – identical to Canada's gas output a decade ago, but considerably more than the 150 billion cubic metres produced in the period from 2010-2013. The country's 2017 Production Indicator was 152%.

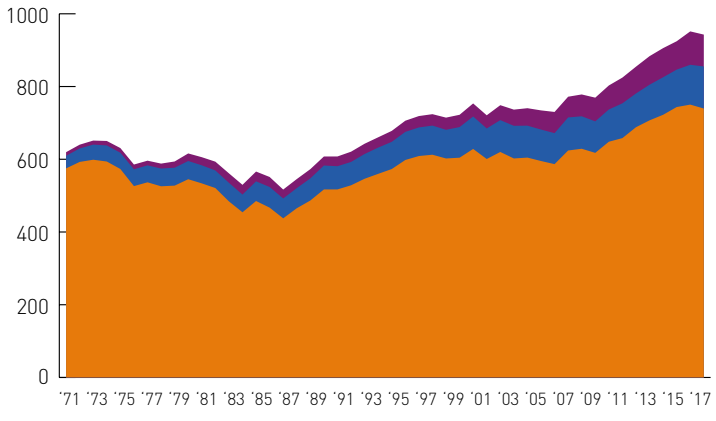
US production continues to grow in terms of volume and share

Gas production in Bcm by country



The US continues to dominate the region in terms of gas demand

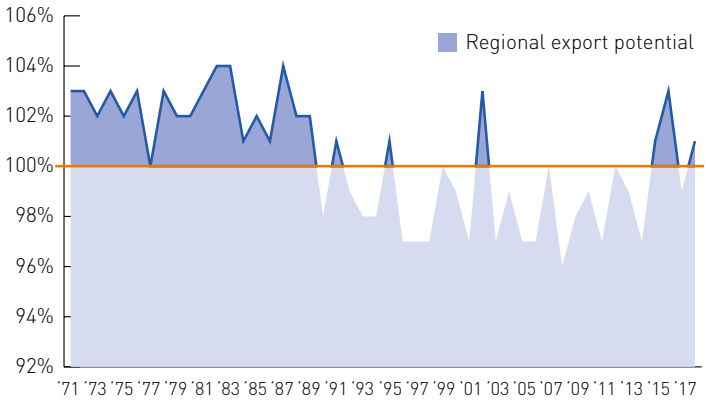
Gas demand in Bcm by country



Source: BP Statistical Review of World Energy 2018

Rising production again exceeds strong demand

Gas: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

North America's PRODUCTION INDICATOR FOR GAS is

101%

Going beyond regional self-sufficiency to become a global exporter?

Mexico trailed in 2017 with 4% of the region's gas output. Its production of 41 billion cubic metres during the year was its lowest level since 2004. Its 2017 Production Indicator of 46% is just over half of what it was in 2007.

Demand just short of last year's record high

In 2017, North America's gas demand was 943 billion cubic metres, just under 1% less than the previous year.

More than three quarters of that demand – 79% – came from the US.

Canada's record appetite for 116 billion cubic metre of gas during the year accounted for 12% of regional demand.

As with gas production, Mexico's level of demand put it third in the region, using 9%.

What remains and where

North America holds 5.6% of the world's proven gas reserves.

More than 80% of those reserves are to be found in the US. Canada holds 17% of the regional reserves.

US natural gas production just powered past the impossible

energy API

The US natural gas industry has quietly achieved a huge milestone over the past year: unprecedented production growth of more than 9 billion cubic feet per day (bcf/d) – a 12 percent increase compared to 2017.

What's changed in the last year? Broad technological advances in well completion techniques and performance across multiple levels of the US exploration and production sector. Through the use of big data tools, honed drill targeting, and drilling of longer laterals, the industry has eclipsed all production expectations – reducing its environmental footprint in the process. Breakeven costs to drill a dedicated natural gas well in major producing basins fell below $2.00 per million BTU (mmBtu), and natural gas prices at Henry Hub remained below $3.00 per mmBTU as they have on average for nearly four years. The trends suggest this year's production growth could be repeatable for years or decades to come if policy headwinds don't interfere.

At the moment, the forecast is concerning. US natural gas abundance creates the challenge to identify additional markets, at home and abroad. Domestically, the proposed bailouts for uneconomic coal and nuclear power plants could impair natural gas' ability to compete in US electricity generation. Internationally, China's imposition of import tariffs on US LNG make it hard to compete there.

The bottom line is that the US natural gas industry has achieved remarkable milestones but needs a level playing field that could make the difference between seizing, or squandering, this historic US natural gas opportunity and harnessing the numerous benefits of our nation's vast resources.

Dean Foreman, Chief Economist, American Petroleum Institute

Peregrino field; Brazil. Photo courtesy of Equinor/Øyvind Hagen

Approaching the end of self-sufficiency?

But Brazil's production hits an all-time high

Production fails to keep pace with demand

Political and economic disruptions have reduced the region's export potential to 400,000 barrels per day. This compares to the average of one million barrels per day in the previous decade, which closed with a Production Indicator of 128%. In 1997, the Production Indicator had been 136%.

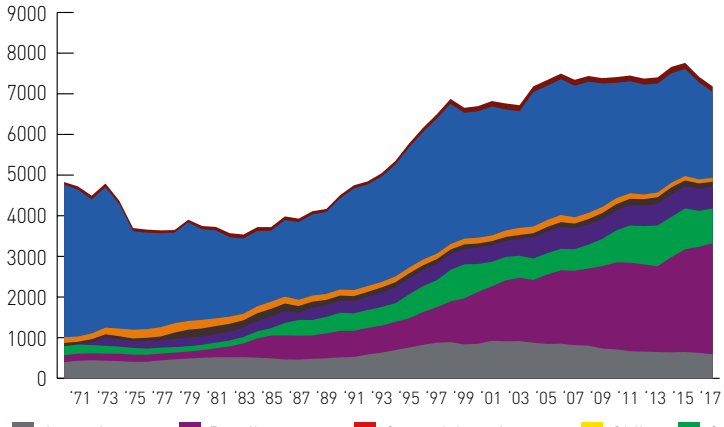
Then, and in 2017, Venezuela was the region's biggest exporter. However, the country's ability to sell oil to others dropped by 1 million barrels per day during the course of the decade.

Overall, in 2017 Central and South America produced 7.2 million barrels of oil per day – about 150,000 barrels per day less than a decade ago.

The biggest producer is Brazil. Its 2.7 million barrels per day (up by almost 50% in a decade) give it a 38% share of the region's total production in 2017. Brazil overtook Venezuela as the region's lead producer in 2016. In 2017, Venezuela's share was 29%, followed by Colombia with 12%. Argentina and Ecuador are tied for fourth place with each producing about 8% of the region's total. Argentina's output has gone down 27% during the course of a decade.

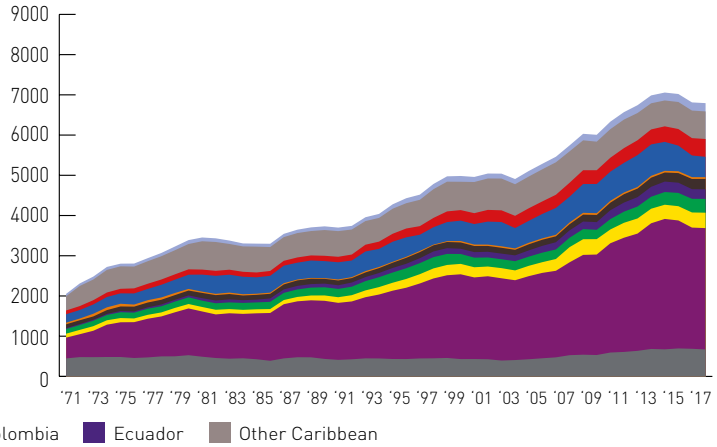
Problems in Venezuela lead to volumes as low as 14 years ago

Oil production in kbd by country



Demand down to the same level as 2012

Oil demand in kbd by country

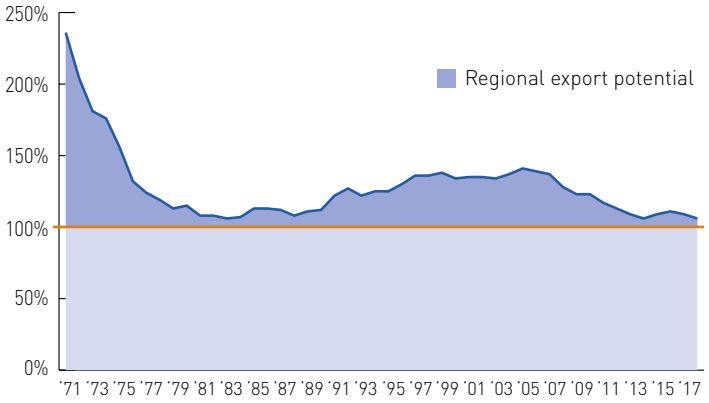


Argentina · Brazil · Central America · Chile · Colombia · Ecuador · Other Caribbean
Other Central and South America · Other South America · Peru · Trinidad & Tobago · Venezuela

Source: BP Statistical Review of World Energy 2018

Export potential continues to decline

Oil: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

Central & South America's **PRODUCTION INDICATOR FOR OIL** is

106%

Self-sufficiency remains perilous due to lower production

Venezuela's problems result in stagnating regional demand

In 2017, Central and South America needed 6.8 million barrels of oil per day. While this was up 18% since 2007, the level of demand remained virtually unchanged from 2012. Higher demand in many countries in the region was offset by a decline in Venezuela following the political and economic upheaval. The country experienced a 35% drop in demand to a mere 500,000 barrels per day.

The region's biggest oil producer – Brazil – is its biggest oil consumer as well. In 2017 it consumed over 3 million barrels of oil per day, accounting for 44% of total demand. While Brazil is still not producing enough oil to meet its own needs, its Production Indicator has improved from 80% in 2007 to 90% in 2017.

In contrast, during the course of the same decade, Argentina went from being a net exporter, with a Production Indicator of 154%, to becoming a net importer. In 2017 its Production Indicator was 89%.

Other countries still producing more oil than they consume are Colombia, which in 2017 had a 500,000 barrel per day surplus and Ecuador, with a 300,000 barrel per day export potential.

What is left and where

Central and South America holds about 20% of the world's oil reserves. The bulk of these regional reserves are in Venezuela. With 303 billion barrels of proved reserves, Venezuela leads the world in oil potential.

A distant regional second is Brazil, with 13 billion barrels of proved reserves – about equivalent to proven reserves in Europe as a whole.

The future for oil in Central & South America

Policy changes and new geological insight have rejuvenated Central and South America in the global oil supply equation, and Equinor has taken several new positions in the region. Adding to our longstanding positions in Venezuela and Brazil, we have accessed exploration acreage in Argentina, Nicaragua, Surinam and other South American countries.

Equinor has a strong position in Brazil and we see the country as a core area for long-term growth. We have a diverse portfolio with activities in all development stages from exploration to production. We have been present in Brazil from 2001 and commenced production from the Peregrino field in the Campos Basin in 2011.

The Peregrino field— with more than 170 million barrels of oil produced since 2011—makes Equinor the largest international operator in the country. Currently the company is developing two large projects in the Brazilian pre-salt: Carcará with more than 2 billion barrels of oil in Santos basin and the gas discovery Pão de Açúcar, with around 1 billion barrels of oil equivalent.

Brazil's Santos and Campos basins also offers some of the most promising exploration acreage available to the industry on a global basis. Over the last year Equinor has participated in new offshore bid rounds, gaining access to significant acreage. We are very excited about the potential and look forward to participating actively in the efforts to unlock new oil and gas resources in these prolific basins.

equinor

Margareth Øvrum, Executive Vice President Development & Production Brazil, Equinor

Aguada Federal block in Argentina's Neuquén Province. Photo courtesy of Wintershall/Alejandro Kirchuk

Export potential remains

Production plateau triggers demand challenges

Export potential reduced

In 2007, total gas exports from Central and South America were 18 billion cubic metres. In 2017, export volumes were down to 5 billion cubic metres.

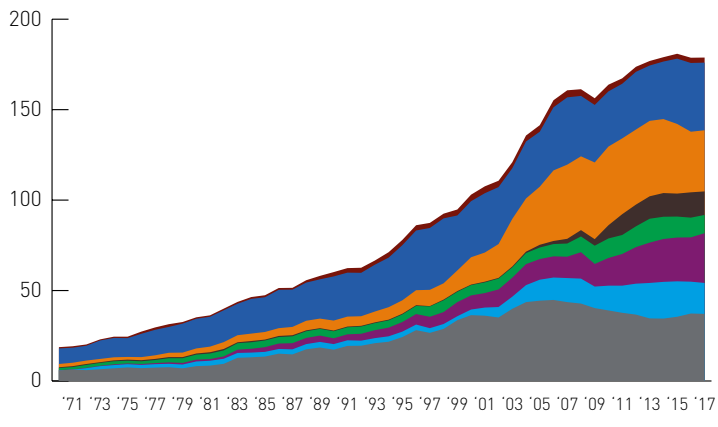
Total gas production for the region in 2017 was 179 billion cubic metres. The two biggest gas producers, each with a share of about 21%, are Argentina and Venezuela. They are followed by Trinidad & Tobago with 19% and Brazil, which has a 15% share. Bolivia, Colombia and Peru are also significant producers, each with annual volumes of more than 10 billion cubic metres.

Looking at the leading producers, Argentina had a 2017 Production Indicator of 77%, which required the import of almost a quarter of demand. Success in Vaca Muerta will help to fill that gap to the time when Argentina last enjoyed self-sufficiency a decade ago.

Brazil's Production Indicator in 2017 was lower, at 72%. However, it is on an upward curve regarding gas production versus demand. The 27.5 billion cubic metres it produced was a record for the country. A decade ago, its Production Indicator was 53%.

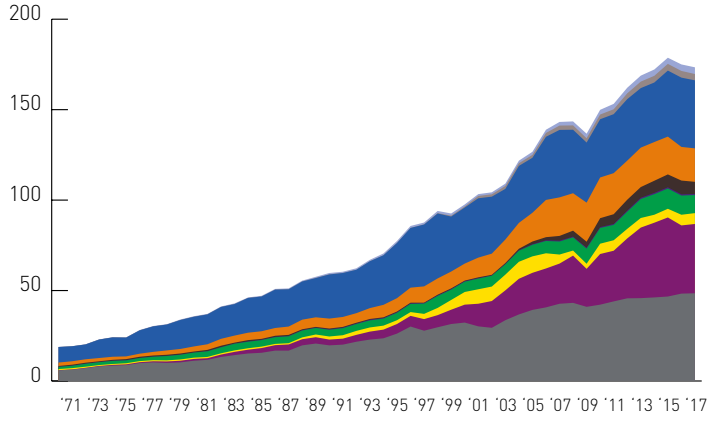
A five-year plateau continues

Gas production in Bcm by country



A slight decline overall, but Argentina's demand holds

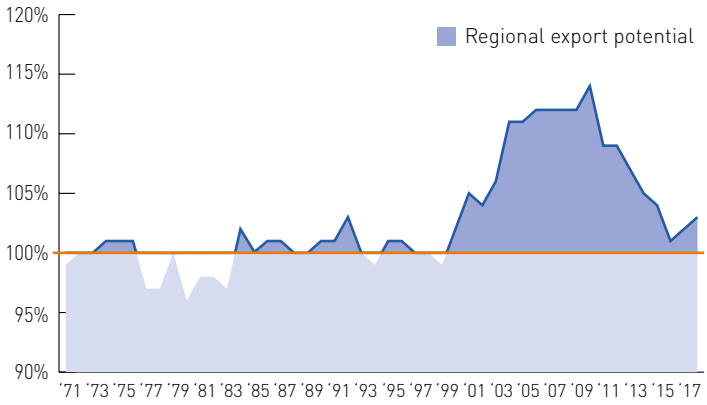
Gas demand in Bcm by country



Source: BP Statistical Review of World Energy 2018

Demand and supply nearly in balance

Gas: Production Indicator 1970-2017



Source: BP Statistical Review of World Energy 2018 and IOGP calculations

Central & South America's PRODUCTION INDICATOR FOR GAS is

103%

Continuing export potential

Venezuela, with a Production Indicator of 100% in 2017, managed to meet its internal demand.

Diminishing demand after all-time highs

Demand for gas in Central and South America was 174 billion cubic metres in 2017 – down 2% from the all-time highs achieved the previous two years.

Argentina is the main source of demand, accounting for 28% of the regional total and marking a new high – 48.5 billion cubic metres – for its gas use. Brazil and Venezuela each used 22% of the region's gas.

What is left and where

Central and South America has 4.2% of the world's proven gas reserves. The bulk of these reserves – more than 75% – are Venezuelan.

The future of gas production: progress through investment

If proof were needed for the potential of gas production in the region, Argentina's Vaca Muerta development is a prime example. Thanks in large part to output from this outstanding shale reservoir, the nation's gas production has risen by 18% over the past four years – helped by government stimuli. Argentina is now optimistic that Vaca Muerta will not only meet domestic needs but also generate welcome export potential.

In Brazil, gas from offshore operations accounts for around 83% of national production. Production from the pre-salt geological formation reached 50% of total output and was the main driver for Brazil's higher production.

In contrast, production in Bolivia has dropped 8% in the past four years. This is due to fall in investment, which could restrict the country's plans for continuing reliable exports to its neighbours and for natural gas industrialization.

Peru is already experiencing the consequences of lower investment. This has resulted in some local gas shortages and led to prioritizing domestic offtake and suspending exports. The number of upstream contracts has halved in the last three years. To its credit, the government is now fostering sector development by developing a new regulatory and legislative framework to make investment in the sector more attractive.

Trinidad & Tobago has a similar objective for the launch of a new upstream licensing round. It aims to foster the country's energy sector, building on the small increase in upstream activity as natural gas production climbs again – although it is still below historic levels. The country requires additional gas supply to meet demand from petrochemical facilities.

Miguel Moyano, Upstream Director, ARPEL

The last word: depletion

Time to prime the pump

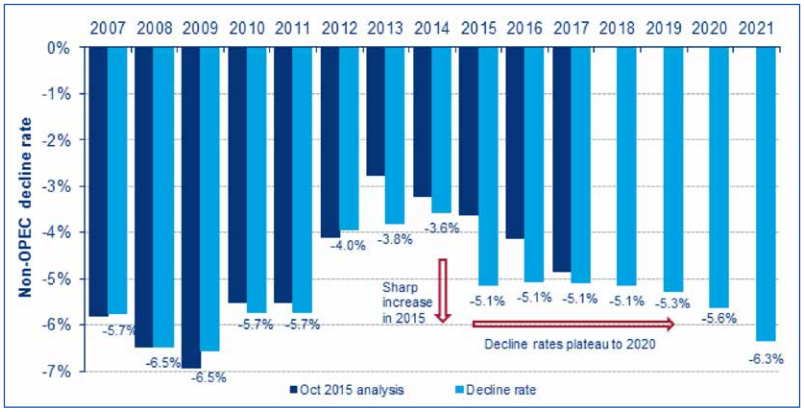
Investment needed to counteract field depletion

Wood Mackenzie

Oil and gas do not simply flow to the surface at a constant rate. They need a boost. The older a field is, the more effort is required to maintain flow rates. Such effort depends on continuing investment.

With a few minor variations, the historic rate of decline for non-OPEC oil fields is 6% per year. After a few years of somewhat lower decline rates, at Wood Mackenzie we expect a reversion to at least the norm after 2020. Even small changes in the decline rate can have a considerable effect on the market. For example, a 1% shift either way would increase or decrease the supply gap by 2 million barrels per day by 2021.

We base our decline rate analysis on fields that produce a total of 37 million barrels per day of liquids (including oil and condensates). This is 85% of total non-OPEC production, equivalent to just under 40% of global production. In all, we have looked at production from more than 5,300 conventional fields.



Source: Wood Mackenzie, Upstream Data Tool Q2 2017; excludes North America tight oil

While field output depletion is set to return to 6% per year, demand for oil and gas is growing, as is the world's population. Come what may in terms of meeting the world's climate change goals, oil and gas will still be needed to meet between 48% and 53% of energy demand between now and 2040, the International Energy Agency says.

To ensure the availability of that oil and gas, continuing investment is needed to apply proven enhanced recovery techniques and improve efficiencies in existing fields and to find and develop new oil and gas fields.

Pat Gibson, Research Director Global Oil Supply, Wood Mackenzie

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Wood Mackenzie's report Non-OPEC decline rates: lower for longer is available in full from:
www.woodmac.com/reports/upstream-oil-and-gas-global-upstream-oil-supply-webinar-lower-for-longer-non-opec-decline-rates-19170

About IOGP

The International Association of Oil & Gas Producers (IOGP) is the voice of the global upstream industry. Oil and gas continue to provide a significant proportion of the world's energy to meet growing demands for heat, light and transport.

Our Members produce 40% of the world's oil and gas. They operate in all producing regions: the Americas, Africa, Europe, the Middle East, the Caspian, Asia and Australia.

We serve industry regulators as a global partner for improving safety, environmental and social performance. We also act as a uniquely upstream forum in which our Members identify and share knowledge and good practices to achieve improvements in health, safety, the environment, security and social responsibility.

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