

Statistics report

# World Energy Balances

Overview

2020

**iea**

# Global trends

This overview provides a detailed look at energy developments based on complete supply and demand data for 2018 for more than 180 countries and regions, and where available provisional official supply or production data for 2019. Data are based on the IEA [World energy balances](#), 2020.

In 2018, global energy demand as measured by total energy supply (TES) increased significantly compared to 2017 (+2.4%) to slightly less than 14 300 Mtoe. This is mainly driven by growth of demand in non-OECD countries (+3.2%), whereas energy demand rose at a slower pace in OECD countries (+1.0%). In 2019, energy demand decreased in OECD countries (-1%), as discussed in more detail in the OECD section.

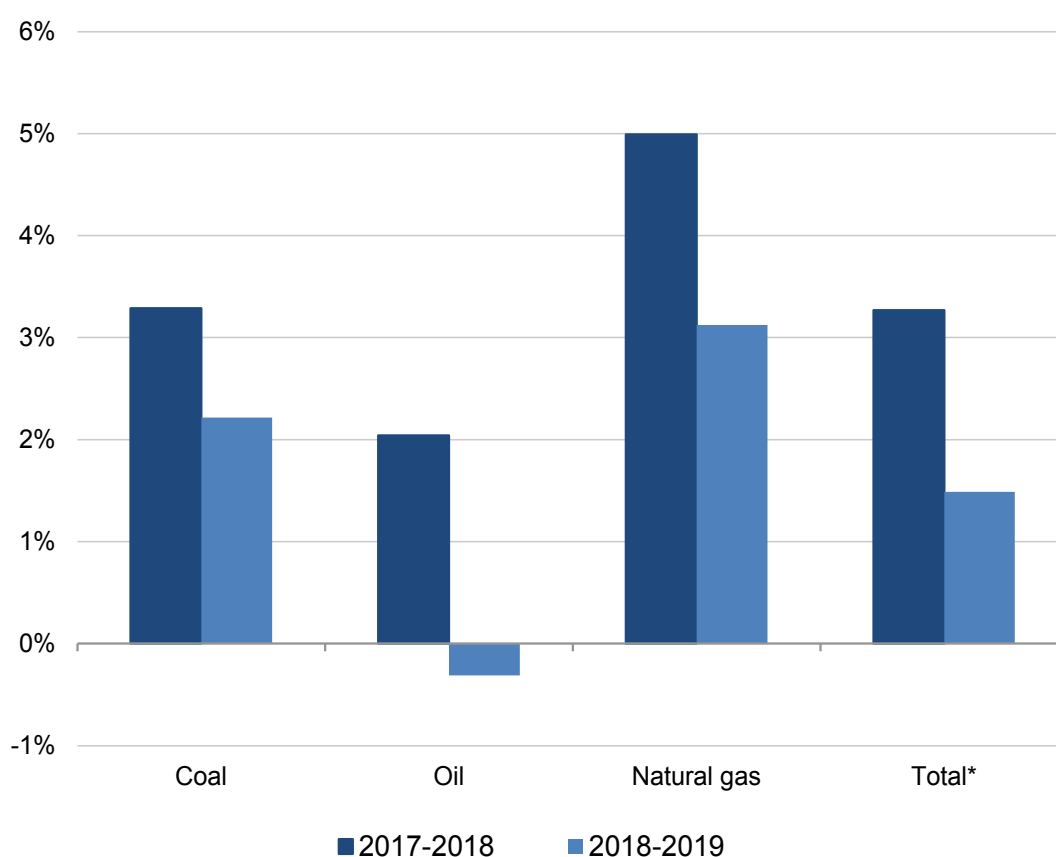
Some of the main messages from the overview are:

- After two years of growth, total energy supply (TES) decreased in 2019 in the OECD due to falls in two third of its countries. Similarly, carbon dioxide emissions dropped too. Improvements in energy productivity, carbon intensity and more favourable weather conditions played a key role.
- Natural gas and renewable energy continued displacing coal and reached new heights in OECD electricity generation in 2019. Further to power generation, gas steadily increased its share in buildings and in industry, both as a fuel and as a feedstock. Conversely, transport remained mostly fuelled by oil.
- Non-OECD Asia, which accounted for 28% of global production and 36% of global TES in 2018, is the region that relies the most on coal for electricity globally, with a share of 63% of coal in the region's electricity mix in 2018. Its main energy-consuming sector, industry, was also, in 2018, still heavily reliant on coal (41%); however the sector's consumption is gradually shifting to electricity.
- In 2018, total energy production in non-OECD Europe and Eurasia increased by 3.9%, a growth above the world average of 3.2% and third after OECD (+4.8%) and non-OECD Asia (+4.0%). The region's energy demand (TES) rose even more (4.5%). Nevertheless, the region self-sufficiency ratio still remained very high at 171%.
- Energy production kept increasing in Africa, reaching 1 169 Mtoe in 2018. This production was dominated by crude oil (35%) and solid biofuels (32%). However, Africa remains highly dependent on its importation of refined oil products to meet its rising demand, especially in the transport sector.
- Non-OECD Americas produced 757 Mtoe of energy in 2018, 33 Mtoe less than in 2017, and the lowest level since 2009. In Venezuela, crude oil production declined for the fifth year in a row. Oil provided the biggest share of TES in the region (39%), followed by natural gas (22%) and biofuels and waste (22%). In 2018, transport slightly surpassed industry as the biggest energy-consuming sector.

## Production

For 2019, global country-level production data is preliminary and restricted to fossil fuels. Based on these data, the production of fossil fuels continued growing but at a slower rate (+1.5% in 2019 after +3.2% in 2018). On the one hand, natural gas and coal production growth rates decreased (+3.1% and +2.2% respectively, compared to +5.0% and +3.3% a year before). On the other hand, oil production declined in 2019 as in 2017 (-0.2%) as in 2017 (-0.2%).

### Annual average change in global fossil fuels production by fuel



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\* In this graph, total fossil fuels exclude peat and oil shale.

Source: IEA World Energy Balances, 2020.

### Growth of global energy production in 2019 was driven by natural gas and coal.

The increase in coal production (peat and oil shale included) was particularly strong in two regions: non-OECD Asia China excluded, (+ 46 Mtoe, +7.1%), and China region (+ 75 Mtoe, +4.0%). They more than compensated for the decline in OECD (- 29 Mtoe, -3.5%), and in Africa (- 4 Mtoe, -3.0%).

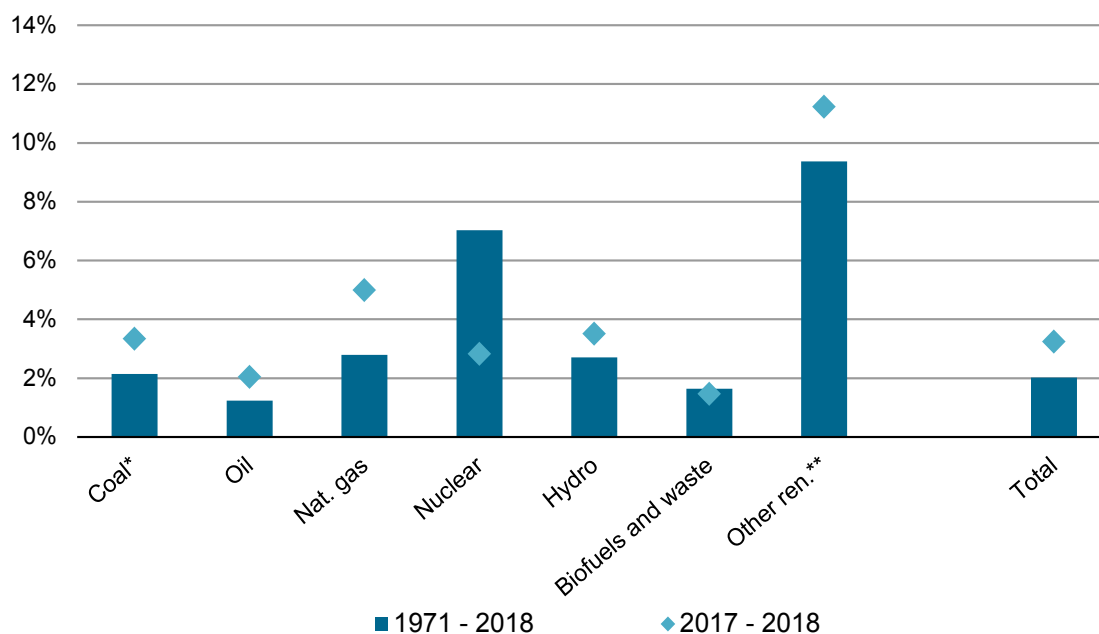
Natural gas production grew mainly in OECD (+ 68 Mtoe, +5.6%), in China region (+ 13 Mtoe, +9.8%) and in the Middle East and non-OECD Europe and Eurasia (+ 12 Mtoe each, + 2.3% and + 1.5% respectively). This increase of production offset the decrease observed in non-OECD Americas and non-OECD Asia excluding China.

As for oil production, it mainly decreased in 2019 in the Middle East (-75 Mtoe, - 5.0%), non-OECD Americas (- 21 Mtoe, - 5.9%) and non-OECD Asia, China excepted, (- 7 Mtoe, - 4.0%). The growth of production of crude oil in OECD (+ 72 Mtoe, + 5.9%), Africa (+11 Mtoe, + 2.6%), China and non-OECD Europe and Eurasia (+ 6 Mtoe together) could not compensate.

The remainder of this section looks at the detail of 2018 world production and use.

World energy production was 14 421 Mtoe in 2018 – a 3.2% increase compared to 2017. It was mostly driven by fossil fuels: natural gas (+5.0%), coal (+3.3%) and oil (+2.0%), increasing together by more than 370 Mtoe in 2018. All renewables and nuclear also increased, by 60 Mtoe and 19 Mtoe respectively. Fossil fuels ultimately accounted for more than 81% of production in 2018, as was the case in 2017.

#### Annual average change in global energy production by fuel



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\* In this graph, peat and oil shale are aggregated with coal.

\*\* Includes geothermal, solar thermal, solar photovoltaic and wind.

Source: IEA World Energy Balances, 2020.

**In 2018, the production of energy grew for all sources; but fossil fuels were the main drivers of the global growth.**

Production increased for all non-fossil sources. Biofuels and waste increased their production in 2018 by +1.5%, a slightly higher rate than the year before, and aligned with the trend over the last five decades. Their share in the world energy production decreased by 0.16 percentage points, at 9.2%.

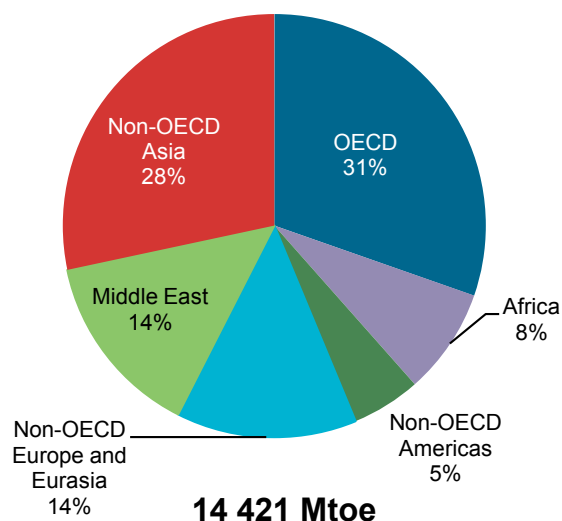
Hydro significantly increased in 2018 (+3.5%), providing 2.5% of global energy production in 2018, and setting a record with 362°Mtoe.

Solar photovoltaic, wind and solar thermal productions kept increasing in 2018 but at a slower pace (+24.7%, +12.4% and +3.2% compared to +34.9%, +17.6% and +3.2% in 2017 respectively). As for geothermal, its production grew at the same rate in 2018 and 2017 (+7.2%). Nonetheless, they still accounted for hardly 2% of global primary energy production together.

Nuclear production increased by 2.8% in 2018, providing the same share of energy at global level in both years (5%). Growth of nuclear production was particularly strong in China (+19%), Chinese Taipei (+23%) and Argentina (+13%). On the contrary it decreased by 18% in South Africa, the only country with nuclear power in Africa.

The contribution of each region to energy production was almost identical in 2018 and 2017. OECD has been the largest energy-producing area, ahead of non-OECD Asia in 2018, since 2010. OECD economies produced 31% of global energy in 2018, whereas non-OECD Asia accounted for 28%.

### Total production by region in 2018



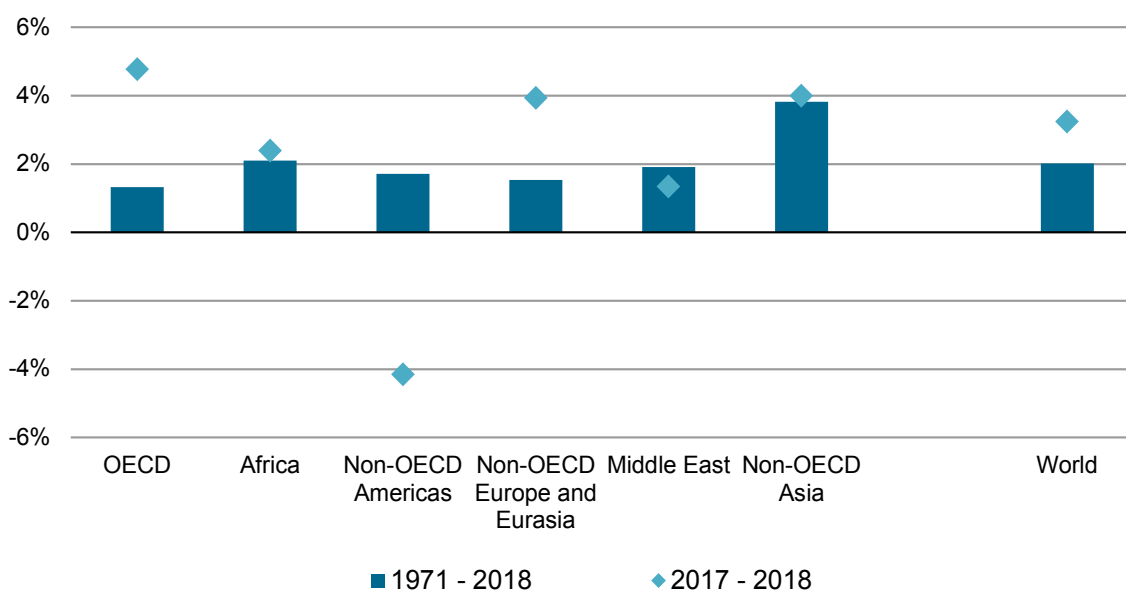
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Source: IEA World Energy Balances, 2020.

### Regions' contributions to global energy production were stable in 2018.

In the OECD as a whole production rose by +4.8%, reaching 4 379 Mtoe in 2018, an increase of 200 Mtoe over 2017. With 4 089 Mtoe in 2018, non-OECD Asia increased its production of energy by 4.0%. Notwithstanding its slower growth (+1.3%), the Middle East remained the third biggest producing region, still ahead of non-OECD Europe and Eurasia which, with a 3.9% growth, is catching up (2 040 Mtoe and 1 987 Mtoe in 2018 respectively).

### Annual average change in global energy production by region



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Source: IEA World Energy Balances, 2020.

### In 2018, the energy production grew strongly in most regions, except non-OECD Americas.

In OECD, the three biggest producers all increased their energy production in 2018 and all reached new records of production. With a 9% growth in 2018, the United States remained the biggest energy producer in OECD by far, reaching 2 173 Mtoe. It is the biggest energy production in history, 150 Mtoe above the previous records set in 2015 and 2014, when production surpassed 2 000 Mtoe for the first time.

In Canada, the second biggest producer in the OECD, production increased by 4% at 529 Mtoe (+21 Mtoe compared to 2017 previous record). In Australia, the third biggest OECD producer, production was above 400 Mtoe for the second year in a row, at 412 Mtoe (+1%). Together, those countries increased their energy production in 2018 by 207 Mtoe. Energy production grew in 21 of the 36 member countries of the OECD.

In non-OECD Asia, energy production significantly increased (+4.0%), at 4 089 Mtoe in 2018, boosted by increases in the People’s Republic of China (+4.3%) and Indonesia

(+5.8%). In the People's Republic of China, energy production in 2018 reached 2 562 Mtoe, the biggest production in its history, beating the last record set in 2015 by 50 Mtoe. This is explained by coal (+74 Mtoe, + 4.1%), solar PV, wind and tide/wave/ocean, natural gas and nuclear (+10 to 12 Mtoe each). In Indonesia, the increase of energy production was mainly due to coal (+25 Mtoe, +10%) followed by geothermal (+2 Mtoe, +10%).

In 2018, the Middle East still ranked third, with 2 040 Mtoe of energy produced. Nonetheless, it is the region where energy production grew less in 2018: +1.3%, compared to +4.8% in OECD, +4.0% in non OECD Asia including China, +3.9% in non OECD Europe and Eurasia, and +2.4% in Africa.

With 1 987 Mtoe, non-OECD Europe and Eurasia produced 75 Mtoe more energy in 2018 than in 2017 and ranked fourth among the energy-producing regions.

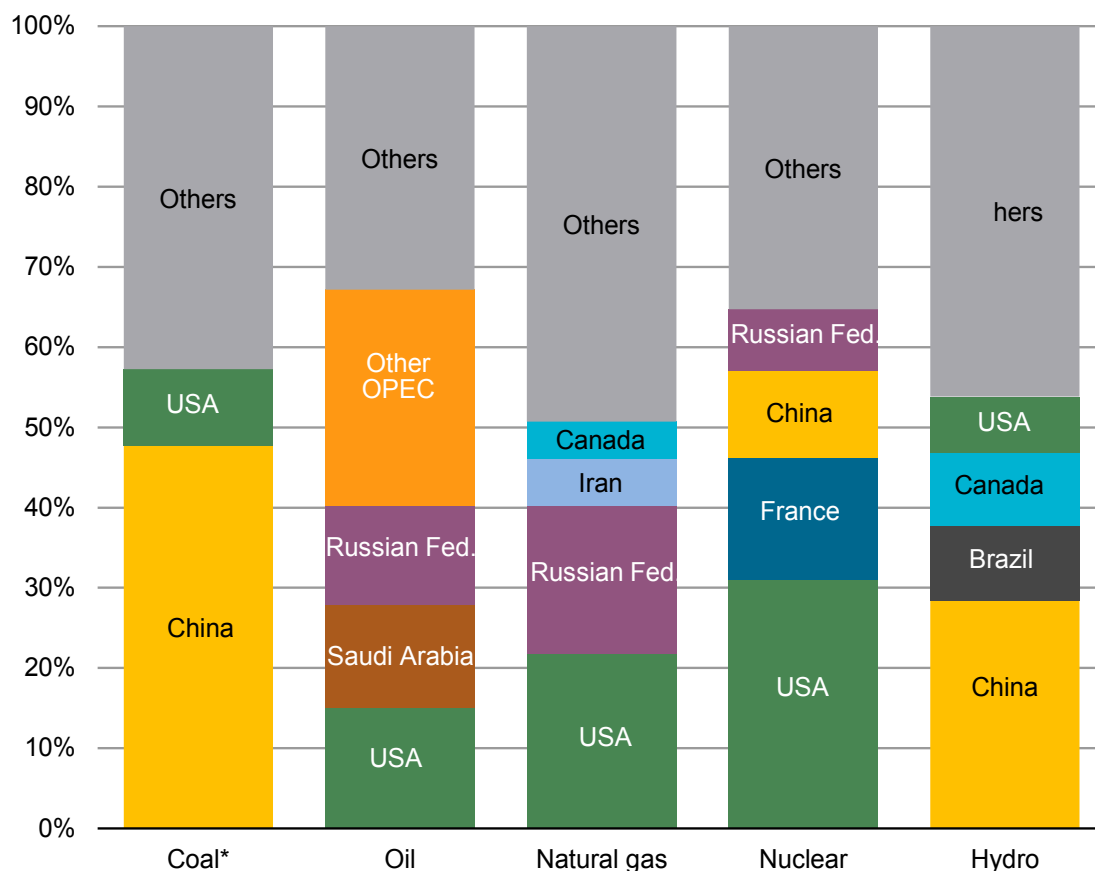
With 1 169 Mtoe of energy produced in 2018, Africa kept its fifth rank among regions in terms of primary energy production.

In non-OECD Americas countries energy production decreased (-4.2%) for the fourth year in a row. The region produced 757 Mtoe of energy in 2018, its lowest level since 2010 due to simultaneous decreases in two of its biggest energy producers, Venezuela (-22.6%) and Colombia (-2.9%). Growth in Brazil (+0.8%) and Argentina (+2.4%) did not offset these reductions.

The IEA family (IEA member economies, Association and Accession countries) represented 54% of the global energy production in 1971, and 59% in 2018.

Less than five countries, sometimes only two, produce more than half of each fuel. China produced 48% of the world coal in 2018, and 28% of hydro. The United States and France combined produced 46% of all nuclear. Saudi Arabia, the Russian Federation (Russia hereafter), and the United States contributed 40% of the world crude oil – these last two also accounting for 40% of the world natural gas.

### Largest producers by fuel in 2018



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\* In this graph, peat and oil shale are aggregated with coal.

Source: IEA World Energy Balances, 2020.

### A maximum of four countries concentrate half the production of each of the five main energy sources.

This concentration is usually stable, as well as ranks of the top countries; the most notable changes in recent years is that Brazil took over Canada as the second biggest hydro producer in 2018, and Canada replaced Qatar as the fourth biggest natural gas producer in 2017.

## Total Energy Supply (TES)

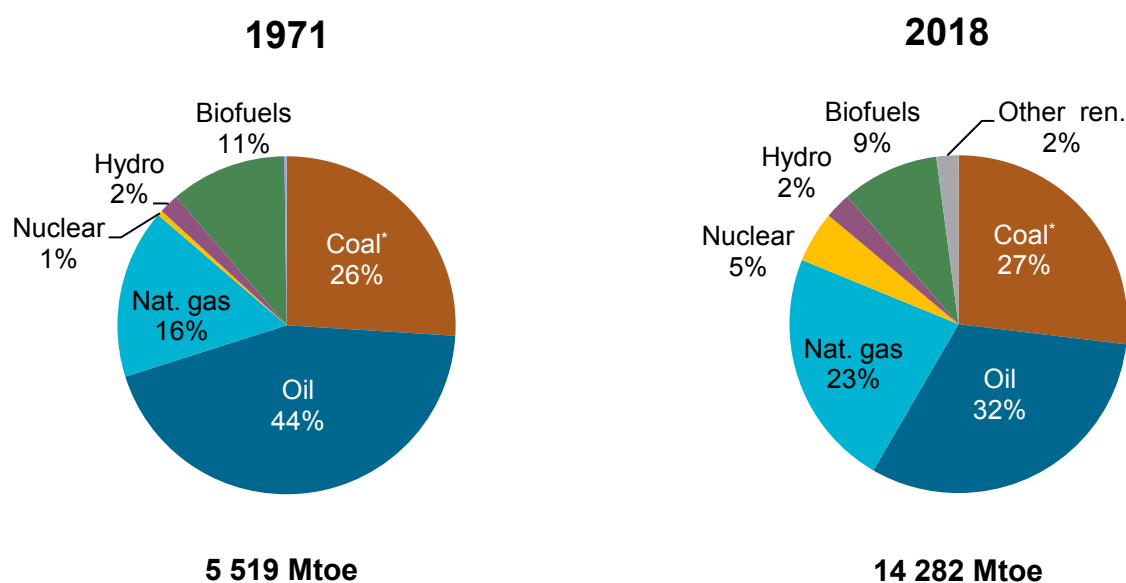
Between 1971 and 2018, world total energy supply (TES) increased 2.6 times (from 5 519 Mtoe to 14 282 Mtoe) and its structure changed. Oil fell from 44% to 32% of TES between 1971 and 2010; it is stable since then, and still the dominant fuel in 2018. Natural gas consolidated its third rank, growing from 16% in 1971 to 23% in 2018.



The share of coal is one percentage point higher in 2018 compared to 1971 (respectively 27% and 26%). However, it has fluctuated significantly during that period, increasing constantly between 1999 and 2011, influenced mainly by increased consumption in China. In 2011 it reached its highest level (29%), peaking at 71% of TES in China. It has declined since then and represented 27% of world TES in 2018.

Meanwhile nuclear grew from 1% to 5%.

### Total energy supply by fuel



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\* In this graph, peat and oil shale are aggregated with coal.

Source: IEA World Energy Balances, 2020.

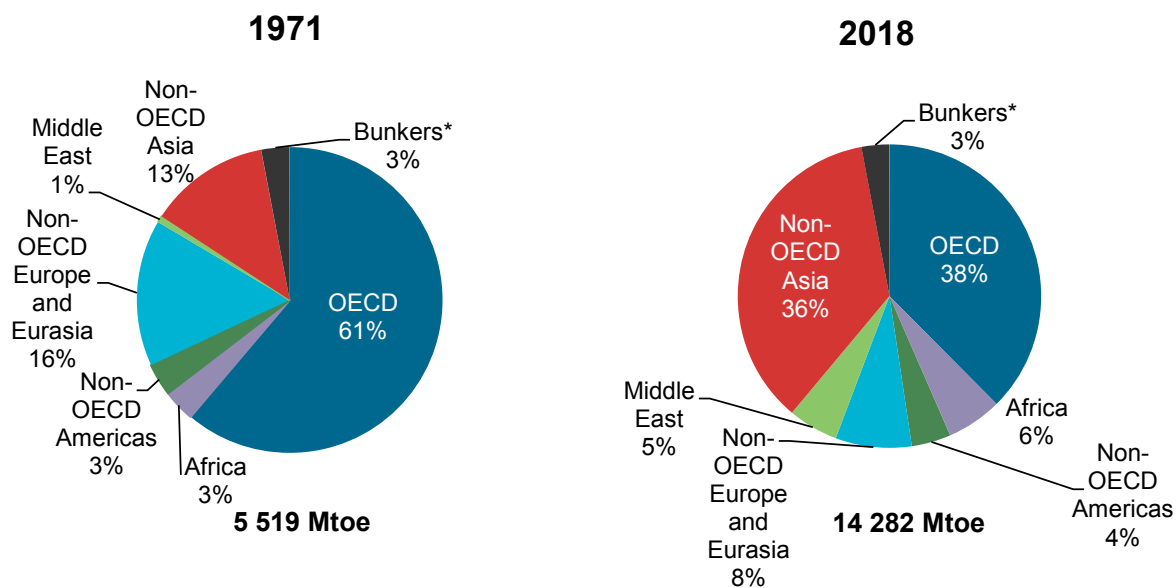
### While the world total energy supply grew 2.6 times in the last 47 years, fossil fuels, in particular oil, remained dominant in the energy mix.

Energy demand has evolved differently across the regions between 1971 and 2018. The OECD's share of global TES fell from 61% in 1971 to 38% in 2018. With 5 369 Mtoe, it is now almost on par with non-OECD Asia, where energy demand grew more than seven-fold, reaching 5 136 Mtoe in 2018, and whose share of TES almost tripled over the period, from 13% in 1971 to 36% in 2018.

Though its share of global energy demand halved between 1971 and 2017 (from 16% to 8%), non-OECD Europe and Eurasia remained the third biggest energy-consuming region, with about 1 160 Mtoe TES.

It was followed by Africa, where energy demand over the period has multiplied by more than four, reaching 837 Mtoe in 2018, Middle East (760 Mtoe) and non-OECD Americas (600 Mtoe).

### Total energy supply by region



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\* Includes international marine and aviation bunkers.

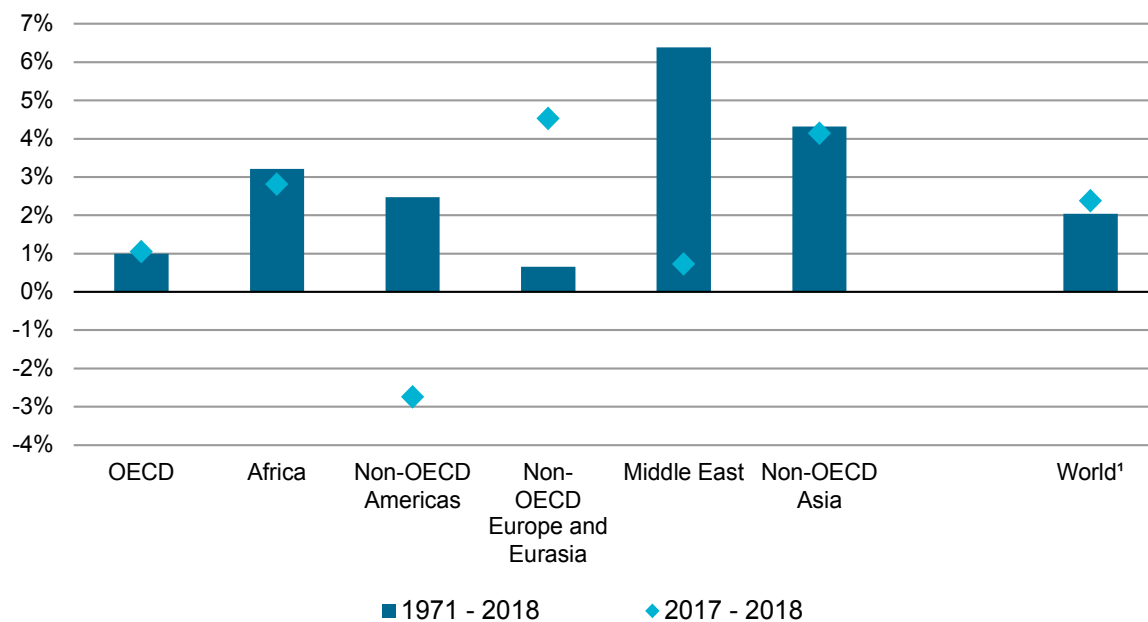
Source: IEA World Energy Balances, 2020.

### OECD and non-OECD Asia are now on par in terms of total energy supply.

Between 2017 and 2018, global TES increased by 331 Mtoe (+2.4%), reaching 14 282 Mtoe. The total primary energy supply increased mostly in non-OECD Europe and Eurasia (+4.5%) followed by non-OECD Asia (+4.1%) and Africa (+2.8%). It also increased in OECD countries and in the Middle East but to a lesser extent (+1.0% and +0.7% respectively). Non-OECD Americas is the only region of the globe where it decreased, for the fourth year in a row now (-2.7%).

With 10 292 Mtoe, the IEA family group accounted for 72.1% of TES in 2018. It had exceeded 10 000 Mtoe for the first time in 2017.

### Annual average change in TES by region



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\* World also includes international marine and aviation bunkers.

Source: IEA World Energy Balances, 2020.

### In 2018, energy demand increased more than 2%, boosted by growth in non-OECD Asia, non-OECD Europe and Eurasia and Africa.

Non-OECD countries account for a continuously growing share of the world energy consumption (62% in 2018). In 2018, the People’s Republic of China accounted for more than 22% of global TES while the United States accounted for slightly less than 16% (Table 1). India and Russia ranked third and fourth respectively. Japan, the second largest OECD consuming country, was in fifth position. Together, these five countries accounted for more than half of the global TES in 2018. The 2018 top ten countries represented 63% of global energy demand. Six of them (China, the United States, India, Japan, Germany and Canada) have been amongst the ten major energy consumers for the whole period. Three Europe countries (the United Kingdom, France and Italy) that appeared in the top ten in 1971, have now been replaced by Asia and Middle East countries (Brazil, Korea and Iran).

**TES – top ten countries in 2018**

Country	TES (Mtoe)	Share in world TES	
		1971	2018
People's Republic of China	3 196	7.1%	22.4%
United States	2 231	28.8%	15.6%
India	919	2.8%	6.4%
Russian Federation	759	N/A	5.3%
Japan	426	4.8%	3.0%
Germany	302	5.5%	2.1%
Canada	298	2.6%	2.1%
Brazil	287	1.3%	2.0%
Korea	282	0.3%	2.0%
Islamic Republic of Iran	266	0.3%	1.9%
France	246	2.9%	1.7%
Indonesia	231	0.6%	1.6%
World	14 282	100.0%	100.0%

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Source: IEA World Energy Balances, 2020.

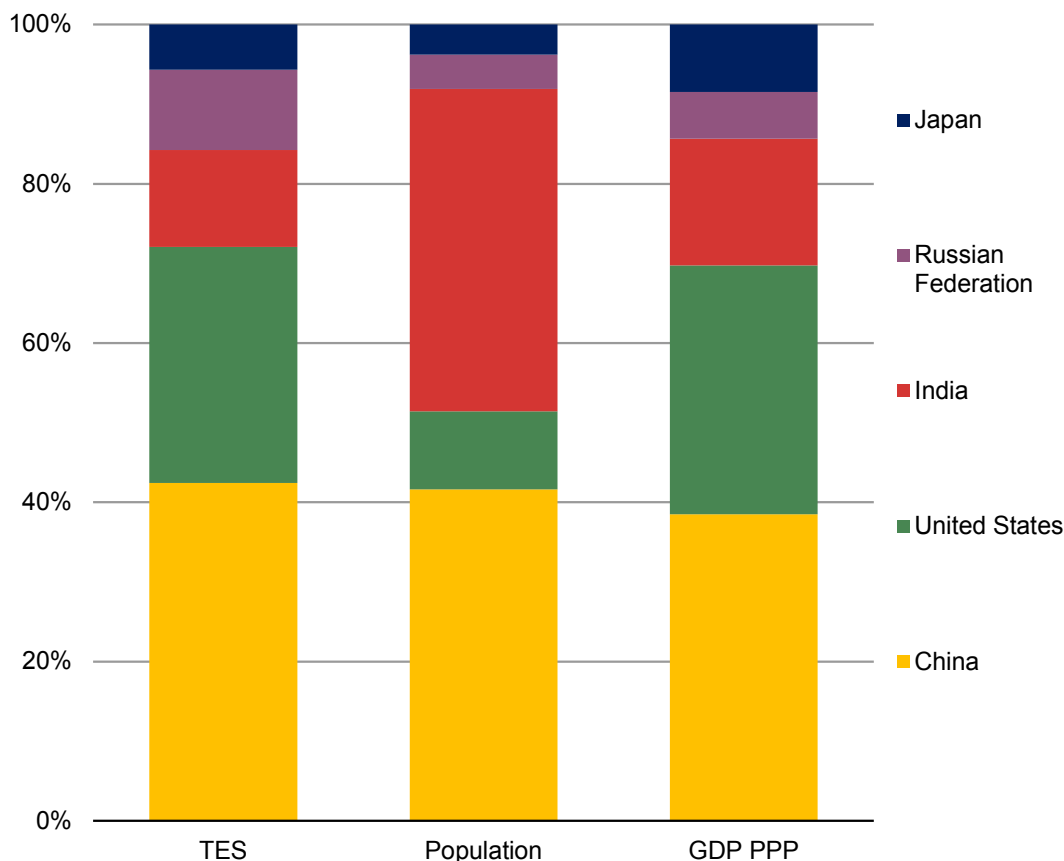
**China, the US, India, Japan, Germany and Canada have been amongst the ten major energy consumers between 1971 and 2018.**

In 2018, the top five countries in terms of TES accounted for less than half of the world GDP and world population (49% and 45% respectively) but consumed 53% of total world energy. However, the relative shares of TES, population and GDP of these five countries significantly varied from one to another.

The United States consumed about 16% of world energy, with 4% of the world's population. Conversely, China and India consumed more than 22% and 6% of global energy respectively, but each accounted for more than 18% of the global population. Russia and Japan also consumed significant amounts of energy in 2018 (5% and 3% of global TES respectively). However, their energy intensities differed significantly.

To produce the same amount of wealth, as measured by GDP based on purchasing power parity, Russia consumed in 2018 almost 207 Mtoe per billion US dollars, 2.6 times as much energy as Japan (the country with the lowest energy intensity of the five top energy consumers, at 81 Mtoe per billion US dollars), and more than twice as much as India (92 Mtoe per billion US dollars). Such comparisons reflect the importance of specific industries in each country, and not just relative efficiency in the use of energy.

**Top five energy consumers' 2018 relative shares\***



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\* Relative shares within the top five, which differ from shares in the world total.  
Source: IEA World Energy Balances, 2020.

**The relative shares of TES, population and GDP of the five top energy-consuming countries significantly vary from one to another.**

Power generation from coal was still dominant by far in 2018, reaching 38% of the electricity produced globally. However, its share resumed decreasing in 2018 after having slightly re-increased in 2017, interrupting four years of consecutive decrease.

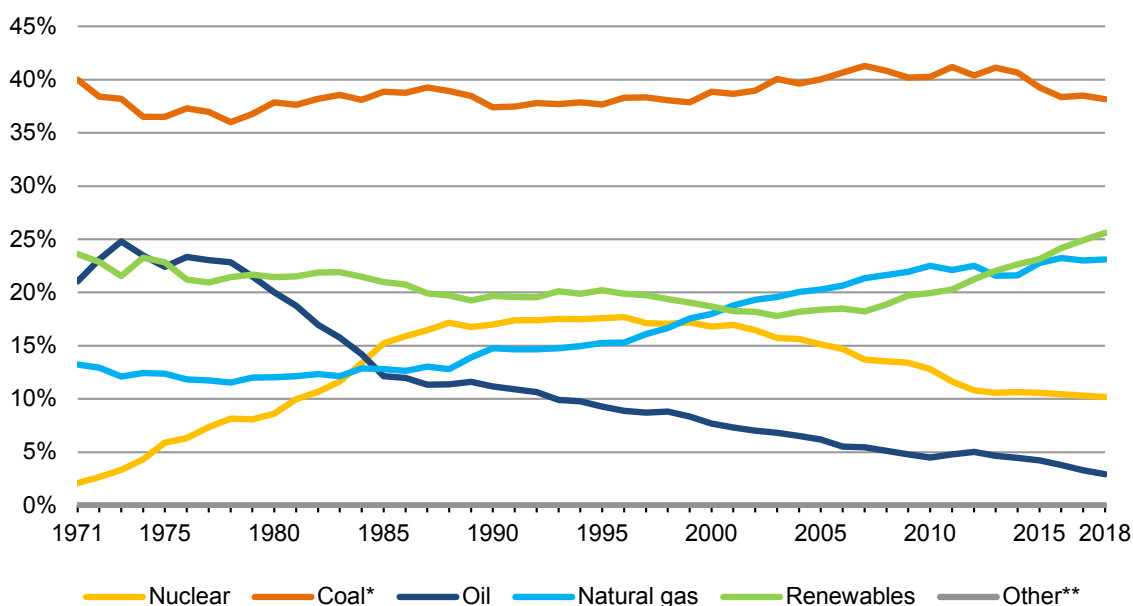
Renewables come second in the electricity mix, as has been the case since 2013, and reached almost 26% of the mix in 2018. Though hydro is still dominant and growing in 2018 (+4.2%), its share in the power mix has decreased since the 1970s from 23% to slightly less than 16% in 2018. Recent growth of renewable electricity is entirely due to the development of wind and solar PV (7% of the power production in 2018, and +15% compared to 2017) and to a smaller extent combustible renewables and geothermal.

Generation from gas grew slowly to reach 15% in the 1990s. Since then increases have seen it grow to peak at 23% in 2016, and it was plateauing near that value in 2017 and 2018.

Nuclear production had steadily increased in the 1970s and 1980s, before plateauing at around 17% of electricity production and then declining continuously since the 2000s to reach around 10% in 2018.

Power production from oil peaked at almost 25% of power production in 1973, just before the oil crisis, and has been declining since then. From being the second fuel used for electricity production after coal, it has become the fifth, at less than 3% of the global electricity generation in 2018. Whilst globally the use of oil for electricity generation has fallen sharply, it still accounts for over 90% of electricity generation in a few countries: Cyprus, Eritrea, Gibraltar, Lebanon, and South Sudan. Oil and natural gas combined provided close to 100% of 2018 power production in Bahrain, Brunei Darussalam, Libya, Oman, Qatar, Saudi Arabia and Trinidad and Tobago.

### World electricity generation mix 1971-2018



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\* In this graph, total fossil fuels exclude peat and oil shale.

\*\* Other includes non-renewable waste and non-renewable heat.

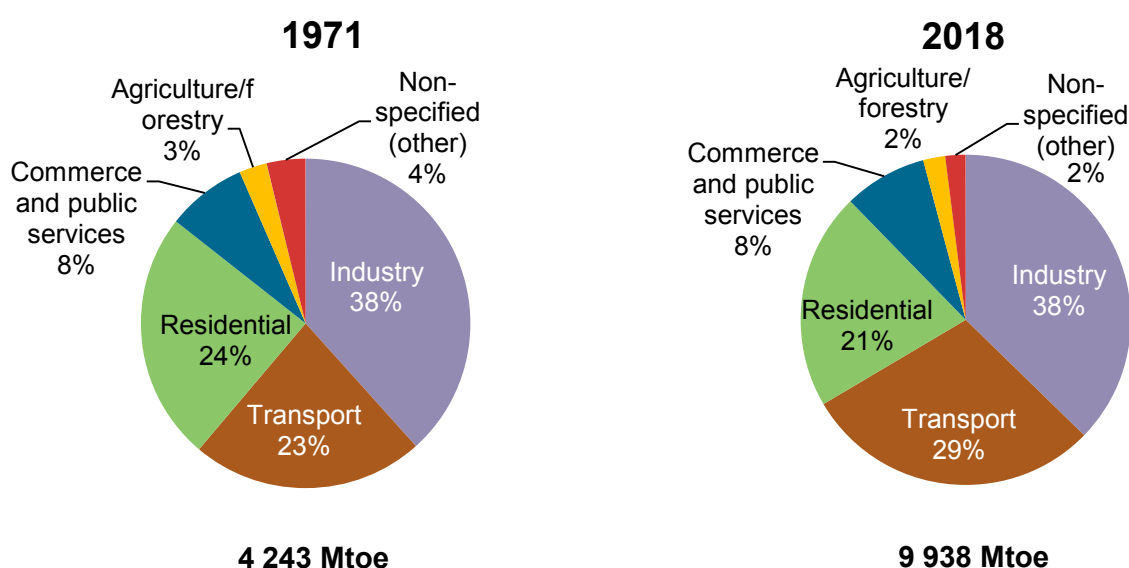
Source: IEA World Energy Balances, 2020.

**Notwithstanding the steady growth of renewables and gas in the electricity mix, coal remains the top fuel for power generation.**

## Total Final Consumption (TFC)

Between 1971 and 2018, total final consumption (TFC) was multiplied by 2.3, reaching 9 238 Mtoe in 2018. The share of energy use of most sectors has been stable – for commerce and services or industry for instance. However, energy use in transport significantly increased, from 23% of TFC in 1971 to 29% since 2015. Notwithstanding the growth of the transport sector, in 2018 industry remained the largest consuming sector globally, with the same share as in 1971 (38%). The residential sector ranked third in 2018 (21%).

### World total final consumption by sector



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Source: IEA World Energy Balances, 2020.

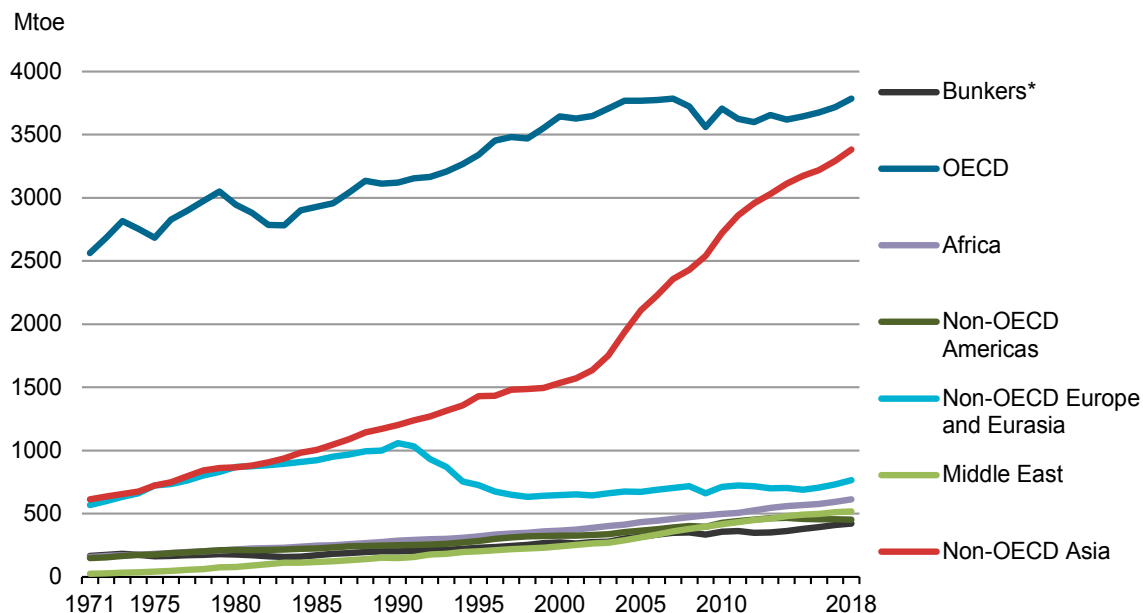
**In 2018, Industry remained the biggest energy-consuming sector ahead of transport, globally.**

Total final consumption has soared in non-OECD Asia since the early 2000s to account for 34% of global TFC since 2015 and a level of 3 381 Mtoe in 2018. The growth of total final consumption was particularly strong in the 2000s in the China region (People's Republic of China and Hong Kong) - almost +8% annually between 2001 and 2010, double the growth observed in the other non-OECD Asian countries.

The OECD keeps ahead in terms of final energy consumption, 400 Mtoe higher than non-OECD Asia in 2018. In the OECD the generally increasing trend came to an abrupt end with the 2008 global economic crisis, with total final consumption oscillating around a plateau of 3 600 Mtoe for a number of years. It has picked up again in 2014

and reached in 2018 its highest level since 2008. At 3 784 Mtoe, it is only 2 Mtoe below the record level reached in 2007, just before the crisis.

### World total final consumption by region



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\* Includes international marine and aviation bunkers.

Source: IEA World Energy Balances, 2020.

### in 2018, OECD final energy consumption kept ahead of non-OECD Asia.

The following sections briefly describe OECD trends up to 2019 and 1971-2018 energy trends in seven different regions of the world: OECD, Africa, non OECD Americas, non-OECD Asia, non-OECD Europe and Eurasia, and the Middle East.

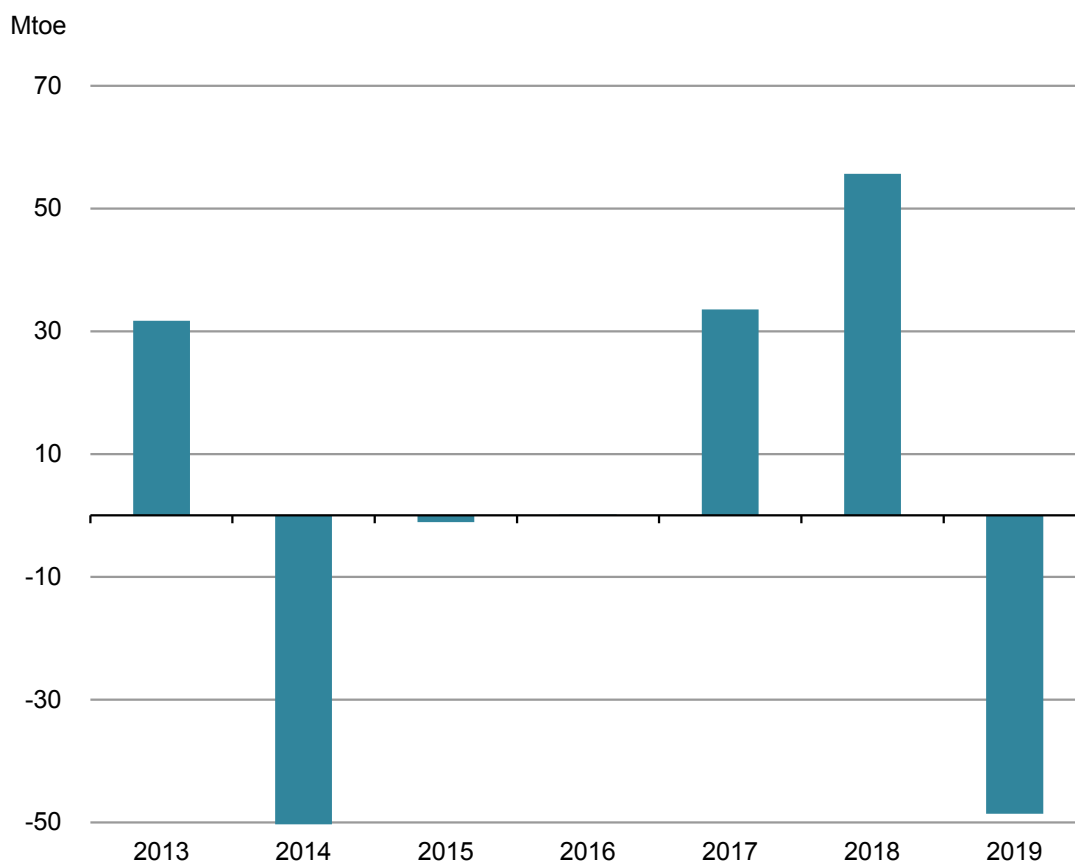


# OECD

## Key supply trends in 2019

After the increases registered in 2017 and 2018, the OECD region showed a decrease in total energy supply (TES) in 2019. The 1% decrease, almost 50 Mtoe, was equivalent to the amount of energy used in a country like Sweden, and almost entirely offset the 2018 increase.

### Annual change in total energy supply for OECD



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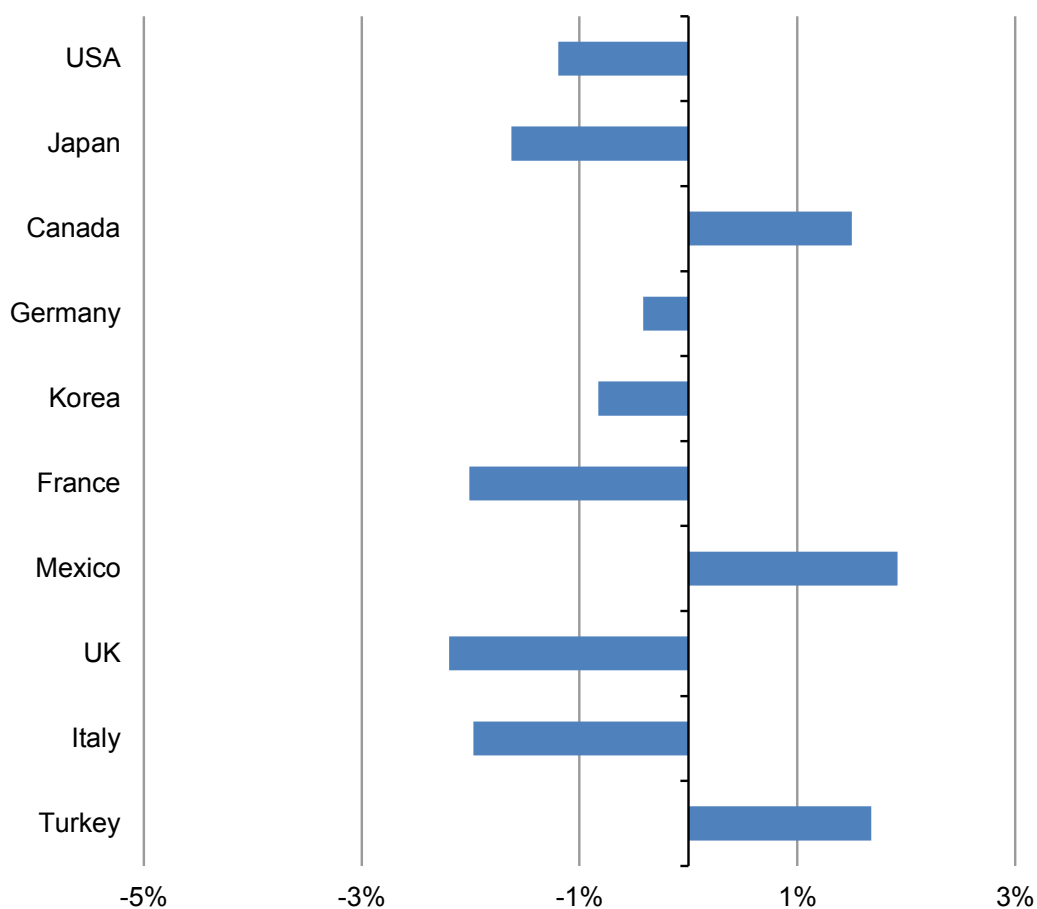
Source: IEA World Energy Balances, 2020.

### After two years of growth, total energy supply decreased in 2019 in the OECD.

The OECD TES in 2019 was equal to 5.32 billion tons of oil equivalent (toe), representing almost two-fifths of global energy supply.

The top energy-consuming countries showed different patterns. The United States alone reduced its TES by 27 Mtoe: the result of opposing trends for coal (-43 Mtoe), and natural gas (+20 Mtoe), mostly driven by continued substitution in power generation; similarly, Japan (-2%) and most European countries (France: -2%, United Kingdom: -2%, Italy: -2%, Germany: -0.5%) reduced energy consumption. Conversely, one third of the OECD members registered an increase (Canada: +1%, Mexico: +2%, Turkey: +2%, Australia: +3%).

### Change in TES in 2019: largest ten energy-consuming OECD countries



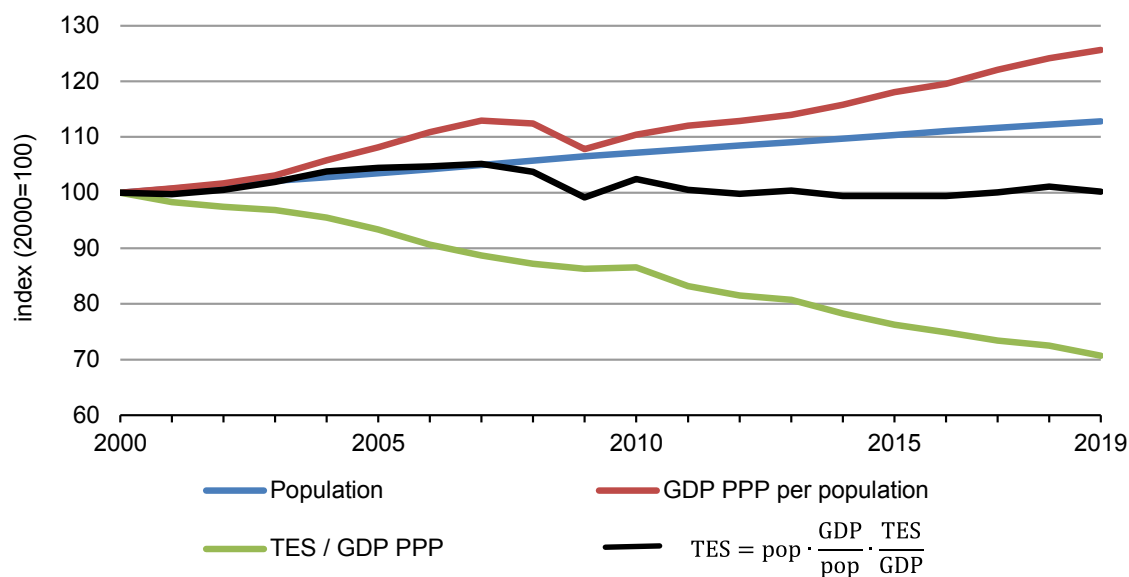
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Source: IEA World Energy Balances, 2020.

### Two third of OECD countries decreased their energy supply in 2019.

Economic output has been the largest driver of the increase in energy consumption in the OECD region over time. In contrast with the previous year, in 2019, improvements in energy intensity, due to efficiency and slightly milder weather conditions among other factors, offset the growth in energy demand.

## Total energy supply and drivers in OECD



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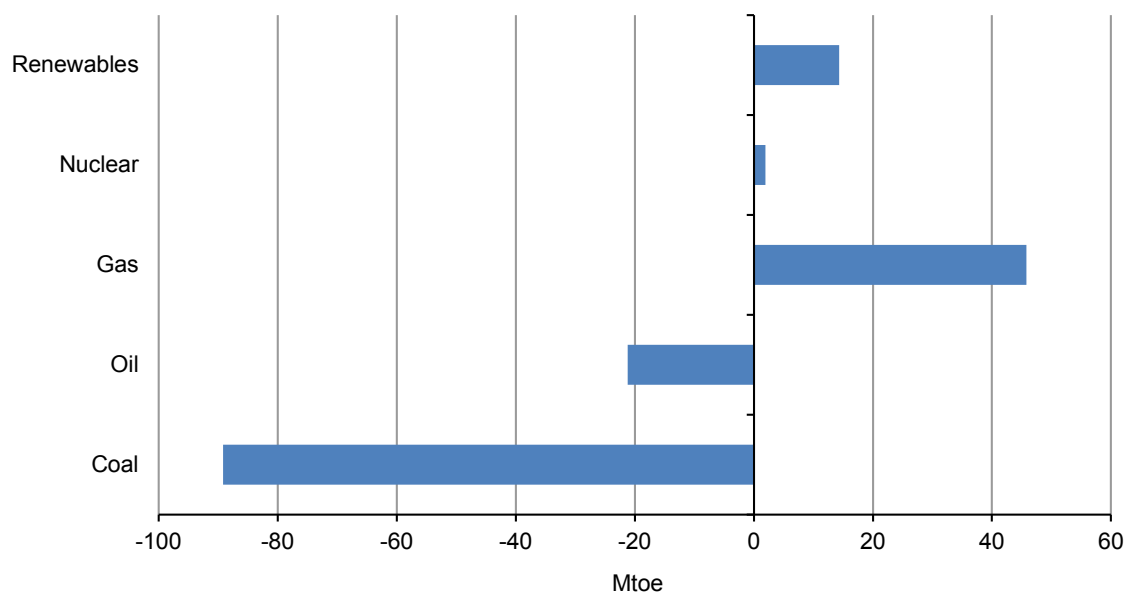
Source: IEA World Energy Balances, 2020.

## Improvements in energy intensity maintained energy supply stable while the economy expanded.

All major OECD countries showed improvements in energy intensity: Europe and Japan maintained the decreasing trend started after the previous decade economic downturn; the United States restarted declining after the first-time-ever increase in energy intensity registered in 2018, also caused by more severe weather conditions.

For a second year in a row, natural gas was the largest OECD growing source in absolute terms, with additional 46 Mtoe: gas supply increased by 3% in the United States, 7% in Mexico, 14% in Spain, 18% in Australia and 26% in Chile. Conversely, gas supply decreased in several north European countries, e.g. Denmark, Estonia, Finland, Latvia, Norway and the United Kingdom, in many cases due to a reduced use for electricity generation.

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**Total energy supply by source: 2019 change in OECD**

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Source: IEA World Energy Balances, 2020.

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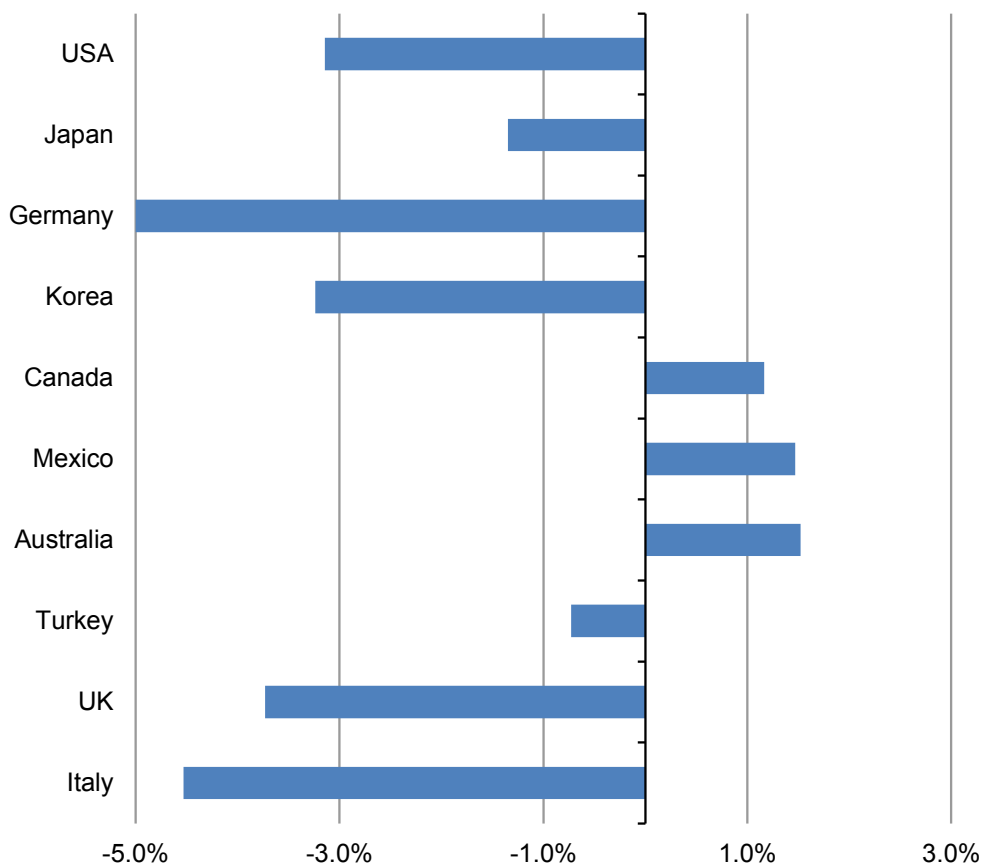
**Coal supply substantially decreased while gas continued to rise.**

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The yearly decrease in coal supply, common to almost all OECD countries since the early 2010s, reached 80 Mtoe, with the United States totaling one half of the total drop, and was not compensated by the increase in gas and renewable energy; at more than 300 MtCO<sub>2</sub>, such drop was the largest since the Great Recession. Changes in supply for these three sources reflected changes in power generation.

Due to the combined fall in coal and increase in gas and renewable energy, the carbon intensity of the energy mix continued to decrease in 2019, resulting in a 3% drop in energy-related carbon dioxide emissions.

### Change in CO<sub>2</sub> emissions in 2019: largest ten OECD emitting countries



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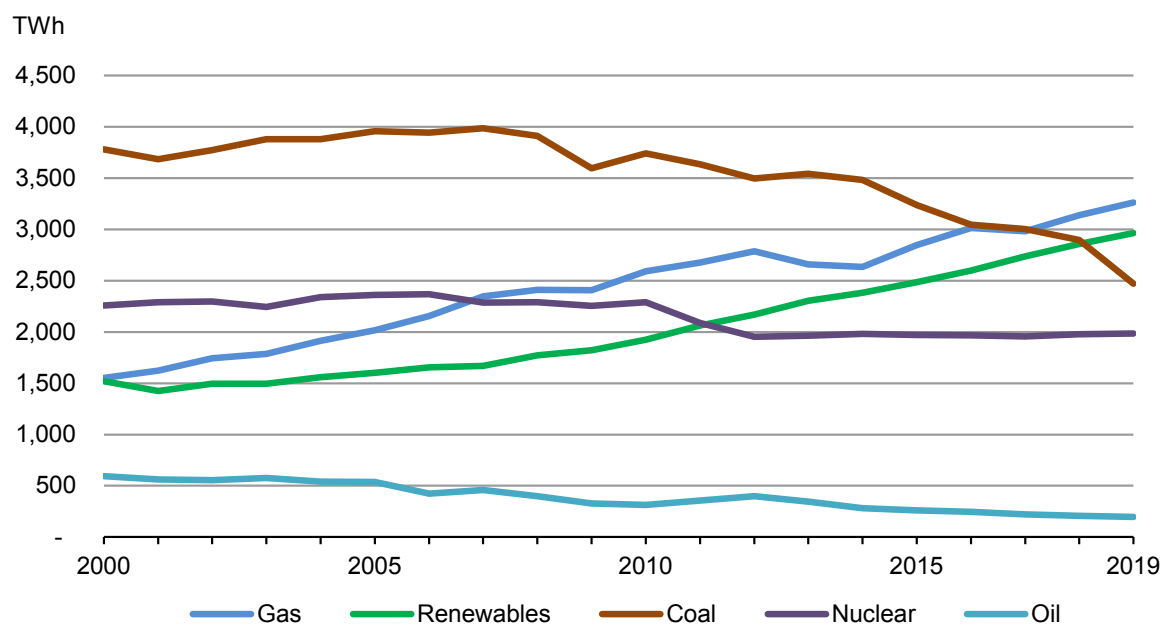
Source: IEA CO<sub>2</sub> emissions from fuel combustion.

### As for energy supply, carbon dioxide emissions decreased in several OECD countries in 2019.

Over two thirds of OECD countries decreased their emissions, several of them by 3% or more: the United States 3%, Germany 5%, Korea 3%, the United Kingdom and Italy 4%, France 3%, Poland 4% and Spain 8%.

Electricity generation, responsible for one third of total OECD emissions, fell by almost 200 TWh in 2019, the biggest drop of the current decade. The decrease in generation was consistent across all OECD regions, with nine out of the top ten countries reducing the total electricity output. The increases in generation from gas and renewable energy together were equivalent to one-half of the drop for coal, i.e. -400 TWh. Similarly to gas in 2018, renewables overtook coal in 2019 for the first time ever, generating almost 3 000 TWh.

### Electricity generation by source in OECD



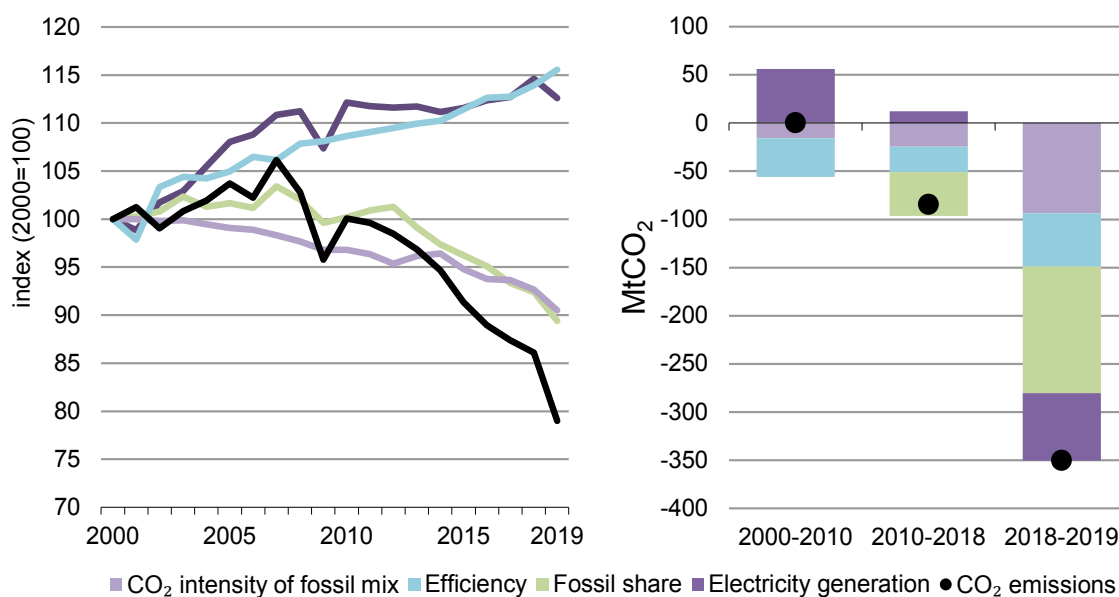
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Source: IEA World Energy Balances, 2020.

### Gas and renewables displaced coal generation and reached new heights in the OECD.

As a result of the continued penetration of gas and renewables in place of coal, the carbon intensity of electricity generation for OECD decreased by 7% in 2019: this, together with the drop in generation, contributed to reduce total emissions from electricity by more than 300 MtCO<sub>2</sub>.

### CO<sub>2</sub> emissions from electricity generation and drivers in OECD



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Source: IEA CO<sub>2</sub> emissions from fuel combustion.

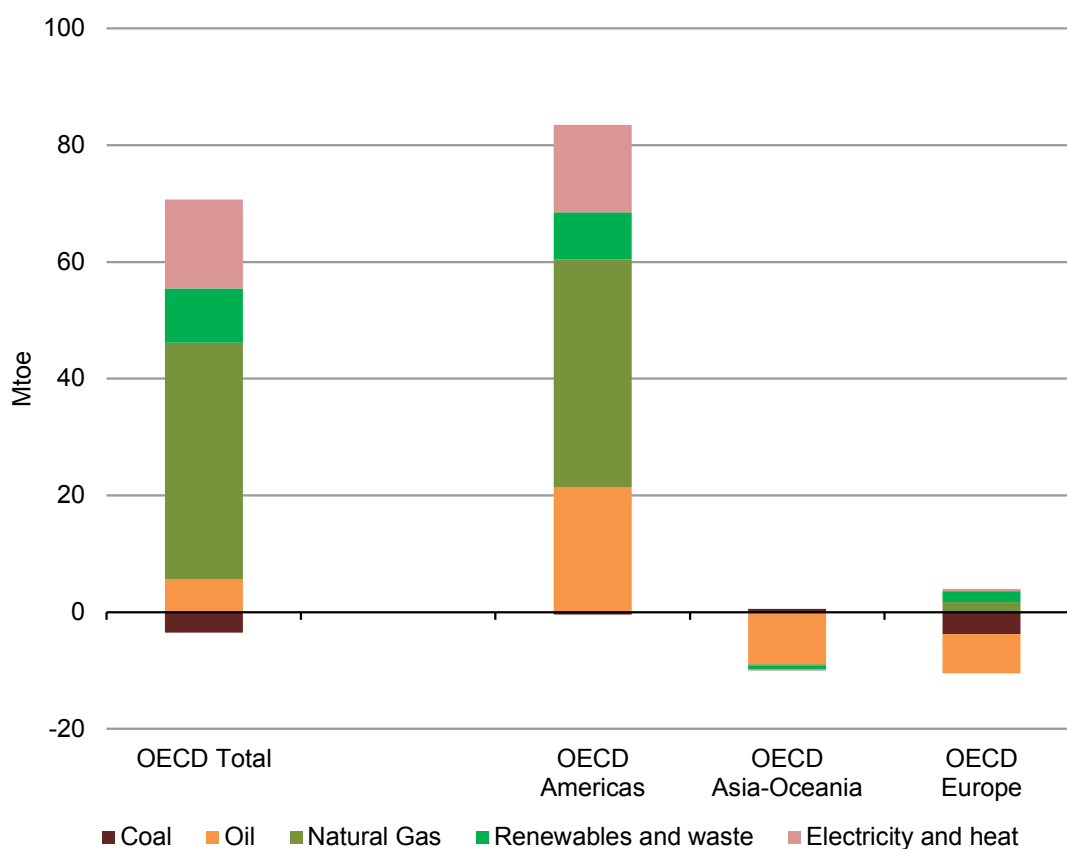
### The 2019 drop in electricity generation helped efficiency gains and renewables penetration to reduce carbon dioxide emissions.

In 2019, all main drivers contributed to reducing CO<sub>2</sub> emissions from electricity generation, with the increase in low carbon sources alone accounting for a saving of more than 100 MtCO<sub>2</sub>.

## Key demand trends in 2018

In 2018, the OECD total final consumption (TFC) reached 3 784 Mtoe, result of a 67 Mtoe (+1.8%) increase - the largest growth since the post-recession rebound of 2010. This increase was driven exclusively by the Americas (+4%), with other regions experiencing mild decreases - Europe (-0.5%) and Asia-Oceania (-1.6%). All fuels' consumption increased with the exception of coal; most notably, natural gas alone accounted for 60% of the total growth.

### Total final consumption: 2018 change by source and region in OECD



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Source: IEA World Energy Balances, 2020.

### The significant 2018 growth was driven by gas consumption in OECD Americas.

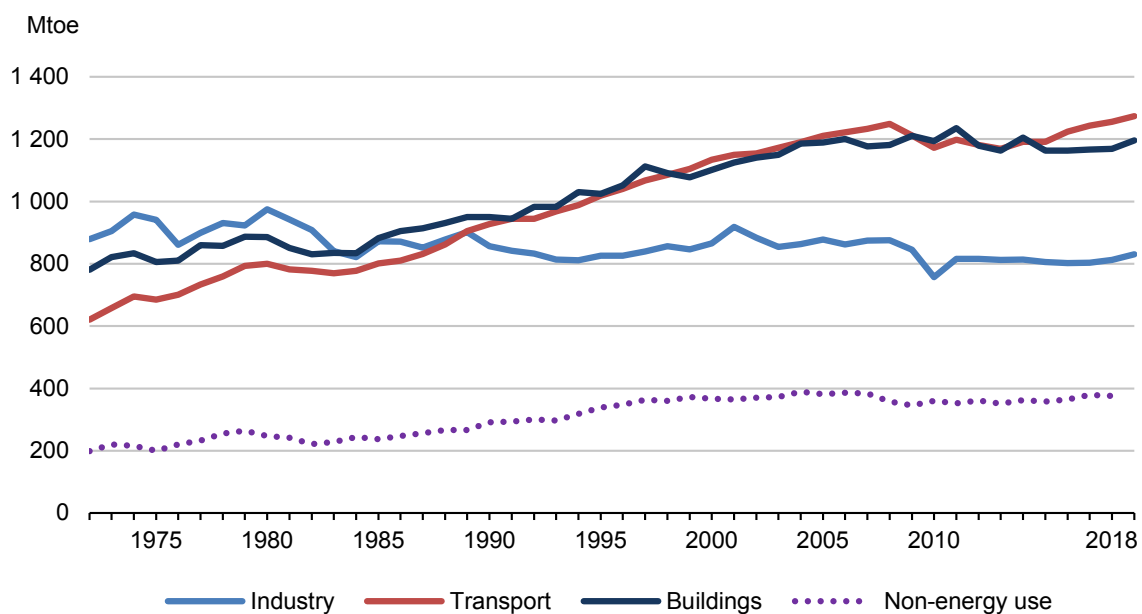
The growth in OECD Americas was dominated by natural gas, with oil and electricity and heat also increasing (21 Mtoe and 15 Mtoe, respectively). In the other two OECD regions, the year-on-year change was marked by the decrease in oil consumption in 2018 after the 2017 increase.

At a sectoral level, none of the final consumption sectors decreased in 2018 except the non-energy use of fuels. Energy use in buildings (residential and services) contributed mostly to the overall TFC change (+67 Mtoe), with transport and industry following.

Consumption in transport reached a new record high (1 251 Mtoe), increasing for a fourth consecutive year and consolidating its position as the largest consuming sector. The buildings sector saw an increase (+2%) after four years of relatively stable levels.



### Total final consumption: 2018 change by source and region in OECD



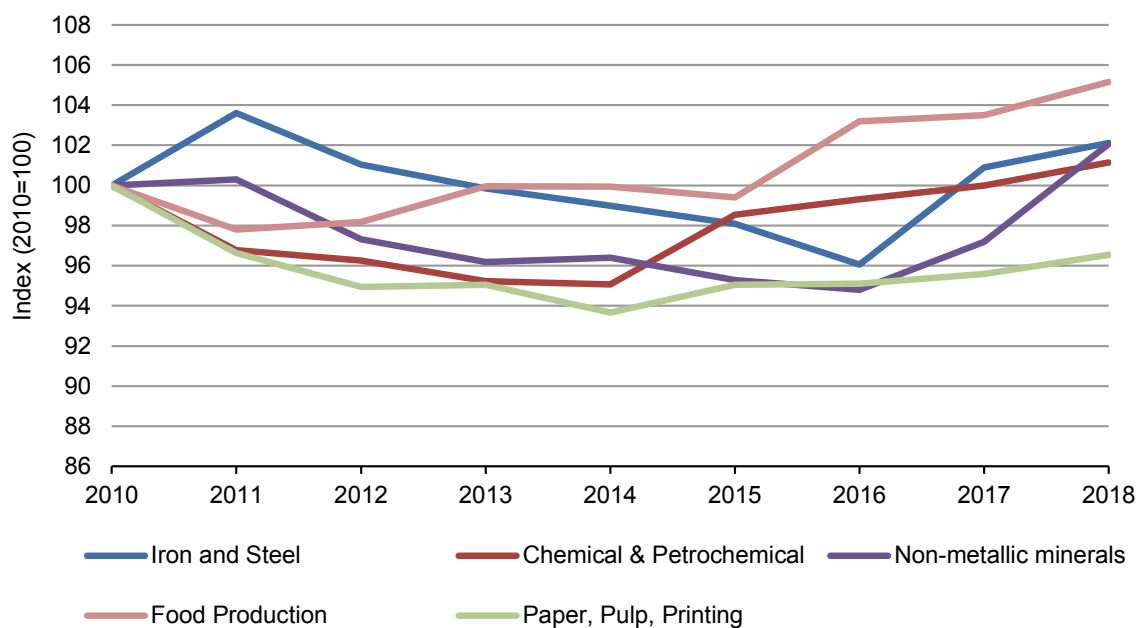
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Source: IEA World Energy Balances, 2020.

### Transport consumption continued its growth reaching a new record high.

Despite its 2018 increase, industry did not exceed the energy consumption levels achieved in 2008 before the Great Recession. This sector has been the most stable sector in terms of final consumption for OECD, having decreased only marginally in absolute terms since 1990 (-1.4%). This long-term mild decrease, in conjunction with the growth in the other sectors, reflected the changes taking place in the profile of the OECD economy, also visible in the 34% reduction of the final energy intensity (defined as TFC/GDP) over the same period.

### Consumption of major industrial subsectors 2010-2018 in OECD



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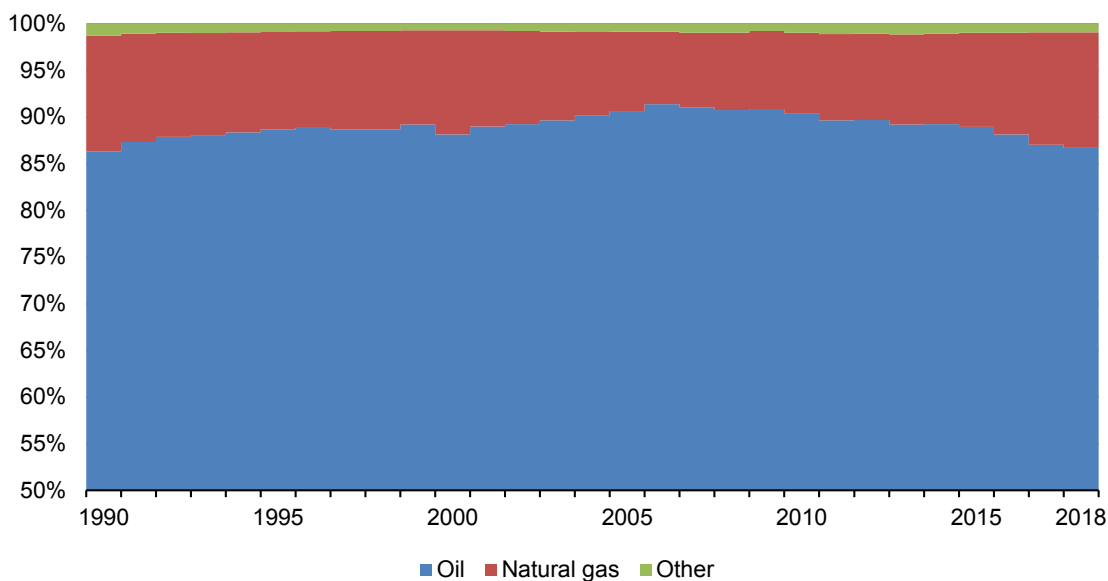
Source: IEA World Energy Balances, 2020.

### The major industrial sub-sectors experienced a moderate increase in the few years up to 2018.

Due to structural differences in national economies, the various industrial sub-sectors have moved differently for each country; however, at the OECD level, the five largest sub-sectors – which account for two thirds of total industrial consumption – have been all experiencing an increase in the past few years, after the moderate decreases in the beginning of the decade.

Consumption of fuels for non-energy decreased mildly (-0.9%) in 2018. Natural gas emerged more strongly as a key feedstock, with a marginal absolute increase combined with the marginal decrease for oil. Natural gas's share reached in 2018 the levels of 1990 after the decline up to 2006, ended with the beginning of the shale revolution.

### Fuels' share for non-energy use in OECD, 1990-2018



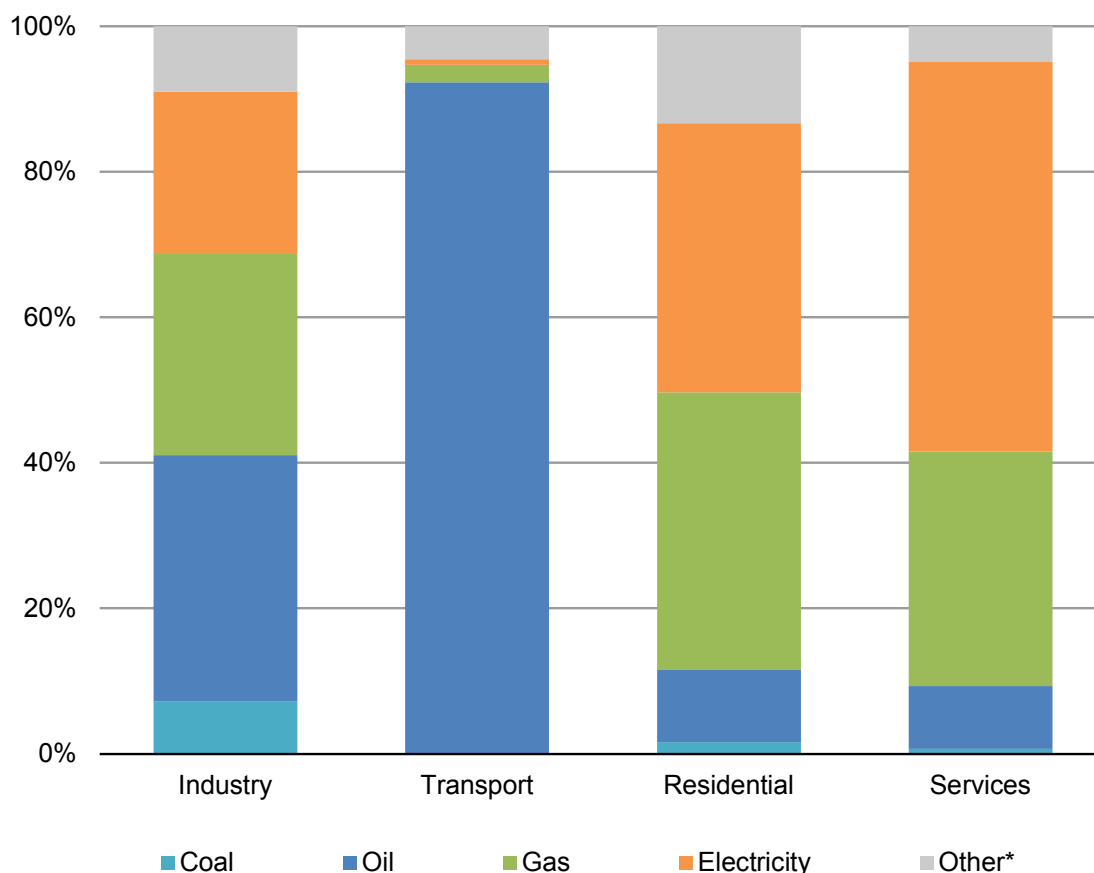
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Source: IEA World Energy Balances, 2020.

### Natural gas continued to gain ground as a feedstock.

In transport, the largest consuming sector with over a third of the overall TFC, the consumption of oil remained dominant (92%), despite the rapid growth of biofuels after 2000. In the industry, residential and services sectors, the gas share increased modestly (0.6-1.7%) at the expense of oil. The shares of electricity remained fairly stable on a year-on-year basis.

### Final consumption by sector and source in 2018 in OECD



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\* Includes biofuels and waste, direct use of geothermal/solar thermal and heat produced in CHP/heat plants.

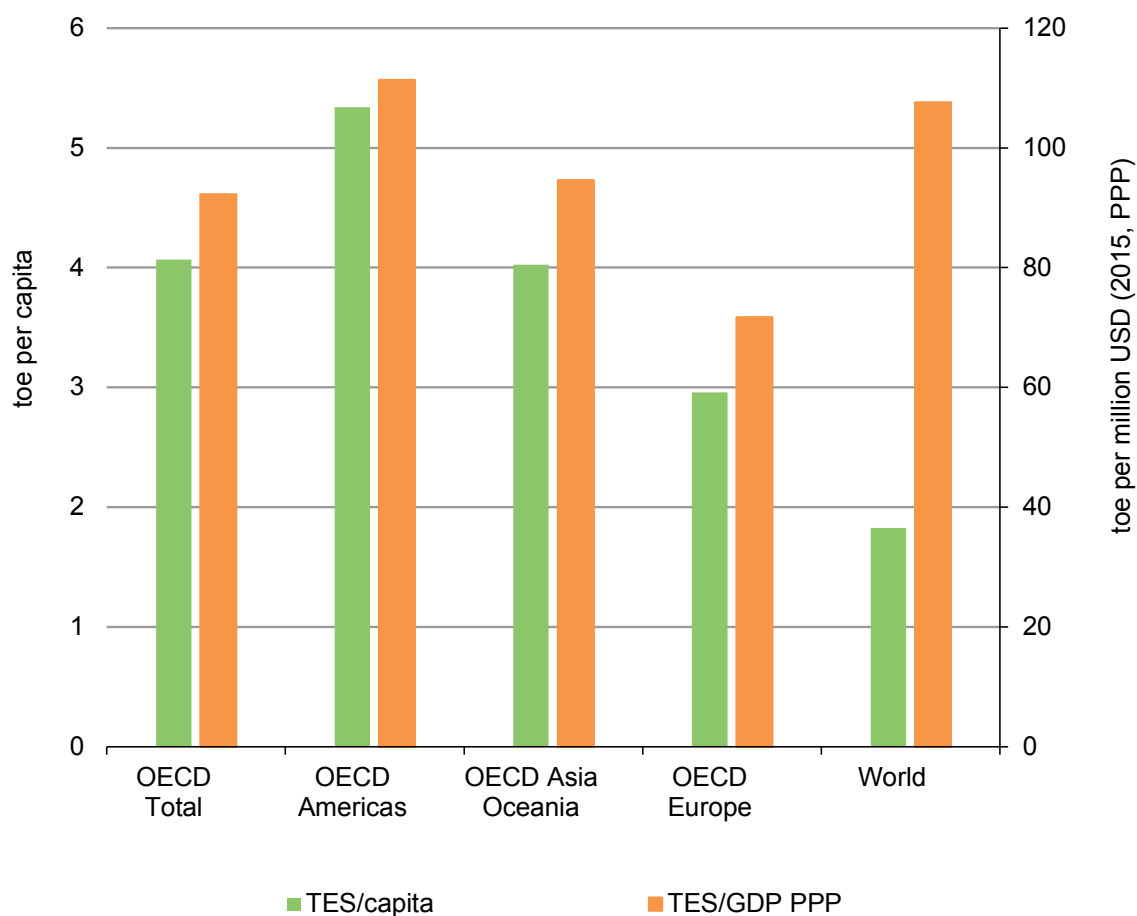
Source: IEA World Energy Balances, 2020.

### Transport stands out in terms of lack of fuel diversification.

## The OECD and IEA in the world

In terms of TES per capita, the OECD remains the most energy-intensive region globally, by a factor of almost two. The figure has remained relatively stable for the previous five years (4.1 toe per capita), with a tendency to a modest reduction. Nevertheless, the energy intensity (TES per GDP) is significantly lower in the OECD relative to other regions. In addition, it decreased further by 3% in 2019 as a combined result of a GDP increase and a TES decrease – confirming the long-term regional trend (-29% for 2019 compared to 2000).

### OECD energy indicators by region, 2019



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Source: IEA World Energy Balances, 2020.

### Structural factors – both economic and geographical – lead to energy intensity differences between OECD regions.

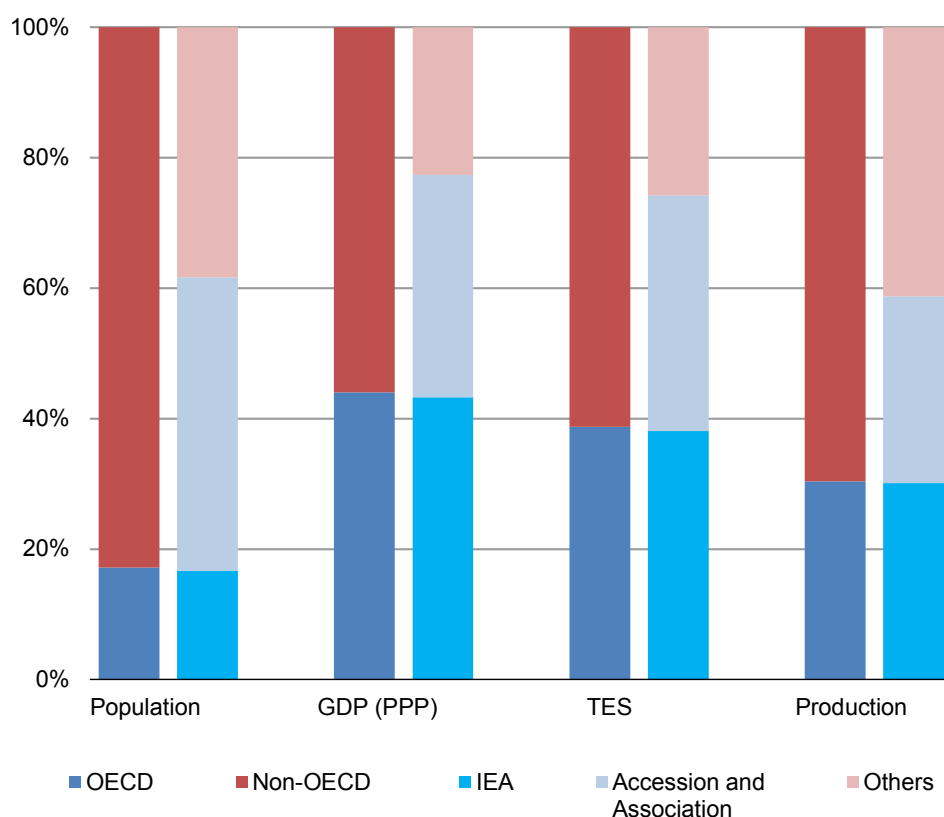
The historical intra-OECD regional differences are attributed to various structural factors, both economic (like the share of industry in the economic activity, or the number of cars per household) and geographical (like having densely or sparsely populated areas, or varying weather conditions). However, the decrease in intensities was a common feature across the OECD regions for 2019, both for TES per capita and TES per GDP.

In 2018, the OECD accounted for 17% of global population, 44% of GDP, 39% of TES and 30% of energy production. Even though these shares have remained stable – or

slightly declining – over the last few years, they have significantly changed since 1971, when the region<sup>1</sup> accounted for 61% of the global energy supply, and 65% of global GDP.

The shares are significantly larger when considering the full group of countries tightly connected with the IEA: IEA, Accession<sup>2</sup> and Association<sup>3</sup> countries altogether accounted for around three quarters of global GDP<sup>4</sup> and global TES in 2018. More precisely, the IEA family accounted for 62% of global population, 77% of GDP, 74% of TPES, and 59% of energy production.

### OECD and IEA family shares in the world, 2018



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Source: IEA World Energy Balances, 2020.

### IEA, Accession and Association countries account for around three quarters of global GDP and TES.

<sup>1</sup> In a constant composition of countries based on the 2018 membership.

<sup>2</sup> The IEA Accession countries are Chile and Lithuania.

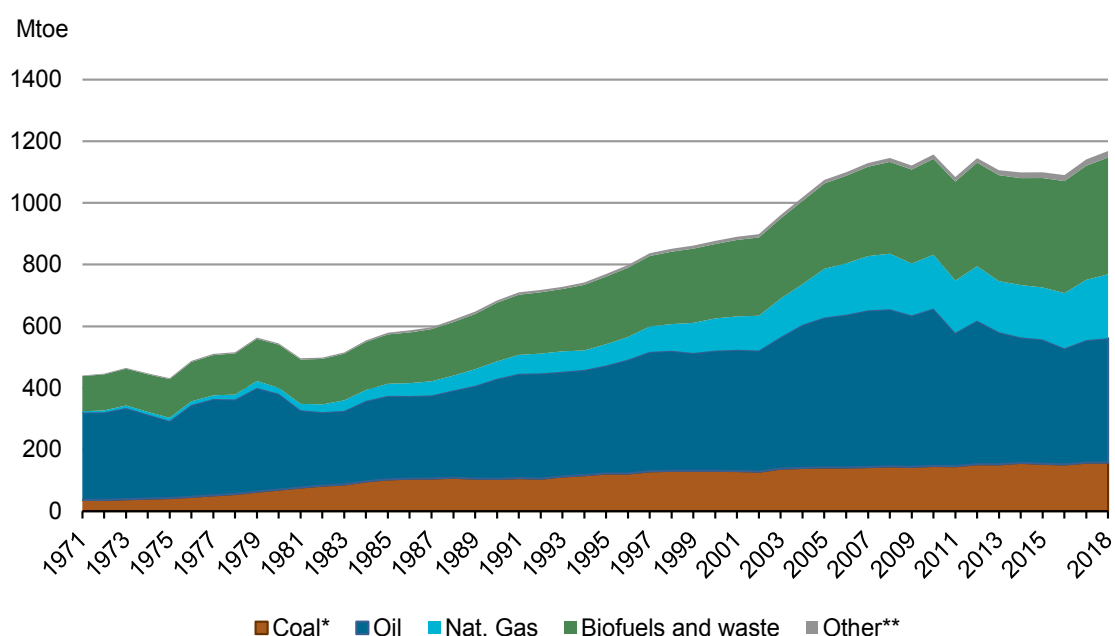
<sup>3</sup> The IEA Association countries are Brazil, China, India, Indonesia, Morocco, Singapore, South Africa and Thailand.

<sup>4</sup> The GDP figures refer to the purchasing power parity adjusted GDP, i.e. GDP (PPP).

# Africa

In 2018, Africa produced 1 169 Mtoe of energy, three times more than in 1971. The region represented 8% of the world's energy, as in 1971. African production is dominated by oil (35%) and biofuels and waste (32%), followed by natural gas (18%) and coal (13%). Hydro and other renewables represent less than 2% of the primary energy production.

## Energy production by product in Africa 1971-2018



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\* In this graph peat and oil shale are aggregated with coal.

\*\* Other includes nuclear, hydro, solar, wind, geothermal and heat from other sources.

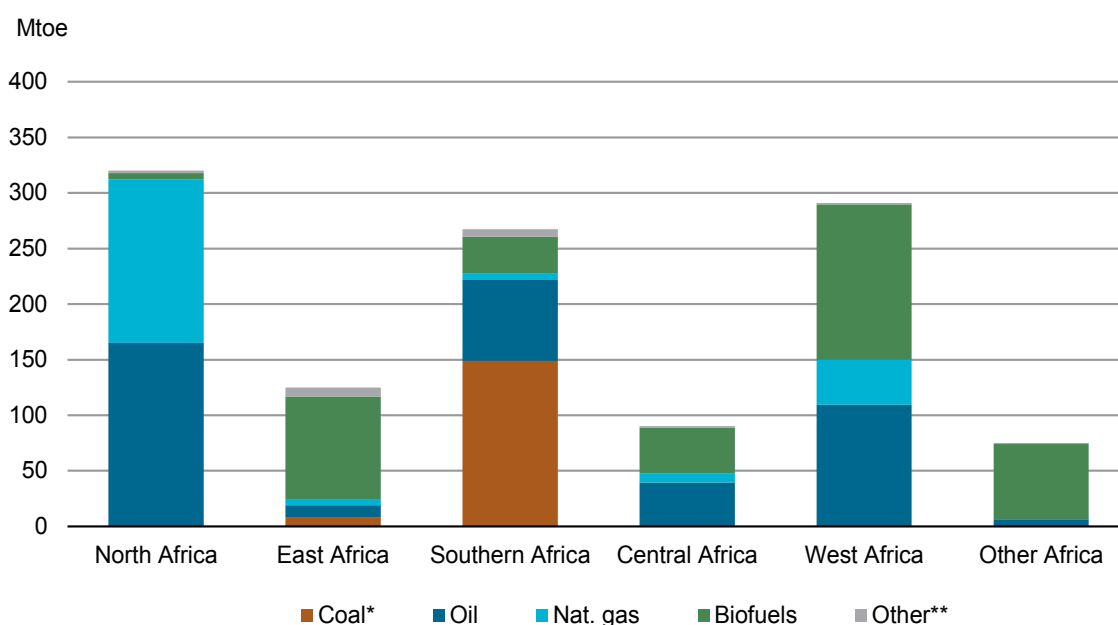
Source: IEA World Energy Balances, 2020.

## Energy production increased by 1.6% in 2018 in Africa.

Africa's share of global total energy supply (TES) increased slightly over the period, from 4% to 6%, reaching 837 Mtoe in 2018. Many African countries are dependent on imported refined oil products and other fossil fuels. Nonetheless, as a region, Africa is energy self-sufficient, as it still heavily relies on solid biofuels for its energy consumption. Moreover, the region as a whole produces more primary fossil fuels than it needs and is a net exporter of coal, natural gas and crude oil. Altogether, Africa produces 1.4 times the energy it needs.

Fossil fuels production is unevenly distributed across Africa. West Africa was the main producer of crude oil in 2018, as Nigeria extracted more than 24% of the African crude oil in 2018. North Africa produces mainly crude oil and natural gas: in 2018 Algeria accounted for almost 40% of the natural gas and 18% of the crude oil of the continent, and Egypt for 8% of crude oil and 25% of natural gas. Southern Africa is characterized by the high share of coal and of crude oil; South Africa, the fifth largest coal exporter in the world, produced 92% of African coal in 2018 whereas Angola was the third biggest producer of crude oil in Africa, with 18% of the region’s production. Congo, Gabon and Equatorial Guinea, three OPEC members, are driving the increase of fossil fuels production in Central Africa, +4% for crude oil and +26% for natural gas. Energy production in East Africa remains dominated by solid biofuels.

### Energy production by sub-region in 2018 in Africa



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\* In this graph peat and oil shale are aggregated with coal.

\*\* Other includes Nuclear, Hydro, Geothermal, Solar, Wind etc.

North Africa includes Algeria, Egypt, Libya, Morocco and Tunisia;

East Africa includes Eritrea, Ethiopia, Kenya, Mauritius, Mozambique, South Sudan, Sudan and the United Republic of Tanzania;

Southern Africa includes Angola, Botswana, Namibia, South Africa, Zambia and Zimbabwe;

Central Africa includes Cameroon, Congo, the Democratic Republic of Congo, Equatorial Guinea and Gabon;

West Africa includes Benin, Côte d'Ivoire, Ghana, Niger, Nigeria, Senegal and Togo

Other Africa please refer to the country notes.

Source: IEA World Energy Balances, 2020.

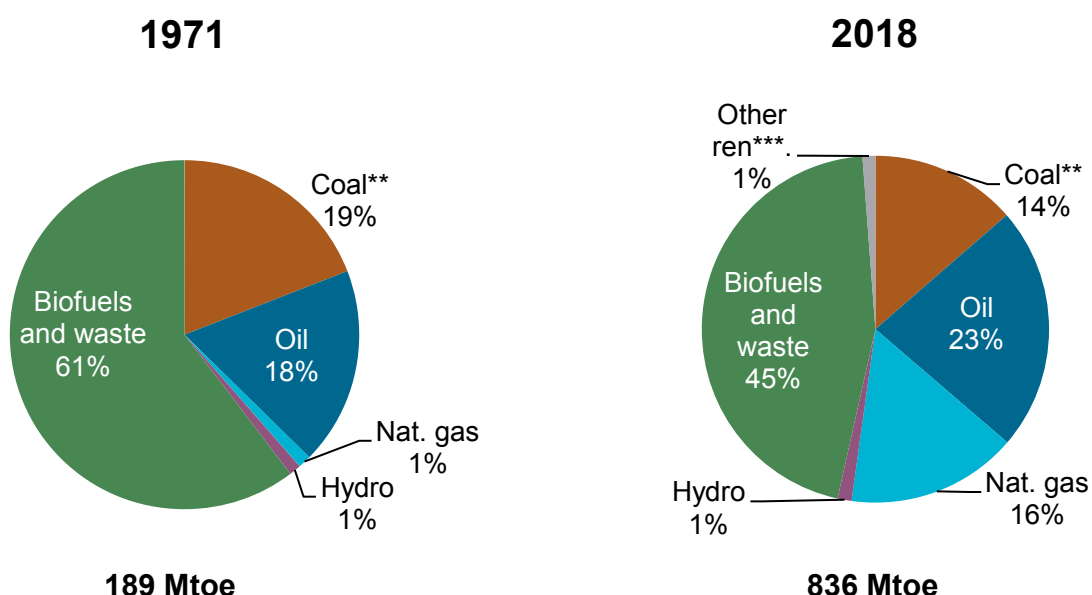
### Energy production varies across regions of Africa depending on resources availability.



In 2018, Africa’s crude oil production increased compared to 2017 (+2%), led by Libya (+26%), Congo (+22%) and Nigeria (+6.5%). The production increased also in South Sudan, Ghana and Other Africa (+5%, +6% and +11%, respectively) but decreased in Angola (-9%), Algeria (-2%) and Egypt (-3%). Africa represented 9% of world crude oil output and it exported 78% of this production in 2018, while importing more than 47% of the secondary oil products it consumes.

The production and consumption of biofuels (mainly fuelwood) is significantly higher across Africa (45% of TES in 2018) than the world average (9% of TES). The presence of large forests, agro-industry, agriculture, a large rural population, and a low GDP per capita have resulted in a large use of solid biofuels, in particular for cooking. Because of the extensive use of fuelwood and charcoal which have a low final use efficiency, energy intensity<sup>5</sup> is higher than the world average.

**Total energy supply (TES)\* by fuel in Africa**



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\* Excluding electricity trade.

\*\* In this graph peat and oil shale are aggregated with coal

Source: IEA World Energy Balances, 2020.

**In five decades, the use of traditional biofuels and waste has decreased in Africa, replaced by growing fossil fuels, in particular gas and oil.**

<sup>5</sup> Measured by the ratio TES/GDP.

However, the share of biofuels and waste in TES has decreased significantly between 1971 and 2018. This is partly explained by electrification<sup>2</sup>, and particularly the recent development of power generation from natural gas. Natural gas share in TES increased steeply from 1% in 1971 to 16% in 2018. Over the period, oil demand increased because of the increase of transportation consumption and is now the second fuel consumed in Africa. Coal has declined since 1971; it comes 4<sup>th</sup> in African TES (14% in 2018, compared to 27% globally). Coal's role is much higher in South Africa, where it represented 89% of the country's primary production, 73% of TES, 90% of electricity generation and 24% of total final consumption in 2018.

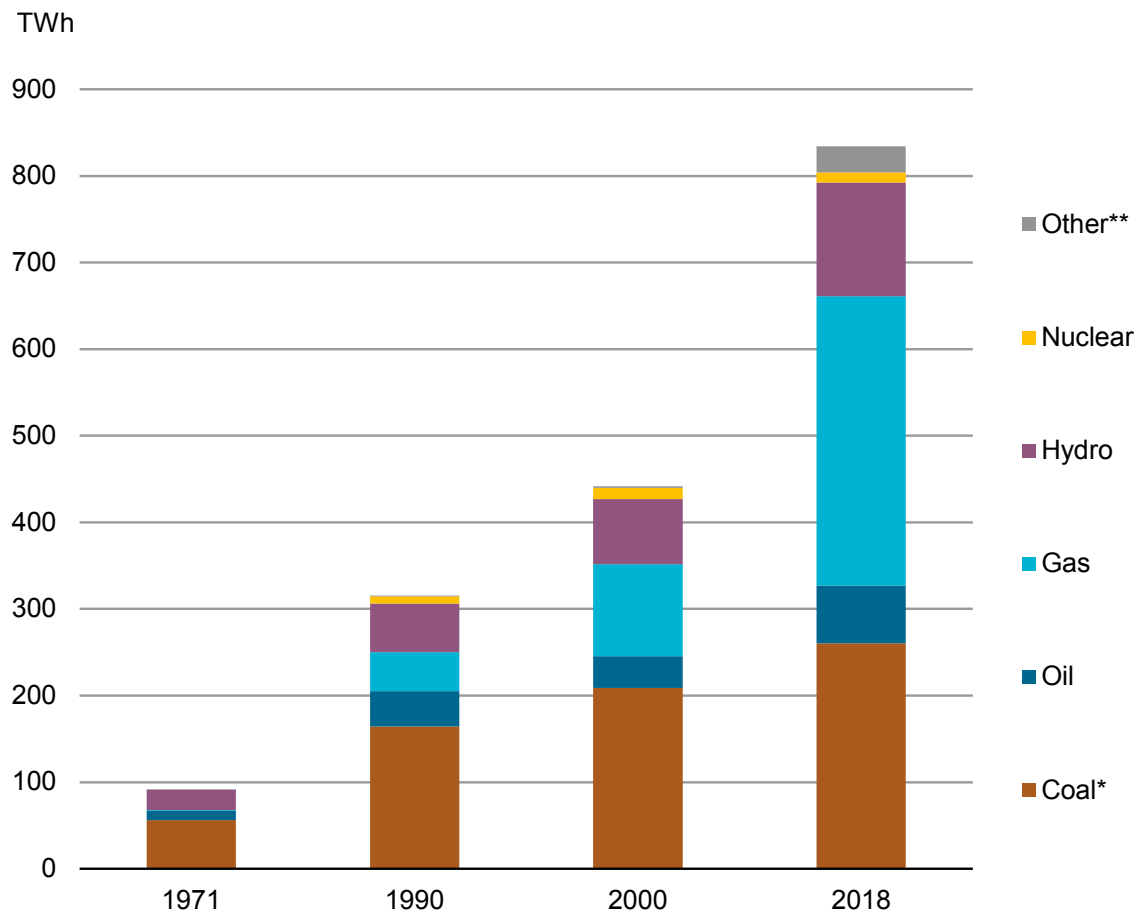
In 2018, power generation in Africa was more than nine times the level in 1971. The fuel mix of electricity generation changed a lot. Natural gas was barely nil in 1971 but provided more than 334 TWh of electricity in 2018, a 40% share of electricity generated in Africa (compared to 28% in OECD, 40% in non-OECD Europe and Eurasia, and 72% in the Middle East). Its share in the power mix reached even higher level in gas-producing countries such as Algeria (98%), Nigeria (82%), and neighbouring importing countries like Tunisia (95%). In 1971, coal was the first fuel used for power generation in Africa (61%); in 2018 it ranked second after natural gas and accounted for 31% of power generation, providing 260 TWh. Hydro was the second provider of electricity in Africa in 1971 (23 TWh, 26% of the power produced in the continent) and ranked third in 2018 with 131 TWh.

Electricity production reflects the disparity in fossil fuel resources between sub-regions of Africa. In 2018, North African countries plus South Africa, represented only 20% of the population but generated 73% of the electricity in Africa. Even if access rates are increasing, electricity remains a grave scarcity for most Sub-Saharan African countries. Their access to electricity in 2018 averaged 45%, compared to 54% for the whole continent, but only 26% in rural Sub-Saharan areas, and much less in some countries, less than 5% in Burkina Faso, Chad, Central African Republic, Djibouti and even less in the Democratic Republic of Congo, Niger or South Sudan<sup>6</sup>.

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<sup>6</sup> Proportion of the population with access to electricity, extracted from the World Energy Outlook 2019 electricity database: <https://www.iea.org/reports/sdg7-data-and-projections/access-to-electricity>

### Electricity generation by source in Africa



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\*In this graph peat and oil shale are aggregated with coal.

\*\* Other includes non-renewable waste and non-renewable heat.

Source: IEA World Energy Balances, 2020.

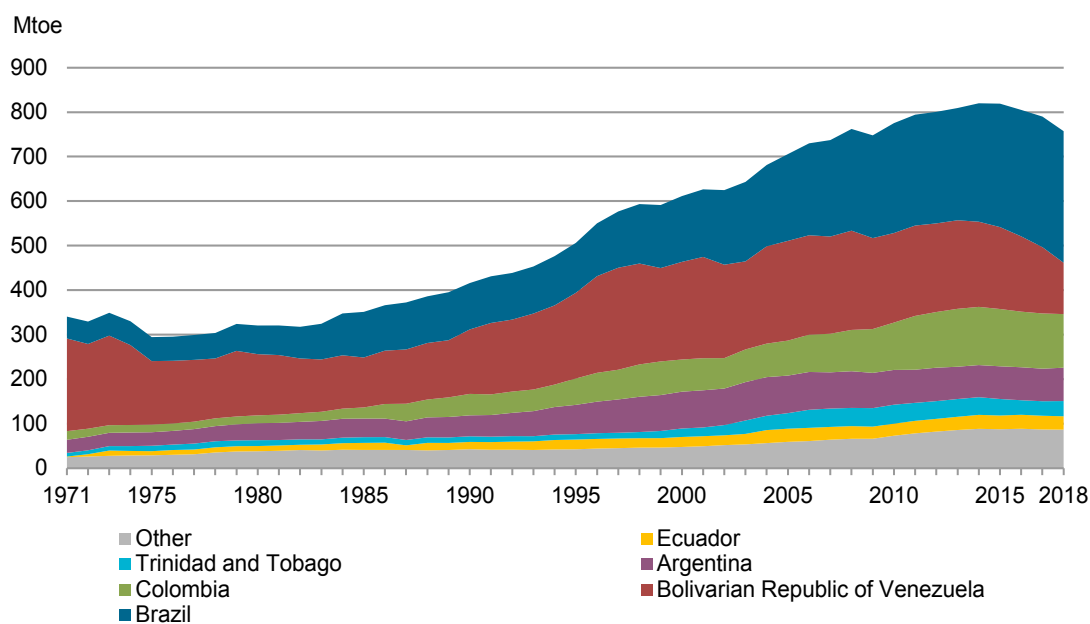
**In five decades, the production of electricity grew eight-fold in Africa, driven by coal, and more recently natural gas.**

# Non-OECD Americas

In 2018, non-OECD Americas' main energy producers were, in descending order, Brazil, Colombia, the Bolivarian Republic of Venezuela (Venezuela), Argentina, Trinidad and Tobago and Ecuador. Together they produced 89% of the 757 Mtoe of energy produced by the whole region, the lowest level since 2009. Brazil alone was responsible for 39% of the region's energy production in 2018.

Non-OECD Americas countries produced 33 Mtoe less in 2018 compared to 2017. This 14% decrease was mainly due to a drop in Venezuela (-29%), Colombia (-3%), Plurinational State of Bolivia (Bolivia; -6%) as well as Ecuador (-3%). Among the region's top producers the increase of energy production in Brazil (+0.8%), Argentina (+2%) and Trinidad and Tobago (+5%) did not offset this decrease.

## Energy production by country in non-OECD Americas



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Source: IEA World Energy Balances, 2020.

## In 2018, energy production in non-OECD Americas reached its lowest point since 2009.

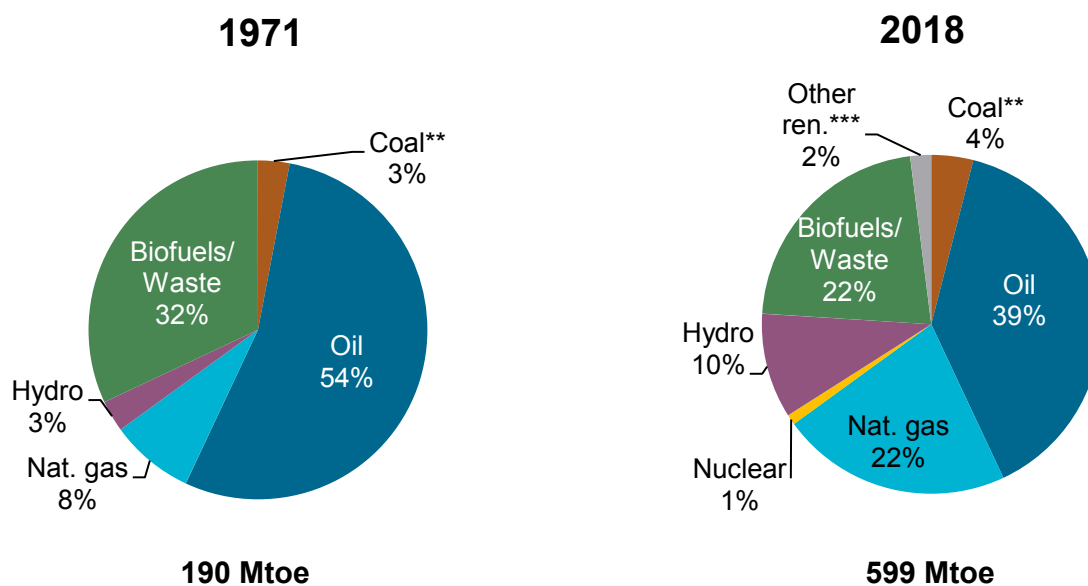
In Colombia, which accounted for 96% of the region's coal, production decreased by 6.9% in 2018 compared to 2017 and reached 55 Mtoe. Total production in the region reached 57 Mtoe, a decrease of 7.1%, in the wake of a stable production in Brazil, the second biggest producer, and decreases of 60% in Venezuela and 30% in Peru, third and fourth producers respectively.

In Venezuela, crude oil production declined for the fifth year in a row, reaching 91 Mtoe in 2018 (-25%): Brazil maintained its position as the biggest crude oil producer of non-OECD Americas after taking the top spot in 2017. Its crude oil production, 40% of the region's 2018 production, decreased for the first time since 2013 though. In 2018 it reached 138 Mtoe, a decrease of 1.4% compared to 2017.

The region's natural gas production decreased slightly in 2018 (-1.7%), although the two biggest producers, Argentina and Trinidad and Tobago, increased theirs (+2.5% and +7.7% respectively). This production increase was indeed offset by lower production in some of the region's other main providers, Brazil (-8%, the first decrease since 2009), Venezuela (-13%) and Bolivia (-7%).

Overall, the energy mix in non-OECD Americas in 2018 was similar to 2017: oil provided the biggest share of TES in the region (39%), followed by natural gas (22%) and biofuels and waste (22%).

**Total energy supply\* by fuel in non-OECD Americas**



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\* Excluding electricity trade.

\*\* In this graph, peat and oil shale are aggregated with coal.

\*\*\* Includes geothermal, solar thermal, solar photovoltaic and wind.

Source: IEA World Energy Balances, 2020.

**Between 1971 and 2018, natural gas and hydro energy supply grew at the expense of oil and biofuels and waste.**

In 2018, 33% of non-OECD Americas TES came from renewables, compared to 14% globally. Following six consecutive years of growth, biofuels increased again

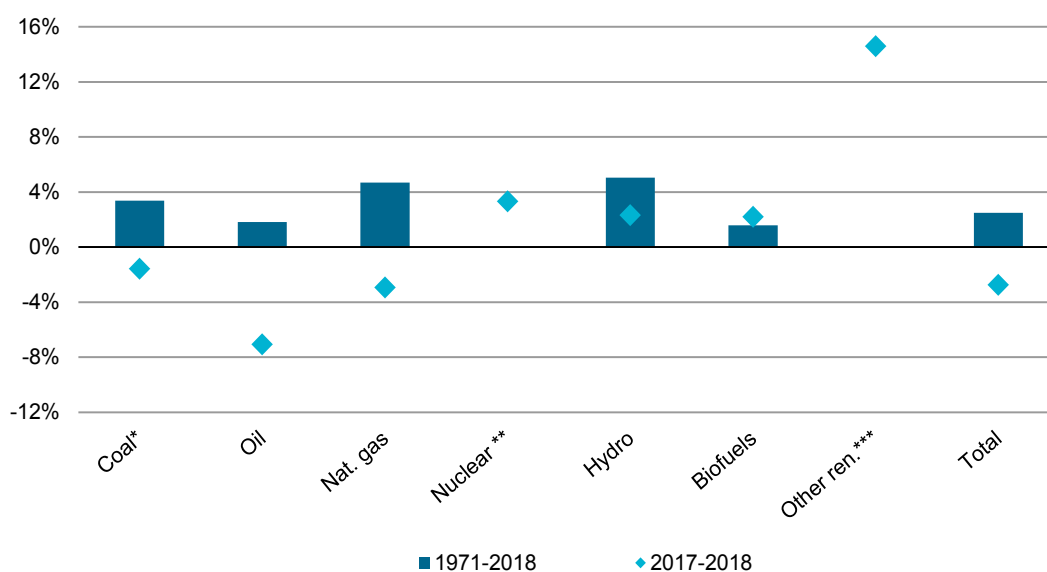
by 2.2% in 2018. While primary solid biofuels in the region only accounted for 9% of global TES in 2018, liquid biofuels use was much more significant, particularly in Brazil. The country alone accounted for 21% of the global TES of liquid biofuels in 2018.

Hydro accounted for 57% of total non-OECD Americas power generation in 2018, a much higher share than globally (16%). Hydro primary energy supply increased by 2.3% in 2018, mostly caused by a strong increase in Brazil (+4.9%). However, it decreased in the other three producers of the top four in the region– Colombia (-2.4%), Paraguay (-0.8%) and Venezuela (-3.9%).

In 2018, the energy production and therefore regional supply of other renewables (solar thermal, solar photovoltaic, wind, geothermal), increased by 15% compared to 2017, led by a +18% production increase in Brazil, the biggest producer of other renewables in the region.

Coal only accounted for 4% of non-OECD America’s TES in 2018 and it declined by 1.6% due to decreases of -9.9% in Colombia and -2.2% in Brazil.

#### Annual change in TES by fuel in non-OECD Americas



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\* In this graph, peat and oil shale are aggregated with coal.

\*\* There was no nuclear production in 1971.

\*\*\* Includes geothermal, solar thermal, solar photovoltaic and wind. There was no production of other renewables in 1971.

Source: IEA World Energy Balances, 2020.

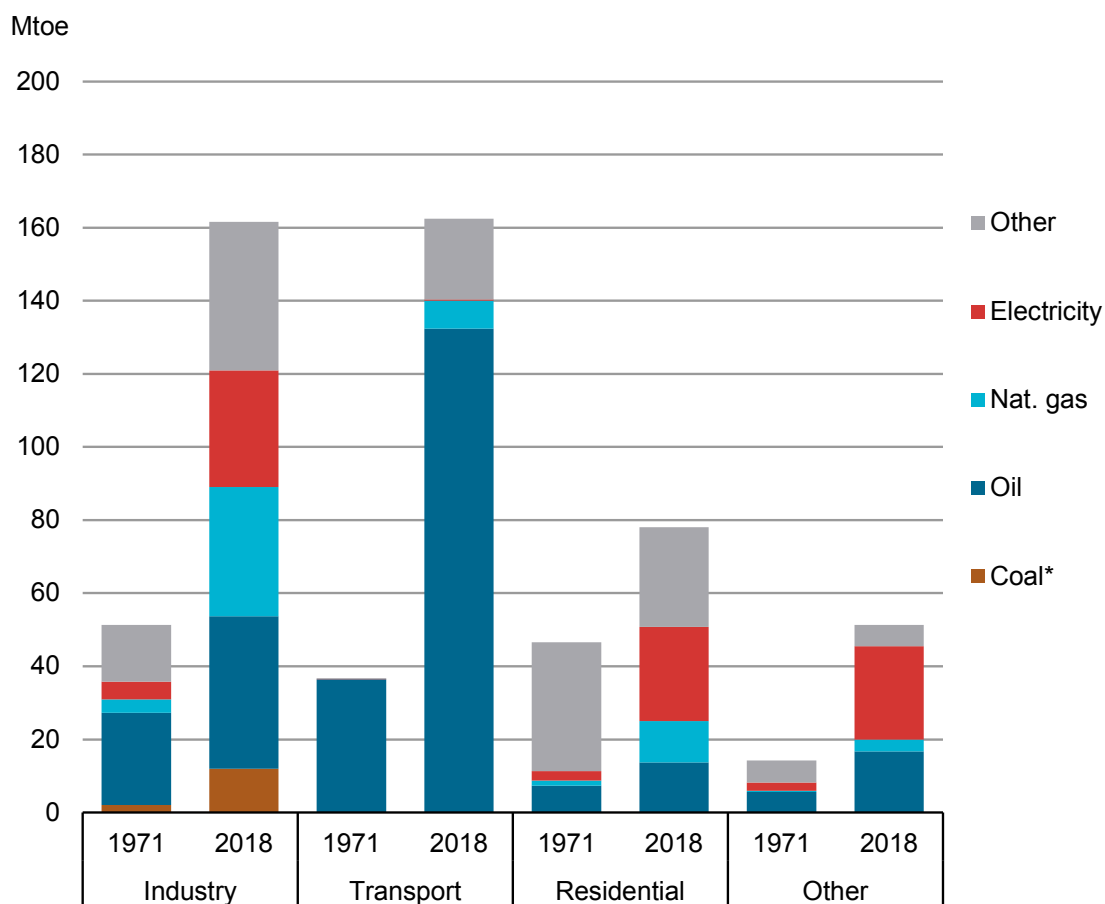
**In 2018, the energy supply of other renewables increased by 15% in non-OECD Americas, led by a +18% production increase in Brazil.**

There are only two countries in non-OECD Americas with nuclear power, Brazil and Argentina. A recovery in Argentina (+13%), caused by higher capacity utilization in 2018, resulted in a 3% increase overall in the region.

In 2018, transport slightly surpassed industry as the biggest energy-consuming sector. With a share of 36% each, both sectors consume more than twice the energy used in residential (17%). Industry final consumption, including non-energy use, increased from 51 Mtoe in 1971 to 162 Mtoe in 2018. However, it is in the transport sector that the energy final consumption increased the most: it multiplied by more than four times since 1971. Residential consumption nearly doubled over the period, and ranked third in 2018.

In 1971, oil accounted for half of total final consumption (TFC) in non-OECD Americas, and it peaked at 55% in 1979 before the second oil crisis. However, the increasing role of electricity and gas in the residential and the industry sectors lead to a slowly diminishing share of oil in TFC, which reached 45% in 2018. The share of electricity has almost tripled during that period, reaching 18% in 2018. Natural gas consumption (including non-energy use) increased from less than 4% to 13%, mainly driven by industry (from 7% to 22%) and residential (from 3% to 15%) use.

### Total final consumption by sector and fuel in non-OECD Americas



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\* In this graph, peat and oil shale are aggregated with coal.

Non-energy use included in industry.

Source: IEA World Energy Balances, 2020.

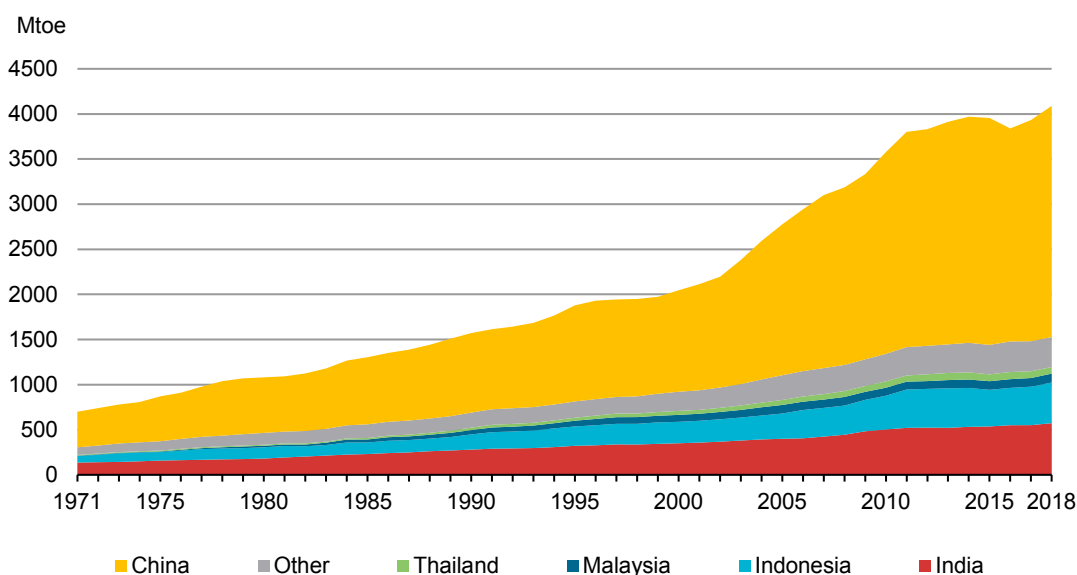
**In 2018 industry and transport were on par in terms of energy final consumption in non-OECD Americas.**



# Non-OECD Asia

Since the early 1990s non-OECD Asia has been the second largest energy-producing region in the world behind the OECD, accounting for 28% of global production in 2018 with 4 089 Mtoe. China<sup>7</sup> alone provided 63% of energy production in the region in 2018, a share slightly above that of 2017. India and Indonesia together accounted for a quarter of the region's production (14% and 11% respectively).

## Energy production by country in non-OECD Asia



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Source: IEA World Energy Balances, 2020.

## China alone provided 63% of energy production in non-OECD Asia in 2018.

In 2018, non-OECD Asia's total energy supply (TES) increased at an even higher rate compared to previous years (+4.1% in 2018, after +3.3% in 2017 and +0.6% in 2016). The strong decoupling from the economic growth observed in 2016 seems to shrink, as in the meantime GDP at Purchasing Power Parity<sup>8</sup> increased by 6.2% in non-OECD Asia in 2018, after 6.4% in both 2016 and 2017.

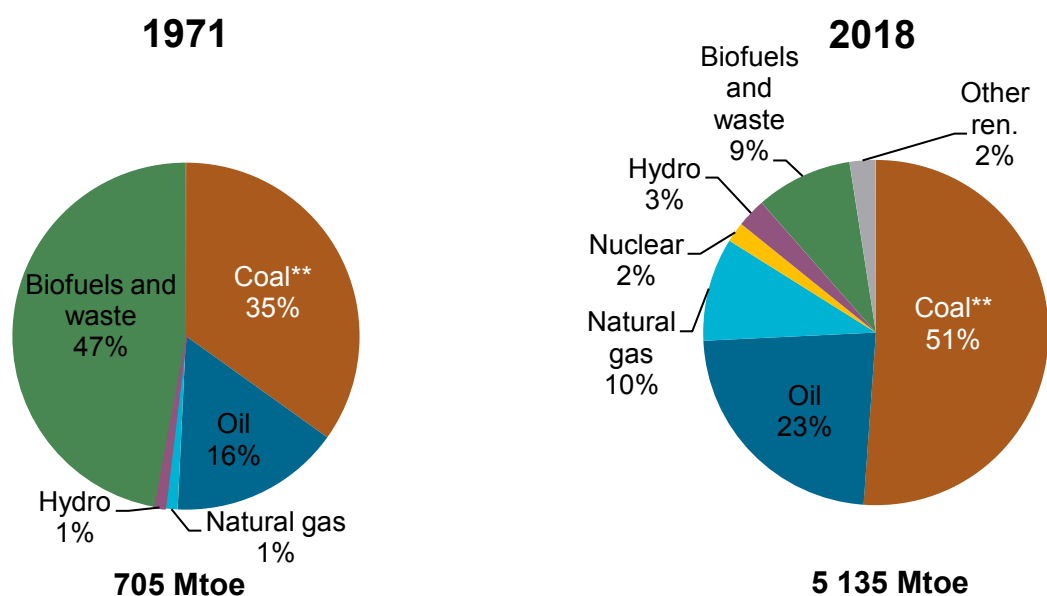
<sup>7</sup> Throughout the "Non-OECD Asia" chapter, China stands for People's Republic of China.

<sup>8</sup> With 2015 base year.

In 2018, non-OECD Asia accounted for 36% of global TES. Since its production does not cover its demand, the region is a net importer. China and India are both energy dependent, with self-sufficiency ratio<sup>9</sup> of 80% and 62%, respectively, in 2018. While China was once self-sufficient with a peak at 108% in 1985, India reached its highest self-sufficiency rate of 96% in 1984. As for Indonesia, it covered 195% of its energy needs in 2018. The country’s self-sufficiency ratio slightly increased in 2018, after it had continuously decreased since 2013, when it became a net importer of crude oil.

Over the decades, the fuel mix of the region has changed drastically. Coal has been by far the main energy source in non-OECD Asia since 2012, supplying more than half of its energy demand in 2018, compared to 27% globally. This is also the case in the main energy-consuming countries in the region. In 2018, the share of biofuels in non-OECD Asia TES decreased to 9% - compared to 47% in 1971. Natural gas has reached 10% of TES, from negligible in 1971.

**Total energy supply\* by fuel in non-OECD Asia**



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\* Excluding electricity trade.

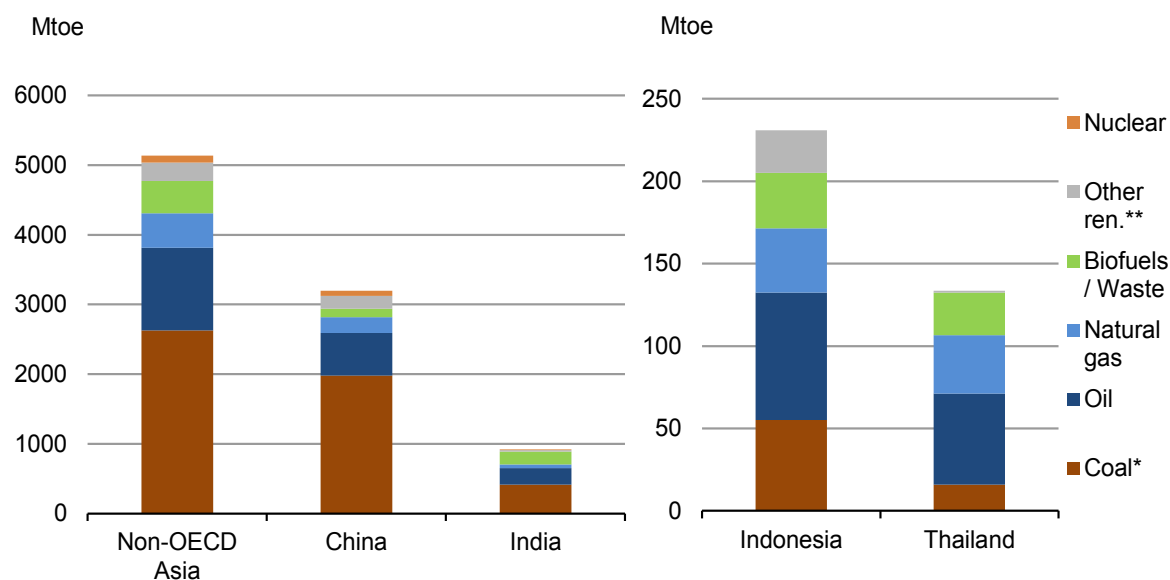
\*\* In this graph, peat and oil shale are aggregated with coal.

Source: IEA World Energy Balances, 2020.

**In slightly less than five decades, the fuel mix of non-OECD Asia changed drastically, with biofuels and waste being replaced by coal.**

<sup>9</sup> Measured by production over TES.

### TES by fuel and by country in 2018 in non-OECD Asia



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\* In this graph, peat and oil shale are aggregated with coal.

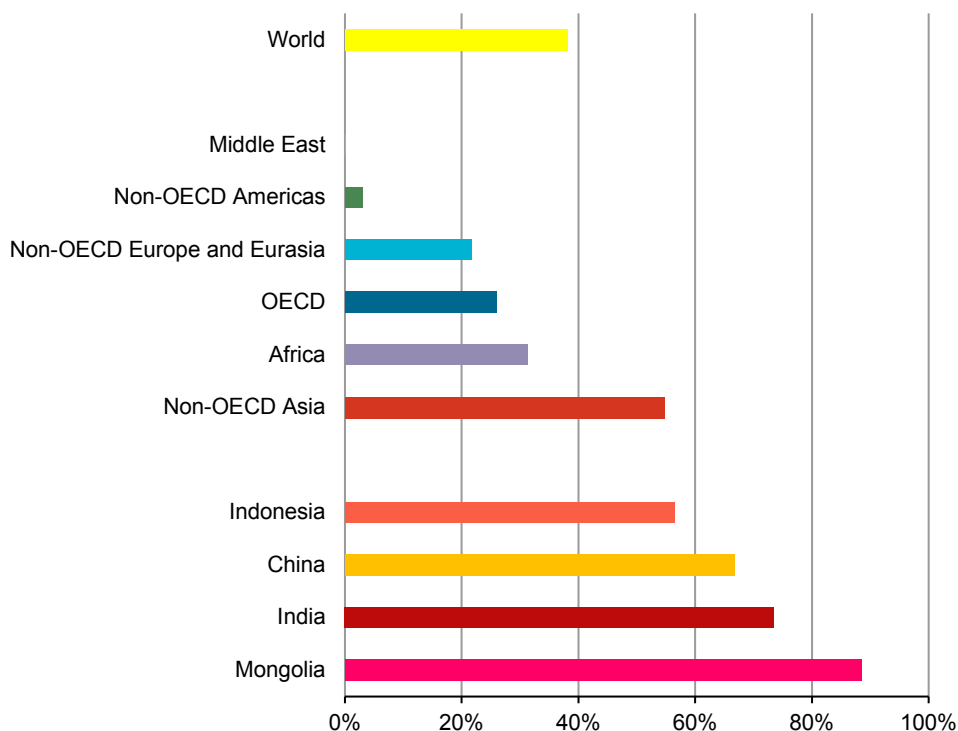
\*\* Includes geothermal, hydro, solar thermal, solar photovoltaic and wind.

Source: IEA World Energy Balances, 2020.

### In 2018, coal is the top fuel used in most of the biggest energy-consuming countries in non-OECD Asia.

Coal's role in non-OECD Asia's energy system is partly explained by power generation: in 2018, it represented 63% of the regional electricity mix, versus 38% globally. Coal provided 73% of electricity in India, 67% in China and 56% in Indonesia. The country mostly relying on coal for power in the region is Mongolia (88% in 2018). In China, the power mix is gradually shifting from coal to other fuels though (natural gas, nuclear, renewables).

### Share of coal in electricity generation in 2018



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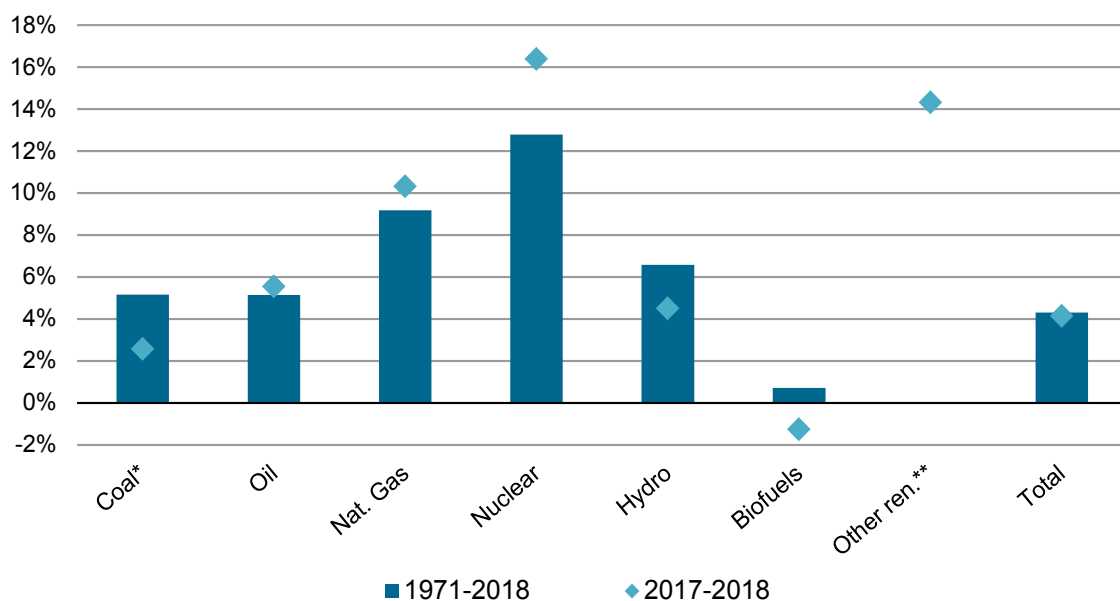
Source: IEA World Energy Balances, 2020.

### In 2018, coal is the leading fuel in electricity generation in non-OECD Asia, driven by the largest countries.

In 2018, electricity generation in non-OECD Asia increased by 7.5%, driven by China (+8.3%, with 7 149 TWh produced) and India (+4.2%, 1 583 TWh produced). Power production has grown in the region at an average annual rate of 8% since 1971.

In 2018, nuclear energy was the main driver of energy supply growth (driven by China which contributed to 90% of the region’s nuclear TES growth in 2018), followed by other renewables (geothermal, solar photovoltaic, solar thermal and wind). The use of coal, oil, gas and hydro also increased in 2018. Only that of biofuels decreased.

### Annual growth in TES by fuel in non-OECD Asia



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\* In this graph peat and oil shale are aggregated with coal.

\*\* Includes geothermal, solar thermal, solar photovoltaic and wind.

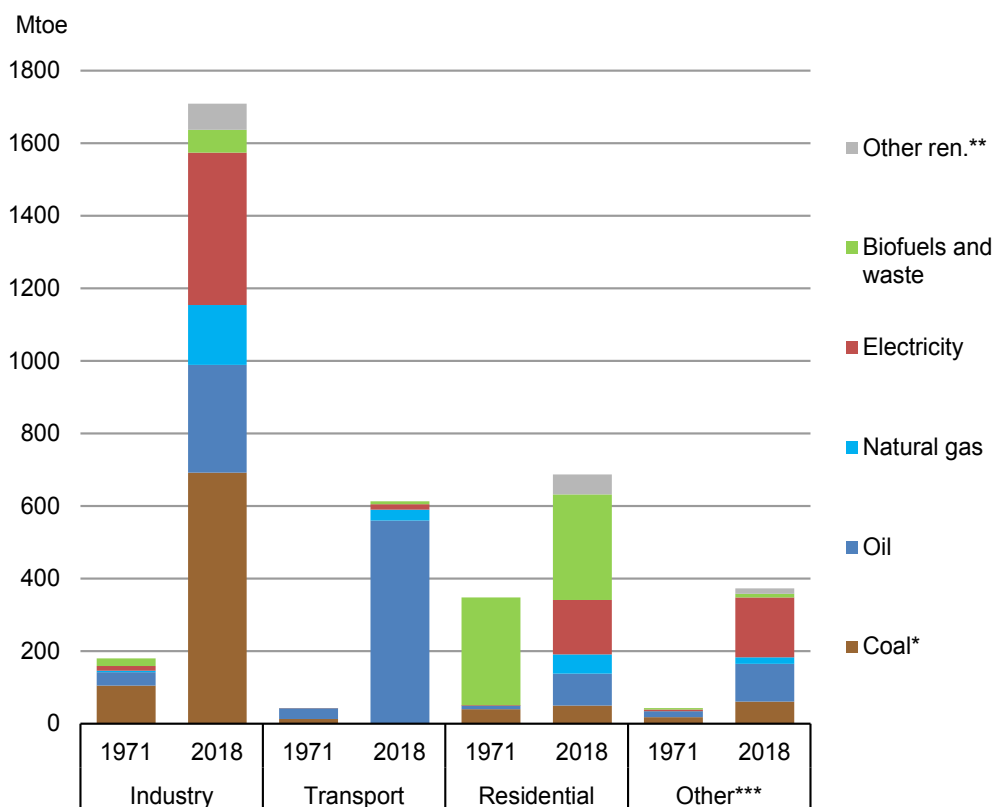
Source: IEA World Energy Balances, 2020.

### In 2018, non-OECD Asia total energy supply grew strongly for most energy sources except the biofuels and waste.

Total final consumption (TFC) in non-OECD Asia has increased by more than five times since 1971 and the mix has changed considerably. The oil's TFC has doubled, in relative terms (from 15% to 31%), becoming the most consumed fuel in the region, followed by coal (24% of TFC). The share of electricity rose from 3% to 22%. That of traditional biofuels (biomass, waste) has fallen to a fifth of its 1971 level (53% of total energy consumption in 1971 compared to 11% in 2018).

With a nine-fold increase, industry (non-energy use included) is by far the biggest energy-consuming sector in non-OECD Asia, representing 51% of the region's TFC in 2018.

### Total final consumption by sector and fuel in non-OECD Asia



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\* In this graph peat and oil shale are aggregated with coal.

\*\* Includes direct use of geothermal, solar thermal and heat.

\*\*\* Includes non-energy use.

\*\*\*\* Includes consumption in commercial and public services, agriculture, fishing and other non-energy use.

Source: IEA World Energy Balances, 2020.

### With a nine-fold increase, industry was the biggest energy-consuming sector in non-OECD Asia, representing 51% of the region's TFC in 2018.

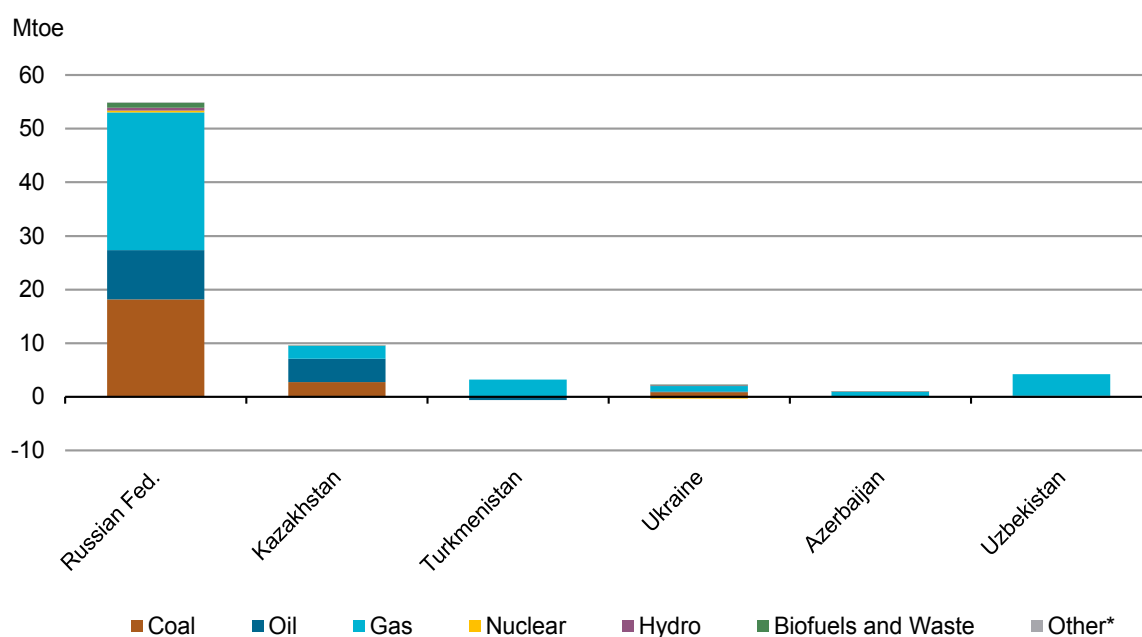
Coal is still the main fuel consumed in industry (41% in 2018). However, its share in the sector is decreasing, replaced by electricity (25%).

The residential sector is the second largest consumer behind industry (20% of the region's TFC). The sector still mainly consumes biofuels and waste (42%). However, electricity, oil and natural gas have significantly increased. The transport sector comes in the third position (18%) but it is the fastest increasing sector: energy consumption has multiplied 14 times since 1971, and it is largely relying on oil.

# Non-OECD Europe and Eurasia

In 2018, total energy production in non-OECD Europe and Eurasia increased by 3.9% (+75 Mtoe), a growth above the world average of 3.2% and third after OECD (+4.8%) and non-OECD Asia (+4%). As in previous years, the growth was largely driven by a 3.8% (+55 Mtoe) rise of energy production in the Russian Federation (Russia), which represented about 75% of the region’s energy production. Production of natural gas, coal and crude oil all grew in Russia between 2017 and 2018 (by 26 Mtoe, 18 Mtoe and 9 Mtoe, respectively). To a lesser extent, all the other major energy producers in the region also reported a surge in production, especially Kazakhstan and Uzbekistan.

**Top producers annual change in production in 2018 in non-OECD Europe and Eurasia**



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\*Other includes hydro, geothermal, solar, wind and heat.

Source: IEA World Energy Balances, 2020.

## Russia was by far the top energy producer in non-OECD Europe and Eurasia, leading in all fossil fuels productions.

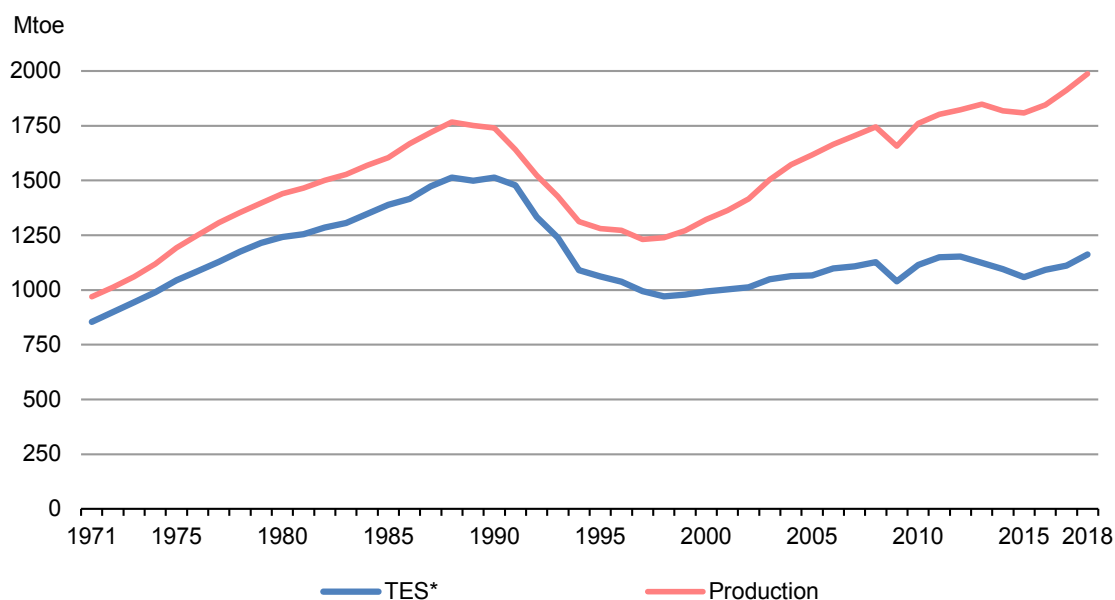
In 2019, Russia was the second largest producer of natural gas and remained the first net exporter globally (respectively 675 bcm and 239 bcm). Furthermore, Russia

overcame Saudi Arabia at the second place in crude oil production with 560 Mt. It was also the sixth largest producer and third net exporter of coal (respectively 419 Mt and 190 Mt).

Turkmenistan held the seventh place in the list of largest natural gas net exporters and Kazakhstan ranked ninth in the top coal net exporters.

Energy production is not evenly distributed across non-OECD Europe and Eurasia. The region as a whole is energy self-sufficient: its self-sufficiency ratio was 171% in 2018. However, it includes some of the most energy import-dependent countries in the world: in 2018, Malta's energy production covered only 3% of its consumption, Cyprus' 7% and Belarus' 15%. In contrast, Azerbaijan and Turkmenistan produced about four and three times more energy than they consumed, respectively.

### Energy production and supply in 1971-2018 in non-OECD Europe and Eurasia



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\*Total Primary Energy Supply; excludes electricity trade.

Source: IEA World Energy Balances, 2020.

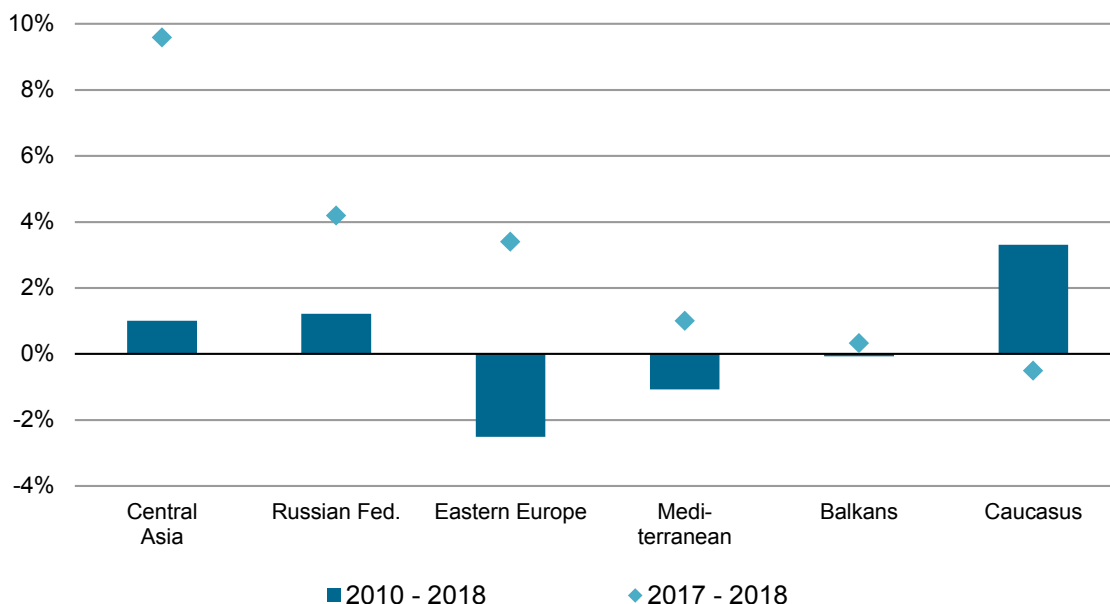
### Over the last five decades, energy production grew quicker than demand in non-OECD Europe and Eurasia.

In 2018, the total energy supply (TES) in non-OECD Europe and Eurasia increased by 4.5% (50 Mtoe), consolidating the upward trend which started in 2016. At sub-regional level, substantial differences emerged between the highest growth countries of Central Asia (+9.6%), Russia (4.2%) and Eastern Europe (3.4%) on the one



hand, and the Mediterranean (+1%), Balkans (+0.3%) and Caucasus (-0.5%) on the other hand. The growth of energy consumption in 2018 contrasts with the general trend of the preceding decade.

### Annual average change in total energy supply by sub-region in non-OECD Europe and Eurasia



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**Balkans** is Albania, Bosnia and Herzegovina, Croatia, Kosovo, Montenegro, Republic of North Macedonia and Serbia.

**Caucasus** is Armenia, Azerbaijan and Georgia.

**Central Asia** is Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

**Mediterranean** is Cyprus, Gibraltar and Malta.

**Eastern Europe** is Belarus, Bulgaria, Moldova, Romania and Ukraine.

Note: Estonia, Latvia, Lithuania and Slovenia are OECD members.

Source: IEA World Energy Balances, 2020.

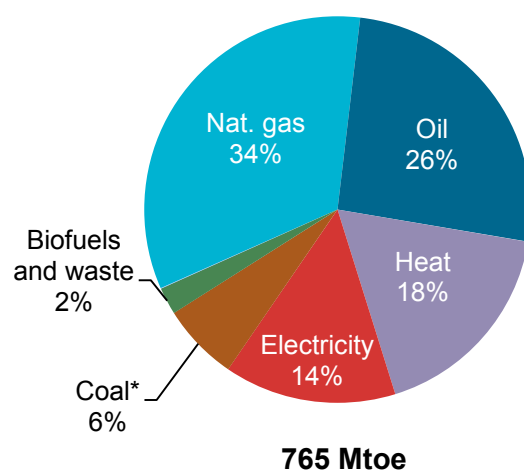
**In 2018, non-OECD Europe and Eurasia was the region where total energy supply grew the most. Energy supply increased strongly in Central Asia and Russia whereas it was stable in the Balkans and Caucasus.**

At the national level, Russia's TES increased by 4% (31 Mtoe) between 2017 and 2018. The total energy supply also rose significantly in Ukraine, Kazakhstan and Uzbekistan, the second, third and fourth largest energy consumers in the region (+5%, +15% and +6%, respectively).

Total final consumption grew by 4% in 2018 (+31.5 Mtoe), reaching 765 Mtoe. Most of the increase came from the residential sector (+12%) and road transport which almost reached 100 Mtoe (+7%), whereas the industry's final consumption for energy purposes dropped by 5% (-10 Mtoe) vis a vis 2017.

In 2018, natural gas was the most commonly used fuel in the regional total final consumption (34%), followed by oil (26%), heat (18%) and electricity (14%). Coal came only fifth, with 6% of the region's total final consumption (TFC), compared to 10% globally. Finally, about 4 Mtoe of biofuels and waste were consumed, equivalent to only 2% of total final consumption in non-OECD Europe and Eurasia in 2018 against a global share of 53%.

### Total final consumption by fuel in 2018 in non-OECD Europe and Eurasia



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\*Coal includes peat and oil shale.

Source: IEA World Energy Balances, 2020.

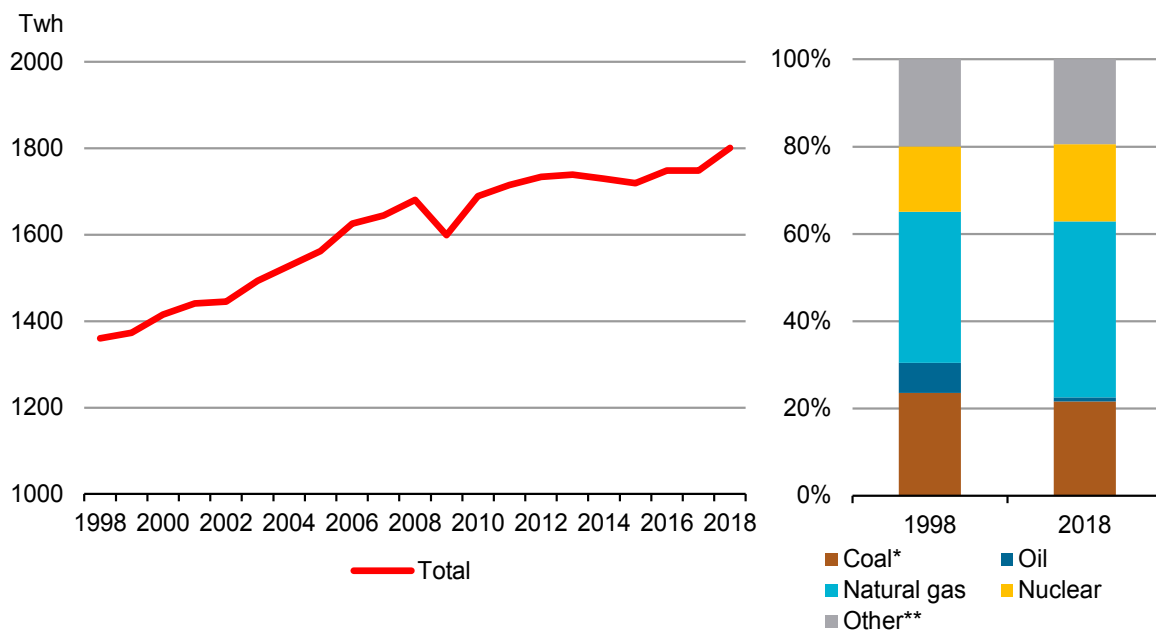
### In 2018, natural gas accounted for more than a third of total final consumption of energy in non-OECD Europe and Eurasia.

The regional electricity mix in 2018 was dominated by natural gas (40%), followed by coal (22%), and nuclear (18%) – shares which are stable since 2016. Non-OECD Europe and Eurasia was the second largest nuclear-producing region in the world after OECD, with Russia, Ukraine, Bulgaria, Romania, and Armenia producing 319 TWh (12% of world's nuclear generation).

Renewables, mostly hydropower, accounted for 19% of the regional electricity mix in 2018. Solar and wind electricity generation growth slowed down (+2.3% in 2018 compared to 12.4% in 2017) and it accounted only for 1% of regional electricity output.

Total power generation grew by 32% in the period 1998-2018. However, the power generation mix of the region was very stable over the same period, except for the decline of oil, which is also true worldwide.

**Electricity generation by source in 1998-2018 in non-OECD Europe and Eurasia**



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\*Coal includes peat and oil shale.

\*\*Other includes hydro, biofuels and waste, geothermal, solar, wind and heat.

Source: IEA World Energy Balances, 2020.

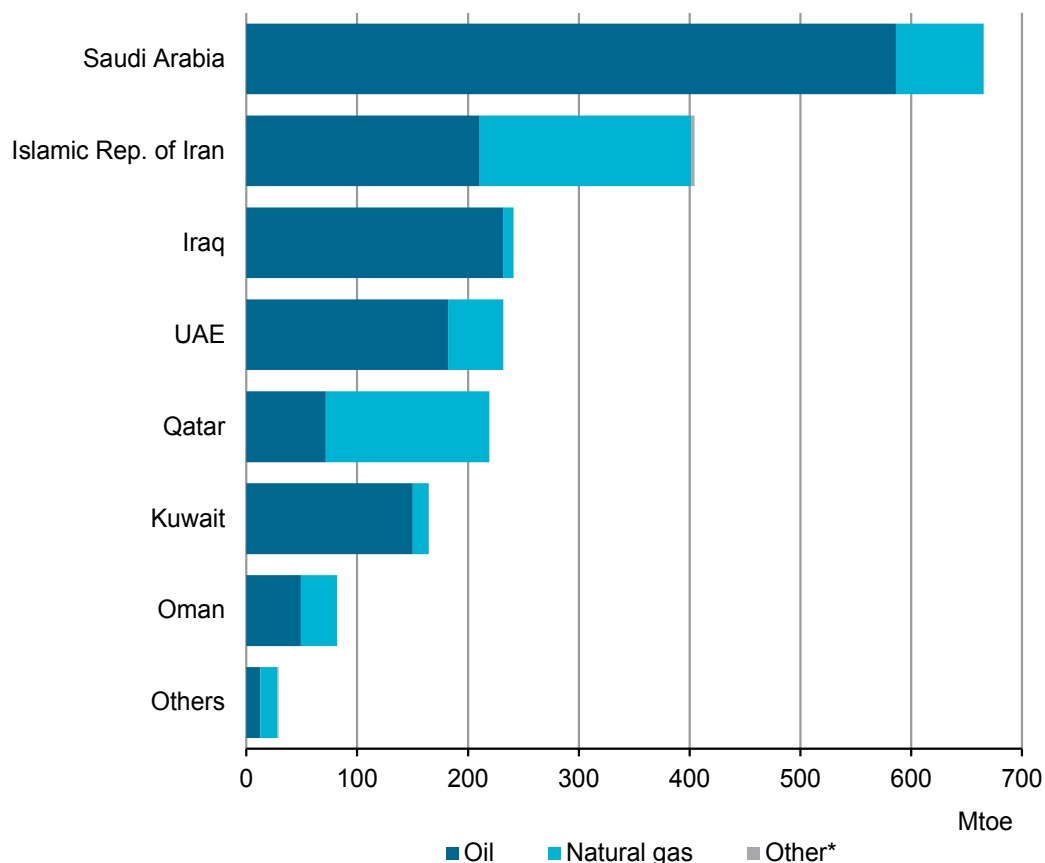
**As electricity generation increased by a third over the last 20 years, natural gas almost entirely replaced oil in the electricity mix of the region.**

# Middle East

With energy production around 2.7 times as large as its demand, and reaching 2,040 Mtoe in 2018 (+1.3% over 2017), the Middle East has the highest energy self-sufficiency ratio in the world. The region produced 14% of global energy in 2018, and more specifically 33% of global oil and 16% of the world's gas. The Middle East's global share of natural gas production has more than tripled since 1993, when it was 5% of world natural gas production.

Saudi Arabia was still by far the largest oil producer in the region in 2018 with 39%, followed by Iraq and Iran, with 16% and 14% respectively.

## Energy production in 2018 in the Middle East



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\*Includes coal, nuclear, hydro, other renewables, biofuels and waste.

Source: IEA World Energy Balances, 2020.

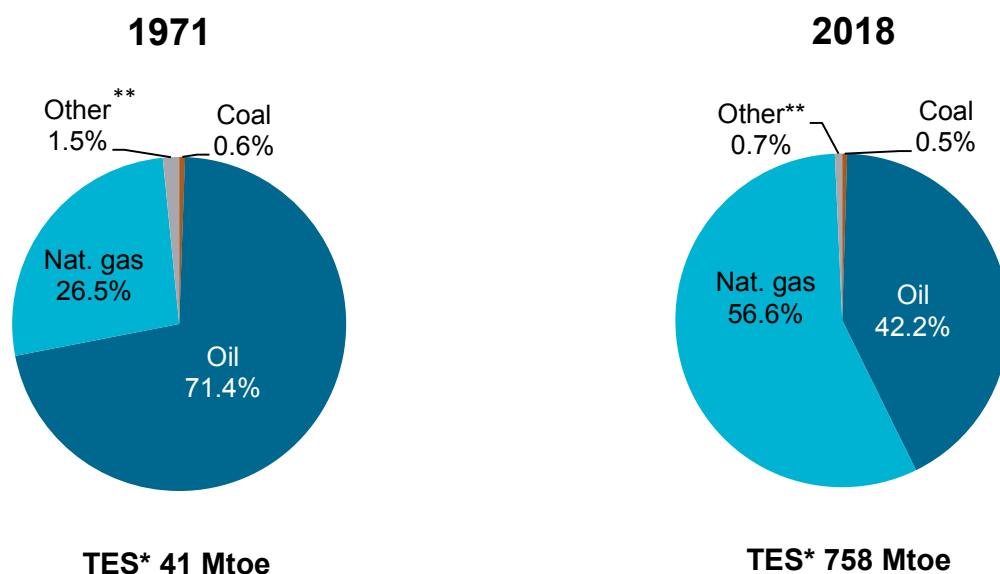
**In 2018, oil production grew strongly in Saudi Arabia and Iraq.**

In 2018, the oil production slightly increased in the region as a whole (+11 Mtoe and +0.7%). The biggest growth in oil production happened in Saudi Arabia (+17.5 Mtoe, +3.1%). With 586 Mtoe, the kingdom reached its second highest production since the 1970s, after the record set in 2016 (596 Mtoe). Oil production also notably grew in Iraq (+2.2%), which reached a record in its production at 232 Mtoe, in UAE (+1.6%) and in Kuwait (+1.2%). As for Yemen, its oil production increased for the second year in a row, by 16.5% in 2018, passing over 1.5 Mtoe after an almost continuous decrease for 15 years, from 22 Mtoe of crude oil produced in 2002 to less than 8 Mtoe in 2014, and less than 2 Mtoe per year since then. On the contrary oil production declined in Iran (-6.0%), and Qatar (-3.8%), but also in Bahrain (-1.0%) and Syria (-5.5%).

Natural gas production almost continuously increased in the Middle East since the 1970s, reaching 539 Mtoe in 2018 – 35 times more than in 1971, and five times more than in 1994. With 35% of the region's natural gas production (191 Mtoe), Iran maintained its position as the Middle East's top producer in 2018, followed by Qatar at 27%, with 147 Mtoe. Iran's natural gas production increased by 4.4% in 2018, a slower growth compared to 7.9% increase in 2017 and 8.6% in 2016. Meanwhile natural gas production in Qatar was stable for the second year in a row (-0.5% in 2018 after -0.4% in 2017). The third biggest natural gas producer in the Middle East is Saudi Arabia, where production has continuously increased and reached 79 Mtoe in 2018, setting a new record.

Energy demand in the Middle East, as measured by total energy supply (TES), increased by 0.7% in 2018 compared to 2017 and reached 760 Mtoe. Though TES has grown faster in all regions except non OECD Americas in 2018, Middle East is still the region where energy use have increased the most over the period from 1971 to 2018 (+6.4% per year – compared to +4.3% in non OECD Asia, the second fastest growing region). In 2018, this supply is almost exclusively based on oil and natural gas. Natural gas has partially displaced oil, more than doubling its share between 1971 and 2018.

### Total energy supply\* by fuel in the Middle East



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\*Excluding electricity trade.

\*\* Includes nuclear, hydro, other renewables, biofuels and waste.

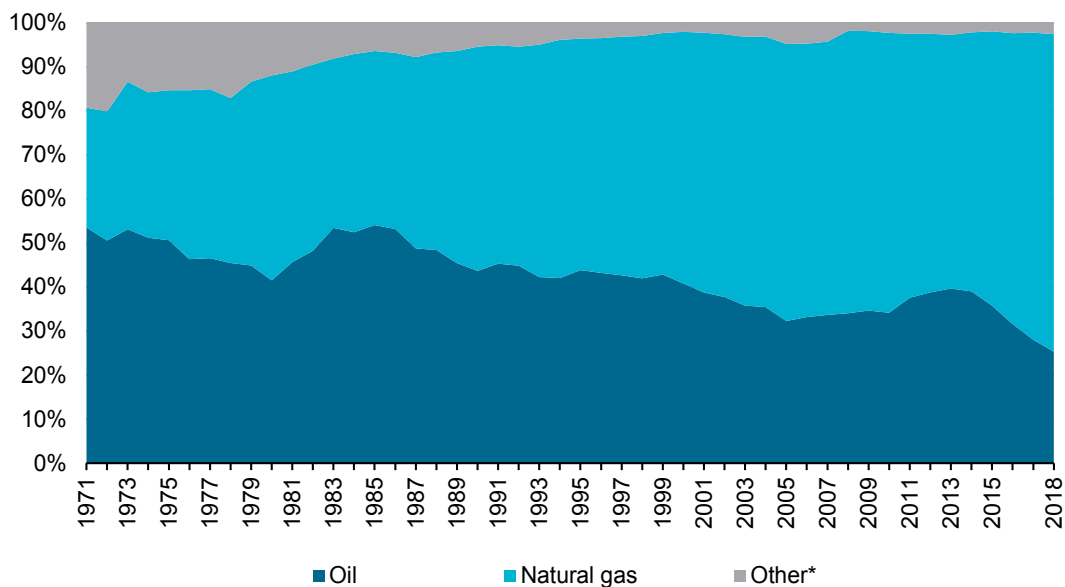
Source: IEA World Energy Balances, 2020.

### In less than five decades, the share of natural gas in the total energy supply of the Middle East doubled, displacing the share of oil.

Key factors driving the rapid development of natural gas in the Middle East are the petrochemical sector and power generation. Indeed the share of oil in electricity production continues to shrink, from 54% in 1971 to 25% in 2018.

In contrast, the share of natural gas in electricity production continually increased, from 27% to 72% in the same period (compared with 23% in 2018 at global level). In 2018, natural gas continued to provide all the electricity generated in Bahrain and Qatar, and more than 97% in the United Arab Emirates and Oman. In Iran and Jordan, natural gas's share in electricity generation reached 83% in 2018. In Jordan, this change has come swiftly, with natural gas generating less than 20% of the electricity up to 2002 and growing to 50% the next year, and 85% in 2016 after the LNG terminal in Aqaba started operating. Except in Lebanon, where electricity is still mainly generated from oil and a small share of hydro, and Yemen where it is dominated by oil (79%), natural gas represents at least half of power generation in each country of the region.

### Electricity generation by source in the Middle East



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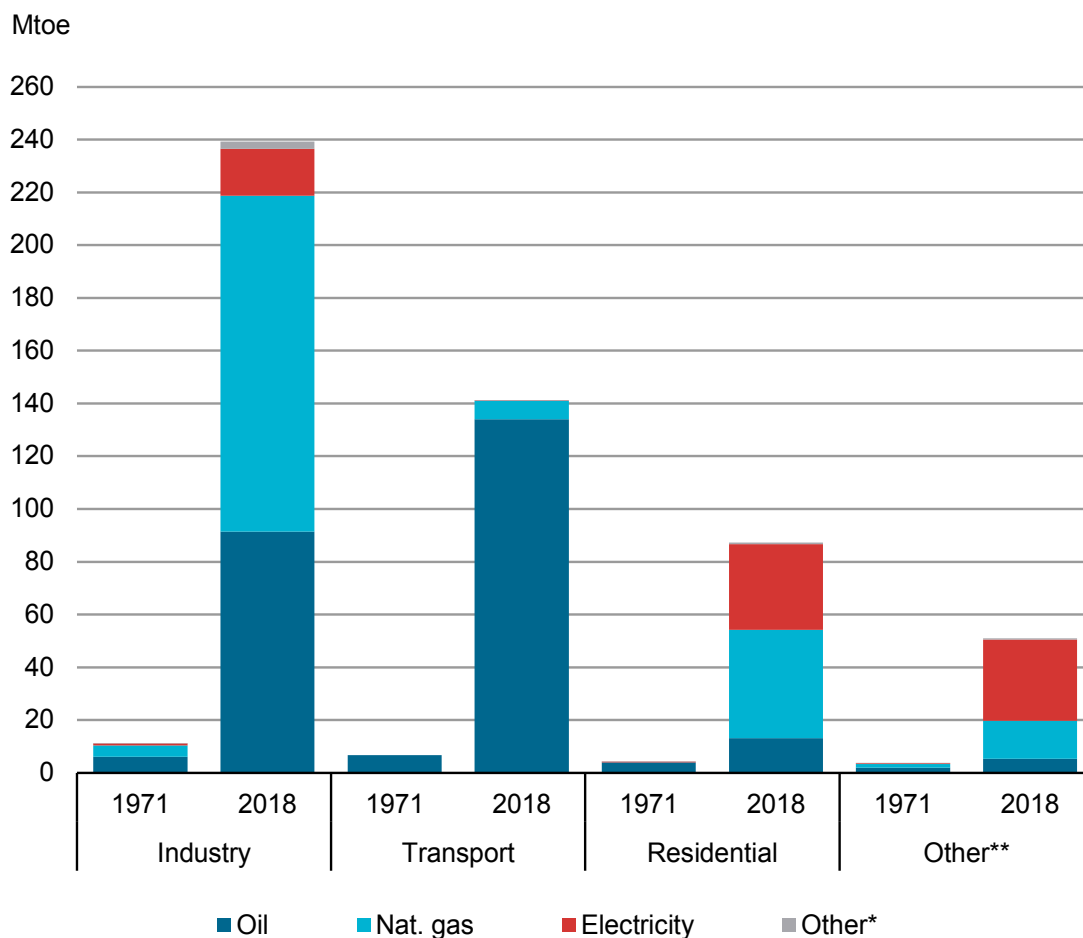
\*Includes coal, nuclear, hydro, other renewables, biofuels and waste.

Source: IEA World Energy Balances, 2020.

### The share of natural gas in the electricity mix of the Middle East accelerated since 2013.

Since 1971, total final consumption (TFC) increased twenty fold in most sectors, in particular industry, transport and residential and even more in commerce and services. In 2018, oil accounted for 47% of TFC in the Middle East – and more specifically for 95% in transport. On the contrary, oil provided only 38% of TFC in industry (non-energy use included), and and 15% in residential. In those sectors, natural gas met a higher share of TFC: 53% and 47%, respectively. Electricity almost tripled its share in final energy consumption from 5.6% in 1971 to 15.6% in 2018.

### Total final consumption by sector and fuel in the Middle East



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\*Includes coal, other renewables, biofuels and waste.

In this graph, non-energy use was classified with industry.

Source: IEA World Energy Balances, 2020.

**Since 1971, total final consumption (TFC) increased twenty fold in most sectors.**



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# INTERNATIONAL ENERGY AGENCY

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