2022 STATISTICAL REPORT

FuelsEurope

Editor: John Cooper

Designed by purebrand.be

FuelsEurope

2022 STATISTICAL REPORT

FOREWORD

High quality, verified and reliable facts and figures are essential to support economic and political analysis. For this purpose, FuelsEurope Statistical Report 2022 aims at providing a comprehensive set of statistics about the refining industry that can be used by all stakeholders.

This 2022 edition contains the most up-to-date information based on currently available data for the sector. One should, however, note that some of the data is updated every two or four years.

This includes global energy markets, oil products demand and international trade flows, fuel specifications, prices and margins, the integration with the petrochemical sector as well as the environmental performance of the EU refining industry.

In this year's edition, we have decided to include some graphs to show the EU import dependency in light of the impact of the Russian war on Ukraine.

John Cooper
Director General

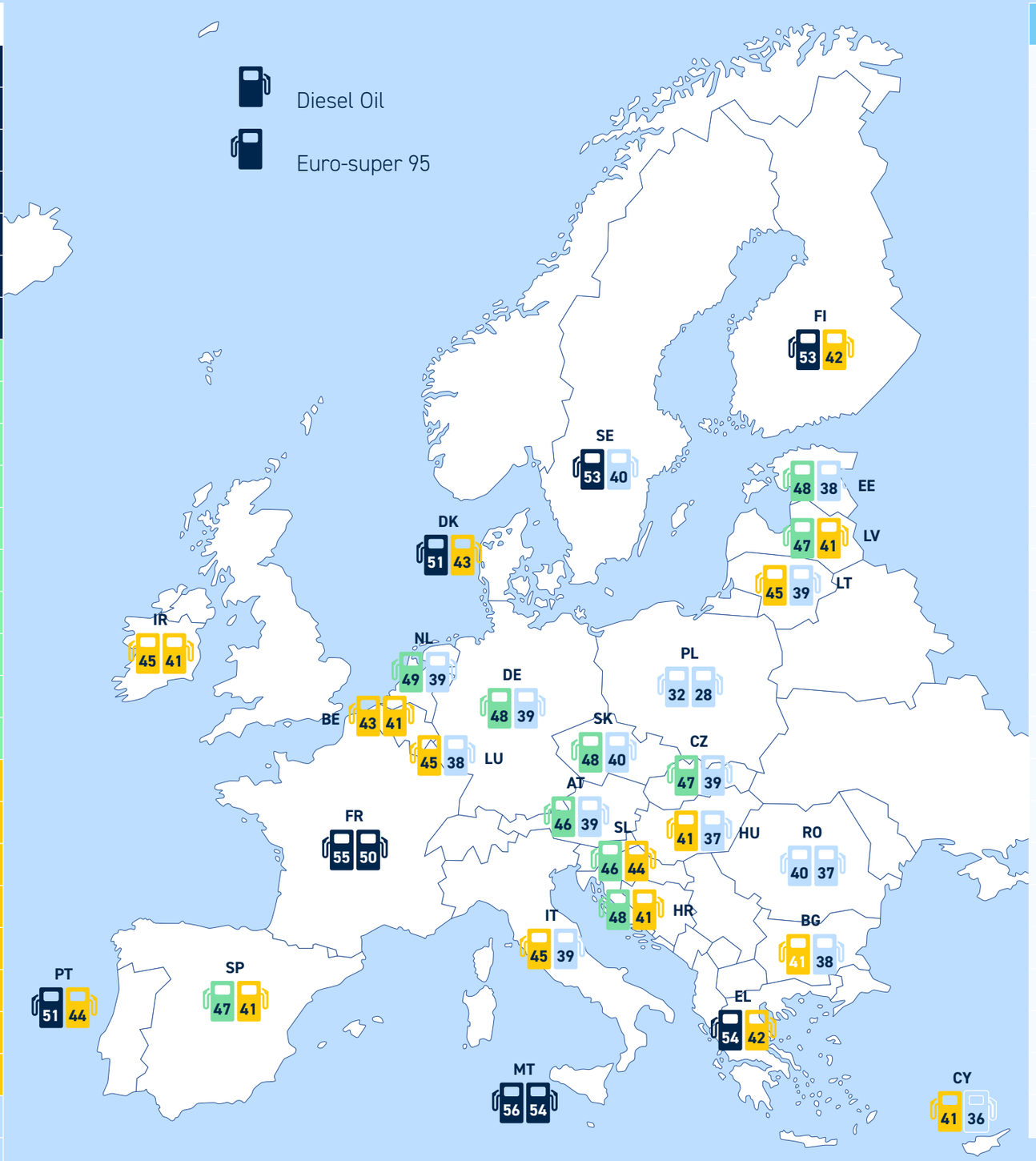
TABLE OF **CONTENTS**

Prices & Margins

FIG.01 TOTAL TAXATION SHARE IN THE END CONSUMER PRICE

Source: European Commission

COUNTRY	Euro-super 95
MALTA	56
FRANCE	55
GREECE	54
FINLAND	53
SWEDEN	53
PORTUGAL	51
DENMARK	51
NETHERLANDS	49
CROATIA	48
SLOVAKIA	48
GERMANY	48
ESTONIA	48
LATVIA	47
SPAIN	47
CZECHIA	47
SLOVENIA	46
AUSTRIA	46
IRELAND	45
ITALY	45
LITHUANIA	45
LUXEMBOURG	45
BELGIUM	43
BULGARIA	41
HUNGARY	41
CYPRUS	41
ROMANIA	40
POLAND	32



COUNTRY	Diesel Oil
MALTA	54
FRANCE	50
PORTUGAL	44
SLOVENIA	44
DENMARK	43
GREECE	42
FINLAND	42
BELGIUM	41
IRELAND	41
LATVIA	41
SPAIN	41
SLOVAKIA	40
SWEDEN	40
AUSTRIA	39
CZECHIA	39
GERMANY	39
ITALY	39
LITHUANIA	39
NETHERLANDS	39
BULGARIA	38
ESTONIA	38
LUXEMBOURG	38
HUNGARY	37
ROMANIA	37
CYPRUS	36
POLAND	28

Unit: Percentage
<40%
40% - >50%
<40% - 45%
50%

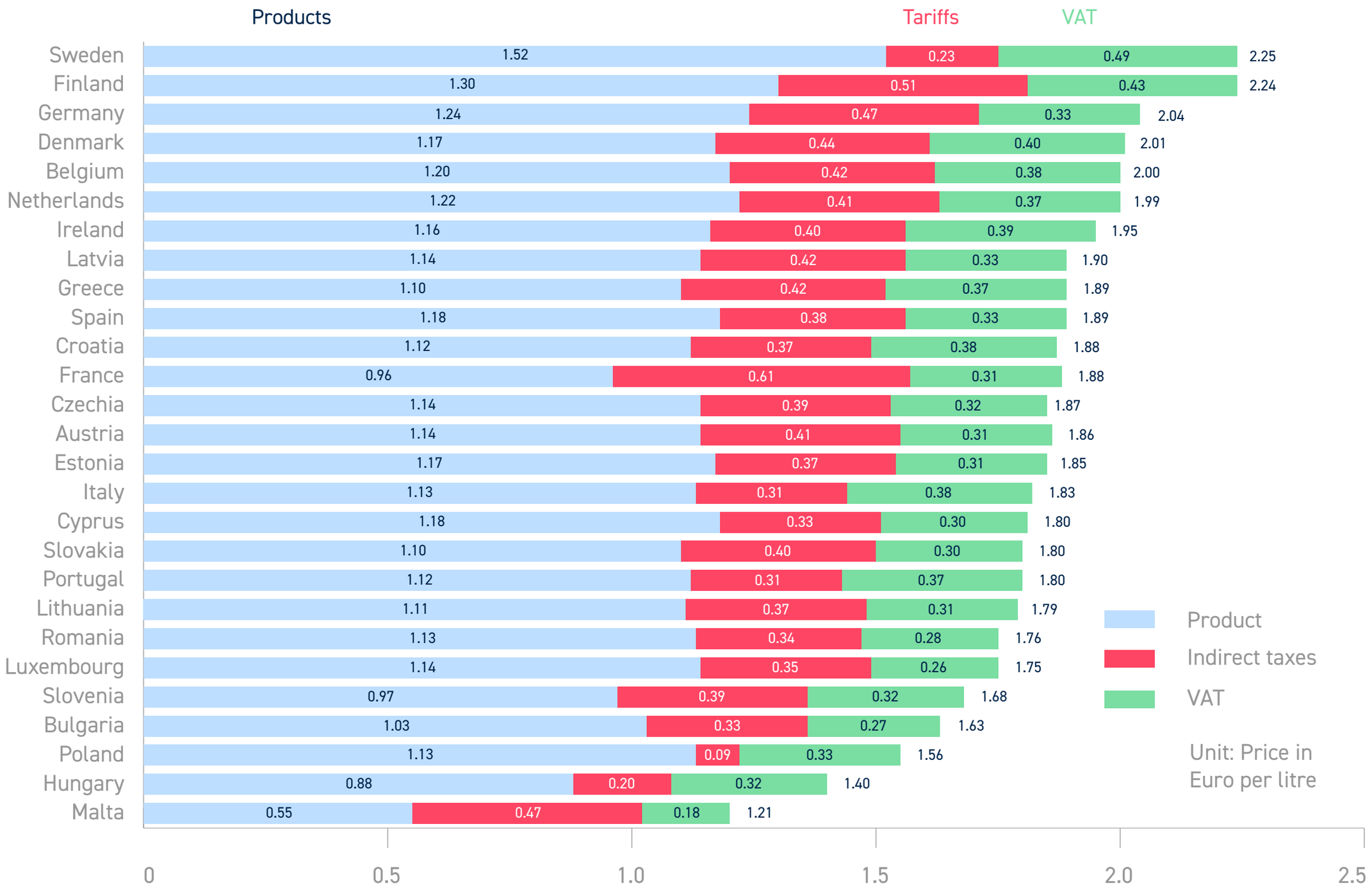
The price at the pump is driven to a large degree by tariffs and taxes and contribute substantially to Member States' revenues. On average, around half of the cost of fuel at the pump represents taxes.

The proportion of taxes is lower in 2022 than in 2021 due to surge in fuel prices following the Russian war on Ukraine, and as a result some countries have cut fuel taxes.

FIG.02

BREAKDOWN OF AUTOMOTIVE DIESEL PRICES
ACROSS EU-27 (MAY 2022)

Source: Oil Bulletin, European Commission

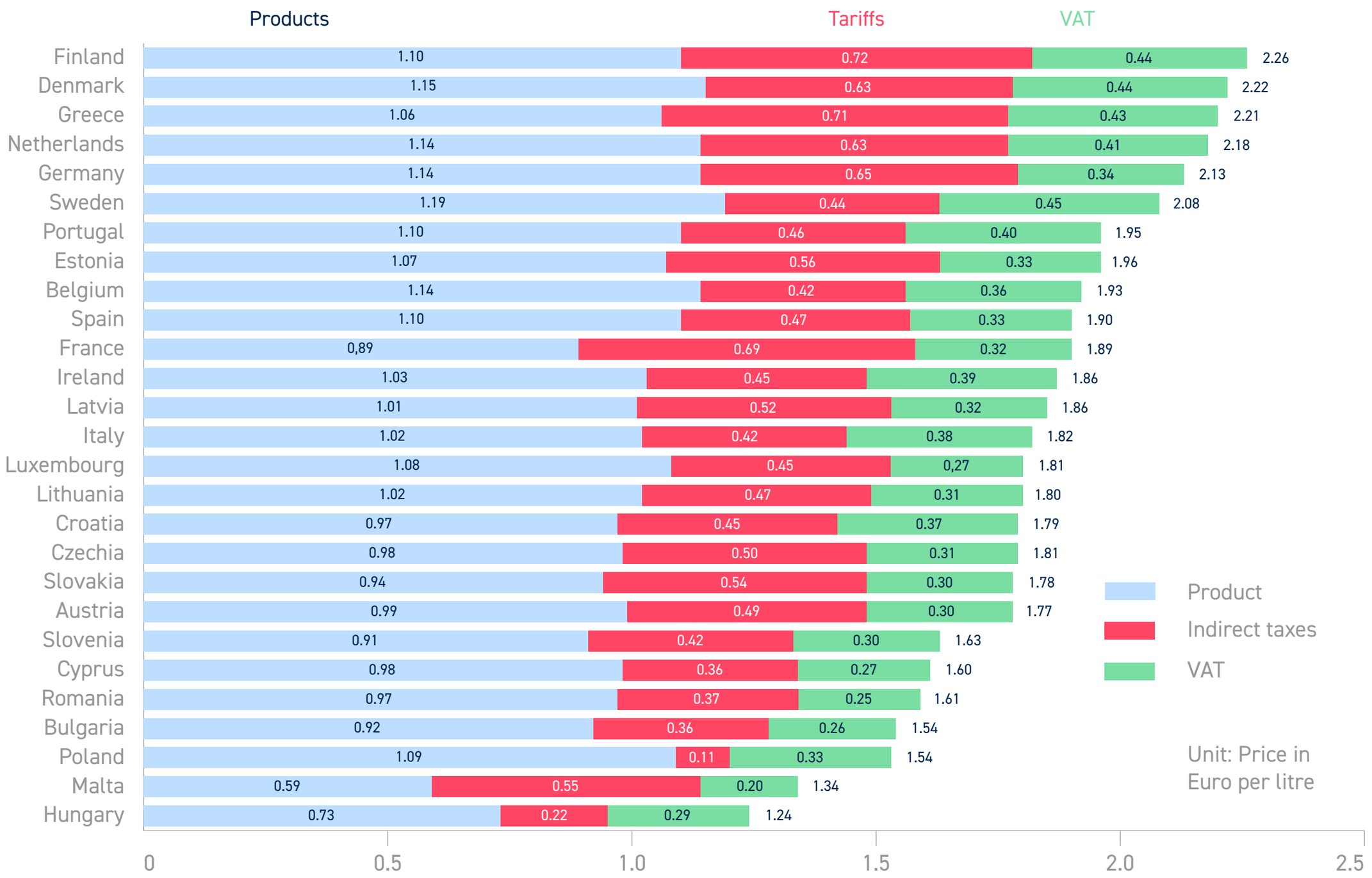


Gasoline prices were generally higher than diesel prices due to the higher tax element. While gasoline prices are still higher on average, we have witnessed that the gap has been significantly reduced. Only a fraction of the price paid at the pump contributes to the refiner's income, the remainder going to Member States and the purchasing of crude oil.

FIG.03

BREAKDOWN OF AUTOMOTIVE GASOLINE PRICES ACROSS EU-27 (MAY 2022)

Source: Oil Bulletin, European Commission

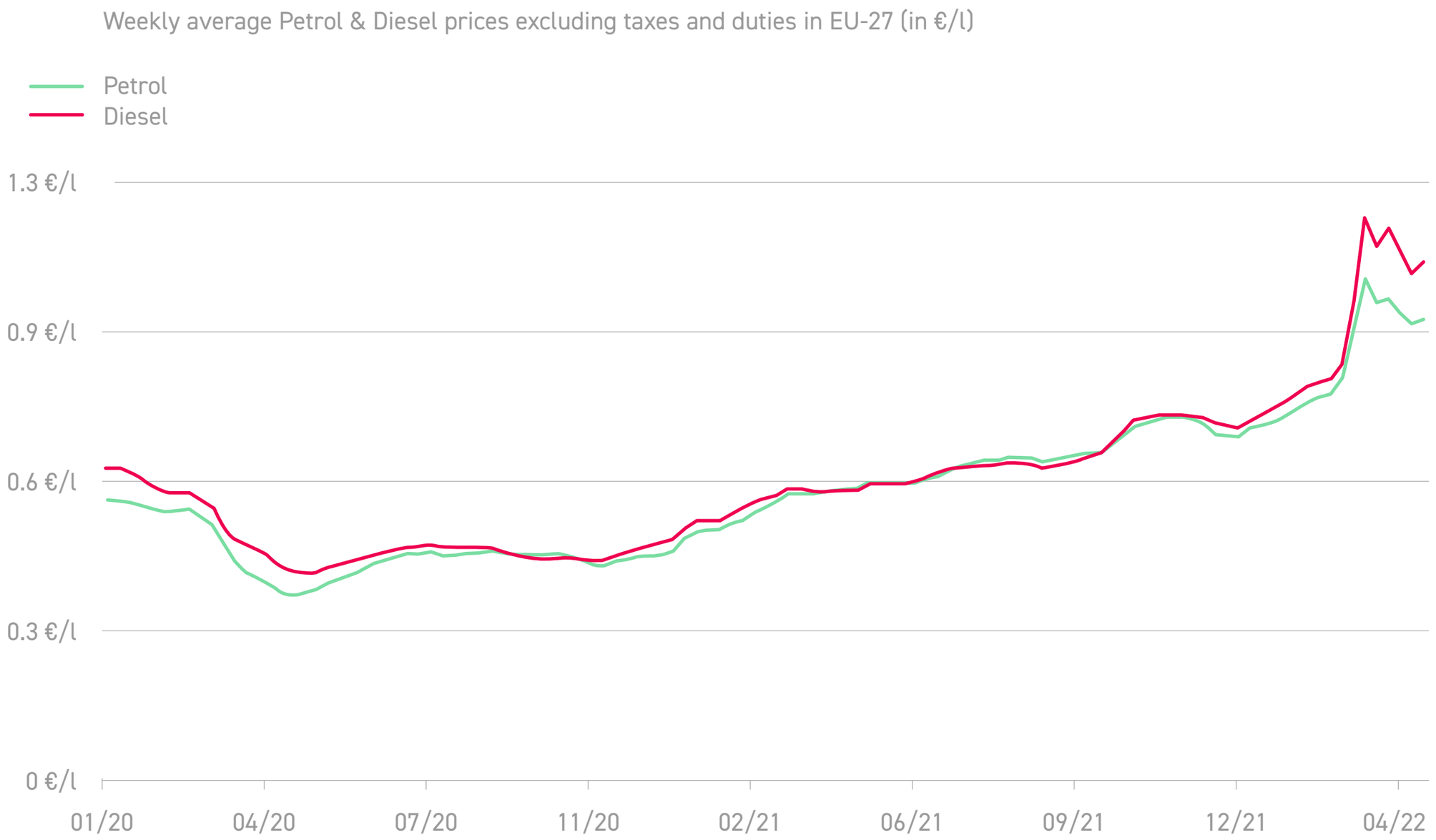


Gasoline prices were generally higher than diesel prices due to the higher tax element. While gasoline prices are still higher on average, we have witnessed that the gap has been significantly reduced. Only a fraction of the price paid at the pump contributes to the refiner's income, the remainder going to Member States and the purchasing of crude oil.

FIG.04a

GASOLINE AND DIESEL **UNTAXED PRICE DEVELOPMENT 2020-2022**

Source: Oil Bulletin, European Commission



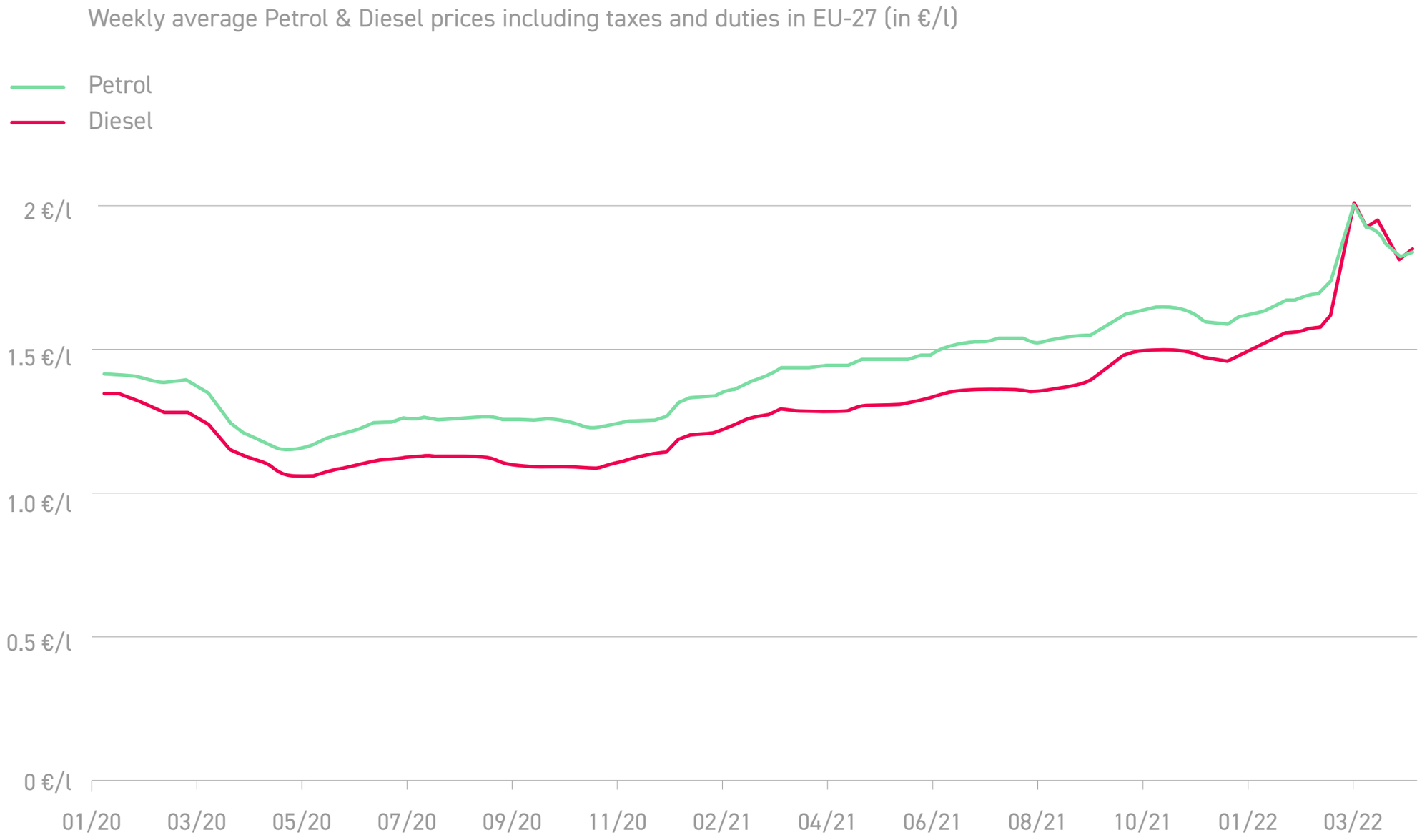
After a rapid decline in economic activity caused by the Covid-19 pandemic in 2020, petrol and diesel prices progressively went back up in 2021 due to increasing vaccination rates, loosening of pandemic-related restrictions, and a growing economy. Increasing demand and lower supply of oil resulted in consistent global petroleum and liquid fuels inventory withdrawals that contributed to increasing prices globally.

The prices of gasoline and diesel peaked in February 2022 with the Russian invasion of Ukraine. Around March, some EU countries decided to cut fuel taxes to reduce the impact of surging prices on citizens.

FIG.04b

GASOLINE AND DIESEL **PRICE WITH TAXES DEVELOPMENT 2020-2022**

Source: Oil Bulletin, European Commission

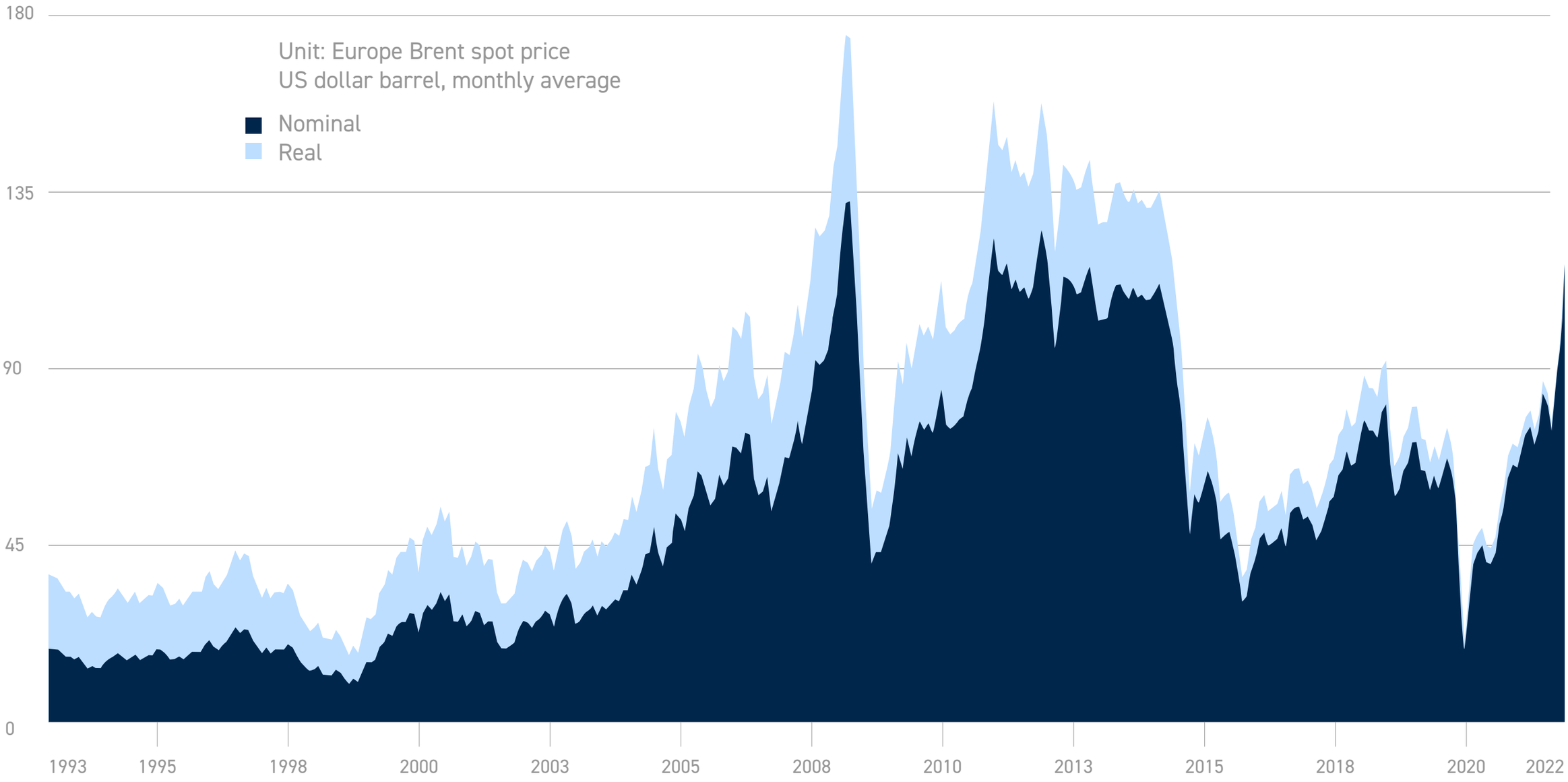


After a rapid decline in economic activity caused by the Covid-19 pandemic in 2020, petrol and diesel prices progressively went back up in 2021 due to increasing vaccination rates, loosening of pandemic-related restrictions, and a growing economy. Increasing demand and lower supply of oil resulted in consistent global petroleum and liquid fuels inventory withdrawals that contributed to increasing prices globally.

The prices of gasoline and diesel peaked in February 2022 with the Russian invasion of Ukraine. Around March, some EU countries decided to cut fuel taxes to reduce the impact of surging prices on citizens.

FIG.05 CRUDE OIL PRICE EVOLUTION

Source: Energy Information Administration and Federal Reserve Economic Data



The EU refining industry operates between two global, open and transparent markets: the market for crude oil and the market for refined products. The main benchmarks are priced in USD. The price of crude oil is set on international spot markets and reported by designated agencies. The price of oil is an important marker for the global economy and is closely watched by businesses and policy-makers.

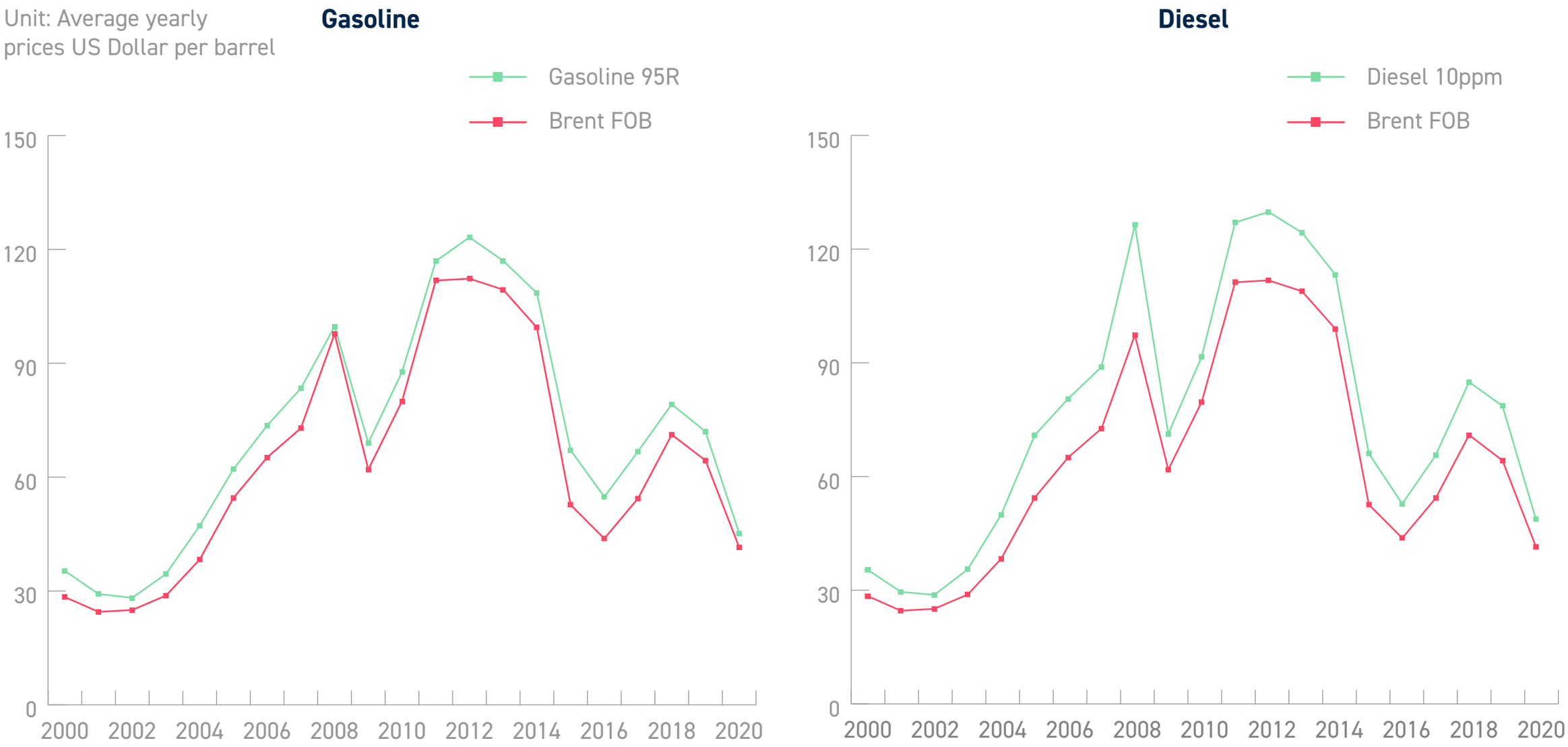
After a decade of relatively low prices, oil started rising leading to peaks just before the financial crisis in 2008. Amid the Covid-19 pandemic and a price war between Riyadh and Moscow, demand in April 2020 reached down to a level last seen in 1995. While the oil price level bouced back, following the reopening of the global economy, it dramatically jumped to around $120/bbl level after the breakout of the Russian war on Ukraine in 2022.

FIG.06

REFINERS OPERATE BETWEEN TWO GLOBAL COMMODITY MARKETS: CRUDE MARKET AND REFINED PRODUCTS MARKET

Source: Wood Mackenzie

Unit: Average yearly prices US Dollar per barrel

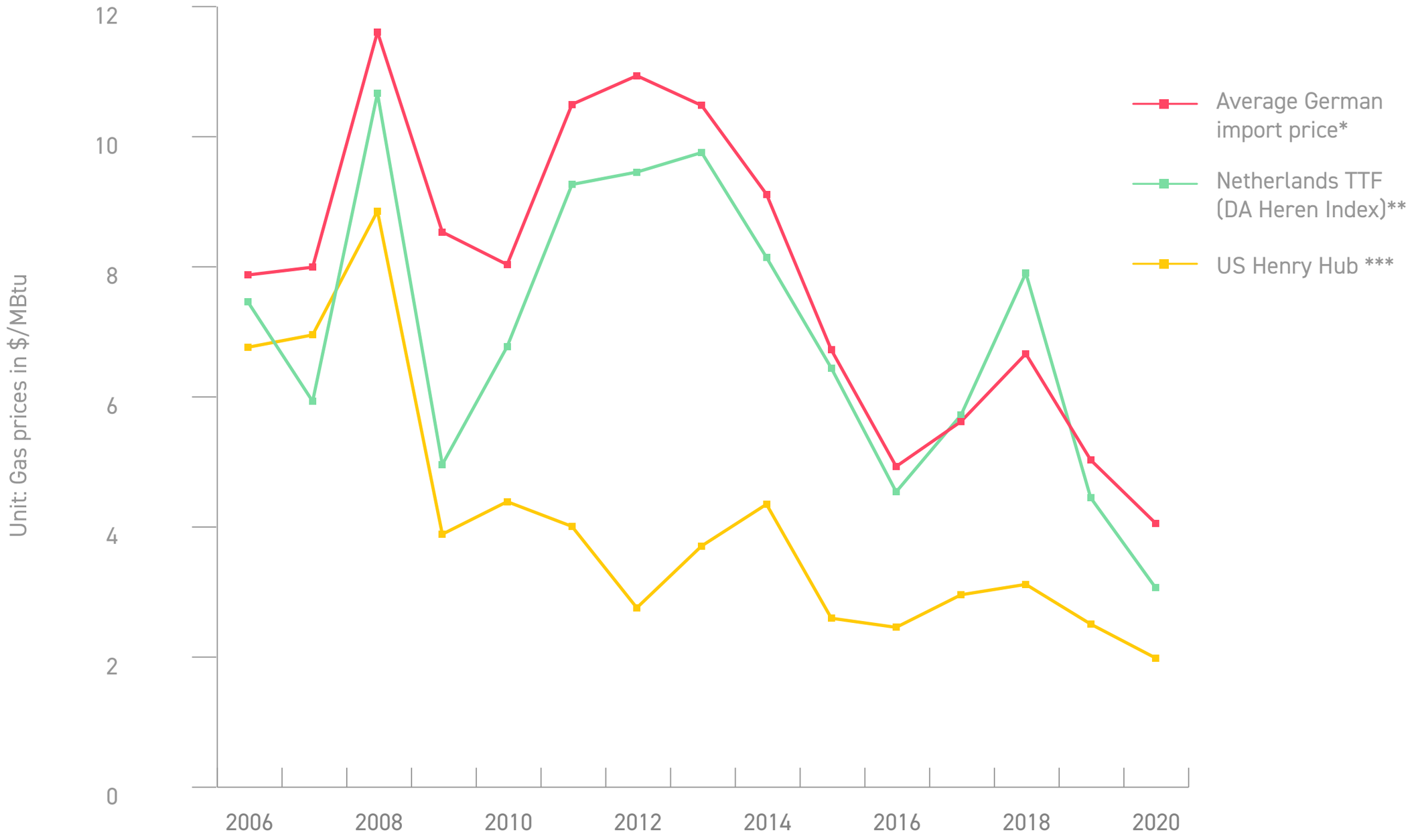


EU refining operates between two global commodity markets, the crude market and the refined products market. The 'crack spread' represents the difference between the cost of crude oil and the market sales price for refined products. Generally, product prices rise with crude prices but the drivers of the difference are many. In historic terms, the profitability has started to decline in a context of falling demand (2008). After a first, yet small, improvement, in 2012-2013 a better period started for refineries in 2015-2018.

Prices started falling again in 2019, with a record low in 2020 due to the Covid-19 pandemic. The spread is generally tight, margins are low and the industry is highly vulnerable to the operating costs that must be deducted from the spread before profitability can be considered.

FIG.07 **EVOLUTION OF** GAS PRICES

Source: BP Statistical Review of World Energy Prices 2021

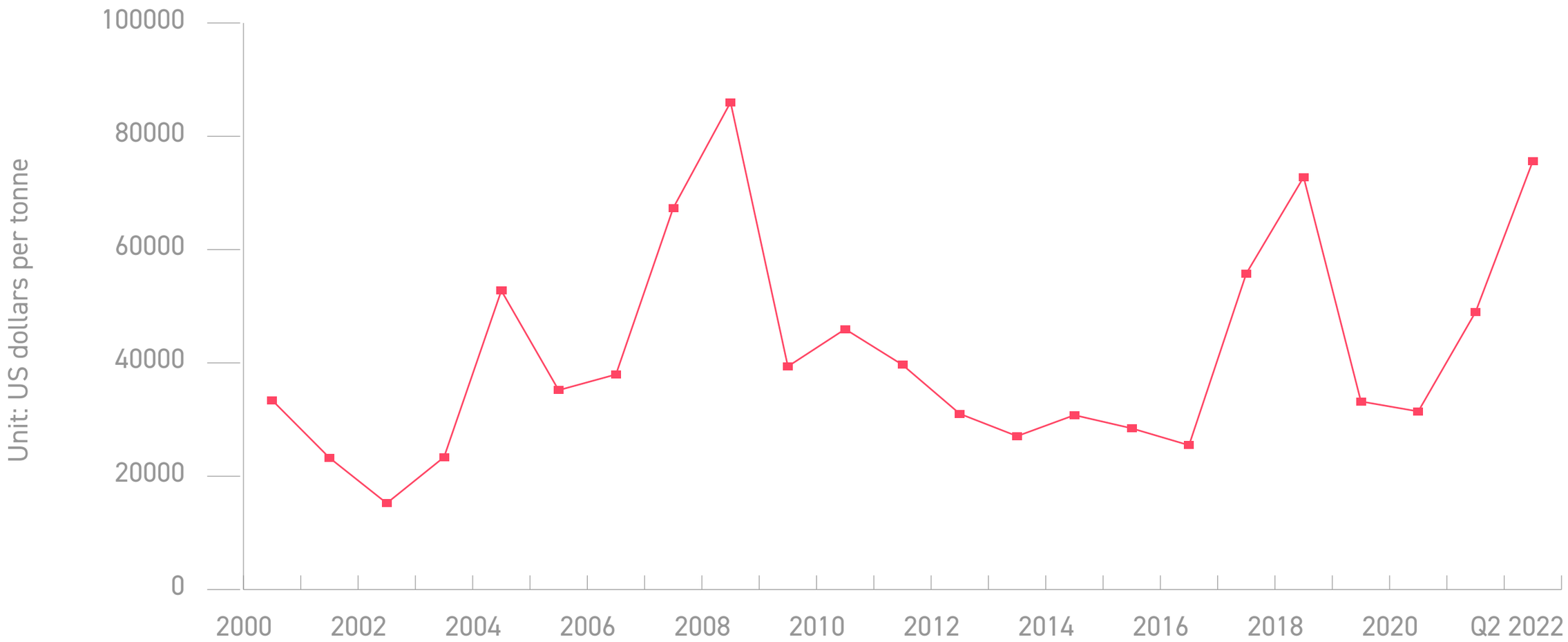


Since 2009, the US industry gained a significant competitive advantage over the EU industry as a result of the shale oil revolution.

*1986-1990 German Federal Statistical Orders, 1991-2020 German Federal Office of Economics and Export Control (BAFA)
**ICIS Geren Energy Ltd.
***Energy Intelligence Group, Natural Gas Week

FIG.08 **EVOLUTION OF** COBALT PRICES

Source: BP Statistical Review of World Energy 2021 and Trading Economics

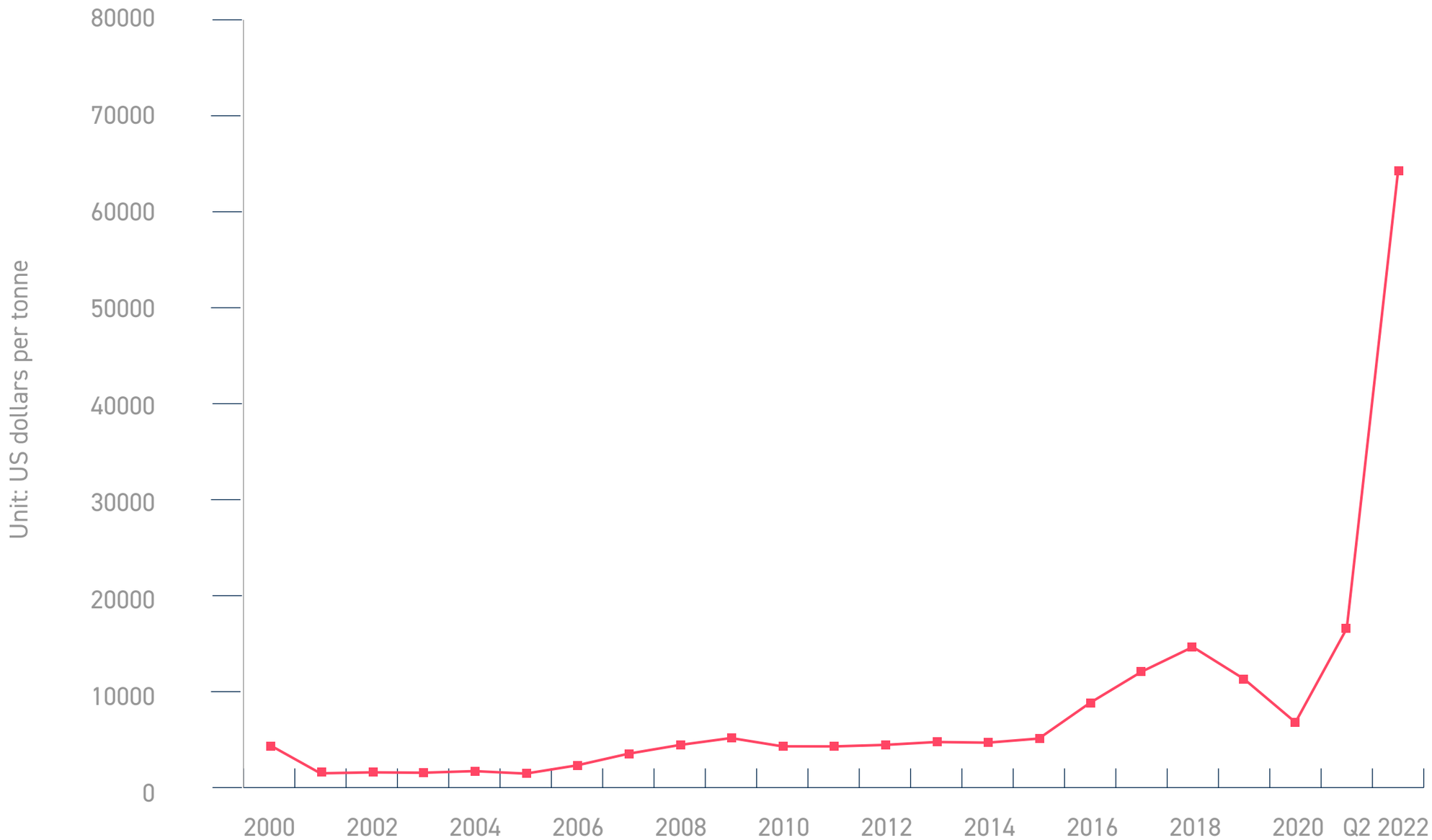


In 2022, Cobalt prices went up 140% compared to 2020 levels. Prices were hovering around the $75,000 per tonne level in June amid continued strong demand from the electric vehicle sector.

Cobalt, a key element in lithium-ion batteries, benefits from robust growth in rechargeable batteries and energy storage due to the outstanding demand for electric vehicles. Adding to the bullish outlook were mounting sanctions on Russia for invading Ukraine, which account for roughly 4% of the world's cobalt production.

FIG.09 **EVOLUTION OF** LITHIUM CARBONATE PRICES

Source: Statistical Review of World Energy 2021 and Trading Economics



After steep rises in prices for lithium in 2017 and 2018, prices fell back sharply in 2019. In 2020, prices for lithium carbonate prices slipped by 40%. Production remained low as a response to the drop in prices, lithium production fell 4.6%, driven mainly by lower Australian output. In 2022, lithium prices have jumped to their highest thanks to an upsurge in electric vehicle sales and depleting stocks of the battery material in top consumer, China.

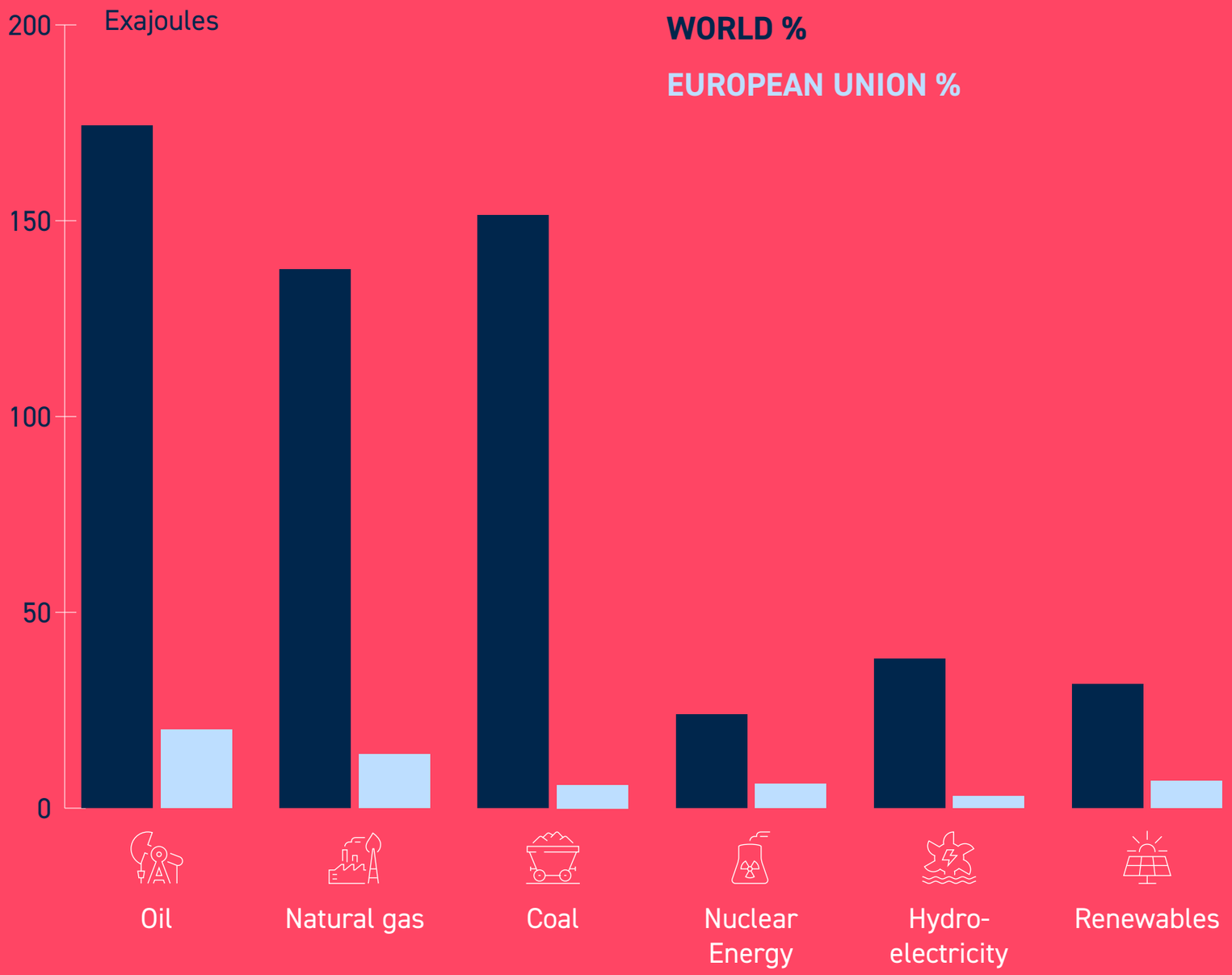
Price of lithium carbonate in China extended its rally to around $75,000 per tonne in March. This translates to a dramatic price increase of more than 900% from 2020 and is attributed to an imbalance in global supply amid huge demand.


+6.5%
78%
95%
85%
60%
35%
0.45 +0.45%
-0.23 -2.34%
-1.01 -1.89%
0.02 +0.21%
+2.58 +3.05%
-0.14 -1.42%
-0.73 -0.90%
+1.08 +5.12%
-0.87 -3.88%
-0.65 -1.37%

Energy

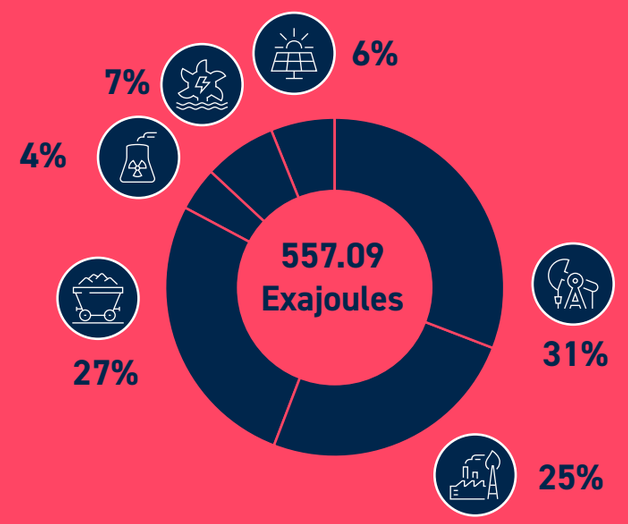
FIG.10 WORLDWIDE ENERGY CONSUMPTION
BY FUEL TYPE IN 2020

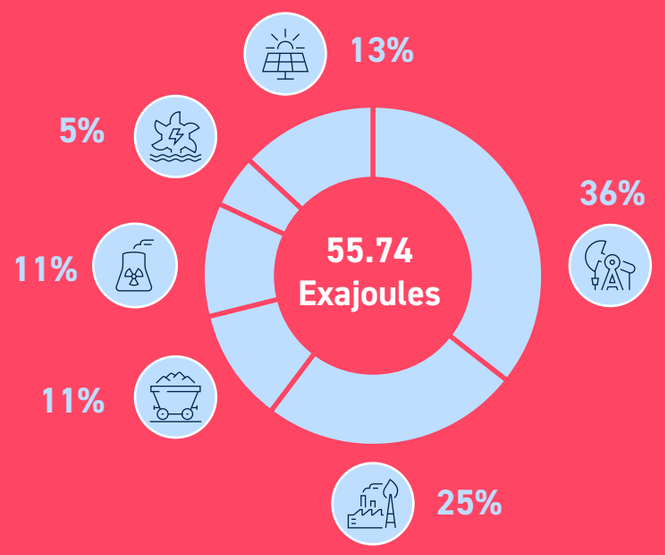
Source: BP Statistical Review of World Energy 2021



WORLD %

EUROPEAN UNION %





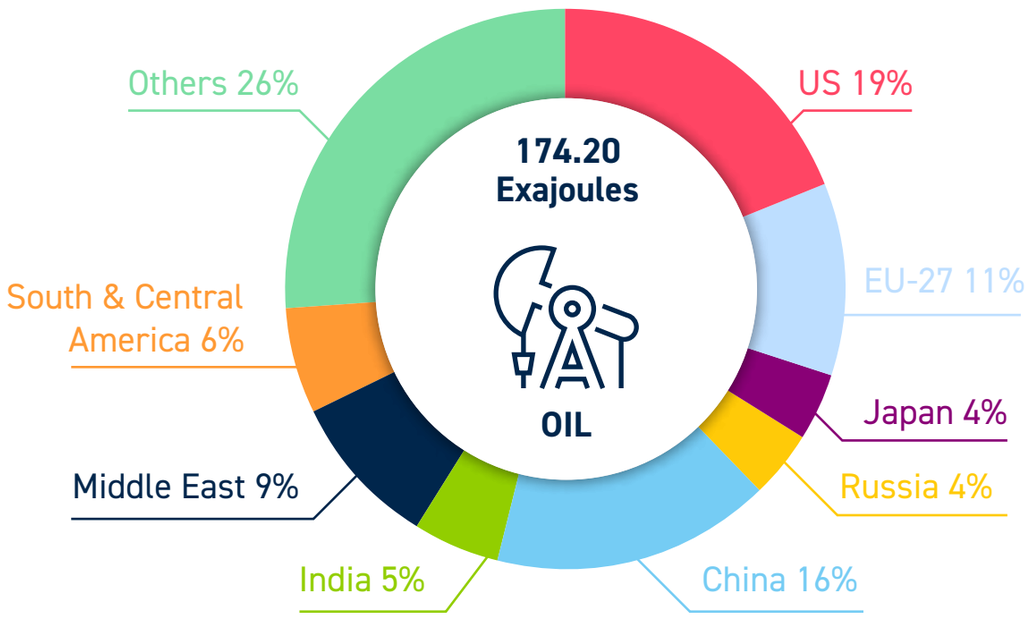
Oil remains the world's dominant fuel, making up just over a third of all energy consumed. Compared to 2019, the oil market share decreased by roughly 2% due to the Covid-19 pandemic and the decrease of economic activities. Natural gas, hydroelectricity and renewables gained 1% of market share while coal remained stable.

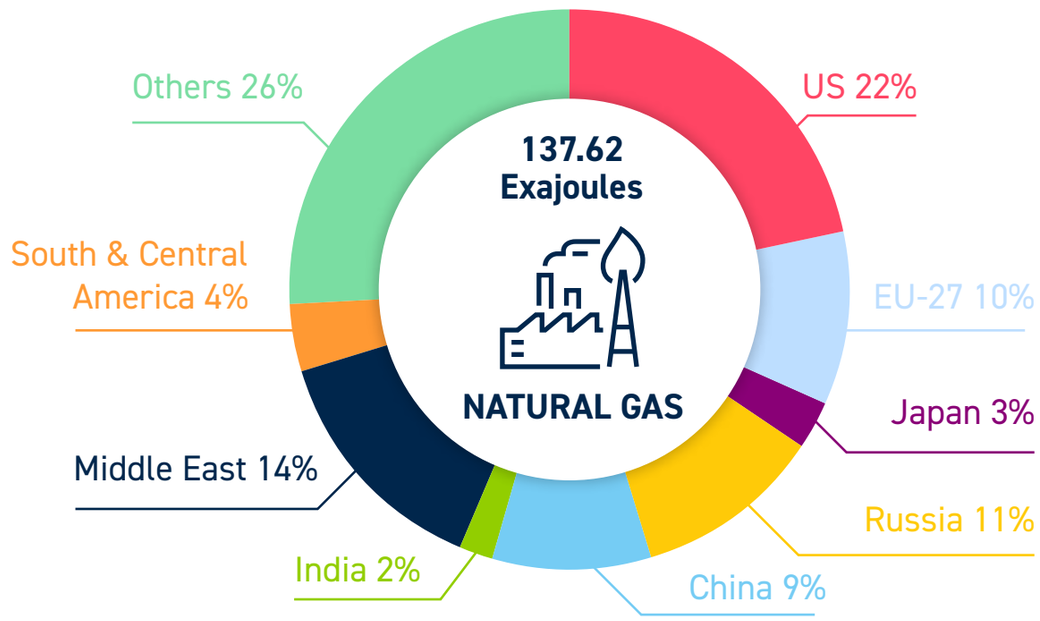
Note: Please note that due to rounding, figures may not add up exactly to 100%.
1 Exajoule = 10^{18} J (1 billion of billions of Joules) = 23,884 Mtoe

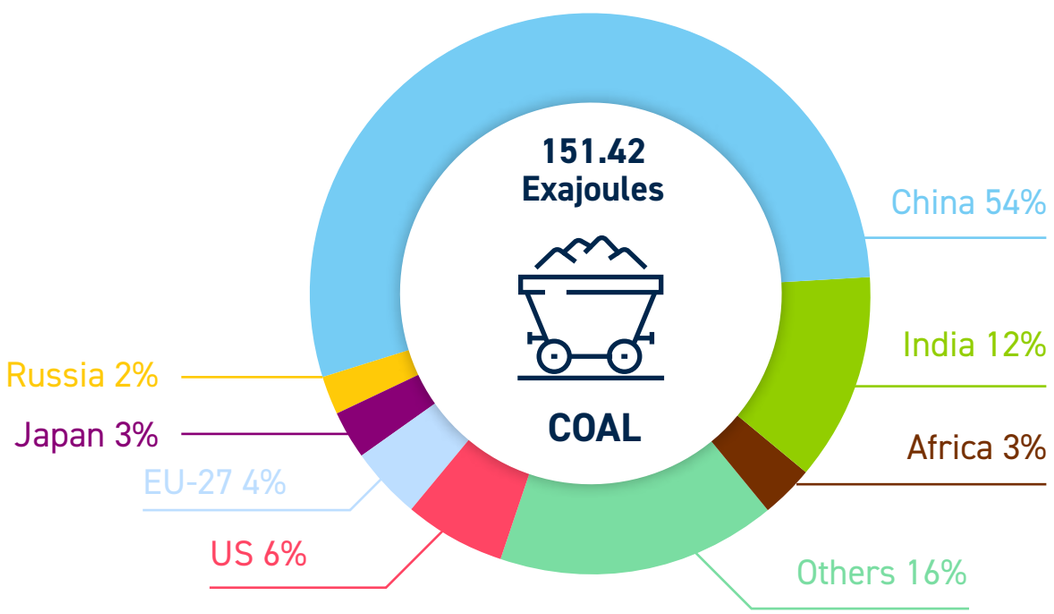
FIG.11

WORLDWIDE FOSSIL ENERGY CONSUMPTION BY REGION IN 2020

Source: BP Statistical Review of World Energy 2021





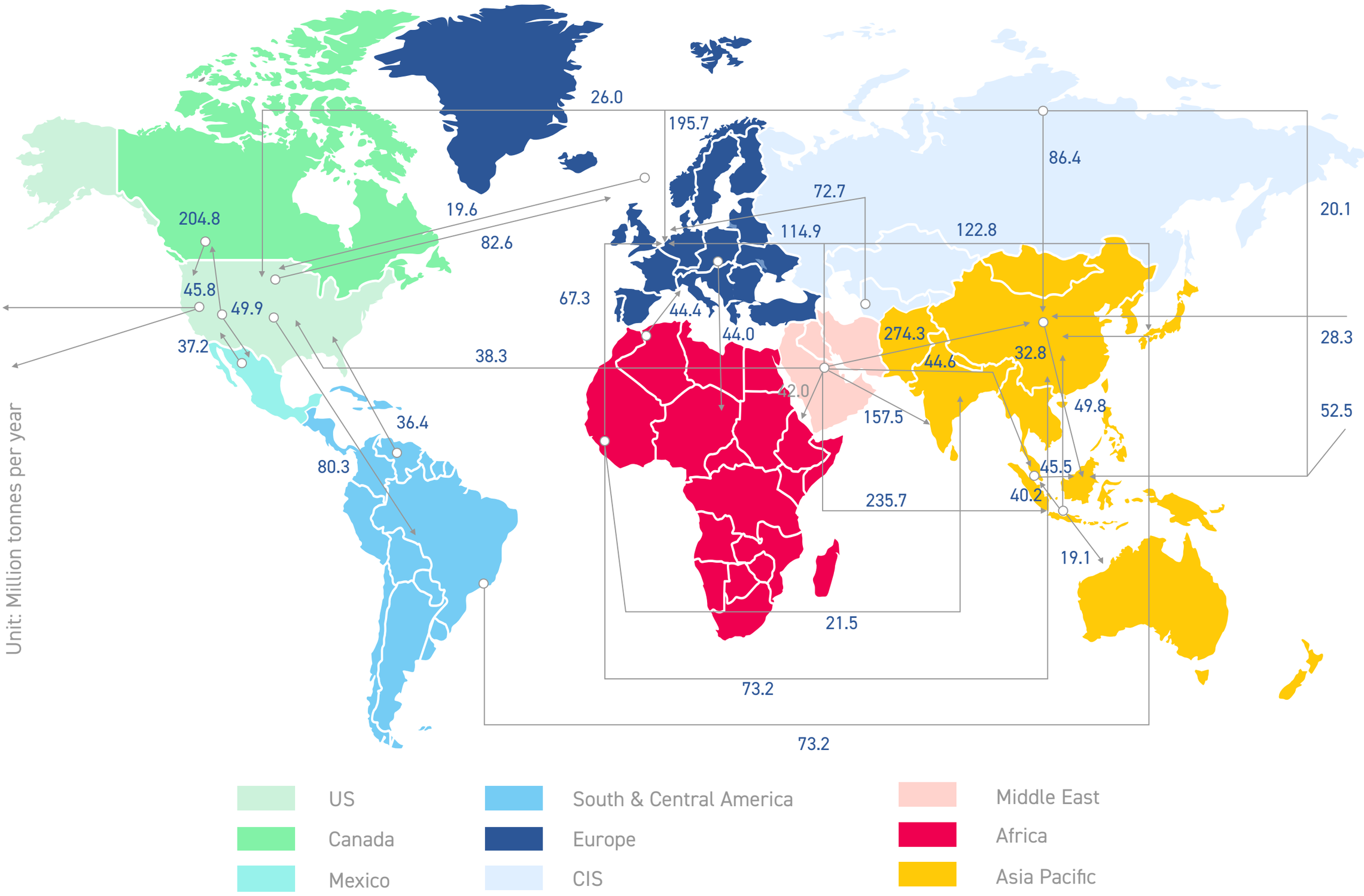


Global energy consumption decreased between 2019 and 2020 due to the decrease in economic activities linked to the Covid-19 pandemic. EU-27 share of oil consumption dropped by 3% and natural gas by 1%. Globally, coal consumption remained at 27%. Coal remains the main energy consumed in China and India - together the two countries are responsible for 66% of the global consumption. Compared to 2019, China and India have each increased their consumption of natural gas by 1%.

Note: Please note due to rounding, figures may not add up to exactly 100%.

FIG.12 **WORLDWIDE CRUDE OIL MOVEMENT** IN 2020

Source: BP Statistical Review of World Energy 2021

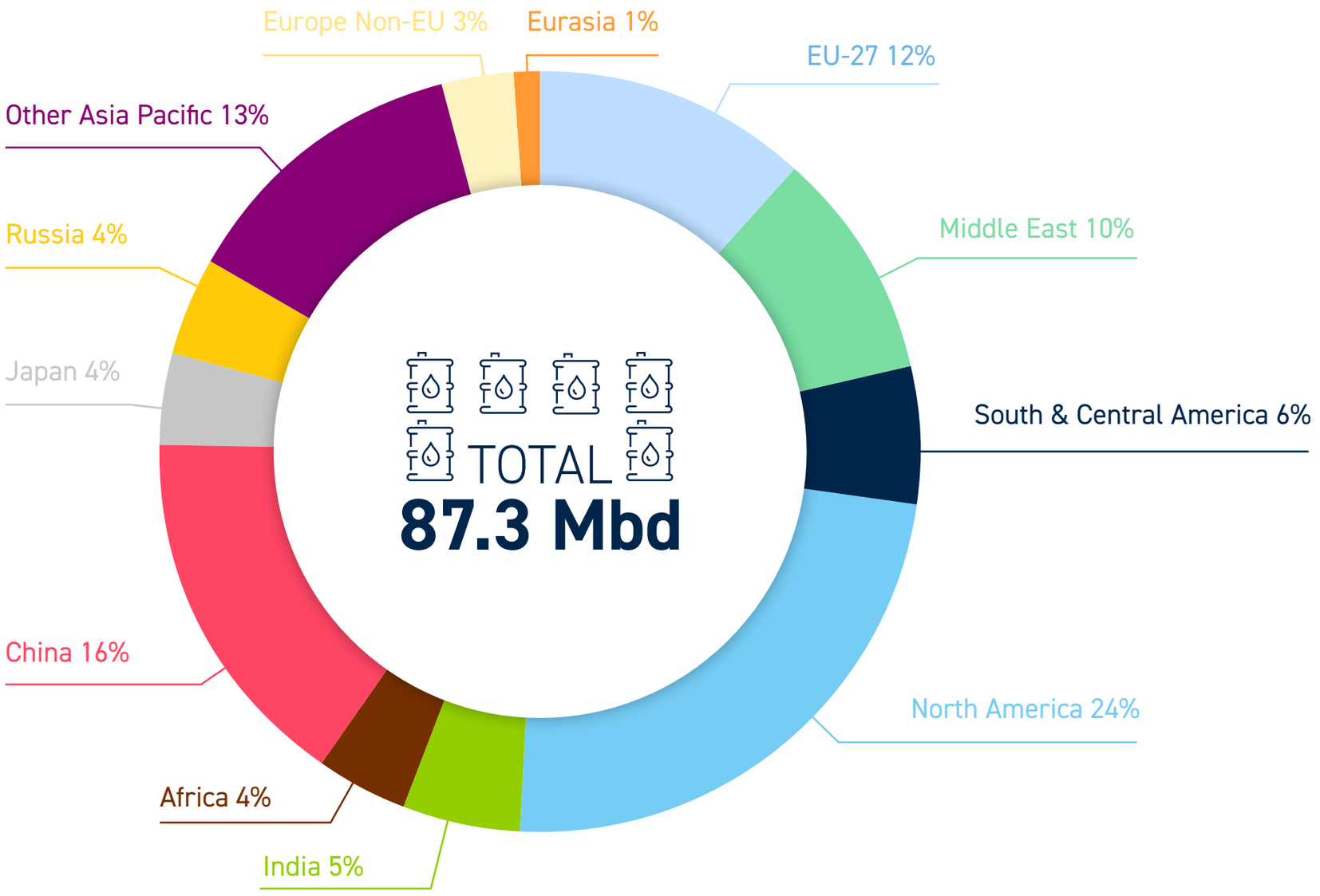


Crude oil is an internationally traded commodity with trade flows taking place all over the world. There are two open and transparent markets - crude oil and refined products - within which the European refining industry operates.

FIG.13

WORLDWIDE REFINED PRODUCT DEMAND* AVERAGED 87.3 MILLION BARRELS PER DAY IN 2020, WITH EU ACCOUNTING FOR 12% OF THE TOTAL

Source: BP Statistical Review of World Energy 2021



Global demand for oil products decreased from 98.3 million barrels per day in 2019 to 87.3 in 2020. The EU share decreased by 1% compared to the previous year. North America still accounts for 24% of the global demand, followed by China with 16%.

Note: Please note due to rounding, figures may not add up to exactly 100%.

*Inland demand plus international aviation and marine bunkers and refinery fuel and loss. Consumption of biogasoline (such as ethanol), biodiesel and derivatives of coal and natural gas are also included.

FIG.14

EU TOTAL OIL DEMAND AMOUNTED TO 524 MILLION TONNES IN 2021 IN THE EU-27

Source: Wood Mackenzie

COUNTRY	MILLION TONNES	COUNTRY	MILLION TONNES
AUSTRIA	11.8	ITALY	55.9
BELGIUM	30.8	LATVIA	1.8
BULGARIA	4.7	LITHUANIA	3.1
CROATIA	3.1	LUXEMBOURG	2.5
CYPRUS	2.4	MALTA	2.8
CZECH REPUBLIC	9.5	NETHERLANDS	41.8
DENMARK	6.6	POLAND	32.8
ESTONIA	1.4	PORTUGAL	10.5
FINLAND	8.8	ROMANIA	10.8
FRANCE	72.8	SLOVAKIA	4
GERMANY	103.3	SLOVENIA	2.3
GREECE	13.5	SPAIN	58.3
HUNGARY	8.5	SWEDEN	13.1
IRELAND	6.8		
TOTAL EU-27 = 524			
UNITED KINGDOM	58.8		
NORWAY	8.9		
SWITZERLAND	8.8		
TURKEY	50.1		
TOTAL = 651.1			

Unit: Million tonnes per year

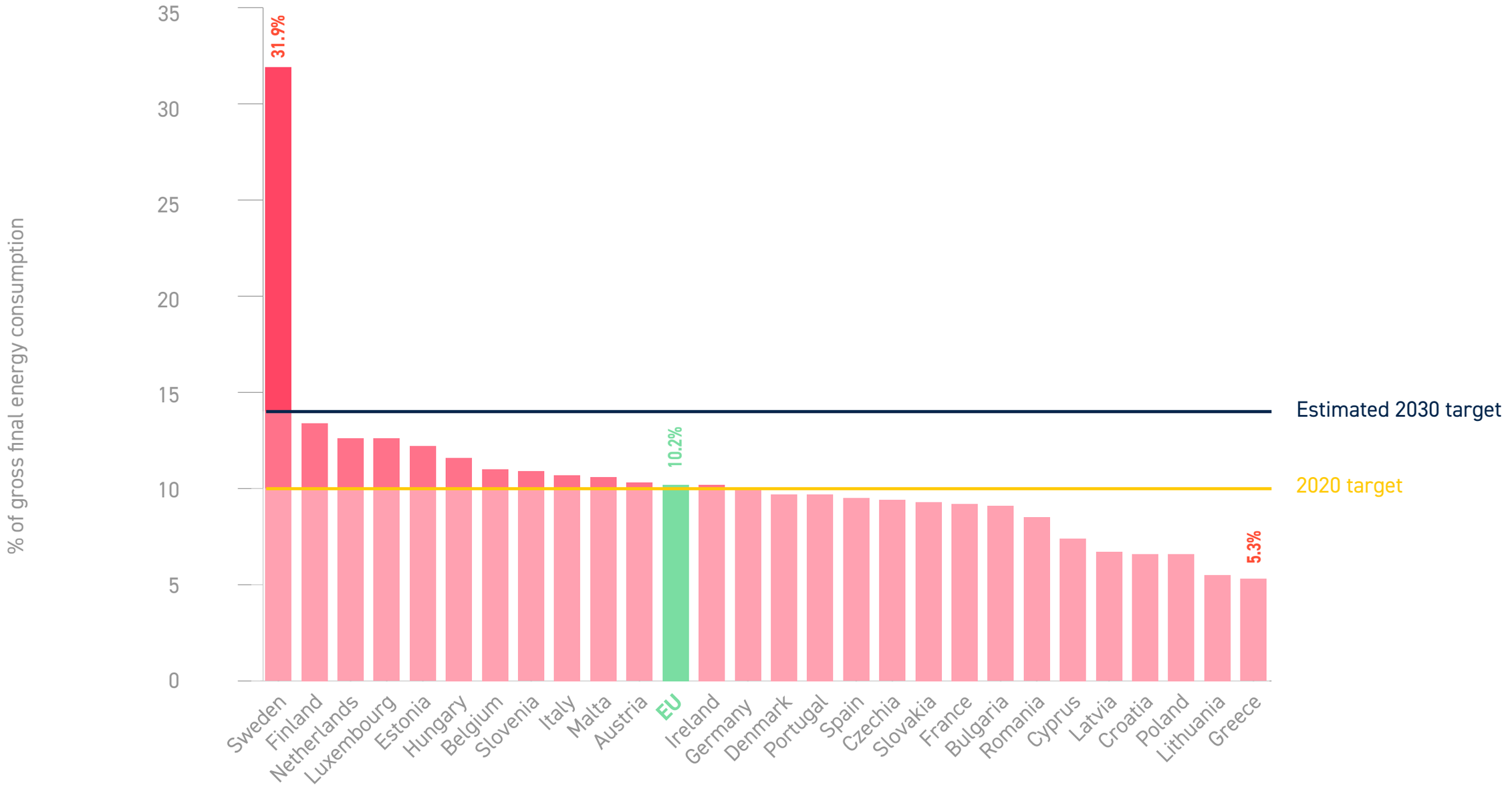
EU-27 total oil demand amounted to 524 million tonnes in 2021 increasing by 3.4% compared to 2020. Oil demand dropped significantly in 2020 due to the Covid-19 pandemic. In 2021, Covid-19 restrictions were loosened resulting in recovery for the economy and oil demand. The countries with the strongest increase in oil demand were Romania (+21.5%), Bulgaria (+20%) and Hungary (+15%) and the countries that recorded the biggest fall in the oil demand were Luxembourg (-11%), Sweden (-9.1%) and Austria (-7.8%).

Note: Due to rounding, figures may not add up.

FIG.15

ENERGY FROM RENEWABLE SOURCES USED IN TRANSPORT ACTIVITIES IN THE EU-27 IN 2020

Source: Eurostat



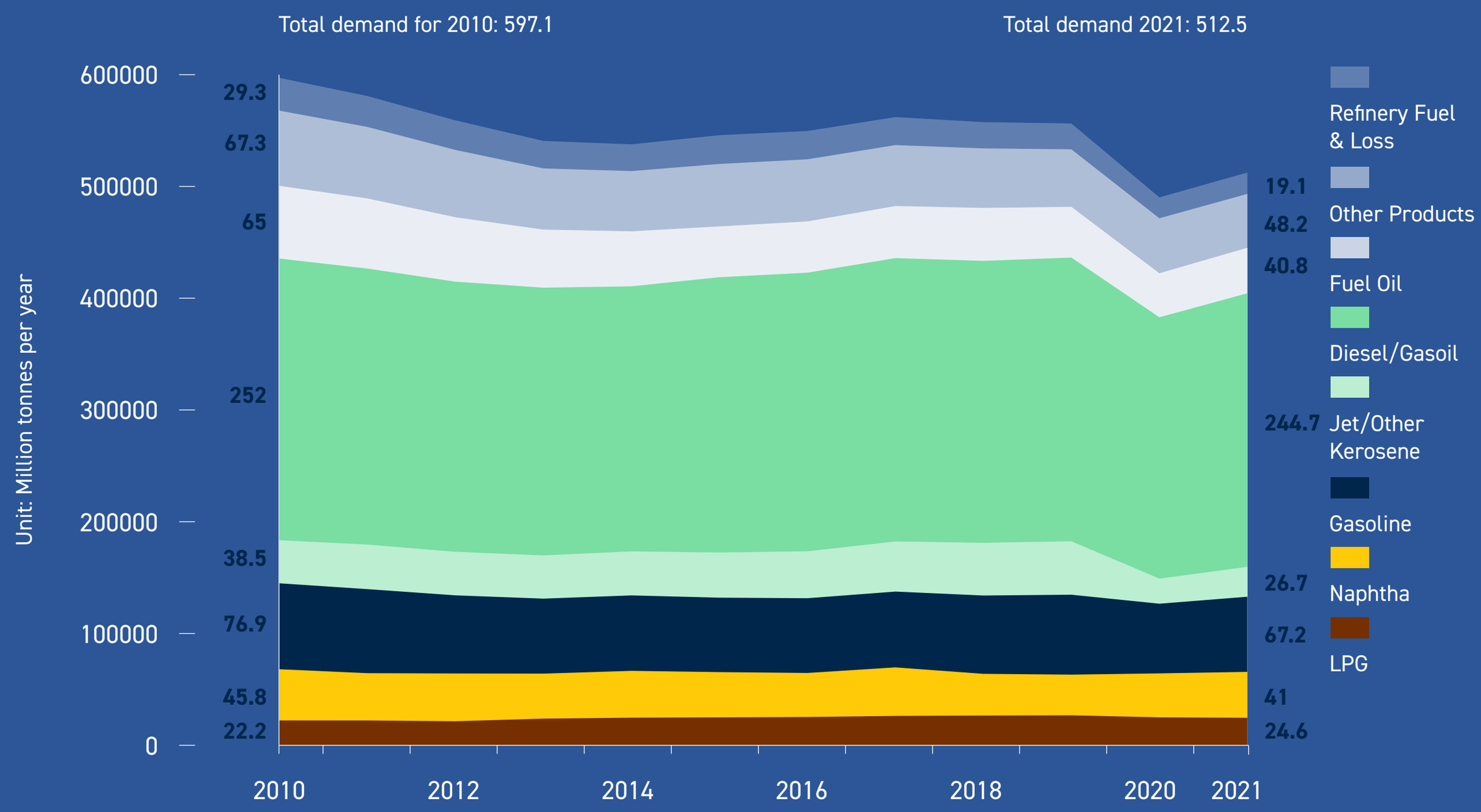
The EU agreed to set a common target of 10% for the share of renewable energy (including liquid biofuels, hydrogen, biomethane, 'green' electricity, etc.) used in transport by 2020.

The average share of energy from renewable sources in transport increased from 1.6% in 2004 to 10.2% in 2020, therefore meeting the EU target. Among the EU Member States, the share of renewable energy in transport fuel consumption ranged from highs of 31.9% in Sweden, 13.4% in Finland and 12.6% in the Netherlands and Luxembourg down to 7% or less in Greece (5.3%), Lithuania (5.5%), Poland and Croatia (both 6.6%).

Refined Products

FIG.16 HISTORICAL DEMAND FOR OIL PRODUCTS IN THE EU-27

Source: Wood Mackenzie



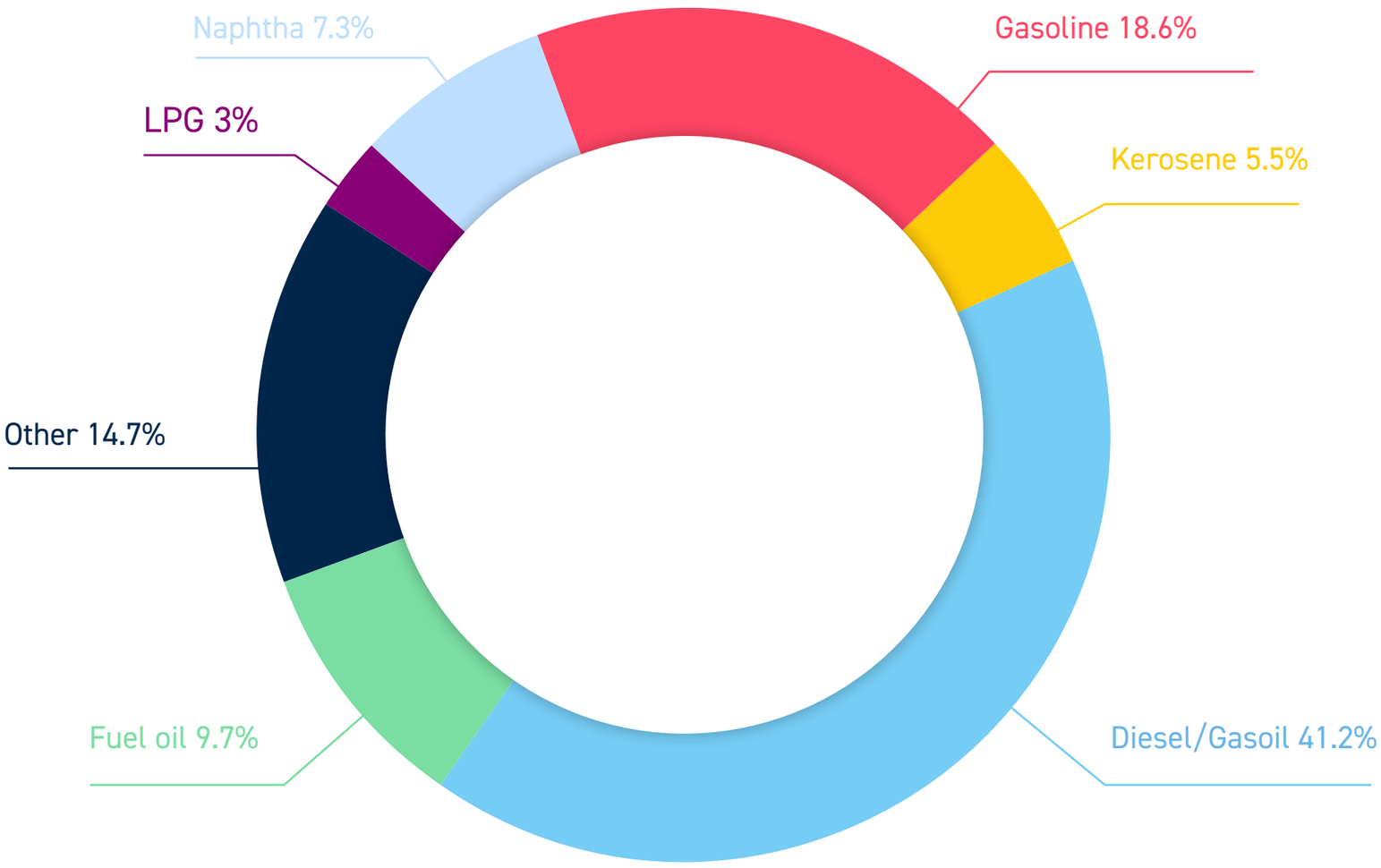
From 2009 to 2014, a downward trend has been observed for oil products demand in the EU. This 10% decline over these five years was mainly due to the fall in fuel oil and gasoline demand.

From 2015, a slight increase had been witnessed mainly due to the rise in demand of diesel/gasoil and kerosene products. As a consequence of the Covid-19 pandemic, the total demand of oil products decreased by 12% in 2020 compared with 2019. In 2021, Covid-19 restrictions loosened allowing the total demand to grow by 4.5%.

FIG.17

AVERAGE REFINERY OUTPUT BY PRODUCT TYPE IN OECD EUROPE IN 2021

Source: International Energy Agency

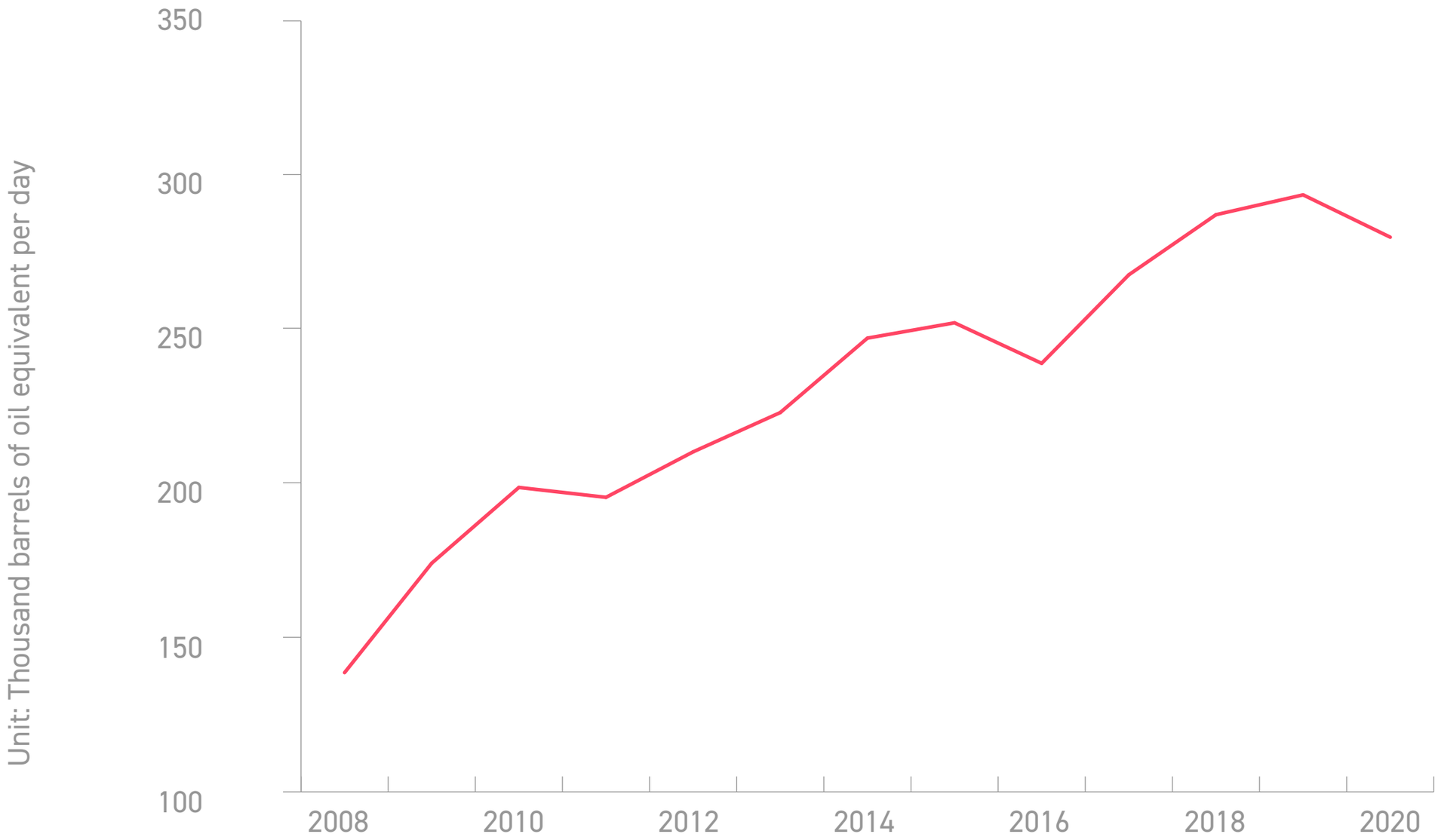


A wide range of products, from transportation and industrial fuels to chemical feedstock, are produced from crude oil. EU refineries also produce many specialty products, such as bitumen for road construction and roofing, lubricants for transport and industry, petroleum coke for the metal industry as well as waxes, solvents and other specialised products. Fuels for transport represent the biggest share of the production.

Note: Please note that due to rounding, figures may not add up.

FIG.18 **BIOFUELS PRODUCTION** IN EU-27

Source: BP Statistical Review of World Energy 2021

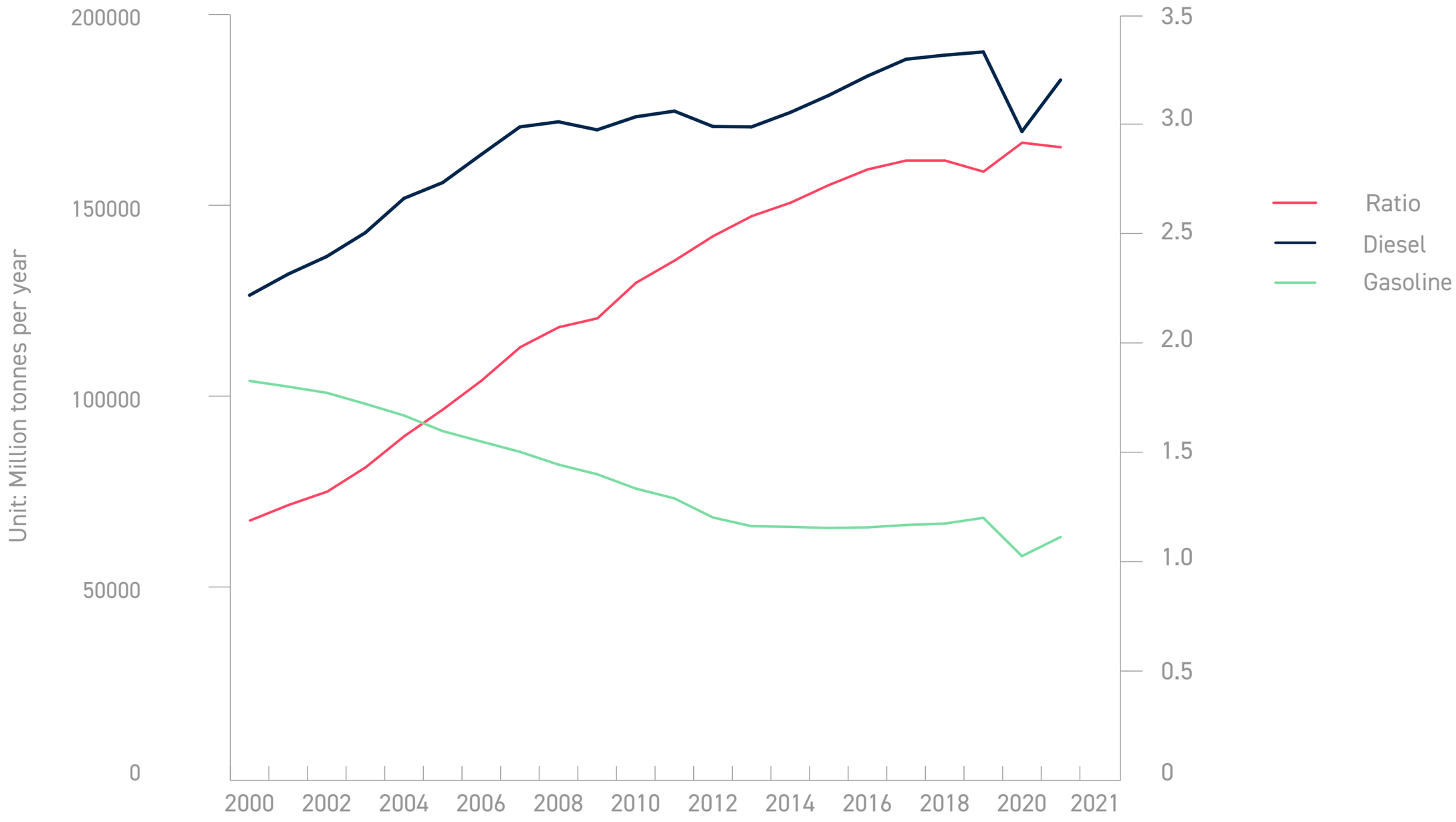


The overall production of biofuels in the EU has doubled since 2008; growing from 138 thousand barrels of oil equivalent per day to 280 in 2020.

Note: Includes biogasoline (such as ethanol) and biodiesel. Volumes have been adjusted for energy content.

FIG.19 **ROAD FUEL DEMAND** IN THE EU-27

Source: Wood Mackenzie

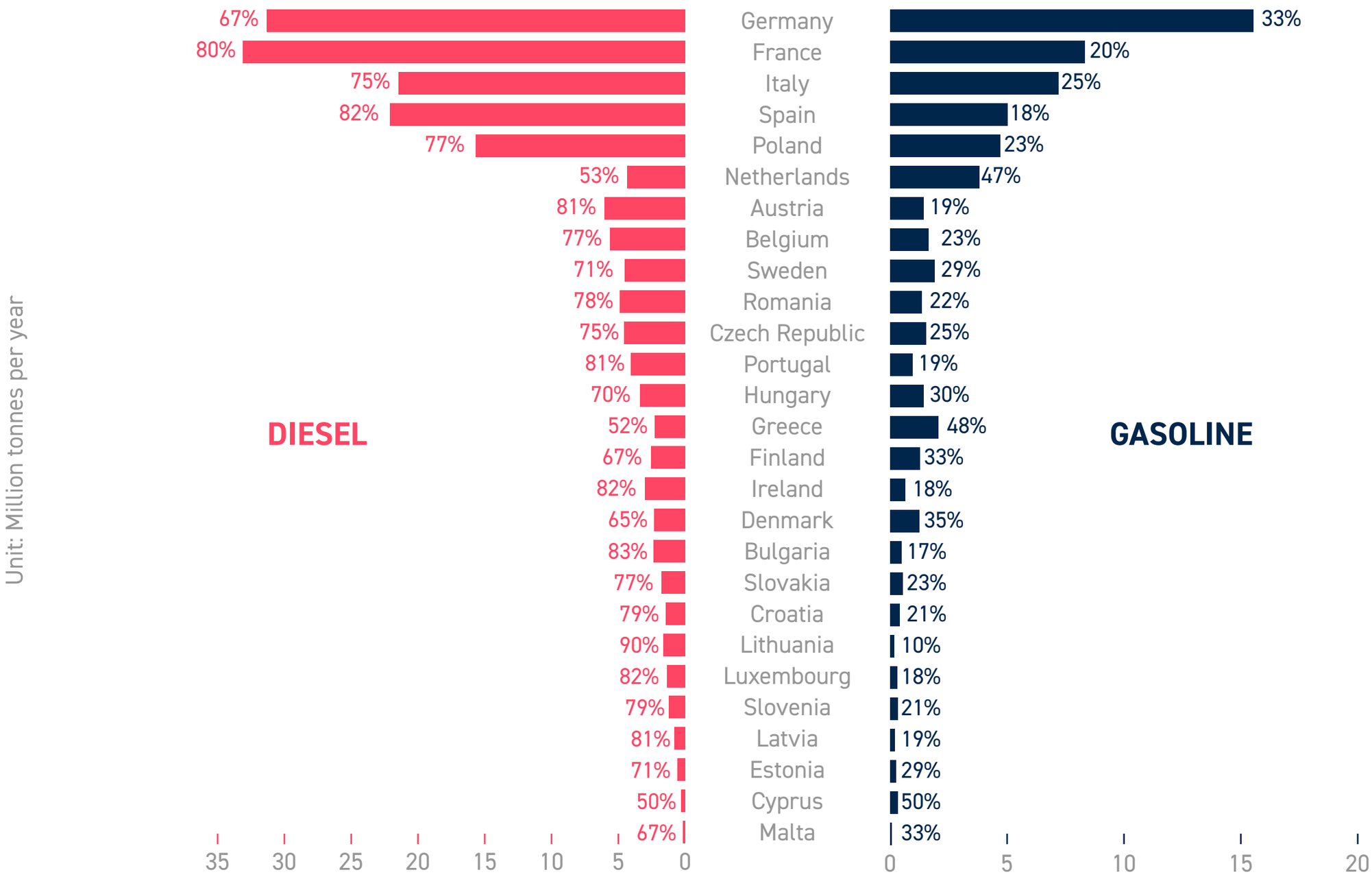


The tax-incentivised dieselisation trend has significantly contributed to a fundamental change in the EU's road fuel demand structure. The shift from gasoline to diesel began some 25 years ago and led to a major demand decline for gasoline as well as a shortage of diesel production in the EU. However, since 2017 this trend is reversing. The effect of the Covid-19 pandemic was significantly bigger on diesel than gasoline, and despite a progressive recovery pre-Covid levels have not been recovered yet (2021).

FIG.20

ROAD FUEL DEMAND IN THE EU-27 BY COUNTRY IN 2021

Source: Wood Mackenzie

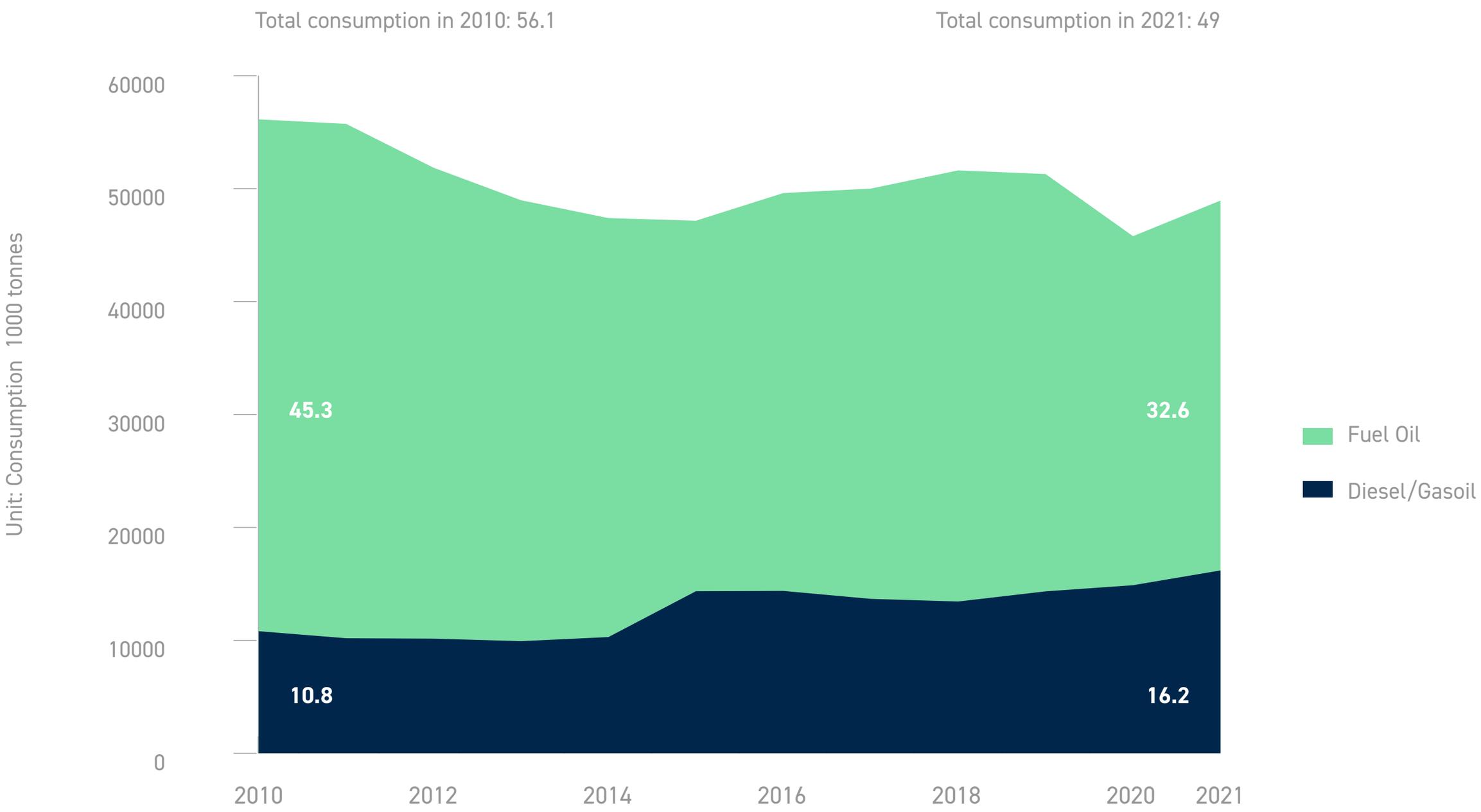


Sustained by favourable excise taxes on diesel, the shift from gasoline to diesel over the past two decades led to a higher demand for diesel as a road fuel in the vast majority of EU Member States. In some countries, such as France and Spain, the imbalance is far more pronounced as a result of even more favourable tax policies for diesel. The continued growth in heavy duty transport in the EU, driven by the internal market and external trade, has further contributed to spurring diesel demand. However, recent measures to rebalance taxation level of diesel with gasoline could trigger a progressive shift in diesel demand.

FIG.21

EU-27 MARINE FUEL CONSUMPTION

Source: Wood Mackenzie



During the past years there was a rise in marine gasoil consumption at the expense of fuel oil. Switching to LNG or using scrubbers are alternatives to meeting the new International Maritime Organisation (IMO) emissions limits.

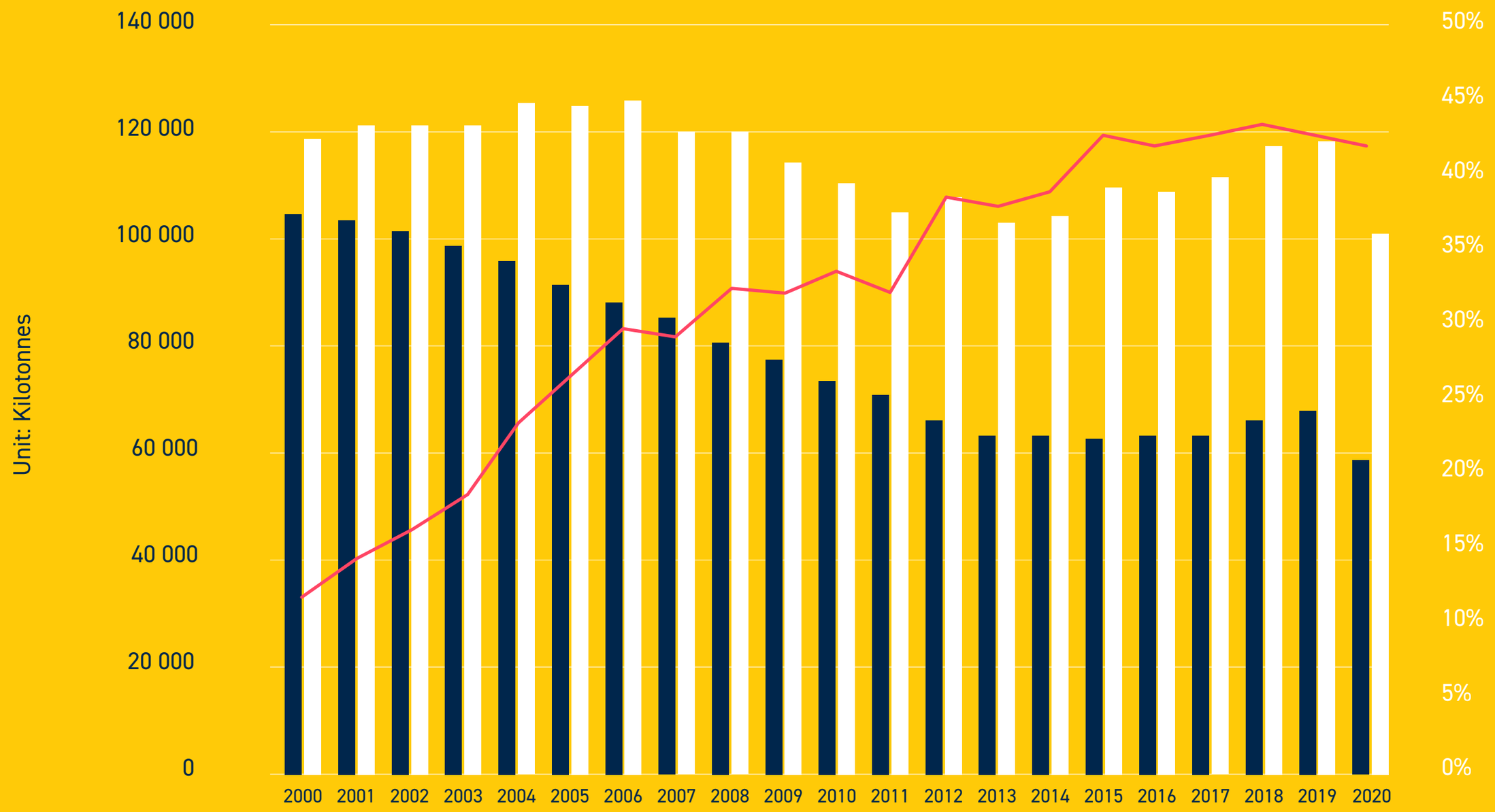
Import Dependency

FIG.**22a**

EU-27 NET TRADE FLOWS FOR REFINED PRODUCTS

IN-DEPTH LOOK AT GASOLINE (EXCLUDING BIO-COMPONENTS)

Source: Eurostat



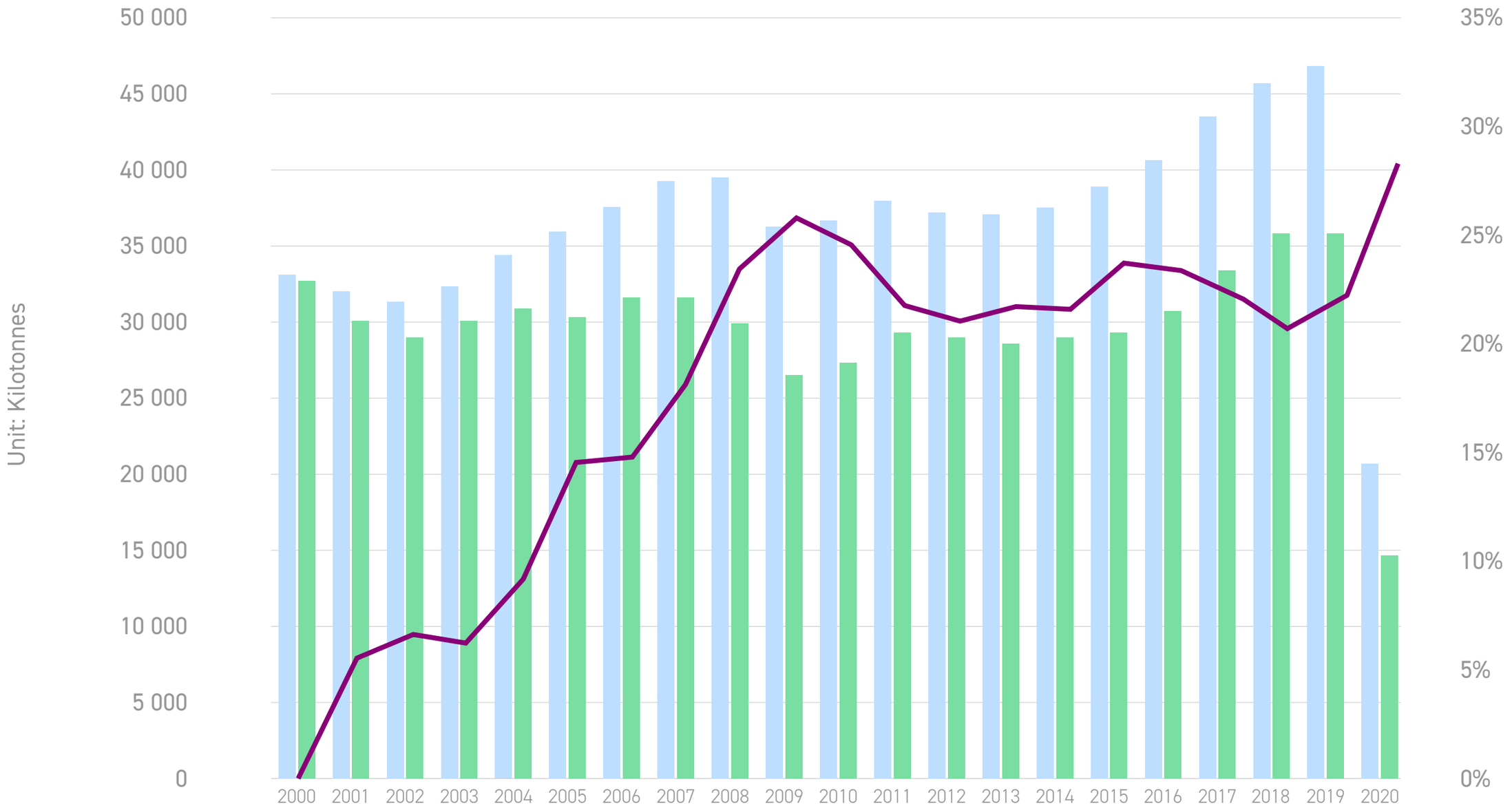
Overproduction of gasoline in the EU has been increasing over the years, despite a mild decrease in overall production volumes, due to a decrease in domestic consumption. This decreasing trend for domestic consumption, however, has stabilised from 2013 onwards. This may in part be driven by a change in consumer preferences toward gasoline.

FIG.22b

EU-27 NET TRADE FLOWS FOR REFINED PRODUCTS

IN-DEPTH LOOK AT KEROSENE (EXCLUDING BIO-COMPONENTS)

Source: Eurostat



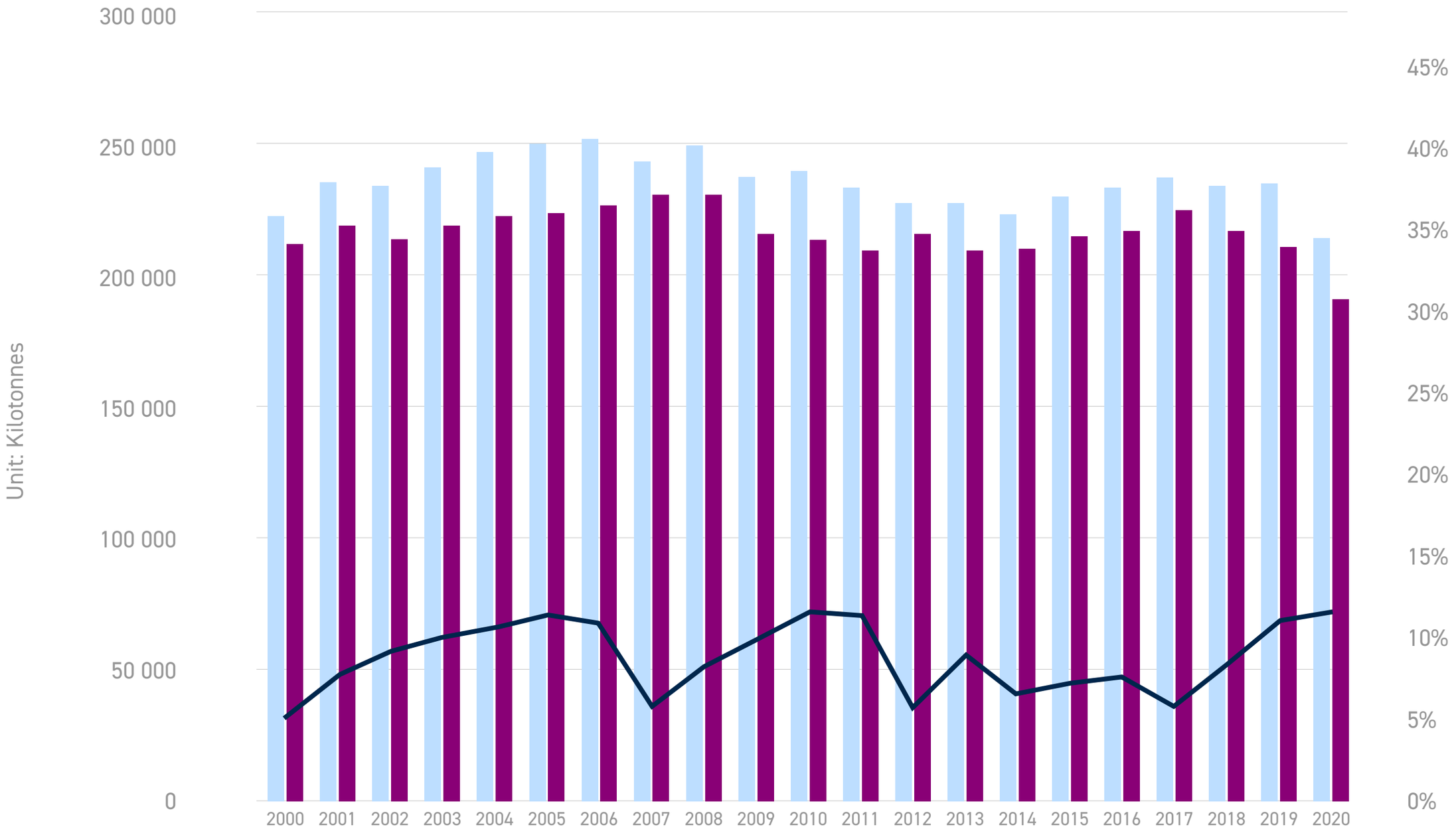
For kerosene, the EU is import dependent, relying substantially on supplies from Middle East and Asia.

FIG.22c

EU-27 NET TRADE FLOWS FOR REFINED PRODUCTS

IN-DEPTH LOOK AT DIESEL/GASOIL (EXCLUDING BIO-COMPONENTS)

Source: Eurostat



Domestic consumption

Domestic production

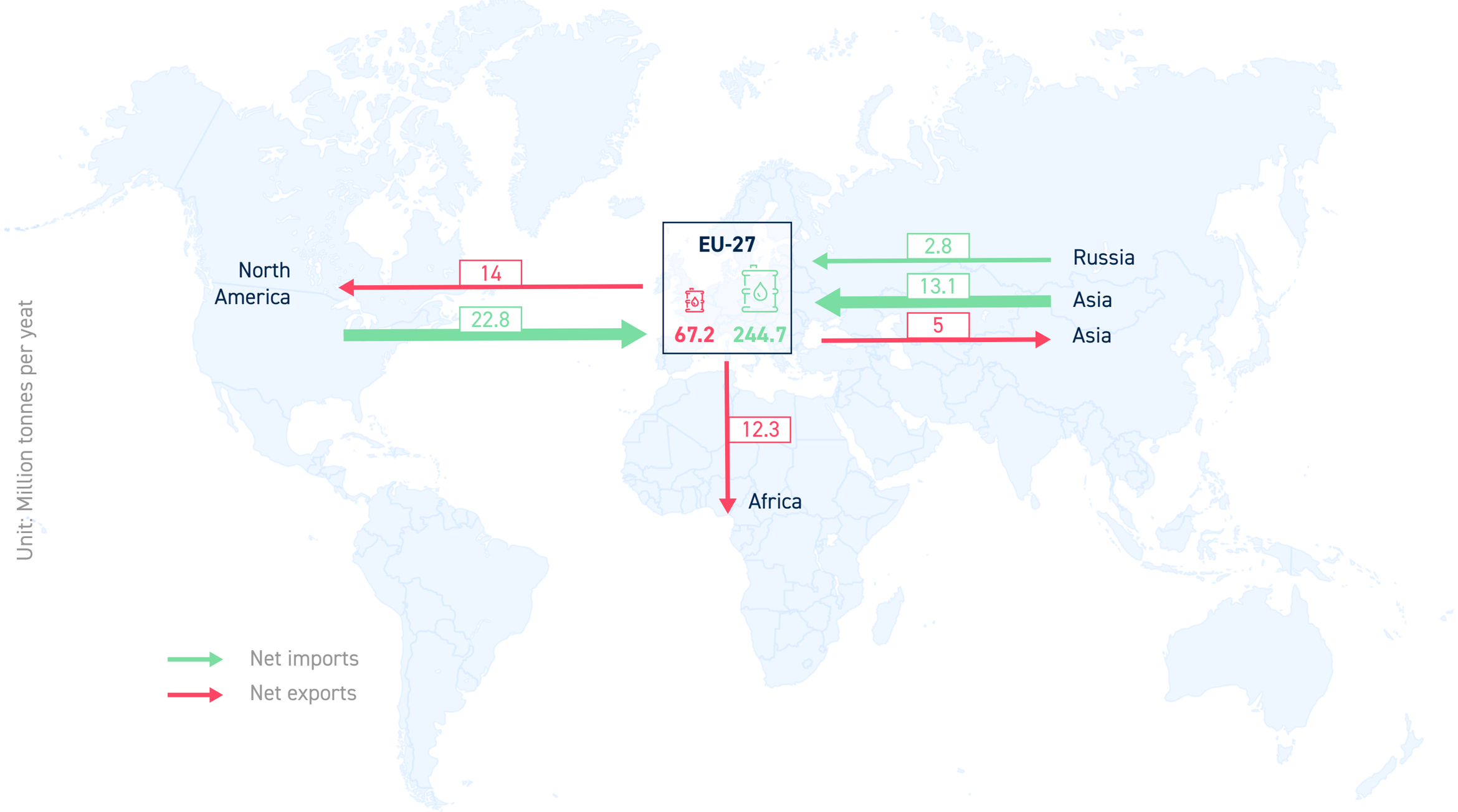
Net imports as % of final consumption

For diesel/gasoil, whilst the EU covers a big share of its consumption it still remains dependent on imports for 11% of its demand, mainly from Russia.

FIG.23

MAJOR GASOLINE AND DIESEL/GASOIL TRADE FLOWS TO AND FROM THE EU-27 IN 2020

Source: Eurostat

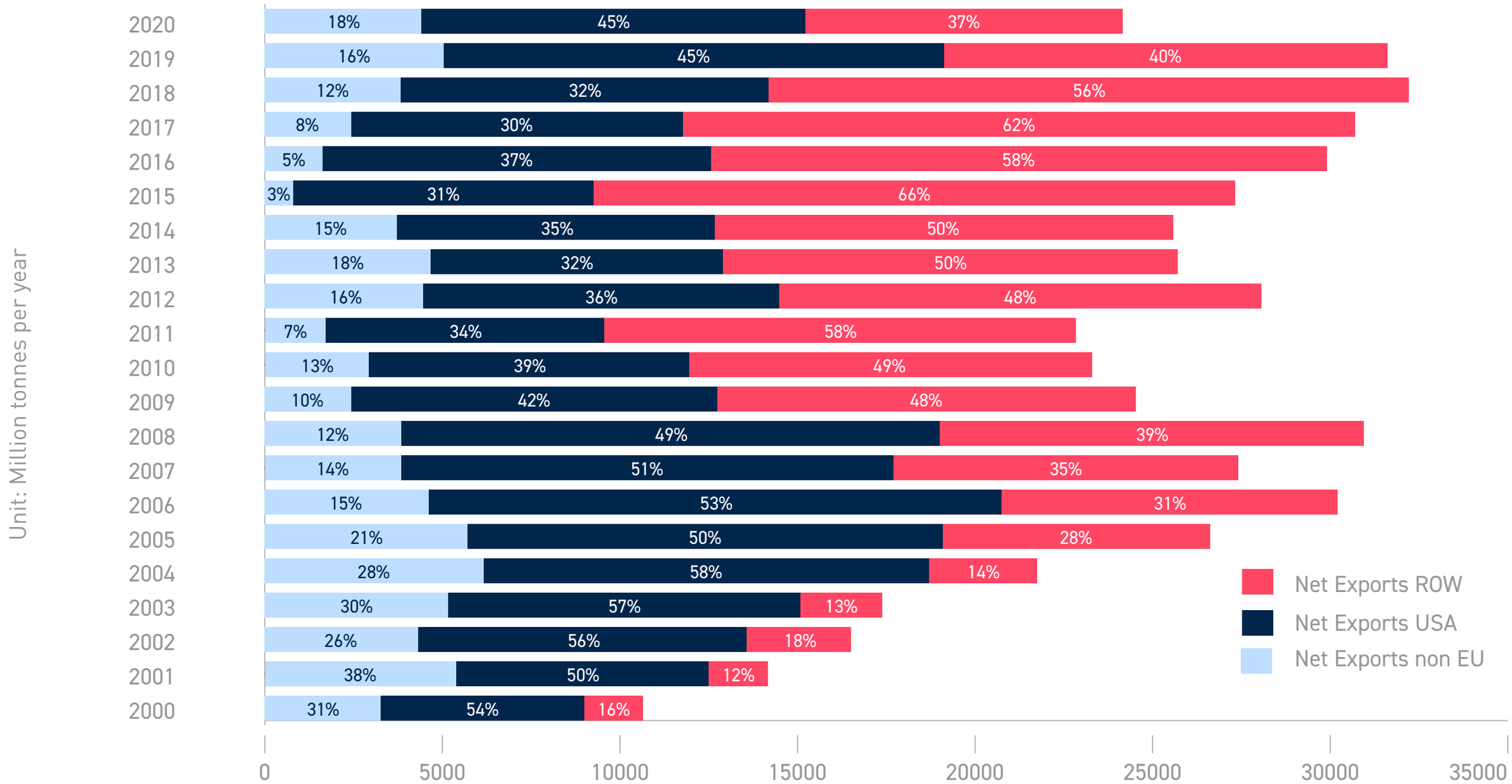


The major trade flows to and from the EU reflect the imbalance in gasoline/diesel demand in Europe. As a consequence, significant excess gasoline production capacity needs to be exported, whilst Europe became heavily reliant on imports from third countries/regions - especially Russia, the Middle East and the US to meet regional demand for diesel and jet fuel.

North America was the traditional export market for gasoline surpluses in Europe, but the shale oil revolution and cheap energy enabled US refiners to increase their supplies for their internal market and compete on other export markets with EU refiners.

FIG.24 EU-27 GASOLINE NET EXPORTS BY REGION

Source: Eurostat

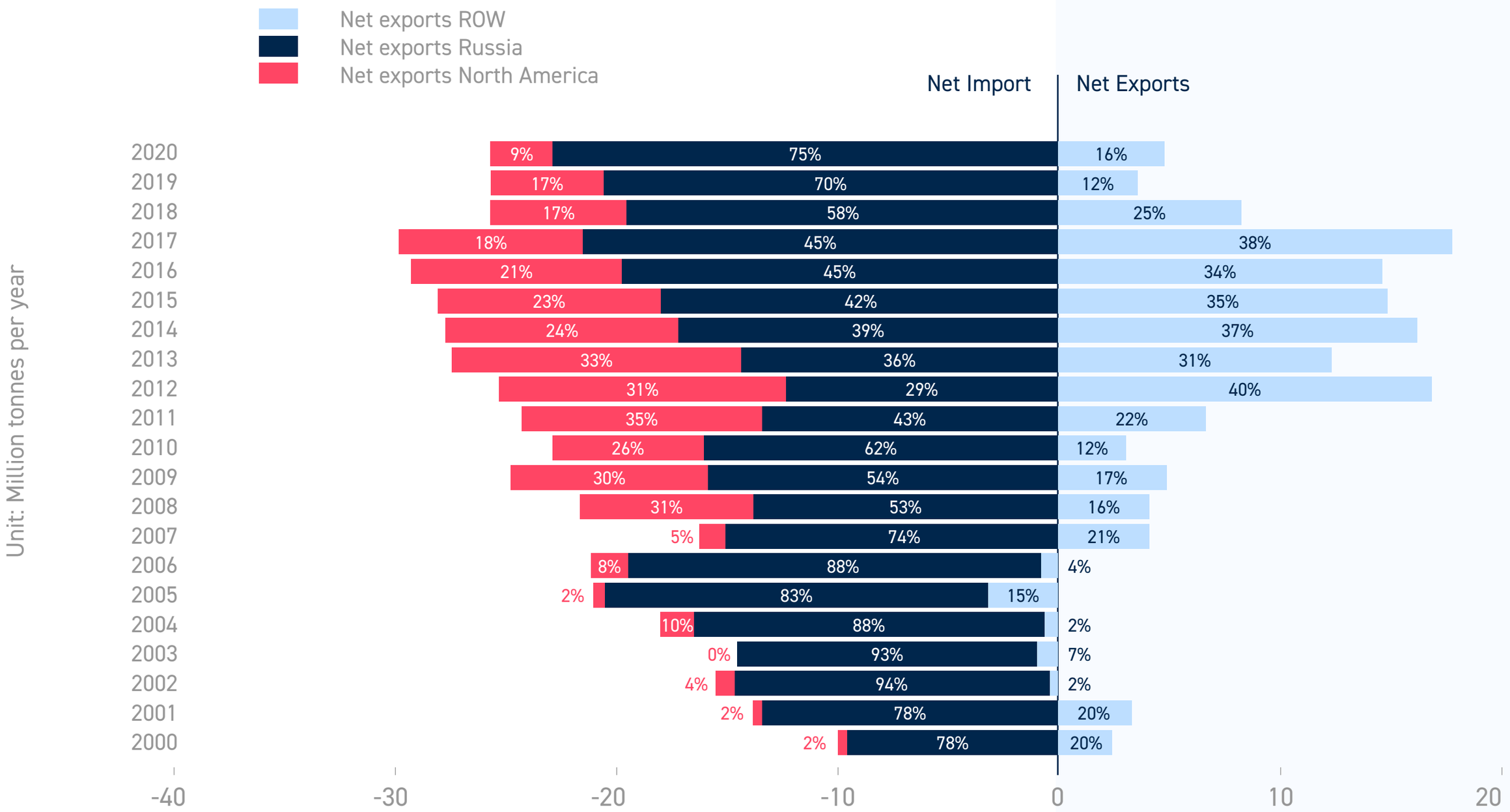


The US was the traditionally the main export market for the structural EU gasoline surplus. The shale oil boom in the late 2000s has decreased export opportunities to the US and forced EU refiners to find other markets, primarily in Africa and Asia. The EU gasoline surplus in 2019 remained high. North America and non-EU Member States were the two key export markets for the EU.

FIG.25

EU-27 NET GASOIL TRADING BALANCE: RUSSIA IS THE LEADING EXPORTER OF GASOIL TO THE EU

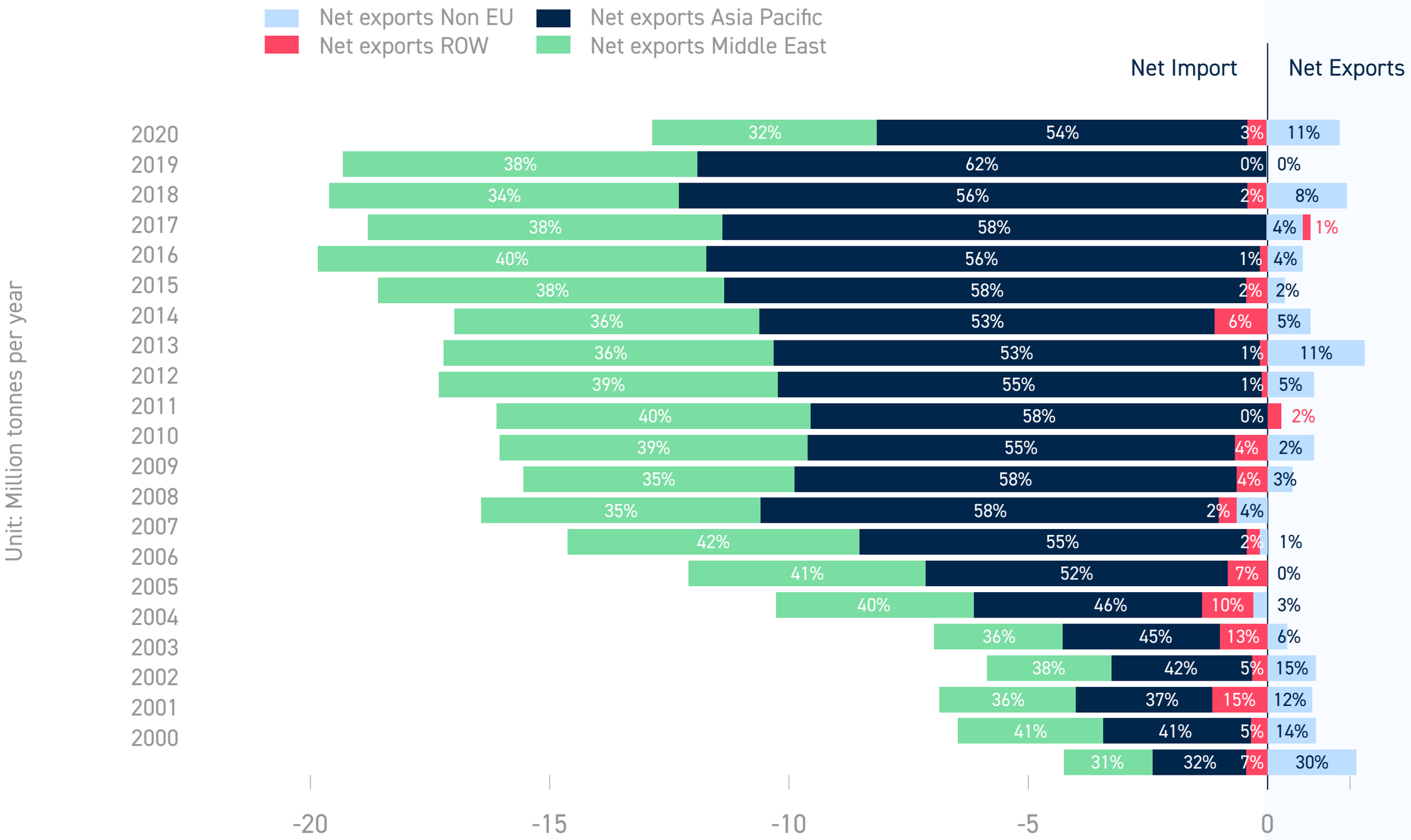
Source: Eurostat



After a significant increase of gasoil imports from the US between 2008 and 2013, Russia recovered some of the lost shares in 2014-2018 to remain the leading gasoil exporter to the EU. This continued dependence of the EU on imports of gasoil is the result of the diesel/gasoline imbalance that the EU is facing for many years.

FIG.26 **NET EU-27** JET FUEL TRADE BALANCE

Source: Eurostat

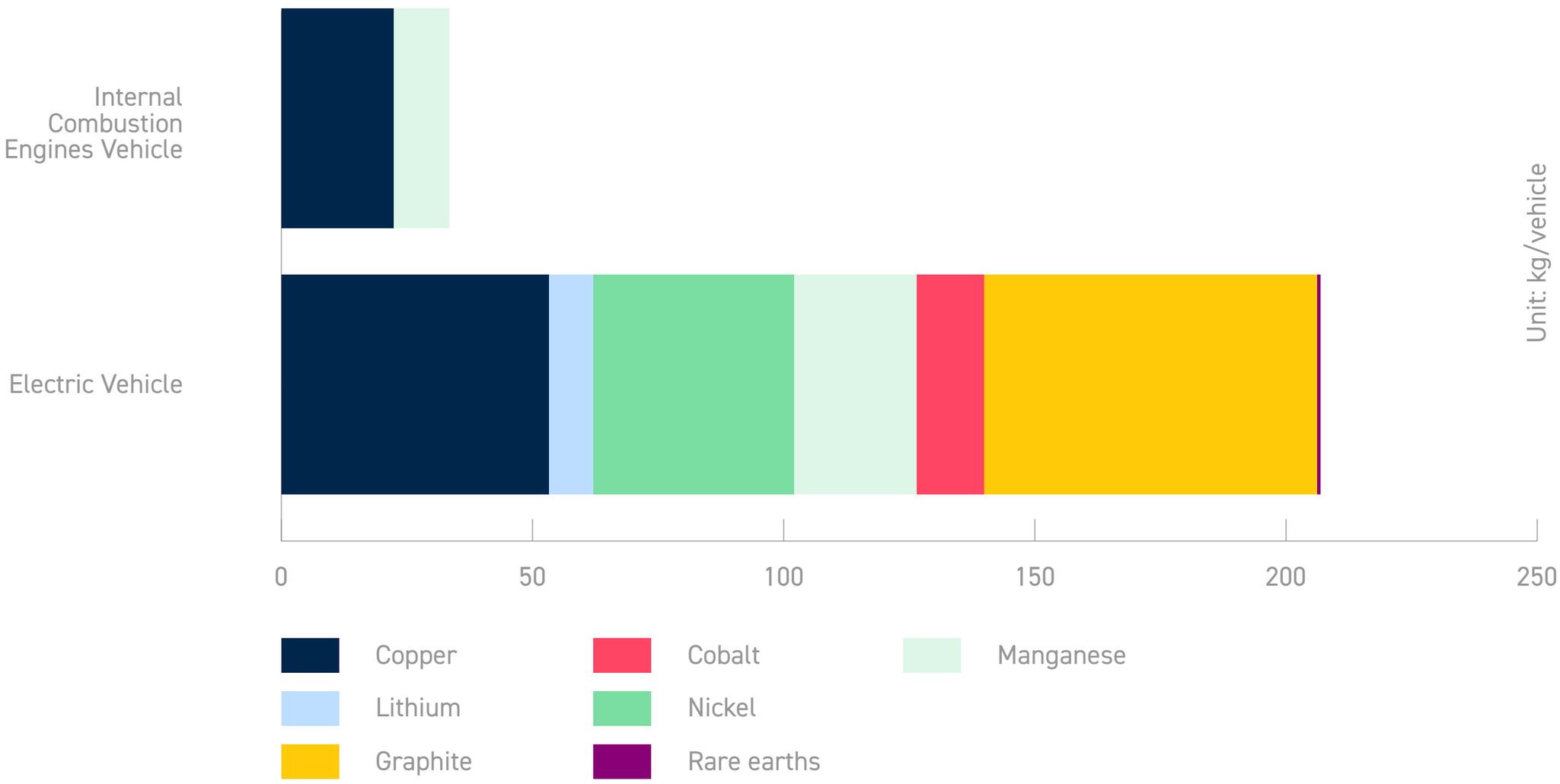


There is a substantial EU dependence on jet fuel imports originating mainly from the Middle East and to a lesser extent from the Asia Pacific region.

FIG.27

MINERALS USED IN ELECTRIC VEHICLES
COMPARED TO CONVENTIONAL VEHICLES

Source: International Energy Agency

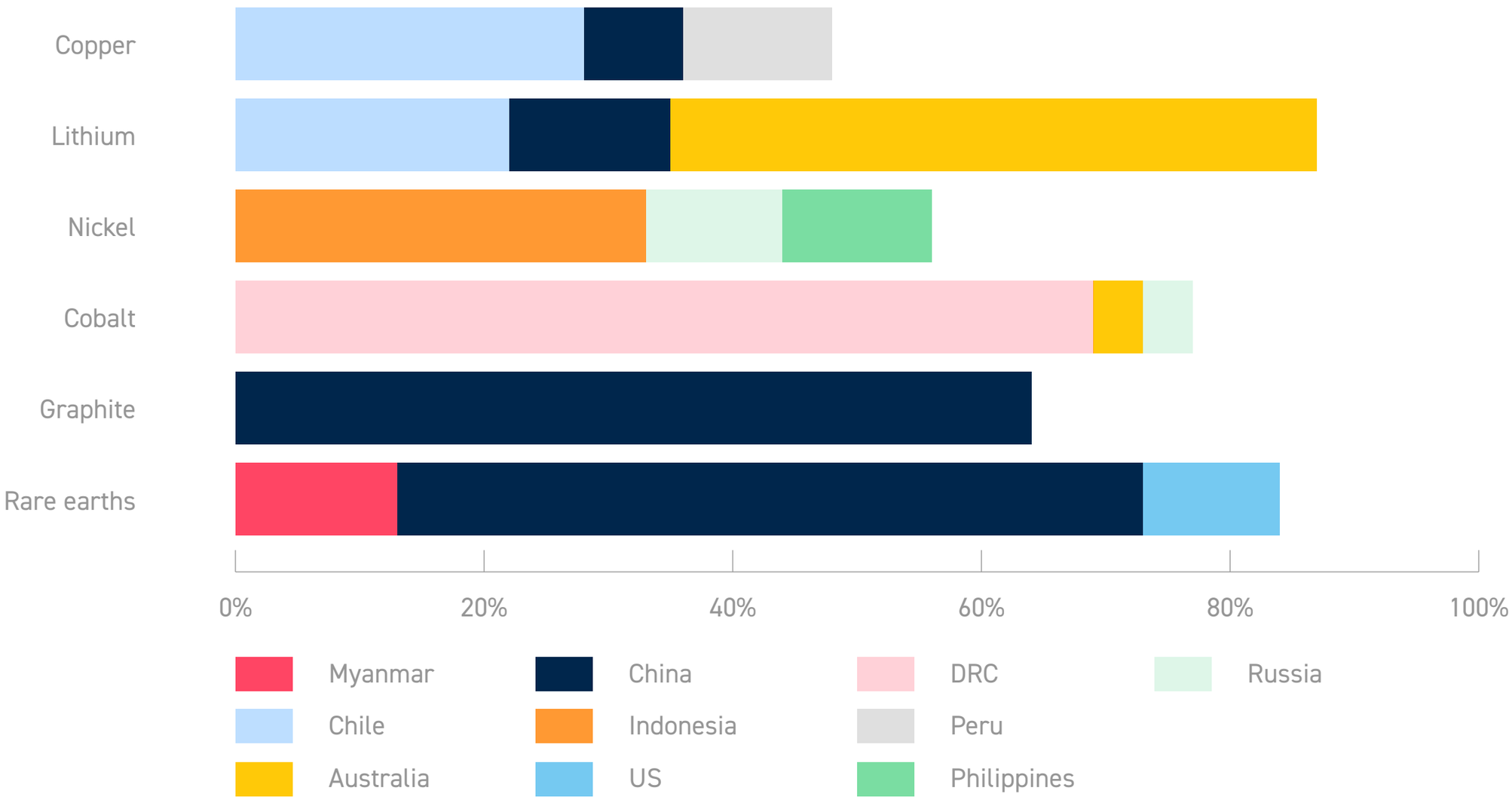


A typical electric vehicle (EV) requires six times the mineral inputs of a conventional car. Lithium, nickel, cobalt, manganese and graphite are crucial to battery performance, longevity and energy density, whereas rare earth elements are essential for permanent magnets that are vital for EV motors. The shift to EVs is set to drive a huge increase in the requirements for these minerals, meaning that the energy sector is emerging as a major force in mineral markets.

FIG.28a

SHARE OF TOP THREE PRODUCING COUNTRIES IN EXTRACTION OF SELECTED MINERALS IN 2019

Source: International Energy Agency

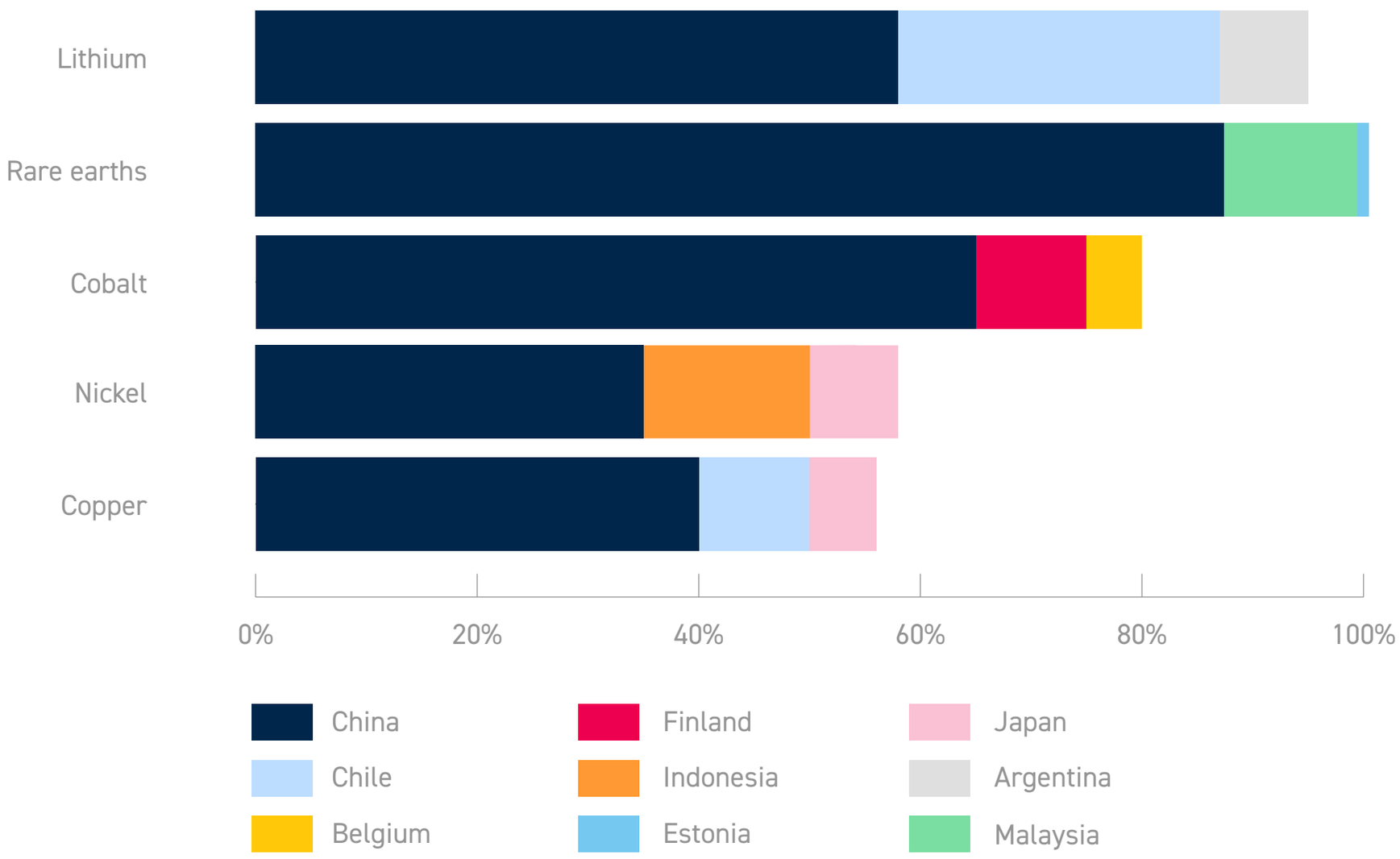


The prospect of a rapid rise in demand for critical minerals necessary for the technologies required in energy transitions poses huge questions about the availability and reliability of supply. The production of these minerals is more concentrated than that of oil. For lithium, cobalt and rare earth elements, the world's top three producing nations control well over three-quarters of global output. In some cases, a single country is responsible for around half of worldwide production. The Democratic Republic of the Congo (DRC) and China were responsible for some 70% and 60% of global production of cobalt and rare earth elements respectively in 2019.

FIG.28b

SHARE OF TOP THREE PRODUCING COUNTRIES **IN TOTAL PROCESSING OF SELECTED MINERALS IN 2019**

Source: International Energy Agency

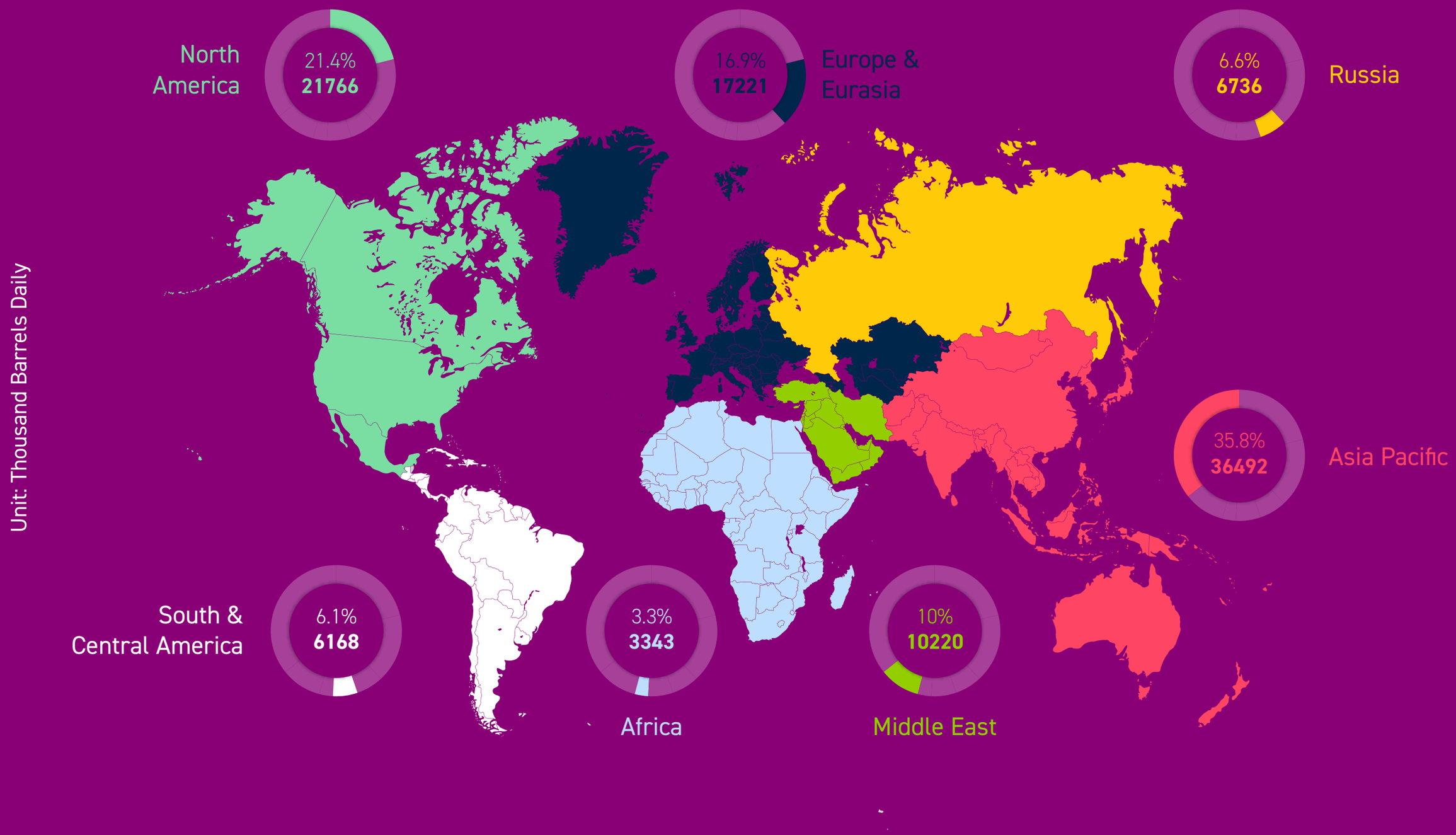


The prospect of a rapid rise in demand for critical minerals necessary for the technologies required in energy transitions poses huge questions about the availability and reliability of supply. The level of concentration for processing operations is particularly high, with China's strong presence across the board: China's share of refining is around 35% for nickel, 50-70% for lithium and cobalt, and nearly 90% for rare earth elements. High levels of concentration, compounded by complex supply chains, increase the risks that could arise from physical disruption, trade restrictions or other developments in major producing countries.

Refining

FIG.29 GLOBAL REFINING CAPACITY AS OF 2020

Source: BP Statistical Review of World Energy 2021



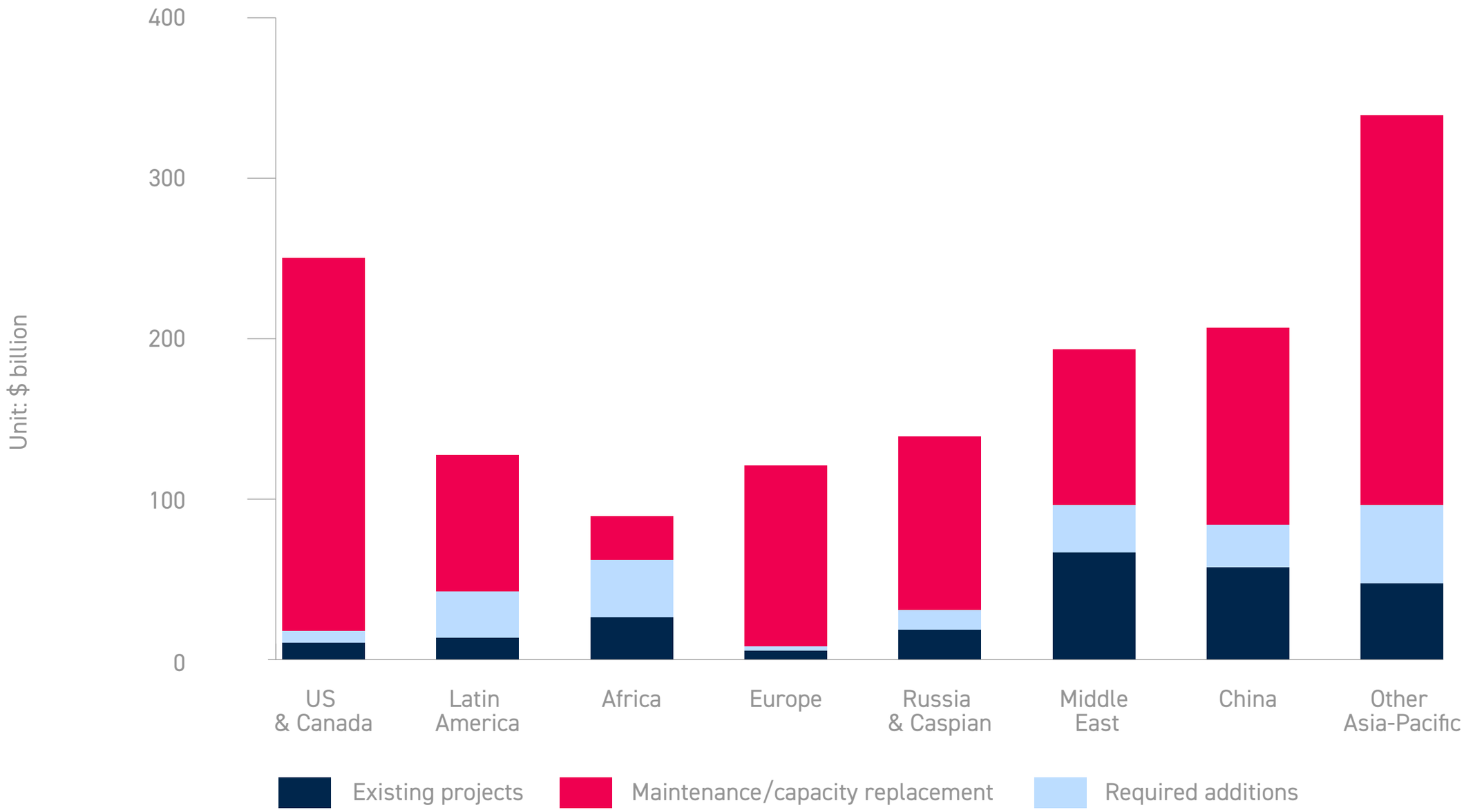
Unit: Thousand Barrels Daily

Refining is spread around the world and truly a global business. The share of Europe and Eurasia (excluding Russia) has remained the same compared to 2019. At 17% it remains the third largest region for refining, behind Asia Pacific at 36% and North America at 21%.

FIG.30

PROJECTED INVESTMENT **IN REFINING SECTOR PER REGION 2021-2045**

Source: Organization of the Petroleum Exporting Countries

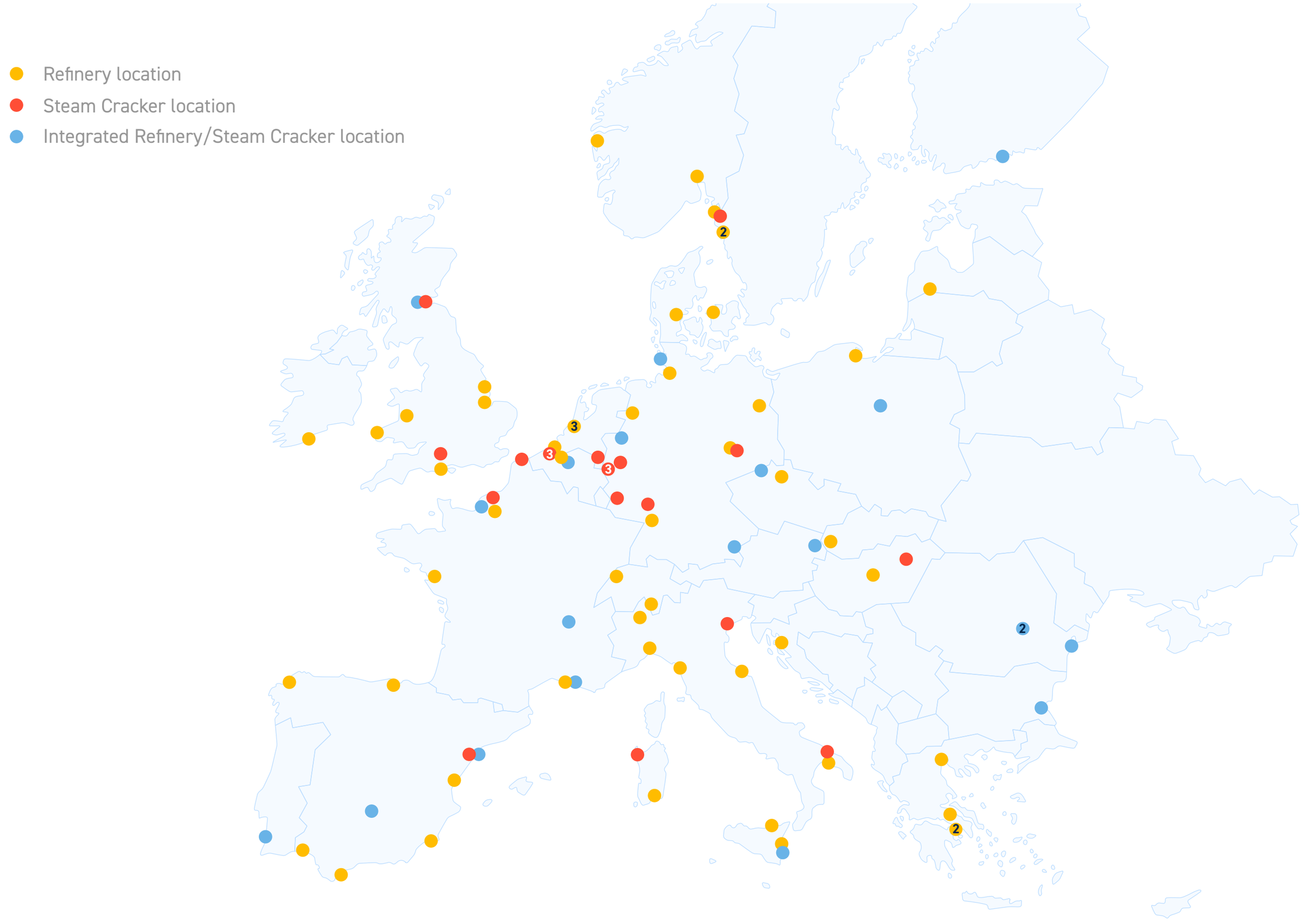


All three categories of refinery investments are estimated at around $1.46 trillion for the 2020-2045 period. More than $1 trillion will be dedicated to maintenance, $246 billion will be invested in known projects and the remaining $191 billion to additions beyond firm projects.

FIG.31

REFINERY/STEAM CRACKER SITES IN EUROPE

Source: Concawe and Petrochemical Europe

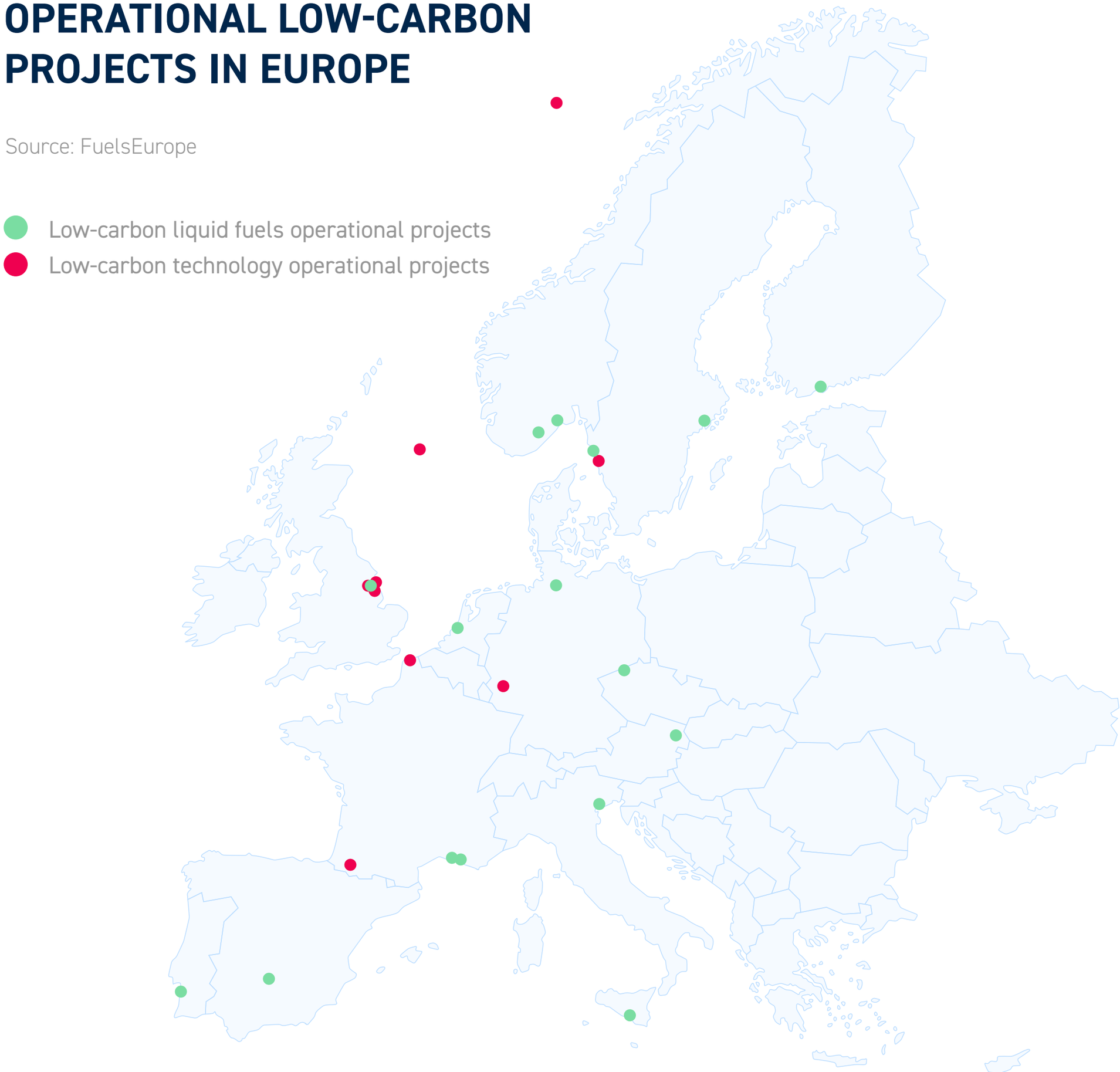


A large number of refineries are integrated with, or very close to steam crackers which produce the feedstock for the petrochemical industry. Such interconnections show how refining is an intrinsic part of the industrial value chain and provides the basis for advanced high value products.

FIG.32

OPERATIONAL LOW-CARBON PROJECTS IN EUROPE

Source: FuelsEurope



Up to May 2022, there were 26 low-carbon projects operational across Europe. These projects - nine low-carbon technologies and 16 low-carbon liquid fuels - are helping the EU achieve its climate goals.

You can visit our **cleanfuelsforall.eu** website for regular updates on the map and more information about each project.

FIG.33

75 MAINSTREAM REFINERIES WERE OPERATING IN THE EU-27, UK, NORWAY AND SWITZERLAND AT THE END OF 2021

Source: Concawe

COUNTRY	NUMBER OF REFINERIES
Austria	1
Belgium	2
Bulgaria	1
Croatia	1
Czechia	2
Denmark	2
Finland	1
France	6
Germany	11
Greece	4
Hungary	1
Ireland	1
Italy	10
Lithuania	1
Netherlands	5
Poland	2
Portugal	1
Romania	3
Slovakia	1
Spain	8
Sweden	3
EU-27 TOTAL = 67	
NO + CH + UK	8
TOTAL = 75	

In December 2021, there were 75 'mainstream' (capacity above 30 kbbdl/d or 1.5Mt/a) refineries in the EU-27, United Kingdom, Norway and Switzerland.

FIG.34

EU, UK, NORWEGIAN AND SWISS MAINSTREAM REFINERIES HAD 650.8 MILLION TONNES OF PRIMARY REFINING CAPACITY IN 2021

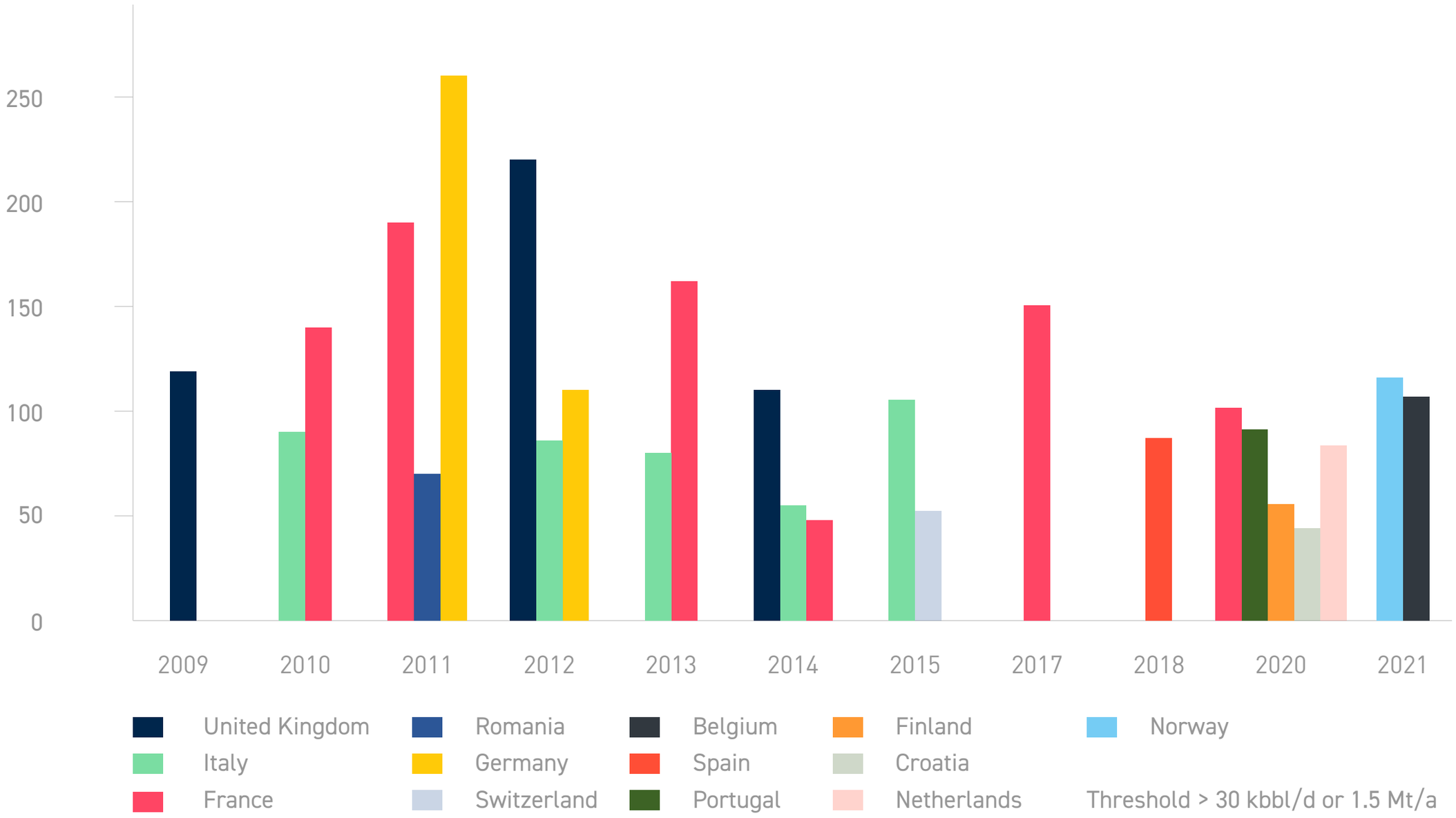
Source: Concawe

COUNTRY	Mainstream > 30 kb/cd
	Mt/a
Germany	101.5
Italy	84.8
Spain	71.5
France	57.6
Netherlands	61.3
Greece	24.7
Belgium	32.3
Romania	11.9
Sweden	19.8
Czechia	8.7
Denmark	8.7
Finland	10.3
Croatia	4.5
Poland	29.2
Portugal	11.3
Austria	9.7
Bulgaria	5.8
Hungary	8.1
Ireland	3.6
Lituania	9.5
Slovakia	5.8
EU-27 TOTAL	**580.2**
Norway	10.2
Switzerland	3.4
United Kingdom	57.1
NO + CH + UK	**70.6**
TOTAL	**650.8**

The 75 'mainstream' refineries operating in 2021 in the EU-27, UK, Norway and Switzerland had a primary refining capacity of 650.8 million tonnes. This represents a decrease by 156 million tonnes of primary refining capacity since 2009. Over the last year the refining capacity in Europe has decreased due to two refinery closures (one in Belgium and one in Norway).

FIG.35 **REFINERY CLOSURES** IN EUROPE

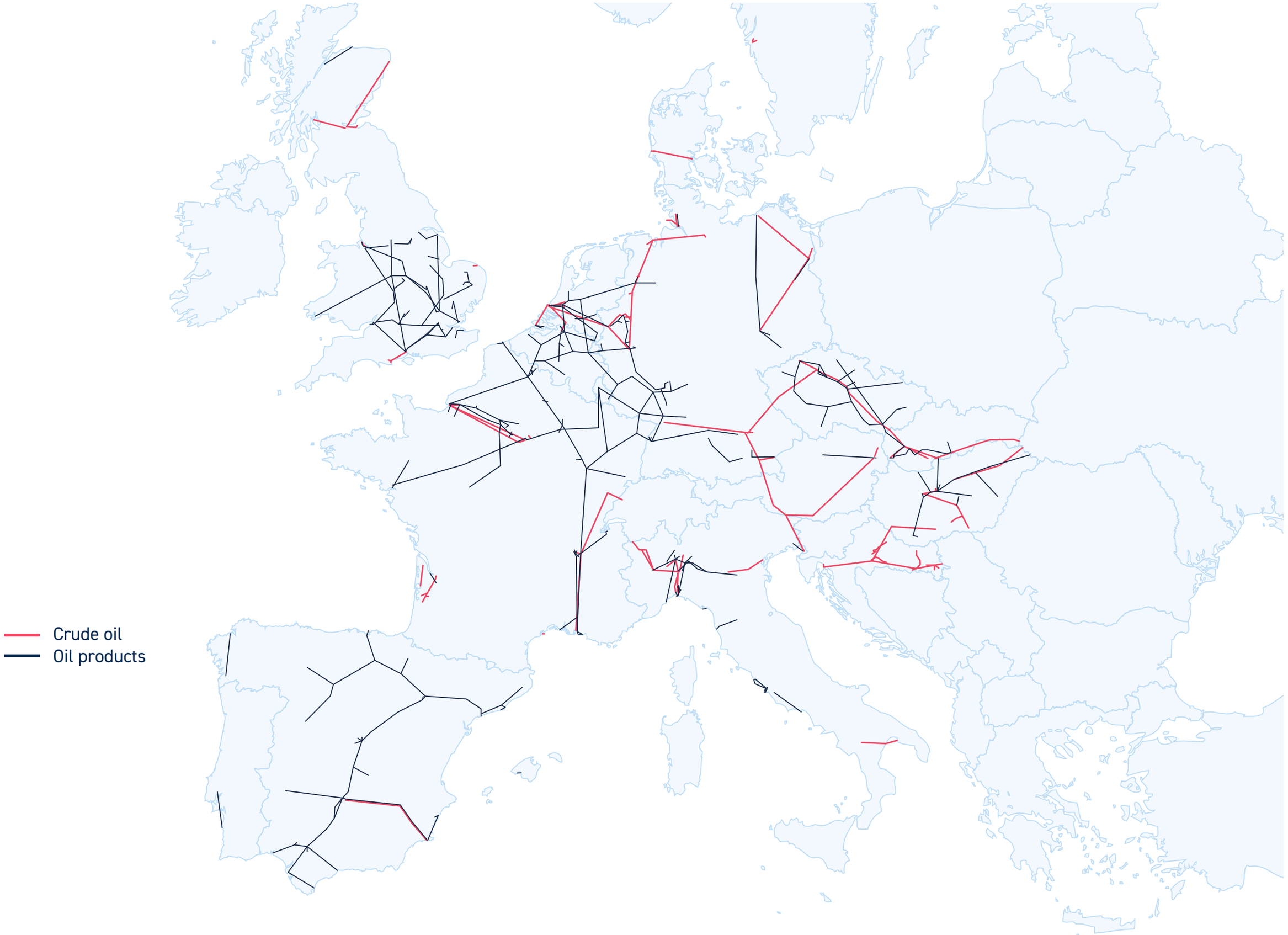
Source: Platts and Concawe



Since 2009, nearly to 100 refineries operating in Europe, 26 mainstream refineries were closed or transformed. Currently, five refineries in Europe underwent a transformation process, moving away from oil and converting into biorefineries.

FIG.36 **OIL PIPELINES -** MAP OF EUROPE

Source: Concawe



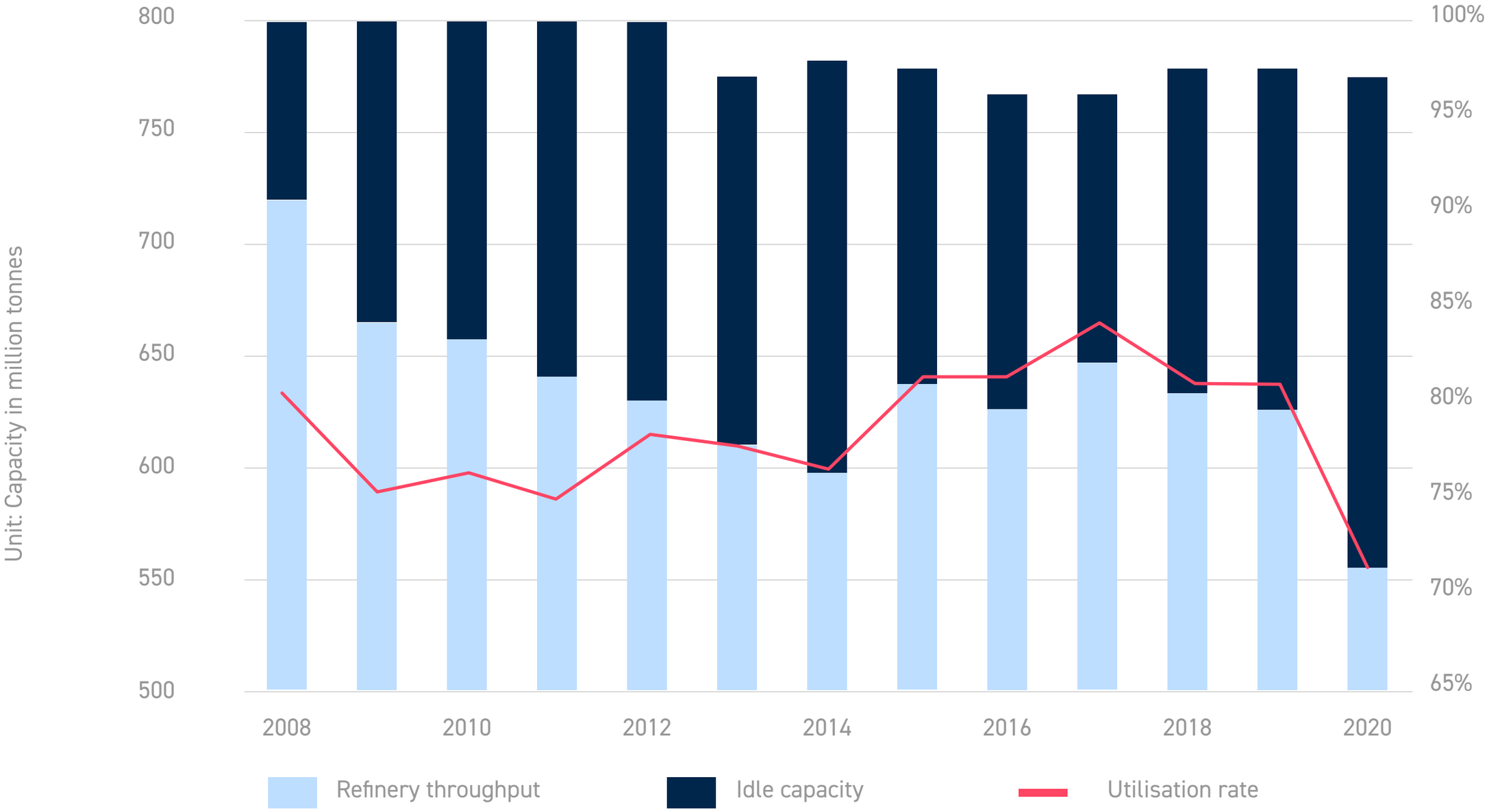
Pipelines are a long-established, safe and efficient mode of transport for crude oil and petroleum products. They are used both for short-distance transport (e.g. within a refinery or depot, or between neighbouring installations) and long distances.

An extensive network of cross-country oil pipelines in Europe meets a large proportion of the need for transportation of petroleum products.

Note: The map is based on publicly available information as well as the information gathered by Concawe and as such should not be considered exhaustive.

FIG.37 CAPACITY AND UTILISATION OF EUROPEAN REFINERIES

Source: BP Statistical Review of World Energy 2021

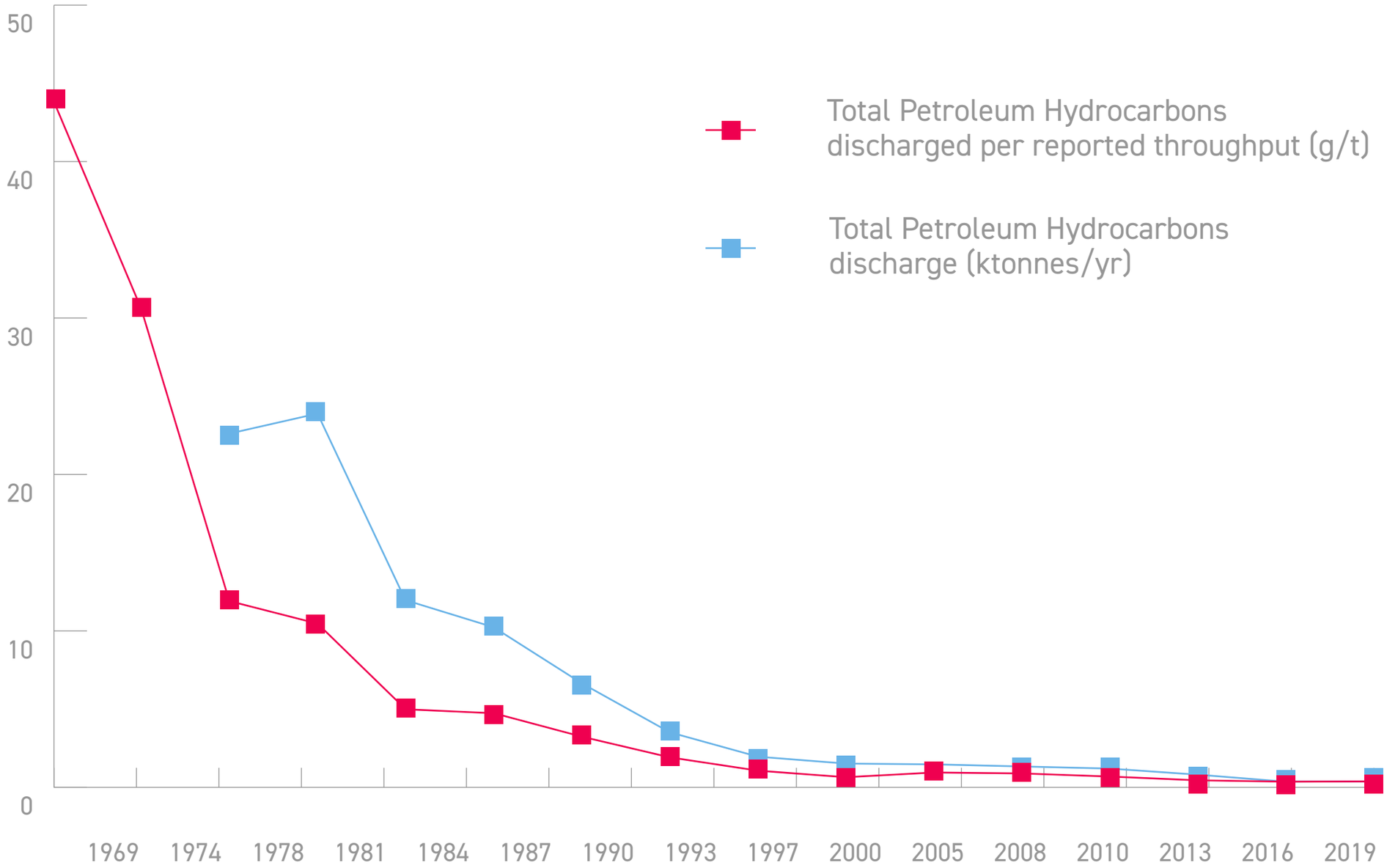


Since 2008, the utilisation rate of EU refineries has been oscillating between 86% to a lowest of 78%. This rate is commonly accepted as a requirement for efficient economic operations of a refinery. However, in 2020, this rate sank to the very low rate of 72% due the Covid-19 crisis.

FIG.38

QUALITY OF REFINERY WATER EFFLUENT OIL DISCHARGED IN WATER

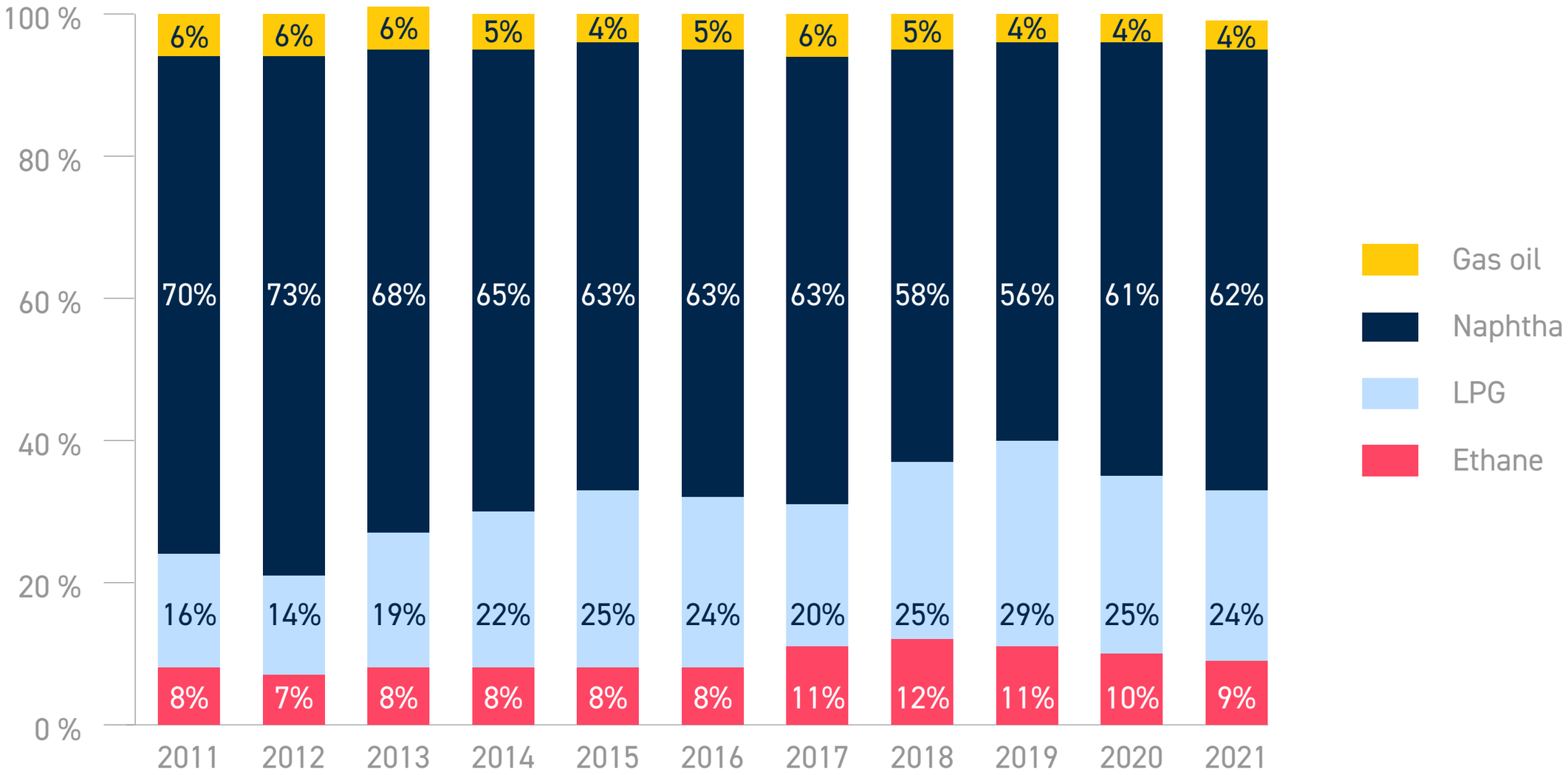
Source: Concawe



The EU refineries have significantly improved the quality of refinery water effluent in the last decades. The amount of Total Petroleum Hyrdrocarbons (TPH) discharged in effluents from reporting installations continued to decrease to extremelly low levels relative to pre-1990; both in terms of the absolute amount of TPH discharged and the amount expressed relative to the volume of feedstock processed (throughput) and the refining capacity of the installations.

FIG.39 CHEMICAL INDUSTRY RAW MATERIAL USE

Source: ICIS/CEFIC



The EU refining sector is closey integrated with the petrochemical sector. A large part of the petrochemical feedstock relies on refined products, such as naphtha and petroleum gases.

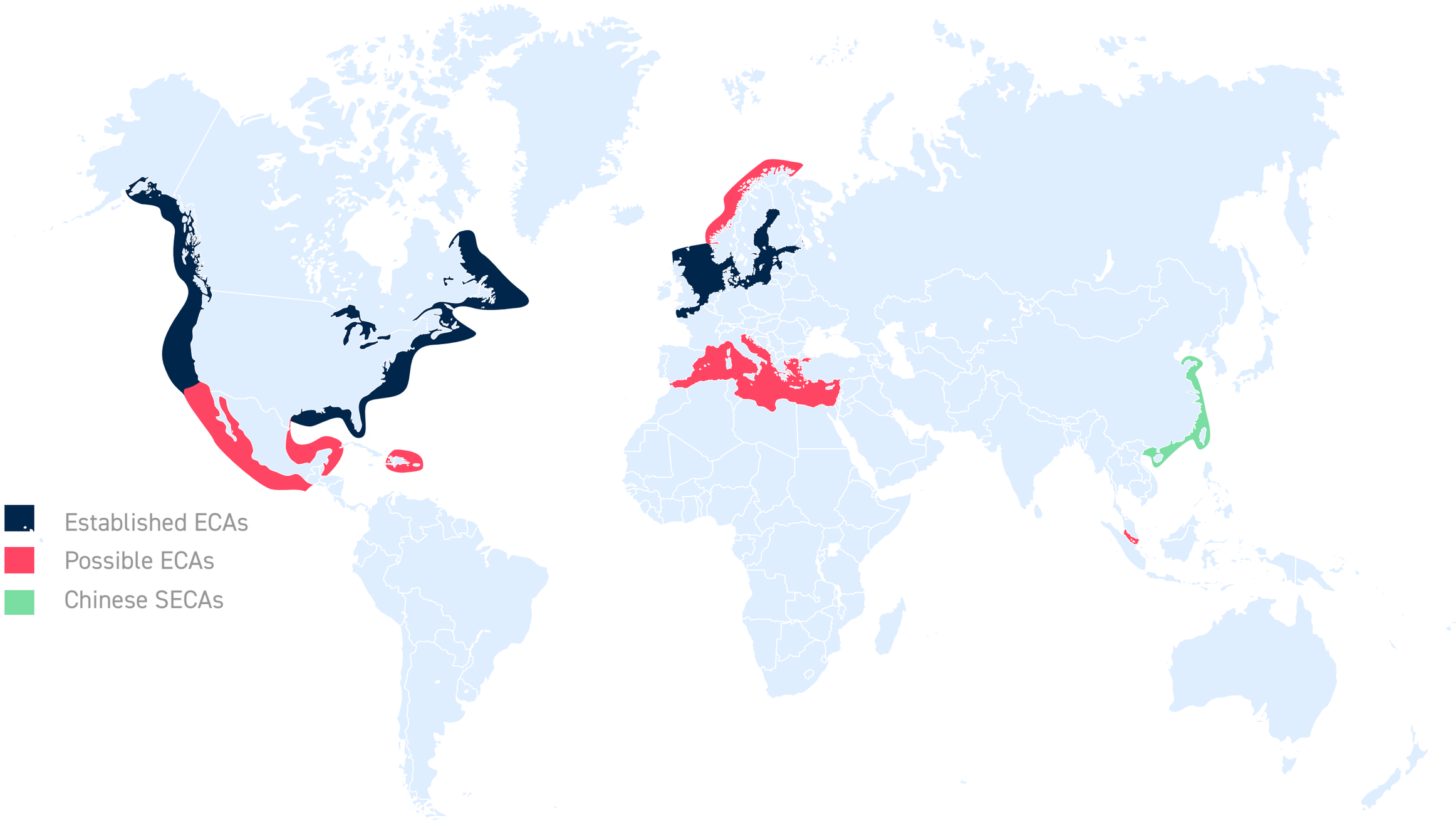
Note: Please note due to rounding, figures may not add up to exactly 100%.

FIG.**40**

MARINE FUEL SULPHUR SPECIFICATIONS

SO_2 EMISSIONS CONTROL AREAS (SECAs)

Source: International Maritime Oragnization and Concawe



Since January 2015, all vessels in the Emission Controlled Area (ECA) of the Baltic Sea, North Sea, English Channel and waters 200 nautical miles from the coast of US and Canada, had to reduce their sulphur emissions to 0.1%. From 1 January 2019, vessels have been required to use fuel with a sulphur content not exceeding 0.50% while operating within the Coastal ECA, i.e. within China's territorial sea (including the Hainan Coastal ECA) as well as Hong Kong, Taiwan and Mainland China. From 1 January 2022, vessels must use fuel with a sulphur content not exceeding 0.10% while operating within the Hainan Coastal ECA.

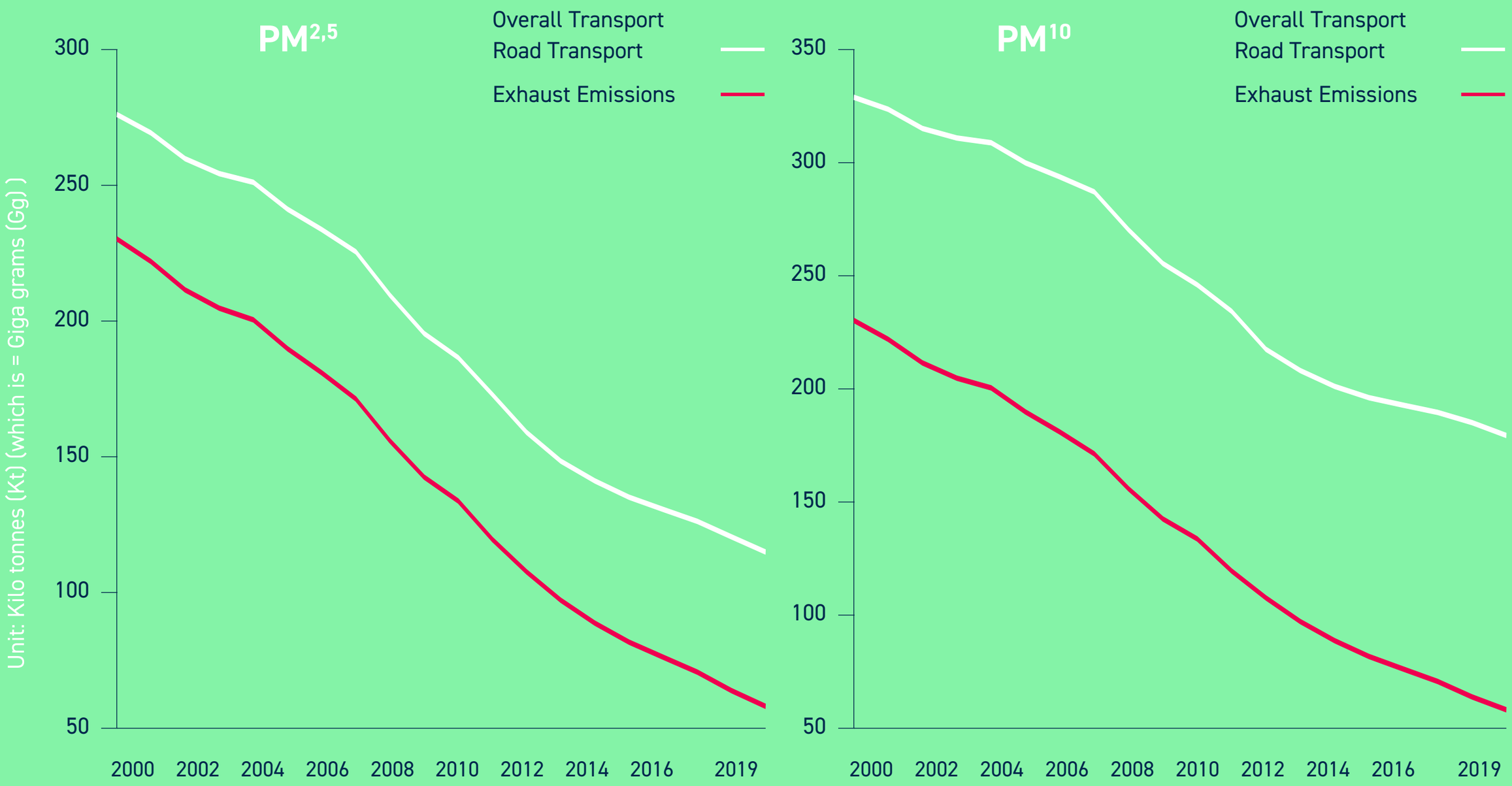
Vessels are required to use either a distillate, an alternate fuel or install a scrubber that removes sulphur from the exhaust after combustion.

Emissions

FIG.**41a**

SINCE 2000, PM EMISSIONS FROM EXHAUST REDUCED BY OVER 35% IN THE EU

Source: European Environmental Agency

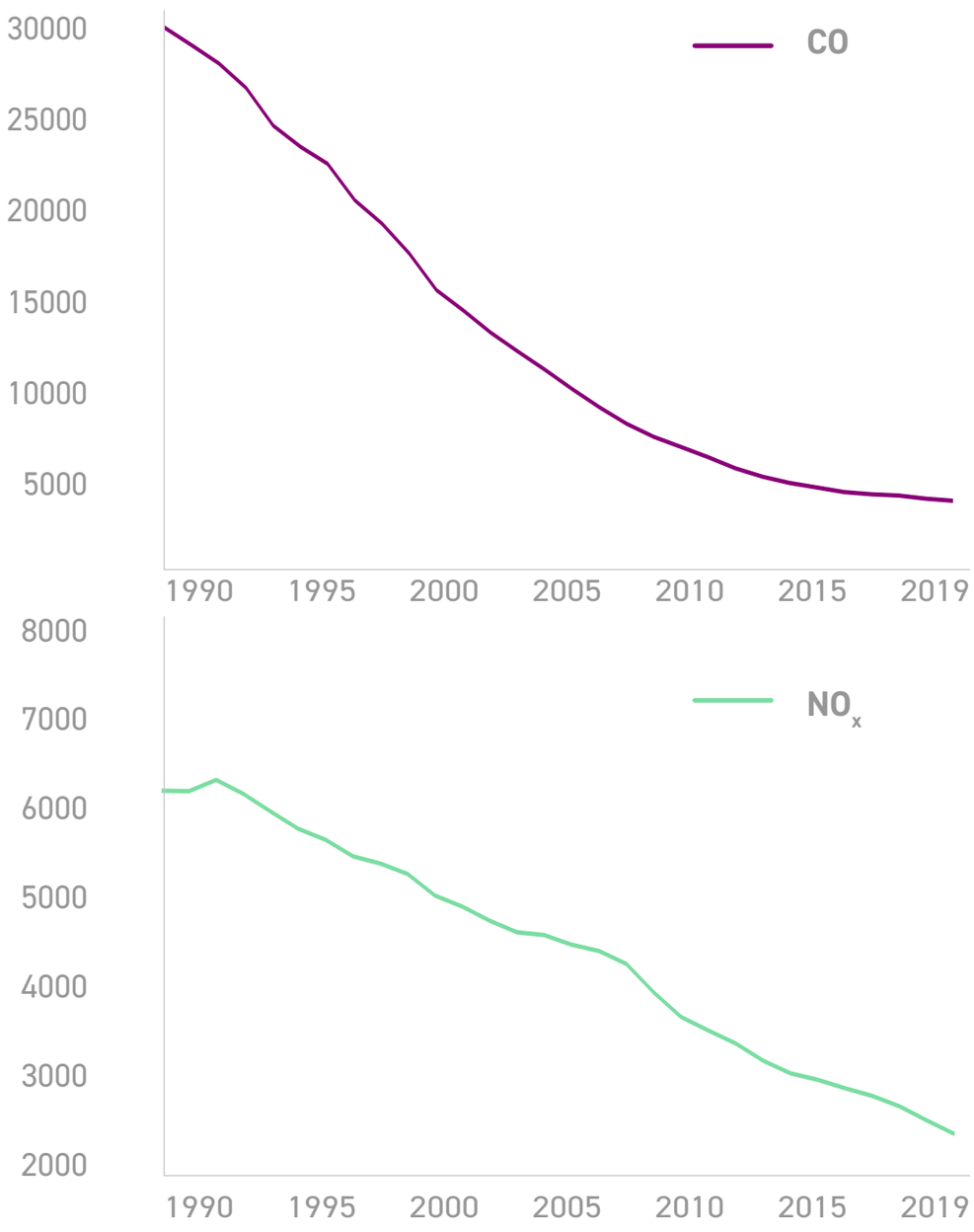


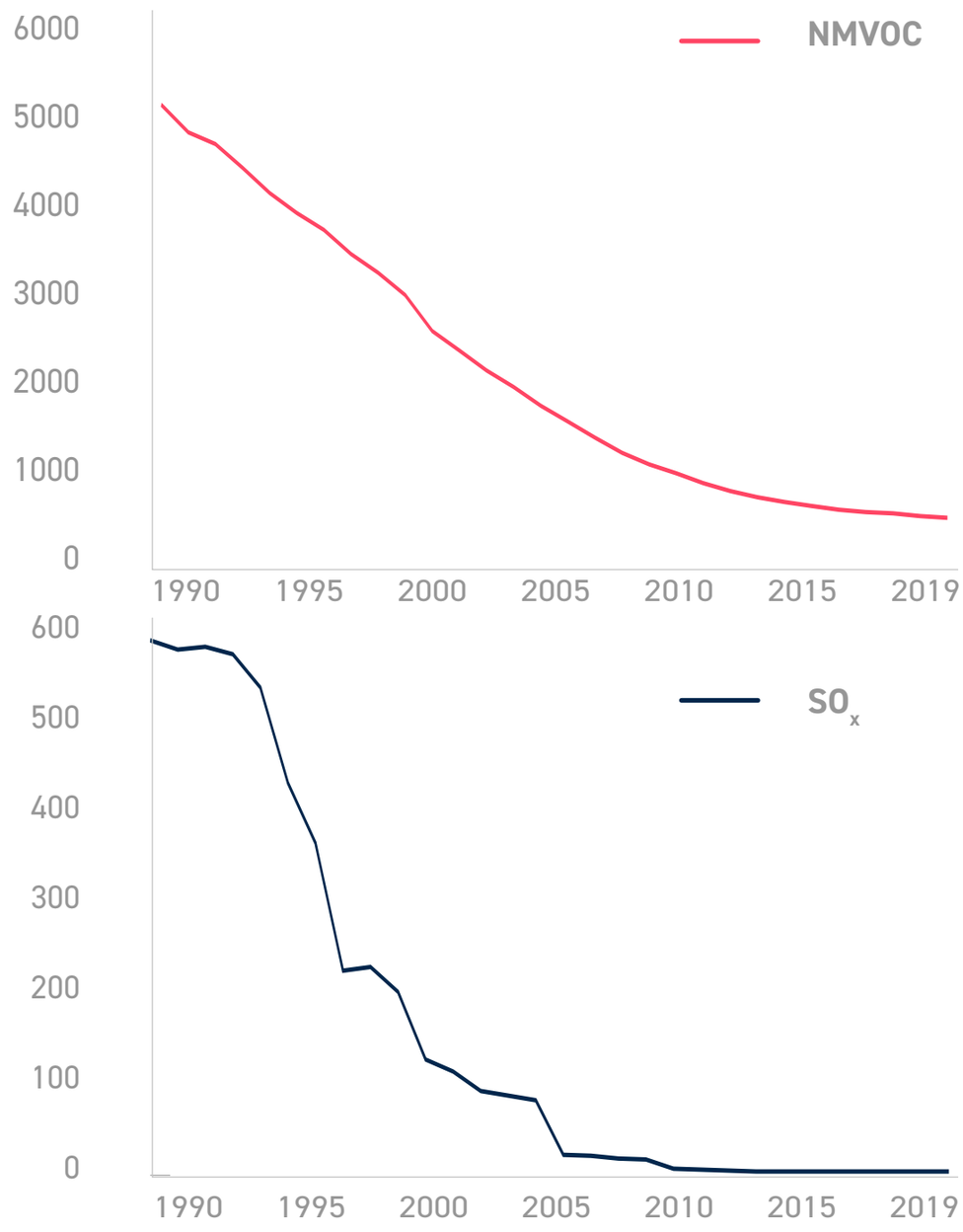
Particulate Matter (PM) emissions are continuously decreasing as the result of cleaner diesel fuel, advanced engines and effective emissions control technology. Since the introduction of the Euro 6 standard, modern road vehicles with diesel engines are using highly efficient filters that remove 99.9% of PM.

FIG.41b

SINCE 1990, FUELS ARE PROGRESSIVELY BECOMING CLEANER RESULTING IN EXHAUST EMISSIONS REDUCTION BY OVER 80%

Source: European Environmental Agency

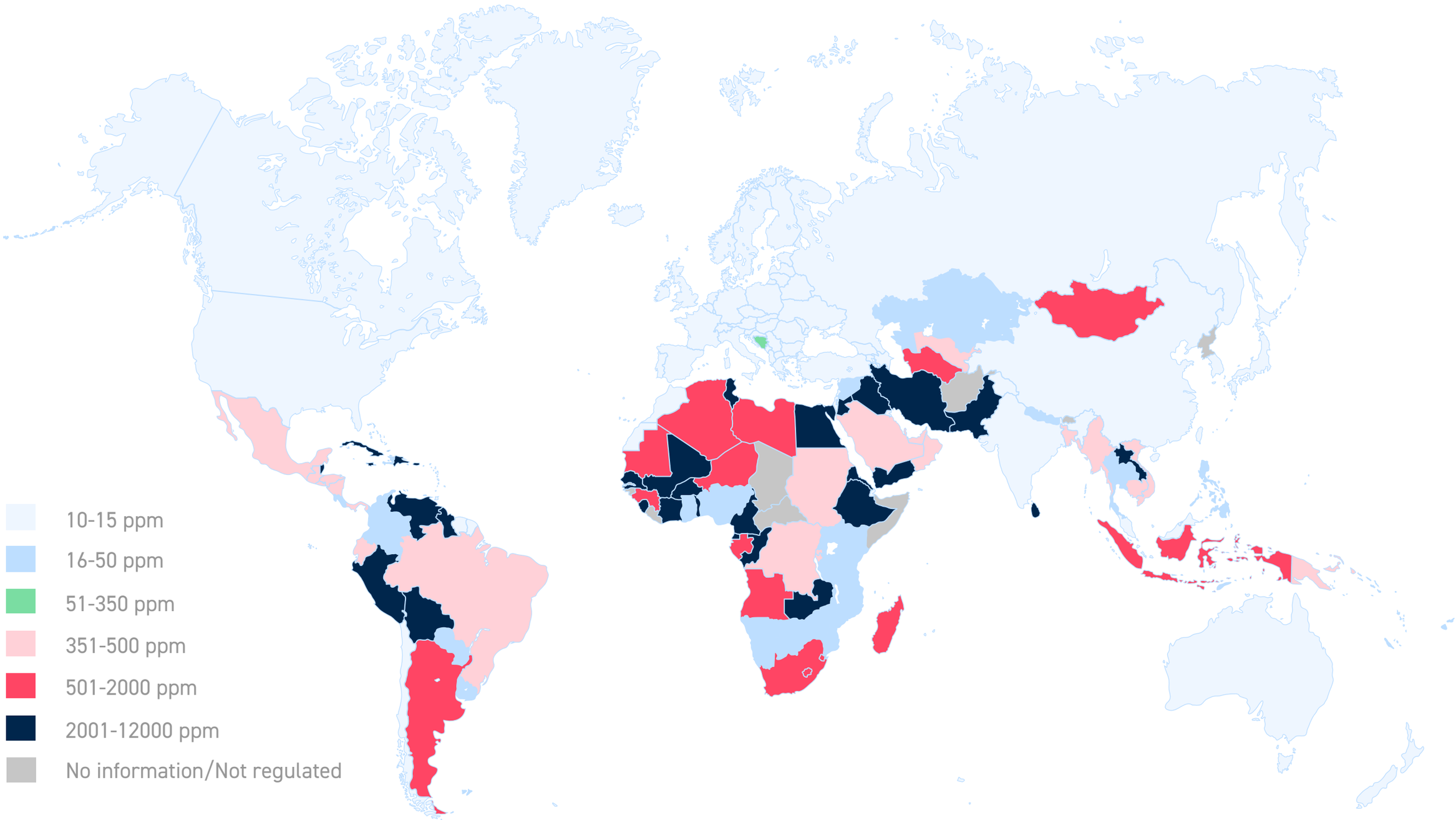




Since 1990 the refining industry has contributed to cleaner exhausts by today, containing over 80% lower SO_x, NMVOC & CO, while NO_x emissions decreased by over 60%. These significant improvements are the result of the partnerships with the automotive industry aiming at improving the fuel-engine efficiency and leading to multiple environmental benefits.

FIG.42 ON-ROAD DIESEL SULPHUR LIMITS

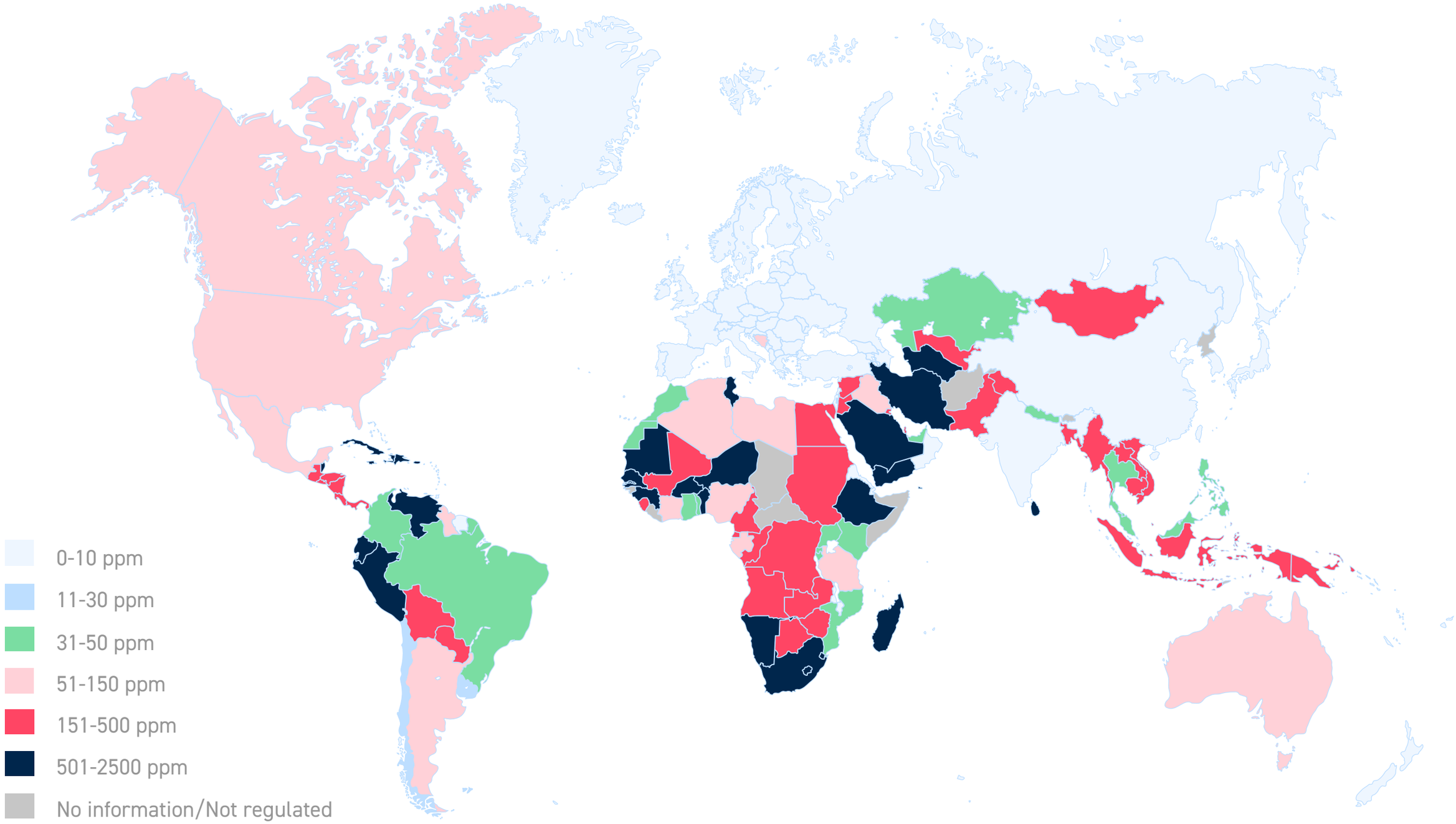
Source: Stratas Advisors, 2022



Countries may apply lower limits for different grades, regions/cities, or based on average content. Detailed information on limits and regulations can be found at www.stratasadvisors.com.

FIG.43 GASOLINE SULPHUR LIMITS

Source: Stratas Advisors, 2022

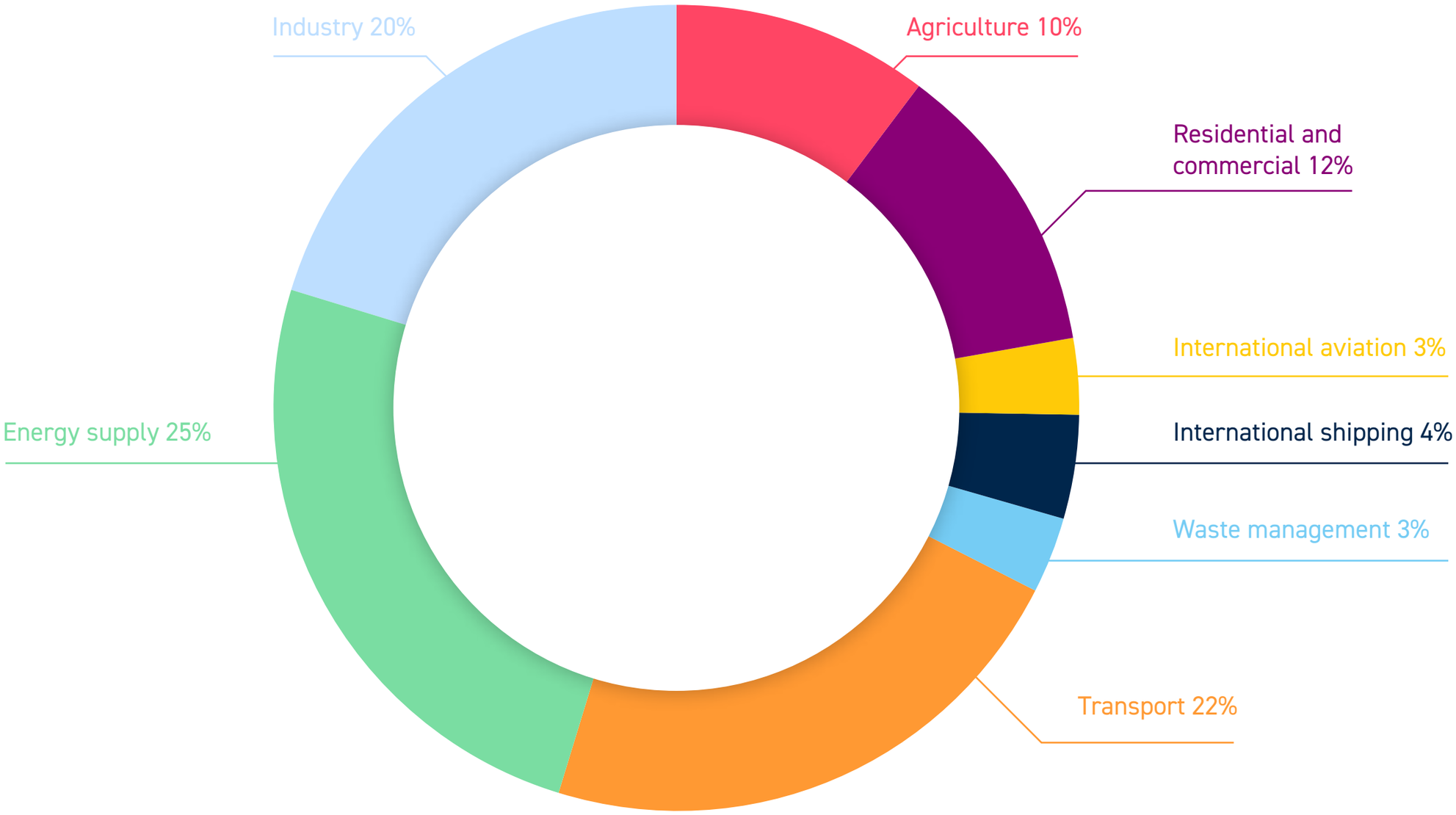


Countries may apply lower limits for different grades, regions/cities, or based on average content. Detailed information on limits and regulations can be found at www.stratasadvisors.com.

FIG.**44**

GHG EMISSIONS BY SECTOR IN THE EU-27 IN 2019

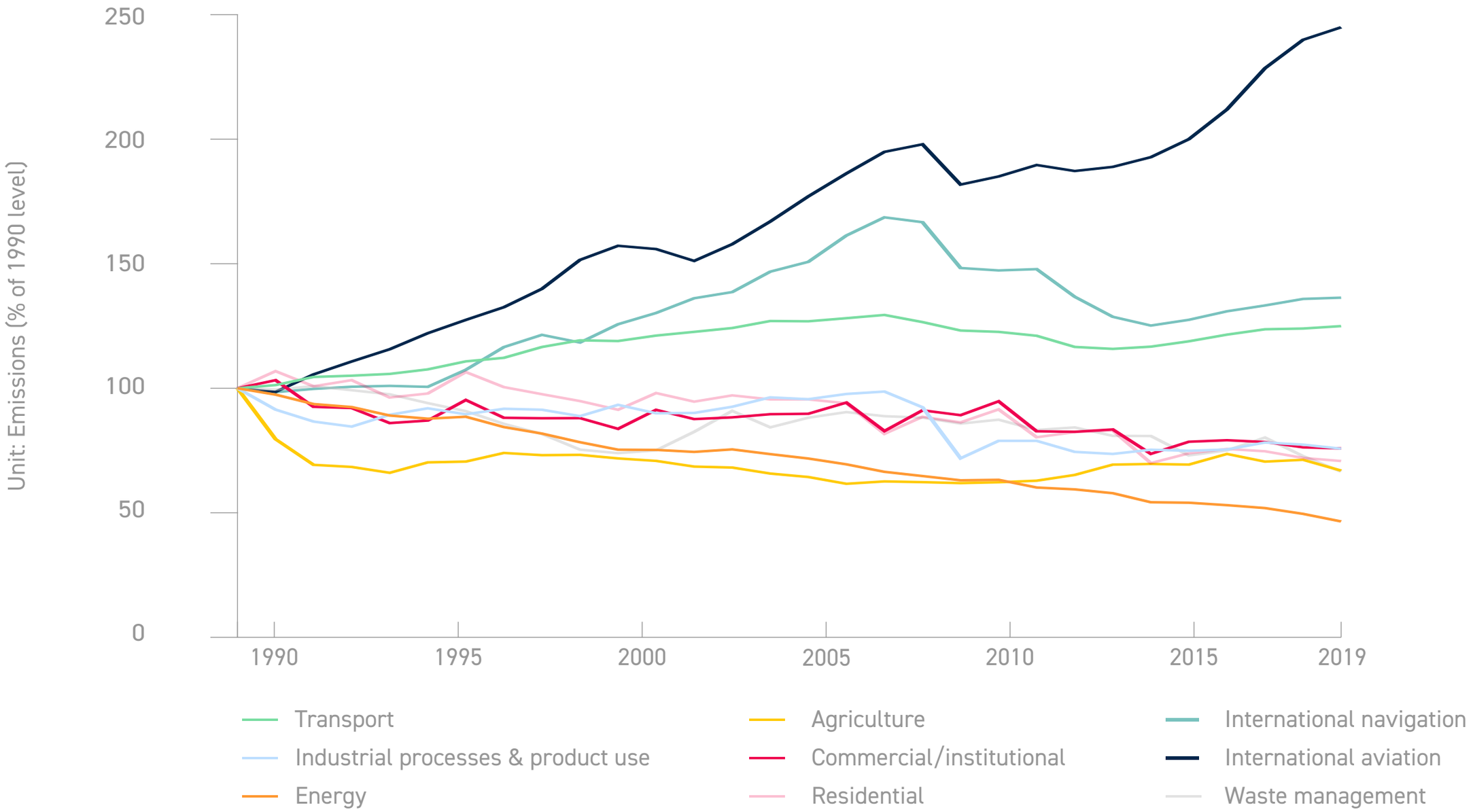
Source: European Environmental Agency



Energy supply and industry accounted for 45% of total GHG emissions in the 27 EU Member States in 2019. Transport, including international shipping and aviation, generated 29% of EU GHG emissions.

FIG.45 CO_2 EMISSION TREND BY SECTOR IN THE EU-27

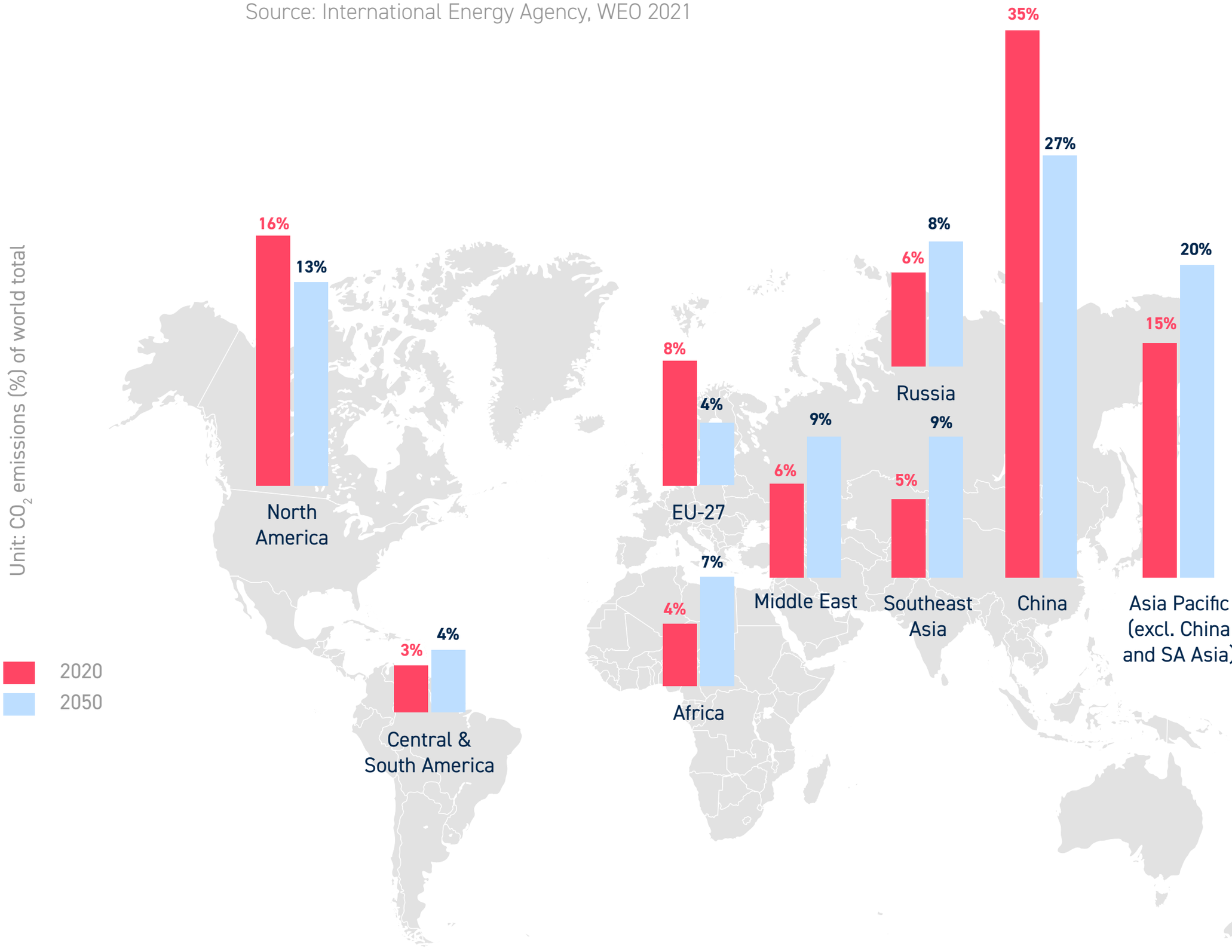
Source: European Environmental Agency



CO_2 emissions per sector have generally been declining since 2007. Industry (processes and manufacturing) CO_2 emissions decreased sharply over the period 2007-2012 and are now between 30% and 38% below the 1990 levels. CO_2 emissions from transport has been steadily decreasing between 2008 and 2015. However, since 2016 we are witnessing an increase of CO_2 emissions in transport mainly due to international aviation.

FIG.46 DECLINING EU SHARE IN GLOBAL CO_2 EMISSIONS

Source: International Energy Agency, WEO 2021

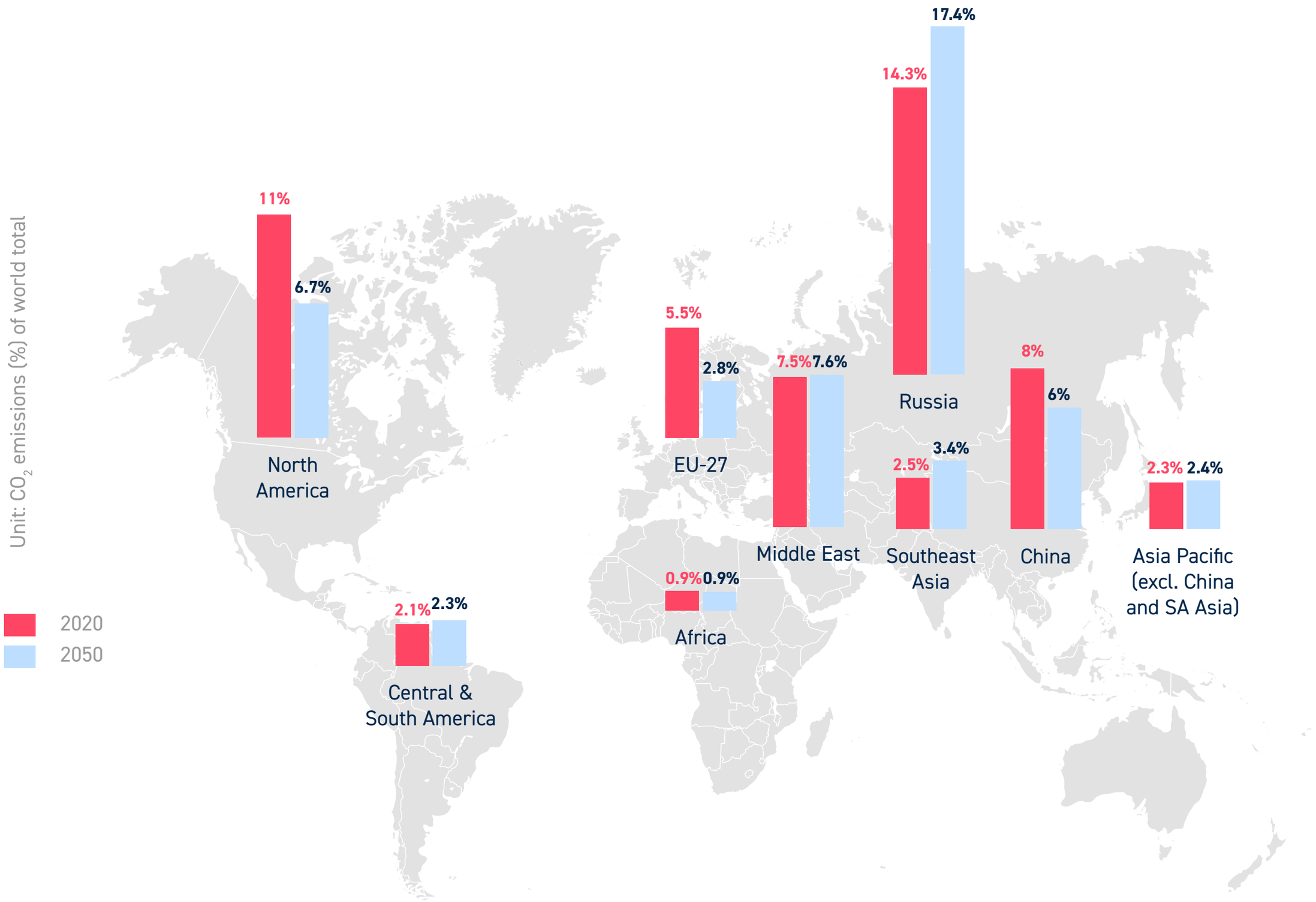


In 2020, the EU accounted for 8% of the total global CO_2 emissions and this share is expected to reduce to 4% by 2050. CO_2 emissions in North America and China are also forecasted to decrease by 2050 by respectively 3 and 8 percent points, whereas in the other parts of the world, emissions are likely to increase.

FIG.47

CO_2 EMISSIONS PER CAPITA/REGIONS

Source: International Energy Agency, WEO 2021

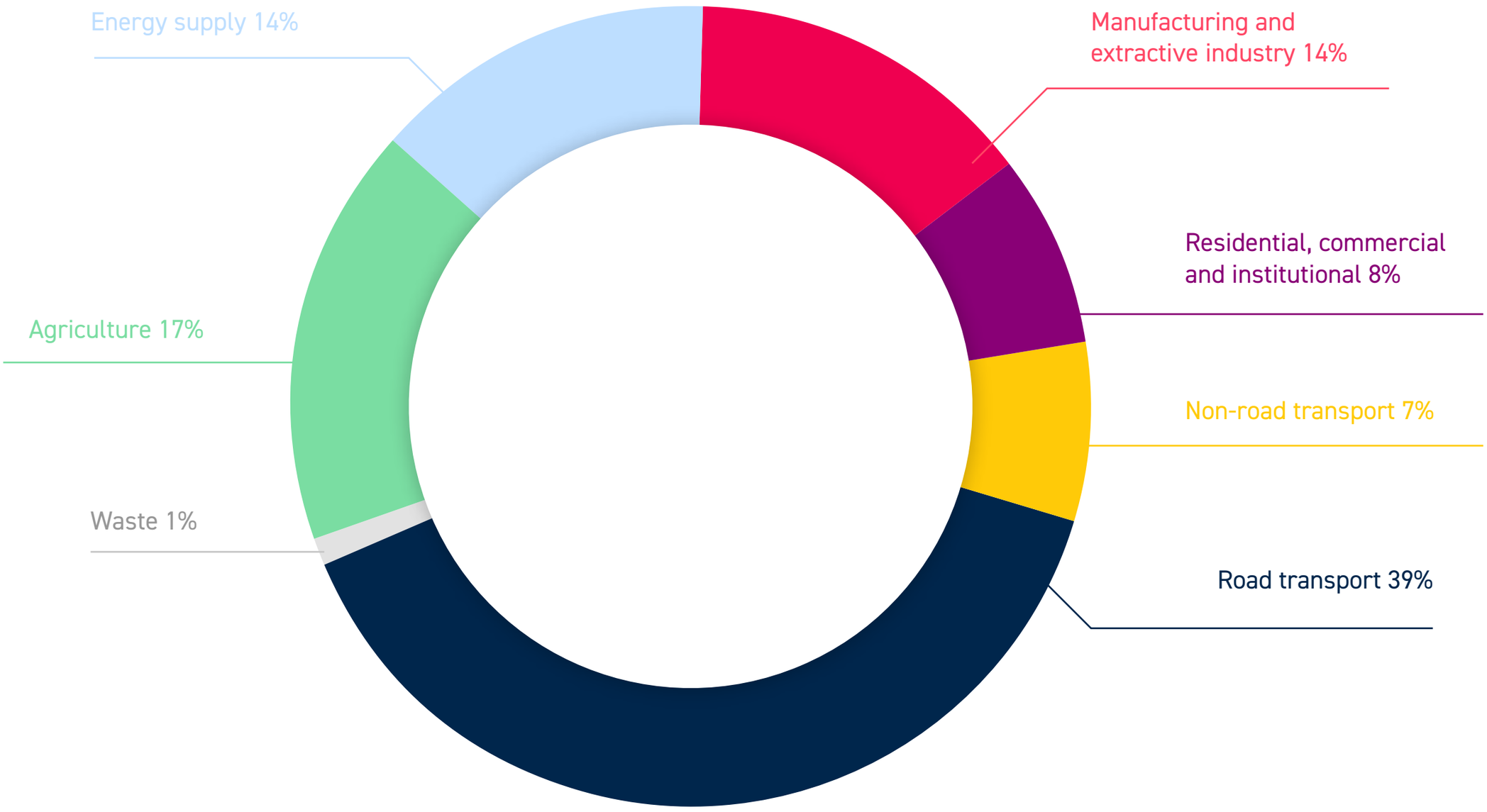


All regions but Russia and Southeast Asia are forecasted to see a decrease in CO_2 emissions by 2050. The drop is especially notable in the EU-27 and North American, where CO_2 emissions per capita are estimated to decreased by 49% and 40%.

FIG.48

NO_x CONTRIBUTION TO EU-27 EMISSIONS FROM MAIN SOURCE SECTORS IN 2019

Source: European Environmental Agency



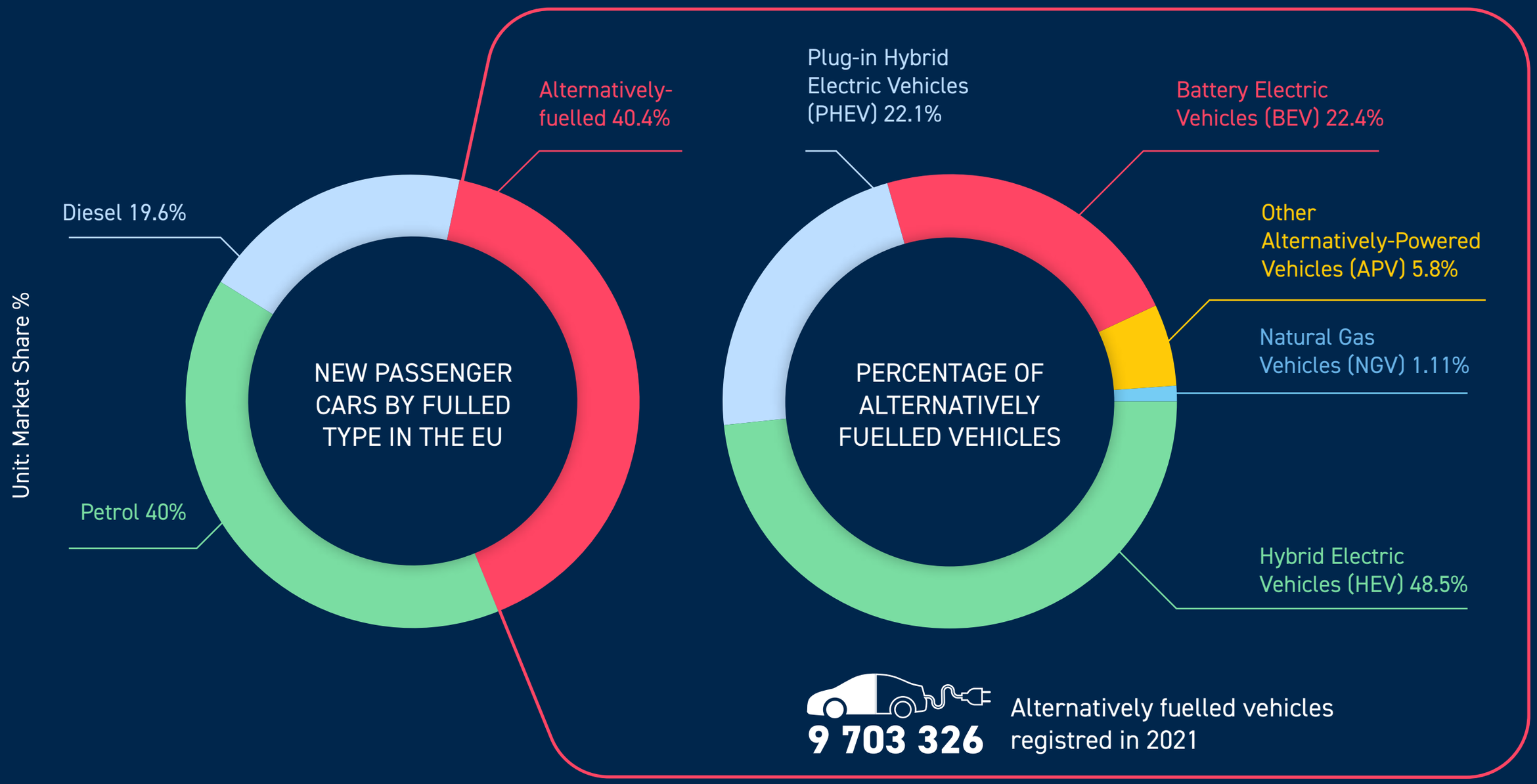
NO_x are main contributors to the air quality problems found in several urban areas in the EU. The road transport sector is the most significant contributor, being responsible for 39% of the total of NOx emissions emitted in 2019 in the EU. Between 2017 and 2019, the agricultural sector's NO_x emissions increased from 8% to 17%. On the other side, the residential, commercial, and institutional sector shrunk their NO_x emissions from 14% to 8%.

Retail & Marketing Infrastructure

FIG.49

ALTERNATIVELY FUELLED VEHICLES ACCOUNTED FOR 40,4% OF TOTAL PASSENGER CAR REGISTRATIONS IN THE EU-27 IN 2021

Source: European Automobile Manufacturers' Association



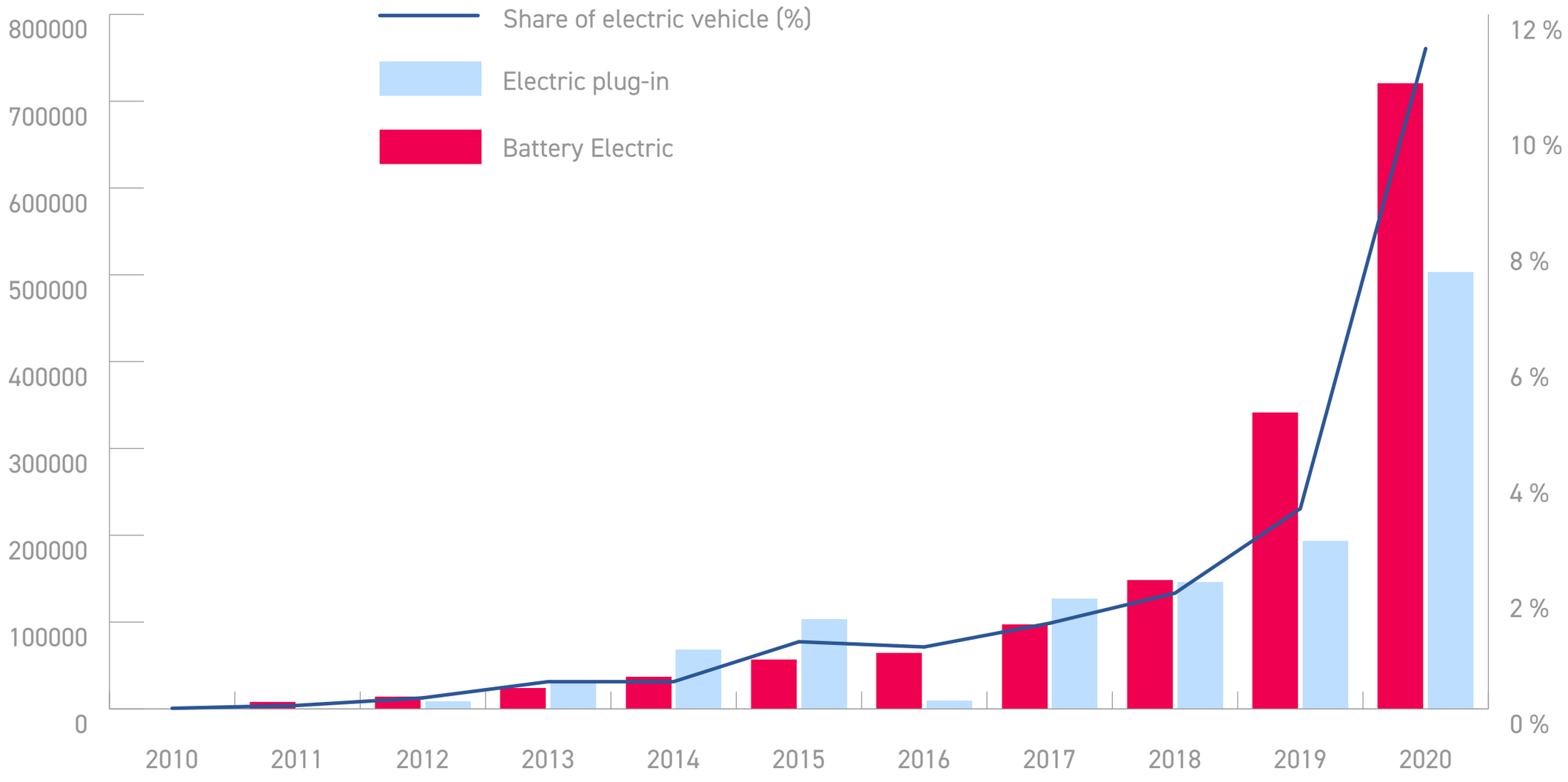
Conventional fuel types dominated EU car sales in terms of market share (59.6%) in 2021. Alternatively fuelled vehicles accounted for 40.4% of the total passenger car sales across the EU, which represents a significant increase from 2019 to 2021 (11% to 40.4%, respectively). Stimulus packages introduced by governments to boost demand, following the unprecedented impact of Covid-19 on car sales, sought to stimulate alternatively-powered vehicles in particular, further driving demand for low and zero-emission cars.

Note: Please note that due to rounding, figures may not add up exactly to 100%.

FIG.**50**

ELECTRIC VEHICLES AS A PROPORTION OF THE TOTAL FLEET IN THE EU-27, ICELAND, NORWAY AND UK

Source: European Environment Agency



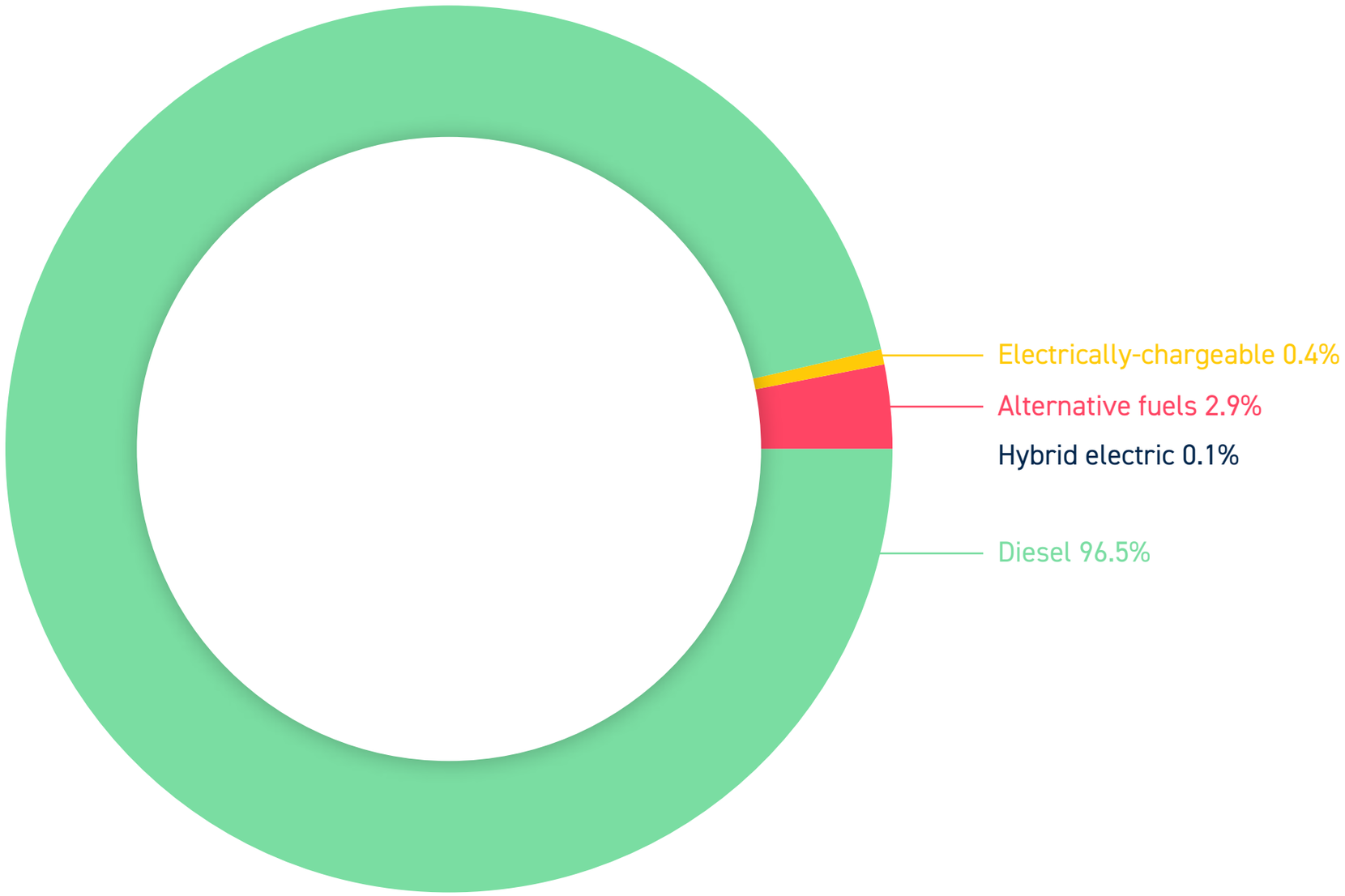
Electric cars — battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) — are gradually penetrating the EU market. There has been a steady increase in the number of new electric car registrations annually, from 700 units in 2010 to about 550,000 units in 2019 (3.5% of new registrations). In 2020, electric car registrations surged, accounting for 11% of newly registered passenger cars.

Note: The chart reports the number of electric vehicles (battery electric vehicles - BEV and plug-in hybrid electric vehicles - PHEV) newely registered in EU27_2020, Iceland, Norway and United Kingdom.

- 'Share of electric vehicles' refers to electric vehicle registrations (BEV and PHEV) as a percentage of the new cars' registration.
- Non-plug-in hybrid electric vehicles, which are exclusively fuelled by conventional fuels, are not included in the data shown.

FIG.51 **NEW TRUCKS IN THE EU** BY FUEL TYPE

Source: European Automobile Manufacturers' Association

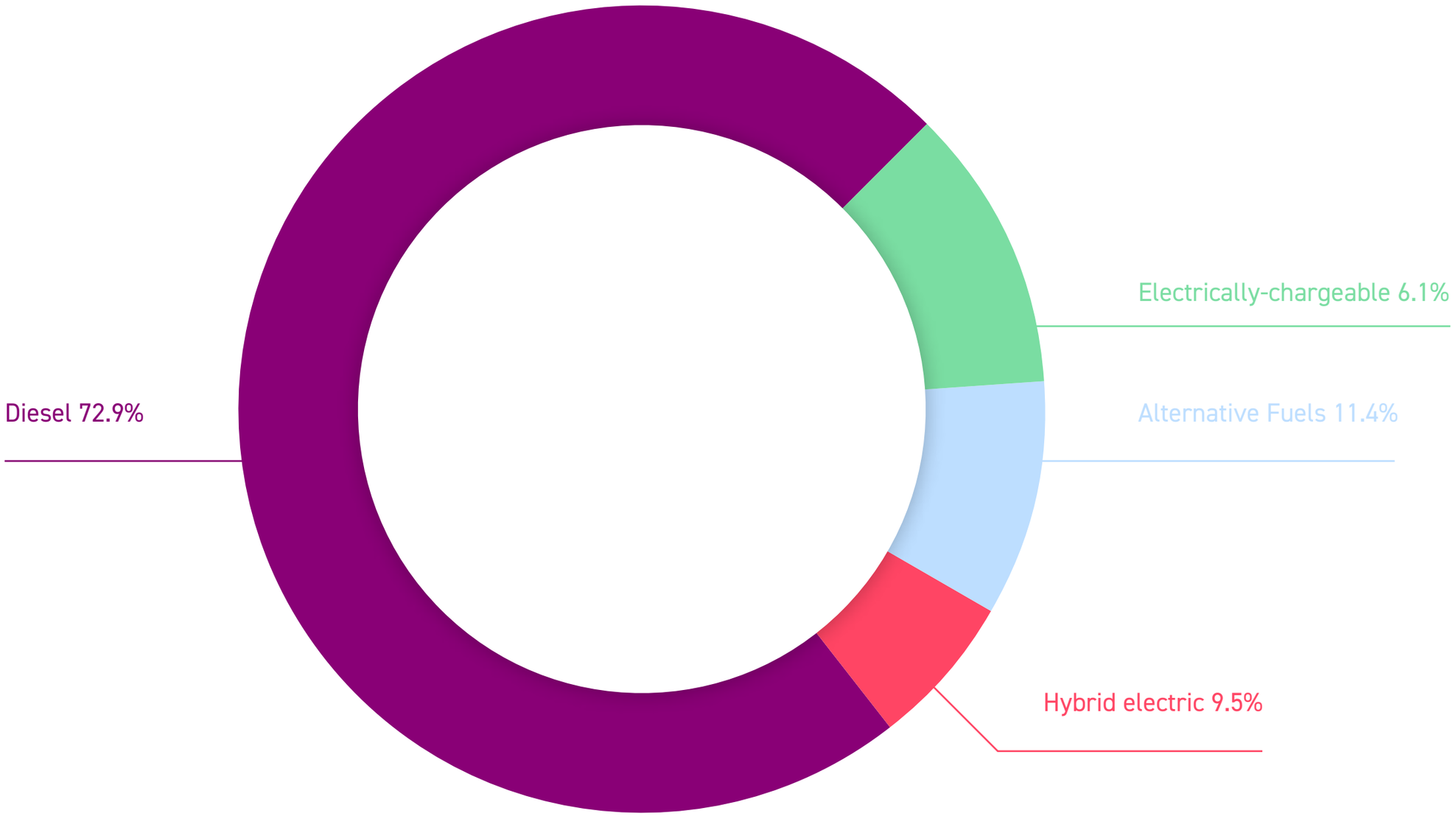


In 2020, the use of low-carbon technologies in trucks remains minor with 96.5% of all newly-registered trucks in the European Union running on diesel, 2.9% fuelled by alternative fuels, while only 0.4% of trucks sold are electrically-chargeable vehicles.

Note: Please note that due to rounding, figures may not add up exactly to 100%.

FIG.52 **NEW BUSES IN THE EU** BY FUEL TYPE

Source: European Automobile Manufacturers' Association



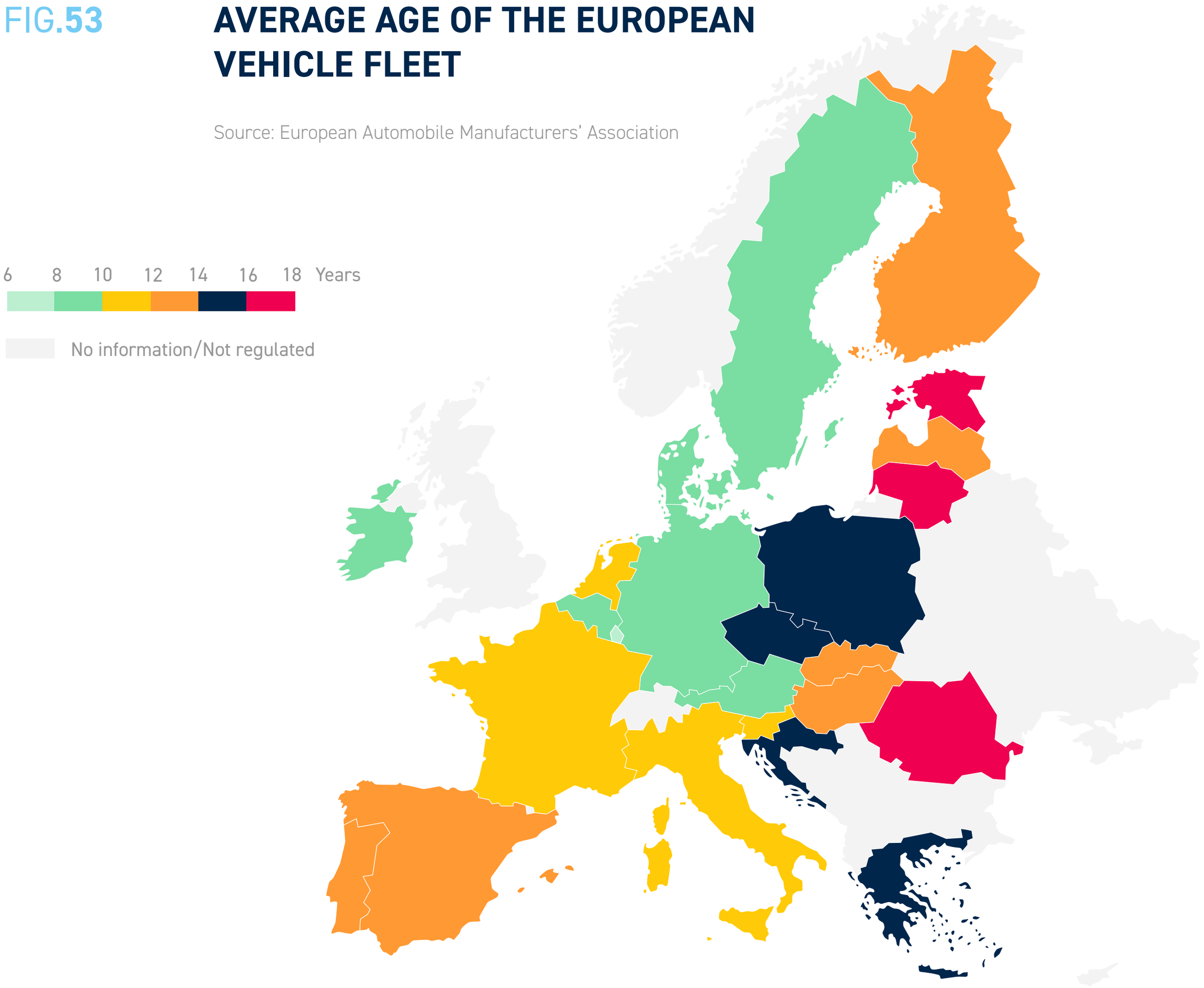
In 2020, 6.1% of new buses are electrically-chargeable vehicles, 9.5% are hybrid electric and 11.4% run on alternative fuels. Diesel still fuels the majority of buses with 72.9% of all buses sold in the European Union powered by diesel. The share of low-carbon technologies is larger than that of trucks but still remains minor.

Note: Please note that due to rounding, figures may not add up exactly to 100%.

FIG.53

AVERAGE AGE OF THE EUROPEAN VEHICLE FLEET

Source: European Automobile Manufacturers' Association



The age of the vehicle fleet can differ greatly across European countries with an average age of 6.5 years for Luxemburg and 16.8 years for Lithuania. In Eastern and Southern Europe, where citizens cannot necessarilty afford buying new vehicles and depend on the second-hand car market, passenger cars will stay on the road longer and will need solutions for decarbonisation.

FIG.54 **SERVICE STATIONS** IN EUROPE 2021

Source: National Oil Industry Associations

COUNTRIES	Number of service stations
AUSTRIA	2748
BELGIUM	3121
BULGARIA	3531
CROATIA	N/A
CYPRUS	320
CZECHIA	7633**
DENMARK	2068
ESTONIA	491
FINLAND	1869*
FRANCE	11151
GERMANY	14458
GREECE	5889
HUNGARY	2015
IRELAND	1906
ITALY	21700
LATVIA	605
LITHUANIA	718*
LUXEMBOURG	235
MALTA	69*
NETHERLANDS	4147
POLAND	7852
PORTUGAL	3333
ROMANIA	2292
SLOVAKIA	1003
SLOVENIA	N/A
SPAIN	11810
SWEDEN	2678
TOTAL EU-27 = 113 642	
UNITED KINDGOM	8381
NORWAY	1838
SWITZERLAND	3293
TURKEY	13011
UK + NO + CH + TR	**26 523**
TOTAL = 140 165	

There were over 140 000 service stations in the EU-27, Norway, United Kingdom, Switzerland and Turkey operating in 2021.

* Numbers for 2019

** The increase in the number of the stations in Czechia compared to the previous year is the result of a new procedure of counting.


SECTOR 16

ABOUT
FUELSEUROPE

FuelsEurope is a division of the European Fuel Manufacturers, an AISBL operating in Belgium. This Association, whose members are all 40 companies that operate refineries in the European Economic Area in 2021, is comprised of FuelsEurope and Concawe divisions, each having separate and distinct roles and expertise but administratively consolidated for efficiency and cost effectiveness. Members account for almost 95% of EU petroleum refining capacity and more than 75% of EU motor fuel retail sales.

FuelsEurope aims to inform and provide expert advice to the EU institutions and other stakeholders about fuel manufacturing and distribution and its products in order to:

- Contribute in a constructive way to the development of technically feasible and cost effective EU policies and legislation.

- Promote an understanding amongst the EU institutions and citizens of the contribution of fuel manufacturing and distribution and its value chain to European economic, technological and social progress.

DISCLAIMER

We have made every attempt to ensure the accuracy and reliability of the information provided in this report. However, the information is provided "as is" without warranty of any kind. Neither FuelsEurope nor any of its member companies accept responsibility or liability for the accuracy, completeness, legality, or reliability of the information contained herein. We shall not be liable for any loss or damage of whatever nature (direct, indirect, consequential, or other), which may arise as a result of use of the information herein.

Quoting from the review - The redistribution or reproduction of data whose source is Platts or Wood Mackenzie is strictly prohibited without prior authorisation from either Platts or Wood Mackenzie.

IEA Disclaimer - Global Indicator Refining Margins are calculated for various complexity configurations, each optimised for processing the specific crude(s) in a specific refining centre. Margins include energy cost, but exclude other variable costs, depreciation and amortisation.

Consequently, reported margins should be taken as an indication, or proxy, of changes in profitability for a given refining centre. No attempt is made to model or otherwise comment upon the relative economics of specific refineries running individual crude slates and producing custom product sales, nor are these calculations intended to infer the marginal values of crude for pricing purposes.

OPEC Disclaimer - The data, analysis and any other information (the "information") contained in the World Oil Outlook is for informational purposes only and is neither intended as a substitute for advice from business, finance, investment consultant or other professional; nor is meant to be a benchmark or input data to a benchmark of any kind. Whilst reasonable efforts have been made to ensure the accuracy of the information contained in the World Oil Outlook, the OPEC Secretariat makes no warranties or representations as to its accuracy, relevance or comprehensiveness, and assumes no liability or responsibility for any inaccuracy, error or omission, or for any loss or damage arising in connection with or attributable to any action or decision taken as a result of using or relying on the information in the World Oil Outlook.

The views expressed in the World Oil Outlook are those of the OPEC Secretariat and do not necessarily reflect the views of its governing bodies and/or individual OPEC Member Countries. The designation of geographical entities in the World Oil Outlook, and the use and presentation of data and other materials, do not imply the expression of any opinion whatsoever on the part of OPEC and/or its Member Countries concerning the legal status of any country, territory or area, or of its authorities, or concerning the exploration, exploitation, refining, marketing and utilization of its petroleum or other energy resources. Nothing in the World Oil Outlook shall be construed as interpreting or modifying any legal obligations under any agreement, treaty, law or other texts; or expressing any legal opinions or having probative legal value in any proceedings.

FUELSEUROPE MEMBERS

FuelsEurope
165, Boulevard du Souverain
1160 Brussels - Belgium

Phone: +32 (0)2 566 9100

www.linkedin.com/company/fuelseurope

www.fuelseurope.eu

www.twitter.com/FuelsEurope

www.cleanfuelsforall.eu

www.youtube.com/fuelseurope

FuelsEurope