2024 STATISTICAL REPORT

FuelsEurope
FUELLING EUROPE'S FUTURE

Editor: Liana Gouta

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Foreword

Dear reader,

High quality, verified and reliable facts and figures are essential to support economic and political analysis. Continuing the legacy of FuelsEurope statistical annual reports, the Statistical Report 2024 aims at providing a comprehensive set of data and statistics about the fuel manufacturing industry that can be used by all stakeholders.

The report includes data on global energy markets, products demand and international trade flows, fuel specifications, prices and margins, taxation, the integration with the petrochemical sector as well as the environmental performance of the EU fuel manufacturing industry.

This 2024 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.

In this year's edition, a new graph on the evolution of CO_2 auction volume and prices within EU ETS was added as it drives the economics of renewable energy projects.

We have also decided to keep graphs on the EU import dependency in light of the continued impact of the Russian war on Ukraine.

We hope you enjoy reading our report and find the data and figures provided useful!

Liana Gouta
Director General

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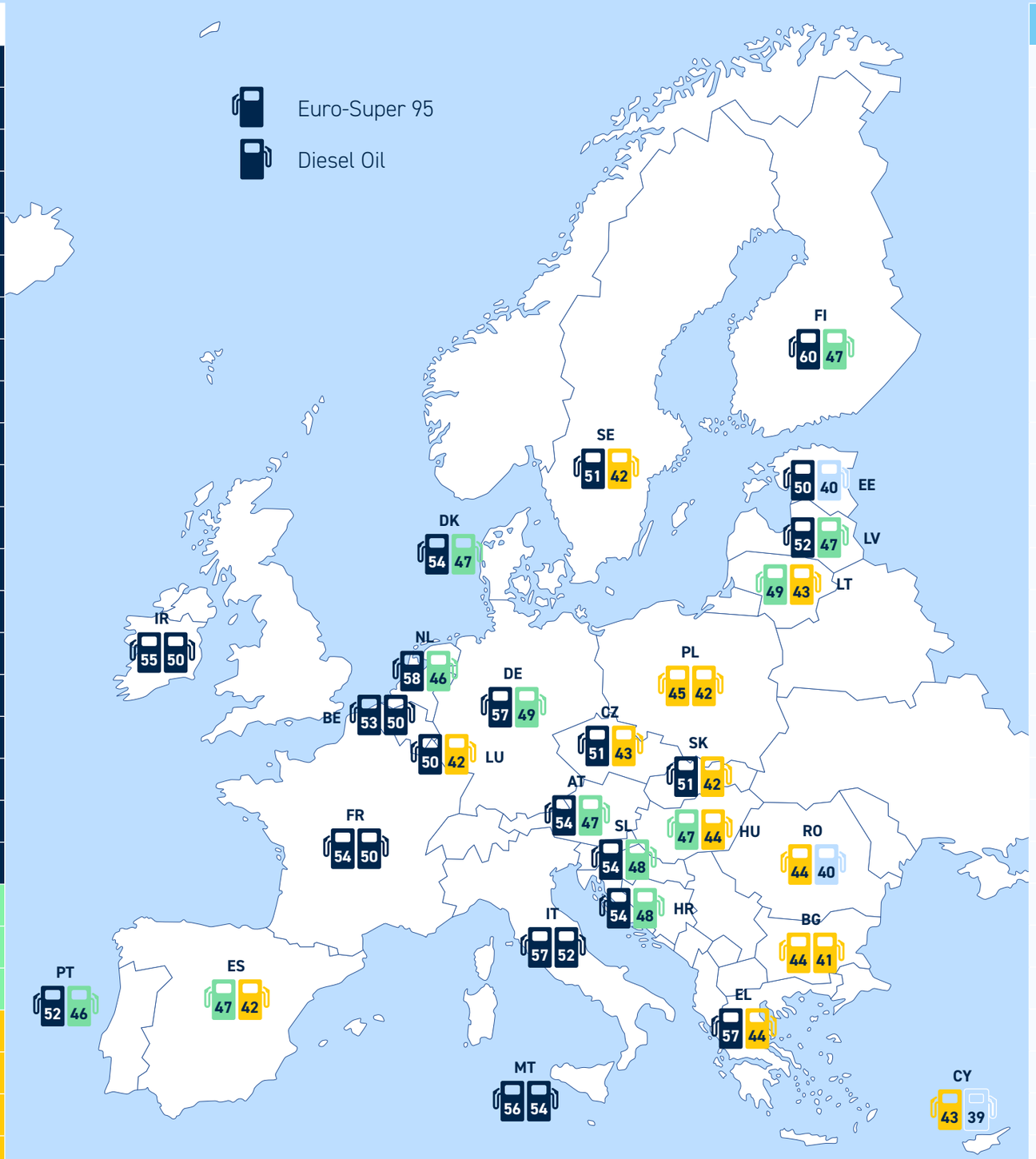
Prices & Margins

FIG.01 TOTAL TAXATION SHARE IN THE END CONSUMER PRICE (FEBRUARY 2024)

Source: European Commission

COUNTRY	Euro-super 95
FINLAND	60
NETHERLANDS	58
ITALY	57
GREECE	57
GERMANY	57
MALTA	56
IRELAND	55
CROATIA	54
SLOVENIA	54
FRANCE	54
AUSTRIA	54
DENMARK	54
BELGIUM	53
PORTUGAL	52
LATVIA	52
CZECHIA	51
SLOVAKIA	51
SWEDEN	51
ESTONIA	50
LUXEMBOURG	50
LITHUANIA	49
HUNGARY	47
SPAIN	47
POLAND	45
ROMANIA	44
BULGARIA	44
CYPRUS	43



COUNTRY	Diesel Oil
MALTA	54
ITALY	52
IRELAND	50
BELGIUM	50
FRANCE	50
GERMANY	49
CROATIA	48
SLOVENIA	48
FINLAND	47
AUSTRIA	47
DENMARK	47
LATVIA	47
NETHERLANDS	46
PORTUGAL	46
GREECE	44
HUNGARY	44
CZECHIA	43
LITHUANIA	43
SLOVAKIA	42
SWEDEN	42
LUXEMBOURG	42
SPAIN	42
POLAND	42
BULGARIA	41
ESTONIA	40
ROMANIA	40
CYPRUS	39

Unit: Percentage

- <40% or = 40%
- >40% - < or = 45%
- >45% - < 50%
- = or >50%

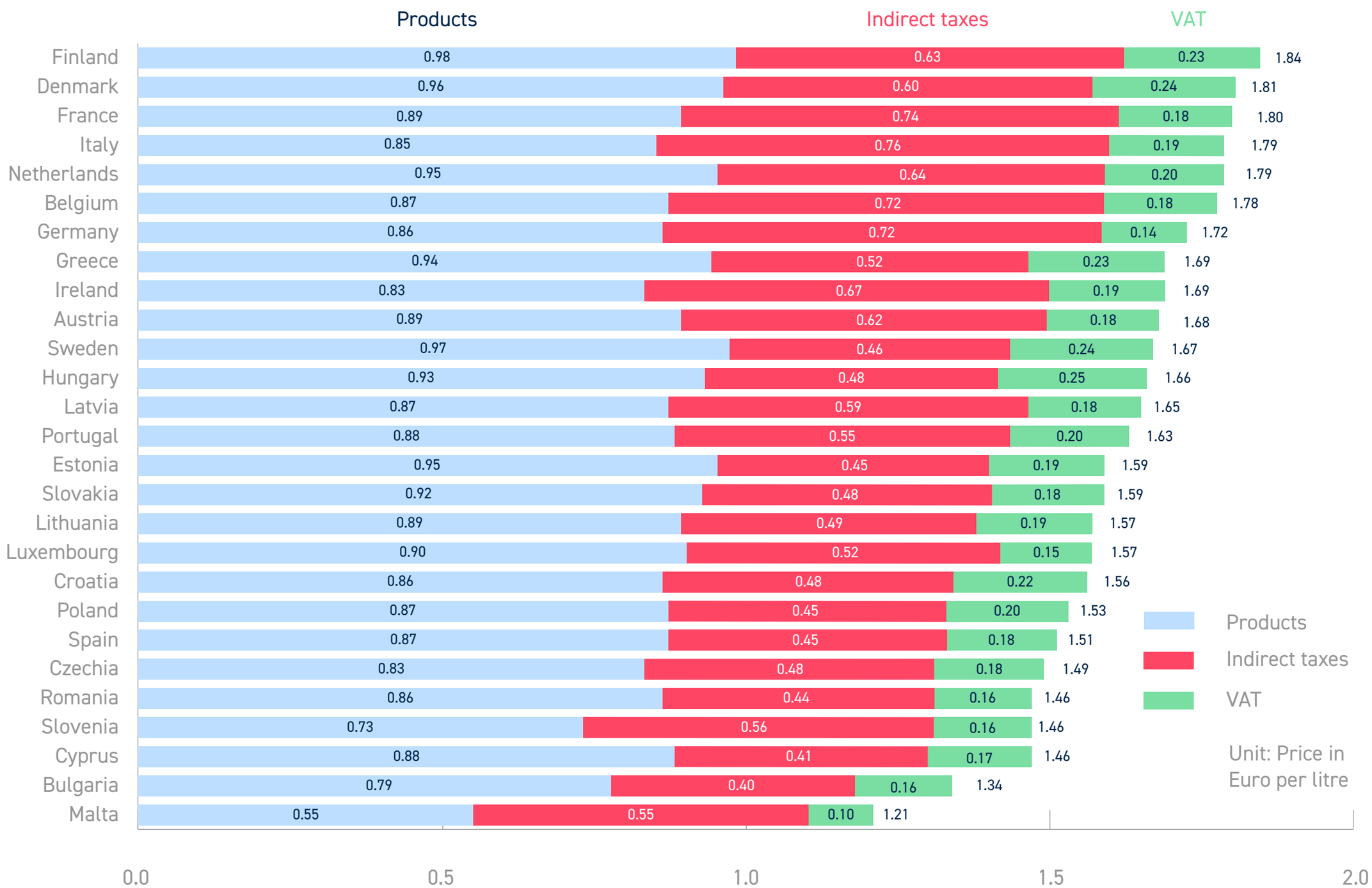
The price at the pump is driven to a large degree by tariffs and taxes which contribute substantially to Member States' revenues. On average, around half of the cost of fuel at the pump represents taxes.

After the extreme rise in fuel prices due to the Russian aggression in Ukraine and subsequent tax cuts decided by Member States in 2021, taxation level went back up.

FIG.02

BREAKDOWN OF AUTOMOTIVE DIESEL PRICES ACROSS EU-27 (FEBRUARY 2024)

Source: European Commission



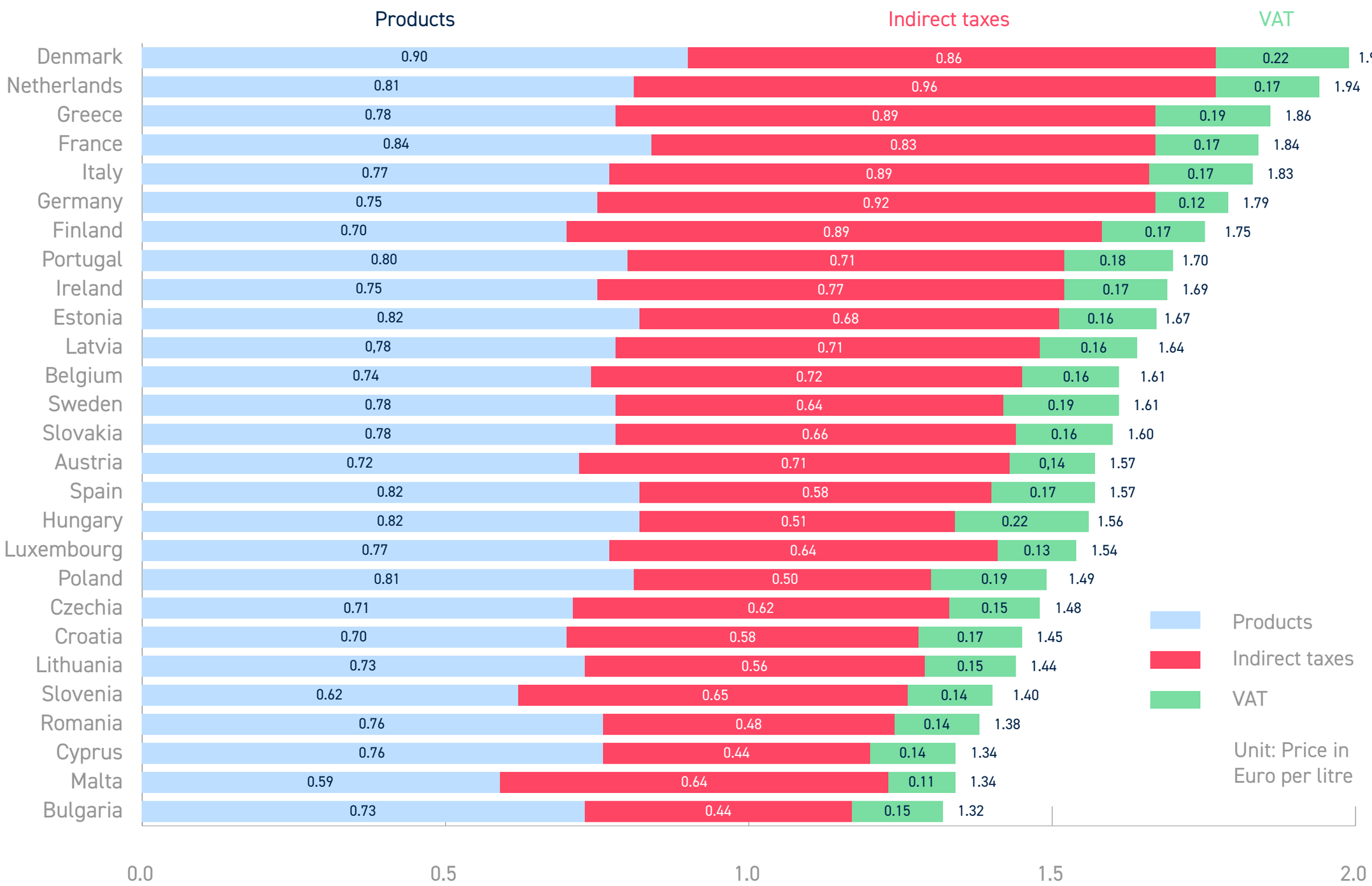
Gasoline prices were generally higher than diesel prices due to the higher tax element. While gasoline prices are still higher on average, we have witnessed that the gap has been significantly reduced. Only a fraction of the price paid at the pump contributes to the refiners income, the remainder is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

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

FIG.03

BREAKDOWN OF AUTOMOTIVE GASOLINE PRICES ACROSS EU-27 (FEBRUARY 2024)

Source: European Commission



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

FIG.04a

GASOLINE AND DIESEL **UNTAXED PRICE DEVELOPMENT 2020-2024**

Source: 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 2022 with the war in Ukraine and the sanctions imposed by the West on Russian oil.

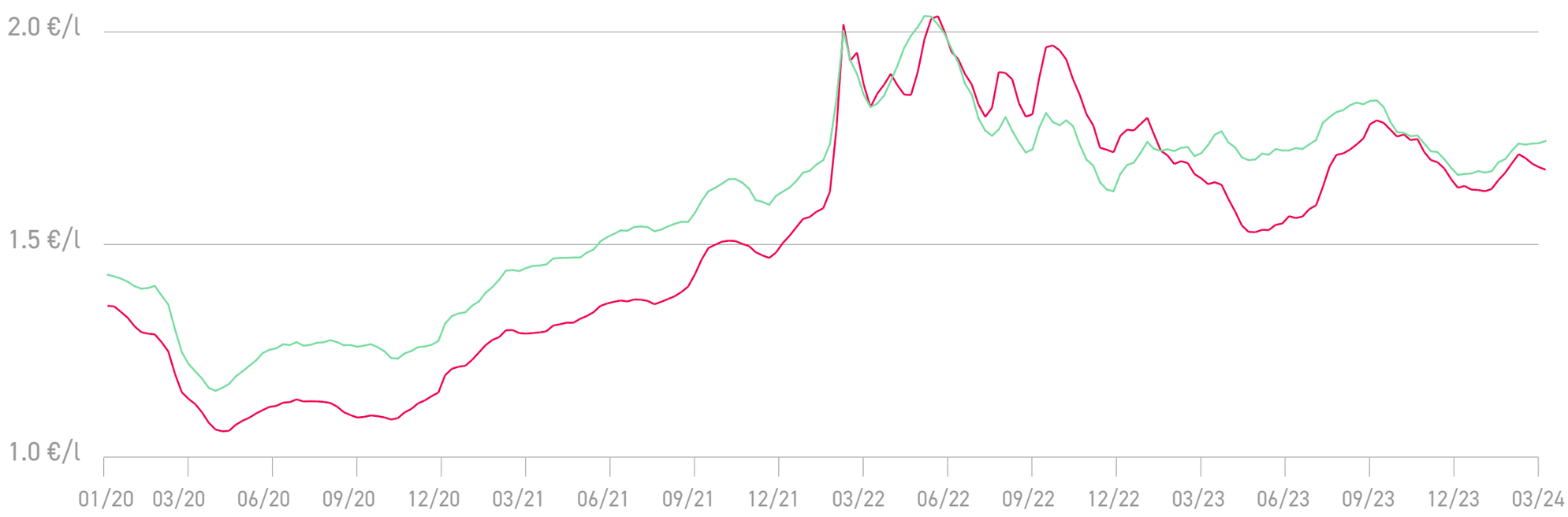
In February 2023, the EU banned Russian import of diesel fuel and other oil products, yet prices decreased slightly due to imports of refined oil products from the Middle East and Asia as well as a frontloading of imports from Russia ahead of the embargo. Towards the end of 2023, Houthi rebel attacks in the Red Sea caused an increase in prices. Without material disruptions to actual oil production this increase did not last but escalating geopolitical tensions in this region keeps having an impact on prices early 2024.

FIG.**04b**

GASOLINE AND DIESEL **PRICE WITH TAXES DEVELOPMENT 2020-2024**

Source: European Commission

Weekly average Petrol & Diesel prices including taxes and duties in EU-27 (in €/l)



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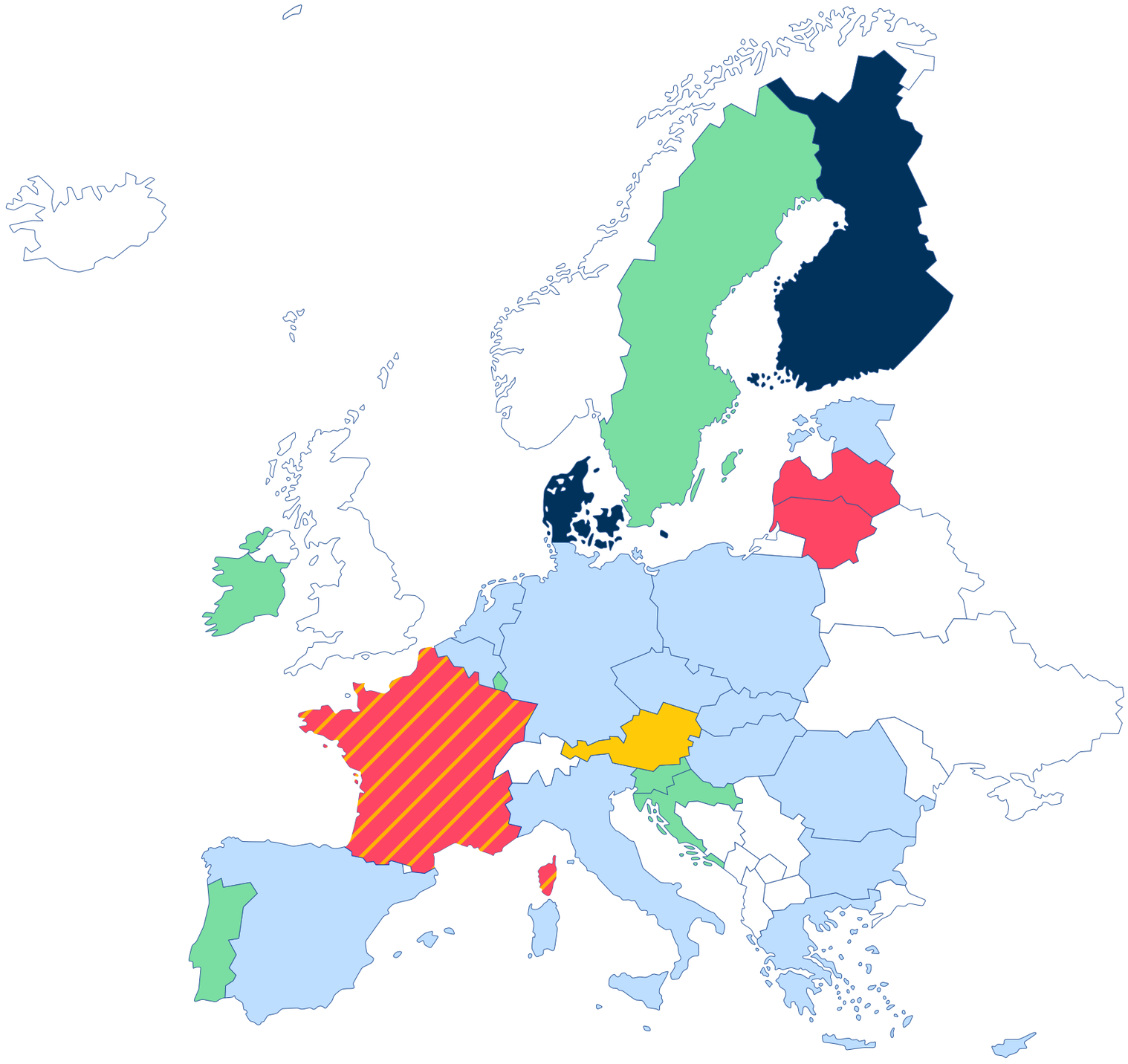
From March 2022, some EU countries decided to cut fuel taxes to reduce the impact of surging prices on citizens. These measures were dropped during the year 2023 with the relative stabilisation of prices. Towards the end of 2023, Houthi rebel attacks in the Red Sea caused an increase in prices. Without material disruptions to actual oil production this increase did not last but escalating geopolitical tensions in this region keeps having an impact on prices in early 2024.

FIG.05

TAX INCENTIVES FOR BIOFUELS
IN TRANSPORT IN EU-27

Source: ePURE, National Fuel Industry Associations, Finnish Ministry of Finance, French Ministry for Ecological Transition, USDA



No tax incentive:

Biofuels do not benefit from any tax advantages compared to fossil fuels.

Lower tax for low biofuels blends:

Lower taxation rates are applied to biofuel blends with a percentage of fossil fuel content above 70%.

Lower tax for high biofuels blends:

Lower taxation rates are applied to biofuel blends with a percentage of fossil fuel content below 70%.

Taxation based on the energy/CO_2 content:

Biofuels are taxed according to their energy content (calorific value) and their average CO_2 emissions.

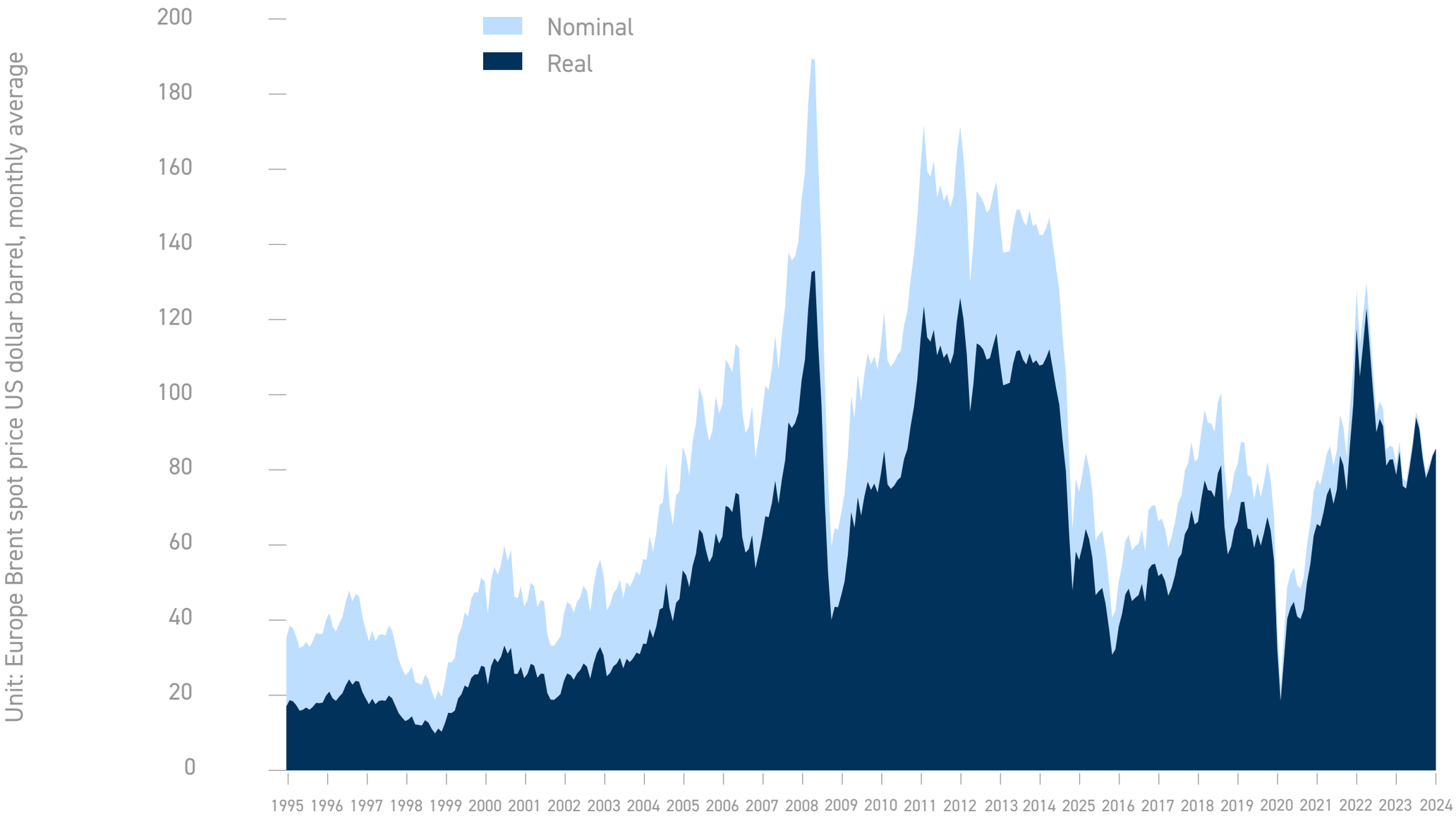
No excise duty/exempted from certain taxes (components):

Biofuels are not subject to excise duties or are exempt from certain taxes. E.g. Exemption from carbon tax.

In the EU, all liquid fuels for a certain purpose or a specific sector are currently taxed at a similar level, regardless of carbon intensity. However, some EU Member States implemented specific taxation incentives to encourage the use of biofuels in the transport sector. The current revision of the Energy Taxation Directive (ETD) included in the Fit for 55 package proposes a taxation based on the climate impact of fuels and energy.

FIG.06 CRUDE OIL PRICE EVOLUTION

Source: US Energy Information Administration & 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 dollars. 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.

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 bounced 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 March 2022 to go back to $80/bbl towards the end of 2023/beginning of 2024.

FIG.07

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

Source: Wood Mackenzie

Unit: Average yearly prices US Dollar per barrel

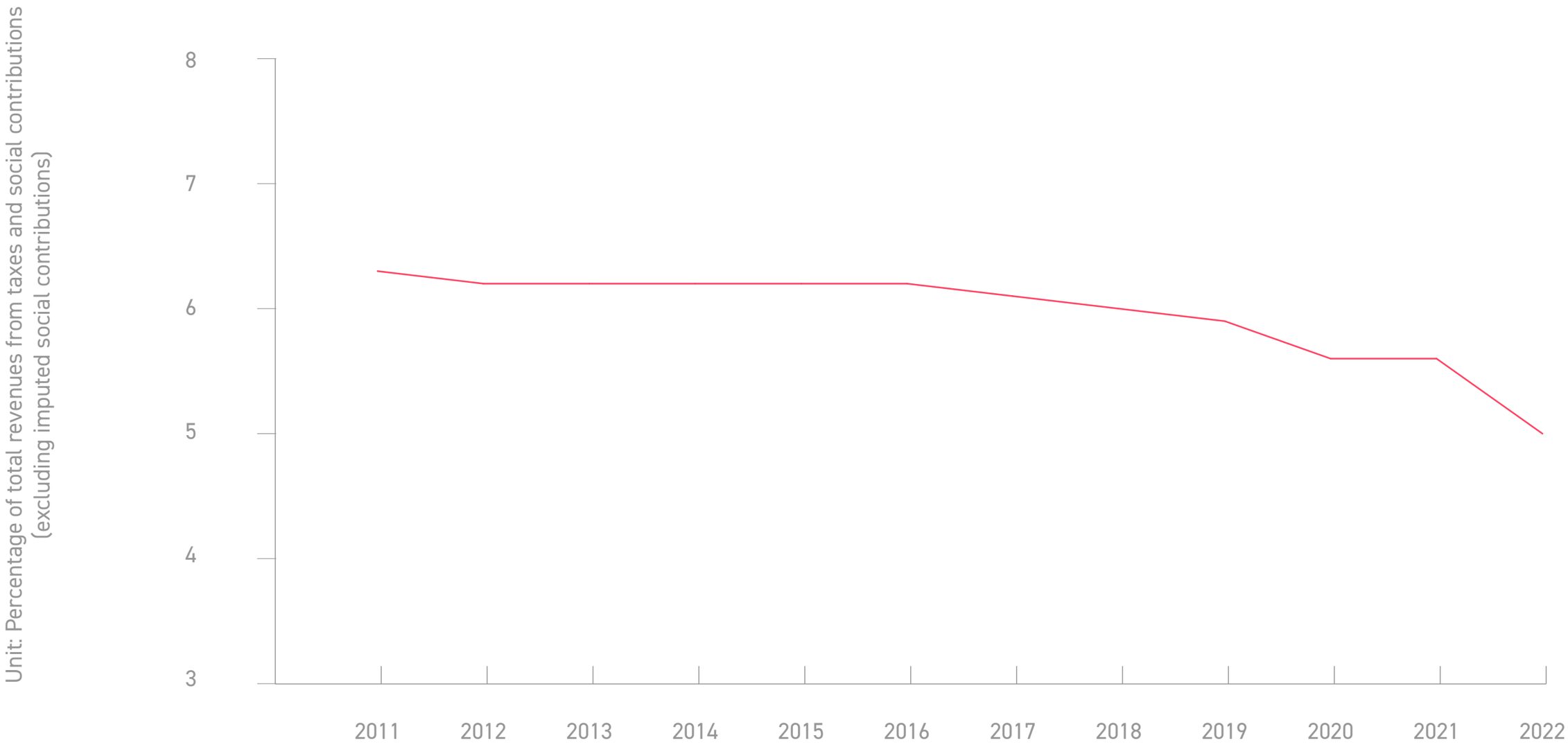
EU refining operates between two global commodity markets, the crude market and the refined products market. The 'crack spread' represents the difference between the cost of crude oil and the market sales price for refined products. Generally, product prices rise with crude prices but the drivers of 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. Profitability started falling again in 2019, with a record low in 2020 due to the global 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.08

EVOLUTION OF REVENUES FROM ENVIRONMENTAL TAX IN THE EU-27

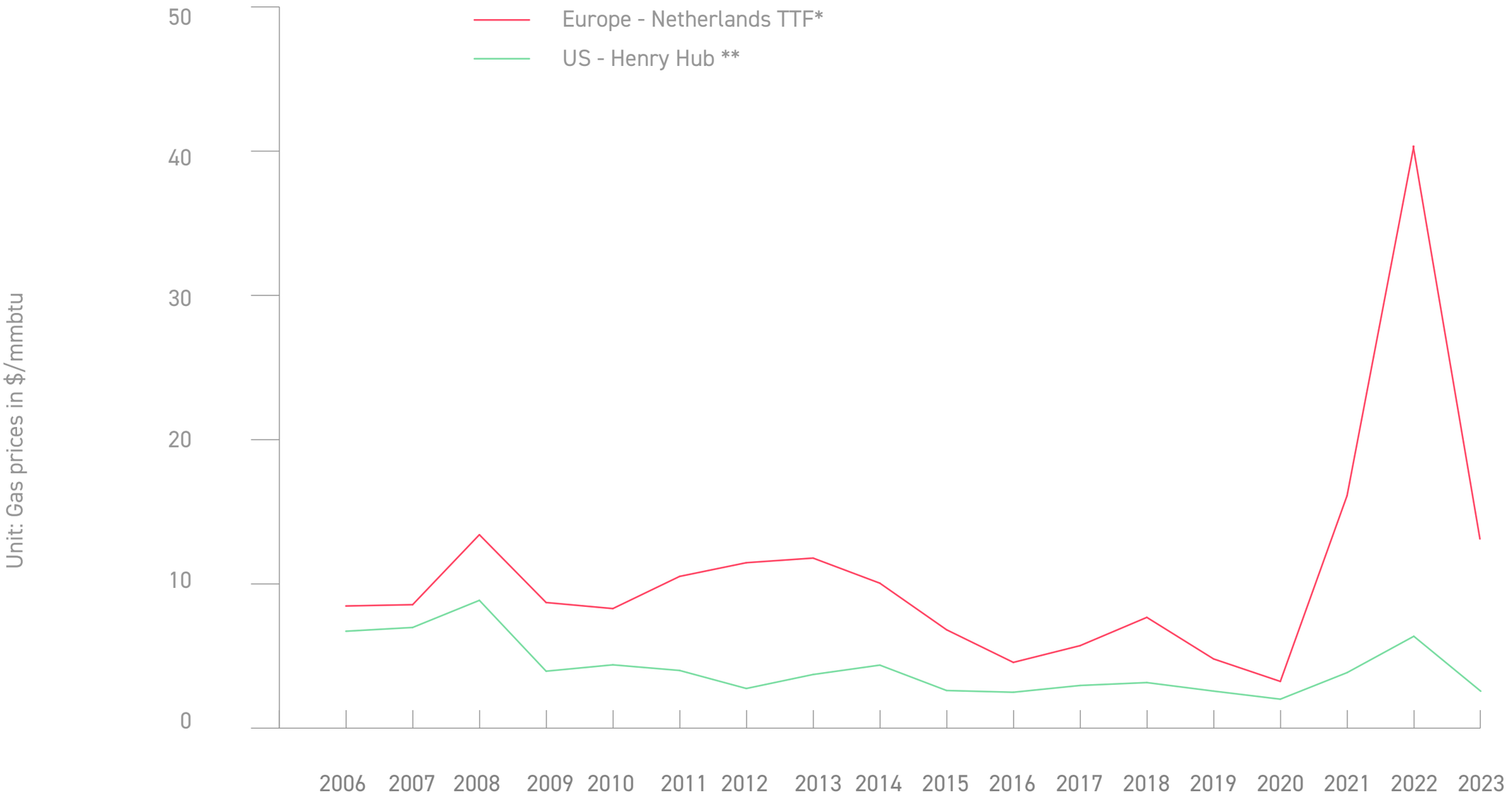
Source: Eurostat



The environmental tax is a tax based on a physical unit (or a proxy of it) of something that has a proven specific negative impact on the environment. Since 2011, the share of environmental taxes of total tax revenues has been steadily declining as a result of environmental policies implemented by Member States and at EU level. This trend highlights the problem that effective environmental taxes could end up eroding the tax base in the long term.

FIG.09 EVOLUTION OF GAS PRICES

Source: World Bank



Since 2009, the US industry gained a significant competitive advantage over the EU industry as a result of the shale oil revolution. Gas prices around the world rose in 2021 as Covid-19 measures were lifted and economies returned to normal. Prices in Europe increased sharply in February 2022 as a result of Russia's war in Ukraine, before declining in 2023 due to a reduction in gas demand and a reinforced shift towards imports from the United States to replace Russian gas.

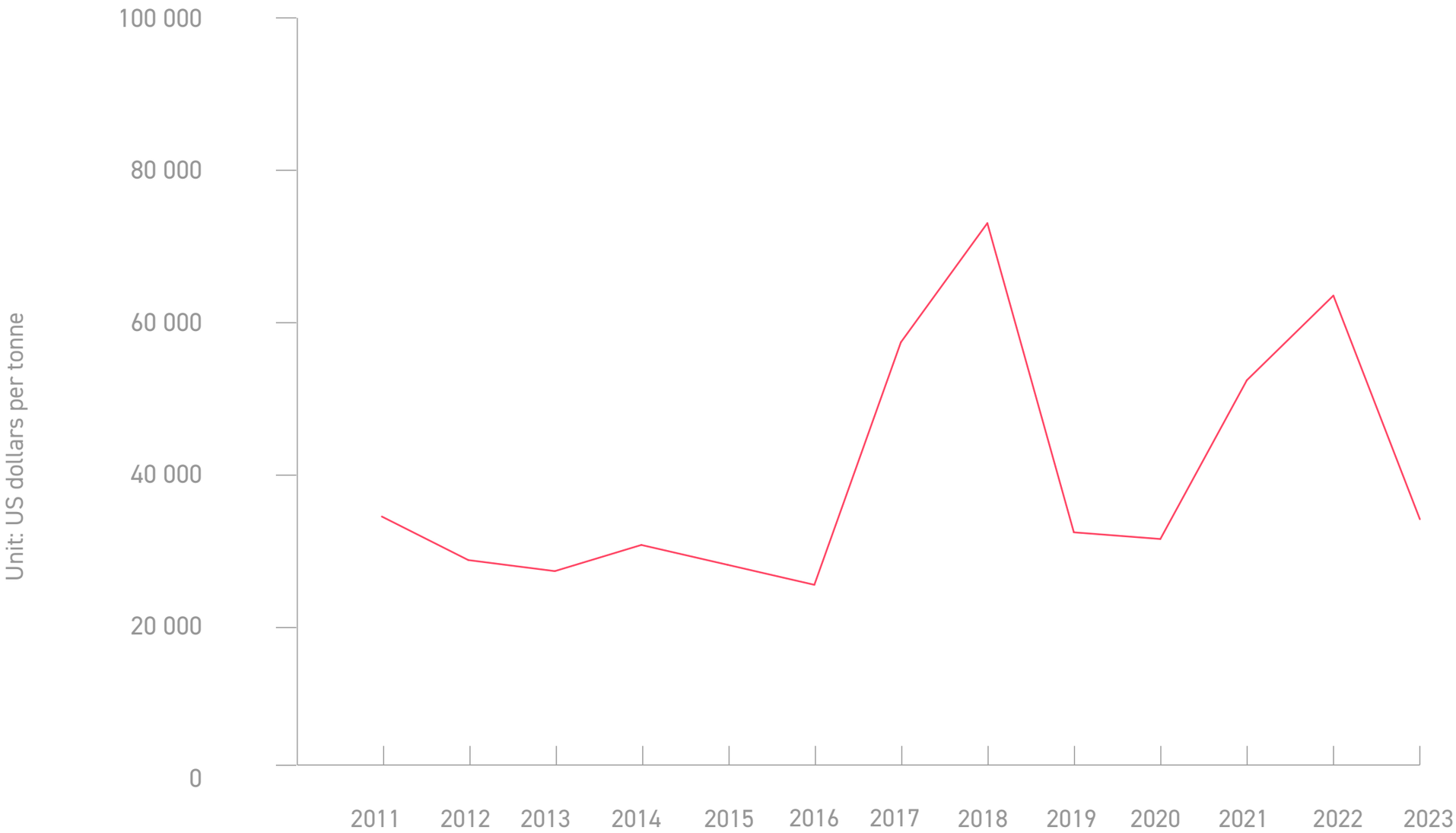
Note: Prices in nominal dollars.

*Natural Gas (Europe), from April 2015, Netherlands Title Transfer Facility (TTF); April 2010 to March 2015, average import border price and a spot price component, including UK; during June 2000 - March 2010 prices excludes UK.

**Natural Gas (U.S.), spot price at Henry Hub, Louisiana

FIG.10 EVOLUTION OF COBALT PRICES

Source: Trading Economics

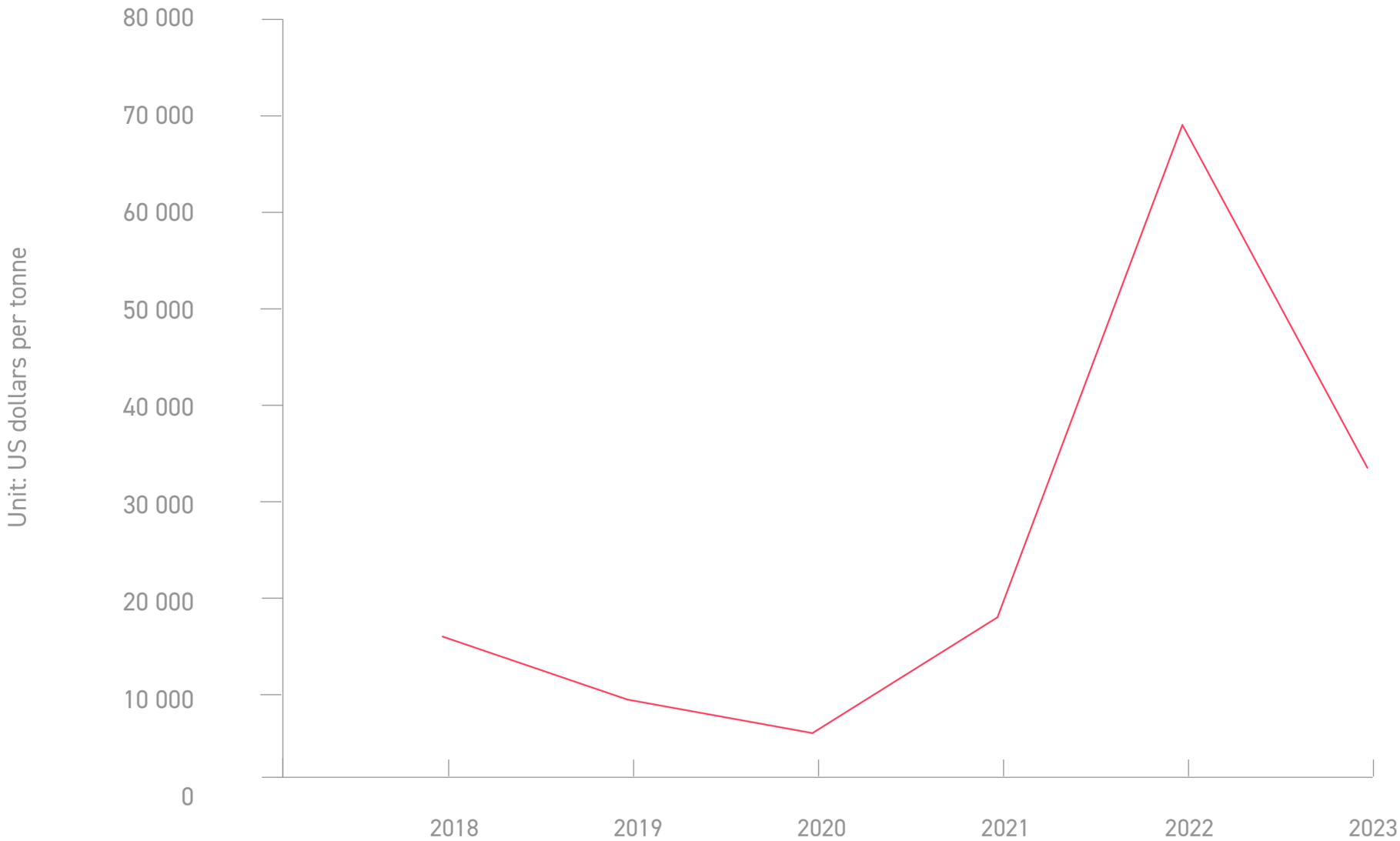


Cobalt, a key element in lithium-ion batteries, benefited from robust growth in rechargeable batteries and energy storage due to the impressive demand for electric vehicles. Adding to the bullish outlook, were mounting sanctions on Russia for invading Ukraine, which accounts for roughly 4% of the world's cobalt production. Prices started decreasing in 2023 due to a hike in supply rates and a lower demand from China for its electric vehicle (EV) industry linked to the end of EV subsidies in the country.

Note: Prices in nominal dollars.

FIG.11 EVOLUTION OF LITHIUM CARBONATE PRICES

Source: Trading Economics



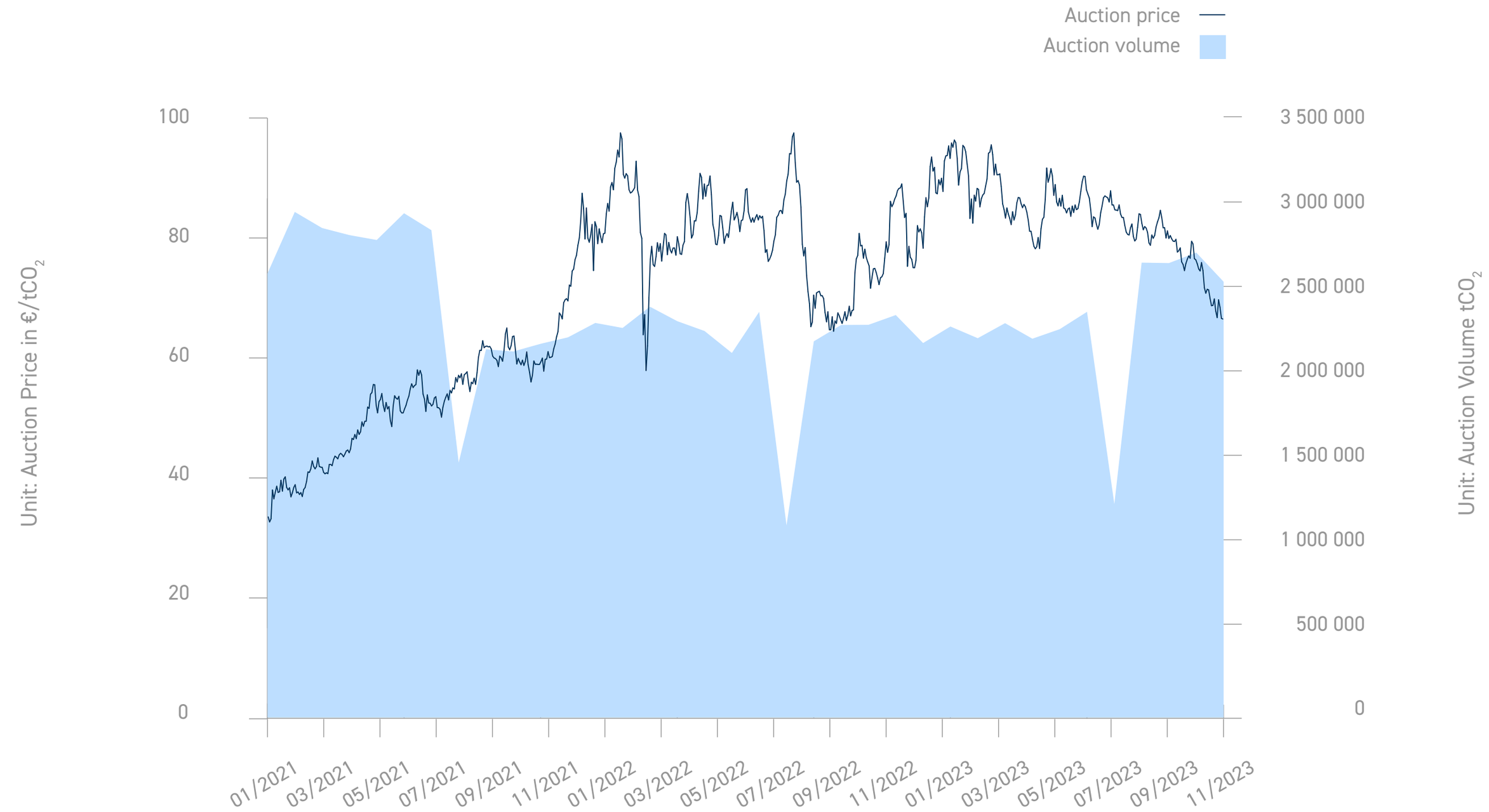
Prices for lithium started to fall in 2018. In 2020, prices for lithium carbonate slipped by 40% and production remained low as a response to the drop in prices. In 2022, lithium prices jumped to their highest thanks to an upsurge in electric vehicle sales and depleting stocks of the battery material in top consumer, China. Prices decreased again in 2023 after China slashed subsidies for electric vehicles from January, while the global lithium supply increased.

Note: Prices in nominal dollars.

FIG.12

EVOLUTION OF CO_2 AUCTION VOLUME AND PRICES WITHIN EU ETS

Source: EEX, ERCST



The EU Emissions Trading System (ETS) works on a "cap and trade" principle. A cap is set to limit the volume of greenhouse gases that can be emitted by the installations and operators covered by the system.

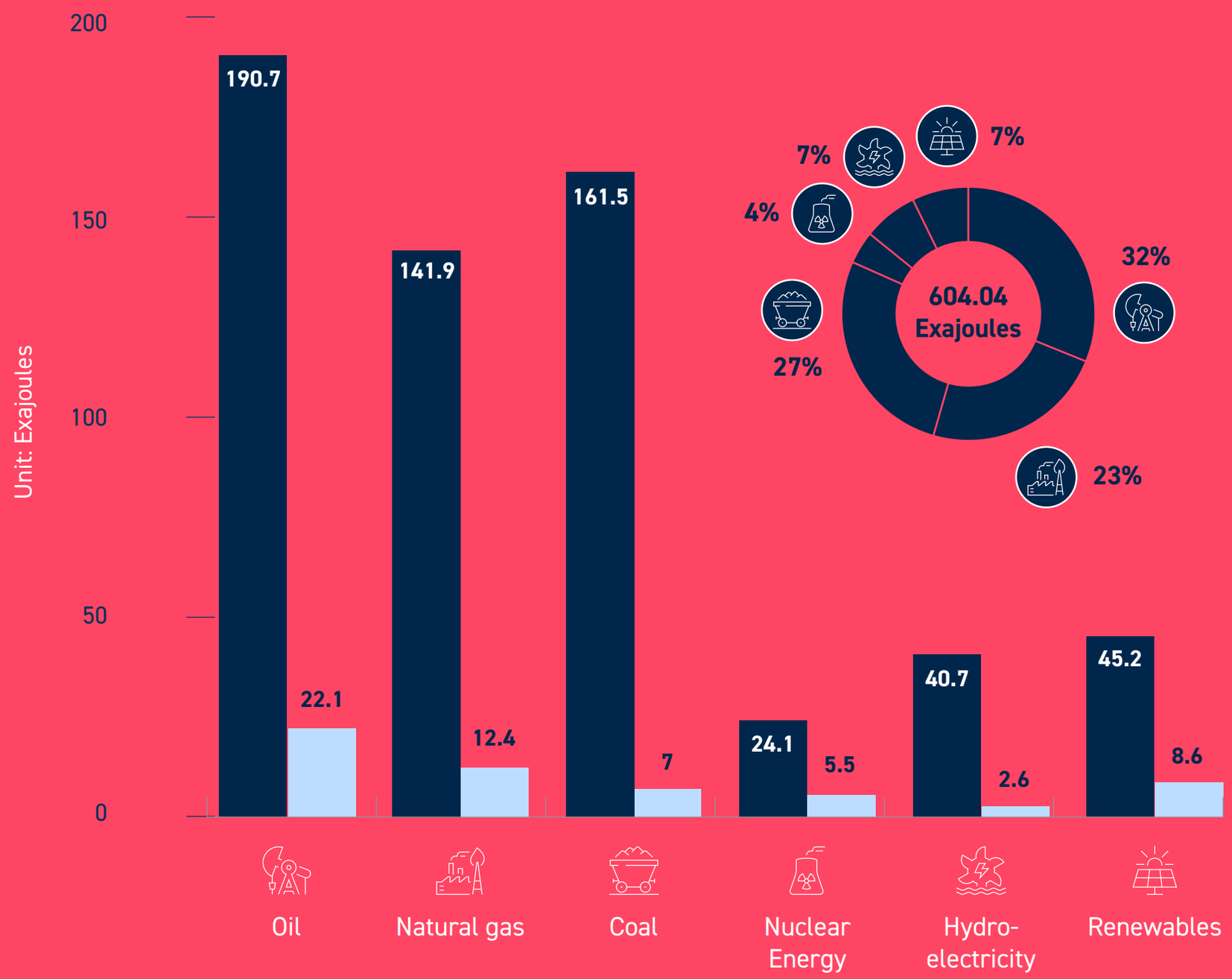
This cap is expressed in emission allowances, with each allowance granting permission to emit one metric tonne of CO_2eq (carbon dioxide equivalent). Annually, companies must surrender sufficient allowances to fully offset their emissions; otherwise, they face substantial penalties.

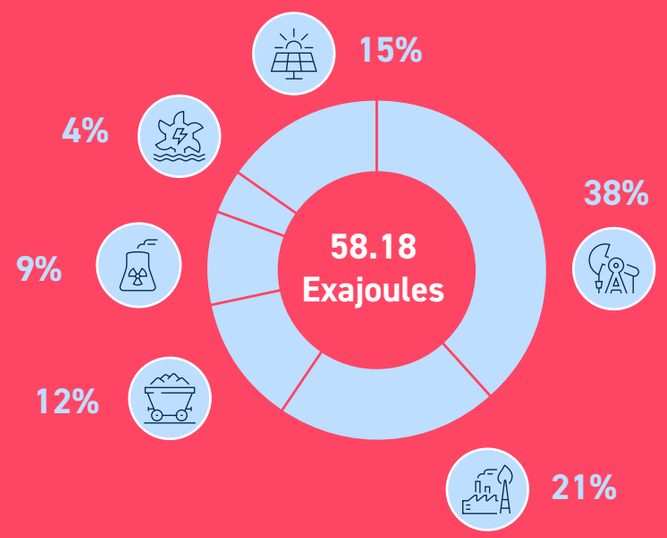
Within the cap, companies engage in trading allowances amongst themselves. Due to the closer interaction between energy and carbon markets, the role of the EU ETS as a driver for change and its impact on investments has now increased. Traded volume is also crucial as it allows auction participants to be confident that future auctions are priced at their true value.

Energy

FIG.13 WORLDWIDE ENERGY CONSUMPTION
BY FUEL TYPE IN 2022

Source: Energy Institute





WORLD %

EUROPEAN UNION %

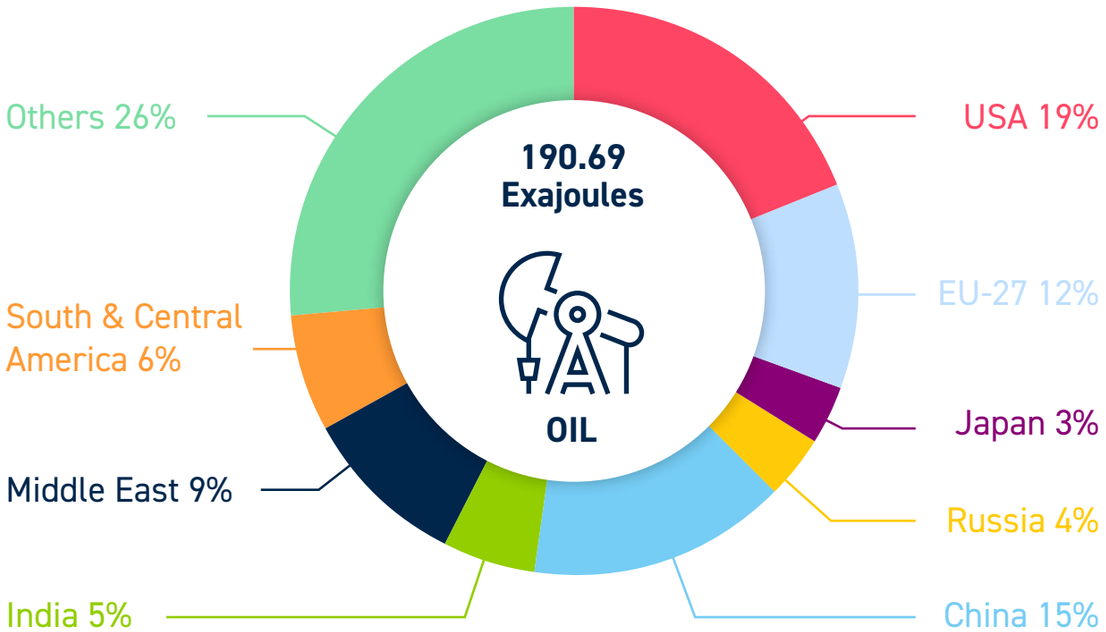
Oil continues to be the dominant fuel type in the world, still representing 32% of worlwide energy consumption. Renewable energy consumption has grown by 13% worldwide and by 9.5% within the EU. There has been a downturn in nuclear energy consumption worldwide, largely represented by a 17.1% decrease in European Union consumption since 2021.

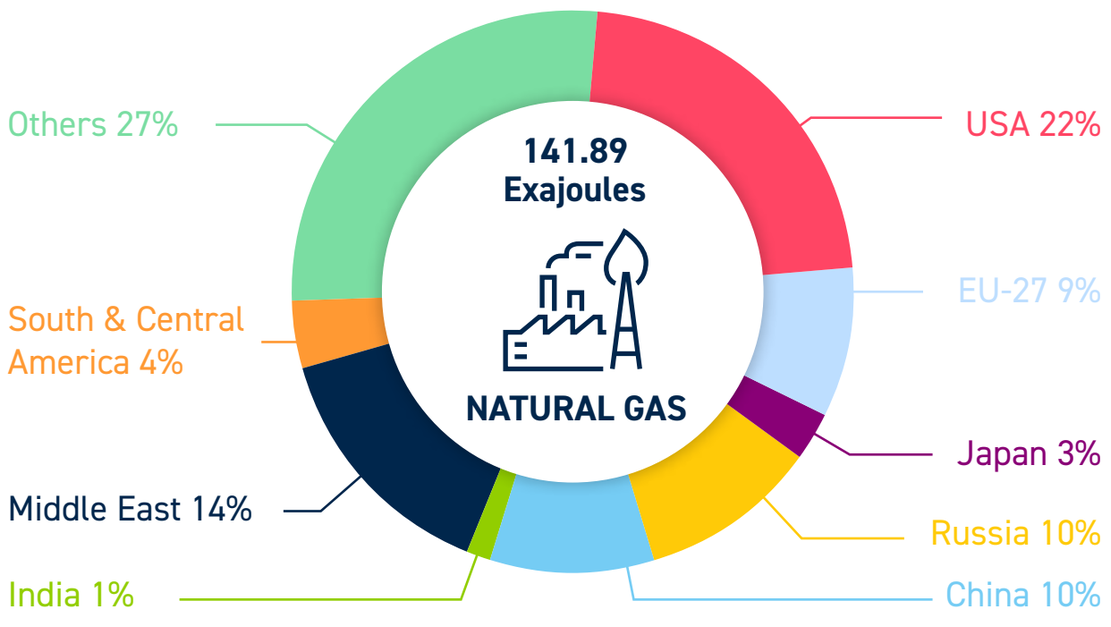
Note: Please note that due to rounding, figures may not add up exactly to 100%.
1 Exajoule = 10^{18} J (1 billion of billions of Joules) = 23.884 Mtoe.

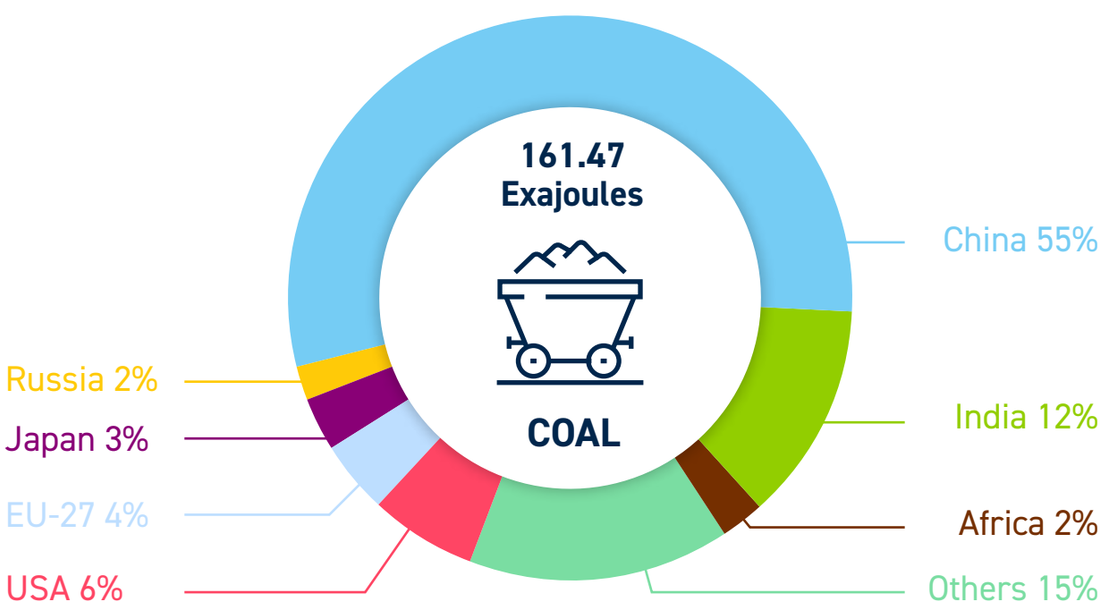
FIG.14

WORLDWIDE FOSSIL ENERGY CONSUMPTION BY REGION IN 2022

Source: Energy Institute







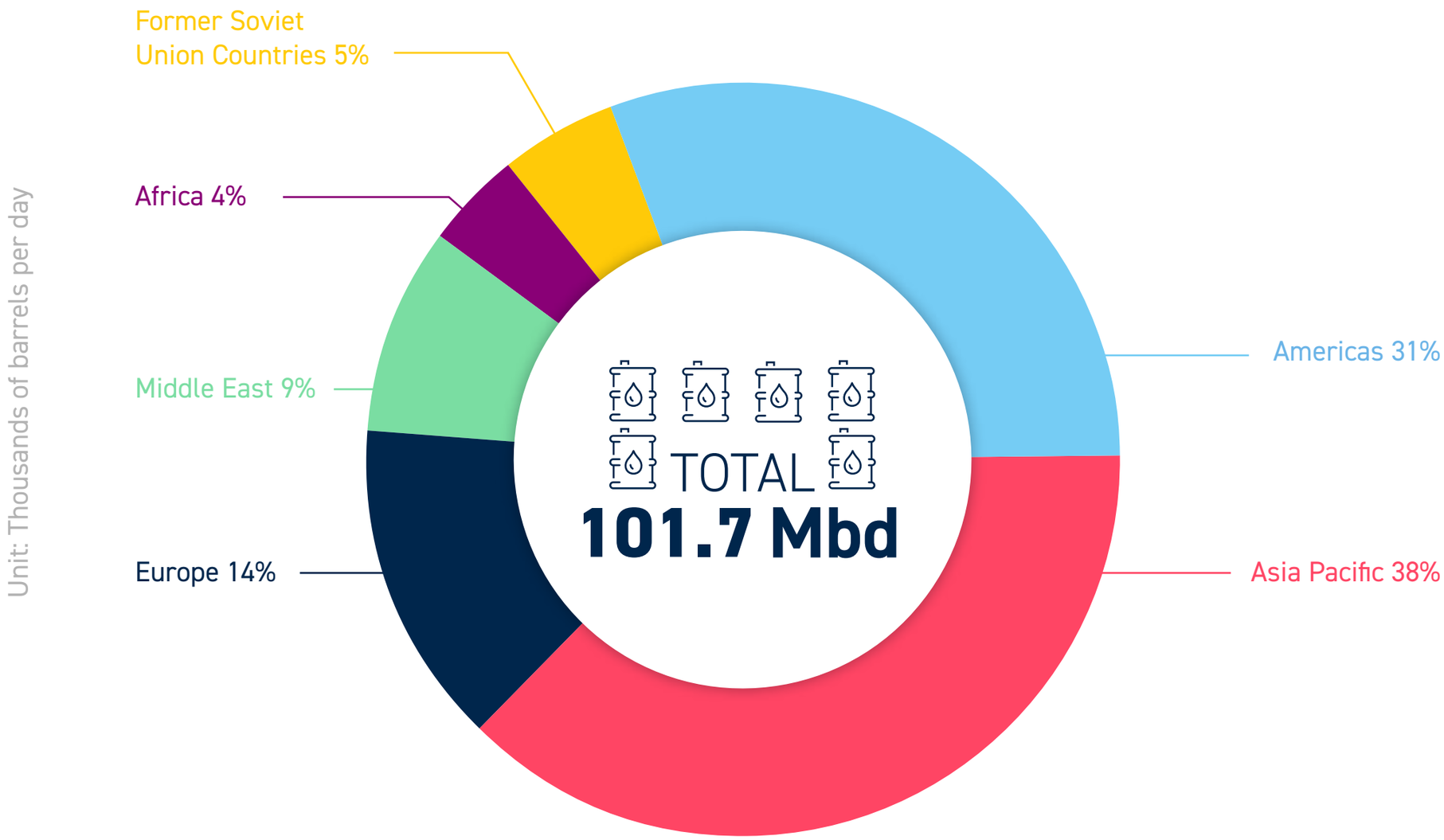
Worldwide fossil energy consumption increased by 0.5% between 2021 and 2022. This was largely represented by a 3.2% increase in global oil consumption, with the EU increasing consumption by 3.5% in the same time period. Despite OECD countries achieving a 3.5% decrease in coal consumption, worldwide, coal consumption increased by 0.7%: China and India, the two largest coal consumers, increased consumption by 1% and 4.1% respectively. On the other hand, natural gas consumption decreased globally by 3.1%, with the EU decreasing consumption by a staggering 13.5%.

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

FIG.15

WORLDWIDE REFINED PRODUCT DEMAND AVERAGED 101.7 MILLION BARRELS PER DAY IN 2023, WITH EUROPE ACCOUNTING FOR 14% OF THE TOTAL

Source: International Energy Agency



Global demand for oil products increased by 2.2% between 2022 and 2023. Europe's demand accounts for 14% while the Asian Pacific region's demand accounts for 38% of global demand, followed by the Americas with 31%.

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.16

EU TOTAL OIL DEMAND AMOUNTED TO 537.3 MILLION TONNES IN 2023 IN THE EU-27

Source: Wood Mackenzie

Unit: Million tonnes per year

COUNTRY	MILLION TONNES
AUSTRIA	11.6
BELGIUM	30.4
BULGARIA	5.1
CROATIA	3.4
CYPRUS	2.6
CZECHIA	9.8
DENMARK	7.1
ESTONIA	1.4
FINLAND	8.8
FRANCE	73
GERMANY	100.3
GREECE	14.5
HUNGARY	8.7
IRELAND	8
ITALY	59.1
LATVIA	1.9
LITHUANIA	3.2
LUXEMBOURG	2.7
MALTA	2.7
NETHERLANDS	45
POLAND	32.6
PORTUGAL	11.8
ROMANIA	11.3
SLOVAKIA	4.5
SLOVENIA	2.7
SPAIN	61.7
SWEDEN	13.3
TOTAL EU-27 = 537.3	
UNITED KINGDOM	66.7
NORWAY	9.5
SWITZERLAND	9.1
TÜRKIYE	51.1
TOTAL = 673.7	

EU-27 total oil demand amounted to 537.3 Mt in 2023. Despite all restrictions being fully lifted since the COVID-19 pandemic, oil demand in the EU-27 decreased by 5% since 2019. This was largely represented by Germany and France which have seen a decline in the demand by 13.2 and 7.5 Mt respectively.

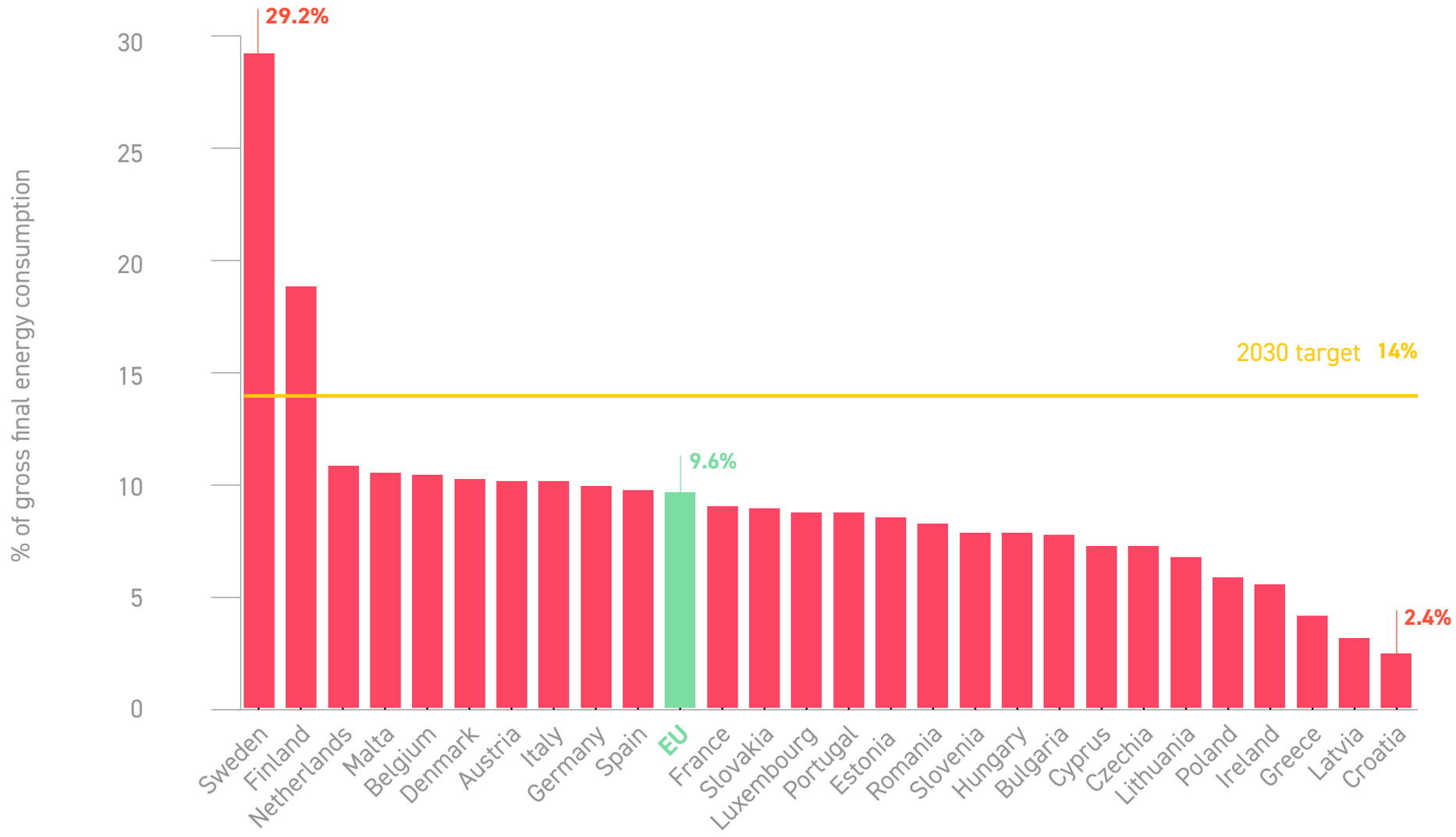
However, the largest proportional decreases were seen in Finland and Austria at -13.1% and -11.1% between 2019 and 2023 respectively. Some EU-27 countries, however, have seen substantial increases in demand; such as Romania which climbed by 13.5% (+1.3 Mt) and Bulgaria which increased by 18.8% (+0.8 Mt) between 2019 and 2023.

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

FIG.17

ENERGY FROM RENEWABLE SOURCES USED IN TRANSPORT ACTIVITIES IN THE EU-27 IN 2022

Source: Eurostat



The EU agreed to set a common target of 14% for the share of renewable energy (including liquid biofuels, hydrogen, biomethane, 'green' electricity, etc.) used in transport by 2030.

The average share of energy from renewable sources in transport increased from 1.6% in 2004 to 9.6% in 2022. Among the EU Member States with the highest share of renewable energy in transport fuel consumption are Sweden (29.2%), Finland (18.8%) and the Netherlands (10.8%) and the lowest share can be found in Greece (4.1%), Latvia (3.1%) and Croatia (2.4%).

Products

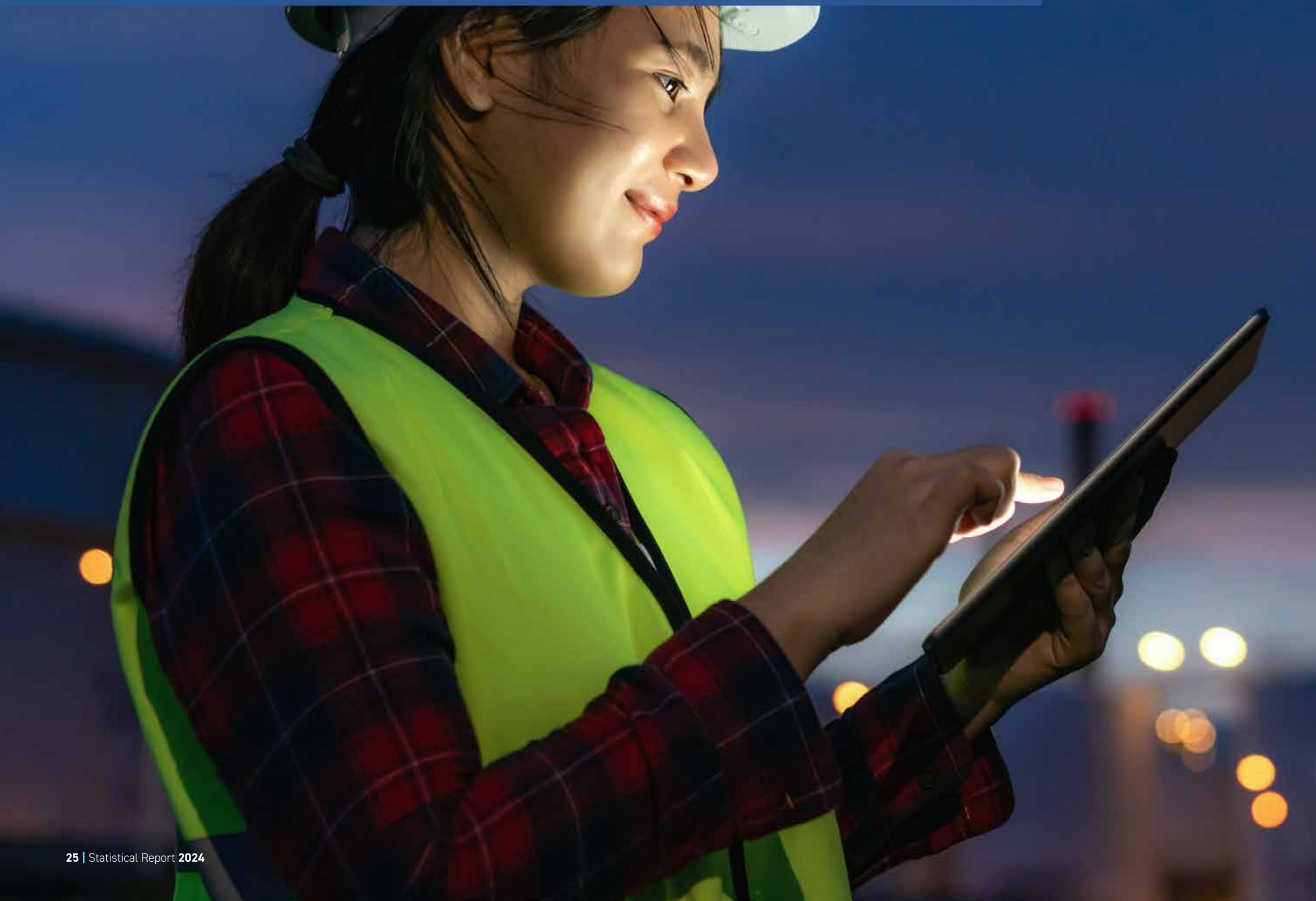
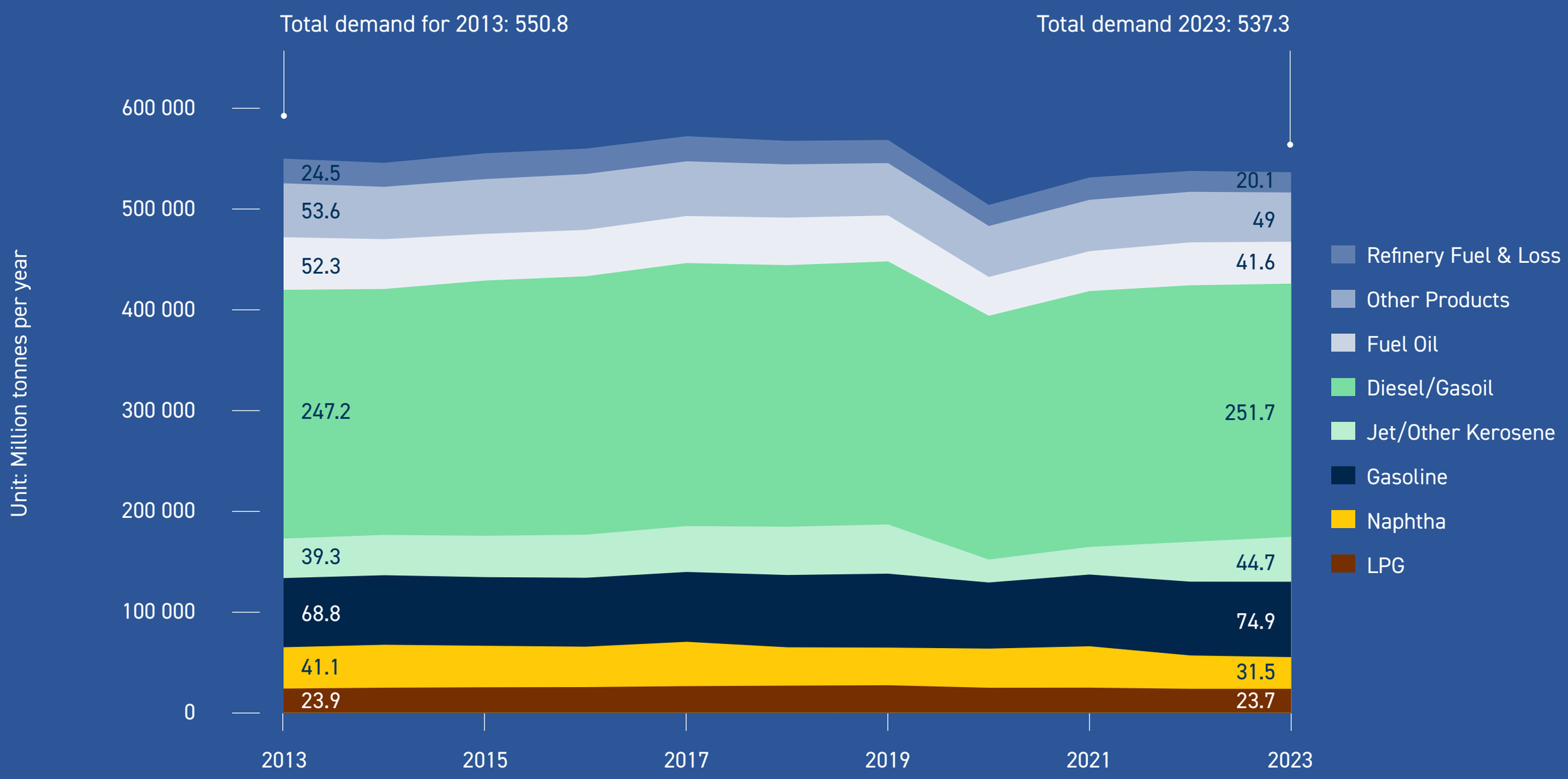


FIG.18 HISTORICAL DEMAND FOR OIL PRODUCTS IN THE EU-27

Source: Wood Mackenzie

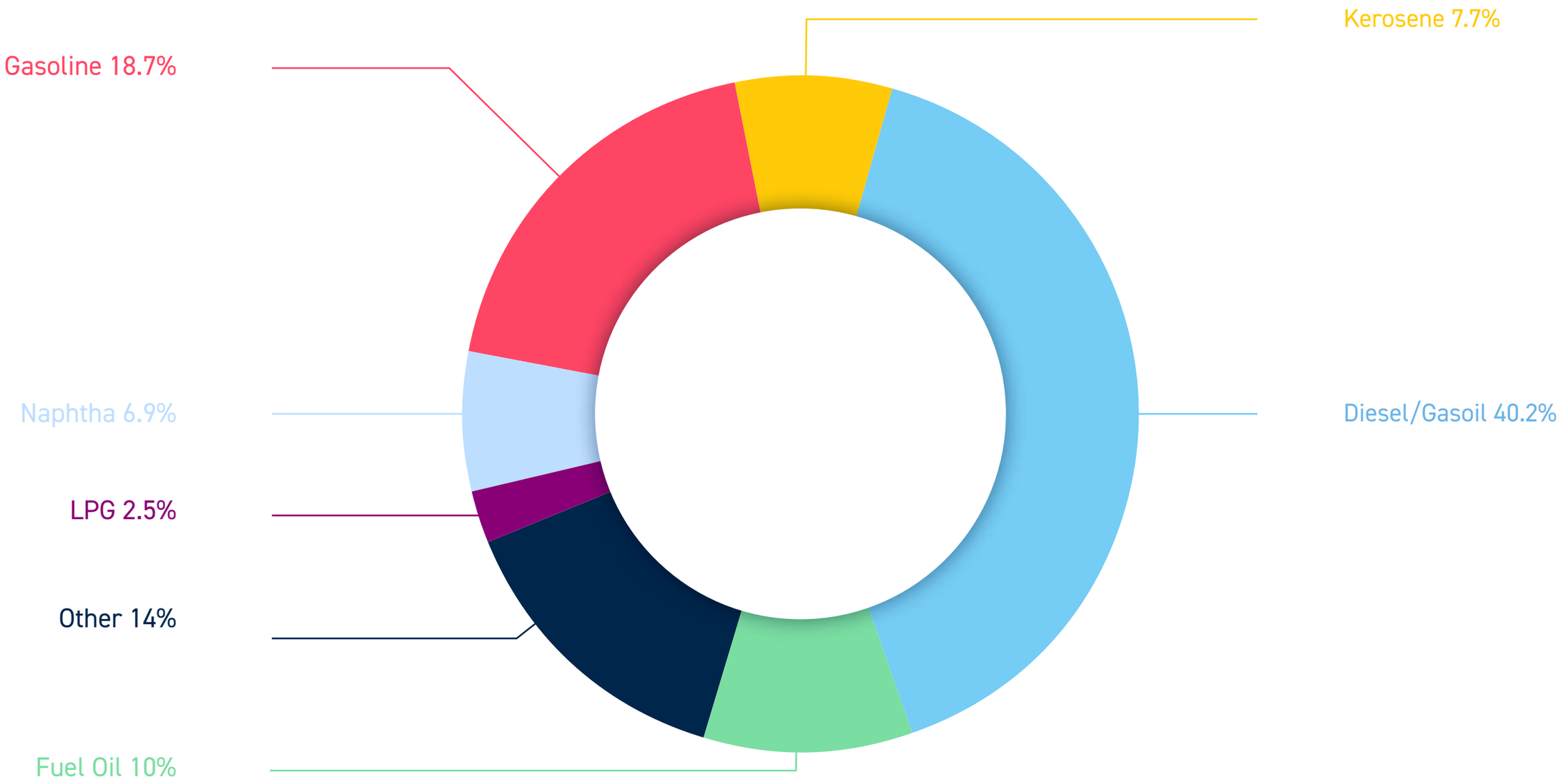


From 2013 to 2019, a slight increase has been witnessed for oil products demand in the EU mainly due to the rise in demand of diesel/gasoil and kerosene products. In 2020, the total demand of oil products decreased by 11% compared with 2019 due to the Covid-19 pandemic. Demand in 2021, 2022 and 2023 is stronger but does not reach 2019's level.

FIG.19

AVERAGE REFINERY OUTPUT BY PRODUCT TYPE
IN OECD EUROPE IN 2022

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.20 **BIOFUELS PRODUCTION** IN THE EU-27

Source: Eurostat

The production of biofuels for aviation has drastically increased post-pandemic, going up by 88% between 2019 and 2022. The production of biogasoline and other liquid biofuels has also increased, going up by 0.72% and 25.5% respectively, between 2019 and 2022. The production of biodiesel decreased by 0.52% in the same time frame.

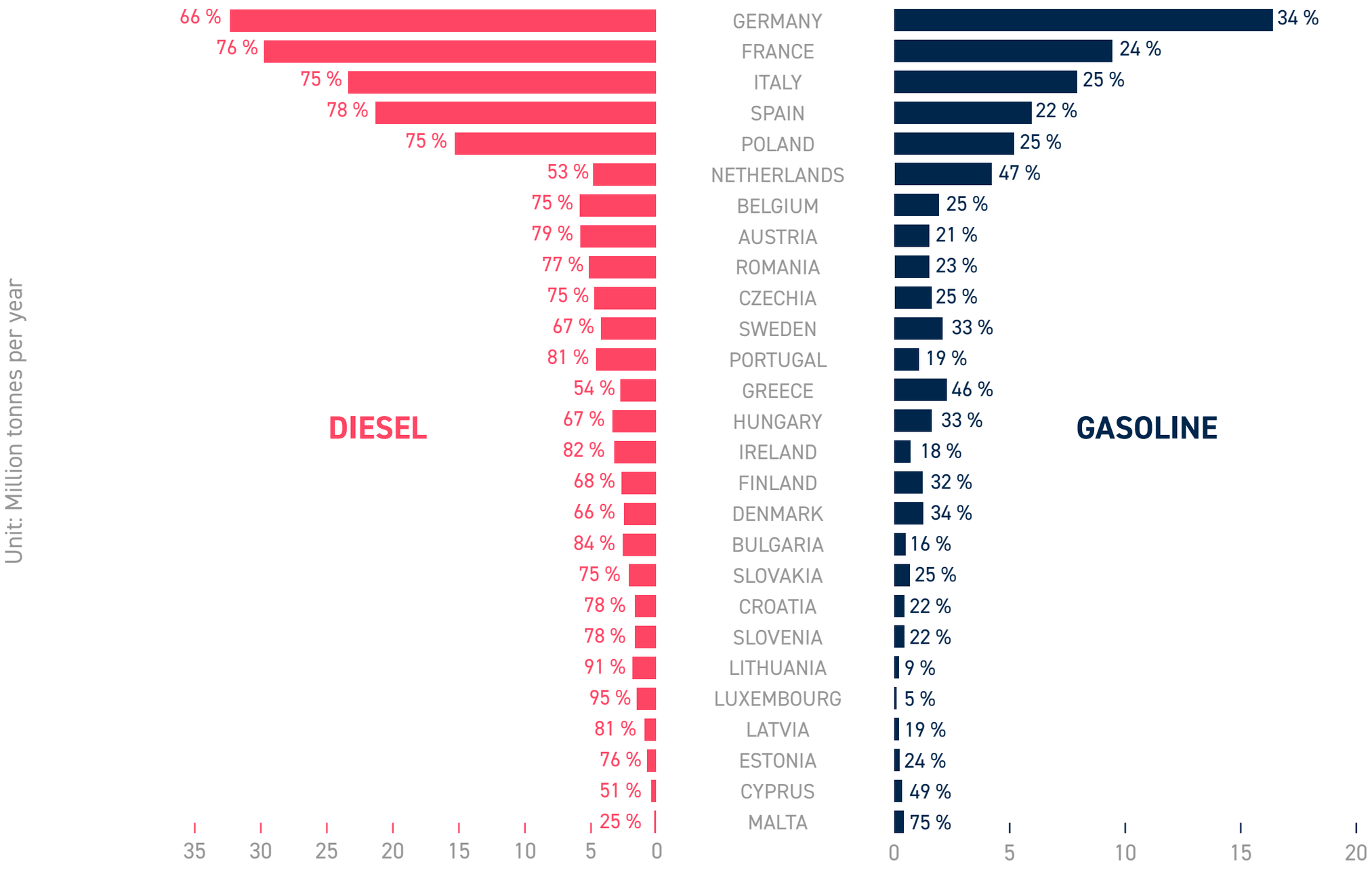
FIG.21 **ROAD FUEL DEMAND** IN THE EU-27 IN 2023

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.

FIG.22 **ROAD FUEL DEMAND** IN THE EU-27 BY COUNTRY IN 2023

Source: Wood Mackenzie

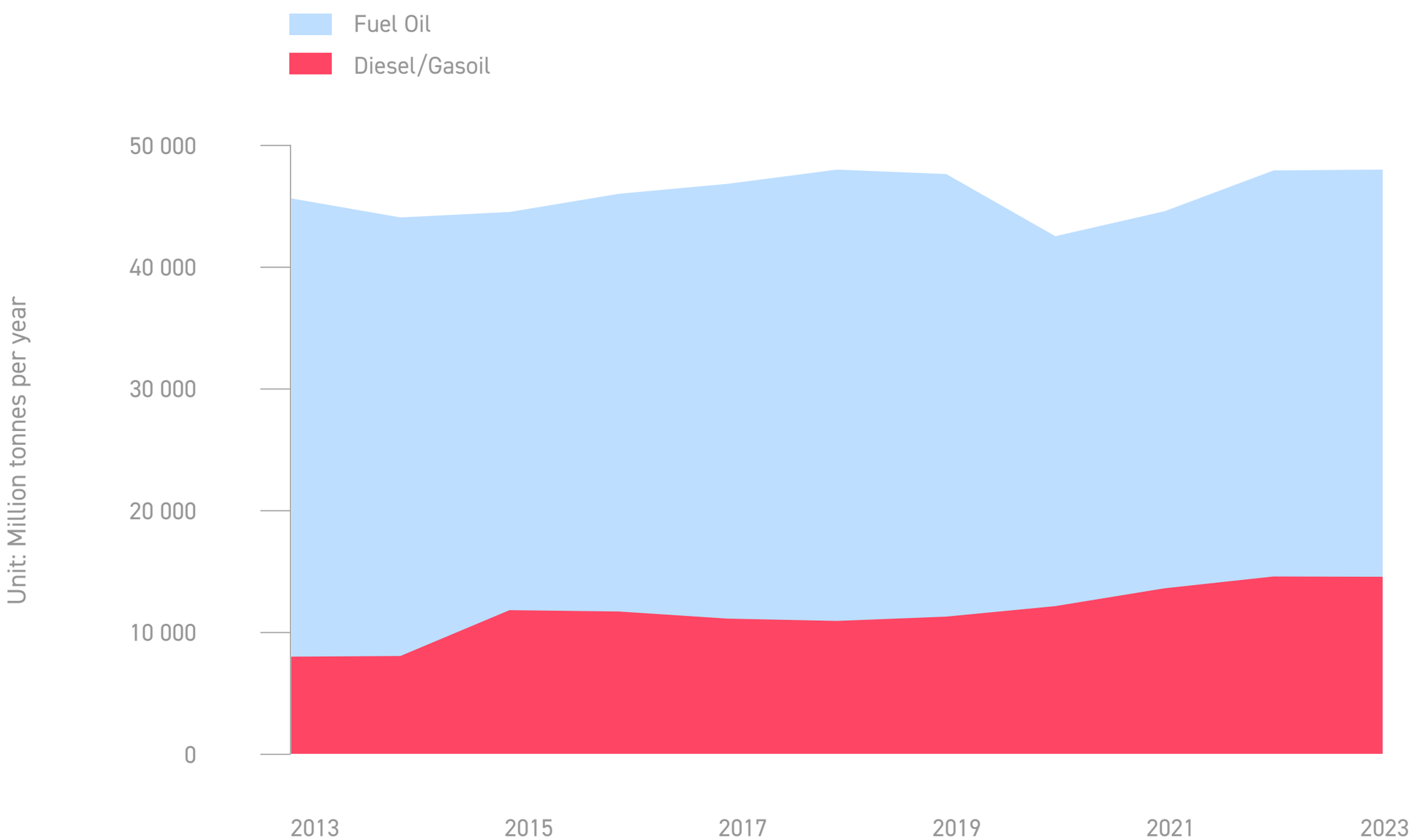


Sustained by favourable excise taxes on diesel, the shift from gasoline to diesel over the past two decades led to a higher demand for diesel as a road fuel in the vast majority of EU Member States. In some countries, such as France and Spain, the imbalance is far more pronounced as a result of even 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.23 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 liquefied natural gas (LNG) or using scrubbers are alternatives to meeting the new International Maritime Organisation (IMO) emissions limits.

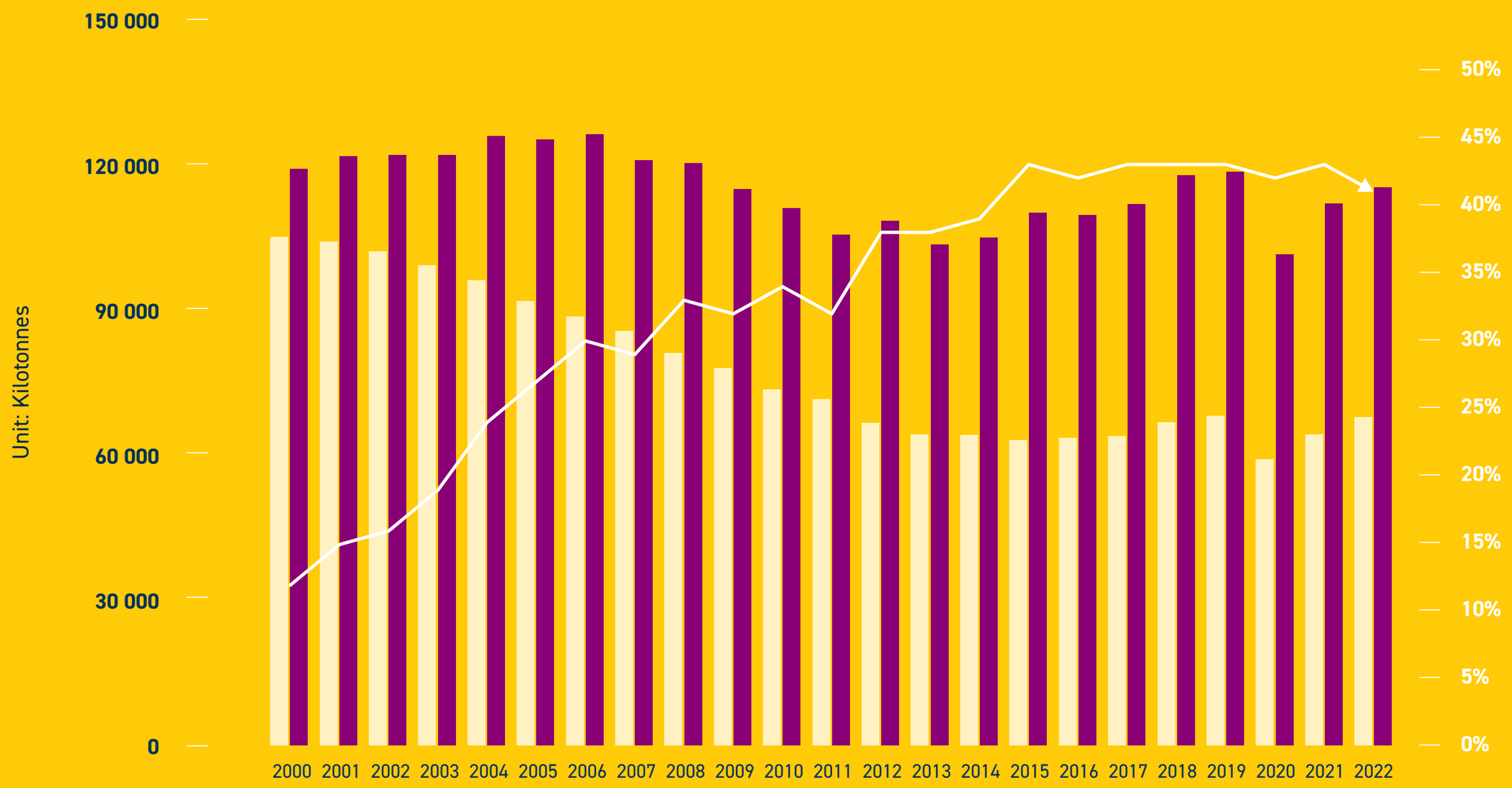
Import Dependency

FIG.**24a**

NET TRADE FLOWS FOR REFINED PRODUCTS

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

Source: Eurostat



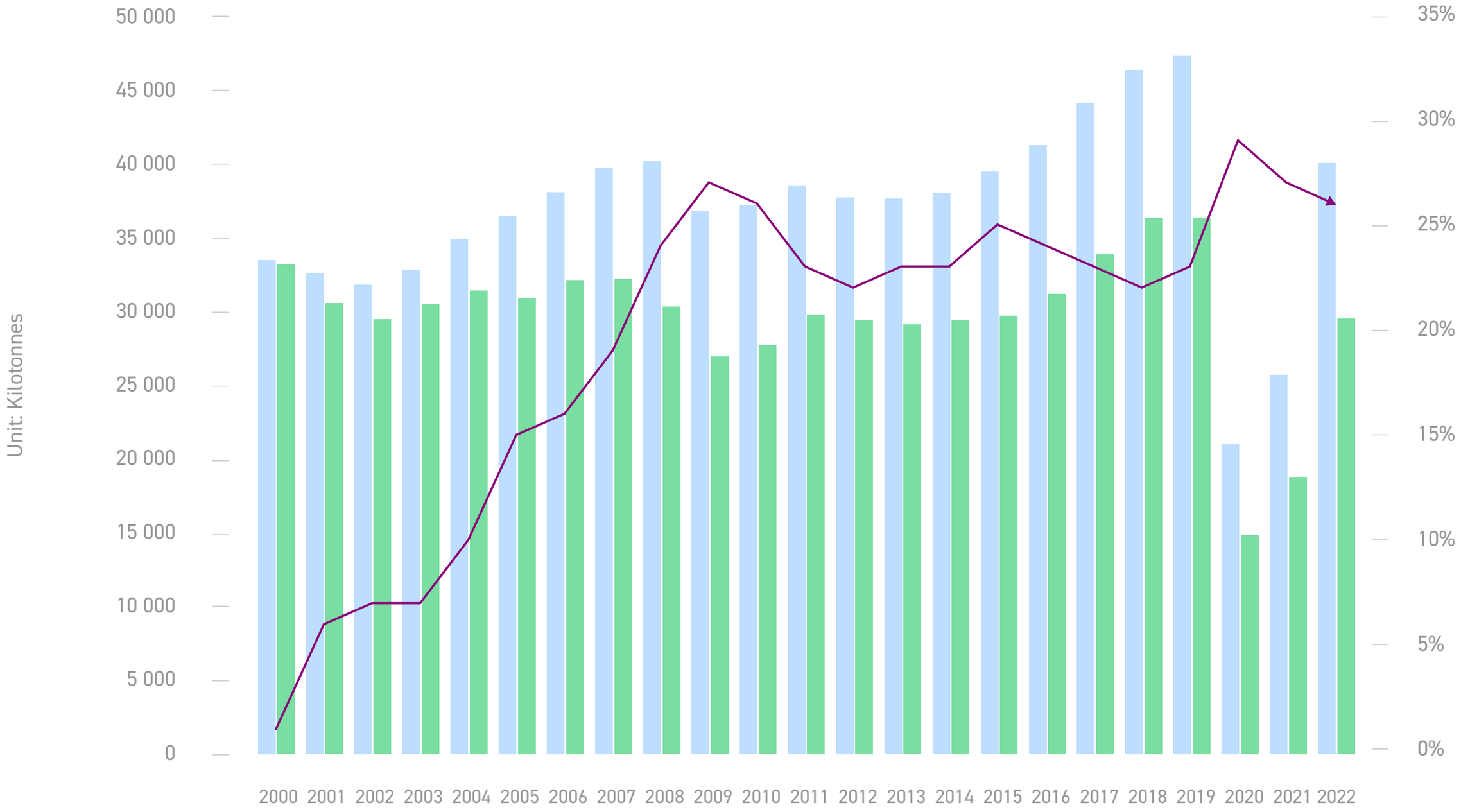
Overproduction of gasoline in the EU has been increasing over the years, despite a mild decrease in overall production volumes, due to a decrease in domestic consumption. This decreasing trend for domestic consumption, however, has stabilised from 2013 onwards. This may in part be driven by a change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

FIG.24b

EU-27 NET TRADE FLOWS FOR REFINED PRODUCTS

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

Source: Eurostat

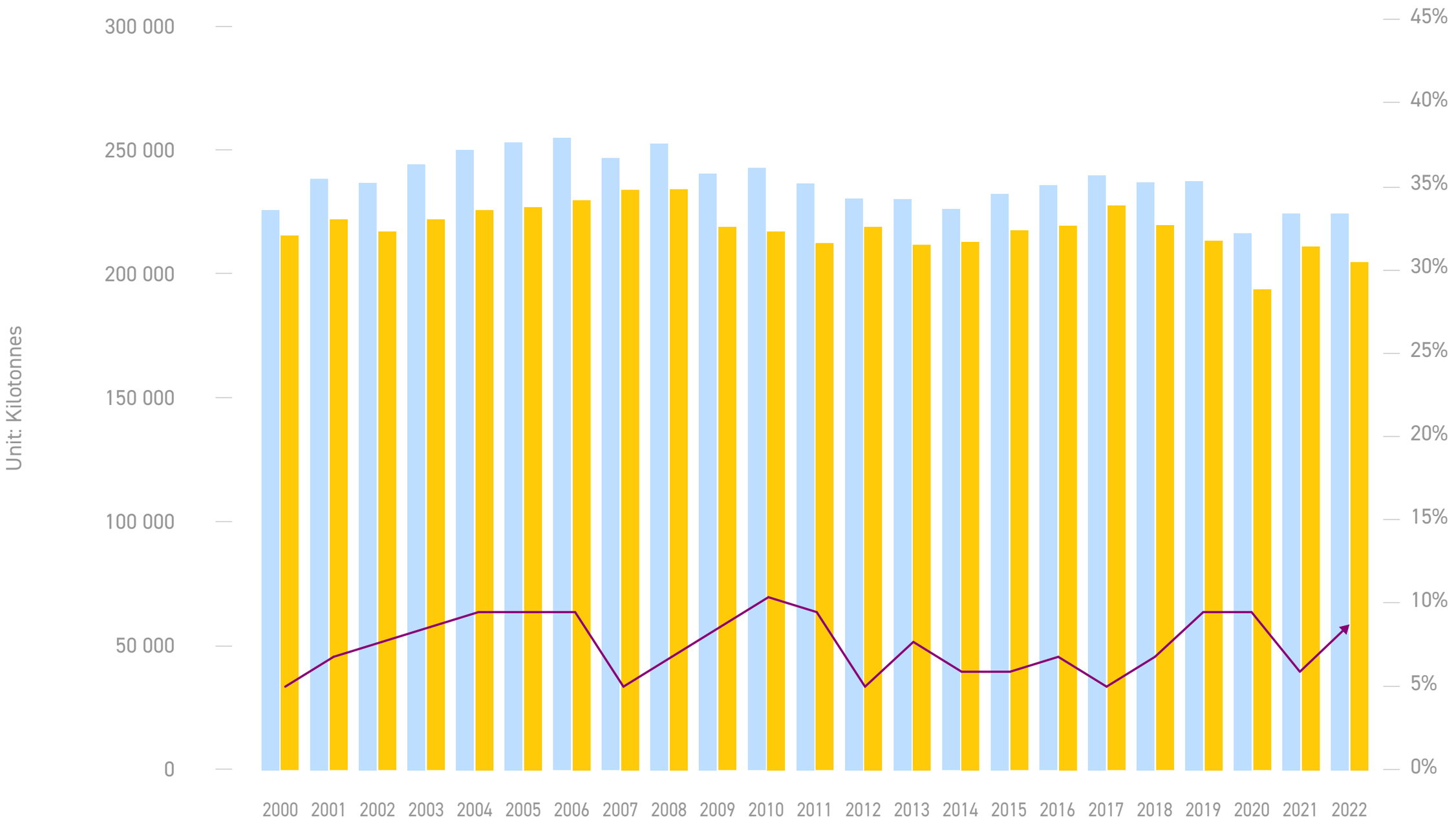


For kerosene, the EU is import dependent, relying substantially on supplies from Russia and Asia.

FIG.24c

NET TRADE FLOWS FOR REFINED PRODUCTS IN-DEPTH LOOK AT DIESEL/GASOIL (EXCLUDING BIO-COMPONENTS)

Source: Eurostat

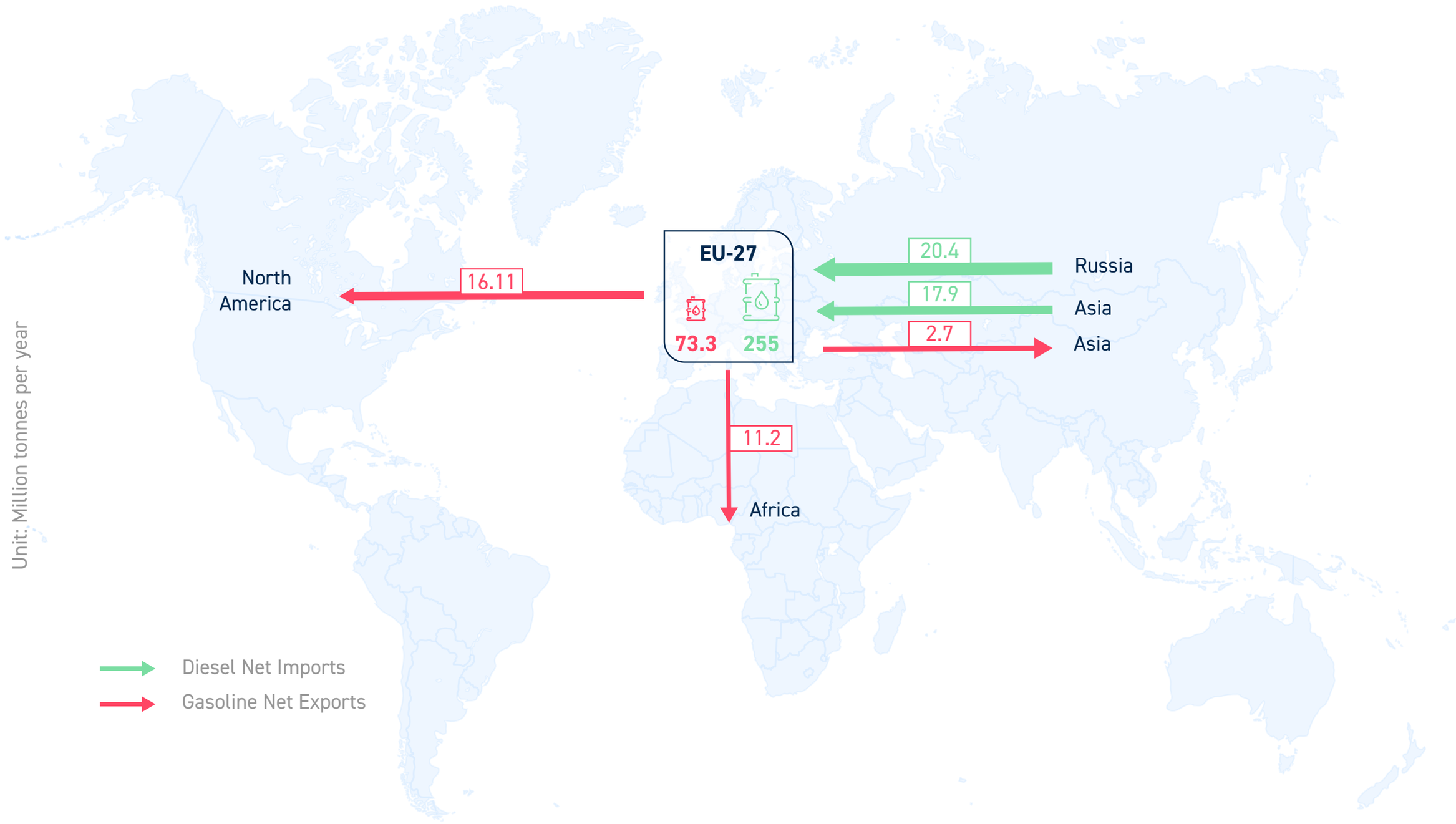


For diesel/gasoil, on the other hand, the EU covers most of its consumption through domestic production.

FIG.25

MAJOR GASOLINE AND DIESEL/GASOIL TRADE FLOWS
TO AND FROM THE EU-27 IN 2022

Source: Eurostat/Wood Mackenzie



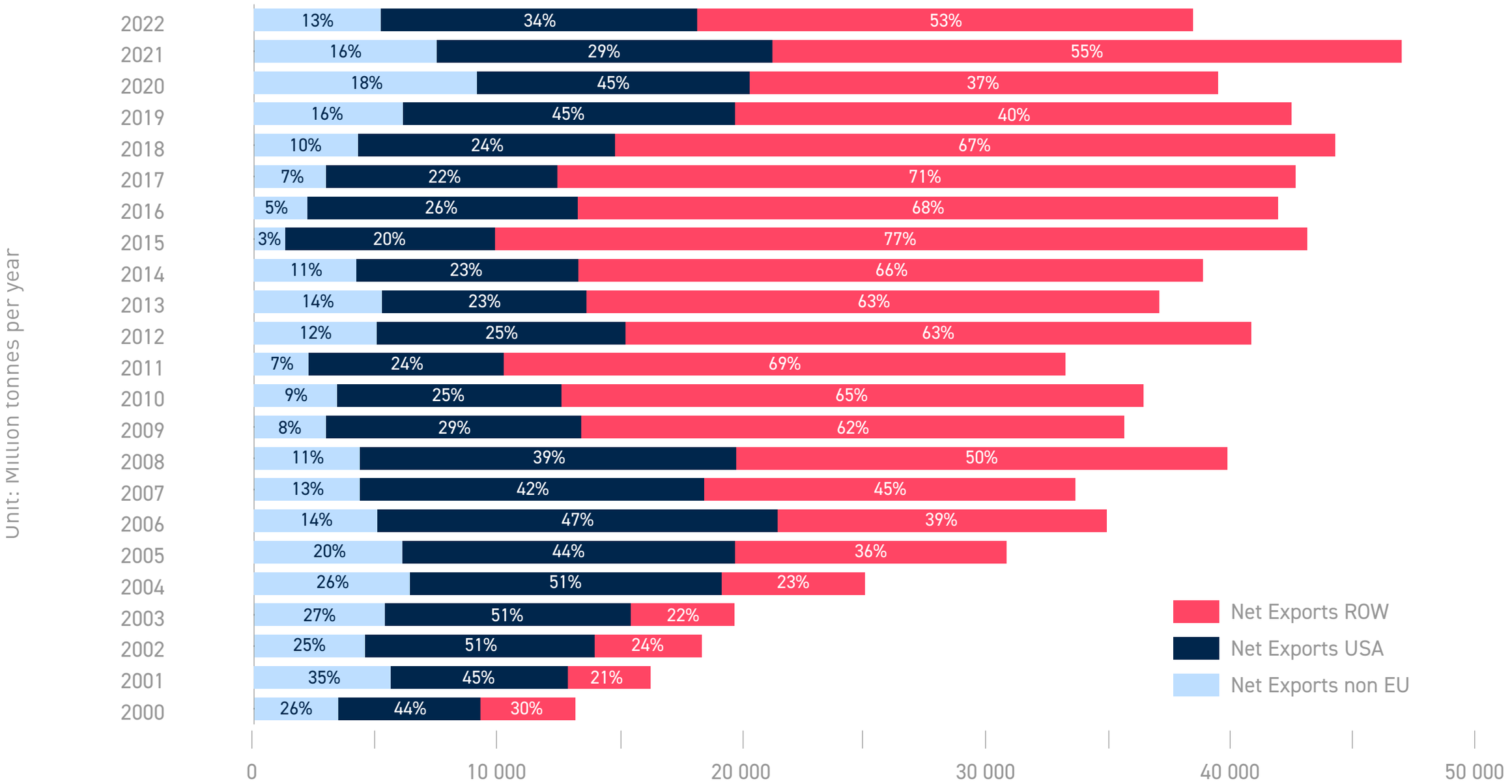
The major trade flows to and from the EU reflect the imbalance in gasoline/ diesel demand in Europe. As a consequence, significant excess gasoline production capacity needs to be exported, whilst Europe became heavily reliant on imports from third countries/regions - especially Russia, the Middle East and the USA - 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.26

EU-27 GASOLINE TRADING BALANCE:
USA IS A KEY EXPORT MARKET FOR THE EU

Source: Eurostat



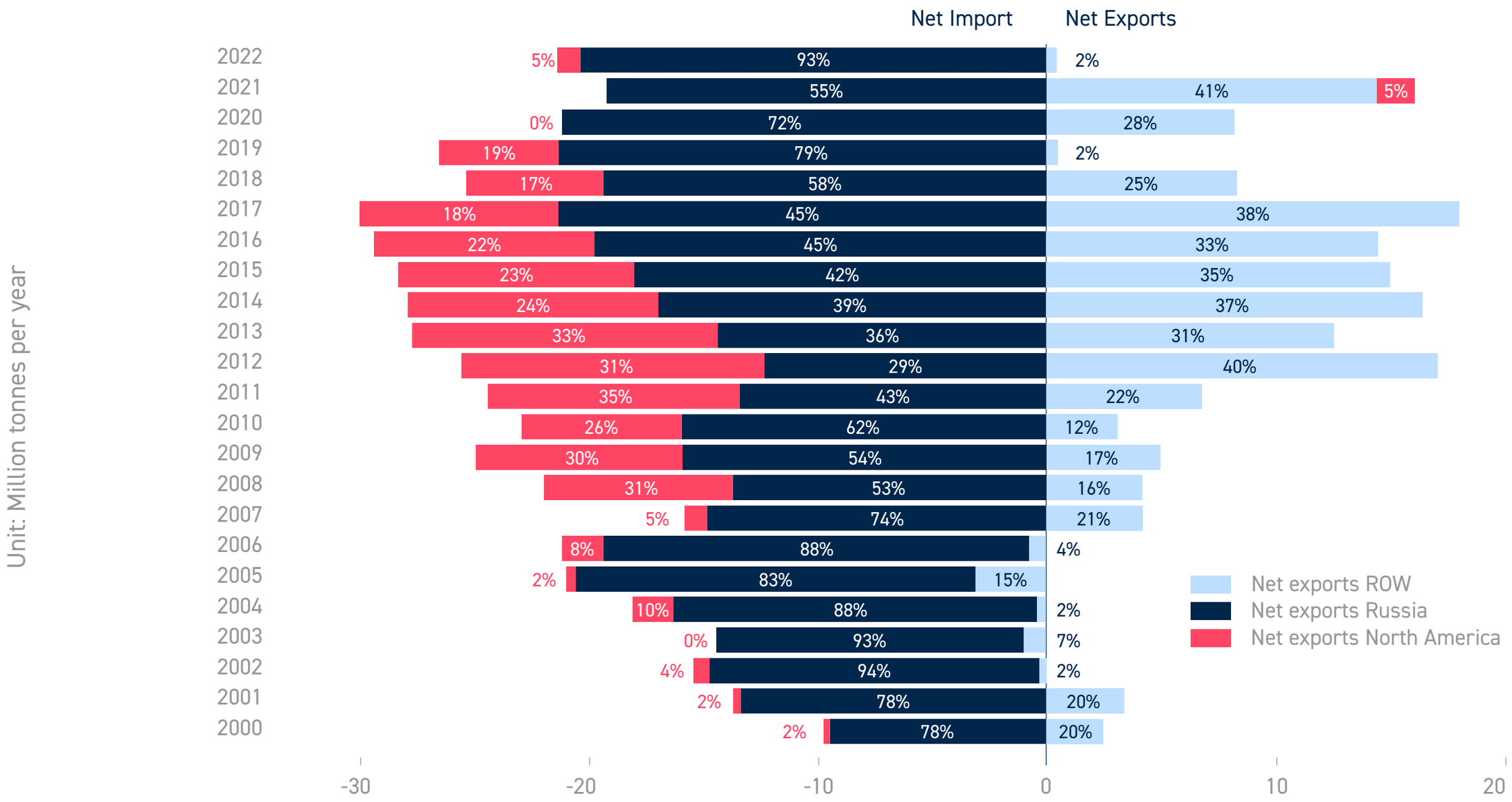
The US was traditionally the main export market for the structural EU gasoline surplus. The shale oil boom in the late 2000s has decreased export opportunities to the US and forced EU refiners to find other markets. North America and Africa are now the two key export markets for the EU. In 2022, the decrease in EU exports is linked to a general decrease in its crude oil production and a higher demand for transport fuel after the end of the pandemic. These elements led to an increased dependency on imports for petroleum products.

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

FIG.27

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

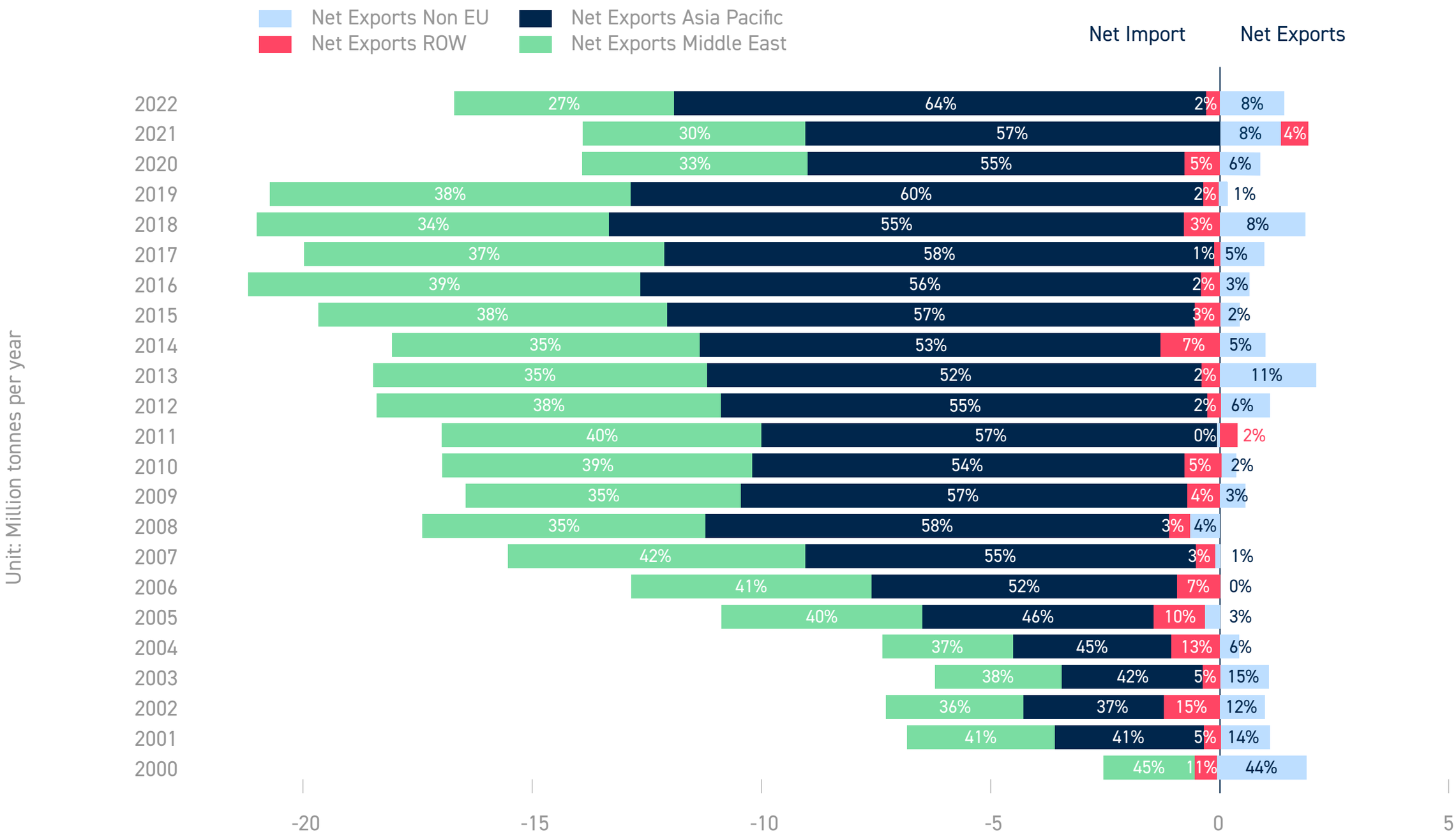
Source: Eurostat



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. The EU's continued dependency on imports for gasoil is the result of the diesel/ gasoline imbalance that the EU has been facing for many years. After a significant decline in import dependency in 2021, this dependency raised again in 2022 due to a higher demand in transport fuels. In May 2022, the European Commission implemented the REPowerEU plan to reduce its dependency on Russian fuels as a result of Russia's war in Ukraine.

FIG.28 NET EU-27 JET FUEL TRADE BALANCE

Source: Eurostat

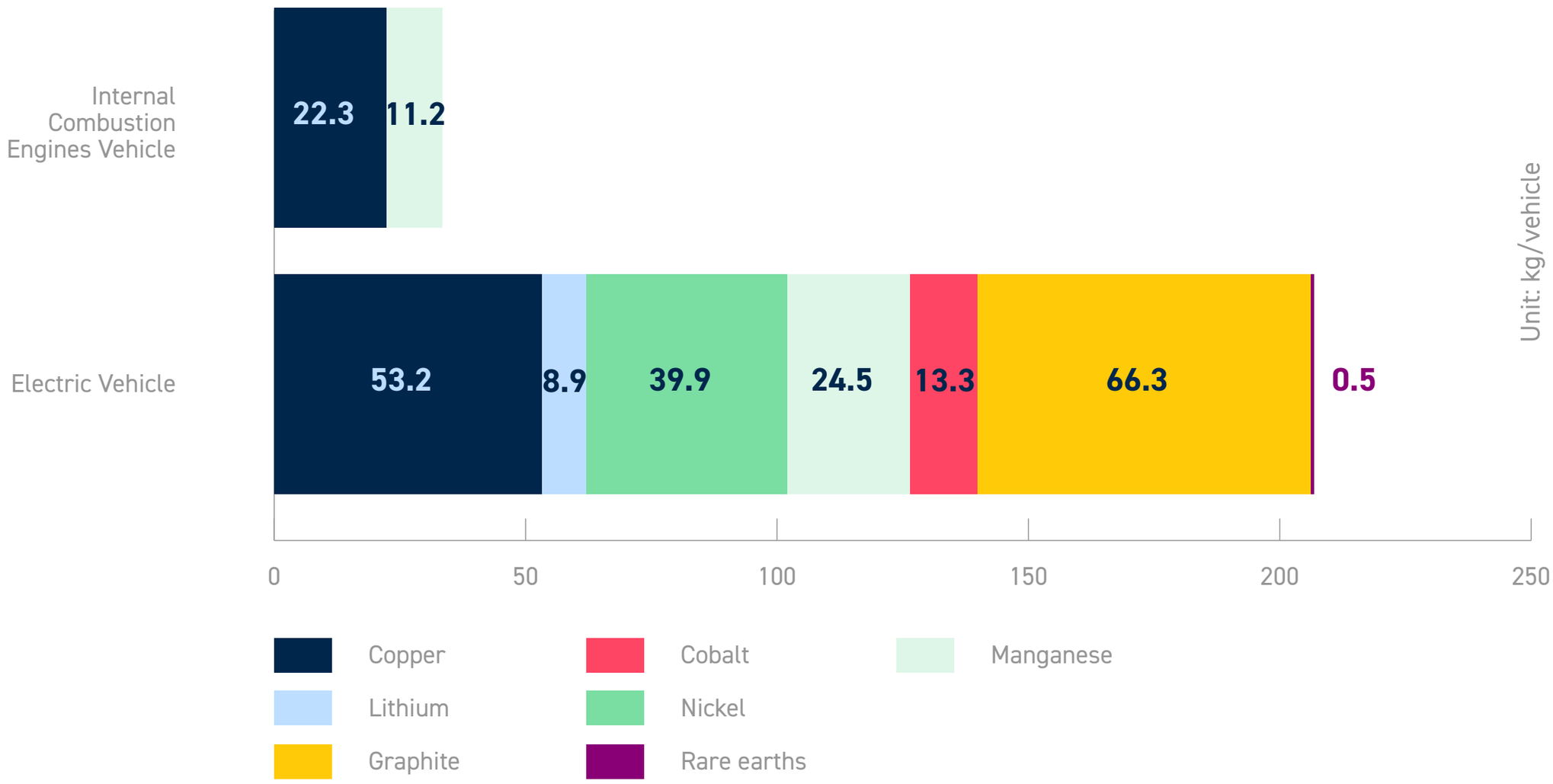


There is a substantial EU dependence on jet fuel imports originating mainly from the Middle East and to a lesser extent from the Asia Pacific region.

FIG.29

MINERALS USED IN ELECTRIC VEHICLES
COMPARED TO CONVENTIONAL VEHICLES

Source: International Energy Agency

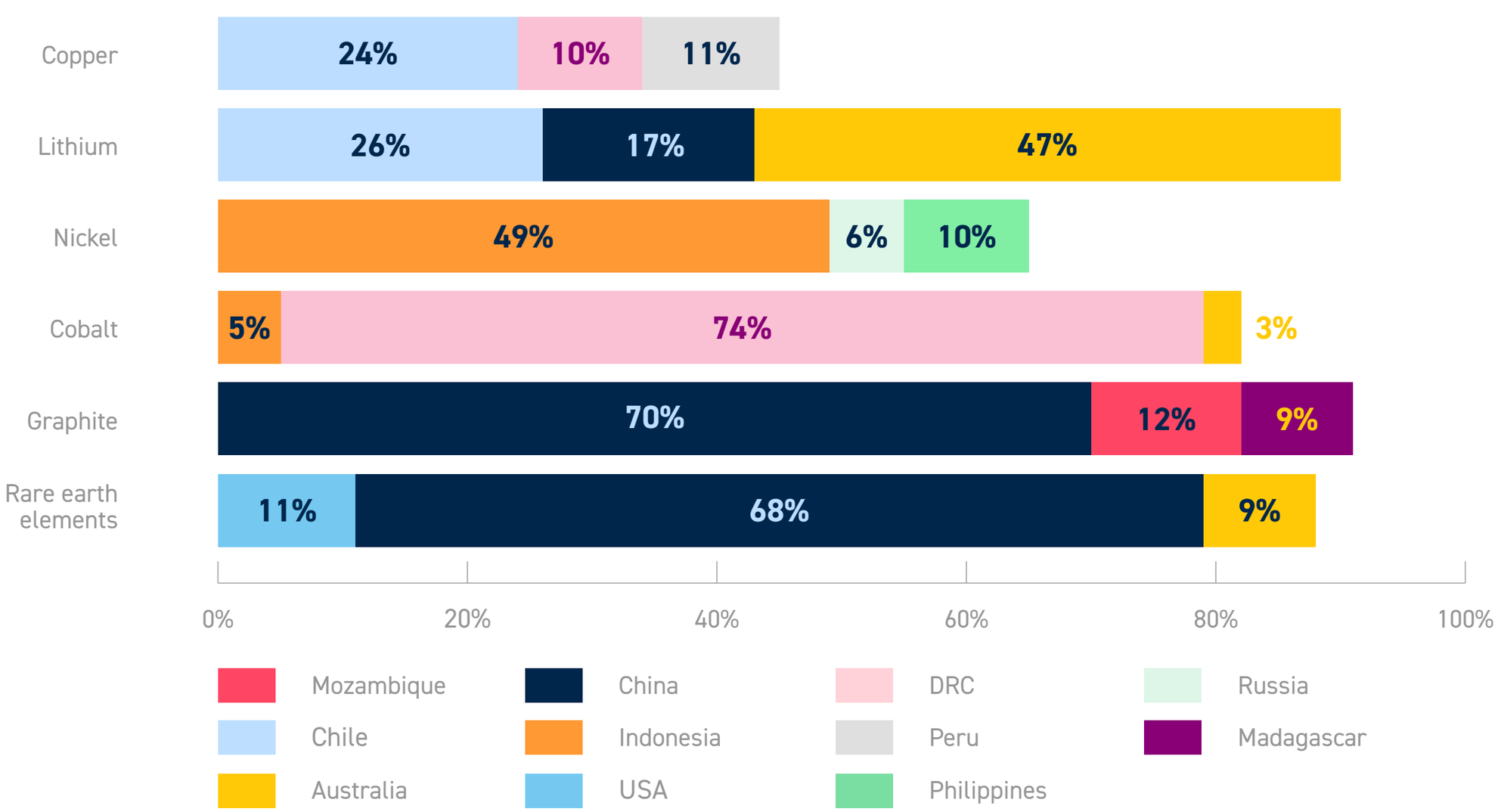


A typical electric vehicle (EV) requires six times the mineral inputs of a conventional car. Lithium, nickel, cobalt, manganese and graphite are crucial to battery performance, longevity and energy density, whereas rare earth elements are essential for permanent magnets that are vital for EV motors. 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.30a

SHARE OF TOP THREE PRODUCING COUNTRIES IN MINING OF SELECTED MINERALS, 2022

Source: International Energy Agency

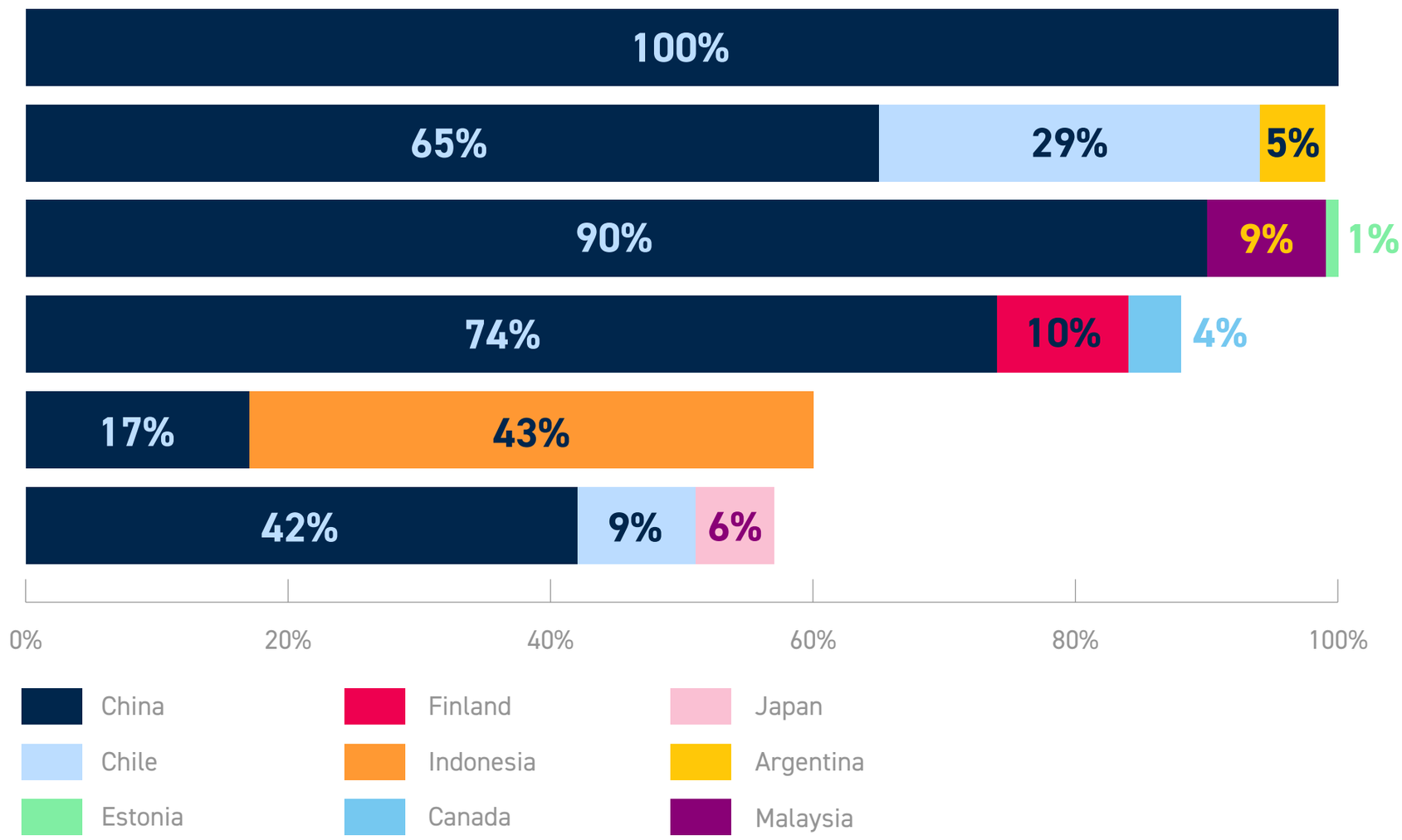


The prospect of a rapid rise in demand for critical minerals necessary for the technologies required in energy transitions poses huge questions about the availability and reliability of supply. The production of these minerals is more concentrated than that of oil. For lithium, cobalt, graphite and rare 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 74% and 68% of global production of cobalt and rare earth elements respectively in 2022.

FIG.30b

SHARE OF TOP THREE PRODUCING COUNTRIES IN PROCESSING OF SELECTED MINERALS, 2022

Source: International Energy Agency

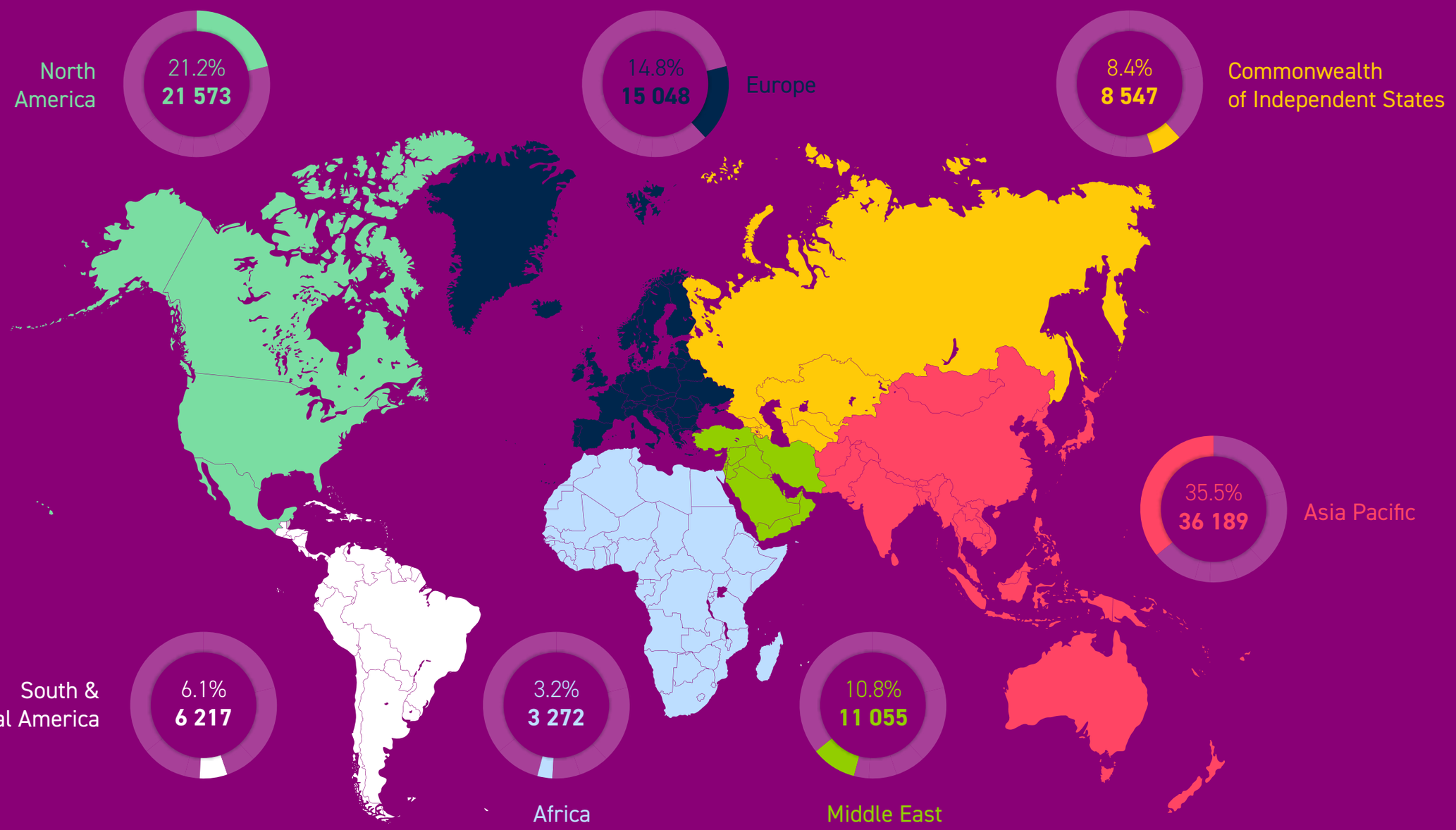


The prospect of a rapid rise in demand for critical minerals necessary for the technologies required in energy transitions poses huge questions about the availability and reliability of supply. The level of concentration for processing operations is particularly high, with China's strong presence across the board: China's share of refining is around 17% for nickel, 65% for lithium, 74% for cobalt, 90% for rare earth elements, and 100% for graphite. 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.31 **GLOBAL REFINING CAPACITY** AS OF 2022

Source: Energy Institute



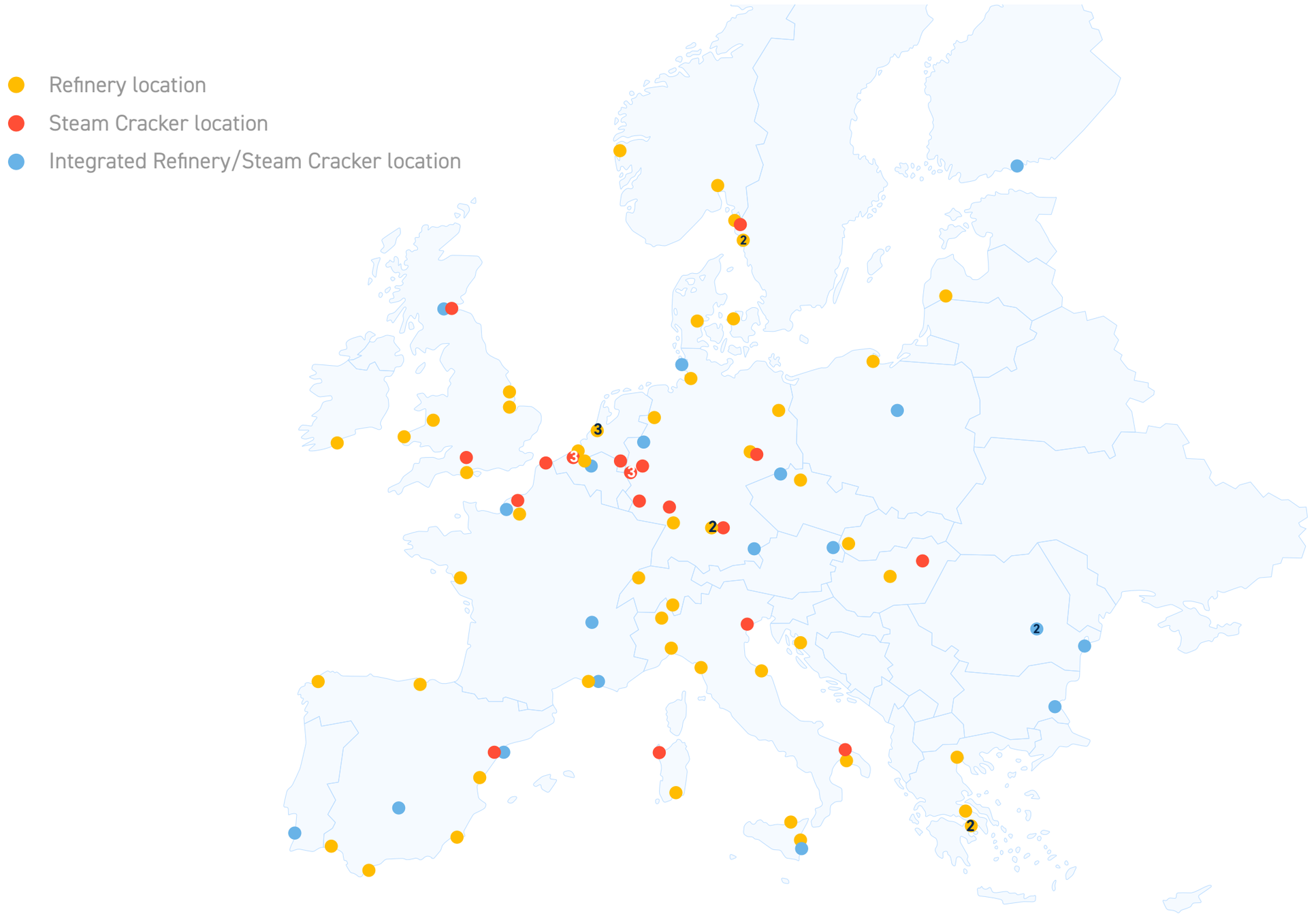
Unit: Thousand Barrels Daily

Refining is spread around the world and truly a global business. The share of Europe, which has remained stable at 14,8%, is the third largest region for refining, behind Asia Pacific at 35.5% and North America at 21.2%.

FIG.32

REFINERY/STEAM CRACKER SITES IN EUROPE

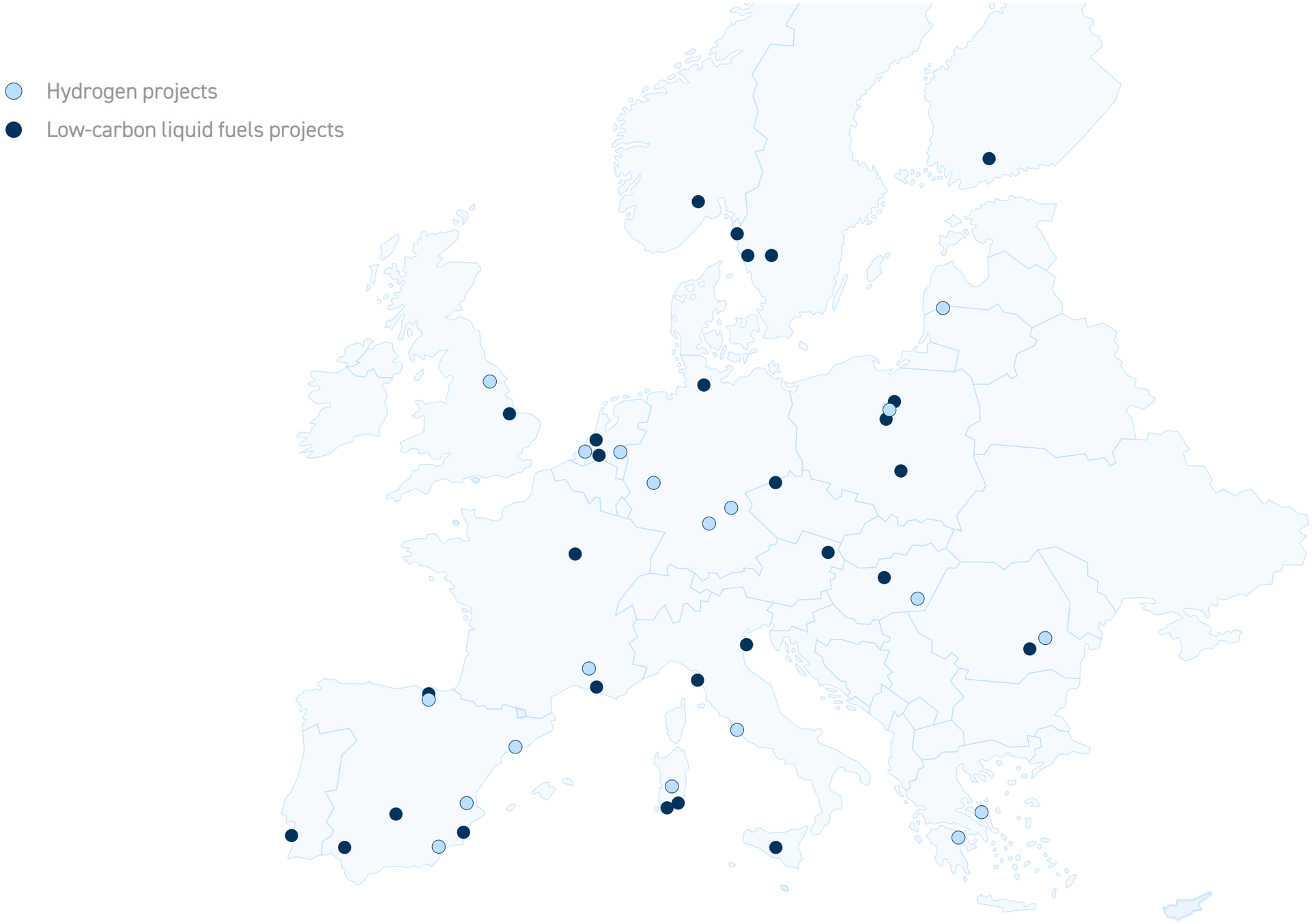
Source: Concawe and Petrochemical Europe



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.33 FUELSEUROPE MEMBERS' LOW-CARBON PROJECTS

Source: FuelsEurope



As of June 2024, there were 28 low-carbon liquid fuel projects in operation or soon-to-be operational. Additionally, there were 19 hydrogen projects at different levels of readiness.

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

FIG.34

75 MAINSTREAM REFINERIES WERE OPERATING IN THE EU-27, UK, NORWAY, AND SWITZERLAND AT THE END OF 2023

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	
CH + NO + UK	8
TOTAL = 75	

The 75 'mainstream' refineries operating in 2023 in the EU-27, UK, Norway, and Switzerland had a primary refining capacity of 677.3 million tonnes - similar to the 2021 total. This represents a decrease by 104 million tonnes of primary refining capacity since 2009.

FIG.35

EU-27, UK, NORWEGIAN AND SWISS MAINSTREAM REFINERIES HAD 677.3 MILLION TONNES OF PRIMARY REFINING CAPACITY IN 2023

Source: Concawe

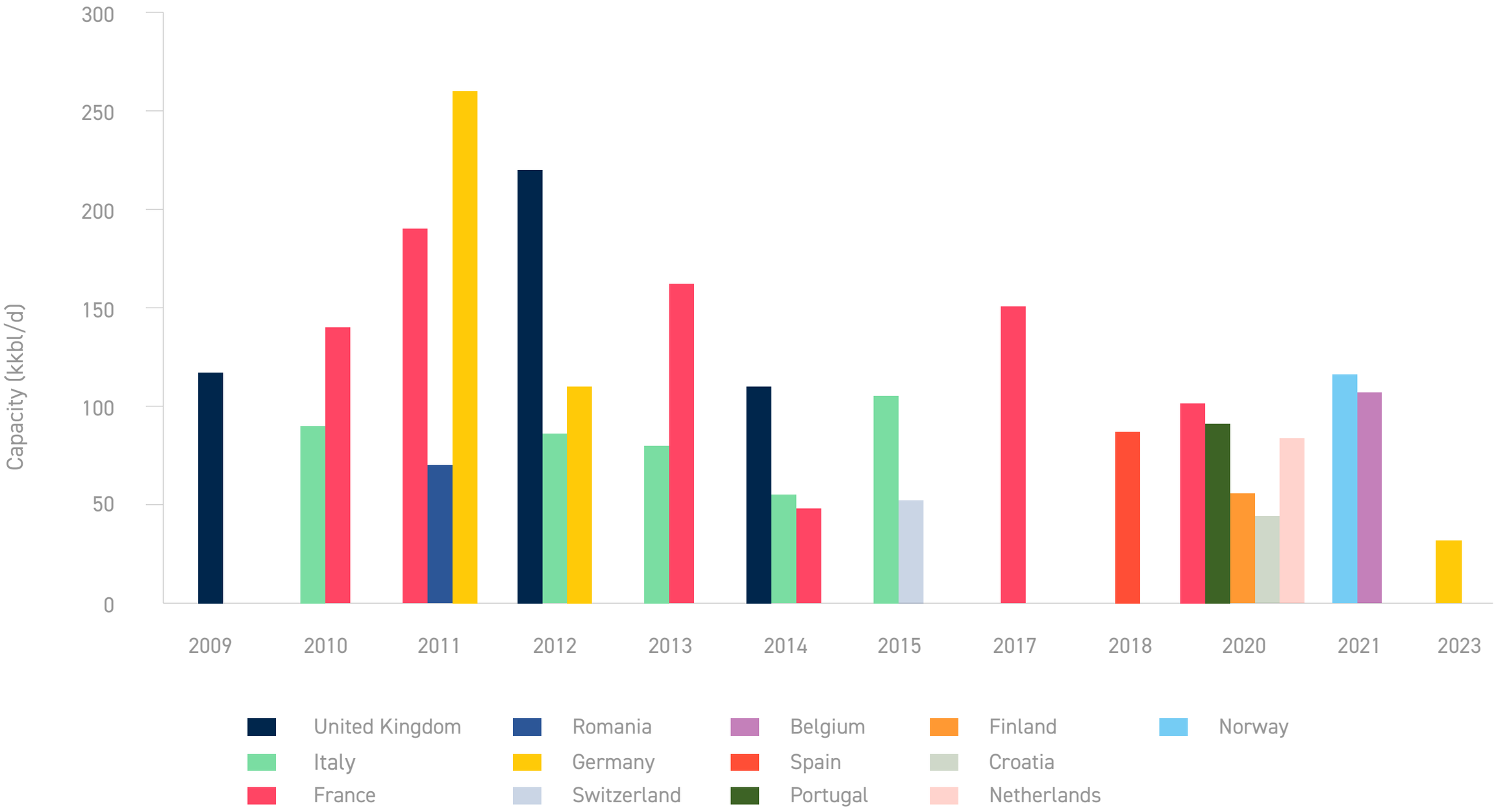
COUNTRY	Mainstream > 1.5 Mt/a
	Mt/a
Austria	10.2
Belgium	33.7
Bulgaria	6.1
Croatia	4.7
Czechia	8.3
Denmark	9.1
Finland	10.8
France	60.4
Germany	104.4
Greece	26.2
Hungary	8.1
Ireland	3.8
Italy	87.1
Lithuania	10.2
Netherlands	63.9
Poland	30.7
Portugal	11.9
Romania	12.5
Slovakia	5.6
Spain	74.3
Sweden	20.8
EU-27 TOTAL	**602.8**
Norway	10.9
Switzerland	3.4
United Kingdom	60.2
NO + CH + UK	**74.5**
TOTAL	**677.3**

The 75 mainstream refineries operating in 2023 in the EU-27, UK, Norway, and Switzerland had a primary refining capacity of 677.3 million tonnes. This represents a decrease by 129 million tonnes of primary refining capacity since 2009. There were no mainstream refinery closure in 2023.

Note: Refining capacity is expressed in million tonnes per year. Numbers may not add up due to rounding.

FIG.36 **REFINERY CLOSURES** IN EUROPE

Source: Concawe

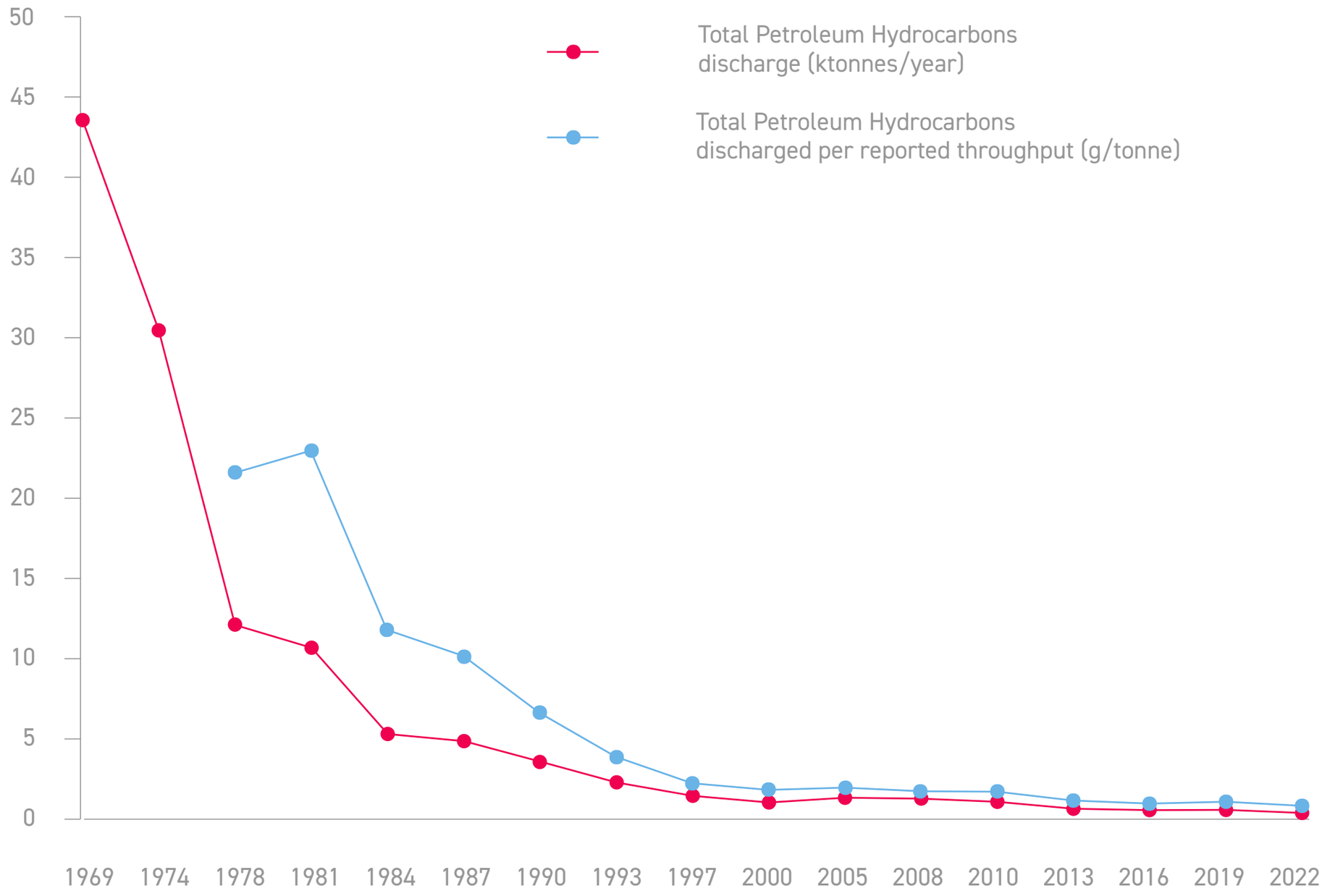


Since 2009, out of close to 100 refineries operating in Europe, 27 refineries (Threshold > 30 kbbl/d or 1.5 Mt/a) were closed or transformed. Currently, at least five refineries in Europe underwent a transformation process, moving away from oil and converting into biorefineries. In 2023, there was one specialised refinery that closed.

FIG.37

QUALITY OF REFINERY WATER EFFLUENT:
OIL DISCHARGED IN WATER

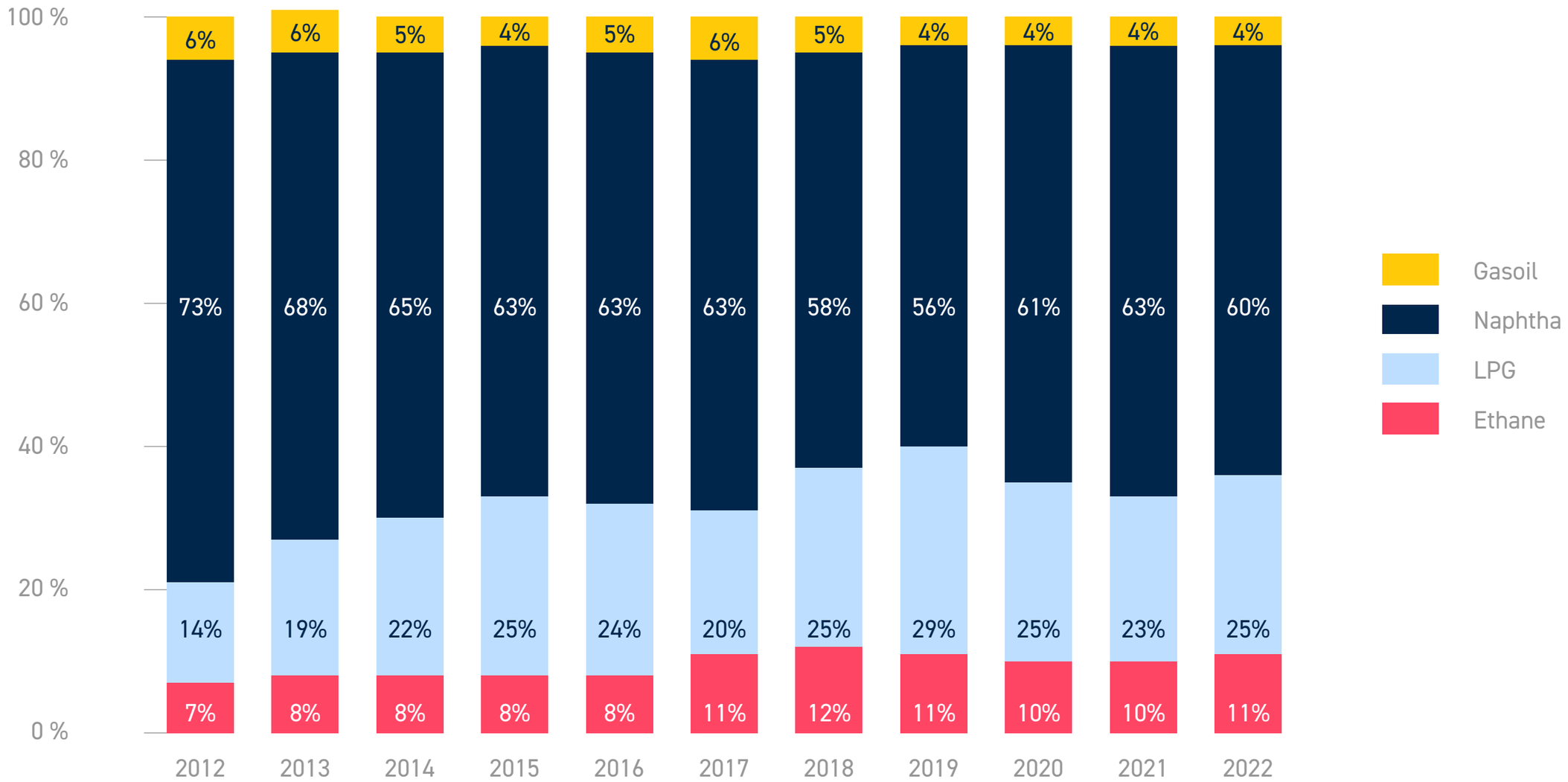
Source: Concawe



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.38 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.

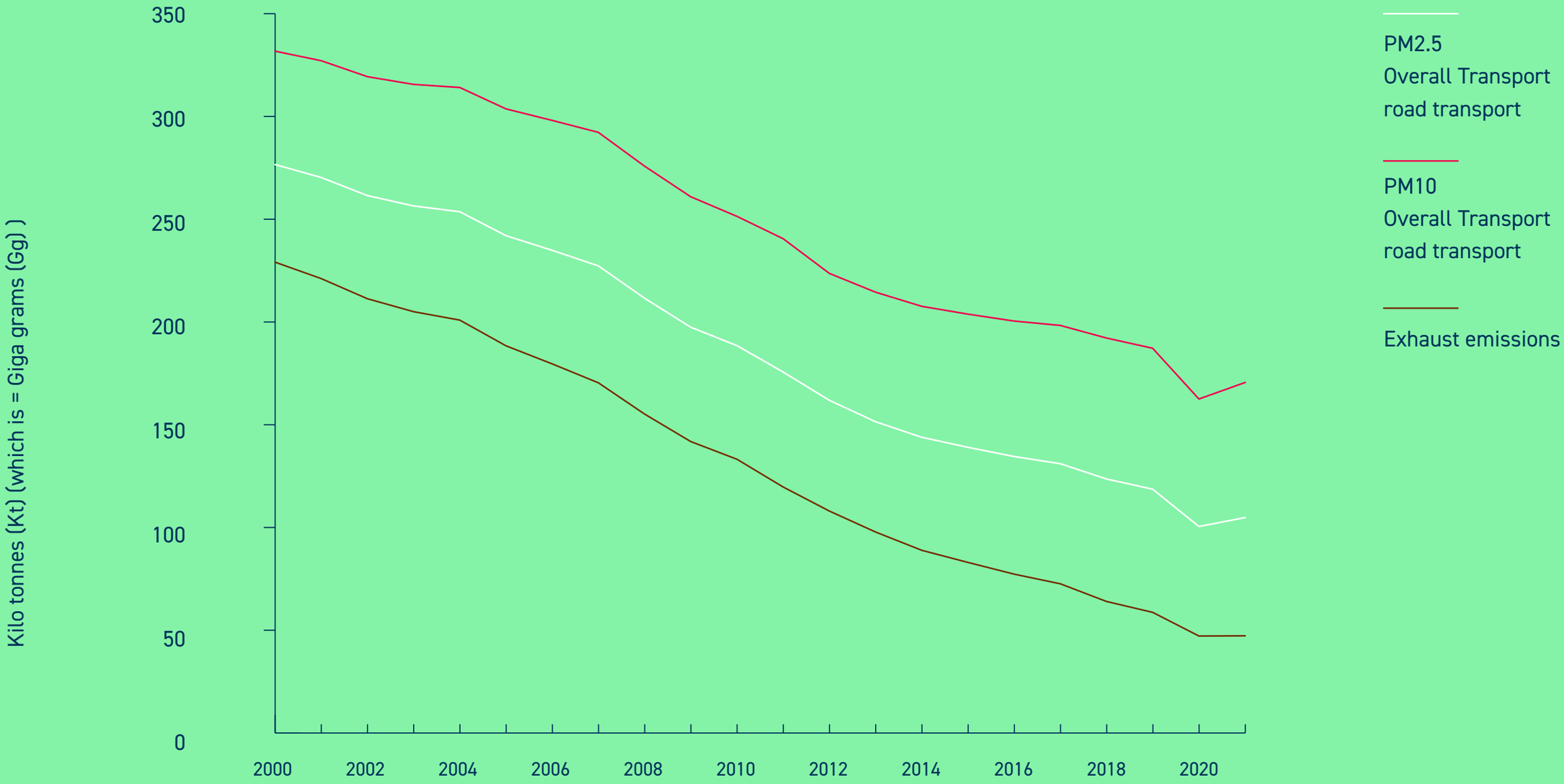
Note: Please note due to rounding, figures may not add up to exactly 100%.

Emissions

FIG.**39a**

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

Source: European Environmental Agency

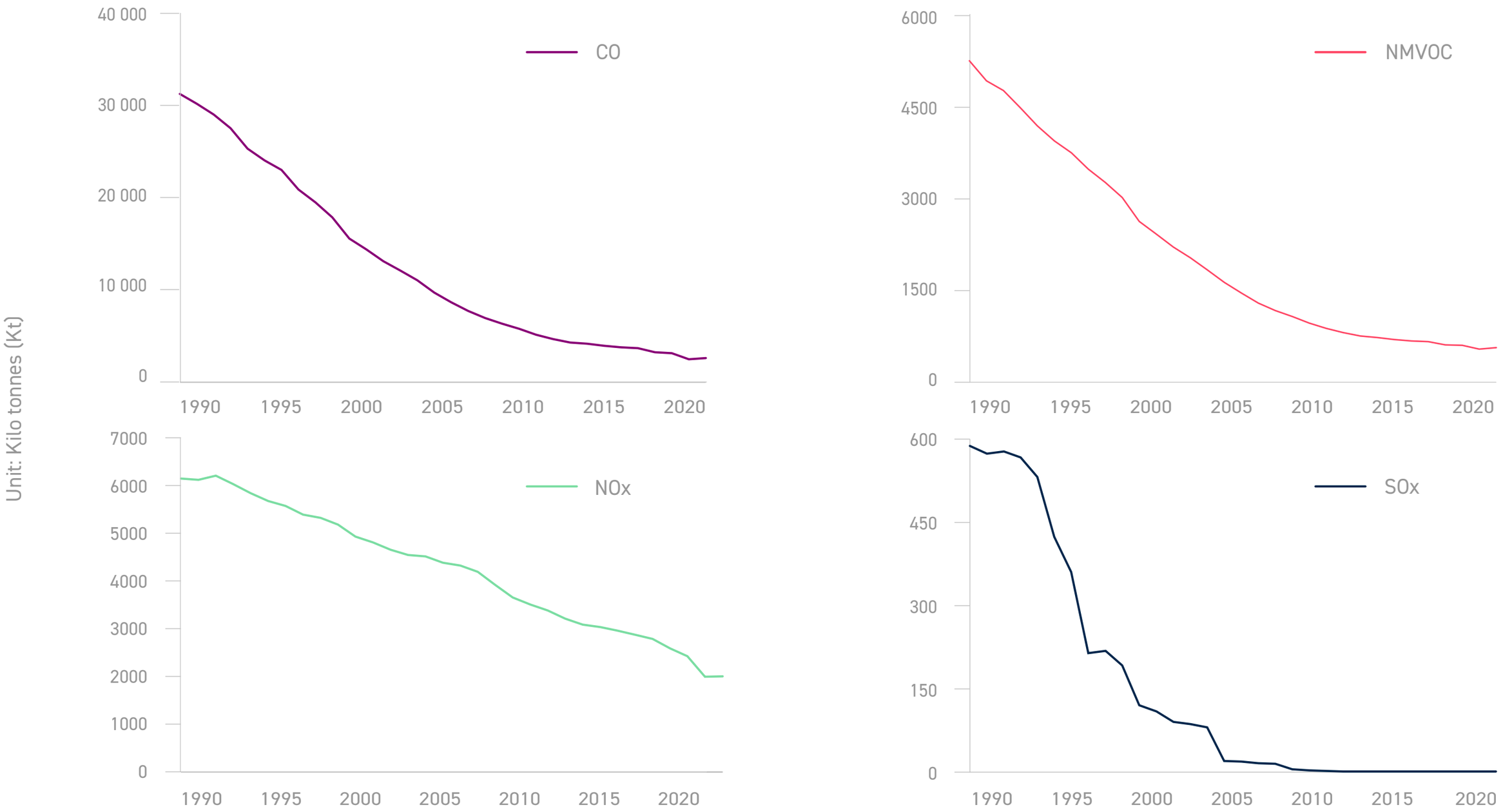


PM emissions are continuously decreasing as the result of cleaner diesel fuel, advanced engines and effective emissions control technology. Since the introduction of the Euro 6 standard, modern road vehicles with diesel engines are using highly efficient filters that remove 99.9% of PM. Despite a slight increase in PM values between 2020 and 2021 due to the end of COVID restrictions on travel, PM emissions continue to decrease and are significantly lower compared to pre-pandemic emissions.

FIG.39b

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

Source: European Environmental Agency

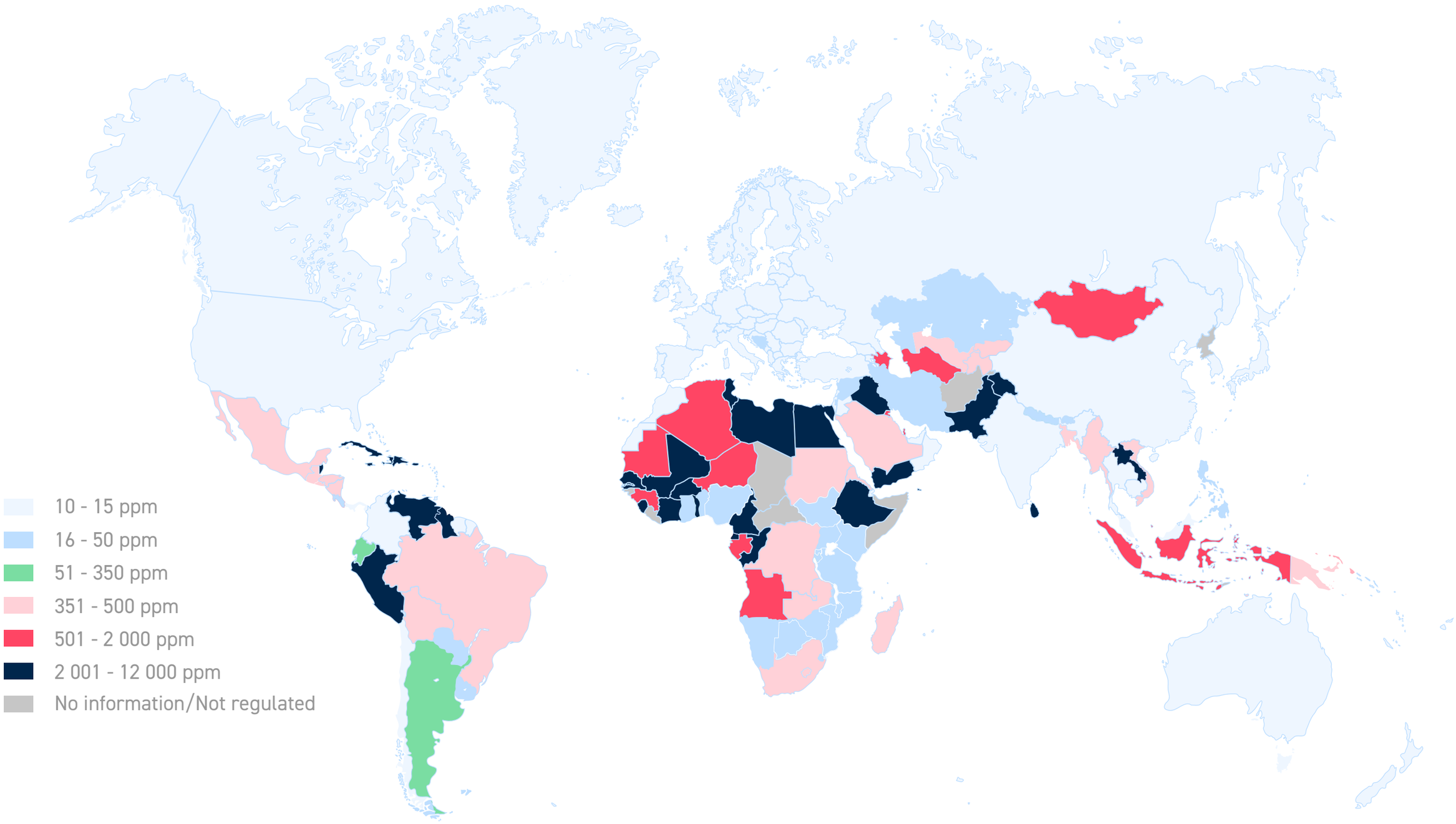


Since 1990 the refining industry has contributed to cleaner exhausts by today containing 99% lower SOx, 90% lower NMVOC & CO, and 67% lower NOx emissions.

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. The travel restrictions imposed due to the Covid pandemic caused a significant reduction in emission values. However, despite travel restrictions being lifted and vehicles returning to the road, emissions have continued to decrease compared with pre-pandemic values. CO emissions have decreased by 15%, NMYOC by 7%, and NOx by 17% between 2021 and 2019. SOx emissions have plateaued since 2012.

FIG.40 ON-ROAD DIESEL SULPHUR LIMITS

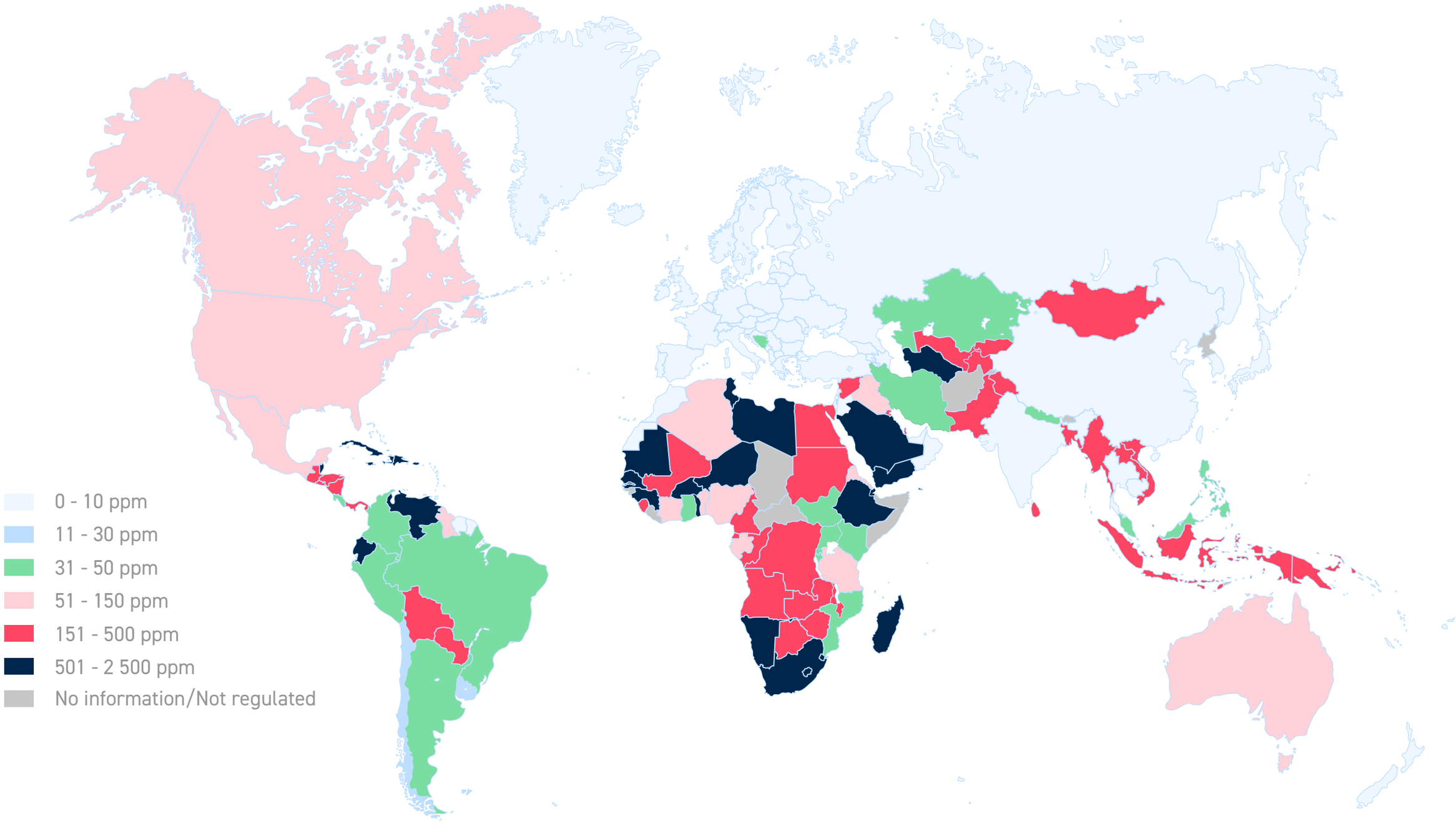
Source: Stratas Advisors



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.41 GASOLINE SULPHUR LIMITS

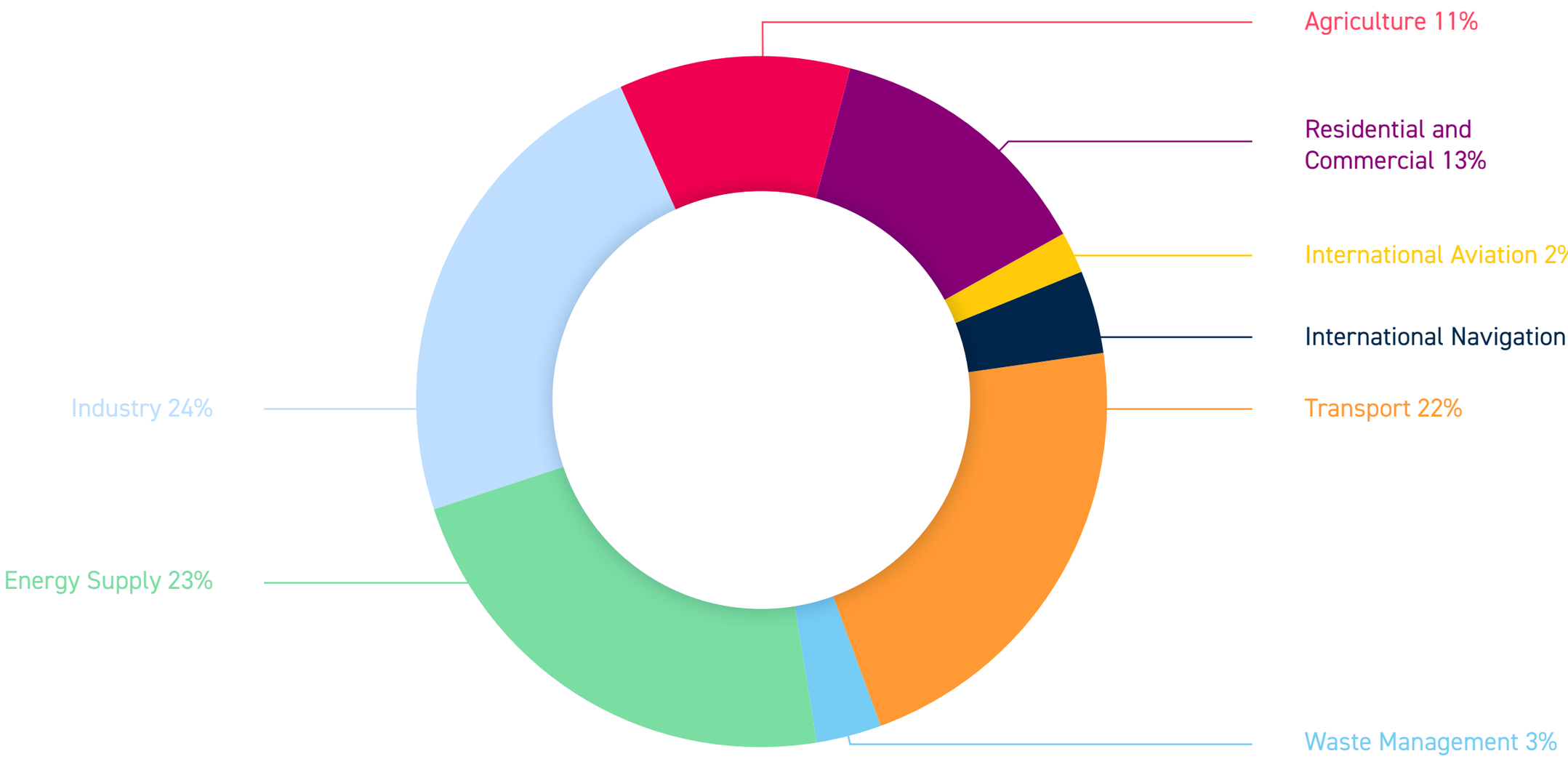
Source: Stratas Advisors



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.42 **GHG EMISSIONS** BY SECTOR IN THE EU-27 IN 2021

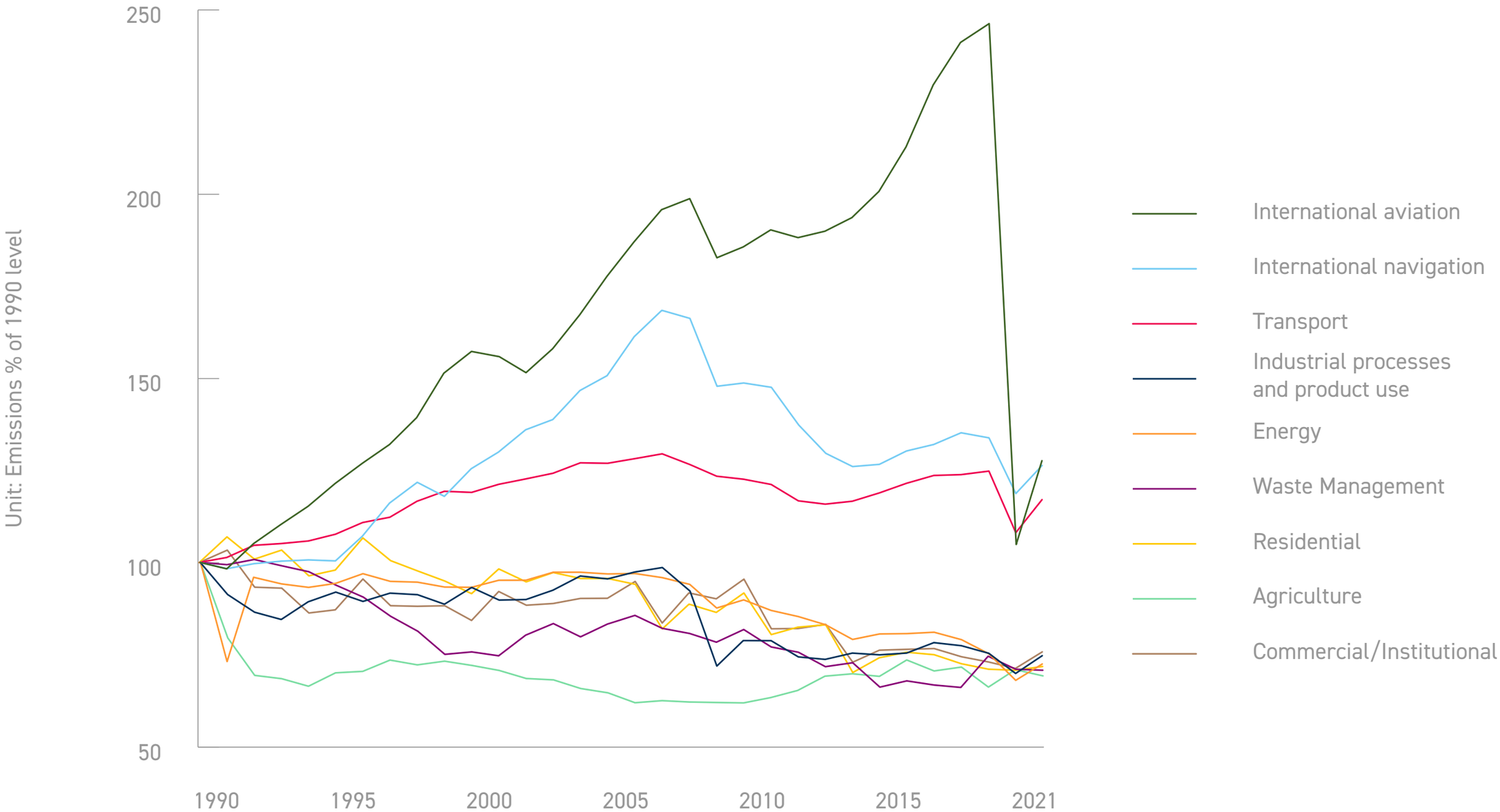
Source: European Environmental Agency



Energy supply and industry accounted for 47% of total GHG emissions in the 27 EU Member States in 2021. Transport, including international shipping and aviation, generated 28% of EU GHG emissions.

FIG.43 CO_2 EMISSION TREND BY SECTOR IN THE EU-27

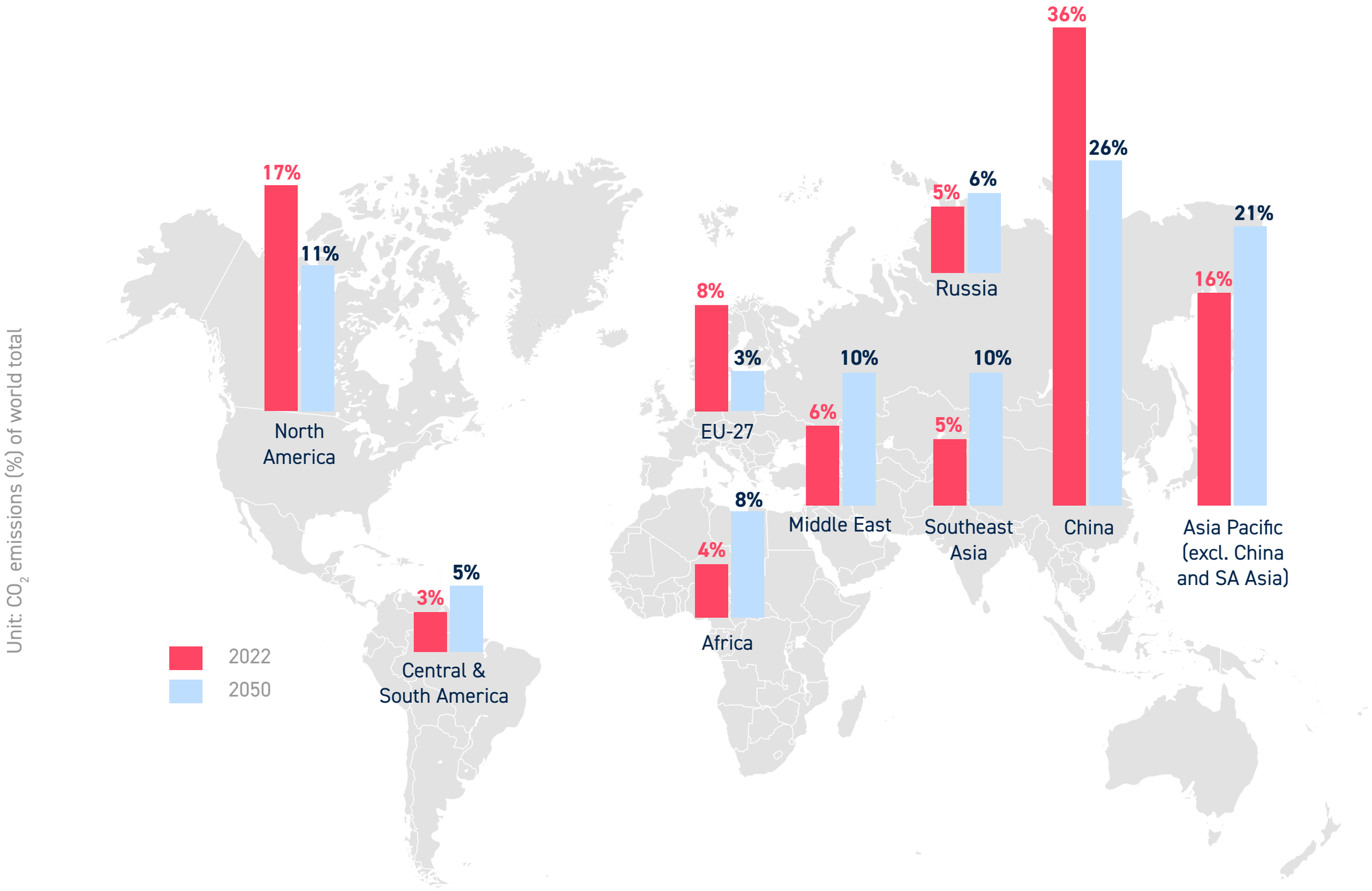
Source: European Environmental Agency



CO_2 emissions per sector have generally been declining since 2007. Industry 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 steadily decreased between 2008 and 2015. However, since 2016, there has been an increasing trend in the CO_2 emissions in international aviation. This increase was halted in 2020 due to global travel restrictions linked to the covid-19 pandemic, with CO_2 emissions dropping drastically for international aviation.

FIG.44 DECLINING EU SHARE IN GLOBAL CO_2 EMISSIONS

Source: International Energy Agency

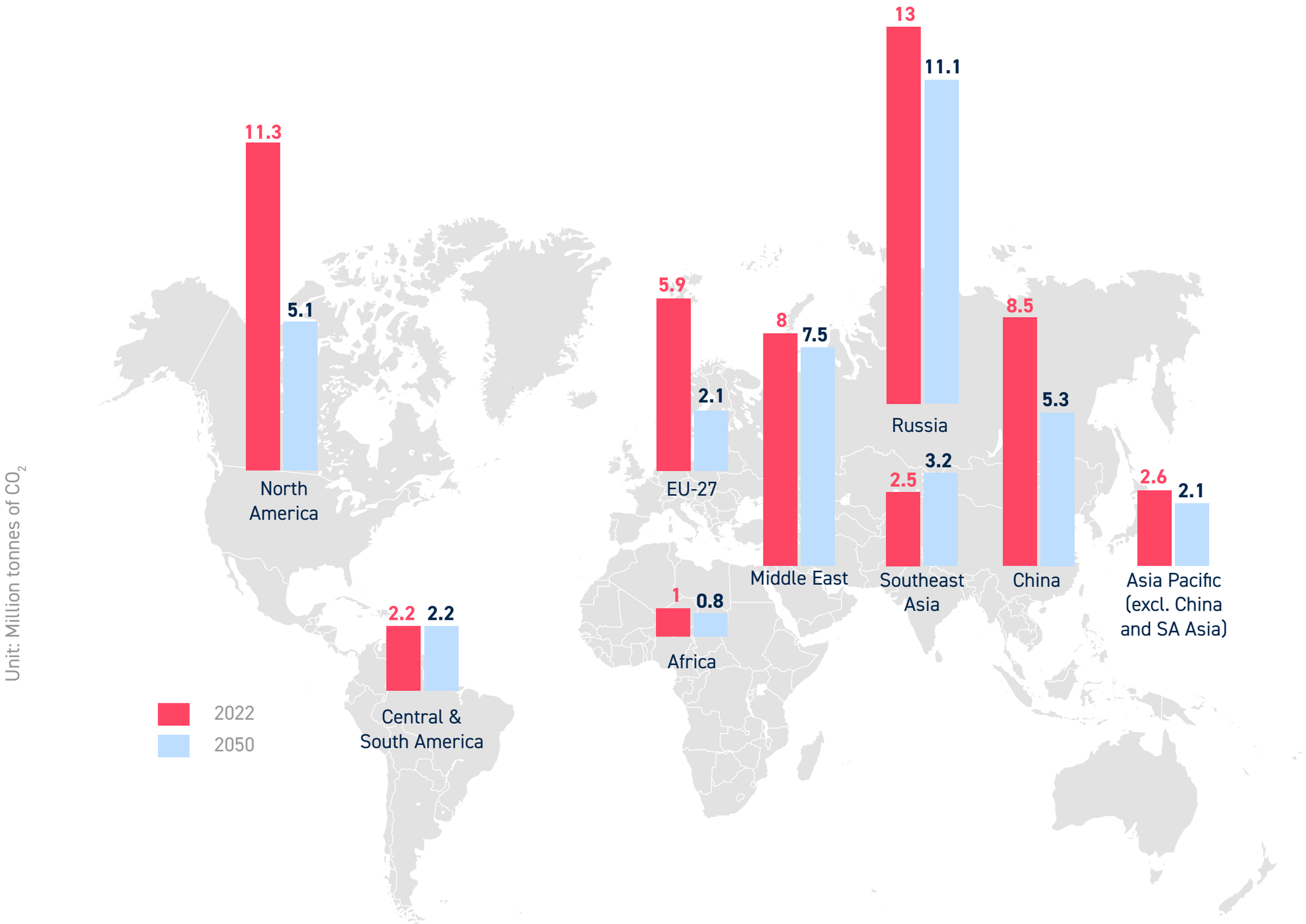


In 2022, the EU accounted for 8% of the total CO_2 emissions and this share is expected to reduce to 3% in 2050. CO_2 emissions in North America and China are also forecasted to decrease by 2050, by respectively 6 and 10 points, whereas in other parts of the world, the share of emissions is likely to increase.

FIG.**45**

CO_2 EMISSIONS PER CAPITA/REGIONS

Source: International Energy Agency

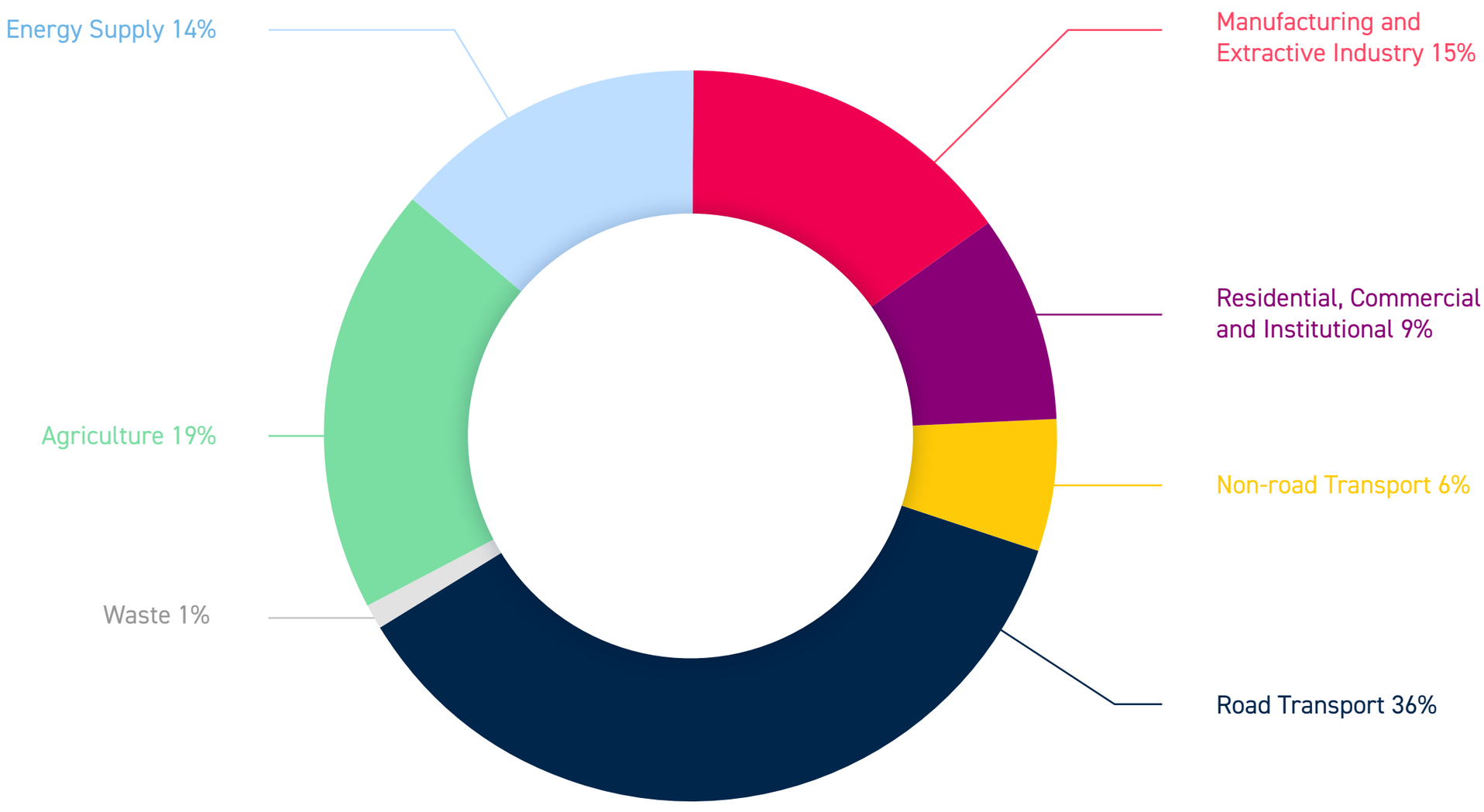


All regions but Southeast Asia are forecasted to see a decrease in CO_2 emissions by 2050. Central and South America are expected to remain stable. The drop is especially notable in the EU-27 and North America, where CO_2 emissions are estimated to decrease by 65% and 55% compared to 2022.

FIG.**46**

NOx CONTRIBUTION TO EU-27 EMISSIONS FROM MAIN SOURCE SECTORS IN 2021

Source: European Environmental Agency



NOx are main contributors to the air quality problems found in several urban areas in the EU.

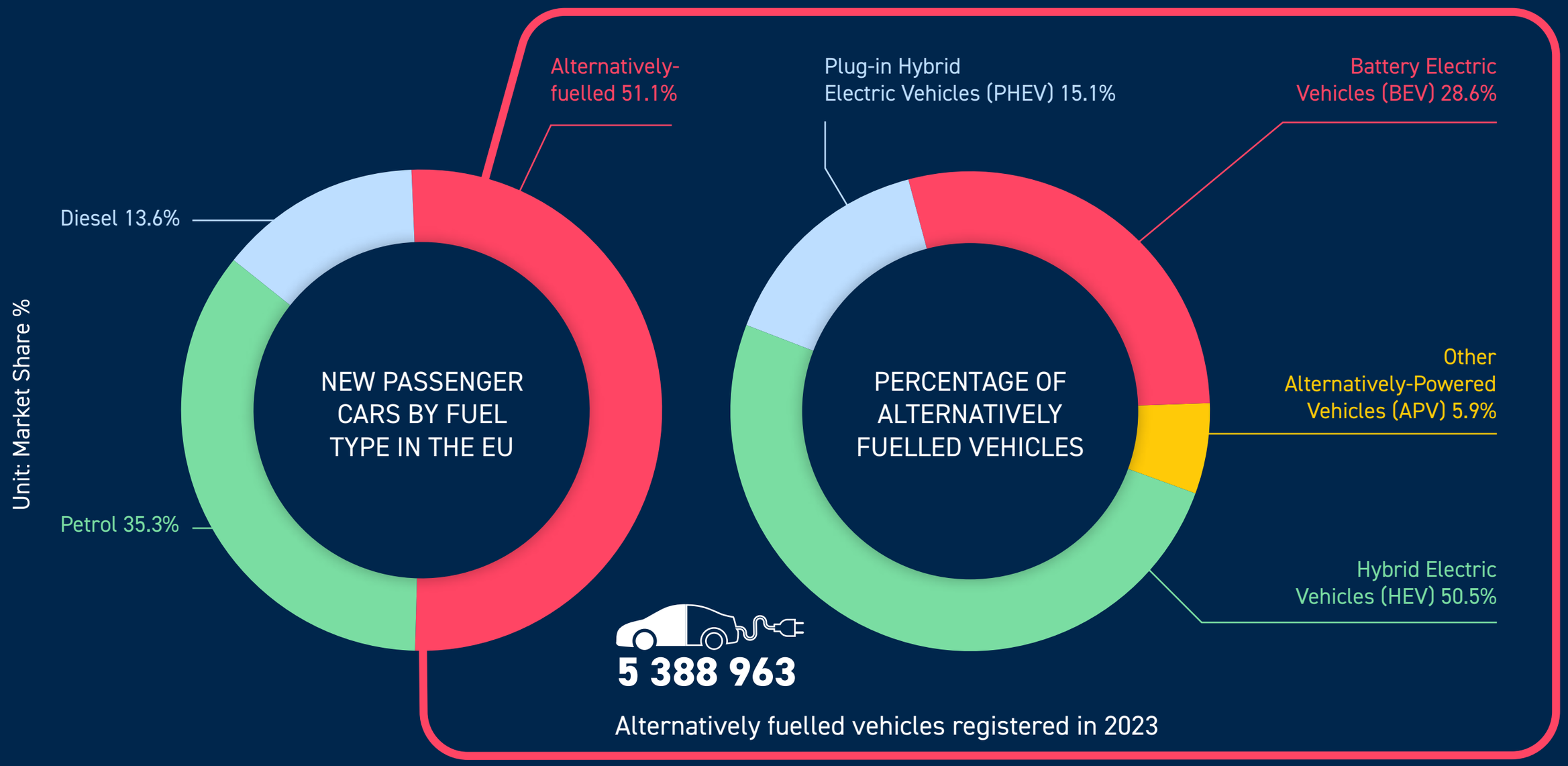
These emissions have gone down by 78% since 1990 and continue to decrease across all major sectors, except waste managment, where NOx emissions have increased by 9.5% since 2015. The road transport sector continues to represent the most significant contributor, being responsible for 36% of the total of NOx emissions emitted in 2021 in the EU.

Retail & Marketing Infrastructure

FIG.47

ALTERNATIVELY FUELLED VEHICLES ACCOUNTED FOR 51.1% OF TOTAL PASSENGER CAR REGISTRATIONS

Source: European Automobile Manufacturers' Association



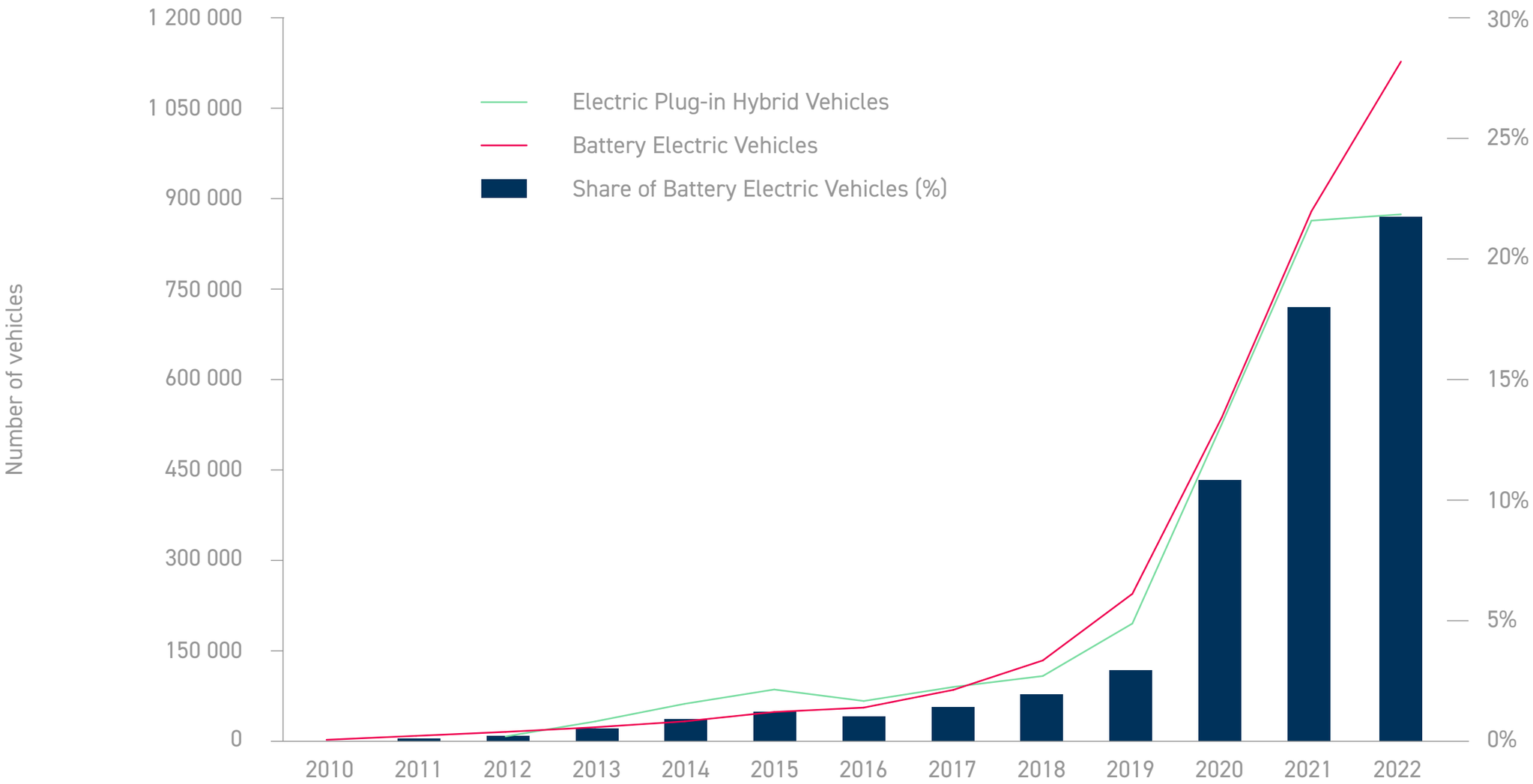
Battery-electric cars established themselves as the third-most-popular choice for buyers in 2023. Market share surged to 14.6% for 2023, surpassing diesel, which remained steady at 13.6%. Petrol cars retained their lead at 35.3%, while hybrid-electric cars claimed second spot, commanding a 25.8% market share.

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

FIG.**48**

ELECTRIC VEHICLES AS A PROPORTION OF THE TOTAL FLEET IN THE EU-27

Source: European Environment Agency



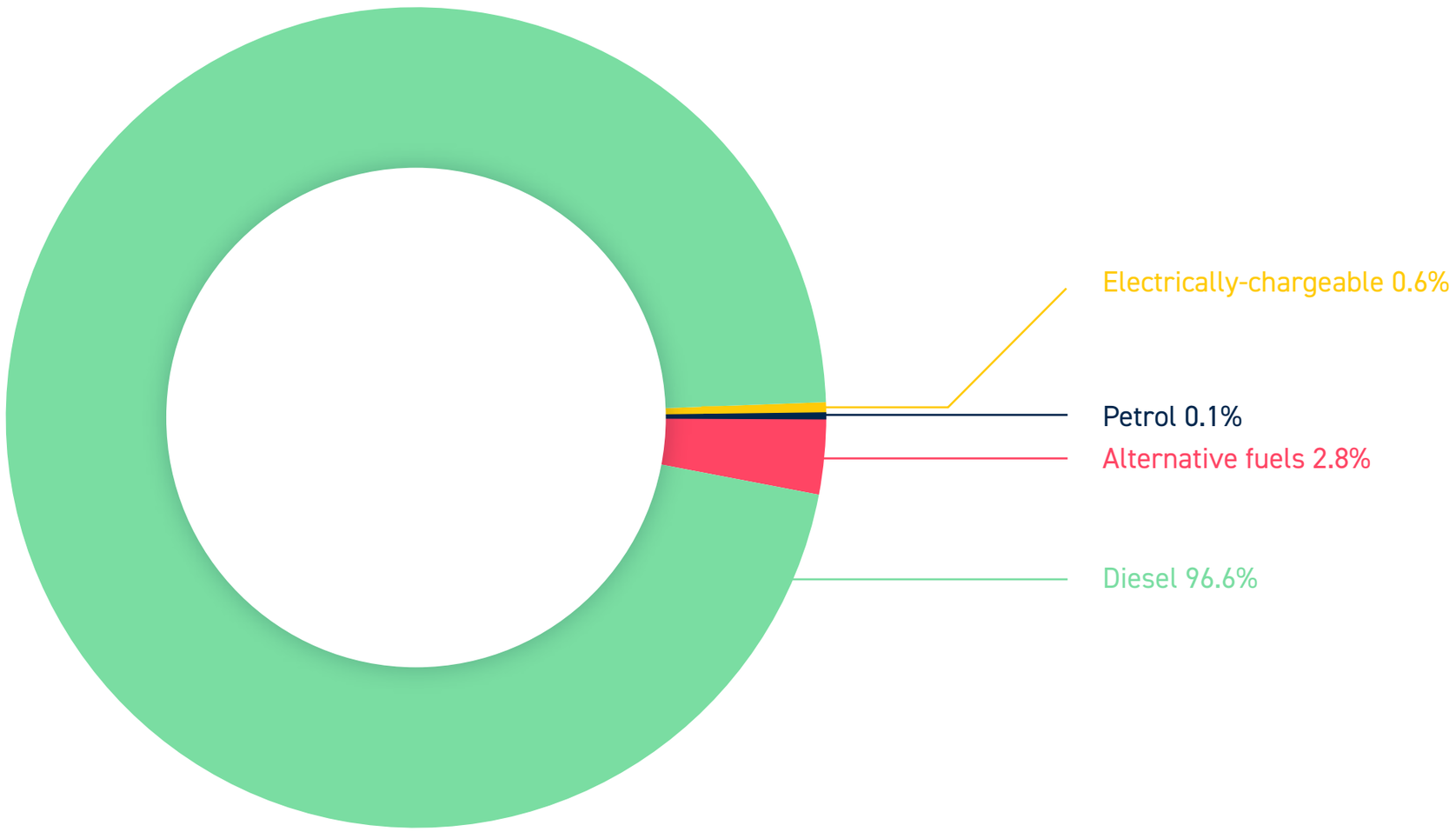
Considerable progress in the uptake of electric cars and vans in the EU was made in 2022, with 21.6% of new car registrations being electric vehicles. Totalling close to two million electric car registrations in one year, up from 1,74 million in 2021. In the last year, the number of newly registered battery electric vehicles increased by 25% while the number of plug-in hybrid cars remained stable.

Note: The chart reports the number of electric vehicles (battery electric vehicles - BEV and plug-in hybrid electric vehicles - PHEV) newly registered in EU27_2022

- '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.49 **NEW TRUCKS IN THE EU** BY FUEL TYPE IN 2022

Source: European Automobile Manufacturers' Association

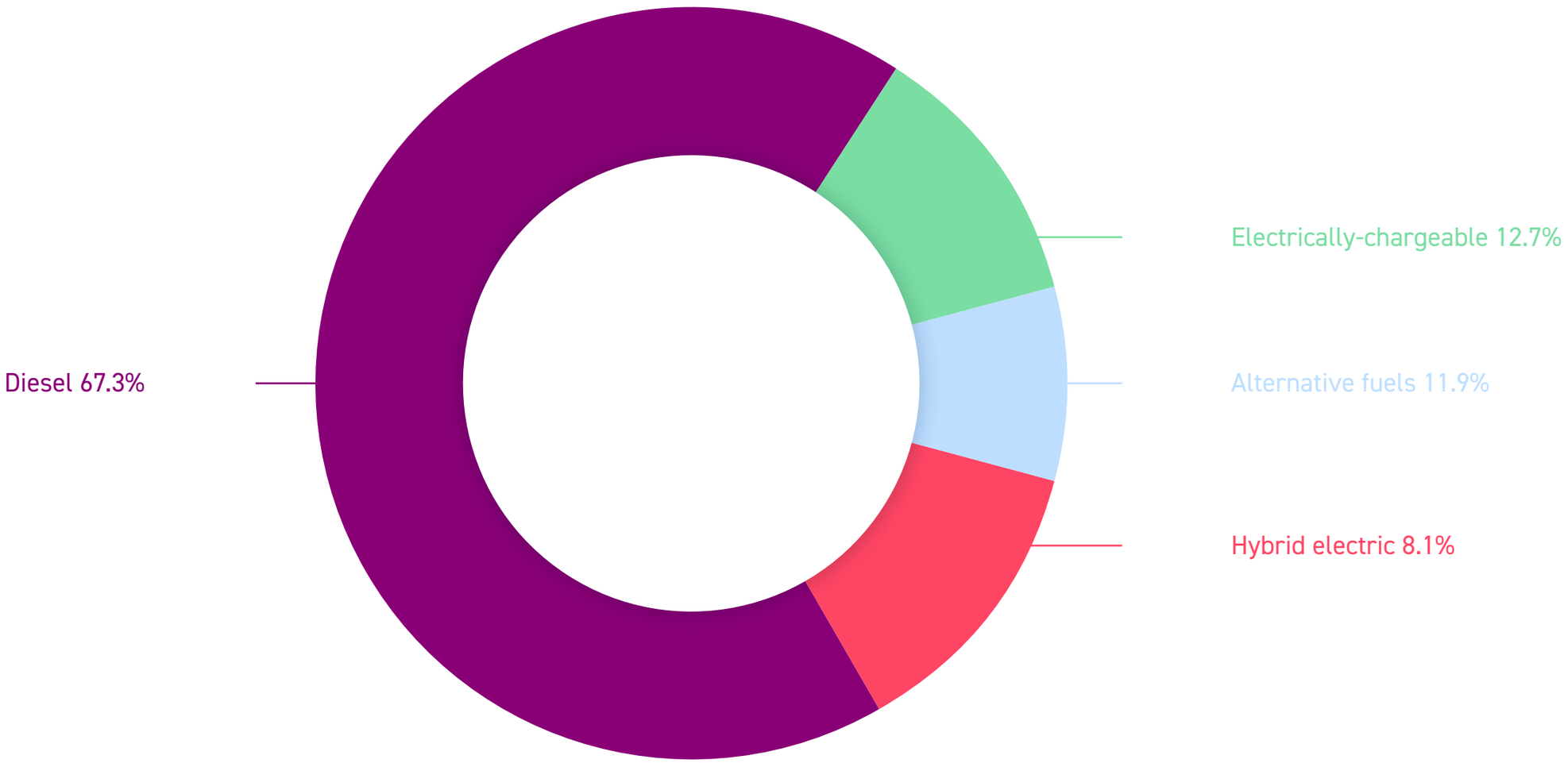


The use of low-carbon technologies in trucks remains minor with 96.6% of all newly-registered trucks in the European Union running on diesel. Alternative fuelled and electrically-chargeable trucks represent a small share of sales in 2022 with a 2.8% and 0.6% share, respectively.

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

FIG.50 **NEW BUSES IN THE EU** BY FUEL TYPE IN 2022

Source: European Automobile Manufacturers' Association

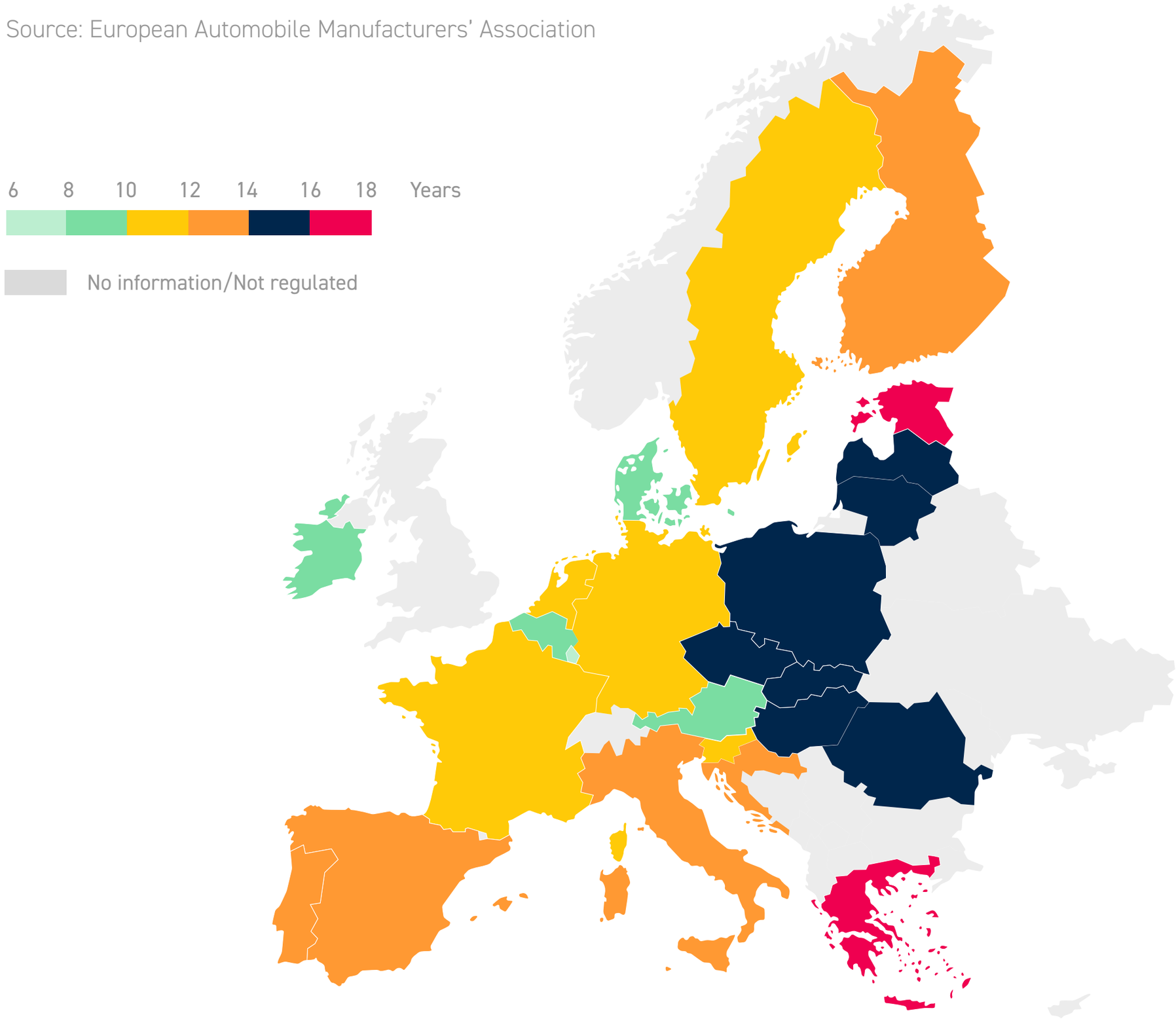


The percentage share of new buses powered by diesel has decreased by 15.1% between 2021 and 2022. Bus fleets are thus becoming more environmentally friendly with a proportion of new buses powered by alternative fuels increasing by 4.3%, electrically chargeable buses by 8.4% and hybrid buses by 2.4% compared with 2021.

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

FIG.51 AVERAGE AGE OF THE EUROPEAN VEHICLE FLEET IN 2021

Source: European Automobile Manufacturers' Association



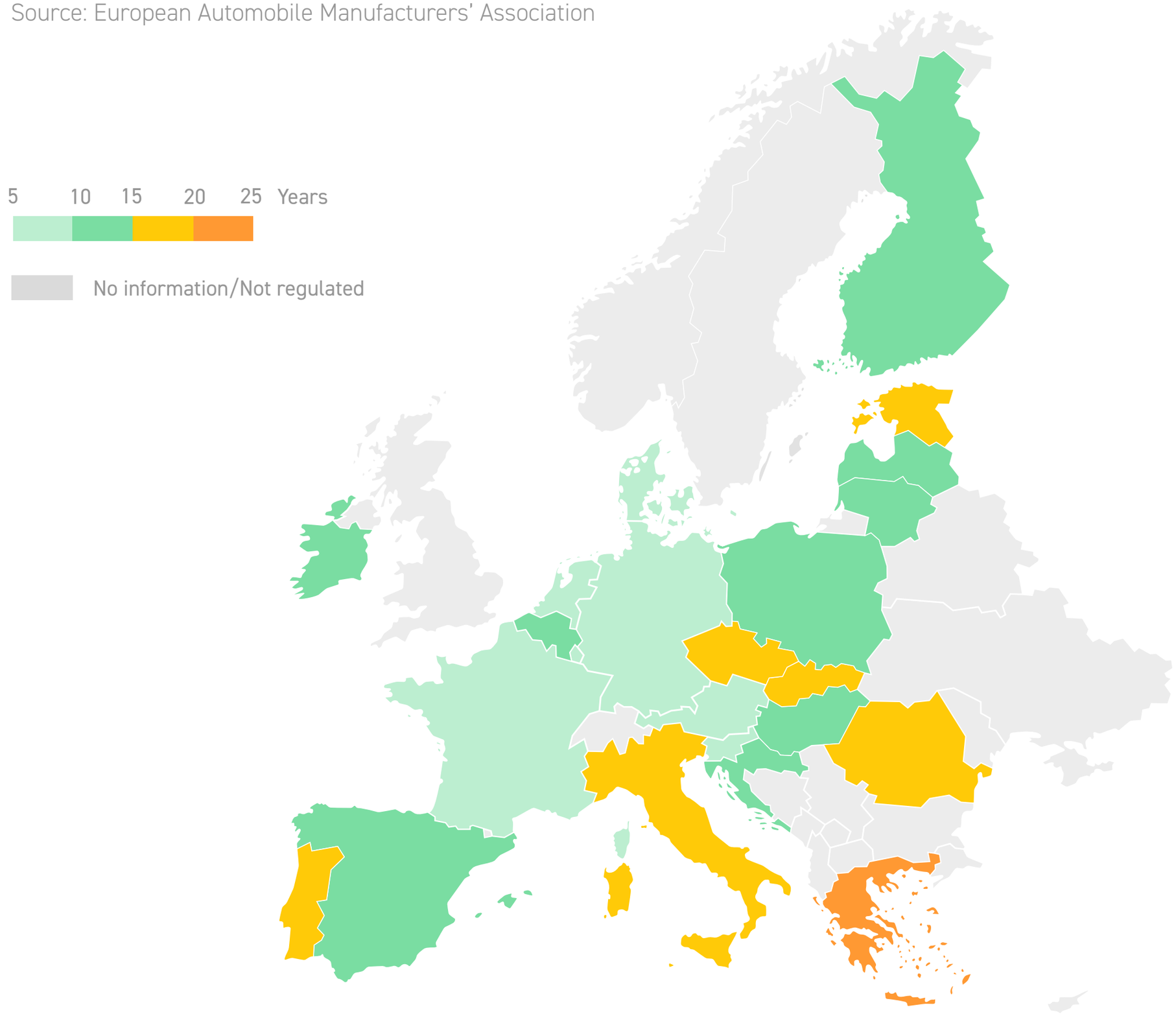
The average age of the vehicle fleet varies across European countries from 7.6 years in Luxembourg to 17 years in Greece, with an average leaning towards the older scale at 12.9 years.

The average age of cars in Lithuania has decreased from 17 to 14.6 years, suggesting a surge in new car purchases. In Eastern and Southern Europe, where citizens cannot necessarily afford to buy 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.52

AVERAGE AGE OF THE EUROPEAN VEHICLE FLEET FOR MEDIUM AND HEAVY DUTY COMMERCIAL IN 2021

Source: European Automobile Manufacturers' Association

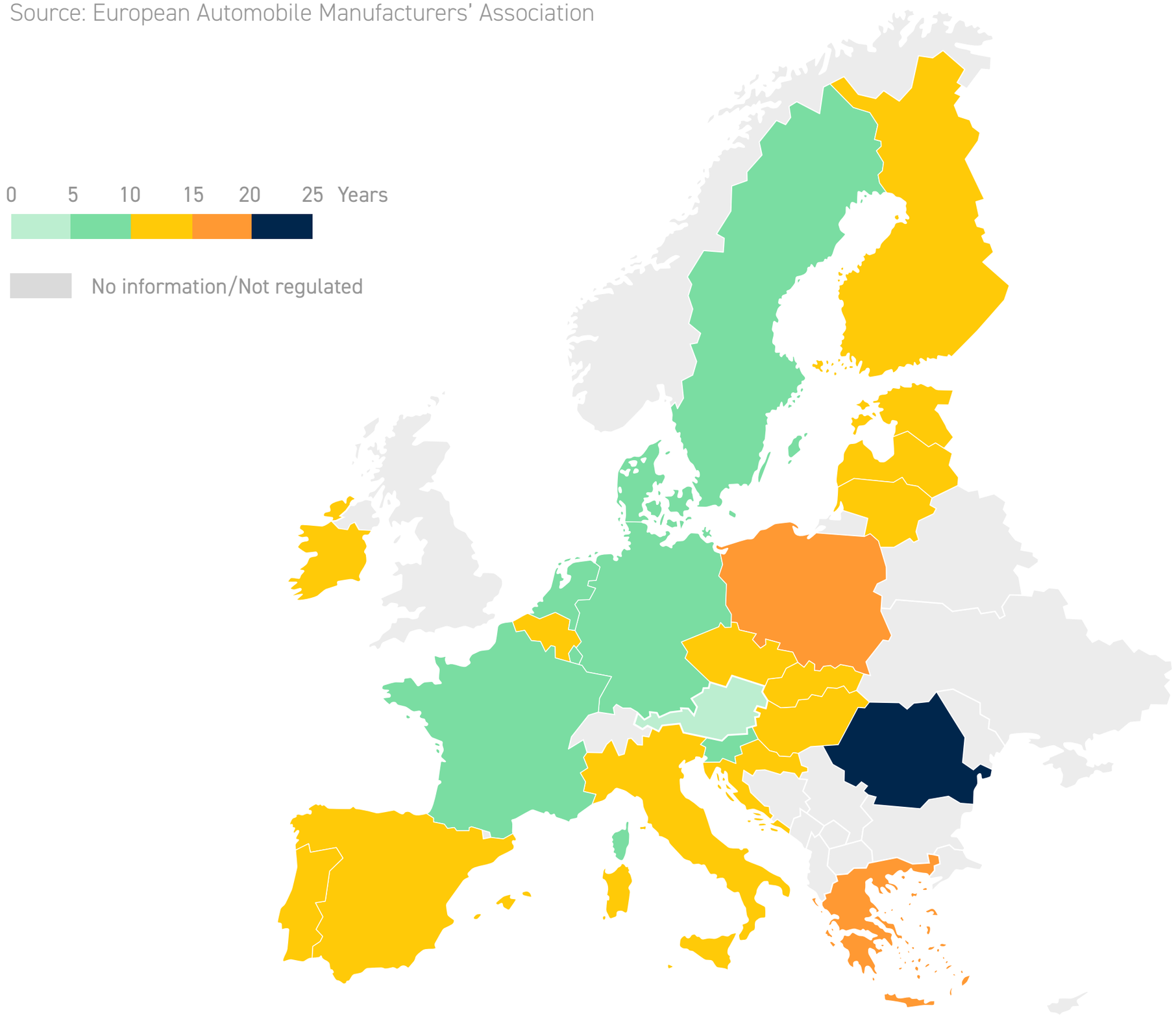


The average truck age continues to increase across most European countries in 2021. Greece has the oldest truck fleet at 22.7 years. Whereas Austria (6.6 years) and Denmark (7.5) have surpass Luxembourg (7.7) as youngest truck fleet. In Eastern and Southern Europe, where companies cannot necessarily afford to buy new vehicles and depend on the second-hand car market, trucks will stay on the road longer and will need solutions for decarbonisation.

FIG.**53**

AVERAGE AGE OF THE EUROPEAN VEHICLE FLEET FOR BUSES IN 2021

Source: European Automobile Manufacturers' Association



The average bus fleet age across Europe is 12.7. Romania has the oldest bus fleet, with an average age of 20.2 years. Only 8 countries have a bus fleet with an average age below 10 years. In Eastern and Southern Europe, where companies and cities cannot necessarily afford to buy new vehicles, buses will stay on the road longer and will need solutions for decarbonisation.

FIG.54 SERVICE STATIONS IN EUROPE IN 2023

Source: National Fuel Industry Associations, Fuelo.net, 2gis, GlobalData and Maps.

COUNTRIES	Number of service stations
AUSTRIA	2 751
BELGIUM	3 091
BULGARIA	3 467
CROATIA	925
CYPRUS	316
CZECHIA	3 961
DENMARK	2 067
ESTONIA	529
FINLAND	1 943
FRANCE	10 920
GERMANY	14 084
GREECE	5 889
HUNGARY	2 035
IRELAND	1 850
ITALY	21 750
LATVIA	600
LITHUANIA	765*
LUXEMBOURG	238*
MALTA	78
NETHERLANDS	4 131
POLAND	7 915
PORTUGAL	3 274
ROMANIA	2 292**
SLOVAKIA	965
SLOVENIA	506
SPAIN	12 346
SWEDEN	2 641
TOTAL EU-27 = 111 329	
UNITED KINDGOM	8 354
NORWAY	1 823*
SWITZERLAND	3 379
TURKEY	12 608
UK + NO + CH + TR	**26 175**
TOTAL = 137 504	

There were over 137 000 petrol stations in the EU, Norway, United Kingdom, Switzerland and Turkey operating in 2023.

* Numbers for 2022

** Numbers for 2021

ABOUT
FUELSEUROPE

FuelsEurope is a division of the European Fuel Manufacturers, an AISBL operating in Belgium. The association, whose 40 members are all companies manufacturing conventional and renewable fuels in the European Economic Area in 2024, is comprised of FuelsEurope and Concawe. These two devision have separate and distinct roles and expertise but are administratively consolidated for efficiency and cost effectiveness.

FuelsEurope represents the EU fuels & industrial value chains products manufacturing industry in the policy debate with EU Institutions and other stakeholders, providing an expert opinion on the production process, distribution and use of our industry's products, in order to contribute to a regulatory framework that:

- **Promotes EU excellence** in technologies contributing to the energy transition towards society's climate goal;

- **Boosts sustainable development** through supporting a competitive EU industry;

- **Establishes effective, technically feasible and sustainable requirements** to protect human health and the environment.

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