FuelsEurope

REFINING PRODUCTS FOR OUR EVERYDAY LIFE

STATISTICAL REPORT 2018

Editor: John Cooper

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STATISTICAL REPORT
2018

Foreword

High quality, verified and reliable facts and figures are essential to support economic and political analysis. For this purpose, FuelsEurope Statistical Report 2018 aims at providing a comprehensive set of statistics about the refining industry that can be used by all stakeholders.

This 2018 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 2 or 4 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.

Colour coding aims to help our readers browse effectively through the document. Each colour corresponds to a specific theme making browsing between subsections user-friendly. We hope that you will find this Report useful.

- **Oil & Energy**
- **Oil Products**
- **Prices & Margins**
- **Refining**
- **Marketing Infrastructures**

John Cooper
Director General

FuelsEurope

REFINING PRODUCTS FOR OUR EVERYDAY LIFE

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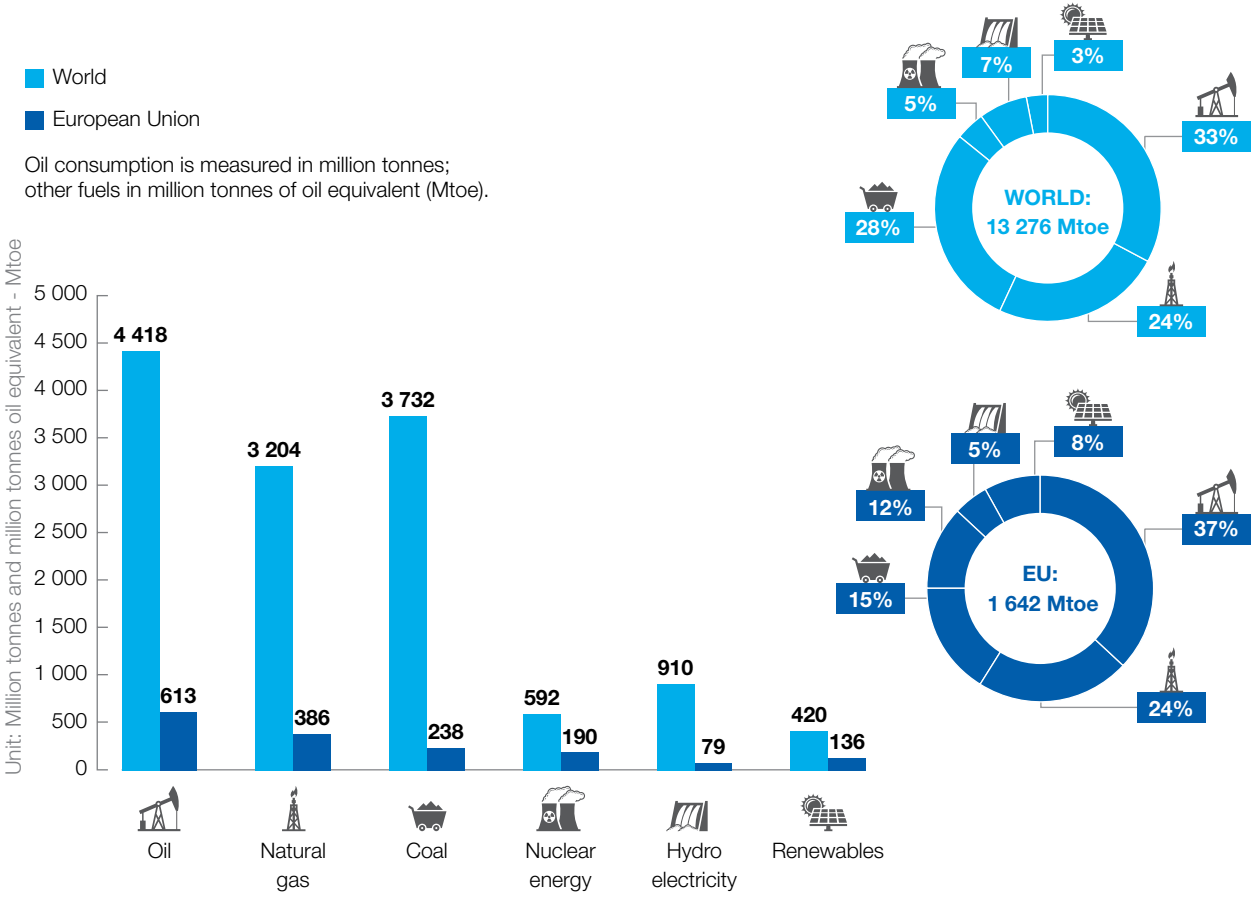
FIG.1 WORLDWIDE ENERGY CONSUMPTION BY FUEL TYPE IN 2016

Source: BP Statistical Review of World Energy 2017



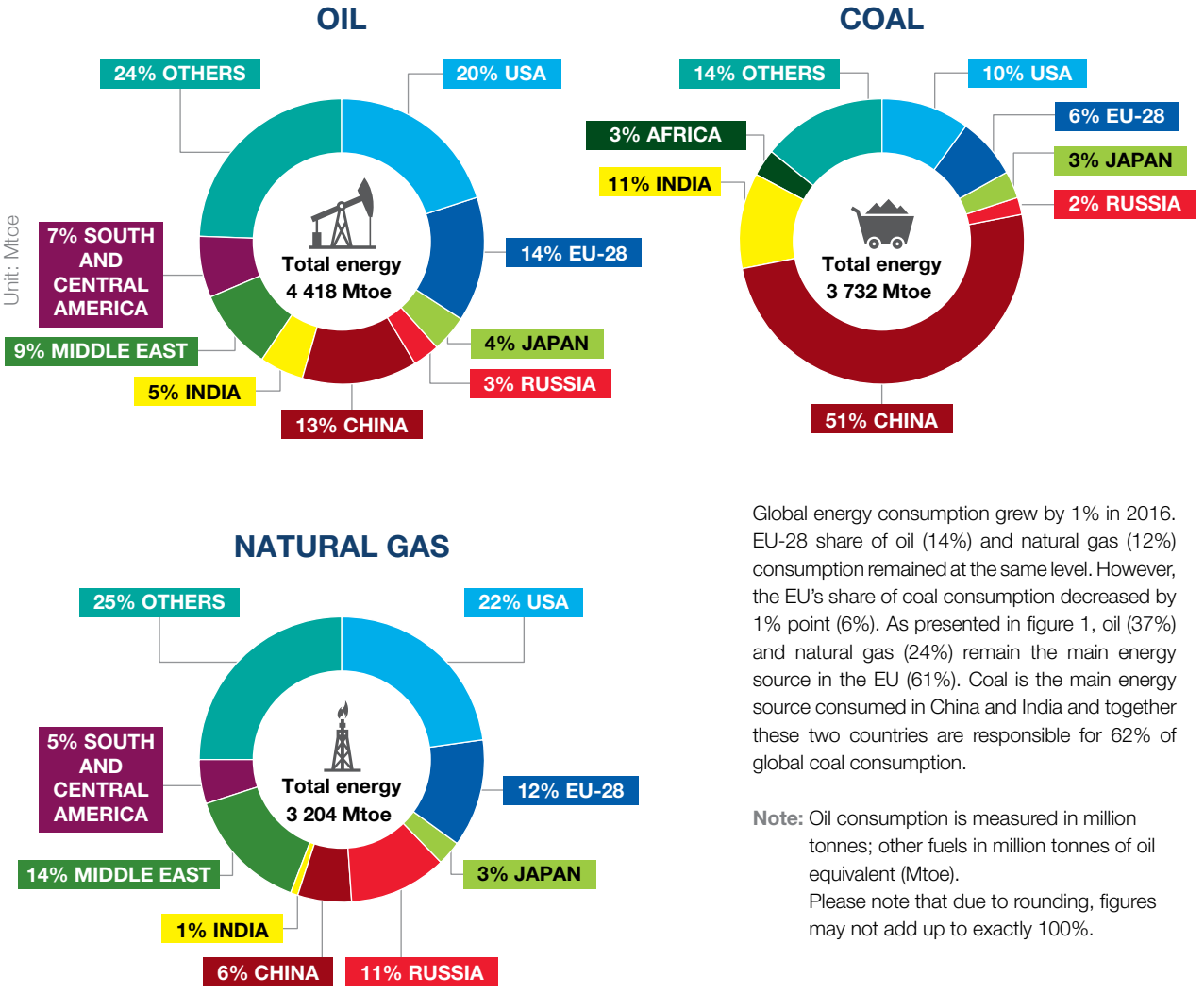
Oil, natural gas, and coal remain the dominant source of energy fuelling the global economy (together 85%). Oil remained the main energy source globally. The overall share for renewables, including hydro electricity, remains relatively small (10%).

The EU, unlike other major economies, has a higher share of nuclear (11.6%), renewables and hydro (13.1%) in its energy mix.

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

FIG.2 WORLDWIDE ENERGY CONSUMPTION BY REGION IN 2016

Source: BP Statistical Review of World Energy 2017

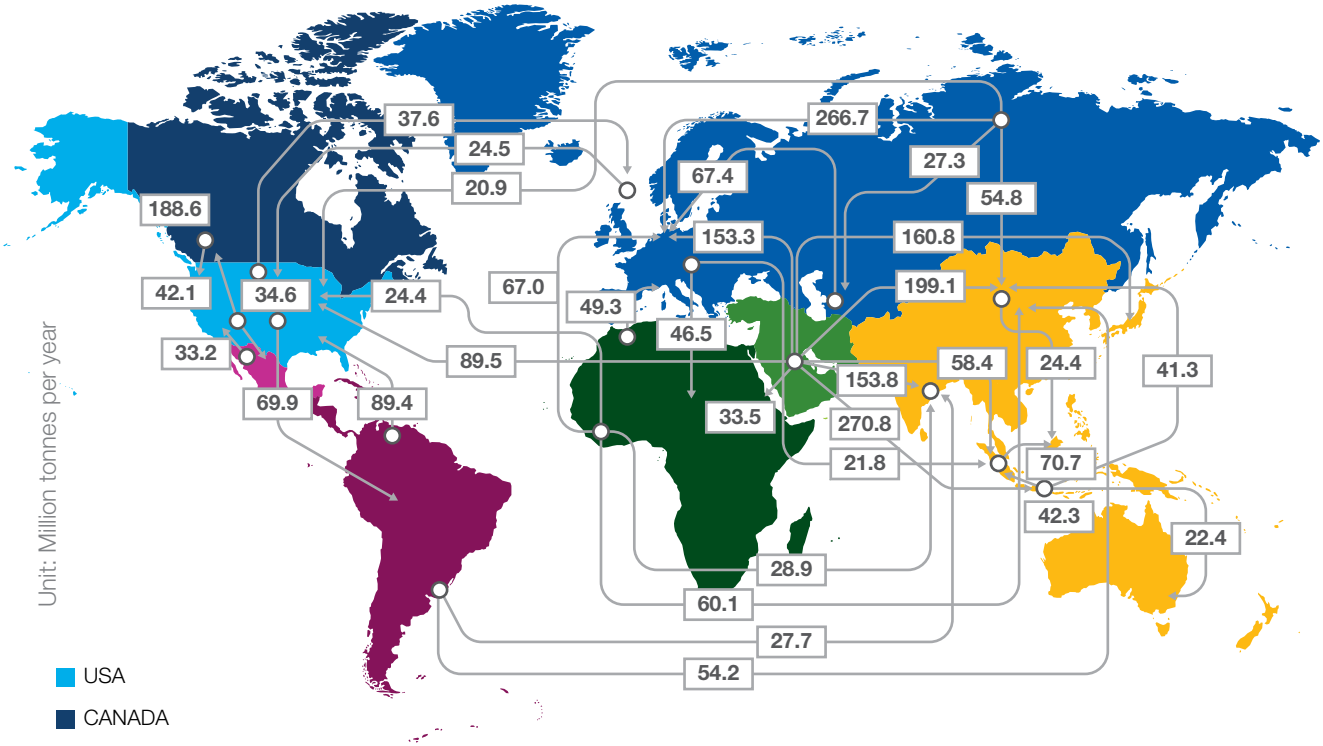


Global energy consumption grew by 1% in 2016. EU-28 share of oil (14%) and natural gas (12%) consumption remained at the same level. However, the EU's share of coal consumption decreased by 1% point (6%). As presented in figure 1, oil (37%) and natural gas (24%) remain the main energy source in the EU (61%). Coal is the main energy source consumed in China and India and together these two countries are responsible for 62% of global coal consumption.

Note: Oil consumption is measured in million tonnes; other fuels in million tonnes of oil equivalent (Mtoe).
Please note that due to rounding, figures may not add up to exactly 100%.

FIG.3 WORLDWIDE CRUDE OIL MOVEMENT IN 2016

Source: BP Statistical Review of World Energy 2017

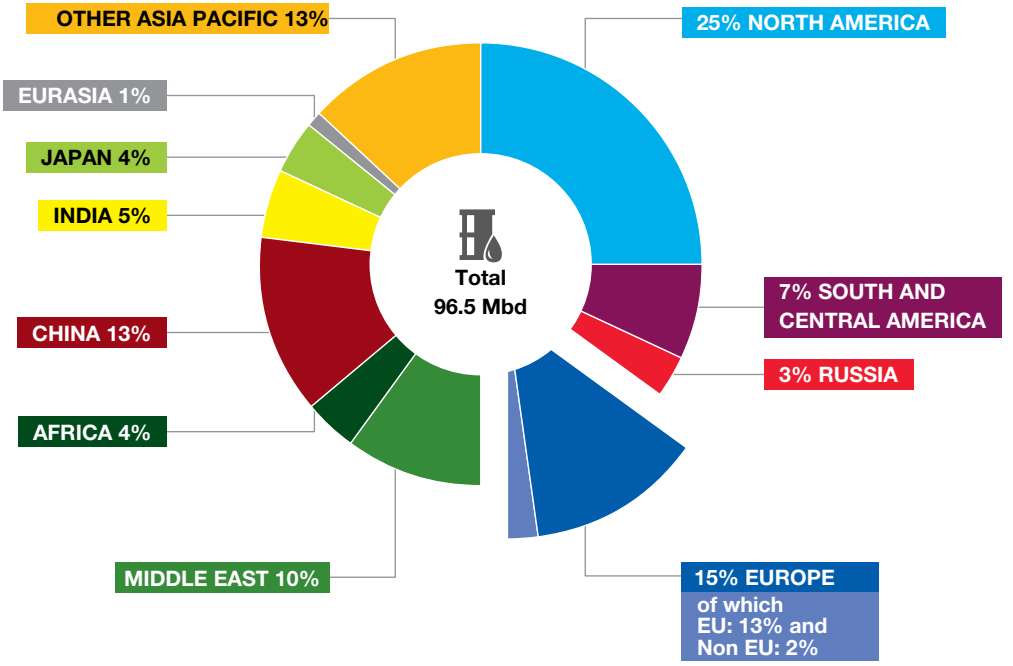


Crude oil is an internationally traded commodity with trade flows taking place all over the world.

There are two open and transparent markets - crude oil and refined products - within which the European refining industry operates.

FIG.4 WORLDWIDE REFINED PRODUCT DEMAND* AVERAGED 96.5 MILLION BARRELS PER DAY IN 2016, WITH EU ACCOUNTING FOR 13%

Source: BP Statistical Review of World Energy 2017

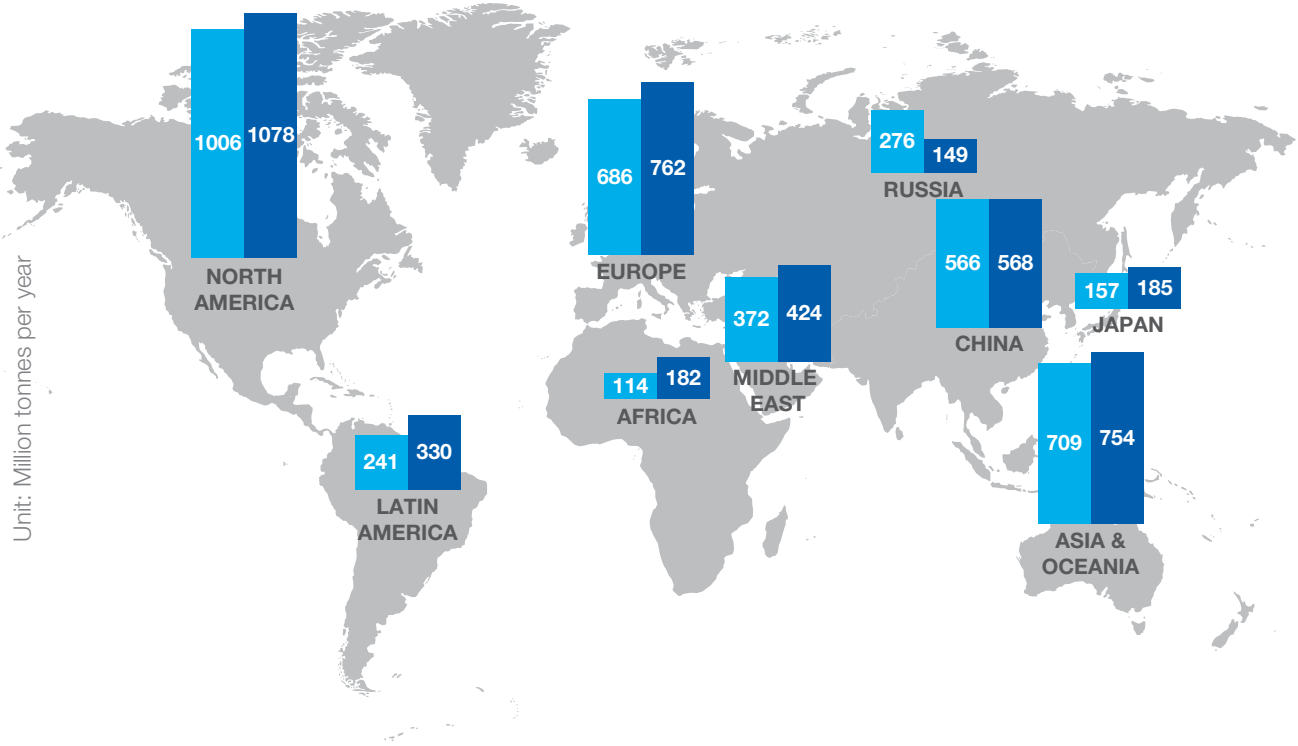


Global demand for oil demand products increased from 96.1 million barrels per day in 2015 to 96.5 in 2016. Although the European market is declining, it still remains the second largest in the world (15%) behind North America. China, Middle East and Africa noted a continued growth in demand for refined products.

*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.5 WORLDWIDE REFINING SUPPLY/MARKET DEMAND BALANCES IN 2017

Source: Wood Mackenzie



The refining supply/market demand balance shows that most of the regions are dependent on imports to meet market demand. Russia has a positive trade balance, which provides it with a key role in supplying the demand from other regions.

Relatively balanced product demand and refinery throughput in the EU hides a large surplus of EU gasoline production and a significant shortage of diesel and jet production.

FIG.6 EU TOTAL OIL DEMAND AMOUNTED TO 630 MILLION TONNES IN 2017

Source: Wood Mackenzie

Unit: Million tonnes per year

COUNTRY	Mt/y	COUNTRY	Mt/y
Austria	12.8	Italy	60.5
Belgium	30.1	Latvia	1.7
Bulgaria	4.2	Lithuania	2.6
Croatia	3.3	Luxembourg	2.6
Cyprus	2.4	Malta	2.4
Czech Republic	10.2	Netherlands	47.7
Denmark	7.4	Poland	27.6
Estonia	1.3	Portugal	10.9
Finland	9.5	Romania	10
France	79.3	Slovakia	4.3
Germany	117.7	Slovenia	2.5
Greece	14.5	Spain	63.0
Hungary	7.4	Sweden	14.1
Ireland	7.1	United Kingdom	71.6
EU TOTAL	**630.2**		
Norway	9.1		
Switzerland	10.0		
Turkey	47.1		
TOTAL NO + CH + TR	**66.4**		
TOTAL	**696.6**		

EU

NON EU

EU-28 total oil demand amounted to 630.2 Mt in 2017, representing a slight increase of approximatively 0.7% compared to 2016.

Most EU Member States recorded an increase in oil demand. Czech Republic, Poland and Sweden with respectively 17.2%, 6.1% and 4.3%, show the biggest increase.

Among EU Member States that recorded the biggest fall in the oil demand were Malta (-4.1%), Luxembourg (-3.7%) and Italy (-3.7%).

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

HOW TO REDUCE CARBON EMISSIONS IN

?

#VISION2050

Providing low-carbon liquid fuels

The pathway to reduce CO_2 emissions

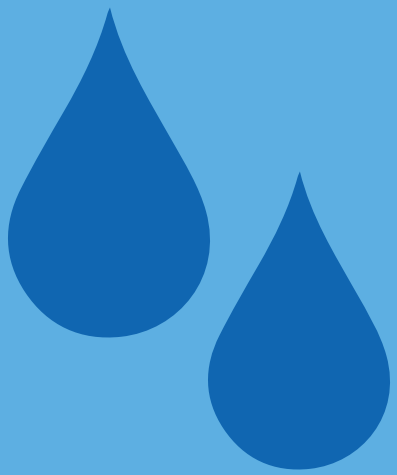


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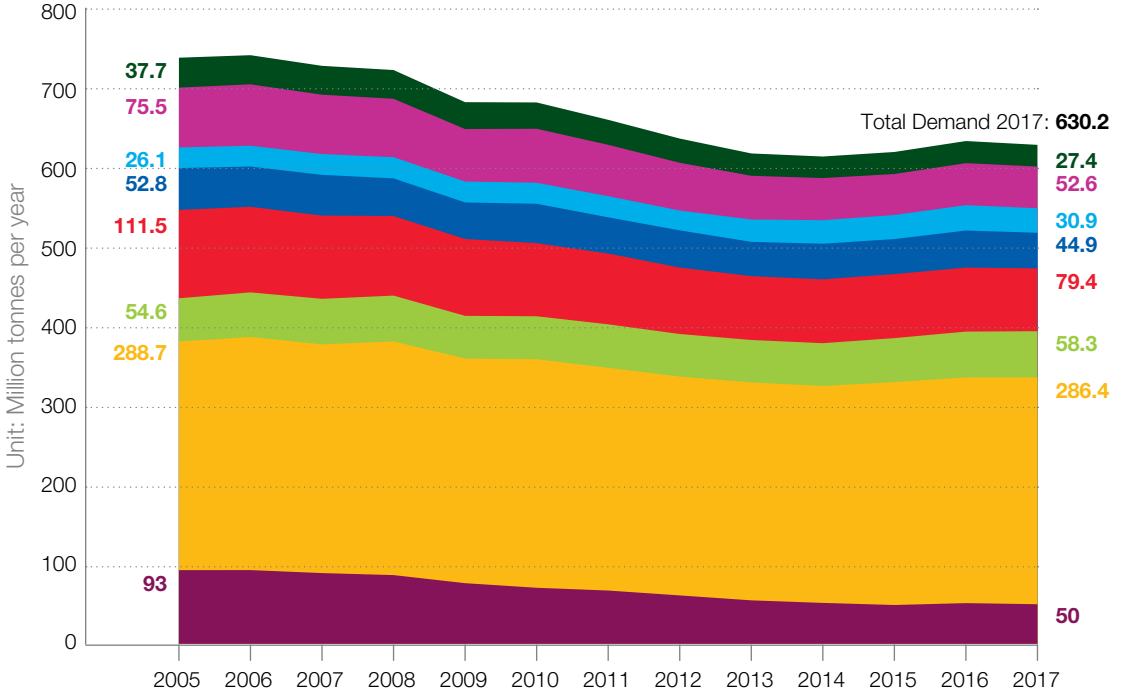
FIG.7 DEMAND HISTORY OF OIL PRODUCTS IN THE EU IN 2017

Source: Wood Mackenzie

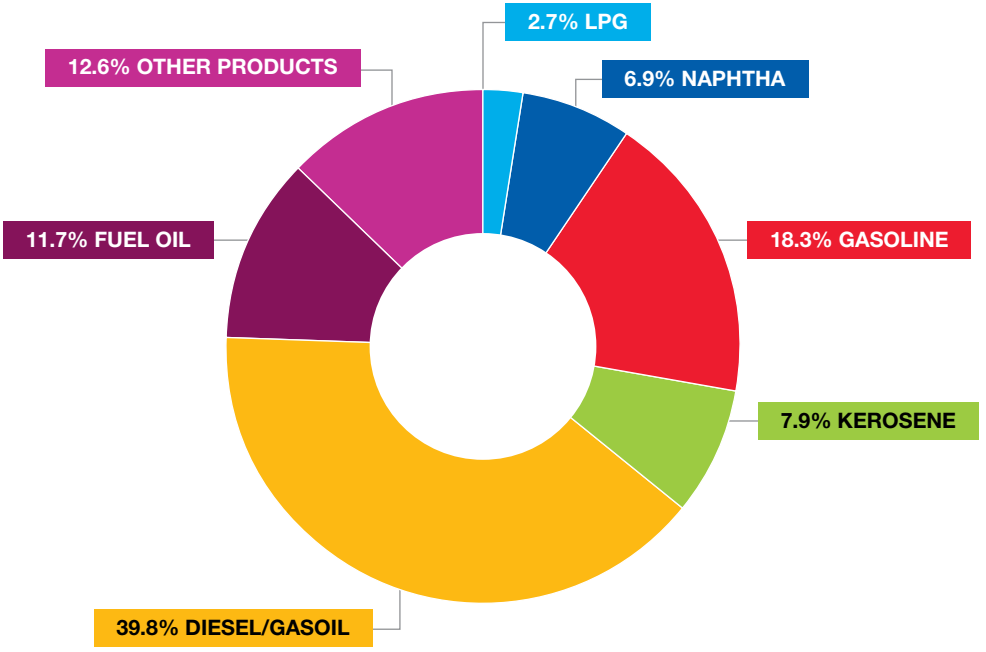


Since 2008, we can observe a downward trend for oil products demand in the EU. Over the past 8 years, overall demand declined by around 8%. The downward trend is mainly driven by the decrease in fuel oil and gasoline, whilst diesel/ gasoil and kerosene decreased only slightly.

- FUEL OIL
- DIESEL/GASOIL
- JET/KEROSENE
- GASOLINE
- NAPHTHA
- LPG
- OTHER PRODUCTS
- REFINERY FUEL & LOSS

FIG.8 AVERAGE REFINERY OUTPUT BY PRODUCT TYPE IN OECD EUROPE IN 2017

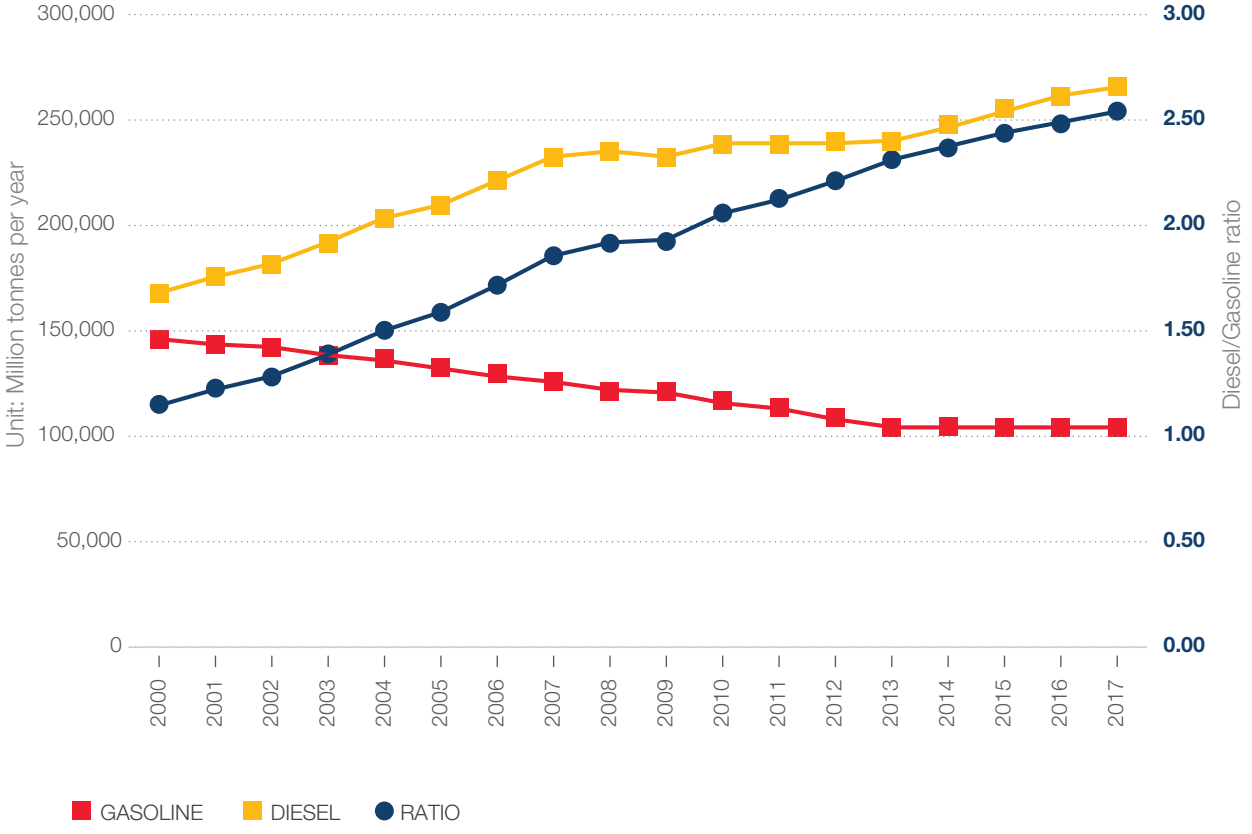
Source: OECD/IEA



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.

FIG.9 ROAD FUEL DEMAND IN THE EU IN 2017

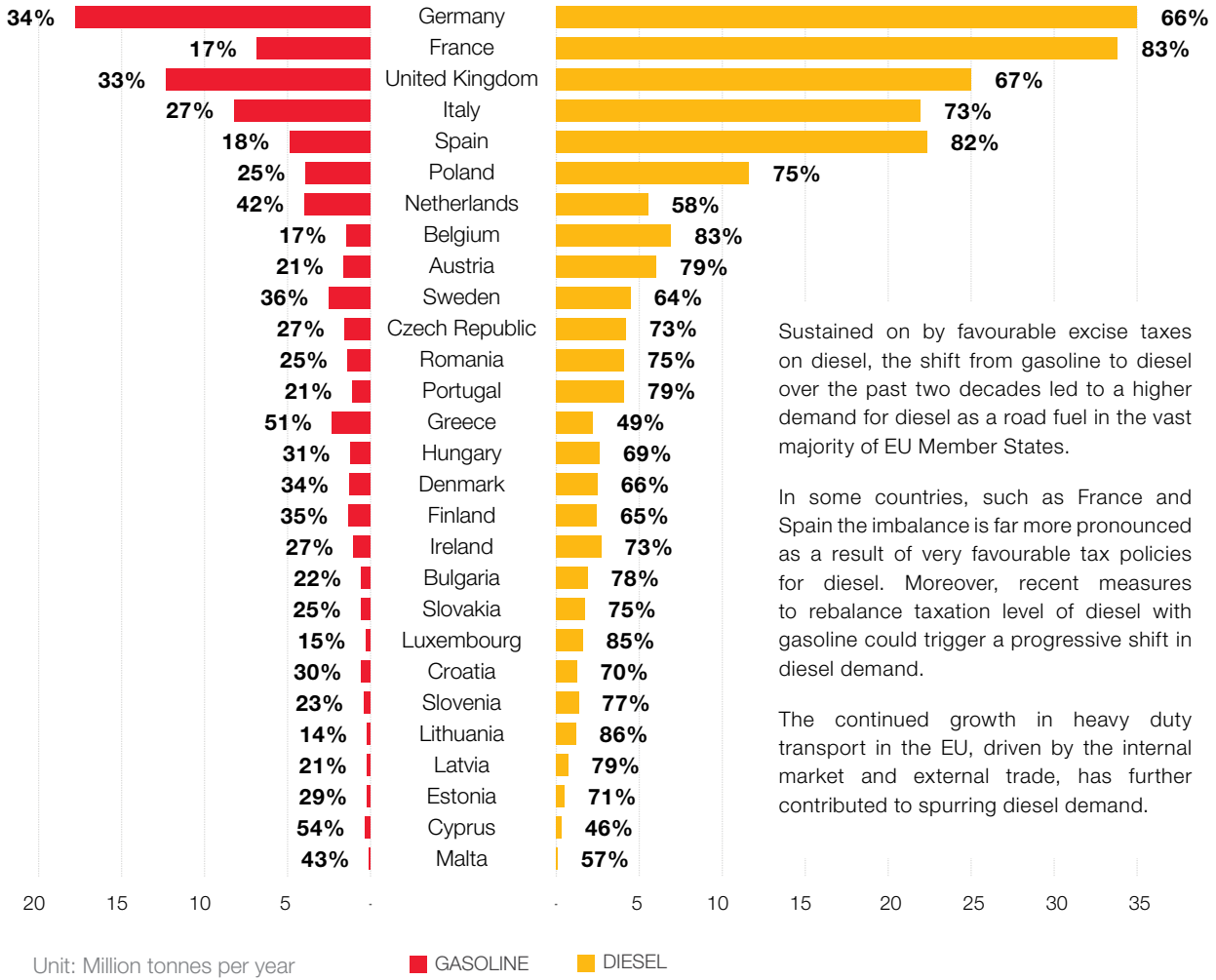
Source: Wood Mackenzie



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. Gasoline demand continues to decline while diesel demand is on the rise, currently reaching a 2.5 demand ratio in 2017.

FIG.10 ROAD FUEL DEMAND IN THE EU BY COUNTRY IN 2017

Source: Wood Mackenzie



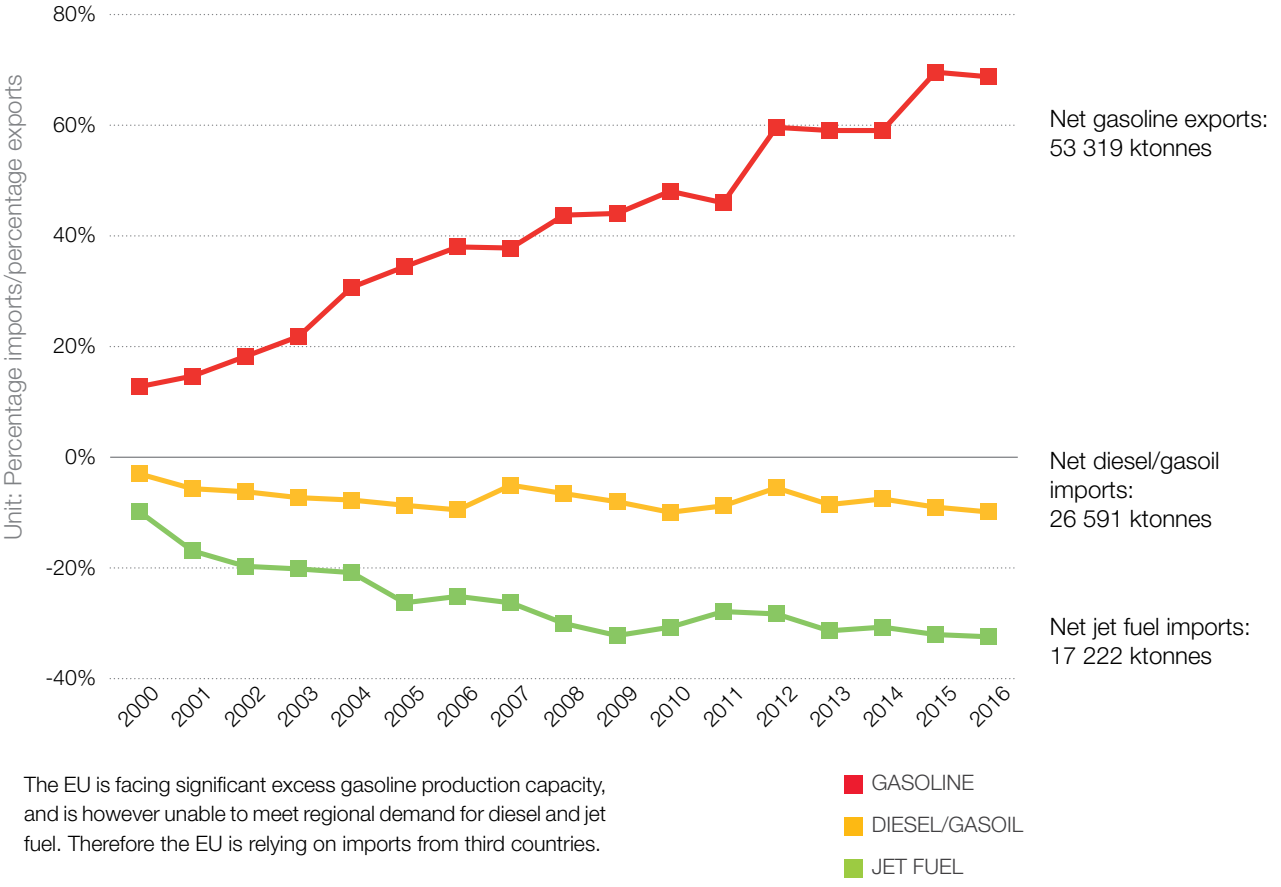
Sustained on by favourable excise taxes on diesel, the shift from gasoline to diesel over the past two decades led to a higher demand for diesel as a road fuel in the vast majority of EU Member States.

In some countries, such as France and Spain the imbalance is far more pronounced as a result of very favourable tax policies for diesel. Moreover, recent measures to rebalance taxation level of diesel with gasoline could trigger a progressive shift in diesel demand.

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.

FIG.11 NET TRADE FLOWS FOR REFINED PRODUCTS DEMONSTRATE THE TREND OF GROWING GASOLINE SURPLUS AND DIESEL / GASOIL / JET FUEL DEFICITS

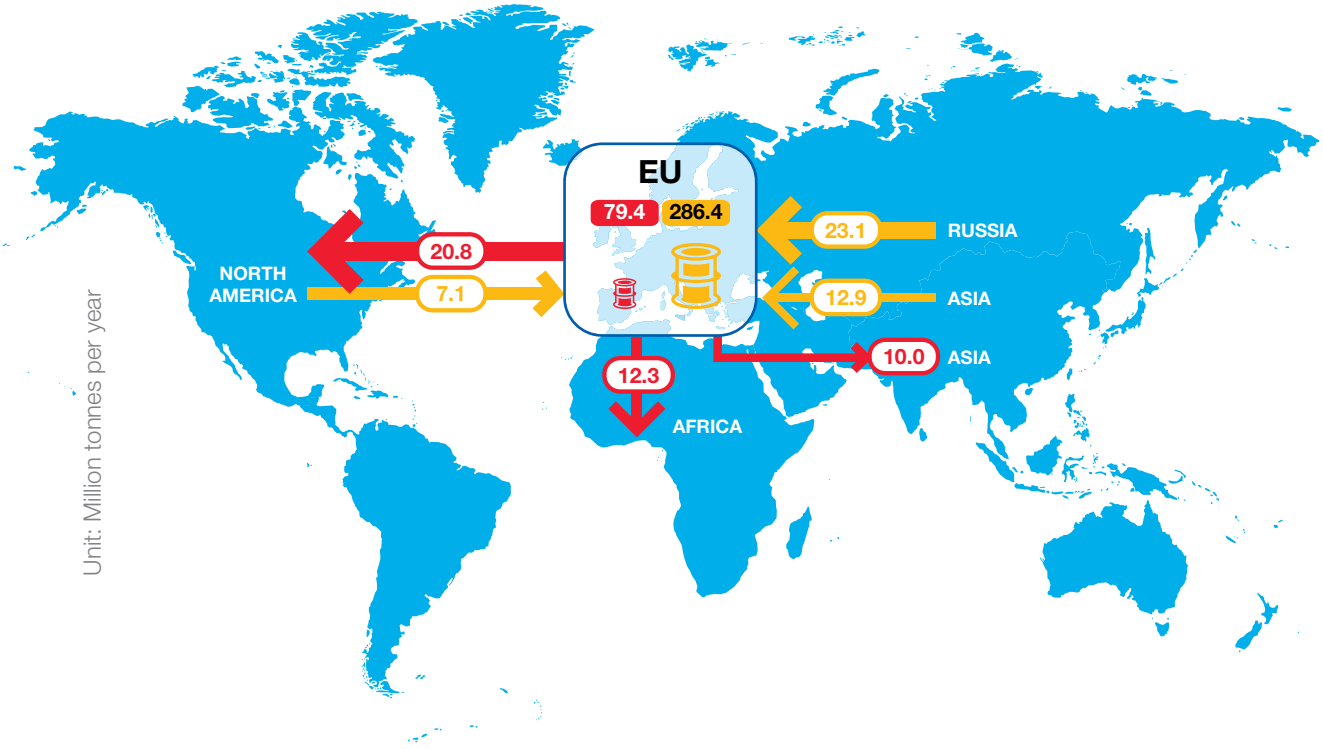
Source: Eurostat



The EU is facing significant excess gasoline production capacity, and is however unable to meet regional demand for diesel and jet fuel. Therefore the EU is relying on imports from third countries.

FIG.12 MAJOR GASOLINE AND DIESEL/GASOIL TRADE FLOWS TO AND FROM THE EU IN 2016

Source: Eurostat



The major trade flows to and from the EU are a result of the gasoline/diesel imbalance demand in Europe. As a consequence, significant excess gasoline production capacity needs to be exported, while, to meet regional demand for diesel and jet fuel, Europe became heavily reliant on other countries for import, especially Russia, the Middle East and USA.

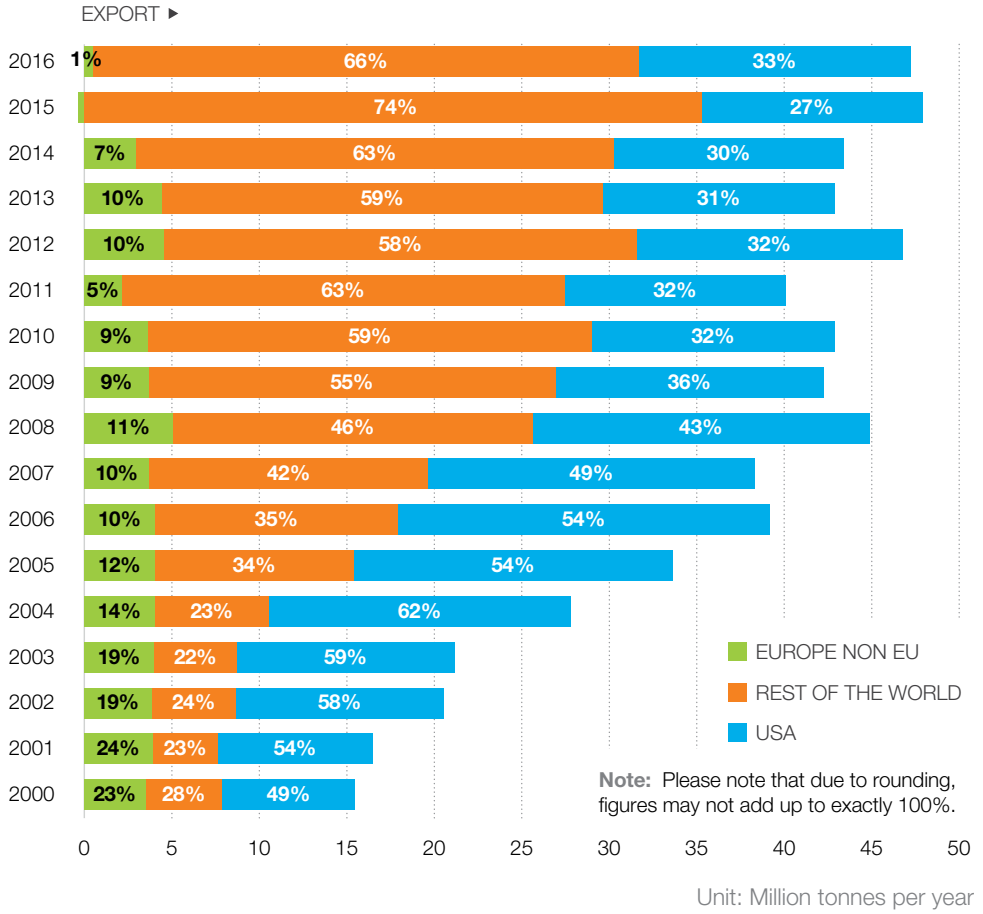
North America was the traditional market for exporting gasoline surplus but the recent shale oil revolution and cheap energy enabled US refiners to increase their supplies for their internal market and compete on other export markets with EU refiners.

- GASOLINE DEMAND IN 2016
- DIESEL/GASOIL DEMAND IN 2016
- MAIN GASOLINE TRADE FLOWS IN 2016
- MAIN DIESEL/GASOIL TRADE FLOWS IN 2016

FIG.13 EU GASOLINE TRADING BALANCE

USA REMAINS AN IMPORTANT EXPORT MARKET FOR THE EU

Source: Eurostat

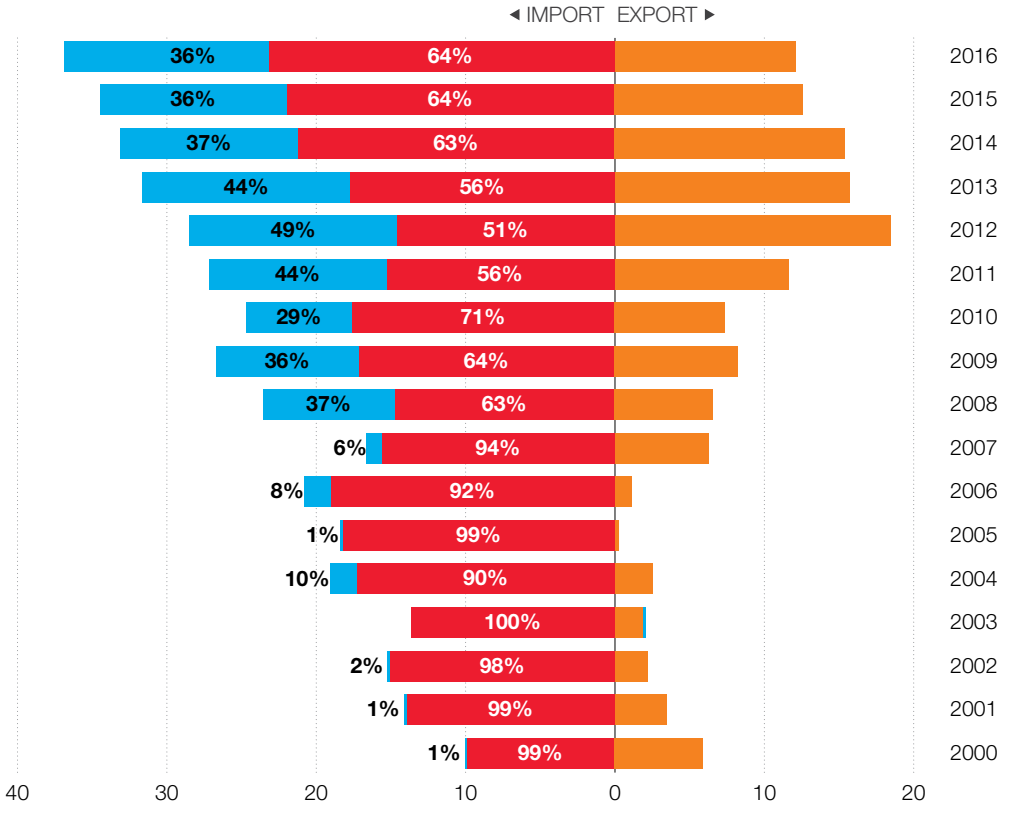


The US was the traditional export market for the structural EU gasoline surplus. The recent shale oil boom has decreased export opportunities to the US and forced EU refiners to find other markets, primarily Africa and Asia. The EU gasoline surplus in 2016 remained high. North America and Asia were the two key export markets for the EU.

FIG.14 EU DIESEL/GASOIL TRADING BALANCE

RUSSIA IS A LEADING EXPORTER OF GASOIL TO THE EU

Source: Eurostat



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

Unit: Million tonnes per year

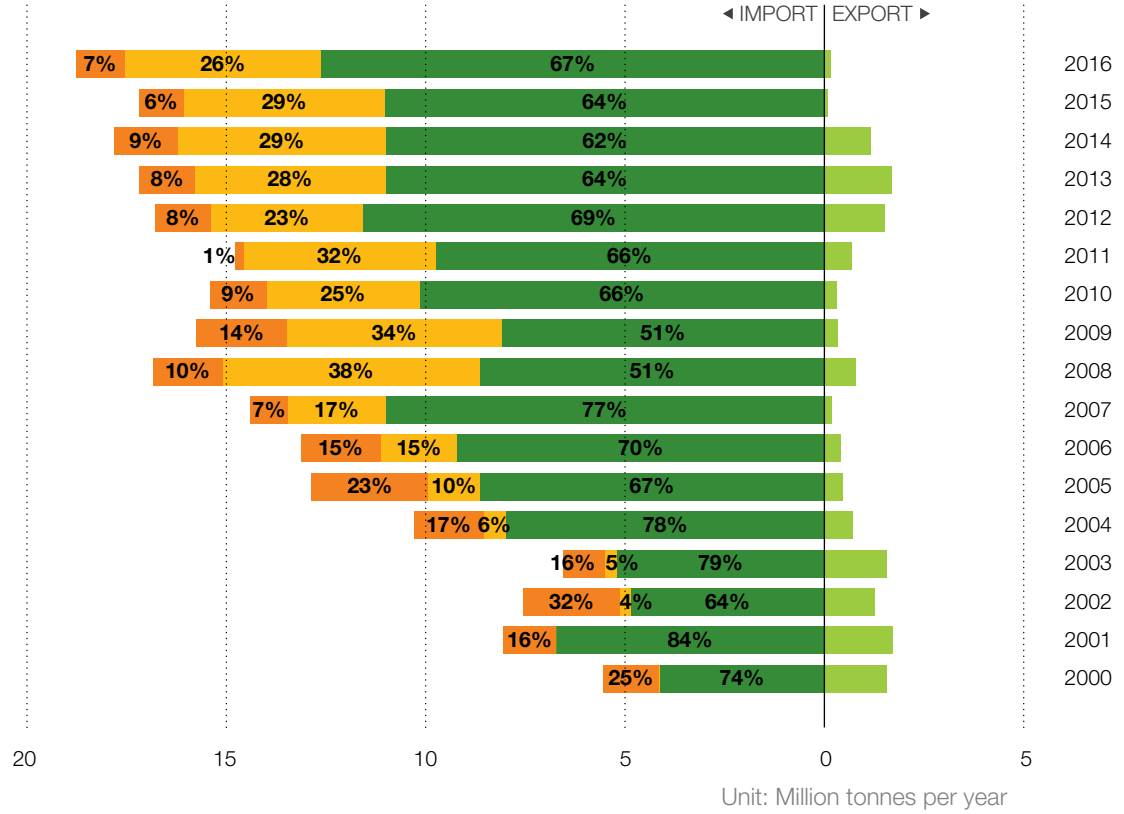
NORTH AMERICA
RUSSIA
REST OF THE WORLD

After a significant increase of gasoil imports from the US between 2008 and 2013, Russia recovered some of the lost shares in 2014-2016 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.15 EU JET FUEL TRADING BALANCE

MIDDLE EAST REMAINS MAIN JET FUEL SUPPLIER FOR THE EU

Source: Eurostat



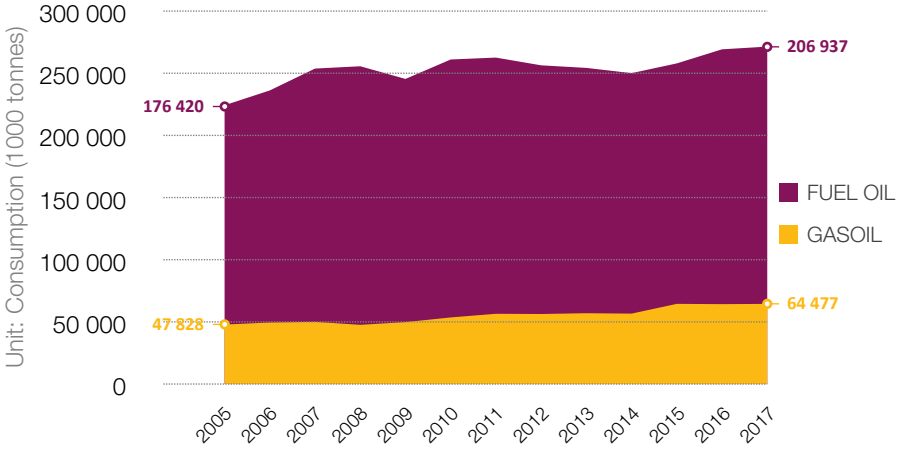
Unit: Million tonnes per year

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

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

FIG.16a GLOBAL MARINE FUEL CONSUMPTION

Source: Wood Mackenzie

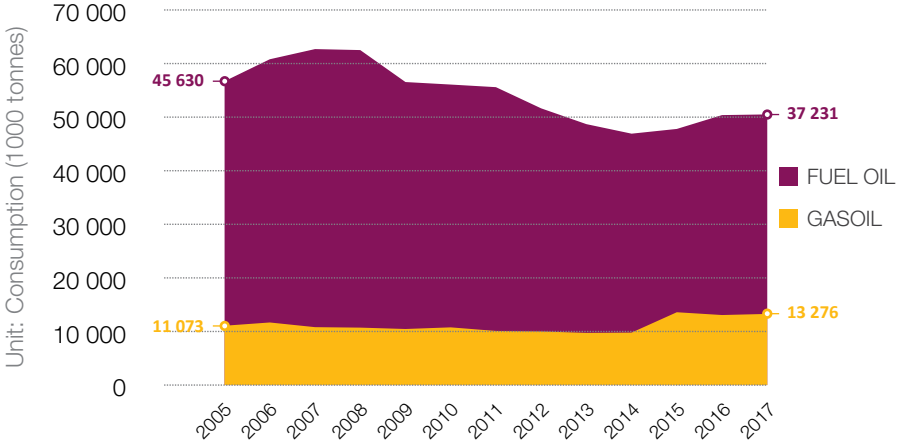


The global demand for marine fuel is mainly met by fuel oil (76%), while gasoil only represents 24% of the market.

The new limits for sulphur content of marine fuels could drastically change the market with a massive demand for low sulphur distillates, requiring major refinery investments.

FIG.16b MARINE FUEL CONSUMPTION IN THE EU

Source: Wood Mackenzie

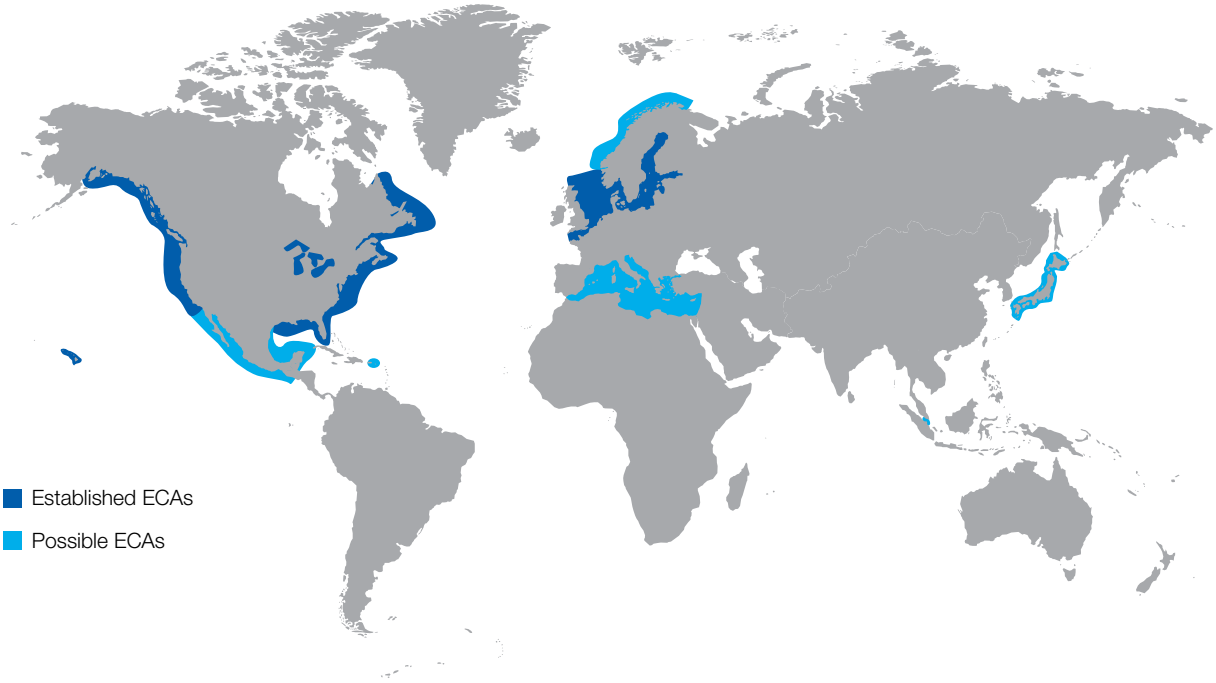


During the past years there was a rise in marine gasoil consumption at the expense of fuel oil. Switching to LNG or using scrubbers are alternatives to meeting the new International Maritime Organisation (IMO) emissions limits.

FIG.17 MARINE FUEL SULPHUR SPECIFICATIONS

SULPHUR EMISSION CONTROL AREAS (SECAs)

Source: IMO



Limits for the sulphur content of marine fuels in SECAs:
1% until 31 December 2014
0.1% since 1 January 2015

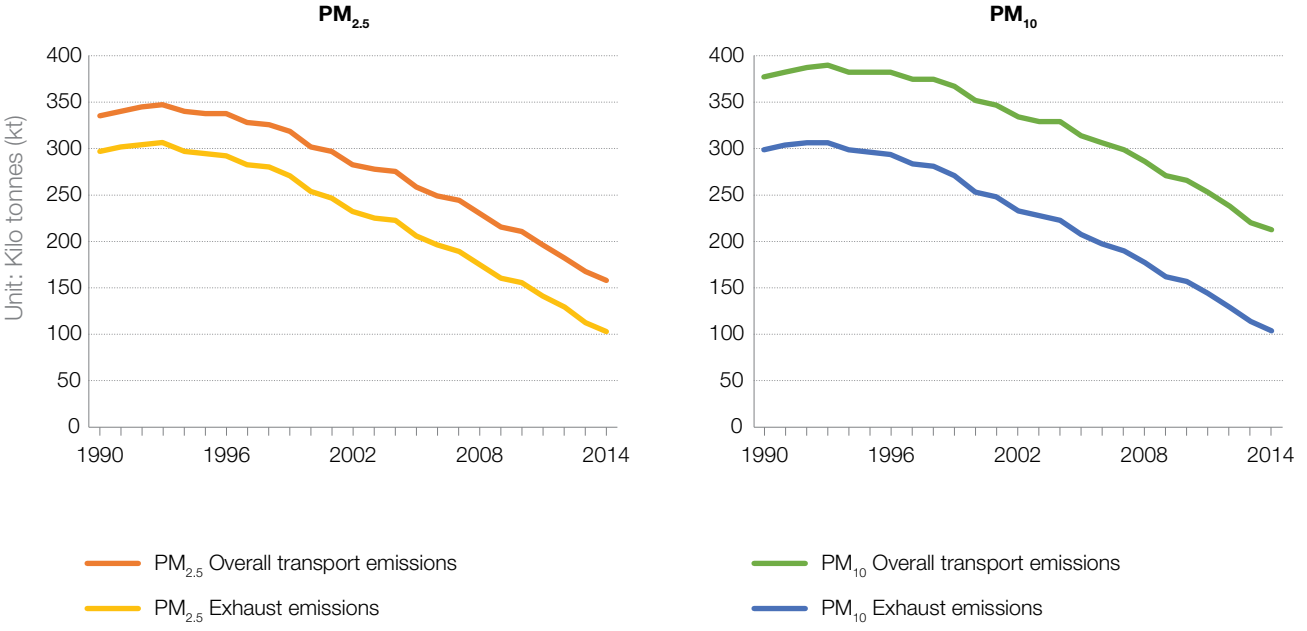
Limits for the sulphur content of marine fuels outside SECAs in the EU waters by 2020: 0.50% for EU waters by 2020.

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, have had to reduce their sulphur emissions to 0.1%. Vessels are required to use either a distillate, an alternate fuel or install a scrubber that removes sulphur from the exhaust after combustion.

The implementation date for the 0.5% global sulphur cap is set for 2020, the International Maritime Organization (IMO) Marine Environment Protection Committee decided at its 70th session in London.

FIG.18a PM EMISSIONS FROM EXHAUST IN THE EU REDUCED BY OVER 60%

Source: European Environment Agency

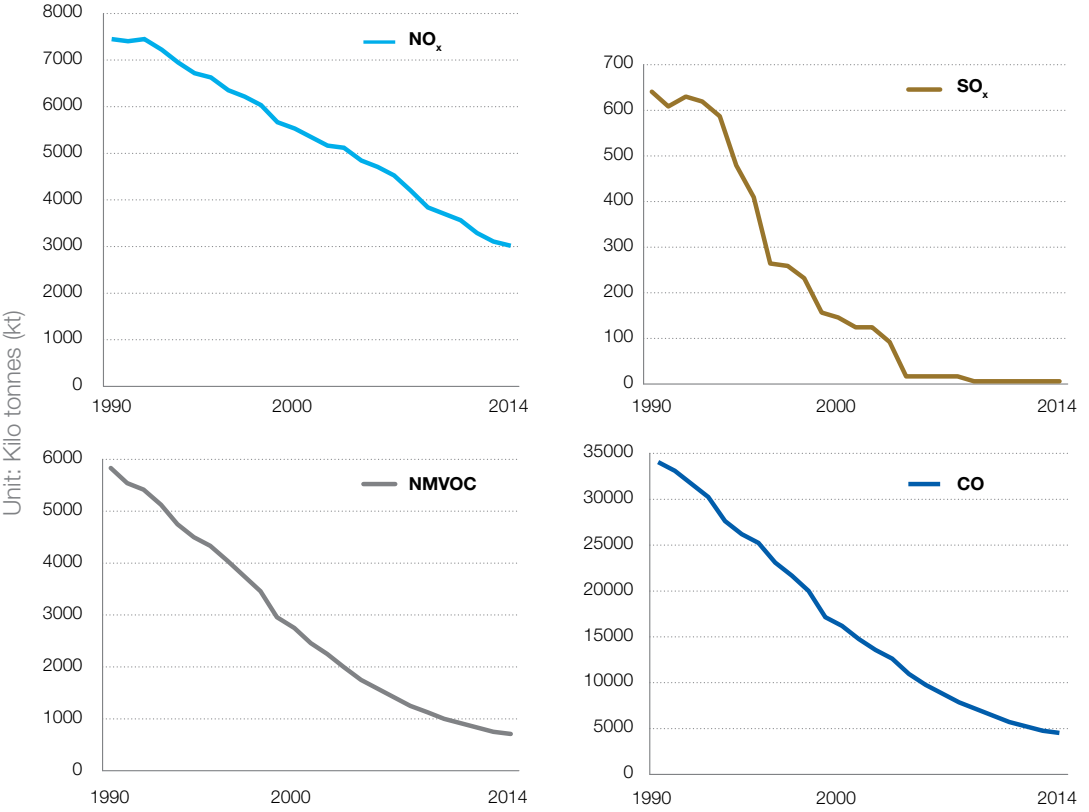


PM emissions are continuously decreasing as the result of cleaner diesel fuel, advanced engines and effective emissions control technology.

With 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.18b SINCE 1990 FUELS ARE GETTING PROGRESSIVELY CLEANER RESULTING IN SIGNIFICANT EMISSIONS REDUCTIONS

Source: European Environment Agency

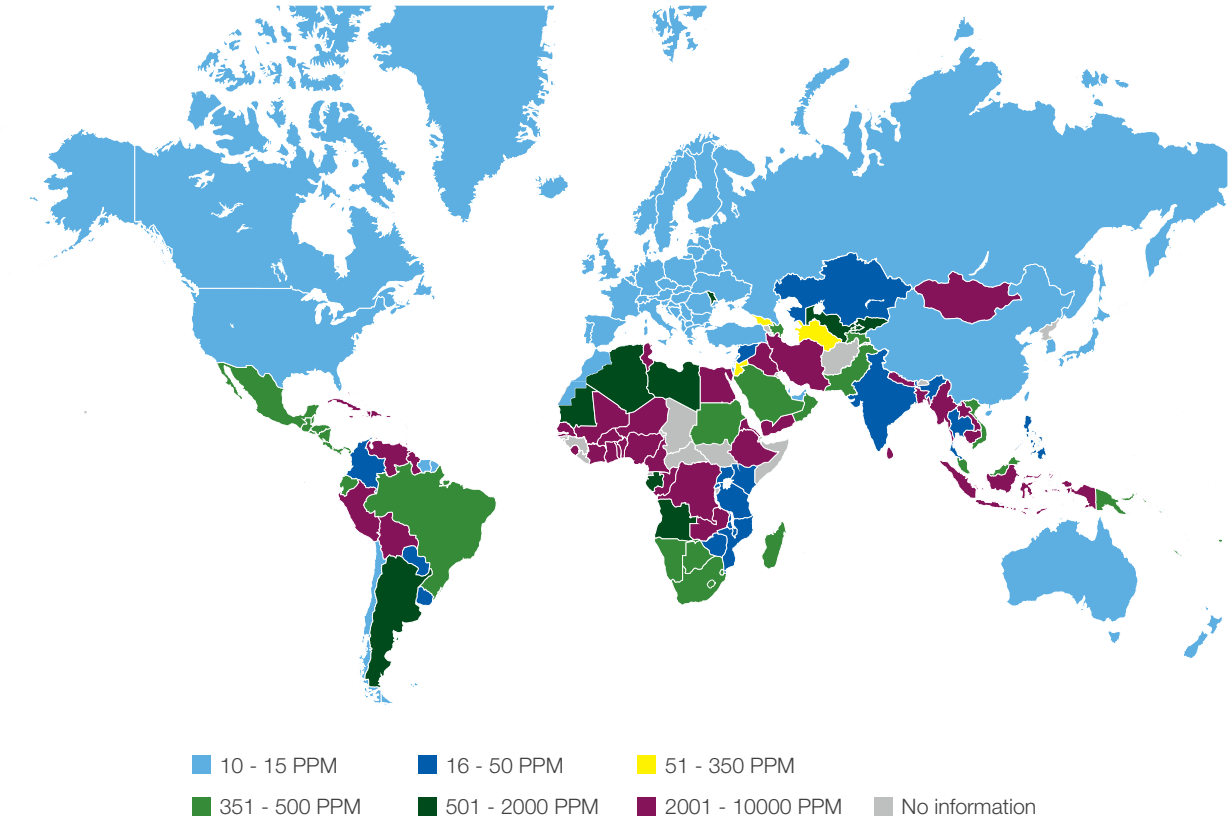


Since 1990 the refining industry has contributed to cleaner exhausts by today containing over 80% lower SO_x, NMVOC & CO, while NO_x emissions decreased by over 60%. These significant improvements are the result of the partnerships with the automotive industry aiming at improving the fuel-engine efficiency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

NO_x (as NO_2) - Nitrogen Oxides
SO_x (as SO_2) - Sulphur Oxides
NMVOC - Non Methane Volatile Organic Compounds
CO - Carbon Monoxide

FIG.19 MAXIMUM ON-ROAD DIESEL SULPHUR LIMITS

Source: Stratas Advisors, March 2018

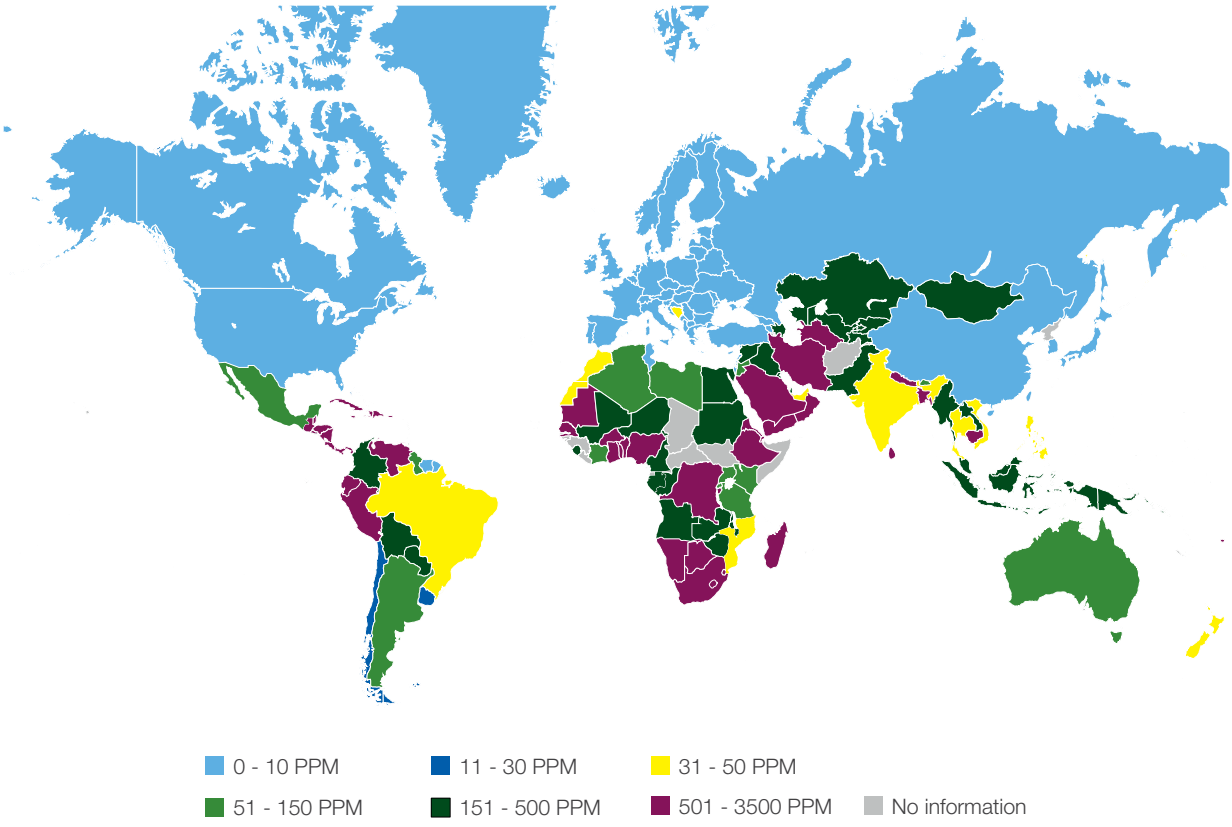


Countries may apply lower limits for different grades, regions/ cities, or based on average content.

Detailed information on limits and regulations can be found at www.stratasadvisors.com.

FIG.20 MAXIMUM GASOLINE SULPHUR LIMITS

Source: Stratas Advisors, March 2018



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.

SAVE MORE than FUEL

10 TIPS TO HELP YOU DRIVE MORE EFFICIENTLY AND REDUCE EMISSIONS

Keep your car well serviced and check the oil level regularly.

Correctly maintained cars can operate more efficiently and help reduce CO_2 emissions.

Check your tyre pressure every month.

Under-inflated tyres can increase fuel consumption by up to 4%*.

Remove unnecessary weight from your boot or back seats.

The heavier the car, the harder the engine has to work and the more fuel it consumes.

Close your windows, especially at higher speeds, and remove empty roof racks.

This will reduce wind resistance and can lower your fuel consumption and CO_2 emissions by up to 10%**.

Use air conditioning only when necessary.

Unnecessary use increases fuel consumption and CO_2 emissions by up to 5%**.

Start driving soon after starting the engine and turn off the engine when stationary for more than one minute.

Modern engines enable you to just get in and go, thus reducing fuel consumption.

Drive at reasonable speeds and above all, drive smoothly.

Every time you accelerate or brake suddenly, your engine uses more fuel and produces more CO_2.

When accelerating, change up gears as early as possible.

Higher gears are more economical in terms of fuel consumption**.

Try to anticipate traffic flow.

Look at the traffic as far ahead as possible in order to avoid unnecessary stopping and starting within the flow of traffic.

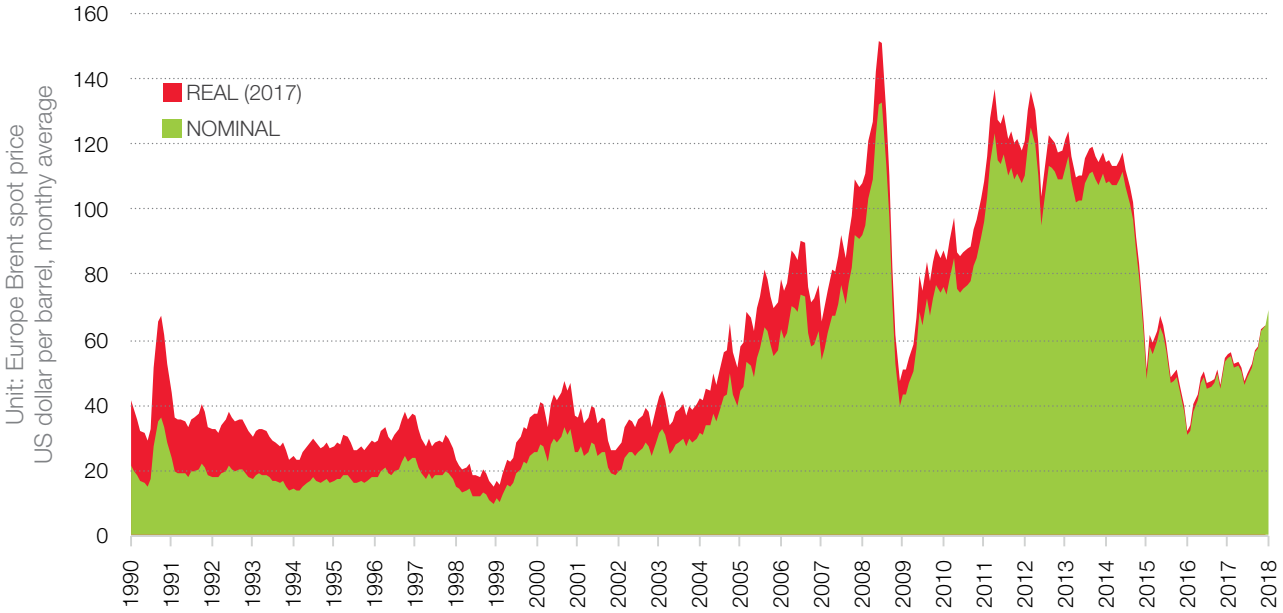
Consider car sharing for work or leisure.

You will help reduce congestion and fuel consumption.

*** International Energy Agency ** European Commission**

FIG.21 CRUDE OIL PRICE EVOLUTION

Source: Energy Information Administration



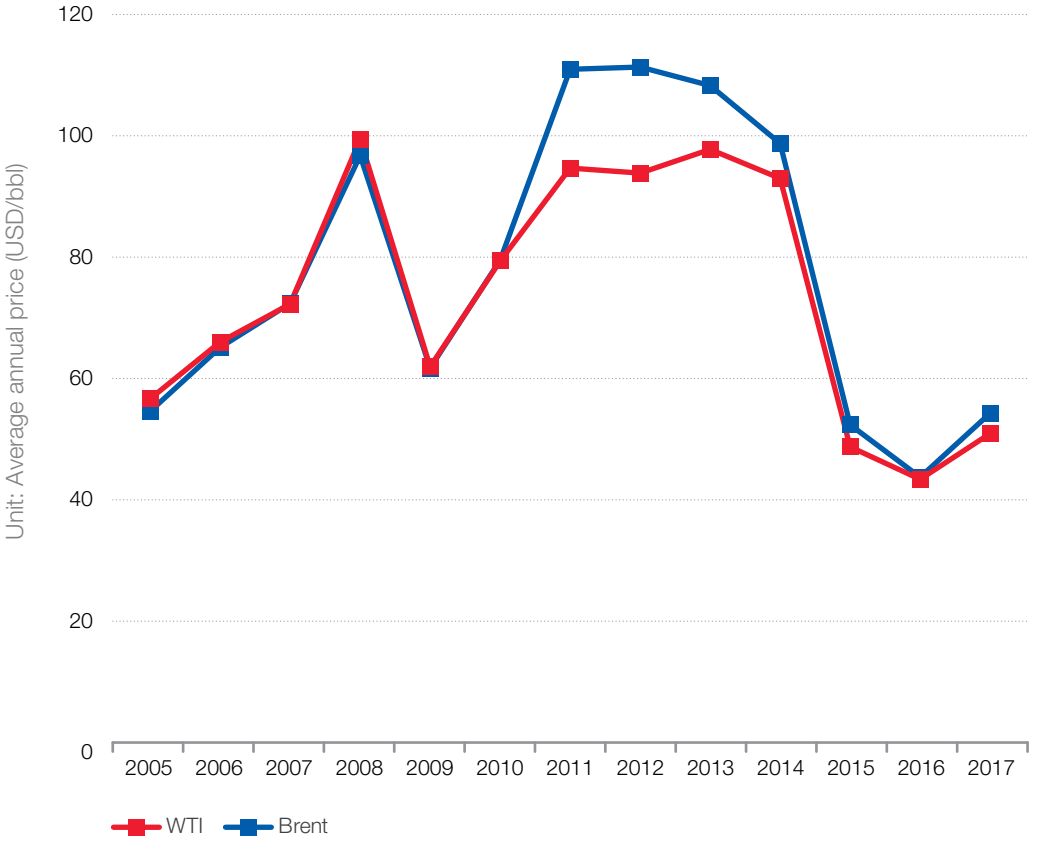
The EU Refining industry operates between two global, open and transparent markets: the market for crude oil and the market for refined products. The main benchmarks are priced in dollars.

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.

After a decade of relatively low prices, oil started rising last decade, leading to peaks just before the financial crisis in 2008. In March 2016, oil prices fell sharply reaching closing prices below 40 $. Prices rose again in 2017 to reach $70 in January 2018.

FIG.22 BRENT V WTI

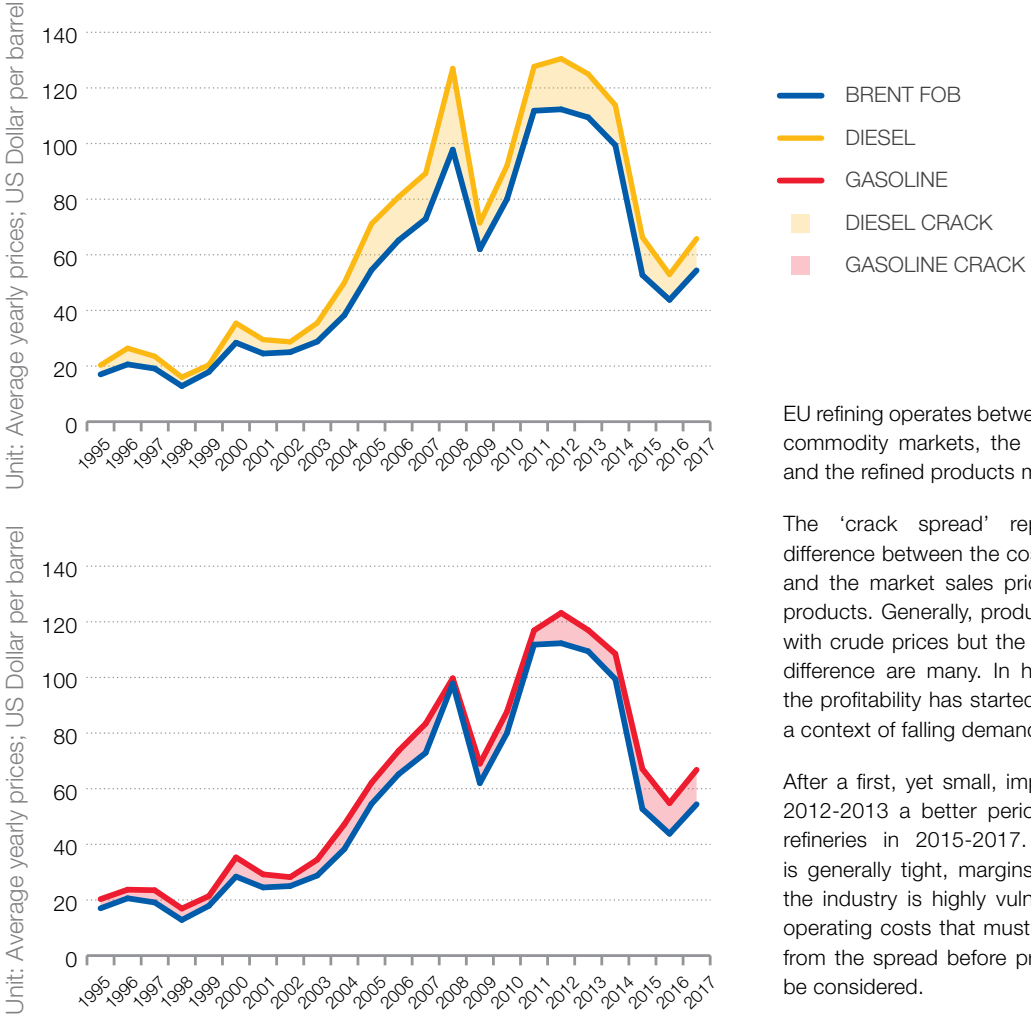
Source: Energy Information Administration (EIA)



Brent and West Texas Intermediate are two of the main crude oil benchmarks. Historically, these crudes, of similar quality, have traded at similar prices. Recent years saw Brent trade at a premium to WTI, meaning EU refiners generally faced higher costs, though this differential decreased last year. The lifting of the US crude oil export ban is one of the reasons that led to the narrowing of the spread between North Sea Brent and U.S. West Texas Intermediate.

FIG.23 REFINERS OPERATE BETWEEN TWO GLOBAL COMMODITY MARKETS: CRUDE MARKET AND REFINED PRODUCTS MARKET

Source: Wood Mackenzie & Argus Media



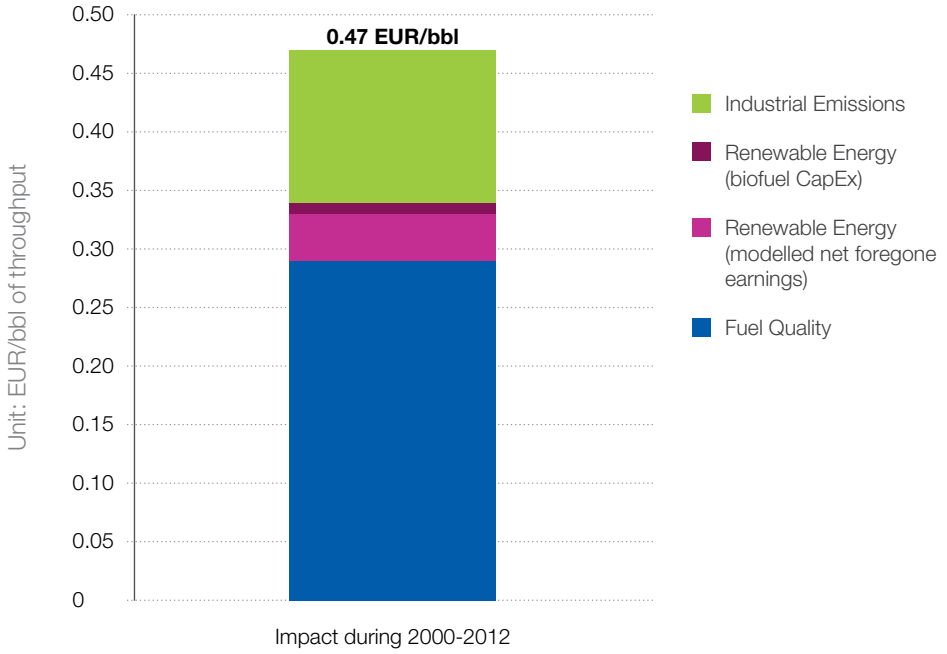
EU refining operates between two global commodity markets, the crude market and the refined products market.

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 2015-2017. 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.24 AVERAGE ESTIMATED QUANTIFIABLE IMPACT OF THE LEGISLATION ON EU REFINERIES DURING 2000-2012 BARREL OF THROUGHPUT

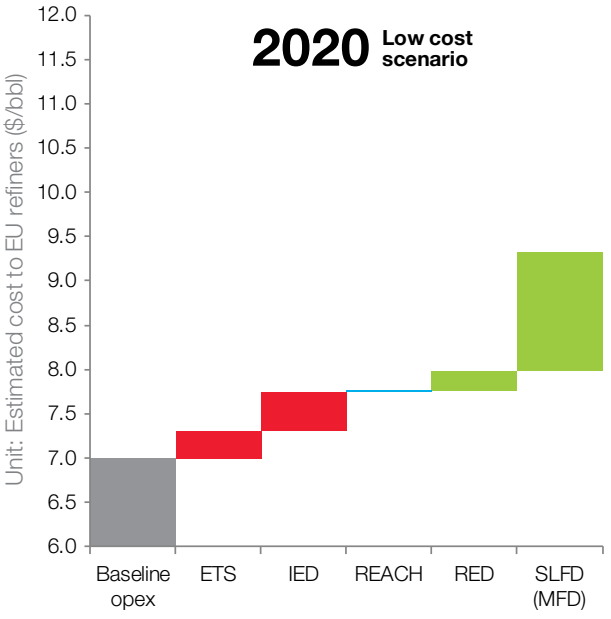
Source: European Commission, Sectoral fitness check for the petroleum refining sector

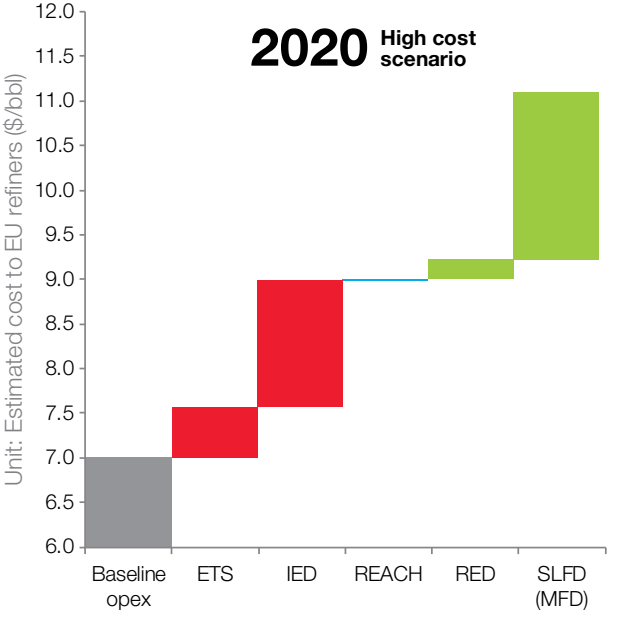


The European Commission Fitness Check concluded that refiners suffered additional costs of 0.47€ per barrel due to EU regulation from 2000 to 2012, accounting for a quarter of the sector's decline in competitiveness versus regional peers. The European Commission Refining Fitness Check was published in December 2015 after almost three years of analysis.

FIG.25 CUMULATIVE COST IMPACT OF EU LEGISLATION IN 2020

Source: Concawe





This chart provides an estimation of the cost burden likely to be imposed on EU refineries over the period 2010 to 2020 as the result of a number of EU legislative and implementing acts. It shows the cumulative impact in a low and high cost scenario, expressed in dollars per barrel of refinery intake. These estimated costs impacts should be seen in the context of the EU refining net margin not exceeding 5$/bbl in recent years (source: IEA Market Series - Oil 2018 -Analysis and forecasts to 2023).

The legislation under consideration has the potential to significantly increase the operating costs of the EU refining industry, thereby impairing its competitive position relative to other world regions where similar legislation is not enacted or is enforced at later dates.

ETS - Emission Trading Scheme (2009/29/EC)

IED - Industrial Emission Directive (2010/75/EC)

REACH - Registration, Evaluation, Authorisation & Restriction of Chemicals (Regulation 1907/2006)

RED - Renewable Energy Directive (2009/28/EC)

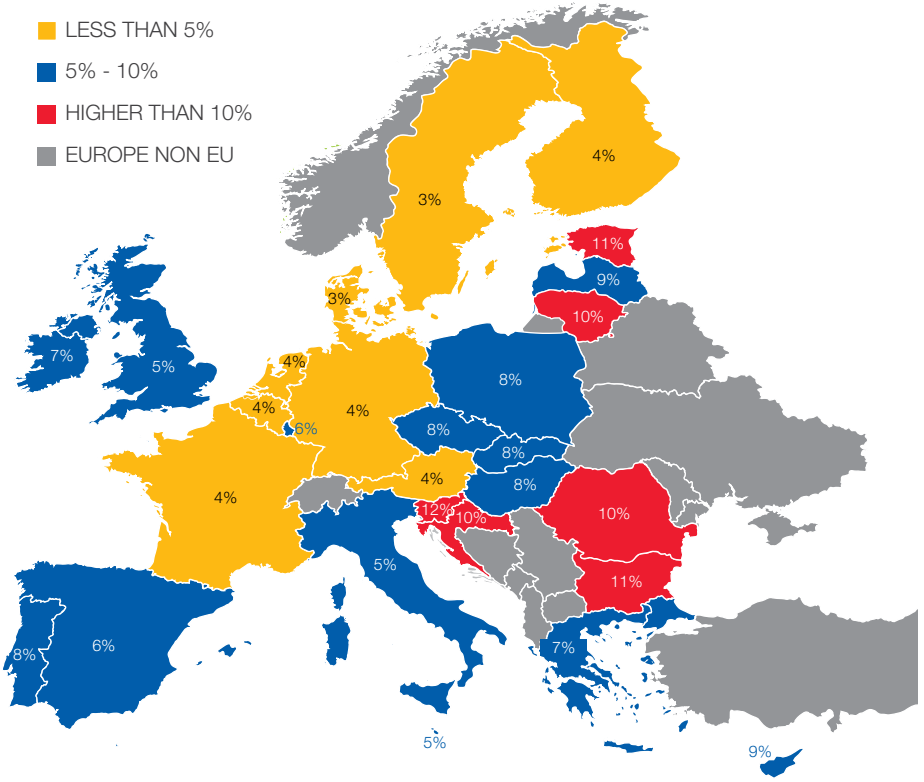
SLFD - The Sulphur in Liquid Fuels Directive (1999/32/EC)

OPEX - Operating Expense

For EU ETS, 'low cost scenario assumes 16.5 €/t CO_2, high cost scenario 30 €/t CO_2.

FIG.26 FUEL TAXES MAKE A SIGNIFICANT CONTRIBUTION TO MEMBER STATE NATIONAL INCOME

Source: Eurostat, Wood Mackenzie and European Commission



COUNTRY		SHARE
SI	Slovenia	12%
BG	Bulgaria	11%
EE	Estonia	11%
HR	Croatia	10%
RO	Romania	10%
LT	Lithuania	10%
LV	Latvia	9%
CY	Cyprus	9%
PL	Poland	8%
EL	Greece	8%
PT	Portugal	8%
CZ	Czech	8%
SK	Slovakia	8%
HU	Hungary	8%
IE	Ireland	7%
ES	Spain	6%
LU	Luxembourg	6%
MT	Malta	5%
IT	Italy	5%
UK	UK	5%
BE	Belgium	4%
AT	Austria	4%
NL	Netherlands	4%
DE	Germany	4%
FR	France	4%
FI	Finland	4%
SE	Sweden	3%
DK	Denmark	3%

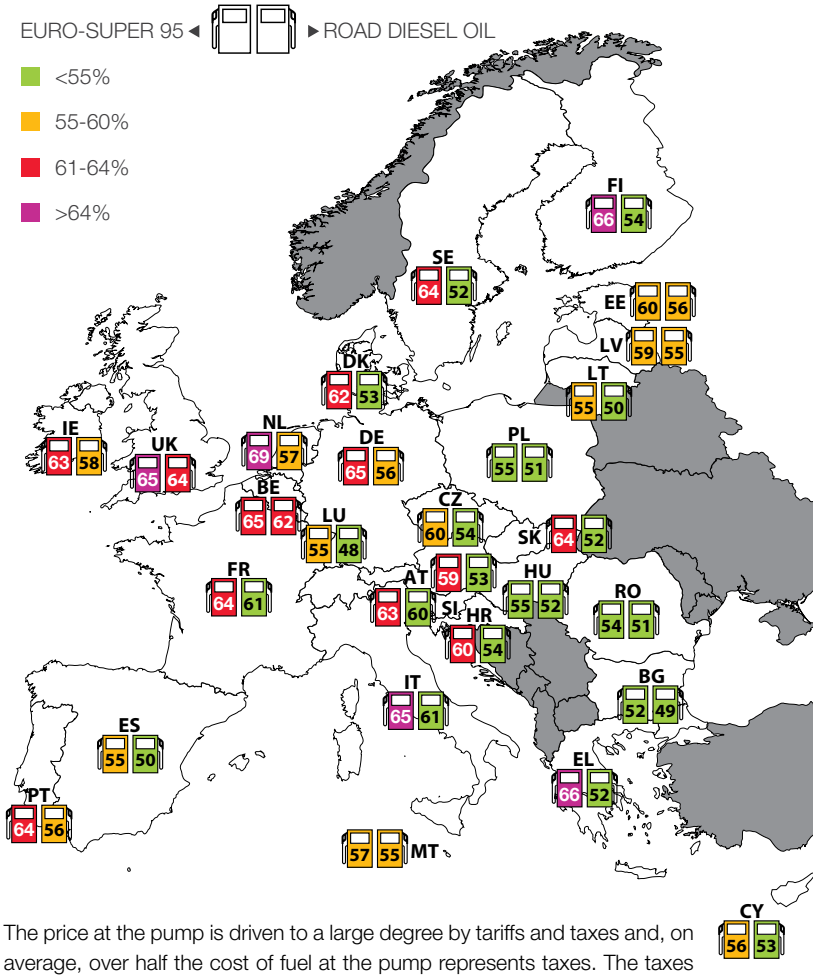
Taxes on fuels contribute on average to some 7% of Member State tax revenue. This significant contribution to Member State revenue has to be put in perspective with the subsidies given to many competing alternatives to oil. This demonstrates that replacing petroleum products by these alternatives would have severe consequences for Member States' income.

*Figures are based on 2017 tax revenues

FIG.27 TOTAL TAXATION SHARE IN THE END CONSUMER PRICE

Source: European Commission

EURO-SUPER 95	
COUNTRY	%
Netherlands	69
Greece	66
Finland	66
United Kingdom	65
Italy	65
Germany	65
Sweden	64
France	64
Portugal	64
Slovakia	64
Slovenia	64
Ireland	63
Belgium	62
Denmark	61
Croatia	60
Estonia	60
Czech Republic	59
Austria	58
Malta	57
Hungary	56
Cyprus	55
Lithuania	55
Latvia	55
Spain	55
Poland	55
Luxembourg	55
Romania	54
Bulgaria	52



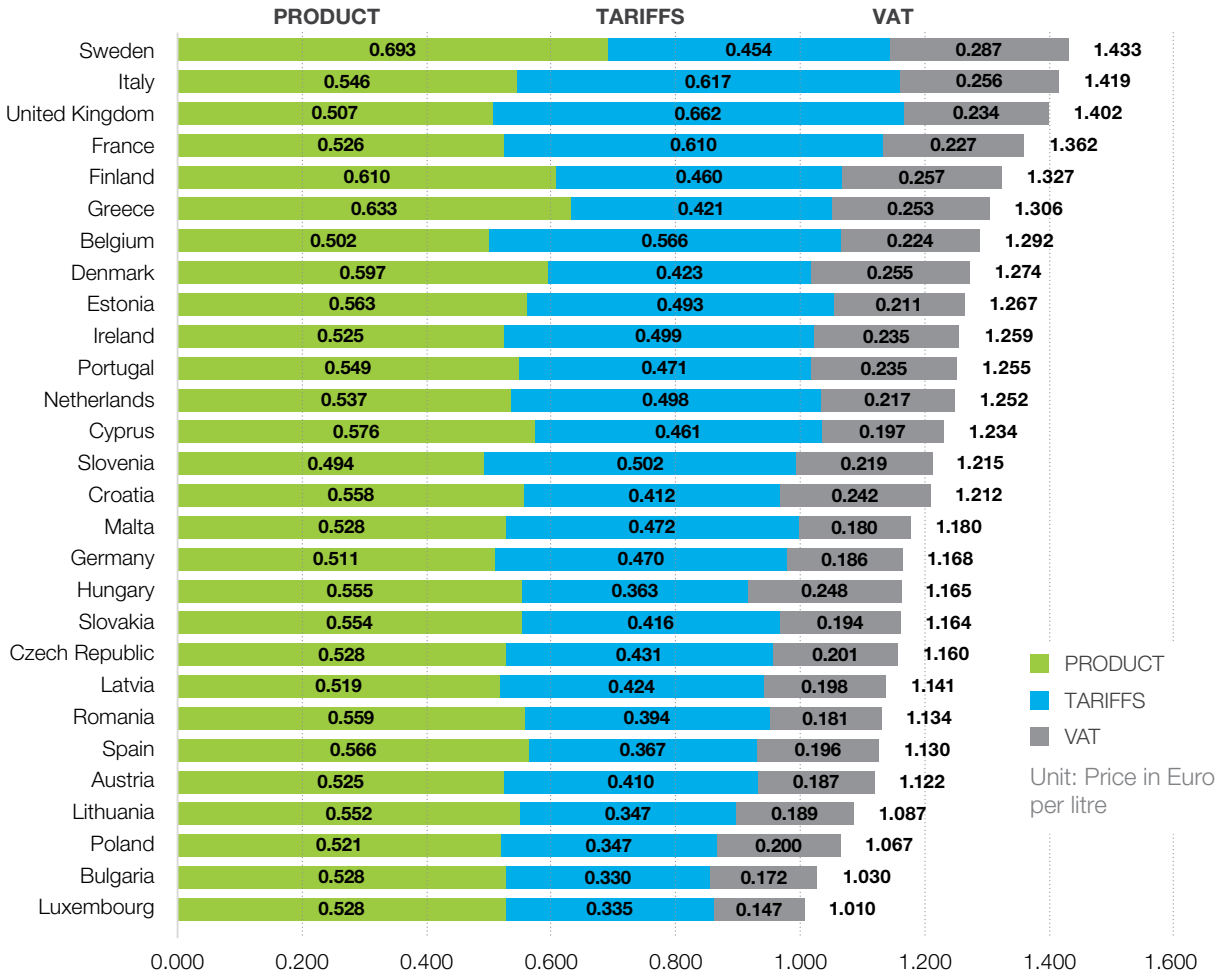
The price at the pump is driven to a large degree by tariffs and taxes and, on average, over half the cost of fuel at the pump represents taxes. The taxes on gasoline are generally higher than for diesel. This differential tax treatment has driven a demand shift over the past 20 years. Fuels taxes contribute substantially to Member States' revenues.

Reference date: 13 March 2018.

ROAD DIESEL OIL	
COUNTRY	%
United Kingdom	64
Belgium	62
Italy	61
France	61
Slovenia	60
Ireland	58
Netherlands	57
Germany	56
Portugal	56
Estonia	56
Malta	55
Latvia	55
Finland	54
Croatia	54
Denmark	53
Czech Republic	53
Austria	53
Cyprus	53
Sweden	52
Hungary	52
Greece	52
Slovakia	52
Poland	51
Romania	51
Spain	50
Lithuania	50
Bulgaria	49
Luxembourg	48

FIG.28 BREAKDOWN OF AUTOMOTIVE DIESEL PRICES ACROSS EU (MARCH 2018)

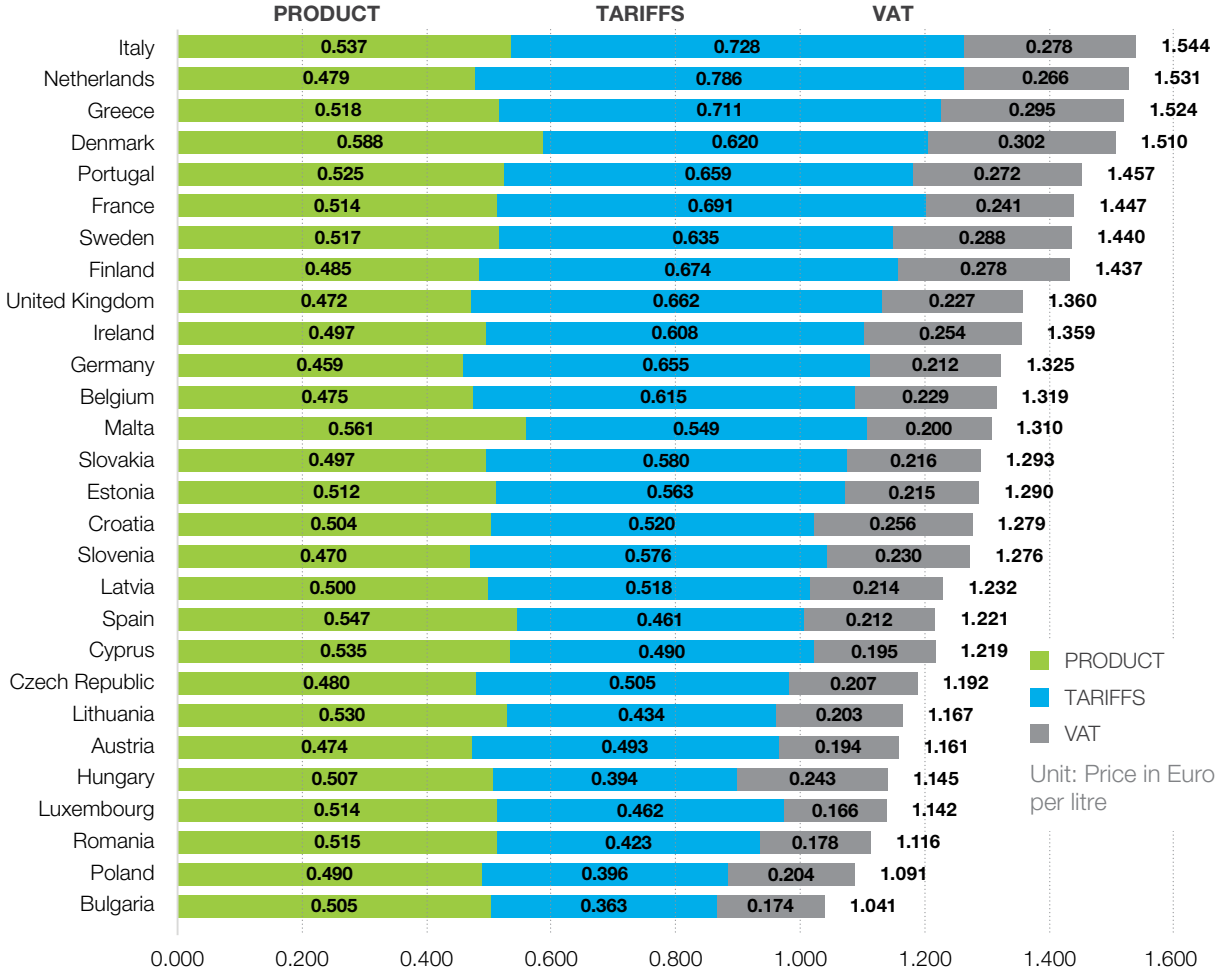
Source: European Commission



In most EU Member States gasoline prices are generally higher than diesel prices due to the higher tax element. Only a fraction of the price paid at the pump contributes to the refiners' income, the remainder represents taxes, the biggest share, the purchase of the crude and the distribution and marketing costs.

FIG.29 BREAKDOWN OF AUTOMOTIVE GASOLINE PRICES ACROSS EU (MARCH 2018)

Source: European Commission



In most EU Member States, gasoline prices are generally higher than diesel prices due to the higher tax element.

Only a fraction of the price paid at the pump contributes to the refiners' income, the remainder going to Member States and the purchasing of the crude oil.

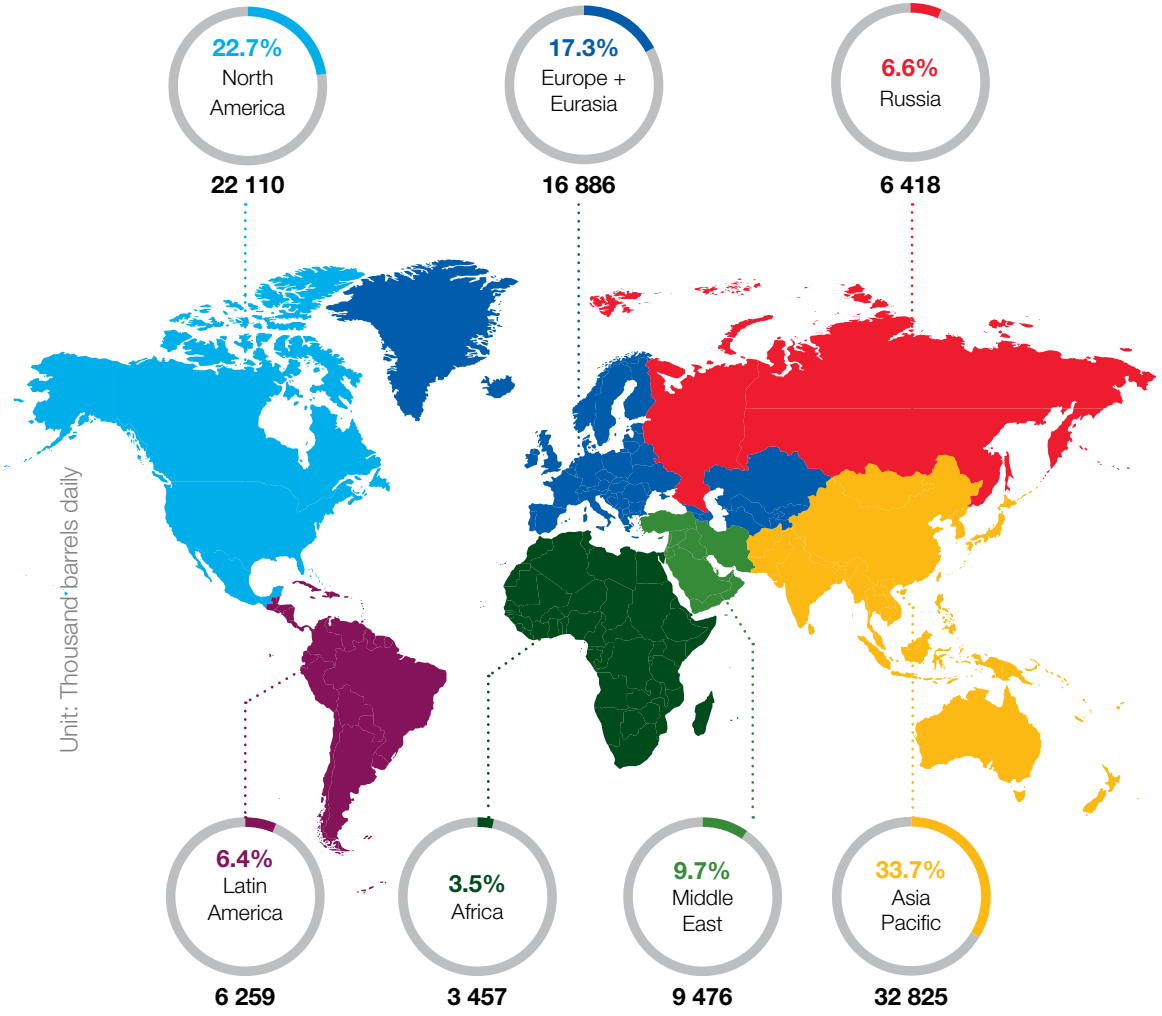
Vision 2050

A PATHWAY FOR THE EVOLUTION OF THE REFINING INDUSTRY AND LIQUID FUELS

FuelsEurope

FIG.30 GLOBAL REFINING CAPACITY AS OF 2016

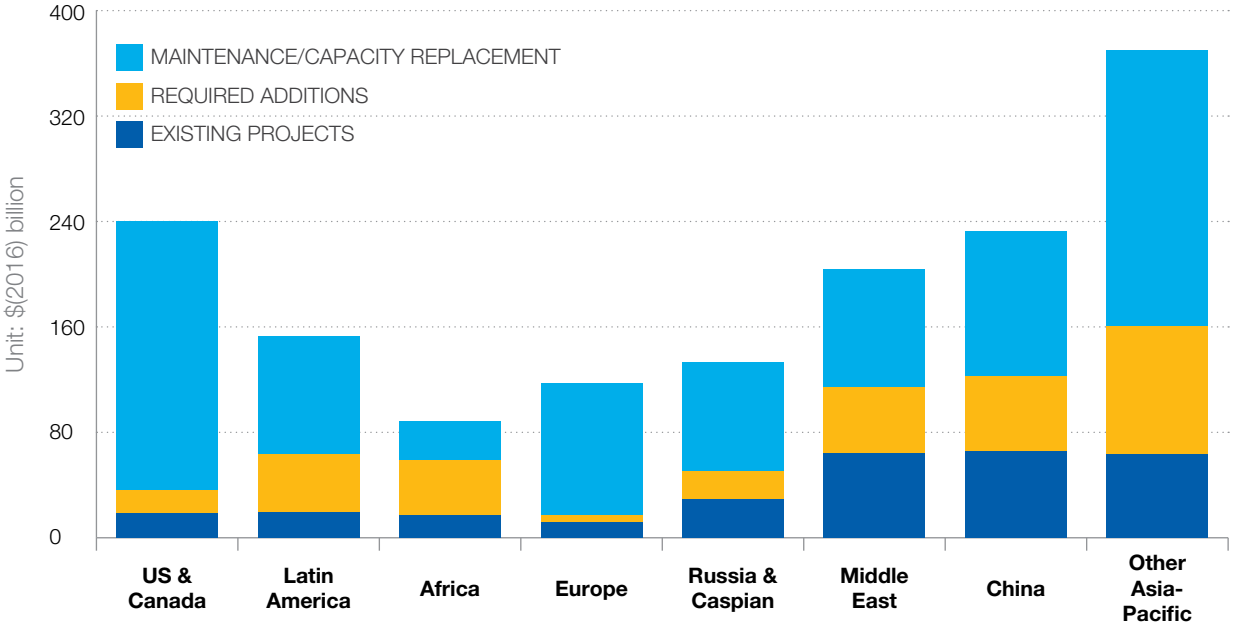
Source: BP Statistical Review of World Energy 2017



Refining is spread around the world and is a truly global business. The share of Europe and Eurasia (Rusia excluded) has decreased from 17.7% in 2015 to 17.3% in 2016 but remains the third largest refining region.

FIG.31 REFINERY INVESTMENTS IN REFERENCE CASE 2017 - 2040

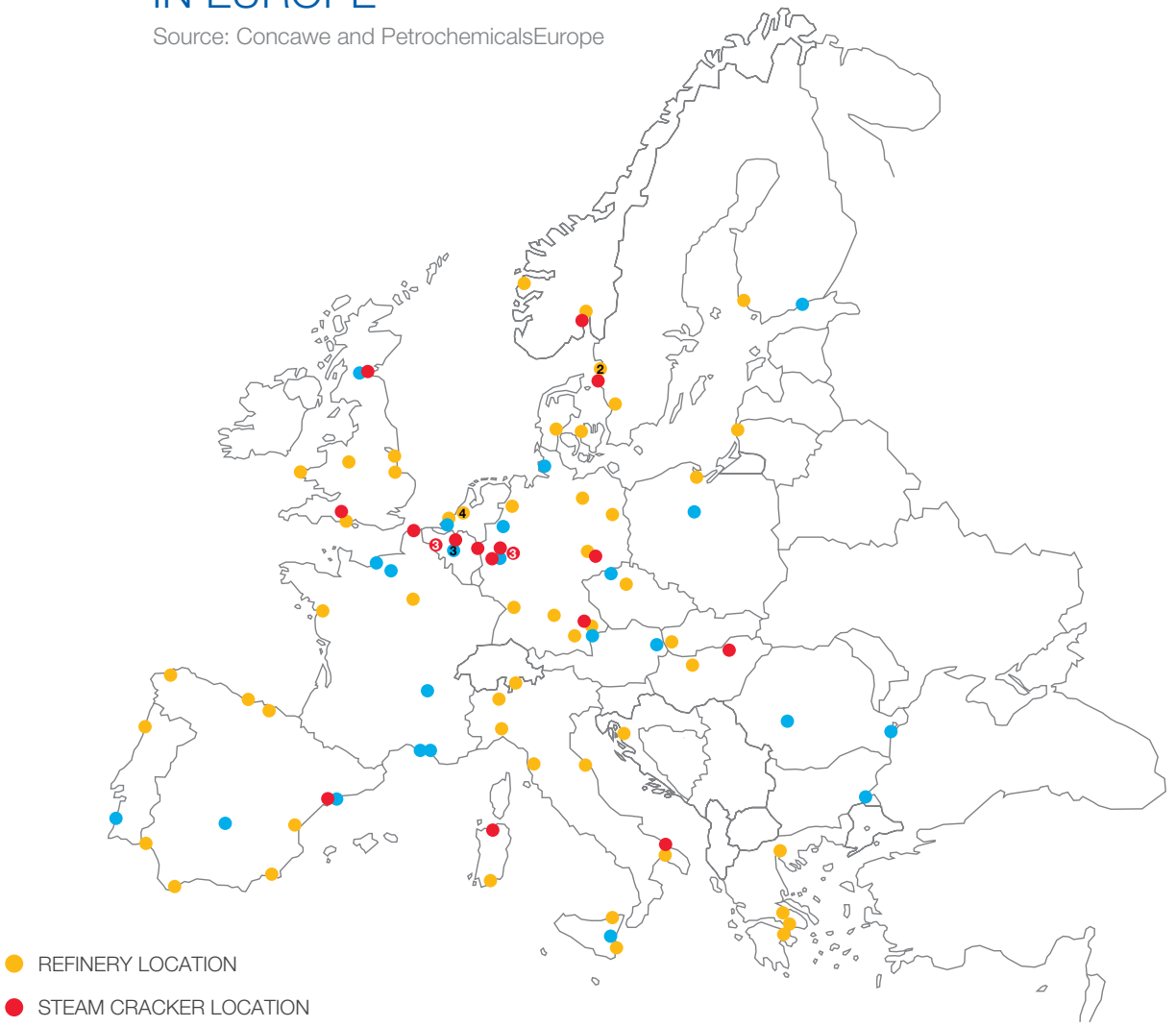
Source: OPEC World Oil Outlook 2017



All three categories of refinery investment requirements are estimated at over $1.5 trillion in the period 2017-2040. The majority, around $900 billion will be dedicated to maintenance, $265 billion to investments in known project and the remaining $385 billion to additions beyond firm projects.

FIG.32 REFINERY/STEAM CRACKER SITES IN EUROPE

Source: Concawe and PetrochemicalsEurope



REFINERY LOCATION

STEAM CRACKER LOCATION

INTEGRATED REFINERY / STEAM CRACKER LOCATION

A large number of refineries are integrated with or located very closely 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 83 MAINSTREAM REFINERIES WERE OPERATING IN THE EU, NORWAY AND SWITZERLAND AT THE END OF 2017

Source: Concawe

COUNTRY	Number of refineries
Austria	1
Belgium	3
Bulgaria	1
Croatia	2
Czech Republic	2
Denmark	2
Finland	2
France	7
Germany	11
Greece	4
Hungary	1
Ireland	1
Italy	10
Lithuania	1
Netherlands	6
Poland	2
Portugal	2
Romania	3
Slovakia	1
Spain	9
Sweden	3
United Kingdom	6
EU TOTAL: Refineries = 80	
Norway	2
Switzerland	1
TOTAL NO + CH: Refineries = 3	
TOTAL: Refineries = 83	

EU NON EU

Threshold > 30 kbbl/d or 1.5Mt/a

In January 2018, there were 83 'mainstream' (capacity above 1.5Mta) refineries in the EU, Norway and Switzerland.

FIG.34 EU, NORWEGIAN AND SWISS MAINSTREAM REFINERIES HAD 684.9 MILLION TONNES OF PRIMARY REFINING CAPACITY IN 2017

Source: Concawe and Oil & Gas Journal

COUNTRY	*Refining capacity	COUNTRY	*Refining capacity
Austria	9.7	Ireland	3.6
Belgium	37.6	Italy	84.8
Bulgaria	5.8	Lithuania	9.5
Croatia	6.7	Netherlands	63.8
Czech Republic	8.7	Poland	29.2
Denmark	8.7	Portugal	15.2
Finland	13.0	Romania	11.9
France	62.6	Slovakia	5.8
Germany	101.5	Spain	75.9
Greece	24.7	Sweden	19.8
Hungary	8.1	United Kingdom	59.3
EU TOTAL: Refineries = 665.6 million tonnes per year			
Norway	16.0		
Switzerland	3.4		
TOTAL NO + CH: Refineries = 19.4 million tonnes per year			
TOTAL: Refineries = 684.9 million tonnes per year			

EU NON EU

Threshold > 30 kbbl/d or 1.5Mt/a

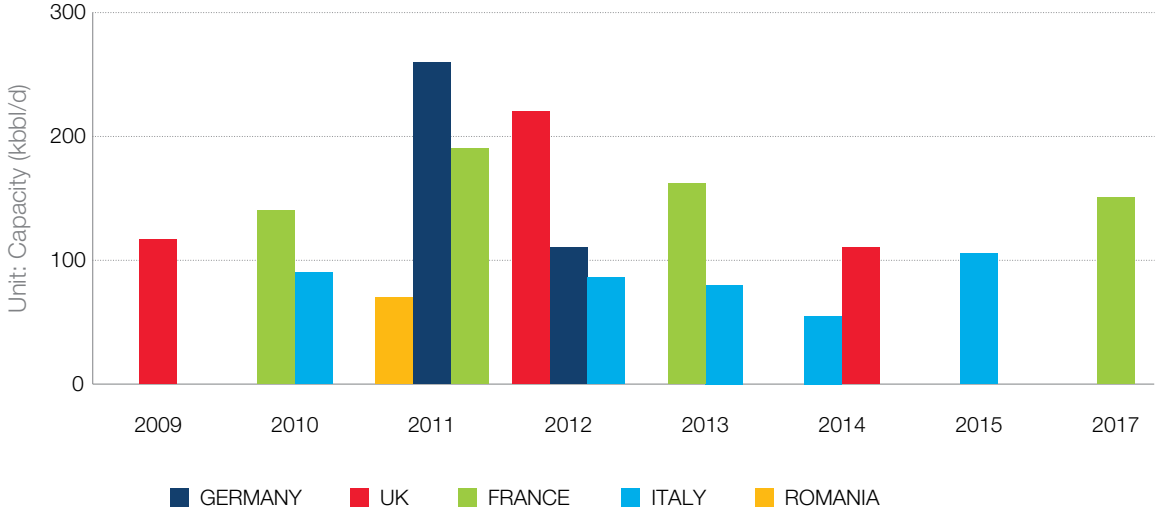
The 83 mainstream refineries operating in 2017 in the EU-28, Norway and Switzerland had a primary refining capacity of 684.9 million tonnes in 2017. This represents a capacity decrease by some 75 million tonnes of primary refining capacity since 2010. Over the past 12 months the refining capacity decreased in the EU by 3.25%, mainly in Italy, Germany, France, and the UK.

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

*Status in December 2017

FIG.35 REFINERY CLOSURES IN EUROPE

Source: Platts and Concawe

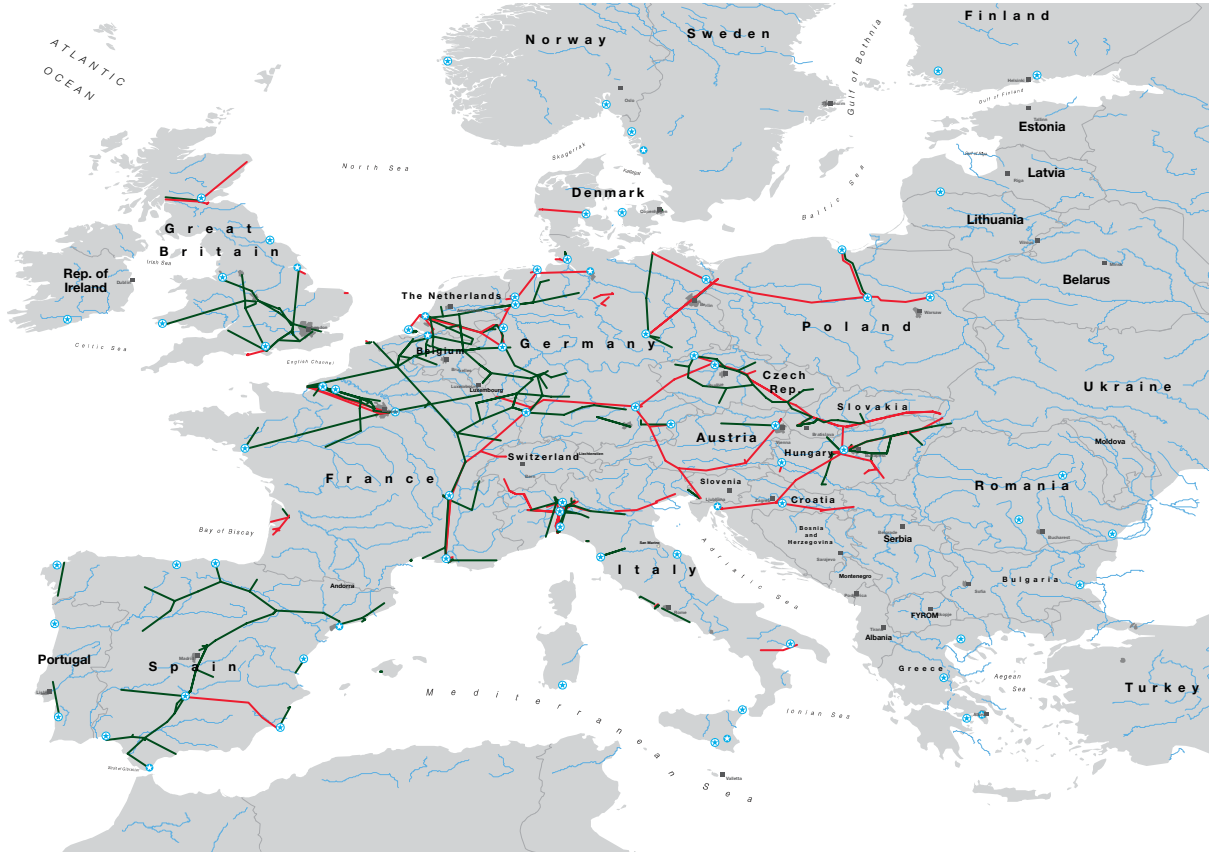


Threshold >50 kbbl/d or 2.5Mt/a

Since 2009, out of close to 100 refineries operating in Europe, 16 mainstream refineries were closed.

FIG.36 OIL PIPELINES - MAP OF EUROPE

Source: Concawe



REFINERY IN OPERATION

TWO OR MORE REFINERIES IN OPERATION

PIPELINES: IN OPERATION OR STAND BY

CRUDE OIL

OIL PRODUCTS

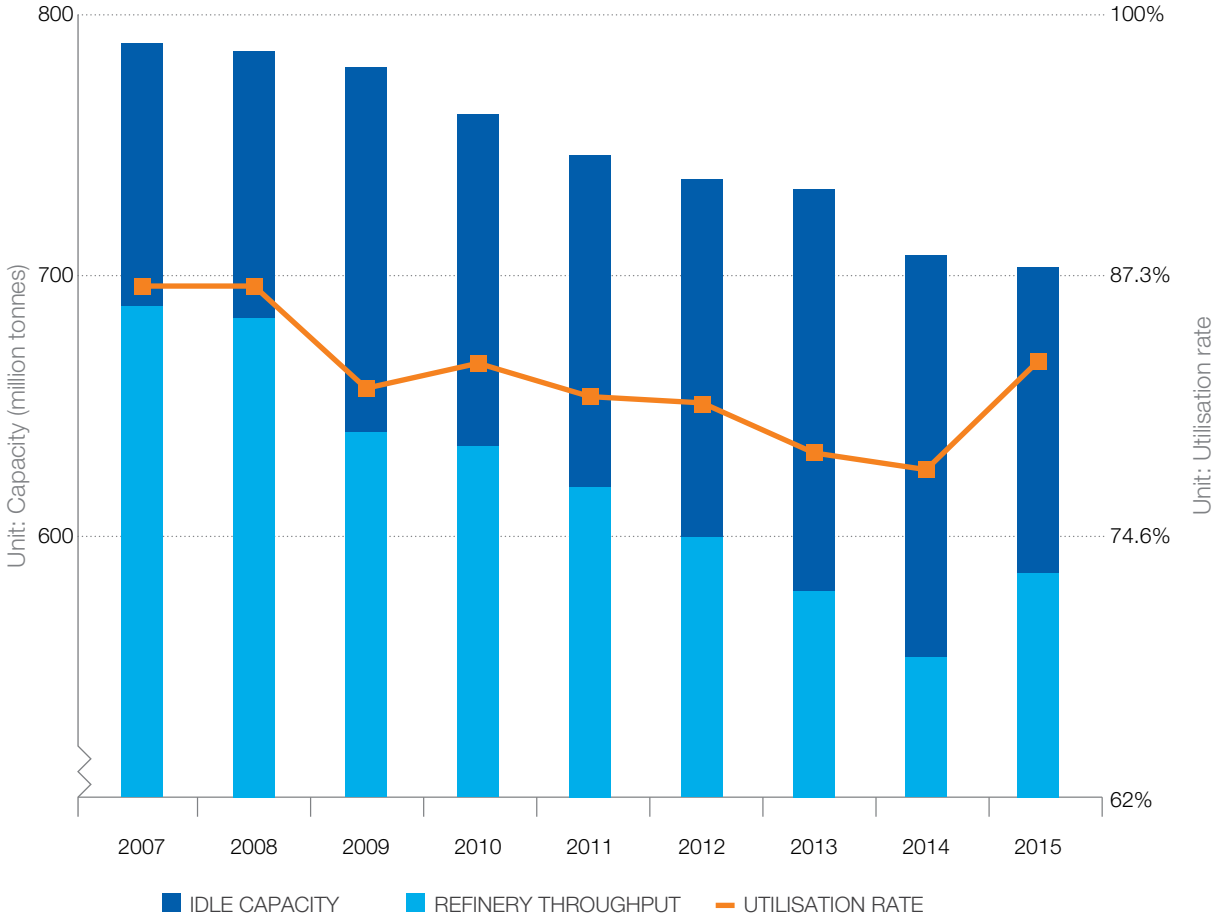
Note: The map is based on publicly available information as well as the information gathered by Concawe and as such should not be considered exhaustive.

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.

FIG.37 CAPACITY AND UTILISATION OF EUROPEAN REFINERIES

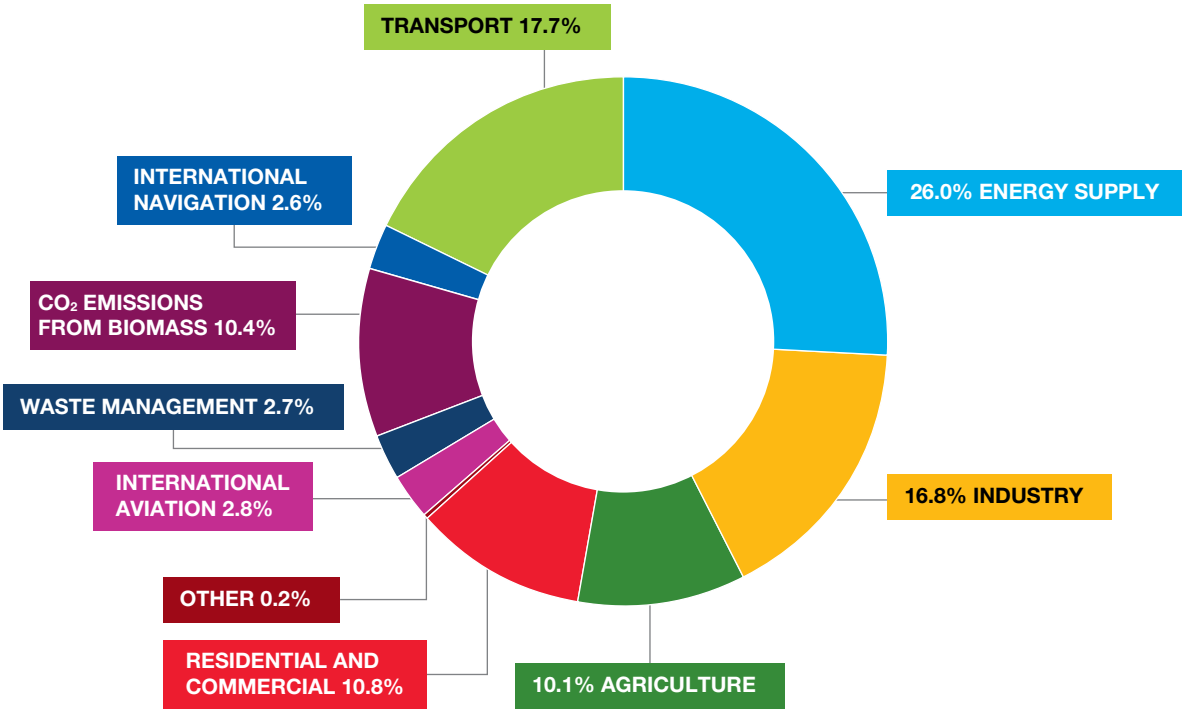
Source: BP Statistical Review of World Energy 2016



Since 2007, the utlisation rate of EU refineries has continuously dropped from 87% to a lowest of 78% in 2014. In 2015, a reverse of the trend has been observed with the utilisation of European refineries oscillating around 85%. This rate is commonly accepted as a requirement for efficient economic operations of a refinery.

FIG.38 GHG EMISSIONS BY SECTOR IN THE EU IN 2015

Source: European Environmental Agency

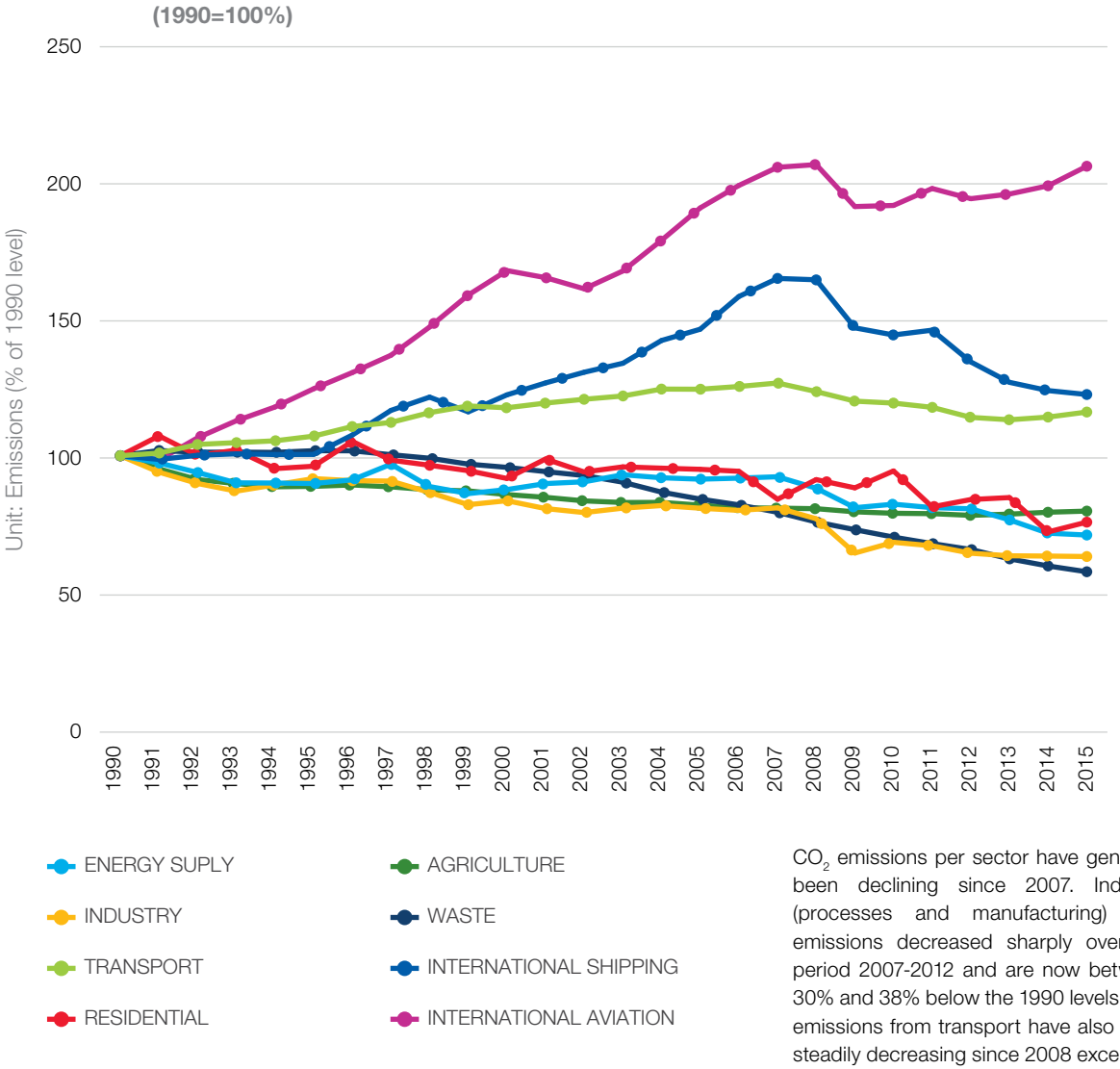


Energy supply and industry accounted for almost 43% of GHG emissions in the EU in 2015. Transport, including international shipping and aviation, is supplied at 94% by oil refined products, and generates just under 23% of EU GHG emissions.

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

FIG.39 CO_2 EMISSIONS TREND BY SECTOR - EU28

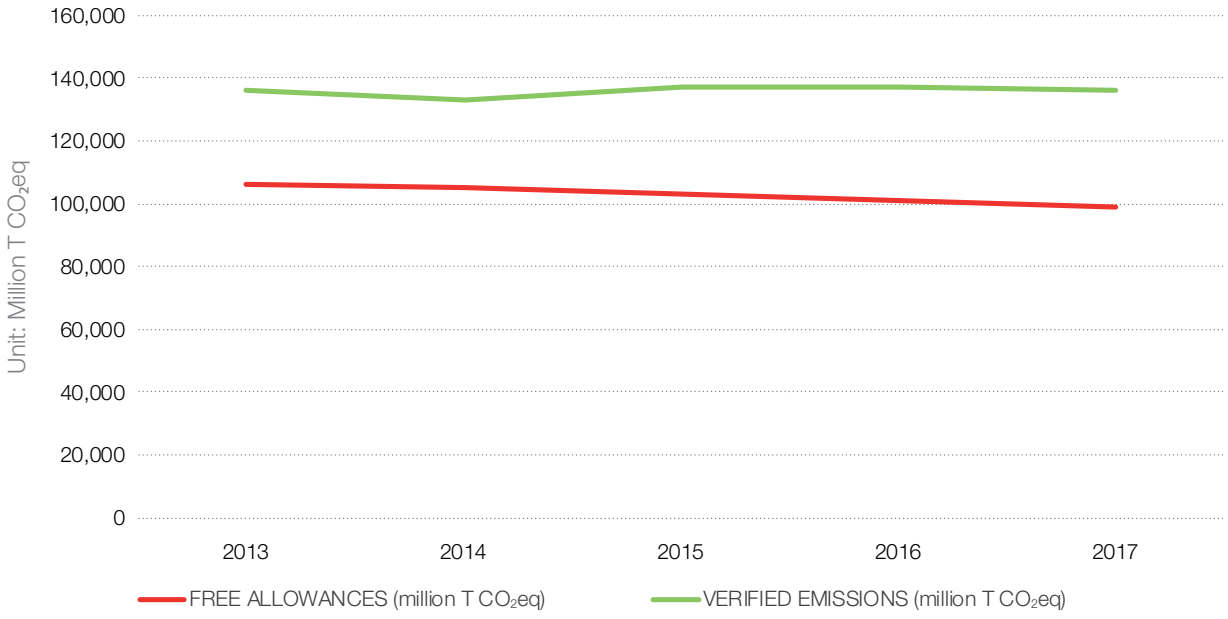
Source: European Environment Agency



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 have also been steadily decreasing since 2008 except for the ones from international aviation that are slightly increasing since 2011.

FIG.40 EU REFINING SECTOR
CO_2 EMISSIONS AND ALLOWANCES

Source: Concawe and TOTAL

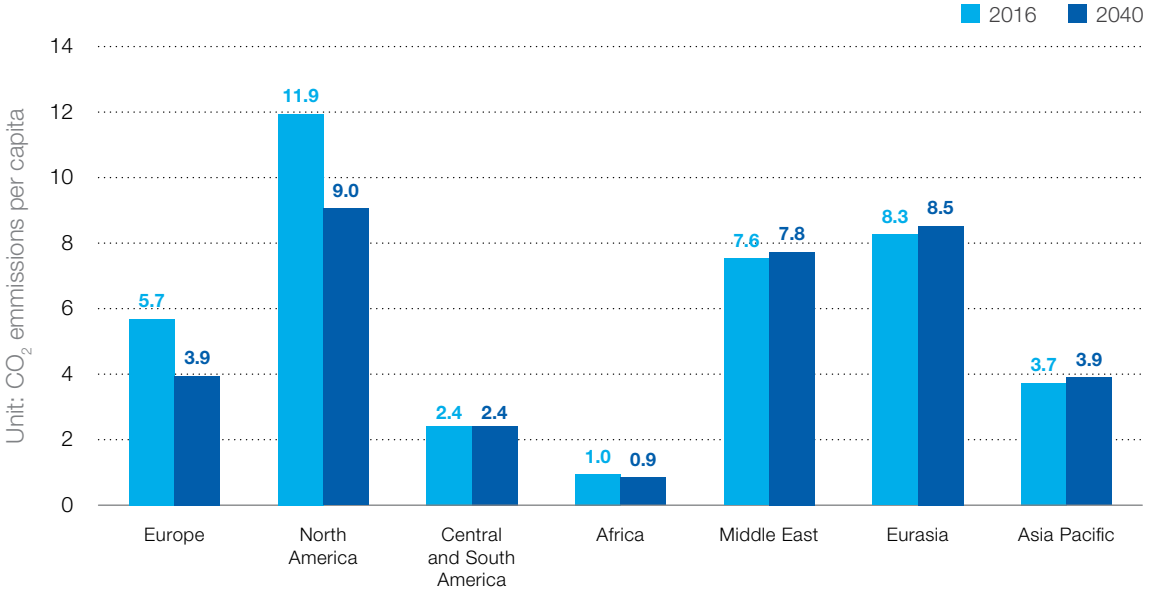


The chart shows that the EU refining sector is facing a full systematic shortage across the first 4 years of the EU ETS phase 3 (2013-2020). This shortage can be estimated at about 27% (free allowances divided by the verified emissions).

Where emissions related to electricity production are excluded, the shortage remains in the order of 15 to 20%.

FIG.41 CO_2 EMISSIONS PER CAPITA/REGIONS

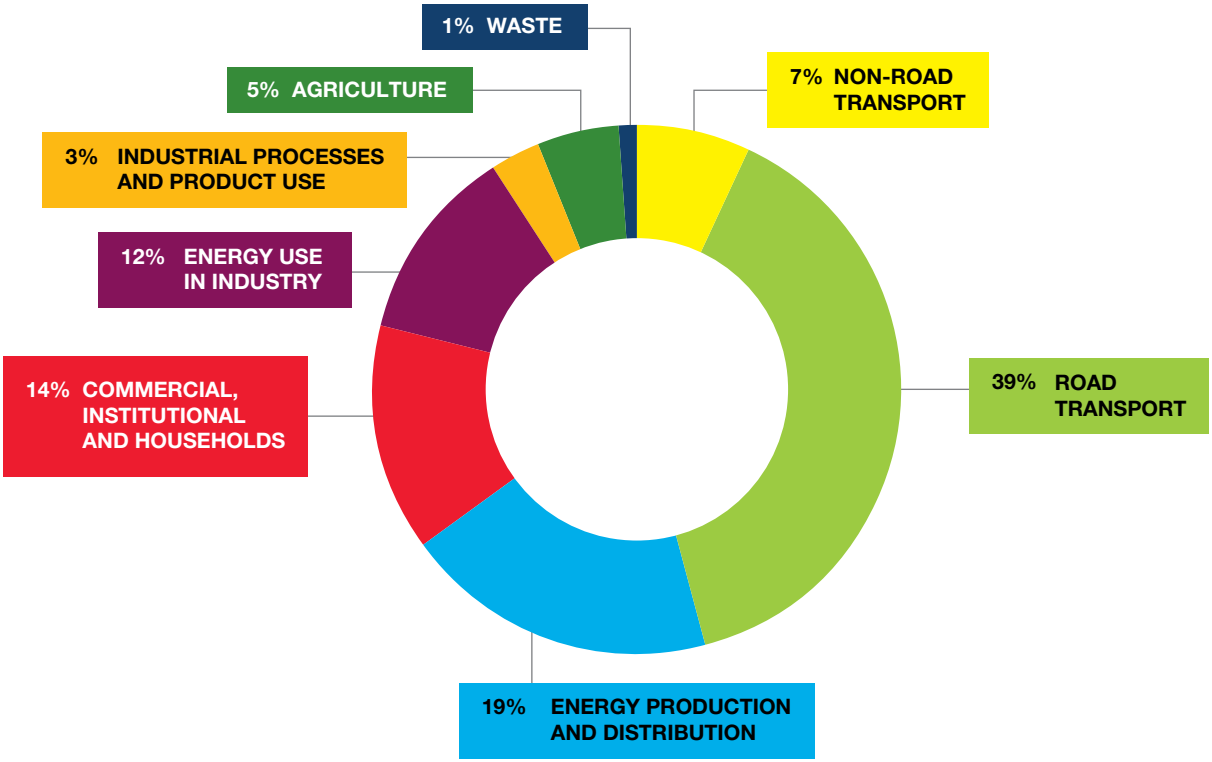
Source: International Energy Agency, WEO 2017



CO_2 emissions vary significantly between regions falling in Europe and North America and increasing in Middle East, Eurasia and Asia Pacific.

FIG.42 MAIN SOURCE SECTORS IN 2015 OF NO_x

Source: European Environmental Agency

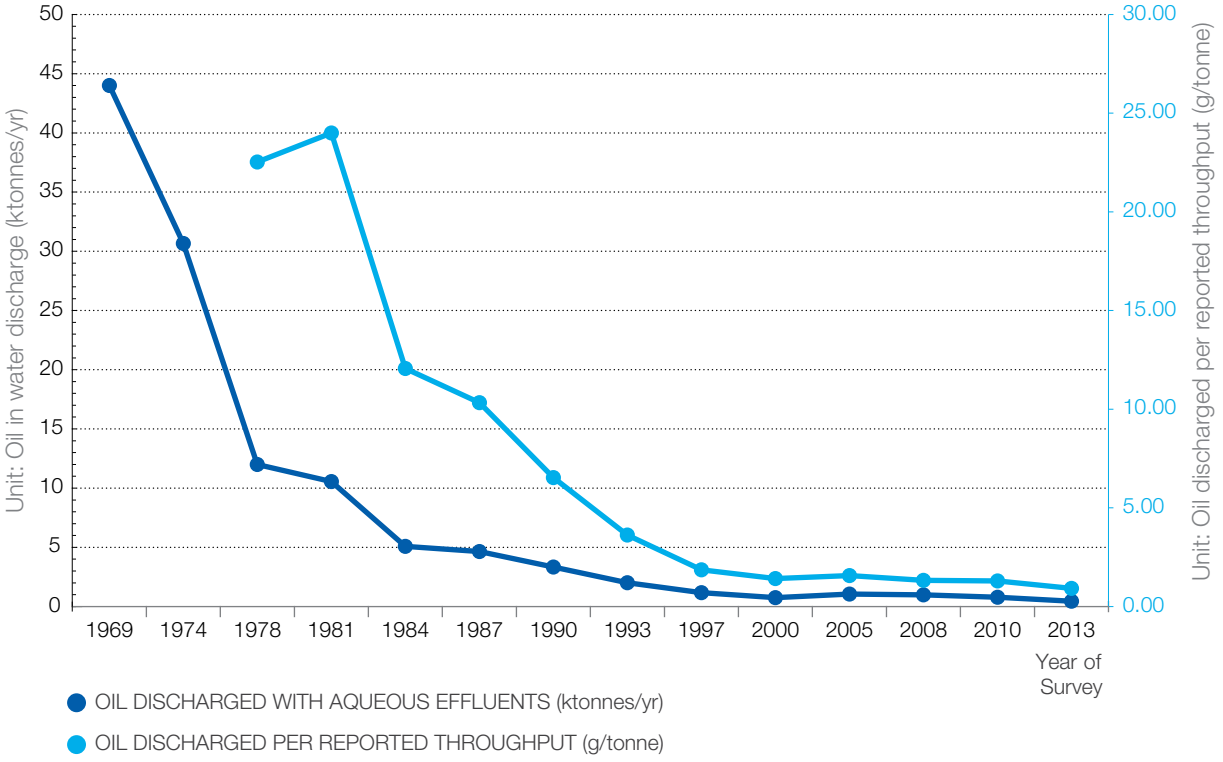


NO_x is main contributor to the air quality problems found in a number of urban areas in the EU. Whilst the road transport sector is the largest contributor with 39% of NO_x emissions in 2015, some other sectors such as energy production and distribution also contribute to the air quality challenge.

FIG.43 QUALITY OF REFINERY WATER EFFLUENT

OIL DISCHARGED IN WATER

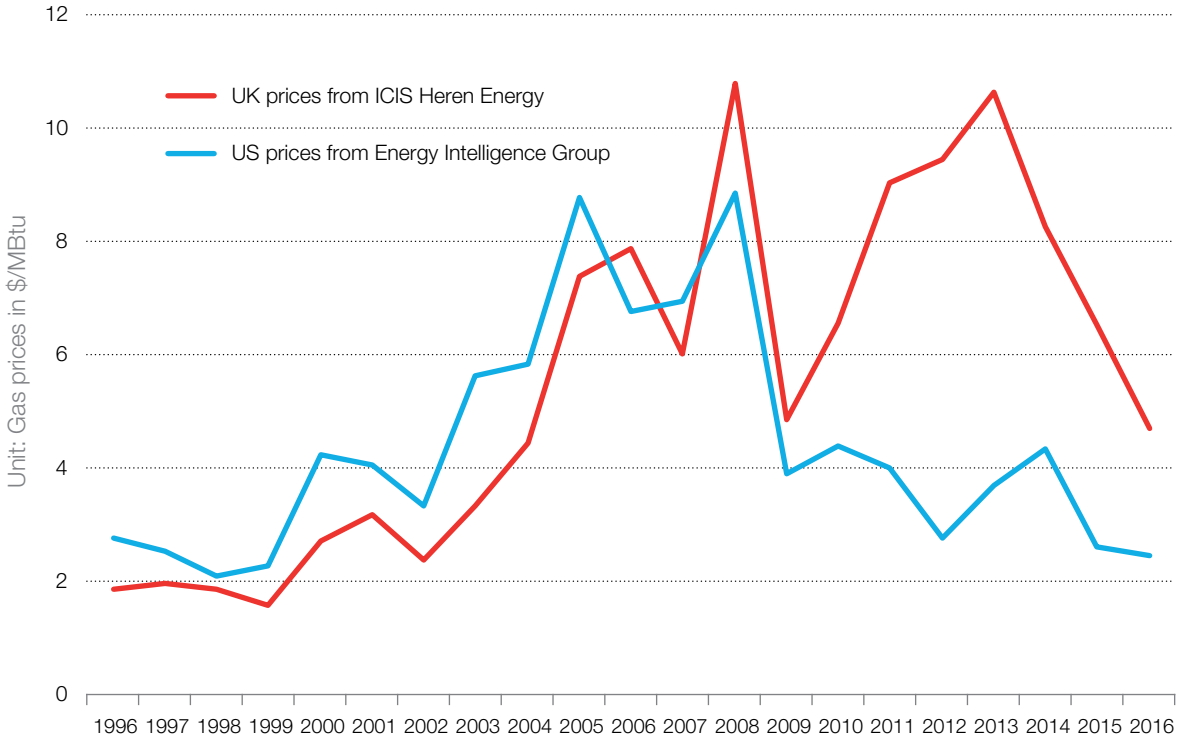
Source: Concawe



Over the years, the EU Refineries have significantly improved the quality of refinery water effluent. The amount of oil discharged in effluents from reporting installations continued to decrease to extremely low levels – both in terms of the absolute amount discharged and the amount expressed relative to the volume of feedstock processed (throughput) and the refining capacity of the installations.

FIG.44 EVOLUTION OF GAS PRICES

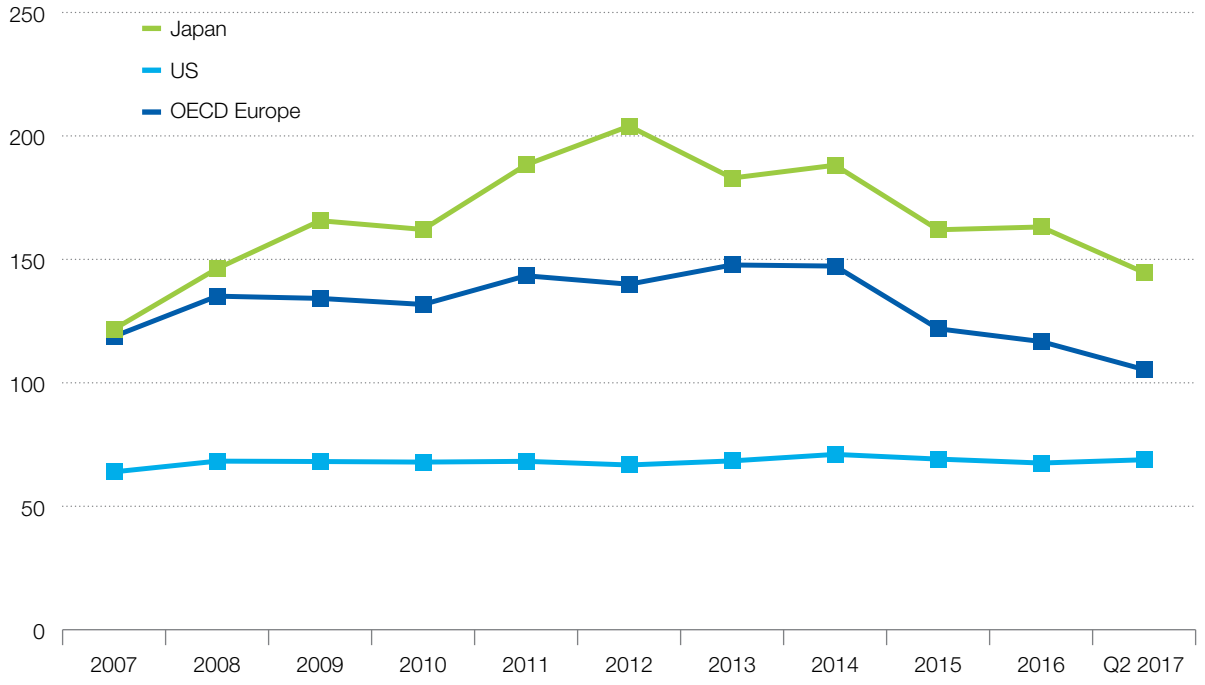
Source: BP Statistical Review of World Energy 2017



Since 2009, the US industry gained a significant competitive advantage over the EU industry as a result of the shale oil revolution. The 2016 prices in the UK were double the average of US gas prices.

FIG.45 EVOLUTION OF END-USER ELECTRICITY PRICES FOR INDUSTRY

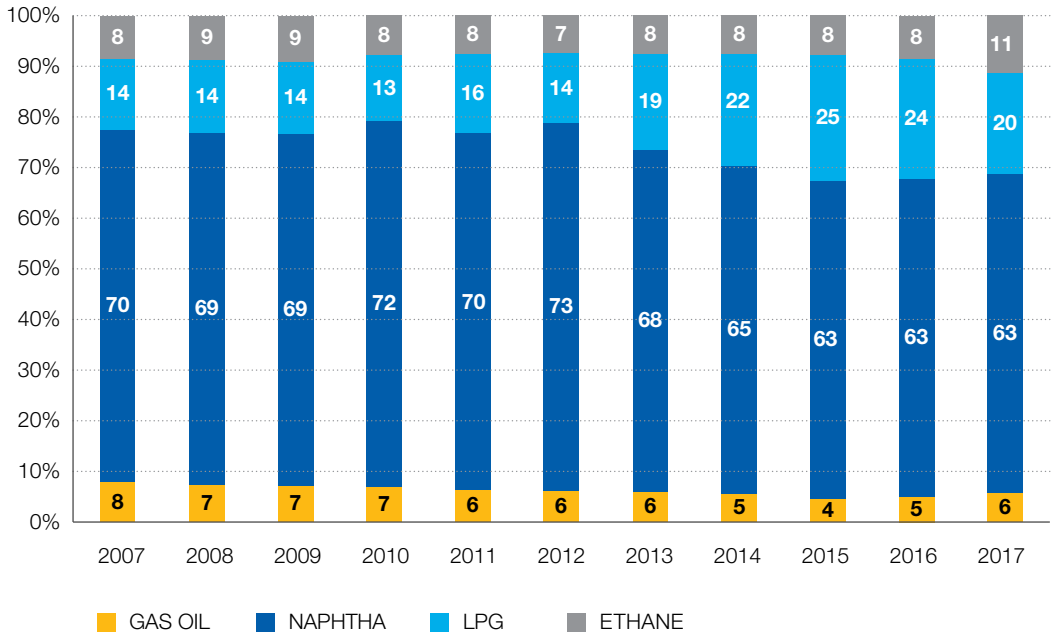
Source: International Energy Agency



Over the past few years the US industry gained a significant competitive advantage as a result of low electricity prices. While European industry faced an 80% energy price increase between 2005 and 2014, the price of electricity for the US industry only increased by 20% over the same period. Nevertheless, since mid-2014, EU electricity prices dropped as a result of lower crude and gas prices and the gap with US refiners has been significantly reduced. This situation is however, according to experts, due to remain overtime and the EU should face again higher electricity prices.

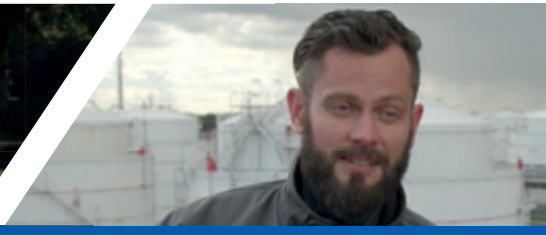
FIG.46 CHEMICAL INDUSTRY RAW MATERIAL USE

Source: ICIS/CEFIC



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

Meet the young refiners



#YoungRefiners

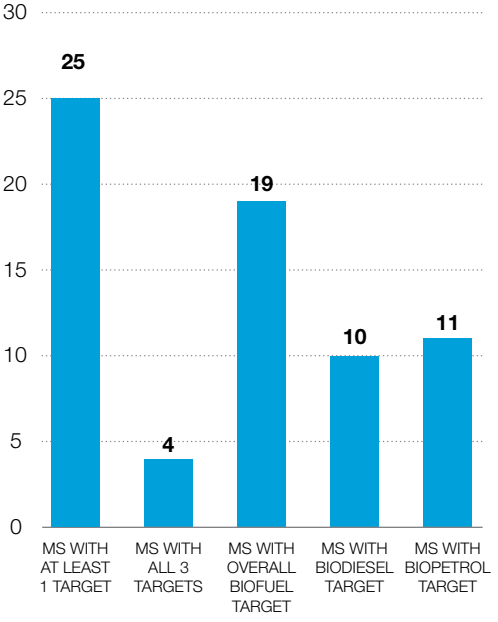
www.youtube.com/**fuelseurope**

FuelsEurope

REFINING PRODUCTS FOR OUR EVERYDAY LIFE

FIG.47 BIOFUELS BLENDING TARGETS BY COUNTRY

Source: National Legislation (NREAP), EEA, ePure, FuelsEurope



A compromise agreement on the RED II for the period 2021 to 2030 was reached between the Council and the European Parliament in June 2018. It will oblige fuel suppliers to blend in advanced biofuels and the use of other renewable energies to achieve the renewable energy use target in transport. The use of first generation biofuels has been capped, while the high risk indirect land change first generation biofuels will progressively be phased out.

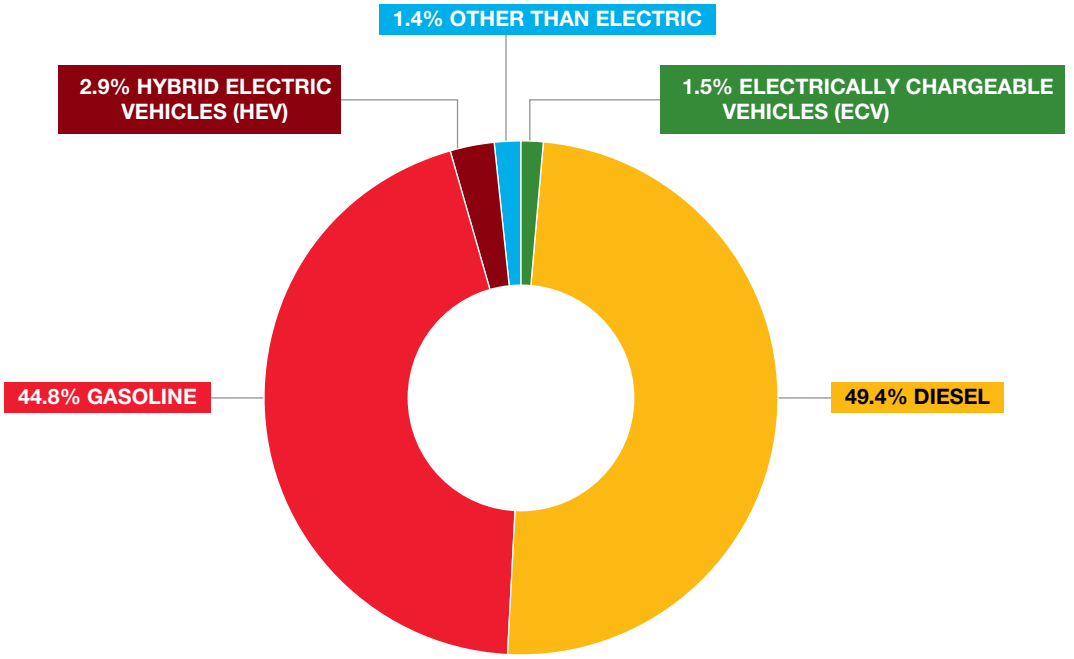
Note: E = Energy
V = Volume
MS = Member State

Unit: Percentage

	Ethanol		Biodiesel		Overall	
	Mandate	E/V	Mandate	E/V	Mandate	E/V
Austria	3.4	E	6.3	E	5.8	E
Belgium	8.5	V	6.0	V	-	-
Bulgaria	8.0	V	6.0	V	-	-
Croatia	6.9	E	3.9	E	5.9	E
Cyprus	-	-	-	-	2.4	E
Czech Republic	4.1	V	6.0	V	10.0	E
Denmark	-	-	-	-	5.8	E
Estonia	-	-	-	-	-	-
Finland	-	-	-	-	15.0	E
France	7.5	E	7.7	E	-	-
Germany	-	-	-	-	-	-
Greece	-	-	-	-	5.8	E
Hungary	4.9	E	4.9	E	-	-
Ireland	-	-	-	-	8.7	E
Italy	-	-	-	-	7.5	E
Latvia	-	-	-	-	5.0	E
Lithuania	5.0	V	7.0	V	-	-
Luxembourg	-	-	-	-	5.2	E
Malta	-	-	-	-	8.5	E
Netherlands	-	-	-	-	8.5	E
Poland	-	-	-	-	7.5	E
Portugal	2.5	E	-	-	9.0	E
Romania	8.0	E	6.5	E	-	-
Slovakia	5.9	E	9.7	E	7.2	V
Slovenia	-	-	-	-	7.5	E
Spain	-	-	-	-	6.0	E
Sweden	-	-	-	-	-	-
United Kingdom	-	-	-	-	7.3	E

FIG.48 VEHICLE MARKET PENETRATION IN EU-15*

Source: Emisia/ACEA

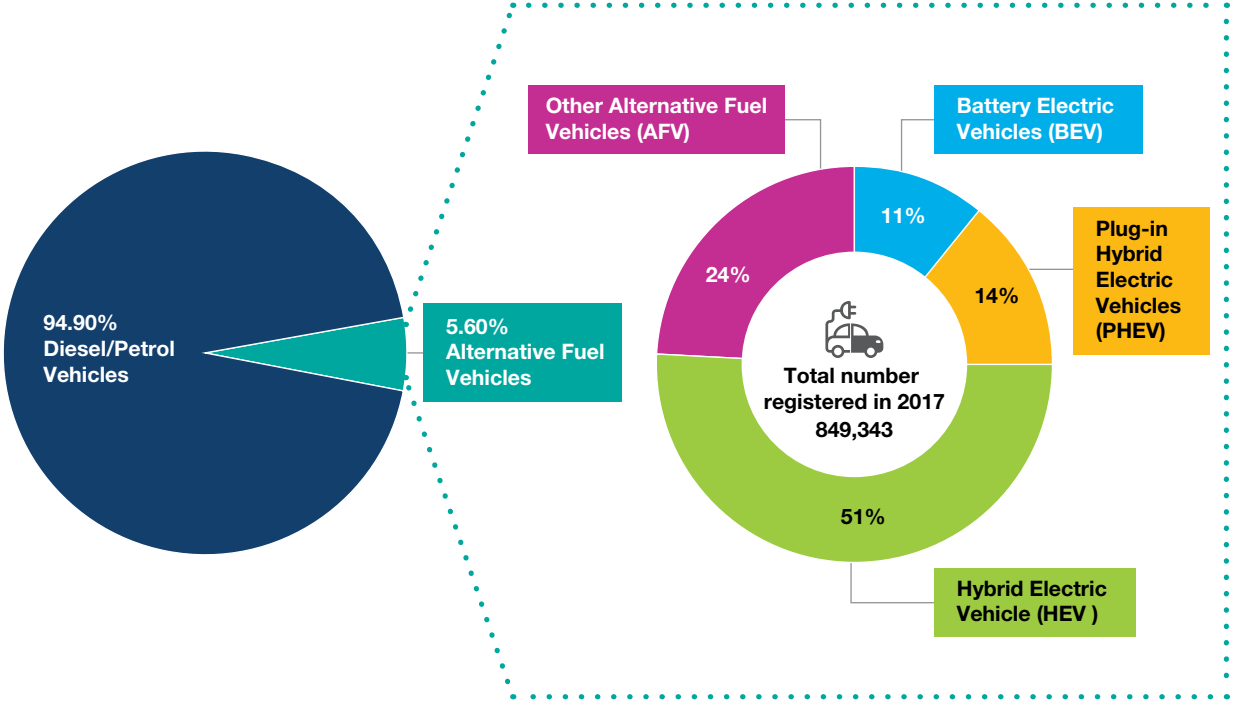


Overall in 2017, 49.4% of all new passenger cars registered in EU-15 ran on diesel and 44.8% on gasoline, while hybrid electric vehicles (HEV) accounted for 2.9% of new cars, electrically chargeable vehicles (ECV) for 1.5% and other alternative fuels (such as LPG, natural gas and E85) for 1.4%. Despite tax incentives introduced by some EU Member States, the uptake of alternative vehicle technologies remains still limited.

*EU-15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom

FIG.49 ALTERNATIVE FUEL VEHICLES ACCOUNTED FOR 5.6% OF TOTAL PASSENGER CAR REGISTRATIONS IN THE EU IN 2017

Source: ACEA

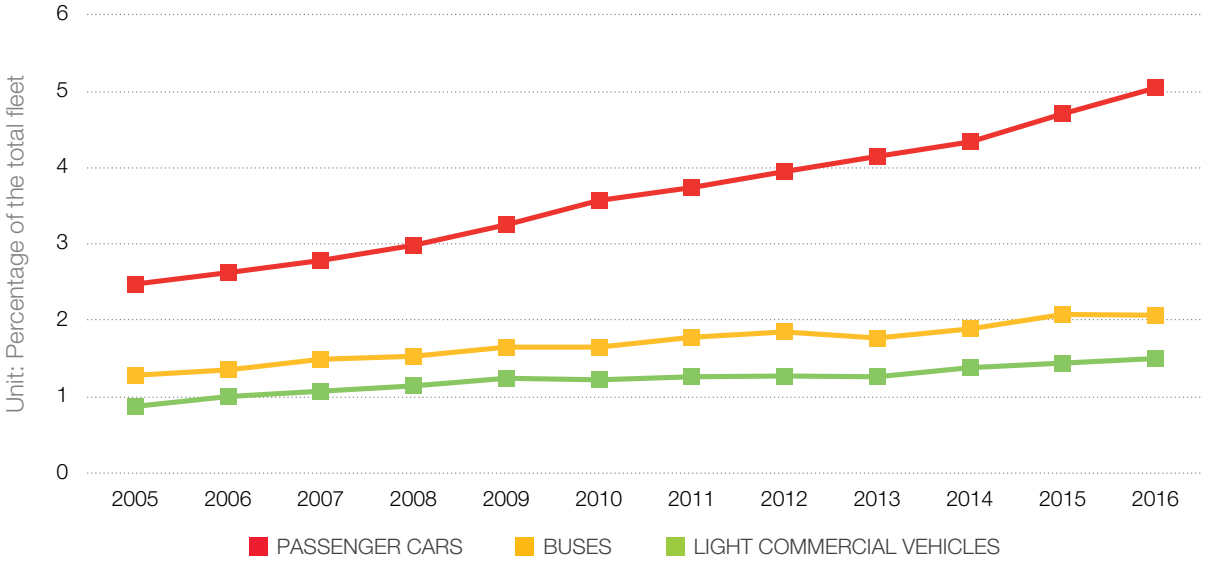


Electric cars are slowly penetrating the EU market. These include battery electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV) and electric vehicles with a range extender (REEV).

From the total of new alternative fuel vehicles registration, 11% are Battery Electric Vehicles. This represents only 0,6% of the new vehicles registrations.

FIG.50 ALTERNATIVE-FUEL VEHICLES AS A PROPORTION OF THE TOTAL FLEET IN THE EEA-33
IN THE PERIOD 2005-2016

Source: European Environment Agency



According to the most recent estimates, the number of alternative fuel passenger cars as a proportion of the total fleet has oscillated around 5% over the last five years, with liquefied petroleum gas (LPG) cars making up the largest proportion. The number of electric vehicles (EVs) has grown, although it represents a minor proportion (0.11%) of total passenger car fleet numbers.

*EEA-33 - EU 28 + Iceland, Liechtenstein, Norway, Switzerland & Turkey

FIG.51 NUMBER OF PETROL STATIONS IN EUROPE END OF 2017

Source: National Oil Industry Associations, FPS Economy, DG Energy

Unit: Number of petrol stations

COUNTRY	Number of petrol stations	COUNTRY	Number of petrol stations
Austria	2 685	Italy	20 500
Belgium	3 109	Latvia	610
Bulgaria	3 000	Lithuania	822*
Croatia	N/A	Luxembourg	236**
Cyprus	310	Malta	75
Czech Republic	3 940	Netherlands	4 164
Denmark	2 013	Poland	6 640
Estonia	510*	Portugal	3 113
Finland	1 848	Romania	2 100*
France	11 147	Slovakia	921
Germany	14 478	Slovenia	553*
Greece	6 140	Spain	11 495
Hungary	1 980	Sweden	2 970 ***
Ireland	1 789	United Kingdom	8 422
EU TOTAL	**115 570**		
Norway	1 817		
Switzerland	3 382		
Turkey	12 653		
TOTAL NO + CH + TR	**17 852**		
TOTAL	**133 422**		

EU

NON EU

* Numbers for 2016

** Numbers for 2015

*** Estimate

There were over 133 000 petrol stations in the EU, Norway, Switzerland and Turkey operating in 2017, fuelling some 250 million cars and over 34 million trucks.

About FuelsEurope

FuelsEurope is a division of the European Petroleum Refiners Association, an AISBL operating in Belgium. This Association, whose members are all 41 companies that operate petroleum refineries in the European Economic Area in 2017, 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 100% 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 European Petroleum Refining 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 European Petroleum Refining and Distribution and its value chain to European economic, technological and social progress.

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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.

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