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Via email: Roadfuels@cma.gov.uk

UKPIA Response to CMA Road fuel market study – Invitation to Comment

Dear Sirs,

UKPIA represents the eight main oil refining and marketing companies operating in the UK. The UKPIA member companies – bp, Essar, Esso, Petrolneos, Phillips 66, Prax, Shell and Valero – are together responsible for the sourcing and supply of product meeting over 85% of UK inland demand, accounting for a third of total primary UK energy[1].

UKPIA welcomes the opportunity to respond to the "Road fuel market study – Invitation to Comment" and the accompanying Market Study Notice published on 8th July 2022. As noted in our response to the CMA Review of the Road Fuels Retail Market on 20th June 2022, UKPIA has a policy to not hold or obtain individual company member pricing data or other commercially sensitive data. Our response therefore makes use of information that is in the public domain.

In response to the questions posed in the Invitation to Comment, we offer the following comments.

Overall Approach

The CMA approach to analysis of the road fuel supply chain presented in the CMA Road Fuel Review is somewhat simplistic and uses some industry terminology incorrectly. The petroleum products market has a complex structure, with many different factors influencing the final cost and pricing to end consumers. Essentially, there are three separate, but interconnected markets – the crude oil market, the traded refined product market, and the retail market, where products are sold to end consumers. The crude and refined product markets are both global in nature due to the fungibility of crude oil and refined products, with demand for refined products linked to national GDP. This leads to both markets being determined by the commodity markets, with refiners being price takers for their products.

The downstream supply chain also includes product import, storage, distribution, and transport elements, all of which involve additional costs and margins taken by companies involved in these activities.

(a) What elements of road fuel refining should we focus on and why?

The CMA objective to understand the drivers leading to the rise in refining spreads will require development of a more detailed understanding of refinery profitability. Refining or

[1] BEIS Digest of UK Energy Statistics (DUKES) 2021 Tables 3.2-3.4.

Company number: 01404376 – a company limited by guarantee

"crack" spreads are not an appropriate measure of refinery profitability in the context of the study, and they have been used incorrectly in the CMA Review of the Road Fuels Retail Market.

Crude oil purchase and the sale of refined petroleum products typically involves prices set within the commodity markets by external benchmarking companies. The benchmark prices are subject to sudden changes caused by geopolitical events (e.g. the conflict in Ukraine), seasonal variation depending on demand (e.g. the summer driving season in the USA, aviation demand in holiday periods, heating fuel and LPG demand in the winter months), structural changes (e.g. the development of fracking) and other factors (most recently, a collapse in demand during the COVID pandemic). As a consequence, refining margins tend to be cyclical, with margins for North West European refineries often tighter than those elsewhere, due to historical overcapacity, refinery configuration (excess petrol and a shortage of diesel refining capacity) and high levels of trading activity[2].

Voluntary restrictions on sourcing Russian crude oil and refined products have been implemented by major oil companies and traders in advance of planned Government sanctions imposed in response to the conflict in Ukraine[3]. These have disrupted trade flows and led to considerable price uncertainty[4], prompting changes in price benchmarking methodology to exclude heavily discounted Russian material, effectively leading to a premium for non-Russian sources[5].

The CMA Road Fuel Market Study should therefore consider other measures of refinery profitability and costs over a longer time period than the last 12 months that appears to have been considered in the Review – a period of five to ten years is suggested.

(b) What elements of road fuel wholesaling should we focus on and why?

As noted earlier, the CMA analysis of the road fuel supply chain presented in the Road Fuel Review (Figure 2) is too simplistic, as it overlooks the supply and logistics activities involved in product distribution from the refineries or import points to filling stations. These activities introduce significant costs which have also risen over recent years (including, but not limited to driver costs, which were highlighted in the driver shortage experienced in Autumn 2021). UKPIA believe the assessment of wholesaling should also take into account supply and logistics activities and recent structural changes in the market structure (for example, outsourcing of logistics and haulage), which UKPIA has understood to have been implemented to reduce costs and improve competitiveness.

(c) Do you agree with the three areas we have identified as our focus in road fuel retailing?

In the context of the findings of the Road Fuel Review, UKPIA does not take any exception to the three areas identified as the focus of the Road Fuel Market Study, specifically:

i. Local and regional variations in price
ii. How retailers determine the prices they set at the pump
iii. The role played by major supermarkets in road fuel retail markets and potential for further benefits

However, to understand what lies behind local and regional variations in price, it will also be necessary to understand the broader arrangements for supply and logistics activities involved in product distribution from the refineries or import points to filling stations and the

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2 See Figure 2 in Annex A)
3 Shell press release, "Shell announces intent to withdraw from Russian oil and gas", March 2022.
4 Argus Media, "European product markets rattled by price uncertainty", T. Warner, March 2022.
5 S&P Global Insights Methodology Subscriber Notes, August 2022.

different business models and economics for different types of fuel outlets. Broadly these can be categorised as:

- Oil company owned and operated sites;
- Oil company owned/dealer operated sites;
- Dealer owned and operated sites;
- Motorway service areas
- Supermarkets and hypermarkets

As part of this assessment it will also be necessary to consider the contractual arrangements between suppliers and retailers, which UKPIA understand use many different variations based on benchmark prices published by companies such as S&P Global Commodity Insights[6], Argus Media Group and ICIS.

(d) What potential future developments should we be aware of that may affect the demand for, or supply of, road fuel, for example the development of alternative sources of road fuel, and how, if at all, we should take these into account in our assessment?

Demand for road transport fuels has declined over recent years[1] due to improvements in vehicle efficiency and the increasing use of hybrid and electric vehicles. Over the same period, the biofuel content of petrol and diesel has also increased[7], leading to a further decline in demand for crude oil derived petrol and diesel blending components. These trends will continue and accelerate under Government transport decarbonisation policies[8], prompting changes also in the supply infrastructure required to service reduced demand for conventional road fuels and growing demand for alternative fuels[9].

UKPIA does not make forecasts on future demand or changes in infrastructure, but the CMA may wish to consider as part of the Road Fuel Market Study, the downsizing of current supply and distribution infrastructure, the need for vehicle recharging points at some types of fuel outlets (e.g. major route sites, motorway service areas and supermarkets), ongoing closures of filling stations, along with the challenges posed by the need for new renewable fuel production sites (including hydrogen), additional renewable electricity generation and the infrastructure required to supply and distribute these.

To support the comments made above, we attach additional information in Annex A.

UKPIA and our members remain willing to engage with the market study and trust that the supporting information provided is clear and of use. If we can be of further assistance, or if you would like to discuss the information attached then please do get in touch.

Yours faithfully,

Dr Andrew Roberts
Director – Downstream Policy

[6] Previously S&P Global Platts and IHS Markit.
[7] DfT Renewable fuel statistics.
[8] These are identified in the DfT "Transport Decarbonisation Plan", July 2021.
[9] See also UKPIA report "The Future of Mobility in the UK", March 2021.

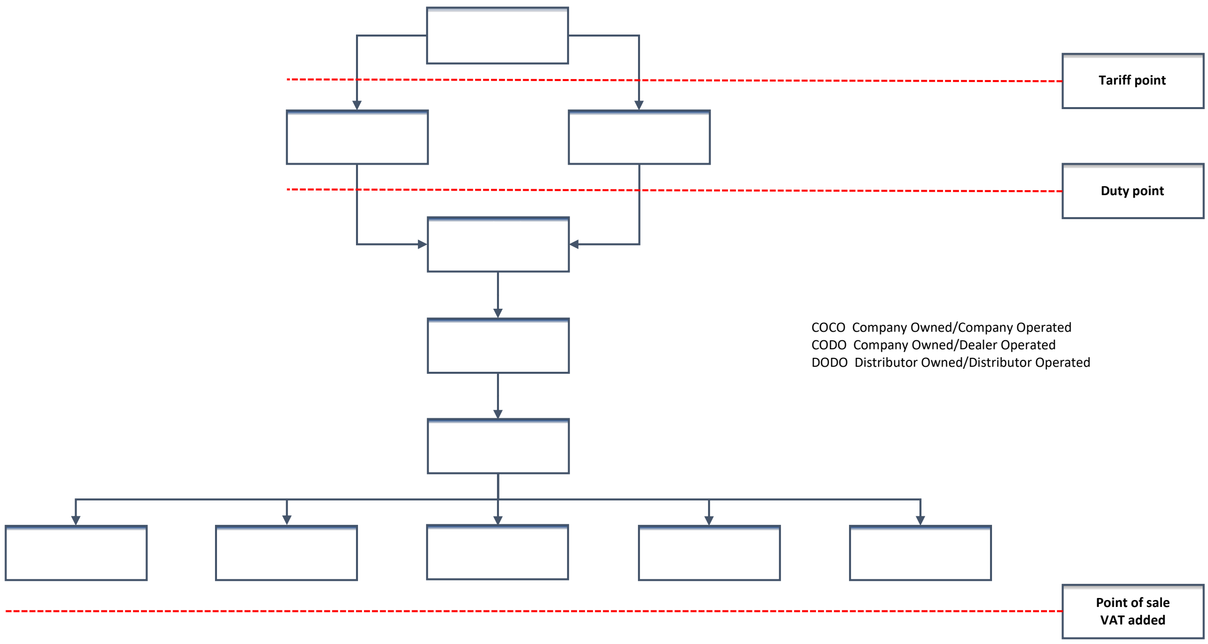
Annex A

UKIA Response to CMA Road Fuel Market Study Invitation to Comment – additional information

1. Overall approach – market structure

The CMA approach to analysis of the road fuel supply chain presented in the Road Fuel Review is too simplistic and uses some industry terminology incorrectly. The petroleum products market has a complex structure, with many different factors influencing the final cost and pricing to end consumers. Essentially, there are three separate, but interconnected markets – the crude oil market, the traded finished product market, and the retail and commercial markets, where products are sold to end consumers. However, the supply chain also includes product storage, distribution, and transport elements, all of which involve additional costs and margins taken by companies involved in these activities (Figure 1).

Figure 1. Schematic diagram of the UK road fuel supply chain



Further complexity is introduced with transfer of product ownership taking place at a number of different points:

- The loading rack located at import or inland terminals.
- On sale to consumers at filling stations (largely for COCO sites).
- On delivery to filling stations (typically for motorway service areas and DODO sites).
- Crude inventories may also be owned by traders or investment banks, with ownership of finished product inventories also transferred to these entities before sale to distributors at the loading rack.
- Distributors are also active in the market where they purchase fuels from coastal and inland terminals for direct or indirect supply to customers. In this case they may buy on the spot market from different locations to secure the most competitive pricing.

The presentation of components of price given in Figures 2-5 of the Road Fuel Review are misleading, as refining spread is not part of the cost build up and many of the costs and other variables encountered in refining and distribution are not recognised.

2. Refinery profitability

Crude oil purchase and the sale of refined petroleum products typically involves prices set within the commodity markets by specialist benchmark agencies such as S&P Global Commodity Insights, Argus Media Group and ICIS. Prices are subject to sudden changes caused by geopolitical events (e.g. the conflict in Ukraine), seasonal variation depending on demand (e.g. the summer driving season in the USA, aviation demand in holiday periods, heating oil and LPG demand in the winter months), structural changes (e.g. the development of fracking) and other factors (most recently, a collapse in demand during the COVID pandemic), including exchange rate fluctuations.

This exposes refinery operators to significant risks, as the markets are not directly linked, each being subject to different drivers. Crude oil represents the largest component of refinery direct (variable) costs, with refined product prices the main source of revenue. Day-to-day profitability can therefore be linked to the difference between the crude price and prices of refined products quoted in the commodity markets[10]. Commonly used definitions for measures of refinery profitability are as follows:

Refining or "crack" spread

In its simplest form, refining or "crack"[11] spread is defined as the difference between a specific crude and a single refined product, for example, petrol or diesel. In North West Europe, Brent Blend is often used as the reference, despite production levels having fallen significantly since the 1980s. In the USA, West Texas Intermediate (WTI) is widely used; due to its availability, WTI prices are generally lower than those for Brent Blend, with WTI crack spreads higher as a consequence.

Refineries co-produce a range of products, with the mix varying according to the crude selection, refinery configuration and unit operating mode. Crack spreads for petrol and diesel are usually positive but can be negative for products such as fuel oil when the product price is lower than the feedstock value.

More complex crack spreads are also used to better represent refinery output, for example, a 3:2:1 crack spread denotes the price of three crude oil futures contracts compared to two petrol and one diesel futures contract.

Given the risk exposure for refiners to sudden changes in the crude and refined product markets, crack spread (usually complex crack spread) is often used in day-to-day optimisation of refinery operation, including crude selection and the desired product mix based on yields from specific crudes and crude mixtures, processing conditions and unit operating modes. This optimisation is performed using complex linear programming (LP) models specific to each refinery.

Crack spread is also used in hedging and futures trading in the commodity markets.[12]

Refining gross margin

Refining gross margin is the difference between total revenue from refined product sales and total costs for all crude oil and other refinery feedstocks. This requires detailed proprietary information on the refinery crude slate, production, and revenues. It is typically

[10] Stillwater Associates, Crack Spread: A "Quick-and-Dirty" Indicator of Refining Profitability, D. Hirshfeld, July 2015.
[11] The term "crack" refers to catalytic cracking, a key refinery process used in upgrading low value streams to higher value products such as petrol and diesel.
[12] CME Group, "Introduction to Crack Spreads", May 2017.

defined at refinery level, is specific to the refinery configuration (which varies from UK refinery to UK refinery) and so is generally not publicly available.

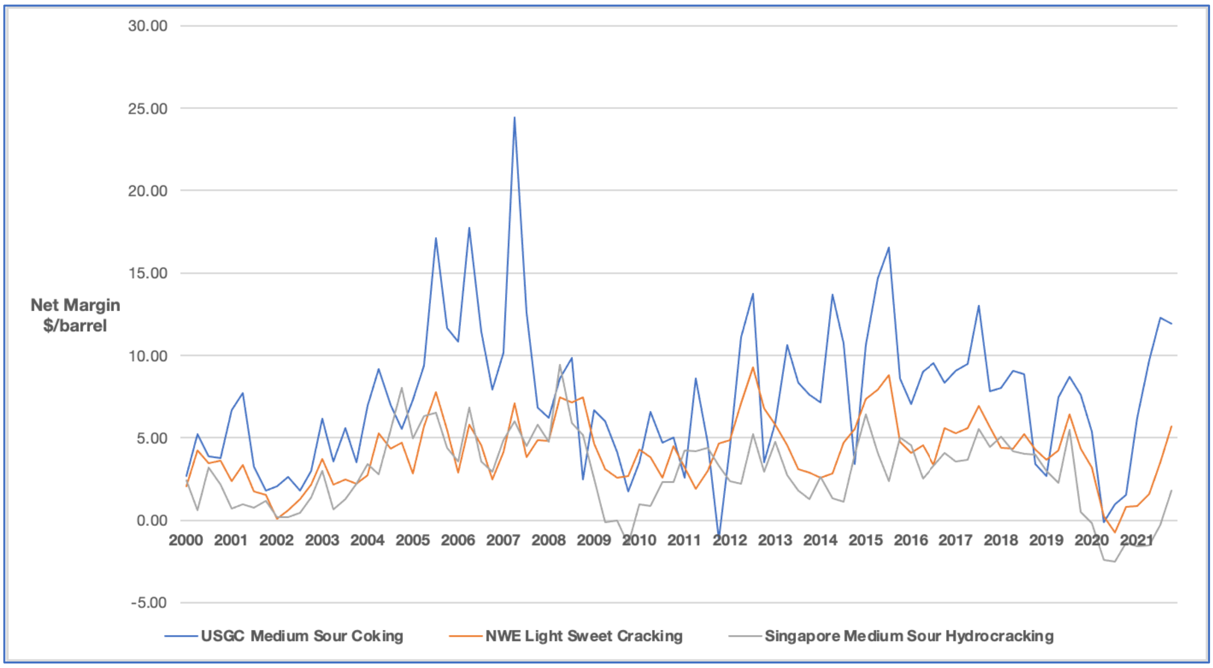
Refining net margin

Refining net margin is the difference in value between the products produced by a refinery and the CIF[13] value of the crude oil used to produce them, taking into account the marginal refinery operating costs (including operating expenditure, carbon, and compulsory stockholding obligation (CSO) costs). Refining net margins will thus vary from refinery to refinery and depend on the cost and characteristics of the crude used, its yield and the value of its products (and hence its location).[14] Refining net margin is often used in company investor reporting, where results aggregated across all of the company's refineries operated are reported.

Benchmark margins

To facilitate comparison of refining margins between different locations, bp has defined benchmark margins for three major global refining centres: US Gulf Coast (USGC), North West Europe (NWE – Rotterdam) and Singapore. In each case they are based on a single crude oil appropriate for that region and have optimised product yields based on a generic refinery configuration (cracking, hydrocracking, or coking), again appropriate for that region. The margins are on a semi-variable basis, i.e. the margin after all variable costs and fixed energy costs.[15]

Figure 2. bp Refining benchmark margins 2000-2021



Data source: bp Statistical Review 2022

Figure 2 clearly shows the cyclical nature of refinery margins and separate movements in the US Gulf Coast), North West Europe and Singapore markets. Over the last ten years, the benchmark margin shown for NWE Light Sweet Cracking refineries has been above $5/barrel for limited periods only and was negative from early 2020 to late 2021.

[13] Including carriage, insurance, and freight costs from the load port to discharge port or terminal.
[14] IEA Oil Market Report Glossary, April 2022.
[15] bp Statistical Review of World Energy 2022, June 2022.

Other measures

Other major oil companies and specialist consultancies also publish indicative net margin indicators, for example TotalEnergies and Wood Mackenzie. The TotalEnergies European Refining Margin Indicator (ERMI) is an indicator intended to represent the margin after variable costs for a hypothetical complex refinery located around Rotterdam in Northern Europe that processes a mix of crude oil and other inputs commonly supplied to this region to produce and market the main refined products at prevailing prices in this region[16].

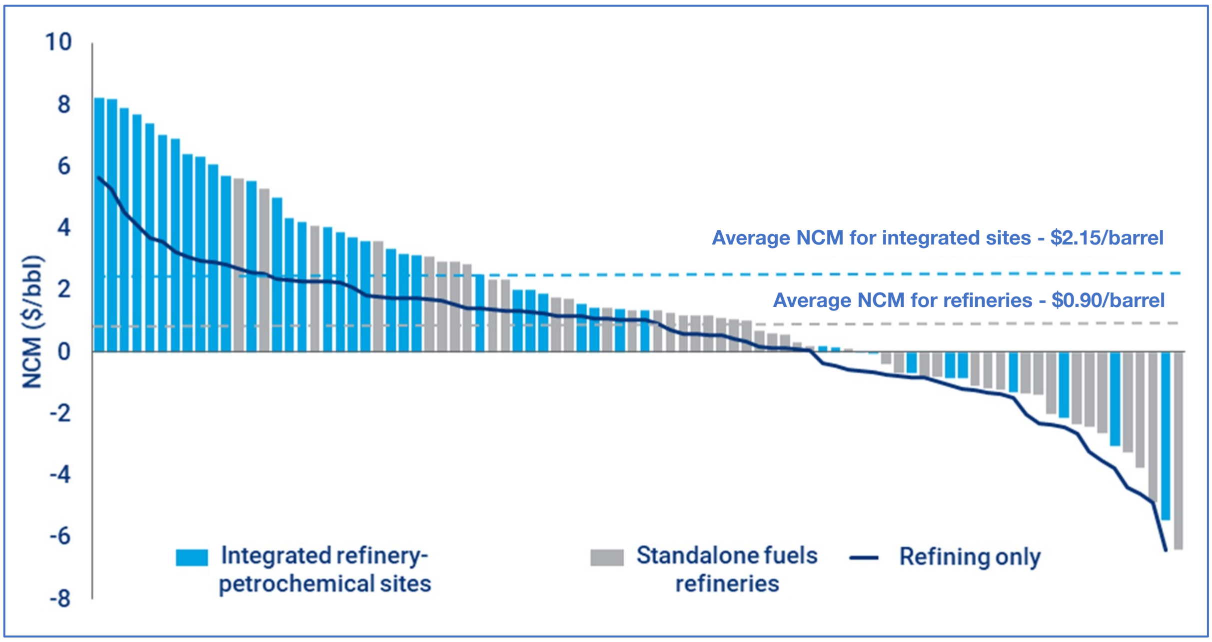
Over a number of years, Wood Mackenzie has developed a model which allows analysis of the competitiveness and profitability of individual refineries, both in Europe and elsewhere[17]. This uses a concept of Net Cash Margin which captures most of the critical elements of a refinery's performance that define its competitive position in the short/medium term. It is defined as:

Net Cash Margin = Gross Margin ($/barrel) - Cash Operating Expenses ($/barrel)

In financial terms, it is the equivalent of EBITDA (Earnings before Interest, Tax, Depreciation and Amortisation).

UKPIA understand that the configuration, product yields and crude slate for each individual refinery are modelled to benchmark the population of, for example, European refineries (Figure 3)[18].

Figure 3. European refining competitive profile - 2019



Source: Wood Mackenzie

Wood Mackenzie have previously opined that UK refineries are considered mid to low performers in terms of European competitiveness[19], with landlocked Eastern European refineries being amongst the more competitive due to their logistical advantages.

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[16] TotalEnergies European Refining Margin Indicator.
[17] See, for example the Wood Mackenzie Insight Report "European refining at the Rubicon again – which assets will make it over?", June 2020.
[18] Wood Mackenzie, "Survival of the fittest refineries: what are the metrics that matter?", A. Gelder, November 2021.
[19] Wood Mackenzie report commissioned by BECC, "UK Downstream Oil Infrastructure", June 2009.

3. Refinery costs

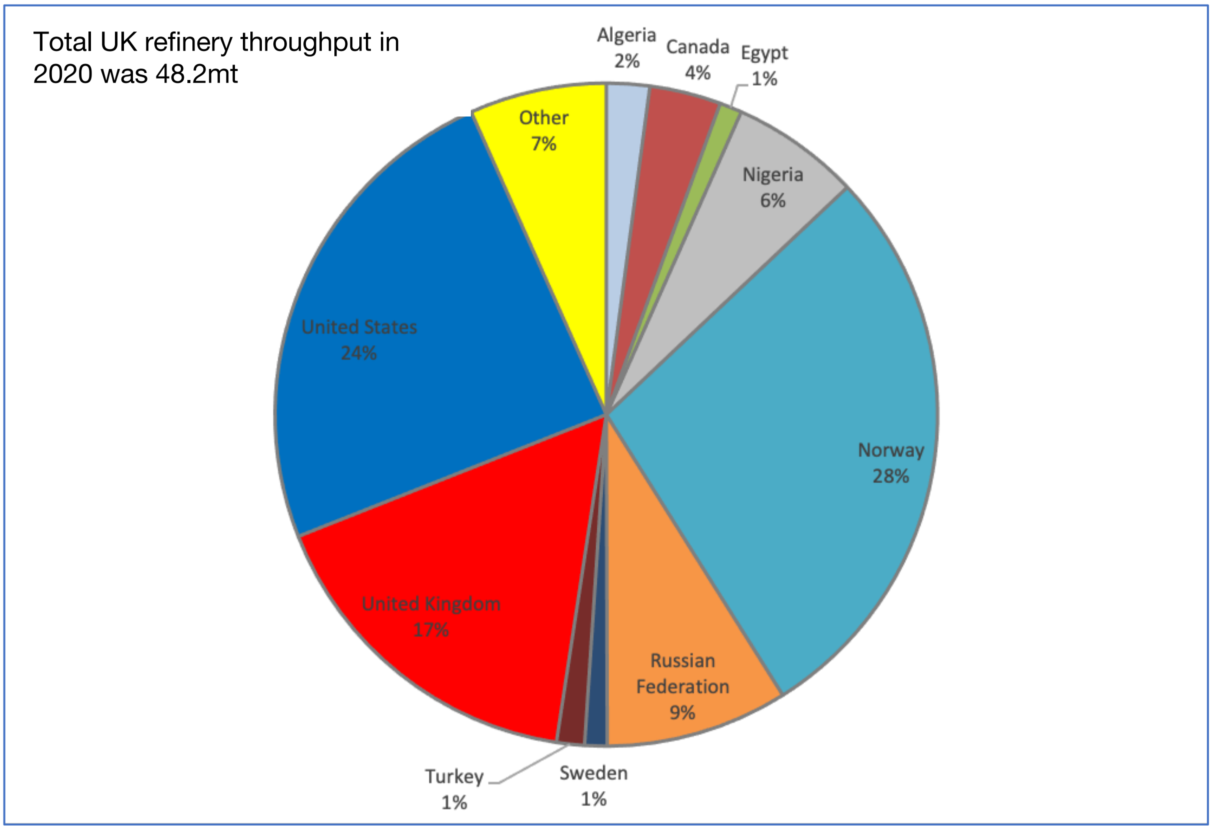
Crude oil and feedstock slate

The crude oil market is global in nature, with different types of crude oil traded on international markets and priced in US dollars. Prices for visible trades are reported by specialist price reporting agencies such as S&P Global Commodity Insights, Argus Media Group, and ICIS. Pricing varies between different crude types depending on availability and quality, with light, sweet crudes such as Ekofisk and Nigerian Forcados attracting a premium over heavier, higher sulphur crudes, such as Arab Heavy, and over acidic, high sulphur crudes that are difficult to process, such as Doba Blend from Chad in West Africa.

Exchange rates and crude price differentials, along with differences between the spot and forward markets, are significant in the determination of refinery input costs, which are also dependent on the crude slate (or intake) and shipping costs. The crude slate for each refinery varies constantly from day to day depending on crude availability, co-mingling of crudes in the refinery tankage, and pricing; this information is not publicly available. However, BEIS publish statistical information on imports of crude oil, natural gas liquids and feedstocks by country of origin, deliveries of UK domestic crude oil and natural gas liquids to UK refineries and UK refinery throughputs[20]. This information can be used to obtain a reasonably accurate assessment of the crude and feedstock slate for the UK refineries (Figure 4).

Analysis of the UK refinery crude and feedstock slate proves that use of the Brent Blend benchmark price as a measure of UK refinery crude costs is at best misleading; a significant proportion of the crudes processed by UK refineries originates outside the North Sea.

Figure 4. UK Refinery crude and feedstock slate by country of origin – 2020



Data source: BEIS DUKES

[20] BEIS Digest of UK Energy Statistics (DUKES) Tables 3.1.1, 3.9 and F.4.

Crude oil delivery costs

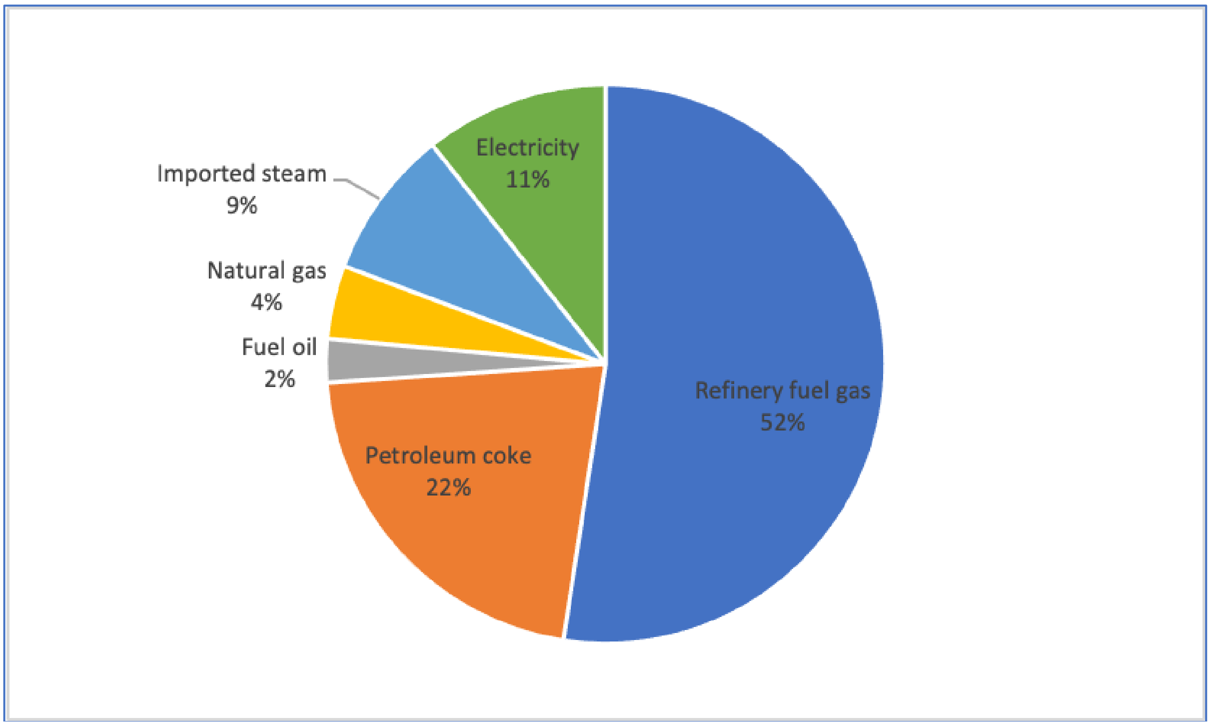
Refinery inputs costs are driven by the cost of crude delivered into the refinery storage tanks. Here it is important to differentiate between prices quoted by the price reporting agencies and the delivered cost, which will include shipping costs (carriage, insurance, and freight) and/or the costs of transfer via pipelines and intermediate storage depending on the supply route and associated trading and delivery costs.

Shipping costs are understood to have increased in recent years with insurance costs also raised due to increased risks from the conflict in Ukraine.

Energy costs

Refinery energy costs are significant and the second most important variable cost after crude oil, natural gas liquid and feedstock costs. Energy use in furnaces and boilers is dominated by refinery fuels derived from crude oil – largely refinery fuel gas and petroleum coke, with a small proportion of fuel oil and natural gas used as the balancing fuel. Electricity used in the refineries is largely produced from natural gas fired combined heat and power (CHP) plants with natural gas is also used in some of the refineries for hydrogen production using steam methane reforming. In three of the six major refineries steam is also imported from adjacent electricity generating plants. Total energy use in 2020 (which was reduced due to the COVID pandemic) including natural gas use for hydrogen production was over 1.2 x 10^8 GJ[21], more than 33 TWh (Figure 5).

Figure 5. UK Refinery energy and natural gas use – 2020

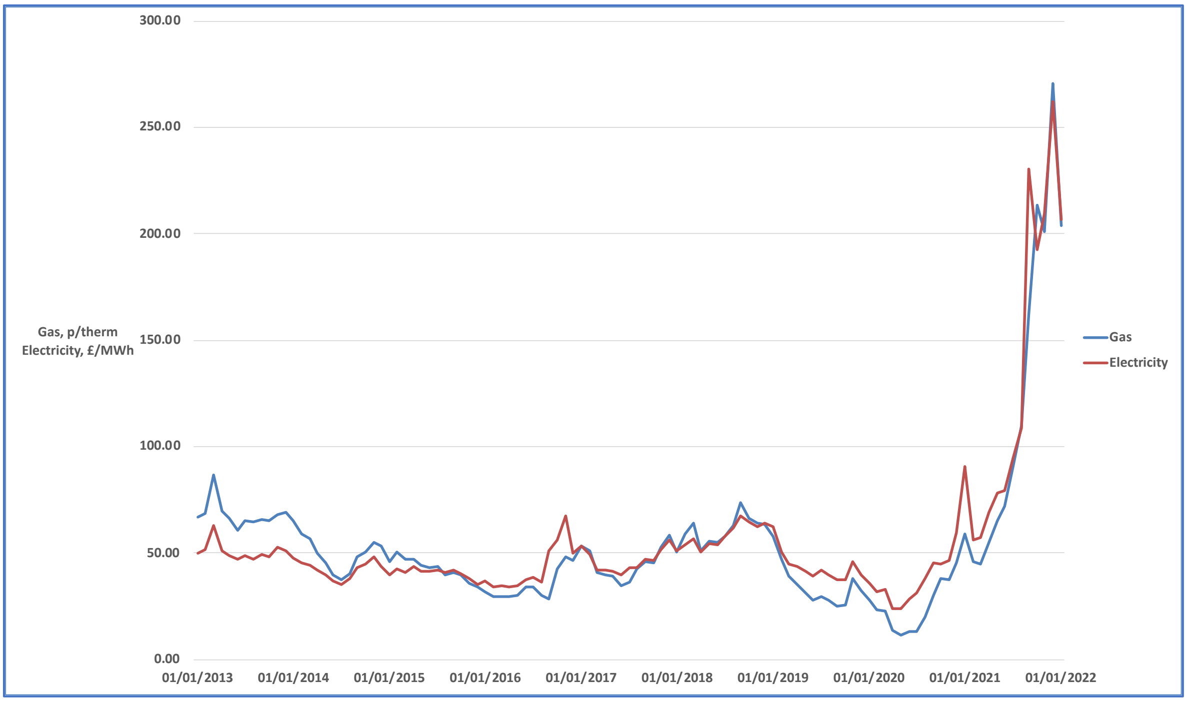


Data source: BEIS DUKES

Around 76% of energy costs are driven by the cost of crude, with the balance driven by natural gas costs, with gas and electricity costs increasing dramatically over the last 12 months (Figure 6).

[21] Based on UKPIA aggregation of data from BEIS Digest of UK Energy Statistics (DUKES) Tables 3.2, 4.1 and 5.1.

Figure 6. Wholesale UK gas and electricity prices

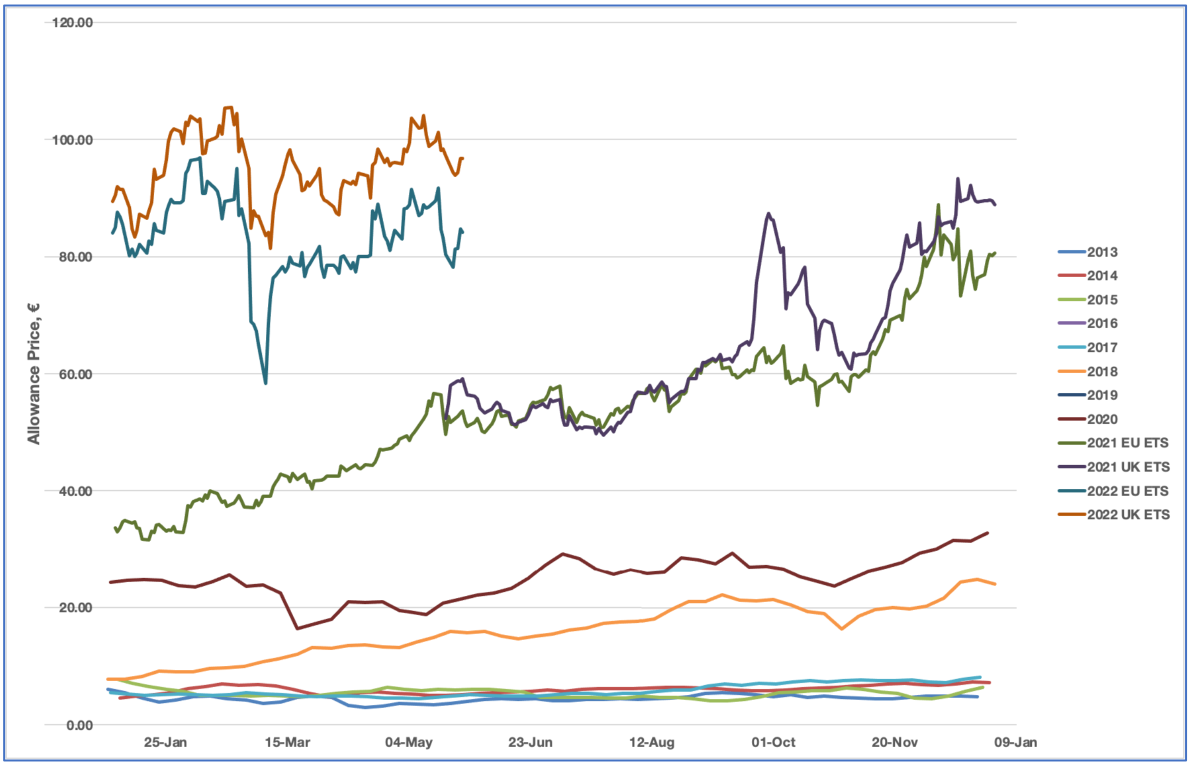


Data source: Ofgem Wholesale Market Indicators

Carbon costs

The eight UK refineries (six major refineries and two specialist refineries) all participate in the UK Emissions Trading Scheme, where installations are required to surrender allowances to cover their CO_2 emissions.

Figure 7. EU ETS and UK ETS futures prices – 2013 to 2022



Data sources: ICE Futures daily close prices, BoE spot exchange rate

Although they receive a portion of free allowances due to their exposure to carbon leakage, these cover around 65% of emissions only and for the balance, refineries are exposed to the full carbon cost. This has risen significantly over the past 10 years (Figure 7), with compliance costs estimated at over £200m in 2021[22].

4. Supply chain and distribution costs

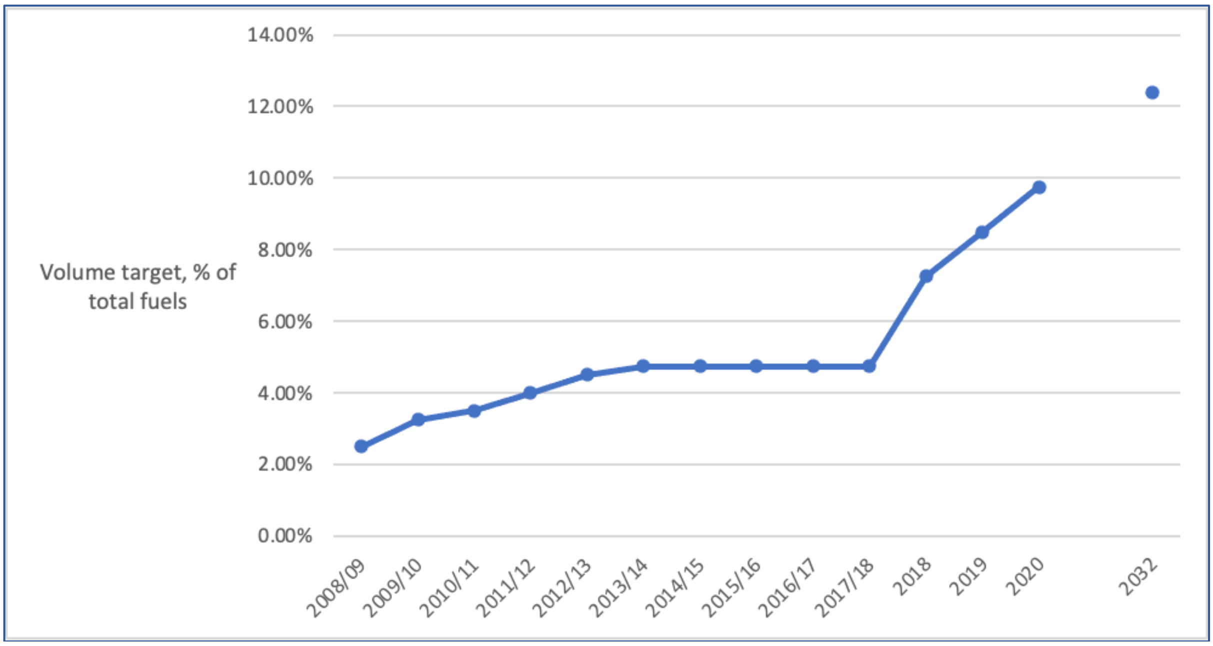
Supply chain and distribution costs have also increased over the last 12 months due to increases in electricity costs seen by terminals and pipeline operators, along with increased haulage costs driven by increases in diesel costs and increases in labour costs driven by the shortage of road tanker drivers.

5. Biofuels

An additional and growing factor in the price of road fuels in the UK is the increasing biofuel content. Biofuel content must be blended into road fuels under the Renewable Transport Fuels Obligation (RTFO), first enacted in UK legislation in 2007 with biofuels being blended from 2008/09[23]. The policy aims to support the decarbonisation of transport by encouraging the production and use of renewable fuels. Under the RTFO, obligated suppliers (refiners and importers) of relevant transport fuel in the UK must be able to show that a percentage of the fuel they supply comes from renewable and sustainable sources. Failure to blend the required target levels of low carbon fuels results in the obligated suppliers having to pay financial "buy-out" penalties.

There has been a steep increase in the biofuel content blended into the UK petrol and diesel since 2018, with the 2020 target being 9.75% by volume (Figure 8). This does not account for so-called 'double counting' fuels under the RTFO – please see Figure 9 "UK Biofuel Fuel Deliveries - 2010 to 2020" for actual volumes in litres of biofuels supplied. It should also be noted that "double-counting" fuels are generally more expensive than their single counting equivalents.

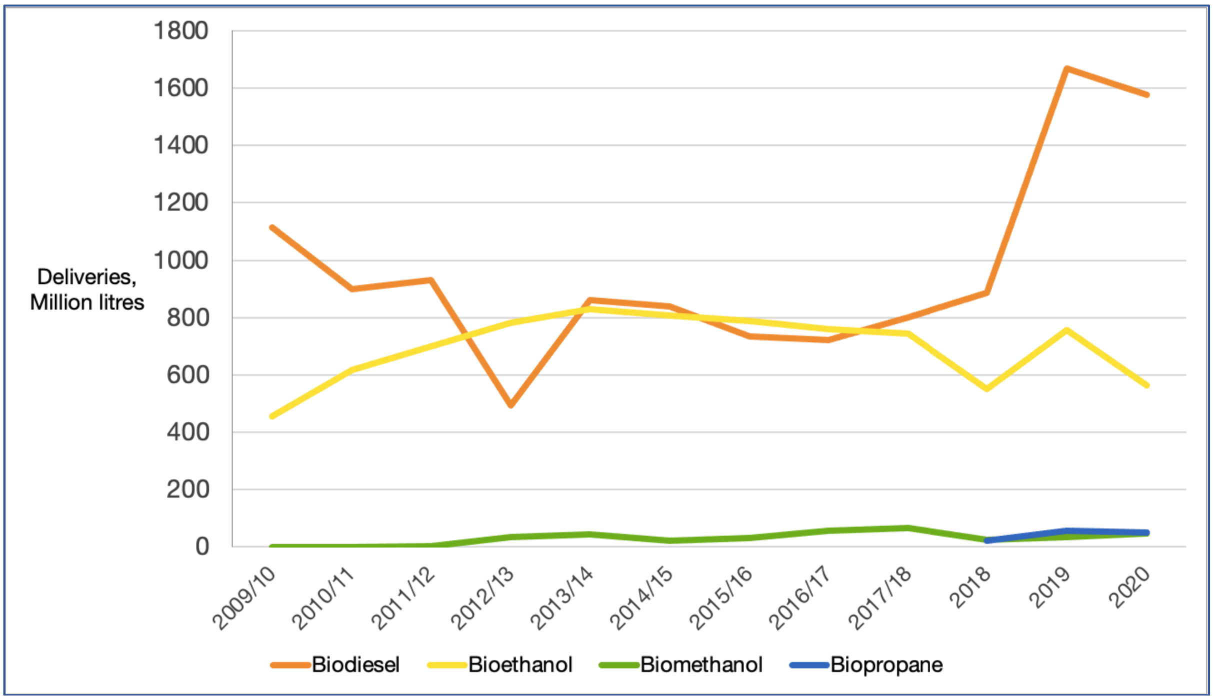
Figure 8. RTFO Volume target to 2020 and 2030 trajectory



Source: DfT RTFO Statistics

[22] UKPIA analysis of UK ETS Compliance Report - Emissions and UK ETS Allowances Surrendered using UKA prices taken from Ember as Dec21 Futures daily close prices.
[23] https://www.legislation.gov.uk/uksi/2007/3072/contents/made

Figure 9. UK Biofuel deliveries - 2010 to 2020

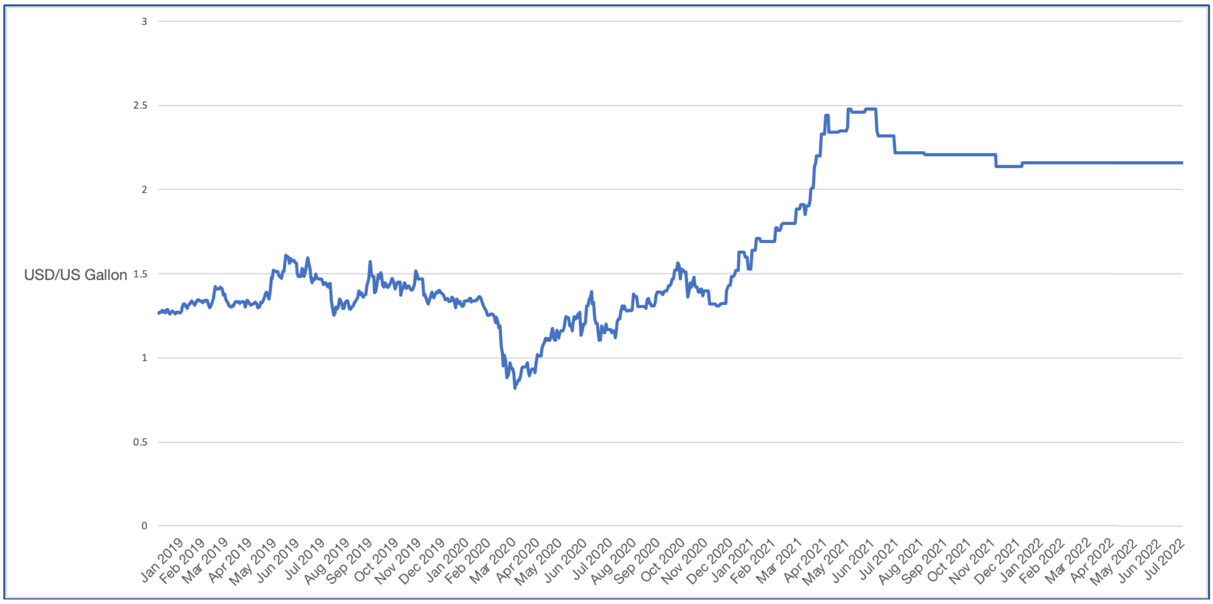


Data sources: DfT RTFO Statistics, HMRC Hydrocarbon Oils Bulletin

Typically, blending of biofuels will take place "in-tank" at refineries or major import terminals (diesel) or at the loading rack as the fuel is loaded into the road tanker for final distribution (petrol). In both cases, the biofuel is duty paid (and liable to VAT at the point of sale).

As seen with crude and finished product prices over the past two years, the price of biofuels – mainly biodiesel and bioethanol – has risen which in turn affects the price paid at the pump (Figures 10 and 11).

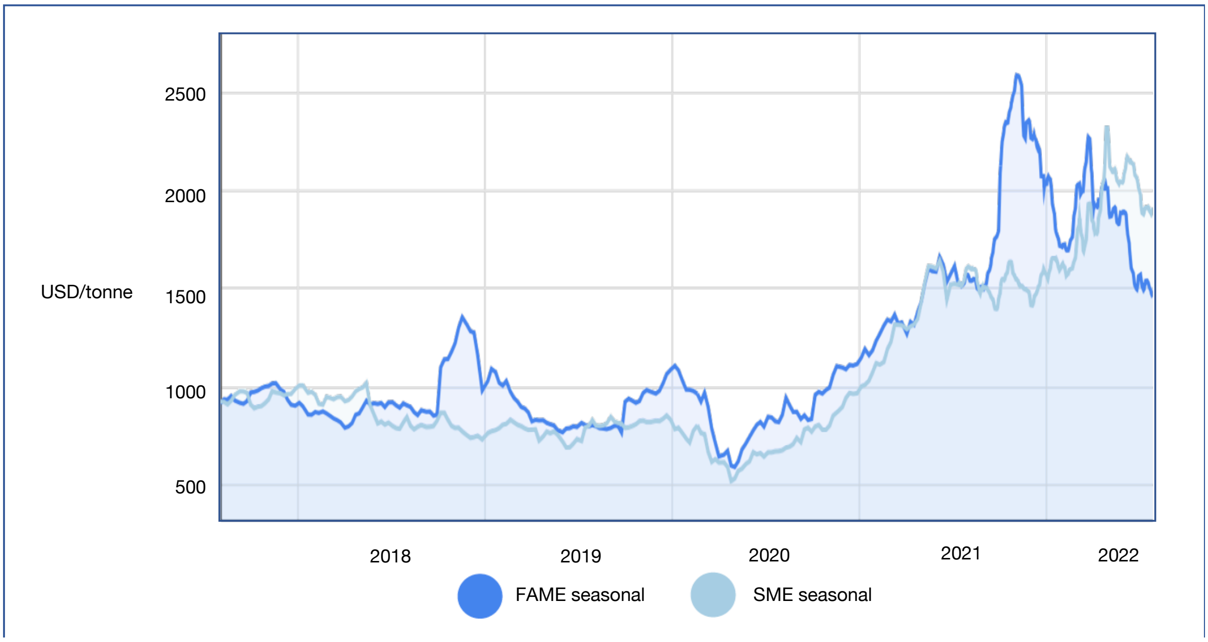
Figure 10. European bioethanol commodity price – 2019 to 2022



Data source: *Markets Insider*

(N.B. Figures 10 and 11 show indicative European prices for both bioethanol and biodiesel - please note different units of measurement).

Figure 11. European FAME and SME commodity price – 2019 to 2022



Source: Neste (based on S&P Global Commodity Insights)

It should also be noted that bioethanol and biodiesel are usually priced in US dollars, again based on benchmark prices published by companies such as S&P Global Commodity Insights, Argus Media Group, and ICIS. Consequently, exchange rate changes have also contributed to increased biofuel costs, with a consequent knock-on effect on the cost of petrol and diesel delivered to retail filling stations.