CSC
COMMODITY & SHIPPING CLUB BY HEC

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FUEL under pressure

Europe's routes, refineries & the price of disruption



TRADE ROUTES / REFINING / THE COST AT THE PUMP

IN THIS ISSUE

Follow the barrel. Then follow the effects.

News is the starting point. The aim is to understand the machinery behind it: how oil moves, what refineries can make and why disruption travels into other markets.

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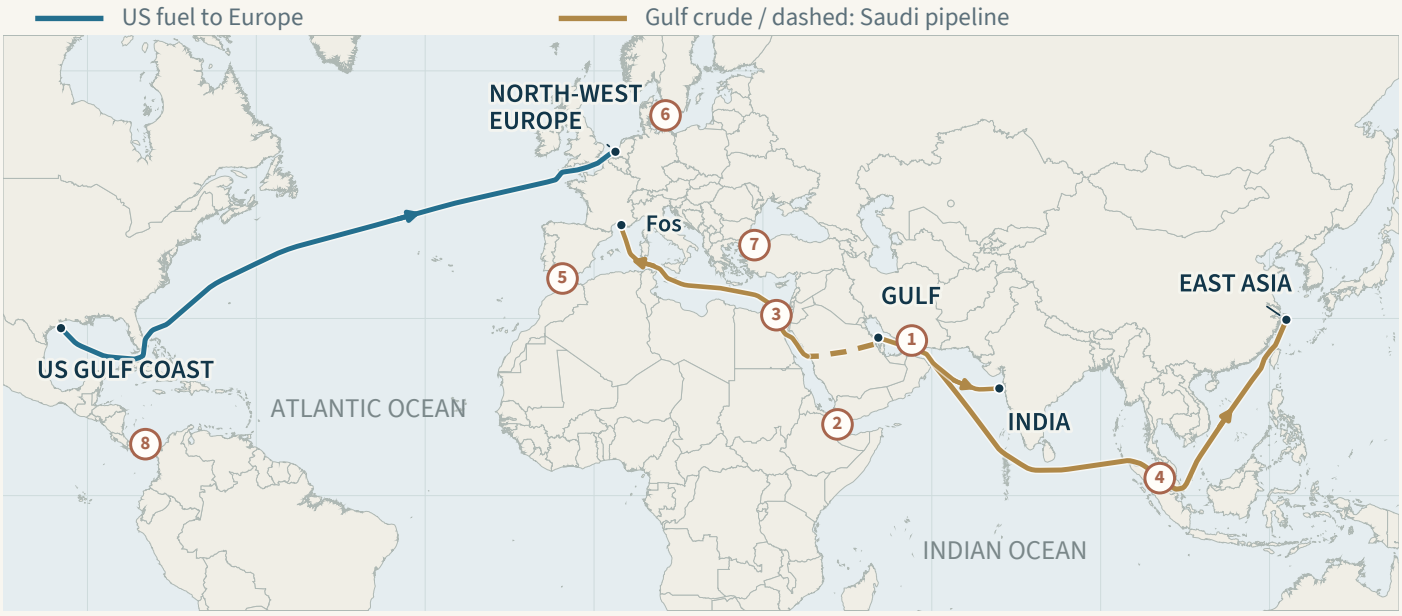
HOW TO READ IT Blue panels explain terms. CSC views identify editorial judgments. Figures state dates & sources.

IEA: International Energy Agency. EIA: US Energy Information Administration.

01 / ROUTES

The long road from crude to fuel

Europe's fuel supply depends on three things: crude, processing capacity and a route to the customer.



1 Hormuz
2 Bab el-Mandeb
3 Suez Canal
4 Strait of Malacca
5 Gibraltar
6 Danish Straits
7 Turkish Straits
8 Panama Canal

Selected trade corridors and major oil-shipping passages. Sea legs follow offshore waypoints; pipeline alignment is approximate. Route width does not show volume.[1,3,12,33,34]

CRUDE

THE FEEDSTOCK

By 2 October, the IEA reported recovering Middle Eastern crude exports, but continuing pressure on refined fuels. Attacks on Russian refineries had added to the diesel shortage.[35]

REFINING

THE PRODUCT

On 29 September, the European Commission described EU oil supplies as stable, with refineries running near maximum capacity. Available crude still had to be turned into the fuels customers needed.[28]

DELIVERY

THE CUSTOMER

Another crude supplier cannot fill every product gap. The oil needs processing and delivery. Buying finished fuel instead means finding a different combination of plants, terminals and ships.

01 / ROUTES

Asia’s oil route. Europe’s price risk.

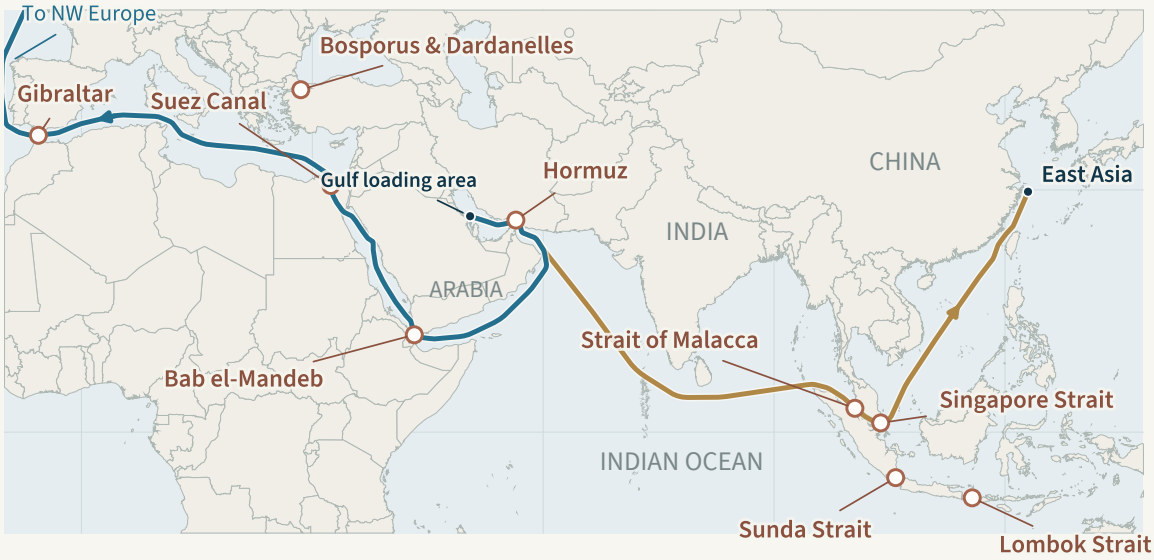
Hormuz, Bab el-Mandeb, Suez and Malacca do different jobs. A blockage at one cannot always be solved by avoiding another.

INDUSTRY TERMS

Condensate

A light oil-like liquid produced with natural gas. It is often counted alongside crude in trade data.

BEFORE THE SHOCK / 2024 BASELINE



84%

Asia’s share of Hormuz

crude and condensate flows in 2024

ASIA 84%

Elsewhere 16%

2024 baseline: Asia received 84% of Hormuz crude and condensate flows. The remaining 16% went elsewhere. The map names passages along the surrounding trade routes; it does not imply they all carry the same cargoes.[1,2,33]

THE DIRECT EXPOSURE

Hormuz is the sea exit from the Persian Gulf. In 2024, oil passing through it was equivalent to about one-fifth of global oil consumption. Asia received 84% of the strait’s crude and condensate flows, with China, India, Japan and South Korea the main destinations.[2]

An Asia-bound cargo may then pass through Malacca and Singapore. A Europe-bound cargo may instead enter the Red Sea at Bab el-Mandeb and continue through Suez. These are separate stages of a journey.

THE PRICE CONNECTION

Europe’s exposure extends further than the cargoes it buys directly from the Gulf. If an Asian refinery loses a shipment, it can bid for replacement crude from another region. European buyers then face competition for barrels that never pass through Hormuz.

Physical dependence and price exposure therefore differ. A country can avoid one shipping route yet remain exposed to the higher price created by its closure.

01 / ROUTES

Yanbu: Saudi Arabia's route around Hormuz

The East-West pipeline ends on the Red Sea. The journey to Europe continues by ship or through a separate Egyptian pipeline.

INDUSTRY TERMS

SUMED

Two parallel crude pipelines across Egypt, linking the Red Sea terminal at Ain Sokhna with Sidi Kerir on the Mediterranean.





SUMED

A separate crude pipeline across Egypt

Sea

Pipeline

WHAT THE BYPASS CHANGES

Saudi Arabia's East-West pipeline connects the eastern oil region with Yanbu. Crude loaded there has already bypassed Hormuz. Yanbu also lies north of Bab el-Mandeb, so a cargo bound for the Mediterranean need not cross that strait.[3]

From Yanbu, tankers can continue north to Suez, or discharge into the separate SUMED pipeline across Egypt. SUMED connects Ain Sokhna with Sidi Kerir; the Saudi pipeline itself ends at Yanbu.[3]

WHAT IT DOES NOT GUARANTEE

Yanbu is a major lifeline for European crude supply during a Hormuz disruption. It cannot replace a missing diesel cargo directly: the crude still needs a suitable refinery and onward delivery.

Operating status can change quickly. AFP reported a halt on 5 October; Reuters' later report on 6 October cited the Saudi energy minister saying the line was pumping.[4,5]

Illustrative offshore corridors and approximate pipeline alignments. The inset separates the Suez Canal from SUMED. Status: Reuters, 6 October, citing the Saudi energy minister.[3,4,33]

3.5-5.5m b/d

Saudi + UAE extra crude capacity
IEA assessment, February 2026

14.9 → 4.9m b/d

Oil passing through Hormuz
Q1 → Q2 2026 / EIA estimates

m = million; b/d = barrels per day. The IEA range estimates extra crude export capacity as of February 2026, not spare capacity still available today. EIA Hormuz figures cover crude and products: 21.6m b/d in Q4 2025, 14.9m in Q1 2026 and 4.9m in Q2. These tanker-tracking estimates are revised frequently.[51,52]

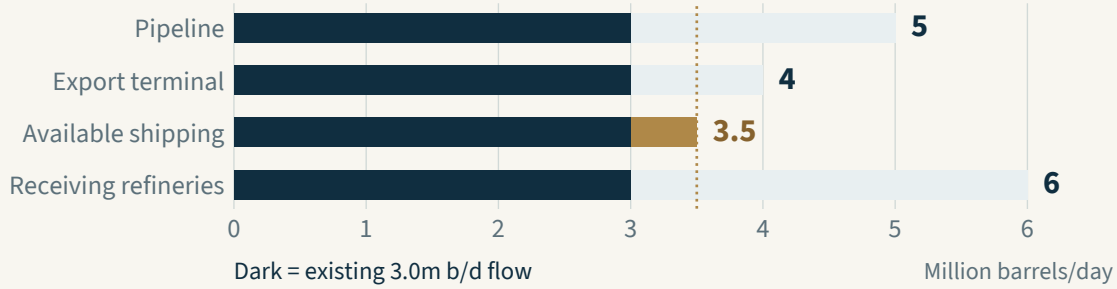
01 / ROUTES

A pipeline is only one link in the chain.

A route's useful capacity is set by its tightest working stage. The largest number in a project announcement may tell us very little.

WORKED EXAMPLE / CAPACITY IS NOT THE SAME AS SPARE CAPACITY

THE SMALLEST STAGE SETS THE FLOW



Only 0.5m b/d of extra delivery fits through this chain.

CSC illustration: sustained crude-flow capacities in million barrels/day, not Saudi operating figures. A single chain is assumed, without alternative routes or inventory changes. Current flow is assumed at 3.0m b/d. The model separates installed capacity, deliverable throughput and spare room.

READ PAST THE PIPELINE HEADLINE

Suppose a pipeline can move 5 million barrels a day. Its export terminal can load 4 million, the available shipping programme can deliver 3.5 million and the receiving refineries can process 6 million. The chain delivers at most 3.5 million: shipping is the limiting stage in this example.

Now suppose it already carries 3 million barrels a day. Its spare deliverable capacity is only 0.5 million, even though the pipeline has 2 million of unused capacity. Adding another million to the pipeline alone changes nothing. Improving shipping would help until the terminal's 4-million limit became the next constraint.

This is a simplified flow model. Real systems have several terminals, storage tanks, different crude grades and maintenance schedules. Stocks can bridge a temporary mismatch between stages, but they cannot sustain withdrawals indefinitely.

WHAT THE HEADLINE LEAVES OUT

The period matters as well as the number. A rate achieved on one good day does not establish what a route can sustain through maintenance, bad weather or irregular arrivals. Storage can absorb those interruptions only while it has room or stocks available.

Access matters too. Unused equipment may already be reserved for another cargo, or may not handle the grade on offer. Spare physical capacity and a delivery slot available to a new buyer are different things. The same distinction applies to refinery units and receiving terminals.

Yanbu gives Saudi crude a valuable route around Hormuz.[3] The next questions are how much additional crude can be loaded, when ships can deliver it and whether the receiving plants can turn it into the fuel in short supply. A bypass changes one part of that chain; its full value depends on the others.

01 / ROUTES

The price of the Cape detour

The Cape route avoids the Red Sea. A tanker inside the Persian Gulf must still get through Hormuz.

TRADE MOVES, AT A COST

The 2024 Red Sea disruption shows what rerouting can achieve. EIA data put oil flows through Suez and SUMED at 4.8 million barrels a day in 2024, down from 8.8 million in 2023. Cape flows rose from 6.2 to 9.3 million barrels a day.[1]

The oil did not have to disappear for delivery to become more expensive. Longer voyages used more ship time and fuel, while keeping cargo in transit and cash tied up for longer.

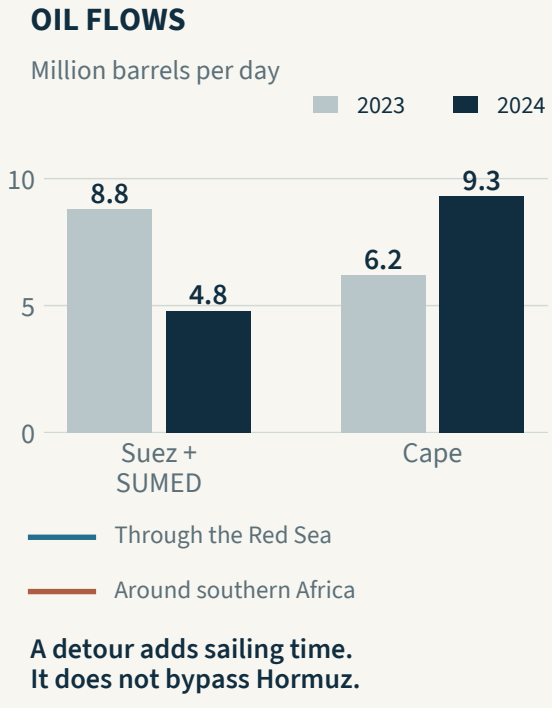
DESTINATION MATTERS

Once a tanker has passed through Hormuz, it can sail around Africa instead of entering the Red Sea. A tanker still inside the Persian Gulf must first pass through Hormuz, whether its next route is through Suez or around the Cape.

Yanbu offers a different advantage. A northbound cargo can reach Suez without passing Bab el-Mandeb; a southbound cargo heading to the Indian Ocean must cross it. Whether a bypass helps depends on where the cargo is going.

THROWBACK / THE RED SEA REROUTING OF 2024





Historical oil flows, million barrels per day. Suez includes SUMED. The two corridors are not mutually exclusive shares of a world total. Coastal routes are illustrative.[1,33]

02 / REFINING

Inside the refinery basket

The output is a mix of products, each with its own customers. A higher diesel price cannot turn the entire mix into diesel.

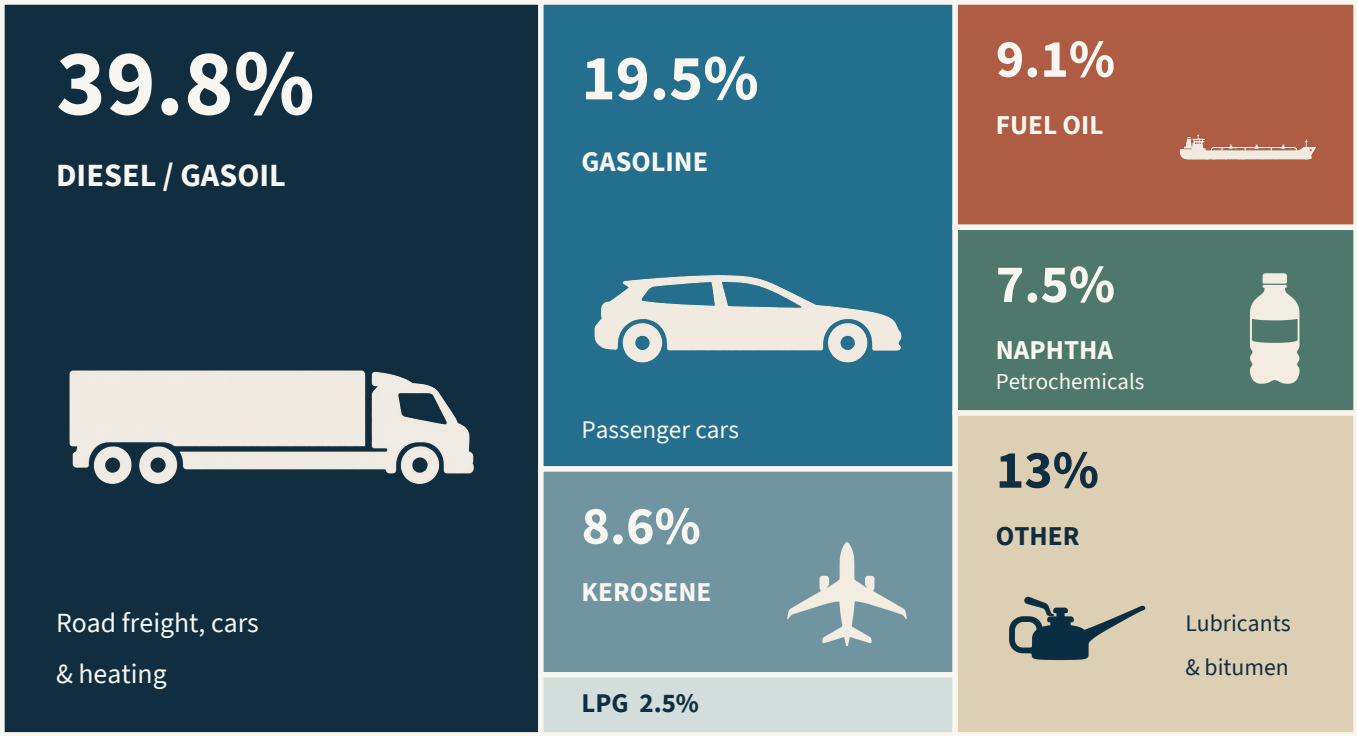
INDUSTRY TERMS

Naphtha
A light refinery product used in petrochemicals & gasoline blending.

INDUSTRY STRUCTURE / OECD EUROPE, 2025

ONE OUTPUT MIX. MANY END USES.

OECD EUROPE / 2025



OECD Europe, 2025 refinery output shares. Tile area is proportional to each share; symbols show example uses. This is neither EU-27 demand nor one refinery's yield. LPG: liquefied petroleum gases.[6,7,42]

SEPARATE, CONVERT, TREAT

A refinery makes several products together. Heating separates crude into fractions with different boiling ranges. Conversion units turn some heavier material into lighter products; treatment and blending then bring fuels up to specification.[6]

Crude quality and equipment constrain the mix. A high diesel price gives refiners a reason to adjust, but only within those limits.

A LARGE SHARE IS NOT A SURPLUS

Diesel and gasoil already accounted for 39.8% of OECD Europe's refinery output in 2025. Gasoline accounted for 19.5%.[7]

Those shares describe production, not self-sufficiency. A region can still import diesel and export gasoline: each product has its own balance of output, demand and trade. The next pages show how Europe reached that position.

02 / REFINING

How Europe grew into diesel

Tax policy, the vehicle fleet and the refinery system changed at different speeds. The fuel trade carries that history.

THROWBACK / INVESTMENT AFTER THE SECOND WORLD WAR

HOW EUROPE GOT HERE

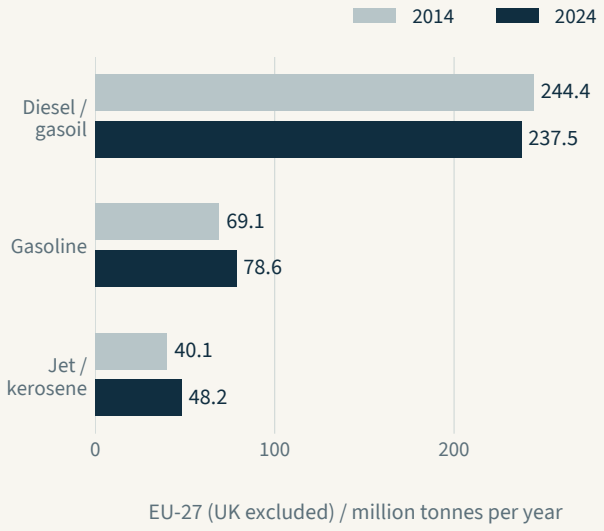
AFTER 1945
Refineries built around gasoline demand

1990s ONWARD
Tax policy favours diesel; the vehicle fleet changes

2013-14
The gasoline surplus and distillate deficit are documented

2023
EU ban resets Russian product trade

THE DEMAND THAT REMAINS



EU-27 means the EU after Brexit, excluding the UK in both years. Product demand in million tonnes/year, 2014 & 2024; FuelsEurope / Wood Mackenzie. Timeline: selected milestones.[8,9,10,12]

HOW THE MISMATCH DEVELOPED

A 2013 study for the European Commission described much of the refinery system built after the Second World War as designed to favour gasoline. Demand later shifted towards diesel, especially from the 1990s.[8]

Lower fuel duties helped make diesel cars attractive. The Commission's 2014 analysis linked this shift to a system that exported gasoline while importing middle distillates, despite ample total refining capacity.[9]

WHY THE TARGET KEEPS MOVING

The recent figures also show why history must not be treated as a forecast. In this EU-27 series, diesel and gasoil demand was slightly lower in 2024 than in 2014, while gasoline and jet-fuel demand were higher.[10]

An upgrade takes years and must earn its return over a long operating life. Refiners have to weigh today's product shortage against future demand, vehicle efficiency and changes in transport.

CSC VIEW

The industrial case should be made fuel by fuel. Support for an ageing plant needs a credible plan for the products Europe will need, reliable operation and a return on investment. A large crude-processing capacity alone tells us little about those three tests.

02 / REFINING

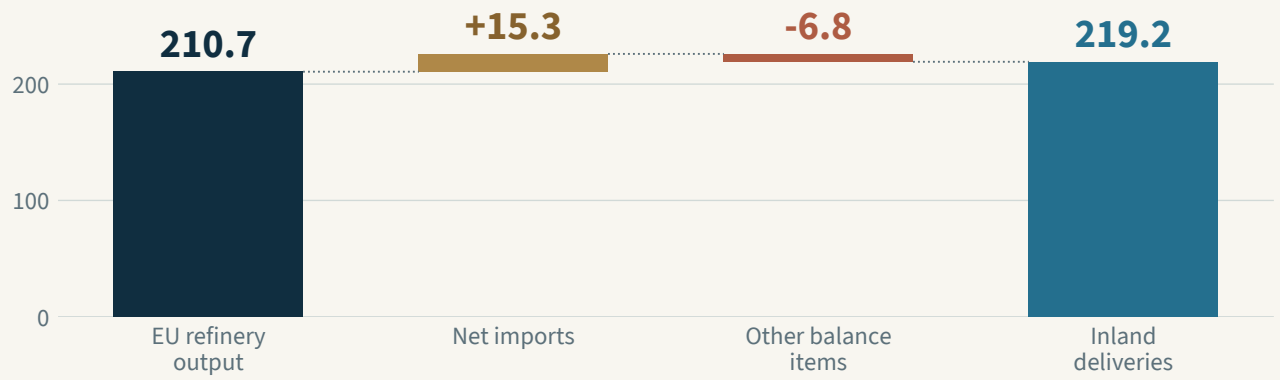
Diesel in. Gasoline out.

Europe makes most of the diesel it uses, but trade closes part of the gap. Its gasoline balance runs in the opposite direction.

EU-27 / 2024 / EXCLUDING BIO-COMPONENTS

HOW THE DIESEL BALANCE FITS TOGETHER

MILLION TONNES



DIFFERENT FUELS, DIFFERENT TRADE BALANCES



Eurostat, EU-27, 2024; million tonnes; biofuel portions excluded. Net trade = imports minus exports. Other items reconcile output, net trade and observed inland deliveries. This delivery measure differs from the demand series on page 9.[36]

WHAT THE BALANCE SAYS

EU refineries produced 210.7 million tonnes of fossil diesel and gasoil in 2024. Net imports added 15.3 million tonnes. Other balance items reduced the total by 6.8 million tonnes, leaving 219.2 million tonnes of observed inland deliveries.[36]

That adjustment matters. Fuel can go to international marine bunkers; stocks, product transfers and statistical differences also change the balance. Production minus domestic deliveries is not a complete measure of trade.

WHY THE MARGINAL CARGO MATTERS

The same EU system was a net exporter of gasoline but a net importer of diesel and jet fuel. Refineries sell several products together. A region can have ample output in total and still need imports of a particular fuel.[36]

This was the 2024 balance, not the size of today's shortage. The lasting lesson is that marginal cargoes matter: when replacement supplies are tight, competition for a relatively small volume can influence the price of the whole market.

02 / REFINING

What a refinery can change

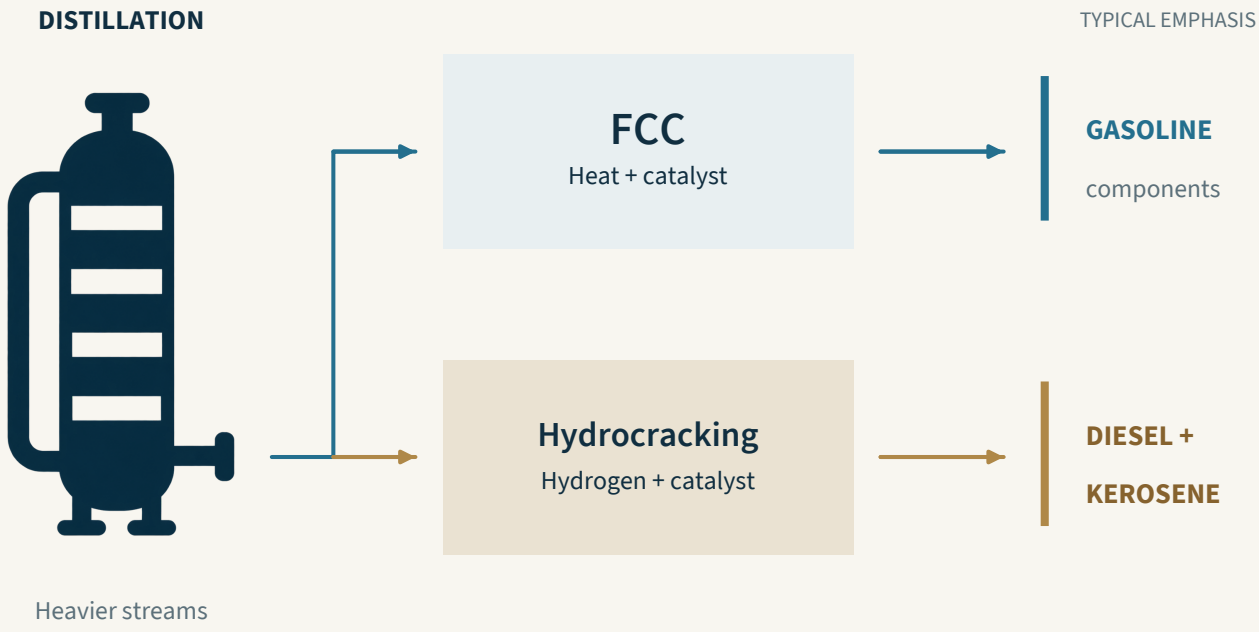
Higher prices give refiners a reason to make more diesel. The equipment determines how far they can go.

INDUSTRY TERMS

FCC
Fluid catalytic cracking: heat & a catalyst break heavy oil molecules into lighter products.

Hydrocracking
Conversion using hydrogen & a catalyst, often geared towards diesel & jet fuel.

MECHANISM / READING THE 2026 FUEL PRESSURE



Simplified comparison of processing routes, not a complete refinery flowsheet or fixed yield formula. Both routes can produce several products; outcomes depend on feed and operation.[6,11]

TWO DIFFERENT CONVERSION ROUTES

After distillation, heavier streams can undergo further processing. Fluid catalytic cracking commonly favours gasoline components. Hydrocracking can produce a larger share of diesel and kerosene. Both processes make several products; neither has a fixed all-diesel setting.[6,11]

Hydrogen supply, treatment units, maintenance and product specifications can each restrict the response. A higher price cannot finish a repair or install new equipment overnight.

CAPACITY ON PAPER, FUEL IN PRACTICE

That distinction matters in the present market. The Commission reported European refineries near maximum operating rates in September, while the IEA highlighted pressure on product supplies and Russian refining.[28,35]

Additional crude helps only if suitable processing and delivery capacity are available. Restoring a damaged unit may improve diesel supply without a comparable increase in oil production. The useful question is which part of the refinery is limiting the output customers need.

02 / REFINING

“Diesel” is not a complete specification.

A cargo must work in the engine, in the season and in the destination market. Usable supply is more specific than a product name.

INDUSTRY TERMS

Cetane number

A measure of how readily diesel ignites under compression.

INSIDE THE INDUSTRY / QUALITY, LOCATION & TIMING

IGNITION



Cetane describes ignition behaviour

COLD WEATHER



Fuel must flow in the local season

SULFUR



EU: 10 / US: 15

ppm maximum

Three selected fuel requirements, not a full specification sheet. EU road-diesel sulfur limit: 10 mg/kg, equivalent to 10 parts per million by mass; US on-highway ULSD: 15 ppm. Passing one test does not establish full compliance.[45,46,47]

THE SAME FUEL NAME, DIFFERENT REQUIREMENTS

Diesel engines inject fuel into hot, compressed air. Cetane describes ignition behaviour; it is not the octane rating used for gasoline. A buyer must also consider density, lubrication properties and contamination. “Distillate available” does not necessarily mean “road diesel ready to use”.[47]

Cold weather adds another constraint. As fuel cools, wax crystals can form and obstruct filters. Blending and additives can improve cold-weather performance, but the necessary fuel depends on the climate and season. A cargo suitable for one market may need adjustment before serving another.[47]

Sulfur is a separate test. EU rules cap road-diesel sulfur at 10 parts per million by mass; US on-highway ULSD allows up to 15. A shipment meeting only the US ceiling is not automatically suitable for the EU. Actual test results matter more than the label “ultra-low sulfur”.[45,46]

WHY QUALITY CHANGES THE SUPPLY PICTURE

These requirements explain why a shortage can coexist with apparently abundant oil. The refinery must have suitable processing capacity; the finished cargo must meet the buyer’s requirements; the receiving terminal must be able to handle it. Each condition narrows the pool of usable supply.

Consider a buyer replacing a late winter diesel cargo. Finding the same tonnage is only the first step. The buyer also needs the right cold-weather properties, a reliable delivery date and transport from the terminal. A cheaper cargo that needs further treatment may arrive too late to solve the original problem.

The practical questions are therefore: what grade is in the tank, what tests support that grade, where is it located and when can it reach users? That is why the reserve discussion later in this issue distinguishes crude stocks from finished diesel. The distinction is about readiness as well as volume.

03 / TRADE

American fuel has other buyers

Europe competes for US refinery output. A cargo crosses the Atlantic when the price makes that journey worthwhile.

INDUSTRY TERMS

Arbitrage

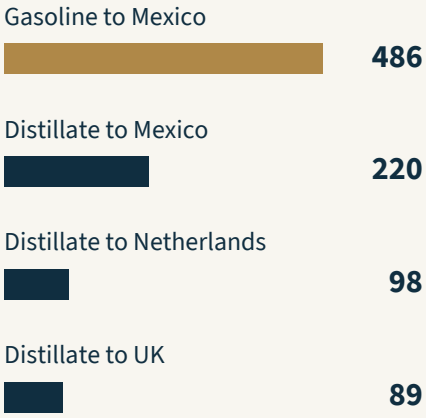
A trade that exploits a price difference after freight, finance, quality & other costs are accounted for.

COMPARISON / UNITED STATES EXPORTS IN 2025



SELECTED US EXPORTS

2025 / thousand barrels per day



Selected US export destinations, 2025 average, thousand barrels per day. Gasoline and distillate are separate products. Figures cover all US origins; the map illustrates Gulf routes. These destinations do not sum to total exports.[33,34]

DIFFERENT BUYERS, DIFFERENT FUELS

In 2025, Mexico bought about 486,000 b/d of US gasoline and 220,000 b/d of distillate. US distillate exports averaged 98,000 b/d to the Netherlands and 89,000 b/d to the UK.[34]

These destinations help a refinery sell its full product mix. Strong demand for one fuel abroad can absorb output that local customers do not need.

WHEN THE TRADE MAKES SENSE

For Europe, an American cargo is not necessarily spare fuel waiting to be collected. The price must compensate the seller for freight, timing, quality requirements and the value of selling elsewhere. That calculation determines whether the arbitrage is open.

The connection works in both directions. Strong overseas demand can raise the value of fuel in the exporting market. Domestic oil production improves a country's supply options, but does not isolate consumers from international fuel prices.

03 / TRADE

The highest selling price does not always win.

An exporter compares what remains after delivery costs. This is the calculation behind a cargo changing destination.

INDUSTRY TERMS

Netback
The destination selling price minus specified costs of reaching that market.

WORKED EXAMPLE / TWO MARKETS, ONE AVAILABLE CARGO

SAME CARGO / SELLING PRICE LESS SELECTED DELIVERY COSTS



A leaves $15/t more, despite its lower selling price.

Illustrative US dollars per tonne

CSC illustration, US dollars/tonne; no market quotes. Same cargo and purchase cost, both destinations assumed feasible. Selected delivery costs include freight and other charges on a consistent basis. Taxes, financing differences and contractual restrictions are excluded.

FOLLOW THE MONEY BACK TO THE LOADING PORT

Suppose a seller can deliver the same fuel to Market A at $900 a tonne or to Market B at $930. A offers the lower headline price, but reaching it costs $35 a tonne. B costs $80 to reach. The resulting netbacks are $865 and $850: A leaves the seller $15 more per tonne.

On 40,000 tonnes, that difference is $600,000 before the costs excluded here. Netback is not profit: the seller still has to pay for the fuel and cover other expenses. It is a way to compare destinations after removing costs that differ between them.

If B's selling price rose to $950 while the assumed costs stayed unchanged, its netback would become $870. B would then lead by $5 a tonne. That is an illustrative switch in the destination decision, not a historical price move.

HOW REGIONAL PRICES BECOME CONNECTED

This is one reason a supply problem in one region can affect buyers elsewhere. A stronger destination price attracts flexible cargoes. Buyers in the exporting region may then have to pay more to keep that supply. EIA describes this connection between product trade and regional prices.[49]

The arithmetic is only the starting point. A seller must check the fuel specification, vessel and terminal availability, arrival date, credit terms and any existing supply commitment. A theoretical price difference cannot move a cargo through a closed passage or into an unavailable berth.

The 2022-24 trade reset on the next page makes the connection tangible: Russian fuel found new buyers, while Europe drew more from other suppliers. The lesson is to compare the delivered alternatives, not just the nearest producer or the highest posted price.[12]

03 / TRADE

Russian diesel: new buyers, new routes

The EU's 2023 ban changed trading relationships. It did not remove every affected barrel from world supply.



EUROPE FOUND NEW SUPPLIERS

After the ban, European buyers increased purchases from the United States and the Middle East. Russian distillate found other customers, including Brazil and Turkey. EIA data put Russia's share of Europe's external seaborne distillate imports at 50% in 2022 and below 1% in 2024.[12]

These were connected changes: US exporters could lose a Brazilian buyer to Russian fuel while gaining a European buyer.

RUSSIA'S SHARE

Europe's external seaborne distillate imports

50%

2022

<1%

2024

THE SHIPPING CONSEQUENCES

Replacing nearby supply with a more distant source can lengthen delivery times and increase the amount of fuel tied up in transit. It can also change the kinds of ships and the routes a buyer depends on.

Trade adaptation preserved access to fuel, but not necessarily the old delivery cost or reliability. A replacement cargo has to be assessed on its route, specifications and timing as well as its volume.

Illustrative Russia-Brazil corridor via the Baltic. The import-share comparison covers the EU, UK, Norway and Switzerland. It measures external seaborne distillate imports, not all diesel consumed in Europe.[12,33]

03 / TRADE

Two refineries, two supply chains

Al-Zour exports from inside the Persian Gulf. Duqm faces the Arabian Sea. The route taken by their incoming crude matters too.

INDUSTRY TERMS

Nameplate capacity
The refinery's designed processing rate. Actual output depends on operation, maintenance & the product mix.

TWO NEW SOURCES OF FUEL

Oman's Duqm refinery was inaugurated in February 2024 with a nameplate capacity of 230,000 barrels a day. Kuwait's Al-Zour reached its full 615,000-barrel-a-day scale in 2024.[13,14]

The contrast is geographical. Al-Zour's seaborne exports leave from inside the Persian Gulf. Duqm faces the Arabian Sea, outside Hormuz. Buyers cannot assess supply security from the size and age of the refinery alone.

FOLLOW THE CRUDE IN, TOO

Kuwait Petroleum International describes Duqm's design feedstock mix as 65% Kuwaiti and 35% Omani crude. That is a design basis, not a current delivery split. OQ8 has since reported processing alternative grades, including West African crude.[39,40]

The point is practical: an export terminal outside Hormuz can still rely on inputs that cross it. Storage and the ability to process other grades change that exposure. Buyers should assess the incoming crude route as well as the outgoing product route.

THROWBACK / TWO REFINERY MILESTONES IN 2024



DESIGN CAPACITY

Thousand barrels per day

615

AL-ZOUR / KUWAIT

230

DUQM / OMAN

2024 design figures.
Actual operation varies.

Design crude capacity reported in 2024, not diesel output or current operating rates. Illustrative outbound routes to west-coast India show the difference between Gulf and Arabian Sea access; these are not tracked voyages.[13,14,33]

Longer voyages tie up ships

Cargo volume measures how much moves. Tonne-miles also measure how far it has to travel.

INDUSTRY TERMS

Tonne-mile
One tonne of cargo moved one nautical mile; a measure of transport work.

Ballast voyage
A sailing leg without commercial cargo, often to the next loading port.

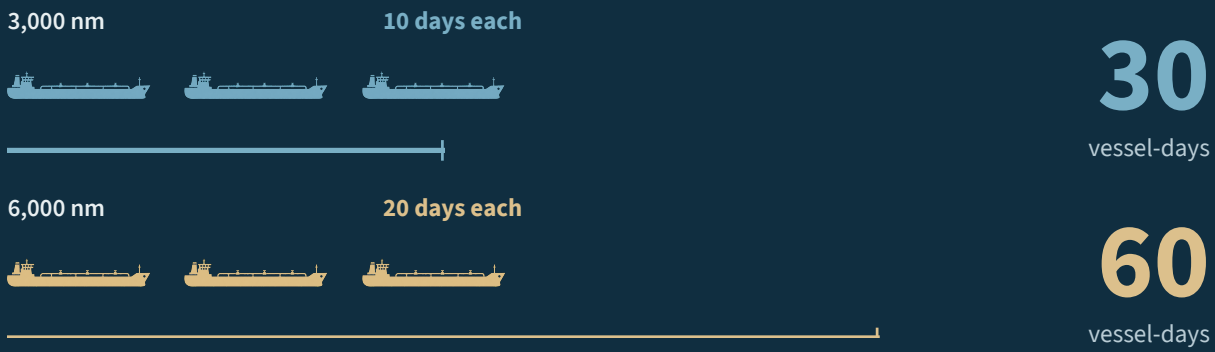
THROWBACK / GLOBAL SHIPPING IN 2024

THE WORLD IN 2024

2.2% more cargo by weight

5.9% more transport work in tonne-miles

SAME 120,000 TONNES / THREE 40,000-TONNE CARGOES



The same cargo now uses twice as many loaded vessel-days.

UNCTAD / Clarksons: global seaborne trade in 2024. Worked example: three identical 40,000-tonne cargoes, speed 12.5 knots. Loaded sailing time only; port and ballast time excluded. Vessel-days add the time used by all three ships.[15]

WHAT THE 2024 NUMBERS SHOW

Global seaborne cargo volume rose 2.2% in 2024, but transport work measured in tonne-miles rose 5.9%, according to UNCTAD. The extra distance mattered as well as the extra cargo.[15]

Take three cargoes of 40,000 tonnes each. At 12.5 knots, a 3,000-nautical-mile leg uses 10 days per ship, or 30 vessel-days in total. Doubling the distance uses 60 vessel-days to move exactly the same 120,000 tonnes.

WHY FREIGHT CAN RISE

The fleet is now tied up for longer before it can load again. A real round trip also includes discharge, queues and the ballast voyage. The increase in the whole fleet requirement depends on those legs as well as the loaded voyage.

The effect varies by trade. A disruption that removes cargoes can reduce demand for ships elsewhere. Vessel size and cargo requirements also matter: a crude tanker is not an immediate substitute for every tanker carrying finished fuels.

04 / SHIPPING & PRICES

One ship. Four different bills.

The same voyage combines four different cost bases. The following pages explain who pays, calculate the bill and translate it into a fill-up.

INDUSTRY TERMS

Charterparty
The contract for hiring a ship or its carrying capacity.

P&I
Protection & indemnity: cover for specified third-party liabilities of the shipowner.

WORKED EXAMPLE / ILLUSTRATIVE SHIP & CARGO

VESSEL TIME

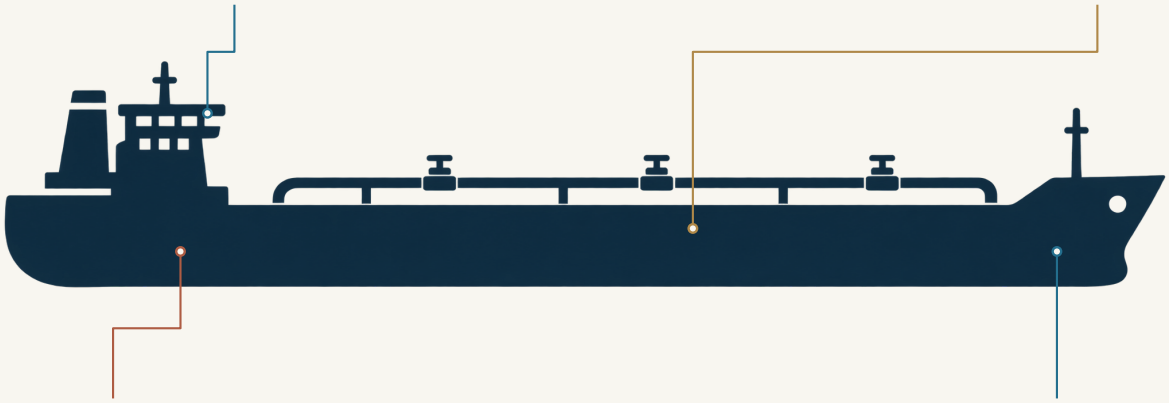
$30,000 / day

Paid for use of the ship

CARGO VALUE

$40 million

40,000 tonnes of diesel



FUEL CONSUMPTION

20 tonnes / day

INSURED SHIP VALUE

$60 million

Illustrative product tanker; cargo is carried in tanks below deck. All four amounts are assumptions used in the following voyage calculation. Hull, cargo, war-risk and liability cover are separate questions; their scope depends on policy and contract wording.[16,17]

FOLLOW THE FOUR COST BASES

A time charge pays for the use of the ship. Fuel consumption creates a separate bill. Money tied up in the cargo has a financing cost, while an insurance premium may be calculated on the ship's value. These amounts cannot be compared until they share a common unit.

Hull cover does not automatically insure the cargo. P&I covers specified liabilities to third parties. The charterparty helps determine who bears extra time, rerouting costs and premiums.[17]

A PRICE DOES NOT MAKE A ROUTE SAFE

Gard's March FAQ explains that a cancellation notice may replace war-risk rates or geographic conditions without ending all cover. Its August circular made specified changes to war-risk cover. Read the terms behind a headline such as "insurance withdrawn".[16,17]

A route must also be safe and workable. The master's judgment, crew safety, delivery dates and available cover matter alongside the price. A cheaper quoted passage may not be an available voyage.

04 / SHIPPING & PRICES

Who pays when the voyage gets longer?

The physical cost and the party receiving the invoice are different questions. Two common charter types divide the bill differently.

INDUSTRY TERMS

Demurrage

An agreed charge for loading or discharge time beyond the allowance under a voyage charter.

INSIDE THE INDUSTRY / TYPICAL CONTRACT STRUCTURES

TIME CHARTER	VOYAGE CHARTER
Hire is usually priced per day	Freight is per tonne or per cargo
CHARTERER	CHARTERER
Hire + voyage costs	Freight for carriage
SHIPOWNER	SHIPOWNER
Crew + routine operation	Vessel + voyage costs

Typical allocation; the signed contract can change the result.

Simplified typical allocation, based on the Baltic Exchange chartering guide. Actual responsibility follows the agreed contract. Rerouting, war risk, port delay and periods off hire need their own treatment.[17,48]

HIRING TIME VERSUS BUYING CARRIAGE

Under a time charter, the charterer hires the ship for a period or trip. The charterer normally pays daily hire and voyage costs such as fuel and port charges. The shipowner owns and supplies the vessel, provides its crew and pays routine operating costs. Commercial direction sits with the charterer within the agreed limits.[48]

Under a voyage charter, the charterer pays freight to move an agreed cargo, often per tonne or as a lump sum. The shipowner normally pays the vessel's fuel and operating costs. The shipowner therefore estimates time and fuel before agreeing the freight.[48]

A $30,000 daily hire quote and a $30-per-tonne freight quote buy different things. Neither is meaningful without the cargo size, route, time and allocation of costs. The worked account on the next page uses a daily time charge and adds fuel separately.

FROM A LONGER VOYAGE TO A BIGGER BILL

For a time charterer, ten extra days can mean ten more days of hire plus additional fuel. For a shipowner earning fixed freight under a voyage charter, the same detour can consume more money and delay the next earning voyage. The physical disruption is similar; its first financial effect lands on a different party.

Contract terms can change that starting point. War-risk clauses, routing agreements and the circumstances of the voyage determine whether extra charges can be passed on. The earlier insurance discussion explains why the existence of cover does not settle the whole commercial question.[17]

Port time is another distinction. A voyage charter can allow a defined period for loading or discharge, with demurrage after that allowance is exhausted. It is not simply a name for every extra day at sea. When reading a freight headline, ask which clock is running and who agreed to pay for it.[50]

04 / SHIPPING & PRICES

The bill for ten extra days

A worked example puts vessel time, fuel and finance on the same basis. The assumptions are explicit; the rates are illustrative.

WORKED EXAMPLE / ASSUMPTIONS, NOT MARKET QUOTES

10
EXTRA DAYS

40,000 t
CARGO

ILLUSTRATIVE VOYAGE ACCOUNT

	TOTAL / USD	USD / TONNE
Vessel time 10 days × $30,000/day	300,000	**7.50**
Additional fuel 200 tonnes × $650/tonne	130,000	**3.25**
Cargo finance $40m × 8% × 10/365	87,671	**2.19**
SELECTED EXTRA COST		**$12.94 / t**
Separate premium example 0.5% × $60m ship value ÷ 40,000 tonnes		**$7.50 / t**

CSC illustration: 40,000-tonne cargo, $40m cargo value, $60m insured ship value. Extra sailing: 10 days; time charge $30,000/day; fuel 20 tonnes/day at $650/tonne; cargo finance 8% a year, 365-day basis. Premium example: 0.5% of ship value for one assumed coverage period. No observed rates are claimed.

PUT THE COSTS IN THE SAME UNIT

A delay creates several bills. Vessel time is priced per day; extra fuel depends on consumption; financing depends on the cargo's value. Divide each cost by cargo tonnage only after calculating it on its own basis.

The premium example uses a different value again: 0.5% of the insured ship, not 0.5% of its cargo. Allocating that charge across 40,000 tonnes gives $7.50 per tonne.

PRICE IS NOT THE WHOLE DECISION

This is not a recommendation to buy the cheaper passage. The two amounts are not full alternative voyage prices. A longer route may still carry insurance charges; a shorter one may involve delays, exclusions or an unacceptable safety risk.

Real comparisons also need canal dues, port costs, ballast positioning, speed, cover duration and who pays under the contract. Put costs on the same basis, then check whether each voyage is safe and available.

04 / SHIPPING & PRICES

Half a million dollars. Half a dollar per fill-up.

The extra bill sounds enormous. Spread it across a full cargo, and its household equivalent becomes easier to judge.

WORKED EXAMPLE / CONTINUED FROM THE VOYAGE ACCOUNT

THE SAME CARGO



40,000 tonnes

40m kg ÷ 0.835 kg/litre

47.9 million litres

EXTRA VOYAGE COST

$517,671

÷ 47.9 million litres

→

1.08¢

US cents per litre



$0.54

on a 50-litre diesel fill-up

CSC illustration. Diesel density is assumed at 0.835 kg/litre. The unrounded cargo volume is 47.904m litres; the extra bill is $517,671.23. Full pass-through is assumed, before tax and currency effects.

PUT THE BILL ON A HUMAN SCALE

This cargo holds enough diesel for about 958,000 fills of 50 litres. Dividing the extra voyage bill across that volume gives about one US cent per litre.

For comparison, an illustrative $100-per-tonne wholesale diesel increase equals 8.35 US cents per litre, or $4.18 per 50 litres, before tax. This is a sensitivity calculation, not an observed rise.

WHY YOUR RECEIPT CAN MOVE DIFFERENTLY

The 54-cent figure is a cost equivalent, not a pump-price forecast. Retail prices also reflect wholesale fuel, distribution, margins, taxes and exchange rates. Pass-through may be delayed or incomplete.

Ask what changed, then divide by the quantity sold. The next page shows why the price of the fuel itself can matter much more than this voyage-cost increase.

04 / SHIPPING & PRICES

When diesel pulls away from crude

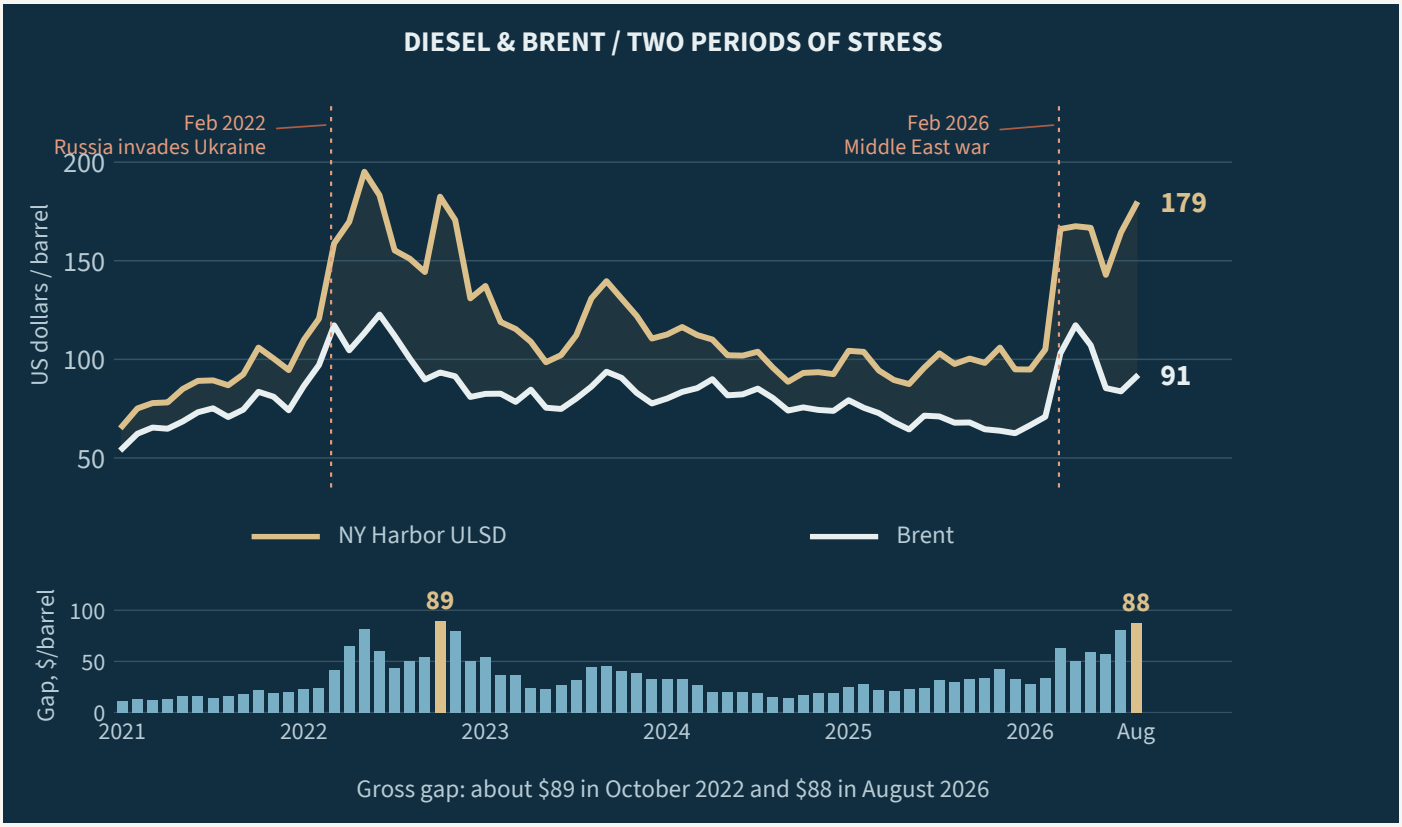
A refinery or transport constraint can leave finished fuel expensive even when crude prices ease.

INDUSTRY TERMS

Crack spread

A product-versus-crude price comparison used to assess refining economics, before many costs.

HISTORY / JANUARY 2021-AUGUST 2026



EIA / LSEG monthly spot averages. New York Harbor ultra-low-sulfur diesel (ULSD): $/gallon × 42. Lower panel: ULSD minus Brent, on the same time axis. Event markers give context rather than attributing every price move to one cause.[17,18,19,25]

READING THE TWO SERIES

A refinery or shipping constraint can make diesel scarce even when crude is available. The difference between the two prices then widens. This is why following Brent alone can miss an important part of an oil shock.

The current gap is large, but not unprecedented. The same comparison reached about $89 a barrel in October 2022, against $88 in August 2026. In August, diesel cost around $179 a barrel while Brent was $91. Different disruptions can produce a similar fuel premium.[18,19]

WHAT THE GAP DOES NOT MEASURE

A crack spread compares product and crude prices before many costs. This particular chart also compares different locations: New York Harbor diesel and Brent. A refinery's realised margin depends on its full product basket, crude purchase price, energy, transport and operating costs.

Nor does expensive diesel prove that demand is strong. Supply may have fallen faster than consumption. Fuel prices need to be read alongside refinery operations, trade and inventories to distinguish a supply constraint from a demand boom.

04 / SHIPPING & PRICES

What reserves can deliver

Stocks buy time. Their value depends on the product, its location and the route from the tank to the user.

INDUSTRY TERMS

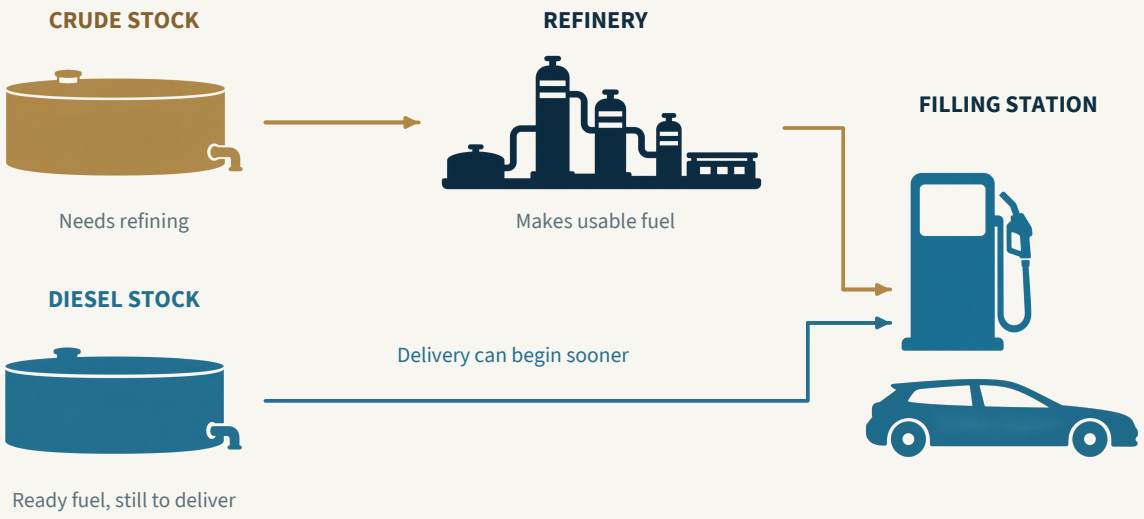
Net-import cover

The stock held relative to average daily imports minus exports, subject to the IEA's counting rules.

100m

barrels still to reach the market

On 7 October, IEA members backed faster delivery of stocks pledged in March, prioritising diesel where possible. About 100 million barrels from those commitments had yet to arrive. These barrels were already committed in March.[26]



Illustrated stock-to-user paths, not measured volumes or a complete distribution network. Refined diesel can bypass the refinery stage. The IEA's 90-day minimum is based on net imports under its methodology, not 90 days of every fuel.[27]

A BUFFER, NOT NEW PRODUCTION

Stocks bridge the gap when arrivals fall below consumption. They buy time for repairs, replacement cargoes or lower demand. Every withdrawal also reduces the reserve left for a longer disruption.

Crude must still pass through a refinery. Diesel of the right specification, stored near users, has a shorter path to the market. Both depend on working terminals and transport.

THE MEANING OF "90 DAYS"

The IEA's minimum stock obligation is generally 90 days of net imports, calculated under its methodology. That measure reflects a country's dependence on foreign supply.[27]

It does not mean 90 days of total consumption or 90 days of every fuel. The headline volume alone cannot tell us how quickly diesel will reach a filling station.

05 / SPILLOVERS

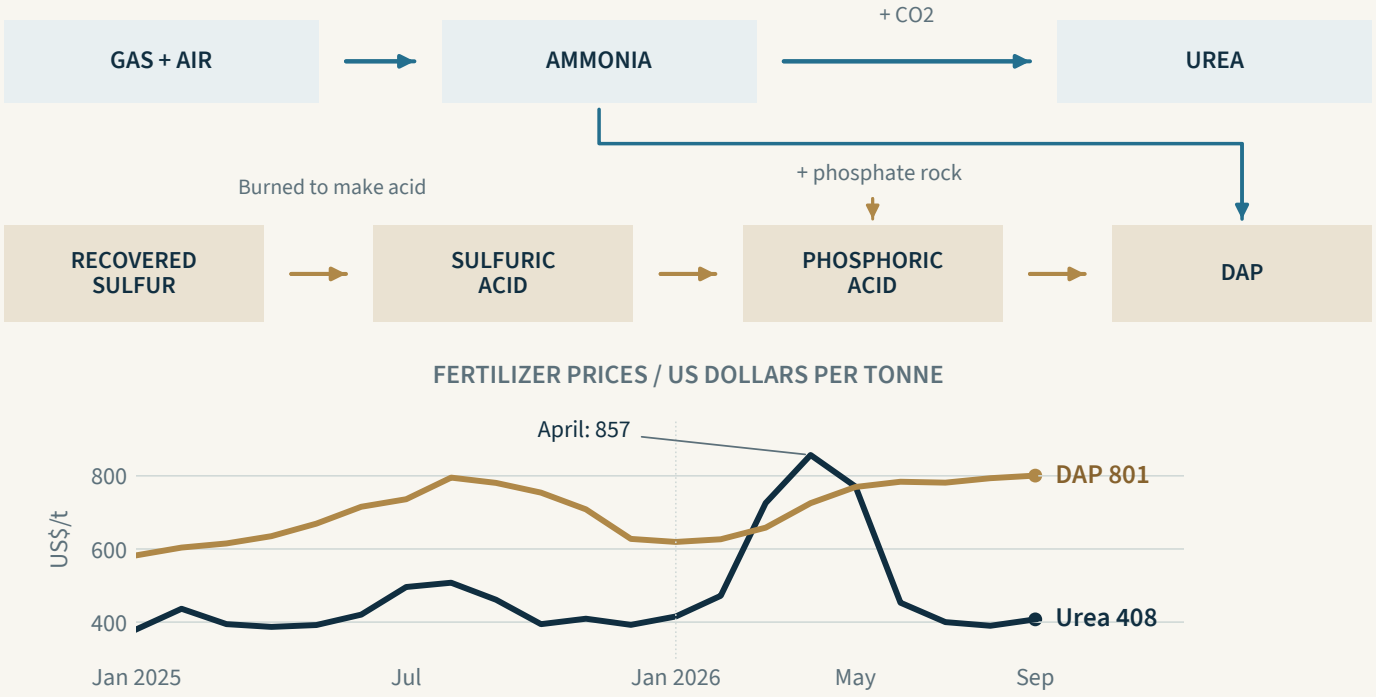
From gas & sulfur to the farm

Two inputs connect energy markets to crop nutrients. Their prices can move in very different directions.

INDUSTRY TERMS

DAP
Diammonium phosphate: a fertilizer that supplies both phosphorus & nitrogen.

CURRENT CASE / FERTILIZER PRICES IN 2026



World Bank monthly benchmarks: January 2025-September 2026. Price axis: US dollars per metric tonne (US$/t). Ammonia feeds urea and DAP; phosphate rock and sulfuric acid produce phosphoric acid. CO2 is carbon dioxide. Not every input or process is shown.[20,21,22,38]

TWO DIFFERENT INPUT CHAINS

Natural gas supplies energy and a key input for ammonia, the basis of nitrogen fertilizers. Sulfur recovered from oil and gas processing provides a separate link: sulfuric acid is used to make phosphate fertilizers.[21,22]

Urea rose from about $415 a tonne in January to $857 in April, then fell to $408 in September. DAP instead ended September near $801, about 29% above January. The longer chart shows that neither price started moving with this year's disruption.[20]

THE EFFECT REACHES A LATER HARVEST

Mosaic linked sulfur availability and cost to phosphate production cuts in August. A higher fertilizer selling price is little help if the producer cannot obtain enough of a necessary input.[23]

For a farmer buying 10 tonnes, those urea benchmarks imply roughly $8,570 in April versus $4,080 in September, before local freight and dealer costs. But the crop needs nutrients at the right time: waiting for a cheaper month may mean missing the application window.

05 / SPILLOVERS

One chemical. Two sides of the trade.

A sulfuric acid shortage can hurt one copper producer and help another. The processing route decides which side it is on.

INDUSTRY TERMS

By-product credit
Revenue from a secondary product deducted from reported production costs.

Payable copper
Copper for which a customer pays under the sales contract, after any contractual deductions.

WHY ONE PLANT BUYS & ANOTHER SELLS

Acid leaching dissolves copper from certain ores. Those operations need sulfuric acid as an input. A smelter can instead recover sulfur-bearing gases as acid and sell it to other mines.[43]

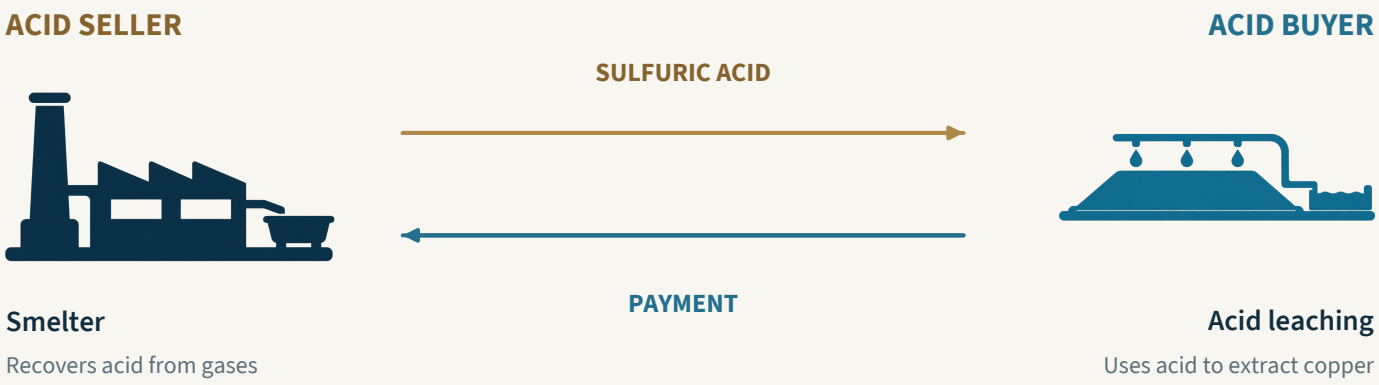
At Kamoa-Kakula in Q2 2026, acid credits of $0.39 per payable pound of copper offset about 95% of the $0.41 smelter operating cost. This covers the smelting component, not the full cost of copper production.[24]

THE CUSTOMER MATTERS TOO

Ivanhoe sells this acid at its mine gate to nearby operations in the DRC Copperbelt. A usable local market turns a secondary product into revenue. Storage, customers and transport are part of that value.[24]

For the buyer, a shortage can constrain production as well as raise costs. Two companies selling copper can therefore respond very differently to the same chemical price. Knowing the metal price is only the start of understanding the business.

CASE STUDY / KAMOA-KAKULA, Q2 2026



KAMOA-KAKULA / Q2 2026 / $ PER PAYABLE LB OF COPPER

$0.41	–	$0.39	=	$0.02
Smelting cost		Acid credit		Difference

Acid credits offset about 95% of smelting cost.

Physical acid flow and payment run in opposite directions. Simplified processing routes. Kamoa-Kakula, Q2 2026: $0.41 smelting cost less $0.39 acid credit leaves $0.02 per payable pound. The 95% offset is derived; these are not total copper production costs.[24,43]

05 / SPILLOVERS

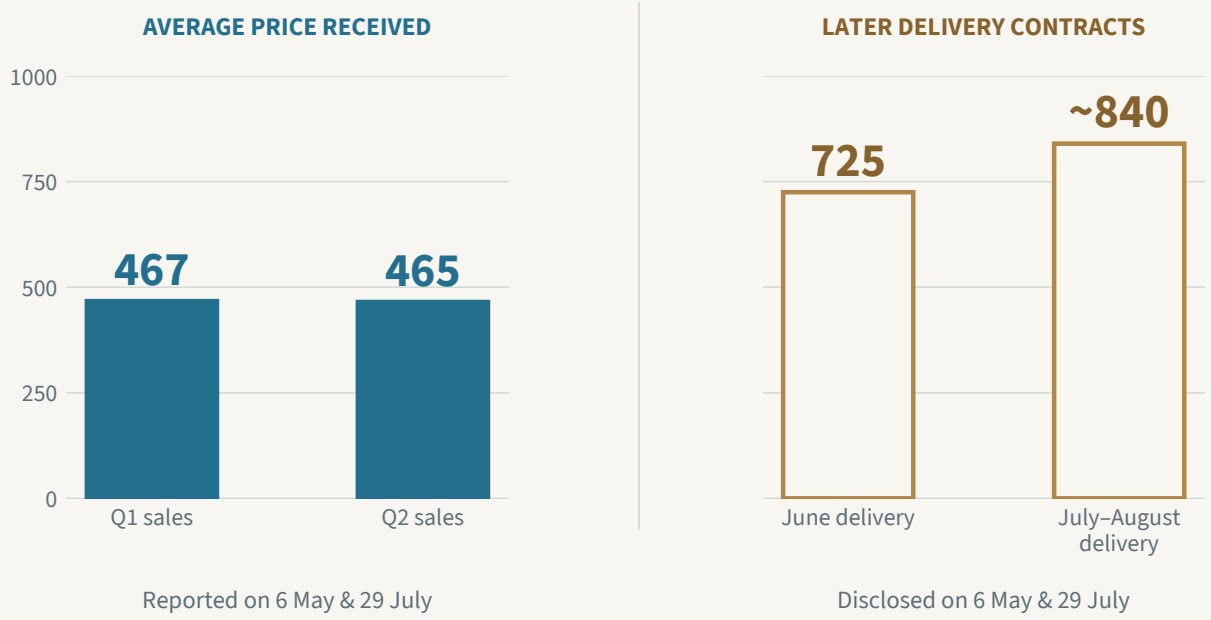
The quote is not the price received.

A contract can reset sharply while average sales prices barely move. This copper-industry example shows why timing matters.

PRICE HISTORY / ONE PRODUCER, TWO MEASURES

SULFURIC ACID / KAMOA-KAKULA / 2026

US dollars per tonne, at the mine gate



A new contract price does not instantly reprice every sale.

Ivanhoe company disclosures, US dollars/tonne. Filled bars: realised quarterly acid sales prices. Outlined bars: June delivery contract and expected average of July-August delivery contracts. Separate measures, not a continuous spot-price series. Latest disclosure used: 29 July 2026.[24,44]

THE CONTRACT CALENDAR MATTERS

Kamoa-Kakula received an average $467 per tonne of sulfuric acid in Q1 and $465 in Q2. Meanwhile, a contract for June delivery was set at $725; contracts for July and August were expected to average about $840.[24,44]

Sales averages include deliveries made under earlier terms. Contract renewal dates, shipment volumes and settlement rules can therefore delay the effect of a higher new price on reported revenue.

WHAT A BUYER WOULD WANT TO KNOW

For scale, a 1,000-tonne purchase at $840 would cost $115,000 more than at $725. That comparison holds volume and all other terms constant; it is not a claim about a particular customer's bill.

This acid is sold at one mine gate in the DRC. A buyer elsewhere faces different local supply, acid strength, delivery terms and transport costs. The history stops at the latest disclosed observations used here; it does not assume later sales realised $840.

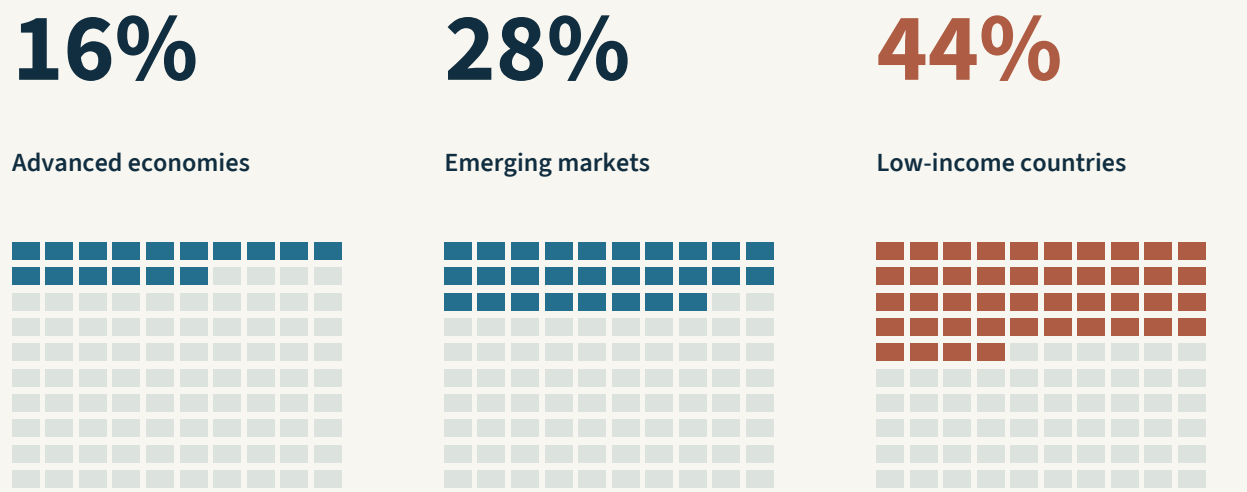
05 / SPILLOVERS

The same shock. A different burden.

Exposure depends on a country's trade, a business's costs and what a household already has to spend.

THROWBACK / THE 2022 SHOCK AS A GUIDE

FOOD'S SHARE OF CONSUMPTION IMF / JUNE 2022



Each square represents one percentage point of consumption.

Food's average share of consumption by economy group, as reported by the IMF in June 2022. A historical exposure comparison; these are not 2026 budgets or the direct effect of an oil-price rise.[37]

IMPORTERS & EXPORTERS

The IMF's March 2022 analysis showed why food and energy shocks affect regions differently. Oil importers faced a squeeze on purchasing power and trade balances; some exporters gained revenue.[25]

A weaker currency can amplify the importer's local fuel bill. An exporter benefits only if it can still produce and deliver. It may also face higher prices for imported food and equipment.

For a simple currency example, take a $100 oil purchase. At one local-currency unit per dollar, it costs 100 units. If a dollar later costs 1.20 units, the same oil costs 120. That 20% increase comes entirely from the exchange rate, before freight or taxes.

HOUSEHOLDS & BUSINESSES

In June 2022, the IMF put food at 44% of consumption in low-income countries, against 28% in emerging markets and 16% in advanced economies. Necessities leave less room to absorb a price rise.[37]

Oil can affect food through fertilizer, farming and transport. Harvests, currencies and trade policy matter too. The burden depends on the household's spending pattern and the government's response, not just the oil price.

05 / SPILLOVERS

Three budgets, one shock

An identical food-price increase takes a larger bite from a budget that already spends more on food.

WORKED EXAMPLE / THREE ILLUSTRATIVE $100 BUDGETS

16% FOOD SHARE		28% FOOD SHARE		44% FOOD SHARE	
Original total	$100	Original total	$100	Original total	$100
Food	19.20	Food	33.60	Food	52.80
Everything else	84.00	Everything else	72.00	Everything else	56.00
$103.20		**$105.60**		**$108.80**	
NEW TOTAL		NEW TOTAL		NEW TOTAL	
+$3.20		**+$5.60**		**+$8.80**	

CSC illustration using the preceding IMF food shares: 16%, 28% and 44%. Food prices alone rise 20%; quantities and all non-food prices stay unchanged. These are constructed $100 spending baskets, not observed household bills or national inflation forecasts.[37]

THE PRICE RISE MEETS THE SPENDING PATTERN

Begin with three $100 spending baskets. Food costs $16 in the first, $28 in the second and $44 in the third. Raise only food prices by 20%, and the same food now costs $19.20, $33.60 and $52.80. The additional total bill is therefore $3.20, $5.60 or $8.80.

The direct calculation is simple: food's share of spending multiplied by the food-price increase. The result depends on the starting basket. A headline about the same global commodity price can therefore imply very different pressure on living standards.

WHY THE RESPONSE CAN BE PAINFUL

A household whose income does not rise cannot keep buying everything in the old basket. It may switch foods, use savings or cut other spending. Those choices reduce the measured bill but do not make the original loss of purchasing power disappear.

Nor does a 20% rise in an international cereal index mean a 20% rise at the supermarket. Retail food also includes processing, packaging, labour and distribution; contracts and inventories can delay changes. The receipt is a controlled example that isolates one mechanism, not a pass-through forecast.

CSC VIEW

Targeted cash support lets households choose what they need most. Its weakness is coverage: people outside tax or benefit systems can be missed. Where that gap is large, temporary broader relief can help while registration improves.

06 / PERSPECTIVE

Three decisions before the next shock

CSC's view: secure deliverable fuel, identify the real production constraint and pay attention to the routes suppliers share.

01

DURING THE DISRUPTION

Put usable diesel near demand.

We would judge emergency stocks by the fuel they can deliver this week. When refining is the constraint, correctly specified diesel near consumers deserves priority over crude awaiting processing.

THE TRADE-OFF

Diesel costs money to store and maintain. A reserve also needs working terminals, trucks and pipelines; a full tank alone offers little protection.

02

BEFORE COMMITTING CAPITAL

Restore output before adding capacity.

First ask what keeps existing plants from producing more usable fuel: maintenance, conversion units, hydrogen or power. We would test those upgrades before backing another crude-distillation unit.

THE TRADE-OFF

Some plants will remain uncompetitive. Imports can be a better answer, and any long-lived upgrade must still earn its return if road-fuel demand falls.

03

BEFORE THE NEXT SUPPLY CONTRACT

Count independent routes.

Two suppliers using the same strait share a point of failure. We would give explicit value to different loading coasts, compatible crude grades and usable storage when comparing supply options.

THE TRADE-OFF

Resilience costs money in quiet years. Alternative routes can protect deliveries while global prices still rise. They reduce a physical risk, not every exposure to the market.

06 / PERSPECTIVE

Four markets. Four things to watch.

A short reading of the fortnight: what changed, what the number measures and why it matters.

OIL / STOCKS
7 OCTOBER

100m

barrels still to arrive

Get the pledged fuel moving

The IEA called for faster delivery of reserves already pledged in March, with diesel prioritised where possible.[26]

This is fuel still to be delivered, not a new 100m-barrel pledge.

GAS / LNG
1 OCTOBER

330+

billion m³/year of new capacity

A bigger export system is coming

Liquefied natural gas (LNG) projects in the IEA tracker are scheduled to add this annual export capacity in 2025-30. All were under construction by early 2025.[41]

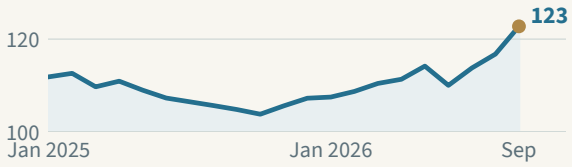
Plant capacity is a future flow, not gas available in storage today.

AGRICULTURE / CEREALS
2 OCTOBER

+5.1%

in September versus August

CEREAL PRICE INDEX / 2014–16 = 100



FAO linked the increase to weather and transport problems: grain prices have their own drivers.[29]

METALS / COPPER
2 OCTOBER

~67%

of normal ore-processing rate

Grasberg's recovery is partial

Freeport put Grasberg's ore processing at about two-thirds of the rate before the September 2025 mud rush, when wet material flooded the underground mine.[30,53]

Ore processed at a mine is not yet refined copper delivered to a buyer.

Cereal chart: FAO monthly nominal index, Jan 2025-Sep 2026; 2014-16 = 100. Release: 2 Oct 2026.[29]

NEXT TO WATCH

8 OCT NOAA El Niño / La Niña outlook / 14 OCT IEA Oil Market Report
15 OCT EU Oil Coordination Group[28,31,32]

SOURCES & DATA

The evidence behind the issue

Research cutoff: 7 October 2026. Numbered citations link here; source titles open the originals. The editable pack includes chart data, route geometry and calculation methods.

01 **EIA · World Oil Transit Chokepoints**
3 Mar 2026; data to H1 2025

02 **EIA · Why Hormuz matters**
Jun 2025; 2024 baseline

03 **Aramco · Annual Report, pipelines**
2022; infrastructure background

04 **Reuters · Saudi pipeline pumping**
6 Oct 2026

05 **AFP · Earlier pipeline-halt report**
5 Oct 2026; via L'Orient Today

06 **EIA · The refining process**
Technical background

07 **FuelsEurope / IEA · Refinery output**
2026 report, fig. 17; 2025 data

08 **Ecorys et al. · Refining history**
2013; DG CLIMA-commissioned study

09 **European Commission · Fuel imbalance**
2014; SWD(2014)330

10 **FuelsEurope / Wood Mackenzie · Demand**
2026 report, fig. 16; 2014 / 2024

11 **IEA · Oil 2025, refining outlook**
2025; forecast horizon to 2030

12 **EIA / Vortexa · Europe's diesel supply**
17 Sep 2025; 2022-H1 2025 data

13 **OQ8 · Duqm's 100th export vessel**
14 Feb 2024; design capacity

14 **Kuwait Government · Al-Zour refinery**
19 Jun 2024; design capacity

15 **UNCTAD · Maritime Transport 2025**
Chapter 1; 2024 trade data

16 **Gard · War-risk circular 08/2026**
12 Aug; effective 16 Aug 2026

17 **Gard · Middle East conflict FAQ**
19 Mar 2026

18 **EIA / LSEG · Monthly spot prices**
30 Sep release; through Aug 2026

19 **EIA · Spot-price definitions**
Price-series methodology

20 **World Bank · Commodity Pink Sheet**
2 Oct 2026; monthly workbook

21 **IFA · Fertilizer supply chains**
16 Mar 2026

22 **IFPRI · Fertilizers & Hormuz**
18 Sep 2026

23 **Mosaic · Agricultural industry impacts**
27 Aug 2026

24 **Ivanhoe · Q2 operating results**
29 Jul 2026; smelting cost / credit

25 **IMF · How war affects world regions**
15 Mar 2022; historical analysis

26 **IEA · Accelerating reserve deliveries**
7 Oct 2026

27 **IEA · Oil-stock obligations**
12 Aug 2026 update; methodology

28 **European Commission · Oil supply**
29 Sep 2026; Oil Coordination Group

29 **FAO · Cereal prices & monthly history**
2 Oct 2026; monthly workbook

30 **Freeport · Q3 operational update**
2 Oct 2026

31 **IEA · Oil Market Report calendar**
Next report: 14 Oct 2026

32 **NOAA · ENSO discussion**
10 Sep; next update 8 Oct 2026

33 **Natural Earth · Geographic base**
1:10m countries; public domain

34 **EIA · US transport-fuel exports**
2026 publication; 2025 data

35 **IEA · Fuel pressure & the G7**
2 Oct 2026

36 **Eurostat · EU oil commodity balance**
2024; nrg_cb_oil; 2 Sep 2026 update

37 **IMF · Food costs & vulnerability**
7 Jun 2022; historical comparison

38 **Fertilizers Europe · Production routes**
Technical background; accessed 7 Oct 2026

39 **Kuwait Petroleum Intl · Duqm design**
230,000 b/d; design feedstock mix

40 **OQ8 · Reliability & feedstock flexibility**
2024 operations; company review

41 **IEA · Global LNG Capacity Tracker**
1 Oct 2026; scheduled capacity to 2030

42 **EIA · LPG & petrochemical uses**
26 Dec 2023; technical background

43 **Ivanhoe · Acid buyers & sellers**
13 Apr 2026; processing routes

44 **Ivanhoe · Q1 acid sales & contracts**
6 May 2026

45 **EU · Road-fuel quality requirements**
Directive 98/70/EC, Annex II

46 **EIA · Diesel fuel & sulfur**
Technical background

47 **EIA · Fuel properties & cold weather**
3 May 2018; corrected 9 May 2019

48 **Baltic Exchange · Chartering guide**
Costs & contract structures

49 **EIA · How product trade links prices**
Market mechanism; 2022 example

50 **Baltic Exchange · Laytime & demurrage**
Shipping glossary

51 **IEA · Hormuz & alternative export routes**
Feb 2026; spare-capacity assessment

52 **EIA · Global Energy Security Data**
12 Aug 2026; flows through Q2 2026

53 **Freeport · Grasberg mud-rush incident**
2025 Sustainability Report; 8 Sep 2025 incident

MAPS & METHODS

Natural Earth 1:10m base. Sea routes show named offshore approaches or explicit continuations, not tracked voyages. Suez is modelled as a canal; pipeline alignments are approximate. Worked costs are assumptions, not quotes.

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