

The Whole Barrel:

Why Every Drop Matters When You Pay for Crude Oil

A plain-language guide for buyers, partners, and clients new to the economics of physical petroleum trading.

Most people picture an oil refinery as a place that turns crude oil into fuel. That description is true in the simplest sense, but it conceals the most important fact about how money is made and lost in the physical petroleum business.

This article is written for the visitor to the Afri-Fuel-Consult website who has heard the words "crude", "refining", "diesel", and "trader" used in the same conversation but has not had the underlying economics explained in plain terms. By the time you reach the end, you will understand why a buyer who pays for the crude itself, rather than just one finished product, takes on a very different commercial risk to a buyer who simply purchases a finished fuel.

We will walk through the maths together, using current market prices for Brent crude and an illustrative complex European refinery. No prior knowledge of petroleum chemistry or trading is required.

The principle in one sentence: *When you pay for the crude oil, you pay for the whole barrel. The only way to make your money back is to sell every drop of it.*

1. Crude Oil Is Not One Substance

Crude oil pumped out of the ground is not a single chemical. It is a mixture of hundreds of different compounds, each one with its own boiling point. When this mixture is heated in the tall distillation tower at the heart of a refinery, the different compounds separate from one another by boiling point. Light compounds come off near the top of the tower. Heavy compounds come off near the bottom. Each level produces a different commercial product.

The refinery does not choose what comes off the tower. The chemistry of the crude decides. When a refinery charges 1,000 kilograms of Brent crude into the distillation tower, it does not produce 1,000 kilograms of diesel for the buyer. It produces a fixed mixture of seven different output streams, all at the same time, in roughly the same proportions every parcel.

This is the first fact a new client must internalise. Refining is not a transformation of one substance into another; it is a separation of a pre-existing mixture into its component parts.

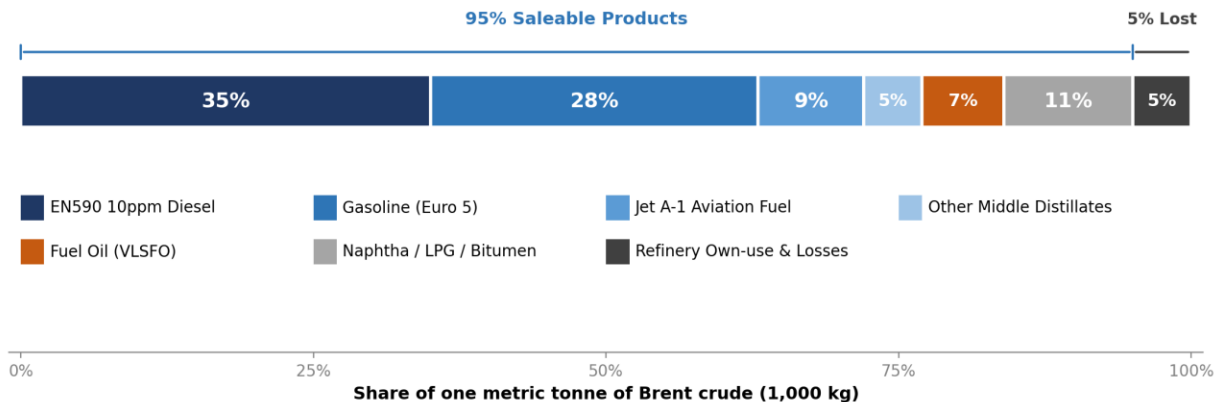
2. What Comes Out of One Tonne of Brent Crude

To make this concrete, let us walk through what happens when one metric tonne (1,000 kilograms) of Brent crude is charged into a complex European refinery. We will use a refinery of the Shell Pernis Rotterdam class as our example: this is the largest refinery in Europe, with a Nelson Complexity Index of approximately 10, capable of producing the full slate of finished Euro 5 and Euro 6 grade products. The yield slate from Brent crude at a refinery of this class is approximately as follows:

Product	Mass (kg)	Share	What it is, in plain language
EN590 10ppm Diesel	350 kg	35%	High-grade transport diesel for trucks, buses, and ships
Gasoline (Euro 5)	280 kg	28%	Petrol for passenger cars and light vehicles
Jet A-1 Aviation Fuel	90 kg	9%	Kerosene-grade fuel for commercial aircraft
Other Middle Distillates	50 kg	5%	Marine gas oil, heating oil, off-road diesel
Fuel Oil (VLSFO)	70 kg	7%	Heavy industrial fuel for ships and power stations
Naphtha, LPG, Bitumen	110 kg	11%	Petrochemical feedstock, cooking gas, road asphalt
Refinery own-use and losses	50 kg	5%	Burned by the refinery for its own energy, or lost in processing
TOTAL	1,000 kg	100%	Every kilogram accounted for

All seven streams come out at the same time, from the same crude. The refiner cannot "make more diesel" by suppressing the gasoline or the jet fuel. The split is fixed by the underlying chemistry and is broadly similar for every metric tonne of Brent crude that enters the refinery.

**What Comes Out of One Tonne of Brent Crude at a Complex EU Refinery
(Yield slate typical for Shell Pernis class, Rotterdam)**



This is the single most important visual in this article. It shows that when a buyer pays for one metric tonne of crude oil, the refinery produces seven different things at once. Six of them have commercial value (95% of the tonne). One of them (the 5% own-use and losses) has no value to the buyer and is consumed inside the refinery itself. This image is the basis of everything that follows.

3. The Costs the Buyer Cannot Avoid

Now we turn to the money. With Brent crude trading at approximately USD96 per barrel today, and a standard conversion of 7.45 barrels per metric tonne of Brent (Brent has an API gravity of around 38, which determines this ratio), the buyer's per-tonne cost stack at a Rotterdam-area refinery is as follows:

Cost Component	USD per MT crude	What it pays for
Crude oil purchase	715.20	Brent at USD 96/bbl × 7.45 bbl/MT
Refinery tolling fee (complex EU class)	45.00	What the refinery charges to process each tonne of the buyer's crude
Terminal handling, inspection, FOB loading	15.20	Storage, SGS or Intertek quantity and quality inspection, vessel loading
Cargo insurance and risk allowance	2.85	Marine cover for product cargoes leaving the refinery
Working capital financing (60-day cycle)	7.60	Cost of capital between payment for crude and customer receipt
TOTAL all-in cost per metric tonne of crude	USD 785.85	What it costs to charge 1,000 kg of crude into the refinery and deliver the products FOB

Every metric tonne of crude charged into the refinery costs the buyer approximately USD786 by the time the products are loaded onto a vessel. Critically, *this cost is incurred regardless of how many of the resulting products the buyer successfully sells*. The crude is paid for upfront. The tolling fee applies to every tonne charged. The working capital cycle runs whether the products move or sit.

4. The Revenue the Buyer Must Realise

The 950 kilograms of saleable product produced from each metric tonne of crude has the following indicative value at current FOB Rotterdam prices:

Product	Kilograms (per MT crude)	Price (USD/kg)	Revenue (USD)
EN590 10ppm Diesel	350	0.90	315.00
Gasoline (Euro 5)	280	0.94	263.20
Jet A-1	90	0.98	88.20
Other Middle Distillates	50	0.85	42.50
Fuel Oil (VLSFO)	70	0.57	39.90
Naphtha / LPG / Bitumen	110	0.68	74.80
TOTAL (if every product is sold)	950 kg	—	USD 823.60

If the buyer sells every product, each metric tonne of crude charged returns approximately USD824 in revenue against the USD786 spent. That is a margin of approximately USD38 per metric tonne, or about 5%. In per-barrel terms this is about USD5 per barrel of crude, which is typical for European refining economics in the current market environment.

Five per cent does not sound like much. But on the volumes at which physical petroleum trading operates, even a 5% margin generates substantial returns. More importantly, this margin only exists if the buyer can monetise the full slate. We turn to that next.

5. The Three Sales Scenarios

Three scenarios show what happens to the same crude bill under different sales outcomes. In every case the buyer pays the full USD786 per tonne of crude. The only variable is how many of the six saleable products find a buyer.

Scenario A: Sell only the EN590 diesel

Suppose the buyer has a confirmed channel for EN590 diesel but cannot find buyers for any of the other five product cuts. The other products still come out of the refinery. The buyer still paid for the crude that produced them. But they have no revenue value.

Line	Value (USD per MT crude)
Revenue: EN590 (350 kg × USD 0.90)	315.00
Revenue: all other products (no buyers)	0.00
Total revenue	315.00
Total cost (crude + tolling + financing + EN590 logistics)	773.40
LOSS per metric tonne of crude	USD -458.40

Scenario B: Sell the EN590, the gasoline, and the jet fuel

Suppose the buyer has channels for three of the six saleable products: diesel, gasoline, and jet fuel. The remaining three cuts (other middle distillates, fuel oil, and the naphtha/LPG/bitumen blend) cannot find buyers.

Line	Value (USD per MT crude)
Revenue: EN590 (350 kg × USD 0.90)	315.00
Revenue: Gasoline (280 kg × USD 0.94)	263.20
Revenue: Jet A-1 (90 kg × USD 0.98)	88.20
Total revenue	666.40
Total cost (crude + tolling + financing + three-product logistics)	779.32
LOSS per metric tonne of crude	USD -112.92

Better than Scenario A, but still a loss. Selling three of the six products is not enough to cover the cost of buying the crude that produced all six. The buyer is being asked to absorb the value of the unsold cuts.

Scenario C: Sell every product

This is the target scenario. The buyer successfully sells all six saleable product cuts, either to its established buyer pool or through partnerships with regional traders, blenders, and end-users.

Line	Value (USD per MT crude)
Revenue: EN590 (350 kg × USD 0.90)	315.00
Revenue: Gasoline (280 kg × USD 0.94)	263.20
Revenue: Jet A-1 (90 kg × USD 0.98)	88.20
Revenue: Other middle distillates (50 kg × USD 0.85)	42.50
Revenue: Fuel oil VLSFO (70 kg × USD 0.57)	39.90
Revenue: Naphtha, LPG, bitumen (110 kg × USD 0.68)	74.80
Total revenue	823.60
Total cost (crude + tolling + financing + full-slate logistics)	785.85
PROFIT per metric tonne of crude	USD +37.75

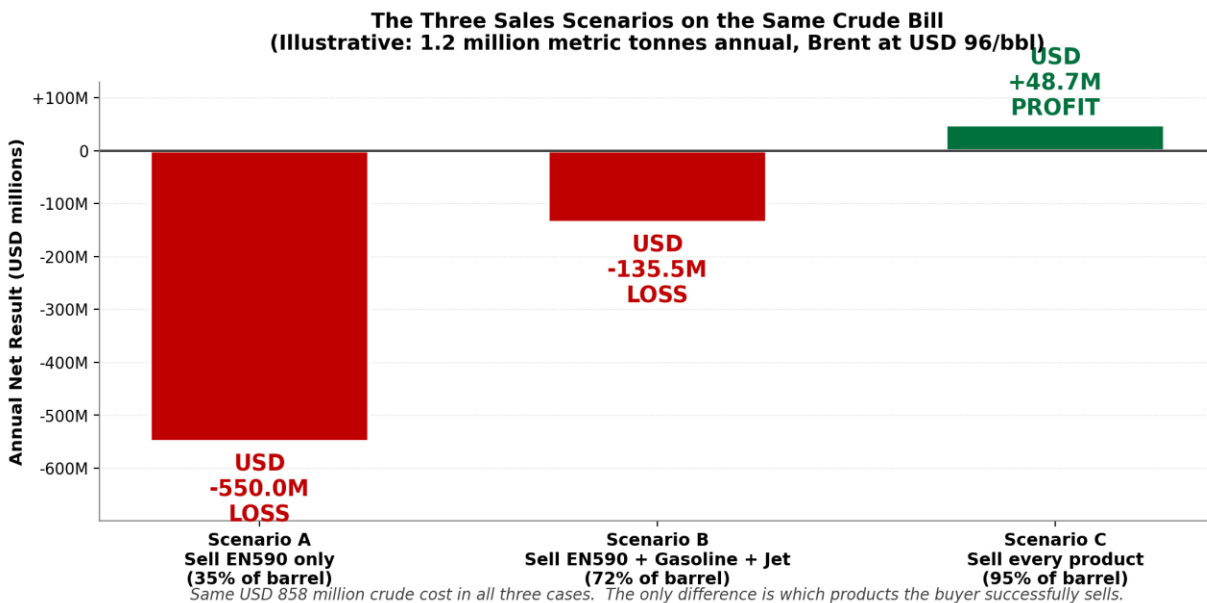
Same crude. Same refinery output. Same product prices. The only variable is how many of the six products the buyer successfully sells. *Sell one: lose USD 458 per tonne. Sell three: lose USD 113 per tonne. Sell all six: gain USD 38 per tonne.*

6. Scaled Up to a Commercial Parcel

Per-tonne figures can feel abstract. Let us scale them to a realistic commercial volume. A typical large parcel in physical petroleum trading is 100,000 metric tonnes of crude per month, which equates to approximately 745,000 barrels. Over a twelve-month period that is 1.2 million metric tonnes of crude and an aggregate purchase cost of approximately USD858 million.

Applying the per-tonne mathematics of the three scenarios above to this volume produces the following annual outcomes:

Scenario	Products Sold	Annual Revenue (USD)	Annual Net Result (USD)
A: Sell EN590 only	35% of crude yield	378M	Loss of 550M
B: Sell EN590 + Gasoline + Jet	72% of crude yield	800M	Loss of 135M
C: Sell every product	95% of crude yield	988M	Profit of 49M



The contrast is stark. On the same crude bill, the same refinery slate, and the same product prices, the difference between selling only the diesel and selling every product is approximately USD600 million per year. There is no clever financial engineering that bridges this gap. Only marketing the full slate does.

7. Why This Matters for Buyers and Partners

The economics above explain a structural fact about physical petroleum trading that is not always obvious to those new to the industry. There is a fundamental difference between two roles that look superficially similar:

- **The downstream product trader:** A buyer who purchases one finished product (for example, EN590 diesel) from a refinery at a fixed per-tonne price, lifts it to its customers, and resells it at a margin. The trader's exposure is bounded by the volume and price of the one product purchased. The refinery retains the crude purchase obligation and the marketing of every other product cut.
- **The principal owner of the crude:** A buyer who purchases the crude oil itself, pays a refinery to process it on its behalf, and takes ownership of every product the refinery produces. This buyer's exposure is the whole barrel. The marketing of all six product cuts becomes the buyer's commercial responsibility, and the buyer's profitability depends on whether all six cuts find a home.

These two structures look similar from the outside ("a buyer purchases petroleum products from a refinery") but they are profoundly different in the risks they impose. Anyone considering a partnership or a supply arrangement in the petroleum sector should know which structure they are being asked to participate in, because that determines who carries the marketing risk on the heavier and less popular cuts of the barrel.

Buyers new to the industry sometimes accept a crude purchase structure thinking they have agreed to buy only their target product (say, EN590). When the refinery delivers the full slate and asks them to sign for it, they discover that they own the gasoline, the jet fuel, the fuel oil, the naphtha, the LPG, and the bitumen as well. By then, the working capital is committed, and the crude is paid for. The arithmetic of Scenario A or Scenario B catches them in real time.

8. How Afri-Fuel-Consult Approaches This

Afri-Fuel-Consult operates as a principal trader, not an intermediary. Every metric tonne we trade, we own outright on title. That is the standard we hold ourselves to, and it is the standard we test prospective partners against.

Our published focus is EN590 10ppm ultra-low sulphur diesel. That focus exists for a reason. We have built confirmed marketing channels for this product across our buyer pool in Africa, Asia, the Indian Ocean rim, and South America. When a supplier offers us finished EN590 at a per-tonne price, the commercial structure aligns with where our marketing capability is, and we can quote our buyers with confidence.

When a supplier offers us the crude instead of the finished diesel, the analysis above is the analysis we run. We model the full slate. We ask which cuts our partners or we ourselves can place. We price the unplaced cuts conservatively or assign them back to the upstream party. We do not commit working capital to a barrel we cannot fully monetise.

This discipline is the difference between a principal trader and an aspirational one. It is also what allows us to honour the commitments we make to our buyers, because we never lift a parcel we cannot place. Clients of Afri-Fuel-Consult are buying from a trading house that understands these mechanics in detail and refuses to deploy capital into structures where the arithmetic does not close.

Afri-Fuel-Consult: We own what we sell. We document everything. We deliver what we commit to.

For our daily market intelligence, see the Market Intelligence page. For specific commercial enquiries, please use the Get In Touch page or the Client Portal.

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All figures in this article are illustrative for educational purposes, based on Brent crude at USD 96 per barrel and indicative FOB Rotterdam product prices at the date of publication. Refining economics in the physical petroleum industry vary continuously with crude-product price spreads, refinery efficiency, and market conditions.

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