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The Global Trade in Physical Crude Oil Cargoes

Mechanisms, Participants, Pricing, and Digitization

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The Global Trade in Physical Crude Oil Cargoes: Mechanisms, Participants, Pricing, and Digitization

Introduction

The global physical crude oil market represents a cornerstone of the world economy, underpinning energy supply chains and influencing macroeconomic trends. Its scale is immense, significantly larger than any other commodity market in terms of both physical production value and financial market activity. ¹ Every day, millions of barrels of crude oil are bought, sold, transported, and processed, involving a complex web of participants, intricate logistical operations across vast distances, and substantial financial flows. ² This market connects thousands of producers, refiners, marketers, brokers, traders, and consumers worldwide through an extensive physical infrastructure of rigs, pipelines, ports, tankers, and storage facilities, all supported by an international financia I market.² Understanding how companies navigate this complex environment to trade physical cargoes of crude oil is crucial for anyone involved in the energy sector or global commerce. The interplay between the physical movement of oil and the associated financial markets adds further layers of complexity and opportunity. ³

This report aims to provide a comprehensive analysis of the mechanisms governing the trade of physical crude oil cargoes. It will dissect the primary trading methodologies, identify the key participants and their respective roles, and detail the typical lifecycle of a physical trade, from initial negotiation through contract terms, logistics management, quality verification, and final payment settlement. Furthermore, the report will examine the critical role of benchmark crudes like Brent and West Texas Intermediate (WTI) in global pricing, clarify the meaning and function of Indications of Interest (IOIs) within the trading context, and investigate the current landscape and capabilities of electronic trading platforms specifically for physical cargo transac tions. Finally, it will explore the vital connections and distinctions between the physical crude market and the related financial derivatives markets, particularly futures contracts.

The analysis will proceed by first outlining the fundamental landscape of physical crude trading, including its dominant methodologies and the diverse array of

participants. It will then delve into the anatomy of a typical trade, followed by an examination of pricing mechanisms centered around benchmarks. The role of IOIs and the state of electronic trading platforms will be assessed before concluding with an analysis of the relationship between physical and financial oil markets.

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Section 1: The Landscape of Physical Crude Oil Trading

The international trade in physical crude oil operates through specific methodologies and involves a diverse set of actors, each playing a distinct role in moving oil from production sites to refineries.

1.1 Trading Methodologies

The way physical crude oil cargoes change hands is shaped by the commodity's unique characteristics and logistical requirements.

Over - the - Counter (OTC) Dominance : Unlike many financial assets or standardized commodities traded on public exchanges, the vast majority of international physical crude oil transactions occur in the over - the-counter (OTC) market. ¹ In this market, deals are privately negotiated between two counterparties, and the specific terms of the transaction are not typically disclosed publicly. ¹ This prevalence of OTC trading is well-suited to the nature of crude oil itself. With over 300 different types of crude oil varying in quality (density, sulfur content, etc.), buyers (primarily refiners) often have specific requirements, necessitating tai lored contracts that specify grade, delivery terms, and pricing formulas. ¹ Standardized exchange contracts struggle to accommodate this heterogeneity efficiently for physical delivery purposes.

Term Contracts : A significant portion of global physical crude oil trade, estimated at around 90 percent, is conducted under medium - and long-term contracts. ¹ These agreements are negotiated directly between producers (like National Oil Companies or International Oil Companies) and major consumers (like refiners) or intermediaries (trading houses). ⁴ Term contracts provide security of supply for the buyer and security of demand for the seller over an extended period. ⁵ They typically outline volume commitments and establish a formula -based pricing mechanism, linking the price of the delivered crude to recognized benchmark prices, adjusted by a negotiated differential. ¹ Commodity trading firms often secure long -term supply from producers through "offtake agreements," sometimes providing upfront financing or investment in return for guaranteed future volumes. ⁵

Spot Market : While term contracts dominate, physical crude oil cargoes are also traded on the spot market. ¹ These transactions typically involve single cargoes for

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relatively prompt delivery.⁷ However, the term "spot" in the oil market differs significantly from its meaning in other commodity markets. Due to the complex logistics of sourcing, chartering vessels, loading, transporting, and unloading large oil cargoes, "spot" delivery rarely means immediate or next-day delivery.¹ Instead, it usually refers to near-term forward transactions, with physical delivery scheduled anywhere from 10 days to as long as 60 days after the deal is concluded.¹ These spot deals often represent the "marginal barrel" – oil traded to meet unforeseen refinery needs, dispose of surplus production not covered by term contracts, or capitalize on short-term arbitrage opportunities.¹ The prices agreed in these spot transactions reflect immediate supply and demand dynamics and serve as crucial inputs for price assessments by Price Reporting Agencies (PRAs) and influence the pricing levels of futures contracts.⁷



Figure 1 Oil Cargo Market Participants

Physical vs. Financial Trading : It is essential to distinguish between trading physical cargoes and trading oil financially. While this report focuses on the physical trade

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involving the actual movement of oil, the vast majority of *trading volume* associated with crude oil occurs in the financial derivatives markets. ¹ Instruments like futures contracts, options, swaps, and Contracts for Difference (CFDs) are traded in massive volumes on exchanges (like ICE and NYMEX) and OTC? Most of these financial contracts are cash - settled or closed out before expiration, meaning they do not result in the physical delivery of oil. ¹ Financial trading volume dwarfs physical trading volume, with daily "paper barrels" traded often being multiples of actual global oil consumption. ⁹ However, the physical market remains the fundamental anchor, providing the underlying commodity whose price movements the financial markets track and hedge. ⁹

The structure of the physical market, dominated by privately negotiated OTC deals and long-term relationships inherent in term contracts, underscores the importance of counterparty trust, creditworthiness assessment, and strong negotiation skills. ¹ This relationship-centric aspect, driven by the need for tailored agreements and reliable performance in complex logistical operations, differentiates it from more anonymous, standardized exchange - traded markets and presents challenges for full digitizati on. Furthermore, the extended timeframe associated with "spot" deals in oil trading directly reflects the inescapable influence of shipping and logistics, making these operational aspects integral to the very definition of market timing, unlike commodities with simpler transport chains. ¹

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Feature	Term Contract	Spot / Near - Term Forward
Primary Mechanism	Negotiated Bilateral (OTC)	OTC / Broker-Facilitated
Typical Duration	Medium to Long - Term (Months/Years)	Single Cargo
Typical Delivery	Scheduled over contract period	Prompt (often 10 -60 days post - deal)
Pricing Basis	Formula (Benchmark +/- Differential)	Spot Assessment / Differential vs. Benchmark/Futures
Typical Use	Secure long-term supply/demand	Marginal barrel, surplus disposal, urgent need
Market Prevalence	Dominant (approx. 90% of physical trade) ¹	Less common (approx. 10% of physical trade) ¹
Flexibility	Lower (Volume/Price often pre-agreed)	Higher (Negotiated per cargo)
Price Discovery Role	Reflects longer - term views	Reflects immediate supply/demand, marginal value

Figure 2 Comparison of Physical Crude Oil Trading Methods

1.2 Key Market Participants and Their Roles

A diverse range of entities participates in the global physical crude oil market, each contributing unique functions and capabilities:

- **Producers** : These are the entities that extract crude oil from the ground. They form the initial supply side of the market.⁵ This category includes:
- National Oil Companies (NOCs) : State-owned enterprises that control the vast majority of the world's proven oil reserves (over 80%) and a significant share of global production (around 60%).¹ Examples include Saudi Aramco, Rosneft, PetroChina, etc. Their production and export policies heavily influence global supply.
- International Oil Companies (IOCs) : Large, publicly traded multinational corporations involved in exploration and production globally, often referred to as "majors".⁵ Examples include ExxonMobil, Shell, BP, Chevron.¹⁶ While their share of reserves is smaller than NOCs, they possess significant technological expertise and global reach.
- Independent Producers : Smaller companies focused primarily on exploration and production, often operating regionally.⁵ They may sell their production to larger companies, traders, or directly into the market if they have logistical capabilities.
- **Refiners** : Refiners are the primary buyers and consumers of physical crude oil.⁴ They operate complex facilities that process crude oil into refined petroleum products like gasoline, diesel, jet fuel, heating oil, and feedstocks for the petrochemical industry.¹ Refiners' specific technical configurations and target product slates dictate their demand for particular crude oil qualities (API gravity, sulfur content, etc.).
- **Trading Houses** : These are specialized firms whose core business is buying, transporting, storing, blending, and selling physical commodities, including crude oil.⁵ Major players include companies like Vitol, Trafigura, Glencore, and Mercuria.¹⁶ They act as crucial intermediaries, bridging the gap between producers and refiners globally.⁶ Their expertise lies in logistics (transforming commodities in space), storage (transforming in time), and sometimes

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processing or blending (transforming in form).¹⁹ They thrive by identifying and exploiting arbitrage opportunities arising from price discrepancies between regions, time periods, or qualities, often navigating complex logistical bottlenecks and managing associated risks.⁵ They are major users of trade finance ²¹ and sophisticated risk management tools.¹⁹

- Integrated Oil Companies : This category overlaps with IOCs but emphasizes companies that operate across multiple stages of the oil value chain from upstream exploration and production, through midstream transportation and trading, to downstream refining and marketing. ⁵ Their trading arms often function similarly to independent trading houses but also manage the company's own production and refining needs.
- Brokers : Brokers act as intermediaries, facilitating transactions between buyers and sellers in the OTC market without taking ownership (title) of the physical oil themselves.¹⁴ They connect parties, provide market information and intelligence, assist in negotiations, and earn a commission for their services.²² They are particularly active in arranging deals for specific cargoes or in niche markets.¹⁴ Many brokerage firms specialize in energy markets, offering services for both physical and derivative trades.¹¹
- **Financial Institutions** : Banks play an indispensable role by providing trade finance instruments like Letters of Credit (LCs) and revolving credit facilities, which are essential for funding high -value cargo transactions. ²¹ Other financial players, such as hedge funds, investment banks, and commodity trading advisors (CTAs), participate primarily in the oil derivatives markets (futures, options, swaps) for speculation, investment diversification, or providing liquidity, rath er than trading physical barrels. ³ Their activity, however, significantly impacts overall price levels and volatility, influencing the physical market indirectly. ³⁰
- Logistics Providers : Shipping companies operating tanker fleets, pipeline operators, and owners of storage terminals and facilities are critical enablers of the physical trade. ² Their capacity, availability, and costs directly impact trading decisions and arbitrage economics.

The evolution of the market has seen independent trading houses rise in prominence

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since the 1970s, taking on roles previously dominated by the integrated oil majors.²⁰ These specialized firms leverage expertise in logistics, risk management, and finance to optimize the complex global supply chain, often capitalizing on market inefficiencies and infrastructure constraints.¹⁶ Despite the visibility of IOCs and traders, the dominant position of NOCs in controlling underlying reserves and production capacity grants them substantial market power, allowing their strategic

Participant Type	Primary Role	Ownership	Key Examples (Illustrative)
Producer - NOC	Extract & Sell Crude (State - Owned)	Yes	Saudi Aramco, Rosneft, PetroChina
Producer - IOC	Extract & Sell Crude (Multinational)	Yes	ExxonMobil, Shell, BP, Chevron ¹⁶
Producer - Independent	Extract & Sell Crude (Smaller/Regional)	Yes	Various smaller E&P companies
Refiner	Buy & Process Crude into Products	Yes	Valero, Marathon Petroleum, Sinopec, Reliance Industries
Trading House	Intermediation, Logistics, Storage, Arbitrage	Yes	Vitol, Trafigura, Glencore, Mercuria ¹⁶
Integrated Oil Company	Full Value Chain (Production, Refining, Trading)	Yes	Shell, BP, ExxonMobil, Chevron ¹⁶
Broker	Facilitate Deals, Provide Market Intel	No	Onyx ²⁵ , Oil Brokerage ²⁶ , Evolution ²⁸
Financial Institution (Bank)	Provide Trade Finance (LCs, Credit)	No	Major international banks
Financial Institution (Other)	Speculate/Invest/Hedge in Derivatives	No (Typically)	Hedge Funds, Investment Banks, CTAs ²²
Logistics Provider	Transport (Ship/Pipeline), Store Crude	No	Tanker companies, Pipeline operators, Terminal owners

decisions to significantly shape global supply balances and price trends.¹

Figure 3: Key Participants in Physical Crude Oil Trading

Section 2: Anatomy of a Physical Crude Oil Cargo Trade

Trading a physical cargo of crude oil is a multi -stage process involving detailed negotiation, precise contractual terms, complex logistics, and secure payment settlement .

2.1 Negotiation and Deal Initiation

Physical crude oil deals typically originate through various channels. Established relationships between producers, refiners, and traders often lead to direct negotiations. ¹⁴ Brokers play a key role in introducing potential buyers and sellers, particularly in the OTC market. ¹⁴ Deals may also arise opportunistically to address specific market needs, such as a refiner requiring an urgent cargo or a producer needing to sell surplus barrels not committed under term contracts. ¹ Identifying these opportunities requires constant market monitoring, analysis of supply/demand fundamentals, and tracking of price movements and arbitrage windows. ²¹

Once potential counterparties connect, the negotiation phase begins. This is often an iterative process where traders, representing their respective firms (producer, refiner, trading house), discuss and agree upon the critical commercial terms of the transaction.⁶ Key points of negotiation include ⁶:

- **Product Specification** : The exact grade of crude oil (e.g., Brent Blend, WTI Midland, Arab Light) and its agreed quality parameters.
- Quantity : The volume of the cargo, typically specified in barrels (e.g., 600,000 barrels).
- **Delivery Window (Laycan)** : The agreed timeframe during which the vessel must arrive for loading or discharge.
- **Pricing Mechanism** : Whether the price will be fixed outright or, more commonly, determined by a formula based on a benchmark crude price (e.g., Dated Brent) plus or minus a negotiated differential. The specific benchmark, pricing period (e.g., average price over 5 days around the Bill of Lading date), and the differential itself are all subject to negotiation.
- **Incoterms** : The standardized trade term (e.g., FOB, CIF) that defines the responsibilities, costs, and risk transfer point between buyer and seller.

- **Payment Terms** : The method (e.g., Letter of Credit, Open Account) and timing of payment.
- **Governing Law and Dispute Resolution** : The legal framework under which the contract will be interpreted and disputes resolved.

Modern trading desks utilize various communication tools during negotiation, including traditional phone calls, email, and increasingly, instant messaging platforms, which allow traders to conduct multiple negotiations simultaneously to secure the best ter ms.²³

The negotiation culminates in a legally binding sales contract once there is a clear offer and an unconditional acceptance of that precise offer (the "mirror image rule"). ⁶ Any modification to the offer constitutes a counter -offer, which terminates the original offer and reverses the roles of offeror and offeree. ⁶ Given the high value and complexity of crude oil transactions, companies often rely on pre - agreed standard terms and conditions vetted by their legal departments to streamline the contract finalization process. ¹⁴ Clearly defined contract terms are paramount to prevent misunderstandings and potential disputes later in the trade lifecycle. ⁶

2.2 Essential Contract Terms

The sales contract for a physical crude oil cargo contains numerous critical clauses. Among the most important are Incoterms and quality specifications.

Incoterms (FOB vs. CIF) : Incoterms (International Commercial Terms) are a set of globally recognized rules published by the International Chamber of Commerce (ICC) that define the responsibilities of buyers and sellers for the delivery of goods under sales contracts. ³¹ They clarify who is responsible for arranging and paying for transport, insurance, export/import clearance, and, crucially, when the risk of loss or damage to the goods transfers from the seller to the buyer. For seaborne crude oil trade, FOB and CIF are the most commonly encountered terms. ⁶

FOB (Free On Board) : Under FOB terms (followed by the named port of loading, e.g., FOB Bonny), the seller's responsibility is to deliver the crude oil and load it on board the vessel nominated by the buyer at the agreed port. ³¹ The seller handles export clearance. ³³ Both the cost and the risk of loss or damage transfer from the seller to the buyer when the oil passes the ship's rail

(or is safely loaded aboard, depending on the specific Incoterms version cited).³¹ From that point onwards, the buyer is responsible for arranging and paying for the main sea freight, insurance for the voyage, unloading costs, import duties, and any further transport.³³ FOB gives the buyer greater control over the choice of vessel, shipping schedule, and insurance coverage, potentially allowing for cost savings.³³ However, it places the burden of managing international shipping logistics squarely on the buyer, requiring significant expertise.³⁵ Producers with limited logistical capabilities often prefer to sell on an FOB basis.⁶ Cargo volume under FOB is typically determined based on measurements taken at the loading port.³¹

• CIF (Cost, Insurance, and Freight) : Under CIF terms (followed by the named port of destination, e.g., CIF Rotterdam), the seller has broader responsibilities. The seller must contract for and pay the costs of the goods, the main carriage (sea freight) to bring the oil to the agreed destina tion port, and obtain at least minimum marine insurance cover against the buyer's risk of loss or damage during transit. ³¹ Importantly, while the seller arranges and pays for these elements, the risk of loss or damage transfers from the seller to the buyer at the port of origin once the goods are loaded onto the vessel, just like FOB. ³³ The buyer assumes responsibility for costs and risks from the destination port onwards, including unloading, import clearance, and duties. ³³ CIF is often preferred by buyers who lack shipping expertise or prefer a simpler landed cost, as the seller handles the main logistics. ³⁵ However, it generally offers the buyer less control and can be more expensive, as the seller chooses the carrier and insurance provider, potentially opting for more costly options. ³⁵ Cargo volume under CIF is also typically measured at origin ³¹, although a variation, "CIF Outturn," specifies measurement at the discharge port, shifting the in transit volume risk to the seller. ³¹

Other Incoterms like DES (Delivered Ex Ship) ³², DAP (Delivered at Place), and DDP (Delivered Duty Paid) ³¹ exist but are less common for bulk crude cargoes than FOB and CIF. Contracts must clearly state which version of the Incoterms rules applies (e.g., Incoterms® 2020).³⁴ Furthermore, the specific wording of the sales contract always overrides the standard Incoterms definitions in case of any conflict or modification. ³²

The selection between FOB and CIF is therefore a significant strategic decision in the negotiation process. It reflects not just a simple allocation of costs but a fundamental division of operational control, logistical responsibility, and risk management between the trading parties, heavily influenced by their respective capabilities and risk preferences.⁶

Feature	FOB (Free On Board)	CIF (Cost, Insurance, Freight)
Risk Transfer Point	When goods loaded on vessel at origin port ³⁵	When goods loaded on vessel at origin port ³⁵
Main Carriage Arrangement	Buyer ³⁵	Seller ³⁵
Main Carriage Payment	Buyer ³⁵	Seller ³⁵
Insurance Arrangement	Buyer (Optional) ³³	Seller (Minimum Cover Required) ³⁵
Insurance Payment	Buyer ³⁵	Seller ³⁵
Control over Logistics	Buyer (Post-Loading) ³³	Seller (To Destination Port) ³³
Typical Buyer Preference	Experienced buyers seeking control/cost savings	Buyers seeking simplicity/less logistical burden
Typical Seller Preference	Producers lacking logistics ⁶	Sellers wanting more control over delivery process
Point Named in Term	Port of Loading ³⁴	Port of Destination ³⁴

Figure 4 Comparison of Common Incoterms (FOB vs. CIF) for Crude Oil Cargoes

Quality Specifications : The contract must precisely define the quality of the crude oil being traded. This is crucial because crude oil quality directly impacts its suitability for different refineries, the yield of valuable products, and consequently, its market price.⁸ Key quality parameters include:

• **API Gravity** : This scale, developed by the American Petroleum Institute, measures the density of crude oil relative to water.³⁹ A higher API gravity indicates a lower density (lighter crude), while a lower API gravity signifies a

higher density (heavier crude).⁴⁰ Crude oils are generally categorized as:

- Light: API > 30 ° or 31°
- Medium: API approx. 20°-30° ⁴¹
- Heavy: API approx. 10°–20°⁴¹
- Extra Heavy / Bitumen: API < 10°³⁹ Lighter crudes generally yield a higher percentage of valuable light products like gasoline and diesel upon refining and are typically less viscous, making them easier to produce and transport.³⁹ Consequently, light crudes usually command higher prices than heavy crudes.³⁸ Examples include WTI (~39.6° API) and Brent (~38.3° API) as light crudes, while Maya (~21-22° API) is heavy.⁴⁰ A list of various crudes and their API gravities can be found in sources like.⁴³
- Sulfur Content : Measured as a percentage by weight (%wt). ⁴⁴ Crude oil is classified based on its sulfur content:
- Sweet: Low sulfur content, typically defined as less than 0.5%wt or sometimes
 <0.42%wt.³⁹
- Sour: High sulfur content, typically greater than 0.5%wt. ³⁹ Sulfur compounds are impurities that must be removed during refining, as they are corrosive and lead to pollution when burned in final products. ³⁹ Sweet crudes require less intensive and less expensive processing than sour crudes, making them more desirable and generally higher priced. ³⁸ Examples include WTI (0.24% S) and Brent (0.37% S) as sweet crudes, while Maya (3.4% S) and Arab Heavy (2.87% S) are sour.⁴⁰
- Other Specifications : Contracts may also specify limits or values for other properties, such as:
- **TAN (Total Acid Number)** : Measures acidity, indicating potential corrosivity, particularly problematic for certain refinery equipment. ⁴⁰
- Viscosity : Resistance to flow, important for pumping and transportation, especially for heavier crudes. ⁴²

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- Water and Sediment Content (BS&W) : Impurities that take up volume and can cause processing issues.⁴²
- Reid Vapor Pressure (RVP) : Measure of volatility. 42
- Content of Metals (like vanadium, nickel) and Nitrogen : These can poison refinery catalysts or affect product quality.

These technical specifications are not merely descriptive details; they are fundamental determinants of a crude oil cargo's economic value. The specific combination of API gravity, sulfur content, and other properties dictates how efficiently a refinery ca n process the crude and what slate of products it will yield, directly influencing the price differential the cargo achieves relative to standard benchmarks.¹

Volume : Contracts clearly state the quantity of crude oil being traded, usually in barrels. Standard cargo sizes exist, such as 600,000 barrels for North Sea cargoes ⁴⁵ or 1 million barrels (often traded as 1,000 futures contracts). ⁴⁶ US pipeline trades often occur in increments of 1,000 barrels per day. ⁴⁷ The contract also specifies the basis for volume measurement (e.g., shore tank figures at loading, vessel figures after loading, figures at discharge), which determines who bears the risk of measurement discrepancies or in - transit losses.³¹

Delivery Window/Laydays : The contract specifies a range of dates (laycan) during which the nominated vessel must arrive at the designated loading or discharge port and be ready to commence operations. ³² Meeting these windows is critical for scheduling and avoiding contractual penalties (demurrage).

Pricing Basis : As mentioned, contracts detail the exact pricing formula, referencing the agreed benchmark(s), the pricing period (e.g., average of benchmark prices over specific dates relative to the Bill of Lading date or delivery), and the negotiated premium or disco unt (differential). ¹

Governing Law and Jurisdiction : Contracts specify which country's laws will govern the agreement and where any disputes will be settled (e.g., English law, New York law, arbitration in London or New York). ³²

2.3 Shipping and Logistics Management

The physical movement of crude oil is a critical and complex part of the trade execution process.

Vessel Chartering : Once the commercial terms are agreed, transportation needs to be arranged. For seaborne cargoes, this involves chartering an appropriately sized oil tanker. The responsibility for chartering depends on the Incoterm (buyer charters under FOB, seller charters under CIF).³³ Common tanker sizes for crude oil include Aframax (approx. 80,000 tonnes or 500,000 -700,000 barrels) and VLCC (Very Large Crude Carrier, approx. 270,000 tonnes or 2 million barrels). ⁴⁸ Chartering involves negotiating freight rates, often based on the Worldscale system, which provides a standardized framework for calculating tanker costs. ¹⁵ Availability and cost of shipping can significantly impact trade economics and arbitrage opportunities. ¹⁵

Scheduling : Meticulous scheduling is required to coordinate the entire logistical chain.²³ This includes:

- Nominating a suitable vessel that meets terminal requirements.
- Ensuring the vessel arrives at the loading port within the agreed laycan.
- Coordinating loading operations with the terminal operator.
- Managing the voyage to the destination port.
- Arranging for discharge operations within the agreed timeframe at the destination. This process involves constant communication between the trader/scheduler, vessel owner/operator, vessel agents, port authorities, and terminal operators.²³ Efficient scheduling is vital for meeting contractual obligations, minimizing delays and associated costs (like demurrage), and managing inventory levels effectively.²³

Inspection : Independent inspection companies (e.g., SGS, Intertek, Bureau Veritas) are typically appointed to verify the quantity and quality of the crude oil at the point of custody transfer, usually at both the loading and discharge ports.¹³ Inspectors measure volumes in shore tanks and/or vessel tanks and draw representative samples for laboratory analysis to confirm the crude meets the contractual specifications (API, sulfur, BS&W, etc.).¹³ Their impartial reports (Certificate of Quantity, Certificate of Quality) are crucial documents, often required for invoicing and payment under LCs.¹³

Documentation : A significant administrative burden accompanies physical oil trading, revolving around the generation, checking, and exchange of numerous documents. ¹³ Key shipping documents include:

- **Bill of Lading (BoL)** : Issued by the carrier (shipping line) upon loading, it serves as a receipt for the cargo, evidence of the contract of carriage, and, crucially, a document of title. The holder of the original BoL typically has the right to claim the cargo at discharge.¹³
- **Certificate of Origin** : Certifies the country where the crude was produced, important for customs and compliance.
- **Commercial Invoice** : The seller's bill for the goods.
- Inspection Certificates (Quality & Quantity) : Issued by the independent inspector.
- Insurance Certificate/Policy : Required under CIF terms. These documents are essential for clearing customs, proving ownership, and triggering payment, especially under LCs or documentary collections.⁵⁰ Delays in document processing can delay payment or cargo release.³²

2.4 Payment Settlement Procedures

Securing timely and complete payment is the final crucial step in a physical crude oil trade. Given the high value of cargoes, payment terms and mechanisms are carefully negotiated and managed.

Common Payment Methods : Several methods are used in international trade, each offering a different balance of risk and security for the buyer and seller ⁵¹:

- Letter of Credit (LC) : This is a widely used and highly secure method for international commodity trading, including crude oil.²¹ An LC is a formal undertaking by the buyer's bank (issuing bank) to pay the seller a specified amount, provided the seller presents specific documents (e.g., BoL, commercial invoice, inspection certificates) that comply strictly with the terms stipulated in the LC, within a set timeframe.²¹
- *Security*: It significantly reduces the seller's risk of non -payment, as they rely

on the creditworthiness of the issuing bank rather than the buyer.⁵¹ It also offers protection to the buyer, as the bank will only pay if the seller provides documentary evidence of shipment according to the contract.⁵¹

- *Types*: LCs can be irrevocable (cannot be changed without agreement of all parties), confirmed (where a second bank, usually in the seller's country, adds its guarantee to pay), or standby (used as a guarantee against default rather than the primary payment mech anism).⁵¹ Crude oil deals often specify requirements like a Revolving Documentary Letter of Credit (RDLC) for ongoing shipments under term contracts. ¹³
- *Process*: The process involves the buyer applying to their bank, the issuing bank sending the LC to the seller's bank (advising/confirming bank), the seller shipping goods and presenting documents to their bank, the banks checking documents for compliance, and fin ally, payment being released. ⁵¹
- *Challenges*: LCs involve bank fees, can be complex to manage, and require meticulous attention to document accuracy, as even minor discrepancies can lead to payment delays or refusal. ⁵⁰ If original documents like the BoL are delayed (e.g., due to slow mail or fast voyages), payment might be made against a seller's Letter of Indemnity (LOI), although this carries risks for the buyer.³²
- Documentary Collection (D/C) : In this method, the seller entrusts the collection process to banks, but unlike LCs, the banks do not guarantee payment.⁵² The seller ships the goods and sends the shipping documents along with payment instructions through their bank (remitting bank) to the buyer's bank (collecting bank).
- Documents against Payment (D/P or CAD Cash Against Documents): The collecting bank releases the documents (needed by the buyer to claim the goods) only after receiving immediate payment from the buyer. ⁵⁰
- Documents against Acceptance (D/A) : The collecting bank releases documents after the buyer accepts a time draft (a promise to pay at a future date). ⁵³ The seller bears the credit risk until the payment date.
- *Risk* D/Cs are less secure for the seller than LCs, as payment depends on the

buyer's willingness and ability to pay upon document presentation or acceptance.⁵² They are generally less expensive than LCs.⁵²

- **Open Account** : The seller ships the goods and sends an invoice directly to the buyer, granting credit terms (e.g., payment due 30, 60, or 90 days after shipment or invoice date). ⁵⁰ This method is highly advantageous for the buyer's cash flow but represents the highest risk for the seller, who relies entirely on the buyer's promise to pay. ⁵⁰ Open account terms are typically used only when there is a long-standing, trusted relationship between the parties or within the same corporate group.
- Cash-in-Advance / Prepayment : The buyer pays the seller in full or in part before the goods are shipped. ⁵⁰ This is the most secure option for the seller, eliminating credit risk entirely. ⁵⁰ However, it is the least attractive and riskiest for the buyer, who faces the risk of non shipment or receiving non compliant goods after having paid, and it negatively impacts their cash flow. ⁵⁰ Prepayment might be required for new or less creditworthy buyers or can be structured as part of financing arrangements linked to offtake agreements. ⁵

Payment Timing : Contracts precisely define when payment is due, often linking it to a specific event like the date of the Bill of Lading, the date of vessel arrival, or the date of cargo discharge, usually within a set number of days (e.g., 30 days after BoL date). ³² Provisions for handling payments due on weekends or bank holidays are also typically included. ³²

Credit Risk Management : Due to the large sums involved, managing counterparty credit risk is paramount. Sellers rigorously assess the creditworthiness of buyers. ³² If the buyer's credit standing is insufficient or unknown, the seller will typically demand some form of payment security, most commonly an LC from a reputable bank, but potentially also a bank guarantee, parental guarantee, or prepayment. ¹³ Failure by the buyer to provide required payment security can constitute grounds for the seller to suspend deliveries or terminate the contract. ³² Access to substantial capital and robust trade finance facilities is therefore essential for companies participating in physical oil trading. ²¹

The prevalence of Letters of Credit in international crude oil transactions reflects the inherent risks involved. The high cargo values, the international nature of the trade

often involving parties in different legal jurisdictions, and the potential for disputes over quality or delivery necessitate a secure payment mechanism. While LCs add complexity and cost, the security they provide to the seller often outweighs these factors, making them a standard requirement unless a strong, trusted relationship or alternative security arrangements exist between the counterparties.¹³

Section 3: Pricing Physical Crude Oil Cargoes

Determining the price of a physical crude oil cargo is a complex process heavily reliant on global benchmarks, negotiated differentials, and the assessments of price reporting agencies.

3.1 The Central Role of Benchmarks

Given the hundreds of different crude oil grades produced globally, each with unique quality characteristics, pricing every single one independently would be impractical. ⁵⁵ Instead, the market relies on a few key **benchmark crudes** (also known as marker crudes) to serve as reference points. ⁸ The price of most other crude oils is determined relative to these benchmarks. ¹ Benchmarks provide essential price transparency and simplify the pricing process in a diverse market. ⁸ They act as crucial signals for refiners assessing the value of different crudes based on the potential value of the refined products they can yield. ⁸ The most widely recognized global benchmarks are Brent and West Texas Intermediate (WTI).

• **Brent**: Originating from the North Sea, Brent is technically a blend of crudes from several fields: Brent, Forties, Oseberg, Ekofisk, and Troll (often abbreviated as BFOET).¹ Recently, WTI Midland crude deliverable at specific terminals has also been incorporated into the basket of crudes deliverable against the Brent complex, reflecting the growing importance of US exports.⁵⁸ Brent is classified as a light (API gravity around 38°) and sweet (sulfur content around 0.4%) crude.⁴⁰ A key characteristic is that it is **waterborne**, meaning it is loaded onto tankers directly from offshore fields or coastal terminals, allowing easy access to global shipping routes and markets.⁵⁷ This global reach, combined with factors like diversified ownership and stable political/legal frameworks in the North Sea region, has contributed to Brent becoming the **primary global benchmark**, used directly or indirectly to price over three-quarters (or roughly two-thirds, according to older sources) of the world's internationally traded crude oil.¹ Its price is considered highly reflective of global supply and demand fundamentals ⁵⁷ and tends to be sensitive to geopolitical events outside the US, particularly in Europe, Africa, and the Middle East.⁵⁶ Trading in the Brent complex involves physical cargoes (referred to as Dated Brent once assigned loading dates), forward contracts (Cash BFOET), and highly liquid futures contracts traded primarily on the

Intercontinental Exchange (ICE).⁴⁵ Physical traders show a strong preference for the Brent complex for hedging purposes.⁵⁷

- WTI (West Texas Intermediate) : WTI is the benchmark crude for the United States market, sourced primarily from inland US oil fields, particularly in Texas and surrounding states. ⁵⁶ It is even lighter (API gravity around 39.6°) and sweeter (sulfur content around 0.24%) than Brent, making it ideal for refining into gasoline.⁴⁰ The official delivery and price settlement point for the main WTI futures contract, traded on the New York Mercantile Exchange (NYMEX), is Cushing, Oklahoma .¹ Being landlocked, WTI relies on pipeline infrastructure for transport, and logistical bottlenecks or high inventory levels at Cushing can significantly impact its price relative to waterborne crudes like Brent. ¹ Historically, WTI often traded at a premium to Brent due to its superior quality, but the US shale boom led to increased production and infrastructure constraints, causing WTI to trade at a discount for extended periods. ¹ Despite these localized influences, WTI remains a crucial global benchmark, particularly for North American markets and as a heavily traded financial instrument. ⁸
- Dubai/Oman : These Middle Eastern medium sour crude grades serve as the primary benchmarks for crude oil exported from the Persian Gulf region to Asia.¹ Prices are often assessed based on spot market activity reported by PRAs or traded on the Dubai Mercantile Exchange (DME) for Oman futures. ⁶⁴ While important regional references, their prices are often quoted or analyzed as a differential relative to Brent, reflecting quality and geographical spreads. ⁸
- Other Benchmarks : Depending on the region and crude type, other benchmarks are also used. For example, the Argus Sour Crude Index (ASCI) is used by Saudi Aramco for pricing exports to the US. ¹Murban crude from Abu Dhabi has its own futures contract on ICE and serves as a key benchmark for crudes heading to Asia. ⁶⁶ Canada utilizes benchmarks like the Canadian Crude Index (CCI) or Western Canadian Select (WCS).⁴⁸

Successful benchmarks share common characteristics: they represent significant physical production volumes, involve a diverse range of producers and sellers (preventing dominance by any single entity), maintain consistent and well - defined quality, and enjoy broad acceptance among market participants, particularly refiners.

The **Brent - WTI spread**, the price difference between these two major benchmarks, is closely watched by the market. It fluctuates based on factors influencing their relative supply and demand, such as changes in North Sea vs. US production, refinery maintenance schedules, invent ory levels at Cushing, pipeline capacity, geopolitical events affecting Middle East supply (impacting Brent more directly) versus US - centric issues (impacting WTI more directly), and overall global economic conditions. ⁵⁶

The concept of a benchmark like Brent extends beyond a single price point. It represents a complex ecosystem encompassing the physical spot market for cargoes with specific loading dates (Dated Brent), the forward market where cargoes are traded for delive ry in future months (Cash BFOET), highly liquid futures contracts traded electronically almost 24 hours a day, and numerous related financial derivatives like Contracts for Differences (CFDs) and Dated -to-Frontlines (DFLs).⁴⁵ These interconnected markets, spanning different time horizons and settlement types (physical vs. financial), work together, influenced by the assessments of PRAs, to establish the overall "Brent price" referenced globally.

Feature	Brent	WTI (West Texas Intermediate)	Dubai/Oman
Typical	North Sea (UK/Norway) ¹	United States (Texas,	Middle East
Location		Cushing OK) 56	(Persian Gulf) ⁵⁵
Quality	Light (~38° API), Sweet	Lighter (~39.6° API),	Medium (~31° API),
	(~0.4% S) ⁴⁰	Sweeter (~0.24% S) ⁴⁰	Sour (Dubai) ⁴³
Key Trading Hub	ICE Futures Europe (London), OTC Physical/Forward	NYMEX/CME (New York/Chicago), Physical hubs (Midland, Houston)	OTC Physical, DME (Oman Futures) ⁶⁴
Primary Region Priced	Global (ex-US), Europe, Africa, Middle East ⁶¹	United States, Americas ⁶¹	Asia-Pacific ¹
Key	Waterborne, Global	Landlocked Delivery	Key Asian Ref. for
Features	Reach, High Liquidity ⁵⁷	(Cushing), US Focus ⁶¹	ME Sour Crudes ⁵⁵

Figure 5: Major Crude Oil Benchmarks Comparison

3.2 Formula Pricing and Differentials

Section 3: Pricing Physical Crude Oil Cargoes

Most physical crude oil cargoes are not bought and sold at a single, fixed price agreed upon months in advance. Instead, the industry predominantly uses a system called **"formula pricing"** .¹ Under this mechanism, the final price of a cargo is calculated based on the average price of a specified benchmark crude over an agreed pricing period, plus or minus a negotiated **differential** .¹

The **benchmark** component provides the baseline price level, reflecting the global or regional value of crude oil at the time. The contract specifies which benchmark (e.g., Dated Brent, WTI Cushing Average, Argus WTI Houston) and which contract month (if using futures) will be used.¹

The **pricing period** defines the timeframe over which the benchmark price is averaged to determine the base price for the cargo. This could be, for example, the average of the daily benchmark assessments for the five days centered around the Bill of Lading date, or the averag e price over a full calendar month. ⁴⁵

The **differential** is a premium or discount applied to the benchmark average price, negotiated between the buyer and seller. ¹ This differential is crucial as it adjusts the benchmark price to reflect the specific characteristics and circumstances of the actual cargo being traded. Key factors determining the differential include ¹:

- Quality Differences : Adjustments are made for variations in API gravity, sulfur content, acidity (TAN), viscosity, and yields of valuable products between the cargo being sold and the benchmark crude. A higher quality cargo relative to the benchmark will typically command a positive differential (premium), while a lower quality cargo will trade at a negative differential (discount). This reflects the difference in value to the refiner.¹
- **Transportation Costs** : The differential accounts for the difference in freight costs between transporting the cargo from its origin to the final destination versus the notional transport cost embedded in the benchmark price (e.g., cost from North Sea to Rotterdam for Brent, or cost from Cushing to market for WTI).¹
- Local Market Conditions : Short-term supply and demand factors at the specific loading or discharge port can also influence the negotiated differential.

For example, a contract might specify the price as "Dated Brent average for 5 days around B/L date + \$0.75/barrel".⁴⁵ This means the final price will be the average of the assessed Dated Brent price for the relevant five-day period, plus a premium of 75 cents per barrel, reflecting perhaps a slightly higher quality or favorable location relative to the standard Brent assessment point. Major producers like Saudi Aramco use different benchmarks and differentials depending on the destination market, reflecting varying regional dynamics and transport costs (e.g., Brent-linked prices for Europe, Dubai/Oman-linked prices for Asia, ASCI-linked prices for the US).¹

This formulaic approach allows buyers and sellers to agree on long-term supply deals or spot transactions while incorporating real-time market price levels close to the time of physical delivery, using the benchmark as the fluctuating base and the differential as the negotiated adjustment for specific attributes. The choice of benchmark and the negotiated differential are therefore critical economic components, reflecting not just global price trends but also the specific logistical journey and the intrinsic value of that particular cargo within the buyer's refining system.¹

3.3 Influence of Price Reporting Agencies (PRAs)

In the largely opaque OTC physical crude market, Price Reporting Agencies (PRAs) play a vital role in establishing price transparency and providing the benchmark assessments and differentials used in formula pricing. ²³ The most influential PRAs in the global crude oil market are Platts (part of S&P Global Commodity Insights) and Argus Media.⁶⁴ Their price assessments are widely embedded in physical supply contracts and used for settling financial derivatives, mark -to-market valuations, risk management, and analysis.⁴⁸

• **Platts** : Platts is arguably the most dominant PRA, known for key benchmarks like Dated Brent.⁵⁸ Its assessments are deeply ingrained in industry contracts.⁶⁹ Platts primarily uses a **Market - on-Close (MOC)** methodology for its major assessments.²³ This involves a defined time window at the end of the trading day (e.g., 16:00-16:30 London time for Dated Brent ⁵⁸) during which market participants report firm, named bids, offers, and confirmed trades to Platts editors.⁷³ Platts assesses the market value based on this observed activity, with the most competitive price indication often setting the final assessment.⁵⁸ To facilitate this process, Platts operates **Platts eWindow**, an online

communication tool (not an execution platform) where participants can submit their MOC indications directly to Platts and simultaneously to the market.⁵⁹ This tool aims to enhance transparency and efficiency in the price discovery process.⁷⁵ Platts' dominance and methodology, particularly the MOC process, have sometimes drawn criticism for potentially influencing trading behavior, as participants may structure their deals to fit within the MOC window to ensure they are considered in the assessment.²³

- Argus Media : Argus is another major PRA providing widely used crude oil assessments, including benchmarks like Argus WTI Houston, Argus WTI Midland, the Argus Sour Crude Index (ASCI), and Argus North Sea Dated. ⁶⁴ Argus employs a range of methodologies depending on the market, including direct market surveys (via phone, email, IM), analysis of bids, offers, and transactions, and sometimes volume weighted averages (VWAPs) where liquidity permits. ²³ Argus emphasizes reflecting prices as traded in the open market across various channels, not just a single platform. ⁶⁴ They publish daily reports (e.g., Argus Crude) and provide data feeds through various channels, including their own portal (Argus Direct) and partnerships with platforms like CME Direct (providing the Argus Crude Market Ticker ACMT for intraday physical price indications) and LSEG.⁴⁸ Argus also defines conventions like the US physical trade month calendar. ⁷⁹
- **Other PRAs** : Other agencies like OPIS (Oil Price Information Service) provide pricing, particularly focused on downstream US rack and retail markets. ²³

The influence of PRAs extends beyond simply reporting numbers. Their methodologies for data collection and price assessment can actively shape market dynamics. For instance, the concentration of activity during Platts' MOC window suggests that the assessme nt process itself can draw liquidity and influence when and how trades occur. ²³ The decision by a PRA to include or exclude certain crudes in a benchmark assessment (like Platts adding WTI Midland to the Dated Brent basket) can have significant market implications. ⁵⁸ Therefore, PRAs act not just as observers but as integral components of the market structure whose actions and methodologies can create feedback loops impacting trading behavior.

Section 4: Understanding Indications of Interest (IOIs)

Indications of Interest (IOIs) are communications used in various financial and commercial contexts to signal preliminary interest in a transaction without creating a binding obligation.

4.1 Defining IOIs in the Context of Trading

In general terms, an Indication of Interest (IOI) is a formal or informal expression by one party to another signifying a potential desire to engage in a specific transaction, such as buying a security, acquiring a company, or entering into a partnership. ⁸⁰ The defining characteristic of an IOI is that it is **non-binding**.⁸⁰ It allows parties to "test the waters," gauge mutual interest, and initiate discussions without committing legally or financially at an early stage. ⁸⁰

IOIs typically contain basic information about the potential deal, such as the name of the asset or security, whether the interest is to buy or sell, and potentially an indicative quantity. ⁸⁰ In more structured contexts like Mergers and Acquisitions (M&A), an IOI submitted by a potential buyer might also include ⁸⁰:

- An approximate purchase price range (e.g., \$10-15 million or 3-5x EBITDA).
- Proposed deal structure (e.g., asset vs. stock purchase).
- Potential sources of financing.
- Key conditions or contingencies.
- Expected timeline for due diligence and closing.
- Intentions regarding existing management.

The primary purpose of an IOI is to facilitate early-stage communication and assessment.⁸⁰ It helps parties determine if there is sufficient alignment on key parameters (like valuation) to warrant investing further time and resources in detailed due diligence and negotiation.⁸⁰ IOIs can help weed out "tire kickers" or parties whose expectations are fundamentally misaligned.⁸⁵ In market contexts, IOIs can also serve as tools for price discovery and gauging potential supply or demand, particularly in less liquid markets where firm bids and offers may be scarce.⁸³ An IOI often precedes

a more detailed and slightly more committed (though still largely non-binding) document called a Letter of Intent (LOI), especially in M&A.⁸⁰

4.2 IOIs in Commodity Trading (Specifically Crude Oil)

While the concept of an IOI is well - established in M&A and securities offerings⁸⁰, its application in the day -to-day trading of physical crude oil cargoes requires nuance. The fast-paced, relationship - driven nature of the OTC physical market means that formal, multi - page IOI documents typical of M&A are less common for standard cargo trades. However, the *function* of expressing non - binding interest is still highly relevant.

Broker IOIs : A significant use of the term "IOI" in commodity trading relates to communications, often electronic, disseminated by brokers. ⁸³ Brokers use IOIs to advertise potential trading interest to their clients, aiming to "source and unlock liquidity" in the market. ⁸⁸ These IOIs can represent:

- **Client Natural Interest** : Derived from actual client orders the broker holds on an agency basis.⁸⁸
- **Potential Natural Interest** : Stemming from indicative interest expressed by a client, but not yet a firm order.⁸⁸
- **Principal Natural Interest** : Representing the broker's own position resulting from prior facilitation or hedging.⁸⁸
- Non-Natural Interest : Generated by the broker's facilitation desk with the intent to provide liquidity, likely triggering an offsetting trade if filled.⁸³

These broker IOIs are typically non-firm and serve to gauge interest from potential counterparties.⁸³ They are often disseminated electronically via FIX messages, dedicated platforms, or direct messaging/chat systems, with controls around timing, size, client tiering, and opt-outs to manage information flow and confidentiality.⁸⁸

IOIs vs. Bids/Offers : It's crucial to distinguish these non-binding IOIs from the firm bids and offers that constitute actual executable orders during negotiation or within specific trading windows like the Platts MOC.⁷³ While an IOI might solicit a firm bid or offer, the IOI itself is generally understood to be conditional and not immediately actionable.⁸⁹

Section 4: Understanding Indications of Interest (IOIs)

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Use in Negotiation : In the context of OTC physical crude negotiation between principals (traders, producers, refiners), informal communications often serve the purpose of an IOI. A trader might use a chat message, email, or phone call to inquire about interest in a specific cargo, delivery window, or price level ("Would you have interest in buying a Brent cargo loading early June around Dated +\$0.50?") without making a firm commitment. ²³ This allows them to gauge the counterparty's appetite and potential terms before formulating a concrete, potentially binding bid or offer.

Therefore, while formal M&A - style IOI documents may not be standard for every physical crude cargo deal, the underlying principle of expressing non - binding interest to initiate dialogue and discover potential opportunities is a fundamental part of the trad ing process. This function is fulfilled through various means, including broker - disseminated electronic IOIs aimed at liquidity discovery, and informal communications between principals during the pre - negotiation phase. The non - binding nature of these init ial expressions allows participants in the volatile and often opaque OTC market to gather crucial market intelligence and test potential transactions without revealing their firm hand or committing capital prematurely.

Section 5: Digitization: Electronic Trading Platforms

The trading of energy commodities, including crude oil, has increasingly incorporated electronic platforms, although the extent of adoption varies across different market segments.

5.1 The Evolution Towards Electronic Trading

Historically, OTC commodity trading, particularly for complex physical products like crude oil cargoes, relied heavily on telephone calls and relationship -based interactions. ¹⁴ However, driven by the desire for increased efficiency, better price transparency, broader market access, improved risk management, and enhanced data capture for analysis and compliance, the industry has progressively adopted electronic tools and platform s.³ While financial derivatives like futures and swaps moved relatively quickly to electronic execution, the digitization of the *physical* crude oil cargo market has been more gradual. The heterogeneity of the product, the complexity of logistical arrangements, the importance of counterparty relationships and credit assessment, and the need for bespoke contract terms have presented challenges to full electronic standardization. ¹ Nonetheless, various electronic platforms now play significant roles in different parts of the crude oil trading ecosystem.

5.2 Survey of Platform Types

The electronic landscape supporting crude oil trading is diverse and somewhat fragmented, with different platforms specializing in specific functions or market segments:

- Exchange Front Ends (for Futures & Related Derivatives) : These platforms provide access to the central limit order books of major derivatives exchanges where benchmark futures contracts are traded.
- ICE WebICE: The primary web-based interface for accessing Intercontinental Exchange (ICE) markets, including Brent crude, WTI, Murban, Gasoil futures and options.⁶⁶ It offers order entry, real-time market data, charting, risk management tools (like position keeping), and access to related functionalities such as ICE Chat and reporting for EFP/EFRP transactions.⁶⁷ It can also display integrated data from third parties like Argus and Platts.⁵⁹ While primarily for derivatives, its relevance to physical trading stems from the use of futures for

hedging and pricing, and the EFP mechanism linking futures to physicals.

- CME Direct : CME Group's platform providing access to its exchanges, including NYMEX WTI crude oil futures.⁴⁷ Similar to WebICE, it offers trading functionality and market data, and integrates tools like the Argus Crude Market Ticker (ACMT) for visibility into physical market indications.⁷⁸
- **PRA-Associated Platforms/Tools** : Price Reporting Agencies offer electronic tools primarily focused on facilitating their price assessment processes and disseminating market data.
- Platts eWindow : Explicitly described as an online communication and data entry tool for participants in the Platts Market-on-Close (MOC) price assessment process, not an execution venue .⁶⁹ It allows approved participants to submit bids, offers, and report trades directly to Platts editors and the wider market simultaneously during the MOC window.⁷³ It enhances transparency in the price discovery for benchmarks like Dated Brent.⁷³ While trading itself doesn't occur on eWindow, it can interface with ICE's execution platform.⁷⁵ Access requires a subscription, and the data captured is available in near real-time and historically.⁵⁹
- Argus Platforms/Feeds : Argus disseminates its price assessments, news, and market data through various electronic channels, including its proprietary portals (Argus Direct), data feeds (APIs), email/PDF reports, and via third-party platforms like LSEG Workspace/Refinitiv Eikon, CME Direct (ACMT), and potentially through integration partners like VAKT.⁴⁸ Argus also offers tools like the Argus Crude Oil Bulletin Board for viewing deal/bid/offer information.⁶⁸ Argus focuses on providing market intelligence and benchmark prices that feed into other trading and risk management systems.
- Independent Physical Marketplaces : Some platforms aim specifically to facilitate the negotiation and execution of *physical* commodity transactions electronically.
- OilEx (by Hunter Technology) : Designed as a digital marketplace connecting independent oil producers with global buyers for physical crude oil trades. ¹⁷ Its features cover the entire workflow: deal discovery using interactive maps and

smart matching, RFQ capabilities, encrypted negotiation via chat, secure document exchange and storage, digital smart contracts, payment integration, delivery confirmations, participant reputation ratings, and a blockchain-based audit trail.¹⁷ Its "Deal Actions" feature aims to provide a flexible, user-controlled structure for negotiation and settlement.¹⁷

- VAKT: This platform focuses more on post trade process digitization for physical commodities, including oil. ⁷⁰ Founded by major oil companies and traders, it aims to replace manual, paper based processes for trade confirmation, logistics management, and invoicing with a secure, blockchain enabled digital platform, interfacing with other systems. ⁷⁰ It recently received investment from S&P Global (Platts) and Argus, suggesting potential integration with PRA data. ⁷⁰
- OTC Broker Platforms : Many interdealer brokers (IDBs) and other brokerage firms provide electronic platforms or utilize multi-dealer systems to facilitate OTC trading, primarily in derivatives but sometimes extending to physical products or related services.
- Examples include platforms offered by StoneX (StoneX One Pro) ²⁴, Onyx Capital Group ²⁵, Trayport (Joule, primarily for refined products/LPG derivatives) ²⁷, Evolution Markets ²⁸, OTC Global Holdings (EOX/EON platform) ²⁹, and potentially services from firms like Oil Brokerage.²⁶
- ICE also offers ICE OTC Energy, a platform specifically for bilateral, physically settled OTC contracts in crude, gas, and power.⁹⁰
- These platforms often provide aggregated liquidity views, algorithmic execution tools, and access to both OTC and exchange-traded products.²⁷ Communication tools like integrated chat or standalone Instant Messenger remain crucial for negotiation, especially for non-standardized trades.²³

This overview reveals a specialized electronic landscape. No single platform dominates the entire workflow for physical crude cargo trading from discovery to settlement. Instead, different platforms cater to specific needs: exchanges for standardized futures, PRA tools for price discovery communication, dedicated marketplaces attempting end-to-end physical workflows, post-trade platforms for

efficiency gains, and broker platforms primarily focused on OTC derivatives intermediation. The inherent complexity and bespoke nature of many physical cargo deals continue to support a role for voice brokerage and direct negotiation, often aided by, rather than entirely replaced by, electronic tools.

Platform/Tool Type	Example(s)	Primary Focus	Physical Cargo Negotiation?	Handles IOIs?
Exchange	ICE WebICE,	Futures/Options	No (Handles EFP	No (Accepts Firm
Front - End	CME Direct	Execution	Reporting)	Orders)
PRA	Platts	MOC Price	No	Displays
Communication	eWindow	Discovery		Bids/Offers (Firm
Tool		Communication		in MOC)
Physical	OilEx (Hunter	Physical Deal	Yes	Via Chat / RFQ /
Marketplace	Tech)	Workflow (End- to-End)		Negotiation Tools
Post - Trade	VAKT	Post-Trade	No	No
Platform		Processing (Confirmations, etc.)		
OTC Broker	StoneX One	OTC Derivatives	Varies (Often	Via Broker
System	Pro, Onyx, Joule, EOX, ICE OTC	Brokerage, Some Physical OTC	Limited/Indirect)	Messages / Chat / Platform Communication

Figure 6 Overview of Electronic Platforms/Tools in Crude Trading

5.3 IOI Functionality on Electronic Platforms

The handling of Indications of Interest (IOIs) on electronic platforms varies significantly depending on the platform's purpose and the nature of the IOI itself.

Formal IOI Posting for Physical Cargoes : Direct functionality for users to formally post or view non - binding IOIs specifically for physical crude oil cargoes appears

uncommon on major execution platforms described in the research. Exchange platforms like ICE WebICE and CME Direct are designed for submitting firm, standardized orders for futures contracts, not preliminary expressions of interest for bespoke physical deals.⁹² Platforms focused on the entire physical workflow, like OilEx, emphasize negotiation tools, deal structuring, and Request for Quote (RFQ) functionality rather than a distinct "IOI posting" feature.¹⁷

Broker IOI Dissemination : Electronic platforms are, however, commonly used for the dissemination of *broker* IOIs (representing client or principal interest for liquidity discovery). As outlined by BNP Paribas, these IOIs can be sent electronically via FIX messages to client Order Management Systems (OMS) or platforms like Bloomberg, or communicated directly via proprietary broker platforms or integrated chat functions. ⁸⁸ Multi-dealer platforms like Trayport's Joule aggregate prices from various brokers, which may originate from or represent IOIs before becoming firm quotes. ²⁷ Systems used by large brokers like OTC Global Holdings likely incorporate electronic dissemination of trading interests, including IOIs. ²⁹

PRA Tools and IOIs : Platts eWindow displays bids and offers submitted during the MOC process.⁷³ While these represent interest, they are generally expected to be firm and actionable within the MOC context, distinguishing them from non - binding IOIs.⁷⁵ Platts explicitly states eWindow is a communication tool for price assessment, not a general trading platform for exchanging preliminary interests.

Functional Equivalents : Even without dedicated IOI features, other electronic functionalities serve a similar purpose in the physical market.

- **Request for Quote (RFQ)** : Platforms like OilEx allow buyers to issue RFQs to solicit offers from multiple potential sellers.¹⁷ This effectively allows a buyer to express interest in purchasing and gather pricing information without making an initial firm bid, similar to an IOI's role in initiating price discovery.
- Chat/Messaging : Integrated chat functionalities within platforms (like OilEx ¹⁷) or standalone secure messaging systems widely used by traders ²³ provide a crucial channel for informal, non-binding communications. These tools are likely the primary electronic medium for exchanging preliminary interest, discussing potential parameters, and gauging counterparty appetite before moving to firm bids, offers, or formal negotiation effectively serving as the

digital equivalent of a verbal IOI.

In summary, while dedicated "Post IOI" features for physical cargoes might be rare on execution platforms, the core function of expressing non-binding interest electronically is achieved through broker message dissemination, RFQ systems, and, perhaps most commonly for bespoke physical deals, through integrated or standalone chat and messaging tools. These mechanisms allow participants to leverage electronic communication for initial exploration and liquidity discovery without the immediate commitment required by firm orders on exchanges or during specific assessment windows.

Section 6: Bridging Physical and Financial Markets

The physical crude oil market, where actual barrels are traded and moved, is inextricably linked to the much larger financial derivatives market, primarily centered around futures contracts. Understanding this relationship, including hedging mechanisms, basis risk, and bridging tools like EFP, is essential.

6.1 Physical Cargo Trading vs. Crude Oil Futures

These two market segments, while related, operate differently:

- Physical Cargo Market :
- **Asset**: Actual barrels of specific crude oil grades for physical delivery.⁷
- Venue: Predominantly Over-the-Counter (OTC), involving bilateral negotiation.¹
- **Contracts** : Bespoke, tailored to specific quality, quantity, timing, logistics, and counterparty requirements.¹
- **Delivery Intent** : Explicit intention to physically deliver and receive the oil.¹⁰
- Liquidity/Volume : Lower volume compared to financial markets.⁹
- Transparency : Generally lower due to private negotiations.¹
- **Participants** : Producers, refiners, physical traders, integrated majors.²
- Primary Use : Securing physical supply for refining, managing physical production flows, physical arbitrage.⁶ Sets the underlying value for the commodity.⁹
- Crude Oil Futures Market :
- Asset : Standardized contracts representing a promise to buy or sell a set quantity (e.g., 1,000 barrels) of a specific benchmark grade (e.g., WTI, Brent) at a predetermined future date and location (e.g., Cushing for NYMEX WTI).¹

- Venue : Organized exchanges (e.g., NYMEX/CME, ICE) with central clearing.¹
- Contracts : Highly standardized terms regarding quantity, quality, delivery point, and expiry.¹
- Delivery Intent : Low; the vast majority of contracts (~99%) are closed out (offsetting trade) or cash - settled before expiration, without physical delivery occurring.¹
- Liquidity/Volume : Extremely high, dwarfing physical market volumes.⁹
- **Transparency** : High, with real-time price and volume data publicly available from exchanges.
- Participants : Includes physical players (hedgers) plus financial participants (speculators, hedge funds, index investors). ³
- Primary Use : Price risk management (hedging), speculation on price movements, investment/portfolio diversification. ¹¹

Despite these differences, the markets are deeply interconnected ¹²:

- **Benchmarking** : Futures prices (particularly for Brent and WTI) serve as the primary reference points for pricing physical cargoes via formula pricing.¹
- Fundamental Influence : Supply and demand dynamics in the physical market (e.g., production levels, refinery demand, inventory changes) are key drivers of futures price movements.⁵⁷
- **Convergence** : As a futures contract approaches its expiration date, its price tends to converge with the spot price of the underlying physical commodity at the delivery location. This occurs because the futures contract effectively becomes a substitute for a near-term physical transaction.¹²
- Arbitrage : Price discrepancies between the physical and futures markets (beyond carrying costs) create arbitrage opportunities, which help keep the markets aligned.⁹⁷

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Feature	Physical Cargo Trading	Crude Oil Futures Trading	
Asset Traded	Actual barrels of specific crude grades ²²	Standardized contracts on benchmark grades ¹	
Trading Venue	Primarily OTC (Bilateral Negotiation) ¹	Organized Exchanges (ICE, NYMEX/CME) ⁷	
Contract Specs	Bespoke / Negotiated ¹	Highly Standardized ⁹⁵	
Delivery Intent	High (Physical Delivery Expected) ¹⁰	Low (~1% Physical Delivery) ¹	
Liquidity / Volume	Lower ⁹	Extremely High ⁹	
Transparency	Lower (Private Deals) ¹	High (Public Exchange Data)	
Key Participants	Producers, Refiners, Physical Traders ⁴	Hedgers, Speculators, Financial Institutions ³⁰	
Primary Use	Physical Supply/Demand Balancing, Arbitrage ¹⁹	Hedging Price Risk, Speculation, Investment ¹¹	

Figure 7 Physical vs. Futures Crude Oil Trading Comparison

6.2 Hedging Physical Positions with Futures

One of the primary functions of the futures market is to allow participants with exposure to physical commodity price fluctuations to manage, or **hedge**, that risk.¹¹ Companies involved in producing, transporting, refining, or consuming crude oil face potential losses if the price moves adversely between the time they commit to a physical transaction and the time it is completed or priced. ³⁰

The basic principle of hedging involves taking a position in the futures market that is equal in size but opposite to the existing or anticipated physical position. ¹² The aim is for potential losses in the physical market position to be offset by gains in the futures market position, and vice versa, thereby locking in a price or margin. ⁹⁸

- Short Hedge (for Sellers/Producers) : A producer who owns physical crude oil (a long physical position) and plans to sell it later is exposed to the risk of falling prices. To hedge, they would sell crude oil futures contracts (take a short futures position) of equivalent volume.¹¹ If the price falls, the loss on the physical sale is offset by the profit from buying back the short futures position at a lower price.
- Long Hedge (for Buyers/Refiners) : A refiner who needs to buy crude oil in the future (a short physical position) is exposed to the risk of rising prices. To hedge, they would buy crude oil futures contracts (take a long futures position).⁴⁷ If the price rises, the higher cost of the physical purchase is offset by the profit from selling the long futures position at a higher price.

For example, a North Sea oil producer agrees to supply a refiner with 1 million barrels per month for six months, with the price based on the monthly average of Dated Brent plus a premium. To protect against a fall in the Dated Brent price before each shipment is priced, the producer could sell an equivalent volume of Brent futures contracts for each relevant month.⁴⁵ Similarly, a trader buying a physical cargo today for delivery and resale in two months might hedge the price risk during transit by selling futures contracts.¹¹ Futures contracts provide a liquid and standardized tool for transferring price risk to those willing to bear it (speculators).³⁰

6.3 Understanding Basis Risk

While hedging with futures can significantly reduce price risk, it rarely eliminates it entirely due to a phenomenon known as **basis risk** .⁹⁸

Basis is defined as the difference between the cash (or spot) price of the physical commodity being hedged (at a specific location and time) and the price of the futures contract used for the hedge.12

Basis = Cash Price - Futures Price

Basis risk is the risk that this difference (the basis) will change unexpectedly between the time the hedge is initiated and the time it is lifted (i.e., when the physical transaction occurs and the futures position is closed). ⁹⁸ Effectively, hedging transforms price risk into basis risk. ⁹⁹

Several factors can cause the basis to fluctuate, leading to basis risk ⁹⁷:

- Location Differences (Locational Basis) : The futures contract specifies delivery at a particular location (e.g., Cushing for NYMEX WTI). The physical crude being hedged might be produced, stored, or consumed at a different location. Differences in transportation costs and regional supply/demand balances between these locations can cause their prices to move differently, altering the basis.⁹⁷
- Quality/Grade Differences (Quality Basis) : The futures contract is based on a specific benchmark grade (e.g., WTI with specific API/sulfur). The physical crude being hedged might be of a different quality. Changes in the relative value of different grades (e.g., due to shifts in refinery demand or product cracks) can cause the price differential (and thus the basis) to change.¹⁰¹
- **Timing Differences** : The futures contract expires on a specific date. The physical transaction might occur at a different time. Changes in market conditions between these times can affect the basis.¹⁰¹
- **Changes in Carrying Costs** : The relationship between spot and futures prices is influenced by the costs of storing the physical commodity (storage fees, insurance, cost of finance).⁹⁷ Changes in interest rates or storage availability can alter these carrying costs and thus affect the basis.

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• **Market Sentiment and Dynamics** : General market conditions, supply/demand shocks, or shifts in trader sentiment can cause spot and futures prices to diverge temporarily. ¹⁰⁰

The change in basis directly impacts the net outcome of a hedge.

- A **strengthening basis** (basis becomes less negative or more positive; i.e., cash price rises relative to futures) benefits a short hedger (seller) by increasing their effective selling price, but hurts a long hedger (buyer) by increasing their effective purchase price. ⁹⁹
- A **weakening basis** (basis becomes more negative or less positive; i.e., cash price falls relative to futures) hurts a short hedger but benefits a long hedger. ⁹⁹

Because the basis can fluctuate unpredictably, hedges are rarely perfect. ¹⁰⁰ The relationship between spot and futures prices is dynamic, influenced by factors like inventory levels (leading to market structures of contango where futures > spot, or backwardation where spot > futures) and market expectations. ²³ This inherent variability means that successful hedging requires not only managing the overall price level via futures but also understanding, forecasting, and managing the potential changes in the basis, which demands close attention to local physical market conditions, logistics, and quality differentials. ¹²

6.4 The Exchange for Physical (EFP) Mechanism

The Exchange for Physical (EFP) is a specific type of transaction that serves as a critical bridge between the standardized futures market and the bespoke physical commodity market, particularly prevalent in energy trading. ¹⁸ It is a privately negotiated agreement where two parties simultaneously exchange a futures position for an equivalent position in the underlying physical commodity (or a closely related asset).⁴⁶

How EFP Works :

1. **Private Negotiation** : Two parties agree privately on the terms of the exchange. This includes the specifics of the physical transaction (commodity, quantity, quality, delivery location, timing, price or differential) and the corresponding futures transaction (contract, month, quantity, price). ⁴⁶ One

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party agrees to buy the physical and sell the futures, while the other agrees to sell the physical and buy the futures.⁹⁴

- 2. **Exchange Reporting** : The parties (or their brokers) report the agreed upon transaction to the relevant futures exchange (e.g., ICE, CME). ¹⁸
- 3. **Registration and Clearing** : The exchange registers the transaction. The volume involved is typically added to the day's official trading volume, but the privately negotiated price of the EFP transaction is usually **not** publicly disclosed. ¹⁸ The futures legs of the transaction are cleared through the exchange's clearing house, transferring or closing out the futures positions of the involved parties. ¹⁰⁴
- Physical Settlement : The physical delivery of the commodity occurs off exchange, directly between the two parties, according to the terms they privately negotiated. ¹⁰⁴

Purpose and Uses of EFPs : EFPs offer significant flexibility and efficiency, making them valuable tools for various market participants ⁴⁶:

- Facilitating Bespoke Physical Delivery : EFPs allow parties to leverage the liquidity and pricing transparency of the futures market while arranging physical delivery terms (like non-standard locations, specific timing, or particular quality adjustments) that differ from the standardized futures contract specifications.¹⁸ It effectively separates the pricing function (linked to futures) from the physical supply logistics.¹⁸
- Efficient Hedging and Position Management : EFPs provide an efficient way to initiate, liquidate, or transfer hedged positions.⁴⁶ For example, a producer short futures as a hedge can use an EFP to simultaneously sell their physical product and close out their futures hedge in a single transaction with a refiner.
- Avoiding Market Impact/Slippage : Executing large futures orders directly on the exchange can move the market price adversely (slippage). EFPs allow large, often offsetting, positions related to physical transactions to be exchanged privately at an agreed price without disrupting the public market price discovery process.⁴⁶ This is particularly useful when the required volume exceeds the market's immediate depth.⁴⁶

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- **Counterparty Risk Management** : Unlike anonymous exchange delivery, an EFP allows parties to choose their counterparty for the physical leg of the transaction. This enables them to manage credit risk and ensure the counterparty has the capability to perform (deliver or take delivery of the physical commodity), which is crucial for high -value cargo trades. ¹⁰⁶
- **Basis Trading and Arbitrage** : EFPs can be used to lock in a specific basis (differential between cash and futures) or to execute arbitrage strategies between the physical and futures markets. ⁹⁴

EFPs are extremely common in the oil and gas industry, frequently used by producers, refiners, and major trading houses to manage their physical flows and associated price risks.⁴⁶ A typical scenario involves a producer selling physical crude to a refiner via EFP; the refiner gives up their long futures hedge, and the producer takes on that long futures position, allowing the producer to remain exposed to potential price increases while the refiner secures physical supply at a futures -linked price.¹⁸

The EFP mechanism thus acts as a vital interface, connecting the standardized, financially-focused world of futures exchanges with the non -standardized, logistically complex world of physical commodity trading. It allows market participants to benefit from the pricing efficiency of futures while retaining necessary control over the specific physical aspects of their business. ¹⁰⁶ However, the fact that the EFP price itself is not typically disclosed publicly, even when volume is reported, underscores the reduced price transparency inherent in OTC and bilaterally negotiated transactions compared to trades executed on a public excha nge order book. ¹⁸

Conclusion

The global trade in physical crude oil cargoes is a vast and intricate ecosystem, fundamentally driven by the need to move energy from production centers to consumption hubs. This report has detailed the core mechanisms, participants, and processes involved.

The analysis indicates that the physical market remains dominated by **Over-the**-**Counter (OTC) transactions**, primarily through **medium - to long - term contracts** that provide supply security, supplemented by a **spot market** characterized by near term forward deliveries reflecting immediate supply/demand imbalances. ¹This structure highlights the enduring importance of **bilateral relationships, negotiation, and counterparty trust** in a market dealing with a heterogeneous commodity requiring tailored agreements. ¹A diverse array of participants, including powerful **NOCs**, integrated **IOCs**, essential **refiners**, increasingly influential **independent trading houses**, facilitating **brokers**, and crucial **financial and logistics providers**, navigate this landscape.¹

The lifecycle of a physical trade involves meticulous **negotiation** of terms, codified in contracts that precisely define **quality specifications** (API gravity, sulfur content being paramount value drivers), quantity, delivery timing, and crucially, **Incoterms like FOB and CIF** which allocate significant logistical and risk management responsibilities. ³¹ Executing the trade demands complex **shipping and logistics** coordination and secure **payment settlement**, often relying on **Letters of Credit** due to the high values and cross - border nature of transactions. ¹³

Pricing is overwhelmingly anchored to **global benchmarks**, primarily the waterborne **Brent** complex and the US-centric **WTI**, whose values are assessed and disseminated by influential **Price Reporting Agencies (PRAs)** like Platts and Argus.¹ Most physical deals utilize **formula pricing**, linking the cargo price to a benchmark average over a specified period, adjusted by a negotiated **differential** reflecting quality, freight, and local market factors.¹

Indications of Interest (IOIs) serve as non-binding expressions to gauge interest and initiate discussions, particularly in broker communications for liquidity discovery, though formal IOI documents are less common than informal electronic exchanges (chat, RFQ) in initiating direct phy sical cargo negotiations. ¹⁷ The **electronic platform**

landscape remains fragmented, with distinct systems for futures execution (e.g., ICE WebICE), PRA communication (e.g., Platts eWindow), specialized physical workflows (e.g., OilEx), and OTC broker intermediation, reflecting the ongoing challenges in fully digitizin g complex physical trades. ⁹⁰

Finally, the physical market is deeply intertwined with the much larger **financial futures market**. Futures provide essential **hedging tools** for managing price risk, although **basis risk** – the potential for divergence between physical and futures prices due to location, quality, or timing mismatches – remains a critical challenge requiring careful management. ⁹⁹ Mechanisms like the **Exchange for Physical (EFP)** provide a vital bridge, allowing participants to link futures pricing with bespoke physical delivery arrangements efficiently and manage counterparty risk, albeit with reduced price transparency compared to exchange – traded futures. ⁴⁶

In conclusion, trading physical crude oil cargoes remains a specialized field requiring deep expertise in market analysis, logistics, contract negotiation, risk management, and finance. While technology continues to reshape communication and process effici ency, the fundamental complexities of moving diverse physical barrels across the globe ensure that relationships, operational capability, and sophisticated risk management remain central to success in this critical global market.

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