ANNUAL PERFORMANCE REVIEW – WTI CRUDE OIL

2023-2024

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1. **Background**

a) **Brief about the commodity such as sample picture, lifecycle and various varieties/grade of the commodity found in India**

Crude oil is a naturally occurring mixture of hydrocarbons found underground. It can appear in the form of a highly viscous liquid to a thick tar-like substance. The colour of crude oil can also range from light yellow to dark brown or black. Crude oil may also be referred to as just crude or oil. This fuel source must be refined before it can be used and, once refined, it falls under the category of petroleum products. Crude oil can also be referred to as sour or sweet, based on the sulfur content of the unrefined oil. Determining the sulfur content in crude oil is an important assessment of quality.

Crude oil is referred to as either light, medium, or heavy, based on its density. The American Petroleum Institute gravity, commonly shortened to API gravity, compares the density of crude to water. An API gravity higher than 10 means the oil is less dense than water and will float on it. An API gravity lower than 10 means the oil is denser than water and will sink in it. When referring to oil, an API gravity greater than 31.1 degrees is considered light. An API gravity between 22.3 degrees and 31.1 degrees is considered medium. An API gravity between 10.0 degrees and 22.3 degrees is considered heavy. Finally, an API gravity of less than 10.0 degrees would be considered extra heavy.

Globally, crude oil is one of the most important fuel sources and contributes to over a third of the world's energy consumption. Oil is especially important to businesses that heavily rely on fuel, such as airlines, plastic producers, and agricultural businesses. Being such an important source of energy, crude is a major import and export of numerous countries. The importance of this commodity creates a vast financial trading market for oil and oil derivatives such as futures, forwards, and options.

Value Chain for Crude Oil

The principal activities involved in moving crude oil from its source to the ultimate consumer are:

- Production, which involves finding, extracting, and transporting crude oil.
- Refining, the process by which crude oil is turned into products such as gasoline; and

Distribution and marketing, which focus on moving those products to final consumers.

These activities occur within a global marketplace—an extensive physical infrastructure that connects buyers and sellers worldwide, all supported by an international financial market. The physical infrastructure encompasses a vast array of capital, including drilling rigs, pipelines, ports, tankers, barges, trucks, crude oil storage facilities, refineries, product terminals—right down to retail storage tanks and gasoline pumps. The physical infrastructure links an international network of thousands of producers, refiners, marketers, brokers, traders, and consumers buying and selling physical volumes of crude oil and petroleum products throughout this chain of production. Considering such a large value chain, there is possibility of high number of participants interested in derivatives trading of crude oil such as producers, refiners, marketers, brokers, traders, and consumers of crude oil and petroleum products.

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Various grades of Crude Oil Produced in India

Details of Crude Oil Produced in India			
Region	Sulphur Content (%/weight)	Gravity (Degree API)	Pour Point(Degree Celsius)
Assam	0.3	31	>30
Rudrasagar	0.3	27	>30
Ankleshwar	0.1	48	>18
North Gujarat	0.1	28	>27
Bombay High	0.2	38	>30
KG BASIN	0.1	36	>30

b) Commodity fundamentals and balance sheet as per the following format (to be prepared based on publicly available information on best effort basis

Global Crude Oil Scenario (000 Barrels Daily)		
In 000 barrels /day	2022	2023
Production	94,413	96,258
Total Oil Trade	68,397	68,124
Consumption	97,683	1,00,221
Source: Energy Institute Statistical Review of World Energy 2024		

Domestic Crude Oil Scenario (000 Barrels Daily)		
In 000 barrels /day	2022	2023
Production	33	32
Exports	43	30
Imports	4,642	4,640
Consumption	5,209	5,446
Source: Energy Institute Statistical Review of World Energy 2024		

Top 10 Major producing countries.

Top Producing Countries (000 Barrels Daily)		
Country	2022	2023
US	17,844	19,358
Saudi Arabia	12,191	11,389
Russian Federation	11,202	11,075
Canada	5,575	5,653
Iran	3,945	4,662
Iraq	4,520	4,355
China	4,111	4,198
United Arab Emirates	4,020	3,922
Brazil	3,112	3,502
Kuwait	3,036	2,908
Source: Energy Institute Statistical Review of World Energy 2024		

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Top 10 Major consuming countries

Top Consuming Countries (000 Barrels Daily)		
Country	2022	2023
US	18,862	18,984
China	14,970	16,577
India	5,209	5,446
Saudi Arabia	3,854	4,052
Russian Federation	3,615	3,635
Japan	3,504	3,366
South Korea	2,856	2,797
Brazil	2,512	2,567
Canada	2,312	2,351
Mexico	1,931	1,962
Source: Energy Institute Statistical Review of World Energy 2024		

Top Major Exporting countries

Exports (000 Barrels Daily)		
Country	2022	2023
Canada	4,679	4,836
Mexico	1,173	1,271
US	8,549	9,108
S. & Cent. America	2,843	3,417
Europe	2,640	2,340
Russian Federation	7,821	6,736
Other CIS	2,069	2,170
Saudi Arabia	8,767	8,282
Middle East (ex Saudi Arabia)	15,346	15,018
North Africa	2,061	2,025
West Africa	3,580	3,285
Asia Pacific (ex Japan)	6,575	7,294
Rest of World	2,295	2,341
Total World	68,397	68,124
Source: Energy Institute Statistical Review of World Energy 2024		

Top 10 Major Importing countries

Import (000 Barrels Daily)		
Country	2022	2023
US	8,341	8,539
Europe	14,128	12,811
China	12,143	13,717
India	5,753	5,770
Japan	3,465	3,332
Rest of World	24,567	23,955
Total World	68,397	68,124
Source: Energy Institute Statistical Review of World Energy 2024		

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Top 10 Major producing States in India

State	2022 Production (in TMT)
Rajasthan	5,335
Gujarat	4,783
Assam	4,113
Tamil Nadu	335
Andhra Pradesh	231
Arunachal Pradesh	46
Tripura	3
West Bengal	0
Offshore	14,544
Source: 2022-23 Annual Report	

c) Major changes in the polices governing trade in the spot markets of the commodity

NA

d) Geopolitical issues in the commodity and its impact on Indian scenario

- Challenges in the Chinese economy
- Weak Global Outlook growth, Especially in China and Europe
- Geopolitical tensions in Middle east

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2. Trading related parameter

a) Monthly and Annual traded volume (quantity in appropriate units)

Month	WTI Crude (in barrels)
Apr-23	-
May-23	-
Jun-23	-
Jul-23	-
Aug-23	-
Sep-23	-
Oct-23	12,800
Nov-23	100
Dec-23	-
Jan-24	-
Feb-24	-
Mar-24	-
Total	**12,900**

b) Annual traded volume as proportion of total deliverable supply: 0.0017

- Annual Traded Volume: 28,700 Barrels
- Deliverable Supply: 1,70,52,80,000 Barrels

c) Annual traded volume as proportion of total annual production: 1.31%

- Annual Traded Volume: 28,700 Barrels
- Annual Production: 1,16,80,000 Barrels

d) Annual average Open interest as proportion of total production: 0.0028%

- Annual Average OI: 180 Barrels
- Annual Production: 1,16,80,000 Barrels

e) Annual average Open interest as proportion of total deliverable supply: 0.0004%

- Annual Average OI : 180 Barrels
- Deliverable Supply: 1,70,52,80,000 Barrels

f) Monthly and Annual value of trade

Month	WTI crude Oil (In Rs Crores)
Apr-23	-
May-23	-
Jun-23	-
Jul-23	-
Aug-23	-
Sep-23	-
Oct-23	9.81
Nov-23	0.07
Dec-23	-
Jan-24	-
Feb-24	-
Mar-24	-
Total	**9.88**

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g) Monthly and Annual quantity of delivery

- Not applicable as BSE WTI Crude Oil Options contract is a cash settled contract.

h) Monthly and Annual value of delivery (in Rs. Crores)

- Not applicable as BSE WTI Crude Oil options contract is a cash settled contract.

i) Monthly and Annual Average Open Interest (OI)

Months	WTI Crude (In Barrels)
Apr-23	-
May-23	-
Jun-23	-
Jul-23	-
Aug-23	-
Sep-23	-
Oct-23	11,100
Nov-23	6,700
Dec-23	-
Jan-24	-
Feb-24	-
Mar-24	-

Annual Average OI = 740 barrels

j) Annual average volume to open interest ratio: 72.97

- Avg of Traded Volume: 540 barrels
- Avg of Open Interest: 740 barrels

k) Total number of unique members and clients who have traded during the financial year

- Unique Members = 14
- Unique Clients = 14

l) Ratio of open interest by FPOs/farmers/Hedge/VCP positions to total open interest (Annual average as well as maximum daily value) - Nil

m) Number of unique FPOs / farmers and VCPs/hedgers who traded in the financial year

Nil

n) Algorithmic trading as percentage of total trading

- Nil

o) Delivery defaults:

Number of instances = Not Applicable

Quantity involved = Not Applicable

Value involved = Not Applicable

3. **Price movements**

a) **Comparison, correlation, and ratio of standard deviation of Exchange futures price vis-à-vis international futures price (wherever relevant comparable are available).**

There were no trades in WTI Futures contracts in FY 2023-24 . Hence comparison is not possible

b) **Comparison, correlation, and ratio of standard deviation of Exchange futures price vis-à-vis international spot price (wherever relevant comparable are available) and domestic spot price (exchange polled price).**

Same as point a

c) **Correlation between exchange futures & domestic spot prices along with ratio of standard deviation.**

Same as point a

d) **Correlation between international futures & international spot prices along with ratio of standard deviation (wherever relevant comparable are available).**

The correlation between international futures and International Spot Prices is 0.9976

The standard deviation of International Futures prices (WTI) was 2.06%

The standard deviation of International Spot prices was 2.03%

The ratio of Standard Deviation for the same period was 1.01

e) Comparison of Exchange polled price and mandi price (in case of agricultural commodities) / other relevant price (in case non-agricultural commodities) at basis centre

Not Applicable as the BSE WTI Crude Oil Contract is Internationally referenced commodity

f) Maximum & Minimum value of daily futures price volatility and spot price volatility along with disclosure of methodology adopted for computing the volatility

There were no trades in WTI Futures contracts in FY 2023-24. Hence calculation is not possible

g) Number of times the futures contract was in backwardation/contango by more than 4% for the near month contract in the period under review

There were no trades in WTI Futures contracts in FY 2023-24. Hence Calculation is not possible

4. Other's parameters

a) Qualitative and quantitative measure for Hedge effectiveness ratio and basis Risk (Volatility of Basis) along with disclosure of methodology adopted for such calculations

There were no trades in WTI Futures contracts in FY 2023-24. Hence comparison is not possible

Basis Risk

There were no trades in WTI Futures contracts in FY 2023-24. Hence comparison is not possible

b) Details about major physical markets of the commodity vis-à-vis market reach in terms of availability of delivery centres (information to be provided state-wise and UT-wise)

Not Applicable as the WTI crude oil contract is an internationally referenced commodity.

c) Details about major physical markets of the commodity and average Open Interest for each month generated from those regions

Not Available

d) Details, such as number and target audience, of stakeholders' awareness programs carried out by the exchange

Nil

e) Steps taken / to be undertaken to improve hedging effectiveness of the contracts as well as to improve the performance of illiquid contracts

Nil

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