Parameters for Performance Review of Commodity for the Financial year 2019-20

Brent Crude

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 Brent 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		
In Million barrels /day	2018	2019
Production	95.25	95,19
Total Oil Trade	71.15	70.925
Consumption	97.34	98.27
Source: BP Statistical review 2020		

India Crude Oil Scenario		
In Million barrels /day	2018-19	2019-2019 (P)
Production	0.65	0.61
Import	4.54	4.55
Total Supply	5.20	5.16
Exports	0	0
Domestic Consumption**	4.28	4.28
Source: PPAC		

Top 10 Major producing countries (in tonnes)

Top 10 Major producing countries In Million barrels /day			
Country	2018	Country	2019
US	15	US	17
Saudi Arabia	12	Saudi Arabia	12
Russian Federation	11	Russian Federation	12
Canada	6	Canada	6
Iraq	5	Iraq	5
UAE	4	UAE	4
China	4	China	4
Iran	5	Iran	4
Kuwait	3	Kuwait	3
Brazil	3	Brazil	3
Source: BP Statistical review 2020			

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Top 10 Major consuming countries (in tonnes)

Top 10 Major consuming countries (In Million barrels /day)			
Country	2018	Country	2019
US	19.4	US	19.4
China	13.3	China	14.0
India	5.1	India	5.2
Japan	3.8	Japan	3.8
Saudi Arabia	3.7	Saudi Arabia	3.7
Russian Federation	3.2	Russian Federation	3.3
South Korea	2.7	South Korea	2.7
Canada	2.4	Canada	2.4
Brazil	2.3	Brazil	2.3
Germany	2.2	Germany	2.2

Source: BP Statistical review 2020

Top 10 Major Exporting countries (in tonnes)

Top 10 Major Exporting countries (In Million barrels /day)			
Country	2018	Country	2019
Middle East (excluding Saudi Arabia)	16	Middle East (excluding Saudi Arabia)	15
Russia	9	Russia	9.1
Saudi Arabia	8.6	Saudi Arabia	8.3
Asia Pacific (ex Japan)	7.5	Asia Pacific (ex Japan)	7.9
US	7	US	8
Canada	4.5	Canada	4.5
West Africa	4.5	West Africa	4.5
South and Central America	3.7	South and Central America	3.4
Europe	3.4	Europe	3.1
North Africa	2.4	North Africa	2.4
Other CIS countries	2.2	Other CIS countries	2.2
Mexico	1.3	Mexico	1.2

Source: BP Statistical review 2020

Top 10 Major Importing countries (in tonnes)

Top 10 Major Importing countries (In Million barrels /day)			
Country	2018	Country	2019
Europe	14.8	Europe	14.8
China	11	China	11.8
US	9.9	US	9
India	5.1	India	5.3
Japan	3.9	Japan	3.7
Rest of the World	26.1	Rest of the World	25.9

Source: BP Statistical review 2020

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Top 10 Major producing States in India (in tonnes)

Top 10 Major producing States in India (Thousand MT)		
States	2018-19	2019-20*
Rajasthan	7667	5205
Gujarat	4626	3527
Assam	4309	3090
Tamil Nadu	395	310
Andhra Pradesh	296	182
Arunachal Pradesh	4341	-
Total Onshore	17,336	12,355
Total Offshore	16,868	10,829
Source: Ministry of Petroleum Annual Report, 2019-20 ****Up to Dec 2019***		

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

Hydrocarbon Exploration and Licensing Policy (HELP) adopted on 10/03/2016

The Union Cabinet, chaired by the Prime Minister Shri Narendra Modi, has approved the Hydrocarbon Exploration and Licensing Policy (HELP).

Four main facets of this policy are:

- ✓ uniform license for exploration and production of all forms of hydrocarbon,
- ✓ an open acreage policy,
- ✓ easy to administer revenue sharing model and
- ✓ marketing and pricing freedom for the crude oil and natural gas produced.

The decision will enhance domestic oil & gas production, bring substantial investment in the sector and generate sizable employment. The policy is also aimed at enhancing transparency and reducing administrative discretion.

The uniform licence will enable the contractor to explore conventional as well as unconventional oil and gas resources including CBM, shale gas/oil, tight gas and gas hydrates under a single license. The concept of Open Acreage Policy will enable E&P companies choose the blocks from the designated area.

Present fiscal system of production sharing based on Investment Multiple and cost recovery /production linked payment will be replaced by a easy to administer revenue sharing model. The earlier contracts were based on the concept of profit sharing where profits are shared between Government and the contractor after recovery of cost. Under the profit-sharing methodology, it became necessary for the Government to scrutinize cost details of private participants and this led to many delays and disputes. Under the new regime, the Government will not be concerned with the cost incurred and will receive a share of the gross revenue from the sale of oil, gas etc. This is in tune with Government's policy of "Ease of Doing Business".

Recognising the higher risks and costs involved in exploration and production from offshore areas, lower royalty rates for such areas have been provided as compared to NELP royalty rates to encourage exploration and production. A graded system of royalty rates has been introduced, in which royalty rates decreases from shallow water to Deepwater and ultra-deep water. At the same time, royalty rate for on land areas have been kept intact so that revenues to the state governments are not affected. On the lines of NELP, cess and import duty will not be applicable on blocks awarded under the new policy. This policy also provides for marketing freedom for crude oil and natural gas produced from these blocks. This is in tune with Government's policy of "Minimum Government –Maximum Governance" ***Source: https://pib.gov.in/newsite/PrintRelease.aspx?relid=137638***

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

- Compared with recent years, both crude oil prices traded within relatively narrow price ranges - U.S. petroleum production put downward pressure on crude oil prices
- U.S. military operation in Iraq
- September 16, 2019, the first full day of trading after an attack on key energy installations in Saudi Arabia
- Production cut announcements from the Organization of the Petroleum Exporting Countries (OPEC)
- U.S. sanctions on Iran and Venezuela that limited crude oil exports from those countries

2. Trading related parameter

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

Month	Brent Crude (in barrels)
Apr-19	-
May-19	-
Jun-19	-
Jul-19	-
Aug-19	-
Sep-19	-
Oct-19	-
Nov-19	-
Dec-19	-
Jan-20	10,31,400
Feb-20	17,36,000
Mar-20	3,32,100
Total	**30,99,500**

b) Annual traded volume as proportion of total deliverable supply: 0.16%

- Annual Traded Volume: 30,99,500 Barrels
- Deliverable Supply: 189,96,06,000 Barrels

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

- Annual Traded Volume: 30,99,500 Barrels
- Annual Production: 23,60,26,000 Barrels

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

- Annual Average OI: 6,700 Barrels
- Annual Production: 23,60,26,000 Barrels

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

- Annual Average OI (Units): 6,700 Barrels
- Deliverable Supply: 189,96,06,000 Barrels

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f) Monthly and Annual value of trade

Month	Brent crude Oil (In Rs Crores)
Apr-19	-
May-19	-
Jun-19	-
Jul-19	-
Aug-19	-
Sep-19	-
Oct-19	-
Nov-19	-
Dec-19	-
Jan-20	432.10
Feb-20	691.37
Mar-20	123.48
Total	**1,246.95**

g) Monthly and Annual quantity of delivery

- Not applicable as BSE Brent Crude Oil futures contract is a cash settled contract.

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

- Not applicable as BSE Brent Crude Oil futures contract is a cash settled contract.

i) Monthly and Annual Average Open Interest (OI)

Months	Brent Crude (In Barrels)
Apr-19	-
May-19	-
Jun-19	-
Jul-19	-
Aug-19	-
Sep-19	-
Oct-19	-
Nov-19	-
Dec-19	-
Jan-20	9,500
Feb-20	6,500
Mar-20	6,200

Annual Average OI = 6700 barrels

Note: Average OI is taken since launch date till the end of the year

j) Annual average volume to open interest ratio: 962.69%

- Avg of Traded Volume: 64,500 barrels
- Avg of Open Interest: 6,700 barrels

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

- Unique Members = 48
- Unique Clients = 155

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

Not Available

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

Not Available

n) Algorithmic trading as percentage of total trading

- 3.88%

o) Delivery defaults:

Number of instances = Not Applicable

Quantity involved = Not Applicable

Value involved = Not Applicable

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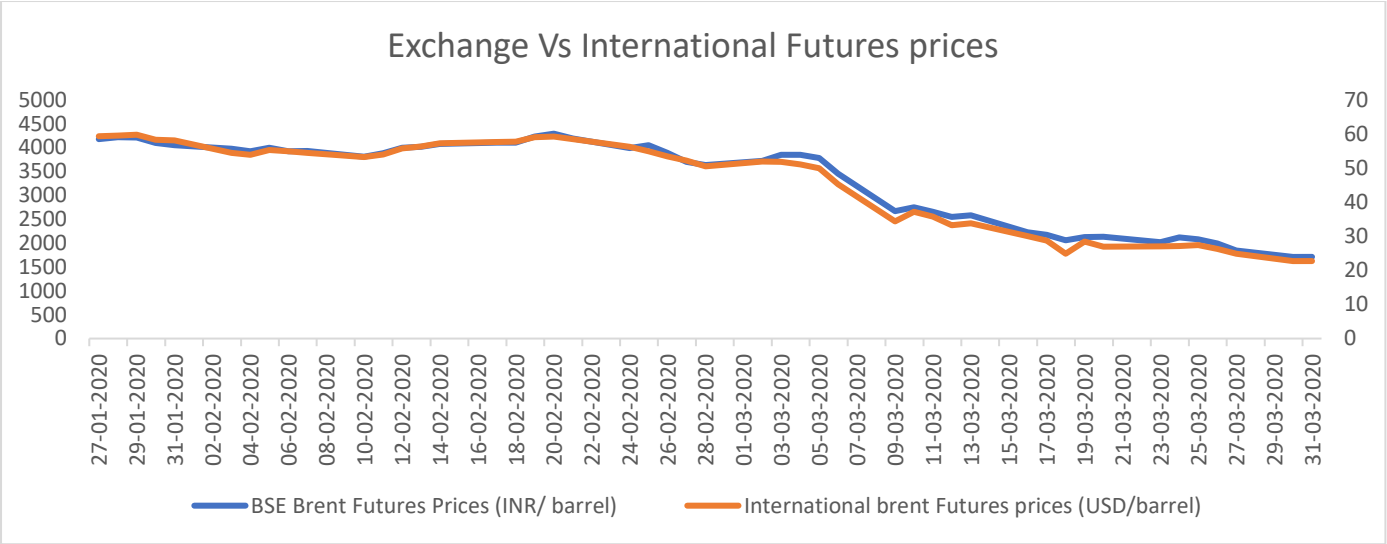
3. **Price movements**

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



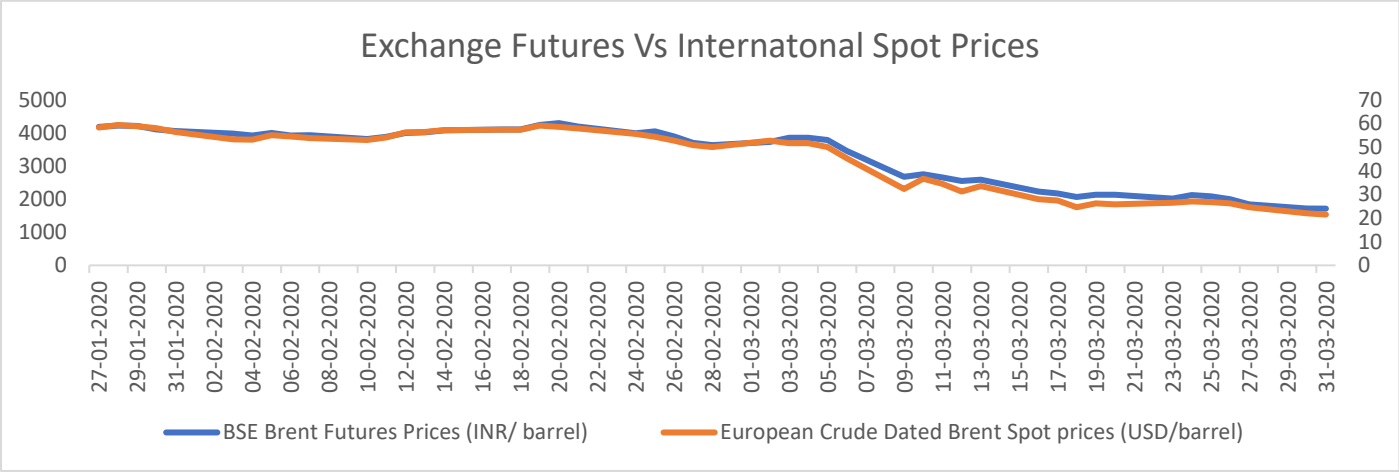
The correlation between exchange and International Futures Prices is 0.9970.

The standard deviation of Exchange Futures prices was 4.82% for period January 27,2020 to March 31, 2020

The standard deviation of International Futures prices was 5.71% for period January 27,2020 to March 31, 2020

The ratio of Standard Deviation for the same period was 0.84

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).**



The correlation between exchange futures and International Spot Prices is 0.9967.

The standard deviation of Exchange Futures prices was 4.82% for period January 27,2020 to March 31, 2020

The standard deviation of International Spot prices was 6.45% for period January 27,2020 to March 31, 2020

The ratio of Standard Deviation for the same period was 0.75

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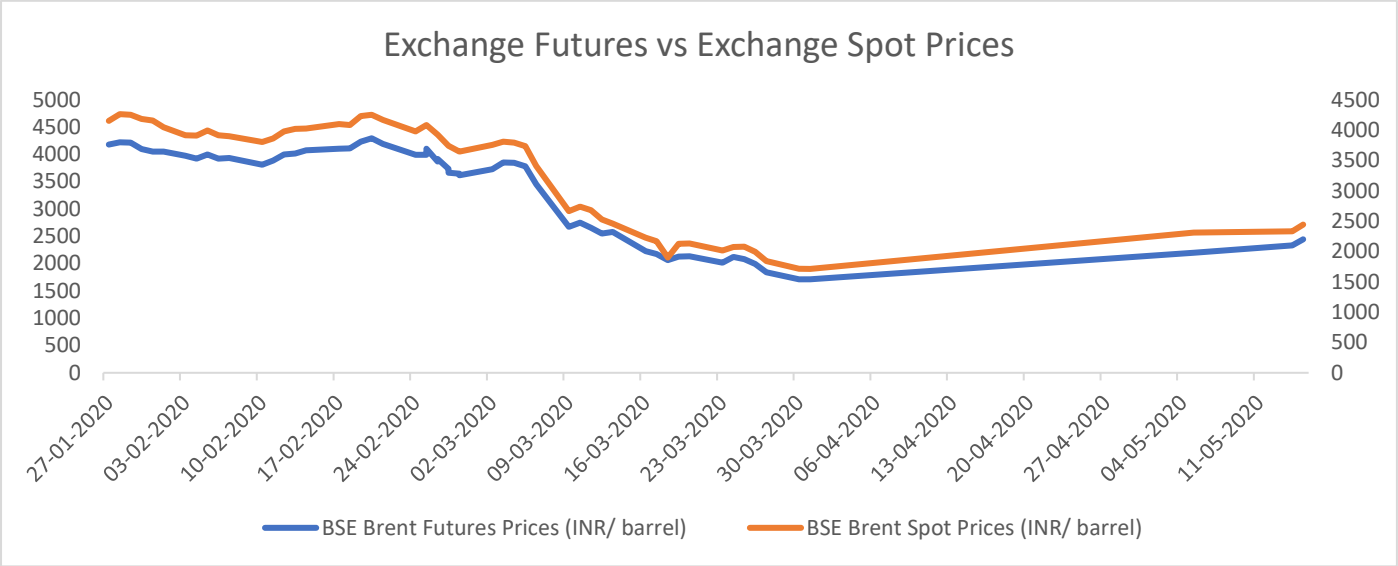
c) Correlation between exchange futures & domestic spot prices along with ratio of standard deviation.



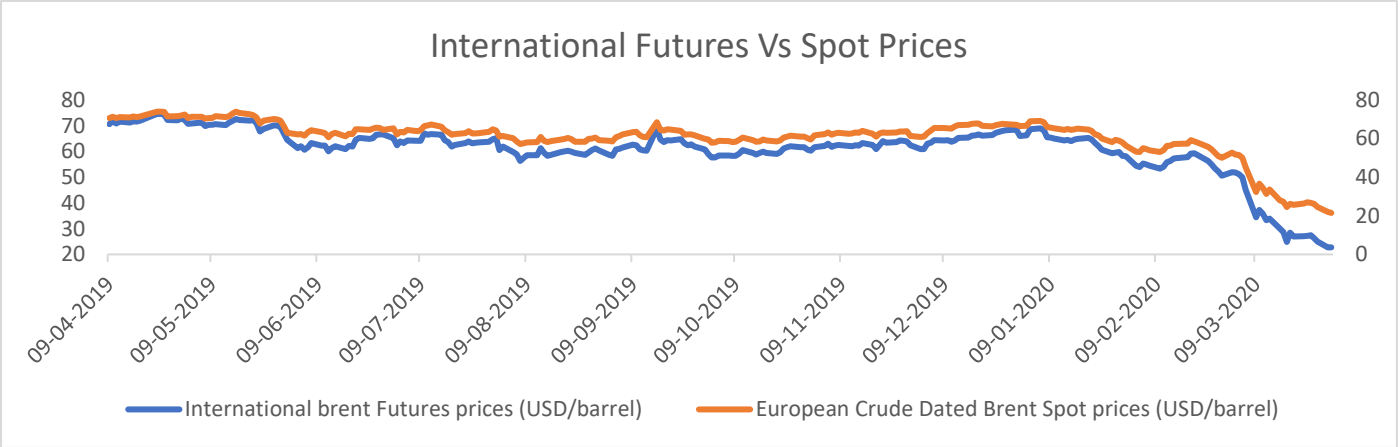
The correlation between exchange futures and exchange Spot Prices is 0.9987.

The standard deviation of Exchange Futures prices was 4.82% for period January 27,2020 to March 31, 2020

The standard deviation of Exchange Spot prices was 6.92% for period January 27,2020 to March 31, 2020

The ratio of Standard Deviation for the same period was 0.69

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 0.9978.

The standard deviation of International Futures prices was 3.16% for period FY 2019-20

The standard deviation of International Spot prices was 3.34% for period FY 2019-20

The ratio of Standard Deviation for the same period was 0.95

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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 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

Commodity	Max of Daily Futures Price Volatility %	Min Daily Futures Price Volatility %	Max of Daily Spot Price Volatility %	Min Daily Spot Price Volatility %
BSE Brent Crude Oil	5.11%	-22.67%	34.94%	-21.94%
Note: for the period January 27,2020 to March 31, 2020				

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

BSE Brent Crude Futures was never in backwardation or contango by more than 4% in the period under review

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

Hedge Effectiveness for FY 2019-20

Commodity	Hedge Efficiency
Brent crude	99.92%

Note: Hedging efficiency is the 'R Square' value of the regression equation between closing price of BSE futures contract and BSE polled spot prices during the financial year.

Basis Risk for FY 2019-20

Commodity	Unit	Average Return of Basis (Unit)	Standard deviation
Brent Crude	Rs/bbl.	10.46	2.08
Note: for the period January 27,2020 to March 31, 2020			

Note: Basis Risk is computed as the Standard deviation of daily normal return in Basis, which is excess of Spot over Futures price.

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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 brent 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 Applicable

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

Sr. No.	Program Type	Location	Participants
1	Product Meeting	Mumbai	30

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

Exchange has conducted only one product meeting for Brent Crude Oil

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