

## **Exhibit A: Description of New DME Futures Contracts Underlying Physical Markets**

### **I. Description of New DME Futures Contracts**

A brief description of each New DME Energy Futures Contract is provided below.

#### **1. Brent (Singapore Marker) vs. DME Oman Crude Oil Futures**

The ICE Brent (Singapore Marker) vs. DME Oman Crude Oil Futures contract will be financially settled based on the calendar month average spread price between ICE Brent crude oil Singapore marker and DME Oman crude oil. The Singapore Marker is established by the Exchange at 16:30 Singapore time to provide a pricing reference for Brent to coincide with the assessments for the Platts physical crude oil and refined products in Asia. Many of the Asian products trade on a spread basis to Brent and this has provided a natural focal point of liquidity in the market during the Singapore trading day. The size of the contract is 1,000 barrels (per lot) and the trading of the contract will terminate on the last business day of the contract month.

#### **2. Brent vs. Dubai (Platts) Crude Oil BALMO Futures**

The Brent vs. Dubai (Platts) Crude Oil BALMO Futures contract will be financially settled based on the spread price of the underlying ICE Brent crude oil settlement and Dubai crude oil assessment for the corresponding balance-of-the-month period. The size of the contract is 1,000 barrels (per lot) and the trading of the contract will terminate on the last business day of the contract month.

A BALMO (balance-of-month) contract is a contract whose pricing period is defined as the selected start date to the end of the month. The floating price of a BALMO contract is the arithmetic average of the published underlying prices during its defined pricing period. The size of the contract is 1,000 barrels (per lot).

#### **3. Brent vs. Dubai (Platts) Crude Oil Futures**

The Brent vs. Dubai (Platts) Crude Oil Futures contract will be financially settled based on the calendar month average spread price between ICE Brent crude oil and Platts Dubai crude oil. The size of the contract is 1,000 barrels (per lot) and the trading of the contract will terminate on the last business day of the contract month.

#### **4. DME Oman vs. Dubai (Platts) Crude Oil Futures**

The DME Oman vs. Dubai (Platts) Crude Oil Futures contract will be financially settled based on the calendar month average spread price between the DME Oman crude oil settlement price and the Platts Dubai crude oil assessment. The size of the contract is 1,000 barrels (per lot) and the trading of the contract will terminate on the last business day of the contract month.

#### **5. Dubai Crude Oil (Platts) Average Price Option**

The Dubai Crude Oil (Platts) Average Price Option contract will be financially settled based on the underlying Dubai Crude Oil (Platts) Futures Contract, which utilizes the arithmetic average price of the first nearby Dubai Crude Oil Futures settlement price over the calendar month. The size of the contract is 1,000 barrels (per lot) and the trading of the contract will terminate on the last business day of the contract month.

## **6. Dubai Crude Oil (Platts) BALMO Futures**

The Dubai Crude Oil (Platts) BALMO Futures contract will be financially settled based on the average settlement price of the underlying Dubai (Platts) Crude Oil Futures contract for the corresponding balance-of-the-month period. The size of the contract is 1,000 barrels (per lot) and the trading of the contract will terminate on the last business day of the contract month.

A BALMO (balance-of-month) contract is a contract whose pricing period is defined as the selected start date to the end of the month. The floating price of a BALMO contract is the arithmetic average of the published underlying prices during its defined pricing period. The size of the contract is 1,000 barrels (per lot).

## **7. Dubai Crude Oil (Platts) Futures**

The Dubai Crude Oil (Platts) Futures contract will be financially settled based on the monthly average price of the underlying Platts Dubai Crude Oil assessments. The size of the contract is 1,000 barrels (per lot) and the trading of the contract will terminate on the last business day of the contract month.

## **8. DME Oman Crude Oil BALMO Futures**

The DME Oman Crude Oil BALMO Futures contract will be financially settled based on the average settlement price of the underlying DME Oman Crude Oil Futures contract for the corresponding balance-of-the-month period. The size of the contract is 1,000 barrels (per lot) and the trading of the contract will terminate on the last business day of the contract month.

A BALMO (balance-of-month) contract is a contract whose pricing period is defined as the selected start date to the end of the month. The floating price of a BALMO contract is the arithmetic average of the published underlying prices during its defined pricing period. The size of the contract is 1,000 barrels (per lot).

## **9. DME Oman Crude Oil Calendar Futures**

The DME Oman Crude Oil Calendar Futures contract will be financially settled based on the monthly average settlement price of the underlying DME Oman Crude Oil Futures contract. The size of the contract is 1,000 barrels (per lot) and the trading of the contract will terminate on the last business day of the contract month.

## **10. Singapore Gasoil (Platts) vs. DME Oman Crude Oil Futures**

The Singapore Gasoil (Platts) vs. DME Oman Crude Oil Futures contract will be financially settled based on the calendar month average spread price between Platts Singapore Gasoil assessments and DME Oman crude oil. The spread represents the refinery margin of Singapore Gasoil. The size of the contract is 1,000 barrels (per lot) and the trading will terminate on the last business day of the contract month.

## **11. Singapore Jet Kerosene (Platts) vs. DME Oman Crude Oil Futures**

The Singapore Jet Kerosene (Platts) vs. DME Oman Crude Oil Futures contract will be financially settled based on the calendar month average spread price between Platts Singapore Jet Kerosene assessments and DME Oman crude oil. The spread represents the refinery margin of Singapore jet kerosene. The size of the contract is 1,000 barrels (per lot) and the trading will terminate on the last business day of the contract month.

## **12. Singapore Mogas 92 Unleaded (Platts) vs. DME Oman Crude Oil Futures**

The Singapore Mogas 92 Unleaded (Platts) vs. DME Oman Crude Oil Futures contract will be financially settled based on the calendar month average spread price between Platts Singapore 92 gasoline assessments and DME Oman crude oil. The spread represents the refinery margin of the Singapore 92 gasoline. The size of the contract is 1,000 barrels (per lot) and the trading will terminate on the last business day of the contract month.

## **13. DME Oman Crude Oil Average Price Option**

The DME Oman Crude Oil Average Price Option contract will be financially settled based on the underlying DME Oman Crude Oil Calendar Futures Contract, which utilizes the arithmetic average price of the first nearby DME Oman Crude Oil Futures settlement price over the calendar month. The size of the contract is 1,000 barrels (per lot) and the trading of the contract will terminate on the last business day of the contract month.

## **14. Middle East Fuel Oil 180 cst (Platts) Futures Contract**

The Middle East Fuel Oil 180 cst (Platts) Futures contract will be financially settled based on the arithmetic of the mid-point of the high and low quotations of the underlying Platts HSFO 180 cst FOB Arab Gulf assessments. The size of the contract is 1,000 metric tons (per lot) and the trading of the contract will terminate on the last business day of the contract month.

HSFO (High Sulfur Fuel Oil) contracts are typically classified according to their viscosity, i.e. 180 cst (Centistokes) or 380 cst.

## **15. Middle East Fuel Oil 380 cst (Platts) Futures Contract**

The Middle East Fuel Oil 380 cst (Platts) Futures contract will be financially settled based on the arithmetic of the mid-point of the high and low quotations of the underlying Platts HSFO 380 cst FOB Arab Gulf assessments. The size of the contract is 1,000 metric tons (per lot) and the trading of the contract will terminate on the last business day of the contract month.

## **16. Singapore vs. Middle East Fuel Oil 180 cst Spread (Platts) Futures**

The Singapore vs. Middle East Fuel Oil 180 cst Spread (Platts) Futures contract will be financially settled based on the calendar month average spread price between Singapore Fuel Oil 180 cst and Middle East Fuel Oil 180 cst. The size of the contract is 1,000 metric tons (per lot) and the trading of the contract will terminate on the last business day of the contract month.

## **17. Singapore vs. Middle East Fuel Oil 380 cst Spread (Platts) Futures**

The Singapore vs. Middle East Fuel Oil 380 cst Spread (Platts) Futures contract will be financially settled based on the calendar month average spread price between Singapore Fuel Oil 180 cst and Middle East Fuel Oil 380 cst. The size of the contract is 1,000 barrels (per lot) and the trading of the contract will terminate on the last business day of the contract month.

## **18. Singapore Fuel Oil 180 cst (Platts) Futures**

The Singapore Fuel Oil 180 cst (Platts) Futures contract will be financially settled based on the arithmetic of the mid-point of the high and low quotations from the Platts *Asia-Pacific Marketscan* for HSFO 180 cst (High-Sulfur Fuel Oil) under the heading "FOB Singapore" for each Trading Day that it is determined

during the contract month. The size of the contract is 1,000 metric tons (per lot) and the trading of the contract will terminate on the last business day of the contract month.

HSFO (High Sulfur Fuel Oil) contracts are typically classified according to their viscosity, i.e. 180 cst (Centistokes) or 380 cst.

### **19. Singapore Fuel Oil 380 cst (Platts) Futures**

The Singapore Fuel Oil 380 cst (Platts) Futures contract will be financially settled based on the arithmetic of the mid-point of the high and low quotations from the Platts *Asia-Pacific Marketscan* for HSFO 380 cst (High-Sulfur Fuel Oil) under the heading "FOB Singapore" for each Trading Day that it is determined during the contract month.

The size of the contract is 1,000 metric tons (per lot) and the trading of the contract will terminate on the last business day of the contract month.

### **20. Singapore Fuel Oil 180 cst vs. 380 cst (Platts) Futures**

The Singapore Fuel Oil 180 cst vs. 380 cst Spread (Platts) Futures contract will be financially settled based on the arithmetic average of the high and low quotations from the Platts *Asia-Pacific Marketscan* for Singapore 180 Cst High-Sulfur Fuel Oil price minus the arithmetic average of the high and low quotations from the Platts *Asia-Pacific Marketscan* for Singapore 380 cst HSFO under the heading "FOB Singapore" for each Trading Day during the contract month (using non-common pricing).

The size of the contract is 1,000 metric tons (per lot) and the trading of the contract will terminate on the last business day of the contract month.

## **II. Background on the Underlying Physical Markets**

### **A. The Oman Crude Oil Market**

Oman crude oil is a key benchmark for Middle Eastern sour crude oil for a number of reasons. The quality of Oman crude oil is broadly representative of other Middle East crude oils. The level of production and the liquidity of Oman crude oil make it a regional benchmark. The market for Oman crude oil is robust, liquid, and transparent, consisting of a physical forward market, physical spot market and an active OTC swaps market. There are numerous participants in the market with no single party dominating the secondary market trading of physical cargoes or financial contracts.

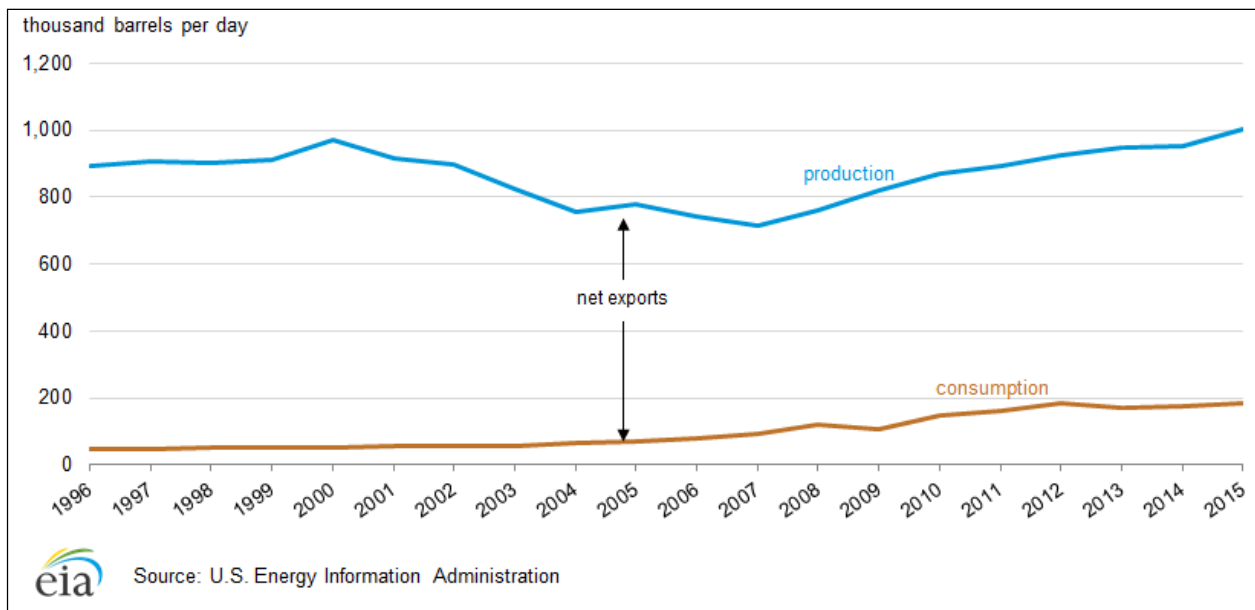
According to the Joint Organisations Data Initiative ("JODI"), the average crude oil production from Oman for the three-year period from 2011 to 2013 was approximately 920,000 barrels per day and Oman's Ministry of Oil and Gas (MOG) announced in 2015 that daily production had reached 1 million b/d). The EIA in its 2015 update on Oman also supports the 1 million b/d production figure.

**Table 1. Oman Crude Oil Production**

Thousand barrels per day

Source: eia

**Oman petroleum and other liquids production, consumption, and net exports, 1996-2015**



At present, approximately 80% of total Oman crude oil production is controlled by the Petroleum Development Oman (“PDO”), which is a joint venture owned 60% by the Oman government, 34% by Shell, 4% by Total, and 2% by Partex. In addition, Occidental Petroleum and other private oil companies have extensive oil production in Oman. Accordingly, there are multiple producers of Oman crude, rather than a single National Oil Company.

Oman is not a member of OPEC, so is not subject to OPEC production, destination or end-user restrictions. The Oman government sells most of its equity share of production through term contracts, and some of these term cargoes are resold in the spot market. The remaining share of Oman crude oil production that is owned by private oil companies is typically sold in the spot market. Thus, there is robust trading activity in the Oman crude oil spot market. The standard cargo size is 500,000 barrels, and there are typically over 50 cargoes loaded per month exported from Oman’s port, Mina al Fahal.

**B. The Dubai Crude Oil Market**

Platts assessment of Dubai crude oil incorporates supply from Dubai, Oman, Al Shaheen (Qatar), plus Upper Zakum and Murban from Abu Dhabi. Platts Dubai assessments reflect market activity in which the Dubai buyer will accept delivery of Dubai crude oil itself, or alternative delivery of an Upper Zakum, Al Shaheen, Murban or Oman. Platts reflects the value of crude as expressed through bids, offers and trading

activity in partial cargo sizes of 25,000 barrels each, with a full cargo of 500,000 barrels to be delivered when the same buyer and seller have traded 20 partials together.

Platts Dubai crude oil is one of the primary crude oil benchmarks for the Middle East and Asia, and is used by regional producers in the Middle East such as Saudi Aramco and by consumers and refiners across Asia to index their long-term contracts. In addition to futures contracts, there is an active OTC market in Dubai crude oil contracts.

The JODI publishes production data for Oman. This data is shown in Table 2. In addition, Energy Intelligence publishes production estimates for Dubai via Bloomberg as shown in the lower part of Table 2.

**Table 2. Middle East Crude Oil Production by Country (benchmark grades)**

Thousand barrels per day

Source: JODI<sup>1</sup>

	2013	2014	2015	Average 2013-2015
Oman <sup>2</sup>	947	948	986	960
UAE <sup>3</sup>	3,048	3,036	3,189	3,091
Qatar <sup>4</sup>	724	709	656	696

No formal data is published in respect of the Upper Zakum field, which contributes to Abu Dhabi production volume. ExxonMobil formed a joint venture Zakum Development Company with Abu Dhabi

#### **Additional production data**

##### **Upper Zakum**

ExxonMobil formed a joint venture Zakum Development Company with Abu Dhabi National Oil Company and Japan Oil Development Company Limited to operate the Upper Zakum field. The current production of the Upper Zakum field is at 650,000 barrels per day<sup>5</sup>, according to ADNOC and Exxon.

##### **Murban**

<sup>1</sup> <http://www.jodidb.org/TableViewer/tableView.aspx?ReportId=57431>

<sup>2</sup> Oman crude is a single grades, sold as Oman Blend

<sup>3</sup> UAE includes Murban, Upper Zakum and Dubai. Plus non-benchmark grade Das Island (which is around 600,000 b/d)

<sup>4</sup> Qatar includes Al Shaheen and non-benchmark grade Qatar Marine (each accounts for around 50% of Qatar's production)

<sup>5</sup> <http://corporate.exxonmobil.com/en/company/worldwide-operations/crude-oils/upper-zakum>

Total is a 10% stakeholder in Murban and as of 2015 production is 1.6 million b/d with plans to increase to 1.8 million b/d<sup>6</sup>.

### Al Shaheen

Denmark's Maersk is a partner in the Qatari Al Shaheen field and has published a production figure of 300,000 b/d<sup>7</sup>.

### Platts data

In 2016, Platts published estimates of the tradable barrels within the five grades, since Upper Zakum and Murban (both from Abu Dhabi) have destination restrictions on the cargoes sold directly by state-owned Adnoc. Total production of the five grades is 3.6 million b/d with an estimated 2.4 million b/d available to be freely traded<sup>8</sup>



### C. Brent Crude Oil Market

The North Sea market is comprised of the oil fields in the UK and Norwegian North oil sectors. There is a series of smaller oil fields which connect into larger streams. The most important streams in the North Sea comprise of Brent, Forties, Oseberg and Ekofisk and each stream has a principle operator that is responsible for the day to the day control of the operations including the scheduling of the cargoes based on the production from each of the smaller producing fields. The Brent, Forties, Oseberg and Ekofisk fields are known as BFOE and they underpin the Brent complex and are the key grades of oil that make up the trading of Dated Brent – the international crude oil physical benchmark price. The four BFOE fields lie in the North Sea. Brent and Forties are in the UK sector, whilst Ekofisk and Oseberg are in the Norwegian sector. The core of the Brent market is the cash market. The Brent forward market consists of the trading of cargoes of any of the Brent, Forties, Oseberg and Ekofisk streams for delivery beyond the 30 days, with no specific dates assigned for loading. The cargoes are 600,000 barrels and, in the forward market, the precise loading dates are not provided, only the delivery month i.e. December BFOE Cargo. However, the commercial contracts, which are standardized, underlying the forward market to specify the minimum timing the seller must provide the buyer to notify them as to the specific cargo loading date – currently 30 days in advance, or month-ahead, amended in February 2015 from 25 days. After the seller of a BFOE forward cargo notifies the buyer as to the loading date and which stream is being loaded, the contract is now considered to have moved from the forward market to the Dated Brent market, historically this moment is

<sup>6</sup> <http://www.total.com/en/media/news/press-releases/abu-dhabi-total-awarded-10-new-40-year-adco-concession>

<sup>7</sup> <http://www.maerskoil.com/media/newsroom/pages/long-termdevelopmentofqataroilproducingassets.aspx>

<sup>8</sup> <https://www.platts.com/IM.Platts.Content/MethodologyReferences/MethodologySpecs/Dubai-Crude-FAQ.pdf>

referred to as the cargo going “wet” i.e. it has loading dates attached to it and can therefore be sold as a Dated Brent cargo. The Brent cash market is essentially a reseller market where buyers either: resell the oil to someone else; transport the cargo and resell it later; or transport the cargo to consume it. Most of the sales in the Brent market are conducted as spot-market transactions and will often change hands multiple times. There is a chronology of sales and purchases of crude oil in the Brent cash market that starts with a sale from the equity producer in a spot market transaction, and finishes with a purchase by an end-user to consume the crude oil. Production of BFOE has been declining over the past few years due to the cost of drilling and the returns on investment compared to other regions in the world. These four North Sea grades are segregated blends delivered at different locations in the North Sea, and each can be substituted by the seller in the 30-Day BFOE cash market (“the forward market”). Quality adjustments ensure that all four grades can be delivered to a buyer under the standardized forward contract. Both ICE and NYMEX have adjusted the expiry calendar of the Futures to align more closely with the forward market with effect from the March 2016 contract month (as an earlier transition would have had a significant impact on the open interest holders).

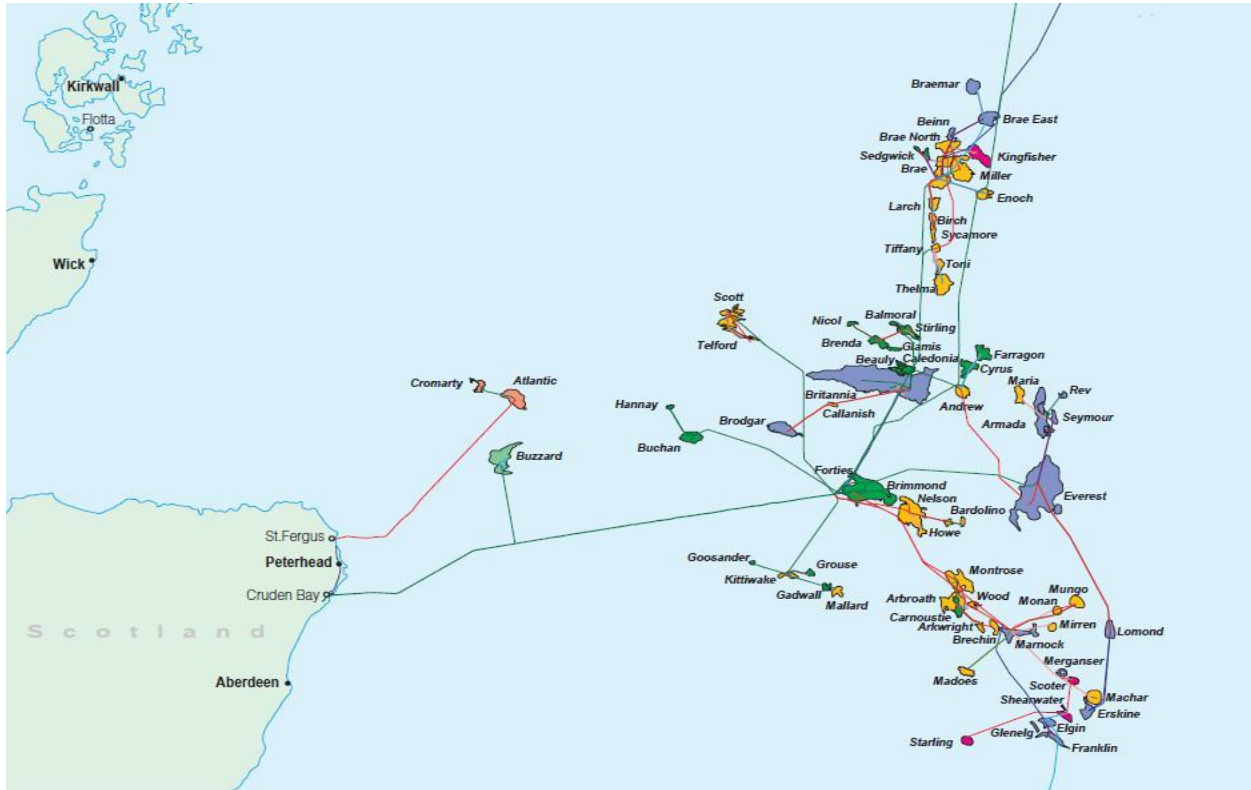
The process of moving from a forward to the physical market where a forward Brent cargo becomes a physical North Sea Dated Brent cargo happens as follows:

1. Refiners, producers and traders enter into a forward agreement for a particular month.
2. The Operator of each field being Shell for Brent; BP for Forties; ConocoPhillips for Oseberg and Statoil for Ekofisk will announce the loading programs on the first working day of the preceding month ie. The November loading program is announced on the first working day of October.
3. The equity producers will begin the chain of nominating cargoes to buyers (or they can decide to keep the cargo). A buyer receiving the nomination can keep the cargo or pass it to another participant with whom it has another forward contract. Buyers trade the cash BFOE on the basis that they will accept any cargo as nominated provided that it is done so within the agreed notice period (30 days) by 4pm London time. Any cargo not nominated by this time will remain with the participant last notified. After 4pm London time, the cargo becomes wet physical with precise loading dates attached.
4. Cargoes that are wet physical will be sold as a Dated Brent cargo with cargo loading dates between 10 and 30 days forward. The dates for a Dated cargo are for a three-day loading window eg. Oct 22-24.

Figure 1 shows the makeup of the fields in the Forties pipeline system (FPS) which is operated by BP. There are over 50 offshore fields that flow through within the FPS. The delivery point for Forties crude oil is Hound Point, which is on the East coast of Scotland a short distance from the UK oil capital Aberdeen. Forties is a blended crude oil from all of the fields that feed into it.



**Figure 1: Forties Pipeline System**



The blend changed at the beginning of 2007 when crude oil from the Buzzard field began to flow into it. Crucially Buzzard is now the largest field within the FPS. Buzzard crude oil is a medium gravity, sour crude oil with an API of 32.6 and a sulphur content of 1.44% therefore the yield is very similar to that of Urals crude oil (from Russia). The FPS produces a forward forecast of the anticipated percentage of Buzzard crude in Forties Blend<sup>9</sup>. The overall quality of Forties crude oil varies depending on the percentage of Buzzard as a proportion of the overall blend.

**Table 1: Percentage of Crude from Buzzard Field Estimates<sup>10</sup>**

	Buzzard %	Forties Blend Production (thousand b/d)
<b>Aug-15</b>	44%	408.60
<b>Sep-15</b>	38%	507.40
<b>Oct-15</b>	31%	495.60
<b>Nov-15</b>	34%	553.60

<sup>9</sup> [http://www.bp.com/en/global/forties-pipeline/about\\_fps/forties\\_blend\\_quality.html](http://www.bp.com/en/global/forties-pipeline/about_fps/forties_blend_quality.html)

<sup>10</sup> [http://www.bp.com/en/global/forties-pipeline/about\\_fps/forties\\_blend\\_quality.html](http://www.bp.com/en/global/forties-pipeline/about_fps/forties_blend_quality.html)

The startup of the Buzzard field feeding into the Forties pipeline system (see the map in Chart 1) has resulted in Forties being almost always the cheapest of the four grades to deliver as a dated Brent cargo due to the higher sulphur content of Buzzard compared to Forties and the fact that Buzzard makes up around 40% of the Forties blend.

Bloomberg LP (“Bloomberg”) provides details of the BFOE loading programs for the four grades that comprise the Brent market. Based on the most recent 3-year averages of the Bloomberg data on BFOE loadings (from August 2012 through August 2015), loadings of Brent (BFOE) crude oil was approximately 857,194 barrels per day.

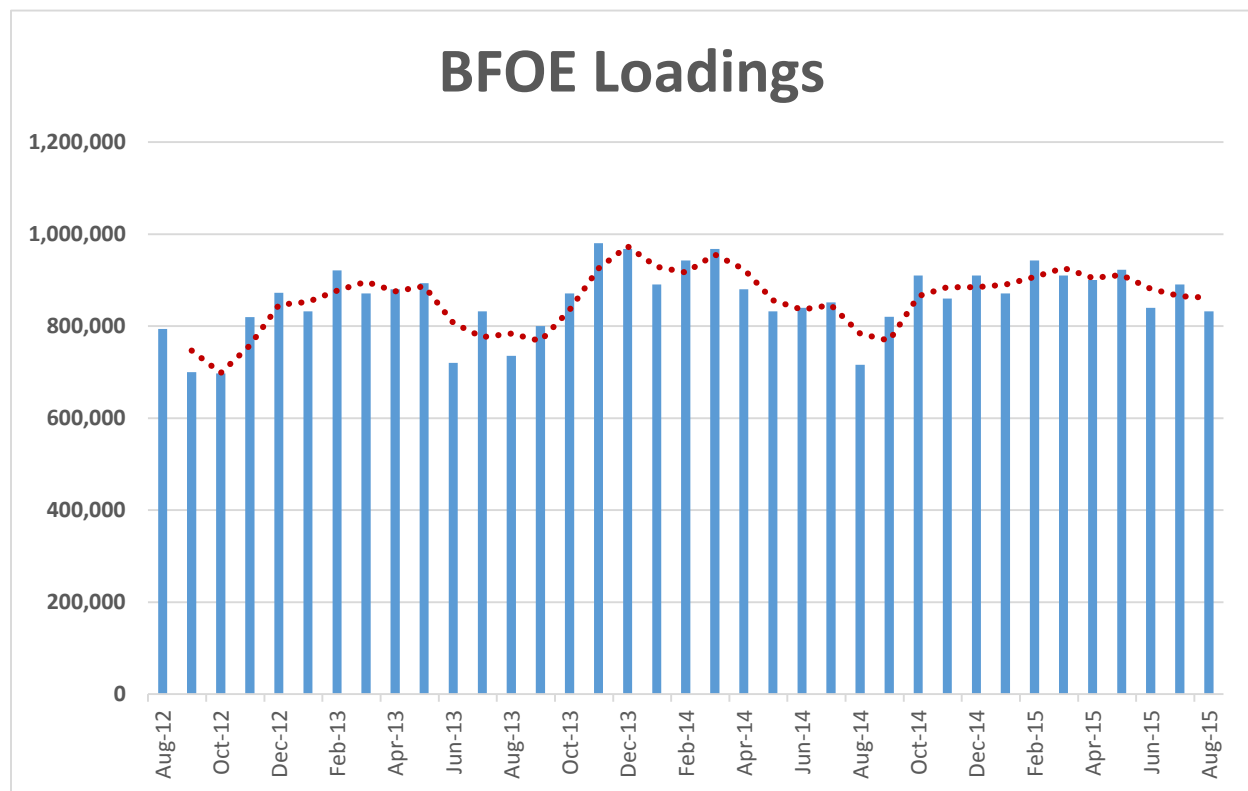
**Table 2: Monthly Loadings of Brent, Forties, Oseberg, Ekofisk**

<b>BFOE Loading</b>	
<b>Date</b>	<b>Quantity (b/d)</b>
<b>Aug-15</b>	<b>832,258</b>
<b>Jul-15</b>	<b>890,323</b>
<b>Jun-15</b>	<b>840,000</b>
<b>May-15</b>	<b>922,581</b>
<b>Apr-15</b>	<b>900,000</b>
<b>Mar-15</b>	<b>909,677</b>
<b>Feb-15</b>	<b>942,857</b>
<b>Jan-15</b>	<b>870,968</b>
<b>Dec-14</b>	<b>909,677</b>
<b>Nov-14</b>	<b>860,000</b>
<b>Oct-14</b>	<b>909,677</b>
<b>Sep-14</b>	<b>820,000</b>
<b>Aug-14</b>	<b>716,129</b>
<b>Jul-14</b>	<b>851,613</b>
<b>Jun-14</b>	<b>840,000</b>
<b>May-14</b>	<b>832,258</b>
<b>Apr-14</b>	<b>880,000</b>
<b>Mar-14</b>	<b>967,742</b>

<b>Feb-14</b>	<b>942,857</b>
<b>Jan-14</b>	<b>890,323</b>
<b>Dec-13</b>	<b>967,742</b>
<b>Nov-13</b>	<b>980,000</b>
<b>Oct-13</b>	<b>870,968</b>
<b>Sep-13</b>	<b>800,000</b>
<b>Aug-13</b>	<b>735,484</b>
<b>Jul-13</b>	<b>832,258</b>
<b>Jun-13</b>	<b>720,000</b>
<b>May-13</b>	<b>893,548</b>
<b>Apr-13</b>	<b>880,000</b>
<b>Mar-13</b>	<b>870,968</b>
<b>Feb-13</b>	<b>921,429</b>
<b>Jan-13</b>	<b>832,258</b>
<b>Dec-12</b>	<b>872,581</b>
<b>Nov-12</b>	<b>819,667</b>
<b>Oct-12</b>	<b>696,774</b>
<b>Sep-12</b>	<b>700,000</b>
<b>Aug-12</b>	<b>793,548</b>
<b>3 year average</b>	<b>857,194</b>

**Source: Bloomberg**

**Figure 2: Monthly Loadings of Brent, Forties, Oseberg, Ekofisk**



The Brent market is priced in USD and cents per barrel. There are two significant Futures contracts based on trading activity in the forward BFOE market. NYMEX and ICE Futures Europe offer trading of Brent Futures on their respective Exchanges. The cash market is traded in partials of 100,000 barrels or larger full size cargo transactions of 600,000 barrels. Physical convergence can occur through the partials market mechanism upon the trading of six parcels with the same counterparty in a single delivery month. If physical convergence does not occur then trades are booked out at the prevailing cash value on the last day of trading day of the cash market for the specific delivery month (i.e. this is currently 30 days/one month prior to the 1st loading date of the delivery month). Full sized physical cargo BFOE trades will be used by ICE in the establishment of the Brent Index which is the mechanism by which the futures open on expiry are cash settled<sup>11</sup>.

The Dated Brent or Dated BFOE, as it is sometimes referred, reflects the value of the cheapest of Brent, Forties, Oseberg and Ekofisk, of 600,000 barrels, loading in the next 10-30 days (month ahead). Dated Brent is estimated to price around 50% of the global crude oil supply<sup>12</sup>. Within the North Sea and beyond grades are traded as a differential to Dated Brent or as a differential to cash Brent (BFOE). Each of the crude oil grades within BFOE are not the same quality, several adjustments have been made. In 2007, Platts included a sulphur de-escalator for Forties crude oil within its Dated Brent and Brent related instruments. The change was made in response to inclusion of sour crude Buzzard into the Forties pipeline system (see chart 1). The de-escalator of price is applied to deliveries above a minimum sulphur level of 0.6%. Every month, Platts establishes a USD value de-escalator for every 0.1% of sulphur above 0.6%. The value of de-escalator is established by reviewing evidence of significant and sustained changes in the

<sup>11</sup> [https://www.theice.com/publicdocs/futures/ICE\\_Futures\\_Europe\\_Brent\\_Index.pdf](https://www.theice.com/publicdocs/futures/ICE_Futures_Europe_Brent_Index.pdf)

<sup>12</sup> <http://www.oxfordenergy.org/wpcms/wp-content/uploads/2012/03/Brent-Prices-Impact-of-PRA-methodology-on-price-formation.pdf>

crude market, as affected by refined products (crack spread values of both heavy fuel oils and light ends) and other relevant factors that affect the economics of Forties crude.

### Analysis of Deliverable Supply

In its analysis of deliverable supply, the Exchange relied on actual loadings of BFOE crude oil, which is estimated at 857,194 barrels per day or 24.86 million barrels per month, which is equivalent to 24,858 contracts.

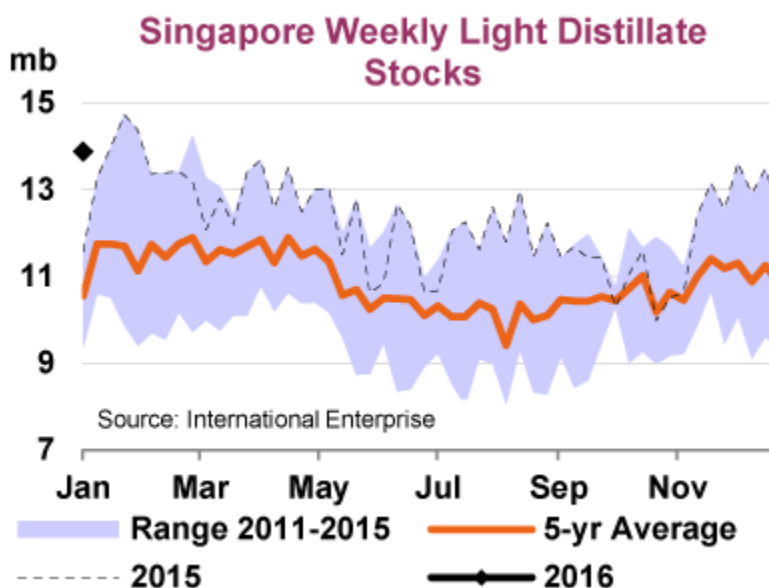
### Refined Products markets in the Middle East and Asia

#### D. Singapore Gasoil Market

The Singapore Gasoil market is the main pricing hub for the Asia-Pacific region due to its large refining and storage network. There are several large refineries located in close proximity to Singapore and this makes it a vibrant trading hub with a large number of distributors, refiners, and trading companies all operating in the region.

The predominant grade of distillate fuel oil in Singapore is low sulphur gasoil (0.05%), which replaced the higher sulphur gasoil that had been the benchmark since 1983. The move towards the increased use of cleaner fuel standards in Asia and the Middle East has seen the sulphur content in gasoil drop over recent years. Platts, the main pricing reference company for Singapore gasoil, ran parallel assessments for 0.05% and 0.5% gasoil for a couple years, and then finally discontinued the 0.5% assessment at the end of 2012.

Singapore International Enterprise publishes detailed weekly import/export data on a subscription basis, but the data is also published in monthly publications including OPEC and IEA<sup>13</sup>.



<sup>13</sup> IEA/IE

## **E. Singapore Mogas 92 Unleaded Market**

Gasoline is a transport fuel used primarily in private vehicles. Gasoline is a globally traded commodity and Singapore is the main refining, storage and trading hub for the Asian oil marketplace. The Singapore gasoline market is highly diverse and actively traded by refiners, traders, importers, and smaller distributors. Gasoline is produced and is classified by its Record Octane Number or RON. Various grades are traded, including 92 RON, 95 RON and 97 RON. The most liquid grade in Asia is 92 RON.

With its high concentration of refining capacity and its low domestic demand, Singapore is one of the largest exporters of gasoline in Asia. Weekly data is published by Singapore's EA.

- **Gasoline terminology and market definitions**
- **Platts assesses 3 grades of gasoline East of Suez - 92, 95 and 97 RON, with the MOPS benchmark based on 50,000/b cargoes loading 15-30 days forward.** However, many grades and qualities of gasoline are used across Asia
- **92 RON is considered the benchmark for Singapore (MOPS 92 RON) and used in most contract prices**
- Only 92 RON has a forward market - growing but still illiquid
- **Platts publishes 95 RON MOPAG netback, which is widely utilized in the AG, India and Africa**
- Gasoline is also traded as a differential to naphtha in the AG
- **Gasoline is mostly traded in Asia in units of \$ per barrel and Platts uses a standardized conversion rate of 8.5 to convert gasoline to \$/mt**

## **F. Singapore Jet Kerosene Market**

The Jet Kerosene market is closely aligned to gasoil/heating oil as it shares the same underlying qualities, with additives to make it suitable for the aviation industry. Global quality standards are set by the UK Ministry of Defense and are referred to in the industry as DEFSTAN. Jet fuel market is priced in units of dollars per barrel. There is active trading in both forward cash deals and in OTC swaps. The market participation in Singapore is diverse and includes many of the regional commercial entities with storage facilities in Singapore.

- **Middle Distillates terminology and definitions**
- **Platts assesses 5 grades of gasoil East of Suez - 5000ppm (0.5% sulfur), 2500ppm, 500ppm, 50ppm and 10ppm**
- 0.5% sulfur is the current benchmark but this will switch to 500ppm in January 2013. Other grades are traded as a differential to the benchmark 0.5%
- **Gasoil swaps are highly liquid in the Singapore market, with Asian refiners heavily geared towards distillate yields**
- Jet/Kerosene follows the global standard Defstan specification
- **Also has a highly liquid Singapore swaps market, while Regrade acts as a proxy hedge for jet fuel in tracking the**
- East/West spreads are also highly liquid and utilized by companies exposed to price differentials in global arbitrage movements

## **G. Middle East High Sulfur Fuel Oil (HSFO)**

HSFO in the Middle East is used primarily in the bunker fuel market, plus occasional power generation demand from Saudi Arabia. Fujairah in the United Arab Emirates is the primary bunkering terminal for vessels in the region, which is located just outside of the Strait of Hormuz. Fujairah bunker volumes are in the region of 1 million metric tons per month, making it the second largest bunkering hub in the world after Singapore, although the Singapore market is approximately four times the size of Fujairah.

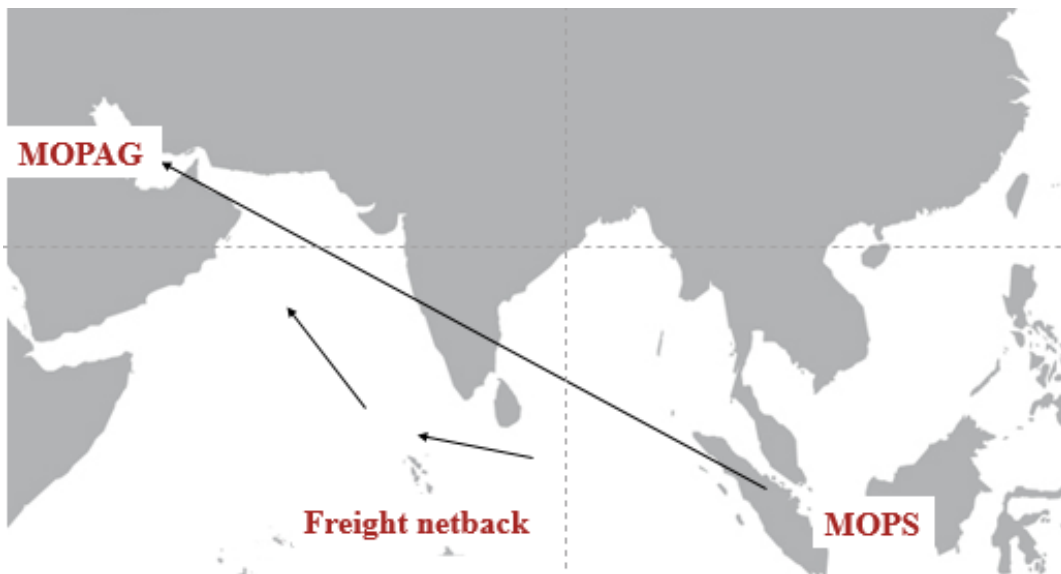
HSFO is the least valuable part of crude oil barrel and modern refineries generally produce zero fuel oil. However there are a number of older refining facilities in the Middle East producing heavy fuel oil, and excess capacity is typically exported to Singapore or occasionally China.

Singapore is typically the home for excess fuel oil from around the world, including Europe, South America and the Middle East. As such the price of HSFO in Singapore is viewed as the key price for the global fuel oil market with other fuel prices outside of the Singapore regularly reflecting the Singapore 'netback value'. HSFO is typically blended into two specifications, namely 380 CST and 180 CST. 380 CST is considered a 'bunker specification' and 180 CST the utility grade (for power generation). Both grades are typically 3.5% sulfur.

The key benchmark prices in Singapore are published by S&P Global Platts, which licenses the data to a number of commodities exchanges, including the DME. They are published as Mean of Platts Singapore (MOPS) and HSFO cargoes are the most actively traded refined products in the region. Platts monitors activity in its Market-on-Close process, which is widely referred to as 'the window'. Traded volumes of derivatives on HSFO are published by Platts for subscribers.

Cargoes in the Middle East are usually traded on a term basis -- for example an annual contract with a National Oil Company (NOC) such as Saudi Aramco, or via spot tender. As such there is far less observable trade data in Middle East compared to Singapore, so Platts uses its Singapore MOPS price minus the freight element. For example if 380 CST Singapore is \$250/mt and Middle East to Singapore freight \$15/mt, Platts will publish the Middle East 380CST price as \$235/mt. The price is published as MOPAG, or Mean of Platts Arab Gulf.

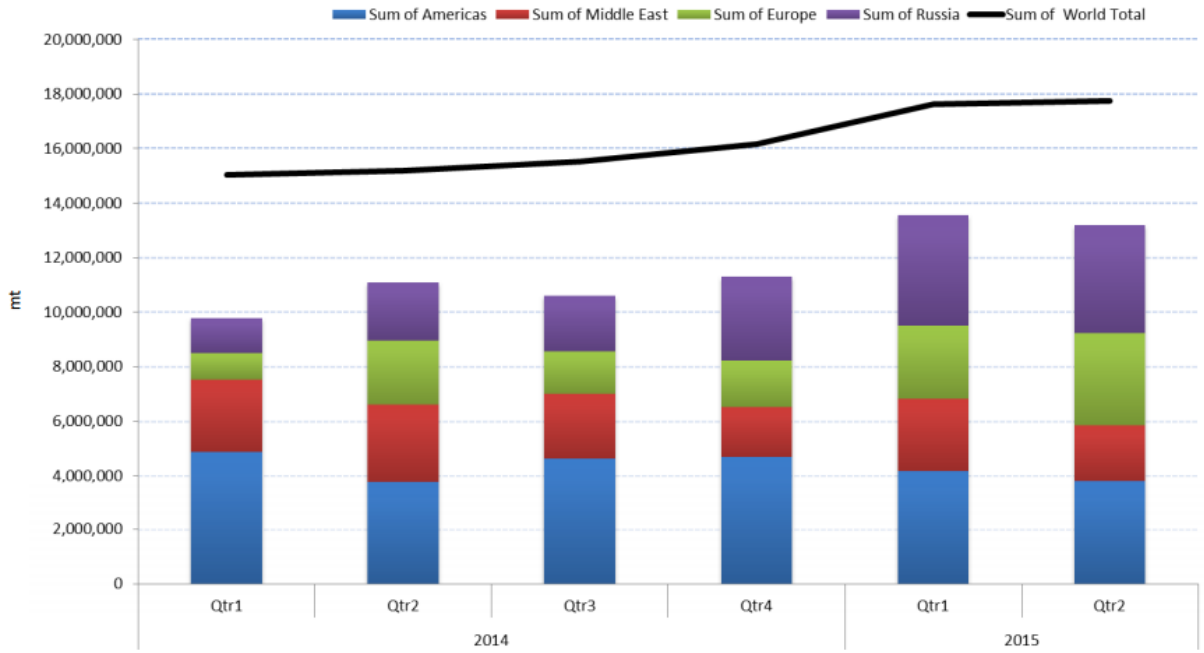
As the MOPAG price is generated as a netback from MOPS, Middle East hedging requirements have typically been served by the Singapore market, where there is a very actively traded derivatives market. However, risk managers using Singapore as a proxy hedge for Middle East fuel oil will carry some 'basis risk' as the freight element can be volatile and difficult to hedge due to lack of liquidity in freight derivative.



Historically NOCs in the Middle East NOCs have not used risk management tools but in recent years a number of NOCs have adopted a hedging strategy more closely aligned with International Oil Companies (IOCs). For instance Saudi Arabia has set up trading entity by the name of Aramco Products Trading, while Oman has established Oman Trading International. As such, demand for MOPAG hedging

instruments is growing and a number of international traders with pricing exposure to Middle East fuel oil have requested that the DME list 180 CST and 380 CST for clearing purposes.

### Quarterly FO imports to Singapore, selected sources

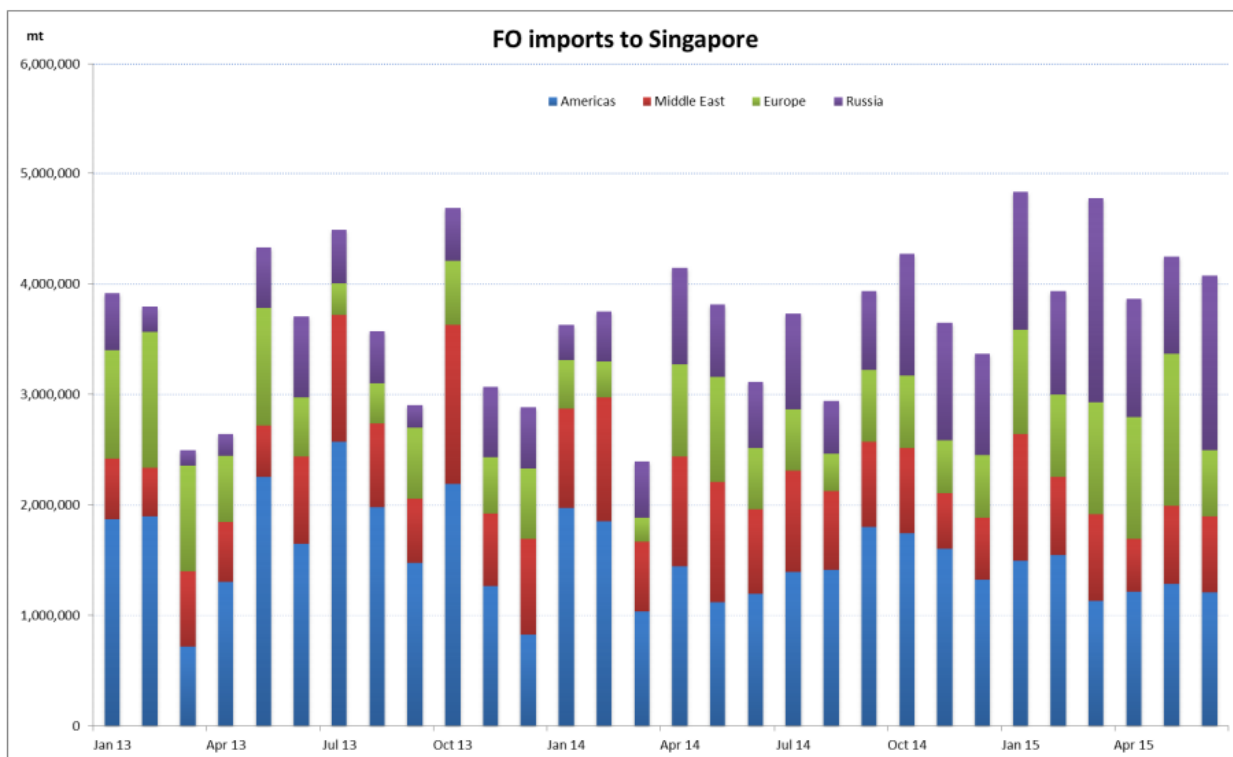


Source: IE Singapore

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<sup>14</sup> Platt Research/IE





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source Platts/IE Singapore

**HSFO terminology and market definitions**

**MOPS = Mean of Platts Singapore**

**MOPAG = Mean of Platts Arab Gulf**

**180 CST typical utility spec and also used in gas pricing**

**380 CST the bunker grade and the larger physical market**

**HSFO typically trades in units of \$ per metric ton**

Crude trades in \$ per barrel. Platts uses a standardized conversion rate of 6.5 to convert HSFO to \$/barrel

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<sup>15</sup> Platt Research/IE

**Exhibit B: NYMEX and DME Markets**

**Average Monthly Volume – 2015 and 2016**

	Average Monthly Volume -- NYMEX		Average Monthly Volume -- DME	
	2015	2016	2015	2016
Jan	2,212,916	2,617,582	7,183	8,438
Feb	2,430,941	2,758,703	7,336	7,427
Mar	1,882,184	2,323,584	6,416	7,695
Apr	1,804,109	2,479,105	6,584	7,396
May	1,759,693	2,252,270	6,335	7,452
Jun	1,736,537	2,293,776	6,685	8,770
Jul	1,852,260	2,225,963	6,703	8,508
Aug	2,139,607	2,255,492	6,433	8,290
Sep	1,973,815	2,465,853	6,951	8,052
Oct	2,082,308	2,428,871	6,683	6,236
Nov	1,992,622	2,799,843	6,680	7,781
Dec	2,076,937	2,599,710	7,176	6,786
<b>Grand Total</b>	<b>1,989,841</b>	<b>2,454,065</b>	<b>6,758</b>	<b>7,737</b>