The Extended JODI Oil Questionnaire

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Joint Organisations Data Initiative   A Concrete Outcome of the Consumer – Producer Dialogue

M-1 and M-2

- What is M-1?
  - ❑ One-month old data
  - ❑ On August 25th 2008, data to be reported is for July 2008 (M-1)

- What is M-2?
  - ❑ Two-month old data
  - ❑ On August 25th 2008, data to be reported is for June 2008 (M-2)

- Why M-1 and M-2 data are to be reported?
  - ❑ M-2 data comprise of more complete data; for M-1, most countries cannot be expected to be able to collect all the required data from all data sources

- Some countries/economies cannot report M-1 data due to limitations in data collection system in their respective areas. They are therefore allowed to report M-2. However, the organizations strongly encourage submission of M-1 data.
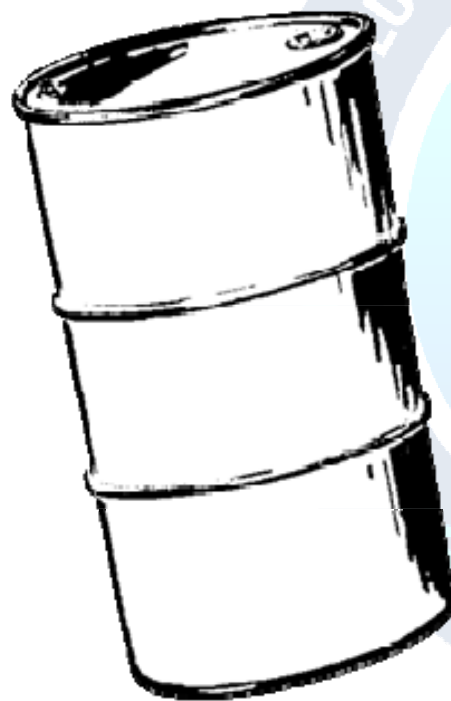
Timetable

- Monthly data are to be submitted preferably every 25th of the month to respective organizations

- Organizations process and evaluate the data until the 15th of the following month

- Organizations submit the data to IEF

- IEF posts the data to the JODI World Database as soon as the data are received from the Organizations

Data Processing Schedule

M-1	Last Month	M	Current Month	M+1	Next Month
1		1		1	
2		2		2	
3		3		3	Organizations receive data from member countries/economies, conducts initial checks and feedback data problems to member countries/economies
4		4		4	
5		5		5	
6		6		6	
7		7		7	
8		8		8	
9		9		9	
10		10	1. National Administrations receive data from respective sources, such as: oil companies, custom offices, importers, etc.	10	
11		11		11	1. Organizations evaluate the data by comparison with data from other sources and checking internal consistency.
12		12		12	
13		13		13	
14		14	2. Data are consolidated	14	
15		15		15	2. Data are rated, coded and submitted to IEFS
16		16	3. Data are entered in the JODI questionnaire.	16	1. IEFS receives and posts the data to the JODI World Database and announces the release of the data to organizations.
17		17		17	
18		18	4. Data are verified for accuracy by balance checks, consistency checks, time series checks and visual checks	18	
19		19		19	
20		20		20	2. Organizations inform member countries/economies of the release.
21		21		21	
22		22	5. National administrations feedback problems to data providers, if any.	22	
23		23		23	
24		24		24	
25		25	1. National Administrations receive corrections from data providers and conduct final accuracy checks.	25	
26		26		26	
27		27		27	
28		28		28	
29		29	2. Data are submitted to respective organizations as early as possible.	29	
30		30		30	
31		31			

Notes:
1. While receiving and processing data for M-1, in parallel, national administrations are also receiving and processing M-2 and even older data.
2. The organizations are happy to receive corrections to M-2 data at any time.

What is produced?

Crude Oil

Refining →

What is consumed?

%	
3	**LPG**
5	**Naphtha**
25	**Motor Gasoline**
8	**Kerosene**
30	**Gas/diesel Oil**
16	**Fuel Oil**
13	**Other**

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Initial JODI Questionnaire

42 Data Points

Country: _____

Month: _____

Unit: _____

	Crude Oil
Production	
Imports	
Exports	
Stocks — Closing	
Stocks — Change	
Refinery Intake	

1 x 6

		Petroleum Products					
		LPG	Gasoline	Kerosene	Gas/Diesel Oil	Fuel Oil	Total Oil
Refinery Output							
Imports							
Exports							
Stocks	Closing							
Stocks	Change							
Demand							

6 x 6

Extended JODI Questionnaire

126 Data Points

Country _____

Month _____

Unit : _____

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		Petroleum Products								
						LPG	Naphtha	Gasoline	Total Kerosene	*Of which: Jet Kerosene*	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output									
+ From Other sources					+ Receipts									
+ Imports					+ Imports									
- Exports					- Exports									
+ Products Transferred /Backflows					- Products Transferred									
- Direct Use					+ Interproduct Transfers									
- Stock Change					- Stock Change									
- Statistical Difference	0	0	0	0	- Statistical Difference	0	0	0	0	0	0	0	0	0
= Refinery Intake					= Demand									
Closing stocks					Closing stocks									

(10 x 4) - 4

10 x 9

Definition of Products

The One critical issue is whether the volumes of NGL, lease or field condensates and oils extracted from bituminous minerals are included. All organisations exclude NGL from crude oil. If condensates are able to be excluded, it should be noted to the JODI organisation(s) of which the country/economy is a member. Most OPEC member countries exclude condensates.

Country _____

Month _____

	Crude Oil	Other	Total (1)+(2)+(3)		Petroleum Products								
					LPG	Naphtha	Gasoline	Total Kerosene	*Of which: Jet Kerosene*	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
+ Production				+ Refinery Output									
+ From Other sources				+ Receipts									
+ Imports				+ Imports									
- Exports				- Exports									
+ Products Transferred /Backflows				- Products Transferred									
- Direct Use													
- Stock Change													
- Statistical Difference	0	0											
= Refinery Intake													
Closing stocks													

Crude Oil: Including lease condensate – excluding NGL

Petroleum is a complex mixture of liquid hydrocarbons, chemical compounds containing hydrogen and carbon, occurring naturally in underground reservoirs in sedimentary rock. Petroleum is normally found at considerable depths beneath the earth's surface, where, under pressure it is essentially liquid. At the surface and atmospheric pressure, petroleum comprises both natural gas and crude oil.

Important: Don't include Natural Gas Liquids (NGL)

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Definition of Products

Country _____

Month _____

Unit : _____

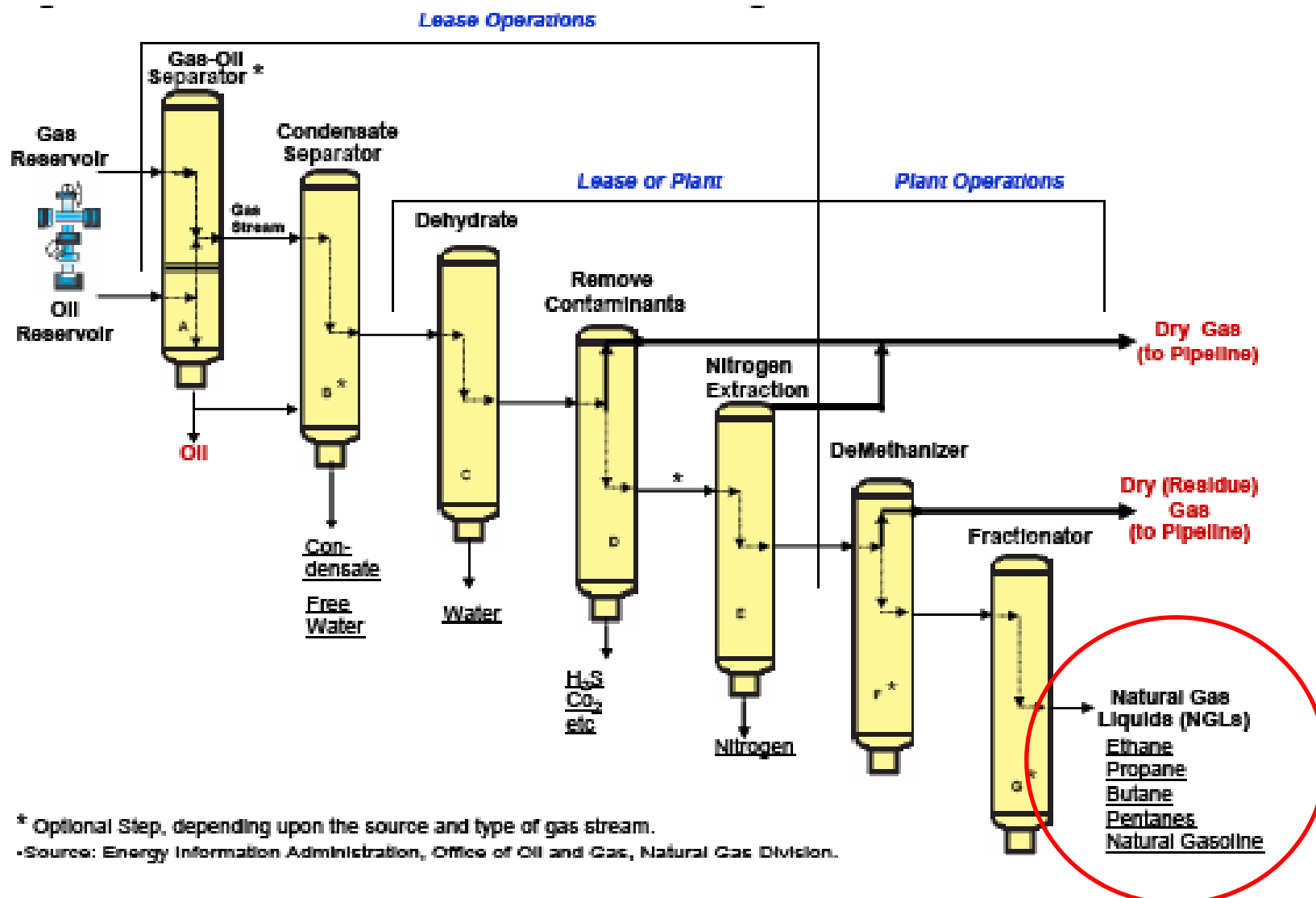|	Cru	NGL	Total (1)+(2)+(3)			Petroleum Products								
						LPG	Naphtha	Gasoline	Total Kerosene	*Of which: Jet Kerosene*	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)		(4)			(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output									
+ From Other sources					+ Receipts									
+ Imports					+ Imports									
- Exports					- Exports									
+ Products Transferred /Backflows					- Products Transferred									
- Direct Use					+ Interproduct Transfers									
- Stock Change					- Stock Change									
- Statistical Difference	0	0	0	0	- Statistical Difference	0	0	0	0	0	0	0	0	0
= Refinery Intake					Demand									
Closing stocks														

NATURAL GAS LIQUIDS (NGL)

NGL are liquid or liquefied hydrocarbons recovered from natural gas in separation facilities or gas processing plants. Natural gas liquids include ethane, propane, butane (normal and iso-), (iso) pentane and pentanes plus (sometimes referred to as natural gasoline or plant condensate).

Definition of Products (NGL)

Definition of Products

Country _____

Month _____

Unit : _____

	Crude Oil	Other			LPG	Naphtha	Gasoline	Total Kerosene	*Of which: Jet Kerosene*	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)		(3)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
+ Production				+ Refinery Output									
+ From Other sources				+ Receipts									
+ Imports				+ Imports									
- Exports				- Exports									
+ Products Transferred /Backflows				- Products Transferred									
- Direct Use				+ Interproduct Transfers									
- Stock Change				- Stock Change									
- Statistical Difference	0	0	0	- Statistical Difference	0	0	0	0	0	0	0	0	0
= Refinery Intake				= Demand									
Closing stocks													

Petroleum Products

Other

Other = Refinery Feedstocks + Additives/oxygenates + Other Hydrocarbons

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Definition of Products

OTHERS 1/2

❑ A **refinery feedstock** is a processed oil destined for further processing (e.g. straight run fuel oil or vacuum gas oil) excluding blending. With further processing, it will be transformed into one or more components and/or finished products. This definition also covers returns from the petrochemical industry to the refining industry (e.g. pyrolysis gasoline, C4 fractions, gas oil and fuel oil fractions).

❑ **Additives/Oxygenates:** Additives are non-hydrocarbon compounds added to or blended with a product to modify fuel properties (octane, cetane, cold properties, etc.):

➢ oxygenates, such as alcohols (methanol, ethanol), ethers (such as MTBE (methyl tertiary butyl ether), ETBE (ethyl tertiary butyl ether), TAME (tertiary amyl methyl ether));

➢ esters (e.g. rapeseed or dimethylester, etc.);

➢ chemical compounds (such as TML, TEL and detergents).

Definition of Products
About Additives and Oxygenates

- Lead was added to gasoline to greatly simplify blending for octane number. Lead, in the form of **tetraethyl lead (TEL) or tetramethyl lead (TML)**, increases the octane number of gasoline without affecting any other properties, including vapour pressure.

- TEL is a very toxic chemical, and even in low concentration in the vapour form can induce violent illness or death. That's why national administrations quickly set a maximum amount of TEL allowed in gasoline.

Definition of Products
About Additives and Oxygenates

- When national administrations required the lead content to be reduced to meet environment requirements, refiners looked for other octane enhancers. From petrochemicals industry came several alternatives: **methanol, ethanol, tertiary butyl alcohol (TBA), and methyl tertiary butyl ether (MTBE).**

- The two classes of compounds to be considered here are **alcohols** and **ethers**. Since the 1970s, alcohols (methanol and ethanol) and ethers have been added to gasoline to increase octane levels, reduce carbon monoxide generation and reduce negative impact on atmospheric ozone layer due to the lower reactivity of resulting VOC emissions.

- As a result of the lead additives withdrawal, a number of different ethers are currently added to the gasoline and are better able to meet both the new oxygen requirements and the vapour pressure limits. The most common ethers being used as additives are **MTBE, ethyl tertiary butyl ether (ETBE), and tertiary amyl methyl ether (TAME).** Some refineries manufacture their own supplies of those ethers.

Definition of Products
About Additives and Oxygenates

- Isobutylene and/or isoamylene and methanol (or ethanol) are necessary to produce MTBE (or ETBE) and/or TAME. Isobutylene is obtained from a number of refinery sources including: the light naphtha from the FCC and coking units; conversion of TBA recovered as a by-product in the manufacture of propylene oxides...

- **Methanol** (CH_3OH) is commonly called wood alcohol because the early commercial source was the destructive distillation of fresh-cut lumber from hardwood trees. Now methanol has been made commercially from methane or naphtha. The source of the methane is usually natural gas, which is predominately methane. However, the ability to produce methanol from non-petroleum feedstocks such as coal or biomass is of interest for reducing petroleum needs.

- **Ethanol** (CH_3CH_2OH), or ethyl alcohol, is the alcohol most intimately familiar to everyone, the primary constituent of whiskey. Like methanol, ethanol had natural beginnings; the fermentation of sugar in grapes (wine), potatoes (vodka), and grain and corn (whiskey). Now synthetic ethanol is produced either by the direct or indirect hydration of ethylene.

Definition of Products

OTHERS 2/2

❑ **Biofuels** such as biogasoline and biodiesel that are blended into gasoline and diesel at oil refineries.

  ➢ Biogasoline: a gasoline quality liquid fuel produced from biomass or used cooking oils, consists of bioethanol, biomethanol, BioETBE and bioMTBE

  ➢ Biodiesel: a diesel quality liquid fuel produced from biomass or used cooking oils, consists of Biodiesel, bio-dimethylether, Fischer-Tropsh and cold pressed biooil.

  ➢ Bioethanol: ethanol produced from biomass and/or the biodegradable fraction of waste;

  ➢ Biomethanol: methanol produced from biomass and/or the biodegradable fraction of waste;

  ➢ Biodimethylether: a diesel quality fuel produced from biomass and/or the biodegradable fraction of waste;

  ➢ Biooil: a pyrolysis oil fuel produced from biomass

❑ **Other Hydrocarbons:** This category includes synthetic crude oil from tar sands, shale oil, etc., liquids from coal liquefaction, output of liquids from natural gas conversion into gasoline, hydrogen and emulsified oils (e.g. Orimulsion).

Definition of Products

For all organisations LPG comprises mainly propane and butane. LPG from gas plants should be reported to all flows of the JODI Oil questionnaire except refinery output
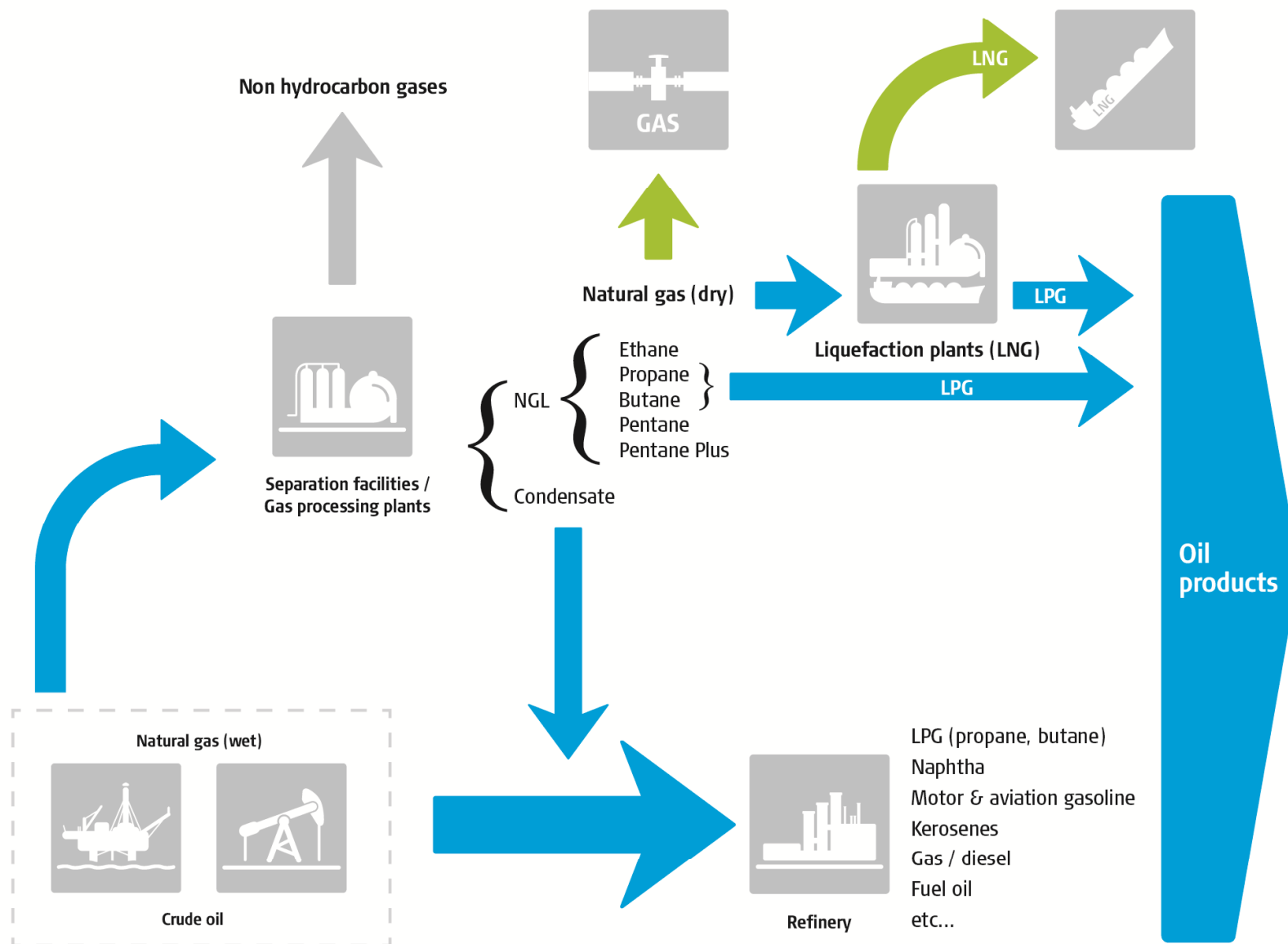
Country _____

Month _____

Unit : _____

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		LPG	Naphtha	Gasoline	Total Kerosene	*Of which: Jet Kerosene*	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)			(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output									
+ From Other sources					+ Receipts									
+ Imports					+ Imports									
- Exports					- Exports									
+ Products Transferred /Backflows					- Products Transferred									
- Direct Use														
- Stock Change														
- Statistical Difference	0													
= Refinery Intake														
Closing stocks														

Petroleum Products

LPG: Comprises Propane and Butane

Liquefied Petroleum Gas (LPG) is the generic name for commercial propane and commercial butane – it can be produced from natural gas processing plants or from refineries. LPG naturally occurs as gas at atmospheric pressure. It has the special property of becoming liquid at atmospheric temperature if moderately compressed. They can easily be converted from liquid into gas by releasing them to atmospheric pressure. In order to facilitate transport and storage, LPG are usually bottled in liquid state (they are about 250 times as dense than when they are gases), propane however can also be supplied in bulk for storage tanks at consumers' premises.

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JOINT ORGANISATIONS DATA INITIATIVE

A Concrete Outcome of the Consumer – Producer Dialogue

LPG

Non hydrocarbon gases

GAS

LNG

Natural gas (dry)

Liquefaction plants (LNG)

LPG

LPG

Separation facilities /
Gas processing plants

NGL {
Ethane
Propane
Butane
Pentane
Pentane Plus
}

Condensate

Natural gas (wet)

Crude oil

Refinery

Oil products

LPG (propane, butane)
Naphtha
Motor & aviation gasoline
Kerosenes
Gas / diesel
Fuel oil
etc...

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How to fill questionnaire?

	NGL		Oil products	
			LPG	Other oil products
	(2)		(11)	(12)
+ Production	100 (of which 50)	+ Refinery output	10	
+ From other sources		+ Receipts		50
+ Imports	25	+ Imports		
– Exports		– Exports	5	
+ Products transferred /Backflows		– Products transferred		
– Direct use	50	+ Interproduct transfers	50	-50
– Stock change	6	– Stock change	2	
– Statistical difference	4	– Statistical difference	-2	0
= Refinery intake	65	= Demand	55	
Closing Stocks		Closing stocks		

Definition of Products

Definitions given are generally comparable among different JODI organisations. Naphtha is semi-final product and it is further processed to become other products so there is no homogeneous definition.

Month _____   Unit : _____

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		Naphtha	...line	Total Kerosene	Of which: Jet Kerosene	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7)+(8)+(10)+(11)+(12) (13)
	(1)	(2)	(3)	(4)			(7)	(8)	(9)	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output								
+ From Other sources					+ Receipts								
+ Imports					+ Imports								
- Exports					- Exports								
+ Products Transferred /Backflows					- Products Transferred								
- Direct Use					+ Interproduct Transfers								
- Stock Change					- Stock Change								
- Statistical Difference	0	0	0	0	- Statistical Difference	0	0	0	0	0	0	0	0
= Refinery Intake													
Closing stocks													

Naphtha is a feedstock destined for the petrochemical industry (e.g. ethylene manufacture or aromatics production). Naphtha comprises material in the 30°C and 2l0°C distillation range or part of this range. Naphtha imported for blending is reported as an import of naphtha, then shown on the interproduct transfer row, as a negative entry for Naphtha, and a positive entry for the corresponding finished product.

Definition of Products

For APEC, Eurostat, IEA, OPEC and UNSD Motor and aviation gasoline comprises aviation gasoline and motor gasoline (including blending components such as bioethanol) – natural gasoline is classified under NGL. For OLADE gasoline comprises aviation gasoline, motor gasoline, natural gasoline and alcohol (ethanol/methanol) used as fuel. JODI Oil definition does not include pure biofuels used directly in engines.

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		LPG	Gasoline	tal sene	Of which: Jet Kerosene	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)		(8)	(9)	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output								
+ From Other sources					+ Receipts								
+ Imports					+ Imports								
- Exports					- Exports								
+ Products Transferred /Backflows					- Products Transferred								
- Direct Use													
- Stock Change													
- Statistical Difference													
= Refinery Intake													
Closing stocks													

Gasoline: Comprises motor gasoline and aviation gasoline

Motor gasoline is the principal fuel used in the transport/road sector and accounts for some 25% of total oil use in the world. In some countries, for example in the US, motor gasoline consumption is almost half of total oil consumption (around 9 Mb/d out of 20).

Aviation gasoline which is principally used for aviation piston engines, is also a mixture of many different hydrocarbon compounds. The specification requirements for aviation gasoline, especially antiknock, volatility, fluidity, stability, non-corrosivity, and cleanliness impose severe limitations on the compounds that can be used.

Definition of Products

Kerosene comprises kerosene type jet fuel and other kerosene for all organisations. Kerosene type jet fuel needs to be reported separately in the category column 9 (of which: Kerosene type jet fuel). JODI Oil definition does not include pure biofuels used directly in engines.

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		LPG	Naphtha	Gasol	Total kerosene & Jet kerosene	el	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)		(10)	(11)	(12)	(13)
+ Production					+ Refinery Output								
+ From Other sources					+ Receipts								
+ Imports					+ Imports								
- Exports					- Exports								
+ Products Transferred /Backflows					- Products Transferred								
- Direct Use					+ Interproduct Transfers								
- Stock Change													
- Statistical Difference													
= Refinery Intake													
Closing stocks													

Kerosene: Comprises jet kerosene and other kerosene

Jet kerosene is a middle distillate fuel, generally produced to exact the stringent specifications of international civil specifications, for use as civil aviation fuel. For JODI definition, jet kerosene includes also naptha or gasoline type jet fuel.

Other kerosene, which is of lower quality specification kerosene or a dual purpose grade, is used in some regions as domestic heating oil, especially in Asia, notably in Japan and Korea. This is also used for lighting in remote areas in many developing countries.

Definition of Products

Gas/diesel oil for all organisations includes diesel used for transport as well as heating oil and other gas oil. JODI Oil definition does not include pure biofuels used directly in engines.

Country _____

Month _____

Unit : _____

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		LPG	Naphtha	Gasoline	Total Kerosene	Gas/Diesel Oil		Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)		(11)	(12)	(13)
+ Production					+ Refinery Output								
+ From Other sources					+ Receipts								
+ Imports					+ Imports								
- Exports					- Exports								
+ Products Transferred /Backflows													
- Direct Use													
- Stock Change													
- Statistical Difference													
= Refinery Intake													
Closing stocks													

Gas/Diesel Oil: For automotive and other purposes

Gas/diesel oil is a lighter fuel oil distilled off during the refining process and used primarily for heating, for automotive purposes in diesel engines and for power generation.

Two main types are distinguished by their use:
Transport diesel: Fuel used for internal combustion in on-road diesel engines, cars and trucks etc., usually of low sulphur content.

Heating Oil and Other Gas oil: This is a distillate fuel oil used mainly in stationary or marine diesel engines.
It includes light heating oil which is used for residential or commercial space heating, or in industrial plants.
It also includes marine diesel which is used for barge and boat engines and other heavier gas oils which may be used as petrochemical feedstocks.

Definition of Products

Definitions given are generally comparable and uniformly refer to a high kinematic viscosity, flash point and density of this product. APEC, Eurostat and IEA differentiate additionally according to the sulphur content of this product, whereas OLADE and OPEC differentiate in relation to its use.

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		LPG	Naphtha	Gasoline	Total Kerosene	Of which: Jet Kerosene	Ga...	Fuel Oil	...r ...cts	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(1...)		(12)	(13)
+ Production					+ Refinery Output									
+ From Other sources					+ Receipts									
+ Imports					+ Imports									
- Exports					- Exports									
+ Products Transferred /Backflows														
- Direct Use														
- Stock Change														
- Statistical Difference														
= Refinery Intake														
Closing stocks														

Fuel Oil: Heavy residual oil / boiler oil, including bunker oil

Heavy fuel oil is a blended product based on the residues from various refinery distillation and cracking processes. It is a viscous liquid with a characteristic odour and it requires heating for storage and combustion.

Heavy fuel oil is used in medium to large industrial plants, marine applications and power stations in combustion equipment such as boilers, furnaces and diesel engines.

Heavy fuel oil is a general term and other names commonly used to describe this range of products include: residual fuel oil, bunker fuel, bunker C, fuel oil No 6, industrial fuel oil, marine fuel oil and black oil. Moreover, terms such as heavy fuel oil, medium fuel oil and light fuel oil are used to describe products for industrial applications to give a general indication of the viscosity and density of the product.

Definition of Products

Double counting should be avoided. For example, if additives and oxygenates (e.g. ethanol or biofuels) are included with gasoline (APEC, Eurostat/IEA and OLADE) then these products should not be added again to the Total Oil Products category. This is similar to the treatment of natural gasoline, if it was already accounted for under gasoline. Crude oil for direct use should be added to the Other products category.

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		LPG	Naphtha	Gasoline	Total Kerosene	Of which: Jet Kerosene	Gas/ Diesel Oil		Other Products	
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)			(13)
+ Production					+ Refinery Output									
+ From Other sources					+ Receipts									
+ Imports					+ Imports									
- Exports					- Exports									
+ Products Transferred /Backflows					- Products Transferred									
- Direct Use					+ Interproduct Transfers									
- Stock Change					- Stock Change									
- Statistical Difference	0	0	0	0	- Statistical Difference	0	0	0	0	0	0	0	0	0
= Refinery Intake					= Demand									
Closing stocks														

Petroleum Products

All the foregoing categories and all other petroleum products:
(refinery gas, ethane, gasoline type jet fuel, petroleum coke, white spirit & SBP, paraffin waxes, bitumen, lubricants and others). Demand for Total Oil includes crude oil.

In order to simplify the JODI questionnaire, only specific data for the seven main products are reported. However to obtain a full picture, it is essential to know what the total oil produced, traded, delivered etc is on the market.

JOINT ORGANISATIONS DATA INITIATIVE

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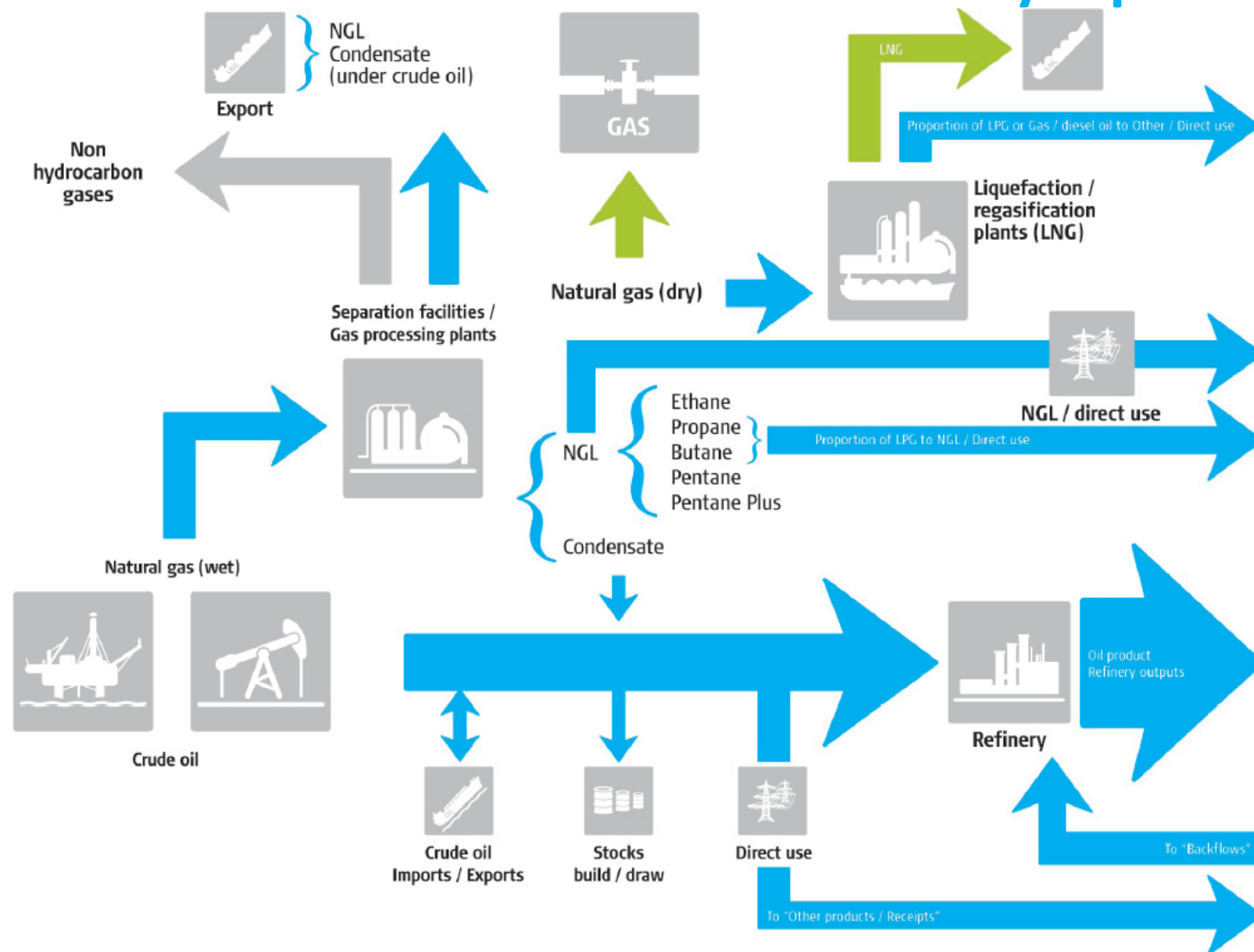
Definition of Products

OTHER PRODUCTS 1/2

❑ Other Products is the sum of Refinery Gas (not liquefied), Ethane, Petroleum Coke, Lubricants, White Spirit & SBP, Bitumen, Paraffin Waxes and Other products as defined below:

➢ **Refinery Gas (not liquefied)** includes a mixture of non-condensible gases mainly consisting of hydrogen, methane, ethane and olefins obtained during distillation of crude oil or treatment of oil products (e.g. cracking) in refineries. This also includes gases which are returned from the petrochemical industry.

➢ **Ethane:** A naturally gaseous straight-chain hydrocarbon, (C_2H_6) extracted from natural gas and refinery gas streams.

➢ **Petroleum coke** is a black solid by-product, obtained mainly by cracking and carbonising petroleum derived feedstock, vacuum bottoms, tar and pitches in processes such as delayed coking or fluid coking. It consists mainly of carbon (90 to 95%) and has a low ash content. It is used as a feedstock in coke ovens for the steel industry, for heating purposes, for electrode manufacture and for production of chemicals. The two most important qualities are "green coke" and "calcinated coke". This category also includes "catalyst coke" deposited on the catalyst during refining processes; this coke is not recoverable and is usually burned as refinery fuel.

➢ **Lubricants** are hydrocarbons produced from distillate by product; they are mainly used to reduce friction between bearing surfaces. This category includes all finished grades of lubricating oil, from spindle oil to cylinder oil, and those used in greases, including motor oils and all grades of lubricating oil base stocks.

Definition of Products

OTHER PRODUCTS 2/2

➤ **White Spirit and SBP** are defined as refined distillate intermediates with a distillation in the naphtha/kerosene range. They are sub-divided as:

  ➤ <u>Industrial Spirit (SBP):</u> Light oils distilling between $30°$ and $200°C$. There are 7 or 8 grades of industrial spirit, depending on the position of the cut in the distillation range. The grades are defined according to the temperature difference between the 5% volume and 90% volume distillation points (which is not more than $60°C$).

  ➤ <u>White Spirit:</u> Industrial spirit with a flash point above $30°C$. The distillation range of white spirit is $135°$ to $200°C$.

➤ **Bitumen** is a solid, semi-solid or viscous hydrocarbon with a colloidal structure, being brown to black in colour, obtained as a residue in the distillation of crude oil, by vacuum distillation of oil residues from atmospheric distillation. Bitumen is often referred to as asphalt and is primarily used for construction of roads and for roofing material. This category includes fluidized and cut back bitumen.

➤ **Paraffin Waxes:** These are saturated aliphatic hydrocarbons. These waxes are residues extracted when dewaxing lubricant oils. They have a crystalline structure which is more-or-less fine according to the grade. Their main characteristics are as follows: they are colourless, odourless and translucent, with a melting point above $45°C$.

➤ **Other Products:** All products not specifically mentioned above, for example: tar and sulphur. This category also includes aromatics (e.g. BTX or benzene, toluene and xylene) and olefins (e.g. propylene) produced within refineries.

This should not be confused with "OTHER PRODUCTS" above.

Feedstocks from Production to Refinery Input

NGL
Condensate
(under crude oil)

Export

Non hydrocarbon gases

GAS

LNG

Separation facilities / Gas processing plants

Natural gas (dry)

Liquefaction / regasification plants (LNG)

Proportion of LPG or Gas / diesel oil to Other / Direct use

Natural gas (wet)

NGL

Ethane
Propane
Butane
Pentane
Pentane Plus

Condensate

NGL / direct use

Proportion of LPG to NGL / Direct use

Crude oil

Crude oil
Imports / Exports

Stocks
build / draw

Direct use

Refinery

Oil product
Refinery outputs

To "Backflows"

To "Other products / Receipts"

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Definition of Flows

Country _____

Month _____

Production

	Crude Oil												
(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
				+ Refinery Output									
				+ Receipts									
				+ Imports									
- Exp				- Exports									
+ Products Transferred /Backflows				- Products Transferred									
- Direct Use													
- Stock Change													
- Statistical Difference													
= Refinery Intake													
Closing stocks													

The term production is defined differently by the 6 organisations according to either more general or more specific energy or fuel reporting. APEC, Eurostat and IEA, use the term for all liquid production i.e. crude oil, NGL, condensates and oil from shale and tar sands as well as additives/ oxygenates. The definition of production in OLADE is used for all energy production, for UNSD it is used for all energy as well as more specifically for crude oil and refined products.

Marketable production, after removal of impurities but including quantities consumed by the producer in the production process

Wellhead production is all oil which exits the ground (wellhead). When the crude oil has been brought to the surface, it will need further treatment so that it can be sent to refineries for processing. The oil produced at the wellhead varies considerably from field to field, due not only to the physical characteristics, but also due to the amount of gas and water which it contains. Before the oil can be sold, the remaining gas, water and other impurities need to be removed. Once this is done, the oil is stored at the terminal before transport to refineries. It is at this point that the produced oil becomes *marketable (production)*.

Crude Oil Production

Wellhead Production

Marketable Production

Onshore oil well

Offshore oil well

GAS

Gathering centre
(Gas & water
separation facilities /
Gas processing plants)

Storage tank
(at shipment terminal)

Refinery

Direct use

Definition of Flows

Country _____

Month _____

Unit : _____

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		Petroleum Products								
						LPG	Naphtha	Gasoline	Total Kerosene	Of which: Jet Kerosene	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
					+ Refinery Output									
					+ Receipts									
					+ Imports									
- Export					- Exports									
+ Products Transferred /Backflows					- Products Transferred									
- Direct Use														
- Stock Change														
- Statistical Difference	0	0												
= Refinery Intake														
Closing stocks														

From other sources

From other sources refers to supplies of *Additives, Biofuels and Other Hydrocarbons* that are produced from non-oil sources such as: coal, natural gas and renewable energy such as biofuels.

Definition of Flows

Trade definitions are common to all organisations, and emphasize the crossing of national territory whether or not customs clearance has taken place and the exclusion of oil in transit quantities. Crude oil and NGL are reported as coming from the country of ultimate origin. Refinery feedstocks and finished products are reported as coming from the country of last consignment. International bunkers are excluded from exports and are reported in oil demand.

Country _____

Month _____

Crude O...

	(1)	(2)	(3)	(4)			(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
+ Refinery Output															
+ Receipts																
+ Imports																

Import Export

- Direct Use
- Stock Change
- Statistical Difference   0
= Refinery Intake
Closing stocks

Goods having physically crossed the international boundaries, excluding transit trade, international marine and aviation bunkers

Both imports and exports should reflect amounts of oil having crossed the national territorial boundaries. It is therefore essential that there is a clear definition of what the statistical national boundary of the country is.

Trade figures should report physical flows of oil and oil products. To that extent, customs clearance which sometimes is delivered much after the goods have crossed the national frontier should not be taken as the point of registering the import.

Important: products in transit should not be included.

Definition of Flows

Country _____

Month _____

Unit : _____

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		Petroleum Products								
						LPG	Naphtha	Gasoline	Total Kerosene	Of which: Jet Kerosene	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output									
+ E...					+ Receipts									
					+ Imports									

Product transfer/ backflow

Product transfer/Backflow:
(Sum of Products Transfers and Backflows from petrochemical Industry)

❑**Products Transferred / Transfer** are imported petroleum products which are reclassified as feedstocks for further processing in the refinery, without delivery to final consumers. For example, naphtha imported for upgrading would be first reported as imports of naphtha, and then appear also as products transferred of naphtha.

❑**Backflows from Petrochemical Industry** are finished or semi-finished products which are returned from final consumers to refineries for processing, blending or sale. They are usually by-products of petrochemical manufacturing. For integrated petrochemical industries this flow should be estimated. Transfers from one refinery to another within the country should be excluded

- Statistical Difference   0

= Refinery Intake

Closing stocks

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How to fill questionnaire?

Country _____

Month _____

Unit : _____

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		Petroleum Products								
						LPG	Naphtha	Gasoline	Total Kerosene	*Of which: Jet Kerosene*	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	*(9)*	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output									
+ From Other sources					+ Receipts									
+ Imports					+ Imports									
- Exports					- Exports									
+ Products Transferred /Backflows					- Products Transferred									
- Direct Use					+ Interproduct Transfers									
- Stock Change					- Stock Change									
- Statistical Difference	0	0	0	0	- Statistical Difference	0	0	0	0	0	0	0	0	0
= Refinery Intake					= Demand									
Closing stocks					Closing stocks									

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Definition of Flows

Country _____

Month _____

Unit : _____

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		Petroleum Products								
						LPG	Naphtha	Gasoline	Total Kerosene	Of which: Jet Kerosene	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output									
+ From Other sources														
+ Imports														
- Ex														
			0											0
=														
Closing st														

Direct use

Direct use refers to Crude oil, NGL and other hydrocarbons which are used directly without being processed in oil refineries are reported as Direct use. This includes, for example, crude oil burned for electricity generation.

Definition of Flows

For all the organisations, the definition for stocks is defined "geographically" or "by territory" except for OPEC whish is characterized by the "ownership".

Country _____

Month _____ *Unit :* _____

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		Petroleum Products								
						LPG	Naphtha	Gasoline	Total Kerosene	*Of which: Jet Kerosene*	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	*(9)*	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output									
+ From Other sources														
+ Imports														
- Exports														
+ Prod														
Stock Change				0										0
Closing stock														

Closing Stocks represents the primary stock level at the end of the month within national territories; includes stocks held by importers, refiners, stock holding organisations and governments

Closing Stocks = Closing minus opening level.
A positive number corresponds to a stock build;
A negative number corresponds to a stock draw.

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A Concrete Outcome of the Consumer - Producer Dialogue

What Comprise Stocks Data?

What should be included? *	What should not be included?
✓ Oil held at production facilities e.g. stocks on platforms or in partly loaded tankers moored at platforms ✓ Stocks held for strategic purposes owned by governments or stockholding organisations ✓ Oil in refinery tanks, ✓ In bulk terminals, ✓ Pipeline tankage (buffer stocks at pipelines) ✓ Barges and coastal tankers (when port of departure and destination are in the same country) ✓ Tankers in port ** ✓ In inland ship bunkers	✗ in pipelines ✗ in rail tank cars ✗ in truck tank cars ✗ in sea-going ships bunkers ✗ in retail stores and service stations ✗ in bunkers at sea ✗ military stocks

* Please note that there is a distinction between oil stocks and reserves. Reserves of oil (oil not yet produced) are not included
** Stocks held on board incoming ocean vessels in port or at mooring should be included irrespective of whether they have been cleared by customs or not. Exclude stocks on board vessels at high seas.

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Definition of Flows

In the extended JODI questionnaire this data is calculated automatically

Country _____

Month _____

Unit : _____

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		Petroleum Products								
						LPG	Naphtha	Gasoline	Total Kerosene	*Of which: Jet Kerosene*	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7)+(8)+(10)+(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	*(9)*	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output									
+ From Other sources														
+ Imports														
- Exports														
+ Prod...														

Statistical differences

❑ For primary oil products, it is calculated as (Production + From Other Sources + Imports - Exports + Product Transfers/Backflows - Direct Use - Stock Change) - Refinery Intake.

❑ For secondary oil products, it is calculated as (Refinery Output + Receipts + Imports - Exports - Product Transfers + Interproduct Transfers - Stock Change) – Demand.

Definition of Flows

Refinery Intake definitions are common to all organisations, comprising crude, NGL, condensates, feedstocks and additives.

Country _____

Month _____

Unit : _____

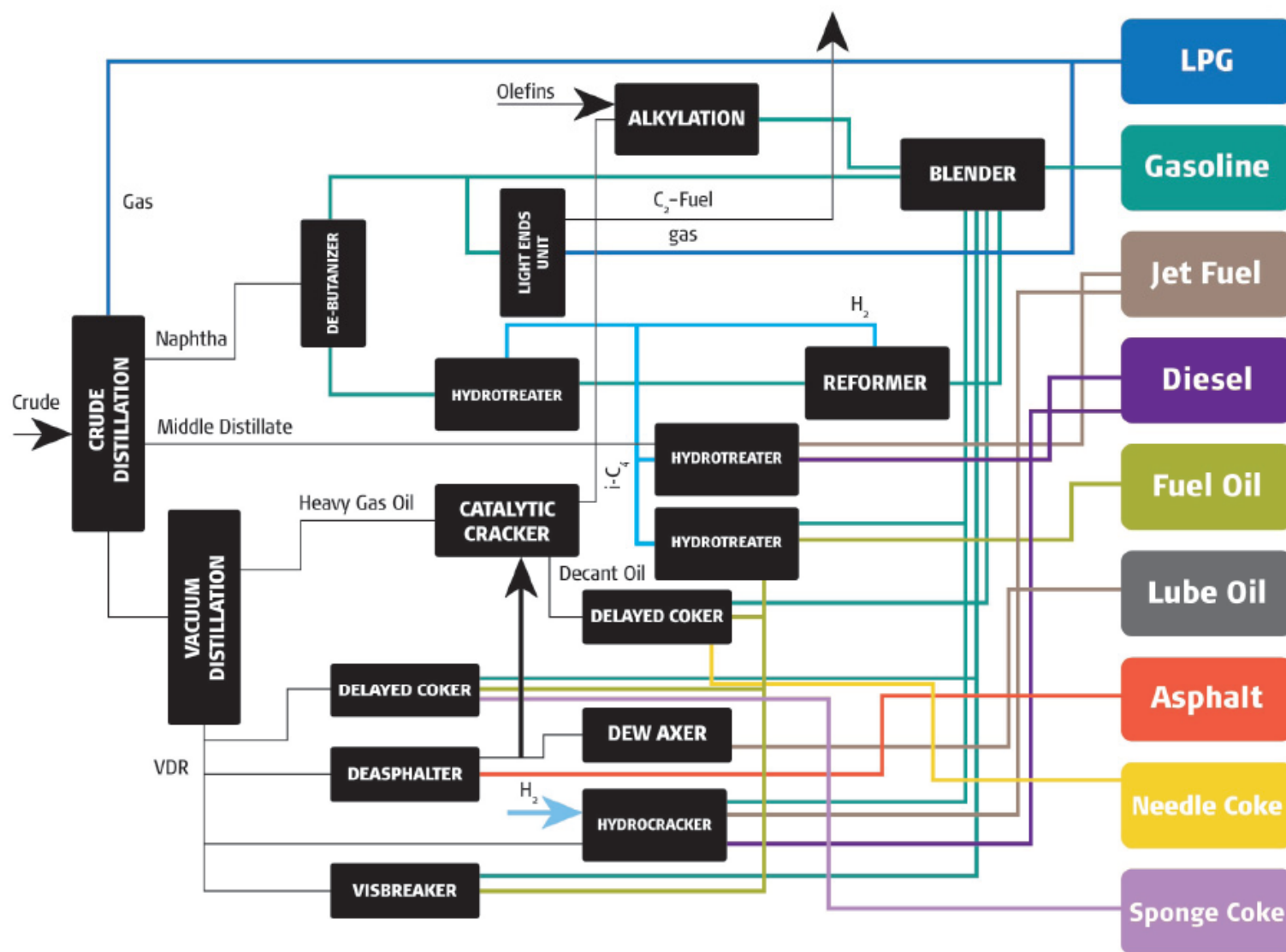|	Crude Oil	NGL	Other	Total (1)+(2)+(3)					Petroleum Products					
						LPG	Naphtha	Gasoline	Total Kerosene	*Of which: Jet Kerosene*	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output									
+ From Other sources					+ Receipts									
+ Imports					+ Imports									
- Exports					- Exports									
+ Products Transferred /Backfl...														

Refinery Intake

Refinery Intake are the observed refinery throughputs

In this flow should be reported the quantities of crude oil inputs entering the refinery. Although there are several other inputs to refineries e.g. Natural Gas Liquids (NGL), refinery feedstocks, additives, biofuels and other hydrocarbons, currently the questionnaire is not collecting any other inputs than crude oil.

Please also note that the amounts of crude oil reported as refinery intake should reflect the real quantities of inputs to the refinery process and not the deliveries of crude oil to the refinery. The difference between the two measures is the stock changes of crude oil at the refinery.

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Oil Refining: It is complicated !

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Oil Refining: It is complicated !

Crude →

But you don't need to know it all!

LPG

Gasoline

Jet Fuel

Diesel

Fuel Oil

Lube Oil

Asphalt

Needle Coke

Sponge Coke

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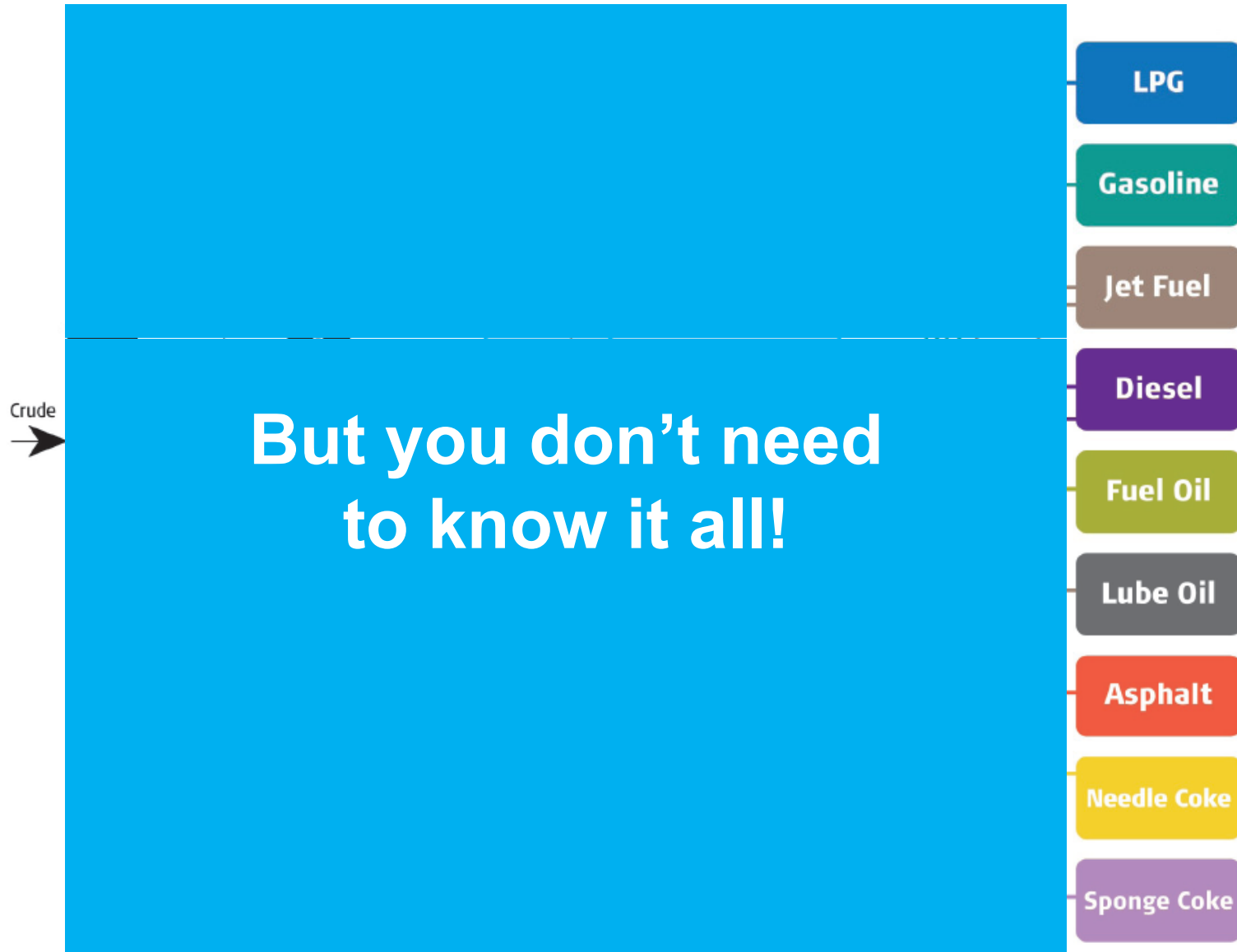
Oil refining: What you do need to

Refinery losses

Refinery fuel

Refinery intake

Crude oil
NGL
Feedstocks
Other

Refinery

Refinery output

LPG
Naphtha
Motor and aviation gasoline
Kerosenes
Gas / diesel oil
Etc.

Refinery intake - Refinery losses = Gross refinery output

Gross refinery output - Refinery fuel = Net refinery output
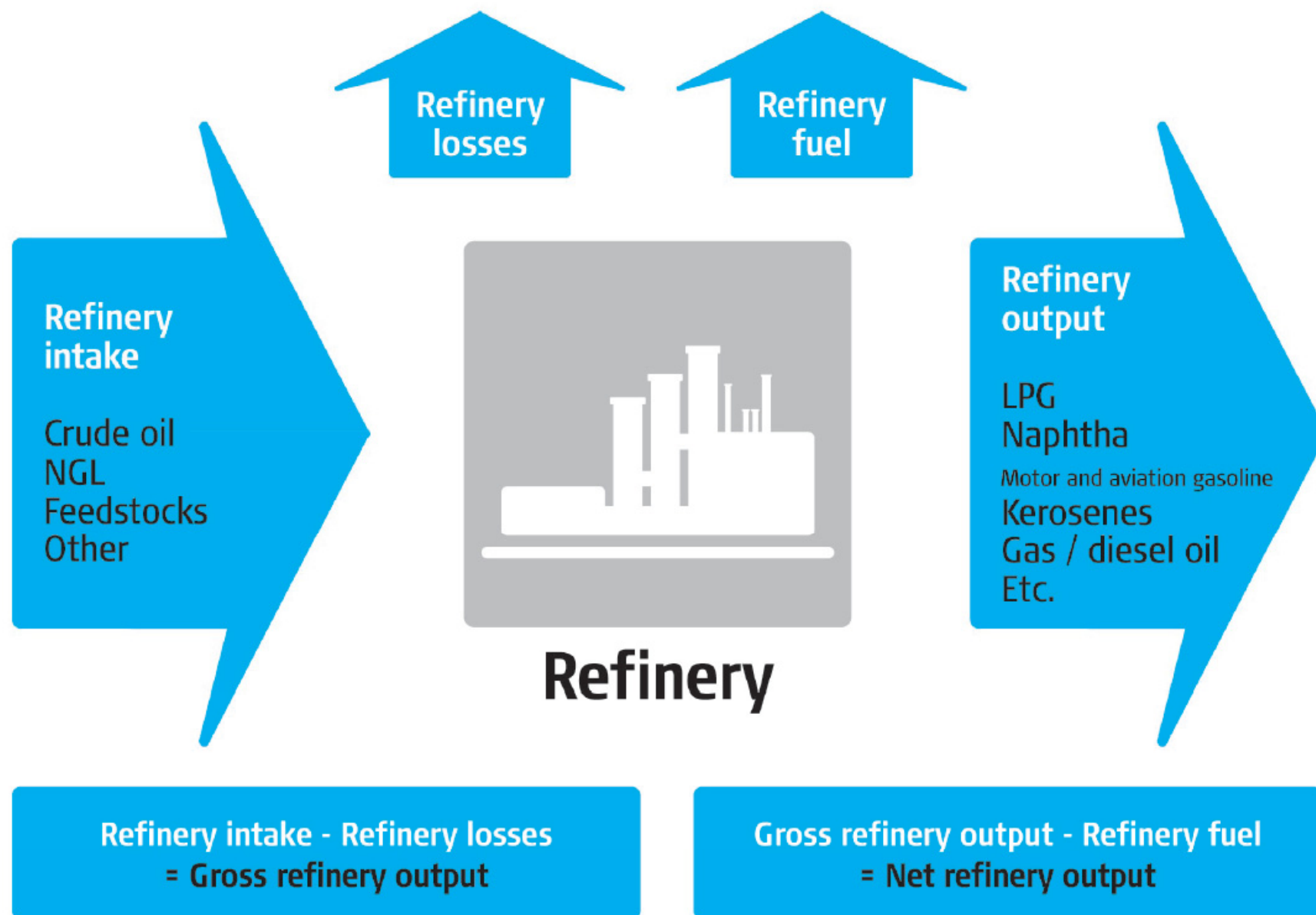
Supply Chain from the Refinery to the End-User

LPG or Gas / diesel oil proportion from LNG liquefaction or re-gasification plants

To Other products / Recepits, then Interproducts transfer to LPG or Gas / diesel oil

To Other products / Recepits

LPG proportion from gas processing plants

To Other products / Recepits, then Interproducts transfer to LPG

NGL / Direct use

Recycled products

Stocks build / draw

Oil products
Refinery outputs

International bunkers

Refinery fuel

DEMAND

Products transferred

Oil products
Imports / Exports

Interproduct transfers

Direct use

To Other products / recepits

Direct use

Inland deliveries

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Definition of Flows

APEC, Eurostat, IEA and UNSD exclude refinery loss but include refinery fuel. OPEC excludes both. The OLADE definition does not mention anything about refinery fuel or loss. Inter-product transfers are excluded by all organisations except OLADE.

Country _____

Month _____

Unit : _____

	Crude Oil	NGL	Other	Total (1)+(2)+(3)	Refinery Output	Petroleum Products								Total Products (5)+(6)+(7)+(8)+(10)+(11)+(12)
						LPG	Naphtha	Gasoline	Total Kerosene	*Of which: Jet Kerosene*	Gas/ Diesel Oil	Fuel Oil	Other Products	
	(1)	(2)	(3)			(5)	(6)	(7)	(8)	*(9)*	(10)	(11)	(12)	(13)
+ Production														
+ From Other sources														
+ Imports														
- Exports														
+ Products Transferred /Backflows					- Products Transferred									
- Direct Use														
- Stock Change														
- Statistical Difference		0												0
= Refinery Intake														
Closing stocks														

Refinery Output is the Gross output (including refinery fuel)

This is the production of finished petroleum products at a refining or blending plant. Production equals the Input into the refinery minus the Refinery Losses.

The terms Net and Gross production are frequently used when referring to refinery output. *Gross production* comprises the amount of fuel which is used in the refinery in support of the operation of the refinery (refinery fuel). *Net refinery production* excludes the refinery fuel.

Important: There should be no double-counting. Double-counting may occur when handling data of products produced from intermediate products, e.g. gasoline produced from naptha.

Definition of Flows

Country _____

Month _____

Unit : _____

	Crude Oil	NGL	Other	Total (1)+(2)+(3)	Receipts		LPG	Naphtha	Gasoline	Total Kerosene	*Of which: Jet Kerosene*	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)			(5)	(6)	(7)	(8)	*(9)*	(10)	(11)	(12)	(13)
+ Production															
+ From Other sources															
+ Imports															
- Exports						- Exports									
+ Products Transf /Backflows															
- Direct Use															
- Stock Change															
- Statistical Differ															0
= Refinery Intake															
Closing stocks															

Petroleum Products

Receipts (Includes primary product receipts and recycled products)

❑**Primary Product Receipts:** Quantities of indigenous or imported crude oil (including condensate) and indigenous NGL which are used directly without being processed in an oil refinery. For example, crude oil used to generate electricity should be placed in primary product receipts of crude oil. Quantities of indigenous NGL which are not included in refinery intake should be reported in primary product receipts of NGL, then transferred through the Interproduct transfers line to the allocated product type. Please note that this flow includes the amounts of backflows from the petrochemical industry which, although not primary fuel, are used directly.

❑**Recycled Products:** These are finished products which pass a second time through the marketing network, after having been once delivered to final consumers (e.g. used lubricants which are reprocessed). These quantities should be distinguished from petrochemical Backflows.

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Definition of Flows

Interproduct Transfers result from reclassification of products either because their specification has changed, or because they are blended into another product. For example, quantities of kerosene may be reclassified as gasoil after blending with the latter in order to meet its winter diesel specification. A negative entry for one product must be compensated by a positive entry (or several entries) for one or several products and vice versa. The total net effect should be zero.

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		LPG	Naphtha	Gasoline	Total Kerosene	Of which: Jet Kerosene	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output									
+ From Other sources					+ Receipts									
+ Imports					+ Imports									
- Exports														
+ Products Transferred /Backflows														
- Direct Use														
- Stock Change														
- Statistical Difference	0	0	0			0	0	0	0	0	0	0	0	0
= Refinery Intake					=									
Closing stocks					Closing stocks									

Interproduct Transfers

A Concrete Outcome of the Consumer - Producer Dialogue

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Definition of Flows

Demand are the deliveries or sales to the inland market (domestic consumption) plus Refinery Fuel plus International Marine and Aviation Bunkers. Demand for Total Oil includes Crude Oil

The total demand of oil in a country includes all the amounts of oil which are needed in a country, on the one hand to supply all final consumers, energy transformation units (including refineries), energy producers within the country and on the other hand to provide all the national and foreign customers with fuels which they will use for international navigation and aviation (e.g. international aviation, marine bunkers, fishing etc.).

	Crude Oil	NGL	Other	Total (1)+(2)+(3)		LPG	Naphtha	Gasoline	Total Kerosene	Jet Kerosene	Gas/ Diesel Oil	Fuel Oil	Other Products	Total Products (5)+(6)+(7) +(8)+(10) +(11)+(12)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
+ Production					+ Refinery Output									
+ From Other sources					+ Receipts									
+ Imports					+ Imports									
- Exports					- Exports									
+ Products Transferred /Backflows					- Products Transferred									
- Direct Use					+ Int...									
- Stock Change														
- Statistical Difference	0	0	0	0		0	0	0	0	0	0	0	0	0
= Refinery Intake					Demand									
Closing stocks														

JOINT ORGANISATIONS DATA INITIATIVE A Concrete Outcome of the Consumer - Producer Dialogue

Demand

=

Refinery fuel

+

International bunkers

+

Direct use — Crude oil, NGL

+

Inland deliveries — Power generation, Other energy, Industry, Transport, Residential, Commercial, Agricultural

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Reporting Unit

- Unit of Mass, Thousand Metric Tons, is the preferred unit

- Volume units such as barrels, kiloliters, cubic meters are also accepted

- National administrations should however provide the specific gravities such as kg/liter or kilogram/barrel of each of the products, including Total Oil, in order to convert the data to common units

Conversion Factors

- 1 barrel = 158.897 liters

- 1 cubic meters = 1,000 liters

- 1 ton = 1,000 kilograms

- No direct conversion from barrels to tons; this requires specific gravity or density data which varies for every product and country

- Conversion factor for Total Oil should be the weighted average of all included products

Conversion Factors

Decimal System Prefixes

10^1	deca (da)	10^{-1}	deci (d)
10^2	hecto (h)	10^{-2}	centi (c)
10^3	kilo (k)	10^{-3}	milli (m)
10^6	mega (M)	10^{-6}	micro (µ)
10^9	giga (G)	10^{-9}	nano (n)
10^{12}	tera (T)	10^{-12}	nico (p)
10^{15}	peta (P)	10^{-15}	femto (f)
10^{18}	exa (E)	10^{-18}	atto (a)

Conversion Factors

Units of Volume

To:	US gal	UK gal	bbl	ft³	l	m³
From:	multiply by:					
US gallon (gal)	1	0.8327	0.02381	0.1337	3.785	0.0038
UK gallon (gal)	1.201	1	0.02859	0.1605	4.546	0.0045
Barrel (bbl)	42	34.97	1	5.615	159.0	0.159
Cubic foot (ft³)	7.48	6.229	0.1781	1	28.3	0.0283
Litre (l)	0.2642	0.22	0.0063	0.0353	1	0.001
Cubic metre (m³)	264.2	220.0	6.289	35.3147	1000	1

A Concrete Outcome of the Consumer - Producer Dialogue

JOINT ORGANISATIONS DATA INITIATIVE

Conversion Factors

Units of Mass

To:	kg	t	lt	st	lb
From:	multiply by:				
kilogramme (kg)	1	0.001	9.84×10^{-4}	1.102×10^{-3}	2.2046
tonne (t)	1000	1	0.984	1.1023	2204.6
long ton (lt)	1016	1.016	1	1.120	2240.0
short ton (st)	907.2	0.9072	0.893	1	2000
pound (lb)	0.454	4.54×10^{-4}	4.46×10^{-4}	5.0×10^{-4}	1

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Conversion Factors

Energy Units

To:	TJ	Gcal	Mtoe	Mbtu	GWh
From:	**multiply by:**				
Terajoule (TJ)	1	238.8	2.388×10^{-5}	947.8	0.2778
Gigacalories (Gcal)	4.1868×10^{-3}	1	10^{-7}	3.968	1.163×10^{-3}
Million tonnes of oil equivalent (Mtoe)	4.1868×10^4	10^7	1	3.968×10^7	11630
Million BTU	1.0551×10^{-3}	0.252	2.52×10^{-8}	1	2.931×10^{-4}
GWh	3.6	860	8.6×10^{-5}	3412	1

A Concrete Outcome of the Consumer - Producer Dialogue

JOINT ORGANISATIONS DATA INITIATIVE

Typical Densities, Conversion Factors and Calorific Values for Crude Oil and Petroleum Products

Product	Density kg/m3	litres per metric ton	Barrel per metric ton	Gross Calorific Value (GJ/t)	Net Calorific value (GJ/t)([3])
Crude oil	853	1172	7.37	47.37	45.00
Ethane	366	2730	17.17	51.90	47.51
Refinery Gas	786	1272	8	52.00	47.60
Propane	508	1969	12.38	50.32	46.33
Butane	585	1709	10.75	49.51	45.72
LPG ([1])	**539**	**1856**	**11.67**	**50.08**	**46.15**
Naphtha	706	1416	8.91	47.73	45.34
Aviation gasoline	707	1414	8.90	47.40	45.03
Motor gasoline ([2])	741	1350	8.49	47.10	44.75
Jet Kersosene	803	1246	7.84	46.93	44.58
Other Kerosene	810	1235	7.76	46.05	43.75
Gas/Diesel oil	844	1186	7.46	45.66	43.38
Fuel oil low suphur	925	1081	6.80	43.75	41.56
Fuel oil high sulphur	975	1026	6.45	42.00	39.90
Bunker Fuel oil	975	1026	6.45	42.60	40.47
Fuel Oil (Avg)	**944**	**1059**	**6.66**	**42.82**	**40.68**
White Spirit	743	1346	8.46	46.32	44.00
Parrafin Waxes	801	1248	7.85	42.00	39.90
Lubricants	887	1127	7.09	44.00	41.80
Bitumen	1035	966	6.08	42.10	40.00
Petroleum Coke	1150	870	5.47	34.80	33.06
Other Products	786	1273	8.00	42.30	40.19

([1]) Assumes a mixture of 60% propane and 40% butane by mass.
([2]) An average for motor gasolines with RON between 91 and 95.
([3]) For Naphtha and heavier oils the net calorific value is assumed to be 95% of gross.

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Example

- How many metric tons is 100 thousand barrels of motor gasoline?

- The problem is converting a volume unit to mass (barrels to tons)

- Use **Density** of motor gasoline to convert the unit from barrel to tons

- From previous slide, the density of motor gasoline is 8.49 bbl/ton

- 100 kbbl ÷ 8.49 bbl/ton = 11.78 kton

- **Note:** The density of motor gasoline in your country may be different from the typical values shown in the previous slide

Other Useful Conversion Factors

Imports	Reported data in barrel* per day (volume)	Number of days in Month	Density: Mass/ Volume (ton/m^3 - Average)	Volume/Mass Barrel per Ton Conversion Factor	Conversion into Metric Tons (Mass)
Crude Oil	1020	31	0.853	(1/0.853)/0.159*=7.37	(1020x31)/7.37=4290
Motor Gasoline	546	28	0.741	(1/741)/0.159*=8.49	(546x28)/8.49=1801

(*) 1 barrel = 159 litres

Refinery Inputs Checks

- **Total sum** is calculated as Total – (Crude Oil + NGL + Other).

- **Statistical Differences** are calculated as (Production + From Other Sources + Imports - Exports + Product Transfers/Backflows - Direct Use - Stock Change) - Refinery Intake.

- **'Products Transferred/Backflows'** for Total should be larger than 'Products Transferred' for Total Products.

- **'Products Transferred/Backflows'** should be positive.

- No data should be reported in <u>blocked out cells.</u>

- **Refinery losses** are calculated as Total Products Refinery Output – Total Refinery Intake.

Petroleum Products Checks

- **Total products sum** is calculated as Total Products – (LPG + Naphtha + Gasoline + Total Kerosene + Gas/Diesel Oil + Fuel Oil + Other Products).

- **Statistical Differences** are calculated as (Refinery Output + Receipts + Imports - Exports - Product Transfers + Interproduct Transfers - Stock Change) - Demand.

- **Products Transferred** should be positive.

- **Total Products Interproduct Transfers** should be zero.

- **Jet Kerosene** should be smaller than Total Kerosene.

Thank you

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