

**TIO**

# Oil and oil products

**International Workshop on Energy Statistics  
Beijing, 23-25 May 2016**

**Céline Rouquette  
Head of non Member Countries section**

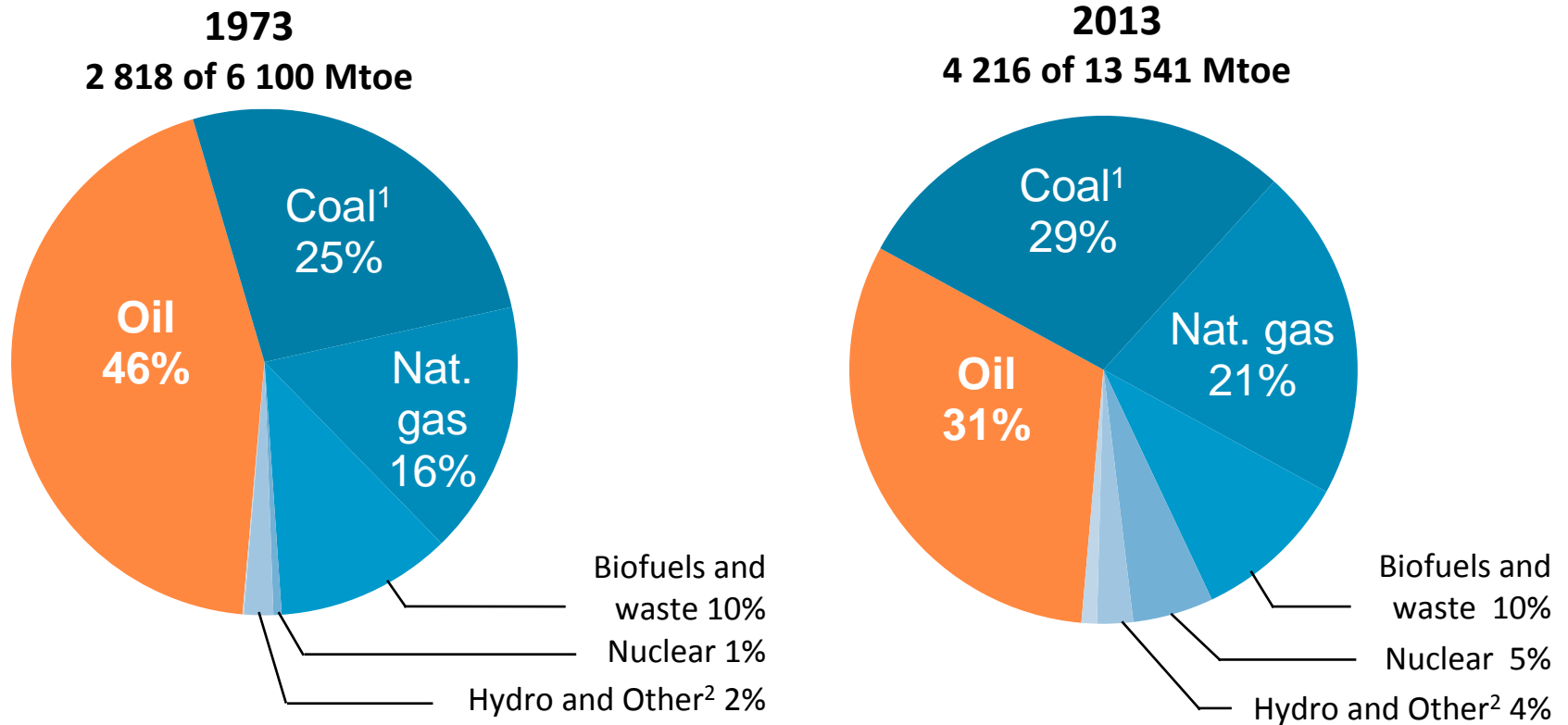
**iea**



International  
Energy Agency

- **WHY** are oil statistics important?
- **HOW** to collect oil statistics?  
An overview of international  
recommandations
- How to **CHECK** oil data?

# Oil is still the first energy source in the world

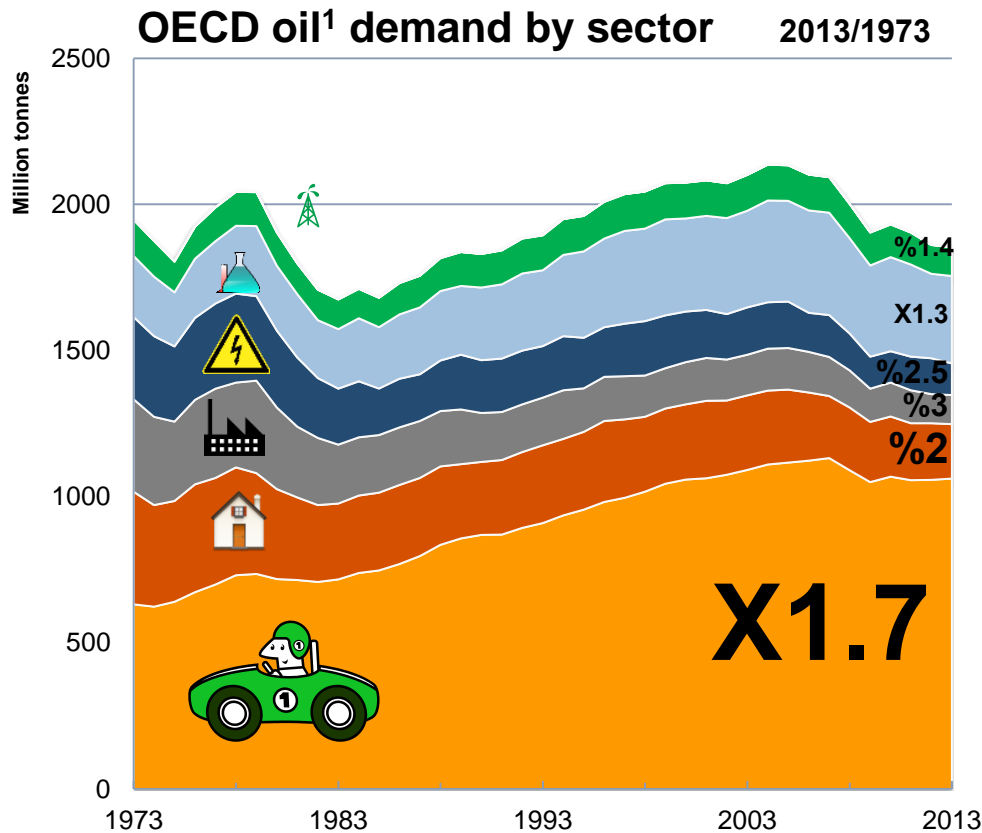


## Total Primary Energy Supply

1. Coal includes peat and oil shale
2. Other includes geothermal, solar, wind, heat, etc

Source: IEA (2015), *World Energy Statistics and Balances* (database), [www.iea.org/statistics/](http://www.iea.org/statistics/).

# OECD countries managed to diversify energy sources but still rely mainly on oil for transport

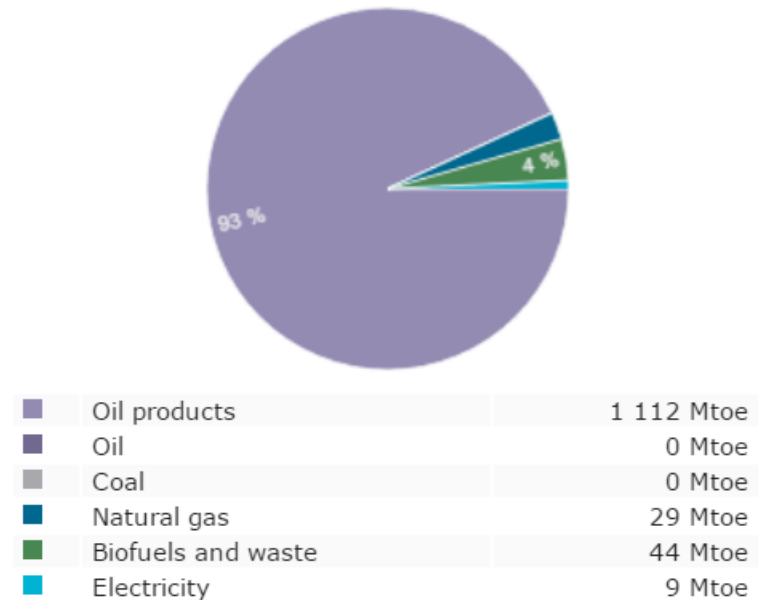


- Transport and Distribution losses\*
- Energy industry own use
- Non-energy use
- Transformation processes (excl refining)
- Industry
- Residential, Com. & Others

Sources:

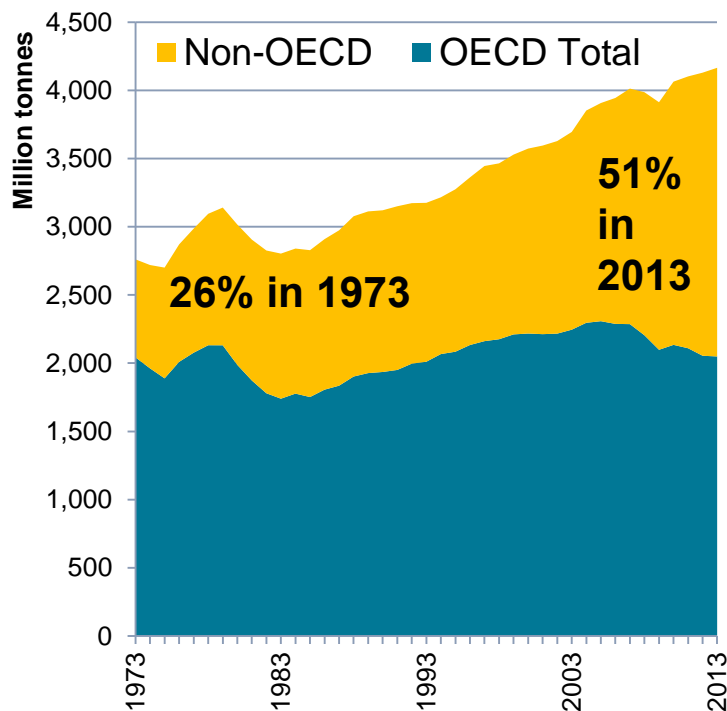
- 1. IEA (2015), *World Energy Statistics and Balances* (database), [www.iea.org/statistics/](http://www.iea.org/statistics/). Oil includes direct use of crude oil and other hydrocarbons
- 2. IEA (2015), *Energy Flow Charts*, [www.iea.org/Sankey/index.html](http://www.iea.org/Sankey/index.html).

**Transport (2013)**  
Total: 1 194 Mtoe

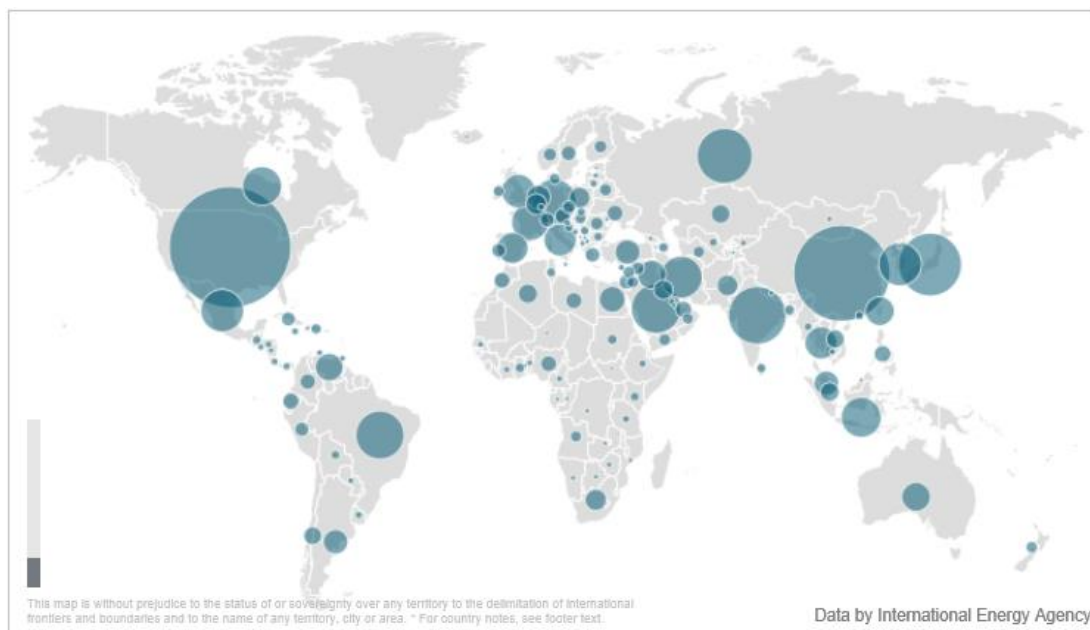


# Demand from non-OECD surged

## World Oil Demand<sup>1</sup>

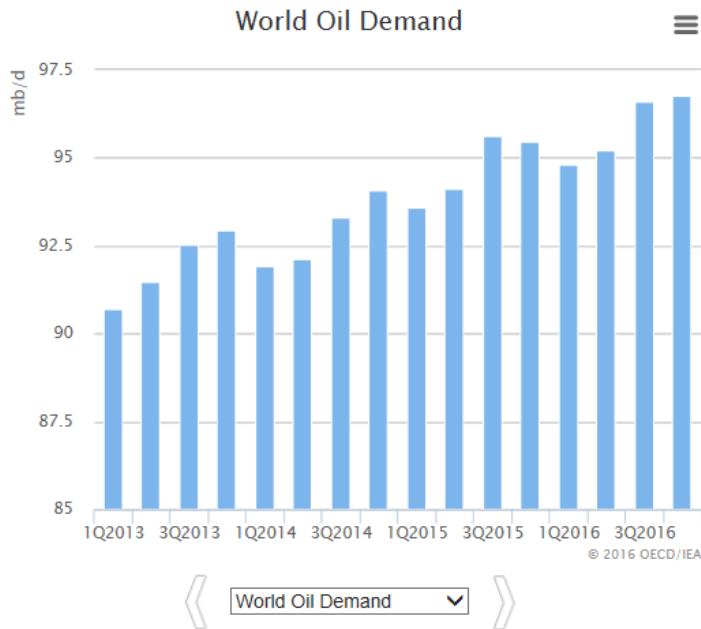


## World Oil Consumption<sup>2</sup>, 2013

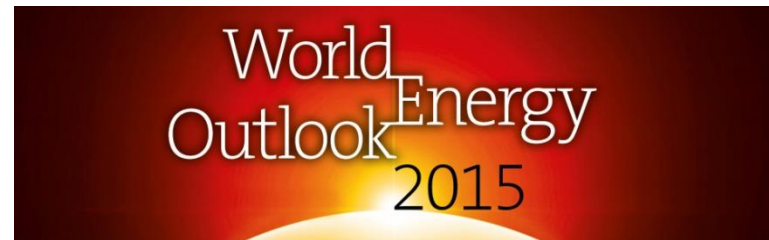
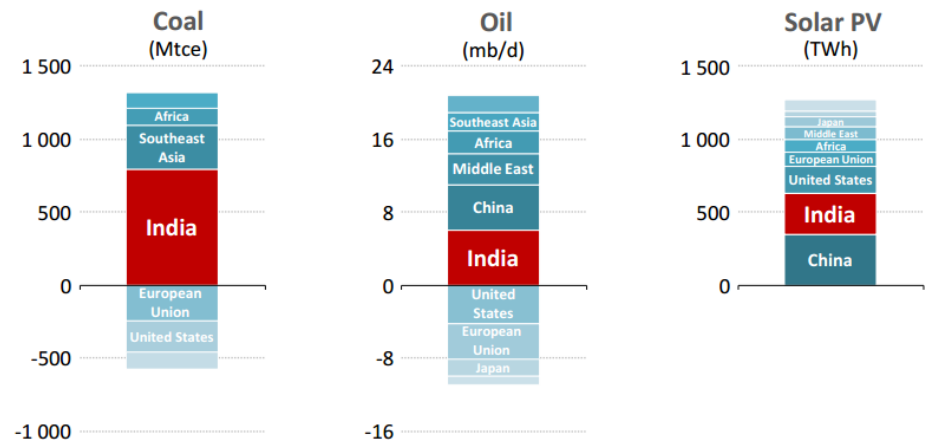


Sources:  
 1 - IEA (2015), *World Energy Statistics and Balances* (database), [www.iea.org/statistics/](http://www.iea.org/statistics/). International marine and aviation bunkers are included in each country  
 2 - IEA (2016), *IEA Energy Atlas*, [www.tellmaps.com/iea/](http://www.tellmaps.com/iea/). International marine and aviation bunkers are excluded

# Sound oil statistics: essential for accurate energy analysis and forecasts



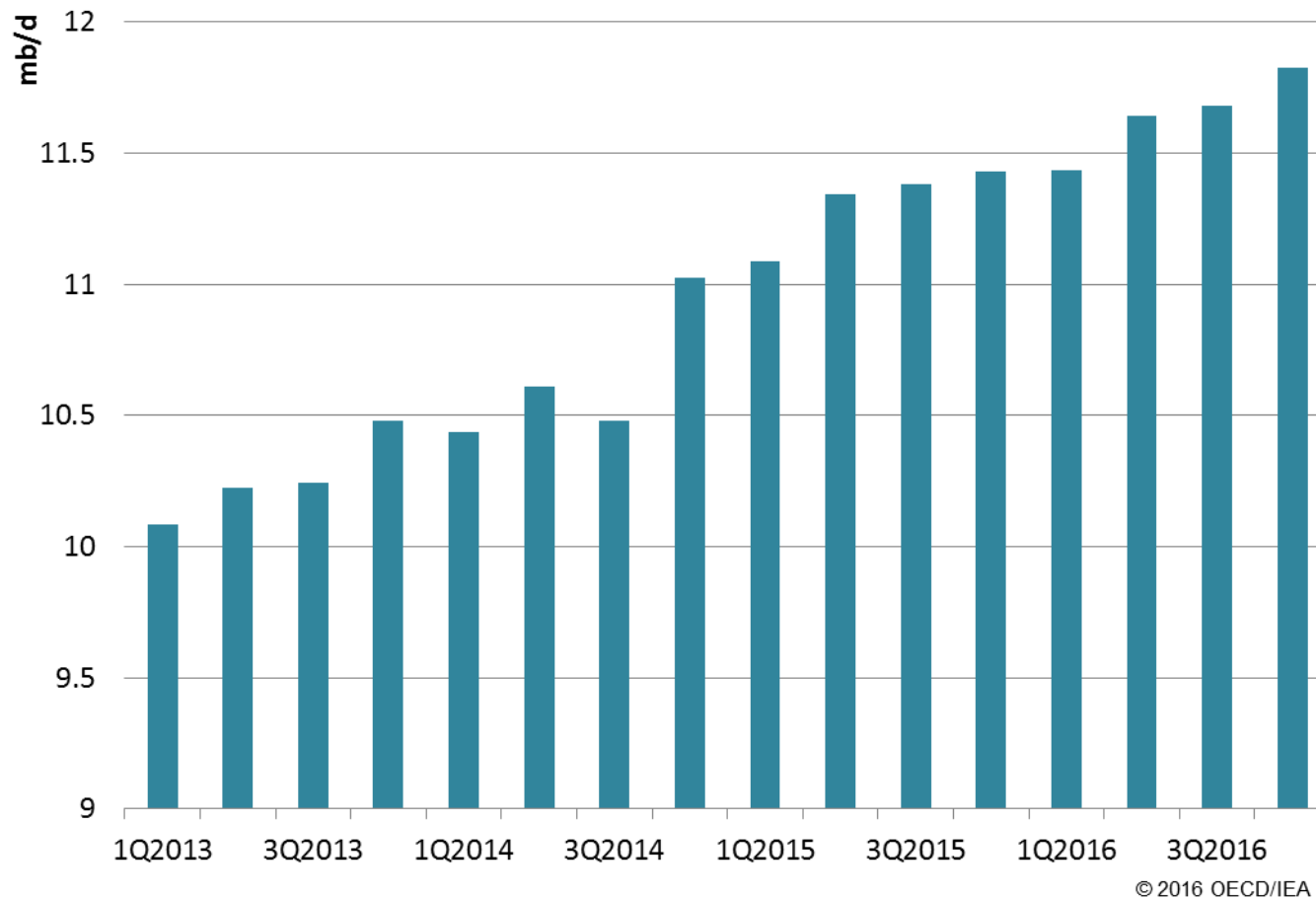
Change in demand for selected fuels, 2014-2040



Sources:

- 1 IEA (2016), *Oil Market Report*, [www.iea.org/oilmarketreport/omrpublic/](http://www.iea.org/oilmarketreport/omrpublic/), (accessed on 6 May 2016).
- 2 IEA (2015), *World Energy Outlook 2015*.

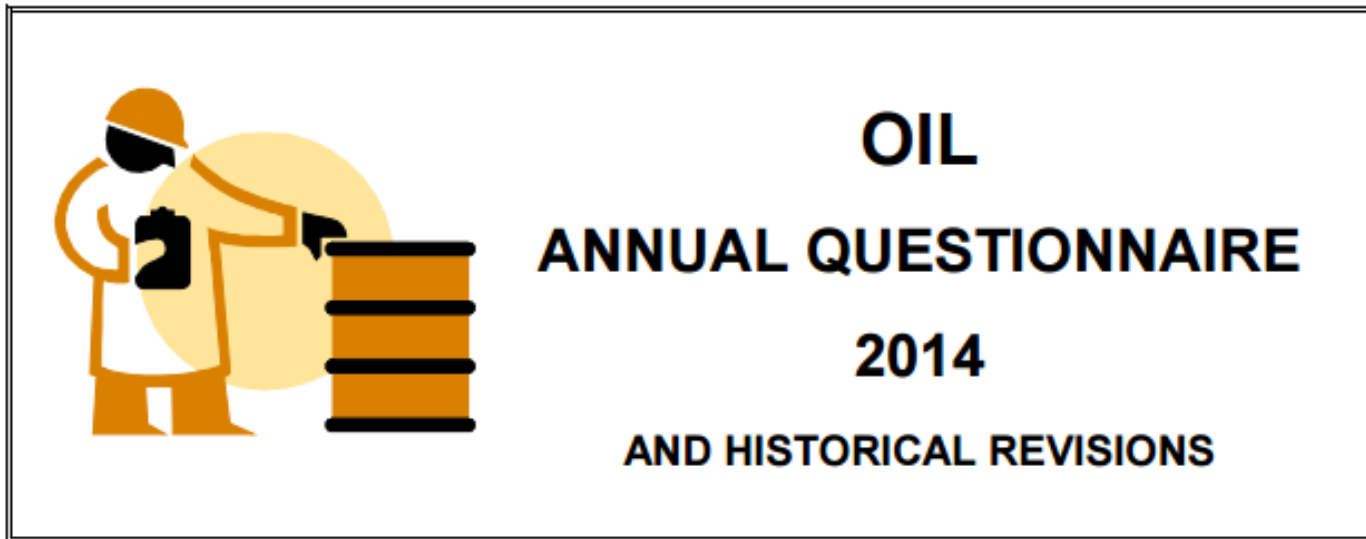
## IEA Oil demand: China



Sources:  
IEA (2016), Oil Market Report, Non-OECD Demand database, (accessed on 6 May 2016).

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An overview of international  
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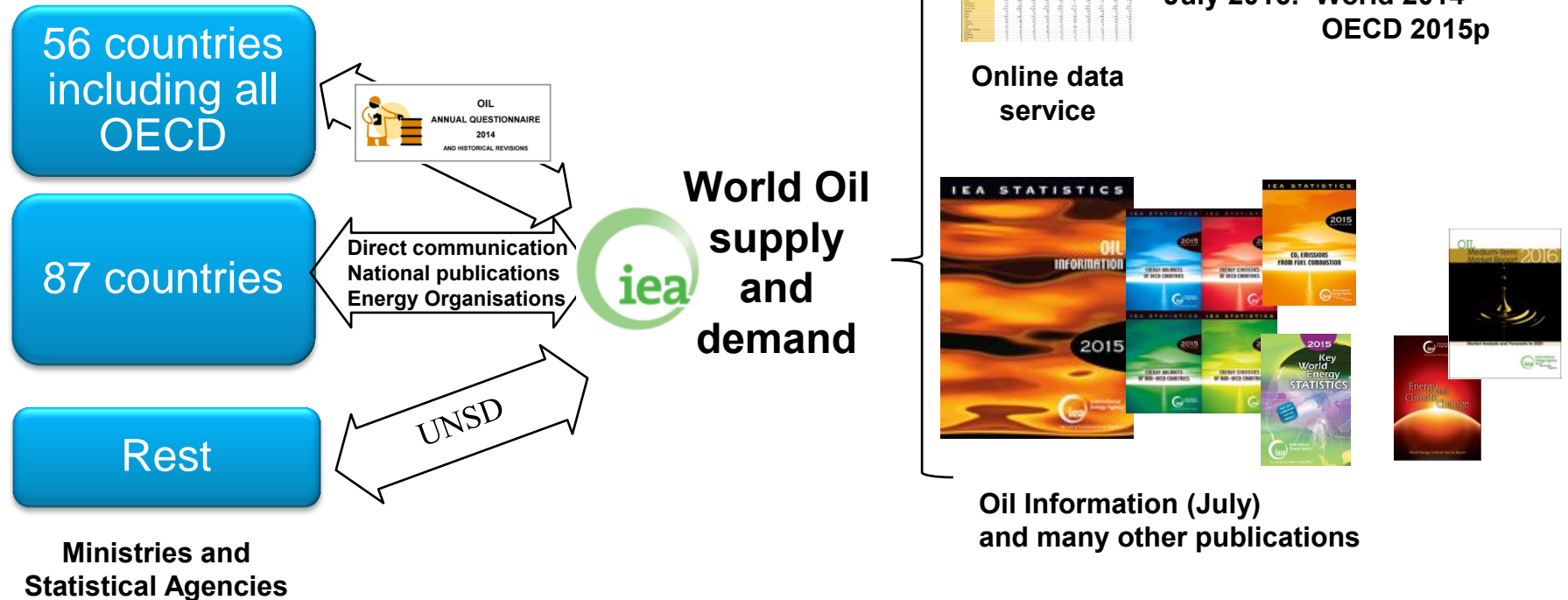


# How does the IEA collect oil statistics?

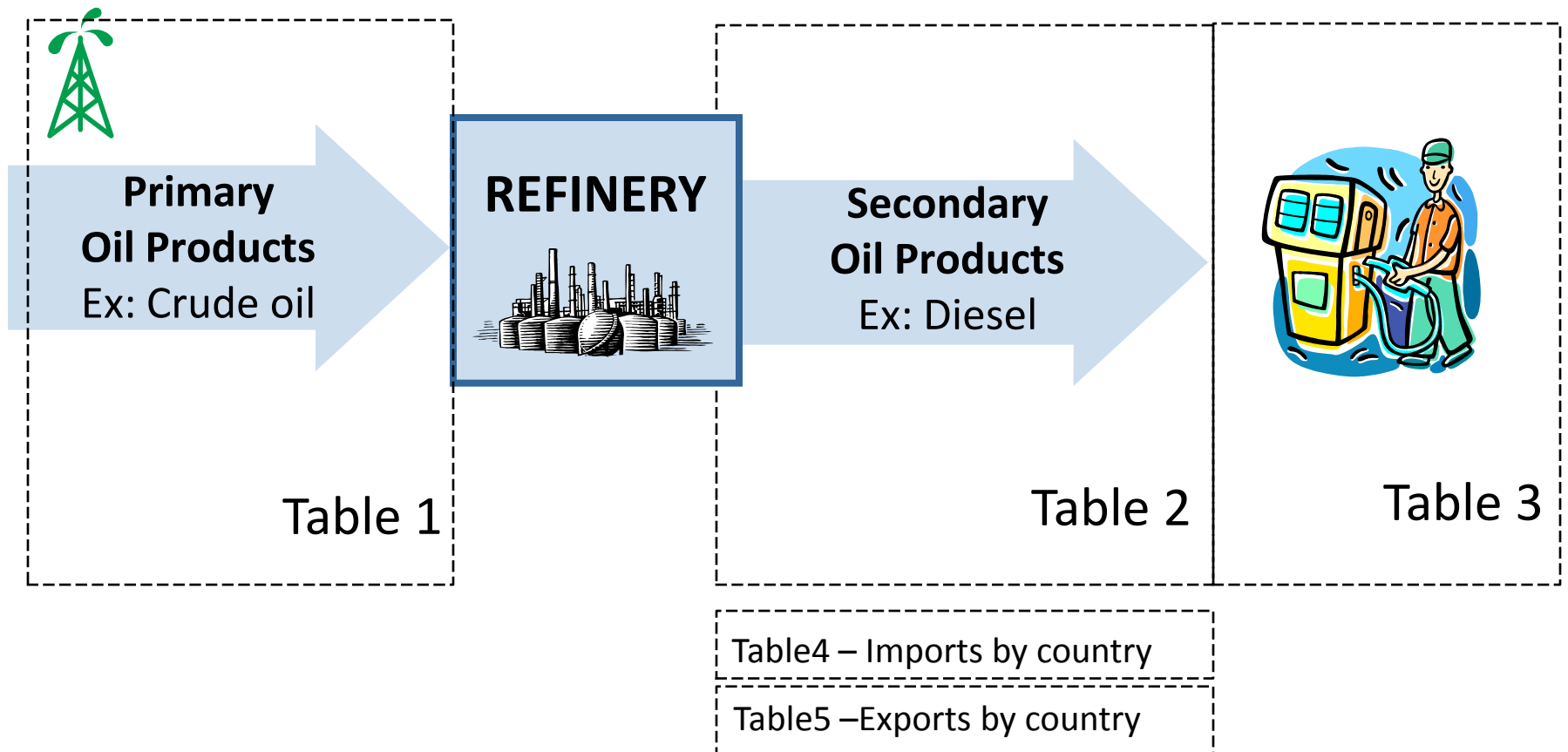
# IEA oil data collection system

- Monthly (OECD/Supply): MOS (M-2), JODI (M-1), + emergency
- Annual: Y-1 (World/Supply and demand)  
Y-2 (OECD/supply preliminary) & Non-OECD production estimates

Annual data (Y-2)

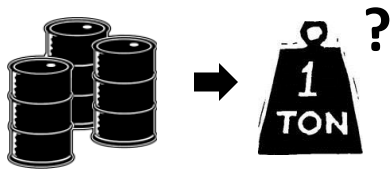


# Oil statistics structure



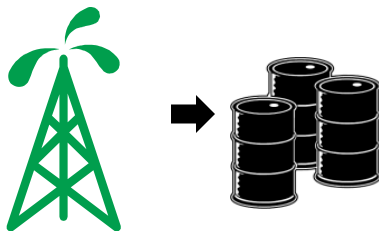
# Important issue: conversion

## ■ From barrels to kilo tonnes



Ask the industry for the number of barrels per ton  
Ex:  $73\,000 \text{ barrels} / 7.3 \text{ bbl/t} = 10\,000 \text{t} = 10 \text{kt}$

## ■ From litres to barrels

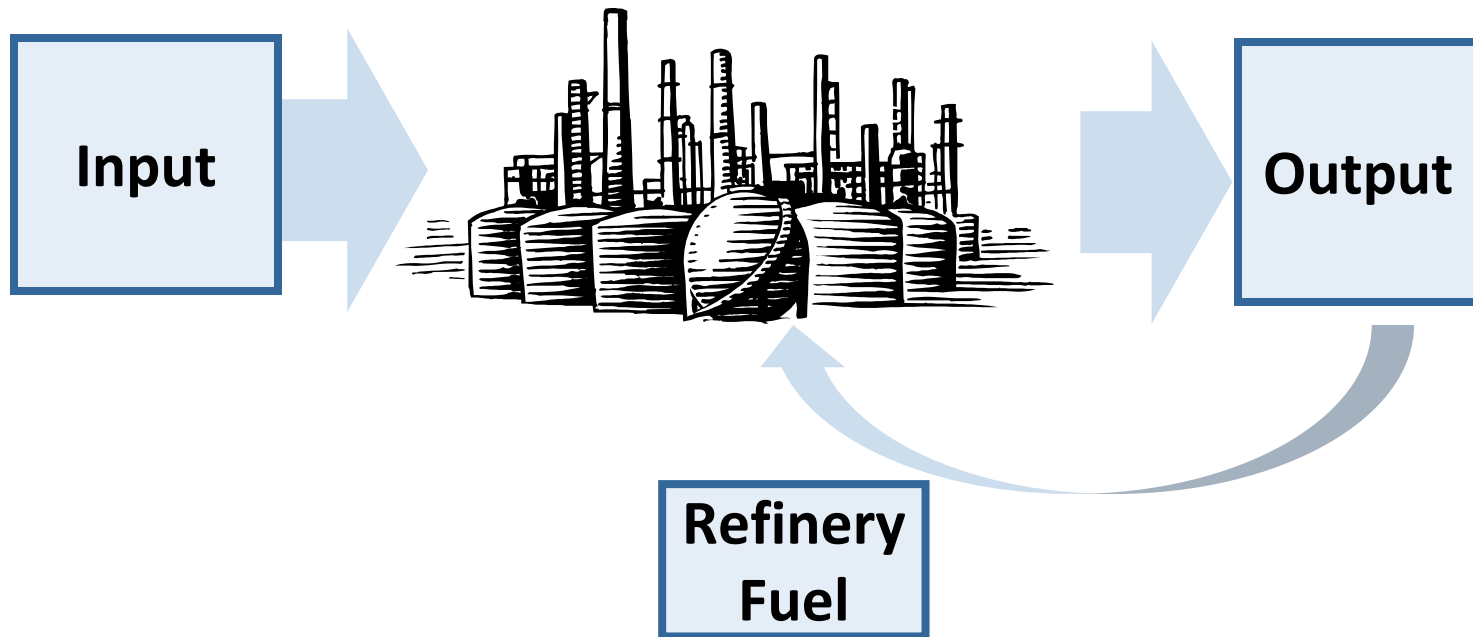


1 barrel = 159 litres

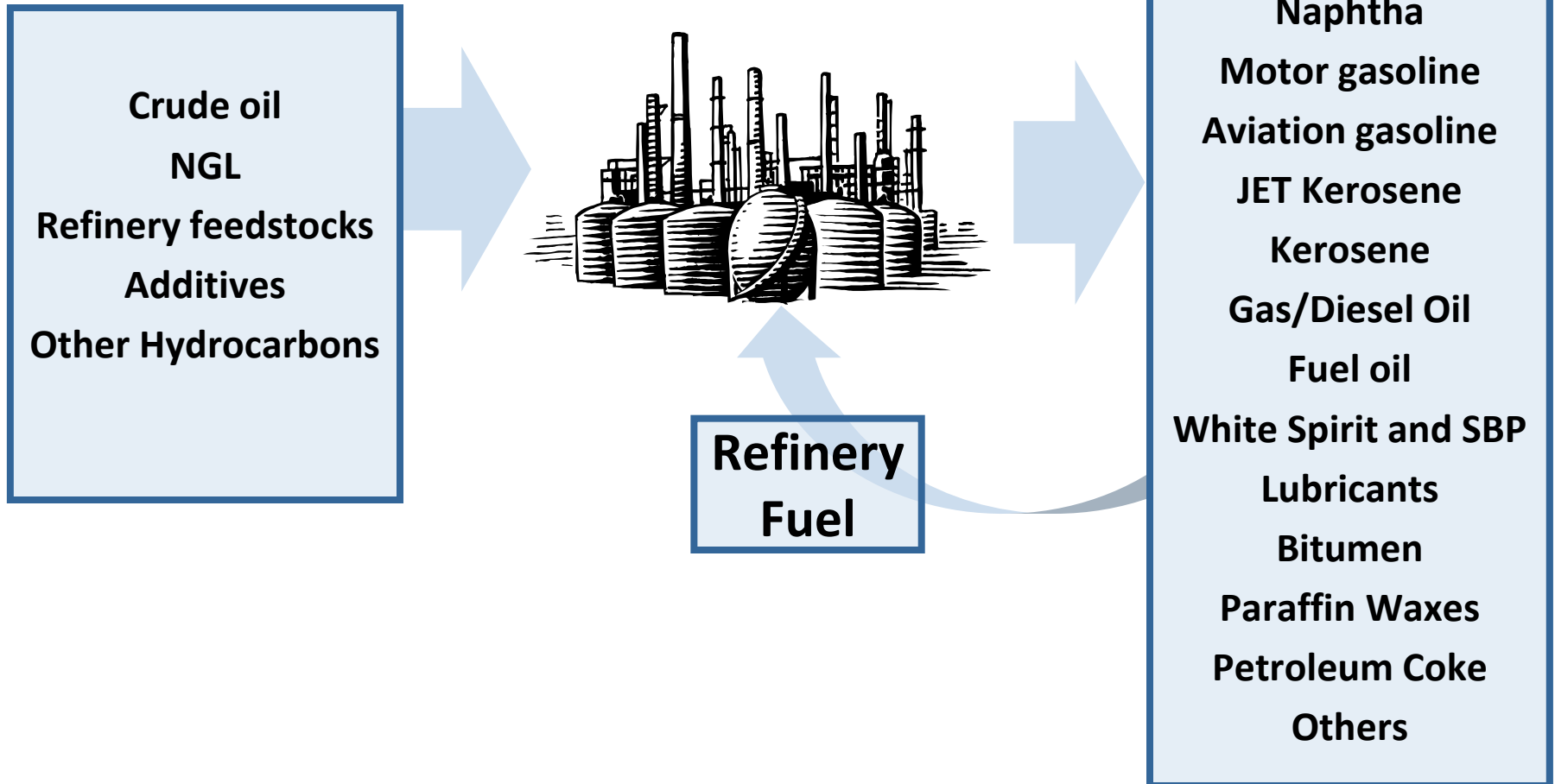
Divide by 159

Ex:  $11\,607\,000 \text{ litres} / 159 = 73\,000 \text{ barrels}$

# Refining basics

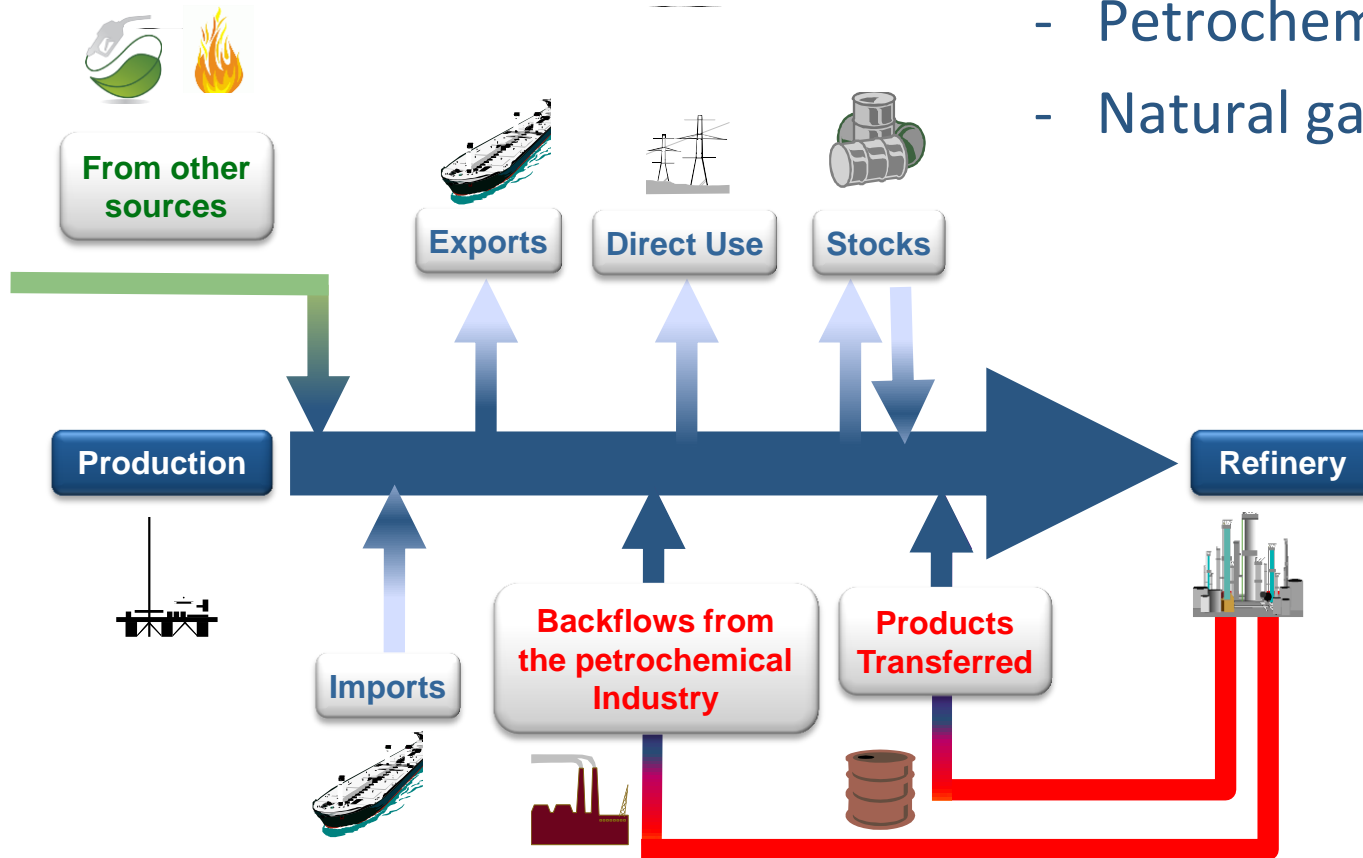


# Refining basics



# Going beyond

- Reporting Biofuels
- Production of petroleum products outside refineries
  - Petrochemical backflows
  - Natural gas separation plants



# Process efficiency checks : expected values

- **Electricity plants: 10 – 50% depending on the fuel and main activity / autoproducer**
  - fuel oil 17 - 33%
  - gas/diesel 35 - 41%
  - Anthracite 30 - 40%
  - natural gas 30 - 50%
- **CHP Plants: 30 – 80%**
- **Heat Plants: 40 – 100%**
  - natural gas 70 - 90%
- **Refineries: 95 – 100%**
- **Blast Furnaces: 35 – 45%**
- **Coke Ovens: 67 – 100% (Coke Oven Coke + Coke Oven Gas)**
- **Patent Fuel plants: 90 – 100%**
- **BKB: 85 – 100%**
- **Gas Works : 67 – 100% (Gas works Gas + Gas Coke)**
- **Charcoal: 25 – 55%**



# Potential sources of oil data in a country

## ■ Refineries – a very reliable source of information

- ◆ Often only a few in a country, so easy to census
- ◆ They hold very detailed information to monitor their activity

## ■ Oil product distributors

- ◆ data collection harder as more companies, so may need sample.
- ◆ Not many data on final users

## ■ Government sources

- ◆ Customs for data on trade
- ◆ Ministry of finance for fiscal data on oil companies
- ◆ Tax services generally have data on transport fuels

## ■ Surveys – often the only source on final use by households or businesses

# Table 1: Where does the refinery intake come from?

			Crude Oil	
Indigenous production	(+) 1	1,000		
Receipts from other sources	(+) 2			
Backflows	(+) 3			
Products transferred	(+) 4			
Imports (Balance)	(+) 5	0		↔ 4
Exports (Balance)	(-) 6	0		↔ 5
Direct Use	(-) 7	0		
Stock changes	(+) 8	0		
Refinery intake (Calculated)	(=) 9	1,000		
Statistical difference	(-) 10	-1		
Refinery intake (Observed)	(=) 11	1,001		

## Table 2a: Where do the oil products delivered to consumers come from?

			Gas/Diesel
Primary product receipts		(+) 1	0
Refinery gross output		(+) 2	596
Recycled products		(+) 3	0
Refinery fuel		(-) 4	0
Imports (Balance)		(+) 5	4
Exports (Balance)		(-) 6	0
International marine bunkers		(-) 7	0
Interproduct transfers		(+) 8	0
Products transferred		(-) 9	0
Stock changes		(+) 10	0
Gross inland deliveries (Calculated)		(=) 11	600
Statistical difference		(-) 12	0
Gross inland deliveries (Observed)		(=) 13	600

## Table 3: Who consumes the oil products?

		Total gas/diesel oil
Gross inland deliveries	1	600
Transformation sector	2	0
Energy sector	16	0
Total final energy consumption	25	600
Transport sector	26	600
Road	29	600
Rail	30	0
Domestic navigation	31	0
Industry sector	34	0
Other sectors	48	0

## Table 3a and 3b

- Energy use



↳ Oil products used as a fuel

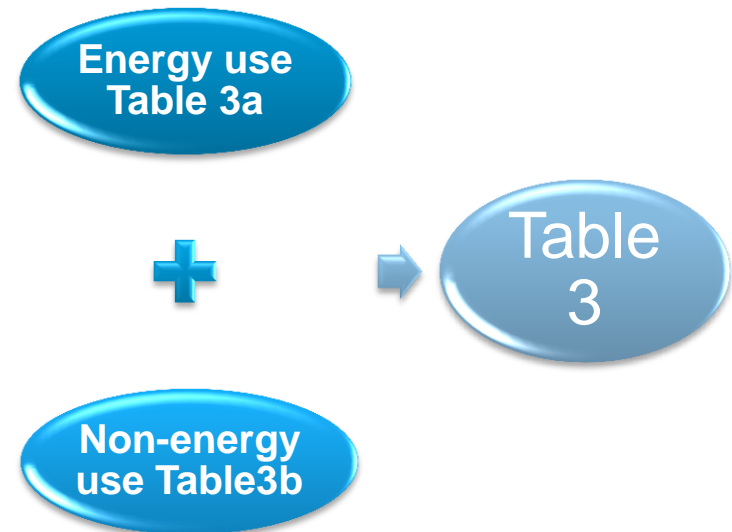
↳ Example: fuel oil used for electricity generation.

- Non-energy use

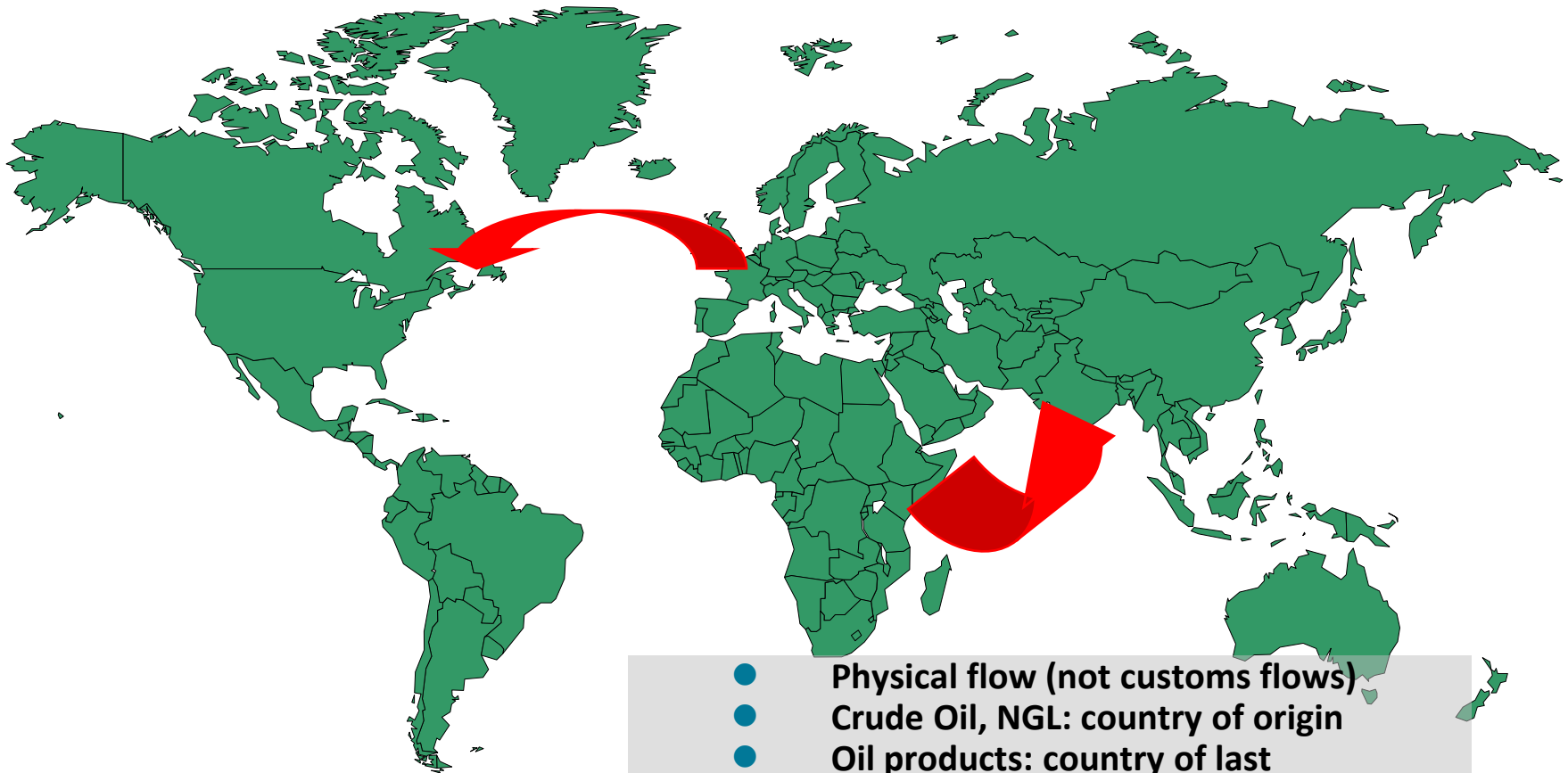


↳ Oil products used as a raw material

↳ Example: oil used to make plastics.



## Table 4 and 5: trade



- Physical flow (not customs flows)
- Crude Oil, NGL: country of origin
- Oil products: country of last consignment
- Transit trade not included

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An overview of the IEA annual oil questionnaire
- How to **CHECK** oil data?

# Two fundamental checks

- **Is there a statistical difference?**

Statistical difference = Demand – Supply

- **What are the refinery losses?**

Refinery losses = Refinery output – Refinery input



Statistical difference/Supply < 1%

Refinery losses < 0 or over 5% of refinery input



# Consistency checks: internal and external

## DATA ENTRY MENU

Control the integrity and coherence of your entries:  
Run the "Check data" program.

Check data

### Message

Stock Change should = Opening Stock - Closing Stock

Total Imports (Row 14) should = Total Imports (Row 101)

			Crude Oil
Total Imports (Balance)	(+) 5		100
Total Exports (Balance)	(-) 6		0
Direct Use	(-) 7		0
Stock Changes (National Territory)	(+) 8		5
<b>MEMO ITEMS:</b>			
Refinery Losses	12		0
<b>STOCK LEVELS:</b>			
Opening Stock Level (National Territory)	13		30
Closing Stock Level (National Territory)	14		10



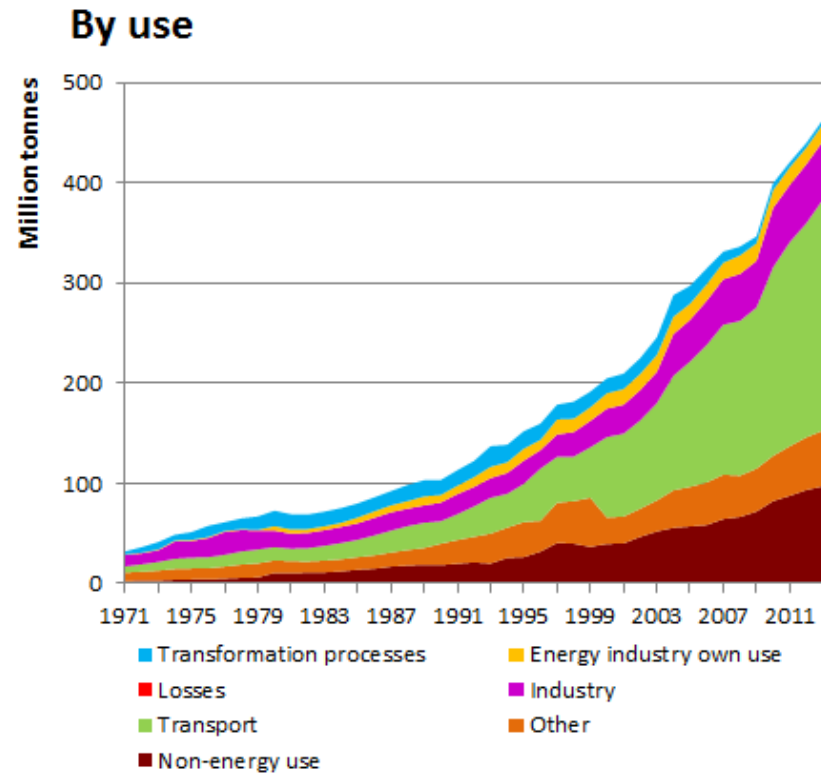
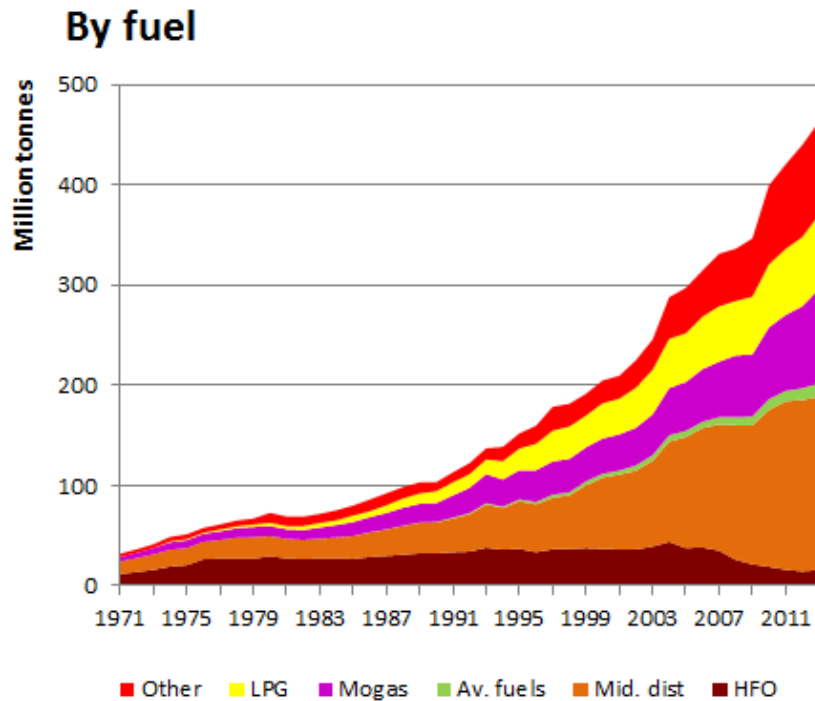
No data on imports by Origin in table 4



Stock change = 30 - 10 ≠ 5

# Other checks on time series

Example China - Oil products consumption



Source: IEA World Energy Balances 2015, excludes international bunkers. LPG: LPG, NGL, ethane and naphtha.

# Resources and contacts

[Oilq](#)

[www.iea.org/stats](http://www.iea.org/stats)

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