



Data quality and verification

Checking the balance scenarios

Training Workshops on Energy Statistics: Energy Balances
December 13-14, 2018, Beirut



Scenario 1.

Statistical differences

Scenario 1. Evaluating the statistical differences

HOW TO CHECK AN ENERGY BALANCE?

Scenario 1. High statistical difference

2015											
Thousand tonnes of oil equivalent (ktoe)											
SUPPLY AND CONSUMPTION	Coal	Crude oil	Oil products	Natural gas	Nuclear	Hydro	Geo-thermal/Solar etc.	Biofuel Waste	Electricity	Heat	Total
Production	6000	1000									8000
Imports			8000	5000					2000		15000
Exports											
Intl. marine bunkers											
Intl. aviation bunkers											
Stock changes				250							250
TPES	15000	1000	10000	5250					2000		33250
Transfers											
Statistical differences	2500	5	5000	-7000					700		1205

Statisland											
2015											
Thousand tonnes of oil equivalent (ktoe)											
SUPPLY AND CONSUMPTION	Coal	Crude oil	Oil products	Natural gas	Nuclear	Hydro	Geo-thermal/Solar/etc.	Biofuel s/Waste	Electricity	Heat	Total
Production	15000	1000									16000
Imports			10000	5000							17000
Exports									2000		
Intl. marine bunkers											
Intl. aviation bunkers											
Stock changes				250							250
TPES	15000	1000	10000	5250					2000		33250
Transfers											
Statistical differences	2500	5	5000	-7000					700		1205

- Look at the row "Statistical differences".
- Can you spot discrepancies?
- What could explain them?
- How can we evaluate the size of the problem?
 - Calculate the ratio statistical difference/TPES for each fuel.

Hint!

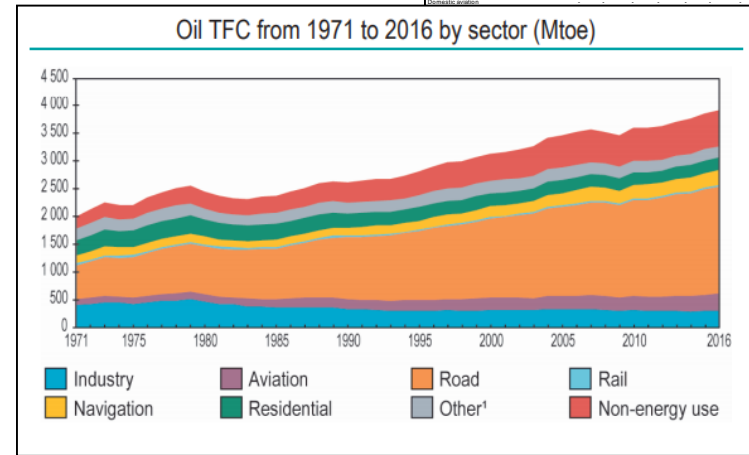
There is only one issue for each fuel

Scenario 1. Using the information in the balance



- How is oil used?
- How are the oil products used in the country?
- What is the sign of the natural gas statistical difference? What does that mean?
- How much electricity is lost in transmission and distribution lines?

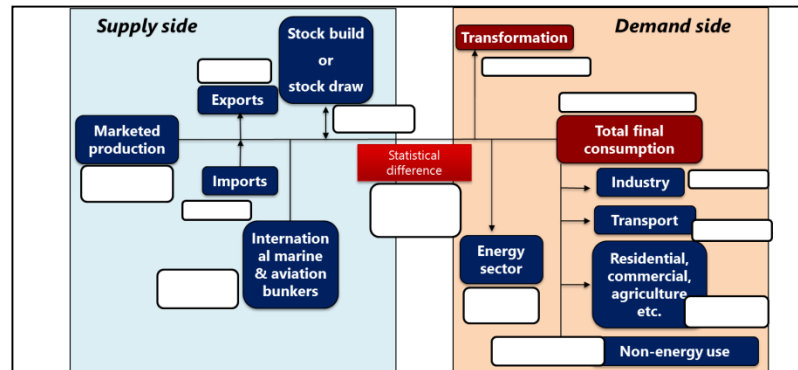
HOW TO CHECK AN ENERGY BALANCE?											
Scenario 1: High statistical difference											
2015											
Thousand tonnes of oil equivalent (toes)											
Statistland											
2015											
Thousand tonnes of oil equivalent (toes)											
SUPPLY AND CONSUMPTION											
	Coal	Crude oil	Oil products	Natural gas	Nuclear	Hydro	Geo-thermal	Biofuel Solar/ etc.	Electricity	Heat	Total
Production	5000	500	-	-	-	-	-	-	-	-	6000
Imports	-	-	6000	5000	-	-	-	-	2000	-	19000
Exports	-	-	-	-	-	-	-	-	-	-	-
Net marine bunkers	-	-	-	-	-	-	-	-	-	-	-
Net aviation bunkers	-	-	-	-	-	-	-	-	-	-	-
Stock changes	-	-	-	250	-	-	-	-	-	-	250
TFC	10000	500	6000	5150	-	-	-	-	2000	-	33250
TRF	10000	500	6000	5150	-	-	-	-	2000	-	33250
TRF	5000	500	5250	2250	-	-	-	-	1500	-	20250
INDUSTRY	5000	500	5250	2250	-	-	-	-	1500	-	20250
Iron and steel	2000	-	100	-	-	-	-	-	500	-	627
Chemical and petrochemical	-	-	100	-	-	-	-	-	400	-	470
Non-metallic minerals	800	-	700	-	-	-	-	-	300	-	281
Non-metallic minerals	-	-	200	-	-	-	-	-	60	-	40
Transport equipment	-	-	100	500	-	-	-	-	32	-	681
Machinery	-	-	-	-	-	-	-	-	200	-	200
Mining and quarrying	1000	-	-	500	-	-	-	-	644	-	2118
Food and tobacco	-	-	-	-	-	-	-	-	250	-	250
Paper, pulp and printing	-	-	-	250	-	-	-	-	70	-	324
Wood and wood products	-	-	-	-	-	-	-	-	4	-	58
Construction	-	-	-	-	-	-	-	-	64	-	21
Textile and leather	-	-	-	-	-	-	-	-	26	-	26
Non-specified	-	-	-	-	-	-	-	-	8	-	8
TRANSPORT	-	-	-	-	-	-	-	-	406	-	406
Domestic aviation	-	-	-	-	-	-	-	-	50	-	50
International aviation	-	-	-	-	-	-	-	-	395	-	395
Domestic shipping	-	-	-	-	-	-	-	-	1178	-	1178
International shipping	-	-	-	-	-	-	-	-	782	-	782
Domestic rail	-	-	-	-	-	-	-	-	397	-	397
International rail	-	-	-	-	-	-	-	-	200	-	200
Domestic road	-	-	-	-	-	-	-	-	1000	-	1000
International road	-	-	-	-	-	-	-	-	1000	-	1000
Domestic non-energy use	-	-	-	-	-	-	-	-	44185	-	44185
International non-energy use	-	-	-	-	-	-	-	-	29070	-	29070
Domestic other	-	-	-	-	-	-	-	-	8181	-	8181
International other	-	-	-	-	-	-	-	-	110863	-	110863
Domestic other	-	-	-	-	-	-	-	-	10000	-	10000
International other	-	-	-	-	-	-	-	-	10000	-	10000



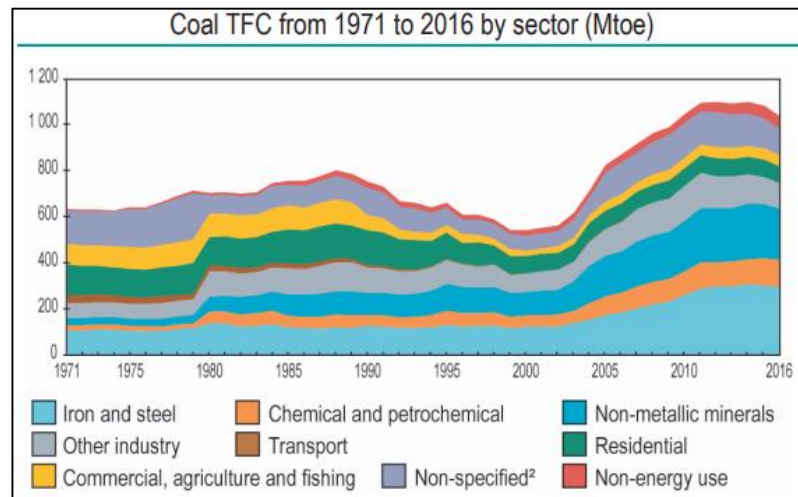
Total final consumption by sector for oil from the IEA Key World Energy Statistics 2018.

Scenario 1. Statistical difference in coal reporting

- Fill in the supply and demand diagram with the information in the balance for coal.
- Why may the statistical difference be so high?
 - What does it tell us about the coal market in this country?
 - Where is most of the coal used?
 - Is the picture of supply and demand complete?



Total final consumption by sector for coal from the [IEA Key World Energy Statistics 2018](#).



A blue arrow pointing upwards and a red arrow pointing downwards, positioned to the left of the text.

Scenario 2.

Transformation Efficiencies

Scenario 2. Transformation sector

HOW TO CHECK AN ENERGY BALANCE?

Scenario 2: Transformation efficiencies

Statisland

2015

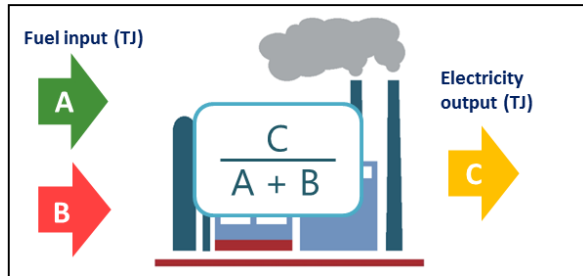
Thousand tonnes of oil equivalent (ktoe)											
SUPPLY AND CONSUMPTION	Coal	Crude oil	Oil products	Natural gas	Nuclear	Hydro	Geo-therm./Solar/ etc.	Biofuel s/ Waste	Electricity	Heat	Total
Production	30000	6000	-	-7000	-	-	-	-	-	-	-47000
Imports	-	-	950	5000	-	-	-	-	2000	-	7950
Exports	-	-	-	-	-	-	-	-	-	-	-
Intl. marine bunkers	-	-	-	-	-	-	-	-	-	-	-
Intl. aviation bunkers	-	-	-	-	-	-	-	-	-	-	-
Stock changes	-	-	250	-	-	-	-	-	-	-	250
Transfers	-	-	-	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	-	1000	-	-	1000
Electricity plants	-22500	-	-	-	-	-	-	2500	-	-	-20000
CHP plants	-	-	-	-5000	-	-	-	-	2300	2700	-
Heat plants	-	-	-	-	-	-	-	-	-	-	-
Blast furnaces	-	-	-	-	-	-	-	-	-	-	-
Gas works	-	-	-	-	-	-	-	-	-	-	-
Coke/pat. fuel/BKB/PB plants	-	-	-	-	-	-	-	-	-	-	-
Oil refineries	-	-10000	1000	-	-	-	-	-	-	-	1000
Petrochemical plants	-	-	-	-	-	-	-	-	-	-	-
Liquefaction plants	-	-	-	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-	-	-	-
Energy industry own use	-	-	-	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-	-	-	-
INDUSTRY	5000	-	3950	3750	-	-	-	3515	1710	17825	-
Iron and steel	2500	-	1000	-	-	-	-	2550	627	6077	-
Chemical and petrochemical	-	-	200	2500	-	-	-	450	555	4705	-
Non-ferrous metals	600	-	700	-	-	-	-	350	291	2841	-
Non-metallic minerals	-	-	250	-	-	-	-	63	100	410	-
Transport equipment	-	-	100	500	-	-	-	32	56	688	-
Machinery	-	-	-	-	-	-	-	250	8	208	-
Mining and quarrying	1000	-	500	-	-	-	-	644	32	2170	-
Food and tobacco	-	-	-	500	-	-	-	250	6	206	-
Paper, pulp and printing	-	-	-	250	-	-	-	76	8	334	-
Wood and wood products	-	-	-	-	-	-	-	52	4	96	-
Construction	-	-	-	-	-	-	-	64	2	66	-
Textile and leather	-	-	-	-	-	-	-	26	1	27	-
Non-specified	-	-	-	-	-	-	-	8	-	8	-
TRANSPORT	-	6000	-	-	-	-	-	406	-	6406	-
Domestic aviation	-	-	-	-	-	-	-	-	-	-	-
Road	-	6000	-	-	-	-	-	50	-	6050	-
Rail	-	-	-	-	-	-	-	356	-	356	-
Pipeline transport	-	-	-	-	-	-	-	-	-	-	-
Domestic navigation	-	-	-	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-	-	-	-
OTHER	2500	-	2000	2500	-	-	-	1179	990	9169	-
Residential	2500	-	1000	2500	-	-	-	712	140	7522	-
Comm. and public services	-	-	-	-	-	-	-	397	250	647	-
Agriculture/forestry	-	-	1000	-	-	-	-	-	-	1000	-
Fishing	-	-	-	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-	-	-	-
NON-ENERGY USE	-	-	1000	-	-	-	-	-	-	1000	-
in industry/transit/energy	-	-	1000	-	-	-	-	-	-	1000	-
of which: chem./petrochem.	-	-	-	-	-	-	-	-	-	-	-
in transport	-	-	-	-	-	-	-	-	-	-	-
in other	-	-	-	-	-	-	-	-	-	-	-
Electricity and heat output											
Electr. Generated - GWh	29070	-	-	-	-	-	-	-	-	-	55814
Electricity plants	29070	-	-	-	-	-	-	-	-	-	29070
CHP plants	-	-	-	-	-	-	-	-	-	-	26744
Heat generated - TJ	-	-	-	110065	-	-	-	-	-	-	110065
CHP plants	-	-	-	10065	-	-	-	-	-	-	10065
Heat plants	-	-	-	-	-	-	-	-	-	-	-

Electricity plants	-22500	-	-	-	-	-	-	-	-	2500	-	-20000
CHP plants	-	-	-	-	-	-	-	-	-	2300	2700	-
Heat plants	-	-	-	-	-	-	-	-	-	-	-	-
Blast furnaces	-	-	-	-	-	-	-	-	-	-	-	-
Gas works	-	-	-	-	-	-	-	-	-	-	-	-
Coke/pat. fuel/BKB/PB plants	-	-	-	-	-	-	-	-	-	-	-	-
Oil refineries	-	-10000	1000	-	-	-	-	-	-	-	-	1000
Petrochemical plants	-	-	-	-	-	-	-	-	-	-	-	-
Liquefaction plants	-	-	-	-	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-	-	-	-	-

- Look at rows below "TPES" (16-25). They represent transformation sector.
- What are the main transformation process for the different fuels ?
- Can you find out why some numbers are negative?

Scenario 2. Transformation efficiencies

- Can you spot any problems with transformation inputs and outputs?
- What do we need to calculate the efficiencies? Do we have this in the balance?
- Do the efficiencies make sense?



Conversions:

1 GWh = 0.086 ktoe

1 GWh = 3.6 TJ

[IEA unit converter tool](#)

Efficiency ranges:

Electricity-only plants: 30-40%

CHP plants: 75-90%

Refinery losses: 0-5%

Hint!

Losses are reported in the total column.



www.iea.org/statistics

