

Check and consistency in energy statistics

IEA Energy Statistics Training

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What type of checks do we make?

- Consistency checks (intra and inter questionnaire)
- Transformation efficiency checks
- Data quality
- Breaks in time series
- Comparison to the sources

Consistency checks

- In each table, do the lines add up?
- In each questionnaire, are the tables coherent?
- For each country, is the set of questionnaires coherent?

Do the lines add up?

Total Final Consumption	1	126,390
Transport Sector	2	0
Road	3	0
<i>of which Biogas</i>	4	0
Pipeline Transport	5	0
Non-specified (Transport)	6	0
Industry Sector	7	11,589
Iron and Steel	8	242
Chemical (including Petrochemical)	9	391
Non-Ferrous Metals	10	70
Non-Metallic Minerals	11	5,078
Transport Equipment	12	391
Machinery	13	703
Mining and Quarrying	14	152
Food, Beverages and Tobacco	15	3,008
Paper, Pulp and Printing	16	47
Wood and Wood Products	17	4
Construction	18	898
Textiles and Leather	19	137
Non-specified (Industry)	20	468
Other Sectors	21	114,801
Commercial and Public Services	22	1,375
Residential	23	112,410

Are the tables coherent?

■ Reminder at the bottom of each table

Row 3: Total (cell G3) should correspond to Total Backflows on Table 2B (cell Z5).

Row 4: Total (cell G4) should correspond to Total Products Transferred on Table 2A (cell Z9).

Row 5: Should correspond to total imports on Table 4 (cells A102 to F102).

Row 6: Should correspond to total exports on Table 5 (cells A95 to F95).

Row 7: Should be carried over to Primary Product Receipts on Table 2A (row 1).

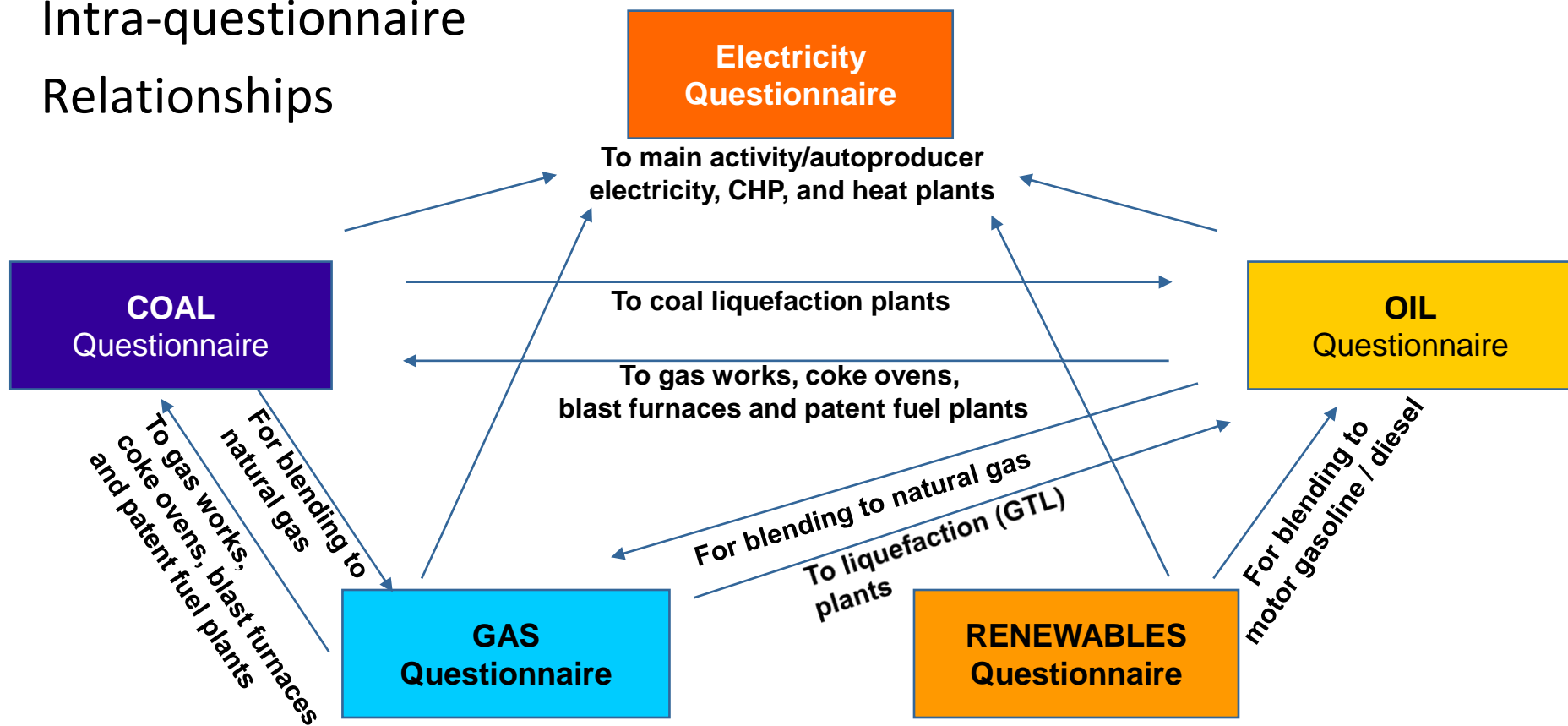
Row 8: Opening Stock Level minus Closing Stock Level (row 13 minus row 14).

■ Automatic checks

Check data

Is the set questionnaires coherent?

Intra-questionnaire Relationships



Common error n°1 : electricity inputs

- Ex: inputs to electricity plants in the coal questionnaire do not match inputs in the electricity questionnaire (table 6)

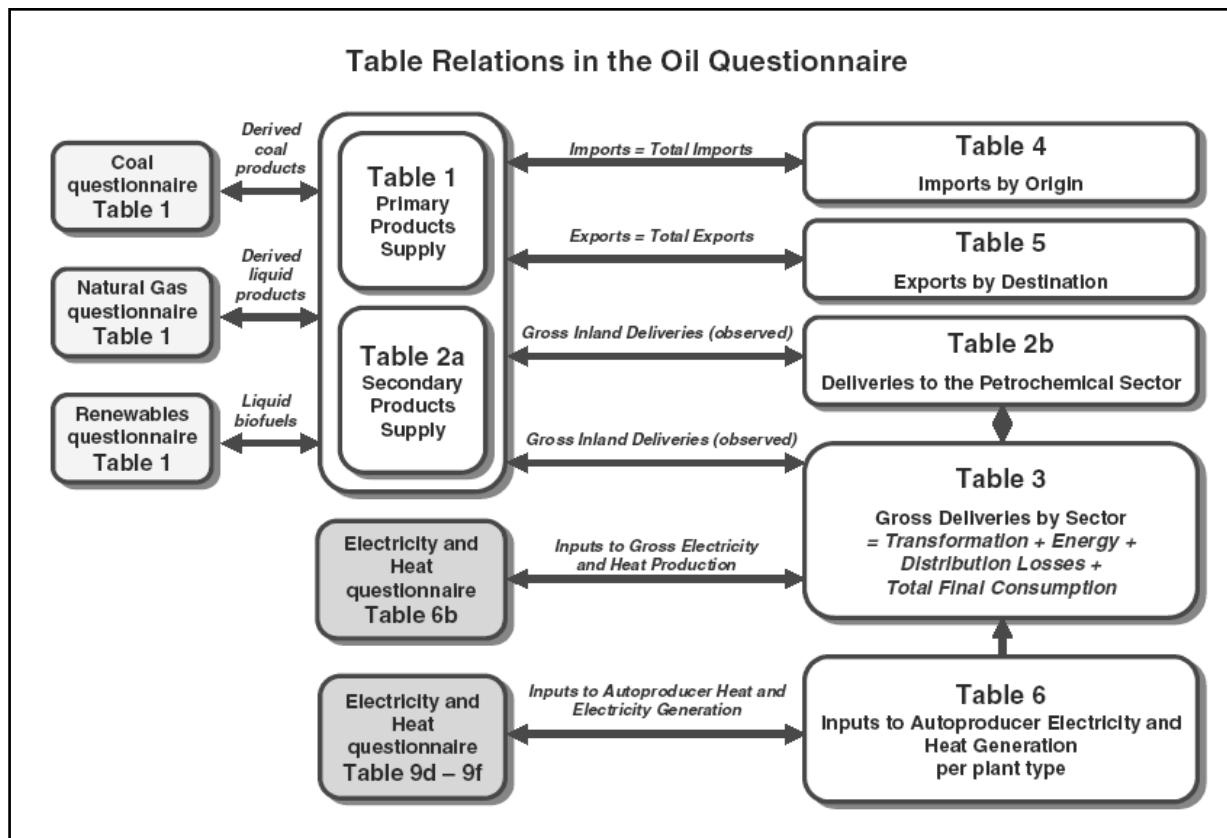
Comparison between ACS and ELE by Plant						
Other bituminous coal						
	2005	2005	2006	2007	2008	2009
Main Activity Electricity						
ACS [ktons]	13	16	23	39	50	83
ELE Inputs [ktons]	13	16	23	35	53	83
diff. ACS-ELE	-	-	-	4	-3	-
Auto Heat						
ACS [ktons]	2	1	3	4	6	8
ELE Inputs [ktons]	2	1	3	4	6	-
diff. ACS-ELE	-	-	-	-	-	8

Common error n°1 : biofuels

- The sum of biodiesel and biogasoline reported for blending in the renewables questionnaire should match the amount of additives from renewable source in the oil questionnaire

For blending	REN	-	-	1	4	24	65	80	80	58
From Other Sources-RENEW	OIL	-	-	1	4	24	65	84	68	50
	Diff	-	-	-	-	-	-	-4	12	8

Tables with summary of relationships



Where to find them?

Gas, Coal, Renewables: page 14 Oil: page 24 Electricity: page 28

Transformation efficiencies

- For each energy **transformation** process there is an **input** and an **output**
- We calculate the **efficiency**

$$\text{Efficiency} = \frac{\text{Total Output (net energy units)}}{\text{Total Input (net energy units)}}$$

- We check that this efficiency falls within a reasonable range

Efficiency error n°1 : electricity

- There is **input** to electricity plants but **no** electricity **output**
- **Efficiencies** are **out of** the expected **range**
- Output is unlikely given net maximum electrical capacity

COUNTRY	XXXXX	<table border="1" style="float: right; border-collapse: collapse;"> <tr> <td>ELE</td> <td>25%-40%</td> </tr> <tr> <td>CHP</td> <td>30%-90%</td> </tr> <tr> <td>HEAT</td> <td>40%-100%</td> </tr> </table>				ELE	25%-40%	CHP	30%-90%	HEAT	40%-100%
		ELE	25%-40%								
CHP	30%-90%										
HEAT	40%-100%										
		2006	2007	2008	2009						
Lignite/brown coal (kt)	Auto Heat Eff (%)	24	23	21	56						
Natural gas (TJ-gross)	Auto CHP Eff (%)	80	84	96	79						
Fuel oil	Main Ele Eff (%)	OUT	OUT	37	36						
Gas/Diesel oil	Main Ele Eff (%)	OUT	OUT	82	81						
Non-specified oil products (kt)	Main Ele Eff (%)	IN	IN	.	..						
Memo: Total Liquid Fuels	Main Ele Eff (%)	42	45	43	41						

Efficiency error n°2 : refineries

- Input too low or too high compared to output

Refinery Throughput and losses in 000 tons for:

Refinery Throughput	Total Output	Losses	Losses %
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2005	52500	52178	322	0.6
2006	59000	58800	200	0.3
2007	63000	63255	-255	-0.4
2008	67200	60200	7000	10.4
2009	70000	70000	0	0

Efficiency error n°3 : coke ovens

Outputs	2007
Coke Oven Coke.Indigenous Production	1 647 kt
Coke Oven Coke.NCV	26 370 kj/kg
Coke Oven Coke.Production	43 431TJ
Coke Oven Gas.Indigenous Production	9 869 TJ
Total output	53 300TJ

Inputs	
Coking Coal.Coke Ovens (Transformation)	2 392 kt
Coking Coal.NCV	27 500 kj/kg
Coking Coal.TJ_Transformation	65 780 TJ

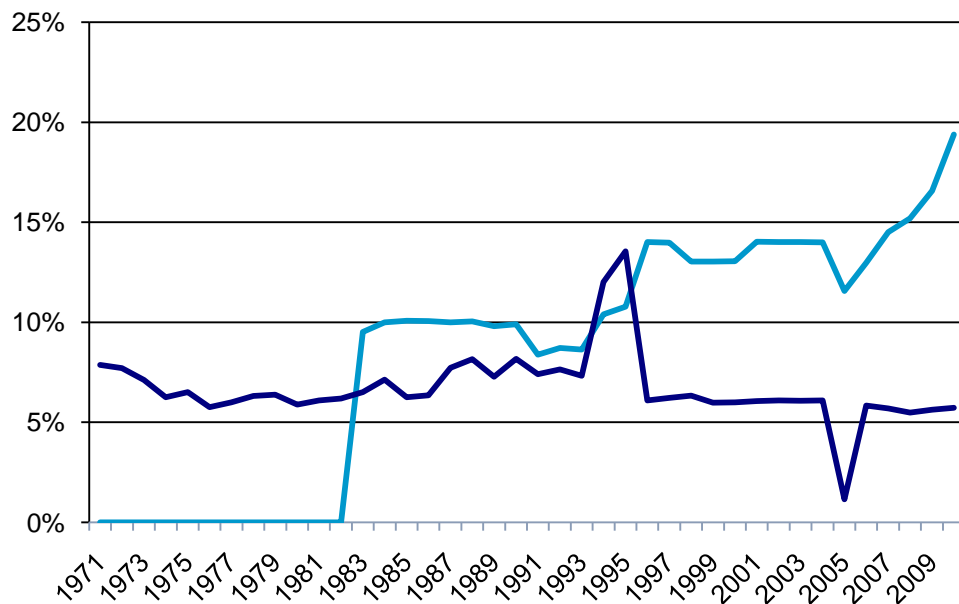
Efficiency **81%**

Expected efficiency values for non-OECD

- ✓ Electricity plants: 10%– 40%
- ✓ CHP Plants: 30 – 80%
- ✓ Heat Plants: 40 – 100%
- ✓ 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%

Electricity and heat own use and losses

- Statistical difference and losses $\leq 10\%$
- Own use $\leq 3\%$ (Main activity electricity plants only)



— Transmission and distribution losses/electricity supplied
 — Own use/Total gross production

Data quality check

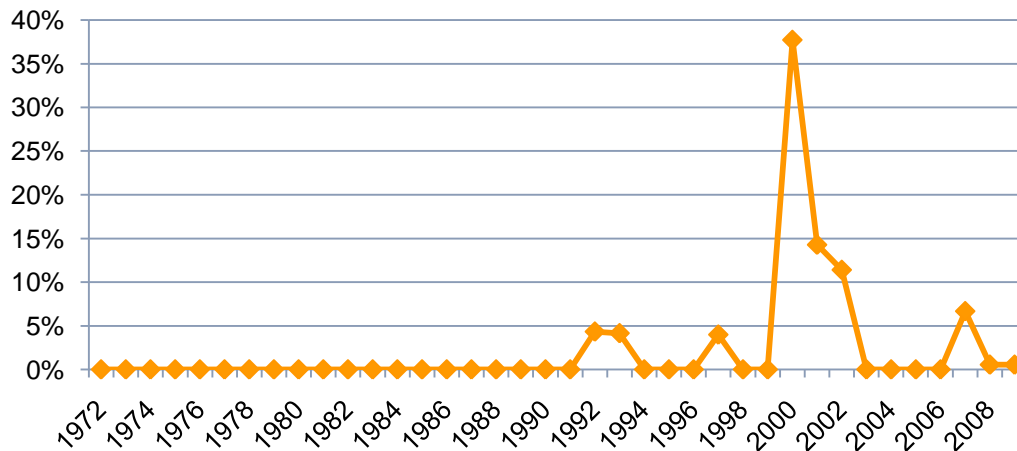
We check for odd uses of energy

	2006	2007	2008	2009
Other bituminous coal (kt).Oil and gas extraction	2886	3990	3304	3046
Natural gas (TJ-gross).International marine bunkers	4443	4293	4845	4923
Crude oil (kt).Road	281	215	184	217

Time series checks

- IEA needs **long and consistent time series** (modelling)
- Need to **avoid break in series** as well as unexplained big changes in trends

Biofuels and waste – TPES growth rate



Contact

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