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From Basic Energy Statistics to Energy Balances

**Workshop on Energy Balances and Energy Statistics
Kuala Lumpur, Malaysia 5 December 2011**



Outline

- 1. What is an energy balance and why create one?**
- 2. Energy balance principles**
- 3. IEA energy balance layout**
- 4. Using the energy balance with economic indicators**
- 5. Harmonisation**
- 6. Proposed changes to the IEA questionnaires**

1. Why calculate an energy balance?

To compare

- **Energy sources in the energy supply of a country**
- **Sectors of economic activity**
- **Countries, regions or the world**

To analyse and monitor

- **Energy efficiency**
- **Dependence on energy imports or exports**
- **Data quality**

Importance of good quality data

- **What is the share of renewables in the energy mix?**
- **What is happening with CO₂ emissions (Kyoto targets)?**
- **Bad or confusing data paves the way for speculation**
- **It needs to be clear and transparent**

Need to decide how to measure renewable energy

Depends on

- **Methodology** used to calculate the **primary energy equivalent** of electricity from non-combustion processes (physical energy content vs. substitution method)
- **Classification / definitions** of **what is renewable** (peat is sometimes included, i.e. Ireland)
- **Presentation:**
how is **supply** calculated? (e.g. international marine bunkers in or out, statistical difference included in TPES or not)

Architecture of IEA energy balance system

5 IEA/Eurostat/UNECE
Annual Questionnaires
OR

National publications, websites



Coal



Oil



Gas

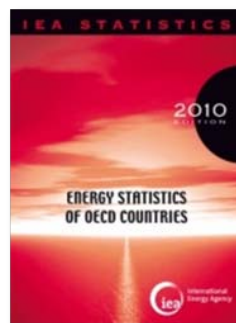


Renewables
+ Waste

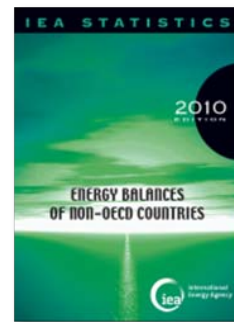
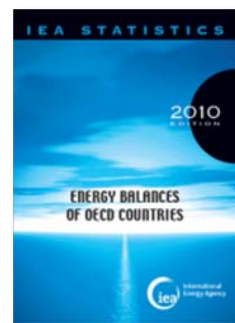


Electricity
+ Heat

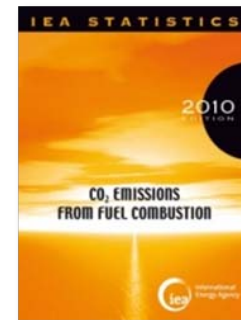
Original
Units



Mtoe



Mt of CO₂



2. Energy balance issues

- a. choice of **unit**
- b. **net vs. gross** calorific values
- c. choice of **conversion factors**
- d. **Primary energy equivalent for non-combustible fuels**
(physical energy content vs. substitution method)
- e. temperature adjustments
- f. fiscal year vs. calendar year

a. What units?

MBtu

kilowatt-hours

Mtoe



Mtce

terajoules



OECD Total / OCDE Total : 1998

Million tonnes of oil equivalent / Million de tonnes d'équivalent pétrole											
SUPPLY AND CONSUMPTION	Coal	Crude Petroleum Oil	Petroleum Products	Gas	Nuclear	Hydro	Geotherm. Solar etc.	Combust. & Waste	Electricity	Heat	Total
APPROVISIONNEMENT ET DEMANDE	Charbon	Pétrole brut	Produits pétroliers	Gaz	Nucléaire	Hydro	Géotherm. solaire etc.	En. ren. combust. etc. & déchets	Électricité	Chaleur	Total
Indigenous Production	1005.64	1046.05	-	874.91	553.58	111.08	30.05	168.64	-	0.35	3790.32
Imports	259.97	1564.37	380.85	345.32	-	-	-	0.45	23.99	0.00	2574.95
Exports	-213.37	-436.86	-322.09	-159.46	-	-	-	-0.00	-23.18	-0.00	-1154.95
Intl. Marine Bunkers	-	-	-81.23	-	-	-	-	-	-	-	-81.23
Stock Changes	-5.30	-3.44	-10.31	-13.08	-	-	-	0.02	-	-	-32.11
TPES	1046.95	2170.13	-32.78	1047.69	553.58	111.08	30.05	169.11	0.81	0.35	5096.97
Transfers	-	-28.22	29.41	-	-	-	-	-0.10	-	-	1.09
Statistical Differences	21.96	-2.82	2.01	-8.02	-	-	-	-0.12	-	-	13.02
Electricity Plants	-732.43	-9.72	-122.39	-185.21	-553.55	-111.08	-27.56	-19.27	702.95	-	-1058.25
CHP Plants	-112.92	-0.77	-9.07	-94.42	-0.04	-	-0.43	-44.25	75.95	38.40	-147.54
Heat Plants	-6.42	-	-1.57	-4.77	-	-	-0.37	-4.55	-0.42	13.82	-4.27
Gas Works	-2.76	-	3.18	3.32	-	-	-	-	-	-	-2.62
Petroleum Refineries	-	-2150.86	2153.22	-	-	-	-	-0.96	-	-	1.40
Coal Transformation	-68.19	-	-3.09	-0.23	-	-	-	-0.13	-	-	-71.64
Liquefaction	-	-	-	-	-	-	-	-	-	-	-
Other Transformation	-	25.72	-26.12	-0.44	-	-	-	-0.05	-	-	-0.89
Own Use	-12.85	-1.02	-129.95	-89.41	-	-	-	-0.03	-63.88	-3.25	-300.39
Distribution Losses	-0.59	-	-0.14	-2.96	-	-	-0.08	-0.00	-51.92	-4.22	-59.91
TFC	132.75	2.43	1856.36	665.56	-	-	1.62	99.64	663.49	45.11	3466.96
INDUSTRY SECTOR	109.57	2.43	335.40	275.30	-	-	0.42	43.95	261.61	12.98	1041.66
Iron and Steel	48.81	-	7.71	28.30	-	-	-	0.00	29.34	0.28	114.44
Chemical and Petrochemical	7.57	2.43	215.47	96.21	-	-	-	1.06	48.13	4.47	375.33
of which: Feedstocks	-	2.27	196.01	21.24	-	-	-	-	-	-	219.51
Non-Ferrous Metals	2.90	-	5.02	12.50	-	-	-	0.11	24.52	0.12	45.18
Non-Metallic Minerals	25.50	-	19.78	26.57	-	-	-	0.73	13.49	0.10	86.17
Transport Equipment	0.44	-	2.65	6.19	-	-	-	0.00	10.68	0.44	20.40
Machinery	1.36	-	6.32	18.85	-	-	-	0.01	25.26	0.34	52.15
Mining and Quarrying	0.96	-	5.32	3.38	-	-	-	0.00	8.92	0.07	18.65
Food and Tobacco	6.46	-	12.53	27.43	-	-	-	4.57	18.01	0.81	69.81
Paper, Pulp and Printing	6.11	-	10.70	26.46	-	-	-	21.83	32.39	1.36	98.84
Wood and Wood Products	0.27	-	3.81	1.96	-	-	-	13.19	4.95	0.15	24.33
Construction	1.37	-	10.77	0.71	-	-	-	0.01	1.24	0.03	14.13
Textile and Leather	0.75	-	6.23	7.51	-	-	-	0.10	9.82	0.43	24.84
Non-specified	7.08	-	29.09	19.23	-	-	0.42	2.34	34.86	4.37	97.40
TRANSPORT SECTOR	0.10	-	1134.52	20.92	-	-	-	1.75	9.13	-	1166.42
International Civil Aviation	-	-	67.20	-	-	-	-	-	-	-	67.20
Domestic Air Transport	-	-	95.22	-	-	-	-	-	-	-	95.22
Road	-	-	942.09	0.54	-	-	-	1.75	-	-	944.37
Rail	0.01	-	16.42	-	-	-	-	-	7.64	-	24.07
Pipeline Transport	-	-	0.02	20.36	-	-	-	-	0.44	-	20.82
Internal Navigation	0.09	-	20.98	-	-	-	-	-	-	-	21.07
Non-specified	-	-	2.59	0.02	-	-	-	-	1.06	-	3.67
OTHER SECTORS	22.12	-	263.44	369.34	-	-	1.20	53.95	392.75	32.13	1134.92
Agriculture	1.39	-	55.85	5.16	-	-	0.06	0.84	6.63	0.29	70.22
Comm. and Publ. Services	3.35	-	74.09	111.32	-	-	0.05	1.89	181.17	7.24	379.12
Residential	16.58	-	130.13	240.84	-	-	1.07	49.50	203.20	21.75	663.06
Non-specified	0.80	-	3.37	12.02	-	-	0.01	1.72	1.74	2.84	22.51
NON-ENERGY USE	0.95	-	123.01	-	-	-	-	-	-	-	123.96
in Industry/Trans./Energy	0.77	-	112.52	-	-	-	-	-	-	-	113.39
in Transport	-	-	7.65	-	-	-	-	-	-	-	7.65
in Other Sectors	0.18	-	2.73	-	-	-	-	-	-	-	2.91
Electricity Generated - GWh	3508315	-	660661	1280305	2124071	1291618	49471	142536	-	-	9056977
Electricity Plants	3145869	-	582057	905927	2124071	1291618	48664	75608	-	-	8173814
CHP plants	362446	-	78604	374378	-	-	807	66928	-	-	883163
Heat Generated - TJ	918598	-	197120	645482	1558	-	21325	376256	13485	27513	2201337
CHP plants	703118	-	131231	533902	1558	-	5985	232052	2174	5284	1615304
Heat Plants	215480	-	65889	111580	-	-	15340	144204	11311	22229	586033

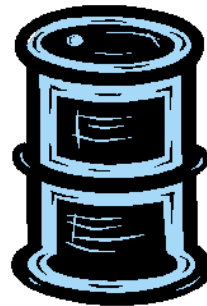
IEA opted for Mtoe

b. Net vs. Gross Calorific Values?

Difference between NCV and GCV is the **latent heat of vaporisation** of the water produced during combustion



5%



5%



10%

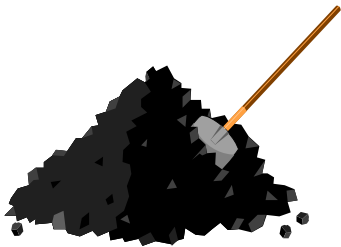
IEA uses **Net Calorific Values**

c. Conversion factors

COAL

Physical units (tonnes) are converted to energy units using NCV [kJ/kg], reported in the questionnaires (varies over time)

Specific NCV for Production, Imports, Exports, Inputs to Public Power Plants, Coal used in Coke Ovens, Blast Furnaces and Industry **Average NCV** for all other flows



COAL GASES

Data collected in gross TJ, then converted to net TJ (0.9·gross TJ) and then to Mtoe (1 TJ = 0.00002388 Mtoe)

CRUDE OIL AND OIL PRODUCTS

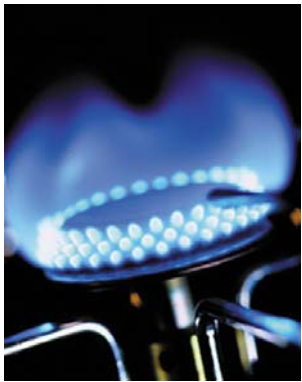
Using NCV [kJ/kg]

Primary oil - Specific NCV for Production, Imports and Exports, reported in the questionnaires (varies over time)

Oil products - region specific default values



c. Conversion factors



NATURAL GAS

- Figures collected in million cubic metres and gross TJ (energy unit)
- Then converted to net TJ (0.9·gross TJ) and then to thousand toe
(1 TJ = 0.02388 thousand toe)

ELECTRICITY

- Figures collected in TWh, then electricity production is converted to thousand toe
(1 TWh = 0.086 thousand toe)
- Gross electricity production is shown and the own use and losses are shown separately



e. Primary energy equivalent for non-combustible fuels

IEA opted for

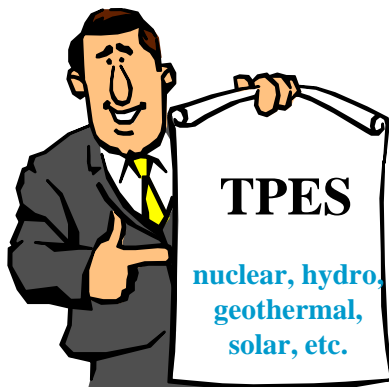


Physical energy content method

- Uses output to back-calculate inputs
- nuclear 33%
- geothermal 10%
- solar, wind, hydro 100%

Partial substitution method

- represents the amount of energy necessary in conventional thermal plants
- difficult to choose efficiency
- not relevant for countries with a high share of hydro



Physical energy content vs. partial substitution

Energy Balance of Sweden

Using physical energy content method

Million tonnes of oil equivalent / Million de tonnes d'équivalent pétrole											
SUPPLY	Coal & peat	Crude oil	Petroleum products	Gas	Nuclear	Hydro	Geotherm. solar etc.	Combust. renew. & waste	Electricity	Heat	Total
Production	0.21	-	-	-	16.63	5.92	0.18	10.12	-	0.27	33.33
Imports	2.32	2173	7.42	0.83	-	-	-	-	1.10	-	33.39
Exports	-0.03	-0.47	-12.07	-	-	-	-	-	-127	-	-13.84
Intl. marine bunkers	-	-	-2.01	-	-	-	-	-	-	-	-2.01
Intl. aviation bunkers	-	-	-0.68	-	-	-	-	-	-	-	-0.68
Stock changes	0.04	-0.44	-0.07	-	-	-	-	-	-	-	-0.47
TPES	2.54	20.82	-7.41	0.83	16.63	5.92	0.18	10.12	-0.17	0.27	49.73
Electricity and Heat Output											
Elec. generated - TWh	3.01	-	107	0.78	63.82	68.80	197	10.03	-	-	149.49
Heat generated - PJ	16.09	-	4.77	6.00	-	-	-	140.36	0.76	19.98	187.95

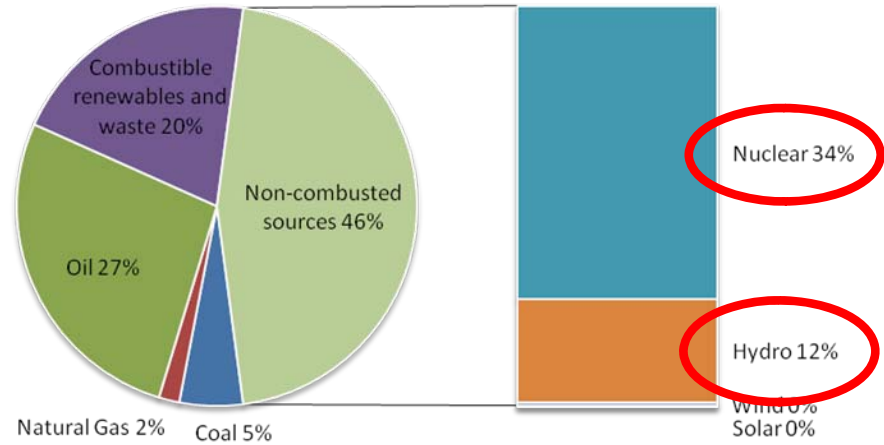
Using partial substitution method

Million tonnes of oil equivalent / Million de tonnes d'équivalent pétrole											
SUPPLY	Coal & peat	Crude oil	Petroleum products	Gas	Nuclear	Hydro	Geotherm. solar etc.	Combust. renew. & waste	Electricity	Heat	Total
Production	0.21	-	-	-	14.26	15.37	0.44	10.12	-	0.27	40.67
Imports	2.32	2173	7.42	0.83	-	-	-	-	1.10	-	33.39
Exports	-0.03	-0.47	-12.07	-	-	-	-	-	-127	-	-13.84
Intl. marine bunkers	-	-	-2.01	-	-	-	-	-	-	-	-2.01
Intl. aviation bunkers	-	-	-0.68	-	-	-	-	-	-	-	-0.68
Stock changes	0.04	-0.44	-0.07	-	-	-	-	-	-	-	-0.47
TPER	2.54	20.82	-7.41	0.83	14.26	15.37	0.44	10.12	-0.17	0.27	57.07
Electricity and Heat Output											
Elec. generated - TWh	3.01	-	107	0.78	63.82	68.80	197	10.03	-	-	149.49
Heat generated - PJ	16.09	-	4.77	6.00	-	-	-	140.36	0.76	19.98	187.95

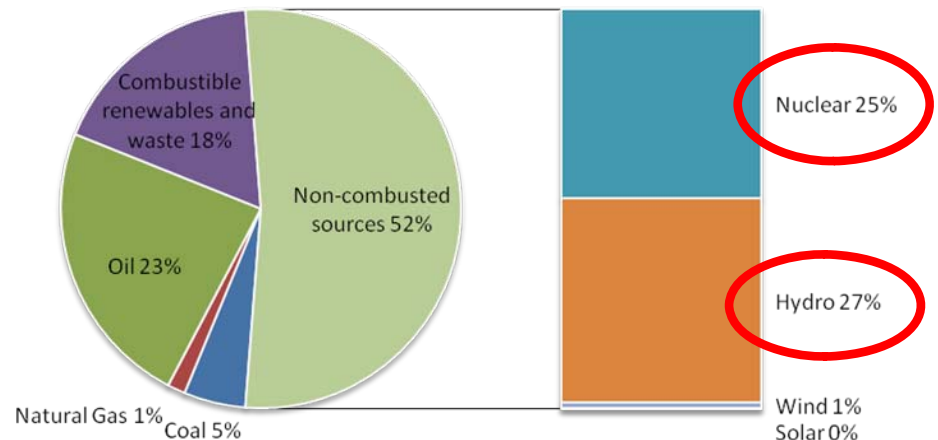
Physical energy content vs. partial substitution

Supply of Sweden

Using physical energy content method



Using partial substitution method



Non-combusted sources can have very different shares!

IEA energy balance layout: compact source of information

		Million tonnes of oil equivalent										Totals
Flows		Coal	Crude oil	Oil products	Gas	Nuclear	Hydro	Geotherm. solar etc.	Combust. renew. & waste	Electricity	Heat	Total
Supply	SUPPLY AND CONSUMPTION											
	Production	16.87	2.13	-	0.84	-	2.88	1.54	4.83	-	-	28.98
	Imports	12.86	21.57	14.41	30.60	-	-	-	-	0.07	-	79.50
	Exports	-	-	-6.53	-0.36	-	-	-	-	-0.10	-	-6.98
	Intl. marine bunkers	-	-	-0.65	-	-	-	-	-	-	-	-0.65
	Intl. aviation bunkers	-	-	-1.30	-	-	-	-	-	-	-	-1.30
	Stock changes	-0.07	-0.14	0.07	-0.50	-	-	-	-	-	-	-1.04
	TPES	29.41	22.86	5.89	20.38	-	2.88	1.54	4.83	0.07	-	98.50
Transformation and energy industries own use	Transfers	-	-	-	-	-	-	-	-	-	-	-
	Statistical differences	0.21	0.70	-0.02	-	-	-	-	-	-	-	0.88
	Electricity plants	-14.13	-	-1.58	-14.51	-	-2.86	-0.21	-0.05	16.35	-	-17.05
	CHP plants	-0.13	-	-0.13	-	-	-	-	0.01	0.72	1.02	-0.50
	Heat plants	-	-	-	-	-	-	-	-	-	-	-
	Blast furnaces	-1.21	-	-	-	-	-	-	-	-	-	-1.24
	Gas works	-	-	-	-	-	-	-	-	-	-	-
	Coke/peat, fuel/EKB plants	-0.65	-	-	-	-	-	-	-	-	-	-0.65
	Oil refineries	-	-24.42	24.60	-	-	-	-	-	-	-	0.19
	Petrochemical plants	-	0.15	-0.16	-	-	-	-	-	-	-	-0.01
Final consumption	Liquefaction plants	-	-	-	-	-	-	-	-	-	-	-
	Other transformation	-	-	-	-	-	-	-	-	-	-	-
	Energy ind. own use	-0.61	-	-	-	-	-	-	-	-0.96	-	-3.26
	Losses	-0.01	-	-	-0.06	-	-	-	-	-2.36	-	-2.47
	TFC	12.71	-	27.45	1.11	-	-	0.13	4.77	13.71	1.02	74.38
Industry	INDUSTRY	6.11	-	1.33	3.19	-	-	0.13	-	6.22	1.02	18.01
	Iron and steel	1.21	-	0.10	0.65	-	-	-	-	1.38	-	3.33
	Chemical and petrochem.	0.01	-	0.13	0.61	-	-	-	-	0.32	-	1.07
	Non-ferrous metals	-	-	0.05	0.10	-	-	-	-	0.21	-	0.36
	Non-metallic minerals	-	-	0.50	0.82	-	-	-	-	0.77	-	2.10
	Transport equipment	-	-	-	0.04	-	-	-	-	-	-	0.04
	Machinery	0.00	-	-	0.13	-	-	-	-	0.31	-	0.44
	Mining and quarrying	-	-	-	-	-	-	-	-	0.12	-	0.12
	Food and tobacco	0.00	-	-	-	-	-	-	-	-	-	1.02
	Paper, pulp and printing	0.00	-	0.05	0.11	-	-	-	-	0.17	-	0.36
	Wood and wood products	0.00	-	-	-	-	-	-	-	-	-	0.14
	Construction	2.00	-	-	-	-	-	-	-	0.30	-	3.04
	Textile and leather	0.00	-	-	0.05	-	-	-	-	0.35	-	1.17
	Non-specified	1.00	-	0.16	0.13	-	-	-	-	1.20	1.02	4.81
Transport	TRANSPORT	-	-	-	-	-	-	-	0.08	-	-	15.07
	Domestic aviation	-	-	0.23	-	-	-	-	-	-	-	0.79
	Road	-	-	-	-	-	-	-	-	-	-	13.40
	Rail	-	-	0.15	-	-	-	-	-	0.02	-	0.17
	Pipeline transport	-	-	-	0.16	-	-	-	-	0.01	-	0.17
Other final consumption	Domestic navigation	-	-	0.50	-	-	-	-	-	-	-	0.50
	Non-specified	-	-	-	-	-	-	-	0.05	-	-	0.05
	OTHER	6.66	-	6.22	9.59	-	-	1.30	4.75	7.41	-	35.93
	Residential	4.93	-	1.69	6.52	-	-	1.30	4.75	3.40	-	22.60
Non-energy use	Comm. and public service	1.06	-	-	3.07	-	-	-	-	3.50	-	7.63
	Agriculture/forestry	-	-	4.53	-	-	-	-	0.49	-	-	5.02
	Fishing	-	-	-	-	-	-	-	0.01	-	-	0.01
	Non-specified	0.66	-	-	-	-	-	-	-	-	-	0.66
Electricity and heat output	NON-ENERGY USE	-	-	5.11	0.26	-	-	-	-	-	-	5.37
	in industry/transport	-	-	4.53	0.26	-	-	-	-	-	-	4.79
	of which: feedstocks	-	-	1.11	0.26	-	-	-	-	-	-	1.57
in transport	-	-	0.58	-	-	-	-	-	-	-	0.58	
in other	-	-	-	-	-	-	-	-	-	-	-	
Electricity and Heat Output												
Electricity and heat output	Elec. generated - TWh	57.72	-	7.52	98.69	-	33.27	1.01	0.22	-	-	198.42
	Electricity plants	57.15	-	6.90	91.55	-	33.27	1.01	0.20	-	-	190.08
	CHP plants	0.57	-	0.62	7.14	-	-	-	0.02	-	-	8.34
	Heat generated - PJ	0.58	-	0.56	41.40	-	-	-	-	-	-	42.54
CHP plants	0.58	-	0.56	41.40	-	-	-	-	-	-	42.54	
Heat plants	-	-	-	-	-	-	-	-	-	-	-	

Comparable information for all products

Comparable energy units (Mtoe)

Global picture of energy situation in a country

Energy balance

SUPPLY AND CONSUMPTION	Coal	Crude	Oil	Gas	Supply			Electricity	Heat	Total
	& peat	oil	products		Refined products and electricity are secondary energy: production = 0	etc.	& waste			
Production	7371				823	48	806	-	-	9922
Imports	945				-	-	1	763	-	7440
Exports	-57				-	-	-4	-757	-	-1056
Intl. marine bunkers	-				-	-	-	-	-	-
Intl. aviation bunkers	-				-	-	-	-	-	-48
Stock changes	-136				-	-	1	-	-	-227
TPES	8122				823	48	804	6	-	16032
Transfers	-				-	-	-	-	-	4
Statistical differences	303	59	-48	-	-	-	-	5	10	329
Electricity plants	-6785	-	-17	-17	-823	-	-	3127	-	-4515
CHP plants	-	-	-33	-99	-	-	-	36	39	-58
Heat plants	-104	-	-349	-389	-	-42	-1	-	778	-106
Blast furnaces	-247	-	-	-	-	-	-	-	-	-247
Gas works	-	-	-	-	-	-	-	-	-	-
Coke/pat.fuel/BKB plants	-99	-	-	-	-	-	-	-	-	-99
Oil refineries	-	-3457	3160	-	-	-	-	-	-	-297
Petrochemical plants	-	99	-103	-	-	-	-	-	-	-4
Liquefaction plants	-	-	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-	-	-
Energy industry own use	-	-	-	-45	-	-	-	-322	-20	-387
Losses	-76	-	-	-31	-	-	-	-508	-81	-696
TFC	1115	-	3541	1420			804	2344	727	9956
INDUSTRY	582	-	498	1002			22	608	296	3007
TRANSPORT	1	-	2178	4			-	23	-	2206
OTHER	511	-	176	281			781	1714	431	3901
NON-ENERGY USE	21	-	689	132			-	-	-	842

Coal-to-coal transformation
Value represents transformation losses; further detail available in BIGBAL

Transformation
- Negative value represents an input, positive value represents an output

- Transformation losses appear in the **Total** column as negative figures

4. Using the energy balance with economic indicators

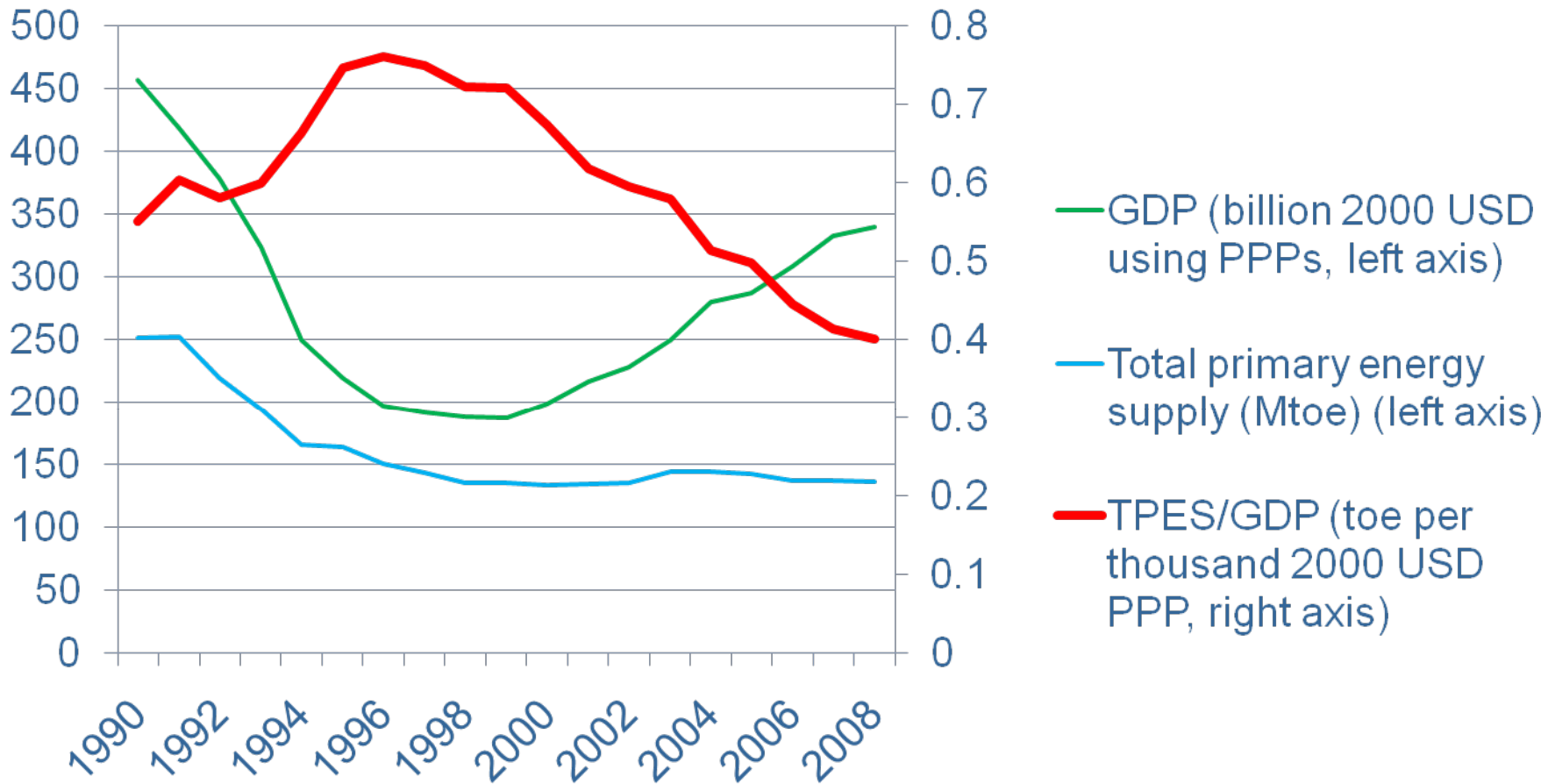
Using:

- Population
- GDP (using 2000 exchange rates to US dollars)
- GDP-PPP (using 2000 PPPs to US dollars)



- Energy Production/TPES
- Net Oil Imports/GDP
- TPES/GDP
- TPES/Population
- Oil Supply/GDP
- Oil Supply/Population
- Electricity Consumption/GDP
- Electricity Consumption/Population

TPES & GDP

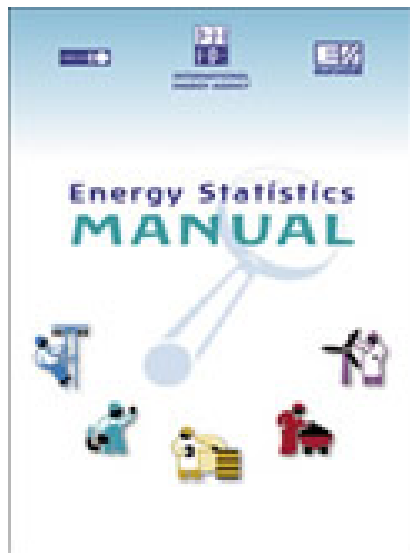


5. Harmonisation

There are at least 3 levels for harmonisation:

- country – organisation (i.e. Malaysia – APEC)
- organisation – organisation (InterEnerStat)
- All statistics: energy – economic – environmental (Oslo City Group, London City Group)

Joint manuals help the process



- In 2004/2005 the IEA and Eurostat prepared a joint manual to help countries collect and submit energy data
- The UN has just completed International Recommendations on Energy Statistics (IRES) to update the previous UN manuals from the 1980s/1990s

Benefits of harmonisation would be felt at all levels

- **National administrations**
- **Data users**
- **Policy makers**
- **General public**
- **International organisations**

Although harmonisation is the way to go, we all know that it is a lengthy process.

Benefits of harmonisation

- Require **good quality** statistics (data, calorific values)
- Are a compact source of energy **information**
- Enable **accurate verification** of energy statistics
- Are the **foundation** for basic energy indicators, CO₂ emissions estimates and policy analysis and decisions

6. IEA Balance Builder

Available at

<http://www.iea.org/stats/questionnaire/balancebuildertemplate.xls>

Two options:

1. Shows links from **basic energy statistics** (“commodity balances”) to the energy balance
2. shows links from the five **annual questionnaires** to the energy balance (via the basic energy statistics)

6. IEA balance builder

- Shows a country what their data will look like in the IEA format (so no surprises on publication day)
- Shows the country's statisticians how to construct an energy balance (and what data they need to do so)
- Highlights the importance of accurate NCVs

Proposed changes to the Coal Questionnaire

- 1. Net calorific value ranges to be updated for the various coals**
- 2. Oil shale and oil sands will be moved out of lignite**
- 3. Provide more explicit instructions for reporting Direct Reduced Iron data**
- 4. “Oxygen steel furnace gas” will be changed to “other recovered gases”**
- 5. Peat briquettes will be separated from BKB**

Proposed Changes to the Electricity Questionnaire

- 1. Report hydro capacity of mixed pumping stations separately**
- 2. Add a line for electricity consumption in road transport**
- 3. Split solar capacity between solar thermal and solar PV**

Proposed changes to the Natural Gas Questionnaire

- 1. More explicit instructions for the reporting of trade.**
- 2. Provision for reporting of natural gas stocks held abroad.**
- 3. More explicit instructions for including LNG storage.**

Proposed changes to the Oil Questionnaire

- 1. Separate Non-Energy use.**
- 2. Petrochemical reporting.**
- 3. Gas/diesel oil detail.**
- 4. Biofuels: improve reporting**
- 5. Separate the bio and non-bio fraction of blended fuels**
- 6. Refinery fuel for Heat only plants**

Proposed changes to the Renewables Questionnaire

- 1. Add row for “Blast Furnaces (Transformation)” in the transformation sector.**
- 2. Liquid biofuels will be able to be reported for all uses.**
- 3. The categories for biogases will be modified and reporting of biogases will be condensed on the commodity balance.**
- 4. Tables for liquid biofuels trade will be added.**
- 5. Reporting instructions for Solar Thermal and Geothermal data will be improved.**
- 6. More data on solid biofuels and biogases**

Thank you

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