UNSD Energy Balances: Following the Principles of IRES

Alex Blackburn, UNSD

Oslo City Group 9th meeting , Abu Dhabi, UAE

5th May 2014

Background

- Since IRES' adoption, UNSD has been updating databases, questionnaires and publications to comply with IRES recommendations
- With exception of flow and product names, the UNSD energy balance presentation was already quite compliant with IRES
- The commodity balances (basic energy statistics) needed a little more adjustment to comply with IRES methodology

Changes made: Commodity Balances

- Various products added and renamed
- Products added: eg a hard coal breakdown (anthracite, coking coal), Other hydrocarbons split from Crude oil
- Products renamed: e.g. hard coal briquettes becomes patent fuel, alcohol becomes biogasoline
- Various flows added, including a better breakdown for power transformation, own use, bunkers, and industry consumption
- Heat now treated equivalently to electricity
- NGL product and methodology updated

NGLs methodology

- Natural gas liquids now include natural gasoline and plant condensate, and are a product in their own right (previously NGL production was a sum of the output of 2ndary products from gas separation plants)
- In contrast to IEA methodology, UNSD will treat 2ndary products from separation plants as production rather than transfers, in line with other areas of statistics
- These quantities will appear in the energy balances as *other transformation* (as IRES doesn't specifically recognise separation plants as a transformation activity)

Previous energy balance structure

Hard coal, lignite and peat	Briquettes and cokes	Crude petroleum and NGL	Light petroleum products	Heavy petroleum products	Other petroleum products	LPG and refinery gas

Natural gas	Derived gases	Electricity	Primary biomass energy	Derived biomass energy	Other energy sources	Total energy

14 different columns, giving a (very) detailed oil product breakdown, plus columns for secondary coal, derived gases, and derived biomass (charcoal). Heat named “other energy sources”.

Proposed Revised Structure

Coal, Peat and Oil Shale	Coal and Peat products	Primary Oil	Oil Products	Natural Gas	Biofuels and waste	Electricity	Heat	Total

- Simplified into nine columns, to fit on one page (portrait layout) and thus a bigger transformation and consumption breakdown can be shown
- All secondary oil products now together
- Derived gases now included with secondary coal products
- Charcoal no longer has its own column

Electricity and Heat methodology

- According to SIEC, there's no product called "hydro", only hydro electricity where the primary energy is electricity.
- Shouldn't we show this as production of electricity, rather than as a separate column? No transformation activity (as defined by IRES) is taking place

- Nuclear, geothermal; the primary energy form is heat. This should therefore be included under the heat product/column; anything transformed into electricity would then appear in the transformation block

IEA Example for Comparison

	Coal and peat	Crude oil	Oil products	Natural gas	Nuclear	Hydro	Geothermal, solar, etc.	Biofuels and waste	Electricity	Heat	Total*
Production	180042	514864	0	552728	45439	14263	449	7091	0	0	1314875
Imports	16334	468	4200	6551	0	0	0	0	134	0	27688
Exports	-80572	-248813	-102770	-165269	0	0	0	0	-2074	0	-599497
International marine bunkers**	0	0	-2990	0	0	0	0	0	0	0	-2990
International aviation bunkers**	0	0	-6426	0	0	0	0	0	0	0	-6426
Stock changes	131	511	-522	-2797	0	0	0	-3	0	0	-2680
TPES	**115935**	**267031**	**-108508**	**391213**	**45439**	**14263**	**449**	**7088**	**-1940**	**0**	**730970**

- Hydro and nuclear are explicitly identified
- Geothermal, solar and wind etc. shown together.
- All these are then shown as inputs into power generation.
- Major drawback: requires back calculation (and thus assumption-dependent)

Primary electricity

			Coal, Peat and Oil Shale	Coal and Peat products	Primary Oil	Oil Products	Natural Gas (gross basis)	Biofuels	Total Electricity (EL)	Heat (ST)	Total
01	Production	(+)	-	-	-	-	-	4276	532.8	42	4851
03	Imports	(+)	2608	203	-	125211	48021	1914	25546	-	203503
04	Exports	(+)	-	-	-	-298	-	-290	-9410	-	-9998
051 +052	Internation	(+)	-	-	-	-17064	-	-	-	-	-17064
06	Stock chai	(-)	-	-	-	-472	-	-	-	-	-472
GA	Total energy supply		2608	203	-	108321	48021	5900	16668	42	16710
07	Transfers and recycled products		-	-	-	-	-	-	-	-	-
SD	Statistical differences		0	0	-	44	0	28	29	0	100
08	Transformation		-	-	-	-42	-19845	-1642	8989	1090	-11450
08811 +08	Electricity plants		-	-	-	-	-14420	-1201	7376	-	-8245

- Primary electricity (hydro, wind…) is represented as electricity production. Therefore no back calculation of “hydro production” (with associated assumptions) necessary.
- Hydro would generally be the bulk of this cell (and anything else here is renewable anyway), so explicitly identifying hydro not too big a deal
- A casual user of the data might mistake the electricity production cell for total electricity generation (for some countries these values would be similar, for others very different). An explanatory footnote might help

What about primary heat?

- The bigger issue comes from power generation sources where heat is the primary form i.e. nuclear, geothermal
- In this case, the cells for heat in the transformation rows could be a residual of a negative geothermal heat input to CHP plants and a positive heat output from combustible fuels' CHP plants: problem?

Residual of two separate processes

		Coal, Peat and Oil Shale	Coal and Peat products	Primary Oil	Oil Products	Natural Gas (gross basis)	Biofuels	Total Electricity (EL)	Heat	ST)	Total
Production	(+)	-	-	-	-	-	4276	532.8		42	4851
Imports	(+)	2608	203	-	125211	48021	1914	25546		-	203503
Exports	(+)	-	-	-	-298	-	-290	-9410		-	-9998
Internation	(+)	-	-	-	-17064	-	-	-		-	-17064
Stock chai	(-)	-	-	-	-472	-	-	-		-	-472
Total energy supply		2608	203	-	108321	48021	5900	16668		42	167710
Transfers and recycled products		-	-	-	-	-	-	-		-	-
Statistical differences		0	0	-	44	0	28	29		0	100
Transformation		-	-	-	-42	-19845	-1642	898		090	-1450
Electricity plants		-	-	-	-	-14420	-1201	73	-		-8245
CHP plants		-	-	-	-42	-5455	-313	1613	970		-3228

Primary Heat Continued

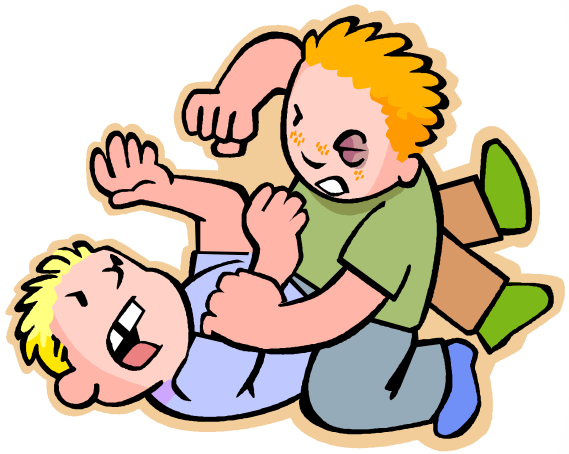
- Possible solution: keep the current UNSD structure but add rows for “of which: nuclear, geothermal, solar thermal”

		Natural Gas	Total Electricity	Heat
Production	(+)	-	532.8	500
of which: Hydro electricity			*209*	
Total energy supply		48021	16668	42
Statistical differences		0	29	0
Transformation		-19845	8989	1090
Electricity plants		-14420	7376	-300
of which: nuclear, geothermal			*100*	*-300*
CHP plants		-5455	1613	970
of which: nuclear, geothermal			*50*	*-100*

The negative part of the residual can at least be identified

Debate

- Does the Oslo Group think it is important to identify hydro and nuclear specifically as separate columns?
- Does the desire to show these as separate columns matter more than strictly following IRES?



Comments welcome!