Implementation of recommendations on energy indicators

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UNECE

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1. Current situation

2. Decisions taken at the 12th session

3. Recommendations

   a) General recommendations

   b) Specific recommendations by each template

1. Current situation

Energy in the Online Guidelines for the Application of Environmental Indicators

G. Energy

G1. Final energy consumption	PDF	XLS	PDF
G2. Total primary energy supply	PDF	XLS	PDF
G3. Energy intensity	PDF	XLS	PDF
G4. Renewable energy consumption	PDF	XLS	PDF
G5. Final electricity consumption		Placeholder	
G6. Gross electricity production		Placeholder	

Examples for indicator frameworks using these statistics and indicators

G1 – final energy consumption:

- SDG indicator 7.2.1: Renewable energy share in the total final energy consumption
- CES climate change-related indicator 8: Energy consumption by households / capita

G2 – total primary energy supply

- SDG indicator 7.3.1: Energy intensity measured in terms of primary energy and GDP
- OECD Green Growth Indicator on energy intensity: TPES per capita
- OECD Green Growth Indicator on total primary energy supply: Index with base year 2000
- OECD Green Growth indicator on renewable energy supply: percentage of TPES
- OECD Green Growth indicator on energy productivity: GDP per unit of TPES
- CES climate change-related indicator 2: Share of fossil fuels in total primary energy supply (TPES)

G3 Energy intensity

- SDG indicator 7.3.1: Energy intensity measured in terms of primary energy and GDP

G4 – renewable energy supply

- OECD Green Growth Indicator on renewable energy supply (% renewables per TPES)

Recalling the 4 main templates of the UNECE recommendations

Units: ktoe, % of total

G1 – Final energy consumption

Total final energy consumption	
Of which	
Industry	
Industry (Row 2 / row 1)	
Transport	
Transport (Row 4 / row 1)	
Households	
Households (Row 6 / row 1)	
Commercial and public services	
Commercial and public services (Row 8 / row 1)	
Agriculture, forestry and fishery	
Agriculture, forestry and fishery (Row 10 / row 1)	
Non-specified	
Non-specified (Row 12 / row 1)	
Non-energy use	
Non-energy use (Row 14 / row 1)	

G3 – Energy intensity (ktoe/USD)

GDP at PPP at constant prices (2011)
Final en. consumption
Final energy consumption (= Table G-1, row 1)
Energy intensity (Row 3 / row 1)
TPES
Total primary energy supply (= Table G-2, row 6)
Energy intensity (Row 6 /row 1)

G2 – Total primary energy supply

Production of energy
Imports of energy
Exports of energy
International marine and aviation bunkers
Stock changes
Total primary energy supply (Row 1 + row 2 - row 3 - row 4 + row 5)
Of which
Coal
Coal (Row 7 / row 6)
Crude oil
Crude oil (Row 9 / row 6)
Oil products
Oil products (Row 11 / row 6)
Natural gas
Natural gas (Row 13 / row 6)
Nuclear energy
Nuclear energy (row 15 / row 6)
Hydropower
Hydropower (Row 17 / row 6)
Geothermal and solar energy, etc.
Geothermal and solar energy, etc. (Row 19 / row 6)
Biofuels and waste
Biofuels and waste (Row 21 / row 6)
Electricity
Electricity (row 23 / row 6)
Heat
Heat (Row 25 / row 6)

G4 – Renewable energy supply

Total primary energy supply (= Table G-2, row 6)
Of which
Hydropower
Hydropower (Row 2 / row 1)
Biomass
Biomass (Row 4 / row 1)
Biofuels
Biofuels (Row 6 / row 1)
Wind power
Wind power (Row 8 / row 1)
Solar power
Solar power (Row 10 / row 1)
Geothermal energy
Geothermal energy (Row 12 / row 1)
Other renewables (specify in footnote)
Other renewables (Row 14 / row 1)
Tot. renew. energy
Total renewable energy supply (Rows 2 + 4 + 6 + 8 + 10 + 12 + 14)
Total renewable energy supply (Row 16 / row 1)

Main issues with the 4 energy tables

1. Following closely IEA Energy Balances

2. Many data items are compiled from others (e.g. % of total)

3. Several data items are redundant (in more than 1 table), tables G1 and G2 contain almost all the basic statistics. Tables G3 and G4 are more detailed and calculate indicators.

4. Basic statistics needed to compile the indicators are:
   a) Final energy consumption by economic activity and households
   b) Non-energy use
   c) Supply of energy by energy product
   d) Imports and exports
   e) International marine and aviation bunkers
   f) GDP

5. Energy products in indicator table G2 (TPES) deviate partly from those used in IEA Energy Balances. This may lead to confusion. Examples:
   1. Some energy products are not included, e.g. peat, oil shale and oil sands
   2. Some aggregations are different, e.g. IEA Energy Balances keep "geothermal" separate from "solar, wind, others"

2. Decisions taken at the 12th Session of the JTF

Decision taken at the 12th JTF Session

9.   It was agreed that the secretariat will prepare a proposal for revised production templates for the energy indicators of the UNECE online recommendations. The revision should result in simplified tables, with less redundancy. The list of energy products should be fully consistent with the Standard International Energy Product Classification, better aligned with the IEA Energy Balances, and more detailed regarding renewable energy.

3. Recommendations

3.a General recommendations (1/5)

Status:

Currently production tables combine rows for statistical data items (energy statistics) with automatically calculated values (% of a total value, or calculation of an indicator from these data items).

Problems:

- Not easy to carry out simple data validations (e.g. building sums over a group of data cells)
- Difficult to navigate through template (for both producers and users of the data)

Recommendation:

Clearly separate data cells for statistics (i.e. absolute values) from others

Status:

Formulas in the production templates calculate results even if not all necessary data are provided.

Problems:

- This may lead to wrong indicators

Recommendation:

- Absolute values (e.g. TPES): no automatic calculation
- Relative values: revise the formulas (no result when a data cell remains empty), and clearly distinguish between "0" values and "not available"

3.a General recommendations (3/5)

Status:

Redundancy in the production templates

Problems:

- Coherence of data in the different tables may get lost

Recommendation:

Avoid duplications, merge tables (i.e. G2 and G4)

3.a General recommendations (4/5)

Status:

Energy products and groupings not fully consistent with the Standard International Energy Product Classification (SIEC)

Problems:

- Incoherence with other data sets
- Not all energy products included

Recommendation:

Revise the used classification to be consistent with SIEC

Status:

The indicators "energy intensity" and total renewable energy supply per TPES are currently being discussed in the SDG context.

Problems:

- The formulas used in the data production templates may be outdated in the near future

Recommendation:

Review again at a later stage

3.b Specific recommendations
G-1 Final Energy Consumption

Problems:
- Currently used definition for final energy consumption is not compatible with other international definitions, because it includes non-energy use of energy products (correct term according to IEA and IRES would be "final consumption"

Recommendation:
- Revise definition and calculation of "final energy consumption"
- Rename the template to " Final consumption for energy and non-energy uses"

3.b Specific recommendations G-1 Final Energy Consumption – proposed structure of template

Part 1: Main data items

Row	Data Item	Unit
1	Total final consumption (=row 2+ row 3)	ktoe
2	Non-energy uses	ktoe
3	Total final energy consumption	ktoe
	of which	
4	Industry	ktoe
5	Transport	ktoe
6	Households	ktoe
7	Commercial and public services	ktoe
8	Agriculture, forestry and fishery	ktoe
9	Non-specified	ktoe

Part 2: Share of total final energy consumption by activity (calculated automatically)

Row	Data Item	Unit
10	Industry (row 4 / row 3)	%
11	Transport (row 5 / row 3)	%
12	Households (row 6 / row 3)	%
13	Commercial and public services (row 7 / row 3)	%
14	Agriculture, forestry and fishery (row 8 / row 3)	%
15	Non-specified (row 9 / row 3)	%

3.b Specific recommendations
G-2 Total primary energy supply

Problems:

- Redundancies with template G-4
- List of energy products not fully compatible with SIEC
- For imported electricity (and heat) it cannot be distinguished between electricity produced from renewables and electricity from non-renewables

Recommendation:

- Integrate template G-4
- Revise list of energy products
- Single out electricity

3.b Specific recommendations G-2 Total primary energy supply – proposed structure of template

Part 1: Main data items

Row	Data Item	Unit
1	Production of energy	ktoe
2	Imports of energy	ktoe
3	Exports of energy	ktoe
4	International marine and aviation bunkers	ktoe
5	Stock changes	ktoe
6	Total primary energy supply (TPES) (Row 1 + row 2 - row 3 - row 4 + row 5)	ktoe
	of which	
7	Electricity	

Part 2: Non-renewables

Row	Data Item	Unit
8	Non-renewables (=sum of rows 9– 16)	ktoe
9	Coal	ktoe
10	Peat	ktoe
11	Oil shale and oil Sands	ktoe
12	Natural gas	ktoe
13	Oil	ktoe
14	Waste - non-renewable	ktoe
15	Nuclear fuels	ktoe
16	Other non-renewable fuels	ktoe

Part 3: Renewables

Row	Data Item	Unit
17	Renewables (=sum of rows 18 – 28)	ktoe
18	Solid biofuels	ktoe
19	Biogases	ktoe
20	Liquid biofuels	ktoe
21	Hydropower	ktoe
22	Geothermal	ktoe
23	Solar photovoltaic	ktoe
24	Solar thermal	ktoe
25	Tide/wave/ocean	ktoe
26	Wind	ktoe
27	Waste – renewable	ktoe
28	Other renewable fuels	ktoe
29	Total renewable energy supply as percentage of TPES (= row 17 / row 6)	%

3.b Specific recommendations
G-3 Energy intensity

Problems:

- Energy intensity indicators are currently being further developed by international expert groups

Recommendation:

- Review again at a later stage

3. Questions, comments?

- Does the JTF agree with the recommended changes?

- Should the current "placeholder templates" G-5 (Final electricity consumption) and G-6 (gross electricity production) be developed?

- Any other comments?