Energy Statistics - The Fundamentals

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Energy Statistics

- The need for comprehensive energy statistics
- Establishing an energy information system
- What statistics to collect
- Basic concepts in Energy Statistics

A country's need for comprehensive energy statistics

- Energy underpins all economic activity (output and transport)
- Need to ensure adequate security and understand risk to supply – be able to understand all flows and ability to model the future
- Provides clear understanding for investors and business
- Understanding energy use allows for efficiency, greater output at lower cost
- Required to address climate change and identify cost effective steps
- Design, monitor and evaluate policies

Establish an energy information system

A country's need for comprehensive energy statistics – a few examples

- Households: mileage of cars, electricity consumption of houses, heating bills, etc.
- Company managers
  - Energy bills, consumption/tonne, use - where to save
  - Even truer for energy companies
    - Refinery: throughputs, stocks
    - Electricity generation: fuel input, electricity production
- Analysts of the energy market: oil, gas, etc.
- Traders, banks, universities, etc.
- Policy makers

Establishing an energy information system – a few basic principles

- Collect only statistics which are needed!
- Explore options for use of Administrative data
- Establish a legal basis
- Establish a proper reporting mechanism:
  - Questionnaires (as user friendly as possible)
  - A network of contacts
  - An agreed timetable
- Establish a regular dissemination mechanism
- Allocate proper resources to collect and process the data
- Review methodology and process to anticipate and adapt to changes in the energy situation

What statistics to collect

Efficiency

Households

Energy Unit

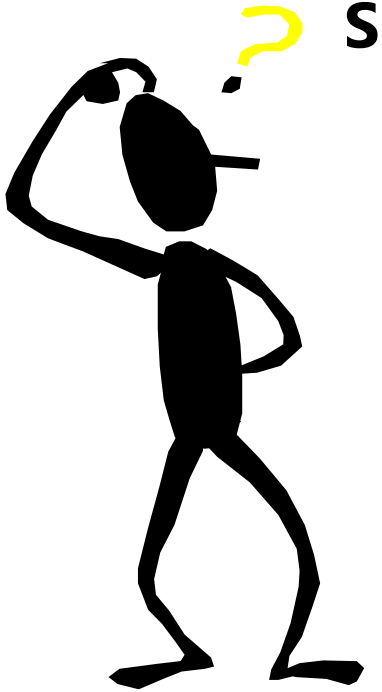
Cooking

Oil

Electricity

Socio-Economic

Transport



Services

Coal

Physical Unit

Agriculture

Heating

Natural Gas

Industry

Biomass

Mining

Money

Lighting

The energy balance

Supply

Demand

Transformation

Final consumption

201· ▼ | Indicators | Balances | Coal and Peat | Electricity and Heat | Natural Gas | Oil | Renewables and Waste

	Coal and peat	Crude oil	Oil products	Natural gas	Nuclear	Hydro	Geothermal, solar, etc.	Biofuels and waste	Electricity	Heat	Total*
Production	33658	173317	0	132349	24390	32309	901	12106	0	0	409029
Imports	5954	34510	12790	25960	0	0	0	759	1287	0	81260
Exports	-20076	-118761	-19053	-76831	0	0	0	-570	-4430	0	-239722
International marine bunkers**	0	0	-524	0	0	0	0	0	0	0	-524
International aviation bunkers**	0	0	-1214	0	0	0	0	0	0	0	-1214
Stock changes	66	1064	-206	2092	0	0	0	0	0	0	3016
TPES	19603	90130	-8207	83569	24390	32309	901	12295	-3144	0	251845
Transfers	0	-3781	7993	0	0	0	0	0	0	0	4213
Statistical differences	2329	4585	4579	2410	0	0	0	-1	0	-32	13872
Electricity plants	-17629	0	-1820	-10824	-24390	-32309	-901	-2426	53814	0	-36484
CHP plants	0	0	-41	-2468							947
Heat plants	0	0	0	0							28
Gas works	0	0	0	0							0
Oil refineries	0	-91737	95461	-849							875
Coal transformation	-1182	0	0	0	0	0	0	0	0	0	-1182
Liquefication plants	0	802	0	-1940	0	0	0	0	0	0	-1138
Other transformation	0	0	0	0	0	0	0	0	0	0	0
Energy industry own use	-4	0	-7956	-13986	0	0	0	-1	-4019	0	-25966
Losses	0	0	0	0	0	0	0	0	-2984	0	-2984
Total final consumption	3117	0	90009	55912	0	0	0	9766	44625	546	203975
Industry	2450	0	6067	23876	0	0	0	5840	17698	545	56476
Transport	0	0	54404	2436	0	0	0	1637	331	0	58808
Other	33	0	8935	26208	0	0	0	2289	26596	0	64062
Residential	33	0	2647	14661							782
Commercial and public services	0	0	3008	10823							464
Agriculture / forestry	0	0	3280	724							316
Fishing	0	0	0	0	0	0	0	0	0	0	0
Non-specified	0	0	0	0	0	0	0	0	0	0	0
Non-energy use	634	0	20603	3392	0	0	0	0	0	0	24629
-of which petrochemical feedstocks	*0*	*0*	*12022*	*3392*	*0*	*0*	*0*	*0*	*0*	*0*	*15415*

Basic concepts in Energy Statistics

- Framework - IRES
- Calorific values/Units/using weighted averages
- Supply & demand breakdown
- Transformation & energy sector own use
- Main activity producers & autoproducers
- Non-energy use

Basic concepts in Energy Statistics : Calorific Values

- When a fuel is combusted, water vapor is produced, but its energy rarely can be used for energy purposes

- Difference between Gross Calorific Value and Net Calorific Value approximately:
  NCV = **90%** of GCV for **natural gas**
  NCV = **95%** of GCV for **oil**
  NCV = **95%** of GCV for **coal**

The heat (energy) obtained from one unit of fuel when burned

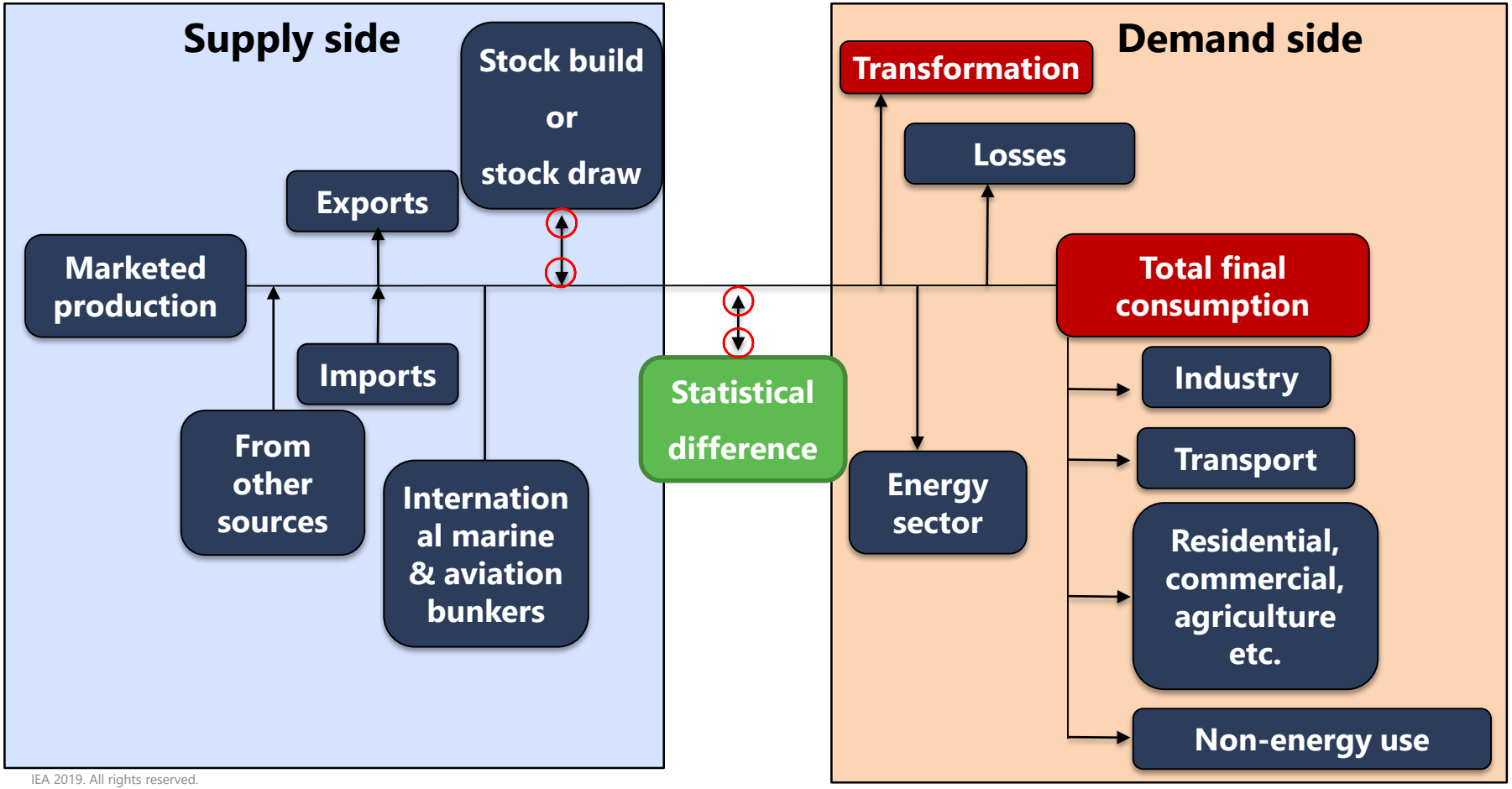
Basic concepts in Energy Statistics

- Calorific value
  - Indicates quality of the fuel
  - Should be within expected ranges

- Energy statistics involve various units
  - Mass: kg, ton, kt, lb
  - Volume: L, bbl, gal, m^3
  - **Energy: TJ, ktoe, ktce, GWh, kcal, BTU**

- Weighted average
  - Use the weighted average to calculate the aggregated values for the country

Basic concepts in Energy Statistics - Supply & demand breakdown



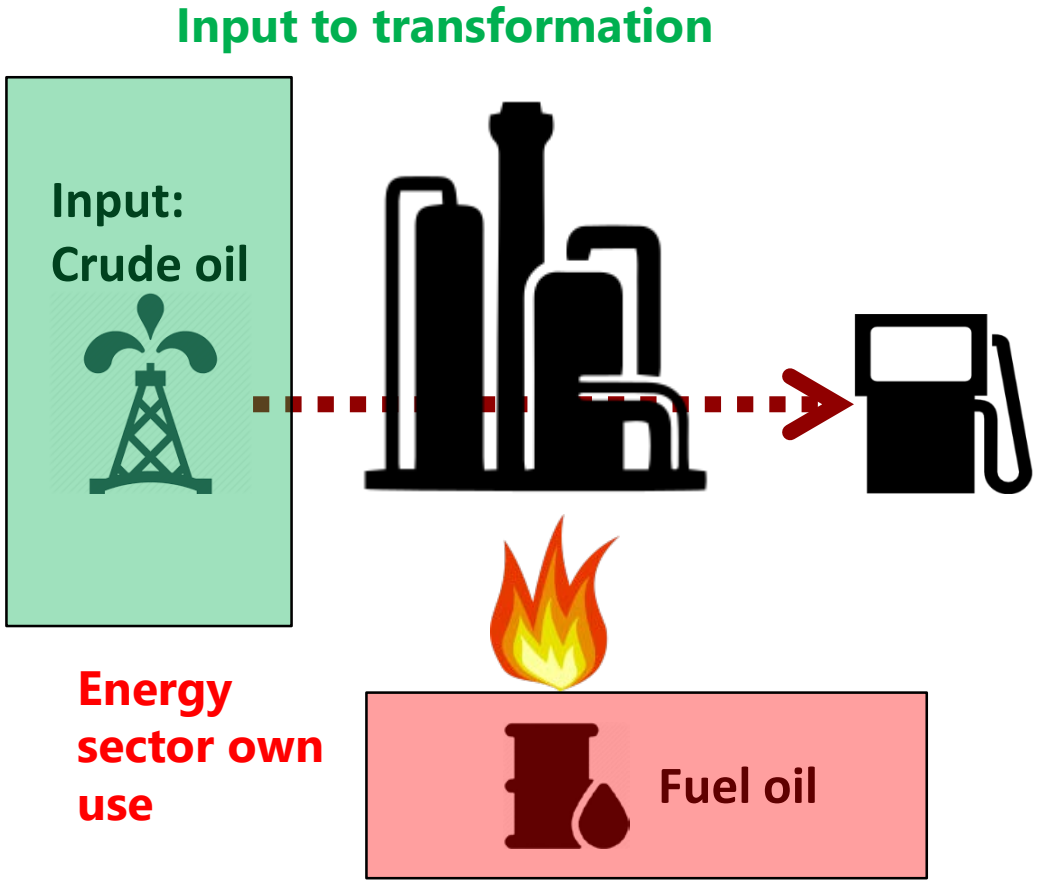
Basic concepts in Energy Statistics - Transformation & energy sector own use

- Oil refineries:
  - Crude oil gets transformed into secondary oil products that we can use

> Inputs from one form of energy to another

- Fuel is needed to keep the refinery running!
  - Fuel oil, refinery gas, etc.

> Fuel used to support energy industry activities



Basic concepts in Energy Statistics - Main activity producers & autoproducers

- Main activity producer plants
  - Facility generating electricity and/or heat for sale to third parties as their primary activity
  - Regardless of whether they are state or privately owned
  - In practice, any plant called a "power plant" or "heat plant"!

- Autoproducers
  - Facility generating electricity and/or heat wholly or partially for their own use as support to their primary activity
  - Regardless of whether they are state or privately owned
  - E.g.: Steel mill, paper mill, waste recycling facilities, etc…

Basic concepts in Energy Statistics - Non-energy use of energy products

- Fuels used as raw materials and not consumed as a fuel or transformed into another fuel (e.g. asphalt, plastics, fertilizers)

- For biomass commodities:
  - only the amounts specifically used for energy purposes are included in the energy statistics
  - Non-energy use of biomass is not taken into consideration and the quantities are null by definition

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