

System of Environmental Economic Accounting



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Energy Balances to Accounts

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Outline

- Energy statistics, balances, accounts
 - > Links, similarities and differences
 - > Terminology
 - > Complementing energy balances and value added of the accounts
- Going from energy balances to energy accounts



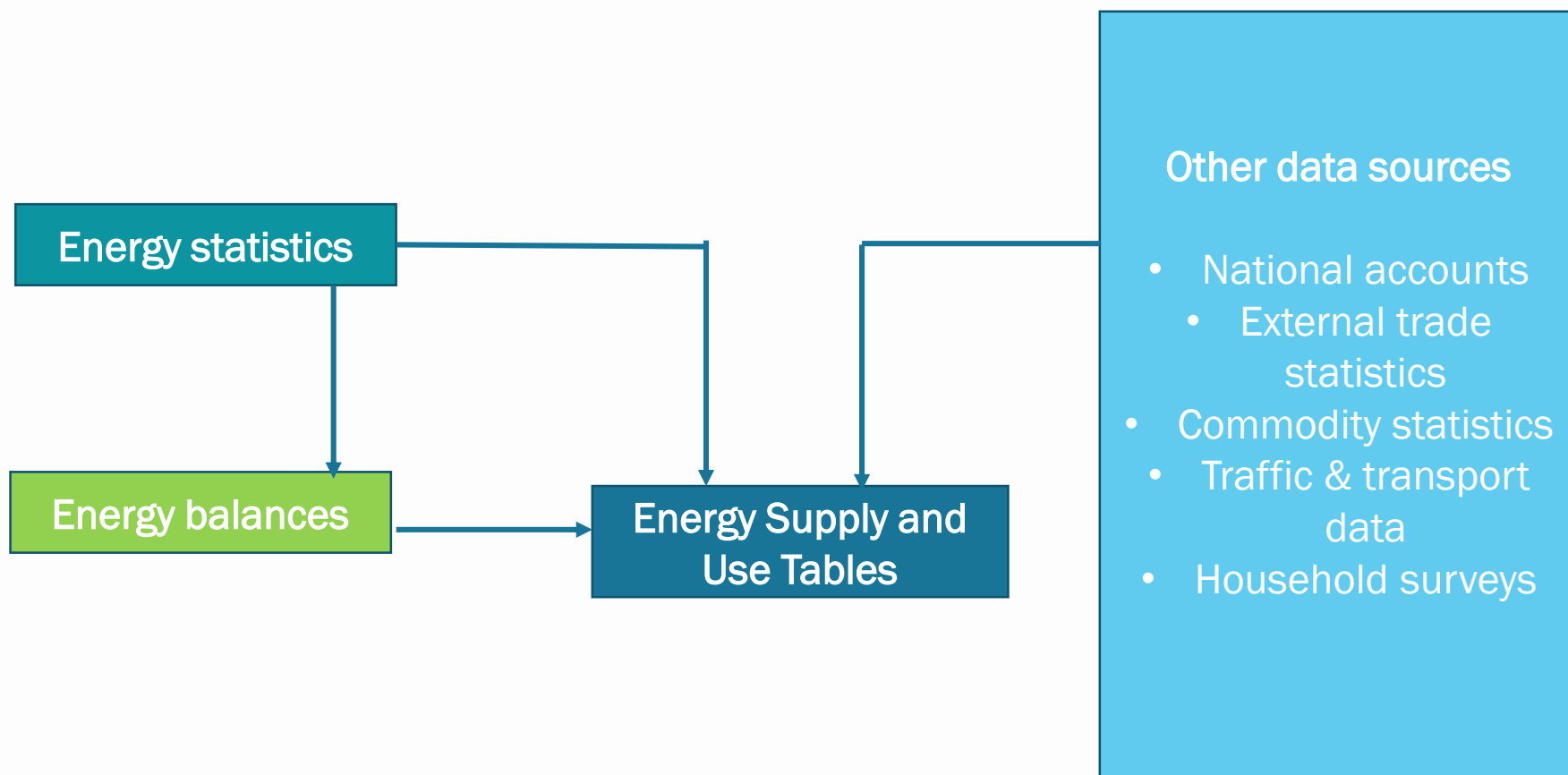
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ENERGY STATISTICS, BALANCES AND ACCOUNTS



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Energy statistics, balances and accounts



Links between energy statistics and accounts

- *International Recommendations for Energy Statistics*
- Standard International Energy Product Classification (SIEC)
- List of renewable products
- Note: Monetary accounts use CPC, not SIEC
 - > No 1:1 correspondence
 - > Crosswalk between SIEC and CPC in IRES is especially helpful for ensuring concordance between physical and monetary accounts

Quiz #1

When are corncobs considered energy products in SEEA-Energy?

- a) When they are combusted directly to produce heat
- b) When they are used in the production of ethanol as a biofuel
- c) Both a) and b)
- d) None of the above

Quiz #1

Answer:

- a) When they are combusted directly to produce heat
- > IRES and SEEA-Energy utilize the same definitions of energy products.
 - > Corncobs are considered energy products for the purpose of energy statistics and SEEA-Energy accounts only when they are combusted directly to produce heat.
 - > If used for ethanol, corncobs are recorded first as natural inputs under “Other energy inputs: energy inputs to cultivated biomass”

Links between energy balances and accounts

- Balances use a similar organizing principle as the physical flow accounts to structure information
- Basic energy statistics and energy balances are the starting point for energy accounts
- Many of the flows described in basic energy statistics and the energy balances are the same as in the energy accounts
- But... critical differences exist!
 - > Main differences relate to activities in scope and how those activities are classified

Differences between energy balances and accounts

Energy balances	Energy accounts
Physical	Physical and monetary
Various formats (IEA, Eurostat, UN)	Uses national accounts supply and use table format
Re-arrangement of industries' energy use according to purpose (transport, auto-producers, heat for sale)	No re-arrangement of industries' energy use
Focus on energy sector, including description of technologies	Energy "sector" described by ISIC, no special focus on technologies
All transport in one separate sector	Own account transport included in industries' activities
Territory principle	Residence principle
Statistical differences	No statistical differences

Quiz #2

How does the scope of supply in the balances differ from the scope of supply in the accounts?

- a) The scope of supply in the balances is wider than that of the accounts
- b) The scope of supply in the balances is narrower than that of the accounts
- c) The scope of supply is the same in the balances and the accounts

Quiz #2

Answer:

- a) The scope of supply in the balances is narrower than that of the accounts
- > The balances and accounts define supply slightly differently due to the use of the territory and residence principle, respectively.
 - > SEEA-Energy definition of supply includes all energy made available for use, including fuel made available through international bunkering
 - > This means that the scope of supply in the balances is narrower than that of the accounts.

Differences in terminology

- Supply
 - > In the energy balance, supply is defined as
 - + *Primary energy production*
 - + *Imports of primary and secondary energy*
 - *Exports of primary and secondary energy*
 - *International (aviation and marine) bunkers - Stock changes*
 - > In the energy accounts the supply is defined as *production (output) + imports*
 - Includes fuel made available through international bunkers


Bridge table for domestic supply and total supply (terajoules)

	Supply (energy balances)	+Losses during generation of secondary production	+International marine bunkers	Exports	Accumulation	Purchased by residents abroad	Supply (SEEA- Energy)
Coal	244.1			1.9	- 21.0		225
Peat and peat products							
Oil shale/oil sands							
Natural gas (extracted)	395						395
Natural gas (distributed)	166.1			201.0	2.0		369.1
Oil (e.g., conventional crude oil)	360			361.0			721
Oil (oil products)	996		44	80.0	- 3.0	160	1277
Biofuels	7						7
Waste	109.1			1.0	0.3		110.4
Electricity	134			100.0			234
Heat	78.5						78.5
Nuclear fuels and other fuels not elsewhere classified							



Note: Exports are removed before the calculation of net supply or availability in the energy balances and therefore need to be added back in.

Differences in terminology

- Use
 - > In the energy accounts use includes *intermediate consumption, households final consumption, exports, international bunkers and inventory (stock) changes* are considered the uses
 - International bunker recorded as intermediate consumption if bunkering undertaken by a ship operated by resident unit
 - Recorded as export if operated by a non-resident unit
 - > *Final consumption* in balances  (or *end use* in the accounts)

VS.

Final consumption in accounts 

Bridge table for final consumption and end use of energy (terajoules)

	Final consumption (energy balances)	+International marine bunkers	Exports	Accumulation	Energy sectors use of energy for supporting activities	Purchased by residents abroad	End use (SEEA- Energy)
Coal	21.1		1.9	- 21.0			2
Peat and peat products							
Oil shale/oil sands							
Natural gas (extracted)							
Natural gas (distributed)	77.1		201.0	2.0	2.0		282.1
Oil (e.g., conventional crude oil)	930		361.0				1291
Oil (oil products)	44	44	80.0	- 3.0	6.0	160	331
Biofuels	7						7
Waste	78.1		1.0	0.3			79.4
Electricity	131		100.0		3.0		234
Heat	76.5				2.0		78.5
Nuclear fuels and other fuels not elsewhere classified							

Complementary approaches

- Energy statistics and balances:
 - > Physical/technical view of energy use in an economy
 - > Focus on transformation sector
- Energy accounts
 - > Physical and monetary terms
 - > Economic perspective

Energy accounts may improve national accounts

- Intermediate consumption of energy products (by ISIC) often not easy to compile for national accounts
 - > E.g. Structural business statistics may only have one item on total cost of energy
- Energy accounts able to provide this information in physical units
 - > Based on understanding of physical energy requirements of economic activities and price information, you can obtain a better picture of intermediate consumption
 - > Ensures that depiction in national accounts is consistent



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GOING FROM ENERGY BALANCES TO ENERGY ACCOUNTS



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Approaches

- Existing data need to be manipulated and re-arranged according to accounting principles of the System of National Accounts
- Two general approaches used:
 - > “Statistics/energy statistics first”
 - > “Energy balances first”
- If energy balances exist - best starting point, since a lot of potential ‘issues’ in the data has already been resolved. However, the energy balances still need to be complemented/adjusted
- Importance of high quality basic energy statistics!

Energy balance first-approach

Direct energy content [TJ]

Total energy consumption

Primary energy production
Recycling
Imports
Exports
Border trade
International marine bunkers
Stock changes
Statistical differences, input from blending

Energy sector

Extraction and gasification
Petroleum products
Used in refineries
Used in distribution

Transformation

Large-scale units
Wind turbines and hydropower plants
Small-scale units
District heating units
Autoproducers
Gas works
Own use

Distribution losses etc.

Final energy consumption

Non-energy use
Transport
Agriculture and industry
Commercial and public services
Households

A	Agriculture forestry fishing
B	Mining and quarrying
C	Manufacturing
D	Electricity and gas
E	Water supply, sewerage and waste management
F	Construction
G	Wholesale and retail trade
H	Transportation
I	Accommodation & food service
J	Information and communication
K	Financial and insurance
L	Real estate activities
M,N	Business activities
O	Public administration, defense, compulsory social security
P	Education
Q	Human health and social work
RSTU	Other service activities
	Total activities by households

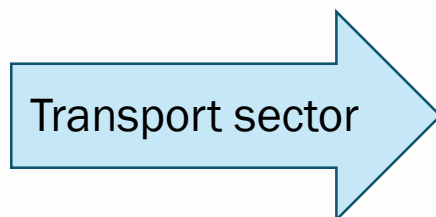
- Balances have a greater focus on products
- Accounts have greater focus on industries
- Level of adjustment often depends on level of disaggregation desired in accounts

Three broad steps to get to the accounts

- Many flows in the balances can be shown directly in the energy accounts
- Compile supply of primary energy products and corresponding natural inputs
 - > Supply of primary energy products from statistics/balances
 - > Using assumptions, approximate natural energy inputs (and losses during extraction)
- Transformation from primary into secondary energy products
 - > Record transformation losses as residuals
- Compile end use of energy products
 - > Record related residuals, usually the identical energy amounts that have been end used

Adjustments

- Some main adjustments include:
 - > Transport
 - Balances: All use of energy allocated to 'transport sector'
 - Accounts: Transport carried out by transport service industries and by all other industries and households (own account transport)
 - > Special case of road transport!
 - Can make assumptions about marine and air transport
 - But for road transport, use of fuels theoretically concerns all economic activities



ISIC Q



ISIC F



ISIC A

Adjustments

- Some main adjustments include:
 - > Residence principle versus territory principles
 - > Data to be adjusted—mainly concerns transport
 - Fuel purchased by non-resident units to be deducted
 - Resident units' transport fuel purchased abroad to be added
 - Location independent!

Supply table

- > Fuel purchased abroad by resident unit, **including international marine bunkers!**
- > Added to imports

Use table

- > Fuel purchased on territory by non-resident unit
- > Added to exports

Fuel- tourists

- > In theory, this also includes fuel purchased by tourists outside of their territory

Adjustments

- Other adjustments needed for:
 - > Autoproducers of energy
 - > Statistical differences
 - > Flaring and venting
 - > among others!

THANK YOU

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