

How energy statistics are used in measuring economic performance

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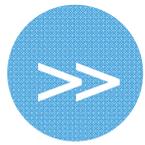
Statistics Denmark





Outline

- The use of energy statistics
 - Economic performance: Quarterly national accounts
 - Economic performance: Annual national accounts
- From energy statistics to the supply and use tables of the national accounts
 - Danish tradition is to compile energy accounts
- Applications
 - Energy related activities' share of the total economy
 - Analysis of the relationship between economy and the use of energy



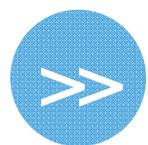
Short term economic performance – quarterly national accounts

- Quarterly growth rates derived from the energy statistics are used as indicators for the development of the economic activities
 - Industries' output
 - Extraction of oil and gas
 - Oil refinery
 - Manufacturing and distribution of gas
 - Steam and hot water supply (district heat)
 - Final private household consumption
 - Consumption of electricity, gasoline, gasoil



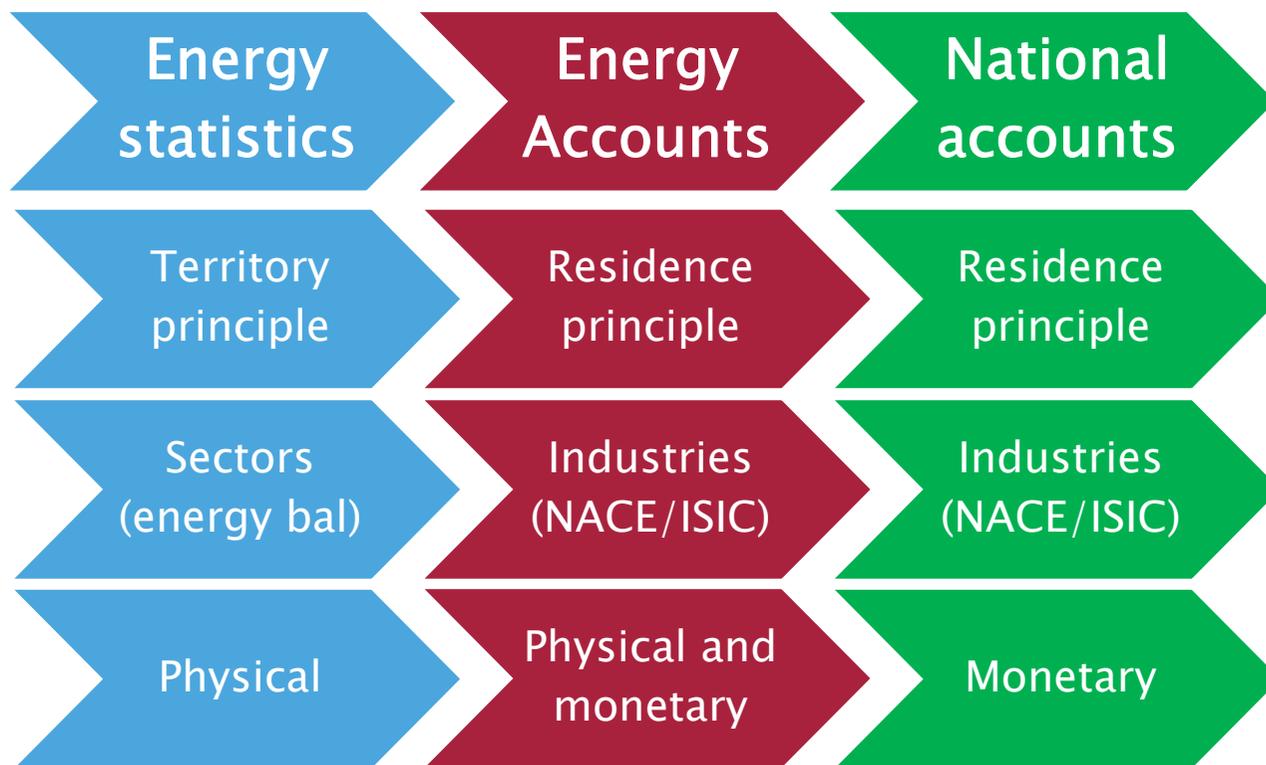
From energy statistics to national accounts

- First step is the compilation of energy accounts
- What are energy accounts?
 - Based on the principles laid down in SEEA-CF and SEEA-E
 - System of Integrated Environmental Economic Accounting – Central Framework (European Commission, FAO, IMF, OECD, UN, World Bank)
 - System of Integrated Environmental Economic Accounting for Energy
 - Energy statistics based on national accounts classifications and definitions
 - This way of describing the flow of energy is fully consistent with the way economic activities are described
- Some adjustments of primary energy statistics / energy balances are needed



Differences and similarities

- Adjustments needed for the use of energy statistics in the annual national accounts





Purpose of energy accounts

- To give a coherent and thorough description of all economic transactions related to the flow of energy
 - In both physical quantities and in monetary values
 - Consistent with other economic statistics
 - E.g. revenues from energy taxes as accounted for in the Government finance statistics
- Provide the basis for the analysis of the link between the economy as described in the national accounts and the flows of energy



Danish energy accounts - 1

- Set of commodity balances each showing the supply and use of energy
 - Supply: Danish production + imports
 - =Uses: Input in 117 industries + private consumption + changes in inventories + exports + waste and cable losses
- Physical and monetary accounts

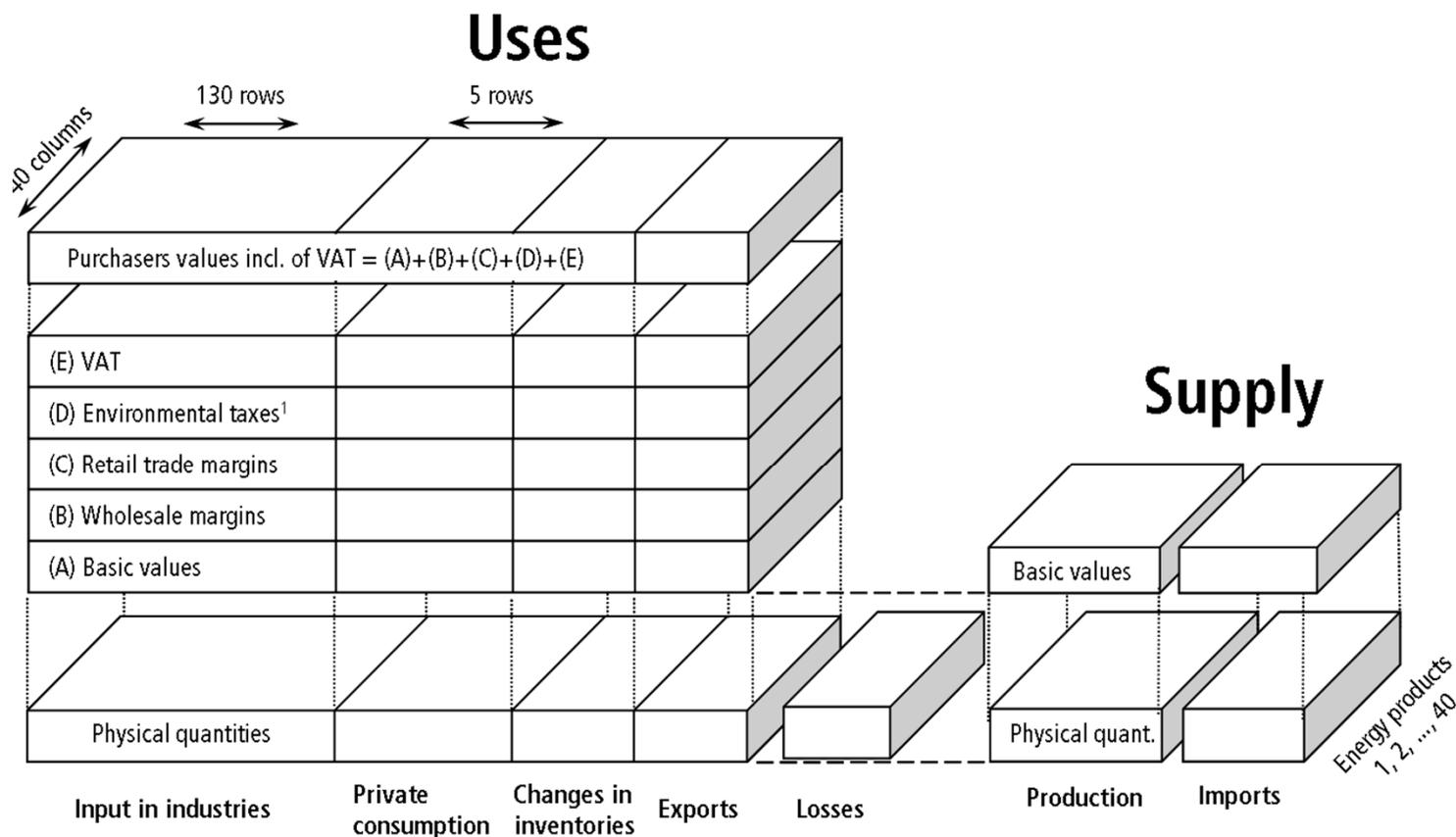


Danish energy accounts - 2

- Monetary energy accounts is part of the supply and use tables of the national accounts
 - Approx. 40 energy commodities out of a total of 2,350 products and services
- Consistent time series 1966 – 2011
- Improves the quality of the national accounts
- Improves the quality of the energy statistics



Physical as well as monetary



¹The environmental taxes on energy are made up of CO₂, SO₂ and energy taxes



Data sources and methods - 1

- The compilation of the energy accounts is based on a number of data sources
- Supply:
 - Production statistics Physical and monetary
 - Production
 - External trade statistics Physical and monetary
 - Imports and exports
 - Balance of payments Monetary
 - Imports (e.g. fuel used abroad by Danish operated ships)



Data sources and methods - 2

- Uses:
 - Energy Statistics Physical
 - Energy balance from the Danish Energy Agency
 - Census on the use of energy Physical and monetary in the manufacturing industries
 - Administrative data on the reimbursement of taxes Monetary
 - Data on employment Number of people
 - Road transport Number of vehicles



Data sources and methods - 3

- The data sources are combined in numerous ways
 - In general, unit prices from where there is information in both physical and monetary units are used to estimate monetary or physical values, where only either physical or monetary information is available
- Physical units and basic prices simultaneously
- Energy statistics, censuses, administrative data and data on employment are used for the break down by industries
- Trade margins (generally a fixed historic percentage)
- Energy taxes (quantity times specific tax rate, balanced to the actual revenue)
- VAT (legislation is taken into account)
- It all adds up to the purchasers values (market prices)



Energy related activities' share of the total economy

- Based on the supply and use tables
 - Extraction/production of energy products' share of total output
 - Imports of energy products' share of total imports
 - Exports of energy products' share of total exports
 - Energy's share of total input
 - Energy taxes' share of total taxes
 - Energy taxes' share of total input
- Employment in energy industries
- Development in energy prices



Combining information from energy accounts with national accounts

2011	Actual use of energy	Energy taxes	Output	Gross value added	Employment
	Per cent				
Total industries	100%	100%	100%	100%	100%
A Agriculture, forestry and fishing	3%	5%	3%	1%	3%
B Mining and quarrying	2%	0%	2%	4%	0%
C Manufacturing	8%	12%	18%	11%	11%
D_E Utility services	27%	3%	3%	2%	1%
F Construction	2%	8%	6%	5%	6%
G_I Trade and transport etc.	52%	32%	23%	19%	25%
J Information and communication	1%	2%	5%	4%	4%
K Financial and insurance	0%	2%	5%	7%	3%
LA Real estate activities and renting of non-residential buildings	0%	1%	2%	3%	1%
LB Dwellings	0%	0%	5%	8%	0%
M_N Other business services	1%	6%	8%	8%	10%
O_Q Public administration, education and health	3%	24%	17%	24%	31%
R_S Arts, entertainment and other services	1%	4%	3%	3%	5%



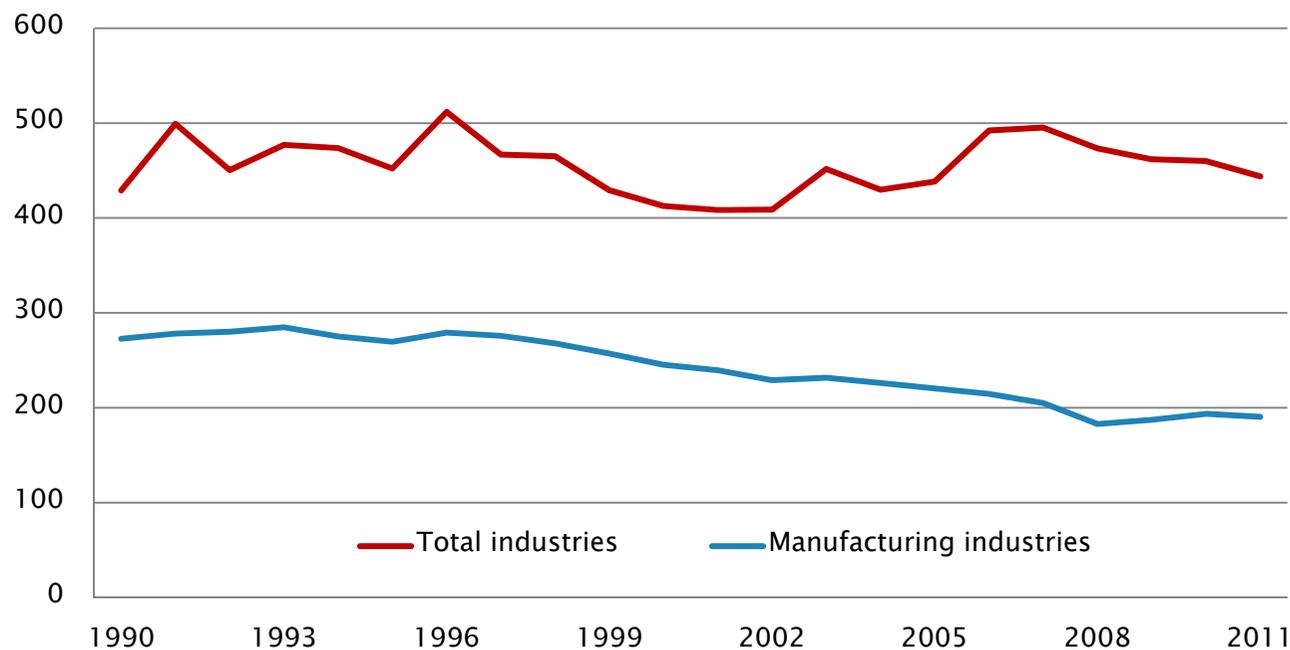
Analysis of the relationship between economic activities and the use of energy

- Energy intensities or energy productivity (economic efficiency)
 - Use of energy compared to output or economic growth
 - Decoupling of use of energy from the economic output
- Input-output model based analysis (multipliers)
 - What is the effect on the use of energy of increased economic activity?
- Decomposition analysis
 - Which factors have contributed to the development?
- Alternative productivity measures like KLEMS
 - Capital (K), labour (L), energy (E), materials (M), services (S)



Energy intensities

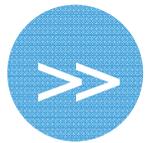
- Use of energy compared to output (GJ / Mill. Dkk, 2005-prices, chained values)





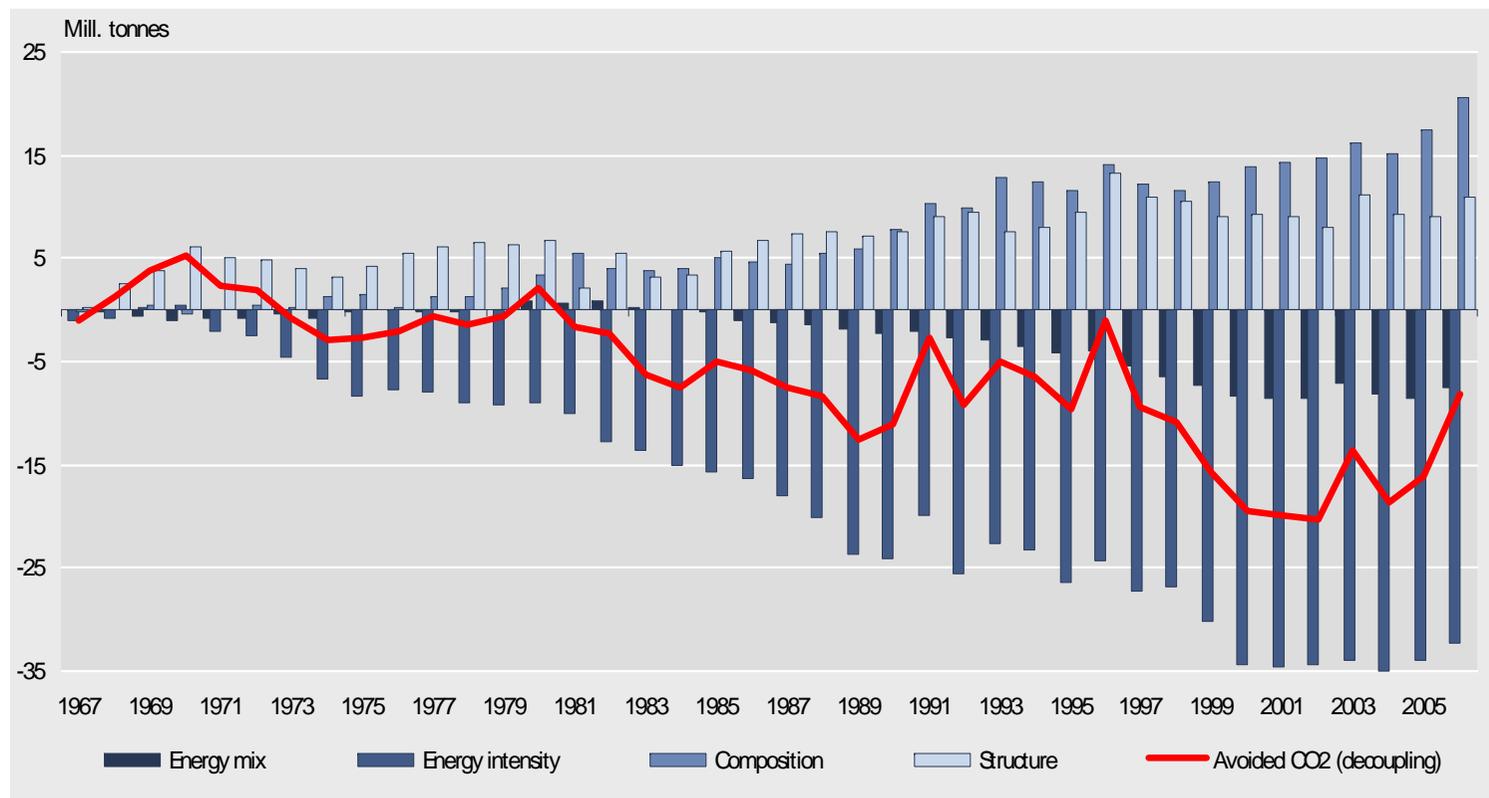
IO-modelling results

- Direct and indirect use of energy in industries
- Use of energy broken down by causing final demand
 - Private consumption, government consumption, investments, exports
- Direct and indirect use of energy related to the households private consumption
- Use of energy embodied in imports



Structural decomposition analysis – based on IO-tables, energy accounts and air emissions accounts

- CO₂ from total industries





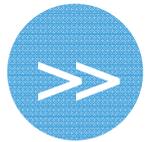
Macro-economic models

- In Denmark, the energy accounts also provide input to macro-economic models describing the links between the economy, energy demand and energy related emissions
- The models are used for forecasting and scenario analysis
- The topic for the next speaker



Dissemination

- News from Statistics Denmark (9.00 AM)
- Statistical Yearbook, Statistical Ten Year Review
- www.statbank.dk
 - /Geography, environment and energy/Energy/Energy accounts
- www.dst.dk/inputoutput
- Metadata
 - Quality declarations: www.dst.dk/declarations/52916
- Time-lag;
 - 11 months for energy accounts
 - 34 months for most detailed national accounts data and input-output tables



www.statbank.dk/ene1n

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TABLES IN STATBANK

Tables in Statbank: Energy Accounts

ENERGY ACCOUNTS

Table	ID	Updated
ENERGY ACCOUNTS IN PHYSICAL UNITS Industry and type Unit: -	ENE1N	2012-11-23
ENERGY ACCOUNTS IN HEATING VALUES (GJ) Industry and unit Unit: GJ	ENE2N	2012-11-23
GROSS ENERGY CONSUMPTION IN HEATING VALUES (GJ) Industry and type (Unit: GJ	ENE3N	2012-11-23
ENERGY ACCOUNTS IN MONETARY VALUES Industry, unit and type Unit: DKK thousand (current prices)	ENE4N	2012-11-23
Archived - will no longer be updated: ENERGY ACCOUNTS (DISCONTINUED) Industry, unit and type Unit: -	ENE1	2010-11-26

STATISTICAL YEARBOOK
Our statistical yearbook is available in English
[Read more about Statistical yearbook](#)

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Thank you

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