Indicators from the physical energy flow accounts (PEFA)

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Energy flow accounts in the Netherlands

- Revised in 2012 according to SEEA-CF guidelines
- PEFA tables: new module for EU legal base
  - Supply and use tables (Tables A and B)
  - Emission relevant energy use (Table C)
  - Bridge tables
- Prime data source: Dutch energy balances plus NA
- Classification:
  - 130 industries
  - 30 energy carriers

→ Indicators

PEFA tables and aggregates

SUPPLY	Industries		Households	Accumulation	ROW		Environment	TOTAL
Natural inputs							A	TSNI1
							A2	TSNI
Products	C	C1			D	D1		TSP1
	C2	Ct			D2	Dt		TSP
Waste				K				
				K2				TSRw
Losses	I	I1	J					TSR1
	I2	It	J2					TSR
TOTAL	TSI		TSH	=K2		=D2	=A2	

USE	Industries		Households	Accumulation		ROW		Environment	TOTAL
Natural inputs	B				B1				TUNI1
	B2				Bt				TUNI
Products	E	E1	F	G	EFG1	H	H1		TUP1
	E2	Et	F2	G2	EFGt	H2	Ht		TUP
Waste	N		Nh						
	N2				Nt				TURw
Losses				O				Q	TUR1
				O2				Q2	TUR
TOTAL	TUI		TUH	=G2+O2		=H2		=Q2	

Overview of all aggregates in PEFA tables A and B

SUPPLY TABLE				
	Natural inputs			
	TSNI1	A; B1; TUNI1		Total extraction of individual natural energy inputs by economic activities
	A2	TSNI; Bt; TUNI		Total energy inputs from the environment. This is the total amount of energy extracted by (national) economic activities
	TSNI	A2; Bt; TUNI		Total energy inputs from the environment. This is the total amount of energy extracted by (national) economic activities
	Energy products			
	C1			Total domestic production of individual energy products by economic activities (includes production from extraction)
	C2		(X)	Total energy production for individual industries (includes production fro
	CTt		X	Total domestic energy production by economic activities (Includes proc
	D1			Total imports for individual energy products
	D2			Imports by different categories (direct imports, imports via fuels by tran
	Dt			Total imports of energy products. The total amount of energy products
	TSP1	TUP1		Total supply of individual energy products (i.e. total amounts of energy
	TSP	TUP	X	Total supply of energy products (i.e. total amounts of energy products
	Waste			
	K2	K; TURw; TSRw		Total supply of waste used for energetic purposes
	TSRw	K; K2; TURw		Total supply of waste used for energetic purposes
	Losses			
	I1			Total energy losses generated by production activities by different 'loss
	I2			Total energy losses generated by individual industries. This is the net
	It			Total energy losses generated by industries. This is the net domestic
	J2			Total energy losses generated by households. This is the net domestic
	TSR1	TUR1		Total energy losses generated by economic activities by different 'loss'
	TSR	TUR		Total energy losses generated by economic activites. Total net domest
	TOTALS			
	TSI	TUI	(X)	Total energy input/output for individual industries. This is the total energ
	TSH	TUH	(X)	Total energy input/output for households
USE TABLE				
	Natural inputs			
	B1	TUNI1; TSNI1; A		Total extraction of individual natural energy inputs by economic activitie
	B2			Total extraction of natural energy inputs by individual industries
	Bt	TUNI; A2; TSNI		Total energy inputs from the environment. This is the total amount of e
	TUNI1	B1; A; TSNI1		Total extraction of individual natural energy inputs by economic activitie
	TUNI	A2. Bt; TSNI		Total energy inputs from the environment. This is the total amount of e
	Energy products			
	E1			Total intermediate consumption of individual energy products
	E2		(X)	Total intermediate consumption of energy products for individual indust
	Et		X	Total intermediate consumption of energy products (gross use)
	F2			Total household consumption of energy products
	G2			Total net inventory changes
	EFG1			Total use of individual energy products by economic activities
	EFGt		X	Total use of energy products by economic activities (gross use)
	H1			Total exports for individual energy products
	H2			Exports by different categories (direct exports, exports via fuels by tran
	Ht			Total exports of energy. The total amount of energy products exported
	TUP1			Total use of individual energy products (i.e. total amounts of energy pro
	TUP	TSP	X	Total use of energy products
	Waste			
	N2			Total use of waste for energetic purposes by individual industries
	Nt	K2; TURw; TSRw		Total waste used for energetic purposes
	Losses			
	O2			Total energy incorparated in products
	Q2			Total flow of energy related residuals to the environment
	TUR1	TSR1		Total energy losses generated by economic activities by different 'loss' categories
	TUR	TSR		Total energy losses generated by economic activites. Total net domestic use of energy by economic activities.
	TOTALS			
	TUI	TSI	(X)	Total energy input/output for individual industries
	TUH	TSH	(X)	Total energy input/output for households

This long list can be shortened:

→ a lot of aggregates are equal to others (because of input-output and the supply-use identities).

→ some aggregates are subject to double counting, making them less useful

We can now **rearrange the remaining aggregates into three categories,** namely whether they provide information on :

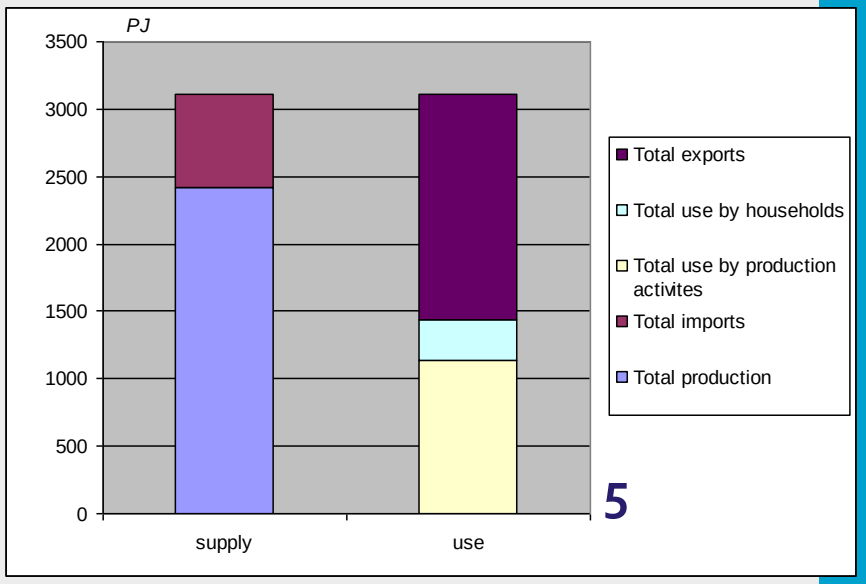
1) individual energy carriers (energy mix)
2) (individual) industries and households
3) the economy as a whole

Indicators for individual energy commodities

	Aggregates	Description
1	TSNI1; A; B1; TUNI1	Total extraction by economic activities
2	C1	Total production by economic activities
3	D1	Total imports
4	TSP1; TUP1	Total supply / use
5	E1	Total intermediate consumption
6	EFG1	Total use by economic activities
7	H1	Total exports

These indicators primarily describe the **supply-use relationship** for **energy products**: Total production + total imports = total use by production activities + total use by households + total exports

5.1.3 Supply and use of natural gas (2011)



Indicators for industries and households

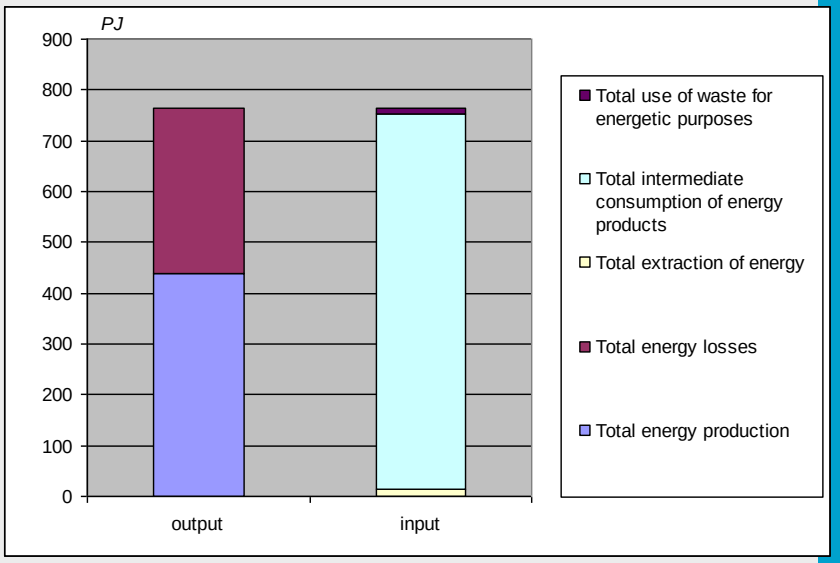
	Aggregates	Description
1	J2	Net domestic energy use by household consumption activities
2	F2	Total household consumption of energy products
3	C2	Total energy production
4	I2	Total energy losses (net domestic energy use)
5	B2	Total extraction of natural energy inputs
6	E2	Total intermediate consumption of energy products
7	N2	Total use of waste for energetic purposes
8	TSI; TUI	Total energy input/output (energy requirement)

Most of these indicators are part of the **input-output identity** for individual economic activities:

Total energy production + total energy losses (net use) =

Total extraction of energy + Total intermediate consumption of energy products + total use of waste for energetic purposes

5.1.4 Input and output of energy for NACE 35 (electricity producers)



Indicators for the economy as a whole

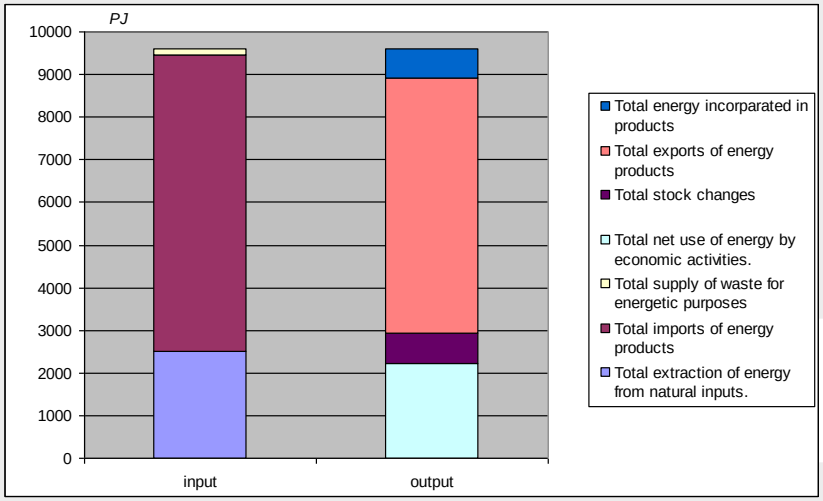
	Aggregates	Description
1	A2; TSNI; Bt; TUNI	Total energy inputs from the environment.
2	Dt	Total imports of energy products
3	K2; Nt; TURw; TSRw	Total use of waste for energetic purposes
4	IT	Total net domestic energy use by production activities.
5	TSR; TUR	**Total net domestic energy use by economic activities.**
6	G2	Total net inventory changes
7	Ht	Total exports of energy products
8	O2	Total energy incorparated in products
9	Q2	Total flow of energy related residuals to the environment

Most of these indicators are part of the **input-output relationship for the economy as a whole:**

Domestic energy inputs + imports + waste inputs use for energetic purposes =

Net use of energy (energy losses) + exports + energy incorporated in products + stock changes.

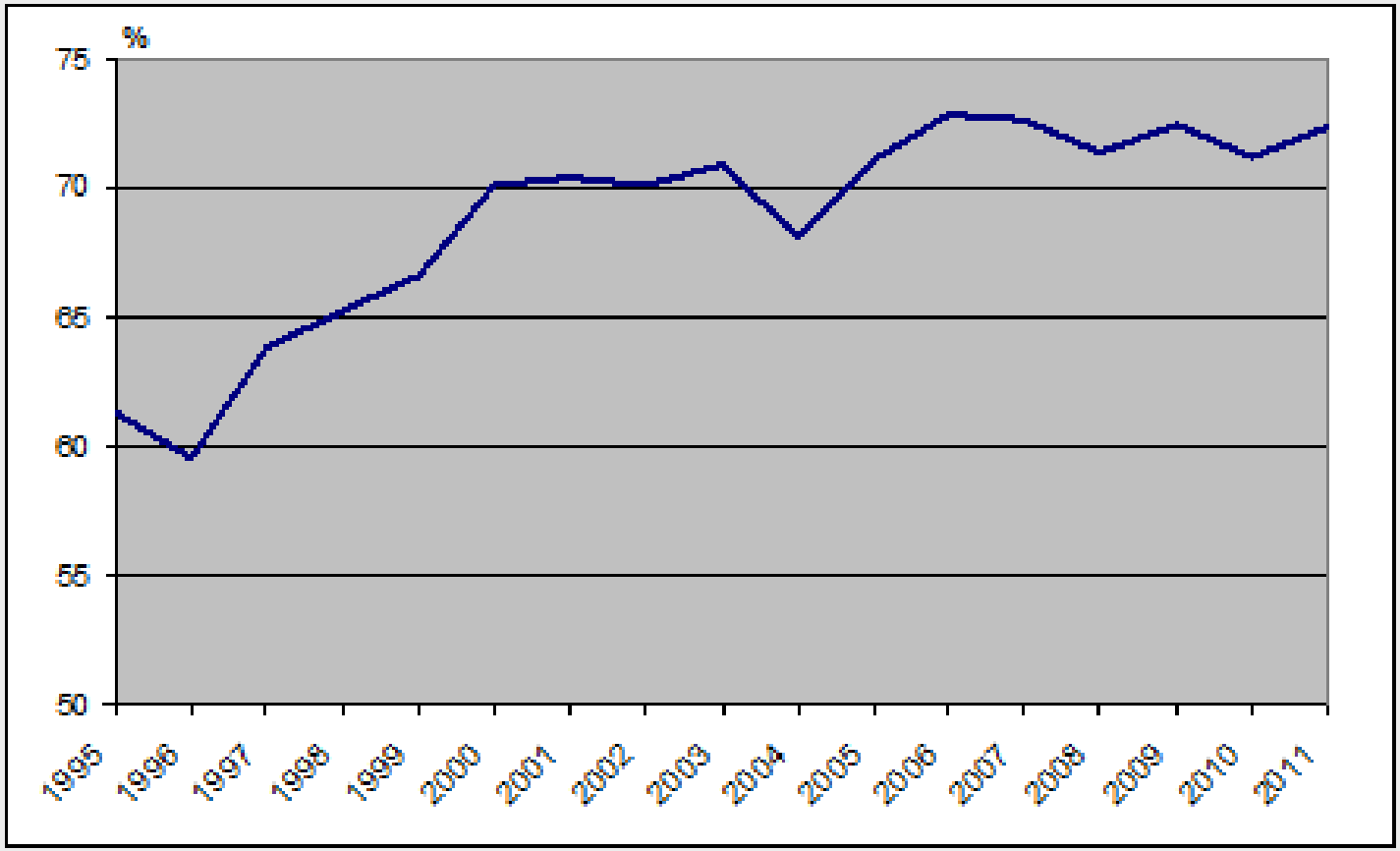
5.1.5 Total input and output of energy for the Dutch economy (2011)



Indicators obtained from combining aggregates

1. **Gross energy input** : *domestic energy inputs plus imports plus waste inputs use for energetic purposes*
2. **Energy dependence:** *Total energy imports (D) / total primary inputs (A+D+TURw)*
3. **Net imports:** *imports (D) minus exports (H)*
4. **Share of renewables:** *Renewables in primary energy inputs (A) + renewables in imports (D) + renewables in waste inputs (TURw) / total primary inputs (A+D+TURw)*
5. **Share of primary energy in total input***: Primary energy commodities in energy inputs (A) + Primary energy commodities in imports (D) / total primary inputs (A+D+TURw)*
6. **Transformation efficiency***: Production of energy products / (production of energy products plus transformation losses)*

Example energy dependence on imports



Ratio indicators

Decoupling indicators

– Physical energy use data combined with value added or GDP provides the energy intensity (or energy productivity). Most common indicator is net domestic energy use divided by GDP or value added.

Per capita indictors

– Energy use data can also be divided by the total number of the population to provide per capita numbers.

Average energy prices

– By dividing the physical use or production of energy products by the monetary data on energy use from the supply and use tables (National accounts), average energy prices can be calculated. This is particularly relevant for individual energy commodities, but also for individual industries.

Summary

Physical indicators	Ratio indicators
Total economy	
Gross energy input	energy intensity/productivity
Total net domestic energy use by economic activities	
of which by production activities	energy intensity/productivity
of which by consumption activities	
Total energy inputs from the environment.	
Total use of waste for energetic purposes	
Net imports	
Energy dependance on imports	
Share of renewables	
Individual Industries	
Total energy requirement	energy intensity/productivity
of which energy products (intermediate consumption)	average price energy use
Total energy production	average price energy production
Total net domestic energy use	energy intensity/productivity
Transformation efficiency	
Households	
Total net domestic energy use	net domestic energy use per capita
Individual energy commodities	
Total extraction	
Total production	average price
Total imports	average price
Total exports	average price
Total use by economic activites	average price