

Technical Note

Household's energy use and associated emissions - methodological guidelines -

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1. Background

Physical energy flow accounts (PEFA) record households' energy use, and air emissions accounts (AEA) record households' emissions to air. In both cases, households' consumption activities are sub-classified into three groupings of purposes:

- Households – transport
- Households – heating and cooling
- Households – other

This document provides methodological guidelines for compilers of PEFA and AEA related to households' energy use and emissions.

2. Concepts and definitions

National accounts define the institutional sector S.14: [Households](#). It is important to distinguish the activities of households into

- consumption activities, and
- production activities.

Consumption activities of households relate to the national accounts' concept of [final consumption expenditures \(P3\)](#). The final consumption of energy products is recorded in PEFA. AEA record emissions that are associated with the consumption of energy products. In PEFA and AEA, consumption activities of households are classified in the `nace_r2` dimension¹, employing the following codes (see SEEA-CF para. 2.41, paras.3.27ff.):

[HH]	Total activities by households
[HH_HEAT]	Heating/cooling activities by households
[HH_TRA]	Transport activities by households
[HH_OTH]	Other activities by households

Production activities of households refer to their function as entrepreneurs producing market goods and non-financial and financial services (market producers). PEFA and AEA record households' production activities under the NACE heading under which the respective production activity typically belongs. E.g., households' production of electricity is recorded under the NACE production activity heading D35 *Electricity, gas, steam and air conditioning supply*.

¹ Statistical classification of economic activities in the European Community (NACE Rev. 2) [`nace_r2`]

3. Guidelines

The following sections provide guidelines on how delineate the three sub-categories of households' consumption activities.

3.1 HH_TRA

Households' transport activities as delineated in PEFA and AEA relate to the purchase of transport fuels by households for the purpose of final consumption, e.g. transport fuels to drive private cars, motor-cycles, campervans, leisure boats etc. The following table shows fuels that are typically used by households for transport purposes.

Table 1: Fuels typically used by households for transport purposes

Eurostat's energy balances' standard international energy product classification [siec]		Corresponding PEFA energy products [prod_nrg]		emission relevance
code	label	code	label	
G3000	Natural gas	P13	Natural gas (without bio)	fossil CO2
O4651	Aviation gasoline	P14	Motor spirit (without bio)	fossil CO2
O4652XR5210B	Motor gasoline (excluding biofuel portion)	P14	Motor spirit (without bio)	fossil CO2
O4653	Gasoline-type jet fuel	P15	Kerosenes and jet fuels (without bio)	fossil CO2
O4661XR5230B	Kerosene-type jet fuel (excluding biofuel portion)	P15	Kerosenes and jet fuels (without bio)	fossil CO2
O4669	Other kerosene	P15	Kerosenes and jet fuels (without bio)	fossil CO2
O4671XR5220B	Gas oil and diesel oil (excluding biofuel portion)	P17 P18	Transport diesel (without bio) Heating and other gasoil (without bio)	fossil CO2
O4680	Fuel oil	P19	Residual fuel oil	fossil CO2
O4630	Liquefied petroleum gases	P20	Refinery gas, ethane and LPG	fossil CO2
R5210P	Pure biogasoline	P24	Liquid biofuels	CO2 bio
R5210B	Blended biogasoline	P24	Liquid biofuels	CO2 bio
R5220P	Pure biodiesels	P24	Liquid biofuels	CO2 bio
R5220B	Blended biodiesels	P24	Liquid biofuels	CO2 bio
R5230P	Pure bio jet kerosene	P24	Liquid biofuels	CO2 bio
R5230B	Blended bio jet kerosene	P24	Liquid biofuels	CO2 bio
R5290	Other liquid biofuels	P24	Liquid biofuels	CO2 bio
R5210P	Pure biogasoline	P25	Biogas	CO2 bio
R5210B	Blended biogasoline	P25	Biogas	CO2 bio

AEA differentiate between CO2 emissions from fossil fuel combustion versus CO2 from biomass combustion. The last column of above table indicates this distinction.

Most AEA compilers use the 'inventory-first-approach', i.e. assigning inventory emissions source classes to economic activities (NACE production activities and households). The inventory emission source class 1.A.3.B 'road transport' is most relevant as it may include significant amounts of

transport emissions by households. AEA compilers may consult PEFA questionnaire Table C ('emission-relevant use of energy') to derive coefficients or shares that can be used to estimate transport emissions by households.

3.2 HH_HEAT and HH_OTH

PEFA and AEA compilers are recommended to employ the following European energy statistics to identify the split between those two sub-classes: [Disaggregated final energy consumption in households - quantities \[nrg_d_hhq\]](#).

This energy statistic [nrg_d_hhq] presents households final consumption of energy products (dimension: siec) for various types of final consumption purposes (dimension: nrg_bal). The following table crosses these two dimensions and assigns each cell to the PEFA and AEA categories HH_HEAT and HH_OTH.

Table 2: Excerpt from detailed energy statistics ([Disaggregated final energy consumption in households - quantities \[nrg_d_hhq\]](#))

SIEC (Codes)	TOTAL	SFF P100	G3000	G3200	O4000	O4630	O4669	O4671	RA000	RA410	RA600	R5110-	R5300	E7000	H8000	
SIEC (Labels)	Total	Solid fossil fuels, peat, peat products, oil shale and oil sands	Natural gas	Liquefied natural gas	Oil and petroleum products	Liquefied petroleum gases	Other kerosene	Gas oil and diesel oil	Renewables and biofuels	Solar thermal	Ambient heat (heat pumps)	Primary solid biofuels	Biogases	Electricity	Heat	
NRG_BAL (Codes)	NRG_BAL (Labels)															
FC_OTH_HH_E	Final consumption - other sectors - households - energy use	10 221 427.802	294 796.490	3 272 407.696		1 280 604.111		50 256.282	986 408.694	1 959 170.718	87 798.364	253 742.775	1 643 884.280	13 091.389	2 563 384.687	851 064.129
FC_OTH_HH_E_SH	- space heating	6 423 978.927	268 295.350	2 441 361.408		1 001 809.304		40 547.857	856 210.039	1 721 282.656	8 980.403	230 931.371	1 519 043.272	11 501.082	336 013.042	655 217.167
FC_OTH_HH_E_SC	- space cooling	39 681.857	0.000	0.000		0.000		0.000	0.000	0.000	0.000		0.000	0.000	39 681.857	0.000
FC_OTH_HH_E_WH	- water heating	1 546 523.503	23 127.925	632 331.364		187 130.763		9 451.625	130 109.638	201 158.021	78 724.131	22 500.582	98 249.826	1 590.304	306 928.469	195 846.962
FC_OTH_HH_E_CK	- cooking	627 823.202	3 373.216	198 714.924		83 009.565		0.000	0.000	22 855.925	0.000	0.000	19 594.091	0.003	319 869.572	0.000
FC_OTH_HH_E_LE	- lighting and electrical appliances	1 484 249.011													1 484 249.011	
FC_OTH_HH_E_OE	- other end use	99 171.332	0.000	0.000		8 654.480		256.800	89.017	13 874.116	93.830	310.822	6 997.091	0.000	76 642.736	0.000
	Assigned to HH_HEAT	emission-relevant														
	Assigned to HH_OTH															

The PEFA and AEA category HH_HEAT corresponds to the final energy consumption purposes (1) space heating, (2) space cooling, (3) water heating, and (4) cooking. While HH_OTH corresponds to the final energy consumption purposes of (5) lightning and electrical appliances, and (6) other end use.

By default, the PEFA-Builder employs EU average shares derived from nrg_d_hhq (see Annex 1 below). These default shares are included in the Excel file PEFA_NaceBreakdown_v5.7.1.xlsm, sheet 'PH'. The PEFA compiler is recommended to derive shares for his respective country and insert in sheet 'PH'.

References

Eurostat (2013): [Manual for statistics on energy consumption in households - 2013 edition](#)

System of Environmental-Economic Accounting 2012: Central Framework - final, official publication 2014: <https://unstats.un.org/unsd/envaccounting/seearev/>

European System of Accounts (ESA2010): final version see also <http://ec.europa.eu/eurostat/web/esa-2010/overview>

Annex 1: Default shares for assigning energy product use (SIEC) to HH_HEAT and HH_OTH

Energy and non-energy use by private households

Instructions: Fill in the yellow cells with your data (please notice that default data is already included). Grey cells (shares) are automatically calculated based on these data.
Once all tables are completed, go to MENU and run "Generate Output data".

[Go to MENU](#)

IEA code	PEFA code	Label	Data *			Shares		
			total	Heating/cooling activities by households	Other activities by households	total	Heating/cooling activities by households	Other activities by households
			NACE code	PH_HEAT	PH_OTHER	NACE code	PH_HEAT	PH_OTHER
			A = Σ B...C	B	C	D = Σ E...F	E	F
PATFUEL	B_2112_CPA_19_2	Patent Fuel	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
ANTCOAL	B_2115_CPA_05	Anthracite	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
COKCOAL	B_2116_CPA_05	Coking Coal	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
BITCOAL	B_2117_CPA_05	Other Bituminous Coal	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
SUBCOAL	B_2118_CPA_05	Sub-bituminous Coal	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
OVENCOKE	B_2121_CPA_19_1	Coke Oven Coke	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
GASCOKE	B_2122_CPA_19_1	Gas Coke	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
COALTAR	B_2130_CPA_19_1	Coal Tar	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
LIGNITE	B_2210_CPA_05	Lignite	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
BKB	B_2230_CPA_19	BKB	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
PEAT	B_2310_CPA_08	Peat	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
PEATPROD	B_2330_CPA_19	Peat Products	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
OLSHALE	B_2410_CPA_06	Oil shale and oil sands	559 929.01	559 929.01	0.00	100.0%	100.0%	0.0%
CRUDEOIL	B_3105_CPA_06	Crude Oil	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
NGL	B_3106_CPA_06	Natural Gas Liquids	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
REFINGAS	B_3214_CPA_19_2	Refinery Gas	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
ETHANE	B_3215_CPA_19_2	Ethane	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
LPG	B_3220_CPA_19_2	LPG	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
NONBIOGASO	B_3234_CPA_19_2	Non-biogasoline	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
AVGAS	B_3235_CPA_19_2	Aviation Gasoline	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
OTHKERO	B_3244_CPA_19_2	Other Kerosene	93 159.73	92 774.53	385.20	100.0%	99.0%	1.0%
JETGAS	B_3246_CPA_19_2	Gasoline Type Jet Fuel	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
NONBIOJETK	B_3247_CPA_19_2	Non-bio Jet Kerosene	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
NAPHTHA	B_3250_CPA_19_2	Naphtha	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
NONBIOOIL	B_3265_CPA_19_2	Non-bio Road Diesel	1 500 688.85	1 497 346.51	3 342.34	100.0%	99.8%	0.2%
NONBIOHOL	B_3266_CPA_19_2	Non-bio Heating Oil and Other Gas Oil	1 500 688.85	1 497 346.51	3 342.34	100.0%	99.8%	0.2%
LOWSULF	B_3271_CPA_19_2	Fuel oil - low sulphur (< 1%)	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
HIGHSULF	B_3272_CPA_19_2	Fuel oil - high sulphur (>= 1%)	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
WHITESP	B_3281_CPA_19_2	White spirit and SBP	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
LUBRIC	B_3282_CPA_19_2	Lubricants	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
BITUMEN	B_3283_CPA_19_2	Bitumen	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
PETCOKE	B_3285_CPA_19_2	Petroleum Coke	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
PARWAX	B_3286_CPA_19_2	Paraffin Waxes	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
OPRODS	B_3295_CPA_19_2	Other Oil Products	2 085 375.42	2 064 391.52	20 983.90	100.0%	99.0%	1.0%
ENERGUSETJ	B_4100_CPA_06	Natural gas (energy use)	7 340 356.05	7 340 356.05	0.00	100.0%	100.0%	0.0%
NONENERGUSETJ	B_4100_CPA_06	Natural gas (non-energy use)	7 340 356.05	7 340 356.05	0.00	100.0%	100.0%	0.0%
CKEOVGS	B_4210_CPA_35_2	Coke Oven Gas	1.00	1.00	0.00	100.0%	100.0%	0.0%
BLFURGS	B_4220_CPA_35_2	Blast Furnace Gas	1.00	1.00	0.00	100.0%	100.0%	0.0%
GASWKSGS	B_4230_CPA_35_2	Gas Works Gas	1.00	1.00	0.00	100.0%	100.0%	0.0%
OGASES	B_4240_CPA_35_2	Other recovered gases	1.00	1.00	0.00	100.0%	100.0%	0.0%
HEAT	B_5200_CPA_35_3	Heat	1 892 409.36	1 892 409.36	0.00	100.0%	100.0%	0.0%
SOLARTH	B_5200_CPA_35_3	Solar Thermal	178 551.62	178 458.50	93.12	100.0%	99.9%	0.1%
PRMSBIO	B_5541_CPA_01_02_10_17_3	Solid Biofuels excluding Charcoal	3 785 918.77	3 778 758.32	7 160.46	100.0%	99.8%	0.2%
BIOGASES	B_5542_CPA_35_2	Biogases	19 898.00	19 898.00	0.00	100.0%	100.0%	0.0%
MUNWASTER	B_55431_CPA_38	Municipal Waste (Renewable)	1.00	1.00	0.00	100.0%	100.0%	0.0%
MUNWASTEN	B_55432_CPA_38	Municipal Waste (Non-renewable)	1.00	1.00	0.00	100.0%	100.0%	0.0%
CHARCOAL	B_5544_CPA_20	Charcoal	1.00	1.00	0.00	100.0%	100.0%	0.0%
BIOGASOLOIL	B_5546_CPA_20	Biogasoline (blended, OIL Quest.)	4 648 353.16	4 633 972.64	14 380.52	100.0%	99.7%	0.3%
BIOGASOLREN	B_5546_CPA_20	Biogasoline (pure, REN Quest.)	4 648 353.16	4 633 972.64	14 380.52	100.0%	99.7%	0.3%
BIODIESELREN	B_5547_CPA_20	Biodiesels (pure, REN Quest.)	4 648 353.16	4 633 972.64	14 380.52	100.0%	99.7%	0.3%
BIODIOL	B_5547D_CPA_20	Bio Road Diesel	4 648 353.16	4 633 972.64	14 380.52	100.0%	99.7%	0.3%
BIOHOL	B_5547H_CPA_20	Bio Heating Oil and Other Gas Oil	4 648 353.16	4 633 972.64	14 380.52	100.0%	99.7%	0.3%
OBIOLIQ	B_5548_CPA_20	Other Liquid Biofuels	4 648 353.16	4 633 972.64	14 380.52	100.0%	99.7%	0.3%
BIOJETKEROOIL	B_5549_CPA_20	Bio Jet Kerosene (blended, OIL Quest.)	4 648 353.16	4 633 972.64	14 380.52	100.0%	99.7%	0.3%
BIOJETKEROREN	B_5549_CPA_20	Bio Jet Kerosene (pure, REN Quest.)	4 648 353.16	4 633 972.64	14 380.52	100.0%	99.7%	0.3%
GEOTHERM	B_5550_CPA_35_3	Geothermal	4 648 353.16	4 633 972.64	14 380.52	100.0%	99.7%	0.3%
ELECTR	B_6000_CPA_35_1	Electricity	5 381 299.46	3 802 109.12	1 579 190.34	100.0%	70.7%	29.3%
INDWASTE	B_7100_CPA_38	Industrial waste (non-renewable)	1.00	1.00	0.00	100.0%	100.0%	0.0%