



Types of Physical Supply and Use Table

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1st Sub-Regional Course on SEEA

23-27 September 2013
Malaysia



Module Content

- A. Physical flow accounts for water
- B. Physical flow accounts for energy
- C. Physical flow accounts for materials
 - 1. Accounting for air emissions
 - 2. Accounting for emissions to water
 - 3. Accounting for solid waste
 - 4. Product flow accounting



Types of physical flows accounts

Physical flow accounts	Topics covered (detailed definition)
Full set of supply and use tables for materials	All resources and materials (energy, water, air emissions, water emissions, solid waste) (CF 3.45)
Economy-wide material flow accounts (MFA)	Supply and consumption of energy; air emissions, water emissions, and solid waste (CF 3.279)
Physical supply and use tables for water (PSUT water)	Supply (precipitation) and consumption of water (CF 3.186)
Physical supply and use tables for energy (PSUT energy)	Supply and consumption of energy (CF 3.140)
Air emissions accounts	Air emissions (CO ₂ , pollutants) (CF 3.233)
Water emissions accounts	Water emissions (CF 3.257)
Waste accounts	Solid wastes (CF 3.268)

- CF = Central Framework, white cover edition, refers to paragraph number



Subsystems: Similarities and differences

- Similarities:
 - Scope includes
 - Flows from the environment to economy (natural inputs)
 - Flows within the economy (Products flow)
 - Flows back to environments (Residuals flows)
 - Finer level of focus can be undertaken consistent with the general principles of the PSUT
 - Same concepts, definitions and standards
 - Same institutional units
- Differences:
 - Units of measurement
 - Key components of the PSUT
 - Breakdowns of economic activities



A. Physical flow accounts for water



Physical flow accounts for water

Water flow accounts describe water flows, in physical units,

- from the initial abstraction of water resources from the environment into the economy,
- to the water flows within the economy in the form of supply and use by industries and households,
- and finally flows of water back to the environment

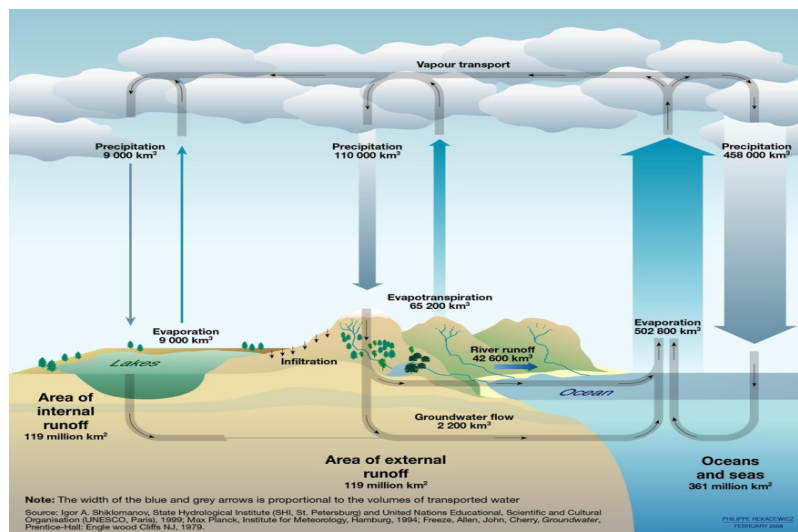


Scope of water flows

- Inland water system
 - Surface water
 - Groundwater
 - Soil water
- Sea or ocean water abstracted for production and consumption



Hydrological cycle

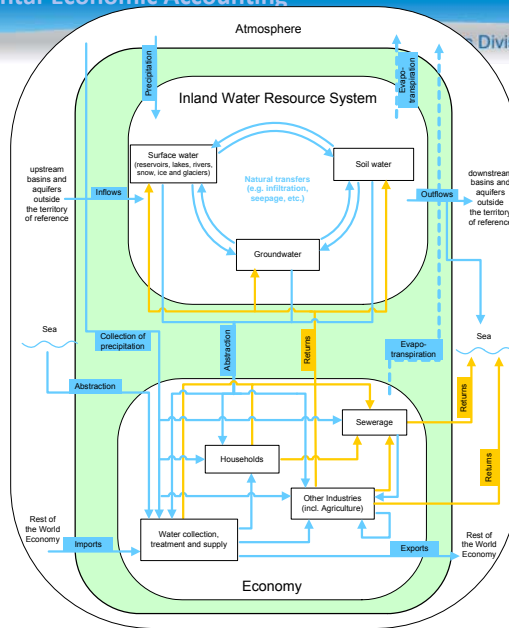




SEEA Water Overview

- Stocks and flows
- Economy and environment

This is a complex system, so it is useful to simplify it



Renewable freshwater resources: Tabular example

1	Precipitation	mio m ³ /y	100
2	Actual evapotranspiration	mio m ³ /y	50
3	Internal flow (=1-2)	mio m ³ /y	50
4	Inflow of surface and groundwaters	mio m ³ /y	100
5	Renewable freshwater resources (=3+4)	mio m ³ /y	150
6	Outflow of surface and groundwaters	mio m ³ /y	145



Water Supply

Water supply: water leaving/flowing-out from an economic unit (Industries, Households and rest of the world). Water supply is the sum of *water supply to other economic units* and *water supply to the environment*.

Water supply to the environment (also Water returns): water returned into the environment during a given period of time after use. Returns can be classified according to the receiving media (i.e. water resources and sea water) and to the type of water (e.g. treated water, cooling water, etc.).

Water supply within the economy: water distributed to households and industries (including agriculture) and to the rest of the world (exports). Water supply within the economy is net of losses in distribution.



Water Use

Water use: water intake of industries and households for production and consumption activities. Water Use is the sum of *water use within the economy* and *water use from the environment*.

Water use within the economy: water intake for production and consumption activities, which is distributed by industries or households and by the Rest of the World (Imports).

Water use from the environment: water abstracted from water resources, seas and oceans, and precipitation collected by industries and households for production and consumption activities, including rainfed agriculture.



Organization of the Physical Supply-Use Tables

- By columns, industries (ISIC Rev.4), households, accumulation, the Rest of the world, flows to the environment

- The breakdown of the economic activities, classified according to ISIC distinguishes the following groups:
 - ISIC 01-03 which includes *Agriculture, Forestry and Fishing*;
 - ISIC 05-33, 41-43 which includes: *Mining and quarrying, Manufacturing and Construction*;
 - ISIC 35 - *Electricity, gas, steam and air conditioning supply*;
 - ISIC 36 - *Water collection, treatment and supply*;
 - ISIC 37 - *Sewerage*;
 - ISIC 38, 39, 45-99, *Other industries*.



PSUT: Key components

- Abstraction of water
- Distribution and use of abstracted water
- Flows of wastewater and reused water
- Return flows of water to the environment
- Evaporation of abstracted water, transpiration and water incorporated into products

Abstraction of water

- Amount of water that is removed from any sources

Physical supply table for water		Abstraction of water; Production of water; Generation of return flows							Flows from the rest of the world	Flows from the environment	Total supply		
		Agriculture, forestry and fishing	Mining & quarrying, Manufacturing and Construction	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Sewerage	Other industries	Households	Imports				
(I) Sources of abstracted water													
Inland water resources													
	Surface water										440.6	440.6	
	Groundwater										476.3	476.3	
	Soil water										50.0	50.0	
	Total										966.9	966.9	
Other water sources													
	Precipitation										101.0	101.0	
	Sea water										101.1	101.1	
	Total										202.1	202.1	
	Total supply abstracted water										1 169.0	1 169.0	
Physical use table for water		Abstraction of water; Intermediate consumption; Return flows							Final consumption	Accumulation	Flows to the rest of the world	Flows to the environment	Total use
		Agriculture, forestry and fishing	Mining & quarrying, Manufacturing and Construction	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Sewerage	Other industries	Households		Exports			
(I) Sources of abstracted water													
Inland water resources													
	Surface water	55.3	79.7	301.0	4.5	0.1						440.6	
	Groundwater	3.1	34.8	3.2	432.9		2.3					476.3	
	Soil water	50.0										50.0	
	Total	108.4	114.5	304.2	437.4	0.1	2.3					966.9	
Other water sources													
	Precipitation				1.0	100.0						101.0	
	Sea water			100.0	1.1							101.1	
	Total	0.0	0.0	100.0	2.1	100.0	0.0					202.1	
	Total use abstracted water	108.4	114.5	404.2	439.5	100.1	2.3					1 169.0	

Distribution and use of abstracted water

- Accounting for distribution and use of abstracted water between economic unit

Physical supply table for water		Abstraction of water; Production of water; Generation of return flows							Flows from the rest of the world	Flows from the environment	Total supply		
		Agriculture, forestry and fishing	Mining & quarrying, Manufacturing and Construction	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Sewerage	Other industries	Households	Imports				
(II) Abstracted water													
	For distribution					378.2						378.2	
	For own-use	108.4	114.6	404.2	61.2	100.1	2.3					790.8	
Physical use table for water		Abstraction of water; Intermediate consumption; Return flows							Final consumption	Accumulation	Flows to the rest of the world	Flows to the environment	Total use
		Agriculture, forestry and fishing	Mining & quarrying, Manufacturing and Construction	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Sewerage	Other industries	Households	Exports				
(II) Abstracted water													
	Distributed water	38.7	45.0	3.9			51.1	239.5				378.2	
	Own use	108.4	114.6	404.2	50.4	100.1	2.3	10.8				790.8	

Return flows of water to the environment

- Accounting for water returned to the environment, including water losses

Physical supply table for water

	Abstraction of water; Production of water; Generation of return flows							Flows from the rest of the world Imports	Flows from the environment	Total supply
	Agriculture, forestry and fishing	Mining & quarrying, Manufacturing and Construction	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Sewerage	Other industries	Households			
(IV) Return flows of water										
To inland water resources										
Surface water			300.0		52.5	0.2	0.5			353.2
Ground water	65.0	23.5		47.3	175.0	0.5	4.1			315.4
Soil water										
Total	65.0	23.5	300.0	47.3	227.5	0.7	4.6			668.6
To other sources		5.9	100.0		256.3		0.2			362.4
Total Return flows	65.0	29.4	400.0	47.3	483.8	0.7	4.8			1 031.0

	Abstraction of water; Intermediate consumption; Return flows							Final consumption Households	Accumulation	Flows to the rest of the world Exports	Flows to the environment	Total use
	Agriculture, forestry and fishing	Mining & quarrying, Manufacturing and Construction	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Sewerage	Other industries						
(IV) Return flows of water												
Returns of water to the environment											668.6	668.6
To inland water resources											362.4	362.4
To other sources											1 031.0	1 031.0
Total return flows											1 031.0	1 031.0



3 additional physical flows

- Evaporation of abstracted water
- Transpiration
 - Soil water is absorbed by cultivated plants and is subsequently released to the atmosphere
- Water incorporated into products
 - E.g. water used in the manufacture of beverages

Evaporation of abstracted water, transpiration and water incorporated into products

Physical supply table for water	Abstraction of water; Production of water; Generation of return flows							Flows from the rest of the world Imports	Flows from the environment	Total supply
	Agriculture, forestry and fishing	Mining & quarrying, Manufacturing and Construction	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Sewerage	Other industries	Households			
(V) Evaporation of abstracted water, transpiration and water incorporated into products										
Evaporation of abstracted water	76.2	43.2	2.5	1.8	0.7	3.6	10.0		138.0	
Transpiration										
Water incorporated into products										

Physical use table for water	Abstraction of water; Intermediate consumption; Return flows							Final consumption Households	Accumulation	Flows to the rest of the world Exports	Flows to the environment	Total use
	Agriculture, forestry and fishing	Mining & quarrying, Manufacturing and Construction	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Sewerage	Other industries	Households					
(V) Evaporation of abstracted water, transpiration and water incorporated into products												
Evaporation of abstracted water											138.0	138.0
Transpiration												
Water incorporated into products												

Physical supply table for water

Physical supply table for water	Abstraction of water; Production of water; Generation of return flows							Flows from the rest of the world Imports	Flows from the environment	Total supply
	Agriculture, forestry and fishing	Mining & quarrying, Manufacturing and Construction	Electricity, gas, steam and air conditioning supply	Water collection, treatment and supply	Sewerage	Other industries	Households			
(I) Sources of abstracted water										
Inland water resources										
Surface water								440.6	440.6	
Groundwater								476.3	476.3	
Soil water								50.0	50.0	
Total								966.9	966.9	
Other water sources										
Precipitation								101.0	101.0	
Sea water								101.1	101.1	
Total								202.1	202.1	
Total supply abstracted water								1 169.0	1 169.0	
(II) Abstracted water										
For distribution				378.2					378.2	
For own-use	108.4	114.6	404.2	61.2	100.1	2.3			790.8	
(III) Wastewater and reused water										
Wastewater										
Wastewater to treatment	17.9	117.6	5.6	1.4	49.1	235.5			427.1	
Own treatment										
Reused water produced										
For distribution					42.7				42.7	
For own use		10.0							10.0	
(IV) Return flows of water										
To inland water resources										
Surface water			300.0		52.5	0.2	0.5		353.2	
Groundwater				47.3	175.0	0.5	4.1		315.4	
Soil water	65.0	23.5								
Total	65.0	23.5	300.0	47.3	227.5	0.7	4.6		668.6	
To other sources		5.9	100.0		256.3		0.2		362.4	
Total Return flows	65.0	29.4	400.0	47.3	483.8	0.7	4.8		1 031.0	
(V) Evaporation of abstracted water, transpiration and water incorporated into products										
Evaporation of abstracted water	76.2	43.2	2.5	1.8	0.7	3.6	10.0		138.0	
Transpiration										
Water incorporated into products										
Total supply	267.5	314.8	812.3	489.9	627.3	55.7	250.3	1 169.0	3 986.8	

Physical use table for water

Physical use table for water

	Abstraction of water; Intermediate consumption; Return flows						Final consumption Households	Accumulation	Flows to the rest of the world Exports	Flows to the environment	Total use
	Agriculture, forestry and fishing	Mining & quarrying, Manufacturing and Construction	Electricity, gas, steam and air conditioning	Water collection, treatment and supply	Sewerage treatment and supply	Other industries					
(I) Sources of abstracted water											
Inland water resources											
Surface water	55.3	79.7	301.0	4.5	0.1						440.6
Groundwater	3.1	34.8	3.2	432.9		2.3					476.3
Soil water	50.0										50.0
Total	108.4	114.5	304.2	437.4	0.1	2.3					966.9
Other water sources											
Precipitation				1.0	100.0						101.0
Sea water			100.0		1.1						101.1
Total	0.0	0.0	100.0	2.1	100.0	0.0					202.1
Total use abstracted water	108.4	114.5	404.2	439.5	100.1	2.3					1 169.0
(II) Abstracted water											
Distributed water											
Distributed water	38.7	45.0	3.9			51.1	239.5				378.2
Own use	108.4	114.6	404.2	50.4	100.1	2.3	10.8				790.8
(III) Wastewater and reused water											
Wastewater											
Wastewater received from other units											
Own treatment	12.0	40.7			427.1						427.1
Own use											52.7
Reused water											
Distributed reuse											
Own use											
Total	12.0	40.7			427.1						479.8
(IV) Return flows of water											
Returns of water to the environment											
To inland water resources											
										668.6	668.6
To other sources											
										362.4	362.4
Total return flows										1 031.0	1 031.0
(V) Evaporation of abstracted water, transpiration and water incorporated into products											
Evaporation of abstracted water											
Transpiration										138.0	138.0
Water incorporated into products											
Total use	267.5	314.8	812.3	489.9	627.3	55.7	250.3			1 169.0	3 986.8

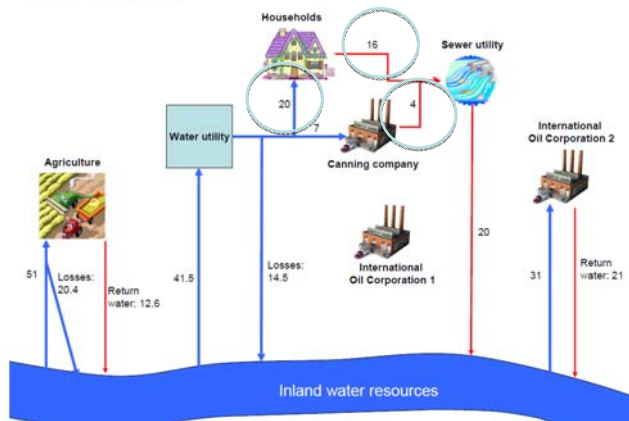


System of Environmental-Economic Accounting

United Nations Statistics Division

Water Supply-Use Accounts: Kangaré

Kangaré Water
(Flows of water in hm³/year)



SEEA Supply-Use Table for Water

	Industries	Households	Accumulation	Rest of the world	Environment	Total
Supply (entering)						
Abstractions						
Reused Water	4	16				
Return flows, evapo-transpiration, incorporated in products						
Use (leaving)						
Abstractions		20				
Reused Water						
Return flows, evapo-transpiration, incorporated in products						



Water aggregates

- Gross Water Input
 - Reflect to water abstracted from the environment of that is import
- New Domestic Water Use
 - Use of water by resident units
 - Exclude flows of water between economic units and deduct all exports of water
 - Sum of all return flows of water to the environment, evaporation, transpiration and water incorporated into products
- Final Water Use
 - Evaporation, transpiration ad water incorporated into products
 - Reflects the quantity of water no longer available for use



B. Physical flow accounts for energy



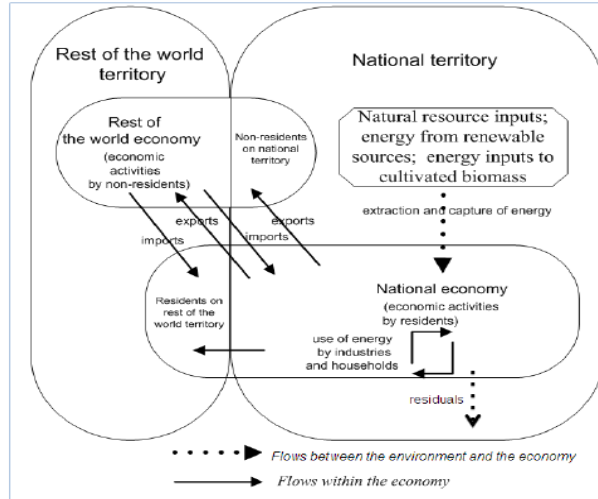
Physical flow accounts for energy

Energy flow accounts

- record energy flows, in physical units,
 - from the initial extraction or capture of energy resources from the environment into the economy,
 - to the flows of energy within the economy in the form of the supply and use of energy by industries and households,
 - and finally, the flows of energy back to the environment



Physical flows of energy



Basic form of supply and use table for energy

SUPPLY TABLE						
	Industries	Households	Accumulation	Rest of the World	Environment	Totals
Energy from natural inputs					Energy inputs from the environment	Total supply of energy from natural inputs
Energy products	Output			Imports		Total supply of energy products
Residuals related to energy	Energy-related residuals generated by industry	Energy-related residuals generated by household consumption	Energy-related residuals from accumulation			Total supply of energy-related residuals
USE TABLE						
	Industries	Households	Accumulation	Rest of the World	Environment	Totals
Energy from natural inputs	Extraction of natural energy inputs					Total use of energy from natural inputs
Energy products	Intermediate consumption	Household consumption	Inventories etc.	Exports		Total use of energy products
Residuals related to energy	Collection & treatment of energy-related residuals		Accumulation of energy-related residuals		Energy-related residual flows direct to environment	Total use of energy-related residuals



PSUT: Key components

- Supply and use of energy from natural inputs
- Supply of energy products, including energy products produced on own account
- Imports and exports of energy products
- Transformation and end-use of energy products
- Supply and use of energy residuals and other residual

Supply and use of energy from natural inputs

Physical supply table for energy		Production (including household production on own-account); Generation of residuals						Accumulation	Flows from the rest of the world	Flows from the environment	Total supply	
		Agriculture, forestry and fishing	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	Households				
		ISIC 01	ISIC 02	ISIC 03	ISIC 04	ISIC 08						
Energy from natural inputs												
Natural resource inputs												
Mineral and energy resources												
Timber resources												
Inputs of energy from renewable sources												
Solar												
Hydro												
Wind												
Wave and tidal												
Geothermal												
Other heat and electrical												
Other natural inputs												
Energy inputs to cultivated biomass												
Total energy from natural inputs												
										1 161.0	1 161.0	
										5.0	5.0	
										20.0	20.0	
										100.0	100.0	
										4.0	4.0	
										2.0	2.0	
										1 292.0	1 292.0	
Physical use table for energy		Intermediate consumption; Use of energy resources; Receipt of energy losses						Final consumption	Accumulation	Flows to the rest of the world	Flows to the environment	Total use
		Agriculture, forestry and fishing	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	Households				
		ISIC 01	ISIC 02	ISIC 03	ISIC 04	ISIC 08						
Energy from natural inputs												
Natural resource inputs												
Inputs of energy from renewable sources												
Other natural inputs												
Total energy from natural inputs												
			5.0	1 161.0							1 166.0	
						124.0					124.0	
			0.3		0.2	1.5					2.0	
			5.3	1 161.0	0.2	225.5					1 292.0	

Supply of energy products, including energy products produced on own account

Physical supply table for energy	Production (including household production on own-account); Generation of residuals						Accumulation	Flows from the rest of the world Imports	Flows from the environment	Total supply
	Agriculture, forestry and fishing ISIC 01	Mining and quarrying ISIC 02	Manufacturing ISIC 03	Electricity, gas, steam and air conditioning supply ISIC 04	Transportation and storage ISIC 08	Other industries				
Energy products										
Production of energy products by SIEC class										
Coal								225.0		225.0
Peat and peat products										
Oil shale/ oil sands										
Natural gas (extracted)		395.0								395.0
Natural gas (distributed)					369.1					369.1
Oil (e.g. conventional crude oil)		721.0								721.0
Oil (oil products)			347.0					930.0		1 277.0
Biofuels		5.3	0.2		1.5					7.0
Waste		39.0	54.5							110.4
Electricity				212.0				16.9		234.0
Heat					78.5			22.0		78.5
Nuclear fuels and other fuels nec										
Total energy products	44.3	1 116.0	401.7	661.1				1 193.9		3 417.0



2 uses of energy products

- Transformation
 - Transformation of energy products into other energy products
- End-use
 - Use of energy products to produce goods and services that are not energy products

Physical use table for energy

	Intermediate consumption, Use of energy resources, Receipt of energy losses					Final consumption	Accumulation	Flows to the rest of the world	Flows to the environment	Total use
	Agriculture, forestry and fishing	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage					
	ISIC 01	ISIC 02	ISIC 03	ISIC 04	ISIC 08					
Energy from natural inputs										
Natural resource inputs	5.0	1 161.0								1 166.0
Inputs of energy from renewable sources				124.0						124.0
Other natural inputs	0.3		0.2	1.8						2.0
Total energy from natural inputs	5.3	1 161.0	0.2	225.5						1 262.0
Energy products										
Transformation of energy products by SIEC class										
Coal				223.0						223.0
Heat and peat products										
Oil shale or sands										
Natural gas (extracted)				395.0						395.0
Natural gas (distributed)				87.0						87.0
Oil (e.g. conventional crude oil)			360.0							360.0
Oil (oil products)				16.0						16.0
Biofuels				31.0						31.0
Electricity										
Heat										
Nuclear fuels and other fuels nec										
Total transformation of energy products			360.0	752.0						1 112.0
End-use of energy products by SIEC class										
Coal	2.0	0.1	17.0				1.0	-21.0	1.9	1.0
Heat and peat products										
Oil shale or sands										
Natural gas (extracted)			39.0	0.1	12.0		25.0	2.0	201.0	262.1
Natural gas (distributed)									361.0	361.0
Oil (e.g. conventional crude oil)	2.0						102.0	-3.0	80.0	1 211.0
Oil (oil products)	34.0	2.0	326.0	1.5	621.0	49.0	102.0	5.0	80.0	7.0
Biofuels	0.3		0.2	1.5			33.0	0.3	1.0	79.4
Waste	3.0	0.1	4.0	37.0		1.0				234.0
Electricity	7.0	1.0	22.0	50.0	10.0	15.0	29.0		100.0	78.5
Heat	2.0		10.5	2.0	1.0	19.0	44.0			0.0
Nuclear fuels and other fuels nec										
Total end-use for energy purposes	50.3	3.2	418.7	90.6	632.0	96.0	240.0	-21.7	744.9	2 254.0
End-use of energy products for non-energy purposes										
Energy residuals										
Losses during extraction										45.0
Losses during distribution										12.0
Losses during storage										6.0
Losses during transformation										211.4
Other energy residuals										1 530.8
Total energy residuals										1 805.2
Other residual flows										
Residuals from end-use for non-energy purposes								51.0		51.0
Energy from solid waste	39.0		54.5							93.5
Total use	94.6	1 164.2	884.4	968.1	632.0	96.0	240.0	29.3	744.9	1 805.2



Energy aggregates

- **Gross Energy Inputs**
 - Total energy captures from the environment, energy products that are imported and energy from residuals within the economy
 - Indicator of the pressures places on the environment in the energy supply to the economy

= Energy from Natural Inputs + Imports of energy products + energy from waste
- **Net Domestic Energy Use**

= End-use of energy products – exports of energy products - all losses of energy

 - Indicator concerning energy use



C. Physical flow accounts for materials



Physical flow accounts for materials

- Focus either on particular materials or on specific types of flows
- Main areas
 1. Accounting for air emissions
 2. Accounting for emissions to water
 3. Accounting for solid waste
 4. Product flow accounting
- Focus on accounting for emission
 - Flow from the economy to environment



C.1. Accounting for air emissions



Emission to air

- Gaseous and particulate substances released by establishments and households as a result of production, consumption and accumulation process
- PSUT
 - Focus is on the generation and release of residuals

Air emission accounts

Households-
broken down
by purpose

Type of substance	Supply table for air emissions									Use table for air emissions			
	Generation of emissions									Accumulation	Total supply	Flows to the	Total use of
	Industries					Households				Emissions from	of emissions	Environment	emissions
	Agriculture	Mining	Manufacturing	Transport	Other	Transport	Heating	Other	landfill		Emissions released to the	environment	
Carbon dioxide	10 610.3	2 602.2	41 434.4	27 957.0	82 402.4	18 920.5	17 542.2	1 949.1	701.6	204 119.6	204 119.6	204 119.6	
Methane	492.0	34.1	15.8	0.8	21.9	2.4	15.5	1.7	222.0	806.3	806.3	806.3	
Dinitrogen oxide	23.7		3.5	0.8	2.6	1.0	0.2	0.1	0.1	32.0	32.0	32.0	
Nitrous oxides	69.4	6.0	37.9	259.5	89.0	38.0	12.1	1.3	0.3	513.6	513.6	513.6	
Hydrofluorocarbons			0.3		0.4					0.7	0.7	0.7	
Perfluorocarbons													
Sulphur hexafluoride													
Carbon monoxide	41.0	2.5	123.8	46.2	66.2	329.1	51.2	5.7	1.1	666.9	666.9	666.9	
Non-methane volatile organic compounds	5.2	6.5	40.0	16.4	27.2	34.5	29.4	3.2	0.9	163.3	163.3	163.3	
Sulphur dioxide	2.7	0.4	28.0	62.4	8.1	0.4	0.4	0.1	0.0	102.5	102.5	102.5	
Ammonia	107.9		1.7	0.2	0.9	2.3	11.4	1.2	0.2	125.9	125.9	125.9	
Heavy metals													
Persistent organic pollutants													
Particulates (incl PM10, dust)	7.0	0.1	8.5	9.3	4.4	6.0	2.8	0.5	0.0	38.5	38.5	38.5	



System of Environmental-Economic Accounting

United Nations Statistics Division

Economic boundary with respect to air emission

- Residence principle
 - Exclude emission released within a national territory by non-resident (e.g. tourist)
 - Emission abroad of resident economic units will be included
- Exclude
 - Air emission released in one country carried through to atmosphere into another country
 - Extent of the capture of gases by the environment
 - E.g. carbon captured in forests and soil
 - Emission from natural process which are not the direct result of economic production
 - E.g. Emission from human metabolic process, unintended forest



SEEA and UNFCCC framework

- UNFCCC emission inventories
 - Territory principle

- Main adjustment required to bridged SEEA air emission accounts and UNFCCC data concerns
 - Emission of residents abroad
 - Non-residents in the territory

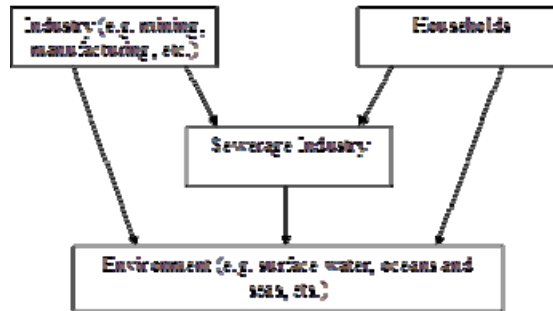


C.2. Accounting for emissions to water

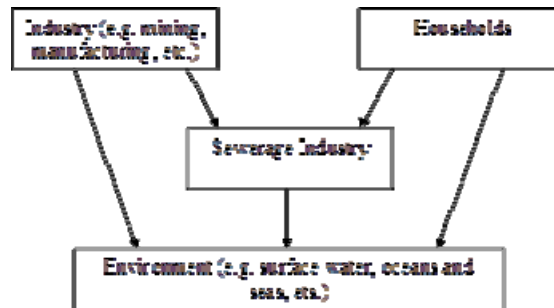


Emission to water

- Substances released to water resources by establishments and households as a result of production, consumption and accumulation process
- Flows:



Flows in water emission account





Water emission accounts

- Present information on the activities responsible for the emissions and releases, the types and amounts of substances, as well as the destination of the emissions (e.g. water resources or the sea).
- Useful tool for designing economic instruments, including new regulations to reduce emissions into the inland water system or seas and oceans.



Water emission accounts: coverage

- Record the quantity of substance added to water by establishment and households during an accounting period
- Cover
 - Substances added to wastewater and collected in the sewage system
 - Substances added to wastewater and discharged directly to water bodies
 - Substances from non-point sources
 - E.g. emissions from urban runoff and emissions from agriculture



PSUT: Key components

- Emission by types of substances (supply) and received by the environment (use)
 - Direct flow to the environment

- Release to (supply) and collection by (use) economic units
 - Flow to sewage industry

PSUT for water emission

Physical supply table for gross releases of substances to water							
	Generation of gross releases to water			Accumulation	Flows with the rest of the world	Flows from the environment	Total supply
	Sewerage industry	Other industries	Households				
Emissions by type of substance							
BOD / COD *	5 594	11 998	2 712				20 304
Suspended solids							
Heavy metals							
Phosphorous	836	1 587	533				2 956
Nitrogen	10 033	47 258	1 908				59 199
Releases to other economic units							
BOD / COD *		7 927	8 950				16 877
Suspended solids							
Heavy metals							
Phosphorous		814	6 786				7 600
Nitrogen		15 139	30 463				45 602
Physical use table for gross releases of substances to water							
	Collection of gross releases to water			Flows with the rest of the world	Flows to the environment	Total use	
	Sewerage industry	Other industries	Households				
Emissions received by the environment							
BOD / COD *					20 304	20 304	
Suspended solids							
Heavy metals							
Phosphorous					2 956	2 956	
Nitrogen					59 199	59 199	
Collection by other economic units							
BOD / COD *	16 877					16 877	
Suspended solids							
Heavy metals							
Phosphorous	7 600					7 600	
Nitrogen	45 602					45 602	



Sources of water emission

- Point sources
 - Geographical location of the discharge of the wastewater is identified
 - E.g. Sewage facilities, power plants, industrial establishments
- Non-point sources
 - Without a single point of origin or a specific outlet into a receiving water resources
 - E.g. Urban runoff, releases from individual and small scale activity



Inclusion and exclusion

- Do not include “imports” and “exports” of substances through natural flows of water resources
 - Substances in rivers crossing country borders are not included
- Included in the accounts are emissions of relevant substances from fixed assets, such as from vessels operating within a country’s water resources.
- Include emission due to activities undertaken in water resources or seas



C.3. Solid waste accounts



Solid waste accounts

- Organizing information on the generation of solid waste and the management of flows of solid waste to recycling facilities, to controlled landfills or directly to the environment
- Solid waste covers discarded materials that are no longer required by the owner or user



Principles of recording flows

- No payment received for discarding materials
 - Residual flow of solid waste
- Payment received for discarding materials
 - Product flow of solid waste
- Discard materials sold as second hand products
 - Flows of products



PSUT: Key components

- Generation (supply), collection and disposal (use) of solid waste residuals
- Generation and use of solid waste products



C.4. Product flow accounting



Product flow accounting

- Trace individual material from the environment, through the economy and back into the environment
 - Elements such as mercury
 - Nutrients such as nitrogen
- Materials flow can be analyzed by combining the physical flow data with the economic relationship in PSUT
- Relevant for demand base analysis of material flows



Nutrient balances

- Track the flows of soil nutrients from the soil through various product
 - Nitrogen
 - Phosphorous
 - Potassium
- Three types of physical flows
 - Product flows of fertiliser products
 - Flows of other organic inputs
 - Nutrient removal (e.g. when crops are harvested)