System of Environmental Economic Accounting

SUSTAINABLE DEVELOPMENT GOALS AND THE SEEA

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Content

- Supply and use in physical terms

- Asset account in physical terms

- SDGs

- Emissions (time permitting)

Supply and use

PHYSICAL SUPPLY TABLE (unit:PJ)	Production (incl. household own account) & generation of residuals								Accumula-tion	Flows from the rest of the World (Imports)	Flows from the environ-ment	TOTAL
	Industries (by ISIC)							Households				
	Agriculture Forestry & Fishery	Mining & Quarrying	Manufacturing	Electricity, gas, steam & air condition-ing supply	Transport-ation & Storage	Other Industries	**Total Industry**					
	(ISIC A)	**(ISIC B)**	**(ISIC C)**	**(ISIC D)**	**(ISIC H)**							
1. Energy from natural inputs:												
Natural resource inputs												
Oil resources										744		744
Natural gas resources										417		417
Timber resources										5		5
Inputs of energy from renewable sources										124		124
Other natural inputs (cultivated biomass)										2		2
2. Energy Products:												
Production of energy products by SIEC class:												
Coal										225		225
Peat and peat products												
Oil shale / oil sands												
Natural gas		395		369			764					764
Oil		721	347				1068			930		1998
Biofuels	5			2			7					7
Waste	39		55				94			17		111
Electricity				212			212			22		234
Heat				79			79					79
Nuclear fuels and other fuels												
3. Energy Residuals:												
Energy residuals from end use	50	3	419	91	632	96	1291	240				1531
Energy residuals from losses		45	13	216			274					274
4. Other Residual Flows:												
Residuals from end-use for non-energy purposes			51									51
Energy from solid waste									94			94
5. TOTAL SUPPLY	94	1164	885	969	632	96	3840	240	94	1194	1292	6660

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PHYSICAL USE TABLE (unit: PJ)	Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment
	Industries (by ISIC)							Households			
	Agriculture Forestry & Fishery (ISIC A)	Mining & Quarrying (ISIC B)	Manufacturing (ISIC C)	Electricity, gas, steam & air conditioning supply (ISIC D)	Transportation & Storage (ISIC H)	Other Industries	Total Industry				
1. Energy from natural inputs:											
Natural resource inputs											
Oil resources		744									
Natural gas resources		417									
Timber resources	5										
Inputs of energy from renewable sources				124							
Other natural inputs (cultivated biomass)				2							
2. Energy Products:											
Transformation of energy products by SIEC class:											
Coal				223			223				
Peat and peat products											
Oil shale / oil sands											
Natural gas				482			482				
Oil			360	16			376				
Biofuels											
Waste				31			31				
Electricity											
Heat											
Nuclear fuels and other fuels											
End-use of energy products by SIEC class:											
Coal	2		17				19		1	-20	2
Peat and peat products											
Oil shale / oil sands											
Natural gas	2		39			12	53		26	2	201
Oil	34	2	326		621	49	1032		102	-3	441
Biofuels				2			2		5		
Waste	3		4	37		1	45		33		1
Electricity	7	1	22	50	10	15	105		29		100
Heat	2		11	2	1	19	35		44		
Nuclear fuels and other fuels											
End-use of energy products for non-energy purposes			51				51				
3. Energy Residuals:											
Energy residuals from end use											1531
Energy residuals from losses											274
4. Other residual flows:											
Residuals from end-use or non-energy purposes									51		

Questions

- In looking at the data in the supply and use, what are some useful aggregates?

- What additional information would be useful to provide more context that would be relevant for policy purposes?

Asset account

	Type of Energy Resource (Class A: Comercially recoverable resources)	
	Oil Resources (PJ)	Natural Gas Resources (PJ)
Opening stock of mineral and energy resources	16000	12000
Additions to stock:		
Discoveries		
Upward appraisals		2000
Reclassifications		
TOTAL ADDITIONS TO STOCK		2000
Reductions in Stock:		
Extractions	744	417
Catastrophic losses		
Downwards reappraisals		
Reclassifications		
TOTAL REDUCTIONS IN STOCK	744	417
Closing Stock of mineral and energy resources	15256	13583

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Questions

- What is the links between the supply and use table and the asset account?

- What type of analysis can be done when putting together the information in the supply and use table and the asset account?

- What type of monetary information would be useful for policy purpose?

Goal 7-Targets and indicators (2 & 3)

Target	Indicator
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption
7.3 By 2030, double the global rate of improvement in energy efficiency	7.3.1 Energy intensity measured in terms of primary energy and GDP

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Questions

- Indicator 7.2—In practical terms, the numerator can be thought of as the total energy used that comes from renewable sources. The denominator is the total energy used. How can this be calculated from the information we have? Assume that 60% of energy from solid waste comes from renewable sources.

- Indicator 7.3—How can the accounts be used to calculate this indicator? What would be the value added of time-series data?

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Emisisons account

Energy product	Emission factor (ton CO2/TJ)
Coal	96
Natural Gas	53
Oil	84
Biofuels	110
Waste	100

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SOME THOUGHTS ON THE QUESTIONS RAISED

Questions

- In looking at the data in the supply and use, what are some useful aggregates?

  > Gross energy input=energy from natural inputs + imports + energy from solid waste=2580

  > Net domestic energy use= End use of energy products + end use for non-energy purposes + losses = 1856

  > Energy security= domestic production/net domestic energy use=0.75

- What additional information would be useful to provide more context that would be relevant for policy purposes?

  > Time series data, monetary information, dependence of certain sectors of the economy on certain energy products

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Questions

- What is the links between the supply and use table and the asset account?
    - > Extractions are the same as energy from natural inputs
- What type of analysis can be done when putting together the information in the supply and use table and the asset account?
    - > Given current extraction rates, how long with the resource last: Oil~20.5 yrs, Natural gas~32.5 yrs
- What type of monetary information would be useful for policy purpose?
    - > Valuation of the assets, taxes and subsidies

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Indicators

- Renewables share (7.2)
    - > Denominator is end use of energy products by industries and households (1582 PJ)
    - > Numerator is the part of end use that comes from renewable sources:
        - Biofuels (7==Timber + cultivated biomass)
        - Waste (79*0.6=47)
        - Electricity and heat –challenging as multiple products are used; but we can estimate it
        - 124 PJ inputs from renewable sources but some of this is imported; 100 PJ of electricity imported; Total use of electricity and heat is 313 PJ→ we can estimate the domestic portion of energy coming from renewable sources to be 68% or 84 PJ
        - Total then is 7+47+84=138
    - > Indicator is 8.7%
    - > Exclusion of losses

Indicators

- Renewables share (7.2)—another approach based on supply of energy

    > Denominator is gross energy inputs (2580 PJ)

    > Numerator is the part that comes from renewable sources:

    - Inputs of imports from renewable sources (124 PJ)

    - Biofuels (7==Timber + cultivated biomass)

    - Waste (94*0.6=56) –we are including all waste here

    - Electricity and heat – challenging to deal with imports; lets assume that all imports of electricity are from renewable sources-

    - (124+7+56+22)/2580=8%

Indicators

- Intensity by industry(7.3)

  > Denominator is GVA

  > Numerator is end use of energy (using terajoules for presentation purposes)

	Agriculture Forestry & Fishery (ISIC A)	Mining & Quarrying (ISIC B)	Manufacturing (ISIC C)	Electricity, gas, steam & air condition-ing supply (ISIC D)	Transport-ation & Storage (ISIC H)	Other Industries	**Total Industry**
End use of energy (terajoules)	50000	3000	470000	91000	632000	96000	1342000
GVA	8659	10526	5546	21407	35063	738690	819891
Intensity	5.77	0.29	84.75	4.25	18.02	0.13	1.64

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Emissions

- Emissions resulting from end use of energy is defined as emission factor time end use of energy

- Emission factors can be found in relevant scientific literature.

Product	Emission factor	End use	Emission
Coal	96	20	1920
Natural gas	53	79	4187
Oil	84	1134	95256
Biofuels	110	7	770
Waste	100	78	7800
		TOTAL	109933

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THANK YOU

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