System of Environmental Economic Accounting

Energy Accounts

An Introduction: 10:00–11:00
How to compile: 11:15 - 12:00
Exercise: 14:00 – 14:30

Regional Training Workshop on an Accounting Approaches to Climate Change Policy

Nairobi, 4-5 September 2023

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Key Purpose and Content of this section

- Key purpose: Constructing an Energy Account is not "business as usual". It requires a development phase.
- Key Content
  - There is an important formal story to know
  - Lessons learnt from implementing Energy EEAs in Kenya, Mozambique and South Africa
  - There is an important practical story to know

System of Environmental Economic Accounting

The Formal Story

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SYSTEM OF ENVIRONMENTAL ECONOMIC ACCOUNTING

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What is the SEEA?

The System of Environmental-Economic Accounting (SEEA) is a framework that integrates economic and environmental data to provide a more comprehensive and multipurpose view of the interrelationships between the economy and the environment and the stocks and changes in stocks of environmental assets, as they bring benefits to humanity. It contains the internationally agreed standard concepts, definitions, classifications, accounting rules and tables for producing internationally comparable statistics and accounts. The SEEA framework follows a similar accounting structure as the System of National Accounts (SNA). The framework uses concepts, definitions and classifications consistent with the SNA in order to facilitate the integration of environmental and economic statistics. The SEEA is a multi-purpose system that generates a wide range of statistics, accounts and indicators with many different potential analytical applications. It is a flexible system that can be adapted to countries' priorities and policy needs while at the same time providing a common framework, concepts, terms and definitions.

Want to learn more? Visit our Frequently Asked Questions page!

Current events

London Group on Environmental Accounting, 29th Meeting

11 September 2023 to 14 September 2023

Africa NCA Policy Forum: Using Natural Capital Accounting and Analysis to Inform Policies for Development, Climate Change and Nature Protection

06 September 2023 to 07 September 2023

Regional Training Workshop on an Accounting Approach to Climate Change Policy

04 September 2023 to 05 September 2023

New Articles

The 18th Meeting of the UNCEEA

30 June 2023

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SEEA-Energy

Energy statistics and accounts serve as tools to develop and strengthen energy information systems in countries. Energy statistics are often developed to address specific policy questions and issues, and energy accounts merge a wide range of energy related statistics across sectors into one consistent framework.

SEEA-Energy

SEEA-Energy is a multi-purpose conceptual framework for organizing energy-related statistics. It supports analysis of the role of energy within the economy, the state of energy inputs and various energy-related transactions of environmental interest. It is fully consistent with the SEEA Central Framework. Energy information is typically presented in physical terms, but the SEEA-Energy also applies monetary valuations to various stocks and flows, based on the SEEA accounting approach. Two main types of accounts capture relevant energy information in a systematic way:

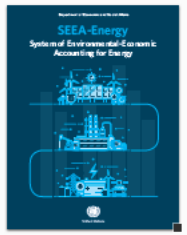
1. **Flow accounts**: In physical terms these accounts record physical flows of energy between the environment and the economy. Physical flows are recorded in joules to provide a common unit to aggregate across energy sources. Parallel monetary accounts then record the monetary flows associated with energy-related transactions for energy products.
2. **Asset accounts**: These accounts measure the quantity of mineral and energy resources and changes in these resources over an accounting period. These accounts can be compiled in physical terms, which provide valuable information about energy resource availability. They can also be compiled in monetary terms to show the contribution and depletion to natural capital of energy resources.

Manuals and Technical Notes

SEEA-Energy

Final: English

Draft Technical Note on Energy (English)



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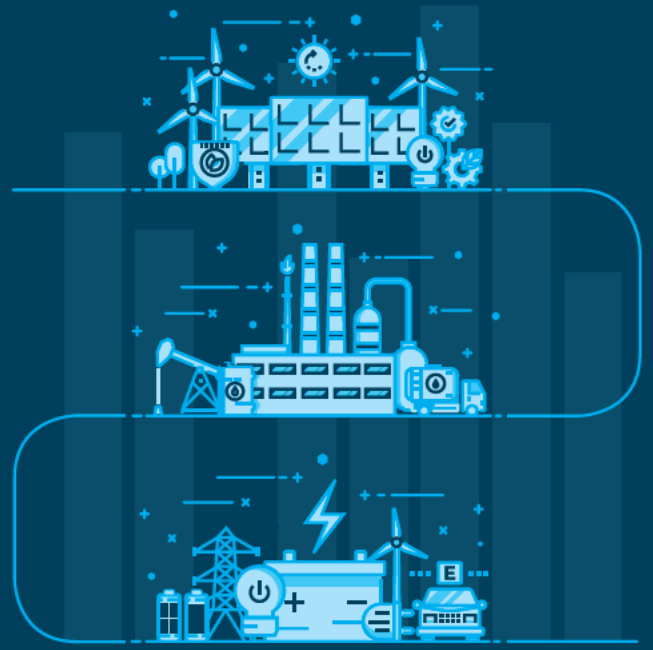
Department of Economic and Social Affairs

SEEA-Energy

System of Environmental-Economic Accounting for Energy



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Discussion: Which one is most important?

Flow Account – Physical	Flow Account - Monetary
Stock Account - Monetary	Stock Account - Monetary

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Table 2.1
Basic form of a physical supply and use table for energy (joules)

Supply table						
	Industries	**Households**	**Accumulation**	**Rest of the world**	**Environment**	**Total**
Energy from natural inputs					A. Energy inputs from the environment	Total supply of energy from natural inputs
Energy products	C. Output			D. Imports		Total supply of energy products
Energy residuals	I. Energy residuals generated by industry	J. Energy residuals generated by household consumption	K. Energy residuals from accumulation	L. Energy residuals received from the rest of the world	M. Energy residuals recovered from the environment	Total supply of energy residuals

Use table						
	Industries	**Households**	**Accumulation**	**Rest of the world**	**Environment**	**Total**
Energy from natural inputs	B. Extraction of energy from natural inputs					Total use of energy from natural inputs
Energy products	E. Intermediate consumption	F. Household consumption	G. Changes in inventories	H. Exports		Total use of energy products
Energy residuals	N. Collection and treatment of energy residuals		O. Accumulation of energy residuals	P. Energy residuals sent to the rest of the world	Q. Energy residual flows direct to environment	Total use of energy residuals

Note: Dark grey cells are null by definition.

Maintain a Policy Perspective

Discussion:

1. What are the most important energy sources in your country?
2. What are the largest and/or most crucial energy requirements in your country?
3. What are the energy challenges your politicians are most concerned about?

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Five questions

How many people in SSA do not have access to electricity?
How much energy did SSA produce before COVID?
What is SSA's largest energy consumption sector?
How will renewables transform SSA's energy economies?
What do most household rely on as a source of energy?

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More than 596 million people in SSA do not have access to electricity

https://www.iea.org/data-and-statistics/charts/people-without-access-to-electricity-in-sub-saharan-africa-2000-2021

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Total Electricity Supply

	GWh	5-year growth	Proportions
Total production (SSA)	452,747	2.0%	
Hydro	109,695	3.1%	24.2%
Renewables	17,197	46.8%	3.8%
Coal and Crude	259,000	-0.4%	57.2%
Natural gas	54,682	8.5%	12.1%
Other	12,173	-3.3%	2.7%

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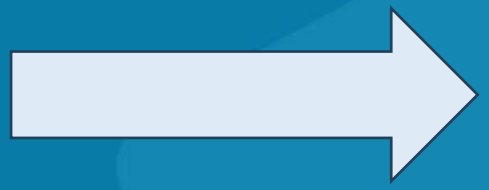
Total Energy Supply

KTOE--	Sub-Saharan Africa
771,680	Production
102,571	Imports
- 340,509	Exports
- 4,216	International marine bunkers
- 5,772	International aviation bunkers
2,113	Stock changes



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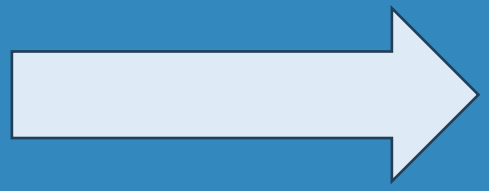
Total Energy Consumption



KTOE--	Sub-Saharan Africa
385,191	Total final consumption
54,182	Industry
68,855	Transport
230,875	Residential
16,194	Commercial and public services
4,442	Agriculture / forestry
123	Fishing
2,821	Non-specified
7,700	Non-energy use

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What happens in the middle?

KTOE--	Sub-Saharan Africa
525,877	Total Energy Supplied
789	Transfers
1,926	Statistical differences
- 57,899	Electricity plants
- 5	CHP plants
	Heat plants
- 1,327	Gas works
- 569	Oil refineries
- 1,673	Coal transformation
- 2,551	Liquefication plants
- 50,077	Other transformation
- 24,258	Energy industry own use
- 5,041	Losses
-385,191	Total final consumption

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Biomass collections in SSA are from felling trees for firewood to cook on and as a source of charcoal. This practice occurs widely and in an unregulated and unsustainable manner. The proportion of biomass to the TES in SSA has remained stable over the past three decades: 56.5% in 1990 and 55.6% in 2018. The total volume of energy derived from this source has more than doubled at the same time, growing from just below 6 billion MMBtu in 1990 to just over 12.1 billion MMBtu in 2018. This is a major cause for concern, as it is driving a high rate of deforestation across the continent and releasing high levels of carbon emissions from the burning of biomass. Africa has the highest net loss of forest area in the world, with an annual net loss of 3.9 million hectares between 2010 and 2020 (FAO 2020). In SSA, the forest area (as a percentage of land area) has declined by an estimated 3.3% (World Bank Data ; FAO 2018).

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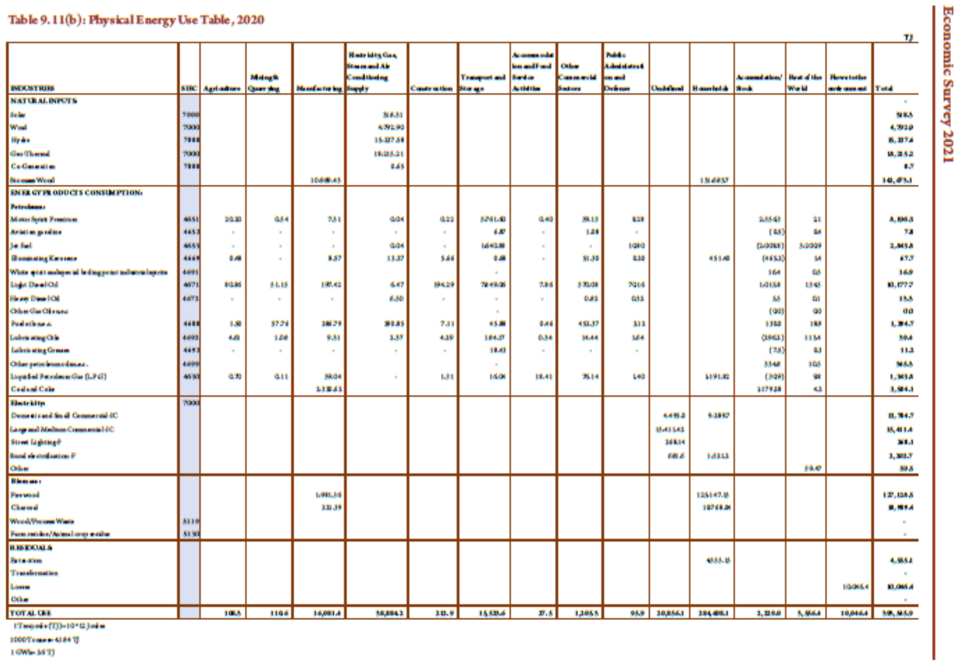
Lessons learnt from implementing Energy-EEAs in Kenya, Mozambique and South Africa

1. Maintain a policy perspective
2. Be practical: use the current Statistical Process as a point of departure
    1. Determine the most likely publication within which the EEA will be published
    2. Align the planning process with the timeframe required for the selected publication
1. Develop an EEA reporting framework, in Excel, that comprises the following:
    1. Data input section
    2. Start with an Energy Balance (physical and monetary IOs)
    3. End with Supply and Use Tables
2. Data pragmatism:
    1. Start with available data (we have found up to 67% of EEA data can already be present within the databases of the statical agency, often collected for other purposes)
    2. Do a data quality assessment
    3. Recommend data improvements for future reporting
3. Be brave on three fronts

Use existing Statistical Process as a point of departure

Structure of Accounts in Kenya as a great example:

1. Energy Balance
2. Supply and Use Tables
3. Summary Tables



Energy Accounts

Environmental Economic Accounts (EEA)

9.22. Environmental Economic Accounts are systems of accounts used for accounting for natural resource utilization. The accounts take stock of natural resources from the point of extraction to intermediate use by industries, to final use, to residuals/waste which are eventually disposed back to the environment. In addition, the accounts seek to promote efficient natural resource accounting and ensure a country is able to track how much it has utilized, estimate reserves in the environment, and promote proper disposal of residuals for environmental sustainability. The System of Environmental Economic Accounts (SEEA) framework follows a similar accounting structure as the System of National Accounts (SNA). The concepts, definitions and classifications used in SEEA are consistent with the SNA in order to facilitate the integration of environmental and economic statistics.

Energy Balance 2020

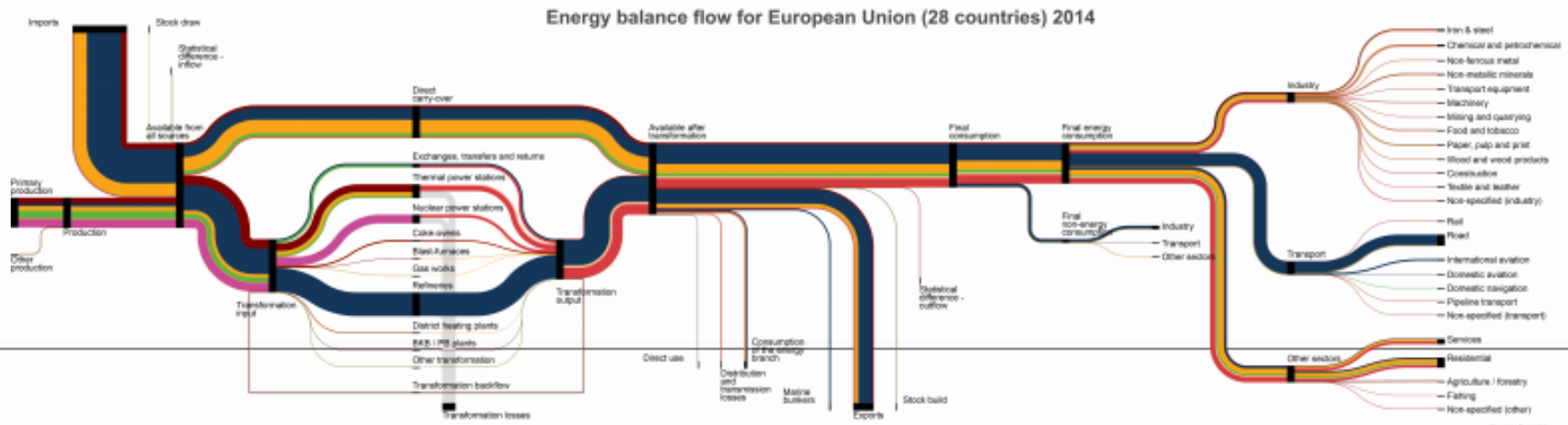
9.23. Table 9.10(a) shows energy balance for coke and coal and renewable feed stocks in 2020. Renewable feed stocks include wood charcoal, fuel wood and wastes or scraps. Total supply of coke and coal and renewable feed stocks was 146,173.0 Tera Joules (TJ) in 2020. About 98.5 per cent of renewable feed stocks was demanded by households in 2020.

Be brave on three fronts

1. As statisticians we operate on a day-to-day basis in a highly structured system – when we do an Energy EEA for this first time, that structure need to be created first – face the developmental challenge bravely
2. Managers, give your statistical staff time and space to engage the developmental challenge, and allow for a continuous improvement process
3. Statisticians, give yourself time and space to engage the developmental challenge

Practical Steps to Follow

1. Brainstorm user requirements (key energy issues)
2. Identify core Energy Account development team
3. Workshop
    1. Energy balance design
    2. Workplan
4. Assemble/collect/mine available data related to key energy policy focus areas
5. Develop in Excel: Energy balance, Input-output tables and Supply-Use tables
6. Select most practical statistical publication
7. Proceed through the statistical process



SEEA

Facilitated Work Session

- Construct Energy Balance
- Construct I-O Tables
- Construct Physical SUTs
- Discuss monetary data sources

- 2x Flip Charts
- Excel and Data Projector