

Module 5. Biofuels consumption data: What data are needed?

Workshop on the Strategic Framework for the African Bioenergy Data Management

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Outline

- Introduction
- Data collection strategies
- Data sources and data collection methods
- Biofuels consumption data
- Household data
- Data from enterprises
- Conclusion

Introduction



Introduction

- The energy data collection depends on country's needs and circumstances.
- The collection of energy data must take into account:
 - Scope of data items (products and flows);
 - Coverage of statistical units;
 - Selection of data sources;
 - Organization of data collection processes;
 - Reliability of collection methods.

An integrated approach to energy data collection

- The collection of energy data should be seen as an integral part of the data collection activities of the national statistical system in order to ensure the best possible **data comparability** and **cost efficiency**.
- In this context, close **collaboration** between energy statisticians and compilers of industrial statistics, as well as statisticians responsible for conducting household, labour force and financial surveys, is of paramount importance and should be fully encouraged and systematically promoted.

(From IRES 7.33)

- A collaborative relationship will create a better understanding of the information, provide an opportunity to incorporate energy items into non-energy specific questionnaires, taking into account the priorities and specific needs of the energy industries, and facilitate the conduct of a cost-benefit analysis.
- The establishment or improvement of the regular programme of energy data collection should be part of a long-term strategic plan in the area of official statistics.



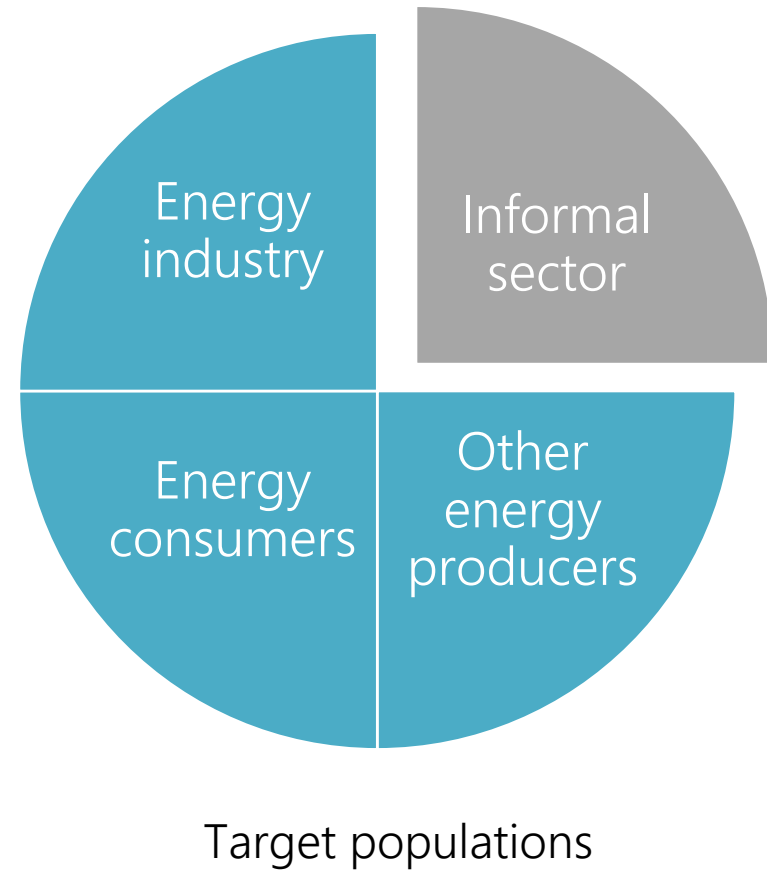
Data collection strategies



Data collection strategies

Scope and coverage of energy data collection involve:

- Conceptual design;
- Target populations;
- Geographical coverage.



Data collection strategies

Periodicity and frequency of data collection:

- Reference period
(time period to which data relate)



- Frequency of collection



- Point in time



Data sources and data collection methods



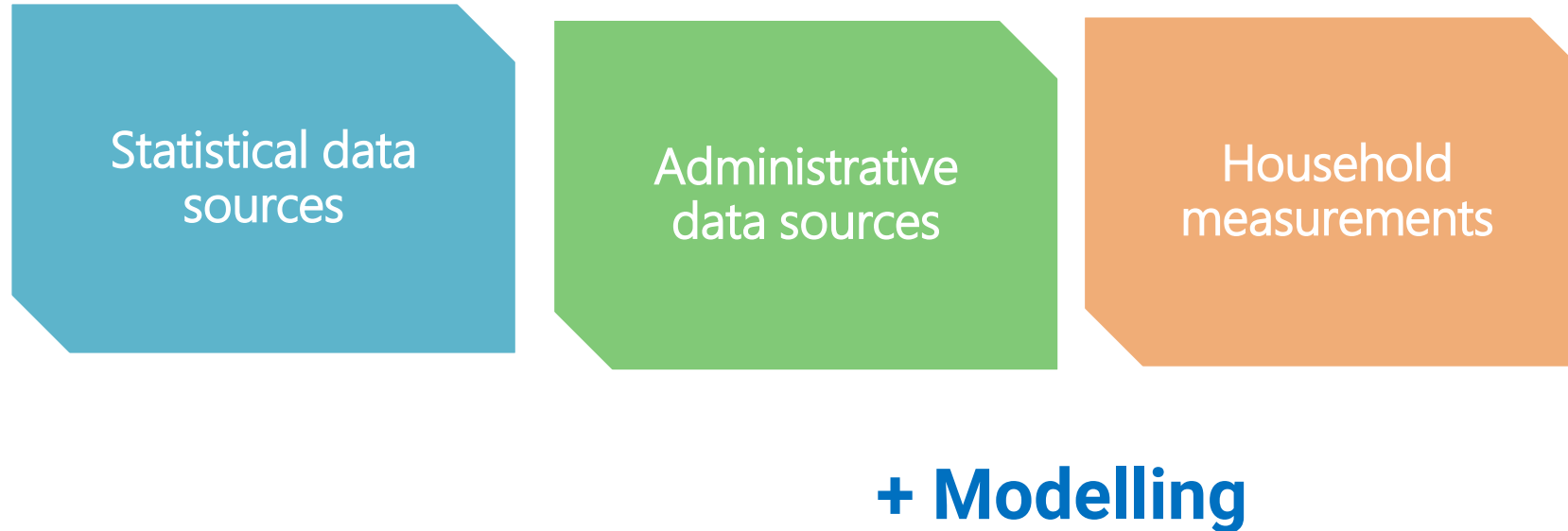
Organization of data collection

Fundamental steps in producing energy statistics:

- Identify the production, supply, transformation and consumption flows for each fuel product;
- Assess the potential data sources for each stage of the energy chain;
- Consider the most appropriate collection methods.

Data sources and data collection methods

National energy data framework typically employs four data collection methods:



Many countries combine variations of these four approaches to obtain the information they require to generate energy balances within a national energy framework.

Data sources and data collection methods

- The generation of energy statistics is based on data collected from two main sources:
 - **Statistical data sources** that provide data collected exclusively for statistical purposes from censuses and/or sample surveys;
 - **Administrative data sources** that provide data created originally for purposes other than the production of statistical data.
- (IRES 7.36)

Data collection – administrative data sources

- Administrative records are publicly or privately-owned data collected for non-statistical purposes.

Public sector data

- Energy monitoring;
- Regulatory policies and audits;
- Assessment of policies, programmes, initiatives
- Taxes

Privately-owned data collected

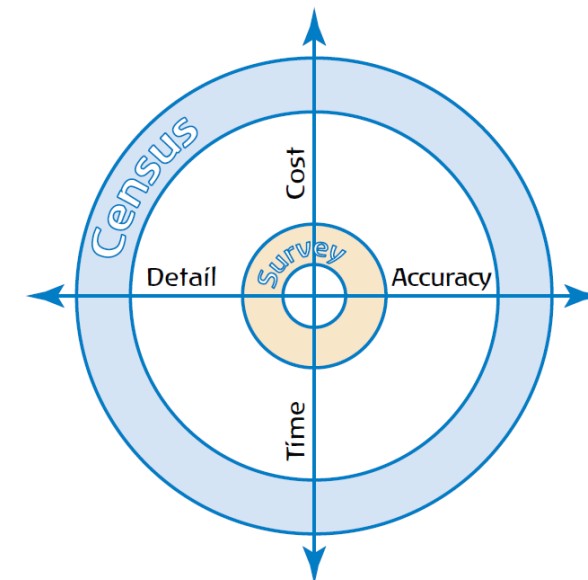
- Trade associations;
- Energy research institutes.

- Administrative records can only be used for statistical purposes if legislation allows the data to be shared. The use of Administrative Data for statistical purposes calls for legislation permitting data to be shared between the national statistics office and the agency responsible for data collection.
- The quality of administrative data should be assessed by the statistical authority.

Data collection – statistical data sources

Statistical data sources are data collected exclusively for statistical purpose. There are two principal types of surveys: sample surveys or censuses.

- **Sample surveys are** conducted by enumerating a ‘subset’, or sample, of comparable and representative units selected from the target population.
- Examples: enterprise surveys, household surveys, and mixed household-enterprise surveys.
- **Census** obtains data from **ALL** the targeted units in the statistical universe (e.g. all energy producers).
- Censuses are time-consuming, resource-intensive, costly, and represent a significant response burden.
- However a census maybe the best choice for collecting energy statistics when there are only a few businesses and not comparable to others (i.e. Oil refinery with blenders).



Trade-off between survey and census

Source: IEA, Energy Efficiency Indicators: Fundamentals on Statistics, 2015

Data collection: before planning a survey

Before embarking on new data collection via survey, it is important to do proper research and verify if data already exist (administrative data, business associations, etc.).

- Is the legal framework adequate for using those sources?
- Are institutional arrangements already in place to allow data sharing?

If the data do not exist, verify if existing surveys could be built upon.

- Is fuel use information collected in household surveys?
- What about business or agricultural surveys?

Ensure that resources are available for surveys to be carried out frequently.

- Even if it means a more complete survey every 5 years (establishing a base year), followed by a less detailed annual one (with a smaller sample), which allows extrapolations to be made.

In case of starting a new data collection, it is important to consult to other countries, international organizations, review good and bad practices.

Data collection: before planning a survey

Adding questions to an existing survey is a good choice when:

- Information required is specific and restricted in volume,
- The complexity of the data is low and questions are self-explanatory,
- The survey targets a specific group.

Advantages of **using an existing survey** are:

- Less expensive than a new survey
- Respondent burden is normally lower

Biofuels consumption data



Which products are considered?

Fuelwood; Cubic metres, thousand

Charcoal; Metric tons, thousand

Bagasse; Metric tons, thousand

Animal waste; Terajoules

Other Vegetal Material and Residues; Terajoules

Black liquor; Terajoules

Biogasoline; Metric tons, thousand

Biodiesel; Metric tons, thousand

Bio jet kerosene; Metric tons, thousand

Other liquid biofuels; Metric tons, thousand

Biogases; Terajoules

Which consumption sectors are considered?

Industry

- Iron and steel
- Chemical and petrochemical
- Non-ferrous metals
- Non-metallic minerals
- Transport equipment
- Machinery
- Mining and quarrying
- Food and tobacco
- Paper, pulp and print
- Wood and wood products
- Construction
- Textile and leather
- Not elsewhere specified (industry)

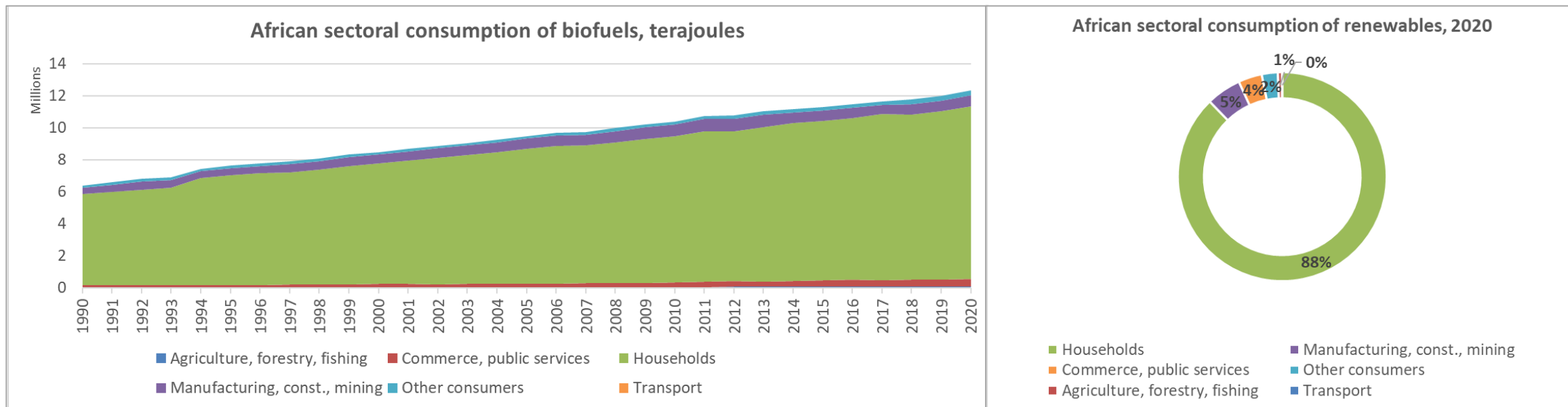
Transport

- Road
- Rail
- Domestic navigation
- Domestic aviation
- Not elsewhere specified (transport)

Other

- Households
- Agriculture, forestry and fishing
- Commerce and public services
- Not elsewhere specified (other)

Final energy consumption



Household data



Household biofuels consumption

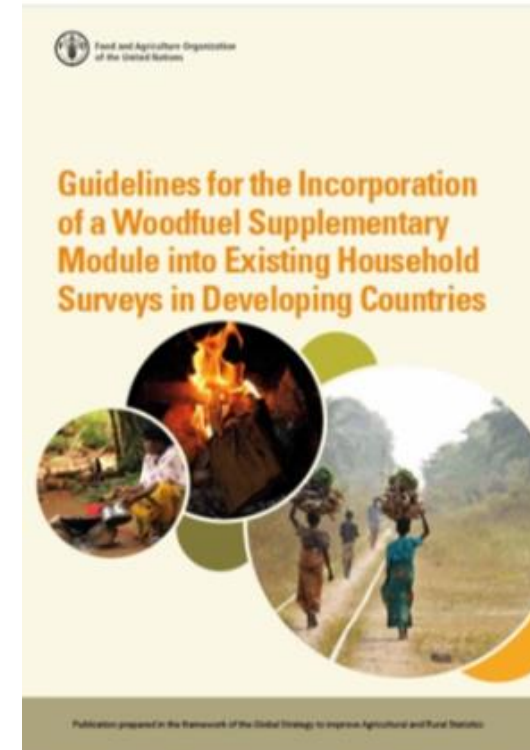
Household surveys are essential for collecting information on energy consumption in the residential sector.

- Population of interest – all the households, rural and urban.
- Results from the survey could be grossed up by using population figures for rural and urban households (in this exists, or for total number of persons)
- Energy survey for households are in some countries carried out as an additional module to the household budget studies.
- Households often have reliable information on energy costs, but not on their energy use in physical units (e.g. kWh, cubic meters). There exists materials on how to help respondents to estimate the quantities (e.g. by showing a picture of different amount of fuelwood, or asking about consumption over a longer period).
- Households survey are key to collect data on both biofuels consumption and production.

Example: FAO fuelwood supplementary module in the households' survey

- The goal of the supplement is to help countries collect reliable and comparable data on fuelwood production and consumption in the informal sector.
 - Incorporated into existing household surveys.

SECTION 2: FUELWOOD																																															
2.A USE OF FUELWOOD																																															
1. In the last 7 days, did you or any member of your household use fuelwood for any domestic, agricultural, commercial, cultural or religious purpose?																																															
YES <input type="checkbox"/> 1 NO <input type="checkbox"/> 2 Skip to Question 7																																															
2. In how many days?																																															
3. What was the usual amount of fuelwood consumed by the household in one day?																																															
<table border="1"> <thead> <tr> <th colspan="6">A. WEIGHT</th> <th colspan="6">B. VOLUME</th> </tr> <tr> <th>Type of fuelwood</th> <th>Quantity (kg)</th> <th>Unit weight (kg)</th> <th>Total weight (kg)</th> <th>Type of fuelwood</th> <th>Type of fuelwood</th> <th>Q1 (m)</th> <th>Q2 (m)</th> <th>L (m)</th> <th>Volume (m³)</th> <th>Type of use</th> <th>Type of use</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>												A. WEIGHT						B. VOLUME						Type of fuelwood	Quantity (kg)	Unit weight (kg)	Total weight (kg)	Type of fuelwood	Type of fuelwood	Q1 (m)	Q2 (m)	L (m)	Volume (m ³)	Type of use	Type of use												
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4. (ENUMERATOR: Record the value of wood moisture as shown on the display of the hygrometer) <input type="text"/> %																																															
OBSERVATIONS																																															
5. In the last 7 days, did your household use fuelwood for:																																															
YES <input type="checkbox"/> 1 NO <input type="checkbox"/> 2 ANSWER CODE																																															
01	Cooking at home?																																														
02	Having picnic, barbecue?																																														
03	Space heating?										OBSERVATIONS																																				
04	Other domestic uses, such as lighting, warming water for bathing, laundering, ironing, or smoking against insects?																																														
05	Agricultural uses, such as roasting coffee, curing tobacco, preparing feed for animals, heating greenhouses, poultry-houses or vermin-houses?																																														
06	Commercial uses, such as boiling bread, smoking fish, brewing alcoholic beverages, vending street food, running artisanal workshops or micro-industries (excluding charcoal production)?																																														
07	Cultural or religious uses, such as operations, incense-burning, other religious rituals or cultural traditions?																																														
ENUMERATOR																																															
<p>How to weigh wood? Place a bundle (or 10 x 10 x 10 cm) with the usual quantity of fuelwood used for the last declared use and weigh it with the provided scale. If quantity is such that more than one bundle should be weighed, weigh only one bundle and ask the total number of bundles or cubic meter. Total quantity recorded expressed in kg, following question (also in the following sections of the module) should be expressed in terms of number of bundles or m³ for one weighed, allowing for fractions thereof. Fuelwood should only be weighed once.</p> <p>How to estimate volume? Record the values of diameter at necking (d₁ and d₂) and the length (L) of the log in the appropriate units. The three measures must be expressed in meters. Then calculate the volume using the below formula: $V = \frac{\pi(d_1^2 + d_2^2) * L}{4}$. The final weight is obtained by multiplying the volume by the density coefficient of wood, which depends on the tree species.</p> <p>How to estimate weight? Weight should only be estimated when there is no wood to weigh at home at the time of the interview, but small-scale activity wood during the reference period. The respondent should estimate the daily amount of wood using each of the measurement of its characteristics (tree species, local, trade, etc.) although the final estimate should always be expressed either in kg or in m³.</p> <p>How to measure wood moisture? Insert the needle tip of the provided hygrometer into the wood used to fire the furnace. Then [enter] the readout against these lines and record the value of moisture content on the display of the hygrometer.</p>																																															



Data from enterprises



Obtaining data from enterprises

- Administrative data (like operation data from power plants, can sugar associations, etc).
- Census/enterprise surveys (e.g. industries, services).

Enterprise surveys

- Enterprise surveys are those in which the sampled units are enterprises from which data are obtained.
- The sampling :
 - List-based: the initial sample is selected from a pre-existing list of enterprises;
 - Area-based: the sampling units are selected from a set of geographical areas.
- In many countries, a 'business register' is maintained, which lists all the enterprises (active and non-active) in the economy, from which samples can be drawn.
- Stratified sampling based on: type of activity; geography (e.g. different regions.); size (turnover).
- Sampling strategy often is in-line with other enterprise surveys

Biofuels production survey

In some cases, industry or agriculture sector may produce biofuels for their own consumption (e.g., biogas digesters). This information could be collected via:

- Annual questionnaire;
- Often together with agriculture, forestry or waste surveys;
- May also include details of customers/end-uses.

Example: Canada, Annual industry energy consumption questionnaire

Business activity

1. Statistics Canada uses the **North American Industrial Classification System** to classify the activities of each business. According to our records, this business's **main activity** is classified as:

Is this the **main activity** of this business?

B05002

Yes, this is the **main activity** of this business. ▶ **Go to question 1c**

No, this is **not the main activity** of this business. ▶ **Go to question 1a**

▼

a. Was this business's main activity, which typically generates the most revenue, **ever** classified as described above?

B05111

Yes ▶ **When did the main business activity change?** ▶ **Date :** B00219

YYYY MM DD

No ▶ **Go to question 1b**

▼

b. Please provide a **brief but precise description** of this business's **main activity** (e.g., "breakfast cereal manufacturing" or "shoe store" or "software development").

B05003

c. Approximately what **percentage of this business's revenue** is generated by this **main activity**? Estimates are acceptable. B05004 %

Are there any other activities that **contribute significantly** (at least 10%) to this **business's revenue**?

B05024

Yes ▶ **Go to question 1d**

No ▶ **Go to next page**

d. Please provide a **brief but precise description** of this business's **secondary activity** (e.g., "breakfast cereal manufacturing" or "shoe store" or "software development").

B05005

Example: Canada, Annual industry energy consumption questionnaire

Type of energy consumed					
1. Which type of energy was consumed by this business?					
Type of energy commodity <small>Please report only the consumed portion</small>	Unit of measure	Amount consumed			
		* as fuel for the production process	to produce steam for sale to another business	to produce electricity	** for non-energy use
Electricity					
self-generated	E42001_UOM E42001		 	 	
purchased	E46001_UOM E46001		 	 	
Natural gas					
	E61002_UOM E61002		E61003	E61004	E61005
Propane					
	E61007_UOM E61007		E61008	E61009	E61011
Middle distillates					
diesel (on-site only)	E61013_UOM E61013		E61014	E61015	E61016
light fuel oil	E61018_UOM E61018		E61019	E61021	
kerosene and other middle distillates	E61022_UOM E61022		E61024	E61025	
Heavy fuel oil					
foreign country	E61027_UOM E61027		E61028	E61029	E61031
Canadian (domestic) companies	E61033_UOM E61033		E61034	E61035	E61036
Wood and wood waste	E61038_UOM E61038		E61039	E61041	
Spent pulping liquor	E61043_UOM E61043		E61044	E61045	
Refuse — please specify:					
	B40034_p9 E61047_UOM E61047		E61048	E61049	E61051

Example: UK, Liquid biofuels data

- “The Department for Transport produce statistics on the volumes of biofuels supplied to the UK road market under the Renewable Transport Fuels Obligation (RTFO).
- Under the RTFO, all road transport fossil fuel suppliers are required to provide a volume of sustainable renewable fuel as a percentage of the total road and non-road mobile machinery fuels they supply. By 2020, 9.75% of all fuel supplied by fossil fuel companies is required to be renewable. Similarly, under the RTFO, suppliers are also required to submit reports on the carbon and sustainability standards of the renewable fuels.
- Published reports include information on the volumes of fuel supplied to the UK road market:
 - by fuel type (e.g. biodiesel, bioethanol);
 - by feedstock (e.g. oilseed rape, used cooking oil, sugar beet);
 - by country of origin (e.g. UK); and
 - whether it meets sustainability standards and the lifecycle greenhouse gas savings of fuels.”

UK government website, **Renewable fuel statistics**

Conclusion



Example of data sources

Energy sector

- Producing biofuels – energy company survey
- Producing electricity and heat – energy company survey
- Consuming biofuels - energy company survey

Industry consumption

- Producing biofuels – biofuels survey
- Producing electricity and heat – enterprise survey
- Consuming biofuels – enterprise survey

Household consumption

- Producing biofuels – household survey
- Consuming biofuels – household survey

Transport consumption

- Consuming biofuels - enterprise survey

Commerce/services, others consumption

- Producing biofuels – biofuels survey
- Consuming biofuels – enterprise survey

+ Trade data

Sharing knowledge and practices

Energy Statistics

Country Practice Examples

As part of the preparation of the Energy Statistics Compilers Manual (ESCM), a country practice template was developed by the Oslo Group in cooperation with UNSD. The use of a common format facilitated the review and comparisons of country practices and has fed into the ESCM. As the ESCM is foreseen to be periodically reviewed and updated, national institutions responsible for energy statistics are encouraged to keep using this template to share their practices in the collection, compilation and dissemination of energy statistics. This way, future revisions of the ESCM will reflect new methodological developments and keep data compilers abreast of new country practices.

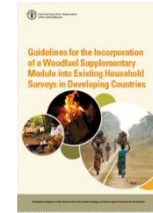
The Country Practice Template is available [here](#). It provides a common format for countries to report and share their practices in the collection, compilation and dissemination of energy statistics. The filled template can be submitted to UNSD at energy_stat@un.org.

Responses by Topic Responses by Country

Browse contents by country:

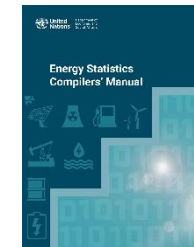
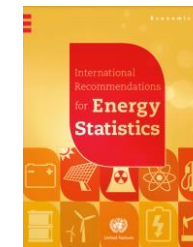
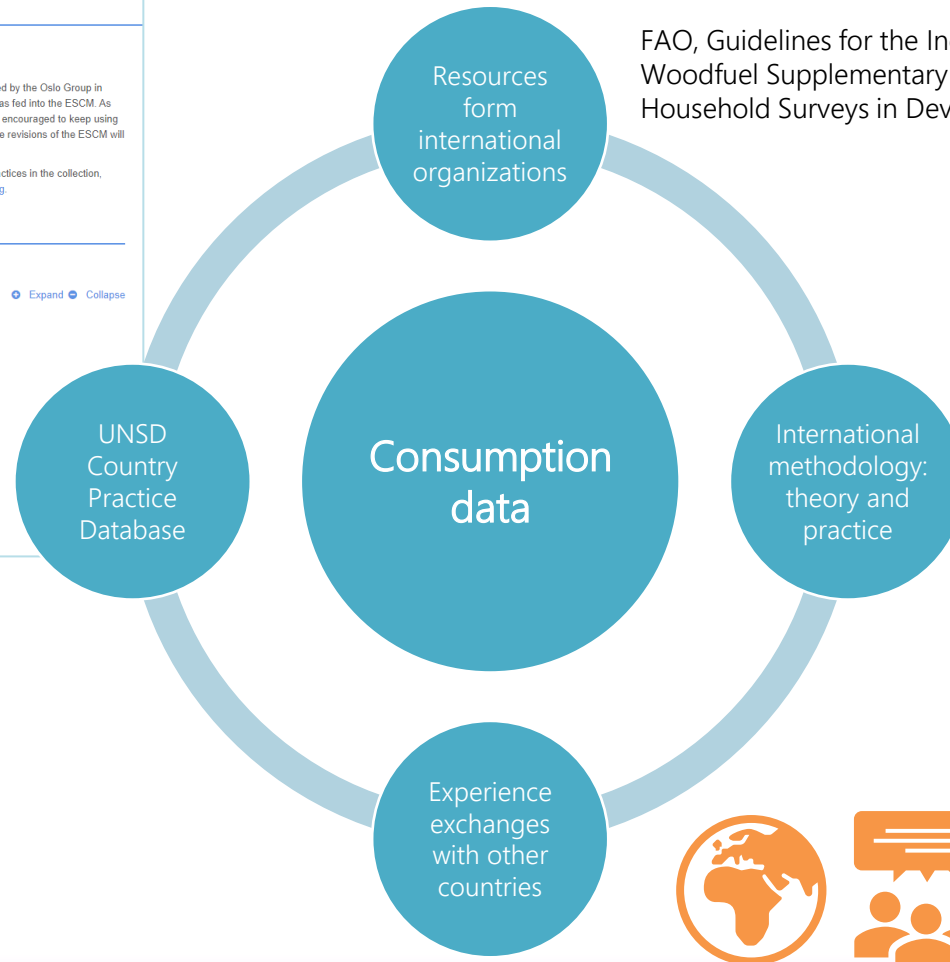
- Argentina
- Australia
 - Energy consumption [PDF](#)
- Austria
 - Electricity and natural gas consumption [PDF](#)
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 - Energy consumption in industry [PDF](#)
 - Energy consumption in the service sector [PDF](#)
 - Input and output of biomass heating [PDF](#)
- Azerbaijan
- Belarus
- Bosnia and Herzegovina
- Brazil
- Canada
 - Energy consumption in industry [PDF](#)

<https://unstats.un.org/unsd/energystats/country-practice/>



SECTION 2: FUELWOOD	
2.A USE OF FUELWOOD	
1. Type of fuelwood	2. Quantity of fuelwood used
3. Source of fuelwood	4. Method of collection
5. Use of fuelwood	6. Other information

FAO, Guidelines for the Incorporation of a Woodfuel Supplementary Module into Existing Household Surveys in Developing Countries.





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Nations**

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Division**

Thank you.

Contact

UNSD – Energy Statistics Section

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