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Where to find data, how to collect data, and how to analyse data

Webinar: SECAP Walkthrough Part 2

Empowering Local Public Authorities to Build Integrated Sustainable Energy Strategies

19/06/2018

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Methodology for the development of the Baseline Emission Inventory



- **It is strongly recommended** to collect the actual energy consumption data (Option A)
- **When the collection of the actual energy consumption data is not feasible** it is suggested to estimate the required energy consumption data (Option B) under the prerequisite that the assumptions will comply with the requirements of the Covenant of Mayors.
- **A template for data collection and energy balance/BEI elaboration** has been prepared by EMPOWERING project partner CRES in order to facilitate the collection of the **required activity data** and the **calculation of the figures for the estimation of the energy consumption** and the **triggered emissions**.

Challenges

Lack of uniform data

**Limited data availability
at regional level**

**Degree of
representativeness**

**Administrative burden
for data collection**

**No free of charge
provision of data**

General guidelines

Relevance

Consistency

Coverage

Availability

Accuracy

Transparency



Indicative activity data collection procedure for municipal buildings

Indicative activity data collection procedure for municipal buildings & equipment/facilities

- Option A: Actual energy consumption data

Energy carrier		Energy	Unit	Unit
Electricity			MWh	Potential
Heat/cold			MWh	utilization of
Fossil fuels	Natural gas		m3	heating
	Liquid gas		tn	values when
	Heating oil		tn	it is required
	Diesel		tn	
	Gasoline		tn	
	Lignite		tn	
	Coal		tn	
	Other fossil fuels		tn	
	Plant oil		tn	
	Biofuel		tn	
	Other biomass		tn	
RES	Solar thermal		MWh	
	Geothermal		MWh	

Calculations for Option A

Option A: Actual energy consumption data

Municipal buildings	Area	Electricity	Heat/cold	Fossil fuels							
				Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels
Units	m2	MWh	MWh	m3	tn	tn	tn	tn	tn	tn	tn
Building 1											
Building 2											
Building 3											

Heating Value	Electricity	Heat/cold	Fossil fuels							
			Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels
Units	-	-	MWh/m3	MWh/tn	MWh/tn	MWh/tn	MWh/tn	MWh/tn	MWh/tn	MWh/tn
Value	1	1	1	1	12.05	1	1	1	1	1

Calculations

Final energy consumption	Electricity	Heat/cold	Fossil fuels							
			Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels
MWh	0	0	0	0	0	0	0	0	0	0

Data sources for Option A

Identification of all buildings and facilities owned/managed by the local authority



Identification all energy delivery points in collaboration with the energy manager of the buildings



Contact with the person/department collecting the invoices and the required energy data



Implementation of a centralized collection, management and storage of these documents/data

Indicative activity data collection procedure for municipal buildings & equipment/facilities



- **Option B: Estimated energy consumption data**

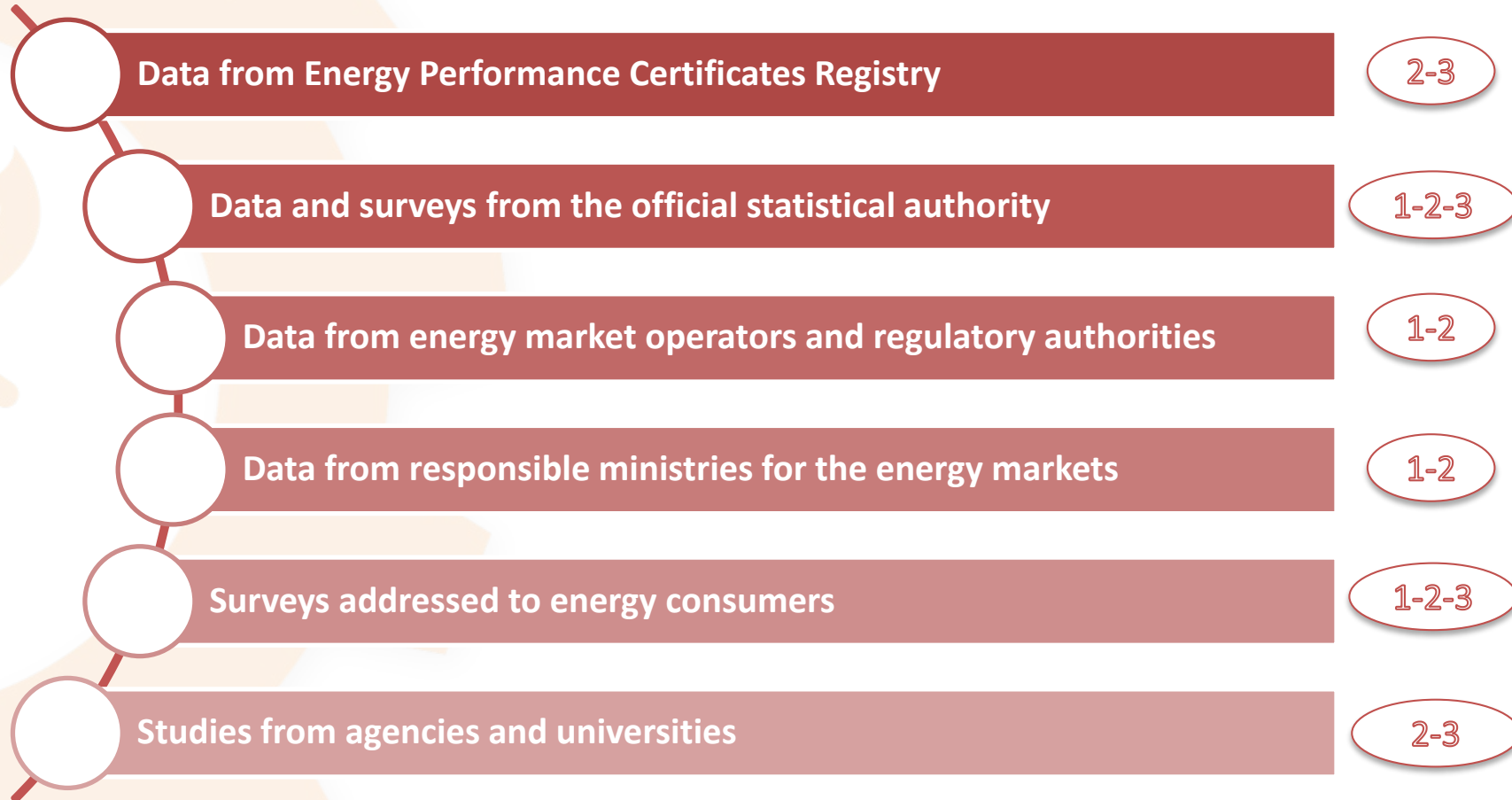


- **Step 1:** Identification of typical categories of municipal buildings and specification of the main characteristics of each category of municipal buildings (such as average area expressed in m²) including the number of buildings
- **Step 2:** Calculation of the unitary **thermal and electricity** consumption of these typical categories of buildings (expressed in MWh/m²)
- **Step 3:** Allocation of **thermal energy to the various energy carriers**
- **Step 4:** Calculation of the final energy consumption for the different energy carriers according to their analysis.

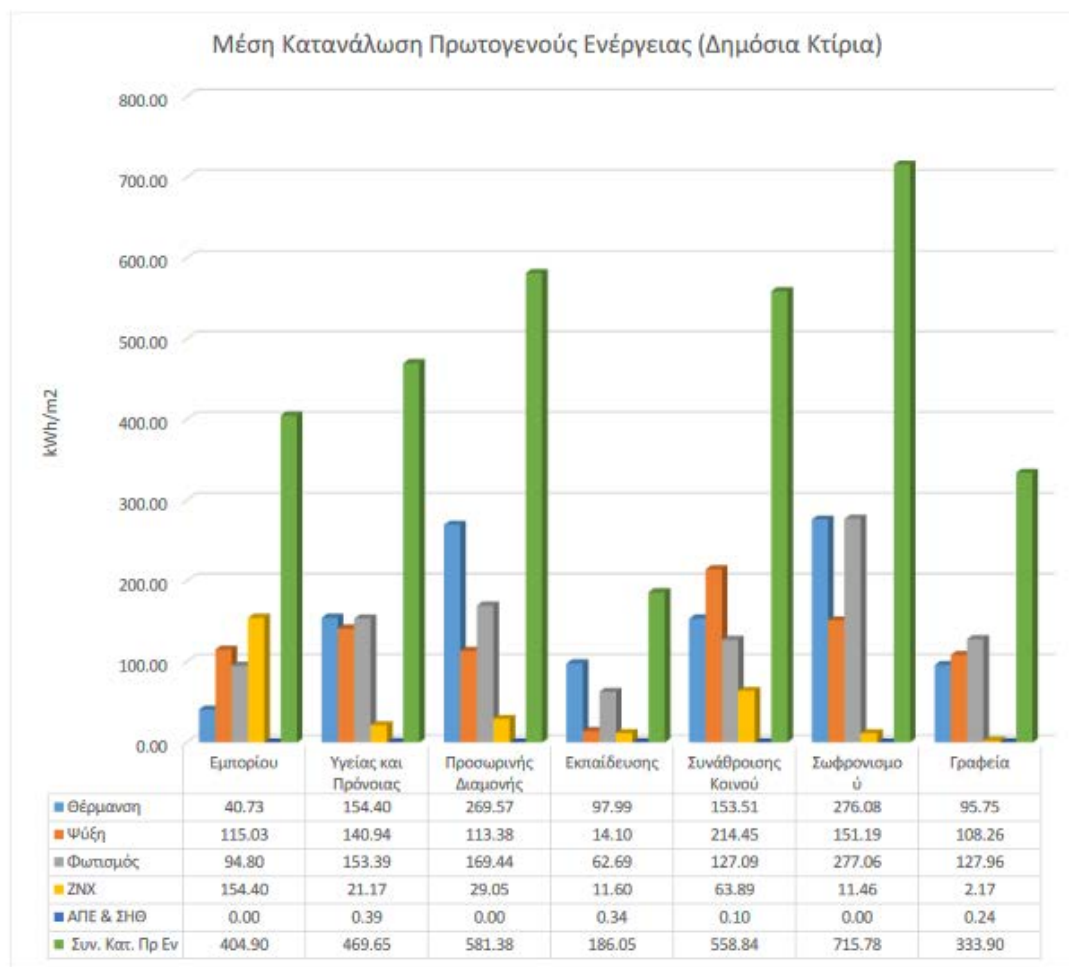


Data sources for Option B

STEPS



Example: Energy Performance Certificates Registry in Greece



Calculations for Option B

Option B: Estimated energy consumption data

Municipal buildings	Total area	Unitary electricity consumption	Unitary thermal consumption	Allocation of thermal energy to energy carriers								
				Heat/cold	Fossil fuels							
					Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels
Units	m2	kWh/m2	kWh/m2	%	%	%	%	%	%	%	%	%
10 schools												
No. Buildings 2												
No. Buildings 3												

Calculations

Final energy consumption	Electricity	Heat/cold	Fossil fuels								Renewable energy
			Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels	Plant oil
MWh	0	0	0	0	0	0	0	0	0	0	0

Indicative activity data collection procedure for municipal public lighting

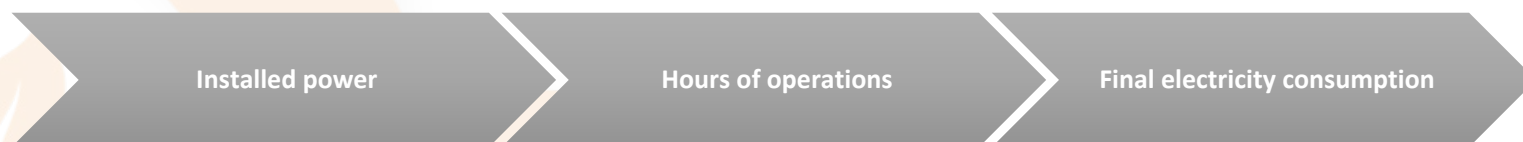


- The local authority **must collect the actual energy consumption data** regarding municipal public lighting (Option A: Actual energy consumption data) though **direct contact with the responsible energy manager**.
- Data about the consumed electricity for public lighting can be collected **by market operators**.
- The **installation of additional meters** is suggested in order to improve the energy data collection especially for cases that an electricity supply point feeds both public lighting and building/facilities.
- **Option A: Actual energy consumption data**

<i>Energy carrier</i>	Energy	Unit
<i>Electricity</i>		MWh

Indicative activity data collection procedure for municipal public lighting

- **Option B: Estimated energy consumption data**



- **Step 1:** Identification of the total installed power for the different categories of public lighting expressed in MW.
- **Step 2:** Identification of the total hours of operation for the different categories of public lighting expressed in hours.
- **Step 3:** Calculation of final electricity consumption



Direct contact with the responsible department of the local authority

Calculations for Option B

Option B: Estimated energy consumption data

Public lighting	Installed power (kW)	Operation hours (h)	Electricity (MWh)
No. Systems 1			
No. Systems 2			
No. Systems 3			
No. Systems 4			
No. Systems 5			
No. Systems 6			
No. Systems 7			
No. Systems 8			
No. Systems 9			
No. Systems 10			

Calculations

Final energy consumption	Electricity
MWh	0



**Indicative activity data collection procedure for
tertiary (non-municipal) buildings,
equipment/facilities, residential buildings and
industrial units**

Indicative activity data collection procedure for other buildings & facilities

- Option A: Actual energy consumption data

Energy carrier		Energy	Unit	Potential utilization of heating values when it is required	Unit
Electricity			MWh		MWh
Heat/cold			MWh		MWh
Fossil fuels	Natural gas		m3		MWh
	Liquid gas		tn		MWh
	Heating oil		tn		MWh
	Diesel		tn		MWh
	Gasoline		tn		MWh
	Lignite		tn		MWh
	Coal		tn		MWh
	Other fossil fuels		tn		MWh
	Plant oil		tn		MWh
	Biofuel		tn		MWh
	Other biomass		tn		MWh
RES	Solar thermal		MWh		MWh
	Geothermal		MWh		MWh

Indicative activity data collection procedure for other buildings & facilities



- **Option B: Estimated energy consumption data for residential buildings**



- **Step 1:** Identification of **typical categories of households** and specification of the main characteristics of each category of households (*such as average area expresses in m²*) including the number of households
- **Step 2:** Calculation of the **unitary thermal and electricity consumption** of these typical categories of households (expressed in MWh/m² or MWh/household)
- **Step 3:** Allocation of **thermal energy** to the various **energy carriers**
- **Step 4:** Calculation of the **final energy consumption** for the different energy carriers according to their analysis.

Data sources for Option B

STEPS

○ Data from Energy Performance Certificates Registry	2-3
○ Data and surveys from the official statistical authority	1-2-3
○ Data from European databases (EUROSTAT, ODYSSEE indicators etc)	1-2-3
○ Data from energy market operators and regulatory authorities	1-2
○ Data from responsible ministries for the energy markets	1-2
○ Surveys addressed to energy consumers	1-2-3
○ Studies from agencies and universities	2-3

Energy Database - Eurostat



eurostat

v3.4.1-20170407-5840-PROD_EUROBASE
DATA-EXPLORER_PRODmanaged12

[Explanatory texts \(metadata\)](#) [Information](#) [Download](#) [Preview](#) [Bookmark](#) [Demo](#) [Help](#) [Login](#)

Simplified energy balances - annual data

[nrg_100a]

Last update: 31-05-2018

Table Customization [show](#)

TIME	+	PRODUCT	+	Unit of measure	+
+ Geopolitical entity (reporting)		+ Energy indicator		Thousand tonnes of oil equivalent (TOE)	
Greece	+	Residential	+		

PRODUCT	2010	2011	2012	2013	2014	2015	2016
All products	4,615.0	5,469.9	5,039.4	3,764.0	3,786.0	4,400.5	4,287.2
Solid fuels	3.4	4.5	0.4	0.9	2.9	4.7	1.9
Total petroleum products	1,966.4	2,582.5	1,914.2	988.4	1,051.4	1,463.9	1,266.4
Gas	254.6	348.0	310.3	232.4	231.6	355.7	329.1
Nuclear heat	:	:	:	:	:	:	:
Derived heat	46.4	53.9	45.1	41.5	49.5	50.0	51.0
Renewable energies	785.4	965.2	1,130.8	1,000.7	975.9	1,018.2	919.4
Electrical energy	1,558.9	1,515.7	1,638.7	1,500.1	1,474.7	1,508.0	1,719.4
Waste (non-renewable)	0.0	0.0	0.0	0.0	0.0	0.0	0.0

eurostat

Important legal not

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DATA-EXPLORER_PRODmanaged12

[Explanatory texts \(metadata\)](#) [Information](#) [Download](#) [Preview](#) [Bookmark](#) [Demo](#) [Help](#) [Log](#)

Number of private households by household composition, number of children and age of youngest child (1 000)

[lfst_hnnhtych

Last update: 26-04-2018

Table Customization [show](#)

TIME	+	GEO	+	Age of the child	+
+ Number of children		+ Household composition		Total	
Total	+	Total	+		

GEO	2010	2011	2012	2013	2014	2015	2016	2017
Greece	4,352.6	4,343.0	4,334.5	4,336.0	4,344.5	4,376.1	4,410.7	4,393.9



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ENERGY SOURCES AND SAVING

Household Budget Survey - EUROSTAT

What are the Household Budget Survey?

The Household Budget Survey, abbreviated as HBS, is a national survey focusing on **households' expenditure on goods and services**, giving a picture of living conditions in the European Union (EU). It is carried out by each Member State and is used to compile weightings for important macroeconomic indicators, such as consumer price indices (used as measures of inflation) and national accounts.

They were launched in most EU Member States at the beginning of the 1960's and Eurostat has been collecting and publishing these survey data **every five years** since 1988. The two last collection rounds (waves) were 2010 and 2015.



[> read more](#)

FIND OUT ABOUT HBS IN YOUR COUNTRY

Links to Member State HBS*

 Belgium	 Czech Republic	 France
 Croatia	 Cyprus	 Latvia
 Malta	 Austria	 Slovenia
 Finland	 Sweden	 United Kingdom

Candidate countries*

 Serbia
--

DIRECT ACCESS TO...



Database



Information on data



Policy context



Publications



Statistics Explained
Glossary

Population and housing census - EUROSTAT

A screenshot of the Eurostat website. The header includes the Eurostat logo, navigation links (News, Data, Publications, About Eurostat, Help), and a search bar. The main content area is titled '2011 CENSUS' and describes the 'Census Hub' as a tool for data dissemination. A sidebar on the left lists various census-related topics. A news section on the right highlights 'The Census Hub: easy and flexible access to European census data' with an image of a crowd.

eurostat
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Type a keyword, a publication title, a dataset title...

News Data Publications About Eurostat Help

European Commission > Eurostat > Population and Housing census > Census data > 2011 Census Hub

POPULATION AND HOUSING CENSUS

- Overview
- ▲ Census data
 - 2011 CENSUS HUB**
 - Database
- Census Atlas
- Legislation
- ▼ Methodology
- Publications
- Statistics Illustrated
- Links

2011 CENSUS

The 2011 Census database is the result of a major joint effort by the European Statistical System (ESS) to better disseminate the results of the Population and Housing Censuses in Europe, providing users with easy access to detailed census data that are structured in the same way and methodologically comparable between countries.

The new tool (the "Census Hub") constructed for data dissemination is based on the concept of data sharing, where National Statistical Institutes (NSIs) provide access to their data according to standard processes, formats and technologies while Eurostat provides the IT structure that allows users to quickly and flexibly specify, compile and extract data stored in the different national census databases. NSIs remain 'proprietors' of the data and keep complete control over them. In addition, the Census Hub data are validated by the NSIs and are not re-validated by Eurostat. In the case of revisions or updates, NSIs need to upload the new data in their own system instead of sending a complete new data set to Eurostat.

NEWS

The Census Hub: easy and flexible access to European census data



Construction of
new buildings
(permits)



Demolition rate



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ENERGY SOURCES AND SAVING

Indicative activity data collection procedure for other buildings & facilities



- **Option B: Estimated energy consumption data for buildings of the tertiary sector**



Step 1: Identification of typical categories of buildings and specification of the main characteristics of each category of buildings (such as average area in m² or number of employees or number of beds (for hotels and hospitals)) including the **number buildings**

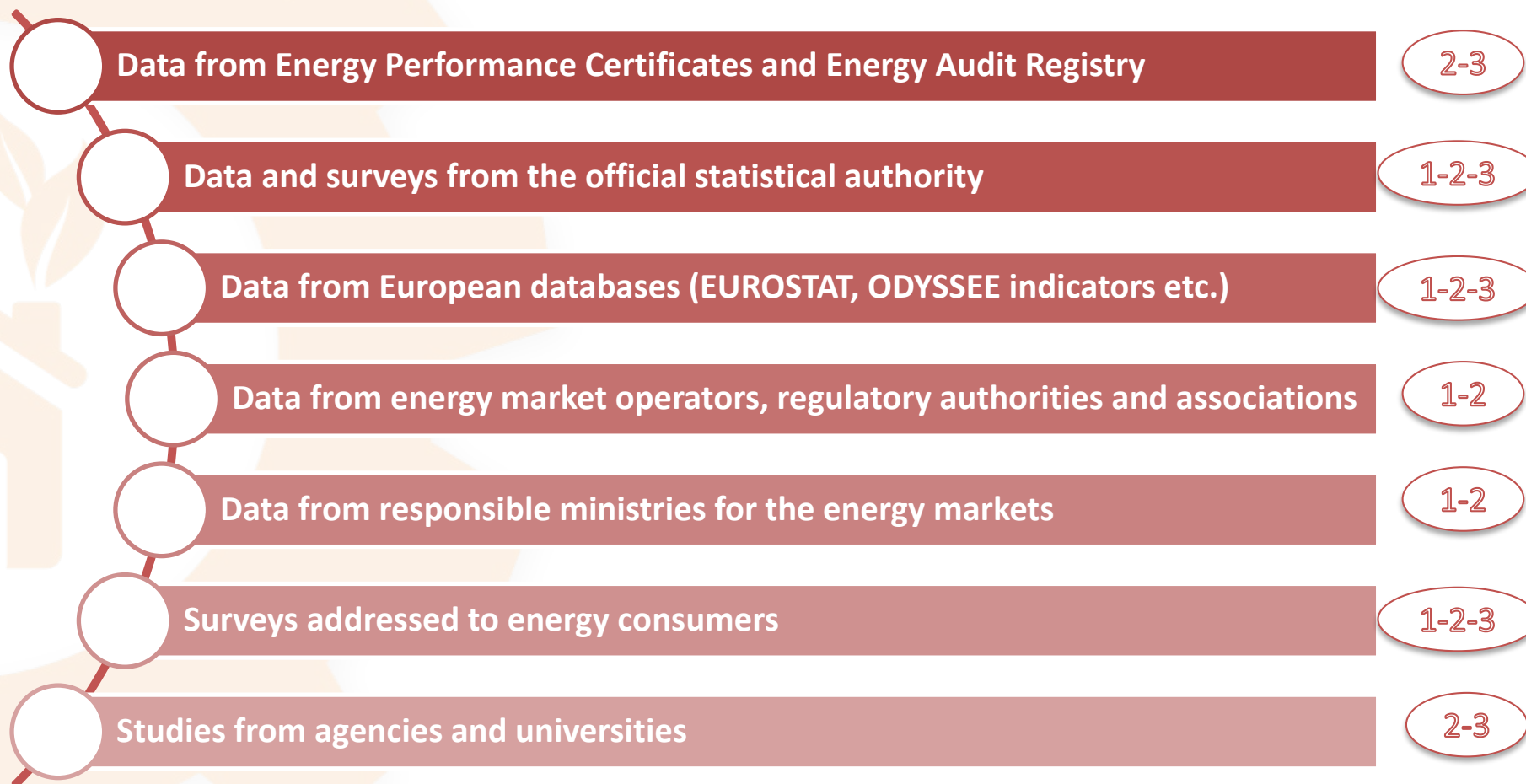
Step 2: Calculation of the **unitary thermal and electricity consumption** of these typical categories of buildings (expressed in *MWh/m² or MWh/employee or MWh/bed*)

Step 3: Allocation of **thermal energy** to the **various energy carriers**

Step 4: Calculation of the final energy consumption for the different energy carriers according to their analysis.

Data sources for Option B

STEPS



ODYSSEE indicators

ODYSSEE DATABASE

The Odyssee database contains detailed energy consumption by end-use and their drivers as well as energy efficiency and CO₂ related indicators. Latest available data is providing by national representatives, such as energy agencies or statistical organization, from all EU countries as well as Norway, Switzerland and Serbia.

Odyssee data and indicators are available through a friendly interface enabling advanced analysis, with the results of queries provided in tables and/or graphs and with the possibility to change units.

Apart from the full database, six data tools have been developed to monitor progress in the market penetration of a selection of energy efficient technologies and practices, to identify the drivers responsible for the variation of energy consumption, to compare and benchmark the energy efficiency of performance of countries.

The access is free for all EU Ministries, Concerted Action EED, EED Committee Members and EU universities and research centres for non-commercial uses and via subscription for other users.



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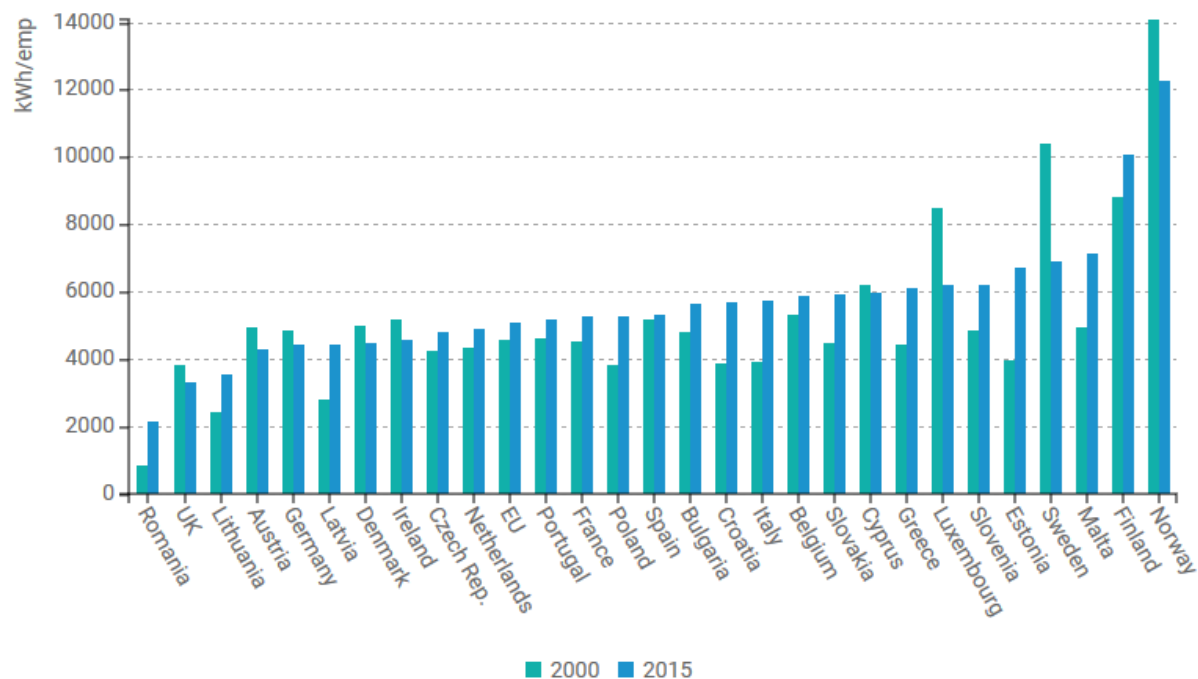


SUBSCRIPTION TO THE DATABASE

[TRIAL VERSION](#)

[CONTACT US](#)

Electricity consumption per employee



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Various information systems



Greece - Information system for the monitoring of oil products



fuelstats.gr
Ολοκληρωμένο Πληροφορικό Σύστημα για την Παρακολούθηση
Πετρελαϊκών Ειδών & Καυσίμων



ΥΠΟΥΡΓΕΙΟ
ΠΕΡΙΒΑΛΛΟΝΤΟΣ
& ΕΝΕΡΓΕΙΑΣ

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ & ΕΝΕΡΓΕΙΑΣ
ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΕΝΕΡΓΕΙΑΣ ΚΑΙ ΟΡΥΚΤΩΝ ΠΡΩΤΩΝ ΥΛΩΝ
ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΕΝΕΡΓΕΙΑΣ
ΔΙΕΥΘΥΝΣΗ ΥΔΡΟΓΟΝΑΝΘΡΑΚΩΝ
ΤΜΗΜΑ ΜΕΛΕΤΩΝ ΚΑΙ ΑΣΦΑΛΕΙΑΣ ΕΦΟΔΙΑΣΜΟΥ

Το www.fuelstats.gr στοχεύει στην αναλυτική παρακολούθηση της παραγωγής, διακίνησης και εμπορίας πετρελαϊκών ειδών και καυσίμων (ΠΕ.ΚΑ.) σε όλη την Ελληνική Επικράτεια και σε όλα τα στάδια.
Απευθύνεται σε φορείς που δραστηριοποιούνται στην Ελλάδα και πραγματοποιούν:

- κινήσεις διακίνησης καυσίμων εσωτερικά στην χώρα
- εισαγωγές από και εξαγωγές προς άλλες χώρες

[Είσοδος στο Σύστημα](#)

[Q1. Οδηγίες για την απόκτηση πρόσβασης στο Σύστημα Διαχείρισης Στοιχείων & Πληροφοριών fuelstats.gr](#)

[A1. Αίτηση πρόσβασης και χρήσης του Συστήματος Διαχείρισης Στοιχείων & Πληροφοριών fuelstats.gr](#)

[E5. Εντυπο δήλωσης αποθηκευτικών χώρων](#)



**ΚΑΠΕ
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Indicative activity data collection procedure for other buildings & facilities



- **Option B: Estimated energy consumption data for industrial units**



Step 1: Identification of **typical categories of industrial units** and specification of the main characteristics of each category of industrial units (such as average **Gross Value Added - GVA** in mil. € or total production in tn) including the **number of the industrial units**

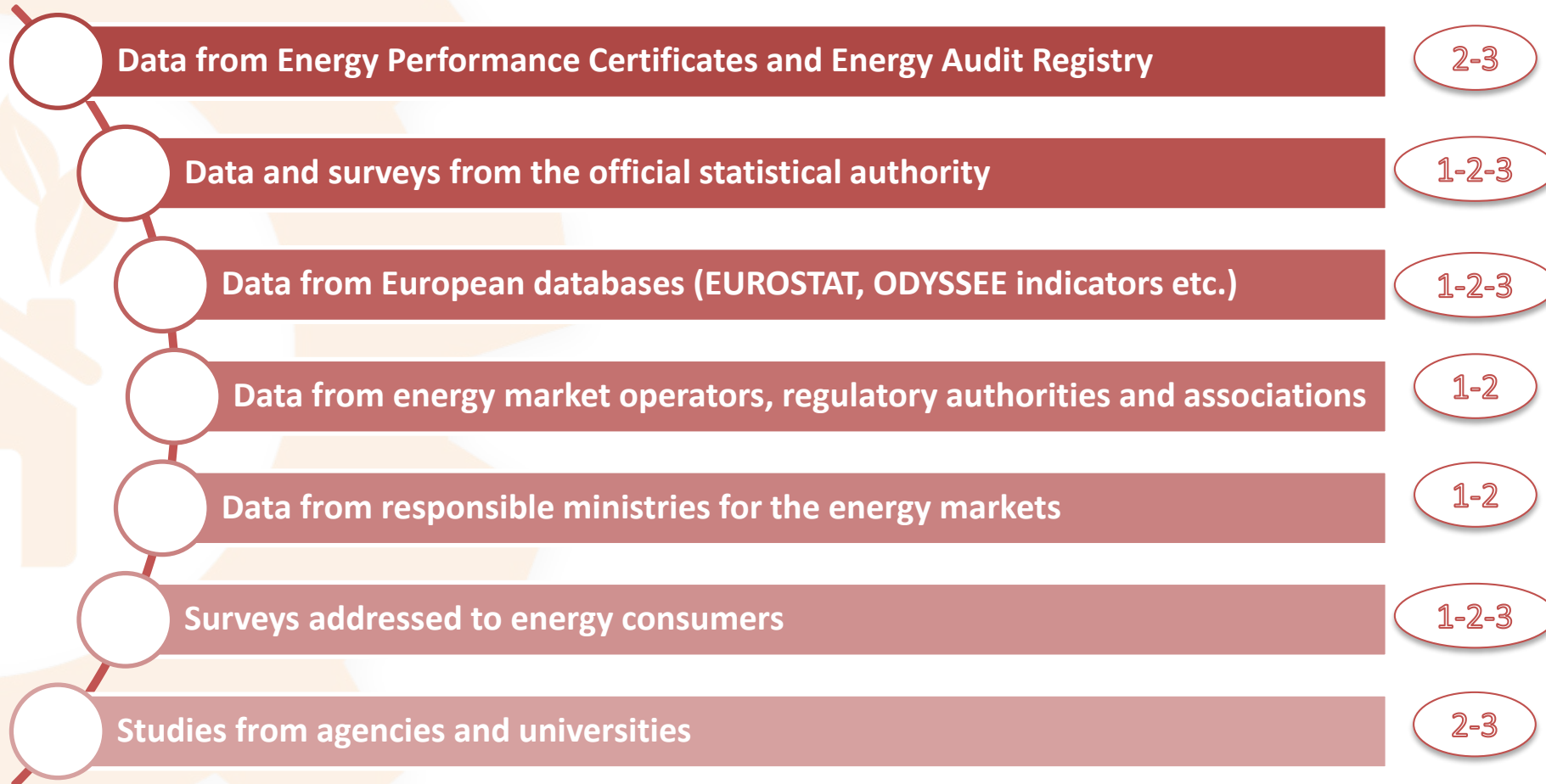
Step 2: Calculation of the **unitary thermal and electricity consumption** of these typical categories of industrial units (expressed in MWh/GVA or MWh/tn)

Step 3: Allocation of **thermal energy** to the various **energy carriers**

Step 4: **Calculation** of the final energy consumption for the different energy carriers according to their analysis.

Data sources for Option B

STEPS





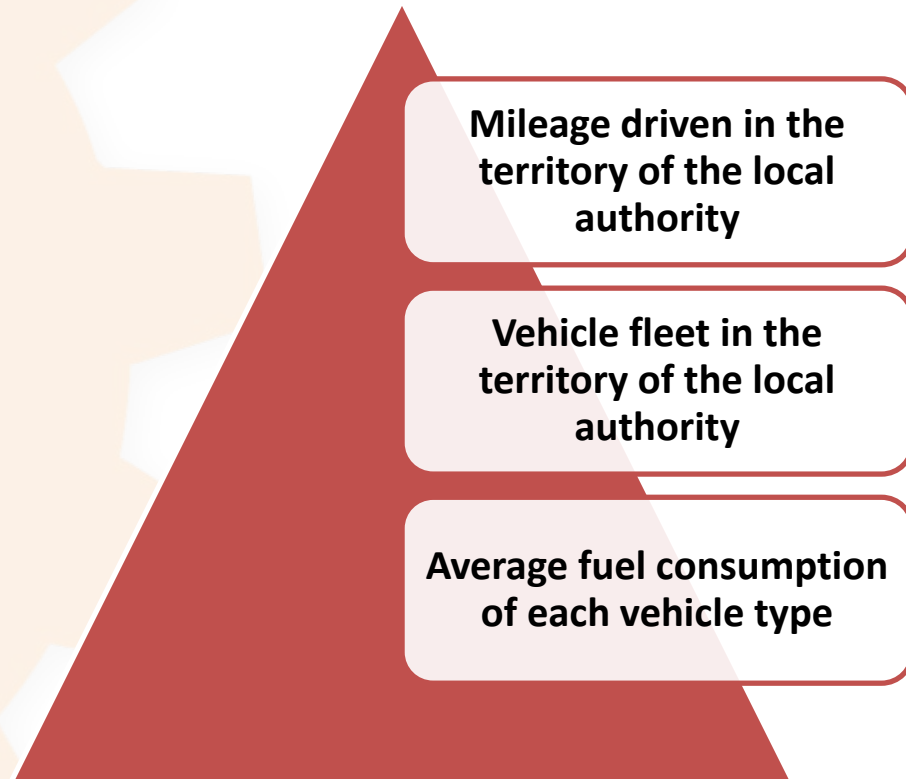
Activity data collection - Road & rail transportation

Indicative activity data collection procedure for road transportation

- Road transportation in the local authority's territory consists of:
 - Urban road transportation** including road transportation on the local street network, which is in the competence of the local authority.
 - Other road transportation** including road transportation, which is not in the competence of the local authority.
- It is recommended the inclusion of the urban road transportation into the BEI collecting **the actual energy consumption data** (Option A: Actual energy consumption data).
- Due to the fact that the collection of the **actual energy consumption data is not always feasible especially for the case of the road transport that is not in the competence of the local authority**, the estimation of the energy consumption can be based on **specific assumptions** (Option B: Estimated energy consumption data).

Energy carrier		Energy	Unit		Unit
Electricity			MWh	Potential utilization of	MWh
	Natural gas		m3	heating values or	MWh
	Liquid gas		tn	fuel densities	MWh
	Diesel		tn	when it is required	MWh
	Gasoline		tn		MWh
	Biofuel		tn		MWh

Activity data collection - Road & rail transportation



Road transportation - Mileage driven

Data from transport department of the local authority

Data from national or local street administration

Data from European databases (EUROSTAT, ODYSSEE indicators etc.)

Data from operator of the transport services including and odometers

Data from responsible ministry - Statistical authority

Surveys addressed to households

Studies from agencies and universities & specialized databases with mobility data

Road transportation - Vehicle fleet distribution



The diagram consists of a vertical line of seven white circles connected by a dark red line. Each circle is positioned to the left of a horizontal dark red bar. The text inside each bar is white. The background features faint, stylized orange and yellow shapes, including a gear and a leaf.

Data from administrator of the traffic flows

Data from registries with the registered vehicles as national and local statistics

Data from European databases (EUROSTAT, ODYSSEE indicators etc.)

Data from responsible ministry - Statistical authority

Surveys addressed to households

Studies from agencies and universities

Tools & specialized databases with mobility data

Road transportation - Average fuel consumption

Data from inspection agencies

Data from national or local street administration

Data from auto clubs and national transport associations

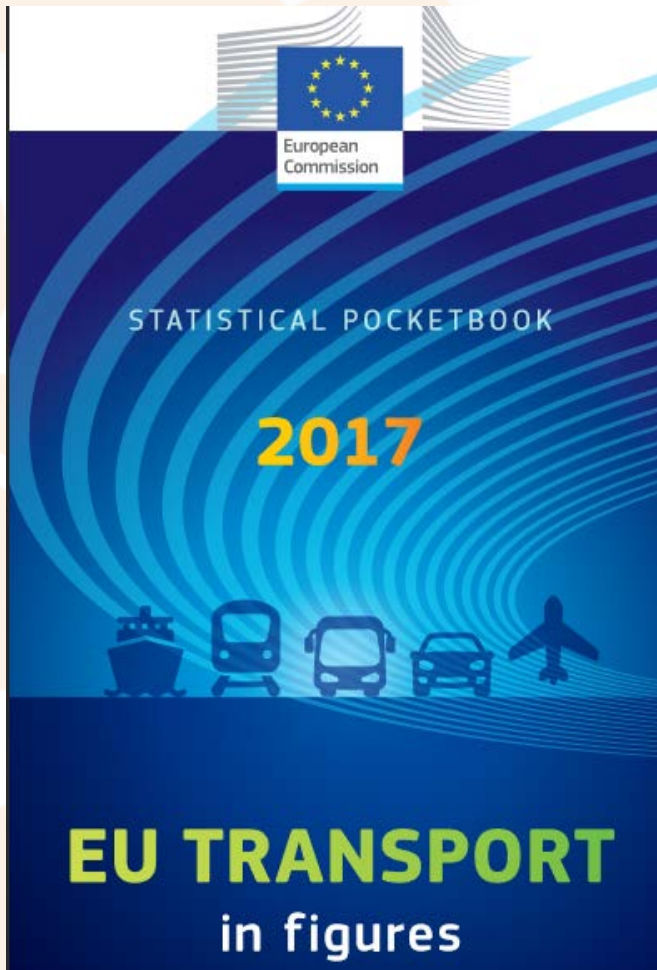
Data from responsible ministry - Statistical authority

Surveys addressed to specific categories of customers

Studies from agencies and universities

Tools & specialized databases with mobility data

EU Transport Pocketbook



**Contact with statistical
authority or
responsible ministry**

Calculation Option B



Option B: Estimated energy consumption data

Electricity	Vehicle fleet	Mileage	Fuel consumption	FEC
Unit	number	km	kWh/100 km	MWh
No. Vehicles 1				0
No. Vehicles 2				0

Natural gas	Vehicle fleet	Mileage	Fuel consumption	FEC
Unit	number	km	kWh/100 km	MWh
No. Vehicles 1				0
No. Vehicles 2				0

Liquid gas	Vehicle fleet	Mileage	Fuel consumption	FEC
Unit	number	km	lt/100 km	MWh
No. Vehicles 1				0
No. Vehicles 2				0

density (kg/lt)

Diesel	Vehicle fleet	Mileage	Fuel consumption	FEC
Unit	number	km	lt/100 km	MWh
No. Vehicles 1				0
No. Vehicles 2				0

density (kg/lt)

Gasoline	Vehicle fleet	Mileage	Fuel consumption	FEC
Unit	number	km	lt/100 km	MWh
No. Vehicles 1				0
No. Vehicles 2				0

density (kg/lt)

Bleding of biofuels	Diesel	Gasoline
%		

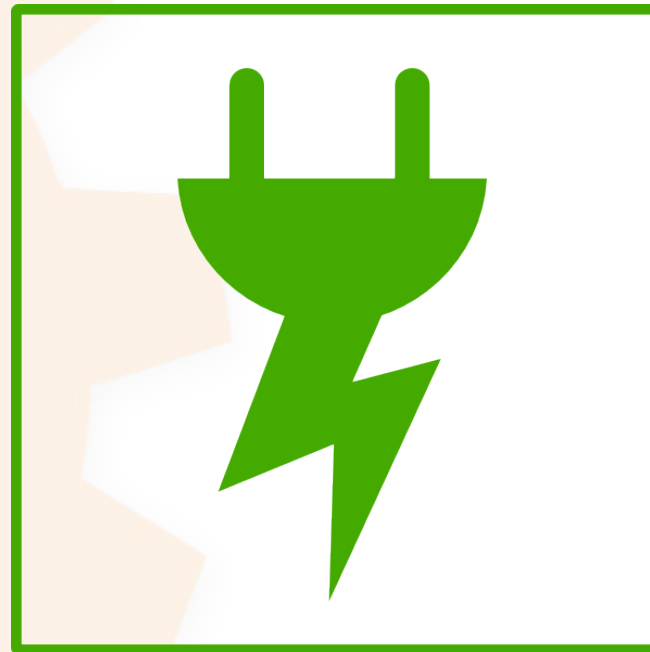
Calculations

Final energy consumption	Electricity	Fossil fuels				Renewable energies
		Natural gas	Liquid gas	Diesel	Gasoline	Biofuel
MWh	0	0	0	0	0	0

Rail transportation

- The **abovementioned methods for road transportation can be utilized also** for the quantification of the energy consumption and the corresponding emissions in rail transportation.
- Mainly, two different types of rail transportation can be identify comprising by ***electricity and diesel locomotives***. The local authority is recommended to collect **actual data about the annual electricity and fuel use directly from the service providers** (Option A: Actual energy consumption data).
- In the case that the required actual data are not available, it is recommended to estimate the energy consumption according to the mileage travelled and average electricity or fuel consumption.

Energy carrier		Energy	Unit		Unit
Fossil fuels	Electricity		MWh	Potential utilization of heating values or fuel densities when it is required	MWh
	Diesel		tn		MWh
	Lignite		tn		MWh
	Coal		tn		MWh
	Other fossil fuels		tn		MWh
	Biofuel		tn		MWh
RES					



Energy supply

Local electricity production

- The local authorities must identify the local electricity production plants and to collect **the required actual data for the estimation of the produced energy** (Option A: Actual energy consumption data).
- For larger plants (such as CHPs), the data should be obtained via **direct contact with the plant managers**.
- For smaller units (domestic PV installations), the data can either be obtained through **questionnaires or derived from statistics related to the amount of installations present in the territory of the local authority** (such as indicatively number of permits delivered if such installations require a permit, number of subsidies granted or regional/national statistics with a sufficient level of disaggregation etc.).
- Moreover, data about the entities that provide electricity to the grid can be collected **by market operators**.
- **Avoid double counting** denoting the emissions in other sector.

Energy carrier	Energy	Unit
Electricity		MWh



Example: RES office in Greece

Υπηρεσία Εξυπηρέτησης Επενδυτών για Έργα Α.Π.Ε.

Αποτελέσματα Αναζήτησης Παραγωγών Η/Ε από Σταθμούς ΑΠΕ.

(Τελευταία ενημέρωση Απρίλιος του 2018)

Διάστημα:	Από: 1/2017 έως 12/2017
Τεχνολογία:	Φωτοβολταϊκά (πλήν προγράμματος στεγών)
Περιφέρεια:	ΑΤΤΙΚΗΣ
Σύνολο μηνών:	12

Έτος	Μήνας	Ενέργεια(MWh)	Εγκαταστάσεις	Εγκ. Ισχύς(MW)
2017	1	10.662,85	806	166,45
2017	2	14.234,17	806	166,45
2017	3	21.019,02	805	166,45
2017	4	25.444,88	805	166,45
2017	5	24.695,69	805	166,45
2017	6	25.547,13	805	166,45
2017	7	28.762,21	805	166,45
2017	8	28.138,83	805	166,45
2017	9	23.056,18	805	166,45
2017	10	20.418,43	805	166,45
2017	11	12.147,92	805	166,45
2017	12	12.344,07	805	166,45
Σύνολο ενέργειας:		246.471,39		

Local heat/cold production

- The local authorities must identify the local heat/cold production plants and to collect **the required actual data for the estimation of the produced energy** (Option A: Actual energy consumption data).
- The data should be obtained via **direct contact (or questionnaires) with the plant managers**, as mostly large units will be listed here.
- **Avoid double counting** denoting the emissions in other sector.

<i>Energy carrier</i>	Energy	Unit
<i>Heat/cold</i>		MWh



Thank you for your attention.....