



## **Mapping SMEs in Europe**

**Data collection, analysis and methodologies for estimating energy consumptions at Country levels**

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## Executive Summary

Small and medium-sized enterprises (SMEs) are the backbone of the European economy. The importance of SMEs is shown by the economic database of **Eurostat's Structural Business Statistics (SBS)**, which is categorised in NACE sections and divisions.

Looking at the ownership structure, on average, around 87% of all SMEs are autonomous profit-oriented enterprises and can make independent financial decisions.

In all technical project partner countries of LEAP4SME<sup>1</sup>, the economic relevance of SMEs is significantly high: **more than 99% of all enterprises are SMEs**, whereas large companies only have a marginal share. Micro enterprises alone account for more than 86% of all enterprises.

On average, about 54% of the value added<sup>2</sup> in the EU is generated by SMEs. Specifically, the value added generated by SMEs in the project partner countries varies between 49% in the UK and 79% in Greece. SMEs account for between 54% and 83% of employment in the project partner countries.

To depict the most relevant NACE sections for SMEs in the project partner countries, the top five sections regarding number of persons employed, number of enterprises and value added were gathered. NACE Section G (Wholesale and retail trade) is the most important section in all three areas, followed by NACE Section C (Manufacturing) for number of persons employed and value added. Related to the number of enterprises, NACE Section M (Professional, scientific and technical activities) is the second most important.

The research revealed that no energy-related data for SMEs were published at European level. At national level, the quality and scope of existing energy-related data for SMEs were generally insufficient to compare with other EU countries. In most countries, there are no explicit data sources for energy consumption at sufficient granularity to isolate SMEs.

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<sup>1</sup> The National Energy Agencies of the Countries Austria, Croatia, Greece, Italy, Malta, Poland, Portugal, Slovakia, UK.

<sup>2</sup> Value added at factor cost is the gross income from operating activities after adjusting for operating subsidies and indirect taxes. [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Value\\_added\\_at\\_factor\\_cost](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Value_added_at_factor_cost)

In order to obtain consistent and comparable energy data at SME level for all project partner countries, two calculation approaches were developed to estimate the total energy consumption of SMEs. The two approaches follow different methodologies involving individual hypotheses and assumptions. Nevertheless, the results can be used for a first estimation of the SME energy consumption.

The results show that the estimated **share of SME energy consumption on gross inland consumption<sup>3</sup> (GIC) ranges from 9% to 18% for all countries except Italy**. The reason for this is that Italy included different scenarios into the calculations, resulting in a wide range for the SME energy consumption estimate (from 13% to 20%, from 18% to 25%, and from 27% to 29% of GIC as a function of the approach).

In general, medium or high **energy intensities<sup>4</sup>** were calculated for Greece, Poland, Slovakia, Croatia and Italy - values between 1,500 and 600 MWh/mn€<sup>5</sup>. Energy intensities below 600 MWh/mn€ were calculated for Austria, Portugal, the UK and Malta<sup>6</sup>.

Due to their individual approach, the Portuguese partner was able to calculate energy consumption and energy intensity for SMEs on NACE level. Similar to Portugal, the Maltese project partner also took an individual approach and was able to calculate energy consumption for SMEs on NACE level.

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<sup>3</sup> GIC is the total energy demand of a country or region. It represents the quantity of energy necessary to satisfy **inland consumption** of the geographical entity under consideration.

<sup>4</sup> final energy consumption per value added

<sup>5</sup> mn€: million euro

<sup>6</sup> In the case of Italy the calculated range for energy intensities is wider due to the different approaches used. All models and hypothesis are explained in the pertinent section.

# 1 Introduction

“Small and medium-sized enterprises (SMEs) are the engine of the European economy. They drive job creation and economic growth and ensure social stability. Nine out of every ten enterprises is an SME, and SMEs generate two out of every three jobs. SMEs also stimulate an entrepreneurial spirit and innovation throughout the EU and are thus crucial for fostering competitiveness and employment. Given their importance to Europe’s economy, SMEs are a major focus of EU policy”.<sup>7</sup>

Mapping SMEs is an important preparatory step to support a coherent planning of joint energy efficiency programmes for European SMEs. Basic key indicators for mapping SMEs related to energy efficiency and renewable energy are:

- number of companies,
- size classification of companies (according to staff headcounts),
- ownership structure,
- energy consumption,
- energy intensity (energy consumption per value added),
- energy sources used and
- geographic location.

Regarding to the definition of the European Union, SMEs are enterprises that employ fewer than 250 persons and have an annual turnover not exceeding EUR 50 million and/or an annual balance sheet total not exceeding EUR 43 million.<sup>8</sup> Conversely, companies who exceed the thresholds are classified as large enterprises (non-SMEs).

“In determining whether or not an enterprise is an SME, the enterprise’s size (employees, turnover and balance sheet total) is not the only factor that should be taken into account. In fact, an enterprise can be very small in these terms, but if it has access to significant additional

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<sup>7</sup> User guide to the SME Definition, European Commission, September 2019, EU 2020

<sup>8</sup> *Extract of Article 2 of the annex to Recommendation 2003/361/EC*, User guide to the SME definition, European Commission, September 2019, EU 2020

resources (e.g. because it is owned by, linked to, or partnered with a larger enterprise) it might not be eligible for SME status. For enterprises with a more complex structure, a case-by-case analysis may therefore be required to ensure that only those enterprises that fall within the ‘spirit’ of the SME recommendation are considered SMEs”<sup>9</sup>. Thus, the ownership structure is also an important key figure to map SMEs.

The methodology for mapping SMEs within this report follows three steps:

1. Data collection and analysis of energy-relevant data for SMEs,
2. Calculation and analysis of energy-relevant data and
3. Creation of energy performance indicators as SME maps.

All of the technical and scientific aspects related to the countries covered in the report benefitted from the direct involvement and contribution of the nine National Energy Agencies partner of LEAP4SME<sup>10</sup>.

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<sup>9</sup> User guide to the SME Definition, European Commission, September 2019, EU 2020

<sup>10</sup> The National Energy Agencies of the countries Austria, Croatia, Greece, Italy, Malta, Poland, Portugal, Slovakia, United Kingdom.

## 2 Facts

Facts	
99%	More than 99% of all enterprises in the LEAP4SME project partner countries are SMEs.
87%	On average, around 87% of all SMEs in the EU are autonomous profit-oriented enterprises and can make independent financial decisions.
49% - 79%	The value added generated by SMEs in the LEAP4SME project partner countries varies between 49% in the UK and 79% in Greece.
54% - 83%	The share of persons employed in SMEs in the LEAP4SME project partner countries spreads between 54% and 83%.
>86%	In the LEAP4SME project partner countries, micro enterprises alone account for more than 86% of all businesses.
Most important NACE section for SMEs regarding number of enterprises, number of persons employed and value added	NACE Section G (Wholesale and retail trade) is the most important section in all three areas, followed by NACE Section C (Manufacturing) for number of persons employed and value added. Related to the number of enterprises, NACE Section M (Professional, scientific and technical activities) is the second most important.
No energy-related data for SMEs available on European level	At national level, the quality and scope of existing energy-related data for SMEs were generally insufficient to compare with other EU countries.

### 3 Key findings of LEAP4SME

Key Findings	
Share of SME energy consumption on gross inland consumption (GIC)	The estimated share of SME energy consumption in gross inland consumption (GIC) ranges from 9% to 18% for all countries except Italy. The reason for this is that Italy included different scenarios in the calculations, resulting in a wide range for the SME energy consumption estimate (from 13% to 20%, from 18% to 25%, and from 27% to 29% of GIC as a function of the approach).
Energy Intensities between 1,500 and 600 MWh/mn€	Medium or High energy intensities were calculated for Greece, Poland, Slovakia, Croatia and Italy.
Energy intensities below 600 MWh/mn€	Low energy intensities were calculated for Austria, Portugal, the UK and Malta.

## 4 Mapping Small and Medium-Sized Enterprises (SMEs) in European Regions

The mapping of SMEs was done regarding the following three steps:

1. Data collection and analysis of relevant data for SMEs in the European regions (EU member states and UK),
2. Calculation and analysis of energy-relevant data of project partner countries and
3. Creation of SME maps and infographics

### 4.1 Data Collection and Analysis of Economic and Energy Data for SMEs

In a first step, data collection was carried out through internet literature research. The availability of economic and energy-related public data for SMEs was checked for all EU countries and whether the data was easily accessible in English on the internet. The result of the literature research showed that economic data for SMEs are readily available and accessible. However, no universal data source on energy data for SMEs was identified.

#### 4.1.1 Economic Data

The most comprehensive data source for publicly available and accessible economic data of SMEs is **Eurostat's structural business statistics database**<sup>11</sup> (SBS). Every EU member state is obliged to submit annual economic data (including on SMEs) to Eurostat, the statistical office of the European Union. SBS describe the structure and performance of businesses in the EU as well as in Iceland, Norway, Switzerland, North Macedonia, Serbia and Bosnia & Herzegovina. The SBS cover the “non-financial business economy” (NACE<sup>12</sup> Rev. 2 sections B to J, L to N and division S95<sup>13</sup>), which includes industry, construction, distributive trades and

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<sup>11</sup> <https://ec.europa.eu/eurostat/web/structural-business-statistics/>

<sup>12</sup> NACE = European classification of economic activities

<sup>13</sup> [https://ec.europa.eu/eurostat/documents/portlet\\_file\\_entry/3859598/KS-RA-07-015-EN.PDF.pdf/dd5443f5-b886-40e4-920d-9df03590ff91](https://ec.europa.eu/eurostat/documents/portlet_file_entry/3859598/KS-RA-07-015-EN.PDF.pdf/dd5443f5-b886-40e4-920d-9df03590ff91)

services. Available indicators are, for example, number of enterprises, number of employees, turnover, value added, etc.

An overview of all sections of the statistical classification of economic activities according to the NACE structure is given in Table 1. The NACE sections which are covered by the SBS, the “non-financial business economy” (sections B to J, L to N and S95), are highlighted in bold.

*Table 1 Statistical classification of economic activities in the European Community according to NACE sections<sup>14</sup>*

Section	Name of section
A	Agriculture, forestry and fishing
<b>B</b>	<b>Mining and quarrying</b>
<b>C</b>	<b>Manufacturing</b>
<b>D</b>	<b>Electricity, gas, steam and air conditioning supply</b>
<b>E</b>	<b>Water supply; Sewerage, waste management and remediation activities</b>
<b>F</b>	<b>Construction</b>
<b>G</b>	<b>Wholesale and retail trade; Repair of motor vehicles and motorcycles</b>
<b>H</b>	<b>Transportation and storage</b>
<b>I</b>	<b>Accommodation and food service activities</b>
<b>J</b>	<b>Information and communication</b>
K	Financial and insurance activities
<b>L</b>	<b>Real estate activities</b>
<b>M</b>	<b>Professional, scientific and technical activities</b>
<b>N</b>	<b>Administrative and support service activities</b>
O	Public administration and defence; Compulsory social security
<b>P</b>	<b>Education</b>
Q	Human health and social work activities
<b>R</b>	<b>Arts, entertainment and recreation</b>

<sup>14</sup>

[https://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST\\_NOM\\_DTL&StrNom=NACE\\_REV2&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=&IntCurrentPage=1](https://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NACE_REV2&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=&IntCurrentPage=1)

S	Other service activities; <b>S 95 Repair of computers and personal household goods</b>
T	Activities of households as employers; Undifferentiated goods and service-producing activities of households for own use
U	Activities of extraterritorial organisations and bodies

Source: Eurostat's structural business statistics

Most data for SBS are collected by National Statistical Institutes (NSIs) by means of statistical surveys, business registers or from various other administrative sources. Depending on the data source, member states apply various statistical methods, such as grossing up, model-based estimation or different forms of imputation, to ensure the quality of the SBS. Statistical methods and metadata for all EU member states are described on the website of Eurostat.<sup>15</sup> In Malta, for example, SBS does not cover all NACE sections and enterprises with a turnover of less than EUR 7,000. Personal service activities, mainly NACE sections P to R, are not included<sup>16</sup>.

The further SME mapping is focussing on the NACE section level (level 1: B to J, L to N and S95) and not on the NACE division level (level 2: e.g. C 10, C 11), because energy data are not available on this level. For the calculation of energy performance indicators (e.g. energy intensity, energy consumption of NACE sections), data must be on the same level.

At the time of this reporting, the most current data of Eurostat's SBS for all EU countries were from 2017. Thus, the baseline for data collection in this project was set with 2017.<sup>17</sup>

The best information available on the ownership of SMEs for this report is the **Survey on the Access to Finance of Enterprises (SAFE)**<sup>18</sup>. The European Commission carries out the survey annually and in cooperation between the European Commission and the European Central Bank (ECB): the last edition covered almost 17,000 enterprises in all EU member countries. Having sufficient access to finance is an important determinant for the development of an enterprise. It is a well-known phenomenon that small and medium-sized enterprises face different challenges when accessing finance compared to large enterprises. The survey

<sup>15</sup> [https://ec.europa.eu/eurostat/cache/metadata/en/sbs\\_esms.htm#contact1609757945773](https://ec.europa.eu/eurostat/cache/metadata/en/sbs_esms.htm#contact1609757945773)

<sup>16</sup> [https://ec.europa.eu/eurostat/cache/metadata/EN/sbs\\_esms\\_mt.htm](https://ec.europa.eu/eurostat/cache/metadata/EN/sbs_esms_mt.htm)

<sup>17</sup> Eurostat, Structural business statistics 2017, Code SBS\_SC\_SCA\_R2; current data 2018

<sup>18</sup> SAFE: ISBN 978-92-76-21585-1, Luxembourg: Publications Office of the European Union, 2020

provides annually updated information on SMEs in the EU, dividing them into different categories:

- Autonomous profit-oriented enterprises, making independent financial decisions,
- Non-profit enterprises or
- Subsidiaries or branches of another enterprise.

### 4.1.2 Energy Consumption Data

According to Article 8 of the EU Energy Efficiency Directive 2012/27/EU, mandatory energy audits must be carried out every four years by enterprises that are not SMEs. Additionally, EU member states shall develop programmes to encourage SMEs to undergo energy audits and then implement the recommendations from these audits. However, none of the project partner countries had sufficient available and accessible energy data from these SME programmes.

The literature research showed that the best publicly available data sources for energy data are **Eurostat's energy balances**. Energy balances are available for EU member states and Iceland, Norway, Montenegro, North Macedonia, Albania, Serbia, Turkey, Kosovo, Moldova, Ukraine, Georgia, Bosnia & Herzegovina and the UK.

The energy balance provides information about the energy consumption of different sectors and the used energy sources. It allows assessing the relative importance of different fuels and their contribution to the economy. The energy balance is also a starting point for the construction of various indicators as well as analyses of energy efficiency.<sup>19</sup> Energy balance data are not available related to NACE sections. Therefore, the energy balance is not directly comparable with the SBS database. Additionally, energy data of the Eurostat energy balances are not available on SME level.

Energy balances consist of different data, for example gross inland consumption, consumption of the energy sector, amount of distribution losses, final non-energy consumption and final energy consumptions of different sectors. Table 2 shows the different sectors of final energy consumption from Eurostat's energy balances.

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<sup>19</sup> <https://ec.europa.eu/eurostat/web/energy/data/energy-balances>

Table 2 Final energy consumption sections from Eurostat's energy balances<sup>19</sup>

Sector	Subsector	
<b>Industry sector</b>	Iron & steel	
	Chemical & petrochemical	
	Non-ferrous metals	
	Non-metallic minerals	
	Transport equipment	
	Machinery	
	Mining & quarrying	
	Food, beverages & tobacco	
	Paper, pulp & printing	
	Wood & wood products	
	Construction	
	Textile & leather	
	Not elsewhere specified (industry)	
	<b>Transport sector</b>	Rail
		Road
Domestic aviation		
Domestic navigation		
Pipeline transport		
Not elsewhere specified (transport)		
<b>Other sectors</b>	Commercial & public services	
	Households	
	Agriculture & forestry	
	Fishing	
	Not elsewhere specified (other)	

Source: Eurostat's energy balance

As mentioned at the beginning, the NACE sections of SBS cannot be directly compared with the energy balance sectors. For example, the industry sector of the energy balance is not directly comparable with the manufacturing section of SBS. The sector commercial & public services of the energy balance aggregates NACE Sections G, I and M (among others) of the SBS. In addition, within the energy balance, the consumption of transport activities is covered in a separate transport sector and not allocated to the sectors that actually conduct these activities.

Further important energy-relevant data sources are **Eurostat's physical energy flow accounts (PEFA)**<sup>20</sup>. PEFA statistics are based on NACE sections and are available for EU member states and Norway. The PEFA data methodology differs from the energy balance methodology in that the physical energy flow accounts use the residence principle<sup>21</sup> whereas the energy balances use the territory principle<sup>22</sup>. Thus, PEFA data are not directly comparable with energy balances, but PEFA data can complement the Eurostat energy balances for mapping SMEs.

After conducting desktop research, some project partner countries were able to gain access to **energy-related data for SMEs on national level**. The research on national level data showed that the quality and scope of existing energy-related data for SMEs are in general not sufficient to be compared with other EU countries. Most of the countries do not have explicit data sources for energy consumption. For collecting energy-related data on a national level, a 6.1 Questionnaire was prepared and filled out by all of the project partner National Energy Agencies for their Countries (see in the Annex).

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<sup>20</sup> [https://ec.europa.eu/eurostat/cache/metadata/en/env\\_pefa\\_esms.htm](https://ec.europa.eu/eurostat/cache/metadata/en/env_pefa_esms.htm)

<sup>21</sup> The residence principle includes the energy use by resident units, independent of where it takes place; e.g. it includes fuel use by resident units undertaking international navigation and excludes fuel sales to non-resident units. <https://ec.europa.eu/eurostat/documents/1798247/6191537/PEFA+Guidelines+2017>

<sup>22</sup> The territory principle provides comprehensive information on the energy supply and demand in the national territory. <https://ec.europa.eu/eurostat/documents/38154/4956218/ENERGY-BALANCE-GUIDE-DRAFT-31JANUARY2019.pdf/cf121393-919f-4b84-9059-cdf0f69ec045>

### 4.1.3 Renewable Energy Data

Related to renewable energy, the literature research revealed that no data on the share of renewables in SMEs are publicly available and accessible. However, Eurostat publishes data on the general **share of renewable energy in the EU**<sup>23</sup> on a national level. In 2019, the overall share of energy from renewable sources in gross final energy consumption<sup>24</sup> in the EU reached 18.9%<sup>25</sup>.

Figure 1 depicts the national shares of energy from renewable sources for the year 2019 for gross final energy consumption, gross electricity consumption, in transport as well as for heating and cooling.

Regarding the **overall share of renewable energy**, the value for Italy corresponds with the European average. Austria has the highest share with around 34% and Malta (in line with Member States targets according to the Renewable Energy Directive) has the lowest with around 8.5%.

Looking on the **share of renewable energy in electricity generation from all sources**, the EU average is around 34%. The share of renewables in electricity in the UK, Italy and Greece are close to the European average. Austria has the highest share with around 75% and Malta (in line with Member States targets according to the Renewable Energy Directive) has the lowest share with around 8%.

The average share of **renewables in the transport sector** in EU member states is around 8.9%. Three project partner countries exceed the European average, six are below. Austria has the highest share with 9.8% and Greece has the lowest share with 4.0%. The **share of renewable energy in heating & cooling** in the EU reached around 20% in 2019. The shares in Italy and Slovakia correspond with the European average. Portugal has the highest share with around 42% and the UK has the lowest share with around 8%.

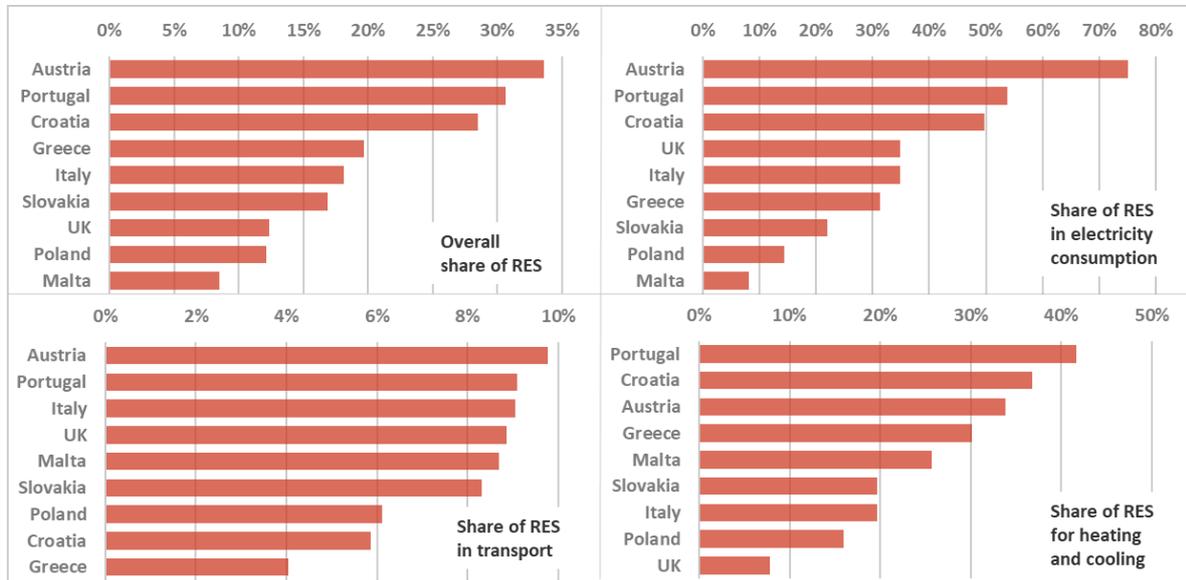
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<sup>23</sup> <https://ec.europa.eu/eurostat/web/energy/data/shares>

<sup>24</sup> Renewable Energy Directive 2009/28/EC: Gross final energy consumption is defined in Directive 2009/28/EC on renewable energy sources as energy commodities delivered for energy purposes to final consumers (industry, transport, households, services, agriculture, forestry and fisheries), including the consumption of electricity and heat by the energy branch for electricity and heat production, and including losses of electricity and heat in distribution and transmission.

<sup>25</sup> <https://ec.europa.eu/eurostat/web/energy/data/shares>

Figure 1 Shares of renewable energy sources in gross final energy consumption, gross electricity consumption, in transport as well as for heating and cooling in project partner countries, according to Directive 2009/28/EC



Source: Eurostat - Share of energy from renewable sources, 2018

The experts from some of the project partner countries emphasised the importance of certain technologies / sources for renewable energy production, especially in SMEs, as listed in Table 3:

Table 3 Important technologies/sources for renewable energy production in SMEs

Project Partner Country	Technologies / Sources
Croatia	Solar, biomass
Greece	1. Solar thermal, 2. Primary solid biofuels, 3. Photovoltaic, 4. Blended biodiesels, 5. Ambient heat (heat pumps)
Malta	Photovoltaic, heat pumps, solar thermal
Poland	Most popular: Photovoltaic Less popular: Biofuels, heat pumps, solar thermal
Slovakia	Solar thermal, photovoltaic, heat pumps, biomass

Source: Expert opinions from project partners

#### 4.1.4 Greenhouse Gas (GHG) Emissions Data

Related to GHG emissions, the literature research showed that no data on GHG emissions in SMEs are publicly available and accessible. However, Eurostat publishes data on **climate change in the EU** related to economic activities.

Looking at GHG emissions for all economic activities relating to all NACE sections in the EU-28 in 2017, section D – Electricity, gas, steam and air conditioning supply had the highest share of greenhouse gas emissions with around 30%. Section C – Manufacturing had the second highest share of greenhouse gas emissions with around 24%, followed by section A – Agriculture, forestry and fishing with around 15%<sup>26</sup>.

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<sup>26</sup> [https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env\\_ac\\_ainah\\_r2&lang=en](https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_ac_ainah_r2&lang=en)

## 4.1.5 Overview of Publicly Available and Accessible Economic & Energy Data for SMEs in the EU

Table 4 gives an overview of the availability and accessibility of economic and energy-relevant data of SMEs for all European countries.

*Table 4 Overview of availability of economic and energy data of SMEs on the internet for all EU countries and the UK*

Basic key indicators	Data for SMEs online available & accessible in English for all EU members	Data source	Evaluation of availability for SMEs
<b>Economic data</b>	yes	Eurostat – Structural business statistics (SBS)	Data available on SME level
<b>Ownership structure</b>	yes	Survey on the access to finance of enterprises (SAFE)	Data available on SME level
<b>Energy data (energy consumption, energy sources) and geographic location</b>	no	Eurostat – Energy balances Eurostat – Physical energy flow accounts (PEFA)	Data not available on SME level
<b>Share of renewable energy in the EU</b>	no	Eurostat – Share of renewable energy in the EU	Data not available on SME level
<b>GHG emissions</b>	no	Eurostat – Climate change	Data not available on SME level

## 4.1.6 Overview of Publicly Available and Accessible Energy Data for SMEs in Project Partner Countries

For collecting information to the availability and accessibility of energy relevant data in each project partner country, a questionnaire was prepared and filled out by all of the National Energy Agencies (9) in the LEAP4SME Consortium. The results are shown in the two following Tables. The answers of the project partners revealed that none of the countries publish energy data on SMEs.

*Table 5 Overview of availability and accessibility of energy data on SMEs in the project partner countries*

	No. of project partners who answered NO	No. of project partners who answered YES
Does your country publish energy data on SMEs?	9	0
Does your Agency have access to energy consumption data for SMEs?	6	3
Does your Agency manage programmes covering both energy and environmental topics for SMEs?	6 (only energy)	3 (both, energy and environmental topics)
Does your country collect data on renewable energy usage (RES) for SMEs?	9	0
Does a specific energy audit database for SMEs exist in your country?	6	3
Does your Agency have access to the energy audit database for SMEs?	6	3
Are SMEs support programmes spread/managed by different Ministries/Agencies?	0	9
From your experience, do you know where the energy-saving potentials for SMEs are (e.g. sector, technology)?	3	6
The SME definition for national statistics corresponds to the EU Commission Recommendation of 6 May 2003.	1	8
The SME definition according to Article 8 EED differs from the EU Commission Recommendation of 6 May 2003.	8	1
Energy audits for SMEs are required by law.	6	3
Energy audits for SMEs are recommended by law on a voluntary basis.	3	6

*Table 6 Overview of level of availability and accessibility of energy-relevant data on SMEs in the project partner countries*

No. of project partners who ticked					
	1	2	3	4	5
Please assess the level of availability of energy-related data on SMEs in your country (tick box from 1 very good to 5 very bad).	0	0	2	4	3
Please assess the level of accessibility of energy-related data on SMEs in your country (tick box from 1 accessible to all/public to 5 accessible to a small group of stakeholders).	0	0	1	4	4

## 4.1.7 Estimation of Energy Consumptions of SMEs in Project Partner Countries

The desktop research showed that no sufficient energy-relevant data for SMEs were available and accessible to project partner countries. In order to obtain consistent and comparable energy data at SME level for all project partner countries and estimate total energy consumption of SMEs, two calculation approaches were developed. The two approaches follow different methodologies involving individual hypotheses and assumptions. Nevertheless, the results can be used for a first estimation of the SME energy consumption.

The estimation of the energy consumption of SMEs in **Approach 1** is based on energy data of Regulation (EU) 2016/1952<sup>27</sup> on “European statistics on natural gas and electricity prices”. The estimation of **Approach 2** is based on the energy consumption of large companies. These estimations are first approximations and baselines for future optimisation. Approach 1 is referred more to small medium enterprises in terms of consumption and not necessarily according to the European Commission definition.

For creating energy performance indicators, the reference year of the collected energy consumption data should be identical to the economic data.

### ESTIMATION ACCORDING TO APPROACH 1

Regulation (EU) 2016/1952<sup>27</sup> on “European statistics on natural gas and electricity prices” requires member states to provide data on natural gas and electricity consumption for different consumption bands, which are presented in the following tables for non-household customers. The annual consumption volumes for each consumption band shall be transmitted by each EU member state to Eurostat once per year, together with energy price data for the second semester. However, Eurostat only publishes data on energy prices, not on consumption volumes. Below, the methodology of Approach 1 is described based on the Austrian methodology and it can be applied to all countries having the same data available.

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<sup>27</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R1952&from=EN>

Table 7 Non-household natural gas consumption bands

Consumption band	Annual natural gas consumption [GJ]		Annual natural gas consumption [GWh]	
	Minimum	Maximum	Minimum	Maximum
Band I1		< 1,000		< 0.28
Band I2	≥ 1,000	< 10,000	≥ 0.28	< 2.8
Band I3	≥ 10,000	< 100,000	≥ 2.8	< 28
Band I4	≥ 100,000	< 1,000,000	≥ 28	< 280
Band I5	≥ 1,000,000	< 4,000,000	≥ 280	< 1,111
Band I6	≥ 4,000,000		≥ 1,111	

Source: Regulation (EU) 2016/1952

Table 8 Non-household electricity consumption bands

Consumption band	Annual electricity consumption [MWh]	
	Minimum	Maximum
Band IA		< 20
Band IB	≥ 20	< 500
Band IC	≥ 500	< 2,000
Band ID	≥ 20,000	< 70,000
Band IE	≥ 70,000	< 150,000
Band IF	≥ 150,000	

Source: Regulation (EU) 2016/1952

If the energy consumption related to consumption bands was available from the local regulatory authority for energy or the national statistics office of each project partner country, the project partners used this information to estimate the energy consumption for SMEs in four steps:

- Step 1: Definition of threshold consumption for non-household customers that are classified as SMEs
- Step 2: Summing up of annual consumption volumes within the threshold
- Step 3: Calculation of the share of other energy sources and extrapolation for total energy consumption
- Step 4: Consideration of additional data to improve the estimation

### **Step 1: Definition of threshold consumption for non-household customers that are classified as SMEs**

In Austria, the energy consumption of each consumption band was not available, but the Austrian national regulatory authority for energy (E-Control) publishes separate statistics for electricity<sup>28</sup> and natural gas consumption<sup>29</sup>.

In the gas statistics, non-household customers with an annual natural gas consumption of less than 2.8 GWh are classified as “small consumers”<sup>30</sup>. For electricity consumption, the threshold for classification as a “small consumer” is an annual consumption of 2,000 MWh.

These figures correspond to the non-household gas consumption bands I1 and I2 and the non-household electricity consumption bands IA, IB and IC of EU Regulation 2016/1952 (see in Table 7 and Table 8). The presented threshold values, which were established using Austrian data, are highlighted in red in Table 7 and Table 8. These thresholds are to be understood as recommendations, since national conditions must be taken into account when determining these values.

In Austria, approximately 1,600 large enterprises have to conduct an energy audit under Article 8 EED. The number of consumers above the bands for electricity (I1 and I2) and for gas (IA, IB, IC) is between 1,100 and 1,200<sup>31</sup>. This suggests that most of the consumers under the suggested thresholds can be considered as SMEs.

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<sup>28</sup> <https://www.e-control.at/statistik/strom/marktstatistik/verbraucherstruktur>

<sup>29</sup> <https://www.e-control.at/statistik/gas/marktstatistik/verbraucherstruktur>

<sup>30</sup> Please note that these classifications do not correspond with small enterprises

<sup>31</sup> Approximately 1,100 consumers for natural gas and approximately 1,200 consumers for electricity; it is assumed that there is an intersection between natural gas and electricity consumers

## Step 2: Summing up of annual consumption volumes within the threshold

For Austria, the natural gas consumption of small non-household consumers in the year 2017 sums up to 8,856 GWh. The electricity consumption of small non-household consumers is 18,856 GWh. This results in an estimated total electricity and gas consumption of SMEs of 27,712 GWh.

## Step 3: Calculation of the share of other energy sources and extrapolation for total energy consumption

The Eurostat energy balance can be used to estimate the share of electricity and natural gas consumption of SMEs in total consumption. The suggested procedure is presented in Table 9 below:

- Summing up of total energy consumption and consumption of natural gas and electricity from the energy balance for the energy sector, the industry sector, the commerce & public sector, the agriculture & forestry sector, the fishing sector as well as the transport sector
- Calculation of the share of natural gas and electricity in total consumption

*Table 9 Calculation of the first estimation of the share of natural gas and electricity consumption in total energy consumption*

Energy indicator	Eurostat codes	Data source	
<b>Total energy consumption of:</b> <ul style="list-style-type: none"> <li>• energy sector</li> <li>• industry sector</li> <li>• commerce &amp; public sector</li> <li>• agriculture &amp; forestry sector</li> <li>• fishing sector</li> <li>• transport sector</li> </ul>	<ul style="list-style-type: none"> <li>• energy sector (NRG_E)</li> <li>• industry sector (FC_IND_E)</li> <li>• commerce &amp; public sector (FC_OTH_CP_E)</li> <li>• agriculture &amp; forestry sector (FC_OTH_AF_E)</li> <li>• fishing sector (FC_FISH_E)</li> <li>• transport sector (FC_TRA_E)</li> </ul>	Eurostat – Energy balance on country level	x GWh
<b>Natural gas and electricity consumption of:</b> <ul style="list-style-type: none"> <li>• energy sector</li> <li>• industry sector</li> <li>• commerce &amp; public sector</li> <li>• agriculture &amp; forestry sector</li> <li>• fishing sector</li> <li>• transport sector</li> </ul>	<ul style="list-style-type: none"> <li>• energy sector (NRG_E)</li> <li>• industry sector (FC_IND_E)</li> <li>• commerce &amp; public sector (FC_OTH_CP_E)</li> <li>• agriculture &amp; forestry sector (FC_OTH_AF_E)</li> <li>• fishing sector (FC_FISH_E)</li> <li>• transport sector (FC_TRA_E)</li> </ul>	Eurostat – Energy balance on country level	x GWh
Share of natural gas and electricity consumption in the energy consumption			= %

#### **Step 4: Consideration of additional data to improve the estimation**

A source of error in the calculation of the share of natural gas and electricity in total consumption is the transport sector. The data on energy consumption of the transport sector from the Eurostat energy balance also include transport activities of households, which represent a substantial part of this figure.

As the consumption of households should not be included in the calculation of the needed share, these data need to be corrected.

Data on the energy consumption of households including transport activities can be found in the physical energy flow accounts (PEFA). To calculate the energy consumption of the transport sector without household activities, the energy consumption of household transport activities needs to be deducted from the total transport consumption. Therefore, the “net domestic energy use for energy purposes of household transport activities” from the PEFA must be subtracted from the final energy consumption of the transport sector from the energy balance.

With this figure for the energy consumption of the transport sector without household activities, a more accurate estimation of the share of natural gas and electricity consumption can be calculated. The calculation is performed in accordance with Step 3, substituting the consumption of the transport sector from the energy balance with the newly calculated figure. For example, in Austria, with the improved estimation of Step 4, the share of natural gas and electricity consumption in total energy consumption increased from 38% (Step 3 calculation) to 42%. Knowing the share, the energy consumption of SMEs can be estimated.

The total SME consumption can be calculated by dividing the figure from Step 2 by the calculated share.

## ESTIMATION ACCORDING TO APPROACH 2

Energy Efficiency Directive EED 2012/27/EU<sup>32</sup> obliges large<sup>33</sup> enterprises to undergo an energy audit at least every four years. In each of the EU member states there are different requirements for the energy audit obligation, especially for reporting on energy audit results. Some of the EU member states have the requirement to report energy consumptions and energy-saving potentials to an energy efficiency monitoring body/authority, others do not have these obligations. If available, energy audit results can be used to calculate the energy consumption of large enterprises. Based on this information, the SME energy consumption can be estimated in three steps:

- Step 1: Accumulation of the annual energy consumption of large enterprises
- Step 2: Collection of relevant data from the energy balance
- Step 3: Complement of energy balance data with data from physical energy flow accounts (PEFA) and estimation of SME consumption

### **Step 1: Accumulation of the annual energy consumption of large enterprises**

If sufficient data on the energy consumption of large enterprises were available and accessible to the project partners, the total annual energy consumption of large enterprises was calculated.

### **Step 2: Collection of relevant data from the energy balance**

For the further estimation of the energy consumption of SMEs, the gross inland consumption of Eurostat's energy balance was used as starting point of the calculation. Gross inland energy consumption, sometimes abbreviated as gross inland consumption, is the total energy demand of a country.

Gross inland consumption should be used as starting point for the calculation (instead of final energy consumption), as the reported energy consumption of large enterprises includes more than just final energy consumption:

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<sup>32</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0027&from=EN>

Amended by Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency

<sup>33</sup> Large enterprises are enterprises that are not SMEs

- Irrespective of the type of enterprise, energy conversion plants whose heat is partly fed into a district heating network as well as any electricity generation plants are to be counted as transformation input according to the Energy Statistics Directive.<sup>34</sup> This is not final energy consumption but could be included in the audit.
- In addition to energy-consuming companies, the energy audit obligation according to the EED also includes energy supply companies whose consumption has to be allocated to the energy sector. Therefore, in addition to final energy, other balance aggregates are also covered by the audit obligation. The comparison with final energy consumption would therefore not be sufficient, which is why gross inland consumption is used at this point.

Gross inland energy consumption covers the consumption by the energy sector itself, distribution and transformation losses, final consumption and statistical differences.<sup>35</sup>

The difference between the energy consumption of large enterprises calculated in Step 1 and gross inland consumption is (mostly) given due to:

- Non-energetic use of energy sources,
- Households,
- Non-audited large enterprises (unreported audits) and
- Small and medium-sized enterprises (incl. motorised individual transport).

Gross inland consumption of Eurostat's energy balances<sup>36</sup> also includes energy consumption data on international aviation consumptions and distribution losses. In some of the EU member states, both areas could be already covered by the energy audit obligation for large enterprises. This should be considered for the further estimation of the SME energy consumption. Calculations of Step 2 are shown in Table 10.

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<sup>34</sup> <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32008R1099>

<sup>35</sup> [https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Gross\\_inland\\_energy\\_consumption](https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Gross_inland_energy_consumption)

<sup>36</sup> [Energy balances - Energy - Eurostat \(europa.eu\)](#)

Table 10 Approach 2 - Step 2 calculation

Energy indicator (GWh)	Calculation	Eurostat code	Data source
Gross inland consumption	+	GIC	Eurostat – Energy Balance on country level
Annual energy consumption of audited large enterprises	-	Not applicable	National data from energy efficiency monitoring body/authority
Final non-energy consumption	-	FC_NE	Eurostat – Energy Balance on country level
International aviation*	-	INTAVI	Eurostat – Energy Balance on country level
Distribution losses*	-	DL	Eurostat – Energy Balance on country level
<b>Input for Step 3 estimation</b>	<b>=</b>		

\*...only if it is not already included in the annual energy consumption of audited large enterprises

### Step 3: Complement of energy balance data with data from physical energy flow accounts (PEFA) and estimation of SME consumption

In order to refine the energy balance data of Step 2, it is necessary to deduct the consumption of households. The value for the total activities of households (PEFA code “HH”) can be obtained directly from PEFA database<sup>37</sup>. The relevant PEFA category is called “natural energy input, energy products and energy residuals”.

In addition, the public sector should also be deducted from the result of Step 2. In PEFA statistics, the public sector consists of three NACE sections: “Public administration and defence; compulsory social security (O)”, “Education (P)” and “Human health and social work activities (Q)”. Energy consumption of the public sector is given by the PEFA category “Natural energy input, energy products and energy residuals”.

The estimation of Approach 2 with data from energy audits of large enterprises, energy balances and PEFA statistics is shown in Table 11 below.

<sup>37</sup> [https://ec.europa.eu/eurostat/databrowser/view/env\\_ac\\_pefasu/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/env_ac_pefasu/default/table?lang=en)

Table 11 Approach estimation of energy consumption of SMEs

Energy indicator (GWh)	Calculation	Eurostat code	Data source
Gross inland consumption	+	GIC	Eurostat – Energy balance on country level
Annual energy consumption of audited large enterprises	-	Not applicable	National data from energy efficiency monitoring body/authority
Final non-energy consumption	-	FC_NE	Eurostat – Energy balance on country level
International aviation*	-	INTAVI	Eurostat – Energy balance on country level
Distribution losses*	-	DL	Eurostat – Energy balance on country level
Energy consumption of households and transport	-	HH Natural energy input, energy products and energy residual (N00, P00, R00)	Eurostat – Physical energy flow accounts, PEFA
Public sector*: 1. Public administration and defence; compulsory social security (O) 2. “Education (P)” “Human health and social work activities (Q)”	-	O, P & Q Natural energy input, energy products and energy residual (N00, P00, R00)	Eurostat – Physical energy flow accounts, PEFA
<b>Estimated energy consumption of all SMEs per country</b>	=		

\*...only if it is not already included in the annual energy consumption of audited large enterprises

## 4.1.8 Overview of the Approaches Used

Table 12 provides an overview of the approaches used for the estimation of the SME energy consumption. Some of the project partners followed the approaches as suggested (●), others adapted the approaches (x) or developed their individual approaches taking into account national circumstances and differences. It was possible to estimate the SME energy consumption based on one of the approaches for all project partners, except Portugal. Three project partner countries developed their own individual approaches, which are described in the Annex.

Since some data sources were not available for the reference year 2017, other reference years were partly chosen for the estimation of the energy consumption.

*Table 12 Overview of approaches used for calculation of the SME energy consumption*

Country	Approach 1	Approach 2	Individual approach
Austria	●	●	
Croatia	●		
Greece		X	
Italy	X	● X	
Malta		X	X
Poland	X		X
Portugal			X
Slovakia	●		
United Kingdom	X		

## 4.2 Mapping Economic Data of SMEs in EU Member States

The European Commission monitors and reports<sup>38</sup> annually on the SME performance. LEAP4SME focusses on some SME-relevant economic data related to the number of enterprises, number of employees and value added also in comparison to the NACE sections. Eurostat's annual structural business statistics (SBS) provide a breakdown of enterprises by size class in relation to the NACE structure. Enterprises are divided into different categories<sup>39</sup>, with SMEs covering three size classes:

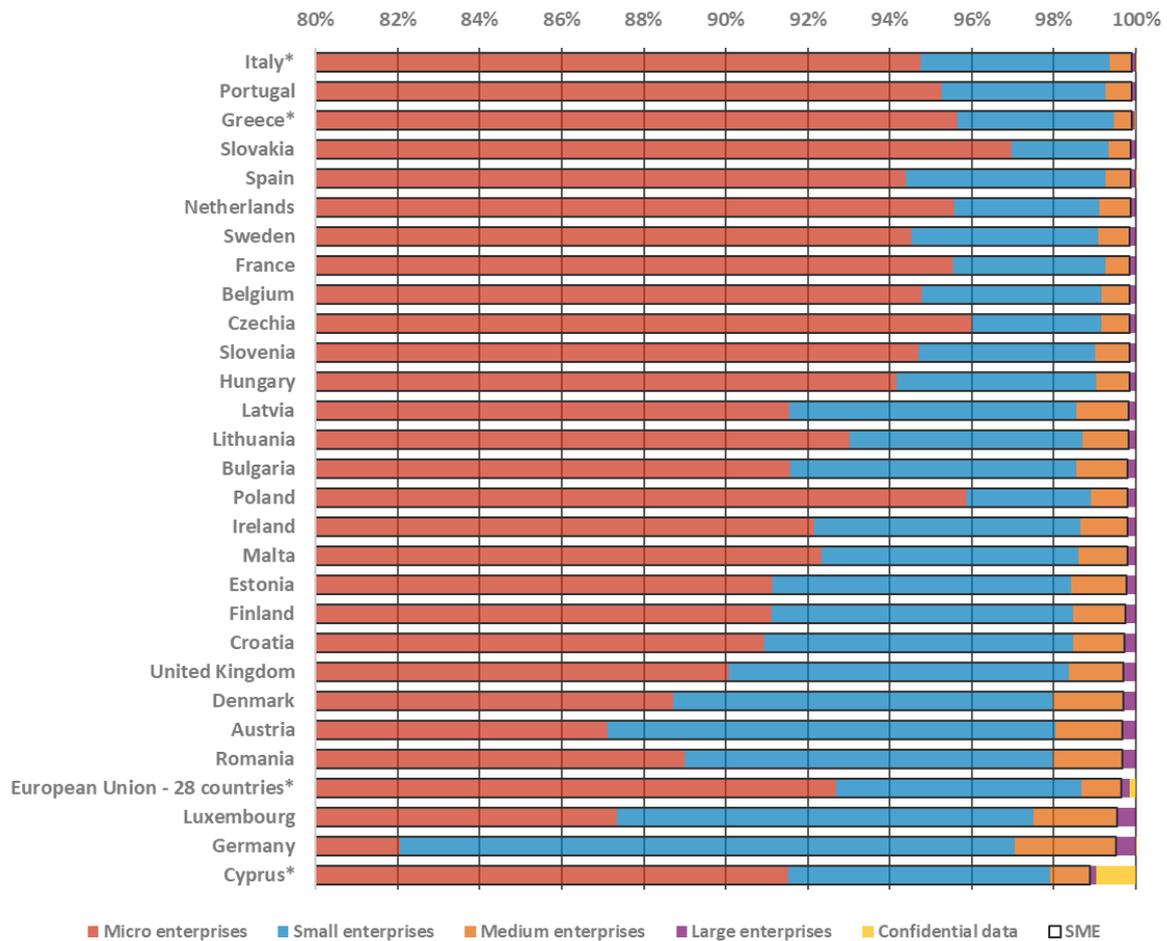
- micro enterprises with less than 10 persons employed,
- small enterprises with 10–49 persons employed and
- medium-sized enterprises with 50–249 persons employed.

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<sup>38</sup> [https://ec.europa.eu/growth/smes/sme-strategy/performance-review\\_en](https://ec.europa.eu/growth/smes/sme-strategy/performance-review_en)

<sup>39</sup> <https://ec.europa.eu/eurostat/web/structural-business-statistics/small-and-medium-sized-enterprises>

Figure 2: Share of micro, small, medium and large enterprises related to the total number of enterprises in EU member states

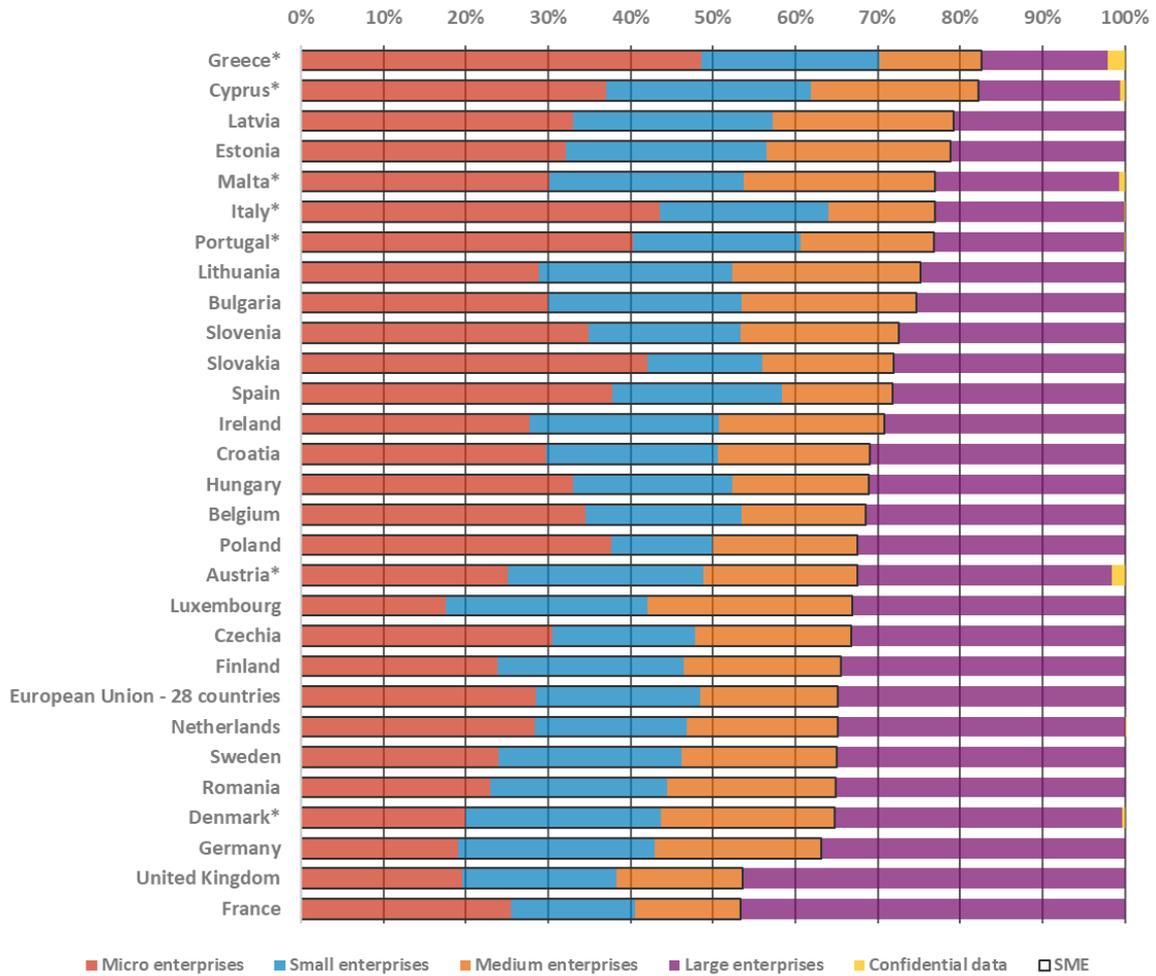


Source: Eurostat – Structural business statistics 2017; \*contains confidential data.

Figure 3 shows the importance of SMEs in Europe. The share of SMEs in all enterprises is over 98% in all EU member states. Micro enterprises are of key relevance as they alone account for more than 80% of all businesses.

Focussing on the share of persons employed by size-class (see Figure 3), SMEs do not show the same significance as in Figure 2. Around 65% of employees in the EU are employed by SMEs, with some considerable national differences. Particularly the UK and France show a lower share of persons employed by SMEs with just over 50%. On the other hand, SMEs employ over 80% of all employees in Greece and Cyprus.

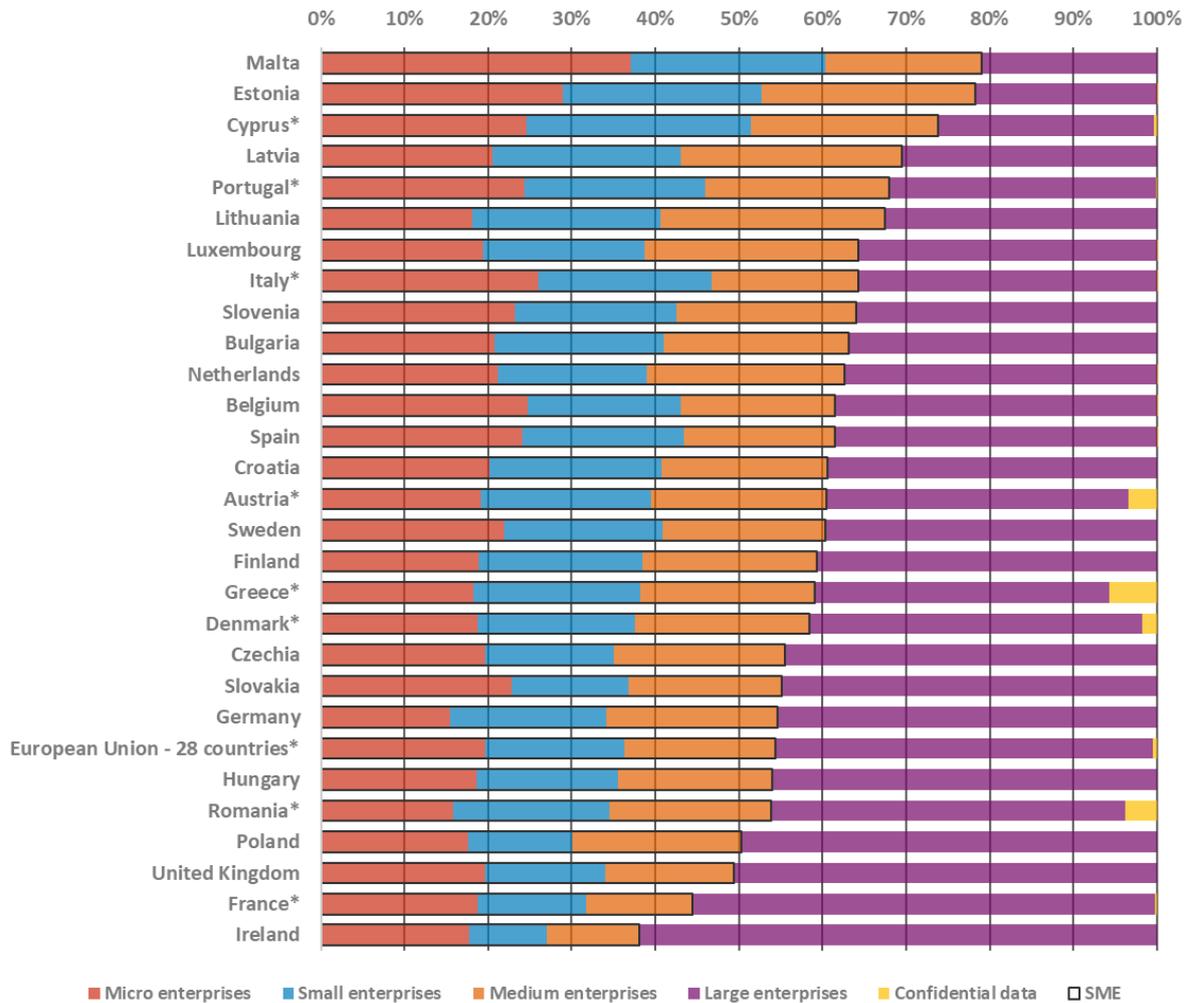
Figure 3 Share of employees in micro, small, medium and large enterprises in EU member states



Source: Eurostat – Structural business statistics 2017; \*contains confidential data.

Figure 4 depicts the distribution of value added across different size classes. On average, about 54% of value added in the EU is generated by SMEs. This share spreads widely on a national level, ranging from almost 80% in Malta to less than 40% in Ireland.

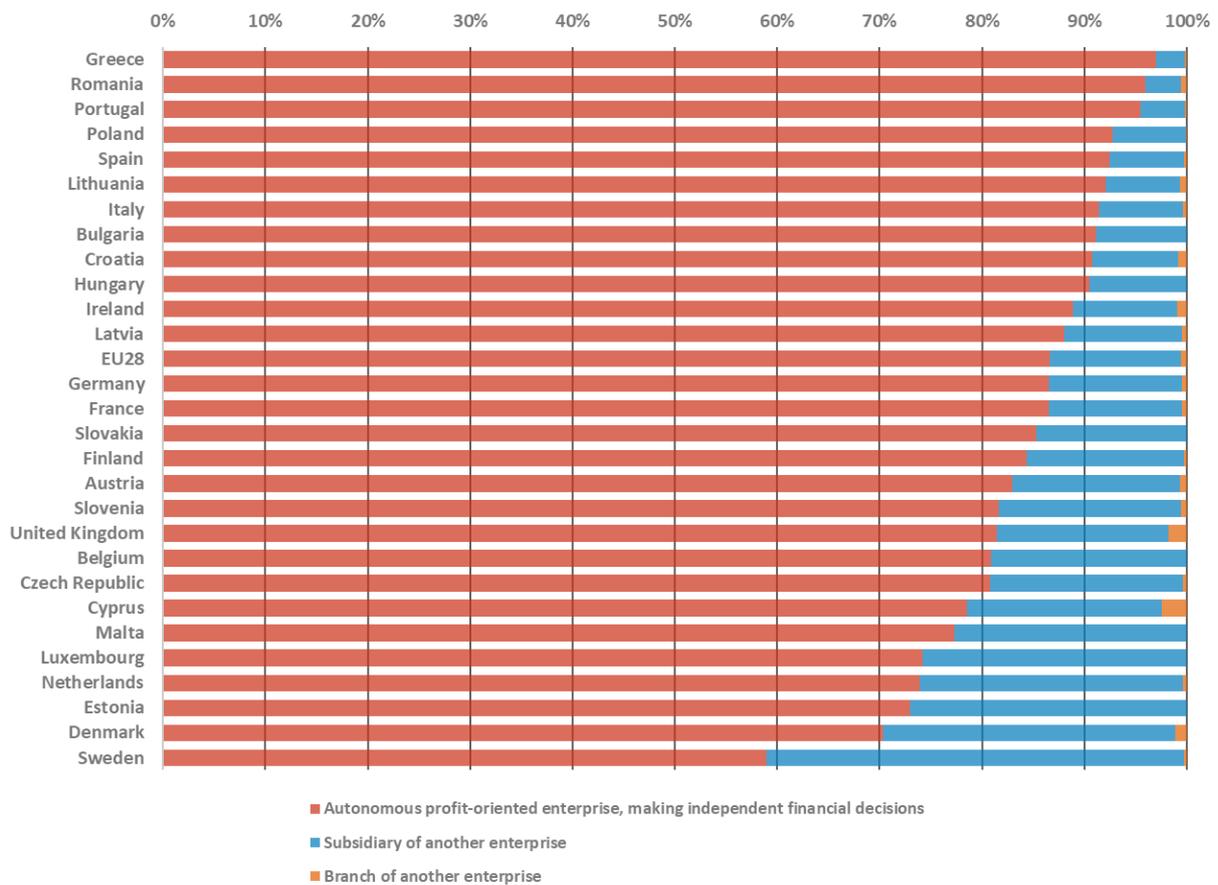
Figure 4 Share of value added at factor cost in micro, small, medium and large enterprises in EU member states



Source: Eurostat – Structural business statistics 2017; \*contains confidential data.

Looking at the ownership structure (see Figure 5), on average, around 87% of all SMEs are autonomous profit-oriented enterprises and can make independent financial decisions. Greece has the highest share of autonomous profit-oriented enterprises with 97%, Sweden the lowest with 59%.

Figure 5 Ownership structure of SMEs in EU member states



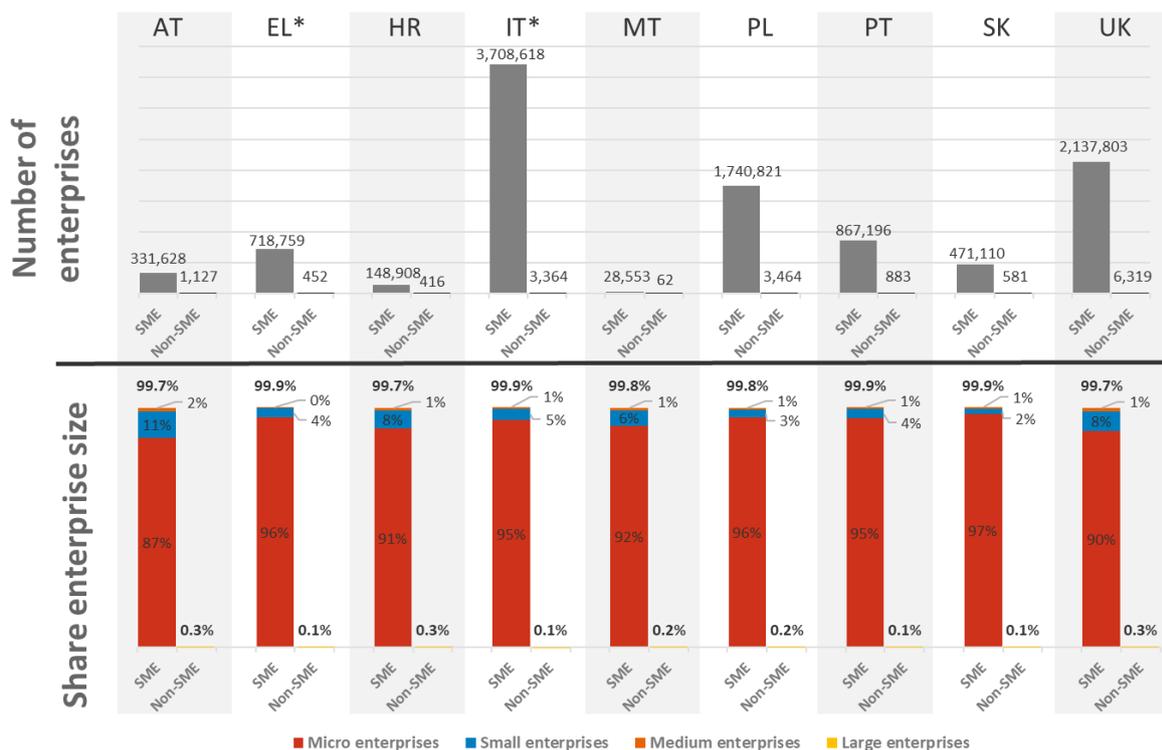
Source: European Commission and the European Central Bank (ECB) – Survey on the Access to Finance of Enterprises (SAFE) 2017. Sample size: 15,092

## 4.3 Mapping Economic Data of SMEs in Project Partner Countries

Figure 6 takes a closer look at economic data of the project partner countries and depicts the absolute number of SMEs and large enterprises (upper graph), as well as the share of the total number of enterprises (lower graph). In all partner countries, the relevance of SMEs is significantly high: more than 99% of all enterprises are SMEs, while large companies only have a marginal share of between 0.1% and 0.3%.

Considering the absolute value of the number of enterprises, Italy has by far the highest number followed by the UK<sup>40</sup> and Poland.

Figure 6 Number of enterprises and shares in project partner countries



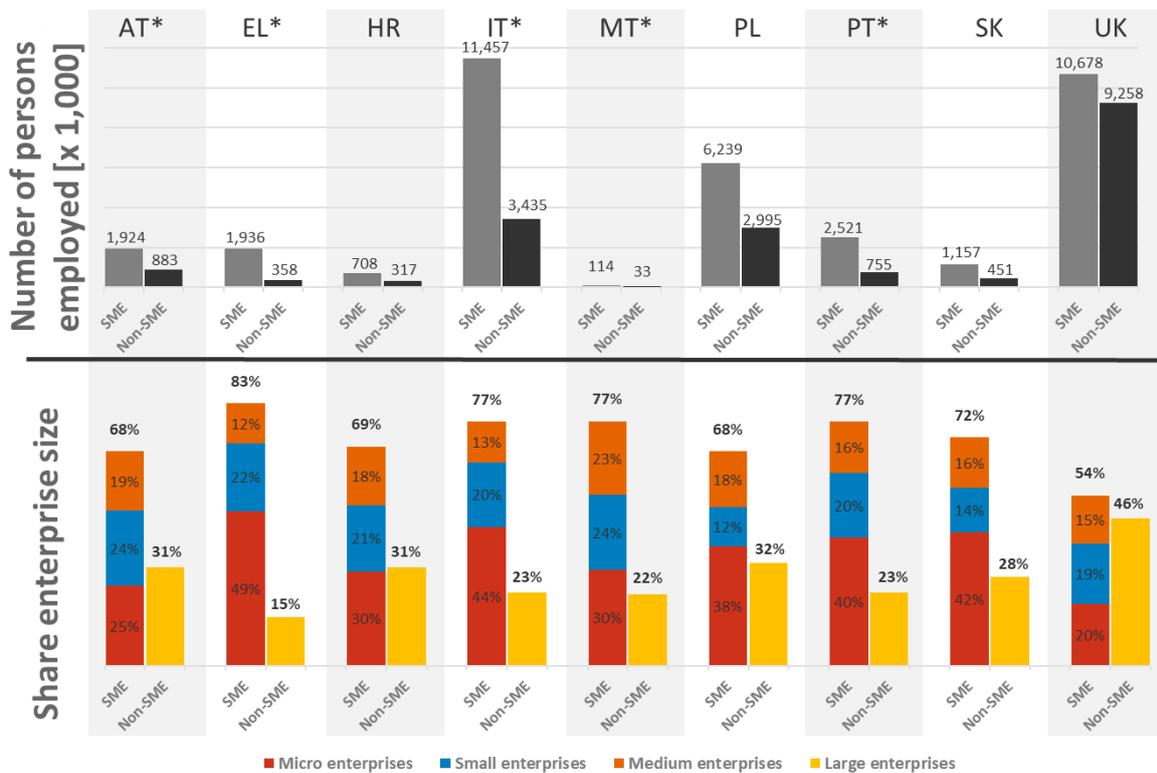
Source: Eurostat – Structural business statistics 2017; \*contains confidential data; sum of shares might not add up to 100%.

<sup>40</sup> The number of UK businesses in the report does not include unregistered businesses (for VAT and PAYE), which make up a significant proportion of the total UK SMEs. Around 55% of the total number of SMEs in the UK are unregistered.

Figure 7 illustrates the total number of persons employed by SMEs and non-SMEs (upper graph) and the corresponding shares (lower graph). The share of persons employed in SMEs in the project partner countries – in comparison to all enterprises – spreads between 54% in the UK and 83% in Greece (EL).

Looking at absolute figures, Italy has the highest number of persons employed by SMEs, followed by the UK and Poland. For non-SMEs, the UK features the highest number by far, which is almost three times as many as in Italy.

Figure 7 Number of persons employed by enterprises and shares in project partner countries

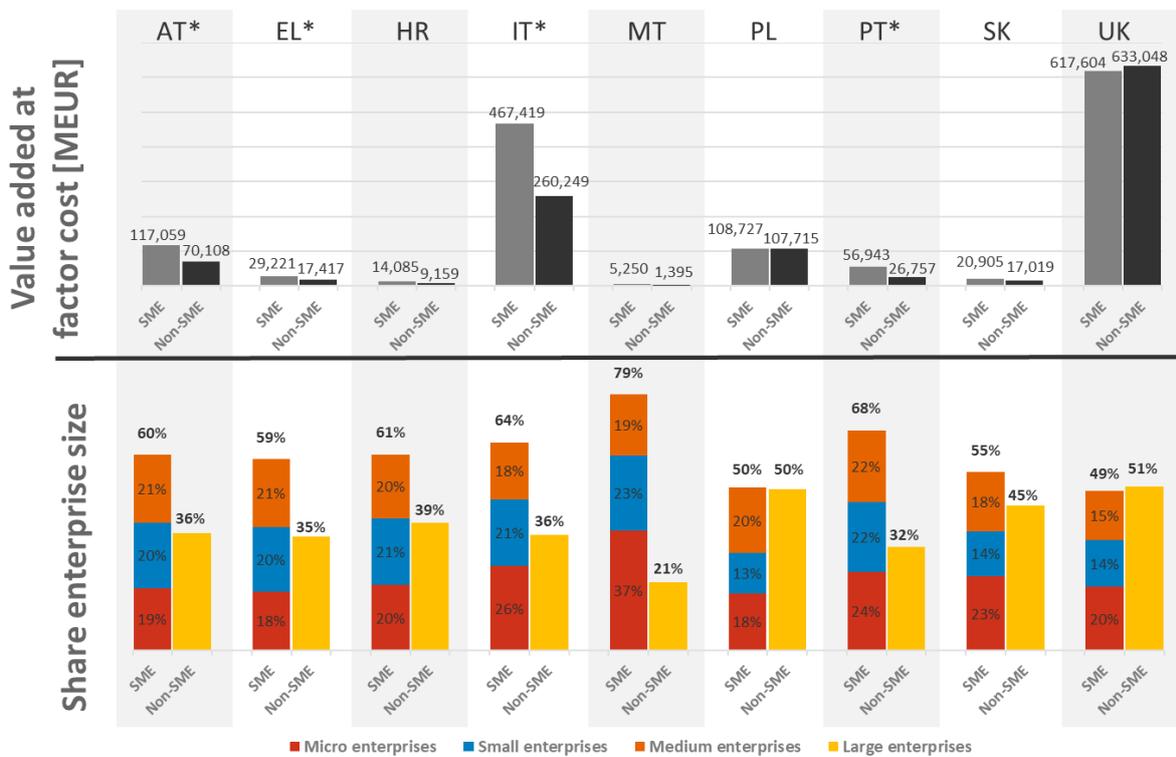


Source: Eurostat – Structural business statistics 2017\* contains confidential data; sum of shares might not add up to 100%.

Figure 8 shows the absolute value added by SMEs and non-SMEs (upper graph) as well as the respective shares (lower graph). The value added generated by SMEs in the project partner countries varies between 49% in the UK and 79% in Malta. Interestingly, the UK is the only project partner country where non-SMEs generate more value added than SMEs. In Poland, the split between SMEs and non-SMEs is almost equal, whereas all other countries exhibit a stronger tendency towards SMEs.

Concerning total figures, the highest value added is generated in the UK and Italy in both SMEs and large enterprises.

Figure 8 Total value added at factor cost by enterprises and shares in project partner countries



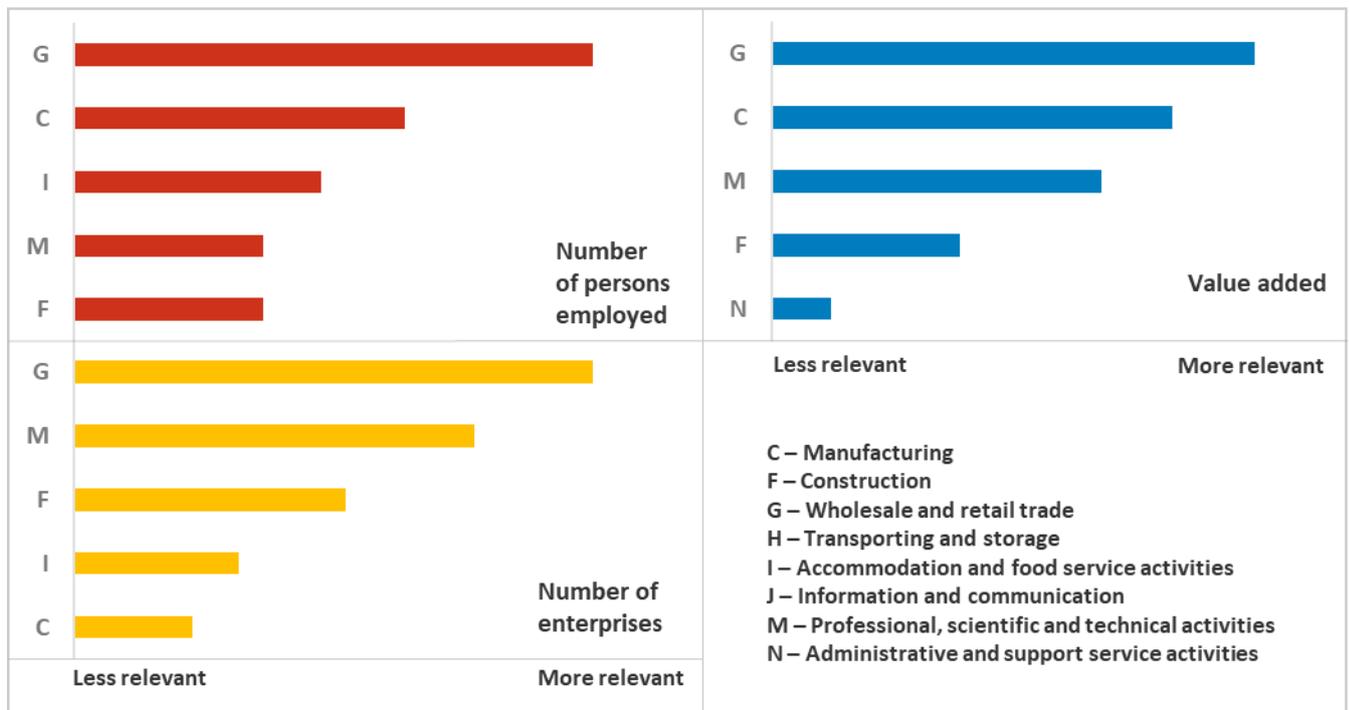
Source: Eurostat – Structural business statistics 2017; \*contains confidential data; sum of shares might not add up to 100%.

To depict the most relevant NACE sections for SMEs in the project partner countries, the top five sections regarding number of persons employed, number of enterprises and value added were gathered for each country.

By assigning five points for the most important national sector, four points for the second most important sector, etc. and adding up the points of each section, the top five sections for all project partner countries were identified. Figure 9 shows the result of this analysis. The length of the bar corresponds to the relevance of the section. The most important section for SMEs related to number of persons employed, number of enterprises and value added is Section G – Wholesale & retail trade.

The manufacturing section (C) is the second most important NACE section for SMEs related to number of persons employed and value added. In terms of number of enterprises, Section M is the second most important.

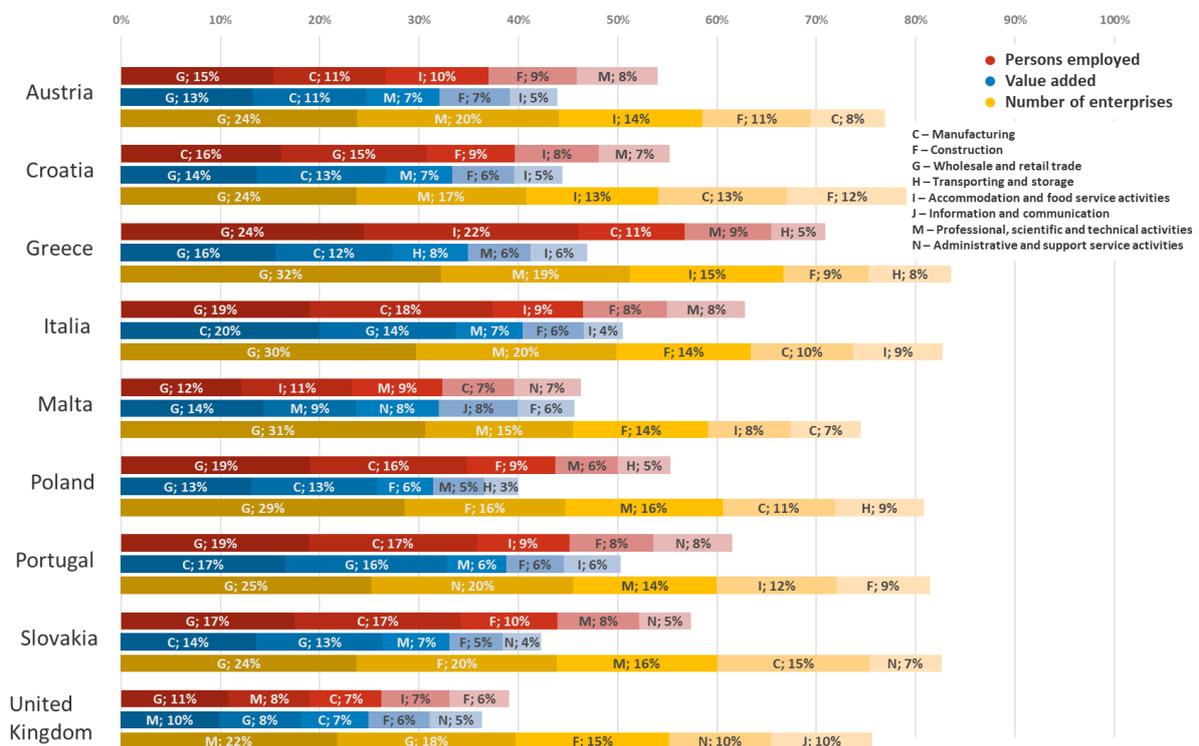
Figure 9 Top five SME NACE sections for all partner countries regarding number of persons employed, number of enterprises and value added



Source: Eurostat – Structural business statistics 2017

The shares of the national top five NACE sections for SMEs in the total figures are shown in Figure 10. The most important sections are depicted in a darker colour. Focussing on the number of persons employed, Section G is the most important NACE section in all countries except Croatia (Section C). The top five sections cover a range from around 40% (UK) to over 70% (Greece) of all persons employed by SMEs. Regarding value added, Section G is in the top position for five countries (Austria, Croatia, Greece, Malta and Poland), Section C for three (Italy, Portugal and Slovakia) and Section M for one country (UK). The top five sections cover a range from around 35% (UK) to over 50% (Italy and Portugal) of total value added by SMEs. Concerning number of enterprises, Section G is in the top position for all countries except the UK (Section M). The top five sections cover a range from around 75% (UK and Malta) to about 83% (Greece) of all SMEs.

Figure 10 Shares of national top five SME NACE sections regarding number of persons employed, number of enterprises and value added in the total figures



Source: Eurostat – Structural business statistics 2017

Looking at the distribution of SMEs in NACE sections (Figure 10), in the UK Manufacturing (C) has a relatively lower importance than in other countries: in terms of persons employed and value added its share is 7%, whereas it is not listed in the top 5 sectors in terms of number of enterprises. This could be one of the reasons behind the trend in value added described above.

Figure 11 depicts the relevance of section G – Wholesale & retail trade – in relation to value added, number of SMEs and persons employed. The size of the bubble corresponds to the generated value added. In Greece, for example, about 24% of all persons employed and 33% of all SMEs are included in section G, generating one of the highest shares of value added in comparison with the other countries. In most countries, the relevance of section G is in a similar range, with the exceptions of the UK with a lower importance and Greece with a higher importance.

Figure 11 Section G – Wholesale & retail trade in SMEs in relation to value added, number of SMEs and persons employed



Source: Eurostat – Structural business statistics 2017

## 4.4 Mapping Energy Data of SMEs in Project Partner Countries

Figure 12 shows estimates of SME energy consumption based on individual calculations of each project partner country as an absolute value (upper graph) and as a share of gross inland consumption (lower graph). A detailed description of the specific calculations is provided in the Annex. If more than one estimation was calculated by partner countries, the graphic contains two bars indicating the results of the different estimation approaches. The reference year for each estimation is given in the graphic. Similar to economic data, absolute values for SME energy consumption exhibit a wide spread. The highest consumptions are found in Italy, the UK and Poland, the lowest in Malta. The share of SME consumption in gross inland consumption (GIC) is between 9 and 18% for all countries. The exception is Italy, which included different scenarios in the calculations<sup>41</sup>, resulting in a wide range of the SME energy consumption estimate (13% to 29% of GIC). Aside from Italy's estimation, the results of the different approaches are within a four-percent margin relative to the GIC.

Figure 12 Estimated SME energy consumption and share of gross inland consumption (GIC)

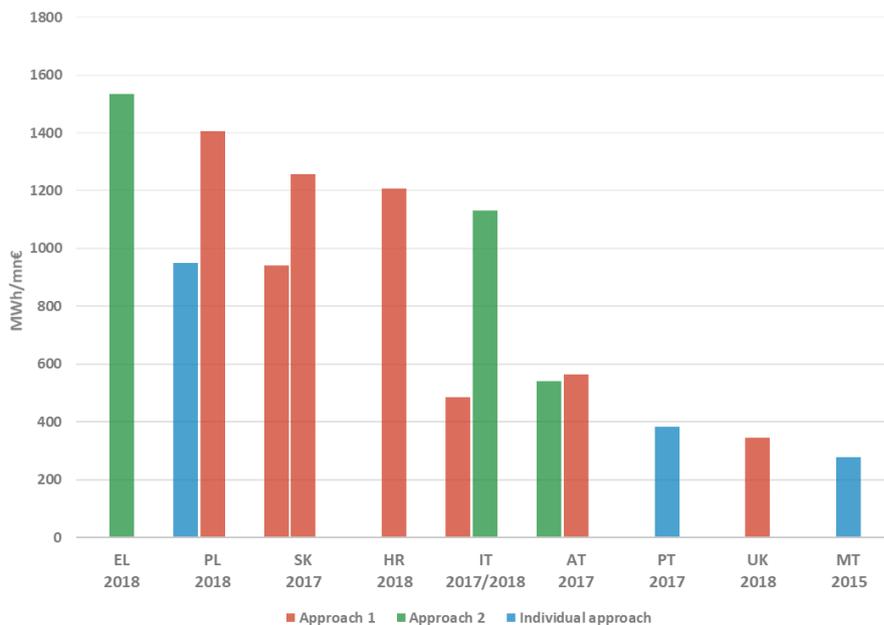


Source: Estimations by project partner countries

<sup>41</sup> For further details, see Table 9 above and Table 11 below as well as the Appendix.

Using estimated energy consumptions and data on value added from Eurostat’s SBS, energy intensities for each country were calculated. The resulting values are shown in Figure 13. It must be noted that the estimated energy consumption does not necessarily refer to the scope of the non-financial business economy (e.g. the scope of value added). Only Greece, Malta and Portugal were able to provide energy data with the same scope as Eurostat’s SBS. Therefore, the calculated energy intensities should be seen as rough approximations that do not allow direct conclusions to be drawn. While energy consumptions related to GIC (Figure 13) are mostly within a narrow range, energy intensities exhibit a wider spread: the highest energy intensity (Greece) is more than five times higher than the smallest (Malta). In general, medium or higher energy intensities with values between 1,500 and 600 MWh/mn€ were calculated for Greece, Poland, Slovakia, Croatia and Italy. Energy intensities below 600 MWh/mn€ were calculated Austria, Portugal, the UK and Malta. Due to the wide range for the estimated energy consumption of SMEs in Italy, the energy intensity shows an identical behaviour and one of the estimations (the most conservative scenario) falls below 600 MWh/mn€. For this reason, in fig.13 Italy is included in the group with higher intensities as well as in the group with lower ones<sup>42</sup>.

Figure 13 Estimated SME energy intensities (SME energy consumption divided by value added by SMEs)



Source: Estimations by project partner countries

<sup>42</sup> The different reference years used in the two approaches developed for Italy do not imply significant differences in the results.

Table 13 summarises the detailed results of the calculations of SME energy consumption and energy intensity in a comprehensive format. Partner countries that provided more than one approach are listed in multiple rows.

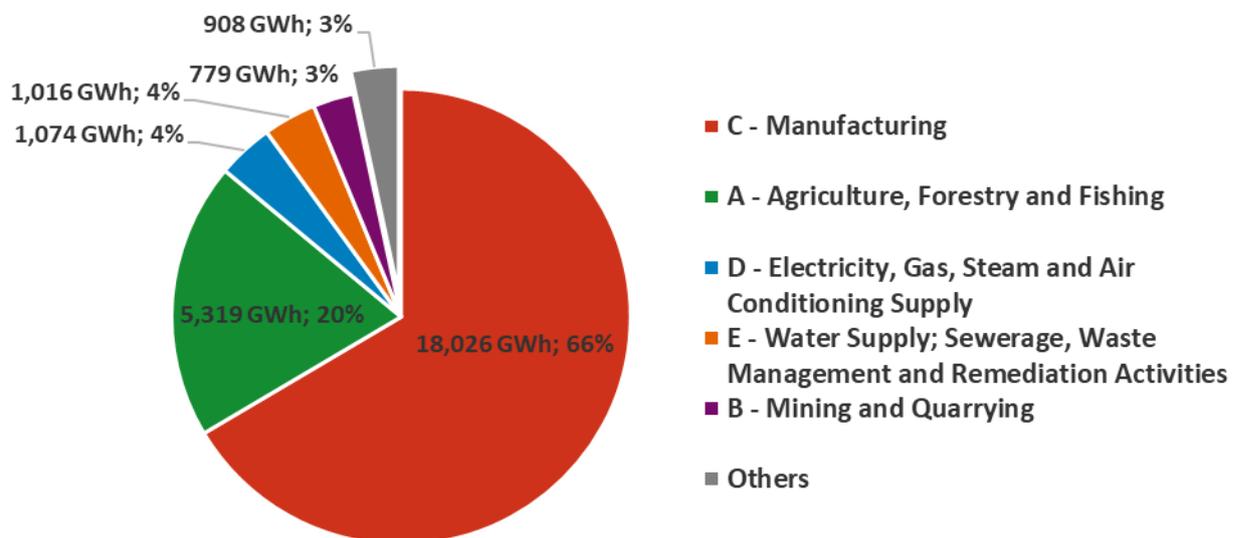
*Table 13 Results of individual calculations and estimations of SME energy consumption and energy intensity per project partner country*

Country	Estimated SME energy consumption [GWh]	Gross inland consumption [GWh]	Share in GIC	SME energy consumption of total business economy [GWh]	Energy intensity [MWh/mn€]	Year	Notes
AT	63,199	404,698	16%	-	540	2017	Approach 2
AT	65,972	404,698	16%	-	564	2017	Approach 1
HR	18,535	100,916	18%	-	1,206	2018	Approach 1
EL	50,017	277,077	18%	50,017	1,534	2018	Approach 2
IT	496,798	1,855,132	27%	-	1,063	2017	Approach 2
IT	529,246	1,855,132	29%	-	1,132	2017	Approach 2
IT	235,438	1,825,789	13%	-	486	2018	Approach 1
IT	361,506	1,825,789	20%	-	746	2018	Approach 1
IT	326,816	1,825,789	18%	-	674	2018	Approach 1
IT	453,651	1,825,789	25%	-	937	2018	Approach 1
MT	1,469	8,814	17%	1,121	277	2015	Individual Approach
MT	1,439	8,814	16%	-	-	2015	Approach 2
PL	178,049	1,241,898	14%	-	1,407	2018	Approach 1
PL	120,345	1,241,898	10%	-	951	2018	Individual Approach
PT	27,122	286,668	9%	21,804	383	2017	Individual Approach
SK	19,703	200,592	10%	-	942	2017	Approach 1
SK	26,280	200,592	13%	-	1,257	2017	Approach 1
UK	221,150	2,153,142	10%	-	345	2018	Approach 1

## Mapping Energy Data of SMEs in Portugal

Due to their individual approach, the Portuguese project partners were able to calculate the energy consumption for SMEs on NACE level. Figure 14 depicts the five most energy-consuming sections, which together account for 97% of Portugal's SME energy consumption. Section C (Manufacturing) has by far the highest consumption, followed by Section A (Agriculture, forestry and fishing), which is not part of Eurostat's SBS.

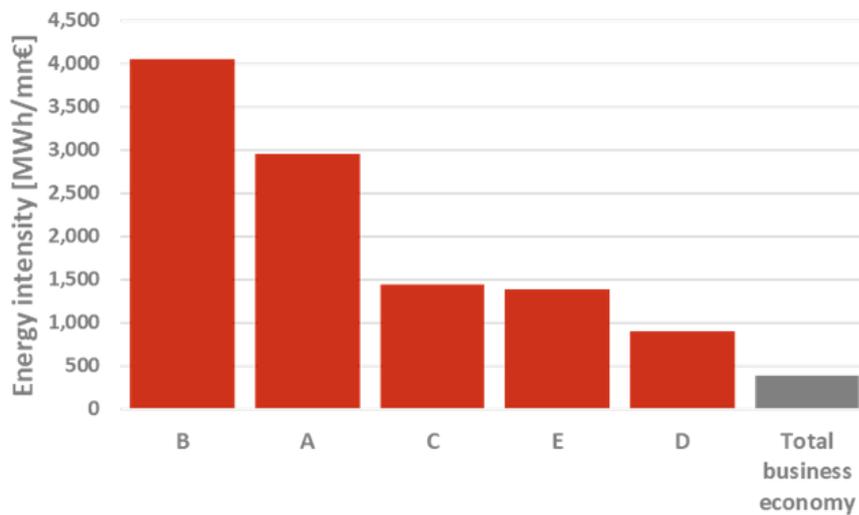
Figure 14 NACE sections with highest estimated energy consumptions in SMEs in Portugal



Source: Intensive Energy Consumption Management System (for Industry) – SGCIE Data Base & General-Directorate for Energy and Geology Energy Balance, 2017

With energy data available on NACE level, it was also possible to calculate energy intensities for the individual NACE sections. Figure 15 depicts the five most energy-intensive sections in Portugal as well as the energy intensity of the total business economy. Section B (Mining and quarrying) has the highest energy intensity with around 4,000 MWh/mn€, followed by Section A (Agriculture, forestry and fishing) with just under 3,000 MWh/mn€.

Figure 15 Most energy-intensive SME sections in Portugal



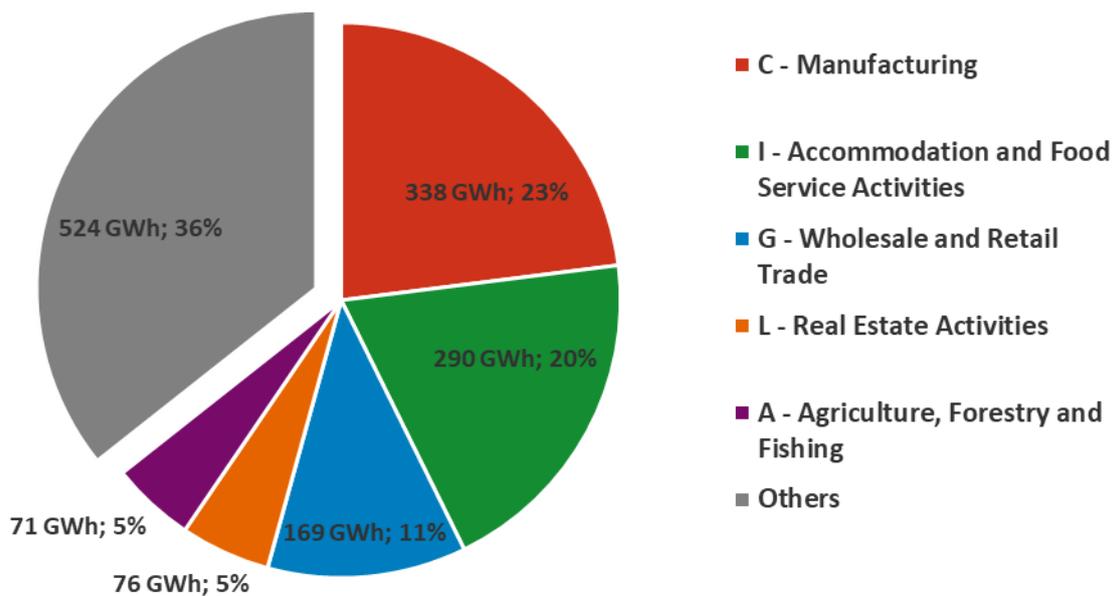
Source: Intensive Energy Consumption Management System (for Industry) – SGCIE Data Base & General-Directorate for Energy and Geology Energy Balance, 2017

- B – Mining and quarrying
- A – Agriculture, forestry and fishing
- C – Manufacturing
- E – Water supply; Sewerage, waste management and remediation activities
- D – Electricity, gas, steam and air conditioning supply

## Mapping Energy Data of SMEs in Malta

Similar to Portugal, the Maltese project partners were also able to calculate the energy consumption for SMEs on NACE level due to their individual approach. The five most energy-consuming sections are depicted in Figure 16 and account for 64% of the total SME energy consumption. Compared to Portugal with a share of 97%, the Maltese share is rather low indicating the different types and distribution of economic sectors. The section with the highest energy consumption is Section C (Manufacturing) followed by Section I (Accommodation and food service activities).

Figure 16 NACE sections with highest estimated energy consumptions in SMEs in Malta



Source: Calculation by the Energy and Water Agency of Malta (EWA)

Due to confidentiality issues with SBS data on NACE level, it was not possible to calculate the energy intensities for the NACE sections as well.

## 5 Conclusion & Outlook

The research within LEAP4SME revealed that no energy-related data for SMEs were published at European level. At national level for the LEAP4SME project partner countries, the quality and scope of existing energy-related data for SMEs were generally insufficient to compare with other EU countries. In most countries, there are no explicit data sources for energy consumption at sufficient granularity to isolate SMEs.

In order to try to fill this gap and obtain consistent and comparable energy data at SME level for all project partner countries, two calculation approaches were developed to estimate the total energy consumption of SMEs. The two approaches follow different methodologies involving individual hypotheses and assumptions. Nevertheless, the results can be used for a first estimation of the SME energy consumption at each Country level.

The methodologies for the calculation and estimation of the energy consumption for SMEs should be further developed in terms of collecting more data and refining the existing data. Further investigations, especially on the role of energy-intensive SMEs, should be done by involving a broader scope of relevant stakeholders (e.g. business associations, national statistical offices, regulators).

Nevertheless, the approaches presented in the present deliverable, the annexed calculations and results, can be considered a step forward in supporting national policy impact assessment processes. These approaches represent the first comprehensive and harmonised attempt in literature to cover the lack of background data in SMEs energy efficiency policy making.

## 6 Annex

### 6.1 Questionnaire

#### General Questions

- Does your country publish energy data on SMEs?
- Does your Agency have access to energy consumption data for SMEs?
- Does your Agency manage programmes covering energy/environmental topics for SMEs?
- Does your country collect data on renewable energy usage (RES) for SMEs?
- Does a specific energy audit database for SMEs exist in your country?
- Does your Agency have access to the energy audit database for SMEs?
- Please assess the level of availability of energy-related data on SMEs in your country (tick box from 1 very good to 5 very bad).
- Please assess the level of accessibility of energy-related data on SMEs in your country (tick box from 1 accessible to all/public to 5 accessible to a small group of stakeholders).
- Do SMEs support programmes spread/managed by different Ministries/Agencies?
- From your experience, do you know where the energy-saving potentials for SMEs are (e.g. sector, technology)?

#### SME characterisation – economic data

- Number of SMEs for total business economy (except financial and insurance activities)
- Number of large enterprises for total business economy (except financial and insurance activities)
- Total number of enterprises for total business economy (except financial and insurance activities)
- Share of SMEs/total enterprises in %
- Share of micro enterprises/SMEs in total in %
- Share of small enterprises/SMEs in total in %
- Share of medium-sized enterprises/SMEs in total in %

- Total number of persons employed for total business economy (except financial and insurance activities)
- Number of persons employed by SMEs for total business economy (except financial and insurance activities)
- Number of persons employed by large enterprises for total business economy (except financial and insurance activities)
- Share of employees in SMEs/employees in total in %
- Share of employees in micro SMEs/employees of all SMEs in %
- Share of employees in small SMEs/employees of all SMEs in %
- Share of employees in medium-sized SMEs/employees of all SMEs in %
- Total value added in million euros for total business economy (except financial and insurance activities)
- Share of value added by SMEs/total value added in %
- Share of value added by micro SMEs/value added by all SMEs in %
- Share of value added by small SMEs/value added by all SMEs in %
- Share of value added by medium-sized SMEs/value added by all SMEs in %
- Top 5 sections of SMEs by number of persons employed
- Top 5 NACE sections of SMEs by number of persons employed
- Top 5 NACE sections of SMEs by value added
- Top 5 NACE sections of SMEs by number of enterprises
- Ownership structure of SMEs

#### **SME characterisation – energy data (energy consumption and renewable energy)**

- Final energy consumption of SMEs (GWh) and data sources
- Energy intensity of SMEs – final energy consumption per value added (GWh/mn€)
- TOP 5 SME NACE sections by final energy consumption
- TOP 5 SME NACE sections by energy intensity

#### **SME definition**

#### **Energy audit definition**

## 6.2 Calculations and estimations of project partner countries

### Austria

For the estimation of the energy consumption of SMEs, Austria used the two approaches described in the chapter “Estimation of energy consumptions of SMEs in project partner countries”.

#### Approach 1

The input data for Approach 1 are given in Table 14. Assuming that “small consumers” represent SMEs, the further calculation was executed according to the general procedure described in the chapter 4.1.7 *Estimation of Energy Consumptions of SMEs in Project Partner Countries*. The estimated total energy consumption of SMEs is 65,972 GWh.

*Table 14 Input data on natural gas and electricity consumption for Approach 1 – Austria, 2017*

Customer category (a)	Natural gas delivery to final customer, GWh	Electricity delivery to final customer, GWh
Small households	-	375
Medium households	-	6,779
Large households	-	7,480
Households	17,596	14,634
Small consumers	8,856	18,856
Medium Industry	8,074	8,610
Large Industry	60,664	17,094
Non-households	77,594	44,560
Statistical differences	-27	-529
Delivery to final customer	95,163	229

Source: E-Control 2019<sup>43</sup>

<sup>43</sup> <https://www.e-control.at/statistik/gas/marktstatistik/verbraucherstruktur>

## Approach 2

The calculation of the SME energy consumption following Approach 2 was executed according to Table 15. The estimated total energy consumption of SMEs is 63,199 GWh.

*Table 15 Estimation of energy consumption of SMEs in Austria, 2017*

Energy indicator	Data source	Value	Unit
Gross inland consumption	Eurostat – Energy balance of Austria	404,698	GWh
Annual energy consumption of large enterprises audited 2017	National data from Energy Efficiency Monitoring Body of Austria	-198,023	GWh
Non-energetic final energy consumption	Eurostat – Energy balance of Austria	-19,561	GWh
Final consumption households + transport	Eurostat – PEFA	-113,398	GWh
Public institutions + human health activities (NACE O, P & Q)	Eurostat – PEFA	-10,518	GWh
<b>Energy consumption of SMEs</b>		<b>63,199</b>	<b>GWh</b>

Source: Calculation of the project partner from Austria

## Croatia

For the estimation of the energy consumption of SMEs, Croatia used Approach 1.

### Approach 1

Input data for Approach 1 are presented in Table 16 and Table 17. The further calculation was executed according to the general procedure described in the chapter 4.1.7 *Estimation of Energy Consumptions of SMEs in Project Partner Countries*. The estimated total energy consumption of SMEs is 18,535 GWh.

*Table 16 Input data on electricity consumption for Approach 1 – Croatia, 2018*

	Total consumption in Industry	Total consumption in Services	Total consumption Industry & Services
	MWh	MWh	GWh
Band IA (<20 MWh)	3,240	1,251,259	
Band IB (<500 MWh)	268,472	3,281,309	
Band IC (<2,000 MWh)	479,618	312,642	
<b>Total</b>	751,330	4,845,210	<b>5,596.54</b>

Source: National Agency of Statistics, Annual Energy Report (made by EIHP), for services – only estimates according to surveys

*Table 17 Input data on natural gas consumption for Approach 1 – Croatia, 2018*

	Total consumption in Industry	Total consumption in Services	Total consumption Industry & Services
	GWh	GWh	GWh
Band I1 (<0,28 GWh)	80.44	n.a.	
Band I2 (<2,8 GWh)	293.3	n.a.	
<b>Total</b>	373.74	2,321.20	<b>2,694.94</b>

Source: National Agency of Statistics, Annual Energy Report (made by EIHP), for services – only estimates according to surveys

## Greece

For the estimation of the energy consumption of SMEs, Greece used an adapted version of Approach 2.

### Adapted Approach 2

For the estimation of the energy consumption, some individual adaptations were added to the approach:

- Starting the calculation with final energy consumption instead of gross inland consumption
- Reference year of 2018; data for 2017 were not available
- Use of the ODYSSEE-MURE database for energy consumption of the transport sector –private cars
- Use of the Hellenic Statistical Authority database for energy consumption of the public sector

The calculation was executed according to Table 18. The estimated total energy consumption of SMEs is 50,017 GWh.

*Table 18 Estimation of energy consumption of SMEs in Greece, 2018*

Energy indicator	Data source	Value	Unit
Final energy consumption	Eurostat – Energy balance of Greece	176,413.60	GWh
Large companies' consumption in Greece	Unofficial data source/ Ministry of the Environment and Energy	-37,896.27	GWh
Energy consumption for households	Eurostat – Energy balance of Greece	-45,550.72	GWh
Energy consumption for Agriculture and forestry	Eurostat – Energy balance of Greece	-3,074.61	GWh
Energy consumption for Fishing	Eurostat – Energy balance of Greece	-173.05	GWh
Energy consumption for Transport sector – Aviation/navigation	Eurostat – Energy balance of Greece	-9,743.98	GWh
Energy consumption for Transport sector – Private Cars	ODYSSEE-MURE database	-25,844.41	GWh
Energy consumption for Public sector	ELSTAT (Hellenic Statistical Authority)	-4,113.07	GWh
<b>Energy consumption of SMEs</b>		<b>50,017.49</b>	<b>GWh</b>

Source: Calculation of the project partner from Greece

## Italy

For the estimation of the energy consumption of SMEs, Italy used two approaches: Approach 2 (incl. corrections with PEFA bridge tables) and Approach 1, developing also an adjusted version of the latter one.

The reference years used in the calculations range from 2017 to 2019, depending on the availability of data. Nevertheless, differences between these years are negligible for the purposes of the estimation and can be refined in future steps.

### Approach 2

In Approach 2, distribution losses, statistical differences, exchanges and transfers are included in the calculation. Apart from that, a further step was established using PEFA bridge correction tables, which link the different methodologies of PEFA (residence principle) and the energy balance (territory principle).

#### *Step 1: Accumulation of the annual energy consumption of large enterprises*

In Italy, the Italian energy agency ENEA is the delegate of the Ministry of Economic Development (Ministero dello Sviluppo Economico – MiSE) to manage the mandatory energy audit database. The preliminary calculation of the energy consumption of large enterprises<sup>44</sup> includes these main steps:

- Calculation of the total annual energy consumption of compulsory audited sites of large enterprises in the years 2016–2019 (about 90% relate to the year 2019 and therefore to energy consumption in 2018)
- Calculation of the total annual energy consumption of non-audited sites of large enterprises (included in clustering procedure files)

The calculated annual energy consumption of large enterprises in Italy is **44.3 Mtoe**. This calculated figure is based on the figures reported by the enterprises through their energy audits. Energy consumptions of large enterprises that have not complied with the obligation<sup>45</sup> are not included in this procedure.

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<sup>44</sup> Including associated/related companies

<sup>45</sup> Around 7%

*Step 2 & Step 3 and PEFA bridge correction: Collection of relevant data from the energy balance; complement of energy balance data with data from physical energy flow accounts (PEFA) and estimation of SME consumption.*

The information required for Step 2 and Step 3 is available through the energy balance<sup>46</sup> and PEFA<sup>47</sup> for Italy (see Table 19). With these data, a first estimation of the energy consumption of SMEs can be calculated.

*Table 19 Estimation of energy consumption of SMEs in Italy with Approach 2*

Energy indicator	Eurostat codes	Data source	Energy consumption – without bridge correction	Energy consumption – incl. bridge correction
			ktoe	ktoe
Gross inland consumption	GIC	Eurostat – Energy balance of Italy	159,512.7	159,512.7
Distribution losses	DL	Eurostat – Energy balance of Italy	-1,992.3	-1,992.3
International aviation	ETR – INTAVI	Eurostat – Energy balance of Italy	-3,419.2	-3,419.2
Final non-energy consumer	FC_NE	Eurostat – Energy balance of Italy	-7,914.7	-7,914.7
Statistical differences	STATDIFF	Eurostat – Energy balance of Italy	-352.1	-352.1
Household (non-transportation)	FC_OTH_HH_E	Eurostat – Energy balance of Italy	-32,898.6	-32,898.6
Household transportation	FC_HH_TRA	PEFA	-20,704.5	-18,033.3
Public sector	PEFA NACE O & P & Q	PEFA	-5,918.5	-5,799.3
Large enterprises	Not relevant	ENEA	-44,300.0	-44,300.0
SME Total	Calculated		42,716.9	45,507.3
<b>SME Total</b>	% GIC		<b>26.8</b>	<b>28.5</b>

Source: Calculation of the project partner from Italy

<sup>46</sup> [Energy balances - Energy - Eurostat \(europa.eu\)](https://ec.europa.eu/eurostat/data/browser/view/env_ac_pegasu/default/table?lang=en)

<sup>47</sup> [https://ec.europa.eu/eurostat/data/browser/view/env\\_ac\\_pegasu/default/table?lang=en](https://ec.europa.eu/eurostat/data/browser/view/env_ac_pegasu/default/table?lang=en)

When comparing gross inland consumption (energy balance) and total energy use by resident units (sum of all activities according to the NACE code, including transformation and household in PEFA), a strong discrepancy between these figures can be observed. This difference is detailed in the bridge table (Physical energy flow accounts totals bridging to energy balances totals – ENV\_AC\_PEFA05<sup>48</sup>).

The difference is due to the energy use by resident units abroad, the energy use by non-residents on the territory and other adjustments and statistical discrepancies. The energy use is divided into land transport, water transport and air transport operated by resident units.

In the first estimation, the consumption of the household transportation and public sector were obtained directly from PEFA, without considering the correction of the GIC due to the bridge table. When using the bridge table to adjust transportation and statistical differences, a reallocation of the bridge table is proposed, as described in Table 20. The resulting estimation including the bridge corrections is presented in Table 19.

*Table 20 Reallocation of the bridge table difference*

	PEFA – Net domestic energy use (ENV_AC_PEFASU)
Land transport	50 % NACE H / 50% HH_TRA
Water transport	NACE H
Air transport	NACE H
Other adjustments and statistical discrepancies	ALL ACTIVITIES (proportional to consumption)

Source: Calculation of the project partner from Italy

## Adapted Approach 1

The Italian electricity market is made up of three main parts: standard condition service, safeguard service and free market. For the standard condition service, specific data for the non-domestic sector as well as for the free market were extracted. The safeguard data

<sup>48</sup> [https://ec.europa.eu/eurostat/databrowser/view/env\\_ac\\_pefa05/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/env_ac_pefa05/default/table?lang=en)

element is negligible this calculation. The second step is to apply thresholds for SME consumption to these data. For electricity, annual consumptions of up to 2 GWh (lower threshold) and 20 GWh (upper threshold) were chosen. The reason for this range is that energy-intensive SMEs in Italy sometimes exceed an annual electricity consumption of 2 GWh. For natural gas, thresholds of 200,000 m<sup>3</sup> (lower threshold) and 2,000,000 m<sup>3</sup> (upper threshold) were selected. Consumption data within these thresholds are presented in Table 21.

*Table 21 Input data on natural gas and electricity consumption for Approach 1 – Italy*

	Units	Natural gas	Electricity
Lower threshold	TWh	60.4	96.3
Upper threshold	TWh	105	120
Lower threshold	ktoe	5,193	8,280
Upper threshold	ktoe	9,028	10,318

Source: Elaboration on the Italian Regulatory Authority for Energy, Networks and Environment (ARERA); Annual report of status of services 2018.

Considering these consumptions, the share of SMEs consumptions in terms of electricity and natural gas was calculated using data from Eurostat’s energy balance. To yield a figure for the total SME consumption, an estimation of the SME consumption for “Oil and petroleum products” and “Other products: solid, waste, heat, biofuels, etc.” must be calculated. The hypothesis used for this estimation is that the SME share of consumption of these energy carriers is identical to the share of natural gas and electricity, excluding refineries (where the SME consumption can be considered negligible). Applying this methodology, an estimation of the total SME energy consumption can be made (Table 22).

*Table 22 Estimation of energy consumption of SMEs in Italy with Approach 1*

	Natural gas (ktoe)	Electricity (ktoe)	Oil and petroleum products (ktoe)	Others (ktoe)	Total (ktoe)	Share in GIC
Lower threshold estimation	5,193	8,280	4,496	2,274	<b>20,244</b>	12.90%
Upper threshold estimation	9,028	10,318	7,833	3,962	<b>31,142</b>	19.80%

Source: Calculation of the project partner from Italy

It is important to note that the lower threshold value is the minimum value of SME consumption for a number of reasons. On the one hand, the role of medium-sized enterprises in the manufacturing sector is very important and their consumption is high. At least 2,300 SMEs in Italy have an electrical consumption of over 1 GWhe per year (*Energivori*<sup>49</sup>). Therefore, it is reasonable to estimate that several companies have a consumption that clearly exceeds the proposed minimum threshold (2 GWhe). This hypothesis can be also applied to the gas sector.

On the other hand, this approach implicitly assumes that all transformation activities are only produced by large enterprises. This is true for thermoelectric power plants (mainly in NACE D). However, the role of SMEs in the Italian generation mix cannot be neglected, specifically the production of renewable energy sources (RES) and the relevance of combined heat and power (CHP). A subsequent analysis of SMEs in the transformation sector is very complex due to the lack and disaggregation of data. However, a refined approach is proposed in order to pre-assess the impact of SMEs on the transformation sector. It is possible to define two main transformation activities:

- Classical transformation: thermal transformation processes based on fossil fuels (CHP, power plants, refineries, coke/steel plants, waste) that are dominated by large enterprises
- RES-based transformation: Renewable Energy sources are input data for the energy balance and are included as “Other energy carrier”. This RES-based sector in Italy is partially dominated by SMEs: 96% of photovoltaics, 77% of bioenergy, 67% of wind and 19% of hydropower generation are provided by SMEs<sup>50</sup>.

Hence, in order to evaluate correctly the weight of SMEs in the energy balance, the term “Others” must be corrected. The estimated SME energy consumption including this correction is presented in Table 23.

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<sup>49</sup> Italy has extended the EED article 8 obligation to include energy-intensive companies that apply for a tax relief under specific conditions (first one is energy consumptions exceeding 1 GWh/year). Those enterprises are listed in a publicly available register managed by CSEA (Fund for Energy and Environmental Services, an Italian Public Authority).

<sup>50</sup> Italian Regulatory Authority for Energy, Networks and Environment (ARERA). Annual Report 2019. Status of services, vol.1 (in Italian).

Table 23 Refined estimation of energy consumption of SMEs in Italy with Approach 1

	Natural gas (ktoe)	Electricity (ktoe)	Oil and petroleum products (ktoe)	Others (ktoe)	Total (ktoe)	Share on GIC
Lower threshold estimation	5,193	8,280.40	4,496	10,139	<b>28,109</b>	17.90%
Upper threshold estimation	9,028	10,318.20	7,833	11,827	<b>39,007</b>	24.80%

Source: Calculation of the project partner from Italy

## Malta

For the estimation of the energy consumption of SMEs, Malta used an individual approach and an adapted version of Approach 2. In addition, a validation of the individual approach was performed. The validation showed similar results for both approaches, which is why only one result is integrated in Figure 12 and Figure 13.

### Individual Approach

In Malta, the Energy and Water Agency (EWA) only has non-SME energy data for 2015. These data were collected from energy audits carried out in enterprises who were obliged by Article 8 of the Energy Efficiency Directive (EED). Data on enterprises (non-SMEs) that were exempted from this obligation are also available to the EWA. Energy data of all large enterprises were classified per NACE section. In 2015, the total energy consumption of large enterprises was 633 GWh.

EWA has final energy consumption data (electricity and fuels) per NACE sections, specifically for the economic sectors (i.e. Industry and Services). These data, together with non-SME energy data, were used to calculate the total final energy consumption in SMEs. For 2015, the calculated final energy consumption in SMEs is around 1,469 GWh.

### Adapted Approach 2

The calculation of the SME energy consumption following the adapted Approach 2 was executed according to Table 24.

*Table 24 Estimation of energy consumption of SMEs in Malta with Approach 2, 2015*

Energy indicator	Data source	Value	Unit
Gross inland consumption	Eurostat – Energy balance of Malta	8,813.97	GWh
Annual energy consumption of audited large enterprises	National data from EWA	-633.045	GWh
Final non-energy consumption	Eurostat – Energy balance of Malta	-69.167	GWh
Energy consumption of households	Eurostat – Energy balance of Malta	-928.833	GWh

Final energy consumption transport	Eurostat – Energy balance of Malta	-2,323.261	GWh
International aviation	Eurostat – Energy balance of Malta	-1,349.722	GWh
Final energy consumption other sectors	Eurostat – Energy balance of Malta	-29	GWh
<b>Energy consumption of all SMEs</b>		<b>3,480.942</b>	<b>GWh*</b>

Source: Calculation of the project partner from Malta

\* Note: This value also includes ‘Own use’ energy, transformational losses and distributional losses.

### Validation of Individual Approach Methodology

In order to validate the methodology used in the individual approach, energy losses in Approach 2 must be taken into account. If total energy losses are subtracted from the total SME energy consumption value obtained in Approach 2, the result should be very close to the one obtained in the individual approach (see Table 25).

Table 25 Validation of the individual approach of Malta

Energy losses	Data source	Value	Unit
Estimated energy consumption of all SMEs in Malta according to Approach 2		3,480.942	GWh
Total energy losses 2015, sum of <ul style="list-style-type: none"> <li>Transformational losses (transformational input – transformational output): 1,862.58 GWh</li> <li>Distributional losses: 179.01 GWh</li> </ul>	Eurostat – Energy balance of Malta	-2,041.59	GWh
Validation: <b>Estimated energy consumption of all SMEs in Malta according to Approach 2 minus total energy losses</b>		<b>1,439.365</b>	<b>GWh</b>

Source: Calculation of the project partner from Malta

Using the calculation in the individual approach, the resulting total final energy consumption for SMEs is 1,468.835 GWh. On the other hand, using Approach 2 and the data validation exercise results in 1,439.365 GWh of energy consumption in SMEs. Both values are very close to each other and the difference between them is about 29.47 GWh, which corresponds to an approximate percentage error of 2%.

Moreover, it was determined that the percentage error of 2% did not affect the ranking of the top NACE sections in the total business economy in terms of energy consumption. In this regard, it can be concluded that **both approaches are valid and accurate.**

## Poland

For the estimation of the energy consumption of SMEs, Poland used an adapted version of Approach 1 and an individual approach.

### Adapted Approach 1

As no data on natural gas consumption disaggregated by different consumption bands is available for Poland, the estimation was conducted utilising only electricity consumption. Apart from that, the calculation followed the procedure described in the chapter 4.1.7 *Estimation of Energy Consumptions of SMEs in Project Partner Countries*. To calculate the share of electricity consumption in total consumption, newest available complete data from Eurostat's energy balance (2018) and PEFA (2016) were used. Input data for the SME energy consumption are presented in Table 26. As the data on electricity consumption are likely to include some non-SMEs, the resulting figure is an overestimation. The estimated total energy consumption of SMEs is 178,049 GWh.

Table 26 Input data on electricity consumption for Approach 1 – Poland, 2019

	Consumption category	Total consumption	Unit	Data source
<50 MWh	Households and small consumers	46,611,484	MWh	URE Report (Energy Regulatory Office) <sup>51</sup>
50–2,000 MWh	Households and small consumers	28,151,980	MWh	URE Report (Energy Regulatory Office) <sup>51</sup>
<2,000 MWh	Households	30,613,200	MWh	Statistics Poland <sup>52</sup>
<2,000 MWh	Households and small consumers <2,000 MWh minus Households <2,000 MWh	<b>44,150,264*</b>	MWh	Own calculation

Source: Calculation of the project partner from Poland; \* overestimation – not only including SMEs

<sup>51</sup> <https://www.ure.gov.pl/download/9/11395/Raport2020.pdf>

<sup>52</sup>

[https://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5485/11/3/1/gospodarka\\_energetyczna\\_i\\_gazownictwo\\_w\\_polsce\\_w\\_2019\\_r.pdf](https://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5485/11/3/1/gospodarka_energetyczna_i_gazownictwo_w_polsce_w_2019_r.pdf)

## Individual Approach

The calculated data are based on results of KAPE's<sup>53</sup> survey among 5,000 Polish SMEs. At the time of writing, the results of this survey have not yet been published. The survey did not cover all SMEs, but only included:

- Companies with 2–249 employees
- Companies that have a contract with an energy supplier or settle payments for energy with other entities on the basis of meter readings
- Companies in the sectors of manufacturing, services and trade, excluding transport, communal services, public education & health services and public administration; however, cultural and education institutions are included

The results of the survey were extrapolated to represent all SMEs within the scope, providing an input for the estimation of the total SME consumption based on Approach 1. This was achieved by calculating the share of electricity and natural gas consumption of the industry and services sector in total electricity and natural gas consumption. With this share, the electricity and natural gas consumption of SMEs in the industry and services sector (coming from the survey) was extrapolated to cover all SMEs. Following the methodology of Approach 1, this value was extrapolated using the share of electricity and natural gas consumption in total consumption. The shares were calculated using the newest available complete data from Eurostat's energy balance (2018) and PEFA (2016). The results are presented in Table 27. The estimated total energy consumption of SMEs is 120,345 GWh.

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<sup>53</sup> The Polish National Energy Conservation Agency

Table 27 Estimation of energy consumption of SMEs in Poland, 2019

	Share	Total consumption	Unit	Data source
Industry & Services share in electricity and natural gas consumption	<b>77.95</b>		%	Eurostat – Energy balance of Poland
Use of electricity and natural gas in Industry & Services SMEs		36,809	GWh	KAPE survey results, extrapolated*
Total use of electricity and natural gas in SMEs		47,221	GWh	Own calculation
<b>Total use of energy in SMEs</b>		<b>120,345</b>	<b>GWh</b>	

Source: Calculation of the project partner from Poland; \* underestimation – survey does not cover 1-person companies

## Portugal

For the estimation of the energy consumption of SMEs, Portugal used an individual approach.

### Individual Approach

The individual approach is based on data from:

- Intensive Energy Consumption Management System (for Industry) – SGCIE Data Base
- General-Directorate for Energy and Geology Energy Balance 2017

Since no specific data are available for the consumption of SMEs, a rationale was created to estimate the energy consumption in SMEs, considering the following:

- Eighty per cent of the total Portuguese industry final consumption is registered in the SGCIE (Intensive Energy Consumption Management System) and the ETS (Emissions Trading System).
- The ETS only includes large enterprises; therefore, this value was not included in the calculation.
- SGCIE includes both SMEs and large companies; therefore, the final energy consumption of SMEs was estimated considering the available data (not public) and isolated from the estimate.
- Five per cent of Portugal's final energy consumption is due to micro enterprises.
- NACE A consumption was available and most enterprises with this NACE were SMEs.

Thus, the first step was to calculate the final energy consumption of the Portuguese industry. Based on these data and the characterisation of the enterprises available, the final energy consumption of SMEs was determined. Lastly, considering the publicly available data for NACE A and the characterisation of the enterprises within this NACE section, the total final energy consumption for SMEs (including NACE A to N without K) was estimated. The estimated total energy consumption of SMEs is 27,122 GWh.

## Slovakia

For the estimation of the energy consumption of SMEs, Slovakia used Approach 1.

### Approach 1

Additional information to the calculation of Approach 1:

- Consumption data are available for 2017, 2018 and 2019. Data from 2017 were used for the estimation.
- Small consumers are considered having an annual consumption of natural gas of less than 3 GWh. Therefore, bands I1 & I2 were used to calculate SME consumption.
- For electricity, an annual consumption of less than 30 MWh is assumed for small consumers. Therefore, two estimations were calculated. Option 1 utilised the consumption of band IA and IB, option 2 included only the consumption of band IA.

The input data for the estimation are presented in Table 28 and Table 29. The extrapolation followed the procedure described in the chapter *4.1.7 Estimation of Energy Consumptions of SMEs in Project Partner Countries*. The estimated total energy consumption of SMEs is 19,703 GWh and 26,280 GWh for option 1 and option 2, respectively.

*Table 28 Input data on electricity consumption – Slovakia, 2017*

Consumption band	Total consumption	Unit
Band IA (<20 MWh)	900.77	GWh
Band IB (<500 MWh)	3,074.09	GWh
<b>Total</b>	<b>3,974.86</b>	<b>GWh</b>

Source: Statistical Office of the Slovak Republic

Table 29 Input data on natural gas consumption – Slovakia, 2017

Consumption band	Total consumption	Unit
Band I1 (<0.28 GWh)	17,073,620	GJ
Band I2 (<2.8 GWh)	12,833,200	GJ
Total in GJ	29,906,820	GJ
<b>Total in GWh</b>	<b>8,307.45</b>	<b>GWh</b>

Source: Statistical Office of the Slovak Republic

## United Kingdom (UK)

For the estimation of the energy consumption of SMEs, the UK used an adapted Approach 1.

### Adapted Approach 1

SME energy consumption was calculated using elements of Approach 1. Data on metered energy consumptions (natural gas and electricity) for SMEs from the Non-Domestic National Energy Efficiency Data framework are only available for England and Wales. This dataset is only available for 2018 (see Table 30). Using the number of SME businesses in England and Wales in 2018, a GWh per business metric was created and applied to the number of SMEs in Scotland and Northern Ireland to get their estimated energy consumptions (see Table 31). The figure for all of the UK was then used to calculate the total SME consumption following the procedure described in the chapter 4.1.7 *Estimation of Energy Consumptions of SMEs in Project Partner Countries*. The estimated total energy consumption of SMEs is 221,150 GWh.

Table 30 Input data on electricity and natural gas consumption – UK, 2018

Business size	Electricity Consumption (GWh)	Natural Gas Consumption (GWh)	Energy Consumption (GWh)
Micro (<10 employees)	15,217	17,386	32,603
Small (10–49 employees)	14,916	15,891	30,807
Medium (50–249 employees)	17,087	23,722	40,809
<b>SMEs (0–249 employees)</b>	<b>47,220</b>	<b>56,999</b>	<b>104,219</b>

Source: Non-domestic NEED data: metered energy consumption for England and Wales 2018<sup>54</sup>

<sup>54</sup> <https://www.gov.uk/government/statistics/non-domestic-national-energy-efficiency-data-framework-nd-need-2020>

Table 31 Number of businesses (registered and unregistered for VAT<sup>55</sup> and PAYE<sup>56</sup>) in 2018, including own calculations for SME energy consumption in Scotland and Northern Ireland

	Number of businesses	Number of SMEs	GWh per SME	Natural gas and electricity consumption in GWh
England	5,004,775			
Wales	198,635			
<b>TOTAL England and Wales</b>	<b>5,203,410</b>	<b>5,198,207</b>	<b>0.02005</b>	<b>104,219</b>
Scotland	331,365	330,702		6,630
Northern Ireland	132,730	132,597		2,658
<b>TOTAL UK</b>	<b>5,667,505</b>			<b>113,508</b>

Source: <https://www.gov.uk/government/statistics/business-population-estimates-2018>

<sup>55</sup> Value Added Tax

<sup>56</sup> Pay as You Earn