European Commission

JRC SCIENCE FOR POLICY REPORT

Assessing the progress towards the EU energy efficiency targets using index decomposition analysis

Economidou, Marina

2017

Joint Research Centre

EUR 28710 EN

Contact information
Name: Marina Economidou
Address: European Commission, Joint Research Centre, Via Enrico Fermi 2749, 21027 Ispra (VA), Italy
Email: marina.economidou@ec.europa.eu

JRC Science Hub
https://ec.europa.eu/jrc

JRC106782

EUR 28710 EN

PDF	ISBN 978-92-79-71299-9	ISSN 1831-9424	doi:10.2760/675791
Print	ISBN 978-92-79-71298-2	ISSN 1018-5593	doi:10.2760/594605

Luxembourg: Publications Office of the European Union, 2017

How to cite this report: Economidou M, *Assessing the progress towards the EU energy efficiency targets using index decomposition analysis*, EUR 28710 EN, Publications Office of the European Union, Luxembourg, 2017, ISBN 978-92-79-71299-9, doi:10.2760/675791, JRC106782.

Title: Assessing the progress towards the EU energy efficiency targets using index decomposition analysis

To track the real progress towards the energy efficiency targets, this report examines the drivers behind EU energy consumption trends using index decomposition analysis. Energy consumption trends are driven by several factors beyond energy efficiency improvements, including economic activity, demography, lifestyle changes, weather and other factors. These can all have a profound effect in the aggregate energy use, irrespective of the impact of energy efficiency policies and measures. The separation of energy efficiency impacts from structural and activity changes of the economy as a whole is conducted by applying the widely-used Logarithmic Mean Divisia Index (LMDI) methodology to study the aggregated and sectoral energy consumption changes at EU and MS levels.

Contents

Acknowledgements

This report was developed with the kind support of various people.

Paula Fernández González, Associate Professor of Statistics and Econometrics at the Department of Applied Economics, University of Oviedo, provided initial guidance and scientific support. Special thanks go to Paolo Bertoldi, Senior Expert at the Joint Research Centre, European Commission for his continuous encouragement and drive and to Nina Gareis, Serena Pontoglio, Maciej Grzeszczyk and Paul Hodson (European Commission DG ENERGY) for their strategic support.

Gratitude is extended to all participants of the technical meeting on decomposition techniques held in Brussels in May 2017 for their technical input, comments and advice. These included Jae Sik LEE (International Energy Agency), Wolfgang Eichhammer (Fraunhofer Institute for Systems and Innovation Research), Maria Cristina Mohora (European Commission DG MOVE), Bogdan Atanasiu (European Commission DG ENERGY), Thomas Brunhes (European Commission DG CLIMA), Rados Horacek (European Commission DG ENERGY), Ioanna Katrantzi (European Commission DG ESTAT), and Fotios Kalantzis (European Commission ECFIN). The report was also reviewed by Energy Efficiency Committee Members and their valuable feedback is gratefully acknowledged. These include experts from Finland, Ireland, Latvia, Czech Republic, Germany, Spain, Croatia, France and Portugal.

Executive summary

Policy context

As rising energy costs, climate change concerns and questions of energy security are becoming increasingly important, energy efficiency is seen as a fundamental pillar of a well-designed energy policy. By maintaining the same level of output while reducing energy consumption through improvements in technology, processes and behaviour, the European Union recognises energy efficiency as an integral part of its low carbon economy vision of the future. In its Europe 2020 strategy, the European Union has, inter-alia, set a target to decrease energy consumption by 20% in 2020 compared to baseline projections and more recently, the European Commission proposed a 30% energy efficiency target by 2030[1] which is expected to further lower energy demand through accelerated energy efficiency efforts.

The EU has noted a considerable progress towards the energy efficiency targets over the last few years. Monitoring progress towards energy efficiency targets requires knowledge of influencing factors behind the latest economy-wide energy consumption trends in order to capture real energy efficiency change. Energy consumption trends are driven by several factors beyond energy efficiency improvements, including economic activity, demography, lifestyle changes and weather. The European Commission Joint Research Centre has recently applied index decomposition analysis to study some of these factors in detail, and this report is the first of a series of annual reports aimed at assessing the impact of energy efficiency in energy consumption trends.

Main findings

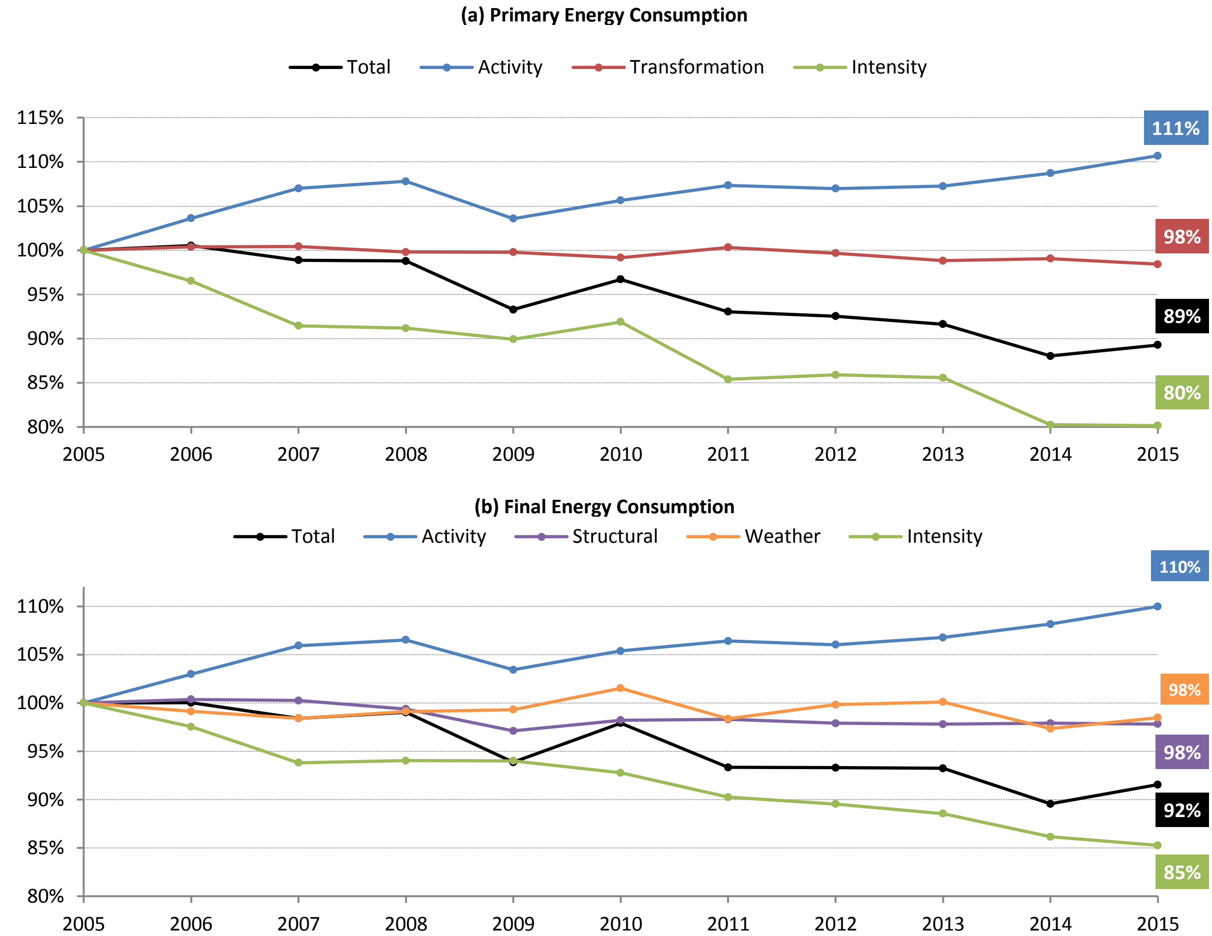
In 2005-2015, consumption at EU level fell by 11% in primary and 8% in final energy. The analysis showed that energy intensity improvements played a dominant role in falling energy consumption during the study period. In terms of primary energy, energy intensity improvements in 2015 were responsible for a drop of 340 Mtoe, equivalent to 19% compared to 2005 consumption levels. Despite the latest hike in energy consumption in 2015, energy intensity improvements continued in 2014-2015. This also holds true for the final energy results as a declining intensity effect was also registered in 2015. In this case, the intensity effect alone was responsible for a 15% drop in final energy consumption in 2005-2015.

The encouraging intensity effect results offset the activity effect which generally drove up energy consumption, reflecting the economic growth experienced in this period. Specifically, increased economic activity resulted in an increase in primary and final energy consumption of around 10% compared to 2005. While the overall results revealed a growth in energy consumption due to increased economic activity in the EU, examining the yearly results also confimed the impact of the recent economic recession on consumption trends. In particular, the decomposition results showed that the dip in energy consumption in 2009 was mainly driven by a negative activity effect, which was caused by lower economic output registered that year. The activity effect returned to its pre-2009 levels only in 2014 in terms of primary and in 2013 in terms of final energy.

In terms of structural changes in the economy, the analysis showed that structural effects have had a secondary role in driving down energy consumption over the examined period. Structural shifts towards less energy intensive sectors of the economy accounted for a final energy drop of 25 Mtoe in 2015, equivalent to 2% reduction compared to 2005 consumption levels. The impact of transformation effect was also small (7 Mtoe drop in primary energy, corresponding to a 2% drop), indicating a small overall increase in overall efficiency of the transformation system. The weather impact on the heating demand in the residential sector was also estimated to be of the same levels; this is expected to be of more significant role if it is considered in more sectors. Sectoral and Member State results are discussed in detail in the main body of the report. In the

[1] http://www.consilium.europa.eu/en/press/press-releases/2017/06/26-increased-energy-efficiency/

future, more research is needed to include more factors in the analysis and to better define the effect that measures the impact of energy efficiency.



Related and future JRC work

Decomposition analysis is deployed by various international organisations, research institutes and national agencies as a tool to inform policy makers in the field of energy analysis. This report forms the first of the series of reports tracking economy-wide energy efficiency trends and the European Commission Joint Research Centre plans to continue and deepen this new activity in the future. The results of the decomposition analysis conducted in this report offer us valuable insights into the factors behind recent consumption trends at both EU and MS levels. This analysis has also shown that further investigation is needed to provide a more comprehensive analysis, which will be feasible with the the inclusion of more factors and collection of more data in the future.

Finer levels of disaggregation are necessary to conduct more detailed decomposition; however disaggregated data are often accompanied with various data gaps and quality issues. Sectors with significant challenges include the transport sector: Eurostat does not make a distinction on the share of the energy consumption of each transport mode that corresponds to freight and passenger transport, while the Odyssee database – an EU-wide database on energy efficiency indicators – offers this level of detail with considerable data gaps. The breakdown of the residential energy consumption by end use is only recently collected by Eurostat, while such a breakdown is not yet available in other sectors. The breakdown of energy consumption data at end-use level will enable the examination of factors such as weather and penetration of appliances in more sectors. The services sector, a growing sector in Europe, is poorly covered by statistics as the breakdown of energy consumption by service sub-sectors is currently not available.

The JRC welcomes on-going efforts made by Eurostat and statistical offices to provide a more complete picture, which will strengthen the analytical framework of tools such as the LMDI method to investigate the real energy efficiency impact in energy consumption trends.

Quick guide

Index decomposition analysis (IDA) is a widely adopted analytical tool used by researchers to inform policy makers on economy-wide energy efficiency trends. This is done by breaking down changes in an aggregate indicator and assigning the effects to a number of predefined factors. To identify the driving factors and their contributions behind the latest energy consumption trends in the EU, the Logarithmic-Mean Divisia Index method (LMDI) method, a widely-used IDA method, was applied to study both aggregated and sectoral energy consumption changes at EU and MS levels over the period 2005–2015 in this report. All applications were run using Eurostat data, with a few exceptions where data from other sources were considered. Based on the analysis conducted, the primary energy consumption trends in 2005-2015 were decomposed into activity, transformation and intensity effects. Following the approach used in numerous sources in the literature, the intensity effect was used as a proxy for energy efficiency changes. Changes in final energy consumption of end use sectors were decomposed in activity, structural, intensity and wherever possible weather effects. The sectoral results were summed up to review the decomposition of the final energy consumption as a whole.

1 Introduction

With its Europe 2020 strategy, the European Union adopted a 10-year strategy with the aim to address various challenges faced by the continent including economic stagnation, climate change, rising poverty and unemployment. Energy efficiency is a major element of the strategy associated with a significant potential towards alleviating many of the aforementioned challenges. To this end, a target to decrease energy consumption by 20% by 2020 compared to baseline projections has been set at the EU level to help address these challenges. The energy efficiency target is estimated to deliver primary energy savings of 370 Mtoe compared to baseline projections by 2020, leading to a target primary energy consumption level of 1483 Moe for the EU28. In terms of final energy, the target corresponds to 1086 Mtoe by 2020.

In its latest energy efficiency progress report[2], the EU has noted a considerable progress towards the energy efficiency targets over the few last years. In 2015, the EU28 primary energy consumption was only 1.7% above its 2020 primary energy consumption target and the final energy consumption was 2.4% below the 2020 target[3]. In 2005-2015, consumption at EU level fell by around 11% in primary and 8% in final energy. Primary energy consumption increased by 1.5% in 2015 compared to 2014 and final energy consumption by around 2%. While many policy efforts have been made through a number of European Directives designed to set up policy instruments targeting energy efficiency improvements in various sectors of the economy such as the Energy Efficiency Directive, the Energy Performance of Buildings Directive, Eco-design Directive etc., a complete analysis of the drivers behind these energy consumption trends requires the examination of wider range of factors beyond policy efforts.

Energy consumption trends are driven by several factors beyond energy efficiency improvements, including economic activity, demography, lifestyle changes and weather. These can all have a profound effect in the aggregate energy use, irrespective of the impact of energy efficiency policies and measures. For example, the economic crisis in recent years has had a profound impact on the sectors of industry and services in certain Member States, which in turn affected energy demand. The update of the PRIMES reference scenario in 2016 (PRIMES 2016) resulted in lower reference energy consumption projections for 2020 compared to the previous PRIMES 2007 projections, reflecting, inter-alia, the changes in the economy, demography but also additional policies adopted in the last years. Another example includes weather fluctuations which can affect the heating and cooling demand. In a particularly warm year, energy consumption may simply drop due to lower heating demand in the residential sector and vice versa. The separation of energy efficiency impacts from structural and activity changes of the economy as well as other factors is possible through the application of decomposition analysis. Indeed, decomposition analysis has been used by several international bodies including the International Energy Agency to quantify the impact of such factors in historical energy- or emission- related trends (IEA (2016), IEA and World Bank (2014)).

To track and understand the progress towards the 2020 energy efficiency targets, this report examines the drivers behind EU energy consumption trends using index decomposition analysis. The widely-used Logarithmic Mean Divisia Index methodology is applied to study the aggregated and sectoral energy consumption changes at EU and MS levels. The report is structured as follows. Section 2 describes the methodological approach and presents in detail the analytical framework of the decomposition options considered in the work (Section 2.1) and a review of the underlying input data used (Section 2.2). Section 3 discusses the results of the decomposition and conclusions are drawn in Section 4.

[2] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017DC0056&from=EN
http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1452162772536&uri=CELEX:52015DC0574

[3] http://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_saving_statistics

2 Methodology

Decomposition analysis has been widely used to study the driving forces behind changes in energy- and emission-related trends in a given time period. Two of the most popular types of decomposition techniques include the index decomposition analysis (IDA) and structural decomposition analysis (SDA). The main difference between these two types lies in the input data used: the SDA method uses the input-output model to decompose the evolution of indicators, whereas the IDA uses only sectoral data. Among the different IDA methods, the Logarithmic Mean Divisia Index (LMDI-I) carries multiple advantages and was therefore selected as the preferred decomposition technique for this analysis.

The LMDI-I has the following favourable properties (Ang & Choi (1997), Ang (2015)):

1. It results in perfect decomposition, i.e. the results do not contain any residual term;
2. It can investigate the effect of more than two factors;
3. There is a simple relationship between multiplicative and additive forms[4];
4. Its consistency-in-aggregation property means that the estimates of an effect at the subgroup level can be aggregated to give the corresponding effect at the group level;
5. It does not increase in complexity as it is expanded, many effects can be considered;
6. It is capable to handle zero values.

Despite the rich literature studying the decomposition of various sectors of the economy in many geographical regions around the world, little attention has been paid at the EU-wide level. A comprehensive survey of index decomposition analysis in energy and environmental studies by Ang & Zhang (2000) revealed that 100 out of 124 studies published in the period 1978-1999 examined the decomposition of energy demand changes and 69 studies focused solely on the industry sector. Most importantly, only 25 of 124 studies exclusively focused on a single or multiple European countries (none of which covered the EU as a whole), while OECD and world regions which may, inter-alia, include European countries were covered by 20 studies. While the focus has since been expanded to cover more sectors, territories and indicators, the number of EU-wide decomposition studies remains limited (Table 1).

In its additive form, the following most common LMDI decomposition identity[5] is used to decompose energy consumption changes in activity, structure and intensity effects:

$$E = \sum_i E_i = \sum_i Q \frac{Q_i}{Q} \frac{E_i}{Q_i} = \sum_i Q S_i I_i \qquad (1)$$

where i denotes the sector, E is the total energy consumption, Q represents the economic activity such as Gross Domestic Product or Value added, S_i is the proportion of the economic activity of sector i in relation to the whole economy (Q_i/Q) and I is energy intensity (E_i/Q_i) of sector i. The change in energy consumption (ΔE) between time t_1 and t_2 is expressed as:

[4] The additive form decomposes the difference between two points in time, while the multiplicative form decomposes the ratio of change with respect to the base year.

[5] Identity refers to the governing decomposition equation that describes the relationship between the decomposed indicator (e.g. energy consumption or GHG emissions) and the various factors

$$\Delta E = E_{t_2} - E_{t_1} = D_{act} + D_{str} + D_{int} \qquad (2)$$

where D_{act}, D_{str} and D_{int} denote the overall activity, structure and intensity effects, respectively. In its multiplicative form, the ratio of energy consumption between t_1 and t_2 is decomposed, defined as:

$$R = \frac{E_{t_2}}{E_{t_1}} = R_{act} \, . \, R_{str} \, . R_{int} \qquad (3)$$

The decomposition is carried out using the following formulae:

$$D_{act} = \sum w_i ln\left(\frac{Q_{T2}}{Q_{T1}}\right), \quad D_{str} = \sum_i w_i ln\left(\frac{S_{i,T2}}{S_{i,T1}}\right), D_{int} = \sum_i w_i ln\left(\frac{I_{i,T2}}{I_{i,T1}}\right)$$

$$R_{act} = e^{\sum_i \widetilde{w_i} ln\left(\frac{Q_{T2}}{Q_{T1}}\right)}, \quad R_{str} = e^{\sum_i \widetilde{w_i} ln\left(\frac{S_{i,T2}}{S_{i,T1}}\right)}, R_{int} = e^{\sum_i \widetilde{w_i} ln\left(\frac{I_{i,T2}}{I_{i,T1}}\right)} \qquad (4)$$

$$\text{where } w_i = \frac{E_{i,T2} - E_{i.T1}}{ln\left(\frac{E_{i,T2}}{E_{i,T1}}\right)} \text{ and } \widetilde{w_i} = \frac{(E_{i,T2} - E_{i,T1})/ln\left(\frac{E_{i,T2}}{E_{i,T1}}\right)}{(E_{T2} - E_{T1})/ln\left(\frac{E_{T2}}{T1}\right)}$$

Table 1. Main features of recent studies focusing on EU-wide decomposition of energy and emission trends IDA

Reference	Indicator	Sectors	Method	Data sources	Study period
(Fernández González, et al., 2014a)	CO_2 emissions	Economy-wide	LMDI	IEA, ESTAT	1999-2008
(Fernández González, et al., 2014b)	Energy	Economy-wide	LMDI	ESTAT	2001-2008
(Cruza & Diasb, 2016)	Energy & CO_2 emissions intensity	Industry	LMDI	WIOD	1999-2009
(Obadi & Korček, 2015)	Energy	Productive sectors	LMDI		2004-2012
(Hajko, 2012)	Energy	Economy-wide	Laspeyres	World Bank	1990-2009
(Kisielewicz, et al., 2016)	GHG emissions	All	LMDI		1990-2012
(Braungardt, et al., 2014)	Energy	All	LMDI	ESTAT/ODYSSEE	2000-2012
(Reuter, et al., 2017)	Energy	Economy-wide	LMDI	ESTAT	2000-2014

2.1 Analytical framework

To quantify the impact of possible various factors on recent energy consumption trends in the EU, a review of available data was carried out to investigate the availability and comparability of the possible input data at sectoral and possibly sub-sectoral level. This is because the depth of decomposition is highly dependent of the input data availability, especially at finer levels of disaggregation (i.e. sectorial and sub-sectoral level). The fine level of sub-sectoral data across all studied indicators used to define the various effects must therefore be available to accurately study the decomposition effects. Sinton & Levine (1994) showed that as the level of sub-sectoral detail becomes finer, a share of intensity change becomes attributable to structural changes. Given the attractive property of the method of studying the impact of multiple factors, the decomposition identity can also be expanded to investigate the effect of various additional factors – beyond the three most common effects of activity, structure and intensity – including the impact of the weather, lifestyle choices, prices, etc., depending on availability of detailed input data.

The conducted data review largely dictated the level of decomposition detail (see Section 2.2 for more information). All applications were run using Eurostat data, with a few exceptions where data from other sources were considered.

Table 2. Overview of decomposition identities used in this study

Sector	Passenger Transport	Freight transport	Commercial	Residential
Sub-sectors	• Road • Rail • Air	• Road • Rail • Water	• Food, Tobacco, Textile, Leather • Wood, Wood Products, Paper, Pulp & Print • Chemical & Petrochemical • Metals & Machinery • Non-Metallic Minerals & other manufacturing • Construction & transport equipment • Services • Agriculture, fishing & forestry	• Heating • All other uses
Activity effect	Passenger kilometres (PKM)	Tonne kilometres (TKM)	Gross value added (GVA)	• Total Floor Area (TFA) for heating • Gross Disposable Income (GDI) for all other uses
Structure effect	PKM_i/PKM	TKM_i/TKM	GVA_i/GVA	-
Intensity effect	FEC_i/PKM_i	FEC_i/TKM_i	FEC_i/GVA_i	• FEC_{heat}/TFA • FEC_{other}/GDI
Weather effect	-	-	-	HDD/HDD_{ref}

LEGEND

i: Sub-sector

FEC: Final Energy Consumption

FEC': Energy Consumption in the residential sector adjusted for weather variations

HEC': Heating Energy Consumption in the residential sector adjusted for weather variations

OEC: Energy consumption for other end uses in the residential sector

Based on the data review, both additive and multiplicative LMDI methods were applied to decompose:

(1) primary energy consumption into activity, transformation and intensity effects

(2) final energy consumption of end use sectors (outlined in Table 2) into activity, structural, intensity and wherever possible weather effect

In the first application, a simple decomposition of the aggregate primary energy consumption[6] at Member State level was conducted:

$$PEC = GDP \frac{PEC}{FEC} \frac{FEC}{GDP} \qquad (5)$$

where GDP is the Gross Domestic Product at chain linked volumes (2010), PEC stands for primary and FEC for final energy consumption. The chain linked volumes were selected as the GDP unit to remove price effects. This means that GDP data at previous year's prices are linked over the years via appropriate growth rates, allowing to theoretically remove price change effects (e.g. inflation).

The **activity effect accounts** for changes in energy consumption due to a change in the overall economic activity. The activity effect is positive if the economy-wide GDP grows due to additional energy demand of increased economic activity. Conversely, activity effect is negative in economic downturn.

The **transformation effect** (represented by the ratio of primary energy consumption to final energy consumption) accounts for the *average* efficiency of the whole energy transformation system. The ratio PEC/FEC[7] provides an indication of the quantity of energy lost in the conversion, transformation and distribution processes, e.g. in the form of own consumption by the energy sector, thermal or materials losses. If the value of the ratio drops, the difference between the total energy available for end-users and the total energy which enters the system also drops, i.e. the overall efficiency of the conversion, transformation and distribution system increases. This translates to negative transformation effect as the ratio of primary to final energy consumption converges to 1. Cases which cause a drop in the transformation effect include increased penetration of renewable energy sources, efficiency gains in conventional condensing power plants, reduction in distribution losses and increase in cogeneration. That is, system efficiency gains and energy mix changes both have an impact. Conversely, the transformation effect is positive in cases where electricity usage (e.g. replacement of fuel use with electricity in the transport sector) increases. In this case, the ratio PEC/FEC increases. In a scenario where both electricity use and renewable energy production increase, the increase caused by higher electricity use will be compensated by the drop due to higher renewables, resulting in a moderate overall effect.

The **intensity effect**, represented by the ratio of the final energy consumption to GDP, accounts for changes in total energy consumption due to technology improvements, policy effects and other factors. In this case, the ratio of final energy consumption divided by GDP describes changes in the overall energy intensity of the economy, including changes in the structure of the economy, such as change from energy intensive to lighter industrial branches and services or vice versa.

---

[6] Given that the input data of this decomposition identity are based on widely available and well-covered by statistical datasets, the advantage of this decomposition identity is that no assumptions are necessary to fill input data gaps. On the other hand, with this level of aggregation, there is loss of information as this decomposition identity does not capture the intensity effect in great detail.

[7] According to the ISO standards, the ratio is equal to 1.1 for fossil fuels, 1.2-1.4 for bio fuels, 2.5 for electricity, 1.3 for district heating/cooling and 1 for on-side renewables. The average ratio of all energy carriers together is considered herein.

In the second application, decomposition analysis of individual end-use sectors was undertaken at Member State level (Table 2). The sectors considered were industry, services, transport, agriculture[8], and residential. For all productive sectors of the economy (i.e. services, industry, agriculture), the Gross Value Added was selected as the most suitable indicator to describe the activity effect. As in the case of GDP, the GVA data are expressed in chain linked volumes to remove price effects. For each sector, the final energy consumption was therefore decomposed as follows:

$$FEC = \sum_{i} GVA \frac{GVA_i}{GVA} \frac{FEC_i}{GVA_i} \qquad (6)$$

where i denotes the sub-sector. Due to the lack of sub-sectoral energy data within the services and agriculture, it was not possible to examine the structural effect within each of these individual sectors. To overcome this issue, the industry, services and agriculture were all combined under the "commercial" sector[9]. In this case, the structural effect within the entire commercial sector as a whole is examined.

As with the first application, the **activity effect accounts** for changes in energy consumption due to a change in the overall economic activity in each sector: the activity effect is positive if the overall GVA increases. The structure effect, represented by the share of activity of individual sectors (GVA_i/GVA), accounts for changes in energy consumption that would have been observed due to a change in the relative importance of sectors with different energy intensities. In other words, it accounts for shifts in the composition of the economy: from more to less-energy intensive sectors and vice versa. The **structural effect** is positive if the GVA of energy intensive sectors grows in relative terms. That is, the structural effect is positive if the share of GVA corresponding to energy intensive sectors increases relative to GVA of less intensitve ones. The **intensity effect** (represented by the ratio FEC_i/GVA_i) accounts for improvements in final energy intensity. Further explanations are given in Table 3.

The transport sector was analysed by decomposing changes in energy consumption of passenger and freight transport sectors separately. Passenger-kilometres and tonne-kilometres were chosen as the most suitable indicators to describe economic activity in passenger and freight transport sectors, respectively. These indicators provide a better proxy for the activity effect than GVA; the use of the latter has been criticised in the literature as GVA could cause significant distortions in the decomposition results for these non-productive sectors (Obadi & Korček (2015), Marrero & Ramos-Real (2013)). Given that energy data to carry this analysis is not available in the ESTAT database, the transport application was conducted by using data stemming from the Odyssee database[10]. The activity data on passenger- and tonne-kilometres in the latest DG MOVE Transport Statistical Pocketbook were not selected for consistency reasons[11]. This is discussed in more detail in Section 2.2.3.

For the residential sector, the weather effect was added to quantify the impact of weather fluctuations in the heating demand in recent years. The **weather effect** is defined by the ratio of the heating degree days of a given year (HDD) over the average heating degree days in a reference period (HDD_{ref}) and was used to adjust the energy consumption in the residential sector. The weather adjustment was considered only for

[8] Forestry and fishing were considered together with agriculture

[9] The lack of availability of energy data for services sub-sectors is an issue in international databases beyond ESTAT. The approach of combining industry, services and agriculture under the so-called commercial sector is also practised by the International Energy Agency.

[10] Available at http://www.odyssee-mure.eu/

[11] Despite the fact that DG MOVE datasets publishes a more complete and detailed activity data in its annual DG MOVE Transport Statistical Pocketbook, which also includes corrections for territoriality principle in terms of the freight transport, the Odyssee transport activity were instead chosen for compatibility reasons between energy and activity data. This was done so that the classification and definitions of the energy data for the various transport modes and categories is consistent with that of the transport activity data.

the final energy consumption attributed to the heating use (FEC_{heat}), while the share of the consumption associated with all other uses (FEC_{other}) remained unchanged. The activity effect was represented by the total floor area of dwellings, TFA (for the heating part) and gross disposable income, GDI (for all other end uses). The decomposition was carried out using the following formula:

$$FEC = TFA \frac{FEC'_{heat}}{TFA} \frac{HDD}{HDD_{ref}} + GDI \frac{FEC_{other}}{GDI} \quad (7)$$

where FEC'_{heat} stands for the weather adjusted final energy consumption for heating. This was calculated by dividing the final energy consumption with the ratio HDD/HDD_{ref}. In our case, the period 1990-2015 was considered as a reference period for the weather adjustment.

Table 3. Summary of effects considered in this analysis

Effect	Explanation
Activity effect	It accounts for change in energy consumption due to changes in economic activity (e.g. GDP, GVA). The activity effect is positive if GDP or GVA grows due to additional energy demand of increased economic activity.
Structure effect	It represents the relative share of activity of individual sectors (e.g. GVAi/GVA) and accounts for changes in energy consumption due to change in the relative importance of sectors with different energy intensities. The structure effect is positive if sectors of high energy intensity grow more relative to less intensive sectors.
Intensity effect	Typically represented by ratio of primary or final energy consumption to GDP. It accounts for changes in total energy consumption due to technology advancements, efficiency improvements, policy and other effects. The intensity effect is negative if there is a drop in energy intensity.
Transformation effect	It is represented by the ratio of primary energy consumption to final energy consumption and accounts for the efficiency of the energy transformation system, reflecting changes in the transformation process, e.g. when fuel use is replaced with electricity. Negative transformation effect translates to increase in the overall efficiency of the transformation system.
Weather effect	It is represented by the ratio of the heating degree days of a given year (HDD) over the average heating degree days in a reference period and applied to sectors where heating is significant end use (e.g. residential). It captures changes to energy consumption due to weather changes. If weather effect is negative, energy consumption has dropped due to warmer climate.

Given the aggregation property of LMDI-I, the sectoral results were summed up to review the decomposition of the final energy consumption as a whole. Likewise, the results of each application at Member State level were summed up to deduce the decomposition at EU level. The decomposition was carried for every two consecutive years (i.e. 2005 and 2006, 2006, and 2007, etc.) and results were then chained to provide the results for the whole time period 2005-2015. Yearly additive decomposition results were chained additively while multiplicative decomposition results were chained multiplicatively. The advantage of chain-linking results is that it captures greater amount of information as it closely follows the path of energy consumption compared to a point to point calculation. It also adjusts to changes in technology or usage patterns when comparing two points separated by a long period of time (Cahill, et al., 2010).

2.2 Data review

The principal source of data used in our analysis was the statistical database of the European Commission Eurostat (ESTAT), which inter-alia collects economic and energy use data for all European countries[12]. The ESTAT builds its statistics based on national accounts data and applies harmonisation procedures to ensure data quality, consistency and comparability across Member States. To complement current data shortcomings (see Sections 2.1 and 2.2.3 for more details), the ODYSSEE database was used to cover specific data needs of the transport sector.

As discussed earlier, finer levels of disaggregation are necessary to conduct more detailed decomposition analysis, however disaggregated data are often accompanied with various data gaps and quality issues. For this reason, a data review of EU-wide data was conducted. Two criteria were used to select these datasets: (1) the suitability of the indicators to reflect the various effects considered in the analysis and (2) completeness of the relevant datasets. The overall completeness was measured by taking the ratio of the number of missing data points to the total number of data points (28 times 11, i.e. 308) and subtracting from 1. The member state completeness was measured by taking the number of countries with missing data points for 10 or more than years and subtracting it from 28.

Table 4 outlines all underlying datasets selected to describe the various factors in the decomposition analysis. These include:

- **Primary (PEC) and final energy consumption (FEC) by country and sector in tons of oil equivalent (toe)**: The underlying "nrg_100a dataset" available in Eurostat contains energy data covering the full spectrum of the energy sector from supply through transformation to final consumption by sector and fuel type. The disaggregation by sector does not strictly follow NACE classification used in the economic data which created some problems in the analysis. The match between nrg_100a and nama_10_a64 (NACE categories) sectors considered in this analysis is shown in Table 5.
- **Gross Domestic product (GDP) by country and Gross Value Added (GVA) by country and sector in chain linked volumes (2010)**: GDP data available in the Eurostat "namq_10_gdp" dataset are used to describe economy-wide activity.
- GVA (see Eurostat dataset with code nama_10_a64(is used to describe the economic activity in all individual sectors except the residential and transport sectors. In the case of Malta, GVA data in current prices are used as GVA data in chain linked volumes (2010) are not available. It should be noted that while the aggregated "nama_10_a64" dataset in Eurostat is complete, several data gaps were identified at sectoral level, which raised the need of assumptions. Table 6 summarises the assumptions made to fill all identified data gaps.
- **Heating Degree days (HDD)**: HDD are used to calculate the weather effect included in the decomposition of the final energy consumption of the residential sector. The origin of the data is the JRC tool, which is used to feed the relevant Eurostat dataset. The original JRC tool[13] was preferred in this case as it contains the full dataset for the entire reference period covered in this analysis.
- **Heating consumption in final energy in the residential sector:** ESTAT has recently published the breakdown of residential FEC by end use and fuel. The data are used to calculate the share consumption which is in turn adjusted for weather variation by using the weather factor discussed above. The data are only available for 2010-2015, which explains the low completeness ratio for this dataset. Assumptions were made to fill gaps for the remaining years.

[12] Inevitably, some of the datasets used contained some zero values. As the LMDI analysis cannot process zero values, we applied the methodology proposed by Ang & Liu (2007), which involves substituting zero values in the underlying dataset with a very small value and allows the calculation to proceed as usual.

[13] http://agri4cast.jrc.ec.europa.eu/DataPortal/

- **Floor area of residential buildings:** The average floor area of residential buildings available in Odyssee dataset was used to calculate the total floor area by multiplying it with the number of households.
- **ODYSSEE datasets of freight and passenger sectors**: Final energy consumption and passenger/tonne kilometres by transport mode were also included in our analysis. Due to considerable gaps in the underlying datasets, assumptions were made to fill all identified data gaps (see Section 2.2.3).

All input data used are given in Annex 1.

Table 4. Datasets used in the model

Indicator	Source	ESTAT dataset	ESTAT code	Last update	Available time period	Unit	EU28 completeness in 2005-2015	
							Overall %[1]	MS [2]
Primary Energy Consumption (PEC)	ESTAT	nrg_100a	B_100900 minus B_101600	27.01.2017	1990-2015	Mtoe		
Final Energy Consumption (FEC)								
Total	ESTAT	nrg_100a	B_101700	27.01.2017	1990-2015	Mtoe	100%	28
Food & Tobacco			B_101830				100%	28
Textile & Leather			B_101835				100%	28
Wood, paper etc.			B_101851+B_101840				100%	28
Chemical & Petrochemical			B_101815				100%	28
Metals/machinery			B_101805 + B_101810 + B_101847				100%	28
Non-metallic minerals etc.			B_101820 + B_101853				100%	28
Transport equipment			B_101846				100%	28
Construction			B_101852				100%	28
Services			B_102035				100%	28
Agriculture etc.			B_102020 + B_102030				100%	28
Gross Domestic Product (GDP)	ESTAT		B1GQ	02.03.2017	1975-2016	Billion EUR Chain linked volumes (2010)	100%	28
Gross Disposable Income per capita (GDI)	ESTAT	nasa_10_nf_tr	PPS_HAB	29.05.2017	1995-2015	EUR	92%	26
Gross Value Added (GVA)								
Total	ESTAT	nama_10_a64	B1G	28.02.2017	1975-2015	Billion EUR Chain linked volumes (2010)* Except Malta which is in current prices	100%	28
Food & Tobacco							100%	28
Textile & Leather							100%	28
Wood, paper etc.							100%	28
Chemical & Petrochemical							76%	25
Metals/machinery							83%	26
Non-metallic minerals etc.							82%	26
Transport equipment							100%	28
Construction							100%	28
Services							100%	28
Agriculture etc.							91%	28
Population (P)	ESTAT	demo_gind	JAN	07.02.2017	1960-2016	-	100%	28
Households (H)	ESTAT	lfst_hhnhtych	TOTAL	30.05.2016	2005-2015	-	98%	28
Heating Degree Days (HDD)	JRC	-	-	-	1979-2016	°C Days	100%	28
Breakdown of residential FEC by end use	ESTAT	-	-	3.2017	2010-2015	PJ	34%	24
Average floor area per dwelling	Odyssee	-	-	7.2017	1990-2015	m^2	91%	27
FEC of passenger transport								
Road	Odyssee	-	-	7.2017	1990-2015	Billion pkm	69%	20
Rail							98%	28
Air							99%	28
FEC of freight transport								
Road	Odyssee	-	-	12.2016	1990-2015	Billion tkm	69%	21
Rail							97%	28
Water							83%	24
Passenger kilometres								
Road	Odyssee	-	-	12.2016	1990-2015	Mtoe	94%	27
Rail							97%	28
Air							67%	20
Tonne kilometres								
Road	Odyssee	-	-	12.2016	1990-2015	Mtoe	96%	28
Rail							94%	27
Water							66%	19

[1] The overall completeness was measured by taking the ratio of the number of missing data points to the total number of data points (28 times 11, i.e. 308) and subtracting from 1.

[2] The member state completeness was measured by taking the number of countries with missing data points for more than 10 years and subtracting it from 28.

2.2.1 Commercial sector

The commercial sector covers industry, services, agriculture, forestry and fishing. A detailed disaggregation of energy and economic data of industry is available, allowing a fine level of decomposition for this sector. As shown in Table 5, it was possible to group industrial activities in eight subsectors. Energy consumption statistics of the services, agriculture, forestry and fishing sectors are in general aggregated under single categories so it is not possible to analyse the **structural shifts within each of these sectors**. As explained above, the examination of the structural effect of the commercial sector as a whole is possible by grouping industry, services, agriculture, forestry and fishing under one sector. The intensity of each of these sectors was defined as the final energy consumption divided by the Gross Value Added in a given year. The subsectors under the commercial sector considered in the analysis are listed in Table 2.

The match established between nrg_100a sectors and classification of economic activities (NACE categories) used in nama_10_a64 dataset is shown in Table 5. Disaggregation of ESTAT'S energy consumption datasets (nrg_100a) according to sectors does not strictly follow NACE classification used to define the sectors in the nama_10_a64 dataset which created some obstacles in our analysis. Mining and quarrying (Industry) were excluded from our analysis as it was not possible to make sensible assumptions that enable the match between economic and energy data for this sector (see Table 5). At EU level, mining and quarrying on average accounts for only 1.1% of the final energy consumption of the industry sector overall in the period 2005-2015.

For several countries the latest data in the year 2015 were not available. For these countries it was assumed that the change in Gross Value Added in 2015 compared to 2014 was proportional to the change in GDP over the same period (Table 6).

Some particularities at Member State level had to be taken into account. For Germany, the final energy consumption data for Construction, Fishing and Agriculture/Forestry sectors are all under "Services" in recent years. This is because the statistics for construction, agriculture and fishing are subsumed by the German authorities under "Other sectors – commercial and public services", which falls under the services sector. For this reason, a different sector categorisation was used for Germany: construction, agriculture and fishing are all under services. For Malta, final energy consumption data prior to 2010 are not available for various sub-sectors such as: B_101830, B_101835, B_101851, B_101840, B_101815, B_101847, B_102020, B_102030[14]. To fill these gaps, it was assumed that the FEC in the period 2005-2009 followed the GDP trend in the same period.

All assumptions made are summarised in Table 6.

[14] The energy statistics reporting became compulsory under the Energy Statistics Regulation adopted only at the end of 2008.

Table 5. Match between nrg_100a and nama_10_a64 (NACE categories) sectors

	Final energy consumption of		**Gross Value Added of**
	[nrg_100a]		nama_10_a64
Industry	Mining and quarrying (Not considered herein)	B_101825	07 (excluding 07.21), 08 (excluding 08.92), 09.9
	Food and Tobacco	B_101830	10, 11, 12
	Textile and Leather	B_101835	13, 14, 15
	Wood and Wood Products, Paper, Pulp and Print	B_101851, B_101840	16, 17, 18
	Chemical and Petrochemical	B_101815	20, 21
	Metals and Machinery	B_101805, B_101810, B_101847	24, 25, 26, 27, 28
	Non-Metallic Minerals and other manufacturing	B_101820, B_101853	22, 23, 31, 32
	Transport equipment	B_101846	29, 30
	Construction	B_101852	41, 42, 43
Transport	Land transport and transport via pipelines	B_101910, B_101920, B_101945	49
	Water transport	B_101940	50
	Air transport	B_101931, B_101932	51
Other	Services	B_102035	33, 36, 37, 38, 39, 45, 46, 47, 52, 53, 55, 56, 58, 59, 60, 61, 62, 63, 64, 65, 66, 68, 69, 70, 71, 72, 73, 74, 75, 77, 78, 79, 80, 81, 82, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96, 99
	Agriculture, forestry and fishing	B_102020, B_102030	1, 2, 3

Table 6. GVA data completeness and assumptions made for individual sub-sectors (Dataset: nama_10_a64, ESTAT code: B1G, Unit: Chain linked volumes, 2010)

ESTAT code	**Sector description**	**Countries with missing dataset**	**Assumptions made to fill data gaps**
C19	Manufacture of coke and refined petroleum products	IE, HR, LT, MT	Proportional to the EU ratio, e.g. $GVA\|_{MS}^{C19} = \frac{GVA\|_{EU28}^{C19}}{GVA\|_{EU28}^{C}} GVA\|_{MS}^{C}$ $GVA\|_{MS}^{C33} = \frac{GVA\|_{EU28}^{C33}}{GVA\|_{EU28}^{C}} GVA\|_{MS}^{C}$
C20	Manufacture of chemicals and chemical products	IE MT SE	
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	LU MT SE	
C26	Manufacture of computer, electronic and optical products	LU MT	
C27	Manufacture of electrical equipment	LU MT	
C28	Manufacture of machinery and equipment n.e.c.	LU MT	
C33	Repair and installation of machinery and equipment	IE, LU, MT	
C31_32	Manufacture of furniture; other manufacturing	LU MT	
H50	Water transport	LU	
H51	Air transport	HR LU MT PL	
H52	Warehousing and support activities for transportation	IE, LU, MT, SE	
H53	Postal and courier activities	IE, HR, LU, MT, PL, SE	
ESTAT code	Sector description	Countries with missing 2015 data	Assumptions made to fill data gaps
C33, H52, H53, C_31_32	Various	BE CZ DE IE ES FR HR IT CY LV LT LU MT PL PT SE	Proportional to the country's GDP 2014-2015 change, e.g. $GVA_{2015} = \frac{GDP_{2015}}{GDP_{2014}} GVA_{2014}$
C10_C12, C13_C15, C16_C18, C29_C30, C24_C25, C22_C23		CZ DE ES HR CY LV LT PL PT SE	
H50, H51, H52, H53	Various	BE CZ DE ES FR HR IT CY LV LT LU MT PL PT SE	
M_N, O_Q R_U	Various	CZ HR SE	
E, G, I, J, K, L, T, F	Various	CZ HR	

2.2.2 Residential

A breakdown of the nrg_100a data in the residential sector by end-use or building type (e.g. single family houses) is not available in Eurostat. For this reason, a detailed decomposition within this sector is not possible at this stage. However, Eurostat has recently made available a separate dataset of the breakdown of this sector's energy consumption by end use, but the dataset is only available for 2010-2015.

For the residential sector, an important factor to be considered in the decomposition analysis is the effect of the weather. Given that heating accounts for a considerable share of the final energy consumption in many EU Member States, it is imperative to adjust the intensity effect of this sector for weather variations. To do so, a weather adjustment effect ($f_{w,t}$) was applied to the heating share of the final energy consumption which was defined as:

$$\mathrm{f_{w,t}} = \frac{\mathrm{HDD_t}}{\mathrm{HDD_{1990-2015}}} \qquad (8)$$

where $\mathrm{HDD_t}$ stands for heating degree days in in year t and $\mathrm{HDD_{1990-2015}}$ represents the average heating degree days in the period 1990-2015 for a given country.

The aforementioned weather adjustment factor is only applied to the final energy consumption for heating. Similar approach was adopted by other studies such as Rogan, et al. (2012) and Maireta & Decellasb (2009). To derive the share of heating, the recently published Eurostat on the breakdown of the final energy consumption of households by end use[15] was used. A key limitation with this Eurostat database is that data only exist for the period 2010-2015 and assumptions are therefore necessary for the period 2005-2010. In addition, the breakdown data cover all EU28 except for Belgium, Cyprus, Estonia and Slovakia. For the Czech Republic, Denmark, Ireland, Greece, Italy, Hungary, Malta, Poland, Finland and Sweden, data are only available for the year 2015, while for Romania for the years 2014 and 2015 only.

For Belgium, Estonia, Cyprus and Slovakia, it was assumed that in 2015 the share of heating consumption (as share of the total consumption of the residential sector) was the same as that of the Netherlands, Latvia, Greece and Romania, respectively. These countries were chosen as the HDD indicator had the closest match. The 2005-2014 heating consumption for those countries was then calculated based on the HDD trend of each of those countries.

2.2.3 Transport

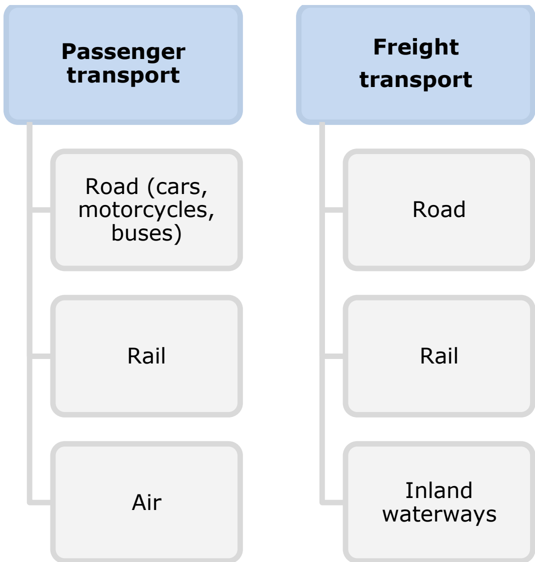
The energy consumption data of the transport sector in the ESTAT database are disaggregated by transport mode (rail, road, aviation, navigation, pipelines), but no distinction is made on the share of the energy consumption of each transport mode that corresponds to freight and passenger transport, respectively (see Table 7). This distinction is very important as the most appropriate indicator to express activity is passenger kilometres in the case of passenger transport and tonne kilometres in the case of freight transport. As the conversion of passenger kilometres to tonne kilometres is not possible and data on the share of FEC passenger or freight transport as part of the total FEC of each transport mode (rail, road, etc.) are not available in the ESTAT database, alternative sources of data were considered, namely the Odyssee database. It should be noted that small differences exist between the transport energy consumption at MS level from Eurostat and sum of passenger and freight transport energy consumption from Odyssee.

[15] These are available here http://ec.europa.eu/eurostat/web/energy/data

Table 7. Transport categories in ESTAT nrg_100a dataset

Final energy consumption	ESTAT code	Transport type
All	B_101900	Freight/Passenger
Rail	B_101910	Freight/Passenger
Road	B_101920	Freight/Passenger
Aviation	B_101931+B_101932	Freight/Passenger
Navigation	B_101940	Freight/Passenger
Pipelines	B_101945	Freight

Figure 1. Classification of transport activities in Odyssee database



The classification of transport activities considered in the Odyssee database is shown in Figure 1. Road transport includes all energy consumed by cars, motorcycles and buses in the case of passenger transport and trucks & light vehicles in the case of freight. Rail transport is only broken down into passenger and freight. Air transport only includes the energy used by all domestic and foreign aeroplanes (e.g. private or commercial planes). Water transport is aggregated and it only includes the energy used for domestic transport (river transport, coastal maritime transport). It should be noted that for freight transport, the Odyssee data do not apply the territoriality principle[16]. Despite the fact that DG MOVE datasets publishes a more complete and detailed activity data in its annual DG MOVE Transport Statistical Pocketbook, which also includes corrections for territoriality principle in terms of the freight transport, the Odyssee transport activity were instead chosen for compatibility reasons between energy and activity data. This was done so that the classification and definitions of the energy data for the various transport modes and categories is consistent with that of the transport activity data. For this reason, the use of transport activity data by ESTAT (even though it was more complete) was not considered in this analysis in order to ensure compatibility between the energy and activity data. To fill data gaps, the assumptions listed in Table 8 were considered.

[16] The 'territoriality principle' refers transport on the national territory, regardless of the nationality of the haulier

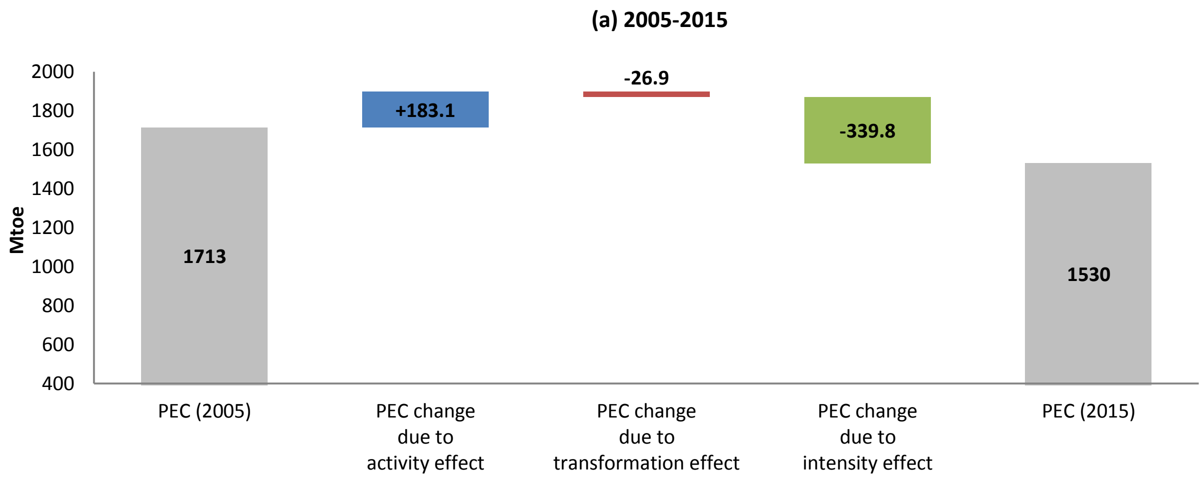
Table 8. Assumptions used to complete data gaps in the Odyssee transport datasets

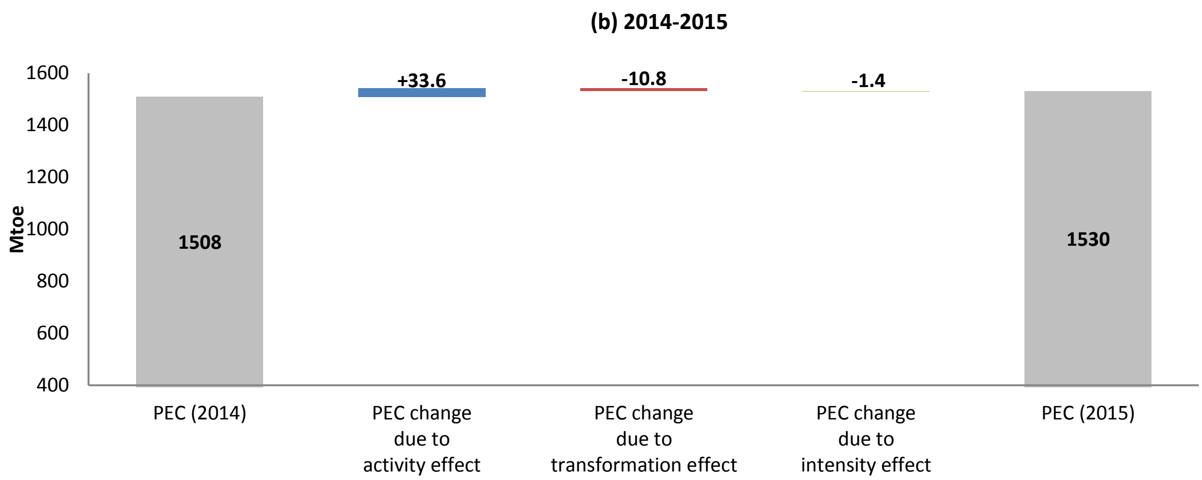
Indicator	Countries with missing data	Assumptions
FEC of passenger transport (road)	BE, BG, EE, LT, LU, HU, MT, SK	Consumption per vehicle of similar country multiplied by vehicles of country in question (BE-DE, BG-PL, EE-LV, LT-LV, LU-DE, HU-PL, MT-CY, SK-SI)
FEC of freight transport (road)	BE, BG, EE, LT, LU,HU, MT, SK	Consumption per vehicle of similar country multiplied by vehicles of country in question (BE-DE, BG-PL, EE-LV, LT-LV, LU-DE, HU-PL, MT-CY, SK-SI)
FEC of freight transport (water)	LU, UK	Freight transport energy intensity (FEC/TKM) of a similar country multiplied by TKM of country in question (LU-NL, UK-FR)
Passenger kilometres (road)	MT	Passenger kilometres per vehicle stock of Cyprus (PKM/GDP) multiplied by Malta's vehicle stock
Passenger kilometres (air)	BE, IE, CY, LT, LU, HU, NL, SI	Passenger kilometres of representative country multiplied by ratio of GDP of representative country and country in question (BE-DE, IE-FR, CY-EE, LT-EE, LU-FR, HU-PL, NL-FR, SI-SK)
Tonne kilometres (water)	DK, EE, EL, IT, LV, PT, FI	Energy productivity (TKM/FEC) of representative country multiplied by FEC of country in question (DK-SE, EE-LT, EL-ES, IT-ES, LV-LT, PT-ES, FI-ES)

3 Results

Figure 2 illustrates the decomposition results of changes in EU-28 primary energy consumption change (Mtoe) for 2005-2015 using the additive Logarithmic Mean Divisia Index approach (LMDI). During the period 2005-2015, the EU28 primary energy consumption decreased by 183.6 Mtoe (11% from 1713 to 1530 Mtoe). The decomposition results show that the activity effect led to an increase of 183.1 Mtoe in primary energy consumption. However, this was offset by an almost twofold decrease (339.8 Mtoe) due to significant improvements in energy intensity. On the other hand, the impact of transformation effect for EU-28 was small (6.9 Mtoe), indicating a small overall increase in overall efficiency of the transformation system. In particular, the share of renewable energy used for electricity production doubled over this period from 62 to 124 Mtoe, however the overall transformation efficiency has increased by just 5%, resulting in a very small improvement in the primary to final energy consumption ratio from 1.44 to 1.41. In terms of the latest trends of 2014-2015, primary energy consumption increased for the first time after 5 years of consecutive decline in energy consumption (Figure 2(b)). The increase of 21.3 Mtoe in primary energy consumption in 2014-2015 is largely attributed to a strong economic activity effect (33.6 Mtoe). The decline in consumption due to improvements in transformation efficiency (10.8 Mtoe) and energy intensity (1.4 Mtoe) were not sufficient to offset the recorded economic growth.

Figure 2. Decomposition of changes in EU-28 primary energy consumption change (Mtoe) for 2005-2015 using the additive Logarithmic Mean Divisia Index approach (LMDI)





In final terms, the aggregated energy consumption at EU28 level declined from 1153 to 1056 Mtoe, corresponding to a drop of 8.4% in the period 2005-2015 (**Figure 3**). As in the case of primary energy consumption, the intensity effect was the strongest factor that led to this decline: improvements in final energy intensity amounted to a drop in final energy consumption of 169.9 Mtoe. If other factors had not come into play, the energy consumption would have increased by 115.1 Mtoe as a result of the economic growth registered in this period. Structural shifts towards less energy intensive sectors of the economy accounted for a drop of 25.2 Mtoe, while warmer winters over this period resulted in a decrease of energy consumption by 26.6 Mtoe. In 2014-2015, a small increase of 23 Mtoe in total final energy consumption was registered at EU level: this was caused by economic growth (activity effect: 20.9 Mtoe), small structural shift (1.0 Mtoe), improvements in intensity (10.2 Mtoe) and colder weather (weather effect: 13.2 Mtoe).

Figure 3. Decomposition of changes in EU-28 final energy consumption change (Mtoe) for: (a) 2005-2015 and (b) 2014-2015 using the additive Logarithmic Mean Divisia Index approach (LMDI)

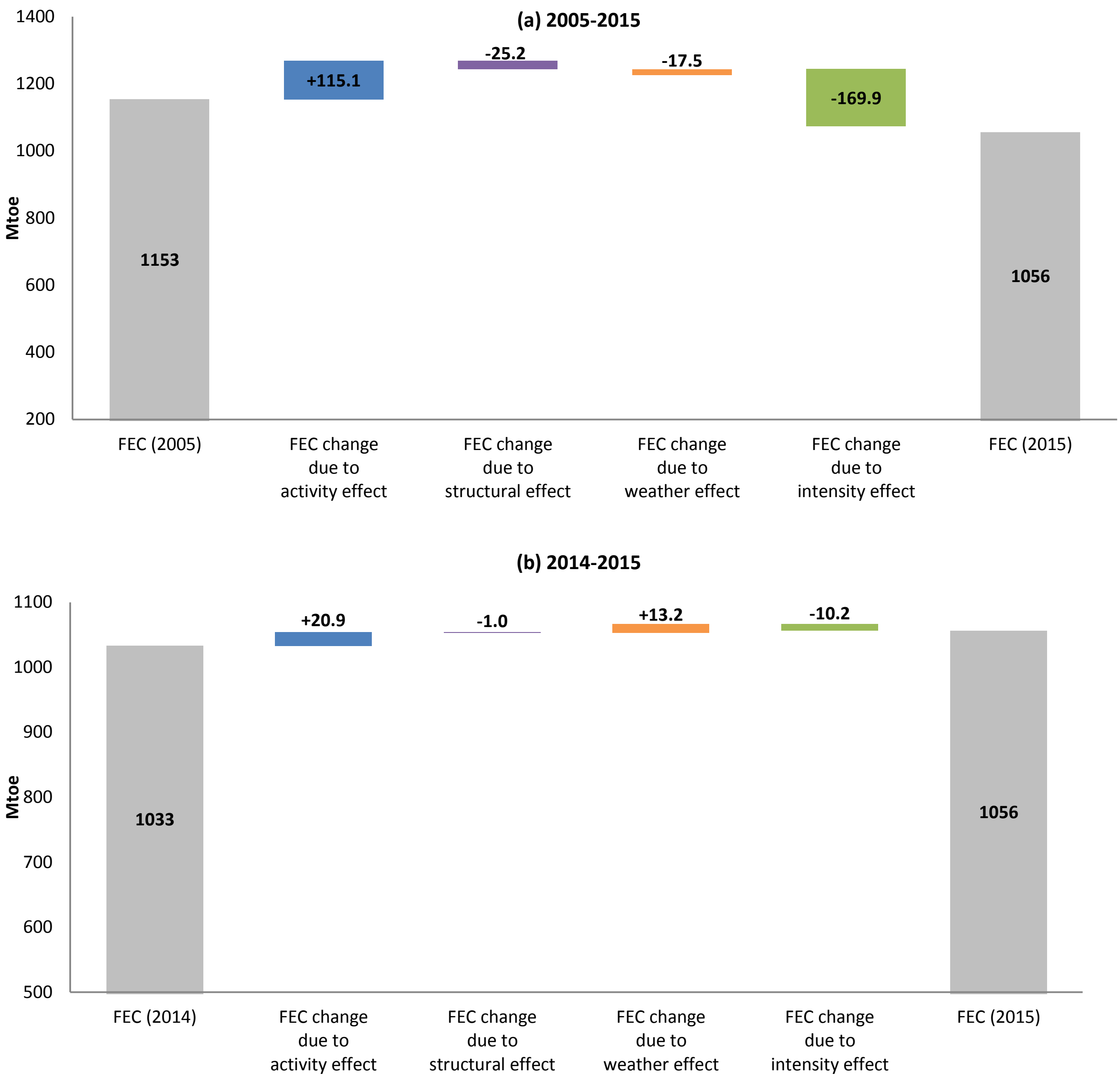
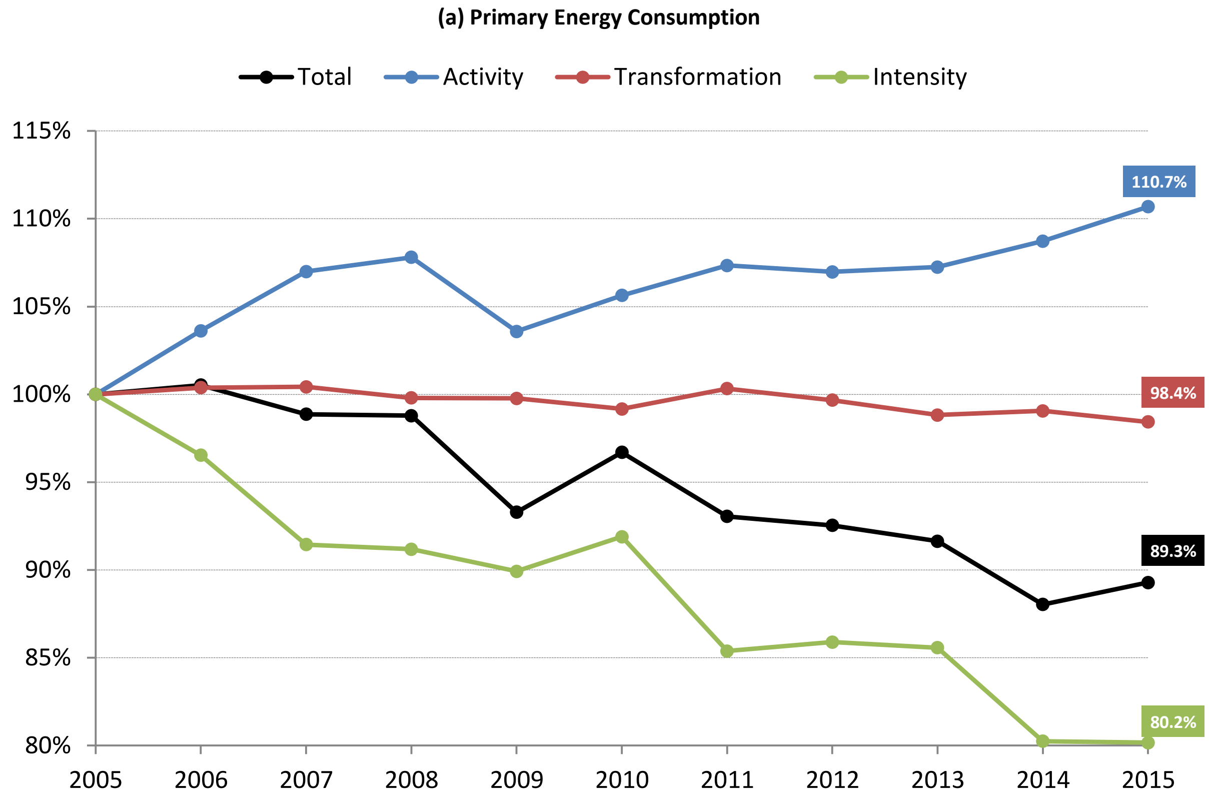
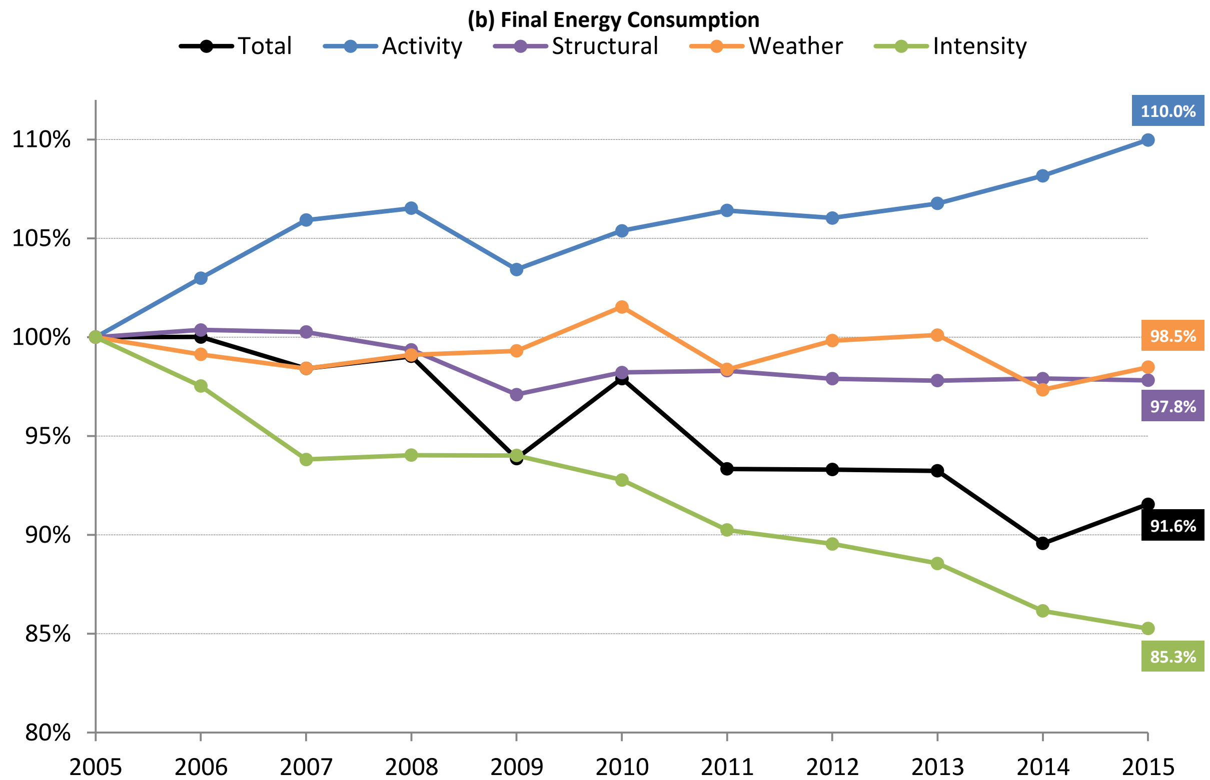


Figure 4. Yearly additive decomposition results at EU level in 2005-2015 (% in terms of 2005 consumption levels)





The year-on-year results at EU level are shown in **Figure 4**. The total effect, shown by the black line, represents the total change in energy consumption relative to 2005. The other lines represent the other effects that make up the total effect, as a percentage in terms of the decomposed indicator in 2005. For example, the total effect value 89% in 2015 means that there was a drop of 11% in primary energy consumption in relation to the 2005 consumption level. The activity effect of 110% represents a 10% increase in total primary energy consumption compared to 2005 that would have been observed had there been no structural and intensity changes. The influence of the financial crisis is primarily evident in 2008-2009, where a sharp drop in the trend of the activity effect in both primary and final energy consumption (corresponding to a 4% reduction) and, to a much lesser extent, in 2012 with a 0.4% energy reduction in both primary and final energy. The activity effect ramped up to its pre-2009 levels only in 2014 in terms of primary and in 2013 in terms of final energy. The intensity effect has been on a falling trend throughout the entire period except in 2010 and 2012, when small increase in energy consumption caused by a positive intensity effect is observed.

Tables 9 and 10 summarise the chained additive decomposition results in the period 2005-2015 for primary and final energy consumption at Member State level. The results are expressed in absolute values and as percentages relative to 2005 consumption levels. A drop in the overall primary energy consumption is noted in all countries except Estonia and Poland, which achieved an increase of primary energy consumption of 14% and 3%, respectively in this period. The biggest primary energy consumption decline was noted in Lithuania (27%), Greece (23%), Malta (21%), UK (18%) and Italy (18%). In final energy terms, all countries except Malta and Poland noted a drop in the period 2005-2015 with the largest drop being registered in Greece (22.9%), Italy (15.6%) and Portugal (15.0%). **With the exception of Greece, Italy and Portugal, economic activity drove up primary energy consumption, leading to a positive activity effect in all countries**. The most pronounced activity effects are recorded in Ireland (31%), Poland (40%), Malta (32%) and Slovakia (33%). Despite the significant economic growth, the overall consumption in these countries dropped due to concurrent intensity improvements except Poland which registered a small increase. This is an indication that these Member States managed to increase their GDP without a detrimental effect in their overall energy consumption. This is also true for the final energy results, where the activity effect has been positive in most countries (except Greece, Spain, Italy and Portugal), however this was not enough to offset the energy intensity improvements occurred in this period.

The transformation effect is the most diversified effect among Member States. The results show that a total of 10 countries had a positive transformation effect (i.e. a reduction in transformation efficiency). These included Bulgaria, Cyprus, Czech Republic, Estonia, Spain, France, Ireland, Latvia, the Netherlands and Portugal. Estonia had the largest increase due to worsening of transformation efficiency in the period 2005-2015, which contributed to an increase of primary energy consumption equivalent to 1.0 Mtoe compared to 2005 consumption levels (19%). In contrast, significant transformation efficiency improvements are registered in Malta (60%) and Lithuania (30%).

In terms of the intensity effect (which also cover structural shifts), most countries achieved significant improvements, with notable reduction in intensity effect in Slovakia (44%), Ireland (43%), Luxembourg (36%) and Romania (37%) with respect to primary energy consumption. Small decline due moderate intensity improvements were noted by Finland (8%), Croatia (9%) and Greece (2%), while Malta was the only country whose energy consumption increased due to higher final energy intensity (i.e. intensity effect 107%). Energy intensity improvements in final energy were noted in all countries except Cyprus (Table 10). The notable reduction in intensity effect was noted in Bulgaria (45.8%), Poland (41.5%) and Slovakia (40.8%). The structural effect was negative – indicating a shift towards less intensive sectors in all Member States except Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Malta, Poland and Slovakia. This is further discussed in the sections on individual sectoral results.

Table 9. Primary energy consumption decomposition results in 2005-2015

	Primary Energy Consumption (ktoe)		Total effect		Activity effect		Transformation effect		Intensity effect	
	2005	2015	ktoe	%	ktoe	%	ktoe	%	ktoe	%
EU	1713193	1529587	-183606	89.3%	183093	110.7%	-26886	98.4%	-339812	80.2%
BE	51334	45701	-5633	89.0%	5919	111.5%	-4429	91.4%	-7123	86.1%
BG	18905	17904	-1001	94.7%	4679	124.8%	280	101.5%	-5960	68.5%
CZ	42477	39930	-2547	94.0%	8384	119.7%	1109	102.6%	-12041	71.7%
DK	19267	16514	-2754	85.7%	1253	106.5%	-814	95.8%	-3193	83.4%
DE	317264	292937	-24327	92.3%	43211	113.6%	-15008	95.3%	-52529	83.4%
EE	5387	6156	770	114.3%	929	117.2%	1021	119.0%	-1180	78.1%
IE	14749	13962	-787	94.7%	4592	131.1%	918	106.2%	-6297	57.3%
EL	30649	23685	-6964	77.3%	-5813	81.0%	-184	99.4%	-967	96.8%
ES	135873	117108	-18765	86.2%	5782	104.3%	5755	104.2%	-30303	77.7%
FR	260267	239448	-20819	92.0%	21356	108.2%	6151	102.4%	-48325	81.4%
HR	9107	7996	-1111	87.8%	20	100.2%	-304	96.7%	-827	90.9%
IT	181473	149563	-31910	82.4%	-7686	95.8%	-4746	97.4%	-19479	89.3%
CY	2466	2248	-217	91.2%	113	104.6%	24	101.0%	-353	85.7%
LV	4495	4279	-216	95.2%	689	115.3%	26	100.6%	-930	79.3%
LT	7978	5797	-2180	72.7%	1511	118.9%	-2438	69.4%	-1253	84.3%
LU	4772	4144	-627	86.9%	1186	124.9%	-116	97.6%	-1698	64.4%
HU	25443	22255	-3187	87.5%	1822	107.2%	-365	98.6%	-4644	81.7%
MT	952	751	-201	78.9%	302	131.7%	-573	39.8%	70	107.4%
NL	69020	64329	-4690	93.2%	6786	109.8%	2631	103.8%	-14108	79.6%
AT	32415	31332	-1083	96.7%	3744	111.5%	-540	98.3%	-4287	86.8%
PL	87651	90001	2350	102.7%	35146	140.1%	-3254	96.3%	-29542	66.3%
PT	24888	21662	-3227	87.0%	-269	98.9%	557	102.2%	-3514	85.9%
RO	36740	31288	-5452	85.2%	9451	125.7%	-1212	96.7%	-13691	62.7%
SI	7016	6453	-563	92.0%	725	110.3%	-267	96.2%	-1020	85.5%
SK	17750	15379	-2372	86.6%	5914	133.3%	-462	97.4%	-7824	55.9%
FI	33350	32030	-1320	96.0%	1597	104.8%	41	100.1%	-2958	91.1%
SE	48700	43700	-5001	89.7%	8497	117.4%	-2137	95.6%	-11361	76.7%
UK	222807	183035	-39772	82.1%	23255	110.4%	-8550	96.2%	-54476	75.6%

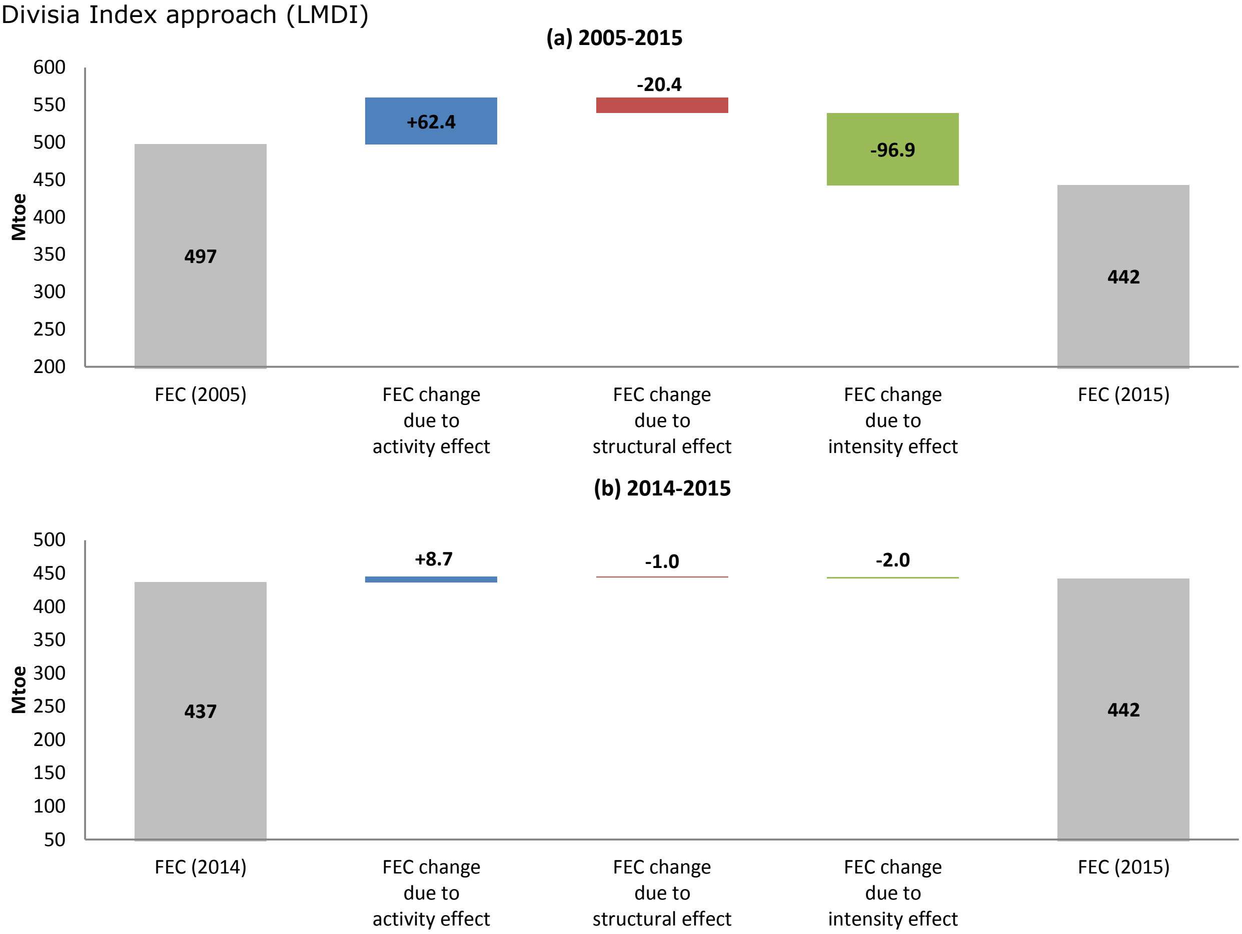
Table 10. Final energy consumption decomposition results in 2005-2015

	Final Energy Consumption (ktoe)		Total effect		Activity effect		Structural effect		Intensity effect		Weather effect	
	2005	2015	ktoe	%	ktoe	%	ktoe	%	ktoe	%	ktoe	%
EU	1153487	1056028	-97460	91.6%	115119	110.0%	-25196	97.8%	-169928	85.3%	-17455	98.5%
BE	35137	34793	-343	99.0%	5024	114.3%	-563	98.4%	-4696	86.6%	-108	99.7%
BG	8993	8420	-573	93.6%	2974	133.1%	738	108.2%	-4120	54.2%	-165	98.2%
CZ	26045	24048	-1997	92.3%	4922	118.9%	182	100.7%	-6413	75.4%	-688	97.4%
DK	15174	13841	-1333	91.2%	1792	111.8%	-376	97.5%	-2621	82.7%	-127	99.2%
DE	215975	210845	-5130	97.6%	27249	112.6%	-1265	99.4%	-28060	87.0%	-3054	98.6%
EE	3435	3238	-197	94.3%	189	105.5%	232	106.7%	-548	84.0%	-70	98.0%
IE	11544	10580	-965	91.6%	1774	115.4%	-1672	85.5%	-1240	89.3%	173	101.5%
EL	20855	16072	-4783	77.1%	-1297	93.8%	-1492	92.8%	-1768	91.5%	-226	98.9%
ES	96690	78698	-17993	81.4%	-171	99.8%	-6939	92.8%	-9496	90.2%	-1387	98.6%
FR	147428	136848	-10580	92.8%	10508	107.1%	-1152	99.2%	-17271	88.3%	-2665	98.2%
HR	7169	6492	-678	90.5%	723	110.1%	-123	98.3%	-955	86.7%	-323	95.5%
IT	136273	115028	-21245	84.4%	-5665	95.8%	-1650	98.8%	-9474	93.0%	-4456	96.7%
CY	1774	1668	-107	94.0%	88	105.0%	-344	80.6%	144	108.1%	5	100.3%
LV	4001	3787	-214	94.6%	577	114.4%	150	103.8%	-834	79.2%	-108	97.3%
LT	4842	4811	-31	99.4%	584	112.1%	252	105.2%	-732	84.9%	-135	97.2%
LU	2514	2500	-14	99.4%	607	124.1%	-328	86.9%	-280	88.9%	-13	99.5%
HU	18367	16357	-2009	89.1%	2366	112.9%	-120	99.3%	-3503	80.9%	-752	95.9%
MT	592	803	211	135.6%	202	134.2%	387	165.4%	-375	36.7%	-4	99.3%
NL	51885	47326	-4559	91.2%	5341	110.3%	-1659	96.8%	-8094	84.4%	-147	99.7%
AT	24891	24645	-246	99.0%	3166	112.7%	-100	99.6%	-2652	89.3%	-660	97.3%
PL	57800	61262	3462	106.0%	25938	144.9%	3219	105.6%	-23972	58.5%	-1723	97.0%
PT	18897	16070	-2827	85.0%	-137	99.3%	-577	96.9%	-1930	89.8%	-183	99.0%
RO	24061	21331	-2730	88.7%	6327	126.3%	-1028	95.7%	-7234	69.9%	-795	96.7%
SI	4762	4395	-367	92.3%	488	110.3%	-101	97.9%	-598	87.4%	-157	96.7%
SK	11493	10721	-772	93.3%	3150	127.4%	971	108.4%	-4689	59.2%	-203	98.2%
FI	24822	23661	-1161	95.3%	1453	105.9%	-2227	91.0%	-211	99.1%	-176	99.3%
SE	32773	30470	-2303	93.0%	4731	114.4%	-2052	93.7%	-4808	85.3%	-174	99.5%
UK	145295	127320	-17975	87.6%	12078	108.3%	-7518	94.8%	-23399	83.9%	864	100.6%

3.1 Commercial sector

In the period 2005-2015, the energy consumption of the EU28 **commercial sector**[17] as a whole decreased by 54.9 Mtoe, corresponding to a **drop of 11%**. If structural and intensity effects would not have come into play, economic growth would have driven up energy consumption by 62.4 Mtoe. The main reason of the **overall energy decline was due to energy intensity improvements**, which contributed to a drop in energy consumption by 96.9 Mtoe, followed by structural shifts which contributed to a reduction of 20.4 Mtoe. In comparison to the structural effect, the intensity effect therefore played a bigger role in reducing the consumption at EU level. The structural effect is attributed to a relative increase in the gross value added of the services sector in this period (GVA was increased by 14%) and other less energy intensive sectors such as transport equipment (35%), food and tobacco (22%). In addition, a drop in energy intensive sectors such as wood and paper dropped by 8% was observed in this period, while chemical and petrochemical sector, representing one of the most energy intensive sectors, increased by 15%. These sectors however have a relative small share in the total gross value added of the commercial sector, with services representing by far the biggest share of value added at around 75%. Intensity efficiency improvements have been achieved in all sectors except wood, paper and construction. Most significant intensity improvements at EU level are noted in transport equipment, textile & leather, metals & machinery, non-metallic minerals & other manufacturing sectors.

Figure 5. Decomposition of changes in EU-28 final energy consumption change (Mtoe) in the commercial sector for: (a) 2005-2015 and (b) 2014-2015 using the additive Logarithmic Mean Divisia Index approach (LMDI)



[17] The results of the commercial sector (that is, combined industry, services and agriculture) correspond to the application of decomposition under option 2 (see Table 2).

During the first period 2005-2008 (Figure 6), energy intensity improvements at the EU level almost evened out with growing demand for energy due to enhanced economic activity of the commercial sector. The decrease in economic activity and its impact in the overall energy consumption is evident in the second period 2008-2012, where a sharp drop in energy demand due to low economic activity is observed in 2008-2009 (22 Mtoe) and a much smaller drop in 2011-2012 (1.3 Mtoe). Since 2012, the activity effect has been positive. In 2014-2015, final energy consumption increased for the first time after 4 years of consecutive decline in energy consumption (Figure 5(b)). The small increase of 5.7 Mtoe in 2014-2015 is largely attributed to a positive economic activity effect (8.7 Mtoe).

Figure 6. Impact of economic crisis in the commercial sector in the EU

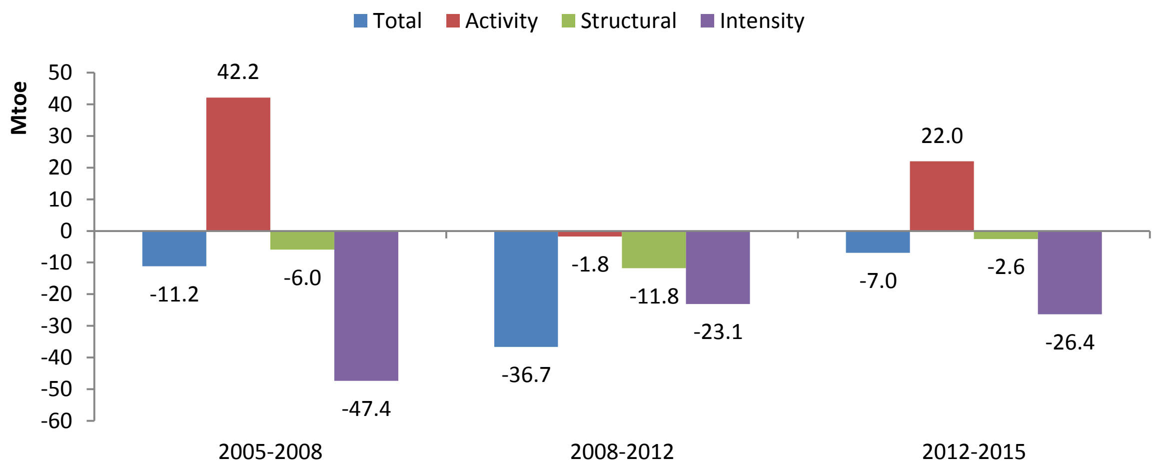
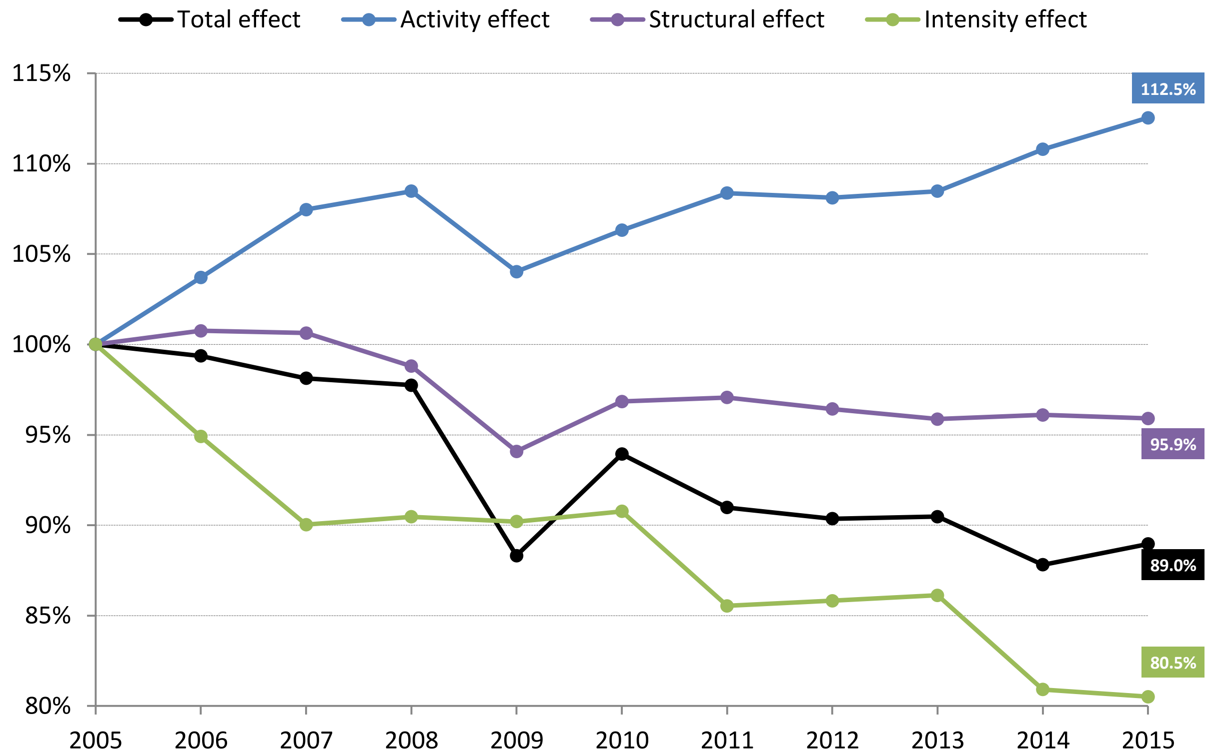


Figure 7. Yearly additive decomposition results at EU level in 2005-2015 (% in terms of 2005 consumption levels) in the commercial sector



The detailed year on year results are shown in Figure 7. **In the period 2008-2009, the commercial sector noted a sharp drop in energy consumption due to economic decline** which resulted in negative activity effect of 22.1 Mtoe (4.4% compared to 2005 consumption), structural shift towards less intensive industrial sub-sectors which resulted in a significant drop of 23.4 Mtoe (4.7%), and a mild drop in energy intensity of 1.3 Mtoe (0.5%). The activity effect reached its pre-2009 levels only in 2013. The intensity effect has experienced some fluctuations, with positive intensity effect being registered in 2007-2008, 2009-2011 and 2011-2013.

In terms of individual sectors, the industry sector noted the biggest drop in final energy consumption at EU level of 53.6 Mtoe, corresponding to a reduction of 17% in 2015 in relation to 2005. As in the case of commercial sector, the overall energy decline in the industry sector was primarily due to energy intensity gains (-72.5 Mtoe), and lesser extent structural shits (-2.8 Mtoe). Economic growth contributed to an increase in energy consumption of 21.7 Mtoe, however this was offset by both negative intensity and structural effects. Among the individual sectors, the services sector was the only sector with an increase in energy consumption, albeit a small one (+3.1 Mtoe, 2%). This was largely driven by increase in gross value added in services, resulting in energy consumption rise of +20.4 Mtoe, mostly offset by energy intensity gains corresponding to -17.Mtoe. As it is not possible to examine structural shifts within the services sector, it is not possible to divide these energy intensity gains into structural and pure intensity effects. The same applies for the agriculture sector which registered an overall drop of -4.3 Mtoe in the period 2005-2015 at EU level. The positive activity effect (+3.9 Mtoe) in the agriculture sector was offset by substantial intensity drop (-8.3 Mtoe), however it is possible to deduce the share of this intensity drop attributed to structural shift within the agriculture sector (i.e. shift from high to low intensity agricultural activities).

At Member State level, the results differ substantially (Table 11). Examining the commercial sector as a whole, the overall energy consumption declined in all Member States in 2005-2015, except Germany which registered a rise in final energy consumption of 3.5 Mtoe (4% compared to 2005), Belgium with a rise of 0.5 Mtoe (3%), Latvia, 86 ktoe (6%) and Malta 65 ktoe (57%). All other countries experienced a decline, with the most significant ones in Greece (28.6%), Spain (26.2%) and Romania (26.7%). In terms of decomposition results, the commercial sector experienced economic growth in 2005-2015, resulting into positive activity effect in most countries in this period which ranged from just over 1% (92 ktoe) in case of Portugal to over 50%, e.g. 52.4% in Poland. In absolute terms, the largest activity effect is noted in Germany (13.3 Mtoe), Poland (13.7 Mtoe), UK (5.8 Mtoe) and France (5.3 Mtoe), followed by the Netherlands (3.5 Mtoe), Romania (2.3 Mtoe), Sweden (3.2 Mtoe) and Slovakia (2.3 Mtoe). Italy and Greece were the only countries with considerable economic downturn in their commercial sectors, resulting in a negative activity effect (1.6 Mtoe and 1.2 Mtoe, respectively). For Greece, this corresponded to a 16.1% reduction due to lower economic activity in the period 2005-2015. Greece's activity effect was registered as negative for the first time in 2007-2008, and continued to remain negative until 2013. On the other hand, Italy's negative effect is noted in the periods 2007-2009 and 2011-2013. A minor negative activity effect in 2008-2009, reflecting economic downturn, was noted also in all countries[18] except Poland. However this was quickly overturned in the following years, resulting in an overall positive activity effect for the period 2005-2015 for these countries. Poland was the only country with consistently positive activity effect throughout the entire period of 2005-2015.

In terms of structural shift, **the commercial sector moved to less intensive sectors in all countries except Austria, Bulgaria, Czech Republic, Lithuania, Latvia, Poland and Slovakia[19] in the period 2005-2015**. Slovakia was the country with the

[18] Outside the period 2008-2009, several countries continued to experience negative activity effect for a few years. These includes Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, Spain, Finland, Croatia, Hungary, Ireland, Luxembourg, Latvia, Netherlands, Portugal, Romania, Sweden, Slovenia and the UK.

[19] These countries had a positive structural effect, meaning that they had a shift towards more energy intensive activities in the period 2005-2015

largest increase in consumption due to shift towards more intensive activities, with an increase of .8 Mtoe (12.6%) in this period. Other notable cases include Lithuania (0.2 Mtoe, 11%), Bulgaria (0.4 Mtoe, 7.8%) and Poland (2 Mtoe, 7.6%). In contrast, countries with significant shift towards less intensive commercial subsectors included the UK (-5.4 Mtoe), Spain (-5.1 Mtoe), Sweden (-1.9 Mtoe), and Finland (-1.9 Mtoe). The energy consumption of services declined in Austria, Czech Republic, Denmark, Greece, Hungary, Ireland, Latvia, the Netherlands, Portugal, Sweden, Slovenia, Slovakia and the UK. In all other countries, services energy consumption increased with the most notable rise in France (1.8 Mtoe), Spain (1.6 Mtoe), Germany (1.5 Mtoe) and Poland (1.1 Mtoe).

The intensity effect was negative in all countries except Cyprus (28 ktoe), Greece (591 ktoe), Finland (221 ktoe), and Malta (1 ktoe). On the other hand, significant energy efficiency improvements, resulting in negative intensity effect are seen in the biggest countries including Poland (-16.2 Mtoe), Italy (-11.1 Mtoe), Germany (-8.7 Mtoe) and Spain (-8.1 Mtoe).

Table 11. Decomposition results of commercial sector in 2005-2015

	Final Energy Consumption (ktoe)		Total effect		Activity effect		Structural effect		Intensity effect	
	2005	2015	ktoe	%	ktoe	%	ktoe	%	ktoe	%
EU	497272	442393	-54879	89.0%	62368	112.5%	-20363	95.9%	-96885	80.5%
BE	16631	17123	492	103.0%	2077	112.5%	-412	97.5%	-1174	92.9%
BG	5055	3775	-1280	74.7%	1392	127.5%	393	107.8%	-3066	39.4%
CZ	13282	10910	-2372	82.1%	2971	122.4%	598	104.5%	-5940	55.3%
DK	5599	4660	-940	83.2%	593	110.6%	-279	95.0%	-1255	77.6%
DE	91858	95305	3447	103.8%	13264	114.4%	-1113	98.8%	-8704	90.5%
EE	1202	1112	-91	92.4%	160	113.3%	-51	95.7%	-200	83.4%
IE	4469	3769	-699	84.3%	897	120.1%	-441	90.1%	-1155	74.2%
EL	7172	5120	-2051	71.4%	-1151	83.9%	-1491	79.2%	591	108.2%
ES	42035	31037	-10998	73.8%	2199	105.2%	-5100	87.9%	-8097	80.7%
FR	58594	55404	-3190	94.6%	5364	109.2%	-1137	98.1%	-7418	87.3%
HR	2480	2047	-433	82.5%	67	102.7%	-158	93.6%	-342	86.2%
IT	58053	44155	-13898	76.1%	-1556	97.3%	-1216	97.9%	-11125	80.8%
CY	517	455	-62	87.9%	35	106.8%	-126	75.6%	28	105.5%
LV	1442	1528	86	106.0%	211	114.6%	31	102.2%	-156	89.2%
LT	1717	1655	-62	96.4%	486	128.3%	188	111.0%	-737	57.1%
LU	1167	1072	-96	91.8%	296	125.3%	-360	69.1%	-31	97.3%
HU	7434	7059	-375	95.0%	796	110.7%	-264	96.4%	-907	87.8%
MT	115	180	65	157.1%	91	179.3%	-26	77.1%	1	100.7%
NL	27975	24442	-3533	87.4%	3500	112.5%	-1828	93.5%	-5205	81.4%
AT	12492	12237	-255	98.0%	1564	112.5%	245	102.0%	-2064	83.5%
PL	26208	25774	-434	98.3%	13736	152.4%	1994	107.6%	-16164	38.3%
PT	8445	6751	-1694	79.9%	92	101.1%	-393	95.4%	-1394	83.5%
RO	11818	8658	-3161	73.3%	3203	127.1%	-896	92.4%	-5467	53.7%
SI	2184	1743	-441	79.8%	248	111.4%	-128	94.1%	-561	74.3%
SK	6585	6093	-493	92.5%	2298	134.9%	829	112.6%	-3619	45.0%
FI	15149	13972	-1177	92.2%	508	103.4%	-1906	87.4%	221	101.5%
SE	17364	15381	-1983	88.6%	3210	118.5%	-1942	88.8%	-3251	81.3%
UK	50229	40978	-9251	81.6%	5817	111.6%	-5375	89.3%	-9694	80.7%

3.2 Residential sector

In the period 2005-2015, energy consumption of the EU28 **residential sector** as a whole decreased by 35.3 Mtoe, corresponding to a **drop of 11%** compared to 2005 levels (**Figure 8**). **Improvements in energy intensity contributed to a reduction** of 67.0 Mtoe in this sector. In addition, **warmer winters** over this period resulted in a **drop** of energy consumption by 17.5 Mtoe in 2015 compared to 2005 levels and the activity effect of the residential energy consumption at the EU level was 49.2 Mtoe. In 2014-2015, a small increase in consumption (11 Mtoe) was registered which was largely attributed to an increase due to colder weather with respect to the previous year (13.2 Mtoe) and a smaller increase in activity effect (5.4 Mtoe). The intensity effect remained negative at 8 Mtoe. In terms of the yearly results (Figure 9), the activity effect has been on constant rise in the period 2005-2015, while the opposite is true for intensity effect. Trend fluctuations in the weather effect followed the one of the total effect, indicating the strong impact the weather effect has on the total energy consumption in the residential sector.

Figure 8. Decomposition of changes in EU-28 final energy consumption change (Mtoe) in the residential sector for: (a) 2005-2015 and (b) 2014-2015 using the additive Logarithmic Mean Divisia Index approach (LMDI**)**

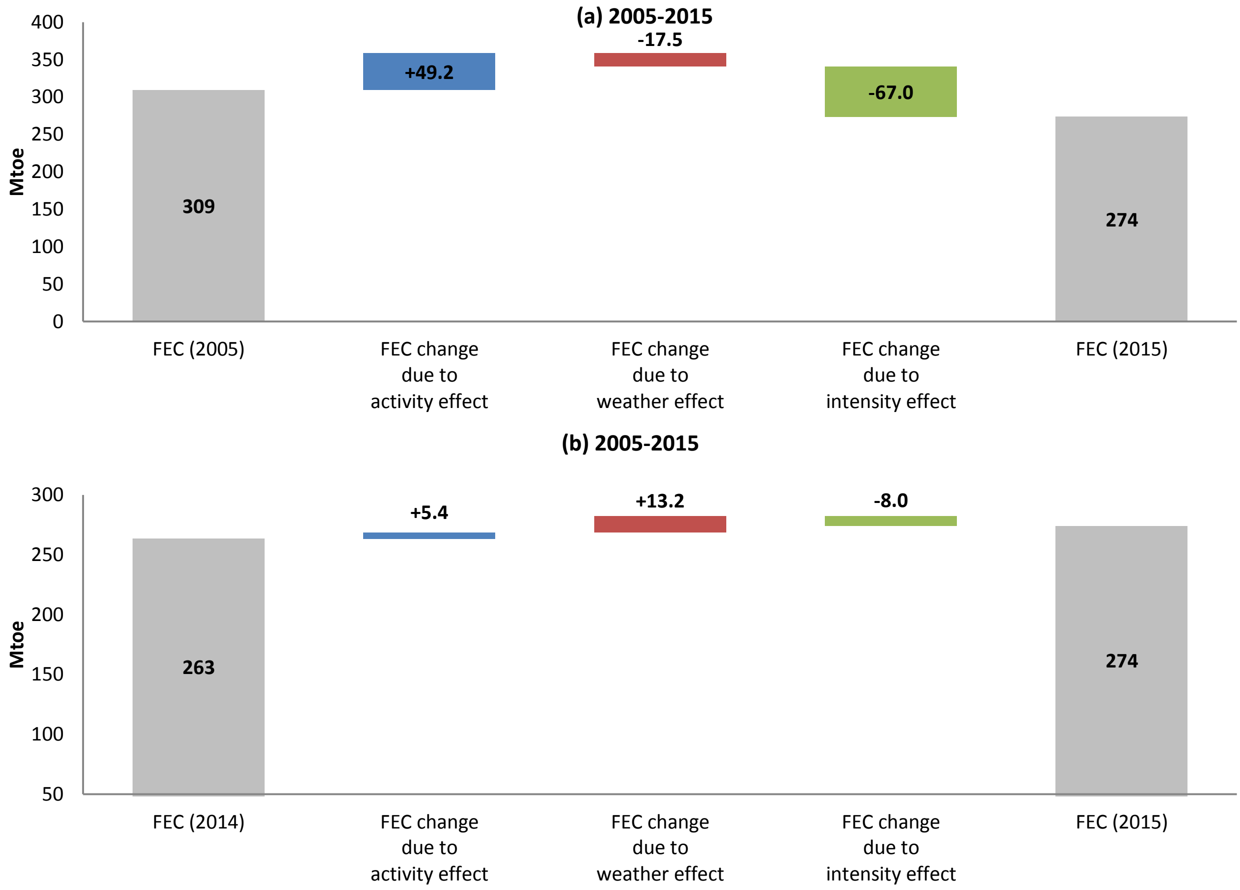
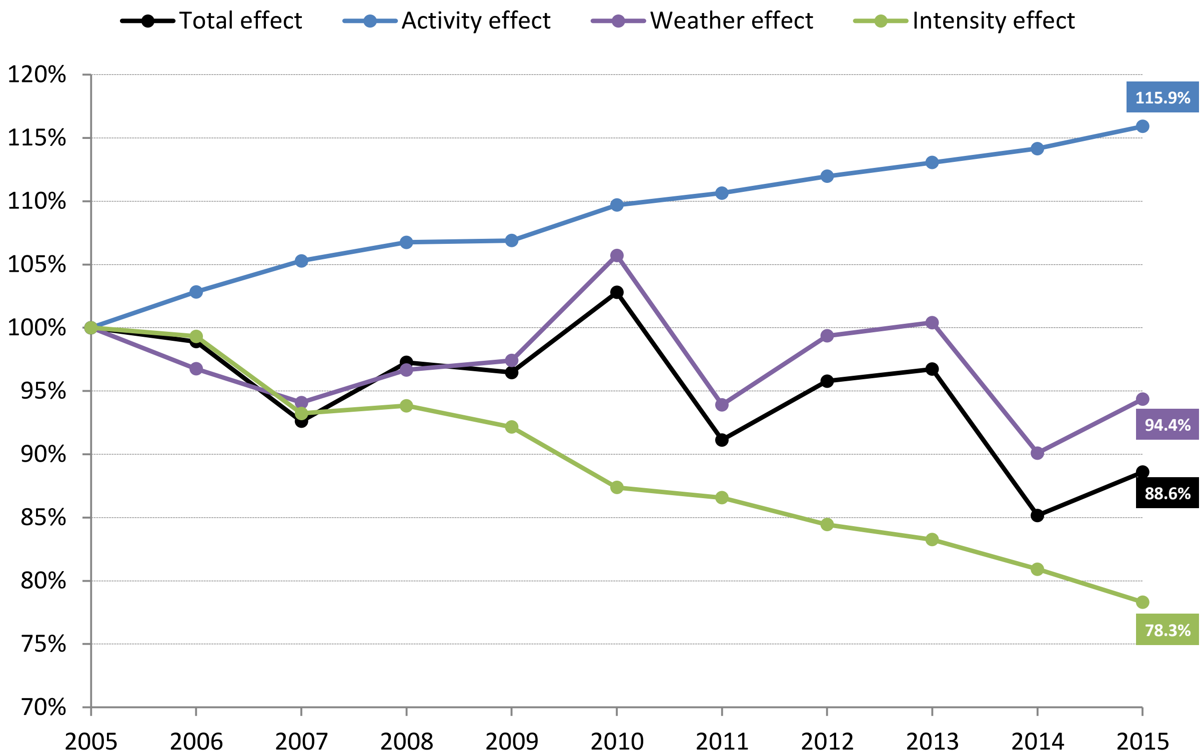


Figure 9. Yearly additive decomposition results at EU level in 2005-2015 (% in terms of 2005 consumption levels) in the residential sector



At Member State level (Table 12), the largest drops in the residential energy consumption are noted in Latvia (26.5%), Hungary (25%) and Greece (20.1%). The residential sector was the sector with the largest share of Member States registering an overall decline in energy consumption in this period (25 Member States). The consumption in Cyprus remained the same, while Malta and Bulgaria experienced a small increase (2.4% and 3.7%, respectively). The activity effect was positive in all countries except Greece, which noted a small drop (36 Mtoe) in energy consumption due to lower activity in its residential sector. Malta (41.3%) Luxembourg (39.8%) and Romania (31.2%) had the biggest increase. Lower heating needs due to warmer weather (i.e. negative effect) was noted in all Member States except UK, Ireland and Cyprus. The year 2015 was a colder year compared to 2014[20], however in most countries this was not enough to shift the overall trend of negative weather effect in the preceding period. The largest drop due to warmer winter was noted in Slovenia (13.2%), Italy (13.1%) and Croatia (21.5%). Intensity improvements were noted in all Member States except Italy. The largest drops due to intensity improvements were registered in Luxembourg (43.1%), Ireland (37.4%), Belgium (37.3%) and the UK (34.8%).

[20] Specifically, all countries except Estonia, Latvia, Lithuania, Finland and Portugal experienced an increase in their heating degree days in 2015 compared to 2014.

Table 12. Decomposition results of residential sector in 2005-2015

	Final Energy Consumption		Total effect		Activity effect		Weather effect		Intensity effect	
	2005	2015	Add.	%	Add.	%	Add.	%	Add.	%
EU	309224	273929	-35294.9	88.6%	49205	115.9%	-17455	94.4%	-67045	78.3%
BE	9925	8136	-1789	82.0%	2017	120.3%	-108	98.9%	-3698	62.7%
BG	2117	2195	78	103.7%	654	130.9%	-165	92.2%	-411	80.6%
CZ	6649	6573	-76	98.9%	1300	119.6%	-688	89.7%	-689	89.6%
DK	4452	4254	-197	95.6%	952	121.4%	-127	97.1%	-1022	77.0%
DE	63498	53171	-10327	83.7%	8707	113.7%	-3054	95.2%	-15980	74.8%
EE	890	858	-32	96.4%	235	126.4%	-70	92.1%	-197	77.8%
IE	2954	2712	-243	91.8%	689	123.3%	173	105.8%	-1104	62.6%
EL	5510	4401	-1109	79.9%	-36	99.3%	-226	95.9%	-847	84.6%
ES	15132	14876	-256	98.3%	2742	118.1%	-1387	90.8%	-1612	89.3%
FR	43070	37666	-5404	87.5%	6373	114.8%	-2665	93.8%	-9112	78.8%
HR	2816	2418	-398	85.9%	430	115.3%	-323	88.5%	-505	82.1%
IT	33922	32495	-1427	95.8%	2261	106.7%	-4456	86.9%	768	102.3%
CY	317	317	0	100.0%	59	118.7%	5	101.5%	-64	79.8%
LV	1504	1106	-398	73.5%	168	111.2%	-108	92.9%	-459	69.5%
LT	1509	1365	-144	90.4%	269	117.8%	-135	91.1%	-278	81.6%
LU	525	495	-30	94.3%	209	139.8%	-13	97.6%	-226	56.9%
HU	6464	4849	-1615	75.0%	1040	116.1%	-752	88.4%	-1904	70.5%
MT	76	78	2	102.4%	32	141.3%	-4	94.8%	-26	66.2%
NL	10743	9557	-1186	89.0%	1972	118.4%	-147	98.6%	-3011	72.0%
AT	6192	5978	-214	96.5%	896	114.5%	-660	89.3%	-450	92.7%
PL	19454	18843	-611	96.9%	5521	128.4%	-1723	91.1%	-4410	77.3%
PT	3224	2539	-685	78.7%	367	111.4%	-183	94.3%	-870	73.0%
RO	7990	7375	-615	92.3%	2494	131.2%	-795	90.0%	-2313	71.0%
SI	1188	1111	-77	93.5%	135	111.4%	-157	86.8%	-56	95.3%
SK	2540	1988	-553	78.3%	481	118.9%	-203	92.0%	-830	67.3%
FI	5020	4898	-121	97.6%	1072	121.4%	-176	96.5%	-1018	79.7%
SE	7305	7197	-108	98.5%	1372	118.8%	-174	97.6%	-1307	82.1%
UK	44238	36481	-7757	82.5%	6794	115.4%	864	102.0%	-15415	65.2%

3.3 Transport sector

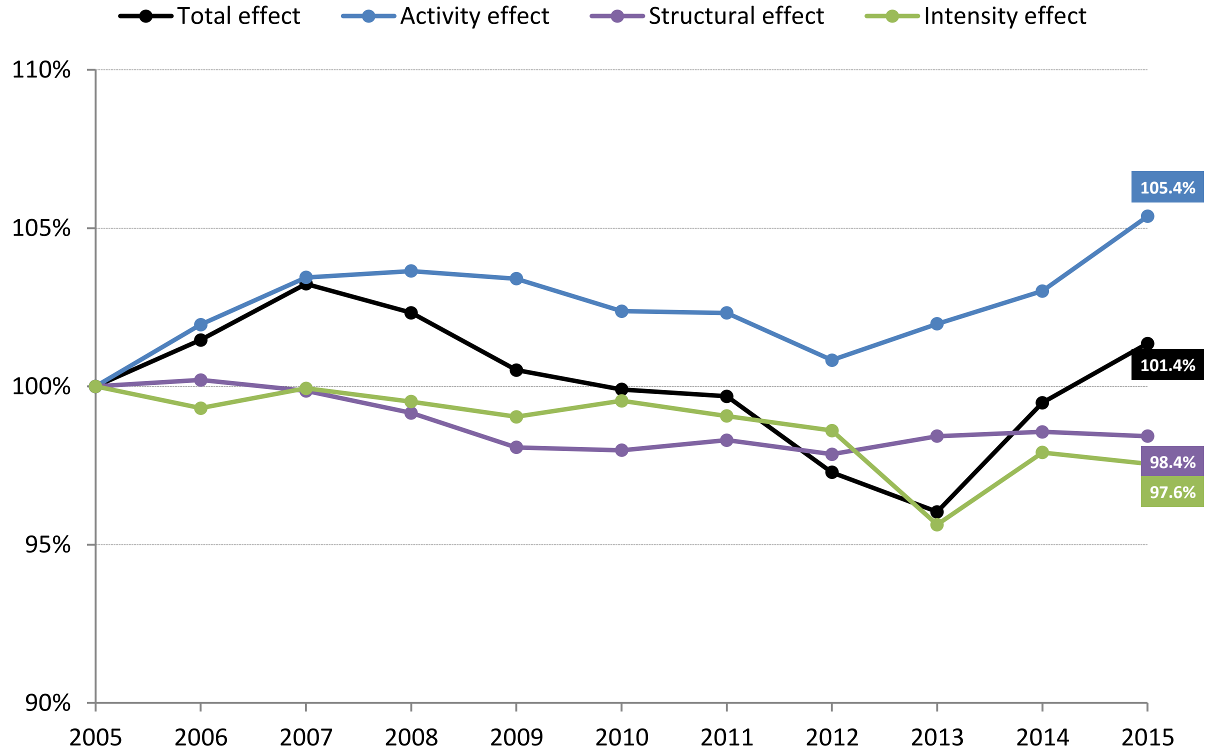
Transport's energy consumption **dropped by only around 2%** in the period 2005-2015: consumption of passenger transport increased by 1%, and consumption of freight transport decreased by 8%. Transport is the sector with the most moderate results. Only 5 Member States (Greece, France, Italy, Sweden and the UK) experienced a small decline, while the passenger transport sector's consumption in all other countries increased from 1% in the case of Portugal, Germany and the Netherlands to over 50% in the case of Poland. On the other hand, just over half of the Member States – Denmark, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Lithuania, Hungary, the Netherlands, Portugal, Slovenia and Finland– experienced a decline in the energy consumption of freight transport sector in this period.

In terms of passenger transport at EU level, the year-on-year results are shown in Figure 10a. The total effect has been on a declining trend since 2007, but in the last two years, a sharp increase is noted. The influence of the financial crisis on the passenger transport is evident in the period 2008-2012, with the activity effect (measured in passenger kilometres) causing a subtle, but relatively constant decline in this period. On the other hand, the intensity effect has been negative throughout the entire period, albeit fluctuating with the biggest drop in 2012-2013. Finally, a constant but moderate shift towards cleaner transport modes (i.e. negative structural effect) is noted at EU level for the entire period. Except 2016, the structural effect has been negative in all years with a plateau at around 98% evident in 2009-2015. With regards to the freight transport, the total energy consumption at EU level (Figure 10b) has been on decline since 2008 except in 2010 and 2015 where a small. A sharp decline in energy consumption mainly driven by lower activity effect (measured in tonne-kilometres) is noted in 2009, reflecting the influence of the financial crisis on the freight transport. Subsequent years were also affected, while small increase of 1% is registered in 2015. Improvements in energy intensity were not a strong driver for reduction in freight transport's consumption and in several years (e.g. 2006, 2009, 2011, 2014, 2015) worsening of energy intensity (i.e. positive intensity effect) was registered. Fluctuations in the structural effects are also noted, albeit milder ones, during the entire period 2005-2015.

At Member State level, all countries experienced growth in their energy consumption due to increase in activity (passenger kilometres) except Spain, Lithuania, the Netherlands, Portugal, Slovenia and Slovakia. A shift to cleaner modes was noted in just over half of Member States while improvements in intensity were registered in all Member States except the Czech Republic, Spain, Cyprus, Lithuania, the Netherlands, Austria, Poland, Portugal, Slovenia, Slovakia, Finland and the UK. In terms of the freight transport, shift to cleaner modes is noted in 11 Member States (Denmark, Ireland, Spain, France Italy, Lithuania, Luxembourg, the Netherlands, Portugal, Romania, Finland and Sweden), while improvements in energy intensity are observed in 16 Member States (Bulgaria, the Czech Republic, Denmark, Germany, Estonia, Spain, Croatia, Latvia, Lithuania, Hungary, Malta, Austria, Poland, Portugal, Slovenia and Slovakia).

Figure 10. Yearly additive decomposition results at EU level in 2005-2015 (% in terms of 2005 consumption levels) in the transport sector

(a) Passenger transport



(b) Freight transport

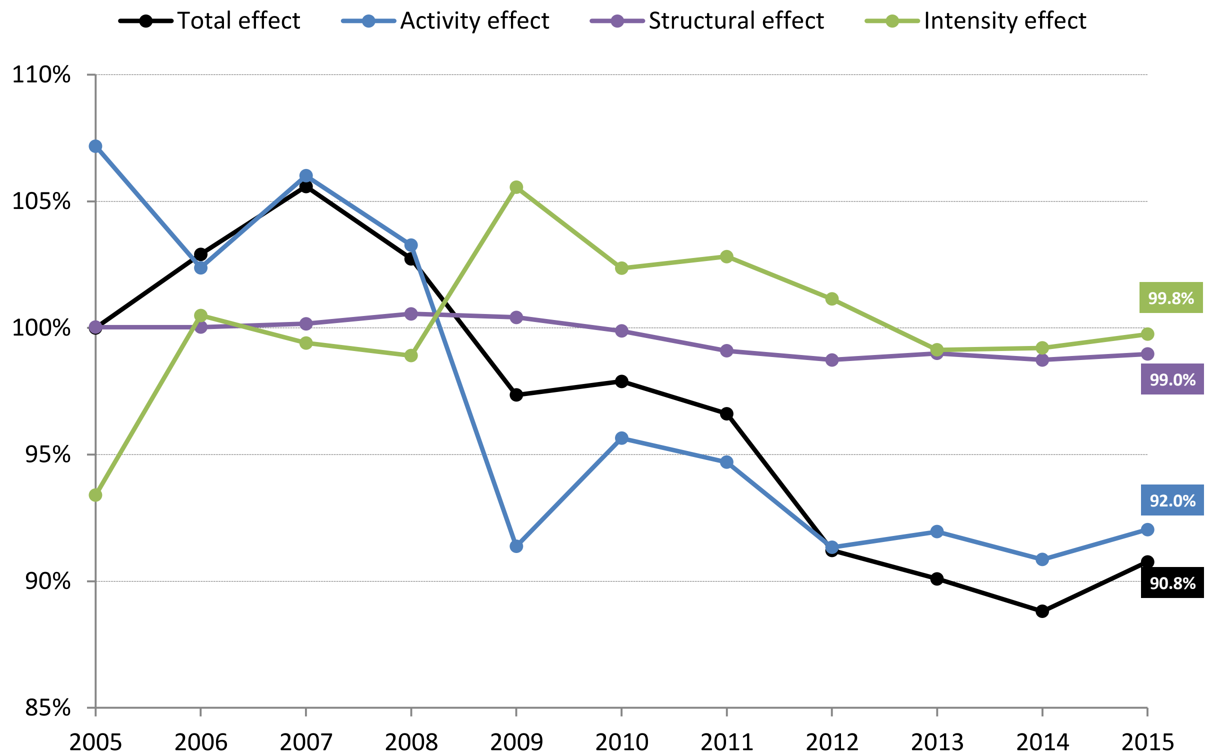


Table 13. Decomposition results of passenger transport sector in 2005-2015

	Final Energy Consumption (ktoe)		Total effect		Activity effect		Structural effect		Intensity effect	
	2005	2015	ktoe	%	ktoe	%	ktoe	%	ktoe	%
EU	233763	236933	3170	101.4%	12560	105.4%	-3671	98.4%	-5719	97.6%
BE	5844	6287	443	107.6%	713	112.2%	-150	97.4%	-119	98.0%
BG	1284	1611	327	125.5%	438	134.1%	204	115.9%	-315	75.5%
CZ	4386	4648	262	106.0%	222	105.1%	-499	88.6%	539	112.3%
DK	3523	3751	228	106.5%	392	111.1%	9	100.3%	-173	95.1%
DE	45629	46252	623	101.4%	3490	107.6%	-397	99.1%	-2470	94.6%
EE	720	738	19	102.6%	93	113.0%	-19	97.4%	-56	92.2%
IE	2951	3099	148	105.0%	1002	134.0%	-9	99.7%	-845	71.4%
EL	5229	4002	-1228	76.5%	522	110.0%	-8	99.9%	-1742	66.7%
ES	19965	21080	1115	105.6%	-1338	93.3%	-1557	92.2%	4011	120.1%
FR	31069	30791	-278	99.1%	1518	104.9%	55	100.2%	-1851	94.0%
HR	1372	1500	128	109.4%	183	113.3%	-2	99.8%	-52	96.2%
IT	28605	25013	-3592	87.4%	571	102.0%	823	102.9%	-4985	82.6%
CY	693	711	18	102.7%	163	123.5%	-218	68.5%	74	110.7%
LV	624	717	93	114.9%	122	119.5%	8	101.3%	-37	94.0%
LT	1028	1229	201	119.5%	-381	63.0%	8	100.8%	573	155.8%
LU	709	787	78	111.0%	134	118.9%	34	104.8%	-90	87.3%
HU	3347	3379	31	100.9%	166	105.0%	59	101.8%	-195	94.2%
MT	301	437	137	145.4%	49	116.2%	413	237.4%	-325	-8.2%
NL	9991	10154	163	101.6%	-284	97.2%	363	103.6%	84	100.8%
AT	4500	4701	201	104.5%	550	112.2%	-383	91.5%	34	100.8%
PL	6177	9645	3468	156.1%	2239	136.2%	240	103.9%	989	116.0%
PT	4851	4906	55	101.1%	-202	95.8%	-158	96.8%	414	108.5%
RO	2331	3012	681	129.2%	1000	142.9%	153	106.6%	-472	79.8%
SI	996	1163	166	116.7%	-69	93.0%	12	101.2%	224	122.5%
SK	985	1167	182	118.5%	-16	98.4%	-24	97.5%	222	122.6%
FI	2963	3106	142	104.8%	187	106.3%	-195	93.4%	150	105.1%
SE	5684	5465	-219	96.1%	367	106.4%	-103	98.2%	-483	91.5%
UK	38006	37585	-421	98.9%	592	101.6%	-2286	94.0%	1274	103.4%

Table 14. Decomposition results of freight transport sector in 2005-2015

	Final Energy Consumption (ktoe)		Total effect		Activity effect		Structural effect		Intensity effect	
	2005	2015	ktoe	%	ktoe	%	ktoe	%	ktoe	%
EU	113228	102772	-10456	90.8%	-9015	92.0%	-1162	99.0%	-279	99.8%
BE	2737	3248	511	118.7%	217	107.9%	-1	100.0%	295	110.8%
BG	538	839	301	156.0%	490	191.2%	140	126.1%	-329	38.8%
CZ	1728	1917	189	111.0%	430	124.9%	82	104.8%	-323	81.3%
DK	1600	1176	-424	73.5%	-145	90.9%	-107	93.3%	-172	89.2%
DE	14990	16117	1127	107.5%	1787	111.9%	245	101.6%	-905	94.0%
EE	623	530	-93	85.1%	-300	51.9%	302	148.4%	-95	84.8%
IE	1171	1000	-170	85.5%	-813	30.5%	-1221	-4.3%	1864	259.3%
EL	2945	2550	-395	86.6%	-631	78.6%	7	100.2%	230	107.8%
ES	19558	11705	-7854	59.8%	-3774	80.7%	-281	98.6%	-3798	80.6%
FR	14694	12987	-1707	88.4%	-2747	81.3%	-70	99.5%	1109	107.5%
HR	502	527	25	104.9%	43	108.6%	37	107.3%	-55	89.0%
IT	15693	13365	-2328	85.2%	-6941	55.8%	-1256	92.0%	5869	137.4%
CY	247	184	-63	74.6%	-169	31.5%	0	100.0%	106	143.0%
LV	431	436	5	101.2%	76	117.7%	111	125.7%	-182	57.7%
LT	588	563	-24	95.8%	210	135.7%	56	109.6%	-290	50.6%
LU	113	147	34	129.9%	-32	71.8%	-2	98.4%	67	159.8%
HU	1121	1071	-50	95.5%	362	132.3%	85	107.6%	-498	55.6%
MT	100	107	7	106.7%	31	131.3%	0	100.0%	-25	75.4%
NL	3175	3173	-2	99.9%	154	104.8%	-193	93.9%	38	101.2%
AT	1706	1728	22	101.3%	156	109.1%	38	102.2%	-172	89.9%
PL	5962	7000	1039	117.4%	4441	174.5%	985	116.5%	-4388	26.4%
PT	2377	1874	-503	78.8%	-395	83.4%	-27	98.9%	-81	96.6%
RO	1922	2286	365	119.0%	-369	80.8%	-284	85.2%	1018	153.0%
SI	394	378	-16	96.0%	174	144.1%	15	103.9%	-205	48.0%
SK	1383	1473	91	106.6%	387	128.0%	166	112.0%	-462	66.6%
FI	1690	1685	-5	99.7%	-314	81.4%	-127	92.5%	436	125.8%
SE	2420	2428	8	100.3%	-218	91.0%	-7	99.7%	232	109.6%
UK	12822	12276	-546	95.7%	-1125	91.2%	143	101.1%	435	103.4%

4 Summary and conclusions

Energy consumption trends are driven by several factors beyond energy efficiency improvements. To track and understand the progress towards the 2020 energy efficiency targets, this study identified the main driving factors behind the latest energy consumption trends in the EU. The widely-used logarithmic-mean Divisia index method (LMDI) method was applied to study both aggregated and sectoral energy consumption changes at both EU and MS levels over the period 2005–2015.

At EU level, a drop in primary energy consumption of 183 Mtoe in 2015 (11%) in relation to 2005 levels was registered. The main driver behind this was the significant energy intensity improvements which drove down consumption by 340 Mtoe (19%) had all other effects remained constant. This overrode the increase in energy consumption due to economic growth, which corresponded to a positive activity effect of 183 Mtoe (12%). The impact of transformation effect for EU-28 was generally small (7 Mtoe), indicating a small increase in overall efficiency of the transformation system. The energy consumption of the EU28 commercial sector as a whole decreased by 55 Mtoe in 2015, equivalent to a reduction of 11% compared to 2005. If structural and intensity effects had not have come into play, economic growth would have driven up consumption by 62 Mtoe. The reason of the overall energy decline was due to energy intensity improvements, which contributed to a drop of 97 Mtoe in energy consumption as well as structural shifts towards less energy intensive sectors which contributed to a reduction of 20 Mtoe. Energy intensity improvements in the residential sector also played a dominant role in declining energy consumption trends during the study period. Improvements in energy intensity contributed to a reduction of 67 Mtoe in this sector. In addition, warmer winters over this period resulted in a drop of energy consumption by 17.5 Mtoe in 2015 compared to 2005 levels. Together with the intensity effect, these were more than sufficient to overcome the positive activity effect of 49 Mtoe in the EU residential sector in this period. Transport's energy consumption dropped by only around 2% in 2005-2015: consumption of passenger transport increased by 1%, and consumption of freight transport decreased by 8%. For the passenger transport sector, moderate improvements in energy intensity (6 Mtoe, 2.5% compared to 2005 consumption) and structural shifts to cleaner transport modes (3.7 Mtoe, 1.6%) compared to 2005 consumption were not enough to counterbalance the activity effect registered in this period (12.6 Mtoe, 5.4%). For the freight transport sector, a total drop in energy consumption of 10.4 Mtoe (9.3%) was attributed to a negative activity effect (7.8%), negative structural effect (1.1%) and negative intensity effect (0.5%).

Changes in energy consumption at Member State level were also analysed. A drop in the aggregated primary energy consumption in 2005-2015 was noted in most countries – all except Estonia and Poland – with the biggest decline in Lithuania (27%), Greece (23%), Malta (21%), UK (18%) and Italy (18%). With the exception of Greece, Italy and Portugal, economic activity drove up primary energy consumption, leading to a positive activity effect in most countries. Despite the significant economic growth, the overall consumption dropped due to concurrent intensity improvements. This shows that many Member States managed to increase their GDP without a detrimental effect in their overall energy consumption. This also holds true for the decomposition results of final energy trends.

Encouraging findings from individual sectors were also noted. In 2005-2015, the overall commercial energy consumption declined in all Member States, except Germany, Belgium, Latvia, and Malta. Economic growth was responsible for an increase in energy consumption ranging from just over 1% in case of Portugal to over 50%, e.g. Poland. Italy and Greece were the only countries with economic commercial sector downturn, as a negative activity effect of 2.7% and 16.1% due to lower economic activity was observed, respectively. In terms of structural shifts in 2005-2015, the commercial sector moved to less energy intensive sub-sectors in all countries except Austria, Bulgaria, Czech Republic, Lithuania, Latvia, Poland and Slovakia. Slovakia was the country with the largest increase in consumption due to shift towards more intensive activities, with an increase of 13% in this period. The intensity effect was negative in all countries except Cyprus, Greece, Finland and Malta. On the other hand, significant energy efficiency improvements, resulting in negative intensity effects were seen in the biggest countries including Poland, Italy, Germany and Spain.

In the residential sector, the largest consumption drops in 2005-2015 were noted in Latvia (27%), Hungary (25%) and Greece (20%). The residential sector was the sector with the largest share of Member States (25 in total) registering an overall decline in energy consumption in this period. The consumption in Cyprus remained the same, while Malta and Bulgaria experienced a small increase. The activity effect was positive in all countries except Greece, which noted a small drop in energy consumption due to lower activity. Malta (41%), Luxembourg (40%) and Romania (31%) had the biggest increase. Lower heating needs due to warmer weather (i.e. negative weather effect) was noted in all Member States except UK, Ireland and Cyprus and intensity improvements were noted in all Member States except Italy. In terms of the transport sector, all countries experienced growth due to increase in passenger activity except Spain, Lithuania, the Netherlands, Portugal, Slovenia and Slovakia. A shift to cleaner passenger transport modes was noted in just over half of Member States while improvements in intensity were registered in all Member States except the Czech Republic, Spain, Cyprus, Lithuania, the Netherlands, Austria, Poland, Portugal, Slovenia, Slovakia, Finland and the UK. In terms of the freight transport, a shift to cleaner modes was noted in 11 Member States (Denmark, Ireland, Spain, France Italy, Lithuania, Luxembourg, the Netherlands, Portugal, Romania, Finland and Sweden), while improvements in energy intensity were observed in 16 Member States (Bulgaria, the Czech Republic, Denmark, Germany, Estonia, Spain, Croatia, Latvia, Lithuania, Hungary, Malta, Austria, Poland, Portugal, Slovenia and Slovakia).

This report forms the first of the series of reports tracking economy-wide energy efficiency trends and the European Commission Joint Research Centre plans to continue and deepen this activity in the future. While our results offer valuable insights into the factors behind recent consumption trends at both EU and MS levels, this work has also shown that further investigation is needed to provide a more comprehensive analysis. As explained, finer levels of disaggregation are necessary to conduct more detailed decomposition analysis. The data review conducted in this report identified some of the main shortcomings with existing datasets. These include the lack of distinction of transport energy consumption data between freight and passenger by Eurostat. The Odyssee datasets offer this level of detail but with various data gaps. In addition, the breakdown of the residential energy consumption by end use is only recently collected by Eurostat (that is, it does not cover the entire period examined here), while such a breakdown is not available in other sectors. The structural effect within the services sector – a growing sector in Europe – cannot be currently examined as the breakdown of energy consumption by service sub-sectors is not yet available. On-going efforts made by Eurostat and statistical offices to address some of these challenges are welcome and will certainly strengthen the analytical capability of tools such as the LMDI method in the future. Finally, the inclusion of more driving factors in the analysis and a more elaborated definition for the effect measuring the impact of energy efficiency will be in the scope of future JRC work.

References

Andreoni, V. & Galmarini, S., 2012. European CO_2 emission trends: A decomposition analysis for water and aviation transport sectors. *Energy,* 45(1), pp. 595-602.

Ang, B. W., 2015. LMDI decomposition approach: A guide for implementation. *Energy Policy,* Volume 86, pp. 233-238.

Ang, B. W. & Choi, K.-H., 1997. Decomposition of Aggregate Energy and Gas Emission Intensities for Industry: A Refined Divisia Index Method. *The Energy Journal,* pp. 59-73.

Ang, B. W. & Liu, N., 2007. Handling zero values in the logarithmic mean Divisia index decomposition approach. *Energy Policy,* 35(1), pp. 238-246.

Ang, B. W. & Zhang, F. Q., 2000. A survey of index decomposition analysis in energy and environmental studies. *Energy,* 25(12), p. 1149–1176.

Braungardt, S. et al., 2014. *Study evaluating the current energy efficiency policy framework in the EU and providing orientation on policy options for realising the cost-effective energy efficiency/saving potential until 2020 and beyond,* Karlsruhe/Vienna/Rome: s.n.

Cahill, C. J., Bazilian, M. & Ó Gallachóir, B. P., 2010. Comparing ODEX with LMDI to measure energy efficiency trends. *Energy Efficiency,* 3(4), pp. 317-329.

Cruza, L. & Diasb, J., 2016. Energy and CO_2 intensity changes in the EU-27: Decomposition into explanatory effects. *Sustainable Cities and Society,* Volume 26, pp. 486-495.

Fernández González, P., Landajo, M. & Presno, M., 2014a. The driving forces behind changes in CO_2 emission levels in EU-27. Differences between member states. *Environmental Science & Policy,* Volume 38, pp. 11-16.

Fernández González, P., Landajo, M. & Presno, M., 2014b. Multilevel LMDI decomposition of changes in aggregate energy consumption. A cross country analysis in the EU-27. *Energy Policy,* Volume 68, pp. 576-584.

Hajko, V., 2012. Changes in the Energy Consumption in EU-27. *Review of Economic Perspectives,* 12(1), pp. 3-21.

IEA and World Bank, 2014. *Sustainable Energy for All 2013-2014: Global Tracking Framework Report.* Washington, DC: World Bank.

IEA, 2016. *Energy Efficiency Market Report 2016,* Paris: International Energy Agency.

Kisielewicz, J. et al., 2016. *Decomposition analysis of the changes in GHG emissions in the EU and Member States,* London: ICF International.

Maireta, N. & Decellasb, F., 2009. Determinants of energy demand in the French service sector: A decomposition analysis. *Energy Policy,* 37(7), pp. 2734-2744.

Marrero, G. A. & Ramos-Real, F. J., 2013. Activity sectors and energy intensity decomposition analysis and policy implications for European countries (1991-2005). *Energies,* 6(5), pp. 2521-2540.

Obadi, S. M. & Korček, M., 2015. Investigation of Driving Forces of Energy Consumption in European Union 28 Countries. *International Journal of Energy Economics and Policy*, 5(2), pp. 422-432.

Reuter, M., Patel, M. K. & Eichhammer, W., 2017. Applying ex-post index decomposition analysis to primary energy consumption for evaluating progress towards European energy efficiency targets. *Energy Efficiency*.

Rogan, F., Cahill, C. J. & Ó Gallachóir, B. P., 2012. Decomposition analysis of gas consumption in the residential sector in Ireland. *Energy Policy,* Volume 42, pp. 19-36.

Sinton, J. & Levine, M., 1994. Changing energy intensity in Chinese industry: the relative importance of structural shift and intensity change. *Energy Policy,* Volume 22, pp. 239-255.

List of abbreviations and definitions

PEC	Primary Energy Consumption
FEC	Final Energy Consumption
GDP	Gross Domestic Product
GDI	Gross Disposable Income
GVA	Gross Value Added
i	Sector
FA	Floor Area
TKM	Tonne Kilometres
PKM	Passenger Kilometres
FEC_{heat}	Heating Energy Consumption
FEC'_{heat}	Heating Energy Consumption (weather adjusted)
TFA	Total Floor Area
FEC_{other}	Energy consumption for end-uses other than heating

List of figures

List of tables

Annexes

Annex 1. Input data

1.1 Energy consumption data

Indicator			Primary Energy Consumption			**Unit**			Ktoe		
ESTAT Code			Nrg_100a			**Last update**			17/01/2017		
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
BE	51,334	50,749	49,532	50,871	49,862	53,543	49,807	47,272	48,733	45,152	45,701
BG	18,905	19,582	19,224	18,934	16,924	17,352	18,588	17,769	16,293	17,233	17,904
CZ	42,477	43,604	43,774	42,619	40,341	42,509	41,116	40,708	40,833	39,294	39,930
DK	19,267	20,742	20,207	19,415	18,660	19,781	18,308	17,663	17,536	16,550	16,514
DE	317,264	327,538	310,428	314,577	295,312	309,905	293,435	296,065	302,800	291,110	292,937
EE	5,387	5,263	5,929	5,735	5,243	6,060	6,112	6,027	6,533	6,569	6,156
IE	14,749	15,191	15,816	15,419	14,562	14,825	13,552	13,474	13,411	13,352	13,962
EL	30,649	30,678	30,678	30,903	29,561	27,610	26,901	26,831	23,592	23,665	23,685
ES	135,873	136,438	138,301	134,089	123,376	123,219	121,724	122,108	114,310	112,574	117,108
FR	260,267	255,773	252,149	255,032	244,846	252,938	243,894	244,689	245,972	234,756	239,448
HR	9,107	9,059	9,419	9,147	8,925	8,831	8,705	8,332	8,047	7,656	7,996
IT	181,473	179,250	179,155	177,428	165,243	168,365	163,291	157,814	153,176	143,840	149,563
CY	2,466	2,563	2,691	2,828	2,741	2,654	2,623	2,477	2,161	2,205	2,248
LV	4,495	4,655	4,772	4,576	4,433	4,556	4,279	4,440	4,359	4,358	4,279
LT	7,978	7,770	8,049	8,152	7,801	6,125	5,856	5,936	5,738	5,687	5,797
LU	4,772	4,693	4,606	4,608	4,337	4,608	4,532	4,422	4,299	4,186	4,144
HU	25,443	25,243	24,591	24,615	23,242	23,738	23,375	21,937	21,166	21,025	22,255
MT	952	900	961	950	860	930	928	971	870	882	751
NL	69,020	68,336	68,076	69,143	66,838	70,569	66,508	66,461	66,107	62,655	64,329
AT	32,415	32,255	31,928	32,261	30,345	32,454	31,591	31,318	31,893	30,448	31,332
PL	87,651	91,721	91,608	92,764	89,815	95,719	95,804	92,695	93,026	89,167	90,001
PT	24,888	24,118	23,839	23,424	23,517	22,555	21,871	20,931	21,023	20,648	21,662
RO	36,740	38,271	38,033	37,973	33,913	34,328	34,830	33,644	30,970	30,637	31,288
SI	7,016	7,011	7,022	7,473	6,922	7,128	7,211	6,922	6,750	6,512	6,453
SK	17,750	17,578	16,527	17,019	15,600	16,802	16,166	15,727	15,929	15,252	15,379
FI	33,350	36,359	36,033	34,717	32,757	35,880	34,691	33,625	32,991	33,570	32,030
SE	48,700	47,193	47,132	46,974	43,696	48,671	47,550	47,972	47,057	46,239	43,700
UK	222,807	219,665	213,299	210,746	198,576	205,036	190,980	197,149	194,374	183,052	183,035

Indicator			Final Energy Consumption			**Unit**			Ktoe		
ESTAT Code			Nrg_100a			**Last update**			17/01/2017		
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
BE	36580	36578	35648	36892	34763	37631	35000	35056	36404	34196	35780
BG	10186	10501	10341	9982	8598	8843	9263	9240	8778	9012	9508
CZ	26330	26677	26243	26101	25044	25271	24450	24408	24291	23494	24128
DK	15499	15662	15718	15523	14793	15519	14799	14233	14052	13515	13944
DE	218456	223424	210231	217643	205791	219650	208779	212052	217654	208881	212124
EE	2878	2879	3102	3066	2765	2907	2835	2871	2870	2816	2765
IE	12597	13226	13284	13298	11872	11956	10899	10613	10738	10766	11214
EL	20958	21555	22059	21374	20526	18997	18866	17002	15282	15520	16437
ES	97766	95474	98124	94636	87769	89084	86671	83152	80771	79225	80461
FR	160765	158357	155115	156702	149893	155303	144035	148721	151523	140507	144304
HR	7237	7256	7285	7403	7175	7212	6964	6654	6573	6241	6587
IT	137153	135599	134565	134228	126144	128459	123131	121769	118519	113350	116444
CY	1833	1865	1927	1971	1934	1926	1918	1764	1614	1616	1660
LV	4018	4194	4354	4153	4040	4120	3869	4027	3855	3885	3800
LT	4671	4933	5218	5138	4650	4814	4793	4913	4794	4893	4869
LU	4475	4409	4341	4379	4074	4323	4290	4170	4121	4001	3988
HU	18229	17971	16918	17032	16363	16527	16455	15285	15300	15229	16287
MT	382	382	389	493	446	503	493	507	525	545	572
NL	54179	53819	53026	53853	51583	55136	51625	51467	51583	47280	48493
AT	27837	27778	27569	27839	26408	28172	27221	27128	27971	26742	27370
PL	58471	61178	61573	62439	61542	66326	64726	64417	63259	61599	62251
PT	19009	18782	18908	18396	18188	18099	17311	16031	15854	15771	16037
RO	24714	24882	24157	24873	22290	22593	22771	22801	21834	21721	21893
SI	4897	4944	4892	5267	4835	5036	5022	4896	4796	4589	4689
SK	11561	11378	11182	11485	10632	11546	10772	10347	10608	9983	10301
FI	25185	26476	26515	25668	23860	26247	25014	25166	24680	24503	24181
SE	33659	33219	33325	32421	31437	34077	32389	32367	31582	31192	31759
UK	151989	149839	147580	147459	137034	142512	131248	135169	135715	128531	130327

Indicator		Final Energy Consumption of passenger transport sector	Unit	Ktoe
Source		Odyssee Database	Last update	12/2016

i=1 Road
i=2 Rail
i=3 Air

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	i=1	4430.4	4472.8	4489.8	4499.0	4565.4	4595.3	4694.3	4605.2	4619.9	4705.5	4734.7
	i=2	81.6	81.2	75.7	84.3	94.0	89.3	99.3	96.5	100.9	96.7	98.2
	i=3	1332.1	1332.1	1332.1	1332.1	1332.1	1332.1	1332.1	1332.1	1332.1	1332.1	1454.3
BG	i=1	1066.8	1003.1	1165.8	1285.9	1367.0	1415.4	1401.7	1380.8	1332.8	1360.2	1409.4
	i=2	17.3	16.7	15.5	18.0	19.4	18.0	15.1	17.0	11.9	9.4	12.8
	i=3	200.0	205.0	222.0	225.0	176.0	183.0	191.0	174.0	170.0	178.0	189.0
CZ	i=1	3964.8	4031.1	4309.2	4279.3	4193.9	4014.4	4045.4	3951.8	3891.0	4031.0	4218.4
	i=2	76.5	77.5	77.0	83.2	84.2	98.0	93.7	97.3	98.1	95.6	96.3
	i=3	344.6	352.7	382.7	402.4	372.4	343.4	354.8	315.4	303.1	311.3	333.0
DK	i=1	2493.3	2501.4	2577.1	2564.2	2516.2	2546.5	2572.2	2613.0	2621.8	2668.6	2747.1
	i=2	72.7	73.1	73.7	76.5	77.8	75.2	72.6	76.1	74.1	74.9	73.2
	i=3	957.0	930.1	972.7	951.9	845.0	875.4	913.4	893.2	892.2	957.6	931.0
DE	i=1	36685.0	36763.1	36421.0	35780.3	36014.1	36047.9	36437.3	36024.4	36259.7	36882.3	37108.0
	i=2	731.7	678.6	650.9	660.0	704.1	693.7	675.1	527.4	527.4	499.7	492.8
	i=3	8212.2	8627.9	8943.1	9036.6	8771.2	8640.3	8266.8	8850.6	8992.1	8654.0	8651.1
EE	i=1	669.6	695.3	712.1	715.4	656.6	678.0	636.8	619.2	618.2	655.8	711.9
	i=2	0.9	1.0	1.1	1.0	1.3	1.6	1.1	1.3	1.1	1.4	1.4
	i=3	49.4	32.6	51.5	29.4	34.7	38.9	35.7	38.9	29.4	42.0	25.2
IE	i=1	2058.2	2175.9	2267.1	2324.9	2248.0	2175.4	2186.8	2178.2	2207.0	2230.7	2207.4
	i=2	35.9	38.5	43.3	46.7	41.1	40.4	39.9	39.0	38.4	35.4	44.7
	i=3	857.0	987.9	1043.3	970.1	766.9	787.1	699.4	585.7	675.1	748.0	846.5
EL	i=1	4012.1	4085.1	4316.5	4216.4	4247.4	3921.1	3689.6	3131.4	3060.1	2967.6	2961.1
	i=2	36.0	37.8	35.1	32.9	30.3	18.8	16.9	26.0	24.1	49.5	49.4
	i=3	1181.1	1295.1	1311.5	1335.1	1143.1	919.2	961.4	845.3	850.4	957.2	991.2
ES	i=1	13995.6	14505.6	15341.8	15118.7	14989.1	15151.3	15024.8	14112.2	13815.3	14397.6	15219.2
	i=2	636.4	527.9	623.9	647.2	622.2	633.8	499.7	526.6	193.2	173.6	219.0
	i=3	5332.6	5578.0	5868.7	5793.7	5281.3	5396.2	5752.5	5424.9	5143.6	5299.6	5641.6
FR	i=1	23891.5	23651.1	23867.2	23701.8	23794.8	23979.7	23603.7	23411.2	22966.3	22997.9	23447.4
	i=2	735.8	749.6	742.8	805.7	834.2	843.2	812.7	841.7	835.2	811.1	802.9
	i=3	6442.0	6699.0	6912.0	6948.0	6365.0	6444.0	6767.0	6639.0	6588.0	6541.0	6541.0
HR	i=1	1255.0	1343.3	1433.0	1421.0	1435.0	1384.7	1366.6	1290.3	1309.4	1275.6	1358.4
	i=2	17.9	18.0	18.4	20.3	21.7	21.6	20.3	17.8	16.3	15.3	14.7
	i=3	98.8	102.3	104.6	118.3	102.8	109.1	115.5	119.5	130.5	130.8	126.9
IT	i=1	24600.2	24421.6	24041.3	22872.9	22866.5	22386.0	21807.7	21016.5	20411.5	21615.0	20836.2
	i=2	289.7	293.7	284.5	276.6	293.3	292.3	279.6	289.0	299.9	281.3	312.7
	i=3	3715.1	3981.2	4227.6	4074.5	3686.4	3882.7	3969.7	3786.8	3684.0	3722.0	3863.8
CY	i=1	401.8	436.4	471.4	525.9	537.0	546.4	533.7	499.9	449.9	436.3	447.8
	i=2	291.0	305.0	318.5	296.5	283.6	278.7	304.0	272.2	243.2	239.1	263.5
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LV	i=1	561.8	637.1	721.3	688.1	611.4	616.6	565.2	537.2	528.2	563.1	606.9
	i=2	3.3	3.7	3.6	3.3	2.5	2.4	2.1	2.2	2.2	2.0	1.8
	i=3	58.8	67.1	81.1	97.7	102.3	117.3	117.8	119.8	123.9	110.5	107.9
LT	i=1	975.7	1002.9	1212.5	1196.6	999.7	1033.2	982.7	1010.2	1035.9	1079.0	1133.5
	i=2	1.7	1.6	1.4	1.4	1.2	1.1	1.1	1.1	1.1	1.0	0.9
	i=3	50.7	57.0	72.1	81.4	41.0	53.9	60.1	66.5	76.1	89.6	94.2
LU	i=1	272.5	279.1	283.6	286.4	293.3	293.7	297.8	298.3	304.8	313.9	320.1
	i=2	3.3	3.6	4.4	6.5	7.1	6.2	7.5	8.4	8.2	9.0	9.0
	i=3	433.0	405.2	435.6	438.5	420.1	429.5	403.3	372.1	374.0	406.0	457.7
HU	i=1	3013.5	3058.3	3012.5	3028.6	2969.7	2862.8	2912.6	2866.0	2926.6	3045.1	3140.9
	i=2	73.3	73.5	70.7	68.8	80.1	66.1	63.3	55.6	65.2	62.8	62.9
	i=3	260.6	264.8	242.8	269.8	230.7	229.7	230.7	167.5	163.5	170.7	174.7
MT	i=1	208.2	224.5	225.6	234.7	234.9	243.1	246.6	253.3	264.8	287.0	308.4
	i=2	92.6	79.0	91.0	96.2	91.7	102.3	102.3	106.0	110.8	120.1	129.1
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NL	i=1	6221.0	6243.3	6330.7	6279.1	6255.5	6280.5	6293.0	6233.5	6180.0	6113.3	6232.6
	i=2	111.1	109.8	103.9	108.0	118.3	122.9	120.6	121.0	118.7	115.9	114.0
	i=3	3659.1	3706.9	3730.8	3783.3	3506.3	3422.7	3561.2	3422.7	3496.7	3625.7	3807.2
AT	i=1	3749.8	3755.0	3819.2	3860.8	3806.5	3845.4	3877.7	3833.3	3687.7	3705.5	3894.3
	i=2	71.8	69.6	71.0	71.4	84.2	79.7	76.0	70.7	72.0	74.5	76.1
	i=3	678.4	709.5	751.9	753.1	657.6	708.7	747.4	713.1	681.0	680.9	730.4
PL	i=1	5732.4	6763.9	7427.3	7993.6	8367.7	8771.8	8885.1	8704.9	8391.6	8567.6	8905.2
	i=2	109.2	93.2	101.5	97.5	97.2	94.9	85.6	83.9	76.4	69.8	72.6
	i=3	335.4	445.0	463.8	556.1	487.5	513.4	465.8	556.1	540.9	611.1	666.9
PT	i=1	3922.5	3953.7	3899.2	3987.2	4129.0	4202.5	4066.1	3697.5	3269.3	3378.2	3713.4
	i=2	39.5	40.6	40.5	42.6	43.2	34.6	29.0	25.8	24.9	20.8	21.1
	i=3	889.2	931.7	975.3	995.5	932.0	1011.7	1036.4	1044.7	1060.0	1116.7	1171.7
RO	i=1	2132.1	2242.5	2273.2	2602.1	2684.7	2503.4	2388.1	2403.4	2488.3	2564.8	2665.8
	i=2	103.3	101.2	100.7	94.0	89.2	90.0	88.1	94.2	86.7	70.8	73.6
	i=3	95.4	136.7	206.3	220.3	231.4	270.3	316.0	173.0	211.0	231.0	272.2
SI	i=1	968.4	1037.5	1078.1	1142.8	1128.2	1161.0	1187.1	1160.9	1145.5	1126.4	1133.1
	i=2	4.0	3.9	3.8	3.7	3.7	3.2	2.9	2.8	2.7	2.5	2.6
	i=3	23.9	26.0	33.3	36.4	29.1	29.1	25.0	25.0	27.0	27.0	27.0
SK	i=1	931.5	916.5	930.0	928.3	926.8	976.9	1004.5	1021.1	1036.3	1063.0	1103.7
	i=2	14.1	14.3	16.8	15.9	16.2	16.4	16.8	17.0	16.8	16.2	20.1
	i=3	39.3	40.2	49.6	63.1	45.5	41.4	43.4	37.2	41.4	35.2	43.4
FI	i=1	2369.5	2386.7	2436.6	2370.2	2366.4	2381.4	2352.2	2344.0	2341.7	2348.0	2345.7
	i=2	21.3	19.5	20.1	21.1	21.5	21.2	21.4	22.3	21.8	20.1	20.5
	i=3	572.5	617.3	685.9	729.8	649.5	680.7	766.9	739.6	745.5	726.2	739.3
SE	i=1	4713.1	4686.7	4743.6	4600.2	4565.4	4514.3	4405.1	4229.7	4177.7	4286.5	4461.6
	i=2	69.5	74.1	63.9	67.2	76.0	67.5	75.5	79.8	83.7	80.5	85.0
	i=3	901.1	917.2	980.6	1028.8	909.1	887.1	959.6	915.7	936.1	948.1	918.0
UK	i=1	24264.8	23995.4	23971.6	23286.0	22469.5	21510.9	21043.6	20660.8	20269.2	24719.1	24914.8
	i=2	577.8	588.0	617.7	631.3	658.9	684.9	670.6	690.3	678.6	711.1	746.7
	i=3	13163.5	13299.1	13210.7	12754.8	12113.7	11655.7	12135.5	11765.2	11787.3	11764.4	11923.7

Indicator	**Final Energy Consumption of freight transport**	**Unit**	Ktoe
Source	**Odyssee**	**Last update**	12/2016
i=1	Road		
i=2	Rail		
i=3	Water		

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	i=1	2415	2599	2705	2986	2815	2857	2953	2860	2943	2875	2975
	i=2	103	103	99	99	78	84	94	90	91	85	86
	i=3	218	205	189	117	165	151	160	150	157	166	187
BG	i=1	491	550	670	743	788	846	847	812	748	784	812
	i=2	47	46	42	44	32	27	25	25	20	20	26
	i=3	0	0	0	0	0	0	0	0	0	0	0
CZ	i=1	1608	1756	1760	1785	1793	1705	1709	1676	1675	1745	1795
	i=2	115	122	126	119	102	127	128	122	117	118	119
	i=3	5	6	5	4	5	4	3	5	2	3	3
DK	i=1	1374	1474	1529	1457	1298	1303	1198	1083	1028	992	1000
	i=2	34	32	30	32	31	38	42	38	39	40	41
	i=3	192	174	151	194	180	156	153	149	150	120	135
DE	i=1	13571	14468	14856	14936	14231	14431	14674	14482	14663	14603	15001
	i=2	1112	1129	1152	1139	1005	1092	1104	834	823	780	782
	i=3	307	267	163	130	265	267	288	313	278	287	334
EE	i=1	572	609	536	539	508	574	427	406	437	453	499
	i=2	43	45	37	26	35	50	34	30	26	19	18
	i=3	8	11	17	20	8	8	5	4	4	9	12
IE	i=1	1112	1076	1145	1475	1174	1050	983	950	911	937	925
	i=2	9	6	4	4	3	3	4	3	4	3	4
	i=3	50	81	64	66	64	65	56	59	58	73	72
EL	i=1	2287	2401	2469	2408	2884	2564	2248	1804	1955	2012	2007
	i=2	10	11	12	11	8	6	3	4	3	8	8
	i=3	648	710	662	596	881	717	516	525	431	449	534
ES	i=1	17606	18029	18352	17019	15389	14411	13288	11003	11325	11092	11151
	i=2	394	318	364	333	240	266	232	255	90	86	108
	i=3	1558	1691	1467	1329	1102	1059	828	861	505	327	446
FR	i=1	13731	13722	13929	12940	12285	12777	13051	12517	12465	12221	12126
	i=2	492	488	490	475	394	370	394	387	383	379	387
	i=3	471	485	502	482	488	490	505	502	490	474	474
HR	i=1	466	487	538	516	497	481	462	474	479	489	505
	i=2	33	36	36	34	28	28	27	27	26	24	22
	i=3	3	3	2	2	2	2	1	1	1	1	0
IT	i=1	14104	14579	15065	14352	12979	12803	13296	12038	11938	12227	12284
	i=2	203	197	201	186	151	146	150	160	151	146	149
	i=3	1387	1385	1331	1414	1190	1128	1075	977	985	969	932
CY	i=1	247	247	247	238	224	223	216	201	180	175	184
	i=2	0	0	0	0	0	0	0	0	0	0	0
	i=3	0	0	0	0	0	0	0	0	0	0	0
LV	i=1	348	386	437	400	338	384	298	293	319	333	364
	i=2	83	72	78	80	75	69	78	83	74	72	69
	i=3	0	0	1	2	4	5	5	4	8	4	3
LT	i=1	508	588	678	673	629	622	460	429	460	467	505
	i=2	74	71	74	74	57	61	63	59	54	57	53
	i=3	6	6	6	6	6	7	6	5	5	5	5
LU	i=1	104	113	119	135	133	133	138	135	139	134	137
	i=2	8	8	9	8	6	8	9	8	7	7	7
	i=3	2	2	1	1	1	1	1	1	2	2	2
HU	i=1	1040	1082	1177	1169	1157	1172	1136	1040	929	952	982
	i=2	80	92	95	94	85	84	79	70	86	85	84
	i=3	1	1	1	1	1	1	0	6	5	6	6
MT	i=1	93	97	99	94	86	88	86	83	87	94	101
	i=2	0	0	0	0	0	0	0	0	0	0	0
	i=3	8	8	8	9	10	10	8	5	5	5	6
NL	i=1	2910	2884	2945	3021	2970	2965	2914	2854	2715	2686	2738
	i=2	59	60	64	62	53	57	59	56	54	54	55
	i=3	206	224	170	126	152	158	182	177	300	291	380
AT	i=1	1524	1599	1645	1612	1517	1552	1595	1578	1483	1494	1568
	i=2	157	165	167	156	135	144	140	132	127	140	139
	i=3	25	22	24	22	19	22	24	25	26	22	21
PL	i=1	5601	5818	6465	6730	6936	7516	7637	7081	6341	6479	6734
	i=2	356	320	331	301	271	306	300	272	274	254	264
	i=3	5	6	5	6	3	0	3	3	3	3	2
PT	i=1	2213	2229	2184	2013	1906	1826	1830	1788	1558	1550	1760
	i=2	31	31	31	31	27	22	19	19	18	16	16
	i=3	133	122	160	191	188	123	112	118	91	86	98
RO	i=1	1707	1750	1774	2039	2086	1985	1894	1906	1973	2034	2114
	i=2	173	158	162	151	111	131	155	190	168	123	128
	i=3	42	41	47	57	55	60	65	44	41	37	44
SI	i=1	370	366	399	420	354	386	367	348	334	343	356
	i=2	24	25	25	23	18	20	21	19	20	22	22
	i=3	0	0	0	0	0	0	0	0	0	0	0
SK	i=1	1319	1300	1422	1577	1403	1556	1503	1445	1415	1382	1408
	i=2	55	58	66	59	49	57	55	53	58	57	55
	i=3	9	10	10	10	9	9	10	10	10	10	10
FI	i=1	1454	1486	1556	1532	1404	1532	1566	1505	1513	1478	1490
	i=2	76	78	72	73	64	68	67	67	66	64	56
	i=3	161	171	175	148	155	172	164	156	155	137	140
SE	i=1	2100	2122	2172	2172	2063	2199	2188	2107	2069	2123	2209
	i=2	194	197	166	159	155	159	171	170	171	163	160
	i=3	126	110	98	59	99	164	91	65	66	72	58
UK	i=1	12451	12741	13159	12241	11811	12395	12411	12737	12874	11713	12017
	i=2	361	344	326	322	301	296	304	305	319	305	251
	i=3	10	10	9	11	9	8	9	10	13	10	8

Indicator	Final Energy Consumption in Commercial sector	Unit	Ktoe
Estat code	Nrg_100a	**Last update**	17/01/2017

i =1 Food, Tobacco, Textile, Leather
i =2 Wood and Wood Products, Paper, Pulp and Print
i =3 Chemical and Petrochemical
i =4 Metals and Machinery
i =5 Non-Metallic Minerals and other manufacturing
i =6 Construction and transport equipment
i =7 Services
i =8 Agriculture, fishing and forestry

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	i=1	1150	1398	1457	1220	1303	1511	1498	1554	1580	1588	1648
	i =2	893	994	1089	968	936	987	917	899	935	927	941
	i =3	3300	3319	3488	3269	3958	4091	3792	3769	4158	4122	4153
	i =4	3927	3985	3731	3819	2155	3241	3114	2878	2855	2798	2691
	i =5	2023	2207	1944	2063	1543	1671	1850	1955	1849	1944	1924
	i =6	373	433	450	465	556	450	373	448	533	495	485
	i =7	4152	4314	3915	4721	4597	5027	4449	4540	4904	4225	4558
	i =8	814	889	837	874	845	758	684	695	819	707	722
BG	i=1	417	414	393	387	346	320	304	297	307	296	315
	i =2	253	239	232	218	133	250	276	271	309	276	307
	i =3	1199	1150	1196	1087	675	723	881	816	781	821	874
	i =4	1277	1288	1241	867	421	364	407	366	363	375	369
	i =5	700	762	892	855	677	747	652	663	650	676	629
	i =6	82	98	97	96	106	77	93	78	85	90	103
	i =7	824	941	894	955	938	989	1047	1023	965	926	992
	i =8	304	295	267	188	185	185	205	200	194	191	186
CZ	i=1	974	936	880	780	679	692	694	684	665	677	698
	i =2	841	843	860	834	801	802	769	797	789	799	836
	i =3	1862	1754	1424	1334	1511	1294	1261	1278	1218	1149	1089
	i =4	3842	3839	3883	3611	3075	2869	2894	2808	2799	2686	2680
	i =5	1565	1696	1785	1702	1454	1531	1508	1492	1358	1449	1560
	i =6	543	568	577	636	576	641	628	622	597	571	593
	i =7	3105	3060	2927	3121	2940	3151	3029	2934	2884	2795	2849
	i =8	548	561	522	521	514	546	547	563	610	615	606
DK	i=1	755	771	711	745	658	707	676	625	596	608	604
	i =2	213	219	220	242	222	233	218	159	152	138	147
	i =3	256	240	218	243	242	257	268	282	268	261	259
	i =4	417	433	434	437	362	373	350	344	323	303	308
	i =5	859	884	886	687	552	550	608	606	556	544	544
	i =6	233	238	250	241	209	209	204	176	178	170	173
	i =7	2002	2036	2006	2014	1996	2128	1948	1979	1965	1815	1867
	i =8	862	895	846	858	851	874	828	781	788	742	758
DE	i=1	5596	5510	5604	5379	5219	5403	5502	5559	5435	5472	5401
	i =2	7274	6782	7437	6700	6898	7565	7520	7195	7297	7673	7464
	i =3	12025	12255	13781	13903	12624	14026	13941	14234	14212	14196	14717
	i =4	20736	21637	20958	21958	17158	20965	21294	21230	21250	21094	21017
	i =5	9704	10101	11067	9961	8809	9213	9301	9032	9059	9066	9112
	i =6	3315	3200	3132	2966	2558	2951	2896	2998	3110	2867	2878
	i =7	33208	35968	30823	33731	32776	35356	31910	33250	34489	33043	34716
	i =8	0	0	0	0	0	0	0	0	0	0	0
EE	i=1	128	122	119	101	85	89	78	77	78	78	78
	i =2	192	164	158	179	142	182	187	163	177	181	191
	i =3	110	110	111	113	50	50	41	47	75	31	42
	i =4	38	44	45	41	39	44	44	47	43	40	36
	i =5	186	179	265	258	169	157	194	167	198	157	108
	i =6	54	61	59	50	46	44	54	61	61	59	58
	i =7	389	394	401	434	419	424	402	424	418	458	466
	i =8	105	100	94	96	93	95	109	111	110	131	133
IE	i=1	640	578	467	465	437	439	470	425	441	442	488
	i =2	193	193	165	152	151	168	159	157	163	172	182
	i =3	378	352	314	290	287	286	239	227	229	232	252
	i =4	597	804	666	683	590	657	716	742	729	721	787
	i =5	648	689	731	671	511	454	504	494	487	540	563
	i =6	33	34	19	28	21	27	29	28	28	28	33
	i =7	1644	1611	1712	1812	1600	1523	1331	1333	1305	1237	1245
	i =8	336	322	301	308	271	277	255	245	234	224	221
EL	i=1	781	790	773	826	712	669	672	587	514	556	554
	i =2	178	196	202	191	167	170	147	133	127	123	114
	i =3	268	269	221	260	225	194	174	101	111	162	158
	i =4	1129	1100	1185	1037	808	961	1030	971	1050	999	957
	i =5	1513	1575	1931	1622	1288	1264	1142	1065	861	1002	1045
	i =6	203	210	195	186	185	154	125	73	98	171	149
	i =7	1946	2082	2141	2223	2148	1952	1868	1938	1818	1712	1873
	i =8	1154	1181	1104	1097	875	800	669	316	324	281	271
ES	i=1	3865	2853	2821	2687	2654	2644	2245	2463	2523	2602	2610
	i =2	3278	2849	3134	2869	2449	1936	2214	2350	2350	2267	2133
	i =3	4679	4475	4339	4191	3041	3181	3887	4135	4087	3980	2819
	i =4	7039	6016	6269	6046	4962	5336	5579	4772	5187	4607	5031
	i =5	10345	7809	9353	8520	6594	7115	6142	5121	4511	4362	4543
	i =6	1305	1125	1209	1204	1232	974	1003	1609	1713	1742	1373
	i =7	8415	8927	8819	9296	9405	9797	10203	10046	9615	8845	10037
	i =8	3110	2811	2943	2695	2359	2240	2401	2714	2851	2769	2491
FR	i=1	4870	4947	5049	4967	4808	5102	4674	5063	5242	5056	5437
	i =2	3738	3691	3266	3059	2826	3101	2607	2721	3336	2800	2923
	i =3	5036	4336	4573	5279	4117	3850	4177	4100	5125	5288	5404
	i =4	10089	10407	10112	9293	7581	8621	8478	8311	8143	6981	7856
	i =5	6460	5989	5737	5466	4676	5267	5727	5331	4980	4713	4424
	i =6	2957	2720	2579	2550	2169	2263	2055	2192	2317	2363	2389
	i =7	20760	20068	20334	20489	22061	23176	21717	22887	23252	22162	22545
	i =8	4683	4575	4436	4484	4524	4517	4559	4452	4579	4492	4426
HR	i=1	306	305	292	334	278	283	277	260	247	243	230
	i =2	147	158	135	121	121	128	125	115	92	87	103
	i =3	237	265	276	250	234	220	205	140	137	142	151
	i =4	105	118	121	127	101	110	108	87	98	107	102
	i =5	578	572	602	600	481	456	403	378	397	393	376
	i =6	173	193	205	211	166	144	141	132	125	110	112
	i =7	692	693	688	730	736	775	761	731	711	676	742
	i =8	242	244	239	255	250	245	249	230	227	234	231
IT	i=1	5827	5550	5099	4944	4380	4118	3917	3878	3824	3875	3814
	i =2	3241	3310	3337	3110	3007	2877	2722	2788	2424	2658	2825
	i =3	5425	5180	5674	4718	4365	4242	4098	4112	4137	3723	3292
	i =4	13216	13182	12515	12014	9106	10629	10827	10374	9020	9019	8698
	i =5	11280	10641	10538	10757	8184	8537	7521	7026	6572	6042	6534
	i =6	689	700	680	668	601	700	849	758	726	727	748
	i =7	15053	15569	15182	17019	16920	16979	15751	15931	15847	14667	15392
	i =8	3322	3288	3177	3085	3122	2940	2924	2824	2785	2776	2852
CY	i=1	15	19	20	21	21	21	21	34	29	32	28
	i =2	2	2	3	3	3	3	2	2	2	3	3
	i =3	2	2	2	2	2	3	3	4	3	5	7
	i =4	3	4	4	3	4	4	4	5	2	2	3
	i =5	296	256	262	263	226	201	174	112	137	169	151
	i =6	1	1	1	1	1	1	1	7	7	7	6

	i =7	161	206	216	230	236	248	237	223	203	203	214
	i =8	38	41	42	41	40	40	43	42	42	39	44
LV	i=1	176	166	150	120	105	106	101	106	105	97	84
	i =2	147	176	161	181	251	296	328	352	366	426	455
	i =3	18	19	16	26	25	28	23	24	25	24	23
	i =4	165	171	166	155	132	151	70	105	50	23	31
	i =5	143	145	154	136	88	144	166	173	158	169	146
	i =6	47	59	70	54	47	45	54	63	52	43	43
	i =7	595	636	683	610	573	598	557	623	600	609	586
	i =8	152	155	156	132	139	156	153	148	153	152	160
LT	i=1	240	244	243	201	196	207	216	218	221	213	217
	i =2	141	136	150	144	114	147	123	128	129	114	112
	i =3	292	310	340	329	338	349	390	414	362	397	358
	i =4	77	50	34	26	17	22	23	29	25	24	25
	i =5	238	275	278	236	161	173	211	235	251	240	225
	i =6	62	64	66	67	43	49	45	46	44	41	42
	i =7	562	608	631	606	593	603	587	614	597	594	577
	i =8	106	114	120	116	105	112	111	111	107	107	100
LU	i=1	69	62	60	57	53	56	55	53	53	59	61
	i =2	43	37	35	38	31	30	27	25	27	32	29
	i =3	71	61	60	52	40	46	58	61	70	58	55
	i =4	361	451	432	418	346	413	358	316	296	284	290
	i =5	199	204	187	185	181	184	207	201	178	196	187
	i =6	35	33	31	33	25	26	23	21	20	22	25
	i =7	368	368	369	387	370	426	371	397	413	362	399
	i =8	23	23	25	25	29	29	24	25	24	24	24
HU	i=1	501	498	442	478	418	434	439	498	585	604	630
	i =2	226	226	221	221	165	193	196	219	255	252	251
	i =3	586	623	665	627	494	511	828	823	1048	1044	1093
	i =4	1163	1135	1126	1076	860	1012	1024	1030	925	950	1072
	i =5	691	689	699	734	560	551	548	569	646	688	744
	i =6	197	206	189	205	163	188	249	302	394	397	422
	i =7	3511	3214	2844	2788	2988	3135	3144	2445	2430	2192	2269
	i =8	560	550	498	527	442	488	483	399	511	595	578
MT	i=1	8	8	9	9	9	9	9	9	8	8	8
	i =2	2	2	2	2	2	2	2	2	2	2	2
	i =3	3	3	3	3	3	3	3	3	3	4	4
	i =4	9	9	9	9	9	10	9	9	10	10	10
	i =5	42	46	46	48	75	18	13	17	16	18	18
	i =6	2	2	2	3	3	3	3	3	3	4	4
	i =7	48	57	57	56	54	92	88	100	109	120	126
	i =8	1	1	1	1	1	8	6	7	8	9	8
NL	i=1	2314	2257	2259	2163	1888	2012	2090	2005	1979	2079	2161
	i =2	1020	1009	965	909	765	789	743	742	738	667	614
	i =3	7867	7608	7758	7182	6751	7230	7051	6977	6881	6736	6565
	i =4	3811	3554	3739	3648	3026	3376	3499	3294	3155	3055	3133
	i =5	1148	1207	1195	1214	1055	1069	1004	960	907	930	992
	i =6	719	718	725	782	774	719	677	664	723	708	662
	i =7	6932	7075	6810	7113	7293	7803	6937	7175	7194	6327	6553
	i =8	4165	3702	3701	3727	3730	4223	3774	3819	3849	3547	3761
AT	i=1	643	650	627	613	639	676	672	694	651	625	727
	i =2	2103	2091	2194	2243	2204	2346	2293	2220	2344	2253	2190
	i =3	936	910	883	947	1008	1062	1061	1025	1023	988	1001
	i =4	3126	3184	3262	3388	2725	3230	3304	3287	3443	3341	3323
	i =5	1114	1145	1212	1235	1159	1146	1157	1102	1097	1095	1117
	i =6	703	713	694	661	636	619	640	640	622	604	605
	i =7	3325	3555	3086	3450	3167	3335	3012	2989	2882	2801	2725
	i =8	543	527	523	528	488	508	493	499	538	529	550
PL	i=1	2262	2096	2162	2006	1884	1905	1875	1954	1955	1970	1972
	i =2	1898	1887	1820	1881	1888	2036	2011	2056	2427	2366	2453
	i =3	2758	2866	2874	2689	2744	2741	2729	2692	2791	2673	2550
	i =4	4429	4607	5025	4130	2943	3241	3480	3551	3559	3767	3848
	i =5	3072	3158	3505	3198	3007	3227	3580	3239	3214	3345	3288
	i =6	628	646	664	667	604	600	587	570	590	553	543
	i =7	6728	7458	7108	7977	8036	8832	8425	8357	8071	7794	7814
	i =8	4433	3818	3506	3636	3573	3731	3681	3668	3582	3434	3306
PT	i=1	930	963	1007	923	922	949	910	710	720	728	748
	i =2	1320	1320	1329	1365	1329	1373	1411	1480	1505	1410	1458
	i =3	483	475	570	503	529	580	576	502	495	377	380
	i =4	377	395	414	397	337	328	355	353	360	364	376
	i =5	2158	2142	2030	1898	1665	1777	1679	1219	1214	1242	1186
	i =6	402	350	342	306	293	321	286	228	191	180	203
	i =7	2195	2040	2031	1945	2041	1883	1855	1843	1787	1901	1960
	i =8	581	452	477	429	426	461	425	415	423	429	441
RO	i=1	1173	834	995	940	706	738	741	745	700	735	731
	i =2	468	494	569	368	284	429	293	334	340	377	413
	i =3	2286	2103	2125	2516	2024	2029	2231	1958	1645	1650	1419
	i =4	4078	4055	3614	3243	2056	2336	2288	2045	2032	2093	2177
	i =5	1432	1263	1055	1155	853	779	860	1040	951	999	1082
	i =6	497	787	742	726	558	523	641	615	598	577	616
	i =7	1670	2412	2020	1698	1760	1881	1774	1763	1785	1768	1762
	i =8	215	261	264	293	380	392	434	498	470	421	459
SI	i=1	155	169	140	125	105	107	96	87	90	96	88
	i =2	341	301	280	258	242	235	216	207	203	228	218
	i =3	168	172	183	160	159	169	157	149	150	152	160
	i =4	514	535	517	462	345	389	423	439	431	428	436
	i =5	347	385	381	365	269	284	266	242	250	254	250
	i =6	108	117	89	99	85	73	65	69	58	57	59
	i =7	475	439	370	497	491	533	532	453	468	427	457
	i =8	75	75	74	76	66	70	68	71	70	75	75
SK	i=1	278	236	223	196	169	162	170	176	165	173	161
	i =2	535	568	619	622	702	592	564	489	472	486	584
	i =3	501	414	436	505	347	335	325	422	295	272	352
	i =4	2553	2772	2480	2423	2165	2573	2440	2572	2636	2715	2558
	i =5	686	602	633	586	491	504	535	478	505	570	574
	i =6	116	158	179	176	170	185	208	198	189	227	190
	i =7	1751	1878	1873	1939	1945	2106	1603	1452	1711	1234	1524
	i =8	165	142	137	141	130	135	158	144	131	137	150
FI	i=1	256	267	381	368	460	451	430	418	418	431	427
	i =2	6108	6973	7833	7241	5808	6656	6624	6466	6458	6395	6368
	i =3	798	725	1035	1044	948	999	1042	1019	1072	996	1001
	i =4	1937	1997	2032	2013	1647	1993	1924	1764	1687	1751	1810
	i =5	2288	2470	748	734	479	662	536	534	491	519	507
	i =6	390	397	436	433	429	446	427	425	427	426	421
	i =7	2618	2677	2677	2671	2889	3078	2844	3008	2886	2869	2714
	i =8	753	767	789	772	769	809	746	796	791	752	723
SE	i=1	488	462	436	444	425	448	429	419	396	377	382
	i =2	6263	6740	6831	6549	6450	6723	6460	6404	6390	4420	6373
	i =3	986	823	814	688	541	568	591	558	557	628	661
	i =4	2665	2482	2544	2395	1667	2463	2472	2280	2239	2199	2212
	i =5	1487	1423	1431	1410	1359	1281	1151	1251	1116	3163	1091
	i =6	381	367	363	309	277	300	306	292	298	282	295
	i =7	4297	4084	4179	4127	4236	4550	4025	4085	3962	4034	3999
	i =8	798	783	758	719	719	684	475	463	356	378	367
UK	i=1	4294	4128	4023	3811	3259	3477	3479	3403	3422	3371	3351

i =2	2712	2554	2450	1967	1656	1682	1622	1597	1665	1653	1624
i =3	5275	5046	4804	4246	3470	3693	3333	3177	3074	2895	2933
i =4	7301	7513	7238	6836	5186	5224	4946	4829	5192	5112	4820
i =5	10952	10748	10984	11258	9838	10486	9391	9474	9253	9407	9344
i =6	2008	1919	1781	1633	1332	1493	1514	1524	1607	1566	1606
i =7	16750	15910	15593	18720	16818	17475	17112	17311	17504	16067	16275
i =8	938	869	861	867	818	923	861	899	946	936	1024

Indicator	Final Energy Consumption in residential sector	**Unit**	Ktoe
Estat code	Nrg_100a	**Last update**	17/01/2017

i=1 Heating
i=1* Heating adjusted for weather changes
i=2 All other uses

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	i=1	4330	4241	3998	4464	4528	5823	4435	4821	5201	3709	4008
	i=1*	4420	4442	4450	4483	4568	4950	5053	4720	4672	4352	4135
	i=2	5595	4679	4266	4502	3956	3588	3507	3481	3775	3695	4128
BG	i=1	1324	1305	1174	1204	1197	1226	1321	1313	1224	1143	1177
	i=1*	1283	1283	1283	1283	1283	1271	1234	1315	1325	1260	1295
	i=2	792	861	894	913	919	1021	1059	1045	1022	1024	1019
CZ	i=1	5257	5077	4700	4747	4928	5665	4786	5026	5193	4314	4569
	i=1*	5049	5049	5049	5049	5049	5049	5049	5049	5049	5049	5049
	i=2	1392	1686	1686	1735	1687	1668	1923	1940	1990	2043	2004
DK	i=1	2680	2535	2472	2498	2655	3264	2584	2798	2789	2340	2553
	i=1*	2724	2724	2724	2724	2724	2724	2724	2724	2724	2724	2724
	i=2	1771	1910	1974	1926	1772	1650	1815	1543	1565	1616	1701
DE	i=1	39195	37610	35055	37175	38366	43775	35883	37905	41404	34514	36532
	i=1*	38712	38712	38712	38712	38712	37477	38852	37654	39071	40244	38974
	i=2	24303	26289	19378	23427	20177	18679	18681	18722	18294	17014	16639
EE	i=1	523	504	491	471	530	575	566	598	544	534	470
	i=1*	517	517	518	520	526	504	594	559	561	552	531
	i=2	368	378	472	482	441	453	370	375	391	355	388
IE	i=1	1457	1453	1410	1565	1568	1767	1542	1599	1586	1472	1630
	i=1*	1544	1544	1544	1544	1544	1544	1544	1544	1544	1544	1544
	i=2	1497	1632	1548	1640	1576	1529	1225	1144	1217	1119	1082
EL	i=1	2839	2947	2615	2497	2509	2327	2976	2755	2404	2307	2613
	i=1*	2743	2743	2743	2743	2743	2743	2743	2743	2743	2743	2743
	i=2	2671	2558	2774	2725	2326	2288	2494	2284	1360	1479	1787
ES	i=1	7463	6455	6922	7078	6569	7228	6483	6422	6323	6307	6543
	i=1*	6836	6836	6836	6836	6836	6713	7498	6230	5982	7261	7335
	i=2	7669	9123	8702	8417	9354	9691	9144	9103	8559	8402	8333
FR	i=1	27600	25530	24960	26953	26325	28907	24237	27562	28945	22614	24151
	i=1*	26564	26564	26564	26564	26564	25247	28494	27192	26485	26158	25809
	i=2	15470	16781	14101	15451	15740	14196	13254	13901	14339	13632	13515
HR	i=1	2008	1803	1653	1655	1700	1930	1791	1715	1680	1470	1645
	i=1*	1818	1818	1818	1818	1818	1858	1839	1767	1778	1889	1775
	i=2	808	851	870	926	934	827	840	834	800	749	773
IT	i=1	26695	24031	22714	23361	23834	25398	22931	24037	23759	20059	22239
	i=1*	24125	24125	24125	24125	24125	24125	24125	24125	24125	24125	24125
	i=2	7227	8392	9626	10251	10206	9995	9447	10311	10472	9487	10256
CY	i=1	190	199	180	175	180	171	225	214	189	181	204
	i=1*	193	183	181	187	200	269	211	203	211	255	213
	i=2	127	129	160	158	172	161	127	131	112	109	113
LV	i=1	866	831	807	772	858	914	883	922	834	813	710
	i=1*	850	850	850	850	850	810	921	878	849	846	797
	i=2	638	650	651	680	676	475	444	454	433	426	396
LT	i=1	1081	1046	1006	956	1062	1140	1081	1085	1039	978	954
	i=1*	1059	1059	1059	1059	1059	1017	1131	1047	1057	1033	1067
	i=2	428	527	502	602	513	459	458	458	436	429	410
LU	i=1	393	377	351	388	383	419	360	386	397	360	385
	i=1*	393	393	393	393	393	368	417	388	363	424	399
	i=2	131	140	150	122	134	89	94	105	100	106	109
HU	i=1	5110	4738	4310	4287	4393	4951	4723	4611	4510	3837	4358
	i=1*	4699	4699	4699	4699	4699	4699	4699	4699	4699	4699	4699
	i=2	1354	1474	1245	1285	1128	789	752	508	348	603	490
MT	i=1	17	12	8	8	12	9	13	15	11	9	13
	i=1*	12	12	12	12	12	12	12	12	12	12	12
	i=2	60	69	72	72	55	60	56	57	61	63	66
NL	i=1	6759	6590	6179	6865	6942	8904	6715	7270	7819	5582	6028
	i=1*	6994	6994	6994	6994	6994	7387	7333	7100	7131	6708	6305
	i=2	3984	4260	3796	4152	4075	3556	3537	3584	3590	3539	3529
AT	i=1	4675	4426	4081	4175	4247	4471	4008	4208	4628	3775	4212
	i=1*	4369	4369	4369	4369	4369	4131	4269	4283	4589	4361	4582
	i=2	1518	1509	1748	1717	1543	1858	1849	1845	1771	1849	1766
PL	i=1	13919	13571	12668	12446	13515	15359	12990	13909	13731	12125	12196
	i=1*	13611	13611	13611	13611	13611	13611	13611	13611	13611	13611	13611
	i=2	5535	6883	6682	7206	6452	6608	7096	6845	6685	6841	6647
PT	i=1	615	544	570	584	528	1159	1093	1063	1039	1009	998
	i=1*	560	560	560	560	560	1094	1220	963	947	1074	1127
	i=2	2609	2676	2656	2534	2669	1810	1683	1632	1596	1556	1541
RO	i=1	5566	5435	4861	4915	4876	5229	5432	5290	4905	4755	4689
	i=1*	5268	5268	5268	5268	5268	5268	5268	5268	5268	5360	5177
	i=2	2425	2419	2657	3155	3139	2873	2428	2771	2817	2654	2686
SI	i=1	981	911	823	854	852	1003	930	884	866	676	775
	i=1*	898	898	898	898	898	938	967	914	884	846	840
	i=2	207	247	225	261	434	323	334	335	338	341	336
SK	i=1	1398	1374	1236	1280	1284	1389	1450	1423	1326	1291	1279
	i=1*	1307	1344	1322	1392	1336	1317	1478	1430	1354	1573	1386
	i=2	1142	936	845	851	863	923	671	648	822	661	709
FI	i=1	3352	3448	3369	3379	3548	3909	3305	3697	3332	3309	3176
	i=1*	3558	3558	3558	3558	3558	3558	3558	3558	3558	3558	3558
	i=2	1668	1674	1755	1661	1751	1905	1776	1735	1782	1761	1722
SE	i=1	4162	4077	4145	4160	4326	4877	4004	4470	4212	3970	3988
	i=1*	4223	4223	4223	4223	4223	4223	4223	4223	4223	4223	4223
	i=2	3143	2927	2586	2478	2624	3158	3461	3358	3267	3048	3209
UK	i=1	25267	24662	24720	26626	26199	31405	22383	28414	28893	23952	25018
	i=1*	26277	26277	26277	26277	26277	27544	23953	27055	27524	26473	25115
	i=2	18971	18457	16885	15887	15070	14060	14139	12609	12384	11341	11463

1.2 Activity data

Indicator	Gross value added of commercial sector	**Unit**	Million EUR in chain linked volumes (2010)
ESTAT code	nama_10_a64	**Last update**	31/03/2017

i =1 Food, Tobacco, Textile, Leather
i =2 Wood and Wood Products, Paper, Pulp and Print
i =3 Chemical and Petrochemical
i =4 Metals and Machinery
i =5 Non-Metallic Minerals and other manufacturing
i =6 Construction and transport equipment
i =7 Services
i =8 Agriculture, fishing and forestry

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	i=1	7932	8251	8750	9085	8533	8496	8829	9409	9031	9416	9450
	i =2	3003	3145	3332	3266	2984	2887	3012	2981	2758	2779	2782
	i =3	11696	10985	11428	11132	11621	13231	12562	12328	12790	13073	13375
	i =4	13843	14578	15687	14953	11528	12201	12731	12886	12988	14088	14966
	i =5	5625	5681	6111	6123	5549	5499	5825	5762	5685	5600	5499
	i =6	20745	21871	22177	22222	21072	21327	22429	22401	22209	22721	23505
	i =7	225038	230252	236840	241059	239842	243986	249500	250576	250633	253218	255545
	i =8	2607	2951	3051	2507	2265	2784	2441	3040	2699	2565	2745
BG	i=1	1606	1466	1485	1455	1592	1529	1732	1740	1737	1826	1612
	i =2	234	253	275	301	301	299	326	323	310	314	329
	i =3	238	266	293	300	279	292	320	321	298	355	373
	i =4	1098	1308	1687	1840	1326	1316	1381	1497	1431	1575	1551
	i =5	496	644	840	801	663	629	714	736	728	855	904
	i =6	1881	2156	2560	2933	3052	2555	2444	2302	2330	2295	2362
	i =7	16448	17660	19255	20054	20271	21501	21948	21952	21830	22064	22810
	i =8	1738	1664	1508	2186	1582	1590	1897	1913	1931	1952	1873
CZ	i=1	4636	5125	4531	4592	4285	4145	4353	4104	3897	3935	4113
	i =2	1676	1874	1975	2151	1923	2093	2000	1922	1745	1823	1906
	i =3	1541	1460	1522	1720	1692	1757	1683	1684	1629	1899	1985
	i =4	9021	10792	11632	11804	9920	11865	13168	13377	13168	14228	14873
	i =5	4095	4909	5237	5710	5289	5354	5680	5406	5401	5579	5832
	i =6	12743	13742	15010	16237	14508	16319	17313	16020	15775	16174	16907
	i =7	76826	79246	84523	86301	84322	85128	86323	86827	88183	90792	94910
	i =8	2424	2569	2715	3119	2441	2382	3523	3793	3792	3876	3786
DK	i=1	5145	4869	4727	4439	4296	4271	4230	4103	4207	3860	3623
	i =2	1935	2046	1987	1930	1509	1434	1465	1324	1290	1346	1425
	i =3	4611	4482	4462	5019	5302	6214	6766	8287	8389	8747	8785
	i =4	9676	10946	11695	11663	9472	9645	10355	10197	10942	10711	11288
	i =5	4458	4781	4762	4485	3777	3848	3877	3929	3960	4318	4500
	i =6	11473	12382	11903	12187	11039	9823	10243	10317	10439	11004	11516
	i =7	142967	148162	149900	152453	149921	152761	154183	153353	155340	158518	160697
	i =8	2438	2628	2741	2073	1928	2923	3253	4213	3369	3633	2901
DE	i=1	48383	49830	48554	44070	41249	45068	46743	42724	41454	44693	45462
	i =2	24384	25282	24841	24127	22203	24207	24081	24711	24248	24188	24604
	i =3	57504	59196	62309	63253	54248	61837	62564	60795	60991	63982	65083
	i =4	202529	220450	232091	233949	179645	209873	234446	230426	229776	238001	242096
	i =5	56175	61581	62586	61564	51000	58529	64579	62790	61769	63602	64697
	i =6	82168	92161	100163	92335	69285	96645	109992	109605	111644	125194	127348
	i =7	1610629	1652471	1706177	1737284	1686939	1696252	1745414	1763151	1777224	1793625	1825050
	i =8	0	0	0	0	0	0	0	0	0	0	0
EE	i=1	538	582	537	435	391	402	412	412	394	412	388
	i =2	367	404	413	362	303	410	453	469	521	582	600
	i =3	102	97	102	134	76	104	105	79	79	73	54
	i =4	419	492	552	617	461	537	710	718	728	773	789
	i =5	404	469	512	399	273	308	349	360	358	369	346
	i =6	1016	1099	1230	1292	848	866	1080	1174	1068	1011	1048
	i =7	8544	9394	10028	9612	8499	8539	8967	9384	9668	9716	9769
	i =8	349	368	493	404	300	411	567	573	582	615	592
IE	i=1	7106	7195	7295	7065	6672	6648	7799	8134	8595	9368	9581
	i =2	1199	1215	1208	1020	768	736	720	694	666	676	686
	i =3	12767	13198	12420	10951	13379	17003	16727	15295	13752	15387	19430
	i =4	9715	11617	11031	11176	5443	4692	4149	4328	3932	4101	5178
	i =5	4432	4910	4935	4855	4661	3822	5041	4394	5136	5305	6581
	i =6	4731	4941	4993	4741	3493	2718	2396	2234	2393	2562	2732
	i =7	96682	103944	109038	106193	104890	108409	107213	106329	110317	120006	128397
	i =8	1760	1695	2048	1585	938	1597	2240	1845	2195	2585	2398
EL	i=1	8300	6677	7649	6763	5947	5661	5124	4712	5020	5002	4872
	i =2	2115	2441	2508	1757	1465	976	917	615	560	517	458
	i =3	1337	1389	1333	1163	998	1260	1109	1126	1380	1337	1359
	i =4	6220	6145	6237	5826	4438	3726	3435	3957	4046	4116	4296
	i =5	3075	3560	3226	3448	3009	2196	2008	1517	1399	1421	1337
	i =6	11058	16477	13985	10306	10432	9240	6810	6424	5224	4697	4850
	i =7	147046	151331	158591	163895	159631	152192	139508	129967	128649	129636	129202
	i =8	8536	6974	7068	6793	6663	6519	6109	6191	5794	5843	6386
ES	i=1	31197	31380	32978	33033	31926	32720	31259	29241	27679	27252	28125
	i =2	11626	11849	11728	11290	9697	9988	9243	8466	8132	7787	8037
	i =3	15351	15990	16498	16574	15491	15328	15254	14804	15821	16820	17359
	i =4	40118	42115	41892	40908	34453	34682	34508	34694	35300	37937	39153
	i =5	24306	24006	23489	23086	18764	17774	16985	15904	15233	15476	15972
	i =6	122797	125990	126996	126318	116192	101207	91587	83683	78014	78535	79174
	i =7	599521	630572	665367	681387	676425	685956	691864	681481	679009	687955	706427
	i =8	25238	23748	26376	25561	23549	25253	24391	24019	25749	23560	25004
FR	i=1	45691	45468	46445	42878	42135	43715	45992	45469	45145	45510	46528
	i =2	11197	10899	10962	11269	11201	11023	11741	11797	11832	11861	12045
	i =3	25094	26279	27171	26291	26589	25846	26911	27512	29085	29567	31078
	i =4	54267	56366	57563	56790	51364	54416	55997	55507	57805	57175	57511
	i =5	26745	27424	27993	27122	24548	24005	26002	24996	23850	23676	23935
	i =6	137037	139563	144897	142196	131717	130940	128502	123220	122809	118087	117142
	i =7	1314060	1346362	1379609	1397608	1373842	1398401	1430270	1442833	1451020	1467185	1486609
	i =8	29820	28179	31448	30298	25669	32092	34044	34078	30882	33193	33854
HR	i=1	1915	1974	1985	1998	1871	1899	1912	1838	1761	1804	1833
	i =2	466	480	528	532	481	447	442	412	402	425	432
	i =3	638	539	596	617	532	536	516	538	527	549	558
	i =4	1481	1634	1825	1859	1465	1400	1405	1282	1269	1324	1346
	i =5	773	856	923	888	777	693	702	688	671	709	721
	i =6	3217	3459	3594	3831	3384	2887	2661	2361	2203	2126	2161
	i =7	24085	25127	26526	27094	25866	25761	26131	25948	25818	25823	26246
	i =8	1546	1749	1806	2037	1965	1874	1793	1667	1610	1504	1529
IT	i=1	50980	51709	52045	50133	43390	46875	49140	48352	47864	48314	48065
	i =2	17032	17507	17626	16507	14860	15415	15632	14820	14364	14282	13929
	i =3	18024	18471	18580	18999	15790	18255	18154	18283	18835	18787	19292
	i =4	88892	94664	99213	97534	76741	86092	88303	86224	85254	85776	86152
	i =5	38437	39465	39811	37454	32268	33985	33528	30894	30252	30634	30866
	i =6	111368	115788	117294	113851	100949	98735	94974	88303	83948	81266	82614
	i =7	1008444	1022239	1035769	1033919	1007453	1017625	1024469	1004176	993269	1002207	1005856
	i =8	30227	30037	30432	30471	28150	28417	30880	31698	33614	31431	33159
CY	i=1	445	394	381	402	427	354	314	282	255	256	260
	i =2	132	121	125	122	106	126	111	94	67	65	66
	i =3	65	63	62	61	60	82	77	77	82	88	90
	i =4	154	177	195	204	168	177	163	148	118	120	122

	i =5	245	249	256	271	230	224	193	142	109	120	122
	i =6	1654	1795	1944	1881	1547	1420	1306	1048	807	714	697
	i =7	10723	11169	11820	12343	12513	12981	13241	13143	12510	12557	12808
	i =8	412	370	356	398	371	406	432	386	365	321	353
LV	i=1	1041	1079	948	891	620	648	595	601	639	631	648
	i =2	545	530	575	438	406	538	568	613	567	606	623
	i =3	117	148	120	155	122	157	152	149	140	118	121
	i =4	346	411	439	425	307	335	428	415	389	400	411
	i =5	282	305	341	307	255	283	304	321	340	346	356
	i =6	1331	1776	2074	2023	1248	845	1098	1195	1241	1314	1302
	i =7	10747	11873	12956	12859	11296	10797	11460	11796	12094	12272	12690
	i =8	523	569	755	724	620	701	697	722	749	728	724
LT	i=1	1490	1589	1707	1621	1444	1500	1629	1685	1752	1817	1849
	i =2	474	520	555	537	441	511	575	586	665	699	712
	i =3	312	411	532	486	500	564	567	582	556	614	625
	i =4	476	526	617	635	478	547	659	696	716	744	757
	i =5	769	954	1011	1025	767	850	1022	1138	1219	1325	1349
	i =6	1919	2422	3032	3100	1695	1616	1875	1806	1987	2228	2213
	i =7	14325	15081	16734	17261	15284	15388	16129	16826	17339	17750	18237
	i =8	908	930	1008	1073	682	838	1086	1340	1251	1252	1221
LU	i=1	557	523	558	392	394	456	412	389	416	417	442
	i =2	158	126	110	106	126	130	107	107	82	79	54
	i =3	228	229	274	263	211	202	191	184	224	290	300
	i =4	1666	1156	1499	1141	782	876	753	812	903	1006	1042
	i =5	751	711	798	648	545	585	470	465	708	920	953
	i =6	1665	1771	2158	2028	1938	1963	2093	1908	1916	2138	2013
	i =7	26110	28140	30056	30393	29187	30796	31538	31434	32363	33872	35600
	i =8	107	115	152	119	94	99	109	159	123	127	113
HU	i=1	2627	2683	2665	2216	2294	2387	2180	2218	2095	2139	2251
	i =2	795	808	805	794	694	773	697	670	672	677	697
	i =3	2275	2319	2394	2409	1739	1888	1861	1825	1501	1595	1716
	i =4	6584	6814	7492	7412	5433	6142	7144	6662	6589	7017	7555
	i =5	1897	2112	2339	2401	1879	2117	2152	2173	2131	2179	2391
	i =6	7471	7797	8125	7335	6336	6604	6783	6706	7500	8544	9390
	i =7	52895	55657	55325	56162	54197	54094	54933	55000	57125	58340	59212
	i =8	3342	3210	3475	3637	2795	2951	3957	3826	3925	4154	3801
MT	i=1	146	129	120	134	125	123	132	132	131	145	152
	i =2	56	62	66	65	65	65	68	69	67	70	74
	i =3	77	75	81	95	87	95	95	97	89	91	98
	i =4	156	160	177	212	173	190	206	201	181	194	209
	i =5	102	103	111	112	93	97	101	104	107	100	107
	i =6	349	311	288	296	279	301	314	313	340	341	395
	i =7	3218	3414	3701	3996	4054	4405	4594	4932	5301	5964	6603
	i =8	100	105	100	75	91	96	95	94	91	96	104
NL	i=1	13946	12967	13332	12927	12570	12540	12687	13110	13487	13870	13583
	i =2	4726	4781	4845	4794	4474	4416	4396	4132	3952	3919	3957
	i =3	10628	11389	12119	11084	10554	11051	10840	11509	10747	10132	10254
	i =4	20890	22238	23688	23768	19709	22145	23981	22790	22950	24168	24606
	i =5	10509	10805	11257	11236	9951	9742	9895	9498	9211	9417	9760
	i =6	35023	36034	38711	40154	37343	34251	34644	31781	30397	31695	34412
	i =7	382224	397990	412334	422473	414380	421096	430851	429950	431504	440093	448899
	i =8	9766	10902	10760	10099	9192	10828	9697	10225	11198	10996	10965
AT	i=1	6003	6201	7007	6162	5788	6205	5953	6308	5901	5931	6122
	i =2	4600	5095	5405	5050	4531	4879	5276	5185	5140	5342	5410
	i =3	3489	3575	4003	3361	3734	3750	3919	3858	4341	4819	5162
	i =4	20475	22463	23777	25246	19346	21207	23120	24201	24109	23941	24246
	i =5	7364	7810	8142	7774	6192	6883	7051	6795	7102	7264	7211
	i =6	23781	23814	24803	24699	21555	20985	21321	21315	21178	21012	20765
	i =7	162951	168409	173562	178078	176750	180004	184577	185625	186257	187999	189581
	i =8	3199	3494	4030	3947	3306	3762	4428	4330	4124	4034	3905
PL	i=1	10677	11732	12100	12639	12944	13003	13108	13648	14008	58834	61152
	i =2	3274	3535	4310	4368	4627	4893	5182	5366	5407	5714	5939
	i =3	3291	3727	3849	3714	3920	3978	3946	4127	3894	4033	4192
	i =4	7030	9256	10975	12449	12439	14266	16320	16760	15912	17295	17976
	i =5	6698	7734	8784	9196	9366	10834	11797	11552	11835	13426	13955
	i =6	23612	25649	26509	27908	29906	31956	36489	35398	33983	37048	38451
	i =7	162285	169144	180806	189027	194655	199671	203462	208768	213078	218713	227350
	i =8	7135	7330	9437	9286	7880	9284	10768	10374	11344	10740	9922
PT	i=1	7573	7480	7481	7320	6691	6931	7232	7179	7311	7494	7613
	i =2	2812	2862	2893	2574	2295	2447	2412	2269	2264	2297	2333
	i =3	1322	1286	1383	1285	1184	1234	1252	1259	1254	1259	1279
	i =4	3995	4229	4518	4627	3899	4291	4212	4092	4203	4404	4474
	i =5	3575	3659	3741	3695	3403	3506	3550	3351	3273	3391	3445
	i =6	13079	12807	13030	12444	11041	10510	10069	8740	8229	7719	7745
	i =7	107261	109215	112440	114162	113921	116005	114953	112272	111704	112630	113971
	i =8	3642	3737	3502	3507	3409	3463	3209	3212	3542	3512	3654
RO	i=1	9146	9536	9249	9752	9054	9519	9375	9007	9570	9038	9201
	i =2	1455	1551	1682	1845	2008	1936	1971	1781	1771	1457	1428
	i =3	442	504	456	514	493	473	452	477	414	470	576
	i =4	5602	6071	6372	6272	5637	7291	6494	6168	5851	5905	6134
	i =5	2025	2273	2381	2514	2208	2124	2192	2102	2629	2612	2760
	i =6	8951	10885	13422	17354	15868	15377	13731	13524	14396	14758	16370
	i =7	48904	50867	58023	58902	57302	55097	57664	63363	63635	67224	68608
	i =8	6723	7603	6062	8326	6551	7102	8578	6232	7785	7104	6651
SI	i=1	907	915	955	863	747	713	723	678	654	668	687
	i =2	508	543	596	543	483	490	512	492	465	485	463
	i =3	832	972	1063	1073	1009	1112	1179	1197	1269	1288	1275
	i =4	2107	2307	2544	2637	2124	2368	2454	2386	2378	2517	2542
	i =5	1151	1176	1208	1180	899	956	911	801	818	882	868
	i =6	2460	2763	3244	3433	2975	2577	2354	2201	1987	2170	2263
	i =7	18562	19422	20476	21205	20487	20771	20950	20676	20624	21170	21665
	i =8	668	629	659	628	599	626	734	647	653	779	794
SK	i=1	1556	1640	1716	1581	1485	1640	1558	1541	1433	1449	1252
	i =2	737	883	938	1004	1018	1121	1069	1163	1159	1278	1228
	i =3	393	472	491	550	637	586	605	569	343	369	438
	i =4	3458	3902	4413	4655	3523	4790	5332	5260	5189	6254	6862
	i =5	1462	1619	1711	1698	1495	1794	1912	1975	2072	2359	2644
	i =6	5012	6059	6769	8136	7215	7534	7784	8071	7568	8169	8837
	i =7	29808	31870	34836	36372	36143	36998	37354	37981	39468	37807	38434
	i =8	1267	1463	2026	2443	1936	1727	2160	2351	2685	3005	2601
FI	i=1	3259	3266	3533	3318	3108	3079	3081	2950	2718	2574	2425
	i =2	5523	6224	6314	5713	3705	4946	4747	4754	4843	4751	4452
	i =3	2213	2214	2428	2351	2522	2675	2977	2866	3106	3155	3091
	i =4	15670	18360	20909	20985	15068	16019	15076	12314	12759	13079	12988
	i =5	3217	3489	3542	3317	2470	2633	2904	2736	2436	2359	2281
	i =6	11180	11563	11879	11562	10402	11332	11617	10996	10773	10358	10635
	i =7	101450	102960	107602	110988	106401	107144	109866	110348	108511	108327	109546
	i =8	3752	3460	4391	4198	4028	4468	4649	4713	5222	4934	4443
SE	i=1	4078	4280	4469	4140	3821	4571	4413	4042	4006	3988	4151
	i =2	6745	7069	6630	6595	6146	6452	6316	6286	5934	5872	6112
	i =3	6578	6969	7208	7042	6241	7624	7672	7194	7167	7216	7511
	i =4	23943	26037	27963	26617	18579	25066	26833	25198	25388	25475	26516
	i =5	4512	5072	5564	5358	4401	4929	5351	4997	4437	4600	4788
	i =6	26818	29002	31076	29667	24083	27670	27309	24892	24579	25495	27503
	i =7	199251	207284	212586	215101	212352	217780	224413	227986	234340	242927	252983
	i =8	3145	3995	4985	4990	4012	5271	5820	5559	5344	5144	5212

UK	i=1	32426	32220	32072	31286	30402	31632	33438	32530	31839	32827	32741
	i =2	14250	14070	14010	13457	12487	12586	11879	11249	11502	11625	11665
	i =3	27778	28921	28382	28633	28152	26844	25298	24249	23772	23415	24121
	i =4	46991	48374	49183	47403	39419	42323	43708	44960	42585	43471	42024
	i =5	24405	25002	25134	23883	21279	21714	22053	20755	20607	22739	22096
	i =6	115534	117134	119740	116548	101283	111981	115867	110113	112984	121060	127139
	i =7	1227418	1263976	1301254	1301068	1263714	1282342	1303720	1334836	1360058	1404520	1440352
	i =8	11579	11915	12652	12381	9358	12044	11359	12299	13062	13643	14981

Indicator	Passenger Kilometres	**Unit**	Gpkm
Source	Odyssee	**Last update**	12/2016

i=1	Road
i=2	Rail
i=3	Air

		2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
BE	i=1	120.3	120.7	123.3	126.3	126.7	126.6	127.3	128.1	131.4	131.8	133.8
	i=2	9.4	9.9	10.4	11.1	11.2	11.6	11.8	11.5	11.8	12.3	12.5
	i=3	1.3	1.4	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4
BG	i=1	48.8	50.5	54.0	57.0	56.8	57.5	58.9	60.2	61.7	64.6	67.0
	i=2	2.8	2.9	2.9	2.8	2.8	3.0	2.9	2.9	2.8	2.4	2.6
	i=3	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1
CZ	i=1	84.2	85.6	87.7	88.3	88.4	80.5	81.3	79.6	80.4	83.0	85.8
	i=2	14.6	14.7	14.6	15.9	15.5	15.6	15.4	16.8	17.2	17.4	18.1
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DK	i=1	56.9	56.7	57.6	58.2	58.7	58.5	59.7	59.2	59.2	60.8	63.4
	i=2	6.1	6.3	6.4	6.5	6.4	6.6	6.6	6.8	6.8	6.8	6.8
	i=3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4
DE	i=1	942.7	948.8	950.8	952.1	960.8	964.1	973.8	974.0	981.9	1002.1	1009.1
	i=2	92.3	94.6	95.3	98.5	98.7	100.3	101.9	102.3	106.1	106.1	108.2
	i=3	9.5	9.9	10.6	11.0	10.6	10.7	10.6	10.3	9.9	9.9	10.1
EE	i=1	12.6	12.8	12.7	13.0	12.6	12.2	12.5	13.0	13.7	13.9	14.5
	i=2	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IE	i=1	51.1	52.9	55.3	56.4	56.7	55.5	54.8	53.7	55.2	56.1	70.9
	i=2	1.8	1.9	2.0	2.0	1.7	1.7	1.6	1.6	1.6	1.7	2.1
	i=3	1.1	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.6
EL	i=1	106.7	111.8	117.0	122.1	122.2	120.7	119.5	118.0	116.8	117.9	117.6
	i=2	3.4	3.4	3.5	3.3	3.1	3.1	2.6	2.5	2.7	2.7	2.7
	i=3	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0
ES	i=1	395.9	395.3	407.5	408.4	412.2	397.2	394.5	380.0	374.8	352.6	368.4
	i=2	27.6	28.3	28.3	30.5	29.4	30.0	30.4	28.5	29.5	30.8	32.5
	i=3	23.0	24.0	24.3	21.3	18.4	17.8	16.5	10.0	15.4	16.3	16.7
FR	i=1	684.4	680.5	683.5	675.3	678.4	684.7	685.5	686.4	687.3	691.5	707.7
	i=2	89.4	93.0	95.0	100.9	100.0	100.3	103.7	104.0	103.3	102.6	104.5
	i=3	12.9	13.2	13.2	13.1	12.9	12.7	13.5	14.0	14.5	14.1	14.3
HR	i=1	39.1	41.8	44.8	44.6	44.3	42.8	42.1	40.7	41.6	40.8	44.8
	i=2	2.2	2.4	2.7	2.9	3.0	2.9	2.7	2.2	2.0	2.0	2.2
	i=3	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2
IT	i=1	778.2	847.9	871.3	839.0	810.4	800.6	767.8	680.2	722.1	745.7	782.5
	i=2	52.2	57.5	56.9	56.8	55.5	54.7	54.4	53.7	55.7	57.1	59.4
	i=3	12.8	13.9	15.3	15.1	14.7	15.7	16.8	16.5	16.3	17.0	17.1
CY	i=1	6.1	6.3	6.6	7.1	7.3	7.2	7.3	7.3	7.3	7.4	7.5
	i=2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LV	i=1	17.4	18.8	20.1	19.9	17.4	18.3	17.2	16.5	16.4	17.6	19.1
	i=2	1.2	1.3	1.3	1.2	0.9	0.9	0.9	0.8	0.9	0.8	0.7
	i=3	1.5	2.1	2.8	3.5	3.5	4.1	4.1	3.7	3.5	3.3	4.1
LT	i=1	38.5	43.2	42.7	41.4	38.8	35.3	32.7	36.9	36.2	27.3	27.8
	i=2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LU	i=1	6.9	7.3	7.4	8.1	7.8	7.9	6.8	6.9	7.9	7.9	8.3
	i=2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
	i=3	0.2	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3
HU	i=1	67.2	70.2	71.1	71.7	70.7	69.1	68.7	68.9	69.0	70.4	72.4
	i=2	12.2	11.9	11.0	10.6	10.6	10.2	10.8	10.8	10.8	11.1	11.1
	i=3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MT	i=1	3.3	3.4	3.4	3.4	3.5	3.5	3.6	3.7	3.7	3.8	3.8
	i=2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NL	i=1	158.8	157.4	158.8	153.1	158.2	154.3	154.8	149.5	155.4	155.0	149.9
	i=2	16.4	16.9	17.3	17.8	18.2	18.7	19.1	19.3	19.5	19.5	19.9
	i=3	4.0	4.1	4.2	4.2	4.1	4.0	4.2	4.4	4.5	4.4	4.5
AT	i=1	79.9	81.1	81.8	82.8	81.9	82.9	84.0	83.6	84.4	86.4	88.3
	i=2	12.7	13.1	13.4	14.7	14.6	14.8	14.9	15.4	16.1	16.1	16.3
	i=3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
PL	i=1	201.5	205.3	210.0	220.3	226.7	230.5	237.9	247.9	250.9	258.1	268.3
	i=2	22.6	23.0	24.5	24.8	23.0	22.3	22.6	22.2	20.9	20.3	21.1
	i=3	0.2	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.4	0.4	0.3
PT	i=1	93.9	94.3	92.5	94.9	97.1	90.2	89.0	88.0	87.9	89.0	90.4
	i=2	4.6	4.9	5.0	5.2	5.1	5.2	5.3	4.8	4.6	4.8	4.9
	i=3	2.5	2.5	2.5	2.5	2.6	2.7	2.8	2.1	2.2	2.4	2.1
RO	i=1	72.8	75.8	79.7	90.7	92.6	91.3	91.0	100.9	104.6	111.2	115.6
	i=2	14.6	14.9	14.4	14.0	13.1	12.5	12.3	9.8	9.8	10.4	10.8
	i=3	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
SI	i=1	28.0	27.4	28.5	31.5	27.6	26.7	28.7	29.4	28.1	28.0	27.4
	i=2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.8	0.7	0.7
	i=3	1.5	1.7	2.2	2.7	1.9	0.4	0.5	0.5	0.5	0.4	0.5
SK	i=1	33.3	34.0	33.6	32.8	31.0	30.9	31.1	31.1	30.9	31.7	32.9
	i=2	3.6	3.6	3.6	3.7	3.4	3.4	3.6	3.6	3.6	3.7	4.5
	i=3	2.5	2.8	3.7	4.7	3.5	0.8	0.9	0.9	0.9	0.9	1.0
FI	i=1	69.5	70.0	71.3	70.9	71.9	72.3	73.0	72.8	72.7	73.0	73.8
	i=2	4.0	4.1	4.3	4.6	4.4	4.5	4.4	4.6	4.6	4.4	4.6
	i=3	1.3	1.3	1.3	1.3	1.1	1.1	1.1	1.1	1.0	1.0	1.0
SE	i=1	117.2	117.5	119.7	118.6	118.1	117.4	118.7	117.9	117.9	120.0	121.8
	i=2	11.0	11.8	12.5	13.4	13.6	13.4	13.7	14.2	14.3	14.6	15.2
	i=3	3.3	3.3	3.2	3.2	2.9	3.0	3.4	3.4	3.4	3.6	3.6
UK	i=1	709.7	712.9	714.6	709.2	705.4	688.7	684.2	687.3	681.0	694.0	697.0
	i=2	51.8	55.3	58.5	60.5	61.1	64.7	68.2	70.0	72.1	75.4	77.6
	i=3	9.9	9.9	9.5	9.0	8.4	7.8	8.2	8.3	8.4	8.5	8.7

Indicator	Tonne Kilometres
Source	Odyssee
Unit	Gtkm
Last update	12/2016

i=1 Road
i=2 Rail
i=3 Water

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	i=1	55.6	60.3	68.9	64.0	58.6	62.5	57.9	58.0	59.3	59.7	60.6
	i=2	8.1	8.6	9.3	8.9	6.4	7.5	7.6	7.3	7.3	7.3	7.4
	i=3	8.6	8.9	9.0	8.7	7.1	9.1	9.2	10.4	10.4	10.5	10.6
BG	i=1	14.4	13.8	14.6	15.3	17.7	19.4	21.2	24.4	27.1	27.9	32.3
	i=2	5.2	5.4	5.2	4.7	3.1	3.1	3.3	2.9	3.2	3.4	3.7
	i=3	0.8	0.8	1.7	1.9	1.8	1.8	1.4	1.4	1.2	1.0	1.1
CZ	i=1	43.4	50.4	48.1	50.9	45.0	51.8	54.8	51.2	54.9	54.1	58.7
	i=2	14.9	15.8	16.3	15.4	12.8	13.8	14.3	14.3	14.0	14.6	15.3
	i=3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DK	i=1	27.1	27.4	27.0	26.2	22.7	20.8	21.2	21.8	23.9	22.2	22.5
	i=2	2.0	1.9	1.8	1.9	1.7	2.2	2.6	2.3	2.4	2.5	2.6
	i=3	12.2	12.6	12.8	12.7	12.1	12.3	12.5	12.5	12.6	12.8	13.0
DE	i=1	402.7	435.7	454.1	457.6	415.6	441.9	465.6	447.0	452.9	468.9	459.0
	i=2	95.4	107.0	114.6	115.7	95.8	107.3	113.3	110.1	112.6	112.6	116.6
	i=3	64.1	64.0	64.7	64.1	55.7	62.3	55.0	58.5	60.1	59.1	55.3
EE	i=1	5.8	5.6	6.4	7.0	5.2	5.6	5.9	5.8	6.0	6.3	6.3
	i=2	10.6	10.4	8.4	5.9	5.9	6.6	6.3	5.1	4.7	3.3	3.1
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IE	i=1	17.8	17.3	18.7	17.3	12.1	10.9	9.9	9.9	9.1	9.8	9.8
	i=2	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	i=3	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EL	i=1	23.8	34.0	27.8	28.9	28.6	29.8	20.6	20.8	19.0	19.2	19.2
	i=2	0.6	0.7	0.8	0.8	0.6	0.6	0.4	0.3	0.2	0.3	0.3
	i=3	18.2	19.3	19.9	19.8	19.0	17.9	16.3	15.1	14.6	14.7	14.6
ES	i=1	329.7	331.5	352.5	325.1	286.2	272.7	264.8	242.0	237.5	243.9	254.9
	i=2	11.6	11.6	11.2	10.7	7.7	8.6	9.6	9.4	9.4	10.3	10.9
	i=3	43.8	43.5	45.7	43.0	38.3	40.4	41.7	40.4	39.4	40.4	43.6
FR	i=1	214.5	220.6	229.2	217.5	187.0	196.3	200.5	188.3	188.0	182.5	172.1
	i=2	40.7	41.2	42.6	40.4	32.1	30.0	34.2	32.5	32.2	32.6	34.3
	i=3	7.9	8.0	7.5	7.5	7.4	8.1	7.9	7.8	7.9	7.8	7.5
HR	i=1	8.4	8.8	9.8	9.4	9.0	8.7	8.4	9.3	9.4	9.5	10.1
	i=2	2.8	3.3	3.6	3.3	2.6	2.6	2.4	2.3	2.1	2.1	2.2
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IT	i=1	211.8	187.0	179.4	180.5	167.6	175.8	142.9	124.0	127.2	117.8	115.2
	i=2	24.8	26.2	27.4	25.9	19.4	18.6	19.8	20.2	19.0	20.1	19.2
	i=3	39.0	39.8	40.4	40.0	37.8	38.4	38.6	37.5	36.9	36.9	37.2
CY	i=1	1.4	1.2	1.2	1.3	1.0	1.1	0.9	0.9	0.6	0.6	0.6
	i=2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LV	i=1	8.5	10.9	13.1	12.3	8.1	10.6	12.1	12.2	12.8	13.7	14.7
	i=2	19.8	16.8	18.3	19.6	18.7	17.2	21.4	21.9	19.5	19.4	18.9
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LT	i=1	15.9	18.1	20.3	20.4	17.8	19.4	21.5	23.4	26.3	28.1	26.5
	i=2	12.5	12.9	14.4	14.7	11.9	13.4	15.1	14.2	13.3	14.3	14.0
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LU	i=1	8.6	8.6	9.5	9.4	8.5	8.7	8.8	6.6	7.2	7.9	7.1
	i=2	0.4	0.5	0.4	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2
	i=3	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3
HU	i=1	25.2	30.5	35.8	35.8	35.4	33.7	34.5	33.7	35.8	37.5	38.4
	i=2	9.1	10.2	10.0	9.9	7.7	8.8	9.1	9.2	9.7	10.2	10.0
	i=3	2.1	1.9	2.2	2.3	1.8	2.4	1.8	2.0	1.9	1.8	1.8
MT	i=1	3.7	3.7	3.8	4.0	3.9	4.0	4.1	4.2	4.4	4.7	5.1
	i=2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NL	i=1	48.5	48.0	47.4	48.2	46.0	47.9	48.1	45.0	47.5	48.0	47.4
	i=2	5.9	6.3	7.2	7.0	5.6	5.9	6.4	6.0	6.1	6.2	6.5
	i=3	43.1	43.6	46.5	46.2	37.9	46.6	47.3	47.5	48.6	49.4	48.5
AT	i=1	45.1	48.0	51.4	50.5	45.7	47.3	49.1	48.6	49.0	50.2	51.0
	i=2	19.0	21.0	21.4	21.9	15.9	18.2	18.7	19.5	19.3	20.5	20.3
	i=3	2.8	2.4	2.6	2.4	2.0	2.4	2.1	2.2	2.4	2.2	1.8
PL	i=1	119.7	136.5	159.5	174.2	191.5	214.2	218.9	233.3	259.7	262.9	273.1
	i=2	50.0	53.6	54.3	52.0	43.4	48.8	53.7	48.9	51.0	50.1	50.6
	i=3	0.3	0.3	0.3	0.3	0.2	0.1	0.2	0.1	0.1	0.1	0.1
PT	i=1	42.7	45.0	46.4	39.0	35.4	34.6	37.5	29.8	36.6	33.9	34.6
	i=2	2.4	2.5	2.6	2.5	2.2	2.3	2.3	2.4	2.3	2.4	2.7
	i=3	3.7	3.8	3.9	3.9	3.8	3.9	3.8	3.6	3.6	3.6	3.7
RO	i=1	51.5	57.3	59.5	56.4	34.3	25.9	26.3	29.7	34.0	35.1	39.0
	i=2	16.6	15.8	15.8	15.2	11.1	12.4	14.7	13.5	12.9	12.3	13.7
	i=3	8.4	8.2	8.2	8.7	11.8	14.3	11.4	12.5	12.2	11.8	13.2
SI	i=1	11.0	12.1	13.7	16.3	14.8	15.9	16.4	15.9	15.9	16.3	17.9
	i=2	3.2	3.4	3.6	3.5	2.8	3.4	3.8	3.5	3.8	4.1	4.2
	i=3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SK	i=1	22.6	22.1	27.1	29.1	27.5	27.4	29.0	29.5	30.0	31.3	33.5
	i=2	9.5	10.0	9.6	9.3	7.0	8.1	8.0	7.6	8.5	8.8	8.4
	i=3	0.7	0.9	0.8	1.0	1.2	2.2	1.0	1.1	0.7	0.7	0.7
FI	i=1	28.7	26.4	26.9	28.5	25.2	26.9	24.7	22.8	21.0	20.3	21.4
	i=2	9.7	11.1	10.4	10.8	8.9	9.7	9.4	9.3	9.5	9.6	8.5
	i=3	10.2	10.6	11.2	11.2	10.3	10.6	10.9	10.7	10.7	10.6	10.6
SE	i=1	44.7	46.1	46.9	49.0	41.3	43.6	43.2	40.1	41.2	40.0	40.5
	i=2	20.8	21.2	22.0	21.5	18.8	21.6	21.1	20.5	19.9	20.0	19.5
	i=3	8.0	7.2	7.9	8.3	6.5	7.9	7.5	6.7	6.7	6.7	6.8
UK	i=1	163.0	163.0	169.0	157.0	137.0	151.0	157.0	162.0	151.0	136.0	152.0
	i=2	22.0	22.0	21.0	21.0	19.0	19.0	21.0	21.0	23.0	22.0	17.8
	i=3	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.1

Indicator	Total Floor Area	Unit	Billion m^2
Source	Odyssee*	Update	July 2017

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	380.1	389.6	399.0	407.5	415.8	423.5	430.4	437.2	444.8	453.3	462.6
BG	191.9	192.5	193.7	196.9	197.0	196.5	229.1	230.2	229.5	229.2	227.9
CZ	294.9	297.9	300.9	305.8	311.4	316.0	315.5	322.6	328.9	335.2	341.6
DK	285.7	289.4	293.3	297.5	301.6	302.9	318.3	320.3	322.6	324.7	325.3
DE	3122.2	3149.0	3169.3	3184.1	3201.5	3447.4	3405.3	3423.7	3443.4	3466.2	3485.1
EE	36.2	36.6	37.2	37.7	38.1	38.3	38.6	38.8	39.0	39.3	39.7
IE	160.8	168.1	176.4	184.1	191.3	198.0	204.6	206.2	207.8	209.5	211.2
EL	366.3	368.6	373.3	375.3	380.9	382.2	382.2	381.4	381.6	382.3	385.1
ES	1380.9	1452.7	1501.0	1540.5	1576.0	1602.9	1623.2	1647.9	1665.8	1676.8	1683.7
FR	2352.1	2395.9	2422.2	2446.3	2467.0	2490.5	2508.4	2528.4	2550.7	2573.5	2589.9
HR	112.0	113.6	115.2	116.9	118.5	120.2	121.1	122.7	124.4	126.1	127.8
IT	2179.3	2196.1	2222.2	2244.0	2260.5	2278.4	2276.0	2309.1	2298.9	2291.6	2285.2
CY	35.1	35.4	36.9	38.1	38.5	40.8	42.9	42.8	42.2	42.1	42.1
LV	51.7	53.7	51.9	51.7	51.1	50.3	50.9	50.6	52.0	53.0	53.5
LT	79.7	80.3	81.0	82.2	83.0	83.7	85.2	85.9	86.8	87.9	89.1
LU	19.7	20.9	22.1	23.3	24.6	25.8	27.0	27.8	28.5	29.3	30.0
HU	342.5	353.4	347.8	362.5	361.3	356.8	390.7	392.8	395.8	392.4	416.5
MT	13.7	13.8	13.9	14.2	14.7	14.6	14.8	15.3	15.9	16.0	16.1
NL	749.9	769.3	790.3	811.5	832.0	851.7	871.6	888.6	897.3	904.2	909.9
AT	336.8	342.0	346.3	349.7	353.2	358.0	361.6	365.2	370.7	375.8	378.6
PL	885.1	895.1	907.0	923.2	937.8	973.9	986.4	999.0	1012.7	1026.4	1031.7
PT	360.5	369.6	352.8	356.1	370.2	420.7	432.2	435.2	437.5	440.0	444.2
RO	278.7	281.2	283.1	284.9	289.4	292.0	295.3	292.8	293.9	294.6	294.6
SI	57.7	58.5	59.4	60.4	61.4	62.2	62.6	62.9	63.0	63.1	63.1
SK	144.7	145.3	146.2	146.0	147.4	148.4	148.1	148.4	148.7	148.9	149.1
FI	230.4	232.8	235.4	238.3	242.9	245.2	248.3	251.1	257.4	262.3	261.9
SE	384.5	385.8	385.6	386.7	391.4	407.7	410.5	415.6	415.4	415.5	411.7
UK	2320.7	2398.3	2421.7	2464.0	2479.8	2511.9	2515.9	2560.5	2656.7	2630.3	2688.2

*The total floor area was calculated by multiplying the Odyssee average floor area of dwellings times number of dwellings. If the number of dwellings was not available in the Odyssee dataset, the number of households, available in ESTAT, was instead used.

Indicator	Gross Disposable Income in PPS	Unit	Billion EUR
ESTAT code	Nasa_10_nf_tr	Update	29/05/17

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	207.1	214.8	222.5	230.5	230.9	240.7	248.6	256.7	261.2	265.9	274.0
BG	44.4	47.2	50.6	57.0	55.0	57.6	61.5	62.5	65.2	66.9	70.2
CZ	128.3	135.6	144.3	139.6	144.4	148.5	154.7	156.8	161.6	169.1	177.2
DK	94.9	101.2	106.8	107.9	109.4	116.4	119.2	121.5	124.0	126.4	133.5
DE	1819.0	1868.8	1934.9	1948.2	1909.3	1985.4	2022.6	2094.1	2111.9	2186.4	2272.9
EE	11.9	13.0	14.5	15.8	14.6	14.9	15.8	17.1	17.2	18.3	19.2
IE	77.3	81.6	88.4	89.7	87.5	89.7	86.4	89.7	86.7	89.4	93.4
EL	182.0	195.9	206.2	215.9	214.2	199.8	182.8	174.2	166.0	166.6	163.3
ES	749.4	792.1	813.5	844.3	849.6	841.0	846.2	828.7	829.0	848.6	884.8
FR	1275.3	1324.0	1401.1	1413.4	1402.7	1464.7	1499.9	1527.0	1564.6	1590.1	1658.7
HR	40.3	42.9	46.0	48.6	48.2	48.9	50.3	51.8	51.1	50.6	51.2
IT	1154.5	1209.1	1262.8	1282.6	1234.1	1270.8	1278.7	1246.1	1235.1	1265.1	1312.1
CY	12.3	13.4	14.3	16.2	15.5	16.2	15.8	15.5	14.9	14.4	14.4
LV	19.2	22.5	24.9	26.2	21.6	21.1	20.6	22.3	23.3	24.0	25.3
LT	33.4	36.3	37.1	40.3	37.3	39.3	40.4	41.9	44.3	45.4	46.4
LU	14.7	15.6	16.3	17.1	18.0	18.3	18.8	19.4	20.6	21.2	22.4
HU	109.4	112.8	112.0	111.8	110.7	115.2	122.5	122.6	125.1	130.2	133.6
MT	4.3	4.6	4.9	5.5	5.2	5.5	5.5	5.7	6.1	6.5	6.8
NL	336.3	358.9	378.4	381.7	374.6	371.4	378.5	381.3	379.8	382.5	395.2
AT	179.1	191.0	196.5	198.4	194.9	201.2	204.8	214.1	215.5	220.6	225.6
PL	340.6	362.3	402.5	419.5	436.4	471.6	493.9	523.4	528.8	542.7	569.4
PT	163.7	170.1	174.1	176.4	172.6	176.9	168.9	166.4	170.3	170.4	177.3
RO	118.1	132.6	154.4	175.8	164.3	172.5	175.7	185.5	229.9	246.9	271.1
SI	28.6	30.0	31.5	32.6	31.2	32.2	33.0	32.8	32.5	33.7	35.0
SK	52.3	55.7	64.0	68.7	69.1	73.3	73.8	76.6	79.1	83.6	88.6
FI	92.1	97.8	107.0	111.3	111.4	116.1	120.1	124.0	125.1	126.9	132.0
SE	166.1	178.3	193.5	199.7	198.6	200.1	210.3	222.3	219.6	226.5	235.8
UK	1232.0	1291.3	1329.5	1320.2	1300.7	1341.8	1344.3	1402.4	1386.7	1434.8	1509.8

1.3 Other data

Indicator	Weather factor	Unit	-
Source	Based on JRC data	Last update	-

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	i=1	0.980	0.955	0.899	0.996	0.991	1.176	0.878	1.021	1.113	0.852	0.969
BG	i=1	1.032	1.017	0.915	0.938	0.933	0.965	1.070	0.999	0.924	0.907	0.908
CZ	i=1	1.041	1.006	0.931	0.940	0.976	1.122	0.948	0.995	1.029	0.854	0.905
DK	i=1	0.984	0.931	0.908	0.917	0.975	1.199	0.949	1.027	1.024	0.859	0.937
DE	i=1	1.012	0.972	0.906	0.960	0.991	1.168	0.924	1.007	1.060	0.858	0.937
EE	i=1	1.011	0.974	0.947	0.907	1.009	1.141	0.953	1.069	0.970	0.967	0.885
IE	i=1	0.944	0.941	0.913	1.014	1.015	1.144	0.999	1.036	1.027	0.953	1.055
EL	i=1	1.035	1.074	0.953	0.910	0.915	0.848	1.085	1.004	0.877	0.841	0.953
ES	i=1	1.092	0.944	1.012	1.035	0.961	1.077	0.865	1.031	1.057	0.869	0.892
FR	i=1	1.039	0.961	0.940	1.015	0.991	1.145	0.851	1.014	1.093	0.865	0.936
HR	i=1	1.105	0.992	0.909	0.911	0.935	1.039	0.974	0.971	0.945	0.778	0.927
IT	i=1	1.107	0.996	0.942	0.968	0.988	1.053	0.951	0.996	0.985	0.831	0.922
CY	i=1	0.983	1.090	0.993	0.938	0.899	0.637	1.066	1.055	0.896	0.710	0.957
LV	i=1	1.018	0.977	0.949	0.908	1.010	1.128	0.959	1.050	0.983	0.961	0.891
LT	i=1	1.021	0.988	0.950	0.903	1.003	1.121	0.956	1.036	0.983	0.946	0.895
LU	i=1	1.000	0.958	0.893	0.988	0.974	1.137	0.865	0.993	1.094	0.847	0.967
HU	i=1	1.088	1.008	0.917	0.912	0.935	1.054	1.005	0.981	0.960	0.817	0.928
MT	i=1	1.374	0.968	0.698	0.664	1.028	0.776	1.057	1.275	0.887	0.721	1.047
NL	i=1	0.966	0.942	0.884	0.982	0.993	1.205	0.916	1.024	1.096	0.832	0.956
AT	i=1	1.070	1.013	0.934	0.956	0.972	1.082	0.939	0.982	1.008	0.866	0.919
PL	i=1	1.023	0.997	0.931	0.914	0.993	1.128	0.954	1.022	1.009	0.891	0.896
PT	i=1	1.099	0.971	1.017	1.044	0.944	1.060	0.896	1.104	1.098	0.940	0.885
RO	i=1	1.056	1.032	0.923	0.933	0.926	0.993	1.031	1.004	0.931	0.887	0.906
SI	i=1	1.092	1.014	0.916	0.951	0.948	1.070	0.963	0.967	0.979	0.800	0.922
SK	i=1	1.070	1.022	0.935	0.920	0.961	1.054	0.981	0.995	0.979	0.821	0.923
FI	i=1	0.942	0.969	0.947	0.950	0.997	1.099	0.929	1.039	0.937	0.930	0.893
SE	i=1	0.986	0.965	0.982	0.985	1.024	1.155	0.948	1.059	0.998	0.940	0.944
UK	i=1	0.962	0.939	0.941	1.013	0.997	1.140	0.934	1.050	1.050	0.905	0.996

KJ-NA-28710-EN-N

JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.

EU Science Hub
ec.europa.eu/jrc

@EU_ScienceHub

EU Science Hub - Joint Research Centre

Joint Research Centre

EU Science Hub

Publications Office

doi:10.2760/675791

ISBN 978-92-79-71299-9