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**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND
THE COUNCIL**

2017 assessment of the progress made by Member States towards the national energy efficiency targets for 2020 and towards the implementation of the Energy Efficiency Directive as required by Article 24(3) of the Energy Efficiency Directive 2012/27/EU

1. INTRODUCTION

In November 2016 the European Commission proposed a revision of the Energy Efficiency Directive (EED)¹ as part of the Clean Energy Package. The review aims to adapt the EED to the 2030 perspective, by setting a binding 30% energy efficiency target², which effectively maintains the current level of ambition. The Commission also proposed simplifying parts of the text to make it easier to implement at national level.

Maintaining the momentum in energy efficiency will not only increase GDP and jobs – energy efficiency is an enabler for the sustainable economy and the construction sector – but will also bring many other benefits to the EU and its people, in particular securing energy supply and reducing pollution. A binding 30% energy efficiency target also contributes significantly to achieving cost-effectively the EU's 2030 greenhouse gas (GHG) emissions reduction target as energy efficiency pays back in the medium and long term. It lowers energy bills, and improves living conditions in buildings. For companies, it can increase competitiveness thanks to monetary savings and greater innovation.

While the proposal for a review of the EED is debated by the co-legislators, the Commission continues to monitor implementation of the current Directive. This 2017 report provides the latest insights into progress made up to 2015 towards the 20% target³. The official European statistics on energy transmitted by Member States to Eurostat are used as primary data source for evaluating progress towards the 2020 target. This report builds on the 2016 Energy Efficiency Progress Report⁴, as well as the 2017 Annual Reports and National Energy Efficiency Action Plans (NEEAPs) submitted by Member States. To better understand the factors behind recent trends, a decomposition analysis developed by the Joint Research Center (JRC)⁵ and the Odyssee-Mure project⁶ was used.

The main findings are as follows:

- After energy consumption gradually decreased between 2007-2014, it increased in 2015 in part due to a less warm winter and lower fuel prices. Although primary energy consumption rose by 1.5% compared to 2014, it was still on track to meet the 2020 target. While final energy consumption also increased in 2015, it was still below the 2020 target thanks to savings achieved in previous years. Energy consumption appears to have increased further in 2016 following another less warm winter⁷.
- Primary energy consumption largely decreased in the post-recession years (2009-2015) in nearly all Member States, showing that economic recovery and growth could be achieved without increasing national demand for energy.

¹ COM(2016) 860 final.

² The proposed 30% target for 2030 translates into final energy consumption of 987 Mtoe and primary energy consumption of 1321 Mtoe in the EU.

³ The 2020 target involves lowering the EU's final energy consumption to at most 1086 Mtoe, and its primary energy consumption to at most 1483 Mtoe.

⁴ COM(2017) 56 final

⁵ JRC (in preparation), *Assessing the progress towards the EU efficiency targets using index decomposition analysis*.

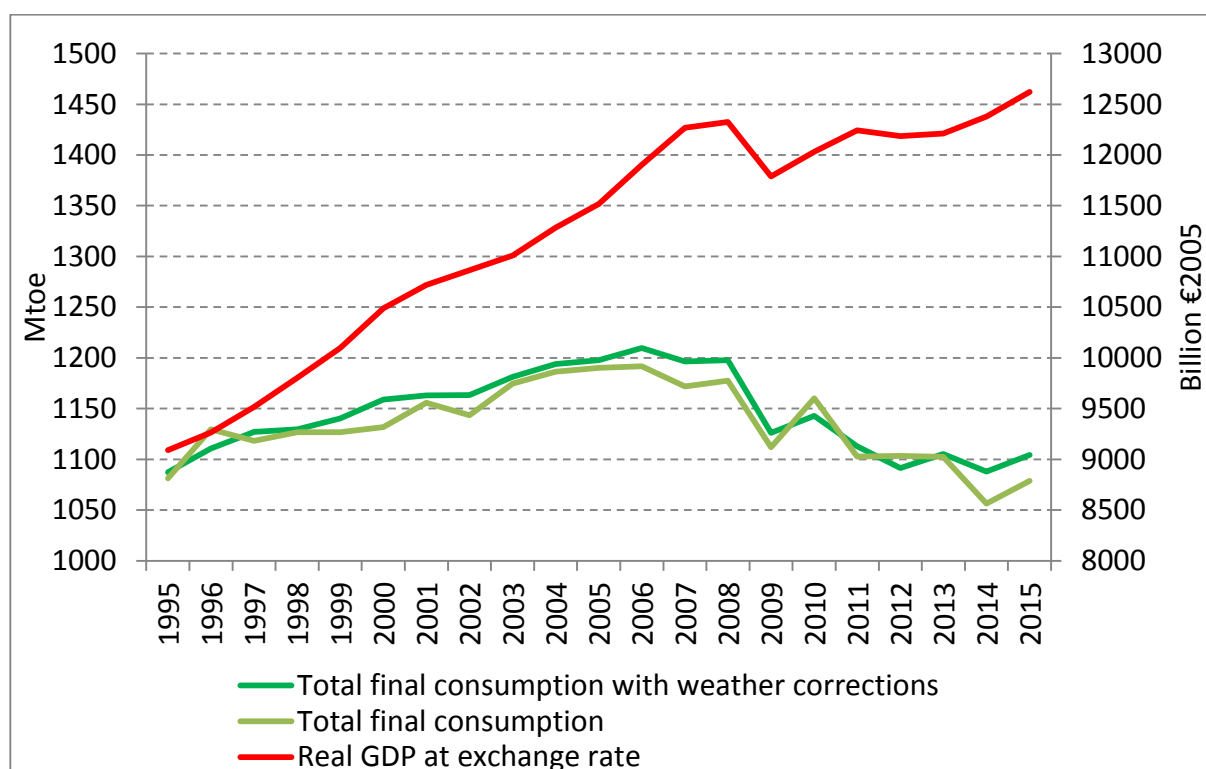
⁶ <http://www.indicators.odyssee-mure.eu/decomposition.html>

⁷ The European Environmental Agency (EEA) gave preliminary estimates for 2016.

- Weather variations⁸ are one of the main reasons for the fluctuations observed in energy consumption in recent years. Weather corrected figures suggest that energy consumption, after falling from 2005, has been broadly flat since 2012 (Figure 1).
- Increases in economic activity have tended to push up energy consumption. Energy savings have helped offset this. However, their level was not high enough in 2015 and 2016 to offset the impact of the growth in economic activity.
- Final energy intensity in industry decreased in almost all Member States in 2015.
- Member States are making good progress in achieving energy savings under Article 7 of the EED. Their collective efforts in 2015 were above the linear trajectory for achieving the required savings by 2020.
- In their 2017 NEEAPs, several Member States revised their indicative national targets for 2020. While the national targets announced are still consistent with the EU level of ambition for final energy consumption in 2020 when taken together, the gap is now greater for primary energy consumption.

If the declining trend observed since 2005 continues in the coming years, the EU should still be on track to achieve the 2020 target both for both primary and final energy consumption⁹. However, if the increases observed in recent years reverse the trend, achieving the 2020 targets will require additional efforts.

Figure 1: GDP and weather corrected final energy consumption in 1995-2015¹⁰



⁸ An exceptionally warm winter in 2014 resulted in much lower heating needs that year. However, 2015 and 2016 winter temperatures were more in line with the climatic average, increasing heating needs and with it also energy consumption in the residential sector and service sector.

⁹ The average rate of decrease in primary energy consumption/final energy consumption in the 2005-2015 period is higher than the rate of linear decrease from 2005 to the 2020 target.

¹⁰ The weather correction factor was calculated as a proportion of heating degree days (HDD) in a given year over the average HDD in the period 1990-2015. This correction factor was applied to the energy consumption used for space heating of the residential sector.

2. PROGRESS TOWARDS THE 2020 EU ENERGY EFFICIENCY TARGET

Final energy consumption¹¹ in the EU fell by 9.1% from 1192 Mtoe in 2005 to 1084 Mtoe in 2015, which is slightly below the 2020 final energy consumption target of 1086 Mtoe. It decreased at an annual average rate of 0.9% between 2005 and 2015, although the downward trend was interrupted in 2015 when final energy consumption increased by 2.1% compared to the previous year.

Higher energy consumption in 2015 was mainly seen in the residential (+4% year-on-year increase), services (+3.6%) and transport sectors (+1.7%). The increases in the residential and service sectors were mainly due to the slightly colder winter compared to the previous year, which was exceptionally warm. Early estimates by the EEA also indicate that final energy consumption rose by 2% in 2016 compared to 2015, again possibly driven by a less warm winter and economic growth¹².

In 2015, transport accounted for 33% of final energy consumption, followed by the residential sector and industry (both 25%), the service sector (14%) and other sectors (3%).

Primary energy consumption¹³ in the EU dropped by 10.6% from 1713 Mtoe in 2005 to 1531 Mtoe in 2015, which is 3.2% above the 2020 target of 1483 Mtoe. It decreased on average by 1.1% per year between 2005 and 2015, but rose in 2015 by 1.5% compared to the previous year. The proxy estimates of the EEA indicate a year-on-year increase of 0.6% in primary energy consumption in 2016.

3. NATIONAL TARGETS

Some Member States communicated in their 2017 National Energy Efficiency Action Plans (NEEAPs) that their national indicative 2020 energy efficiency targets have been revised to adapt to the latest national policy plans or to more recent forecasts¹⁴. Two Member States revised their final energy target upwards and one downwards¹⁵, while three increased and two decreased their indicative 2020 target for primary energy consumption¹⁶.

When looking at the average annual reductions needed to reach the indicative targets, 18 Member States made good progress in 2015 to reach their indicative targets in terms of final energy consumption. By contrast Austria, Belgium, Bulgaria, France, Germany, Hungary, Lithuania, Malta, Slovakia and Sweden were not reducing their final energy consumption annually at a pace to ensure that they meet their 2020 target. On primary energy consumption, five Member States – Bulgaria, Estonia, France, Germany and the Netherlands – were not making savings at a sufficient pace up to 2015 to reach their targets in 2020.

¹¹ Final energy consumption is the energy supplied to industry, transport, households, services and agriculture, excluding deliveries to the energy transformation sector and the energy industries themselves.

¹² The reason why weather variability has such impact on energy consumption is that households account for a quarter of final energy consumption, using two thirds of this to heat their homes. This also concerns buildings that are heated in the service sector, but for the time being there are not official data on them available.

¹³ Primary energy consumption means gross inland consumption excluding non-energy uses.

¹⁴ This assessment is made on the basis of the NEEAPs submitted to the European Commission by 1.10.2017.

¹⁵ Malta and Spain upwards; Croatia downwards.

¹⁶ The Czech Republic, Malta and Spain upwards, Croatia and Denmark downwards.

Overall, the final energy consumption of 18 Member States was already below their indicative 2020 final energy target in 2015¹⁷. Similarly, 19 Member States reached their primary energy consumption levels or kept them (given the recent increase) below their indicative 2020 primary energy target in 2015¹⁸. However, due to the recent revisions made to the national targets, the gap between the sum of national targets and the EU target grew even further for primary energy consumption. For final energy consumption the national indicative targets add up to a total of 1085 Mtoe, i.e. 1 Mtoe below the EU target; for primary energy consumption they add up to 1533 Mtoe i.e. 50 Mtoe above the EU target.

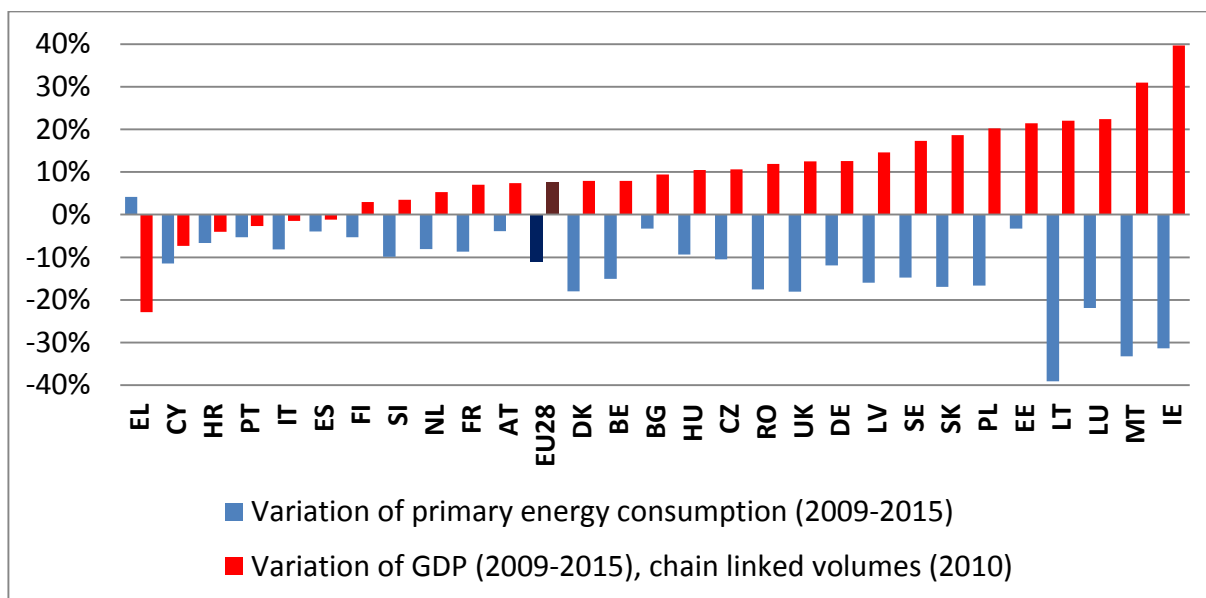
4. ENERGY CONSUMPTION TRENDS AND ASSESSMENT OF NATIONAL MEASURES BY SECTOR

Final energy consumption has fallen in all Member States since 2005 except in Lithuania, Malta and Poland. Compared to 2014, final energy consumption rose in all but five Member States in 2015, with the largest reductions registered in Latvia (-2.5%), Estonia (-1.8%) and Finland (-1.3%). The highest increases were in Hungary (+6.9%), Greece (+6.3%) and Croatia (+5.5%). The decreases and increases in these countries were linked to a large extent to weather conditions.

Primary energy consumption has fallen in all Member States since 2005 except in Estonia and Poland. However, in 2015 primary energy consumption increased in most Member States compared to the previous year, with highest increases in Hungary (+5.9%), Portugal (+4.9%) and Ireland (+4.6%). Malta reported the highest year-on-year decrease (-14.9%), followed by Estonia (-6.3%) and Sweden (-5.5%).

Looking at the post-crisis years (2009-2015) provides an insight into more recent developments during the economic recovery.

Figure 2: GDP and primary energy consumption, 2009-2015



¹⁷ Except Belgium, Bulgaria, Germany, Ireland, France, Lithuania, Hungary, Austria, Slovakia, Sweden, the United Kingdom.

¹⁸ Except Belgium, Bulgaria, Cyprus, Germany, France, Austria, the Netherlands, Sweden and the United Kingdom.

Source: Eurostat

Within this time frame, primary energy consumption decreased in all Member States except in Greece (still affected by the economic downturn) despite growing GDP in 22 Member States. This trend demonstrates that the recovery was achieved without increasing energy demand, even in the countries with fast-growing economies. However, it is also clear that this was possibly due to energy efficiency improvements.

A more detailed analysis of different factors behind the changes in energy consumption is possible thanks to the decomposition analysis carried out by the JRC¹⁹ and Odyssee-Mure²⁰. A decomposition helps attribute a weight to the several factors that have an impact on the energy consumption trends, which are differentiated across the end-use sectors and the generation and transformation sector.

In terms of primary energy, the JRC analysis assessed the relative contribution of economic activity effect²¹, transformation effect²² and energy intensity effect²³ to the overall reduction of primary energy consumption trends over the 2005-2015 period. Final energy consumption trends were decomposed into activity, structural²⁴, intensity and weather effects²⁵.

The 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 (see Figure 3). On the other hand, the increase in overall efficiency of the transformation system in the EU-28 was small (-26.8 Mtoe).

Looking at the latest developments in 2014-2015, primary energy consumption increased for the first time after 5 consecutive years of declining energy consumption. The increase of 21.4 Mtoe in primary energy consumption in 2014-2015 is largely attributed to a strong activity effect (+33.6 Mtoe) which was only partially offset by the improvements in the efficiency of transformation (-10.8 Mtoe) and lower energy intensity (-1.4 Mtoe).

¹⁹ JRC *op. cit.*

²⁰ <http://www.indicators.odyssee-mure.eu/decomposition.html>

²¹ It accounts for change in energy consumption due to changes in economic activity (e.g. GDP, GVA).

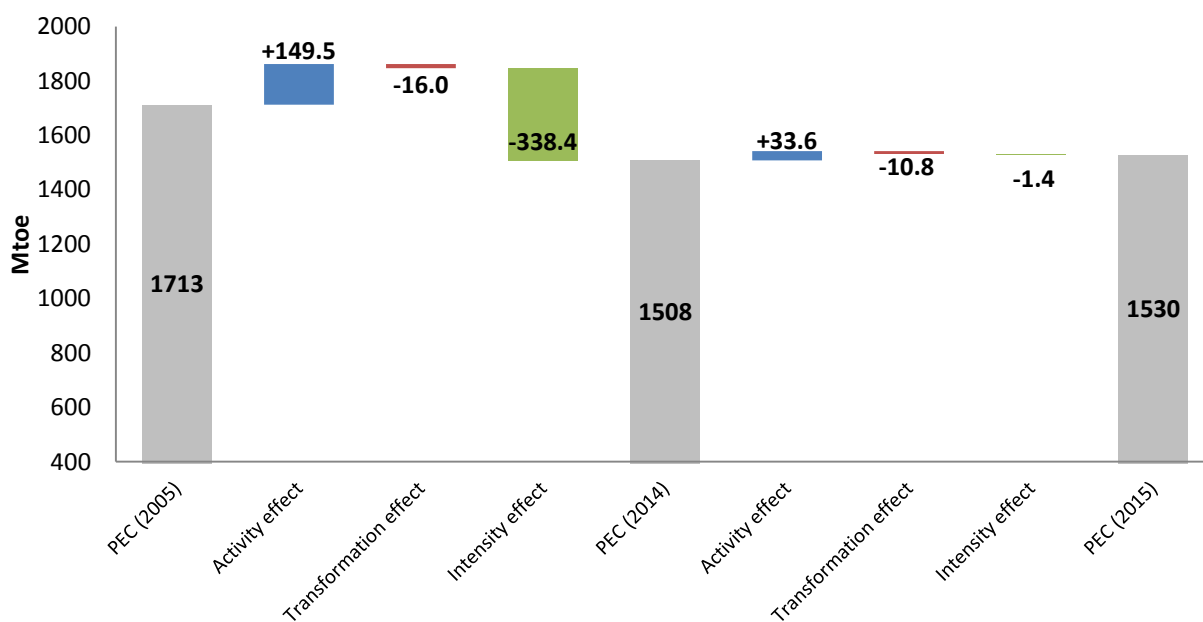
²² It is represented by the ratio of primary energy consumption to final energy consumption and accounts for the efficiency of the energy transformation system.

²³ It is represented by the 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.

²⁴ It is represented by the relative share of economic activity of individual sectors and accounts for changes in energy consumption due to change in the relative importance of sectors with different energy intensities.

²⁵ It captures changes to energy consumption due to weather changes and is applied to sectors where heating is significant in the end use (e.g. residential).

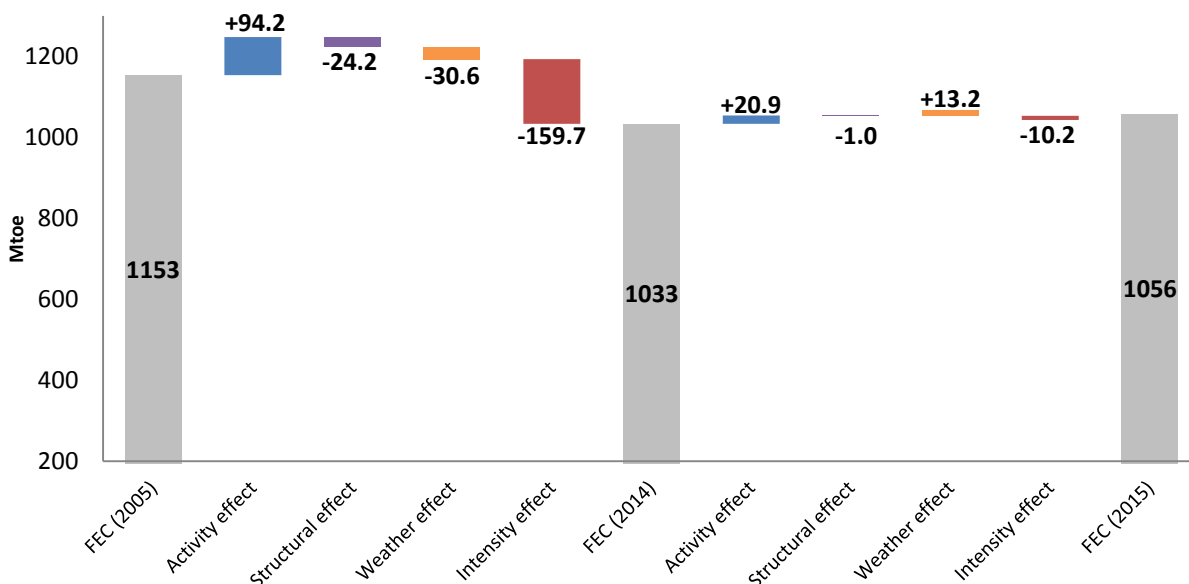
Figure 3: Decomposition of changes in EU-28 primary energy consumption (Mtoe) for 2005-2015 using the additive Logarithmic Mean Divisia Index approach (LMDI)



Source: JRC

The fall in final energy consumption was mainly driven by the decreases in industry (-16% in 2015 compared to 2005) and the residential sector (-11%) and to lower extent by a drop in energy consumption in transport (-3%). In contrast, the service sector increased its energy consumption (+2%).

Figure 4: Decomposition of changes in EU-28 final energy consumption (Mtoe) for 2005-2015 using the additive Logarithmic Mean Divisia Index approach (LMDI)



Source: JRC

The JRC analysis indicates that, as in the case of the primary energy, the drop in final energy consumption for the 2005-2015 period was due to improvements in final energy intensity (-169.9 Mtoe) which offset the increase in energy consumption due to the growth in the economy

(+115.1 Mtoe). Structural shifts towards more energy efficient sectors accounted for a drop in final energy consumption of -25.2 Mtoe, while warmer winters resulted in a decrease of energy consumption by -17.4 Mtoe. This resulted in a drop in final energy consumption from 1153 to 1056 Mtoe²⁶ across the EU in 2005-2015 (see Figure 4).

In 2014-2015, a small increase of +23 Mtoe in total final energy consumption was recorded across the EU. In this short period the improvements in intensity (-10.2 Mtoe) and a small structural shift (-1.0 Mtoe) were not sufficient to counterbalance the increase due to the economic growth (activity effect: +20.9 Mtoe) and to colder weather²⁷ (+13.2 Mtoe).

Looking at the developments at Member State level in the 2005-2015 period, the JRC analysis shows that with the exception of Greece, Italy and Portugal, economic activity increased primary energy consumption. The transformation effect had more diversified impact across Member States, with 10 countries recording reduction in transformation efficiency, which drove up energy consumption (Bulgaria, Cyprus, the Czech Republic, Estonia, Spain France, Ireland, Latvia, the Netherlands, and Portugal). With respect to primary energy intensity most countries achieved significant improvements and only in Malta energy consumption rose due to higher energy intensity of the economy. The structural shift towards less energy intensive sectors, which is considered for the commercial sector²⁸, contributed to a lower final energy consumption in all countries except Austria, Bulgaria, the Czech Republic, Lithuania, Latvia, Poland and Slovakia. On the other hand, Ireland, Cyprus and the UK were the only countries to experience an increase in final energy consumption due to weather factors (these are considered by the JRC for the residential sector only). In all other countries, warmer winters contributed to a decline in energy consumption.

The Odyssee-Mure analysis presents similar trends for the 2005-2015 period. It confirms that energy savings played a major role in offsetting the increase in consumption driven by the activity effect, demography and lifestyles over this period. However, the significance of various factors and their magnitude are not the same due to differences in the methodology and data used as input. Lower primary energy consumption was mainly driven by a decrease in final energy consumption (-109 Mtoe), but the role of efficiency improvements and changes in the fuel mix in power generation were also quite significant (-61 Mtoe). Looking at final energy consumption, the activity effect led to an increase of 39 Mtoe, while demography and lifestyle accounted for an additional 26 Mtoe and 25 Mtoe of final energy consumption respectively. These increases were offset by much higher energy savings between 2005 and 2015 (-161 Mtoe), while structural change and weather led to a further reduction of 10 Mtoe and 18 Mtoe respectively.

4.1. Industrial sector

The final energy consumption of industry in the EU decreased in absolute terms from 328 Mtoe in 2005 to 275 Mtoe in 2015 (-16%). Nonetheless, industry increased its energy consumption during this period in Austria (+4%), Belgium (+2%), Germany (+3%), Latvia (+13%), Hungary (+25%) and Malta (+10%). Compared to the previous year, final energy consumption in industry rose slightly (by 1 Mtoe, i.e. 0.3%) in 2015, with 13 Member States recording a decline. The countries with the highest increases included Ireland (+8%), Hungary (7%) and France (5%).

²⁶ The difference between the JRC decomposition data and the official Eurostat data quoted in the report is caused by different data sources used for transport (Odyssee) and different date of data extraction (January 2017).

²⁷ Heating degree-days in 2015 were 2904 compared to 2809 in 2014 and an average of 3133 in the reference period 1990-2015 (source: Eurostat, JRC).

²⁸ The commercial sector combines industry, services and agriculture.

The JRC decomposition shows an overall positive activity effect that increased the final energy consumption in industry in the EU in the 2005-2015 period (despite a sharp drop in energy demand due to low economic activity observed in 2008-2009). Nevertheless, the improvements in energy intensity more than compensated the activity effect and decreased substantially energy consumption in industry. The shift to less energy intensive sectors also contributed to this decline, but played a smaller role for the EU in general. In contrast, the Odyssee-Mure analysis shows that the activity effect was negative leading to a reduction of energy consumption in industry in the EU by 6 Mtoe during the 2005-2015 period. Energy savings were still the dominant factor behind the overall decrease in energy consumption (-42 Mtoe), accompanied by the structural shift that contributed to a reduction of 8 Mtoe. Only 'other' effects, which are mainly a result of inefficient operations in industry, were positive and increased the consumption by 2 Mtoe.

In terms of energy intensity²⁹, almost all Member States managed to improve their industry performance between 2005 and 2015, leading to an overall reduction in energy intensity of 19% in the EU. Only Greece (+26%), Hungary (+19%), Latvia (+14%) and Cyprus (+11%) increased their final energy consumption per Gross Value Added (GVA) of their industrial sector. On the other hand, the biggest improvements were recorded in Ireland, Romania and Bulgaria, where industry energy intensity was halved. Looking at the developments compared to 2014, only France and Sweden recorded an increase in the energy intensity of industry in 2015, while all other Member States continued to improve.

4.2. Residential sector

The final energy consumption of the residential sector dropped by 11% from 309 Mtoe in 2005 to 275 Mtoe in 2015. The improvements in efficiency (-67 Mtoe) significantly contributed to it and were a result of greater energy efficiency of appliances and energy performance improvements in the building stock following the gradual implementation of the Energy Performance of Buildings Directive³⁰ and ecodesign minimum standards³¹. However, warmer winters also reduced heating needs within this period and partially offset the positive activity effect, driven by an increase in floor area for heating and gross disposable income.

21 Member States reported an increase in final energy consumption of the residential sector from 2014 to 2015. 2014 was an unusually warm year which led to a lower heating demand, so the increase in energy consumption for heating in 2015 – which was a colder year – was not surprising. However, the Odyssee-Mure analysis indicates that while weather³² accounted for an increase of 5 Mtoe in energy consumption, the increase in the number and average size of dwellings and higher number of appliances contributed to an additional 4 Mtoe. This increase was offset by energy savings (-8 Mtoe) in 2015, but other effects (mainly changes in the behaviour, e.g. switching to bigger appliances, and better comfort levels) increased final energy consumption by an additional 10 Mtoe.

Residential sector intensity in terms of energy consumption per population decreased in the EU by some 9% in 2005-2015 (and by 1% in 2015 compared to 2014). Nonetheless, the situation varied substantially across Member States: in 11 countries performance deteriorated with the

²⁹ Energy consumption relative to Gross Value Added (GVA).

³⁰ Directive 2010/31/EU

³¹ For all sectors in general under the business as usual scenario with measures up to 1 January 2016, ecodesign and energy labelling measures are expected to yield 165 Mtoe in primary energy savings in 2020 (cf. European Commission (2016), *Ecodesign Impact Accounting. Status Report 2016*).

³² The Odyssee-Mure analysis also estimates the impact of cooling degree days which play an increasingly important role, in particular in electricity needs over the summer in southern countries.

biggest increases recorded in Bulgaria (+19%), Lithuania (+10%) and Romania (+6%), which reflected the catching-up effect in these countries. In contrast, the United Kingdom (-25%), Belgium and Ireland (-23%) were the top performing countries.

4.3. Service sector

The service sector was the only sector with an increase in energy consumption from 2005 to 2015, albeit a small one (+3.1 Mtoe, 2%). According to the JRC decomposition analysis, this was largely driven by an increase in GVA in services, resulting in a rise of +20.4 Mtoe in energy consumption. This activity effect was mostly offset by energy intensity improvements.

The Odyssee-Mure analysis provides a more detailed breakdown for the service sector. While the positive activity effect was on a similar scale (+20 Mtoe), it was weakened by the warmer weather effect (-5 Mtoe), energy savings (-6 Mtoe), improvements in productivity (-3 Mtoe) and other effects (-3 Mtoe). Compared to 2014 energy consumption in the services sector rose by 3.6% in 2015, due to positive activity, climate and productivity effects.

Final energy intensity in services improved by 10% in the 2005-2015 period. The biggest improvements were in Ireland, Hungary, Slovakia, Austria and Sweden. Compared to 2014 the energy intensity increased by 2% in 2015 for the EU, which may be also related to the higher number of heating degree days as space heating accounts for nearly half of energy consumption in the service sector.

4.4. Transport sector

The EU's final energy consumption in transport³³ decreased by 3% from 369 Mtoe in 2005 to 359 Mtoe in 2015. In 2015, 15 Member States increased their energy consumption in this sector compared to 2005 levels³⁴. Consumption increased significantly (by more than 20% since 2005) in Malta, Poland, Romania, Lithuania and Slovenia. By contrast, it fell by 20% in Greece and 16% in Spain.

The EU's final energy consumption in transport rose by almost 2% from 2014 to 2015, with all but four Member States³⁵ reporting an increase. This magnifies the trend from the previous years, as in 2014 an upward trend was observed in 20 and in 2013 in 11 Member States. Countries with the largest increase include Bulgaria (10%), Hungary (8%), Lithuania and Poland (5%). Growth in road transport activity in 2015, in both passenger transport (by 2.2% in pkm) and freight transport (by 2.8% in tkm), the further decline in petroleum product prices as well as growth in aviation transport were the main reasons for this increase. The importance of the activity effect in driving up energy consumption is also visible in the Odyssee-Mure analysis: this factor³⁶ contributed to an increase of 9 Mtoe in 2015, while energy savings reduced consumption by 2 Mtoe and the impact of modal shift was marginal.

4.5. Electricity and heat generation sector

The output/input ratio of thermal power generation³⁷ has little improved across the EU since 2005 (+1.4%). In 2015, it increased in 18 Member States compared to 2005 and in 20 Member

³³ Including pipeline transport, contrary to the approach taken in COM(2015) 574 final as the 2020 energy efficiency targets do not exclude pipeline transport.

³⁴ A comparison of Member States should be undertaken with caution because final energy consumption is based on the fuels sold rather than the fuels used in the territory of a country. Factors other than energy efficiency therefore come into play, e.g. the degree to which a given Member State is a 'transit country' for road transport or a hub for aviation.

³⁵ Germany, Italy, Luxembourg and Slovenia.

³⁶ The activity effect records changes in passenger traffic, including air, and in traffic of goods.

³⁷ This indicator measures the ratio of transformation output of thermal power generation to fuel input.

States compared to the previous year. The reasons for this can be manifold, including a switch to more efficient fuels.

According to the Odyssee-Mure analysis, the decrease in primary energy consumption over the last decade was in fact due to a change in fuel mix and in the power sector and – to a lesser extent – to efficiency improvements in generation³⁸. The continued increase in the share of renewable energy sources replacing thermal power generation is the main reason behind the positive impact of this structural change. However, the change observed in 2015 as compared to 2014 can be attributed to an increase in the efficiency of the thermal power plants rather than an overall change in the power mix.

Heat generation from combined heat and power (CHP) plants increased in 13 Member States in 2015 compared to 2014, with the highest increases in France, Cyprus, Ireland and Greece³⁹. For some Member States this might be a result of the colder winter in 2015. However, heat generation from CHP decreased by over 10% in the EU in general between 2005 and 2015.

4.6. State of transposition of the EED and National Energy Efficiency Action Plans for 2017-2020

The EED is now fully transposed in all Member States, although there are still delays in implementing some of the measures or the measures are subject to checks to ensure their conformity. The Commission therefore closed all the infringement proceedings for missing or partial notification.

The Commission is now monitoring the EED implementation. In 2017, it started the dialogue with the Member States to ensure that all the obligations and requirements of the EED are correctly reflected in the national legislation and policy. It is also checking that the Member States deliver on their reporting obligations as set out in the Directive. By 30 April 2017 the Member States had to notify to the Commission their Annual Report, the new NEEAPs and the updated long-term building renovation strategy. As of 31 October 2017, 10 Member States failed to submit at least one of these reports⁴⁰.

Under Article 7, Member States have reported their savings for 2015 which across the EU amounted to 28.5 Mtoe in cumulative terms. This is 15% more overall than the estimated amount of savings for 2015, assuming a linear delivery of the savings requirements to be achieved by the end of 2020.

Energy Efficiency Obligation Schemes (EEOS) have been introduced in 15 Member States and are responsible for the highest share of energy savings (35%). While the majority of the policy measures target the buildings sector, other end-use sectors (e.g. transport, industry) are also targeted.

At Member State level progress towards the estimated savings for 2015 differs significantly (see Table 3):

- 15 Member States achieved more savings than the annual amount needed (Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Ireland, Malta, the Netherlands, Romania, Slovakia, Slovenia, Sweden, and the United Kingdom);

³⁸ Energy consumption of the power sector decreased from 378 Mtoe in 2005 to 317 Mtoe in 2015 and change in the power mix accounted for a reduction of 54 Mtoe.

³⁹ CHP data reported under Article 24(6) EED to Eurostat: <http://ec.europa.eu/eurostat/web/energy/data>. Due to some data gaps it is not possible to analyse the developments in all Member States.

⁴⁰ The reports notified by Member States have been published at <https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-plans>.

- 5 Member States (Hungary, Italy, Lithuania, Poland, and Spain) came close to achieving the amount needed;
- 8 Member States achieved much less than the amount needed (Bulgaria, Croatia, Cyprus, the Czech Republic, Greece, Latvia, Luxembourg and Portugal).

While overall the EU as a whole is on track to achieve the required cumulative energy savings by 2020, greater effort is needed in the coming years from those Member States that have reported savings below the amount needed for 2015.

5. CONCLUSION

The latest data show that weather factors and economic growth might have reversed the downward trend in the energy consumption. Despite substantial reductions in the past that moved energy consumption closer to the 2020 targets the increases in 2015 and possibly also in 2016 indicate that reaching the targets may require additional efforts. While the 2015 and 2016 winters were colder than in 2014, which increased the demand for space heating, they were still milder than the climatic average. Economic growth still has a positive impact on the demand for energy and while the energy efficiency efforts largely offset the activity effect, more efforts may be needed to prevent further increases in energy consumption.

What is worth noting, economic growth was not necessarily accompanied by higher energy demand, and various countries with higher GDP growth between 2005-2015 managed to keep their energy consumption in check. They performed even better in terms of energy efficiency than countries with lower GDP growth. These include Slovakia, Malta, Luxembourg, Romania, Lithuania (Member States with over 20% GDP growth and primary energy consumption down by more than 10% in 2005-2015).

These findings are supported by successive studies that demonstrate that it is economically advantageous to implement energy efficiency measures. *The Macroeconomic and Other Benefits of Energy Efficiency*⁴¹ study shows that higher levels of efficiency are associated with macroeconomic impacts which are positive both for GDP and employment. In addition, energy efficiency helps reduce imports of fossil fuels which boosts the EU's trade balance, and also improves the energy security of Member States that are exposed to a highly concentrated supply source for gas. The binding 30% energy efficiency target proposed by the Commission will improve energy security by reducing fossil fuel imports by 12% in 2030 which corresponds to import savings of EUR 70 billion.

The two different decomposition methodologies analysed in this report confirm that energy efficiency was a key driver of the improvements in energy intensities across sectors. These largely neutralised or even exceeded the surge in energy demand driven by economic activity, higher heating and cooling comfort standards, and changes in behaviour and lifestyle. The competitiveness of the EU's industry and services has improved thanks to a decrease in energy intensity in almost all EU countries. The value that energy efficiency can generate in industry goes in fact beyond reduced energy bills and it encompasses broader long-term benefits⁴².

In order to step up efforts, it is essential that the policies and measures proposed in the 2017 NEAPs are implemented effectively. Article 7 is a key energy saving measure of the EED and contributes to the EU energy efficiency target. The savings reported for 2015 (28.5 Mtoe in cumulative terms) indicate good progress in the implementation of Article 7 across the EU.

⁴¹ https://ec.europa.eu/energy/sites/ener/files/documents/final_report_v4_final.pdf

⁴² These include improvements in worker comfort, product quality, overall flexibility and productivity, as well as reductions in maintenance cost, risk, production time and waste. (cf. IEA (2017), *Energy Efficiency 2017*).

However, this progress varies at national level – some countries have put in place ambitious energy efficiency measures that deliver significant savings over the first few years of the obligation period, while a number of Member States will need to increase their efforts if they want to meet their savings requirements due by the end of 2020.

EU and national policies should tap into the large cost-effective potential for energy savings represented by the building stock and speed up digitalisation in the energy sector. The building renovation market is estimated to be worth EUR 80-120 billion in 2030. To further unlock private financing for energy efficiency and renewables, the *Smart Finance for Smart Buildings*⁴³ (SFSB) initiative proposes specific measures to (i) use public funds more effectively, (ii) aggregate projects and support their development, and (iii) change the risk perception of financiers and investors.

Energy efficiency measures for buildings could also play an important role in reducing energy poverty. It has been estimated that potentially 1.5-8 million households could be removed from energy poverty depending on the specific measures adopted by Member States.

Furthermore, additional improvements in the transport sector are needed in most Member States. Against this background the revision of the light duty vehicles CO₂ legislation beyond 2020, together with an improved monitoring system, are of key importance, as reducing CO₂ emissions and energy consumption in transport is closely linked to fuel efficiency. Additional measures to promote more efficient use of transport, such as the revision of the Combined Transport Directive, a switch to collective transport modes, and a transition to zero- and low-emission vehicles, driven in particular by electro-mobility, will also be needed.

In addition, the proposed Regulation for the Governance of the Energy Union⁴⁴ should improve the coordination of efforts on energy efficiency and place them in the wider context of other energy policy goals. It will help the Commission and Member States to set their contribution and take the right corrective measures when needed.

The Commission will continue to closely monitor the progress of Member States towards their indicative national energy efficiency targets for 2020 and EED implementation.

The Commission also invites the European Parliament and the Council to express their views on this assessment.

⁴³ COM(2016) 860 final

⁴⁴ COM(2016) 759 final

Table 1: Overview indicators

MS	Trend to reach the 2020 target		Short-term trend		Whole economy	Industry	Residential	
	PEC 2005-2015 trend compared to PEC 2005-2020 trend to reach the 2020 target	FEC 2005-2015 trend compared to FEC 2005-2020 trend to reach the 2020 target	Change of PEC 2015 compared to PEC 2014 [%]	Change of FEC 2015 compared to FEC 2014 [%]	2005-2015 average annual change of PEC energy intensity [%]	2005-2015 average change of FEC energy intensity in industry [%]	2005-2015 average annual change of FEC in residential per capita with climatic corrections [%]	2005-2014 average annual change of FEC in residential per m ² with climatic corrections [%]
EU28	+	+	1.5%	2.1%	-2.0%	-2.0%	-0.4%	-2.3%
BE	+	-	1.2%	4.6%	-2.2%	-1.1%	-2.3%	-3.1%
BG	-	-	3.9%	5.5%	-2.9%	-5.7%	2.4%	-2.6%
CZ	+	+	1.6%	2.4%	-2.5%	-4.9%	1.2%	-1.0%
DK	+	+	-0.2%	3.2%	-2.1%	-2.3%	-0.2%	-2.1%
DE	-	-	0.6%	1.6%	-2.1%	-1.3%	-0.6%	-2.3%
EE	-	+	-6.3%	-1.8%	0.1%	-4.6%	1.6%	-0.5%
IE	+	+	4.6%	4.2%	-3.7%	-4.9%	-3.1%	-4.3%
EL	+	+	0.4%	6.3%	-0.2%	2.9%	-1.1%	-3.8%
ES	+	+	4.0%	1.6%	-1.8%	-2.3%	1.9%	-1.2%
FR	-	-	2.0%	2.7%	-1.7%	-1.1%	-0.6%	-1.7%
HR	+	+	4.4%	5.5%	-1.2%	-2.0%	0.6%	-3.1%
IT	+	+	4.0%	2.7%	-1.4%	-2.7%	0.9%	-0.7%
CY	+	+	2.0%	2.7%	-1.2%	1.8%	0.7%	-4.5%
LV	+	+	-2.1%	-2.5%	-1.8%	2.1%	-0.2%	-3.6%
LT	+	-	1.9%	-0.5%	-5.1%	-2.6%	2.0%	-1.2%
LU	+	+	-1.0%	-0.3%	-4.0%	-1.0%	-1.6%	-1.5%
HU	+	-	5.9%	6.9%	-1.6%	2.1%	1.1%	-4.6%
MT	+	-	-14.9%	5.1%	-5.3%	na	7.6%	-2.7%
NL	-	+	3.8%	2.5%	-1.6%	-1.6%	-1.3%	-2.6%
AT	+	-	2.9%	2.3%	-1.4%	-0.3%	0.8%	-1.5%
PL	+	+	0.9%	1.1%	-3.4%	-5.1%	1.2%	-1.3%
PT	+	+	4.9%	1.7%	-1.2%	-0.9%	0.7%	-4.6%
RO	+	+	2.1%	0.8%	-4.1%	-6.3%	1.6%	-1.7%
SI	+	+	-0.9%	2.2%	-1.8%	-3.3%	0.9%	-1.0%
SK	+	-	0.8%	0.9%	-4.7%	-5.4%	-0.9%	-1.9%
FI	+	+	-4.8%	-1.3%	-0.7%	0.0%	-0.1%	-1.1%
SE	+	-	-5.5%	1.8%	-2.8%	-1.5%	-0.4%	-1.3%
UK	+	+	0.0%	1.3%	-3.0%	-2.3%	-2.9%	-3.8%
Source and extraction date	Eurostat 06/2017	Eurostat 06/2017	Eurostat 06/2017	Eurostat 06/2017	Eurostat 06/2017	Eurostat 09/2017	Eurostat 06/2017	Odyssee 07/2017

* Symbol "+" is used if Member States decreased their primary and final energy consumption between 2005 to 2015 at a rate which is higher than the rate of decrease which would be needed in the period 2005 to 2020 to meet the 2020 primary and final energy consumption targets. Symbol "-" was used for the other cases. FEC – final energy consumption, PEC – primary energy consumption.

Table 2: Overview indicators

MS	Services		Transport		Generation	
	2005-2015 average change of FEC energy intensity in the service sector [%]	2005-2015 average annual change of total FEC in the transport sector in %	2015 vs. 2005 change of share of trains, buses and coaches for passenger transport [%]	2015 vs. 2005 change of share of railway and inland waterways for freight transport [%]	2005-2015 average annual change of heat generation from CHP [%]	2015-2005 average annual change of ratio Transformation output/Fuel input of thermal power generation [%]
EU28	● -0.9%	● -0.3%	● 0.2%	● -0.4%	● -1.0%	● 0.0%
BE	● 0.3%	● 0.5%	● -1.0%	● 0.8%	● 6.8%	● 1.6%
BG	● -1.0%	● 1.8%	● -11.6%	● 10.3%	● 0.6%	● 0.7%
CZ	● -2.6%	● 0.7%	● 1.4%	● -5.0%	● -0.8%	● 0.3%
DK	● -1.7%	● -0.7%	● -1.7%	● 0.1%	● -1.7%	● -0.1%
DE	● -0.5%	● 0.1%	● 0.0%	● -1.6%	● -1.0%	● 0.3%
EE	● 0.9%	● 0.3%	● -1.2%	● -27.6%	● 2.6%	● -0.1%
IE	● -4.7%	● -0.7%	● 1.7%	● -0.9%	● 0.0%	● 0.9%
EL	● 1.3%	● -1.9%	● -3.1%	● -1.1%	● 1.3%	● 1.0%
ES	● 0.4%	● -1.6%	● 0.6%	● 0.7%	● 0.0%	● -1.1%
FR	● -0.3%	● 0.0%	● 2.2%	● 0.2%	● -6.0%	● -0.5%
HR	● 0.0%	● 1.0%	● -2.1%	● 5.2%	● -0.8%	● 0.7%
IT	● 0.4%	● -1.2%	● 0.4%	● 3.4%	● 1.2%	● 0.4%
CY	● 1.5%	● -1.1%	● -2.1%	● 0.0%	● 0.0%	● 1.2%
LV	● -1.5%	● 1.0%	● -6.1%	● -4.4%	● 3.1%	● 3.6%
LT	● -2.1%	● 2.9%	● 0.5%	● -8.3%	● -4.1%	● 3.0%
LU	● -2.0%	● -1.3%	● 2.6%	● -13.8%	● -2.6%	● 0.1%
HU	● -5.1%	● 0.3%	● -4.2%	● 1.4%	● -6.6%	● -1.1%
MT	na	● 5.8%	● -1.9%	● 0.0%	● 0.0%	● 4.4%
NL	● -2.0%	● -0.6%	● 2.0%	● 2.5%	● -0.7%	● 0.5%
AT	● -3.0%	● 0.0%	● 1.6%	● -3.8%	● 2.8%	● -0.3%
PL	● -1.6%	● 3.4%	● -9.1%	● -11.1%	● -1.5%	● 0.1%
PT	● -1.6%	● -0.8%	● -0.1%	● 4.9%	● 4.6%	● -0.2%
RO	● -0.9%	● 2.8%	● -4.4%	● 18.5%	● -4.3%	● -0.4%
SI	● -1.0%	● 2.3%	● -0.5%	● 4.2%	● 0.2%	● 0.8%
SK	● -4.8%	● -0.4%	● -5.2%	● -9.3%	● 0.1%	● 0.5%
FI	● -0.1%	● 0.3%	● -0.2%	● 2.1%	● -0.7%	● -0.3%
SE	● -2.8%	● 0.1%	● 2.4%	● -3.0%	● 2.2%	● 0.9%
UK	● -1.5%	● -0.7%	● 2.3%	● 0.3%	● 0.0%	● -0.2%
Source and extraction date	Eurostat 06/2017	Eurostat 06/2017	DG MOVE Pocketbook 2017	DG MOVE Pocketbook 2017	Eurostat 05/2017	Eurostat 05/2017

Table 3: Overview of reported energy savings for 2015 under Article 7 (ktoe)

MS	Savings 2014	Cumulative savings 2014-2015	Cumulative savings requirements by 2020	Progress towards total cumulative savings requirement by 2020	Estimated level of cumulative savings in 2015 on the basis of linear delivery	Reported savings for 2015 compared the estimated level
BE	330	875	6911	13%	740	118%
BG	29	79	1942	4%	208	38%
CZ	16	88	4882	2%	523	17%
DK	204	443	3841	12%	412	108%
DE	2548	5883	41989	14%	4499	131%
EE	41	100	610	16%	65	153%
IE	71	279	2164	13%	232	120%
GR	74	208	3333	6%	357	58%
ES	556	1634	15979	10%	1712	95%
FR	1571	3804	31384	12%	3363	113%
HR	2.5	45	1296	2%	139	19%
IT	1298	2697	25502	11%	2732	99%
CY	2.2	6.5	242	3%	26	25%
LV	11	30	851	4%	91	33%
LT	45	98	1004	10%	108	91%
LU	0	9	515	2%	55	16%
HU	75	349	3680	9%	394	89%
MT	4	11	67	16%	7.2	149%
NL	666	1796	11512	16%	1233	146%
AT	714	1339	5200	26%	557	240%
PL	218	1550	14818	10%	1588	98%
PT	46	111	2532	4%	271	41%
RO	364	701	5817	12%	623	113%
SI	18	105	945	11%	101	103%
SK	72	257	2284	11%	245	105%
FI	561	1140	4213	27%	451	253%
SE	252	1516	9114	17%	977	155%
UK	1264	3388	27859	12%	2985	114%
Total	11055	28522	230486	12%	24695	115%

Source: information reported by Member States and complemented by the Commission's calculations and approximations where necessary.