



## **Monitoring SDGs at EU level with composite indicators**



**May 2018**



## 1. SDG Composite indicators for EU countries

With this Report, the Italian Alliance for Sustainable Development (ASviS) releases a unique set of composite indicators synthesizing the elementary indicators of each EU28 Member State on the Sustainable Development Goals (SDGs), the first experiment of this kind in the international panorama. Complexity represents the biggest challenge in monitoring the 2030 Agenda. In this perspective, composite indicators do not represent a simplification of the problem, but an instrument that allows for a first, quick and concise view of performances related to each Goal.

The results of this project<sup>1</sup> provide stakeholders and media with synthetic, clear and easy-to-read evaluations of both EU and countries' progress vis-à-vis each Goal. Moreover, it proves the usefulness of a tool that allows to monitor the overall situation of the EU28 countries, providing an insight on the direction the countries are heading to and if they are going in the right direction towards the achievement of the SDGs. Of course, starting from this work, each Member State can now further develop its own composite indicators using additional elementary indicators. Finally, this research could be an important step for data monitoring and reporting on the SDGs in the international context, stimulating more in-depth analyses of indicators.

The elementary indicators provided by Eurostat's database have been summarized using the AMPI methodology<sup>2</sup>, the same methodology applied to create the Italian composite indicators released in the 2017 ASviS Report. AMPI respects the desirable properties of a composite index<sup>3</sup> and maintains a level of simplicity that enables communication with the public. Starting from the Eurostat's database on SDGs, an overall analysis of countries and EU28 average trends of composite indicators has been produced for each Goal from 2010 to, at least, 2015, according to the available data.

### 1.1 Indicators selection: the criteria

The selection of the elementary indicators to be used in a composite indicator (henceforth, "composite") reflects, always and necessarily, values and priorities of the institutions entitled to select them. This is why, in order to obtain a legitimacy at different levels (political, civil society, and so on), the selection of the elementary indicators (especially at the national level) should follow a process able to promote a debate and a dialogue between different stakeholders with the aim of reaching a wide consensus, as done in Italy with the Project on "Equitable and Sustainable Wellbeing"<sup>4</sup>.

In our work the selection of the indicators for each Goal took into account the following methodological and technical aspects:

- *number of indicators*: the number of indicators should be limited, giving priority to those aspects that contribute most to each Goal;
- *conceptual orientation of indicators*: indicators should be clearly positively or negatively "linked" to the concept expressed by the Goal and indicators liable of ambiguous interpretations should be avoided;

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<sup>1</sup> The project was carried out by Filomena Maggino, Adolfo Morrone, Andrea Stefani, Federico Olivieri, Balint Cocchioni

<sup>2</sup> Mazziotta M. & A. Pareto. 2016. "On a Generalized Non-Compensatory Composite Index for Measuring Socio-economic Phenomena". *Social Indicators Research* 127 (3): 983-1003

<sup>3</sup> Composite indicators and composite index are used such as synonymous.

<sup>4</sup> <https://www.istat.it/it/benessere-e-sostenibilit%C3%A0/misure-del-benessere>

Moreover, the selection should prefer indicators which:

- are *made available on a regular basis*, with reference to the past (time series) and to the future (planned surveys);
- can be *broken down at territorial* (e.g., National comparison) *and social level* (e.g., comparison by age groups, gender, etc.);
- have a *high-quality*, being produced by official sources or by unofficial sources that adopt the same quality criteria of the former (relevance, accuracy, accessibility, comparability, consistency and timeliness).

The selection of the indicators did not ignore what has been defined at international level on the monitoring of SDGs, by taking into account the relevance and adequacy of indicators. Therefore, for the time being the selection was carried out using exclusively indicators available in the Eurostat's dataset "Sustainable Development indicators"<sup>5</sup>.

## 1.2 *How to interpret composite indicators for SDGs*

In this first paper we aim at monitoring the trends of each Goal from 2010 to the most recent year (2015-2016 or 2017). The AMPI methodology allows to evaluate the progress of all Goals against a base year (in our case the year 2010), even though different indicators may have time series of different length. Therefore, it is important to underline that the composite indicators do not measure the distance from the UN target to be reached by 2030. However, for Goal 13 we produced one experimental composite indicator related to final Targets, using the EU 2020 targets (see chapter 4).

For each of the Goals, this paper provides the following information:

- the indicators excluded from composite indicators and the specific reasons why they could not be considered;
- the list of the selected indicators, their polarity, minimum and maximum observed values as well as their average values and standard deviation;
- a correlation matrix among the elementary indicators used for each composite indicator;
- an analysis of the EU28 composite indicators, explaining which elementary indicator influenced mostly the composite's trend, as well some comments on the results of EU Member State;
- an influence analysis in order to assess the effect of specific elementary indicators on each composite (the weight of an elementary indicator is measured in terms of the changes in the ranking of countries caused by its removal);
- an appendix with the list of all elementary indicators used, their measure units, the estimates made in case of missing data, and elaboration made on each indicator' units.

The research carried out allowed to produce an analysis at both national and EU28 levels for all 17 Goals except for Goal 6 and Goal 14. For Goal 14, due to the absence of indicators with national detail, we only managed to create a composite indicator at the European level. Regarding Goal 6, it is important to underline the absence, within the Eurostat database, of reliable indicators, of time

<sup>5</sup> <http://ec.europa.eu/eurostat/web/sdi/indicators>

series and country disaggregation. We take this opportunity to flag the need to produce better data regarding one of the most important themes for the well-being of European citizens.

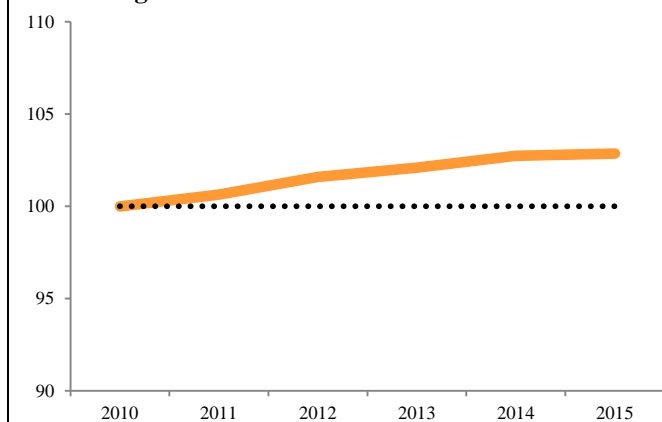
## **2. Trends of composite indicators for the EU-28**

In this chapter an overview of the trends for each Goal for the EU28 average is presented according to their direction. In the first section the Goals with an increasing trend are described, then the Goals with a stable trend and finally those with a decreasing trend. Both Goals with stable and decreasing trends are matter of concern because they highlight situations where Europe is not heading in the right direction for the achievement of the 2030 Agenda.

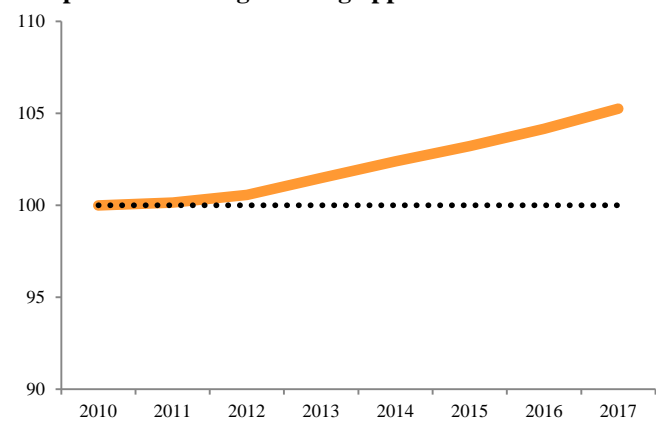
For nine Goals EU-28 composite indicators show a positive trend. While the composite for Goal 3 (health) shows a slight increase between 2010 and 2015, the indicators for Goal 4 (education), Goal 5 (gender equality), Goal 7 (energy), Goal 9 (infrastructures and innovation), Goal 12 (responsible production and consumption) and Goal 13 (climate change) show a remarkable positive development, outreaching in all cases the 105 point mark in the last observed year. The composite indicator of Goal 8 (growth and employment) shows a stability until 2014, while in the last two years the situation improves thanks to the slight improvement of employment indicators.

However, it is important to underline the stability over the last few years of the composite indicators of Goal 7, Goal 12 and Goal 13, due to the raise of the indicators related to energy consumption and GHG emissions during the economic recovery. These trends show how long is the road towards the implementation of the Paris Agreement and the achievement of related SDGs.

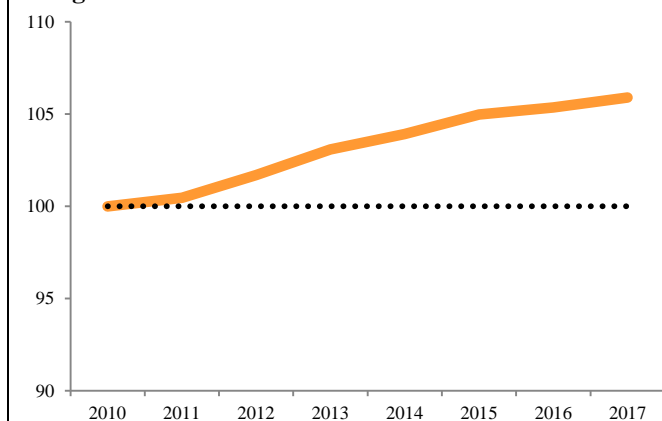
**Goal 3 - Ensure healthy lives and promote well-being for all at all ages.**



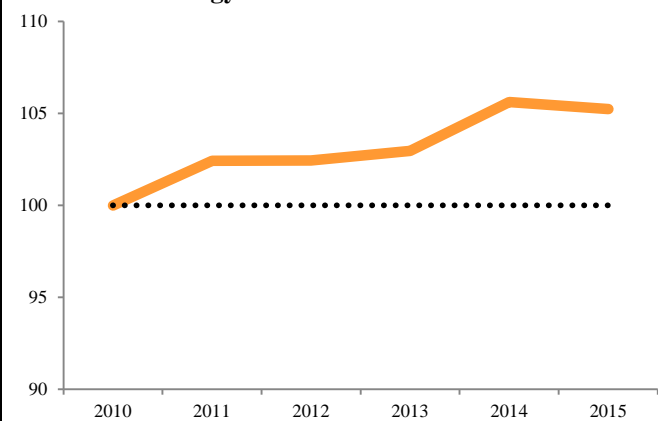
**Goal 4 - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.**



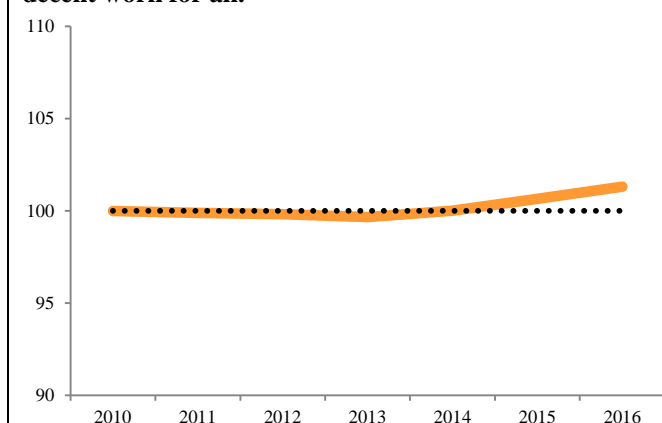
**Goal 5 - Achieve gender equality and empower all women and girls.**



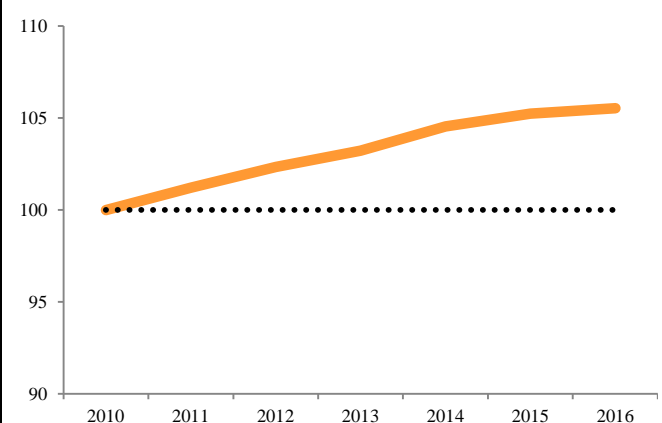
**Goal 7 - Ensure access to affordable, reliable, sustainable and modern energy for all.**



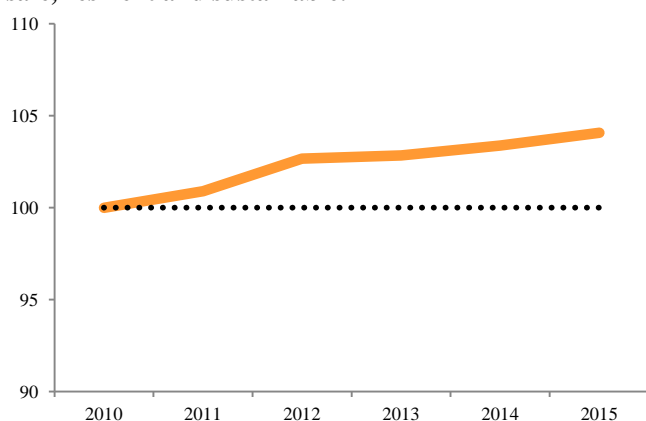
**Goal 8 - Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.**



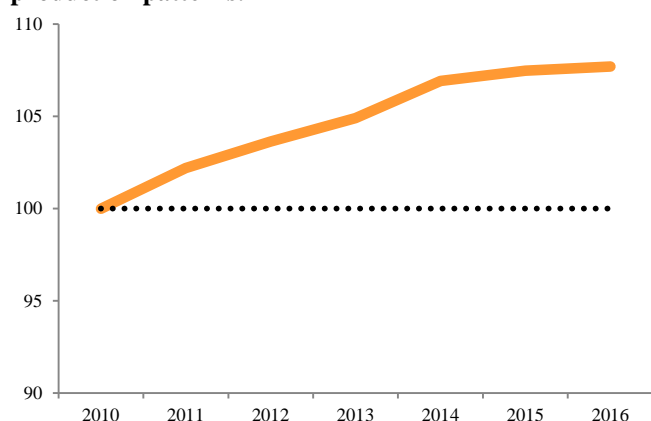
**Goal 9 - Build resilient infrastructure, promote sustainable industrialization and foster innovation.**



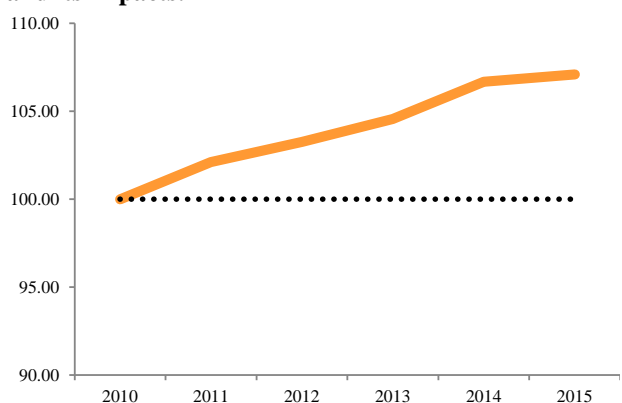
**Goal 11 - Make cities and human settlements inclusive, safe, resilient and sustainable.**



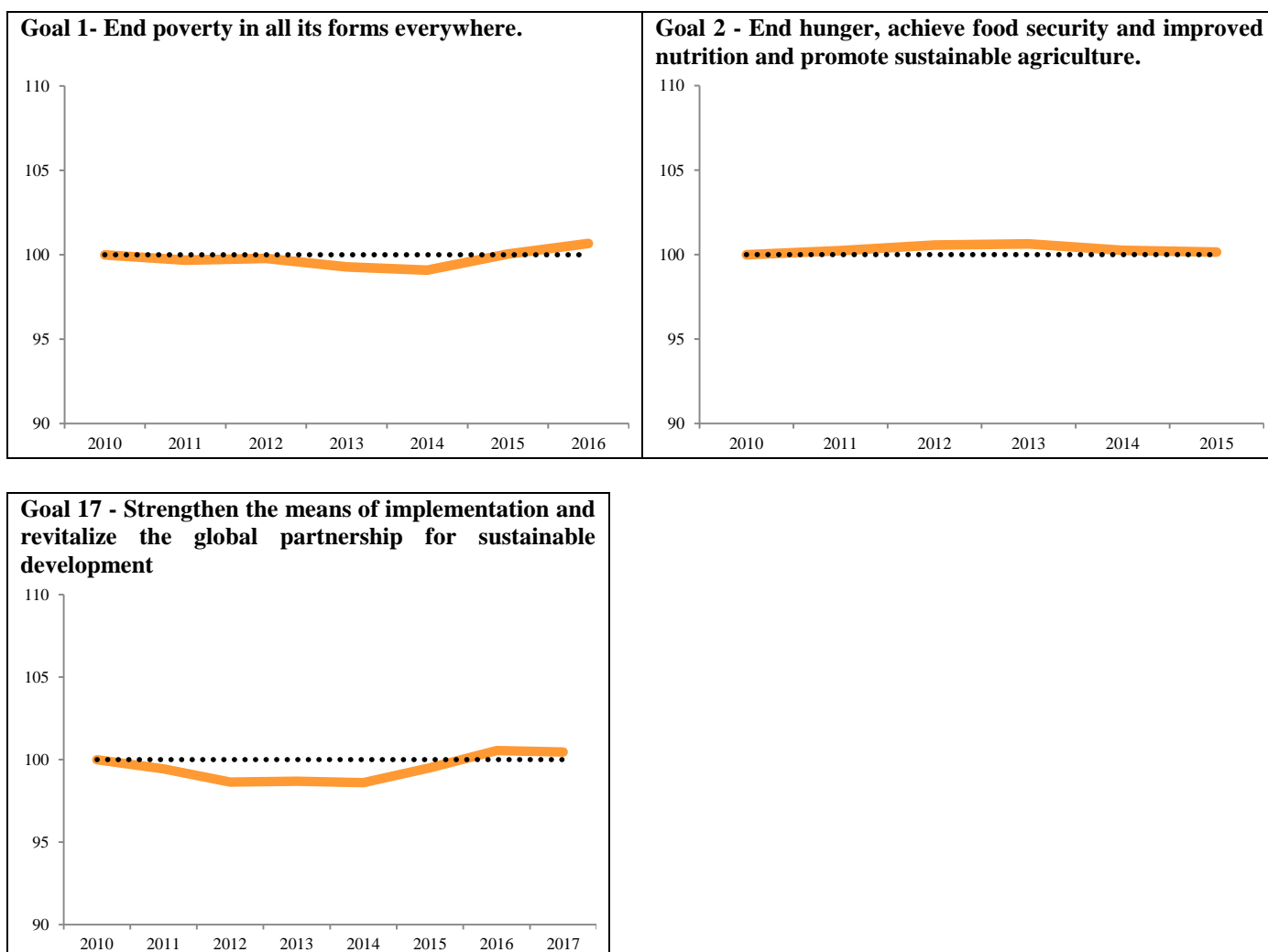
**Goal 12 - Ensure sustainable consumption and production patterns.**



**Goal 13 - Take urgent action to combat climate change and its impacts.**

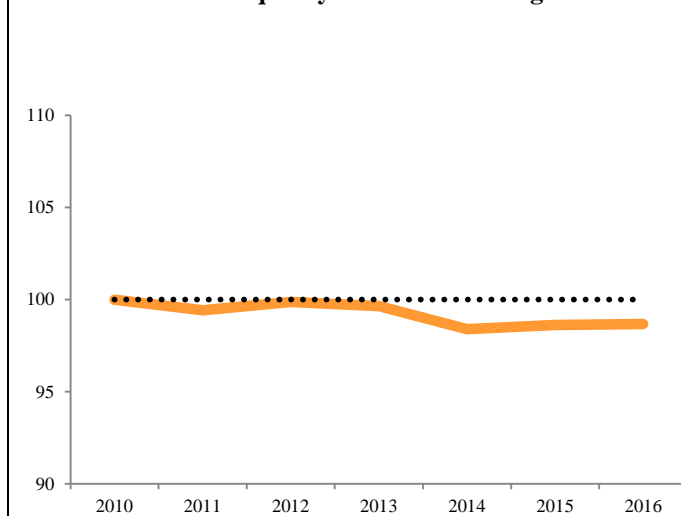


Goal 1 (poverty), Goal 2 (food) and Goal 17 (partnership) do not show any evident trend. For Goal 1 and Goal 17 the stability is mainly explained by an overall compensation between the tiny variations of the elementary indicators included in the composite indicators, while for Goal 2 it is caused by the compensation between the positive increase of the “Area under organic farming” and the negative trend of “Ammonia emissions from agriculture”.

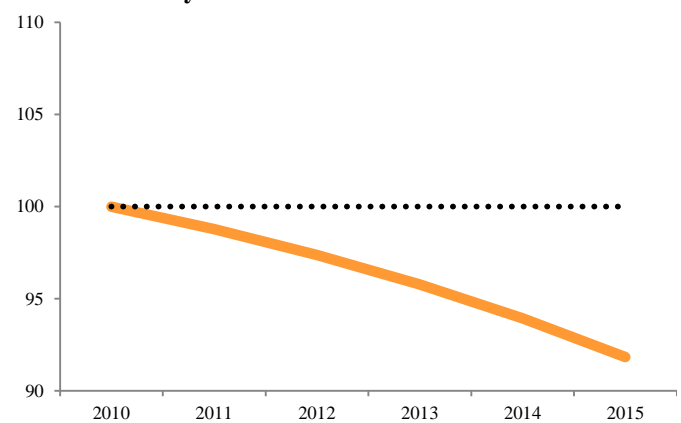


Finally, Goal 10 (inequalities), Goal 15 (terrestrial ecosystems) and Goal 16 (institutions) show a negative trend. For Goal 10 the deterioration happens in 2013 and 2014, notwithstanding the economic recovery, due to the worsening of the indicators related to poverty and inequalities. After 2014, the stability is the result of the raise of disposable income and the decline of the other indicators, especially the increase of the distance from the poverty threshold. The negative trend of Goal 15, attributable to a significant increase of “Change in artificial land cover” is by far the worst among all the presented trends. Finally, the decreasing evolution of Goal 16 is mainly due to the strong worsening of the indicator on the level of confidence in the EU Parliament.

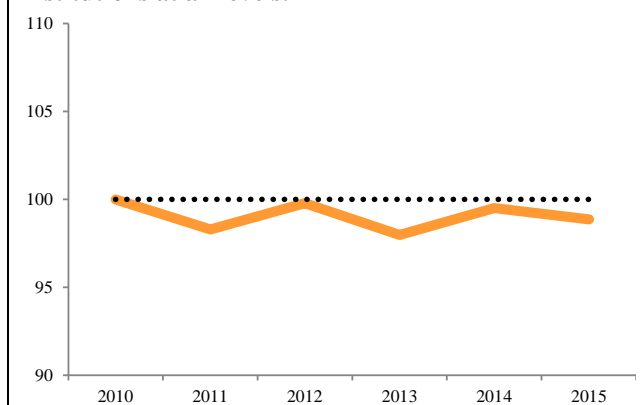
**Goal 10 -Reduce inequality within and among countries**



**Goal 15 -Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.**



**Goal 16 - Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.**





### 3. Results by Goal

#### *Goal 1 - End poverty in all its forms everywhere*

#### Descriptive analysis of elementary indicators

The composite indicator for SDG 1 was built using the indicators listed in Table 1. The indicator “Population having neither a bath, nor a shower, nor indoor flushing toilet in their household” (sdg\_6\_10) has been excluded from the composite indicator because, on one hand, there is a lack of data availability and, on the other hand, the value of the indicator is frequently 0 for most countries. The indicators “People at risk of income poverty after social transfers” (sdg\_1\_20), “Severely materially deprived people” (sdg\_1\_30) and “Population unable to keep home adequately warm by poverty status” (sdg\_7\_60) have been excluded from the composite indicator because they are already included inside the indicator “People at risk of poverty or social exclusion” (sdg\_1\_10).

**Table 1.1 – List of the elementary indicators used for the composite indicator of SDG1**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_01_10	People at risk of poverty or social exclusion	-	13.3	49.3	23.8	6.9
sdg_01_40	People living in households with very low work intensity	-	4.9	24.2	10.0	3.3
sdg_01_50	Housing cost overburden rate	-	1.1	40.9	9.9	7.3
sdg_01_60	Population living in a dwelling with a leaking roof, damp walls, floors or foundation or rot in window frames or floor	-	4.4	34.7	15.6	6.4
sdg_03_60	Self-reported unmet need for medical care	-	0.0	16.1	3.1	3.8
sdg_11_10	Overcrowding rate by poverty status	-	1.4	55.7	18.9	15.5

Correlation does not affect the composite indicator. Indicators always have a correlation lower than 0,75.

**Table 1.2 – Correlation matrix of elementary indicators of SDG1**

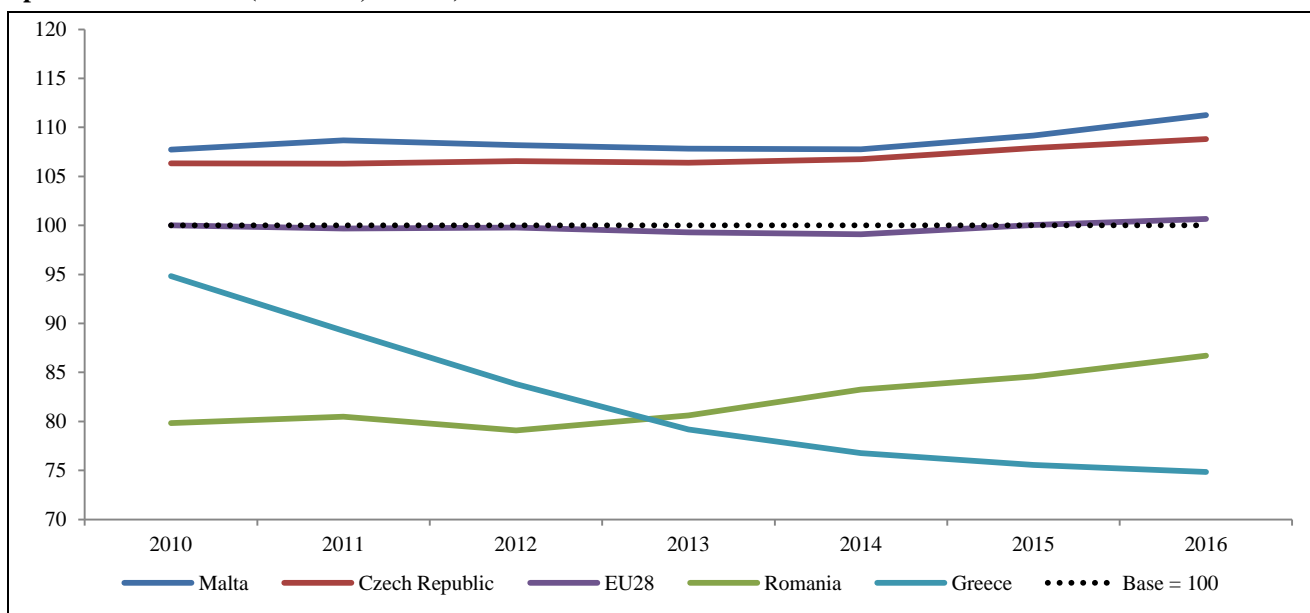
	sdg_01_10	sdg_01_40	sdg_01_50	sdg_01_60	sdg_03_60	sdg_11_10
sdg_01_10	1.00	0.39	0.45	0.26	0.44	0.55
sdg_01_40	0.39	1.00	0.41	0.05	0.04	-0.18
sdg_01_50	0.45	0.41	1.00	-0.06	0.37	0.27
sdg_01_60	0.26	0.05	-0.06	1.00	-0.05	-0.07
sdg_03_60	0.44	0.04	0.37	-0.05	1	0.37
sdg_11_10	0.55	-0.18	0.27	-0.07	0.37	1.00

## Composite indicator

The overall EU28 composite indicator for SDG 1 shows a stable trend in the observed period (2010-2016), staying near the 100 point mark. The composite indicator decreases until 2014 reaching the 99,1 point mark, due to the slight increase of indicators 1\_10 and 1\_40. However, in 2016 the composite indicator goes back to the 2010 value=100 because of the decrease of indicators 3\_60 and 1\_10 that goes back to the 2010 value.

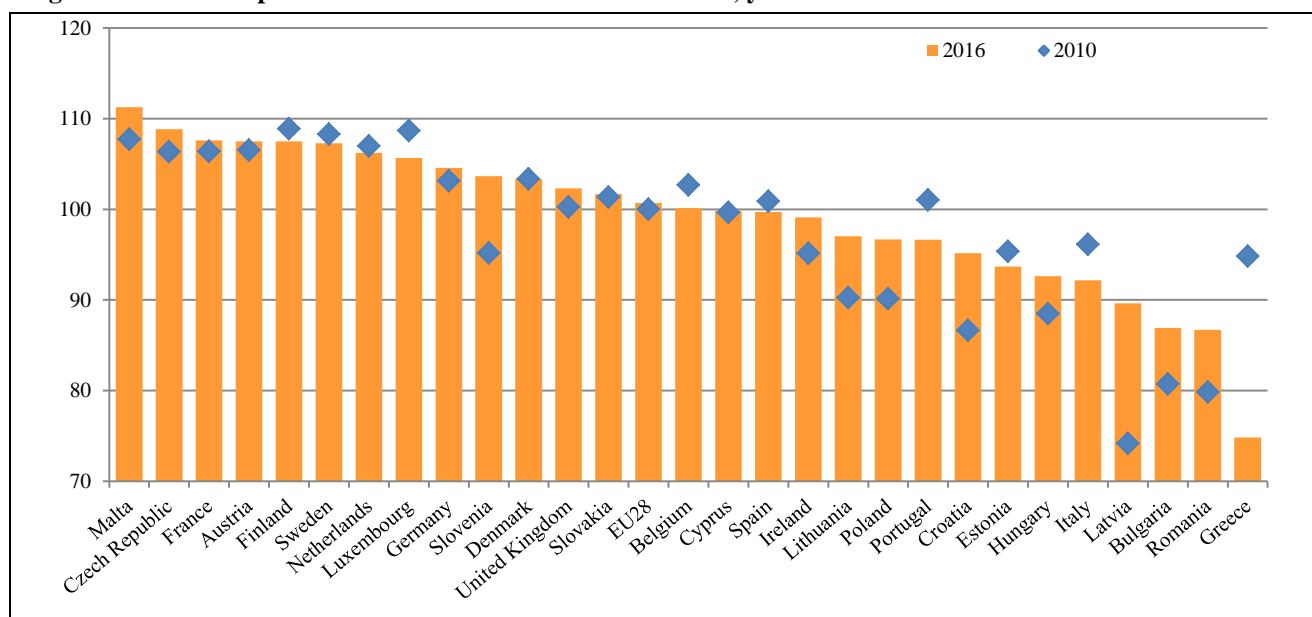
There are substantial differences between member states. In fact, while the best performers (Malta and Czech Republic) have slight increasing trends, staying in the last year well above 100, the worst performer (Greece) has seen its situation decrease dramatically from an already low value of 93 in 2010 to 77 in 2016.

**Fig. 1.1 – Composite indicators of SDG 1. EU28 average, best performers (Malta, Czech Republic) and worst performers in 2016 (Romania, Greece). Base EU28 2010=100**



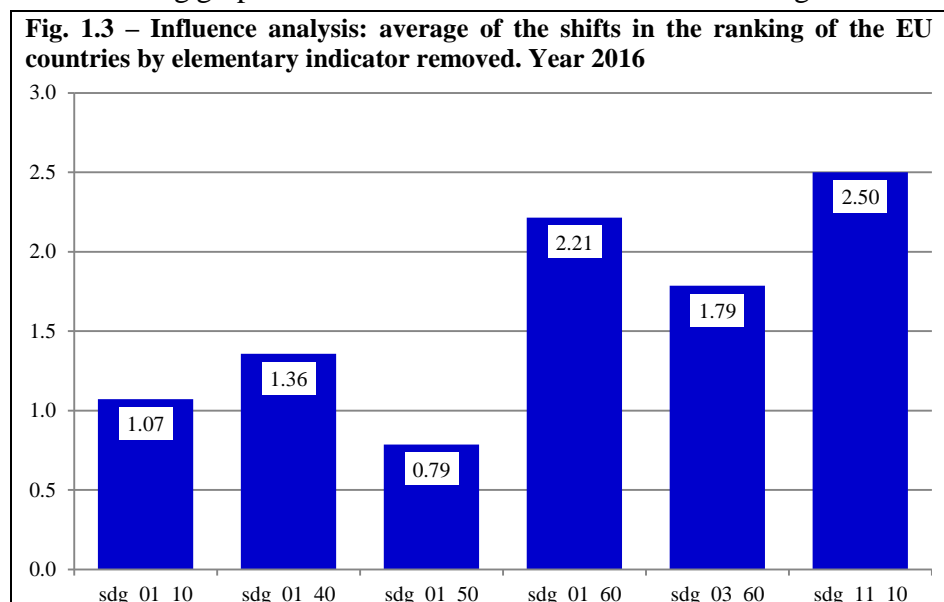
Comparing the composite indicator for all EU28 countries, we can see that the situation has changed in different ways all around Europe. The countries that improved the most are Latvia, Slovenia and Croatia. On the other hand, Portugal Italy and Greece's composite indicators decrease significantly. Greece's situation decreased drastically due to the dramatic increase of the people at risk of poverty and social exclusion (sdg\_1\_10: from 27.7% in 2010 to 36.6% in 2016). Moreover, the population living in households that spend 40% or more of the household disposable income on housing (sdg\_7\_60) raises from 18.1% in 2010 to 40.5% in 2016.

**Fig. 1.2 – SDG1 composite indicator scores for EU28 countries, years 2010 and 2016. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of the shifts in the ranking due to the removal of each elementary indicator.



The indicator “Overcrowding rate by poverty status” (sdg\_11\_10) has a higher impact on the composite indicator because removing this indicator will change the ranking of the countries on an average of 2.5 positions, while other elementary indicators, such as sdg\_01\_50 “housing cost overburden rate” have a smaller influence on the composite indicator.

## Appendix

**Table 1.3 – Results of the composite indicator for SDG 1. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015	2016
Belgium	102.7	100.3	100.9	101.5	100.6	100.5	100.1
Bulgaria	80.7	80.1	80.4	80.7	87.0	87.4	86.9
Czech Republic	106.3	106.3	106.6	106.4	106.7	107.9	108.8
Denmark	103.3	102.3	102.4	101.1	102.2	102.4	103.3
Germany	103.1	102.6	103.4	103.4	103.7	104.4	104.6
Estonia	95.4	97.7	97.1	96.9	95.4	96.1	93.7
Ireland	95.1	93.4	92.6	92.3	94.9	98.1	99.1
Greece	94.8	89.2	83.8	79.2	76.8	75.6	74.8
Spain	100.9	100.8	101.3	98.9	97.1	99.3	99.7
France	106.4	107.1	107.1	107.4	106.2	108.1	107.6
Croatia	86.6	88.0	89.0	91.4	92.3	93.7	95.2
Italy	96.1	93.5	93.6	91.9	90.8	91.0	92.1
Cyprus	99.6	99.6	98.7	96.7	98.4	99.0	99.8
Latvia	74.2	74.8	80.9	80.4	82.4	88.0	89.6
Lithuania	90.2	94.7	96.9	94.8	97.1	97.4	97.0
Luxembourg	108.7	109.6	108.1	108.2	108.2	108.9	105.6
Hungary	88.5	88.0	85.8	85.1	87.2	91.4	92.6
Malta	107.7	108.7	108.2	107.8	107.7	109.2	111.3
Netherlands	107.0	106.7	106.1	105.5	104.7	105.2	106.2
Austria	106.5	106.3	107.6	107.0	107.2	107.5	107.5
Poland	90.1	91.6	91.3	92.2	93.8	94.5	96.7
Portugal	101.0	102.0	99.3	93.0	92.2	95.8	96.6
Romania	79.8	80.5	79.1	80.6	83.3	84.6	86.7
Slovenia	95.2	97.2	99.0	100.9	99.1	101.8	103.6
Slovakia	101.3	100.6	100.9	101.1	101.8	102.2	101.7
Finland	108.9	107.5	107.9	108.6	108.4	107.6	107.5
Sweden	108.3	107.1	108.5	107.1	107.7	107.2	107.3
United Kingdom	100.3	101.1	101.7	101.4	100.5	101.2	102.3
<b>EU28</b>	<b>100.0</b>	<b>99.7</b>	<b>99.8</b>	<b>99.3</b>	<b>99.1</b>	<b>100.0</b>	<b>100.7</b>

## ***Goal 2 - End hunger, achieve food security and improved nutrition and promote sustainable agriculture***

### **Descriptive analysis of elementary indicators**

The composite indicator for SDG 2 was built using the indicators listed in Table 2.1. Four elementary indicators were excluded from the composite indicator: “Obesity rate by body mass index” (sdg\_02\_10), “Nitrate in groundwater” (sdg\_06\_40), “Estimated soil erosion” (sdg\_15\_50) and “Common bird index by type of species” (sdg\_15\_60). All four indicators were excluded for a lack of available data in their time series.

**Table 2.1 – List of the elementary indicators used for the composite indicator of SDG 2**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_02_20	Agricultural factor income per annual work unit (AWU)	+	3026.0	60716.0	17414.9	10837.7
sdg_02_30	Government support to agricultural research and development	+	24.8	1830.6	119.6	76.2
sdg_02_40	Area under organic farming	+	0.1	20.3	7.2	5.1
sdg_02_50	Gross nutrient balance on agricultural land	+	1.0	199.0	67.6	49.0
sdg_02_60	Ammonia emissions from agriculture	-	68.7	114.6	99.0	8.8

Correlation does not affect the composite indicator. The highest correlation coefficient is lower than 0.75 in absolute terms for every pair of indicators (Table 2.2).

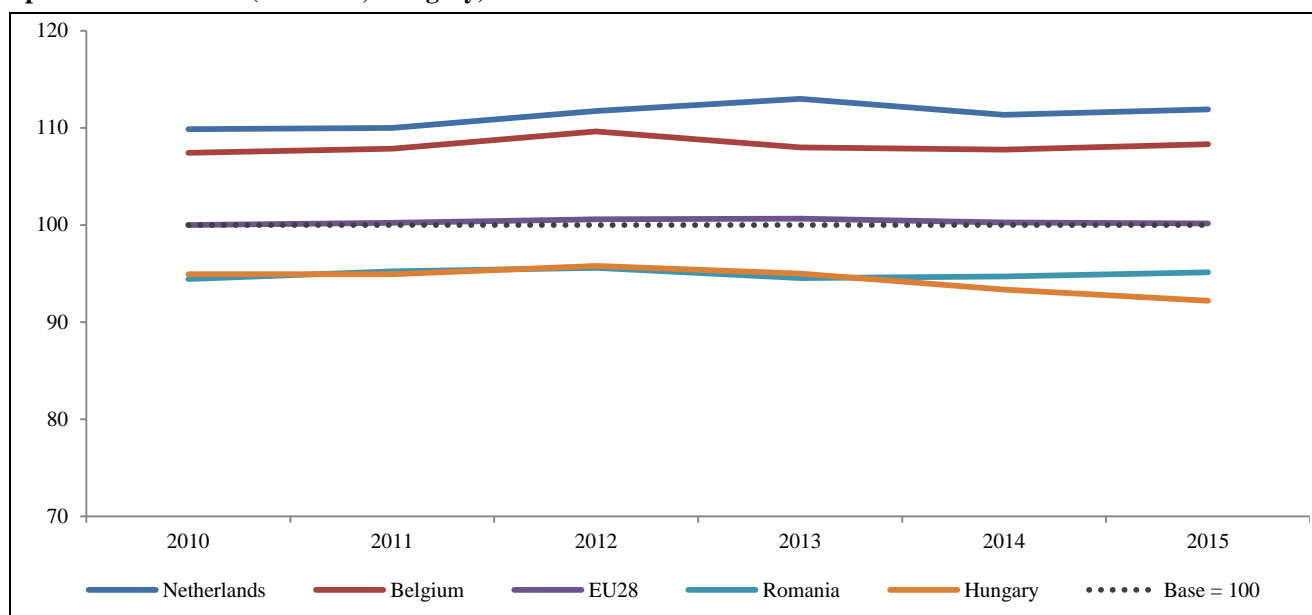
**Table 2.2 – Correlation matrix of elementary indicators of SDG2**

	sdg_02_20	sdg_02_30	sdg_02_40	sdg_02_50	sdg_02_60
sdg_02_20	1.00	-0.09	-0.04	0.51	0.18
sdg_02_30	-0.09	1.00	-0.17	0.12	0.00
sdg_02_40	-0.04	-0.17	1.00	-0.35	0.38
sdg_02_50	0.51	0.12	-0.35	1.00	-0.14
sdg_02_60	0.18	0.00	0.38	-0.14	1.00

## Composite indicator

The overall EU28 composite indicator for SDG 2 shows a stable trend in the observed period (2010-2015), staying near the 100 point mark. This trend is explained by weak fluctuations of the indicators and by the compensation between the increase of the “Area under organic farming” (sdg\_02\_40) and the increment of “Ammonia emissions from agriculture” (sdg\_02\_60).

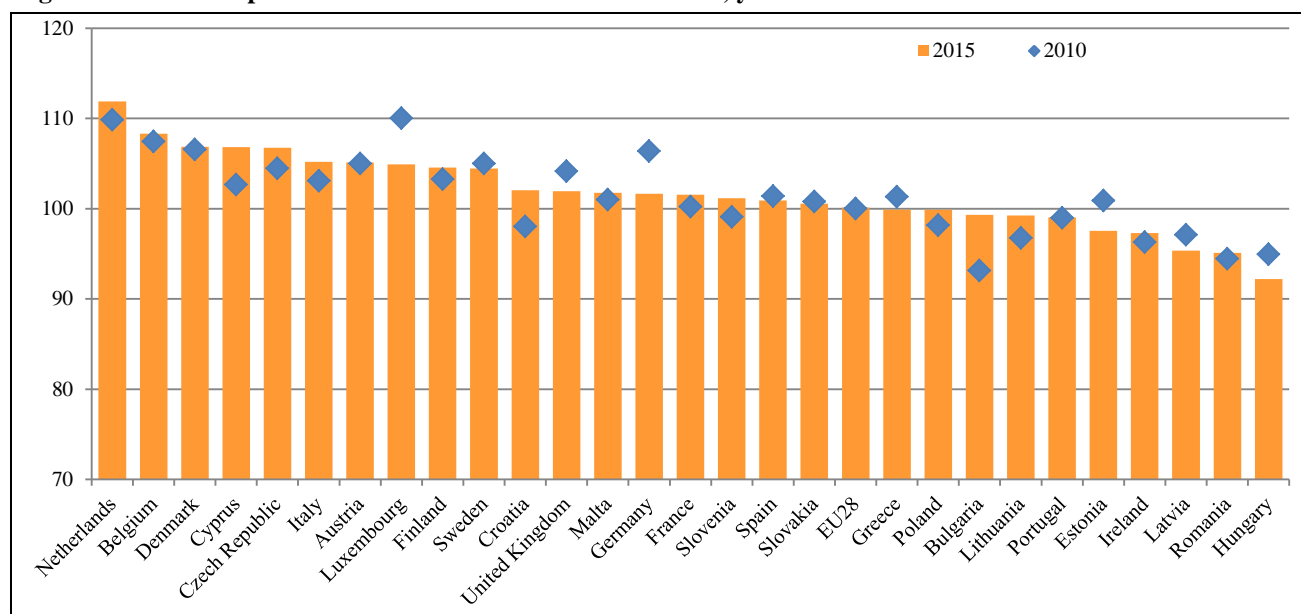
**Fig. 2.1 – Composite indicators of SDG 2. EU28 average, best performers (Netherlands, Belgium) and worst performers in 2015 (Romania, Hungary). Base EU28 2010=100**



However, there are substantial differences between the performances of individual countries. In fact, while the best performer (Netherlands) moved from 109.9 to 111.9 in 5 years, the worst performer (Hungary) has seen its situation worsen from 94.94 in 2010 to 92.2 in 2015.

Comparing the composite indicator for all EU28 countries, we can see that the situation has been stable for the majority of member states. The countries that improved the most are Bulgaria, Cyprus, and Croatia. On the other hand, Germany’s situation declined, reaching the 101 point mark. This can be explained by the decrease of the “Agricultural factor income per annual work unit” (sgd\_02\_20) and the increase of the “Ammonia emissions from agriculture” (sdg\_02\_60).

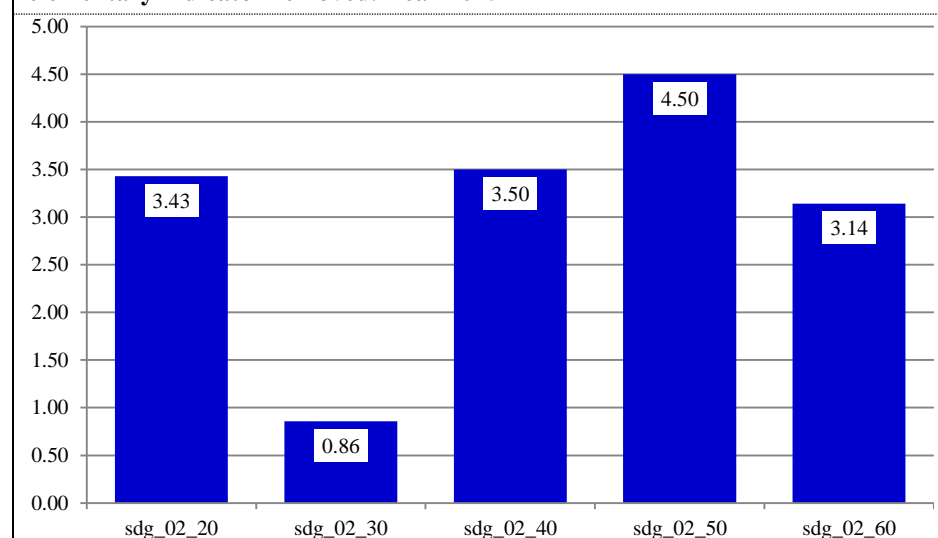
**Fig. 2.2 – SDG2 composite indicator scores for EU28 countries, years 2010 and 2015. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of the shifts in the ranking of the countries caused by the removal of each elementary indicator. The indicator “Gross nutrient balance on agricultural land”

**Fig. 2.3 – Influence analysis: shifts in the ranking of the EU countries by elementary indicator removed. Year 2015**



(sdg\_02\_50) has the higher impact, effecting the ranking of the countries average of 4.5 positions, whereas the indicator “Government support to agricultural research and development” (sdg\_02\_30) has very little influence on the composite indicator.

## Appendix

**Table 2.3 – Results of the composite indicator for SDG 2. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015
Belgium	107.4	107.8	109.6	108.0	107.7	108.3
Bulgaria	93.1	93.8	95.8	98.2	99.0	99.3
Czech Republic	104.5	106.9	107.4	105.9	105.3	106.8
Denmark	106.6	107.7	110.4	109.4	109.1	106.9
Germany	106.4	105.8	105.0	105.0	103.6	101.7
Estonia	100.9	102.0	101.7	101.0	99.6	97.5
Ireland	96.3	97.3	97.1	97.9	97.6	97.3
Greece	101.3	99.5	101.5	100.9	100.9	99.9
Spain	101.4	101.9	102.7	101.9	101.7	100.9
France	100.2	102.0	101.1	101.1	101.3	101.5
Croatia	98.0	98.5	98.3	99.2	102.4	102.1
Italy	103.1	102.7	103.1	104.9	104.9	105.2
Cyprus	102.7	103.7	105.6	106.8	107.1	106.8
Latvia	97.1	97.3	96.2	95.1	94.5	95.3
Lithuania	96.8	98.1	98.0	98.7	97.8	99.3
Luxembourg	110.0	111.4	111.1	107.4	108.2	104.9
Hungary	94.9	94.9	95.8	95.0	93.3	92.2
Malta	101.0	100.6	99.7	99.8	99.9	101.8
Netherlands	109.9	110.0	111.7	113.0	111.3	111.9
Austria	105.0	106.0	105.5	105.9	104.5	105.1
Poland	98.2	99.1	100.1	100.8	99.5	99.9
Portugal	99.0	98.5	99.2	99.6	99.3	99.0
Romania	94.4	95.2	95.6	94.5	94.7	95.1
Slovenia	99.1	101.0	101.2	102.5	101.1	101.2
Slovakia	100.8	101.9	101.2	100.9	98.9	100.6
Finland	103.3	103.2	103.9	104.2	103.7	104.6
Sweden	105.0	105.7	105.8	104.8	104.5	104.5
United Kingdom	104.1	104.4	104.6	105.2	103.2	101.9
<b>EU28</b>	<b>100.0</b>	<b>100.2</b>	<b>100.6</b>	<b>100.6</b>	<b>100.3</b>	<b>100.1</b>



## Goal 3 – Ensure healthy lives and promote well-being for all at all ages

### Descriptive analysis of elementary indicators

The composite indicator for SDG 3 was built using the indicators listed in Table 3.1. The elementary indicators “Smoking prevalence by sex” (sdg\_03\_30) and “Obesity rate by body mass index” (sdg\_02\_10) have been excluded from the composite indicator because there is a lack of data availability in their time series. While “Exposure to air pollution by particulate matter” (sdg\_11\_50) was excluded because of a lack of data availability for countries. Moreover, the indicator “Death rate due to chronic diseases” (sdg\_03\_40) was excluded since it is already taken in consideration in the indicator “Life expectancy at birth” (sdg\_03\_10).

**Table 3.1 – List of the elementary indicators used for the composite indicator of SDG 3**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_03_10	Life expectancy at birth	+	73.1	83.3	79.7	2.8
sdg_03_20	Self-perceived health	+	42.8	83.3	65.9	10.2
sdg_03_50	Suicide rate	-	3.4	36.7	12.7	5.6
sdg_03_60	Self-reported unmet need for medical care	-	0.0	16.1	3.4	3.6
sdg_08_60	People killed in accidents at work	-	0.5	6.4	2.4	1.2
sdg_11_20	Population living in households considering that they suffer from noise	-	8.0	31.6	16.1	4.9
sdg_11_40	People killed in road accidents	-	2.1	11.7	5.8	2.2

With the removal of indicator sdg\_03\_40, the correlation does not affect the composite indicator. In fact, correlation coefficients are relatively high, in absolute terms, in only one case (i.e. |-0.72|) (Table 3.2). The two indicators “Life expectancy at birth” and “People killed in accidents at work” are related. The first one is a measure of the average time people are expected to live and it is the most important indicator when measuring the health of a population. The other one is an indicator that focuses on a specific aspect an indicator of input that shows the mean number of years. Whereas the second is an indicator of output that shows the exact number of people killed in accidents at work and it is relevant for its policy consequences. Their influence on the composite indicator must be equally considered because they describe two different phenomena.

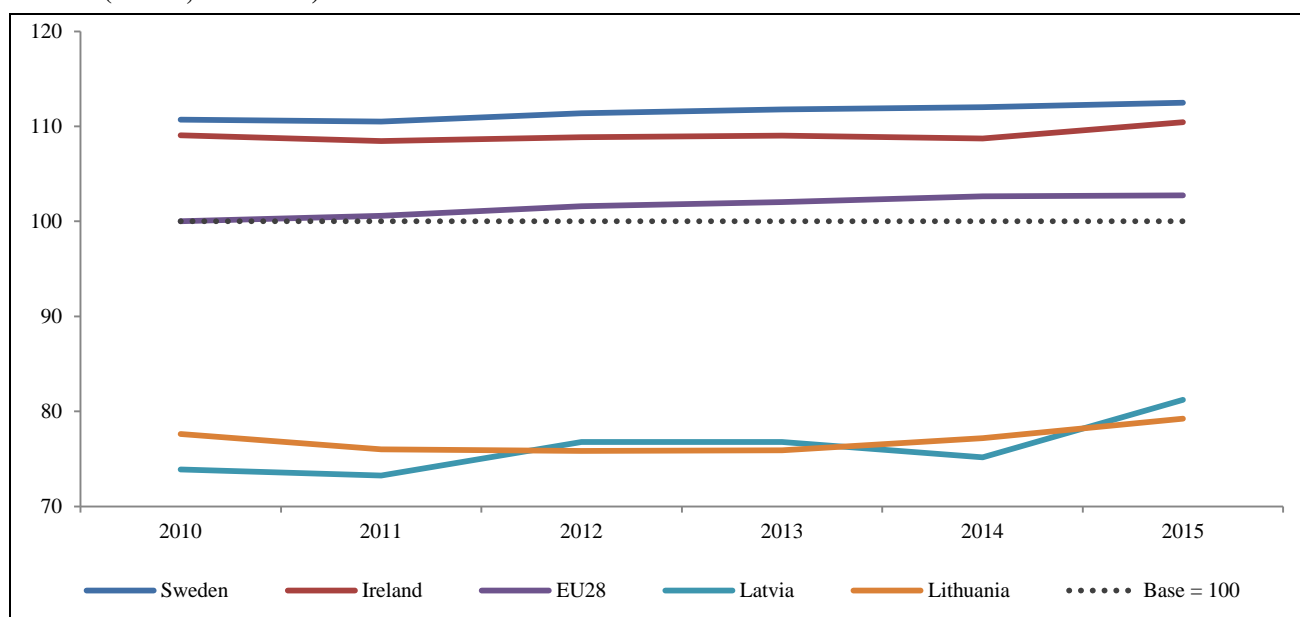
**Table 3.2 – Correlation matrix of elementary indicators of SDG3**

	sdg_03_10	sdg_03_20	sdg_03_50	sdg_03_60	sdg_08_60	sdg_11_20	sdg_11_40
sdg_03_10	1.00	0.62	-0.51	-0.38	-0.53	0.33	-0.72
sdg_03_20	0.62	1.00	-0.65	-0.29	-0.46	0.13	-0.47
sdg_03_50	-0.51	-0.65	1.00	-0.06	0.32	-0.25	0.37
sdg_03_60	-0.38	-0.29	-0.06	1.00	0.24	-0.16	0.45
sdg_08_60	-0.53	-0.46	0.32	0.24	1.00	-0.05	0.59
sdg_11_20	0.33	0.13	-0.25	-0.16	-0.05	1.00	-0.21
sdg_11_40	-0.72	-0.47	0.37	0.45	0.59	-0.21	1.00

## Composite indicator

The overall EU28 composite indicator for SDG 3 shows a slight increasing trend in the observed period (2010-2015), reaching 102.7 point mark in 2015. This trend is explained by the increasing of the “Life expectancy at birth” (sdg\_03\_10) and by the broad decrease of the “Population living in households considering that they suffer from noise” (sdg\_11\_20) and the “People killed in road accidents” (sdg\_11\_40).

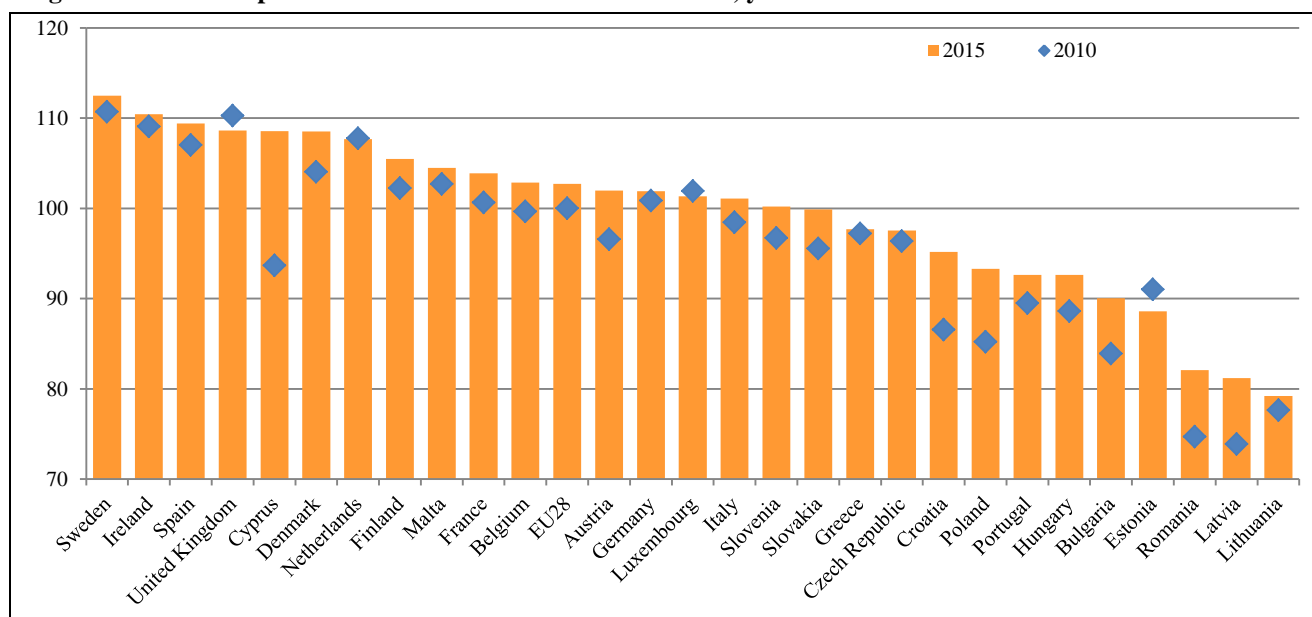
**Fig. 3.1 – Composite indicators of SDG 3. EU28 average, best performers (Sweden, Ireland) and worst performers in 2015 (Latvia, Lithuania). Base EU28 2010=100**



However, the Fig. 3.1 shows substantial differences between member states. In fact, while the best performer (Sweden) moved from 110.7 to 112.5 in 5 years, the worst performer (Lithuania) tended to show a stable trend in the observed period (2010-2015), staying close to the 80 point mark. Even though Latvia has seen its situation change with a considerable increase from 73.9 in 2010 to 81.2 in 2015, it is still one of the worst performers comparing to the EU28. The fluctuating trend is explained as follows. The share value of the composite indicator of this country slightly decreased between 2013 and 2014 mainly because of the raise in the “People killed in road accidents” (sdg\_11\_40) and “People killed in accidents at work” (sdg\_08\_60). On the other hand, the increasing trend between 2014 and 2015 was mainly due to the decrease of “Self-reported unmet need for medical care by detailed reason” (sdg\_03\_60) and a recovery in the indicators sdg\_11\_40 and sdg\_08\_60.

Comparing the composite indicator for all EU28 countries, we can see differences across member states between 2010 and 2015. The countries that improved the most are Cyprus, Croatia, Romania, Latvia, Poland, and Bulgaria. The vast increase of Cyprus’s composite indicator is explained by the huge decrease of the “People killed in accidents at work” (sdg\_08\_60) as well as the fall of the percentage of “Self-reported unmet need for medical care by detailed reason” (sdg\_03\_60) that passes from 4.1% in 2010 to 1.5% in 2016. Differently, Estonia’s situation declined, moving from 91 point mark in 2010 to 88.6 point mark in 2015. This is explained by the increase of the “Self-reported unmet need for medical care by detailed reason” (sdg\_03\_60).

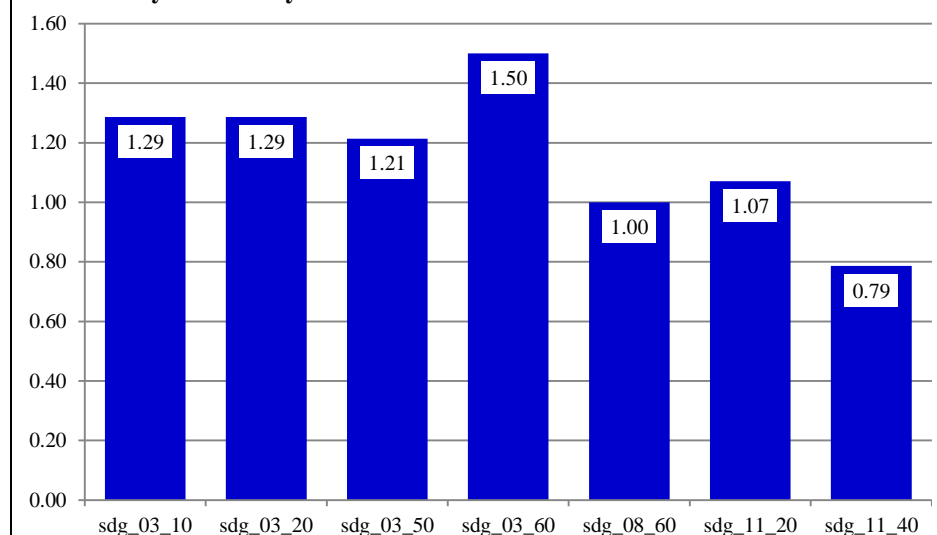
**Fig. 3.2 – SDG3 composite indicator scores for EU28 countries, years 2010 and 2015. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking of the countries by the removal of each elementary indicator. The

**Fig. 3.3 – Influence analysis: average of the shifts in the ranking of the EU countries by elementary indicator removed. Year 2015**



indicator “Self-reported unmet need for medical care by detailed reason” (sdg\_03\_60) has a high impact on the composite indicator, while the indicator “People killed in road accidents” (sdg\_11\_40) has less of an influence on the composite indicator.

## Appendix

**Table 3.3 – Results of the composite indicator for SDG 3. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015
Belgium	99.6	98.2	101.5	101.2	103.1	102.9
Bulgaria	83.9	87.0	88.3	89.7	88.2	90.0
Czech Republic	96.4	95.1	97.1	97.7	99.2	97.5
Denmark	104.1	105.5	106.1	107.6	107.5	108.5
Germany	100.9	100.4	101.0	101.3	101.6	101.9
Estonia	91.0	88.6	89.8	90.5	88.4	88.6
Ireland	109.1	108.5	108.8	109.0	108.7	110.4
Greece	97.2	96.4	97.7	98.7	99.5	97.7
Spain	107.0	109.0	109.5	108.9	109.9	109.4
France	100.7	100.1	101.4	102.2	103.1	103.9
Croatia	86.6	87.4	86.9	91.2	96.3	95.2
Italy	98.5	99.3	101.5	101.6	102.4	101.1
Cyprus	93.7	99.4	101.3	102.4	106.5	108.6
Latvia	73.9	73.3	76.8	76.8	75.2	81.2
Lithuania	77.6	76.0	75.8	75.9	77.2	79.2
Luxembourg	101.9	104.2	103.0	103.8	103.6	101.3
Hungary	88.6	90.4	92.4	93.7	93.3	92.6
Malta	102.7	103.5	98.0	101.6	103.3	104.5
Netherlands	107.7	108.1	107.3	107.7	107.8	107.7
Austria	96.6	100.5	99.8	100.6	102.6	102.0
Poland	85.2	87.0	88.4	90.2	92.4	93.3
Portugal	89.5	88.9	89.2	92.2	91.5	92.6
Romania	74.7	74.9	77.2	79.8	82.0	82.1
Slovenia	96.7	97.0	98.8	100.2	101.0	100.2
Slovakia	95.5	98.1	97.6	99.5	100.5	99.9
Finland	102.3	102.7	102.6	103.4	105.6	105.5
Sweden	110.7	110.5	111.4	111.8	112.0	112.5
United Kingdom	110.3	110.1	110.4	110.0	109.1	108.6
<b>EU28</b>	<b>100.0</b>	<b>100.6</b>	<b>101.6</b>	<b>102.0</b>	<b>102.6</b>	<b>102.7</b>

## *Goal 4 - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*

### Descriptive analysis of elementary indicators

The composite indicator for SDG 4 was built using the indicators listed in Table 1. The indicator “Underachievement in reading, math or science” (sdg\_4\_40) was excluded from the composite indicator because it has several breaks in the time series.

**Table 4.1 – List of the elementary indicators used for the composite indicator of SDG 4**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_04_10	Early leavers from education and training	-	2.8	28.3	9.5	4.1
sdg_04_20	Tertiary educational attainment	+	18.3	58.7	41.9	9.1
sdg_04_30	Participation in early childhood education	+	70.4	100.0	91.9	7.5
sdg_04_50	Employment rates of recent graduates	+	40.0	96.6	80.1	10.0
sdg_04_60	Adult participation in learning	+	1.1	32.6	11.3	7.8
sdg_08_20	Young people neither in employment nor in education and training	-	5.7	28.5	12.7	4.6

Correlation does not affect the composite indicator. Correlation coefficients are high, in absolute terms, in only one case (i.e.  $-0.88$ ) (Highlighted in red Table 4.2). Although the two indicators “Employment rates of recent graduates” (sdg\_04\_50) and “Young people neither in employment nor in education and training (sdg\_08\_20) are highly correlated, they describe two different phenomena.

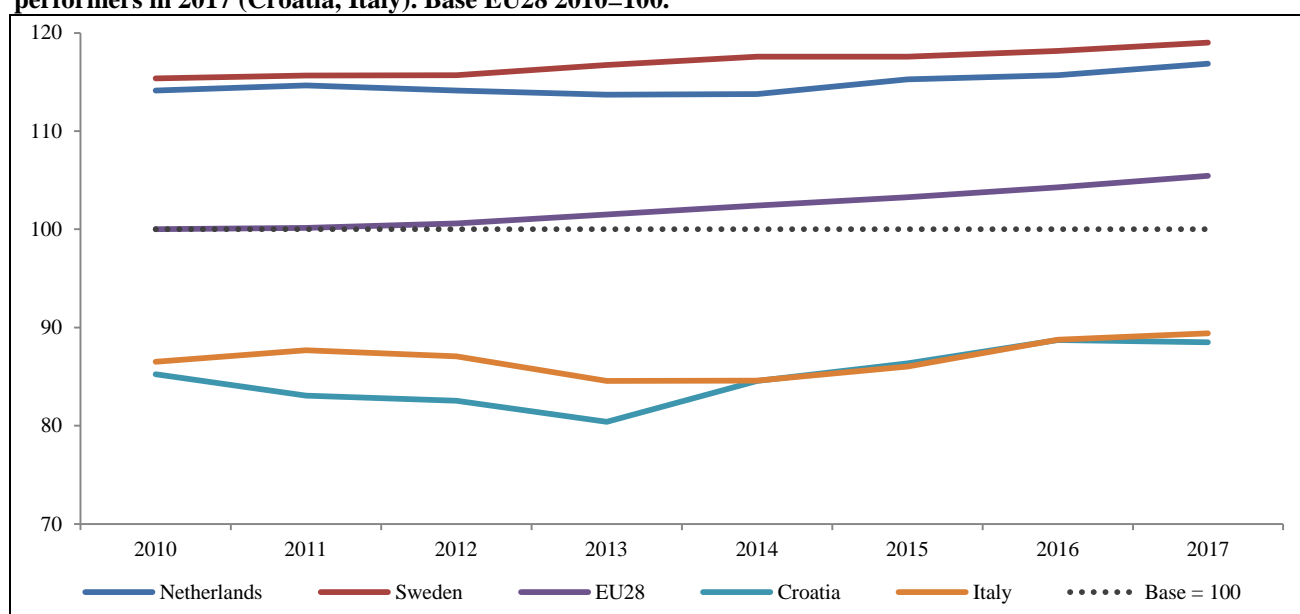
**Table 4.2 – Correlation matrix of elementary indicators of SDG4**

	sdg_04_10	sdg_04_20	sdg_04_30	sdg_04_50	sdg_04_60	sdg_08_20
sdg_04_10	1.00	-0.52	0.30	-0.01	-0.14	0.22
sdg_04_20	-0.52	1.00	0.21	0.19	0.45	-0.40
sdg_04_30	0.30	0.21	1.00	0.55	0.41	-0.51
sdg_04_50	-0.01	0.19	0.55	1.00	0.33	-0.88
sdg_04_60	-0.14	0.45	0.41	0.33	1.00	-0.60
sdg_08_20	0.22	-0.40	-0.51	-0.88	-0.60	1.00

## Composite indicator

The overall EU28 composite indicator for SDG 4 shows an increasing trend in the observed period (2010-2017), reaching the 105.5 points. This tendency is explained by the raise of “Tertiary educational attainment” (sdg\_4\_20) that in 2017 hits 39.9% of the population between 30-34 years old, almost reaching the EU 2020 target (40%), as well as the decrease of “Early leavers from education and training” (sdg\_4\_10) that in 2017 hits 10.6%, outreaching the EU 2020 target (10%). There are no differences between member states trends. In fact, while the best performer (Sweden) moved from 115.4 to 119.9 improving its composite indicator by 3.6 points in 7 years, the worst performer (Croatia) has seen its situation increase by 3.2 in the same period.

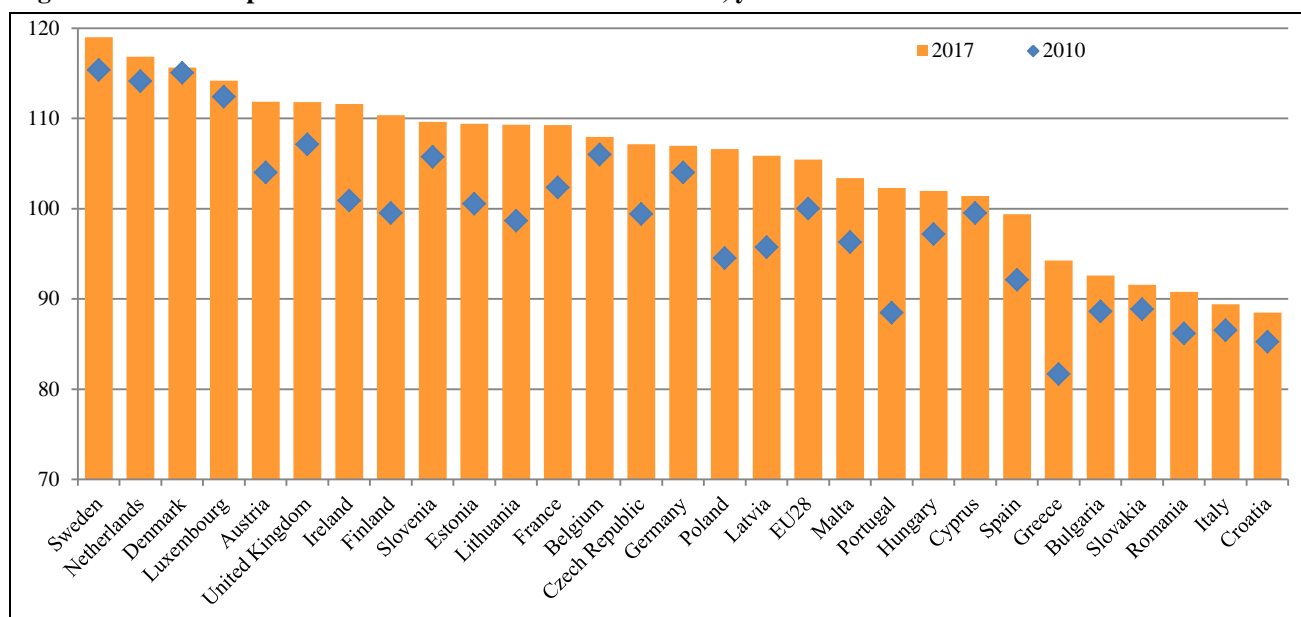
**Fig. 4.1 – Composite indicators, SDG 4. EU28 average, best performers (Sweden, Netherlands) and worst performers in 2017 (Croatia, Italy). Base EU28 2010=100.**



Comparing the composite indicator for all EU28 countries (Fig.4.2), we can see that the situation has increased for all the member states. The countries that improved the most are Portugal, Greece and Poland. All these highlighted countries had a promising reduction regarding the indicator (sdg\_4\_10) halving the percentage of early leavers from school. Croatia and Greece both outreached in 2017 the EU 2020 national Target (Croatia 4%, Greece 10%), reaching 3.1% for Croatia and 6% for Greece. Furthermore, these countries had a broad increase of “Tertiary educational attainment” (sdg\_4\_20). Greece is the only country among the highlighted ones to outreaches the EU 2020 national target (32%) reaching the 43.7% of Tertiary educational attainment.

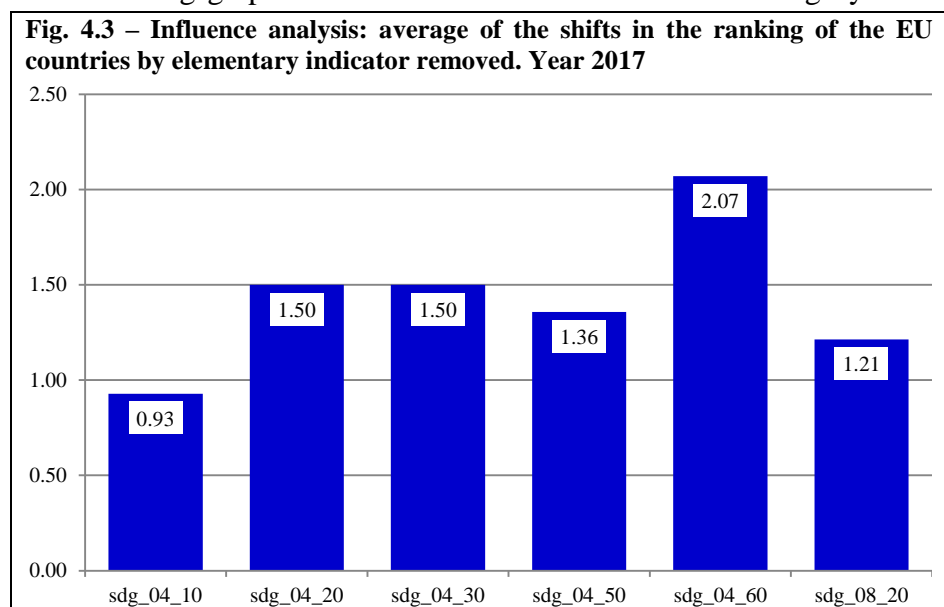
Analyzing the Italian situation a slight improvement of its composite indicator is noticeable during the observed period. Looking at the Italian elementary indicators it is important to highlight the improvement of indicators sdg\_4\_10 and sdg\_4\_20, both outreaching the EU 2020 national Targets (16% 4\_10, 26% 4\_20). However, as shown in Figure 4.1 the Italian situation is still far from the EU28 average, being the second worst performer among the EU28 countries.

**Fig. 4.2 – SDG4 composite indicator scores for EU28 countries, years 2010 and 2017. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator.



Data show that in this analysis the elementary indicators have a balanced influence on the composite indicator with small differences. The indicator “Adult participation in learning” (sdg\_04\_60) has the highest impact on the composite indicator, while the indicator “Young people neither in employment nor in education and training” (sdg\_08\_20) has less of an influence on the

composite indicator.

## Appendix

**Table 4.3 – Results of the composite indicator for SDG 4. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015	2016	2017
Belgium	106.0	104.7	104.6	104.2	105.5	104.9	107.0	107.9
Bulgaria	88.6	86.1	87.6	88.0	89.3	92.0	90.8	92.6
Czech Republic	99.4	100.4	100.0	99.5	100.6	101.5	104.4	107.1
Denmark	115.1	115.2	115.8	116.3	117.3	117.4	117.4	115.6
Germany	104.0	104.6	105.6	106.7	106.6	106.8	106.7	107.0
Estonia	100.6	102.0	102.1	103.8	104.2	105.3	106.0	109.4
Ireland	100.9	100.3	101.2	103.8	104.4	104.0	105.5	111.6
Greece	81.7	81.2	77.7	77.4	79.9	84.0	90.1	94.3
Spain	92.1	92.7	91.9	91.6	94.3	95.9	97.2	99.4
France	102.3	103.6	103.5	109.1	109.1	108.4	108.6	109.3
Croatia	85.3	83.1	82.6	80.4	84.6	86.3	88.7	88.5
Italy	86.5	87.7	87.1	84.6	84.6	86.0	88.7	89.4
Cyprus	99.5	99.0	97.8	94.4	96.8	101.3	101.5	101.4
Latvia	95.7	96.9	99.8	102.4	102.3	103.4	105.1	105.9
Lithuania	98.7	98.5	100.9	102.4	105.0	107.6	108.9	109.3
Luxembourg	112.4	113.7	113.5	114.6	115.5	114.4	115.4	114.2
Hungary	97.2	95.8	95.5	96.6	99.0	101.5	101.9	102.0
Malta	96.3	97.2	99.1	100.0	99.6	101.2	103.1	103.4
Netherlands	114.1	114.6	114.1	113.7	113.8	115.3	115.7	116.9
Austria	104.0	105.4	106.7	106.8	110.2	110.3	111.0	111.8
Poland	94.5	94.7	97.6	97.8	99.8	101.9	104.3	106.6
Portugal	88.5	94.9	94.4	94.9	96.8	99.6	100.3	102.3
Romania	86.2	87.0	87.1	87.5	87.3	87.3	88.2	90.8
Slovenia	105.7	107.1	105.6	104.7	103.7	105.0	107.0	109.6
Slovakia	88.9	88.1	87.7	88.8	89.4	91.2	92.0	91.6
Finland	99.5	100.9	102.3	106.7	105.6	105.2	108.6	110.4
Sweden	115.4	115.7	115.7	116.7	117.6	117.6	118.2	119.0
United Kingdom	107.1	105.6	107.2	108.1	109.6	111.3	110.7	111.8
<b>EU28</b>	<b>100.0</b>	<b>100.2</b>	<b>100.6</b>	<b>101.5</b>	<b>102.4</b>	<b>103.3</b>	<b>104.3</b>	<b>105.5</b>



## Goal 5 – Achieve gender equality and empower all women and girls

### Descriptive analysis of elementary indicators

The composite indicator for SDG 5 was built using the indicators listed in Table 5.1. The indicator “Physical and sexual violence to women experienced within 12 months prior to the interview by age group” (sdg\_05\_10) has been excluded from the composite indicator because there is a lack of data availability in its time series. The indicators “Early leavers from education and training by sex” (sdg\_04\_10), “Tertiary educational attainment by sex” (sdg\_04\_20) and “Employment rates of recent graduates by sex” (sdg\_04\_50) were excluded because the polarity, of these differences between sexes, cannot be clearly explained.

**Table 5.1 – List of elementary indicators used for the composite indicator of SDG 5**

Code	Name	Polarity	Min	Max	Avg	Std
SDG_05_20	Gender pay gap in unadjusted form	-	0.9	29.9	14.4	5.7
SDG_05_30	Gender employment gap	-	-1.5	36.6	10.3	5.5
SDG_05_40_FM	Female/male ratio of inactive population due to caring responsibilities	-	2.5	65.8	8.1	4.7
SDG_05_50	Seats held by women in national parliaments and governments	+	8.7	46.1	28.0	9.0
SDG_05_60	Positions held by women in senior management positions	+	2.1	43.4	21.8	9.7

Correlation does not affect the composite indicator. The correlation coefficient is lower than 0.75 in absolute terms for every pair of indicators (Table 5.2).

**Table 5.2 – Correlation matrix of elementary indicators of SDG5**

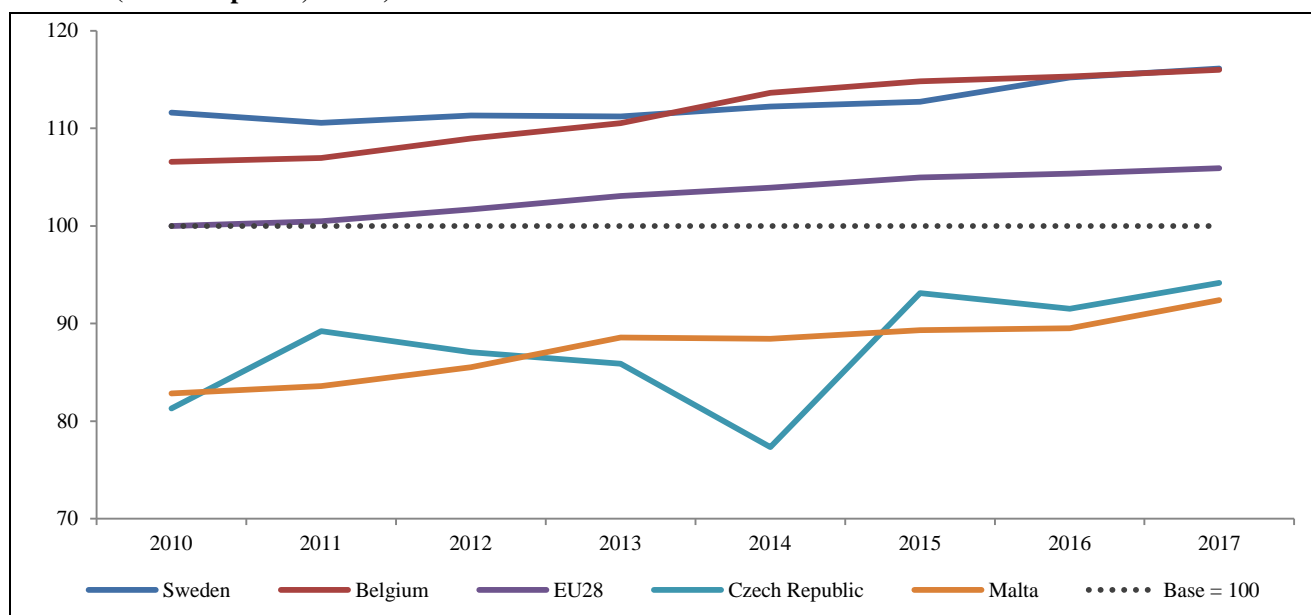
	sdg_05_20	sdg_05_30	sdg_05_40_FM	sdg_05_50	sdg_05_60
sdg_05_20	1.00	-0.28	0.03	0.01	-0.05
sdg_05_30	-0.28	1.00	0.41	-0.43	-0.31
sdg_05_40_FM	0.03	0.41	1.00	-0.13	-0.01
sdg_05_50	0.01	-0.43	-0.13	1.00	0.61
sdg_05_60	-0.05	-0.31	-0.01	0.61	1.00

### Composite indicator

The overall EU28 composite indicator for SDG 5 shows an increasing trend in the observed period (2010-2017), reaching 105.9 point mark in 2017. This trend is explained by the increase of the “Seats held by women in national parliaments and governments” (sdg\_05\_50) and a broad enlargement of the “Positions held by women in senior management positions” (sdg\_05\_60).

However, there are substantial differences between the status of member states. While the best performer (Sweden) moved from 111.6 to 116.1 in 7 years, the worst performer in 2017 (Malta) has seen its situation changed with a significant increase from 82.8 point mark in 2010 to 92.4 point mark in 2017 but it is still well below the 100 point that represent the situation of the EU average in 2010.

**Fig. 5.1 – Composite indicators of SDG 5. EU28 average, best performers (Sweden, Belgium) and worst performers in 2017 (Czech Republic, Malta). Base EU28 2010=100**



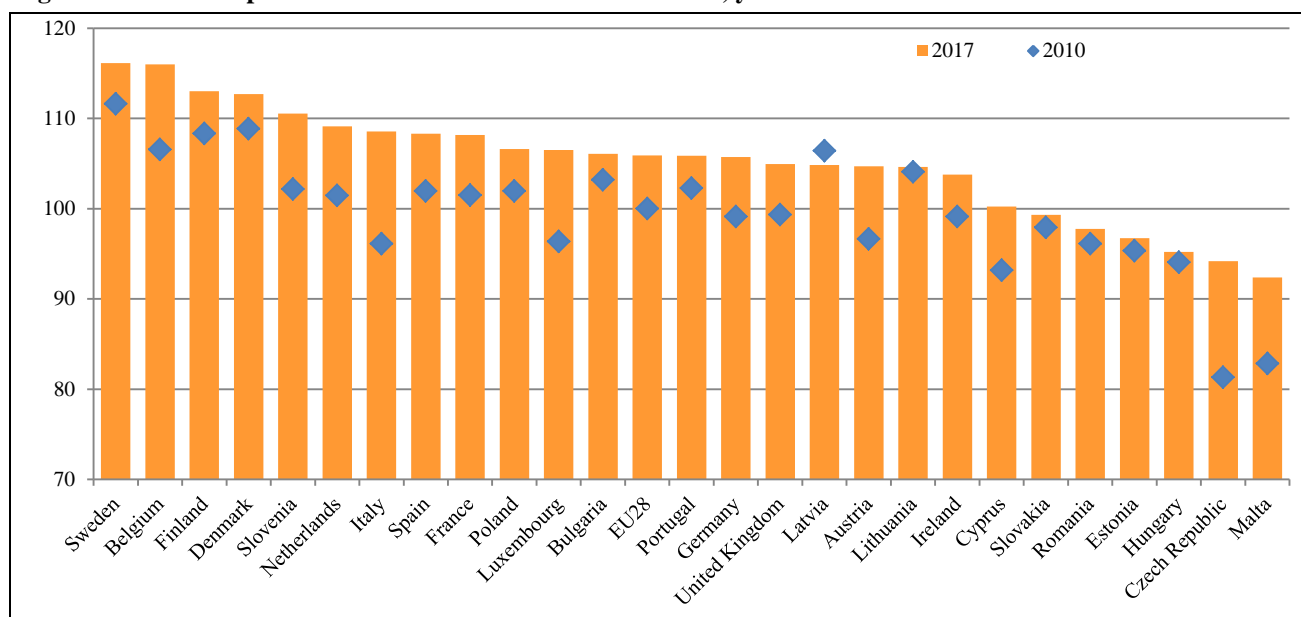
The countries that improved the most are respectively Czech Republic, Italy, Malta, Luxembourg and Belgium. It is remarkable that the two worst performers comparing to 2010's EU28 levels are at the same time two of the four states that have had the highest improvement.

Comparing the composite indicator for all EU28 countries, we can see that the situation has increased for the majority of member states. Particularly, the highest spread between 2010 and 2017 reached by the Czech Republic is attributable to its improvement in "Gender employment gap" (sdg\_05\_30) and its overall "Female/male ratio of inactive population due to caring responsibilities" (sdg\_05\_40). On the other hand, the progress towards the composite indicators for Italy between 2010 and 2017 is mainly caused by the increase in the indicators "Positions held by women in senior management positions" (sdg\_05\_60) and "Seats held by women in national parliaments and governments" (sdg\_05\_50).

Malta has seen an improvement in all the indicators used for the composite indicator, except for the indicator "Gender pay gap in unadjusted form" that, on the contrary, has suffered a slight increase over time.

The only member state that is subject to a decline is Latvia, from 106.4 to 104.8 in 7 years, although it is still above the 2010's EU28 level.

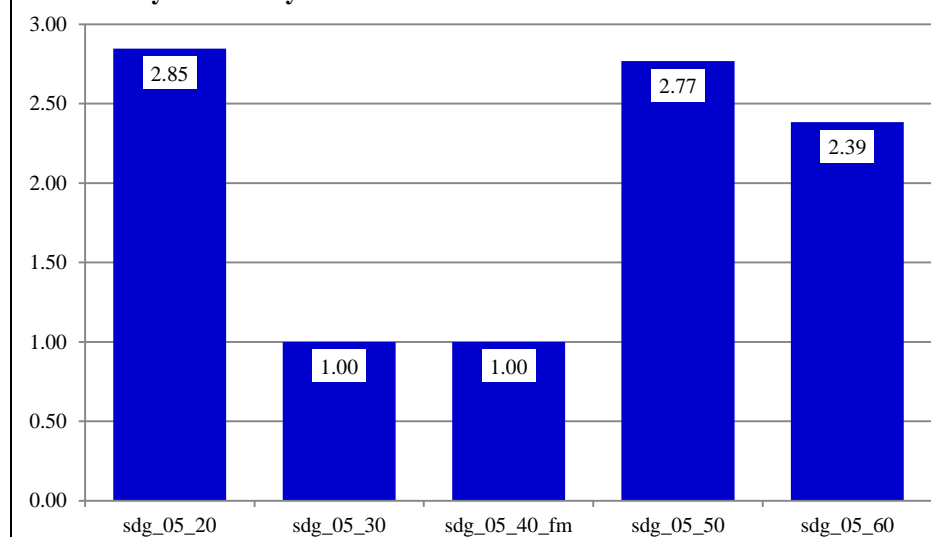
**Fig. 5.2 – SDG5 composite indicator scores for EU28 countries, years 2010 and 2017. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator.

**Fig. 5.3 – Influence analysis: average of the shifts in the ranking of the EU countries by elementary indicator removed. Year 2017**



The indicator “Gender pay gap in unadjusted form” (sdg\_05\_20) and “Seats held by women in national parliaments and governments” (sdg\_05\_50) have a high impact on the composite indicator. On the other hand, the indicator “Gender employment gap” (sdg\_05\_30) and “Female/male ratio of inactive population due to caring responsibilities” (sdg\_05\_40) have less of

an influence on the composite indicator.

## Appendix

**Table 5.3 – Results of the composite indicator for SDG 5. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015	2016	2017
Belgium	106.6	107.0	109.0	110.5	113.6	114.8	115.3	116.0
Bulgaria	103.2	104.8	103.4	105.9	104.5	103.9	103.0	106.1
Czech Republic	81.3	89.2	87.1	85.9	77.3	93.1	91.5	94.2
Denmark	108.9	108.1	109.8	110.2	110.4	110.8	111.6	112.7
Germany	99.1	100.7	101.0	103.4	104.2	104.9	106.5	105.7
Estonia	95.3	93.4	92.9	91.2	92.6	95.8	96.5	96.7
Ireland	99.1	101.1	100.4	100.7	100.2	101.4	103.3	103.8
Greece	Not present due to lack of data							
Spain	102.0	100.6	103.4	104.8	106.8	107.5	107.8	108.3
France	101.5	103.8	106.3	104.5	105.6	104.9	107.4	108.2
Croatia	Not present due to lack of data							
Italy	96.1	97.1	99.4	104.5	107.0	107.9	108.3	108.5
Cyprus	93.2	93.4	94.7	96.6	98.4	97.5	100.1	100.2
Latvia	106.4	108.1	108.3	108.6	105.6	105.3	104.9	104.8
Lithuania	104.1	105.1	107.8	106.7	106.4	105.8	104.9	104.6
Luxembourg	96.4	98.9	101.3	102.7	103.5	105.3	106.2	106.5
Hungary	94.1	91.5	91.6	93.4	95.0	96.7	95.5	95.2
Malta	82.8	83.6	85.5	88.6	88.4	89.3	89.5	92.4
Netherlands	101.5	103.6	104.4	107.1	107.5	108.1	108.5	109.1
Austria	96.7	97.4	98.3	100.0	101.4	102.1	103.1	104.7
Poland	101.9	103.2	103.1	103.2	103.6	106.4	106.4	106.6
Portugal	102.3	101.7	102.1	103.9	103.1	104.5	105.2	105.9
Romania	96.1	93.3	93.5	93.6	94.1	95.2	94.0	97.8
Slovenia	102.2	103.4	110.2	109.6	110.1	109.1	111.2	110.6
Slovakia	97.9	96.2	96.5	99.8	98.6	97.3	98.2	99.3
Finland	108.3	110.3	111.3	111.5	111.8	111.5	112.7	113.0
Sweden	111.6	110.6	111.3	111.2	112.2	112.7	115.2	116.1
United Kingdom	99.3	100.2	100.2	101.6	102.2	104.1	104.2	104.9
<b>EU28</b>	<b>100.0</b>	<b>100.5</b>	<b>101.7</b>	<b>103.1</b>	<b>103.9</b>	<b>105.0</b>	<b>105.4</b>	<b>105.9</b>

## Goal 7 – Ensure access to affordable, reliable, sustainable and modern energy for all

### Descriptive analysis of elementary indicators

The composite indicator for SDG 7 was built using the indicators listed in Table 1. Only the indicator “Energy dependence by product” (sdg\_07\_50) was excluded from the composite indicator because its polarity cannot be clearly explained.

**Table 7.1 – List of the elementary indicators used for the composite indicator of SDG 7**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_07_10	Primary energy consumption	-	0.7	1.3	0.9	0.1
sdg_07_11	Final energy consumption	-	0.7	1.2	1.0	0.1
sdg_07_20	Final energy consumption in households per capita	-	164.0	1,084.0	545.6	179.7
sdg_07_30	Energy productivity	+	2.0	16.8	7.5	3.5
sdg_07_40	Share of renewable energy in gross final energy consumption	+	1.0	53.8	19.8	11.9
sdg_07_60	Population unable to keep home adequately warm	-	0.5	66.5	11.1	10.3
sdg_13_20	Greenhouse gas emissions intensity of energy consumption	-	73.9	124.0	88.1	8.7

Correlation does not affect the composite indicator. All the indicators have a correlation lower than 0.75 in absolute terms. The higher correlation observed is between the indicator “Final energy consumption in households per capita” (sdg\_07\_20) and “Population unable to keep home adequately warm by poverty status” (sdg\_07\_60). The two indicators have a negative correlation and show two different phenomena that have to be considered separately inside the composite indicator.

**Table 7.2 – Correlation matrix of elementary indicators of SDG7**

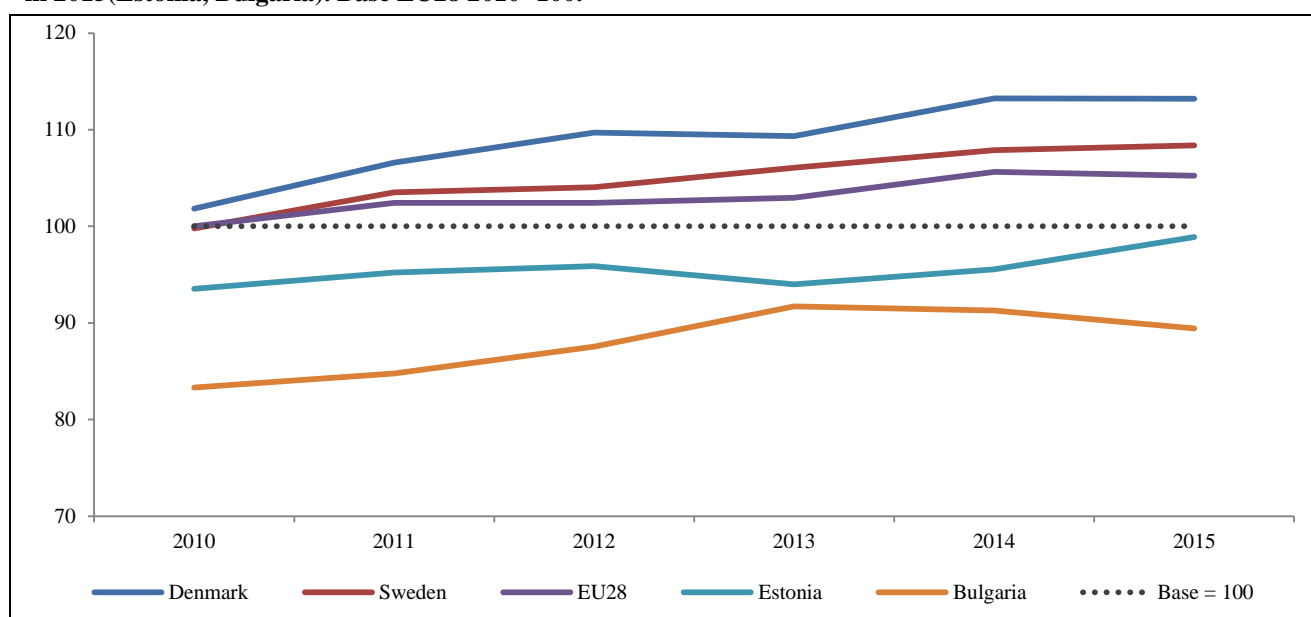
	sdg_07_10	sdg_07_11	sdg_07_20	sdg_07_30	sdg_07_40	sdg_07_60	sdg_13_20
sdg_07_10	1.00	0.29	0.27	-0.26	0.19	-0.47	-0.16
sdg_07_11	0.29	1.00	0.01	-0.12	-0.02	-0.10	0.04
sdg_07_20	0.27	0.01	1.00	0.18	0.29	-0.67	-0.29
sdg_07_30	-0.26	-0.12	0.18	1.00	-0.19	-0.24	-0.23
sdg_07_40	0.19	-0.02	0.29	-0.19	1.00	-0.10	-0.27
sdg_07_60	-0.47	-0.10	-0.67	-0.24	-0.10	1.00	0.57
sdg_13_20	-0.16	0.04	-0.29	-0.23	-0.27	0.57	1.00

## Composite indicator

The overall EU28 composite indicator for SDG 7 shows a raising trend in the observed period (2010-2015), reaching 105.2 points. This increasing trend is explained by the steady increase of the “Share of renewable energy in gross final energy consumption” (sdg\_7\_40) and “Energy productivity” (sdg\_7\_30) and by the decrease of “Final energy consumption in households per capita”. It is important to remark that the composite indicator shows a stable trend from 2014 to 2015, caused by the raise of the indicators related to the energy consumption (sdg\_7\_10, sdg\_7\_11, sdg\_7\_20).

Differences between member states are considerable. While the best performer (Denmark) moved from 101 to 113 in 5 years with an unstable increase, the worst performer (Bulgaria) after three years of promising performance has seen its situation decrease from 91.7 in 2013 to 89.4 in 2015. Other member states such as Sweden and Luxembourg, respectively between the best and the worst performer, have seen a constant increase, whereas member states such as Germany and Netherlands have been subject to fluctuating trends.

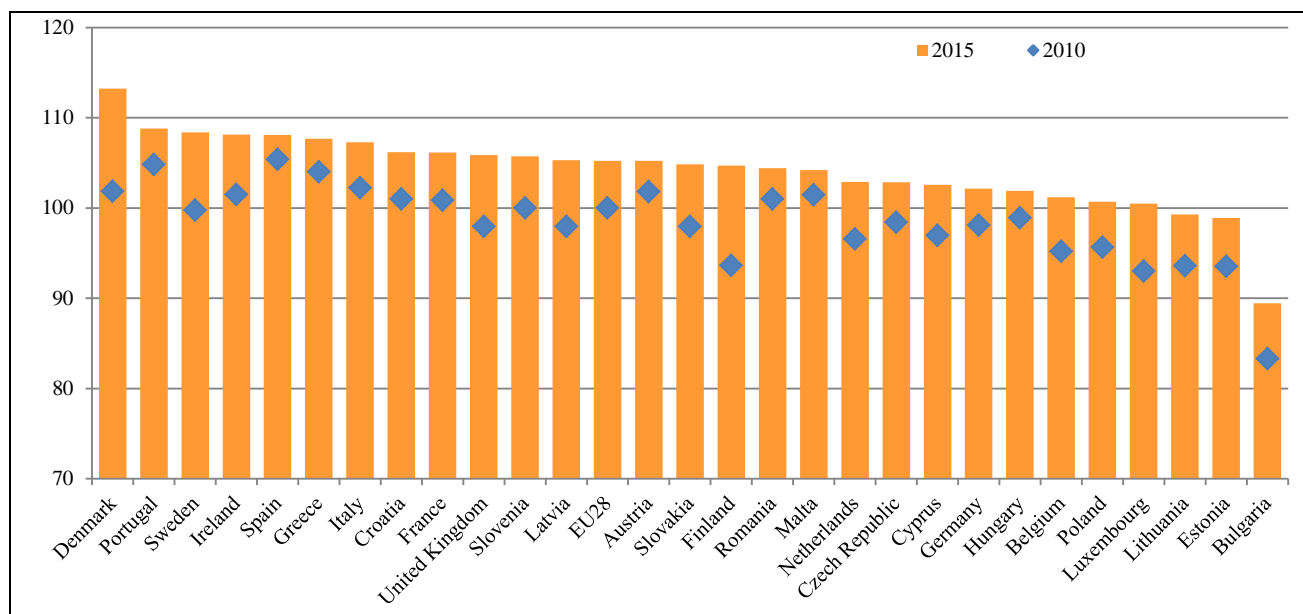
**Fig. 7.1 – Composite indicators, SDG 7. EU28 average, best performers (Denmark, Portugal) and worst performers in 2015(Estonia, Bulgaria). Base EU28 2010=100.**



Comparing the composite indicator for all EU28 countries, the situation has increased for the majority of member states. The countries that improved the most are Denmark and Finland. The increasing trend of Denmark’s composite indicator can be explained by the broadly raise of “Share of renewable energy in gross final energy consumption” (sdg\_7\_40) - that overreaches (31%) the EU 2020 Target of 30% - and by an overall improvement in all the elementary indicators of the composite indicator. Instead, the positive spread between 2010 and 2015 for Finland is explained mainly by a huge decrease of “Final energy consumption in households per capita” (sdg\_07\_20).

Although Bulgaria is the worst performer, it has been subject to a positive trend especially due to a consistent drop in “Population unable to keep home adequately warm” (sdg\_07\_60).

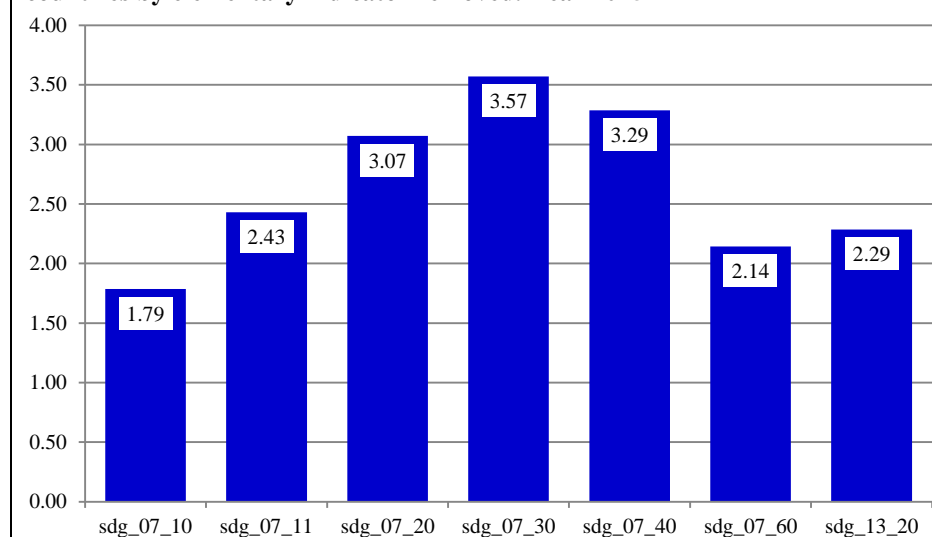
**Fig. 7.2 – SDG7 composite indicator scores for EU28 countries, years 2010 and 2015. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator.

**Fig. 7.3 – Influence analysis: average of the shifts in the ranking of the EU countries by elementary indicator removed. Year 2015**



The indicator “Energy productivity” (sdg\_07\_30) has the highest impact on the composite indicator, whereas “Primary energy consumption” (sdg\_07\_10) has less of an influence on the composite indicator.

## Appendix

**Table 7.3 – Results of the composite indicator for SDG 7. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015
Belgium	95.2	100.0	100.3	99.1	103.3	101.2
Bulgaria	83.3	84.8	87.5	91.7	91.3	89.4
Czech Republic	98.4	100.0	100.5	101.2	103.5	102.9
Denmark	101.8	106.6	109.7	109.3	113.3	113.2
Germany	98.1	100.9	100.3	98.9	102.3	102.2
Estonia	93.5	95.2	95.9	94.0	95.5	98.9
Ireland	101.5	106.2	106.6	107.0	108.6	108.1
Greece	104.0	102.8	103.8	107.0	107.1	107.7
Spain	105.4	106.0	106.5	109.2	109.3	108.1
France	100.9	104.0	103.4	102.8	107.1	106.2
Croatia	101.0	101.7	104.0	105.3	107.5	106.2
Italy	102.2	103.3	103.7	105.8	108.4	107.3
Cyprus	97.0	98.1	99.2	103.1	103.4	102.6
Latvia	98.0	101.1	101.7	102.7	104.0	105.3
Lithuania	93.6	95.2	95.7	97.7	99.0	99.3
Luxembourg	93.0	94.9	95.2	96.8	99.7	100.5
Hungary	98.9	99.4	101.5	102.5	104.2	101.9
Malta	101.4	100.6	98.2	101.1	102.1	104.2
Netherlands	96.6	100.8	101.0	100.5	104.4	102.9
Austria	101.8	104.1	104.5	103.1	107.0	105.2
Poland	95.6	97.1	97.7	98.6	100.7	100.7
Portugal	104.8	106.8	108.2	109.0	109.6	108.8
Romania	101.0	100.4	101.2	103.9	104.7	104.4
Slovenia	100.0	100.0	101.2	103.0	106.4	105.7
Slovakia	98.0	100.5	102.4	101.9	104.8	104.9
Finland	93.6	99.0	99.8	101.3	102.5	104.7
Sweden	99.8	103.5	104.0	106.1	107.9	108.4
United Kingdom	98.0	102.4	100.6	101.0	104.9	105.9
<b>EU28</b>	<b>100.0</b>	<b>102.4</b>	<b>102.4</b>	<b>103.0</b>	<b>105.6</b>	<b>105.2</b>



## *Goal 8 – Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all*

### Descriptive analysis of elementary indicators

The composite indicator for SDG 8 was built using the indicators listed in Table 1. No indicator was excluded from the composite indicator.

**Table 8.1 – List of the elementary indicators used for the composite indicator of SDG 8**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_08_10	Real GDP per capita	+	5,100.0	81,700.0	25907.1	16752.0
sdg_08_20	Young people neither in employment nor in education and training	-	5.7	28.5	13.6	5.0
sdg_08_30	Employment rate	+	52.9	81.2	71.0	5.8
sdg_08_40	Long-term unemployment rate	-	1.2	19.5	4.1	3.3
sdg_08_50	Involuntary temporary employment	-	0.7	22.7	7.5	6.0
sdg_08_60	People killed in accidents at work	-	0.5	6.4	2.4	1.1
sdg_05_40	Inactive population due to caring responsibilities	-	1.5	45.4	21.0	9.0
sdg_12_20	Resource productivity and domestic material consumption (DMC)	+	0.3	4.1	1.7	1.0

Even though there are two cases where there is a correlation higher than 0.75 in absolute terms (highlighted in red in Table 2), the indicators “Young people neither in employment nor in education and training” (sdg\_08\_20), “Employment rate (sdg\_08\_30) and “Long-term unemployment rate” (sdg\_08\_40) show three different phenomena. Therefore, they all have to be considered inside the composite indicator.

**Table 8.2 – Correlation matrix of elementary indicators of SDG8**

	sdg_08_10	sdg_08_20	sdg_08_30	sdg_08_40	sdg_08_50	sdg_08_60	sdg_05_40	sdg_12_20
sdg_08_10	1.00	-0.53	0.30	-0.25	-0.15	-0.02	-0.22	0.69
sdg_08_20	-0.53	1.00	-0.80	0.66	0.27	-0.02	0.40	-0.27
sdg_08_30	0.30	-0.80	1.00	-0.81	-0.43	-0.17	-0.24	0.10
sdg_08_40	-0.25	0.66	-0.81	1.00	0.42	-0.02	0.11	-0.02
sdg_08_50	-0.15	0.27	-0.43	0.42	1.00	-0.01	0.05	0.05
sdg_08_60	-0.02	-0.02	-0.17	-0.02	-0.01	1.00	-0.13	-0.20
sdg_05_40	-0.22	0.40	-0.24	0.11	0.05	-0.13	1.00	-0.16
sdg_12_20	0.69	-0.27	0.10	-0.02	0.05	-0.20	-0.16	1.00

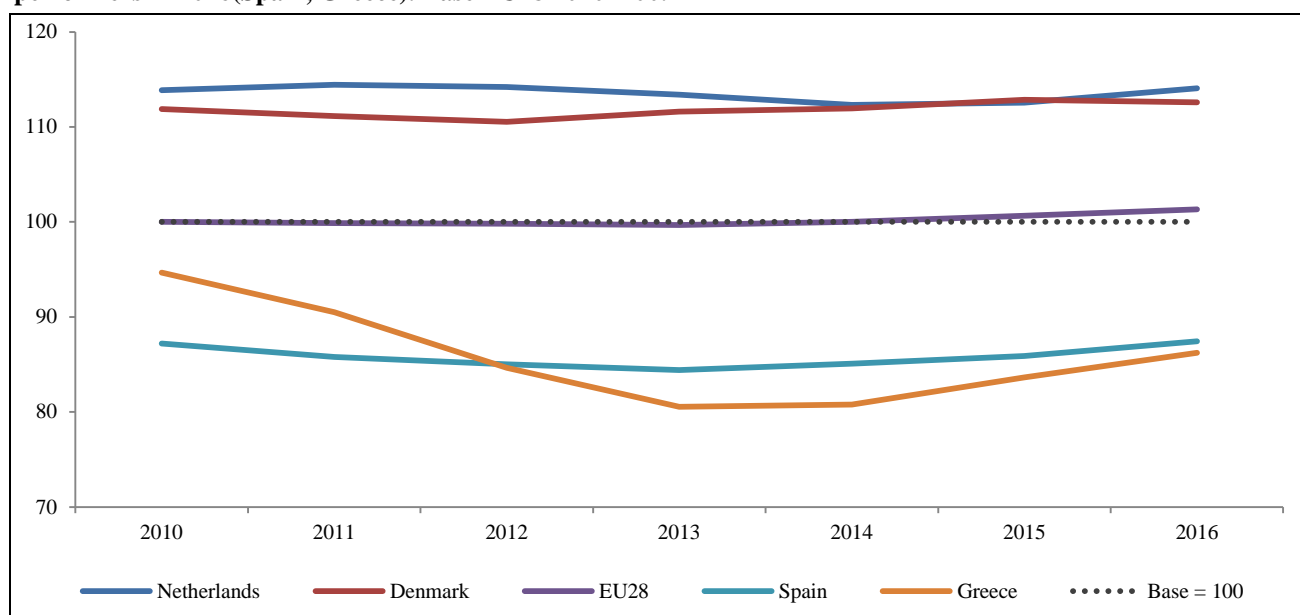
## Composite indicator

The overall EU28 composite indicator for SDG 8 shows a stable trend from 2010 to 2014 staying near the level of 2010=100. From 2014 to 2016 it starts to slightly increase reaching the 101.3 point mark in the last observed year. The marginally raising trend observed in the last two years is a consequence of the reduction of the “Long-term unemployment rate” (sdg\_08\_40) and “Young people neither in employment nor in education and training”(sdg\_08\_20), as well as the raise of the “Employment rate” (sdg\_08\_30) that reaches 71.1% going forward the EU 2020 target 75%.

There are significant differences between member states. In fact, while the best performer (Netherlands) reached the 114.1 point in 2016, the worst performer (Greece) moved from 94.7 to 86.2 in six years.

Comparing the composite indicator for all EU28 countries, we can see that the situation changed in different ways all around Europe (Fig. 8.2). While there are countries that improved their situation like Lithuania, Estonia and Hungary, there are countries like Greece and Croatia that have seen their situation worsen.

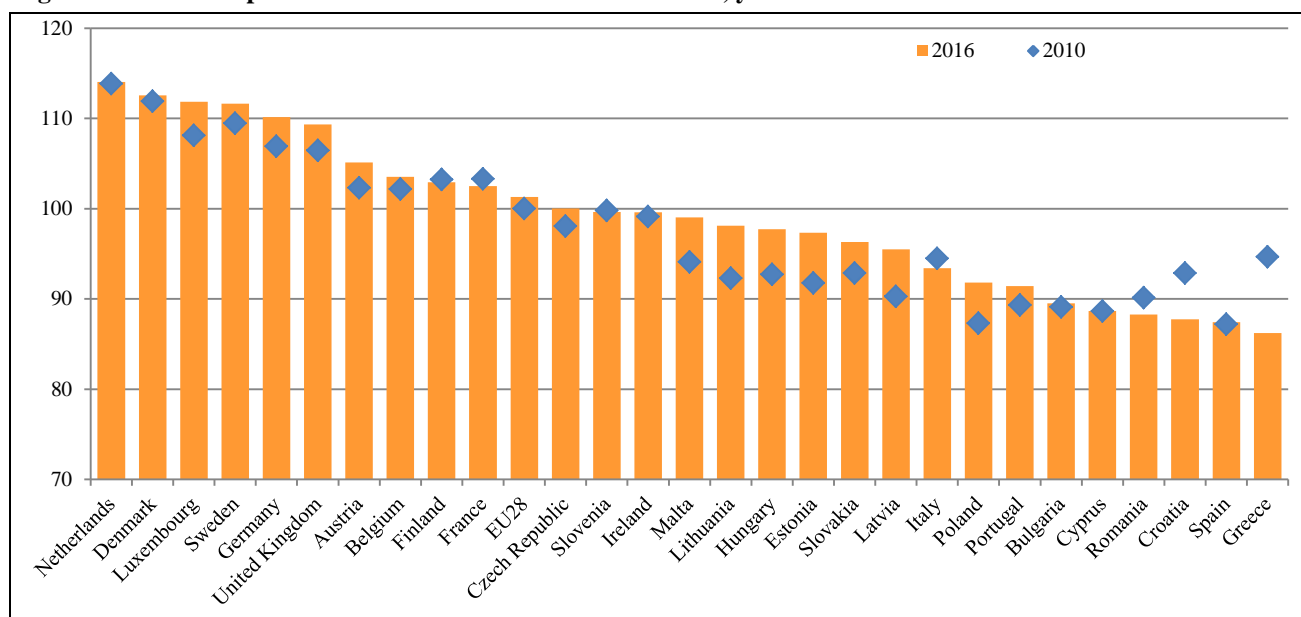
**Fig. 8.1 – Composite indicators, SDG 8. EU28 average, best performers (Netherlands, Denmark) and worst performers in 2016(Spain, Greece). Base EU28 2010=100.**



Analyzing the Greek situation, the composite indicator drastically falls until 2013 and then slightly raises until 2016. This descending trend can be explained by the dramatic raise of the percentage of “Young people neither in employment nor in education and training” (sdg\_08\_20) that reaches its peak in 2013 (28.5%) and then slightly fall until 2016 reaching 22.2%. Another indicator that can explain this tendency is the “Long-term unemployment rate” (sdg\_08\_40), which raise from 5.7 % in 2010 to 17% in 2016.

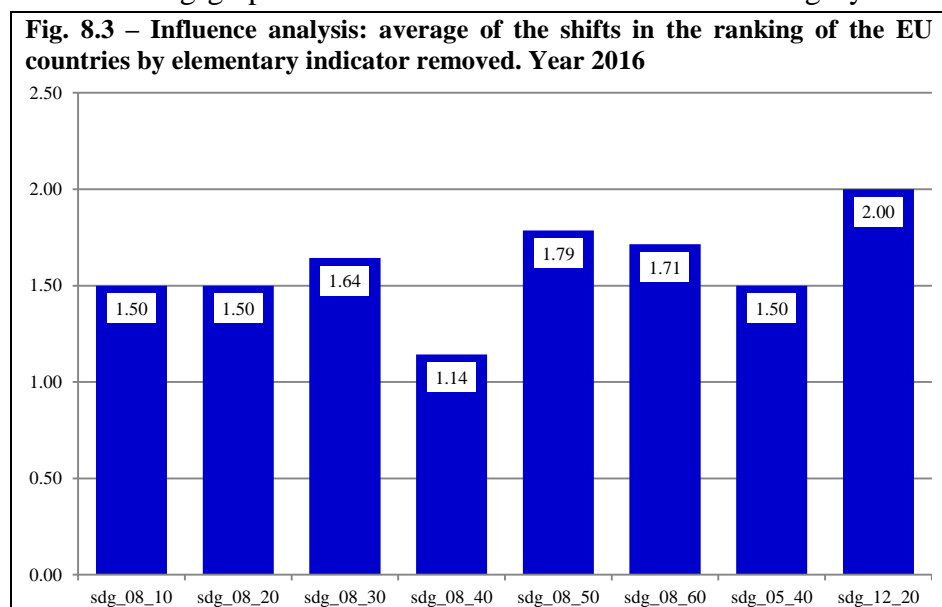
Moreover, the indicator “Real GDP per capita” (sdg\_08\_10) has been subject to a severe fall from 2010 to 2013, then it has started to rise until the amount of 17100 euro per capita, still far from 2010’s value equal to 20300 euro per capita.

**Fig. 8.2 – SDG8 composite indicator scores for EU28 countries, years 2010 and 2016. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator. The indicator “Resource productivity and domestic material consumption (DMC)” (sdg\_12\_20) has the highest impact on the composite indicator, whereas the indicator “Long-term unemployment rate” (sdg\_08\_40) has less of an influence on the composite indicator.



## Appendix

**Table 8.3 – Results of the composite indicator for SDG 8. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015	2016
Belgium	102.2	101.3	102.9	101.8	103.6	103.3	103.5
Bulgaria	89.1	87.7	87.2	87.0	86.4	89.5	89.5
Czech Republic	98.1	97.4	98.2	98.0	98.8	97.5	100.0
Denmark	111.9	111.1	110.5	111.6	111.9	112.9	112.6
Germany	106.9	107.7	108.1	109.0	109.2	110.0	110.1
Estonia	91.8	94.5	96.2	95.9	97.6	98.2	97.3
Ireland	99.1	97.3	93.9	94.2	95.4	97.9	99.6
Greece	94.7	90.5	84.7	80.5	80.8	83.6	86.2
Spain	87.2	85.8	85.0	84.4	85.1	85.9	87.4
France	103.3	102.6	102.6	102.0	102.2	102.4	102.5
Croatia	92.9	90.4	87.3	87.6	89.4	89.8	87.7
Italy	94.5	94.5	93.6	92.2	91.8	92.3	93.4
Cyprus	88.7	93.3	90.2	88.5	89.0	90.1	88.7
Latvia	90.3	89.1	91.1	93.8	93.0	95.5	95.5
Lithuania	92.3	93.5	93.3	94.9	95.3	98.0	98.1
Luxembourg	108.1	109.7	108.3	112.2	111.2	109.9	111.9
Hungary	92.7	93.5	94.5	94.6	95.5	96.2	97.7
Malta	94.1	95.5	90.3	95.1	96.0	97.1	99.1
Netherlands	113.9	114.4	114.2	113.4	112.3	112.6	114.1
Austria	102.3	105.3	105.0	104.9	105.5	105.5	105.1
Poland	87.3	90.1	89.8	89.9	90.2	91.1	91.8
Portugal	89.3	88.1	87.6	88.5	90.2	91.3	91.4
Romania	90.1	86.4	87.9	88.0	88.4	87.7	88.3
Slovenia	99.8	99.4	99.3	98.4	96.9	98.3	99.6
Slovakia	92.9	93.0	92.5	92.0	93.0	93.2	96.3
Finland	103.2	104.0	103.9	103.7	103.0	102.4	102.9
Sweden	109.5	109.8	110.0	110.4	110.3	111.0	111.6
United Kingdom	106.5	105.8	106.2	106.4	107.6	108.4	109.3
<b>EU28</b>	<b>100.0</b>	<b>99.9</b>	<b>99.8</b>	<b>99.7</b>	<b>100.0</b>	<b>100.7</b>	<b>101.3</b>

## ***Goal 9 - Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation***

### **Descriptive analysis of elementary indicators**

The composite indicator for SDG\_9 was built using the indicators listed in Table 9.1. The indicators “Patent applications to the European Patent Office” (sdg\_sdg\_09\_40) and “Share of rail and inland waterways activity in total freight transport” (sdg\_09\_60) were excluded from the composite indicator because of lack of data availability.

**Table 9.1 – List of the elementary indicators used for the composite indicator of SDG 9**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_09_10	Gross domestic expenditure on R&D	+	0.4	3.7	1.6	0.8
sdg_09_20	Employment in high- and medium-high technology manufacturing sectors and knowledge-intensive service sectors	+	24.2	59.6	44.2	7.2
sdg_09_30	R&D personnel	+	0.3	2.2	1.2	0.5
sdg_09_50	Share of collective transport modes in total passenger land transport	+	8.0	32.5	18.1	4.7
sdg_12_30	Average CO2 emissions per km from new passenger cars	-	101.2	162.0	118.8	8.1

The composite indicator synthesizes five indicators. Among them, three indicators have a correlation higher than 0.75 (highlighted in red in Table 9.2). Nevertheless, the elementary indicators “Gross domestic expenditure on R&D” (sdg\_09\_10), “Employment in high- and medium-high technology manufacturing sectors and knowledge-intensive service sectors” (sdg\_09\_20) and “R&D personnel” (sdg\_09\_30) represent three different phenomena. Therefore, they have to be considered inside the composite indicator.

**Table 9.2 – Correlation matrix of elementary indicators of SDG9**

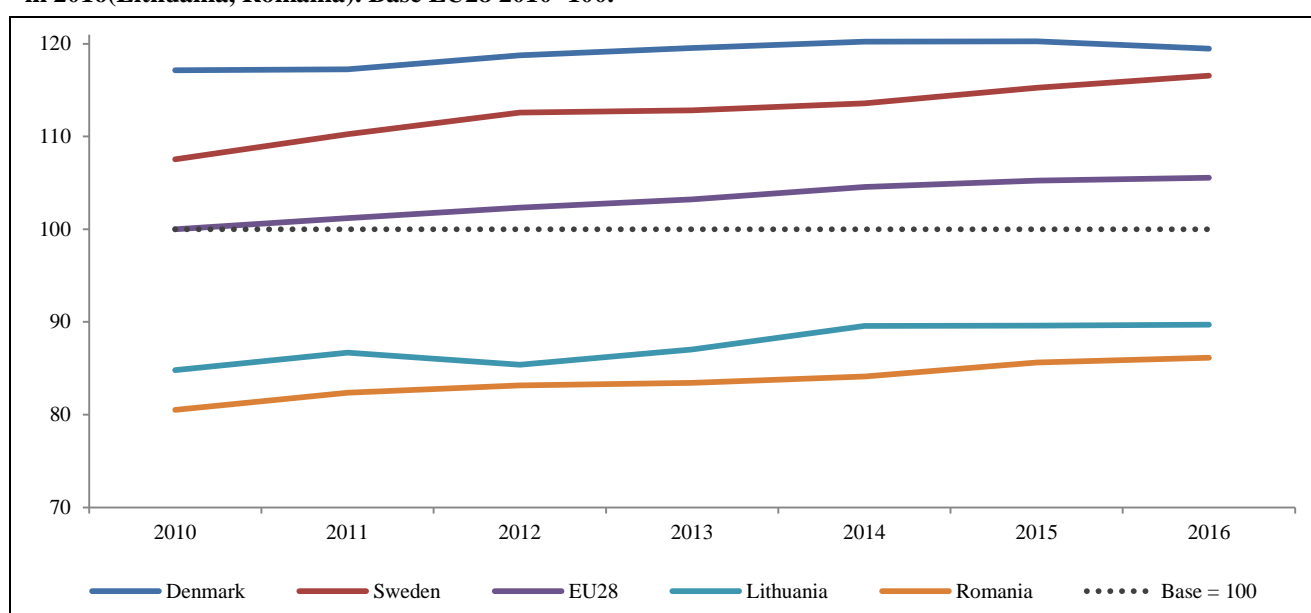
	sdg_09_10	sdg_09_20	sdg_09_30	sdg_09_50	sdg_12_30
sdg_09_10	1.00	0.75	0.84	-0.12	-0.18
sdg_09_20	0.75	1.00	0.86	-0.06	-0.14
sdg_09_30	0.84	0.86	1.00	-0.20	-0.27
sdg_09_50	-0.12	-0.06	-0.20	1.00	0.32
sdg_12_30	-0.18	-0.14	-0.27	0.32	1.00

## Composite indicator

The overall EU28 composite indicator for SDG 9 shows an increasing trend in the observed period (2010-2016), reaching the 105.5 point mark. This growing trend is explained by the fall of “Average CO2 emissions per km from new passenger cars” (sdg\_12\_30) and the raise of “R&D personnel” (sdg\_09\_30). Moreover, the “Gross domestic expenditure on R&D” (sdg\_09\_10) shows a slightly growing trend reaching in 2016 the 2.03% of GDP, but still far from the EU 2020 Target (3%).

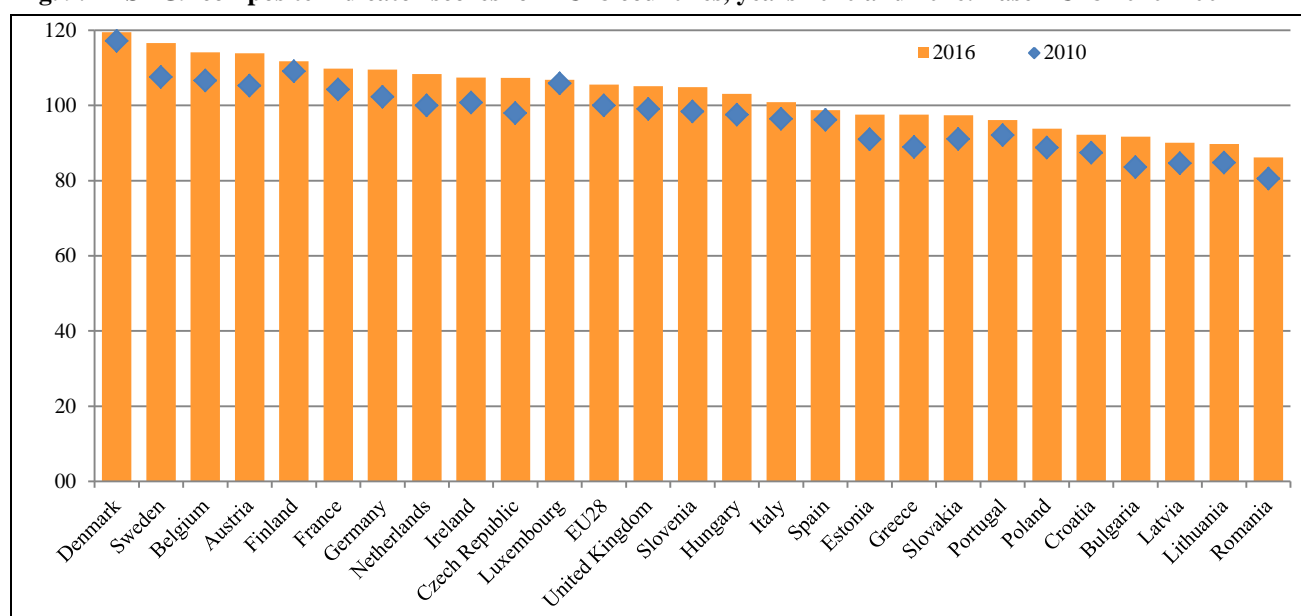
There are differences between the developing trends of member states. While the best performer (Denmark) increased his composite indicator by 2.4 points, the worst performer (Romania) increased by 5.7 during the observed period.

**Fig. 9.1 – Composite indicators, SDG 9. EU28 average, best performers (Denmark, Sweden) and worst performers in 2016 (Lithuania, Romania). Base EU28 2010=100.**



Comparing the composite indicator for all EU28 countries, we can see that the situation has improved for the majority of member states. The countries that improved the most are Sweden, Czech Republic and Greece. The increase of Greece’s composite indicator is a consequence of its decrease in “Average CO2 emissions per km from new passenger cars” (sdg\_12\_30) and in its growth in “Gross domestic expenditure on R&D” (sdg\_09\_10) achieving in 2016 1.01% of GDP almost reaching its EU 2020 Target (1.2%). No countries shown a descending trend.

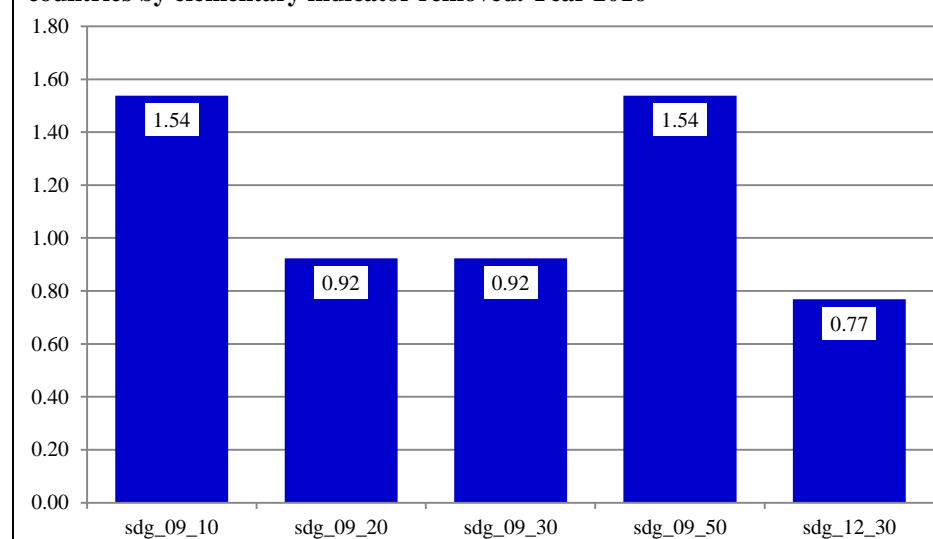
**Fig. 9.2 – SDG9 composite indicator scores for EU28 countries, years 2010 and 2016. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator.

**Fig. 9.3 – Influence analysis: average of the shifts in the ranking of the EU countries by elementary indicator removed. Year 2016**



The indicators “Gross domestic expenditure on R&D” (sdg\_09\_10) and “Share of collective transport modes in total passenger land transport” (sdg\_09\_50) have the highest influence on the composite indicator. Whereas “Employment in high and medium-high technology manufacturing sectors and knowledge-intensive service sectors” (sdg\_09\_20), “R&D

personnel” (sdg\_09\_30) and “Average CO2 emissions per km from new passenger cars” (sdg\_12\_30) have less of an influence on the composite indicator.

## Appendix

**Table 9.3 – Results of the composite indicator for SDG 9. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015	2016
Belgium	106.6	108.9	110.3	110.8	112.1	113.2	114.1
Bulgaria	83.6	85.1	85.6	87.0	89.6	91.8	91.7
Czech Republic	97.9	100.2	103.1	105.3	106.6	107.5	107.4
Denmark	117.1	117.2	118.8	119.6	120.2	120.3	119.5
Germany	102.3	104.0	106.0	105.9	107.5	109.3	109.5
Estonia	90.9	95.0	96.3	96.0	96.0	98.0	97.6
Ireland	100.7	102.3	102.8	103.9	107.3	107.7	107.4
Greece	89.0	91.9	94.0	96.5	96.6	98.1	97.6
Spain	96.1	96.9	97.8	98.7	98.1	98.9	98.8
France	104.3	105.2	106.3	107.6	108.4	110.0	109.8
Croatia	87.4	88.1	88.9	90.3	90.7	91.6	92.2
Italy	96.4	97.2	99.5	100.2	100.7	100.7	100.8
Cyprus			Not present due to lack of data				
Latvia	84.6	87.3	88.6	88.5	90.1	89.9	90.0
Lithuania	84.8	86.7	85.4	87.0	89.6	89.6	89.7
Luxembourg	105.8	106.8	106.3	107.9	108.4	106.9	106.8
Hungary	97.6	99.1	99.8	103.0	102.3	103.0	103.1
Malta			Not present due to lack of data				
Netherlands	100.0	103.7	105.3	107.2	107.9	108.6	108.3
Austria	105.3	106.7	108.6	110.7	111.8	113.5	113.8
Poland	88.8	89.2	90.6	91.0	93.0	93.7	93.8
Portugal	92.0	93.6	93.3	93.9	94.4	95.7	96.1
Romania	80.5	82.4	83.2	83.4	84.1	85.6	86.2
Slovenia	98.3	101.7	103.6	105.1	105.3	105.0	104.8
Slovakia	91.0	92.6	94.1	94.4	95.6	98.6	97.4
Finland	109.0	110.4	110.8	112.1	112.7	112.3	111.8
Sweden	107.5	110.3	112.6	112.8	113.6	115.2	116.6
United Kingdom	99.1	101.0	101.1	102.8	104.1	104.7	105.1
<b>EU28</b>	<b>100.0</b>	<b>101.2</b>	<b>102.3</b>	<b>103.2</b>	<b>104.5</b>	<b>105.2</b>	<b>105.5</b>



## Goal 10 - Reduce inequality within and among countries

### Descriptive analysis of elementary indicators

The composite indicator for SDG 10 was built using the indicators listed in Table 10.1. The indicators “Asylum applications by state of procedure” (sdg\_10\_60) as well as “EU imports from developing countries by country income groups” (sdg\_17\_30) were excluded because their polarity could not be clearly explained. The indicator “EU financing to developing countries” (sdg\_17\_20) was excluded because its negative values could not be used in the analysis. The indicator “Purchasing power adjusted GDP per capita” (sdg\_10\_10) was also excluded because it is already taken in consideration inside the indicator “Adjusted gross disposable income of households per capita (sdg\_10\_20).

**Table 10.1 – List of the elementary indicators used for the composite indicator of SDG 10**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_01_20	People at risk of income poverty after social transfers	-	8.6	25.4	17.1	4.1
sdg_10_20	Adjusted gross disposable income of households per capita	+	7760	32106	19584.9	5222.8
sdg_10_30	Relative median at-risk-of-poverty gap	-	13.2	38.2	23.3	5.6
sdg_10_40	Gini coefficient of equivalised disposable income	-	23.7	38.3	30.3	3.9
sdg_10_50	Income share of the bottom 40 % of the population	+	16.8	25.1	21.2	2.3

In this composite indicator there are at least three indicators with high correlation (highlighted in red in Table 10.2). Although it can be argued the high correlation could affect the composite indicator, the indicators (sdg\_01\_20), (sdg\_10\_50) and (sdg\_10\_40) describe correlated but different phenomena. Moreover, since Goal 10 focuses on income inequalities, in order to have a complete framework, it is crucial to consider all of its different dimensions.

**Table 10.2 – Correlation matrix of elementary indicators of SDG10**

	sdg_01_20	sdg_10_20	sdg_10_30	sdg_10_40	sdg_10_50
sdg_01_20	1.00	-0.47	0.79	0.89	-0.95
sdg_10_20	-0.47	1.00	-0.46	-0.39	0.42
sdg_10_30	0.79	-0.46	1.00	0.67	-0.74
sdg_10_40	0.89	-0.39	0.67	1.00	-0.98
sdg_10_50	-0.95	0.42	-0.74	-0.98	1.00

### Composite indicator

The overall EU28 composite indicator for SDG 10 shows a decreasing trend in the observed period (2010-2016), reaching the 98.7 point mark. The decreasing trend is mainly explained by a drop from 2013 to 2014 caused by a consistent worsening in indicators “People at risk of income poverty after social transfers” (sdg\_01\_20), “Relative median at-risk-of-poverty gap” (sdg\_10\_30) and “Gini coefficient of equivalised disposable income” (sdg\_10\_40).

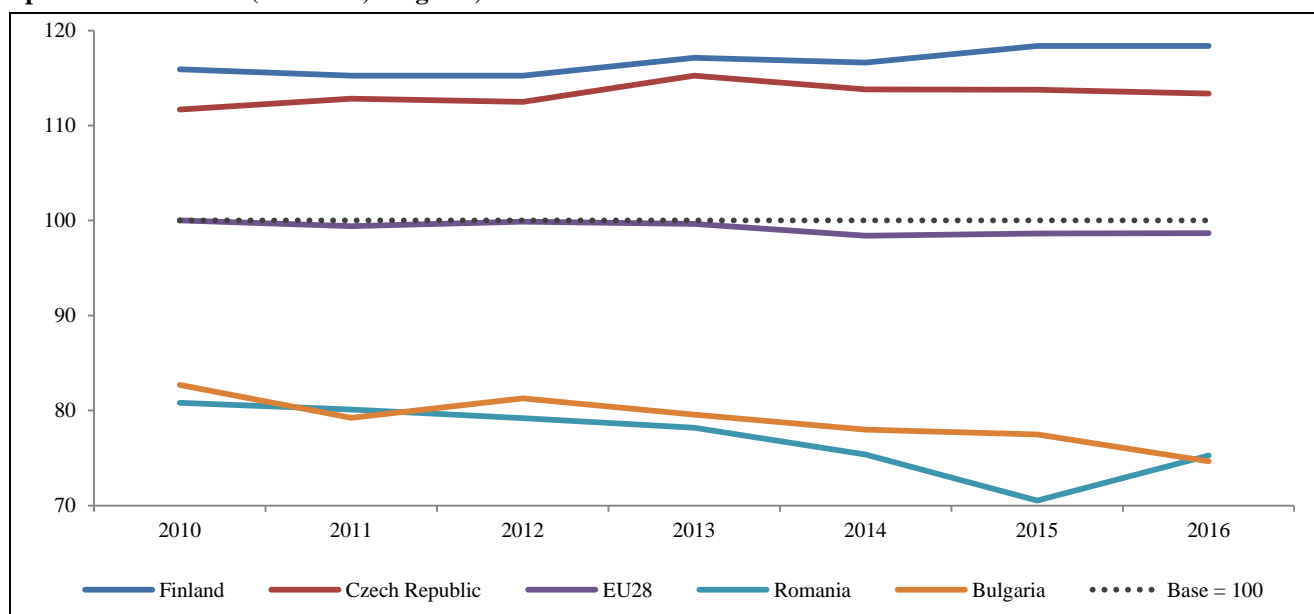
The stable trend observed from 2014-2016 is mainly attributable to the compensation between the raise of “Adjusted gross disposable income of households per capita” (sdg\_10\_20) with the overall worsening of the indicators “People at risk of income poverty after social transfers” (sdg\_01\_20),

“Relative median at-risk-of-poverty gap” (sdg\_10\_30) and “Gini coefficient of equivalised disposable income” (sdg\_10\_40).

As a matter of fact, the percentage of people at risk of poverty (sdg\_01\_20) raised from 16.5 in 2010 to 17.3 in 2016, as well as the percentage of distance from poverty threshold (sdg\_10\_30) that increase from 22.9% to 25% during the observed period.

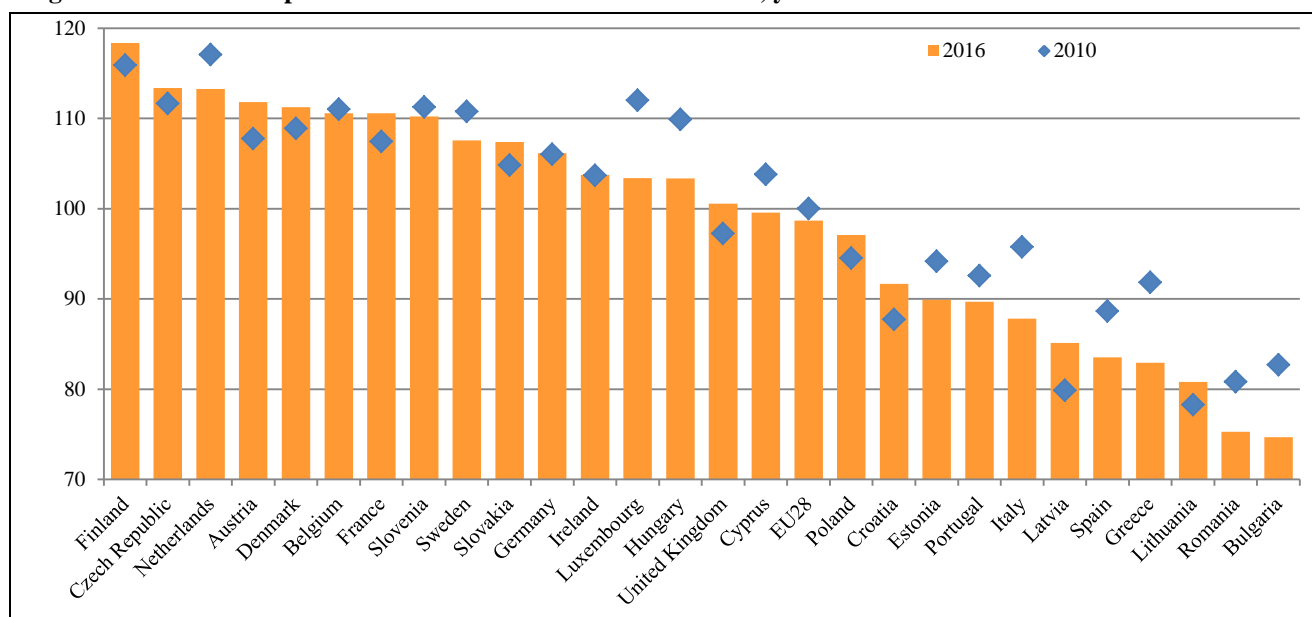
There are substantial differences between member states. While the best performer (Finland) moved from 116 to 118.4 in 6 years, the worst performer (Bulgaria) has seen its situation decrease from 82.7 in 2010 to 74.7 in 2016.

**Fig. 10.1 – Composite indicators, SDG 10. EU28 average, best performers (Netherlands, Belgium) and worst performers in 2016 (Romania, Bulgaria). Base EU28 2010=100.**



Comparing the composite indicator for all EU28 countries, we can see that the situation has decreased for the majority of member states. The countries that improved the most are Latvia, Austria and Croatia. These countries experienced an improvement in “Income share of the bottom 40% of the population” (sdg\_10\_50) and “Gini coefficient of equalized disposable income” (sdg\_10\_40) that had an average improvement of 4.5%. Austria and Croatia experienced an improvement in “People at risk of income poverty after social transfers” (sdg\_01\_20), whereas Latvia has been subject to the strongest improvement on the indicator “Adjusted gross disposable income of households per capita”. On the contrary, the countries that have worsened the most (Greece, Bulgaria and Italy) experienced a broad decline for indicators sdg\_01\_20, sdg\_10\_40, sdg\_10\_50 and sdg\_10\_30. Particularly, during the observed period, the percentage of distance to poverty threshold (sdg\_10\_30) increased by 8.5% points in Greece and by 6.8% in Italy.

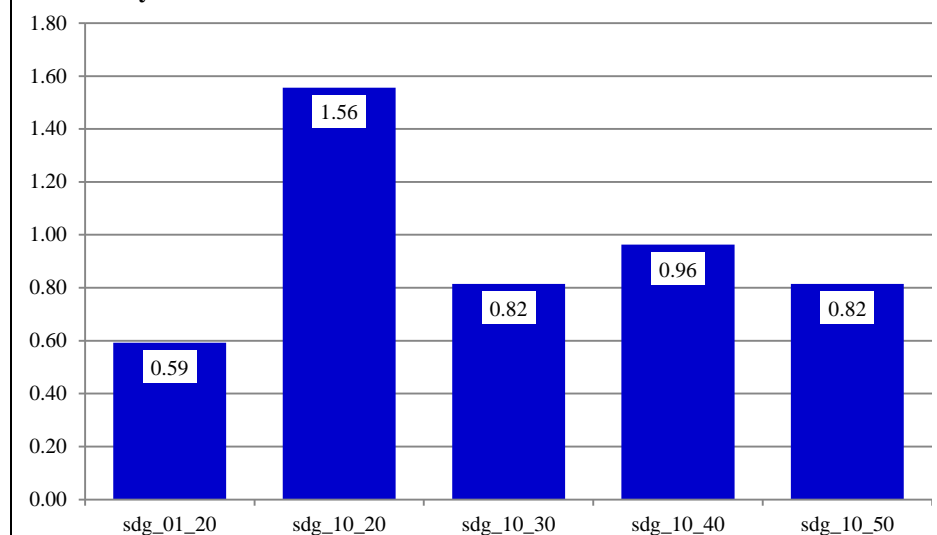
**Fig. 10.2 – SDG10 composite indicator scores for EU28 countries, years 2010 and 2016. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator. The indicator "Adjusted gross disposable income of households per capita" (sdg\_10\_20) has the highest impact on the composite indicator,

**Fig. 10.3 – Influence analysis: shifts in the ranking of the EU countries by elementary indicator removed. Year 2016**



whereas the indicator "People at risk of income poverty after social transfers" (sdg\_01\_20) has less of an influence on the composite indicator.

## Appendix

**Table 10.3 – Results of the composite indicator for SDG 10. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015	2016
Belgium	111.0	110.6	110.4	111.3	111.4	112.6	110.6
Bulgaria	82.7	79.2	81.3	79.6	78.0	77.5	74.7
Czech Republic	111.7	112.8	112.5	115.2	113.8	113.8	113.4
Denmark	108.9	111.4	112.4	110.1	111.7	110.8	111.2
Germany	106.0	106.3	107.5	106.0	102.3	104.4	106.1
Estonia	94.2	91.3	91.7	91.5	84.2	86.7	89.9
Ireland	103.7	103.8	101.0	102.2	100.5	103.2	103.7
Greece	91.8	87.6	82.4	80.6	82.6	83.8	82.9
Spain	88.6	87.6	85.2	86.1	82.7	81.9	83.5
France	107.4	106.9	107.7	108.6	110.6	111.1	110.6
Croatia	87.7	88.1	87.4	89.9	91.0	90.9	91.7
Italy	95.7	92.9	93.3	91.6	92.0	91.1	87.8
Cyprus	103.8	105.0	102.0	99.6	95.5	96.0	99.6
Latvia	79.9	81.2	82.4	83.5	83.6	82.3	85.1
Lithuania	78.3	87.3	92.6	86.9	88.6	79.9	80.8
Luxembourg	112.0	115.3	113.5	108.1	111.0	112.2	103.4
Hungary	109.9	104.7	103.1	101.3	100.7	101.4	103.3
Malta	Not present due to lack of data						
Netherlands	117.1	116.6	117.4	117.8	115.3	115.1	113.3
Austria	107.8	110.5	110.4	110.6	111.1	111.8	111.8
Poland	94.5	95.1	95.9	96.1	96.1	96.8	97.1
Portugal	92.6	91.3	90.6	88.8	86.0	88.1	89.7
Romania	80.8	80.1	79.2	78.2	75.4	70.5	75.3
Slovenia	111.3	110.8	111.4	109.1	107.7	109.8	110.2
Slovakia	104.8	106.2	107.7	107.5	103.1	106.5	107.4
Finland	115.9	115.2	115.2	117.1	116.6	118.4	118.4
Sweden	110.8	109.8	109.1	110.2	108.4	109.3	107.6
United Kingdom	97.2	97.9	101.3	103.3	100.7	99.6	100.6
<b>EU28</b>	<b>100.0</b>	<b>99.4</b>	<b>99.9</b>	<b>99.6</b>	<b>98.4</b>	<b>98.6</b>	<b>98.7</b>

## *Goal 11 – Make cities and human settlements inclusive, safe, resilient and sustainable*

### **Descriptive analysis of elementary indicators**

The composite indicator for SDG 11 was built using the indicators listed in Table 11.1. The indicators “Difficulty in accessing public transport by level of difficulty and degree of urbanization” (sdg\_11\_30),

“Population connected to at least secondary wastewater treatment” (sdg\_06\_20), “Artificial land cover per capita” (sdg\_15\_30) and “Change in artificial land cover” (sdg\_15\_40) were excluded from the composite indicator because there is a lack of data availability.

**Table 11.1 – List of the elementary indicators used for the composite indicator of SDG 11**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_11_10	Overcrowding rate	-	1.6	55.7	18.9	15.5
sdg_11_20	Population living in households considering that they suffer from noise	-	8.0	31.6	16.1	4.8
sdg_11_40	People killed in road accidents	-	2.6	11.7	5.7	2.1
sdg_11_50	Exposure to air pollution by particulate matter	-	5.2	41.3	14.6	5.6
sdg_11_60	Recycling rate of municipal waste	+	9.1	66.7	38.6	13.7
sdg_01_60	Population living in a dwelling with a leaking roof, damp walls, floors or foundation or rot in window frames of floor	-	4.4	34.7	15.3	6.3
sdg_09_50	Share of collective transport modes in total passenger land transport	+	10.2	32.5	18.6	4.6
sdg_16_20	Population reporting occurrence of crime, violence or vandalism in their area	-	5.8	27.7	12.6	4.4

Correlation does not affect the composite indicator. Indicators have a correlation equal to 0.75 in only one case (highlighted in red in Table 2). Indicators “Overcrowding rate” (sdg\_11\_10) and “People killed in road accidents” (sdg\_11\_40) show two different phenomena. Therefore, they both have to be considered inside the composite indicators.

**Table 11.2 – Correlation matrix of elementary indicators of SDG11**

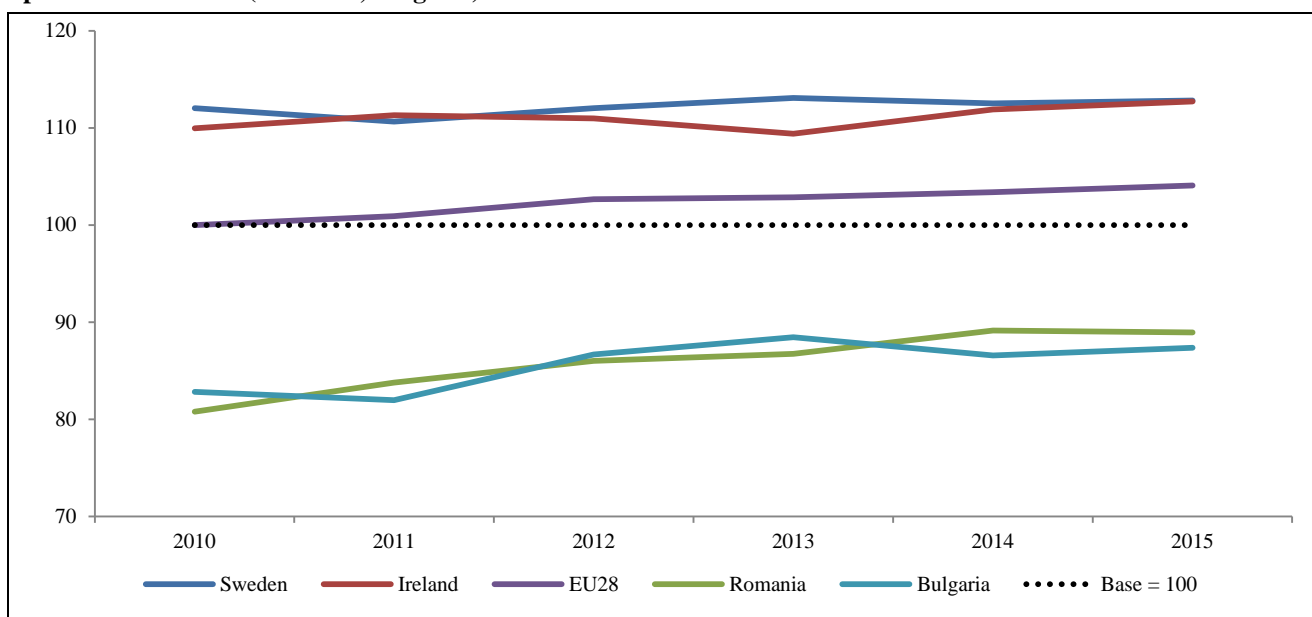
	sdg_11_10	sdg_11_20	sdg_11_40	sdg_11_50	sdg_11_60	sdg_01_60	sdg_09_50	sdg_16_20
sdg_11_10	1.00	-0.18	0.75	0.69	-0.60	0.08	0.48	0.02
sdg_11_20	-0.18	1.00	-0.06	-0.02	0.23	0.24	-0.37	0.20
sdg_11_40	0.75	-0.06	1.00	0.65	-0.47	0.18	0.24	0.24
sdg_11_50	0.69	-0.02	0.65	1.00	-0.21	0.32	0.30	0.25
sdg_11_60	-0.60	0.23	-0.47	-0.21	1.00	0.06	-0.33	0.10
sdg_01_60	0.08	0.24	0.18	0.32	0.06	1.00	-0.12	0.12
sdg_09_50	0.48	-0.37	0.24	0.30	-0.33	-0.12	1.00	-0.22
sdg_16_20	0.02	0.20	0.24	0.25	0.10	0.12	-0.22	1.00

## Composite indicator

The overall EU28 composite indicator for SDG 11 shows an increasing trend in the observed period (2010-2015), reaching 104.1 points. This growth can be explained by the raise of “Recycling rate of municipal waste” (sdg\_11\_60) that reaches the 45% of total waste generated, as well as the decline of “Exposure to air pollution by particulate matter” (sdg\_11\_50). Moreover, there is a slight decrease of the number of “People killed in road accidents” (sdg\_11\_40), “Population living in households considering that they suffer from noise” (sdg\_11\_20) and “Overcrowding rate” (sdg\_11\_10).

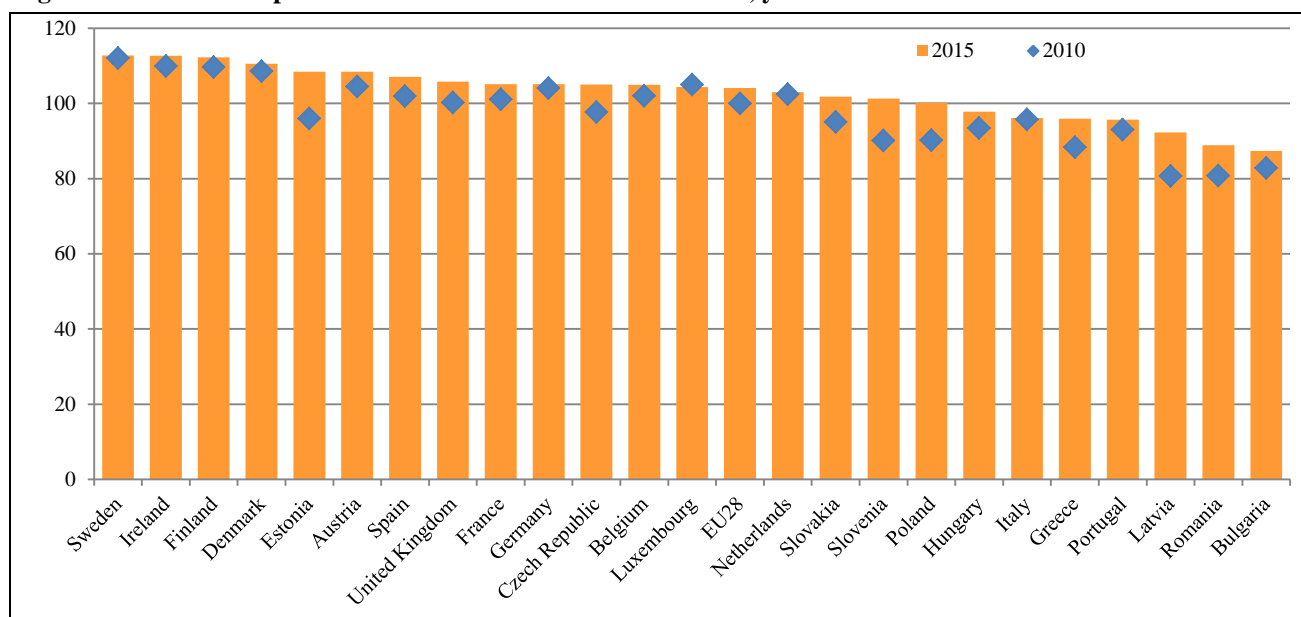
There are substantial differences between member states status. In fact, while the best performer (Sweden) scored 112.8 in 2016 the worst performer (Bulgaria) scored 87.4 in the last observed year. Comparing the composite indicator for all EU28 countries, we can see that the situation has increased for the majority of member states. The countries that improved the most are Estonia, Slovenia and Latvia. The promising growth of Estonia’s composite indicator can be explained by the broad raise of the “Recycling rate of municipal waste” (sdg\_11\_60) that goes from 18% in 2010 to 28% in 2015 and the huge decrease of the percentage of people living in overcrowded conditions that fall from 39.7% in 2010 to 13.4% in 2015.

**Fig. 11.1 – Composite indicators of SDG 11. EU28 average, best performers (Sweden, Ireland) and worst performers in 2015 (Romania, Bulgaria). Base EU28 2010=100**



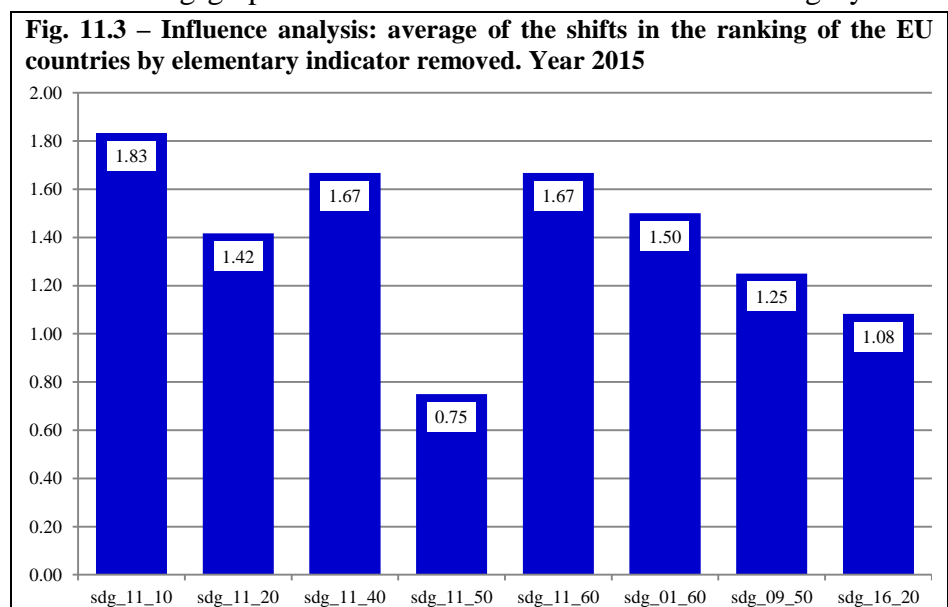
The only country that slightly worsens its situation in the observed period is Luxembourg. The descending trend from 2010 to 2015 is mainly due to a worrying increase of “Population reporting occurrence of crime, violence or vandalism in their area” that rose from 10.2% in 2010 to 14.9% in 2015, and to an increase of the indicator “Population living in households considering that they suffer from noise”.

**Fig. 11.2 – SDG11 composite indicator scores for EU28 countries, years 2010 and 2015. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator.



The indicator “Overcrowding rate by poverty status” (sdg\_11\_10) has the highest impact on the composite indicator, and the indicator “Exposure to air pollution by particulate matter” (sdg\_11\_50) has less of an influence on the composite indicator.

## Appendix

**Table 11.3 – Results of the composite indicator for SDG 11. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015
Belgium	102.0	102.0	105.2	103.2	105.1	105.0
Bulgaria	82.8	82.0	86.7	88.5	86.6	87.4
Czech Republic	97.6	99.0	102.1	102.7	103.9	105.0
Denmark	108.6	105.1	109.1	110.1	110.2	110.6
Germany	104.0	103.4	104.9	104.5	105.0	105.1
Estonia	96.0	100.6	100.3	101.8	105.6	108.5
Ireland	109.9	111.3	111.0	109.4	111.9	112.7
Greece	88.4	89.2	90.4	93.1	95.8	96.0
Spain	101.9	105.6	108.0	105.7	106.0	107.1
France	101.1	102.2	103.3	103.4	104.4	105.1
Croatia			Not present due to lack of data			
Italy	95.7	95.3	98.1	98.2	97.6	96.1
Cyprus			Not present due to lack of data			
Latvia	80.7	87.2	89.4	92.7	89.6	92.3
Lithuania			Not present due to lack of data			
Luxembourg	105.0	106.5	104.5	102.5	103.6	104.3
Hungary	93.5	95.3	96.4	96.5	96.0	97.8
Malta			Not present due to lack of data			
Netherlands	102.5	102.0	102.2	102.8	102.5	103.0
Austria	104.5	106.1	107.3	107.9	108.8	108.4
Poland	90.2	90.6	93.6	95.6	97.6	100.2
Portugal	93.0	94.3	96.3	93.0	93.4	95.7
Romania	80.8	83.8	86.0	86.7	89.1	88.9
Slovenia	90.1	93.1	97.5	98.8	98.8	101.3
Slovakia	95.1	95.6	97.1	99.6	99.1	101.8
Finland	109.6	109.6	109.8	109.9	110.6	112.3
Sweden	112.0	110.7	112.0	113.1	112.5	112.8
United Kingdom	100.2	101.3	102.5	104.4	104.5	105.8
<b>EU28</b>	<b>100.0</b>	<b>100.9</b>	<b>102.7</b>	<b>102.8</b>	<b>103.4</b>	<b>104.1</b>



## Goal 12 – Ensure sustainable consumption and production patterns

### Descriptive analysis of elementary indicators

The composite indicator for SDG 12 was built using the indicators listed in Table 12.1. The indicator “Consumption of toxic chemicals by hazardousness” (sdg\_12\_10) was excluded from the composite indicator because the only data available are for the aggregate EU28. The Indicators “Volume of freight transport relative to GDP” (sdg\_12\_40), “Generation of waste excluding major mineral wastes by hazardousness” (sdg\_12\_50) and “Recycling and landfill rate of waste excluding major mineral wastes” (sdg\_12\_60) were excluded from the composite indicator because there is a lack of data availability both for countries and time series. In order to maintain one indicator regarding waste and recycle we introduced inside this composite indicator the indicator “Recycling rate of municipal waste” (sdg\_11\_60).

**Table 12.1 – List of the elementary indicators used for the composite indicator of SDG 12**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_12_20	Resource productivity and domestic material consumption	+	0.27	4.07	1.7	1.0
sdg_12_30	Average CO2 emissions per km from new passenger cars	-	101.2	162	118.8	8.0
sdg_11_60	Recycling rate of municipal waste	+	4	66.7	37.6	14.9
sdg_07_10	Primary energy consumption	-	73.08	125	96.1	8.8
sdg_07_11	Final energy consumption	-	74.6	120.0	100.0	7.8
sdg_07_30	Energy productivity	+	2.0	16.9	7.6	3.5
sdg_07_40	Share of renewable energy in gross final energy consumption	+	1.0	53.8	20.0	11.8

Correlation does not affect the composite indicator. The highest observed correlation is 0.64 between indicators “Resource productivity and domestic material consumption (DMC)” (sdg\_12\_20) and “Energy productivity” (sdg\_07\_30).

**Table 12.2 – Correlation matrix of elementary indicators of SDG12**

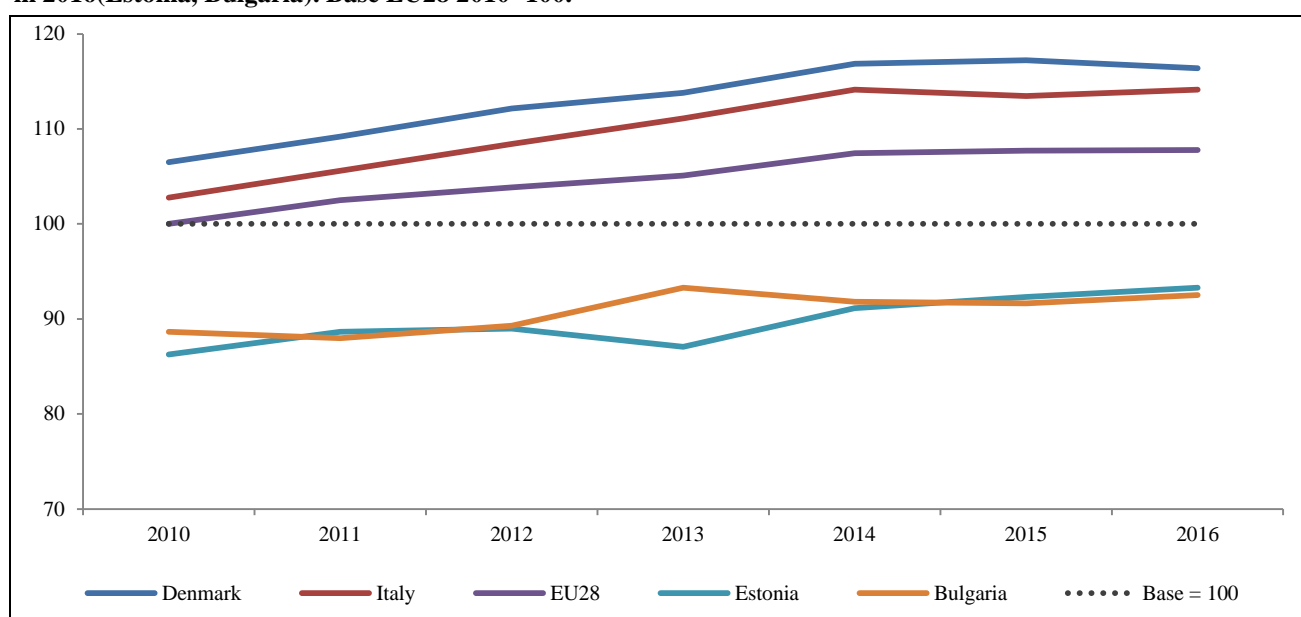
	sdg_12_20	sdg_12_30	sdg_11_60	sdg_07_10	sdg_07_11	sdg_07_30	sdg_07_40
sdg_12_20	1.00	-0.45	0.49	-0.10	-0.25	0.64	-0.39
sdg_12_30	-0.45	1.00	0.05	0.47	0.42	-0.53	0.13
sdg_11_60	0.49	0.05	1.00	0.34	0.17	0.23	0.07
sdg_07_10	-0.10	0.47	0.34	1.00	0.16	-0.27	0.29
sdg_07_11	-0.25	0.42	0.17	0.16	1.00	-0.12	-0.01
sdg_07_30	0.64	-0.53	0.23	-0.27	-0.12	1.00	-0.19
sdg_07_40	-0.39	0.13	0.07	0.29	-0.01	-0.19	1.00

## Composite indicator

The overall EU28 composite indicator for SDG 12 shows an increasing trend in the observed period (2012-2016), reaching the 107.8 point mark. Analyzing the trend of the elementary indicators of EU28, there is an overall improvement in all the indicators. Particularly, “Resource productivity and domestic material consumption” (sdg\_12\_20), “Recycling rate of municipal waste” (sdg\_11\_60) and “Share of renewable energy in gross final energy consumption” (sdg\_07\_40) have improved and the “Average CO2 emissions per km from new passenger cars” (sdg\_12\_30) has fallen, explaining the increasing trend of the composite indicator. It is important to remark that the EU28 composite indicator shows a stable trend from 2014 to 2016 caused by the raise of the indicators related to the energy consumption (sdg\_07\_10, sdg\_07\_11).

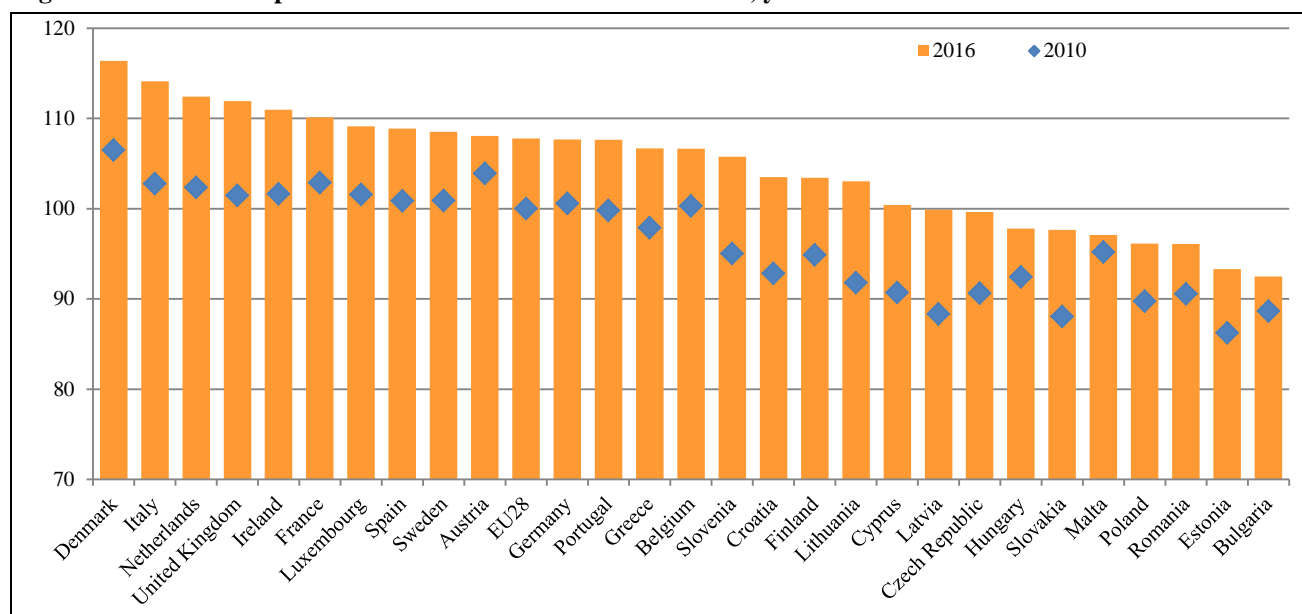
There are no substantial differences between the trends of member states. In fact, both the best performer (Denmark) and the second worst performer (Estonia) increased their situation in the observed period by 9.9 Denmark, and 7.0 Estonia. However, as shown in the Fig.12.1, there are differences in terms of distance from the 2010’s EU28 situation.

**Fig. 12.1 – Composite indicators, SDG 12. EU28 average, best performers (Denmark, Italy) and worst performers in 2016(Estonia, Bulgaria). Base EU28 2010=100.**



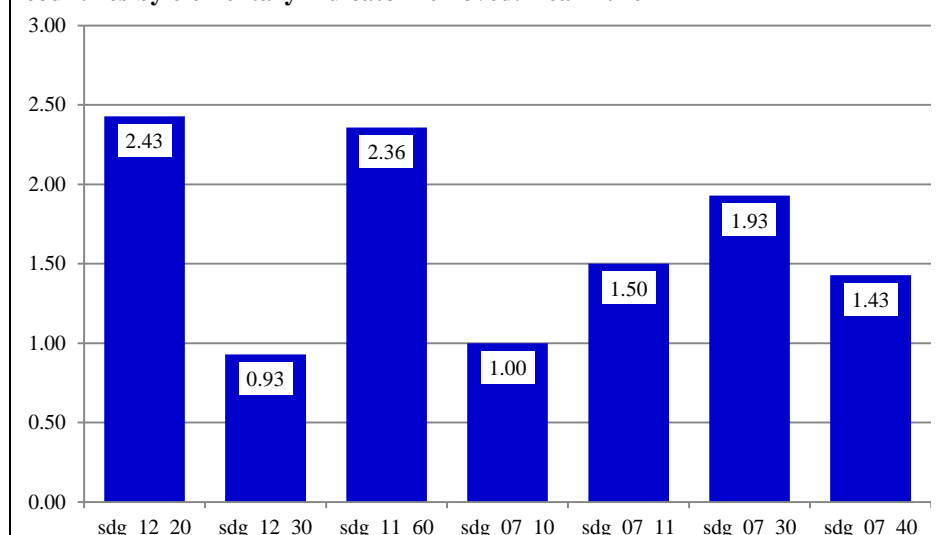
Comparing the composite indicator for all EU28 countries, we can see that the situation has increased for all member states. The countries that improved the most are Latvia, Italy and Lithuania. The promising performance of Italy can be explained by the raise of “Resource productivity and domestic material consumption” (sdg\_12\_20), “Recycling rate of municipal waste” (sdg\_11\_60) and “Share of renewable energy in gross final energy consumption” (sdg\_07\_40) as well as the fall of “Average CO2 emissions per km from new passenger cars” (sdg\_12\_30). For this last indicator is important to point out Greece’s remarkable situation where the average CO2 emissions have decreased drastically, moving the level of CO2 (g/km) from 143.7 to 106.3 in six years.

**Fig. 12.2 – SDG12 composite indicator scores for EU28 countries, years 2010 and 2016. Base EU28 2010=100**



## Influence analysis of elementary indicators

**Fig. 12.3 – Influence analysis: average of the shifts in the ranking of the EU countries by elementary indicator removed. Year 2016**



(sdg\_07\_10) have less influence on the composite indicator.

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator. The indicator “Resource productivity and domestic material consumption” (sdg\_12\_20) has the highest impact on the composite indicator, and “Average CO2 emissions per km from new passenger cars” as well as “Primary energy consumption”

## Appendix

**Table 12.3 – Results of the composite indicator for SDG 12. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015	2016
Belgium	100.3	104.0	105.5	104.8	108.2	107.5	106.6
Bulgaria	88.6	88.0	89.3	93.3	91.8	91.6	92.5
Czech Republic	90.6	92.5	94.8	96.0	97.8	98.6	99.6
Denmark	106.5	109.2	112.2	113.8	116.9	117.2	116.4
Germany	100.6	104.0	104.6	104.4	107.1	107.9	107.7
Estonia	86.3	88.6	89.0	87.1	91.1	92.3	93.3
Ireland	101.6	106.2	107.8	108.1	110.5	111.8	111.0
Greece	97.9	99.8	102.4	106.2	106.3	106.3	106.7
Spain	100.9	102.1	104.9	108.3	109.3	108.6	108.9
France	102.9	104.9	105.6	106.2	109.3	109.3	110.1
Croatia	92.8	95.2	99.0	100.4	103.6	102.9	103.5
Italy	102.8	105.6	108.4	111.1	114.1	113.5	114.1
Cyprus	90.7	92.6	95.8	100.7	102.4	102.6	100.4
Latvia	88.3	91.9	92.9	96.2	97.7	99.2	99.9
Lithuania	91.8	96.1	96.9	99.1	100.1	101.6	103.0
Luxembourg	101.6	102.9	104.9	106.6	108.9	109.4	109.1
Hungary	92.4	94.0	97.0	98.2	98.9	97.8	97.8
Malta	95.2	95.8	94.2	97.4	97.1	95.0	97.1
Netherlands	102.3	106.9	108.0	109.3	112.6	112.2	112.4
Austria	103.9	105.7	106.8	106.2	108.8	108.3	108.1
Poland	89.7	89.8	91.5	93.1	96.2	97.9	96.1
Portugal	99.8	102.0	105.5	106.5	108.2	107.5	107.6
Romania	90.6	90.8	92.4	95.0	95.8	95.7	96.1
Slovenia	95.0	97.9	101.1	102.2	103.9	106.7	105.8
Slovakia	88.0	90.7	93.4	93.1	95.0	96.5	97.7
Finland	94.9	97.9	99.1	100.4	101.4	104.6	103.4
Sweden	100.9	104.3	105.3	106.8	108.3	110.3	108.5
United Kingdom	101.5	105.9	106.0	107.2	110.4	111.0	111.9
<b>EU28</b>	<b>100.0</b>	<b>102.5</b>	<b>103.9</b>	<b>105.1</b>	<b>107.5</b>	<b>107.7</b>	<b>107.8</b>

## Goal 13 – Take urgent action to combat climate change and its impacts

### Descriptive analysis of elementary indicators

The composite indicator for SDG 13 was built using the indicators listed in Table 13.1. The indicators “Mean near surface temperature deviation” (sdg\_13\_30), “Climate related economic losses by type of event”(sdg\_13\_40), “Contribution to the international 100bn USD commitment on climate related expending” (sdg\_13\_50), “Population covered by the Covenant of Mayors for Climate & Energy signatories” (sdg\_13\_60) and “Mean ocean acidity” (sdg\_14\_50) were excluded from the composite indicator because of a significant lack of data availability.

**Table 13.1 – List of the elementary indicators used for the composite indicator of SDG 13**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_13_10	Greenhouse gas emissions	-	41.5	163.8	80.6	24.5
sdg_13_20	Greenhouse gas emissions intensity of energy consumption	-	73.9	124.0	88.1	8.7
sdg_07_10	Primary energy consumption	-	73.1	125.0	94.8	8.4
sdg_07_11	Final energy consumption	-	74.6	120.0	97.9	7.4
sdg_07_40	Share of renewable energy in gross final energy consumption	+	1.0	53.8	19.8	11.9
sdg_12_30	Average CO2 emissions per km from new passenger cars	-	101.2	162.0	120.9	9.6

Correlation does not affect the composite indicator. All observed correlations are inferior to 0.75.

**Table 13.2 – Correlation matrix of elementary indicators of SDG13**

	sdg_13_10	sdg_13_20	sdg_07_10	sdg_07_11	sdg_07_40	sdg_12_30
sdg_13_10	1.00	0.01	-0.27	-0.29	-0.29	-0.52
sdg_13_20	0.01	1.00	-0.16	0.03	-0.27	0.20
sdg_07_10	-0.27	-0.16	1.00	0.29	0.19	0.41
sdg_07_11	-0.29	0.03	0.29	1.00	-0.02	0.38
sdg_07_40	-0.29	-0.27	0.19	-0.02	1.00	0.21
sdg_12_30	-0.52	0.20	0.41	0.38	0.21	1.00

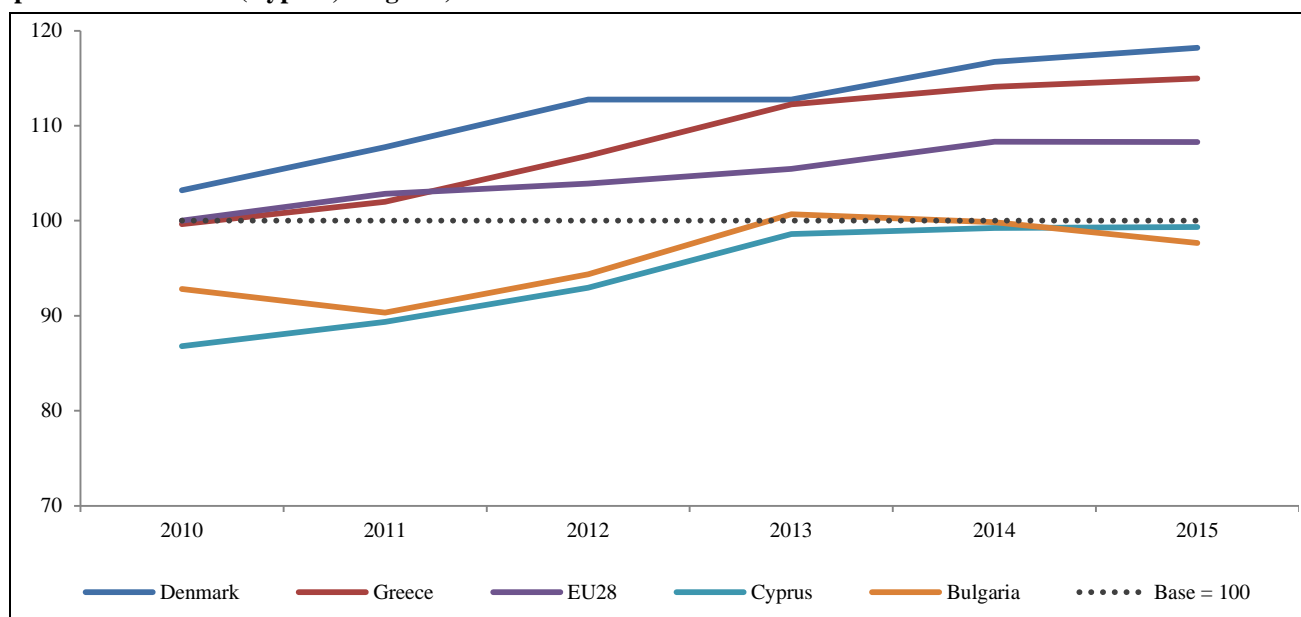
## Composite indicator

The overall EU28 composite indicator for SDG 13 shows an increasing trend in the observed period (2010-2016), due to the fall of "Greenhouse gas emissions" (sdg\_13\_10), "Greenhouse gas emissions intensity of energy consumption" (sdg\_13\_20), "primary and final energy consumption" (sdg\_7\_10; 7\_11) and "Average CO2 emissions per km from new passenger cars" (sdg\_12\_30) as well as the consistent raise of "Share of renewable energy in gross final energy consumption by sector" (sdg\_07\_40).

However, in the last observed year, 2014-2015, there is a steady trend, as shown in the Fig.13.1, where the EU28 composite indicator lies at the 2014 level of 108.3. This stable trend can be attributed to the slight worsening of all composite indicators except sdg\_07\_40 that continues to raise, and sdg\_12\_30 that keeps reducing.

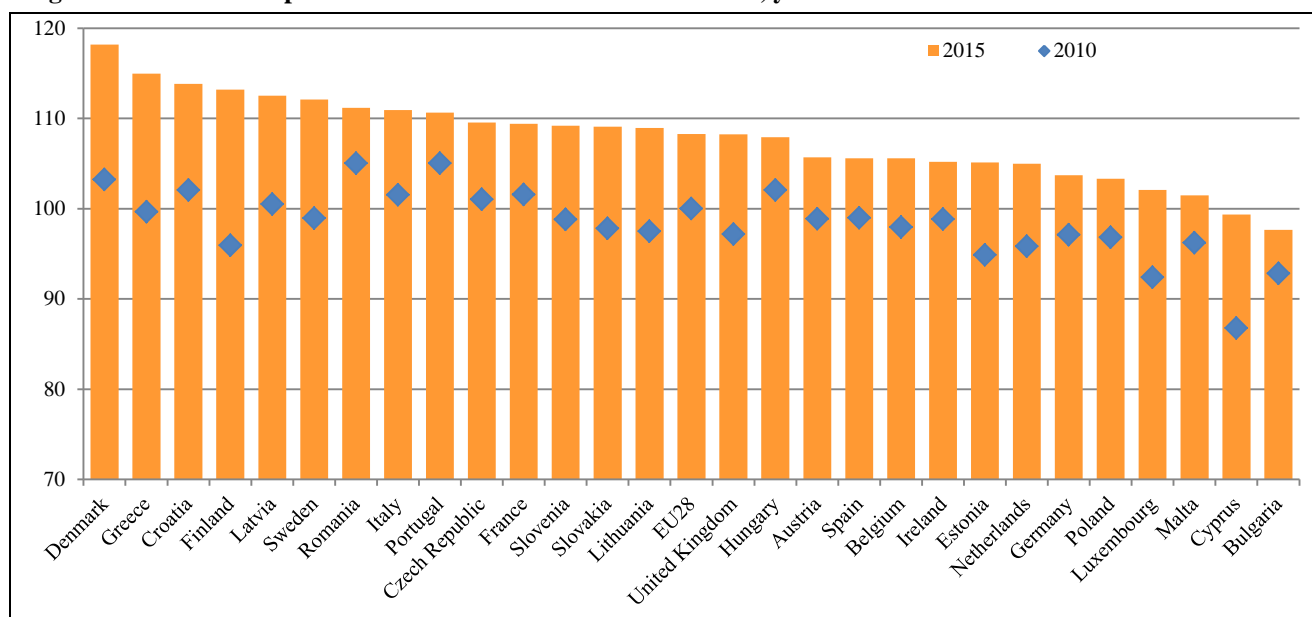
There are substantial differences between the developing trends of member states both in terms of distance from the 2010's EU28 level. While the best performer (Denmark) moved from 103.2 to 108.2 in 5 years, the worst performer (Bulgaria) has seen its situation increase until it has reached the EU28 2010's level in 2013, and then it has suffered a decrease to the 97.7 point mark in 2015.

**Fig. 13.1 – Composite indicators of SDG 13. EU28 average, best performers (Denmark, Greece) and worst performers in 2015 (Cyprus, Bulgaria). Base EU28 2010=100**



Comparing the composite indicator for all EU28 countries, the situation improved for all member states. The countries that improved the most are, respectively, Finland, Greece and Denmark. In these cases, all the indicators show great improvements, especially there is a considerable decrease in "Greenhouse gas emissions" (sdg\_13\_10) and "Average CO2 emissions per km from new passenger cars" (sdg\_12\_30) and is observed a remarkable increase in "Share of renewable energy in gross final energy consumption" (sdg\_07\_40).

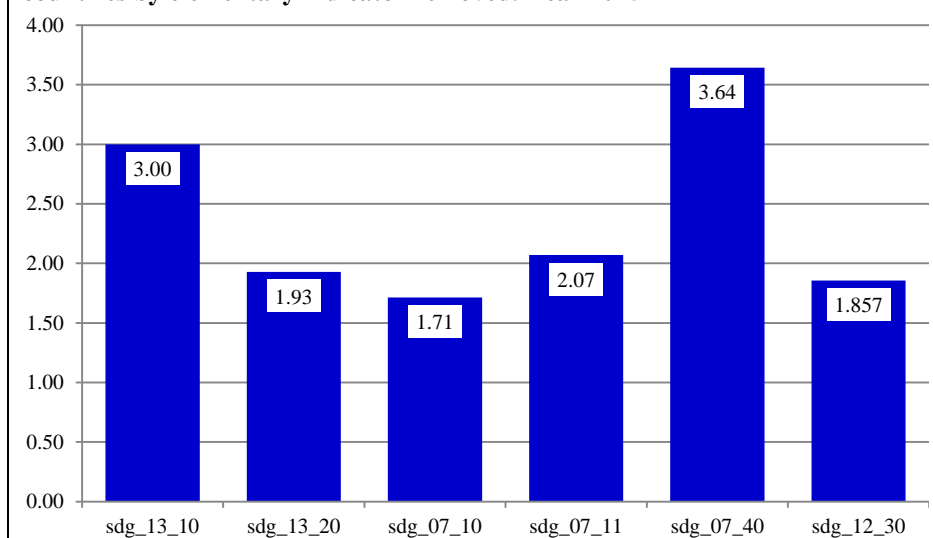
**Fig. 13.2 – SDG13 composite indicator scores for EU28 countries, years 2010 and 2015. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator.

**Fig. 13.3 – Influence analysis: average of the shifts in the ranking of the EU countries by elementary indicator removed. Year 2015**



The indicator “Share of renewable energy in gross final energy consumption” (SDG\_07\_40) has the highest impact, whereas “Primary energy consumption” (SDG\_07\_10) has less of an influence on the composite indicator.

## Appendix

**Table 13.3 – Results of the composite indicator for SDG 13. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015
Belgium	98.0	103.3	103.8	103.7	107.2	105.6
Bulgaria	92.8	90.3	94.4	100.7	99.8	97.7
Czech Republic	101.1	103.2	105.0	107.2	109.7	109.5
Denmark	103.2	107.8	112.8	112.7	116.7	118.2
Germany	97.1	100.1	100.3	100.1	103.3	103.7
Estonia	94.9	97.1	99.9	97.6	100.1	105.1
Ireland	98.9	103.5	104.4	105.7	106.6	105.2
Greece	99.7	102.0	106.9	112.3	114.1	115.0
Spain	99.0	99.8	101.8	106.2	107.0	105.6
France	101.6	104.7	105.0	105.7	110.0	109.4
Croatia	102.1	104.1	108.1	110.7	114.6	113.8
Italy	101.5	103.7	106.1	109.2	111.7	110.9
Cyprus	86.8	89.4	93.0	98.6	99.2	99.4
Latvia	100.5	106.5	107.8	109.6	111.6	112.5
Lithuania	97.5	103.1	103.2	105.1	106.7	108.9
Luxembourg	92.4	93.4	95.2	97.6	100.0	102.1
Hungary	102.1	103.8	107.2	109.5	110.3	107.9
Malta	96.2	96.0	94.2	98.5	99.1	101.5
Netherlands	95.8	100.6	102.3	103.2	106.5	105.0
Austria	98.9	101.5	103.4	103.1	107.0	105.7
Poland	96.8	98.1	99.3	100.6	103.2	103.3
Portugal	105.0	107.2	109.9	112.1	113.2	110.7
Romania	105.0	104.7	105.9	110.1	111.2	111.2
Slovenia	98.8	99.3	101.8	105.0	109.6	109.2
Slovakia	97.8	101.1	104.2	104.8	108.5	109.1
Finland	96.0	101.8	105.2	107.0	109.9	113.2
Sweden	98.9	104.5	107.2	109.4	111.2	112.1
United Kingdom	97.2	101.9	101.3	102.8	106.7	108.3
<b>EU28</b>	<b>100.0</b>	<b>102.8</b>	<b>103.9</b>	<b>105.5</b>	<b>108.3</b>	<b>108.3</b>



## ***Goal 14 – Conserve and sustainably use the oceans, seas and marine resources for sustainable development***

### **Descriptive analysis of elementary indicators**

The data of EU countries for Goal 14 are scant and poorly available. For this reason it was calculated only as a composite indicator at the EU level without countries details. By consequence, in this exercise the elementary indicators are standardized using the minimum and maximum calculated on the EU time series only, rather than the minimum and maximum between all the member states. Therefore, the composite indicator stands in a wider range of values, thus it is not comparable with the composite indicators of the other Goals. Furthermore, the scarceness of disposable indicators, as well as the absence of reliable indicators on marine pollution, only allows a partial analysis of the context.

The composite indicator for SDG 14 was built using the indicators listed in Table 14.1. The indicators “Bathing sites with excellent water quality” (sdg\_14\_40) and “Mean ocean acidity” (sdg\_14\_50) were excluded from the composite indicator because there is a lack of data availability in times series. The indicator “Catches in major fishing areas” (sdg\_14\_20) was left out since its polarity cannot be clearly explained.

**Table 14.1 – List of the elementary indicators used for the composite indicator of SDG 14**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_14_10	Sufficiency of marine sites designated under the EU Habitats directive	+	198,757.0	360,350.0	278339.6	58943.9
sdg_14_30	Assessed fish stocks exceeding fishing mortality at maximum sustainable yield (FMSY)	-	40.9	58.7	46.9	6.0

Correlation does not affect the composite indicator. The two indicators have the correlation coefficient equal to 0.48 in absolute terms, therefore inferior to 0.75 (Table 14.2).

**Table 14.2 – Correlation matrix of elementary indicators of SDG14**

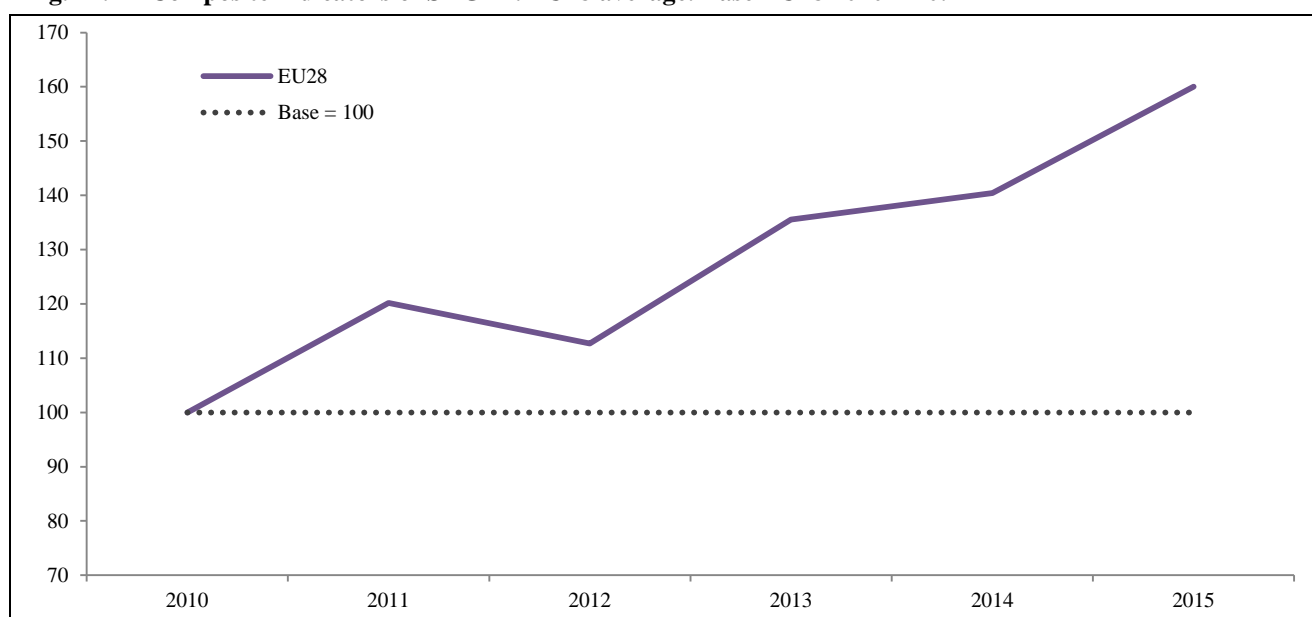
	sdg_14_10	sdg_14_30
sdg_14_10	1.00	-0.48
sdg_14_30	-0.48	1.00

## Composite indicator

The overall EU28 composite indicator for SDG 14 shows an increasing trend in the observed period (2010-2015), reaching 160 point mark in 2015.

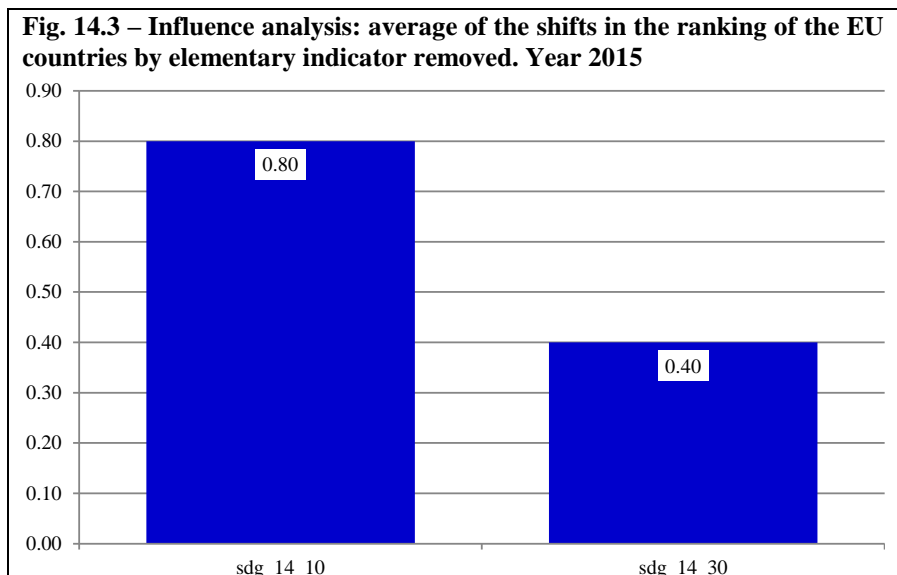
In particular, between 2010 and 2015 the marine protected areas (km<sup>2</sup>) observed in the indicator “Sufficiency of marine sites designated under the EU Habitats directive” (sdg\_14\_10) almost redoubled, while the indicator “Assessed fish stocks exceeding fishing mortality at maximum sustainable yield (FMSY)” (sdg\_14\_30) revealed a consistent downward tendency explaining the promising trend of the composite indicator.

**Fig. 14.1 – Composite indicators of SDG 14. EU28 average. Base EU28 2010=140.**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator.



The indicator “Sufficiency of marine sites designated under the EU Habitats directive” (sdg\_14\_10) has a higher impact than “Assessed fish stocks exceeding fishing mortality at maximum sustainable yield (FMSY) by fishing area” (sdg\_14\_30) on the composite indicator.

## Appendix

**Table 14.3 – Results of the composite indicator for SDG 14. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015
EU28	100.0	120.2	112.7	135.5	140.4	160.0

***Goal 15 – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss***

**Descriptive analysis of elementary indicators**

The composite indicator for SDG 15 was built using the indicators listed in Table 15.1. “Estimated soil erosion by water” (sdg\_15\_50), “Common bird index by type of species” (sdg\_15\_60), “Nitrate in groundwater” (sdg\_06\_40), “Biochemical oxygen demand in rivers” (sdg\_06\_30) and “Phosphate in rivers” (sdg\_06\_50) were excluded from the composite indicator because there is a lack of data availability in time series and/or in countries. The indicator “Change in artificial land cover” (sdg\_15\_40) was used in place of “Artificial land cover by capita” (sdg\_15\_30) to take in consideration the artificial land developing trough time, rather than its ratio with population.

**Table 15.1 – List of the elementary indicators used for the composite indicator of SDG 15**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_15_10	Share of forest area	+	7.8	71.7	39.6	16.3
sdg_15_20_nt	Sufficiency of terrestrial sites designated under the EU Habitats Directive	+	0.0	0.3	0.2	0.1
sdg_15_40	Change in artificial land cover	-	92.9	109.6	109.1	3.6

Correlation does not affect the composite indicator. The highest correlation between elementary indicators is equal to 0.38, always inferior to 0.75.

**Table 15.2 – Correlation matrix of elementary indicators of SDG15**

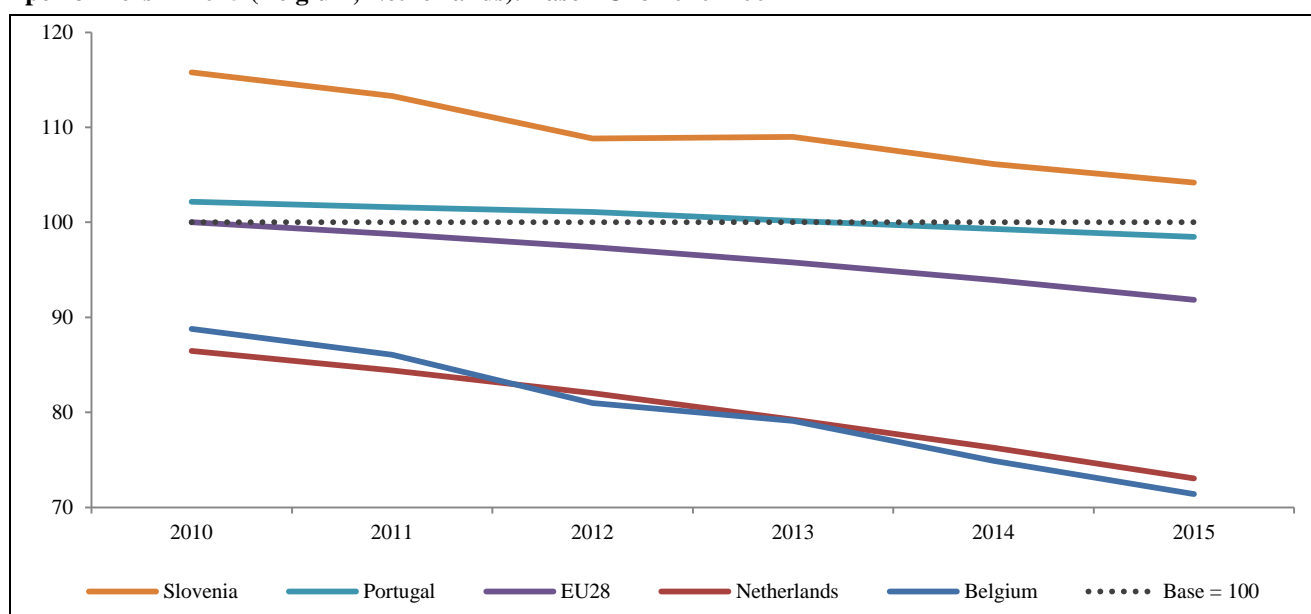
Indicatore	sdg_15_10	sdg_15_20_NT	sdg_15_40
sdg_15_10	1.00	0.34	-0.03
sdg_15_20_NT	0.34	1.00	0.38
sdg_15_40	-0.03	0.38	1.00

## Composite indicator

The overall EU28 composite indicator for SDG 15 shows a strong decreasing trend in the observed period (2010-2015), losing more than 8 points in 5 years by far the worst trend observed among all the 17 Goals. It is important to remark that the absence of available indicators regarding biodiversity, due to the broad lack of data, only allows a partial context's analysis.

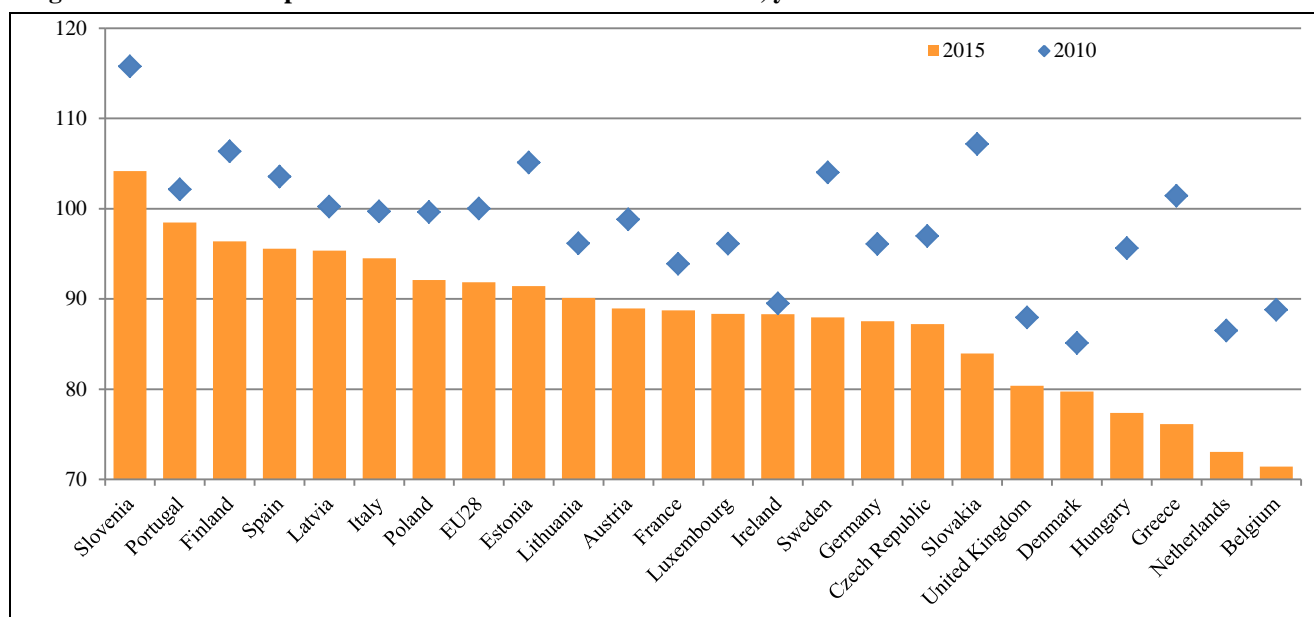
The decreasing trend showed in Fig. 15.1 is attributable to the linear growth of indicator “Change in artificial land cover” (sdg\_15\_40) increased by more than 6% in the observed period. On the other hand, the indicators “Share of forest areas” (sdg\_15\_10) as well as “Sufficiency of terrestrial sites designated under the EU Habitats Directive” (sdg\_15\_20) exhibit a slight increase. There are no substantial differences between the trends of member states. In fact, while the best performer (Slovenia) moved from 115.8 to 104.2 in 5 years, the worst performer (Belgium) has seen its situation decreased from 88.8 to 71.4.

**Fig. 15.1 – Composite indicators of SDG 15. EU28 average, best performers (Slovakia, Portugal) and worst performers in 2015 (Belgium, Netherlands). Base EU28 2010=100**



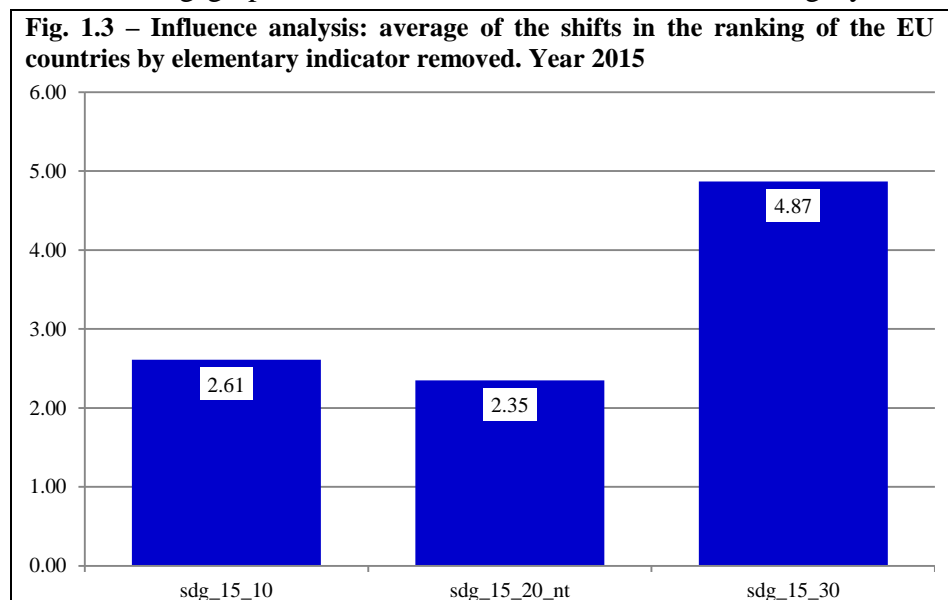
Comparing the composite indicator for all EU28 countries, the situation worsened for all member states. The countries that have declined the most are Greece, Slovakia and Hungary. Analyzing their elementary indicators' trends, despite the slight growth of “Share of forest area” (sdg\_15\_10), the broad increment of “Change in artificial land cover” (sdg\_15\_40), observed in all these countries, explains the decreasing trend of the composite indicators.

**Fig. 15.2 – SDG15 composite indicator scores for EU28 countries, years 2010 and 2015. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator.



The indicator “Change in artificial land cover” (sdg\_15\_40) has a high impact, whereas the indicator “Sufficiency of terrestrial sites designated under the EU Habitats Directive” (sdg\_15\_20\_nt) has less of an influence on the composite indicator.

## Appendix

**Table 15.3 – Results of the composite indicator for SDG 15. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015
Belgium	88.8	86.1	81.0	79.1	74.9	71.4
Bulgaria			Not present due to lack of data			
Czech Republic	97.0	95.4	94.3	91.8	89.8	87.2
Denmark	85.1	84.3	82.8	81.9	80.8	79.7
Germany	96.1	94.7	93.7	91.5	89.7	87.5
Estonia	105.1	102.8	100.9	97.7	94.8	91.4
Ireland	89.5	89.4	88.8	88.8	88.5	88.3
Greece	101.4	97.1	87.2	86.5	80.1	76.1
Spain	103.6	102.2	100.6	99.1	97.3	95.6
France	93.9	92.9	92.1	90.9	89.9	88.7
Croatia			Not present due to lack of data			
Italy	99.7	98.8	97.8	96.7	95.6	94.5
Cyprus			Not present due to lack of data			
Latvia	100.2	99.6	99.3	97.7	96.7	95.3
Lithuania	96.1	95.2	94.9	93.0	91.9	90.1
Luxembourg	96.1	93.8	86.4	88.4	85.3	88.4
Hungary	95.6	92.9	91.2	86.5	82.6	77.4
Malta			Not present due to lack of data			
Netherlands	86.5	84.4	82.0	79.2	76.3	73.0
Austria	98.8	97.1	93.7	92.9	90.6	88.9
Poland	99.6	98.4	97.5	95.5	94.0	92.1
Portugal	102.2	101.6	101.1	100.2	99.3	98.5
Romania			Not present due to lack of data			
Slovenia	115.8	113.3	108.8	109.0	106.1	104.2
Slovakia	107.2	103.7	100.1	95.0	89.9	84.0
Finland	106.3	104.6	102.9	100.8	98.7	96.4
Sweden	104.0	101.6	101.2	96.1	93.0	88.0
United Kingdom	88.0	87.7	86.6	84.5	82.7	80.4
<b>EU28</b>	<b>100.0</b>	<b>98.8</b>	<b>97.4</b>	<b>95.8</b>	<b>93.9</b>	<b>91.8</b>



***Goal 16 – Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels***

## Descriptive analysis of elementary indicators

The composite indicator for SDG 16 was built using the indicators listed in Table 16.1. The indicators “Perceived independence of the justice system” (sdg\_16\_40) and “Physical and sexual violence to women experienced within 12 months”(sdg\_05\_10) were excluded from the composite indicator because of lack of data availability. The indicator “General government total expenditure on law courts” (sdg\_16\_30) was excluded since its polarity cannot be clearly explained.

**Table 16.1 – List of the elementary indicators used for the composite indicator of SDG 16**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_16_10	Death rate due to homicide	-	0.1	7.0	1.2	1.2
sdg_16_20	Population reporting occurrence of crime, violence or vandalism in their area	-	2.5	27.7	11.9	4.7
sdg_16_50	Corruption Perceptions Index	+	33.0	94.0	65.6	15.2
sdg_16_60	Population with confidence in EU institutions	+	18.0	76.0	43.8	11.3

Correlation does not affect the composite indicator. The highest correlation observed is equal to 0.25, always inferior to 0.75.

**Table 16.2 – Correlation matrix of elementary indicators of SDG16**

	sdg_16_10	sdg_16_20	sdg_16_50	sdg_16_60
sdg_16_10	1.00	-0.16	-0.20	0.23
sdg_16_20	-0.16	1.00	-0.08	-0.19
sdg_16_50	-0.20	-0.08	1.00	0.25
sdg_16_60	0.23	-0.19	0.25	1.00

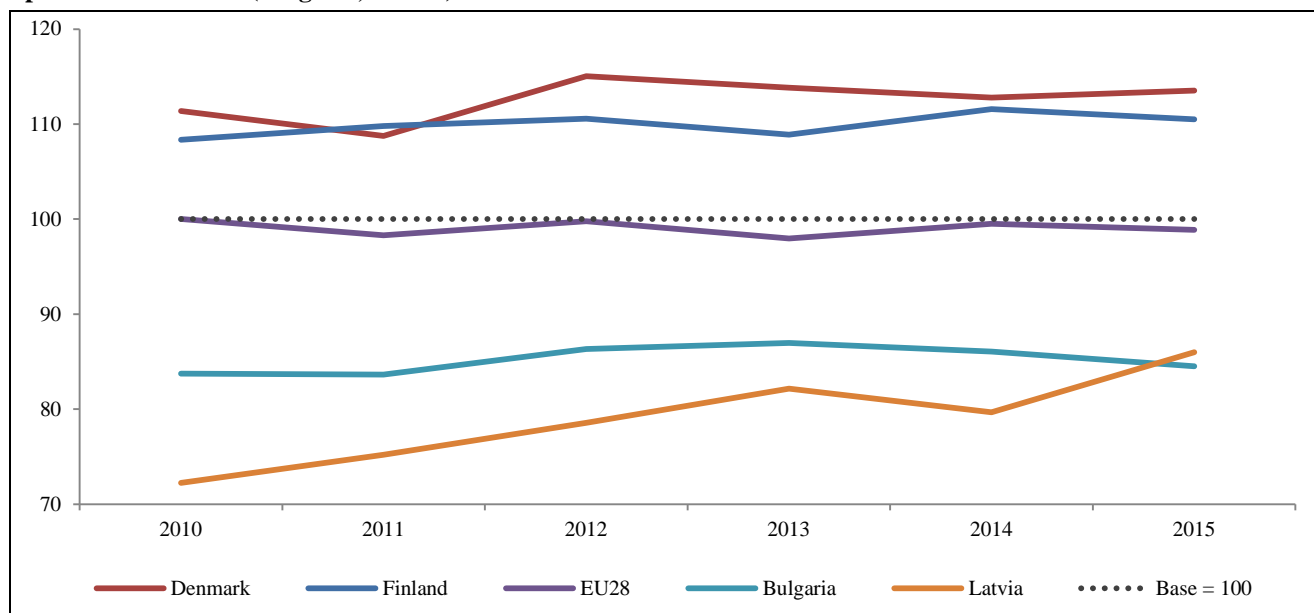
## Composite indicator

During the observed period (2010-2015) the overall EU28 composite indicator for SDG 16 shows a slight decreasing trend, reaching in 2015 the 98.9 point mark. Analyzing the trends of elementary indicators, both the “Death rate due to homicide” (sdg\_16\_10) and “Population reporting occurrence of crime, violence or vandalism in their area” (sdg\_16\_20) decrease during the observed period; while the indicator “Corruption Perceptions Index” (sdg\_16\_50) experiences a slight positive increase. However, the decreasing trend of the composite indicator is explained by the strong worsening of indicator “Population with confidence in EU Parliament” (sdg\_16\_60). Indeed, the percentage of people with confidence in the European Parliament passes from 48% in 2010 to 38% in 2015 losing 10 percentage point in 5 years.

Nonetheless, there are substantial differences between member states. In fact, while the best performer (Denmark) moved from 111.4 to 113.5 in 5 years, the second worst performer (Latvia) has

seen a broad increase in its composite indicator moving from 72.2 in 2010 to 86 in the last observed year.

**Fig. 16.1 – Composite indicators of SDG 16. EU28 average, best performers (Finland, Denmark) and worst performers in 2015 (Bulgaria, Latvia). Base EU28 2010=100**



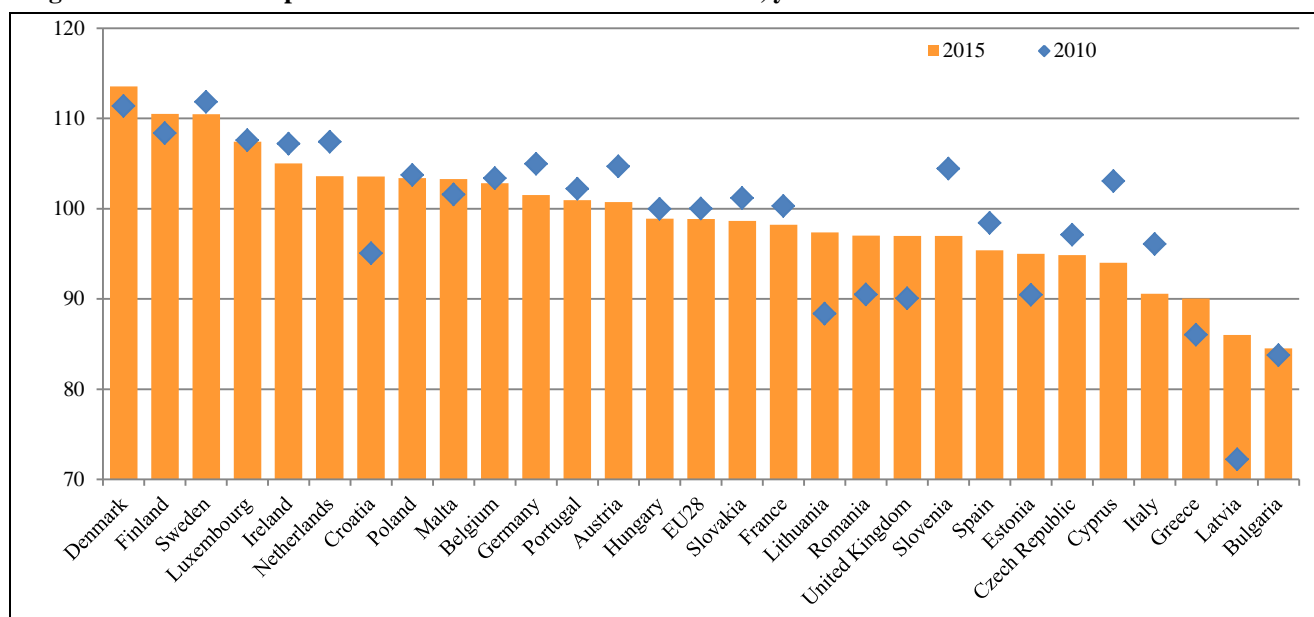
Comparing the composite indicator for all EU28 countries, the situation changed differently all around Europe.

The countries that improved the most are Latvia, Lithuania and Croatia. All these highlighted countries experienced a broad improvement on crime indicators, namely “Death rate due to homicide” (sdg\_16\_10) and “Population reporting occurrence of crime, violence or vandalism in their area” (sdg\_16\_20). An improvement is noticed also for indicator “Corruption Perceptions Index” (sdg\_16\_50) that experienced, for these three countries, an average positive increase of 24%.

Nonetheless, the three member states regarding indicator “Population with confidence in EU Parliament” (sdg\_16\_60) follow different paths. Indeed, Croatia had a consistent increase, Lithuania experienced a slight increase while Latvia has seen a worsening in its level of confidence.

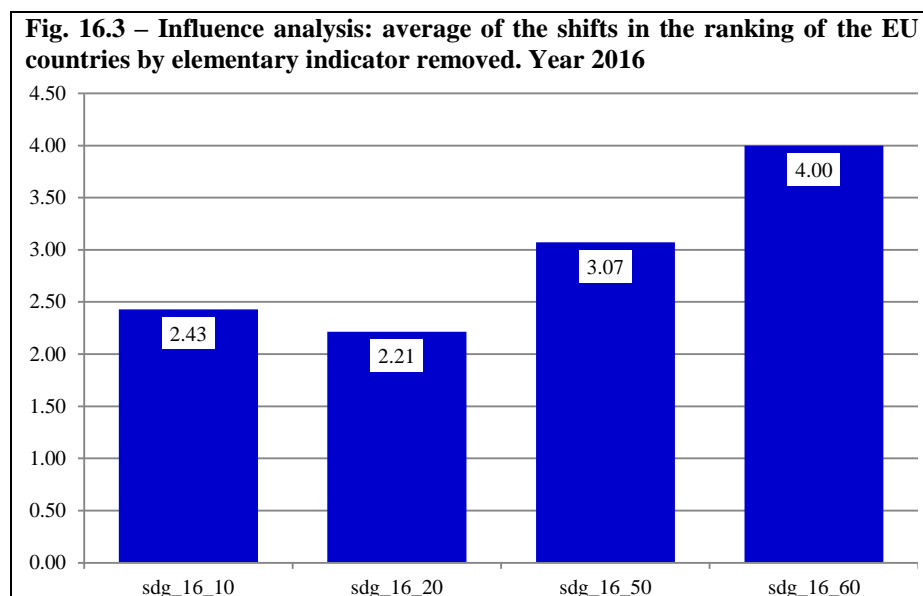
On the other hand, Slovenia, Italy, and Cyprus decreased drastically. Analyzing Italian elementary indicators, the “Population reporting occurrence of crime, violence or vandalism in their area” (sdg\_16\_20) worsened moving from 12.7% of the population in 2010 to 19.4% in 2015. The same declining trend can be noticed for “Population with confidence in EU institutions” (sdg\_16\_60) that moves from 55% in 2010 to 40% in 2016 losing 15% points in 5. The only indicators that improve their situation are “Death rate due to homicide” (sdg\_16\_10) and the “Corruption Perceptions Index” (sdg\_16\_50) that passes from a score of 39 in 2010 to 44 in the last observed year.

**Fig. 16.2 – SDG16 composite indicator scores for EU28 countries, years 2010 and 2015. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator.



indicator.

The indicator “Population with confidence in EU institutions” (sgd\_16\_60) has a high impact, whereas “Population reporting occurrence of crime, violence or vandalism in their area” (sgd\_16\_20) has less of an influence on the composite indicator.

## Appendix

**Table 16.3 – Results of the composite indicator for SDG 16. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015
Belgium	103.4	103.5	104.7	101.8	102.1	102.8
Bulgaria	83.8	83.7	86.3	87.0	86.0	84.5
Czech Republic	97.1	93.9	96.6	95.7	96.0	94.8
Denmark	111.4	108.8	115.0	113.8	112.8	113.5
Germany	105.0	102.9	104.8	102.9	104.0	101.5
Estonia	90.5	90.6	90.1	96.0	97.0	95.0
Ireland	107.2	107.3	102.4	102.7	103.6	105.0
Greece	86.0	83.4	83.1	85.0	89.1	90.0
Spain	98.4	97.9	96.2	92.0	95.3	95.4
France	100.3	99.7	102.0	98.1	99.0	98.2
Croatia	95.1	95.0	97.3	99.5	100.5	103.6
Italy	96.1	92.9	93.2	91.1	90.9	90.6
Cyprus	103.1	95.6	95.4	92.7	96.3	94.0
Latvia	72.2	75.2	78.6	82.2	79.7	86.0
Lithuania	88.4	88.6	94.0	91.8	98.3	97.4
Luxembourg	107.6	111.7	108.3	109.5	104.6	107.4
Hungary	100.0	97.4	101.3	100.4	99.0	98.9
Malta	101.6	100.3	100.4	99.6	102.0	103.3
Netherlands	107.4	103.0	103.8	101.8	103.1	103.6
Austria	104.7	103.9	104.2	104.2	105.0	100.7
Poland	103.7	102.5	105.8	103.8	104.9	103.4
Portugal	102.2	100.8	101.1	96.2	100.4	101.0
Romania	90.5	90.7	93.7	92.0	94.8	97.0
Slovenia	104.4	100.9	103.3	98.1	99.1	97.0
Slovakia	101.2	96.7	98.9	99.4	100.1	98.6
Finland	108.4	109.8	110.6	108.9	111.6	110.5
Sweden	111.8	111.5	111.1	110.6	109.9	110.5
United Kingdom	90.1	90.4	92.9	93.3	96.9	97.0
<b>EU28</b>	<b>100.0</b>	<b>98.3</b>	<b>99.8</b>	<b>98.0</b>	<b>99.5</b>	<b>98.9</b>

## *Goal 17 – Strengthen the means of implementation and revitalise the global partnership for sustainable development*

### **Descriptive analysis of elementary indicators**

The composite indicator for SDG 17 was built using the indicators listed in Table 17.1. The indicator “EU financing to developing countries” (sdg\_17\_20) was excluded from the composite indicator because there is a lack of data availability. On the other hand, the indicator “EU imports from developing countries” (sdg\_17\_30) was excluded because its polarity cannot be clearly explained.

**Table 17.1 – List of the elementary indicators used for the composite indicator of SDG 17**

Code	Name	Polarity	Min	Max	Avg	Std
sdg_17_10	Official development assistance as share of gross national income	+	0.0	1.4	0.3	0.3
sdg_17_40	General government gross debt	-	6.1	180.8	68.2	37.6
sdg_17_50	Shares of environmental and labour taxes in total tax revenues	+	4.3	12.2	7.5	2.0

Correlation does not affect the composite indicator. No indicators have a correlation higher than 0,75 in absolute terms.

**Table 17.2 – Correlation matrix of elementary indicators of SDG17**

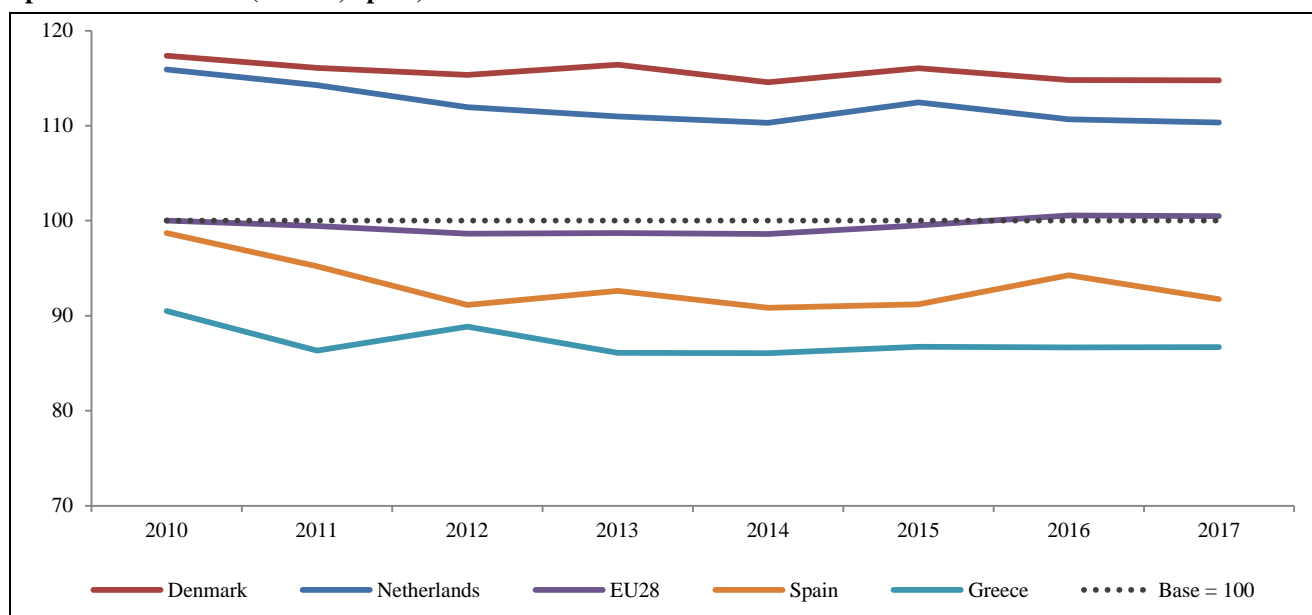
	sdg_17_10	sdg_17_40	sdg_17_50
sdg_17_10	1.00	-0.17	-0.49
sdg_17_40	-0.17	1.00	0.05
sdg_17_50	-0.49	0.05	1.00

### **Composite indicator**

The overall EU28 composite indicator for SDG 17 shows a stable trend in the observed period (2010-2017), staying near the 100 point mark. Analyzing the trends of the elementary indicators for the EU28, the “Shares of environmental and labour taxes in total tax revenues” (sdg\_17\_50) didn’t show any remarkable changes. On the other hand, the “General government gross debt” (sdg\_17\_40) had a slight increase as well as the indicator “Official development assistance as share of gross national income” (sdg\_17\_10) that passes from 0.44% of national GDP to 0.5%.

However, there are substantial differences between member state’s trends and the EU. In fact, while the EU 28 composite indicator shows a stable trend, the best performer (Denmark) decrease from 117.4 to 114.8 in 7 years, just like the worst performer (Greece) that is subject to a decrease from 90.5 in 2010 to 86.7 in 2017.

**Fig. 17.1 – Composite indicators of SDG 17. EU28 average, best performers (Netherlands, Denmark) and worst performers in 2017 (Greece, Spain). Base EU28 2010=100**



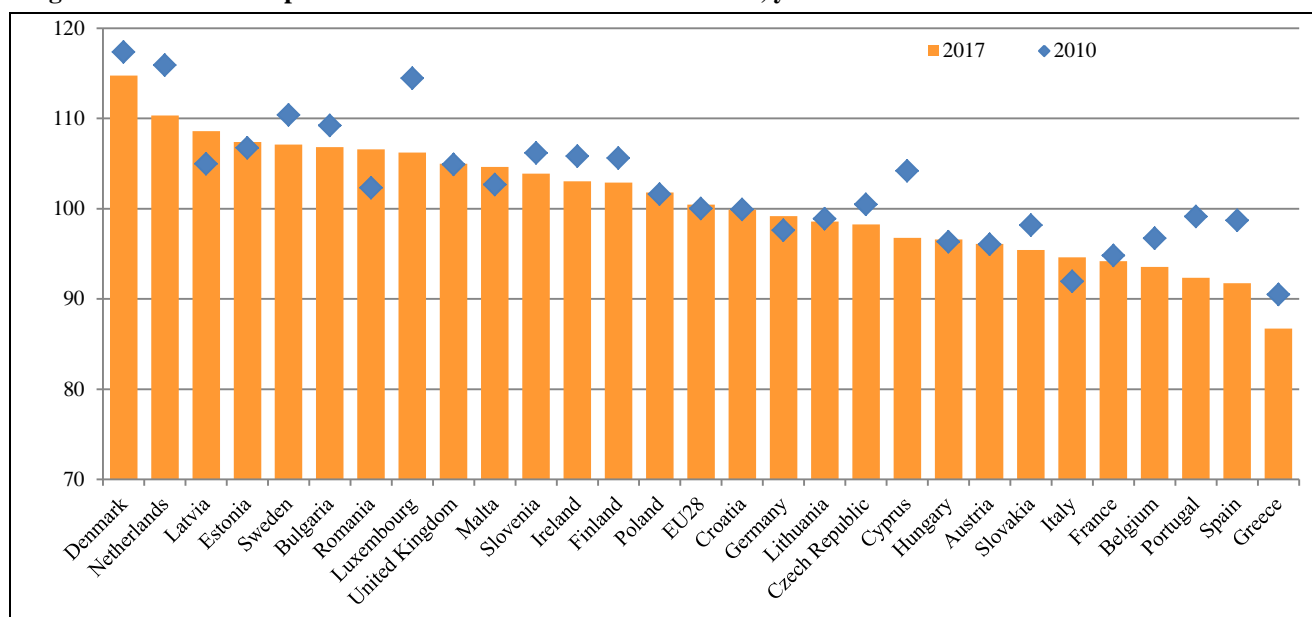
Comparing the composite indicator for all EU28 countries, the situation is deeply variable. The countries that improved the most are Latvia, Romania and Italy. All these three countries had a consistent increase for “Official development assistance as share of gross national income” (sdg\_17\_10), as well as a slight improvement on “Shares of environmental and labor taxes in total tax revenues” (sdg\_17\_50).

Instead, looking at the indicator “General government gross debt” (sdg\_17\_40) the situation is not similar for the three countries. Indeed, while Italy and Romania worsened their situation through the years, Latvia reduced its gross debt by 6.7% in seven years.

On the other hand, Spain, Portugal and Luxemburg experienced a decrease in their situation. All these countries had an increase of “General government gross debt” (sdg\_17\_40) as well as a decrease in “Official development assistance as share of gross national income” (sdg\_17\_10).

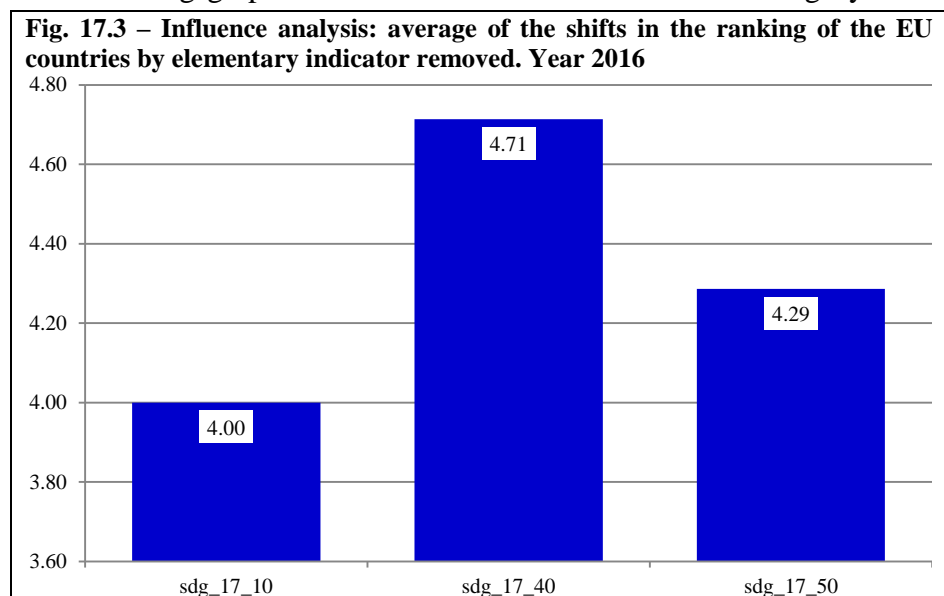
The situation is more variable for the indicator “Shares of environmental and labour taxes in total tax revenues” (sdg\_17\_50). While Spain had a slight increase in the percentage of environmental taxes, Portugal and Luxemburg experienced a decline on the same indicator.

**Fig. 17.2 – SDG17 composite indicator scores for EU28 countries, years 2010 and 2017. Base EU28 2010=100**



## Influence analysis of elementary indicators

The following graph shows the mean of shifts in the ranking by the removal of each elementary indicator.



The indicator “General government gross debt” (sdg\_17\_40) has a high impact, whereas “Official development assistance as share of gross national income” (sdg\_17\_10) has less of an influence on the composite indicator.

## Appendix

**Table 17.3 – Results of the composite indicator for SDG 17. Base EU28 2010=100**

Country	2010	2011	2012	2013	2014	2015	2016	2017
Belgium	96.7	95.3	93.3	92.1	92.1	92.0	93.9	93.5
Bulgaria	109.2	109.2	107.8	108.0	106.2	107.1	106.8	106.8
Czech Republic	100.5	100.2	98.5	97.3	97.7	97.8	98.4	98.3
Denmark	117.4	116.1	115.4	116.4	114.6	116.0	114.8	114.8
Germany	97.6	97.9	96.8	96.6	97.1	98.1	100.0	99.2
Estonia	106.7	106.8	106.2	105.4	106.2	106.1	108.5	107.4
Ireland	105.8	102.1	99.5	99.7	100.0	102.1	102.3	103.1
Greece	90.5	86.3	88.9	86.1	86.1	86.7	86.7	86.7
Spain	98.7	95.2	91.1	92.6	90.8	91.2	94.3	91.7
France	94.8	94.0	93.4	92.8	92.0	92.7	93.2	94.2
Croatia	99.9	97.6	96.1	97.1	99.1	99.1	99.3	99.9
Italy	92.0	93.8	93.0	92.6	93.1	93.0	94.2	94.6
Cyprus	104.2	101.8	98.3	96.1	96.0	95.7	95.7	96.8
Latvia	105.0	105.8	105.7	107.7	108.4	109.2	108.6	108.6
Lithuania	98.9	98.5	98.0	98.1	98.0	98.4	99.2	98.6
Luxembourg	114.5	113.6	112.9	111.1	110.4	108.1	107.7	106.2
Hungary	96.3	96.3	95.6	96.1	96.1	96.4	97.5	96.6
Malta	102.7	104.7	103.2	101.5	102.8	103.5	103.4	104.6
Netherlands	115.9	114.3	111.9	111.0	110.3	112.5	110.7	110.3
Austria	96.0	95.8	95.7	95.2	95.1	95.8	97.2	96.1
Poland	101.6	100.7	100.5	99.5	100.9	101.3	101.8	101.8
Portugal	99.1	95.9	92.7	90.9	90.4	90.9	91.8	92.3
Romania	102.3	99.7	100.0	100.2	103.2	103.3	105.3	106.6
Slovenia	106.2	104.7	105.5	104.0	102.5	102.7	103.9	103.9
Slovakia	98.2	97.6	96.3	95.0	95.1	94.9	95.5	95.4
Finland	105.6	106.8	105.7	104.8	104.9	104.0	103.5	102.9
Sweden	110.4	109.9	109.3	109.0	108.2	111.0	106.5	107.1
United Kingdom	104.9	103.5	103.4	105.5	105.3	105.0	104.5	105.0
<b>EU28</b>	<b>100.0</b>	<b>99.4</b>	<b>98.6</b>	<b>98.7</b>	<b>98.6</b>	<b>99.5</b>	<b>100.6</b>	<b>100.5</b>



## Appendix

### *List of indicators*

The following tables describes, for each Goal, the list of elementary indicators used for the composite indicators, the unit of measure as well as the estimates performed in case of missing data.

The elementary indicators included in the composite indicators have been selected in order to minimize the imputation of missing values. However, estimates were sometimes necessary, otherwise the number of available elementary indicators would have been greatly reduced. When estimations were necessary it has been used the imputation method of linear regression.

#### Goal 1

Code	Name	Unit	Estimates
sdg_01_10	People at risk of poverty or social exclusion	% of total population	-
sdg_01_40	People living in households with very low work intensity	% of total population aged less than 60	-
sdg_01_50	Housing cost overburden rate	Percentage of total population aged less than 60	-
sdg_01_60	Population living in a dwelling with a leaking roof, damp walls, floors or foundation or rot in window frames or floor	% of total population	-
sdg_03_60	Self-reported unmet need for medical care	% of population aged 16 and over	-
sdg_11_10	Overcrowding rate by poverty status	% of total population	-

#### Goal 2

Code	Name	Unit	Estimates
sdg_02_20	Agricultural factor income per annual work unit (AWU)	Chain linked volumes (2010), euro per annual work unit	-
sdg_02_30	Government support to agricultural research and development	Chain linked volume to GDP	Poland 2010-2011
sdg_02_40	Area under organic farming	% of utilised agricultural area	Croatia 2010-2011; UE28 2010-2011
sdg_02_50	Gross nutrient balance on agricultural land	Distance from zero	-
sdg_02_60	Ammonia emissions from agriculture	Chain linked volume to 2009=100	-

**Goal 3**

Code	Name	Unit	Estimates
sdg_03_10	Life expectancy at birth by sex	years	-
sdg_03_20	Self-perceived health by level of perception	% of population	-
sdg_03_40	Death rate due to chronic diseases by sex	number per 100 000 persons aged less than 65	Denmark 2010
sdg_03_50	Suicide rate by sex	number per 100 000 persons	Denmark 2010
sdg_03_60	Self-reported unmet need for medical care by detailed reason	% of population aged 16 and over	-
sdg_08_60	People killed in accidents at work	number per 100 000 employees	-
sdg_11_20	Population living in households considering that they suffer from noise, by poverty status	% of population	-
sdg_11_40	People killed in road accidents (source: EC services)	Rate	-

**Goal 4**

Code	Name	Unit	Estimates
sdg_04_10	Early leavers from education and training	% of population aged 18 to 24	-
sdg_04_20	Tertiary educational attainment	% of population aged 30 to 34	-
sdg_04_30	Participation in early childhood education	years-old and the starting age of compulsory education	Belgium 2016; UE28 2016; All countries for 2017
sdg_04_50	Employment rates of recent graduates	% of population aged 20 to 34	-
sdg_04_60	Adult participation in learning	% of population aged 25 to 64	-
sdg_08_20	Young people neither in employment nor in education and training	% of population aged 15 to 29	-

**Goal 5**

Code	Name	Unit	Estimates
sdg_05_20	Gender pay gap in unadjusted form	% of average gross hourly earnings of men	Ireland 2015-2016; All countries for 2017
sdg_05_30	Gender employment gap	%	France 2010-2013
sdg_05_40	Inactive population due to caring responsibilities by sex	% of inactive population aged 20 to 64 (females/males)	-
sdg_05_50	Seats held by women in national parliaments and governments	% of seats	-
sdg_05_60	Positions held by women in senior management positions	% of positions	-

**Goal 7**

Code	Name	Unit	Estimates
sdg_07_10	Primary energy consumption	Chain linked volume to 2009=100	-
sdg_07_11	Final energy consumption	Chain linked volume to 2009=100	-
sdg_07_20	Final energy consumption in households per capita	kg of oil equivalent	-
sdg_07_30	Energy productivity	Euro per kilogram of oil equivalent (KGOE)	-
sdg_07_40	Share of renewable energy in gross final energy consumption	%	-
sdg_07_60	Population unable to keep home adequately warm	% of population	-
sdg_13_20	Greenhouse gas emissions intensity of energy consumption	index (2000 = 100)	-

**Goal 8**

Code	Name	Unit	Estimates
sdg_08_10	Real GDP per capita	Chain linked volumes (2010), euro per capita	-
sdg_08_20	Young people neither in employment nor in education and training	% of population aged 15 to 29	-
sdg_08_30	Employment rate	% of population aged 20 to 64	France 2010-20011-2012-2013
sdg_08_40	Long-term unemployment rate	% of active population	-
sdg_08_50	Involuntary temporary employment	% of employees aged 20 to 64	-
sdg_08_60	People killed in accidents at work	number per 100 000 employees	All countries for 2016
sdg_05_40	Inactive population due to caring responsibilities	% of inactive population aged 20 to 64	-
sdg_12_20	Resource productivity and domestic material consumption	Euro per kilogram, chain linked volumes (2010)	-

**Goal 9**

Code	Name	Unit	Estimates
sdg_09_10	Gross domestic expenditure on R&D by sector	% of GDP	-
sdg_09_20	Employment in high- and medium-high technology manufacturing sectors and knowledge-intensive service sectors	% of total employment	-
sdg_09_30	R&D personnel by sector	% of active population	Greece 2010; France 2010-2011-2012-2013-2016; Poland 2016
sdg_09_50	Share of collective transport modes in total passenger land transport by vehicle	% of total inland passenger-km	All countries for 2016
sdg_12_30	Average CO2 emissions per km from new passenger cars	g CO2 per km	UE28 2010-2011-2012-2013; Croatia 2010-2011-2012

**Goal 10**

Code	Name	Unit	Estimates
sdg_01_20	People at risk of income poverty after social transfers	% of total populatio	-
sdg_10_10	Purchasing power adjusted GDP per capita	Real expenditure per capita (in PPS_EU28)	-
sdg_10_20	Adjusted gross disposable income of households per capita	Purchasing power standard (PPS) per inhabitant	Croatia 2013-2014-2015-2016; Romania 2016; UK 2016
sdg_10_30	Relative median at-risk-of-poverty gap	% distance to poverty threshold	-
sdg_10_40	Gini coefficient of equivalised disposable income	coefficient of 0 (maximal equality) to 100 (maximal inequality)	-
sdg_10_50	Income share of the bottom 40 % of the population	% of income	-

**Goal 11**

Code	Name	Unit	Estimates
sdg_11_10	Overcrowding rate	% of population	-
sdg_11_20	Population living in households considering that they suffer from noise	% of population	-
sdg_11_40	People killed in road accidents	Rate	-
sdg_11_50	Exposure to air pollution by particulate matter	µg/m3	2011; Ireland 2012; Bulgaria 2015; Hungary 2015.
sdg_11_60	Recycling rate of municipal waste	% of total waste generated	Denmark 2010; Irlanda 2015
sdg_01_60	Population living in a dwelling with a leaking roof, damp walls, floors or foundation or rot in window frames of floor	% of population	-
sdg_09_50	Share of collective transport modes in total passenger land transport	% of total inland passenger-km	-
sdg_16_20	Population reporting occurrence of crime, violence or vandalism in their area	% of population	-

**Goal 12**

Code	Name	Unit	Estimates
sdg_12_20	Resource productivity and domestic material consumption	Euro per kilogram, chain linked volumes (2010)	-
sdg_12_30	Average CO2 emissions per km from new passenger cars	g CO2 per km	EU28 2010-2011-2012-2013, Croatia 2010-2011-2012
sdg_11_60	Recycling rate of municipal waste	% of total waste generated	Denmark 2010; Ireland 2015-2016
sdg_07_10	Primary energy consumption	Chain linked volume to 2009=100	-
sdg_07_11	Final energy consumption	Chain linked volume to 2009=100	-
sdg_07_30	Energy productivity	Euro per kilogram of oil equivalent (KGOE)	-
sdg_07_40	Share of renewable energy in gross final energy consumption	%	-

**Goal 13**

Code	Name	Unit	Estimates
sdg_13_10	Greenhouse gas emissions	Greenhouse gas emissions (in CO2 equivalent), base year 1990	-
sdg_13_20	Greenhouse gas emissions intensity of energy consumption	index (2000 = 100)	-
sdg_07_10	Primary energy consumption	Chain linked volume to 2009=100	-
sdg_07_11	Final energy consumption	Chain linked volume to 2009=100	-
sdg_07_40	Share of renewable energy in gross final energy consumption	%	-
sdg_12_30	Average CO2 emissions per km from new passenger cars	g CO2 per km	EU28 2010-2011-2012-2013, Croatia 2010-2011-2012

**Goal 14**

Code	Name	Unit	Estimates
sdg_14_10	Sufficiency of marine sites designated under the EU Habitats directive	Marine protected area (km2)	-
sdg_14_30	Assessed fish stocks exceeding fishing mortality at maximum sustainable yield (FMSY) by fishing area	% total fishing areas	-

**Goal 15**

Code	Name	Unit	Estimates
sdg_15_10	Share of forest area	% of total land area	2010-20011-2013-2014 for all countries
sdg_15_20	Sufficiency of terrestrial sites designated under the EU Habitats Directive	Chain linked volume to national land	EU28 2010-2011-2012
sdg_15_40	Change in artificial land cover	Index 2009=100	2010-20011-2013-2014 for all countries

**Goal 16**

Code	Name	Unit	Estimates
sdg_16_10	Death rate due to homicide by sex	number par 100 000 persons	Denmark 2010
sdg_16_20	Population reporting occurrence of crime, violence or vandalism in their area by poverty status	% of population	-
sdg_16_50	Corruption Perceptions Index	score scale of 0 (highly corrupt) to 100 (very clean)	EU 28 2010-2011-2012-2013-2014-2015
sdg_16_60	Population with confidence in EU Parliamnet	% of population	-

**Goal 17**

Code	Name	Unit	Estimates
sdg_17_10	Official development assistance as share of gross national income	% of gross national income (GNI)	Croatia 2010-2011; Cyprus 2016-2017; Romania 2017
sdg_17_40	General government gross debt	% of gross domestic product (GDP)	-
sdg_17_50	Shares of environmental and labour taxes in total tax revenues	% of total taxes	All countries for 2017

***Elaboration***

In the following table there is list of elementary indicators that were included in the composite indicators with a unit of measure different from the one proposed by Eurostat. These transformations were performed mainly for technical reasons. For example, when the proposed elementary indicator was in absolute terms (i.e. Millions of euro), which is not suitable in the AMPI methodology, it was necessary to transform it in an index number.

In the table below, there is the indicator's name, original unit of measurement and the elaborated unit.

Code	Name	Original unit	Elaborated unit
sdg_02_30	Government support to agricultural research and development	Million euro	Chain linked volume to GDP
sdg_02_50	Gross nutrient balance on agricultural land	kg per hectare	Distance from 0
sdg_02_60	Ammonia emissions from agriculture	Tonne	Chain linked volume to 2009=100
sdg_05_40	Inactive population due to caring responsibilities	% of inactive population aged 20 to 64	Ratio females/males
sdg_07_10	Primary energy consumption	Million tonnes of oil equivalent (TOE)	Chain linked volume to 2009=100
sdg_07_11	Final energy consumption	Million tonnes of oil equivalent (TOE)	Chain linked volume to 2009=100
sdg_15_20	Sufficiency of terrestrial sites designated under the EU Habitats Directive	Terrestrial protected area (km2)	Chain linked volume to national land

#### 4. Modified AMPI: An example of AMPI composite indicator based on the distance from the EU 2020 targets

One of the main problems of the AMPI methodology is that the baseline is set to an arbitrary point in space and time. In our report the baseline is set equal to the situation of the EU28 average in 2010. This solution allows to evaluate the EU and countries improvements relatively to 2010, but it is not possible to evaluate the improvement's entity on a specific target to achieve.

For example, the composite indicator of SDG 4 shows an important improvement, whereas the composite indicator of SDG 8 shows a less steep rise. Setting 2010 as the baseline, it is not possible to distinguish which Goal is closer to reach the targets set by the Agenda 2030.

Nevertheless, the AMPI methodology can be adapted to measure the distance from a vector of targets. It is possible to set the value of the AMPI composite indicator=100 if all the elementary indicators meet the EU28 target, or if the majority of indicators outreach the target and the rest are relatively close to their target. In this way both the value of individual countries and of the EU28 average for every year can be considered as a composite evaluation of the distance from the target of each elementary indicator.

An assessment of this methodology has been produced on SDG 13 as a test using only the EU28 average data for each available year. In the table below, there are the elementary indicators and the corresponding 2020 targets.

**Table 1 – List of the elementary indicators used for the test on SDG13**

Code	Name	Polarity	Min	Max	Target
sdg_13_10	Greenhouse gas emissions	-	77.4	85.9	80.0
sdg_13_11	Greenhouse gas emissions in ESD sectors	-	85.8	94.7	90.7
sdg_07_10	Primary energy consumption	-	86.6	96.7	86.6
sdg_07_11	Final energy consumption	-	89.1	97.5	91.1
sdg_07_40	Share of renewable energy in gross final energy consumption	+	12.9	20.0	20.0

This test is carried out on the EU28 average only because countries have different policy targets. The difference from the methodology adopted in the report lies on the usage of two different baselines. In this example, the baseline is a fictional vector of targets created using the EU 2020 targets. In all the other sheets of the Report, the baseline is the vector of EU28 in 2010.

**Table 2 – Results of the composite indicator for SDG 13. EU28 targets=100**

Country	2010	2011	2012	2013	2014	2015
EU28	50.2	68.0	74.5	80.8	99.6	95.0

Therefore, the results of the modified AMPI can be used to build a different narrative from the one of the classical AMPI. The results of the test in table 2 tell that the EU28 starts from a value of 50.2 in 2010 and in the observed period the composite indicator shows a remarkable raising trend until 2014 when it almost reaches the targets baseline.

Analyzing the elementary indicators and their targets, it is worth noticing that in 2014, all indicators have outreached their 2020 target except for “Primary energy consumption” (sdg\_07\_10) and “Share of renewable energy in gross final energy consumption” that in 2014 reached 16.1% still far from the

20% 2020 target. However, the EU 28 composite indicator has a decreasing trend in the last observed year, reaching the 95.0 point mark in 2015.

This decreasing trend is explained by the worsening of all the elementary indicators regarding both GHG emissions and energy consumption, the only indicator that continues its linear increase is the “Share of renewable energy in gross final energy consumption”.

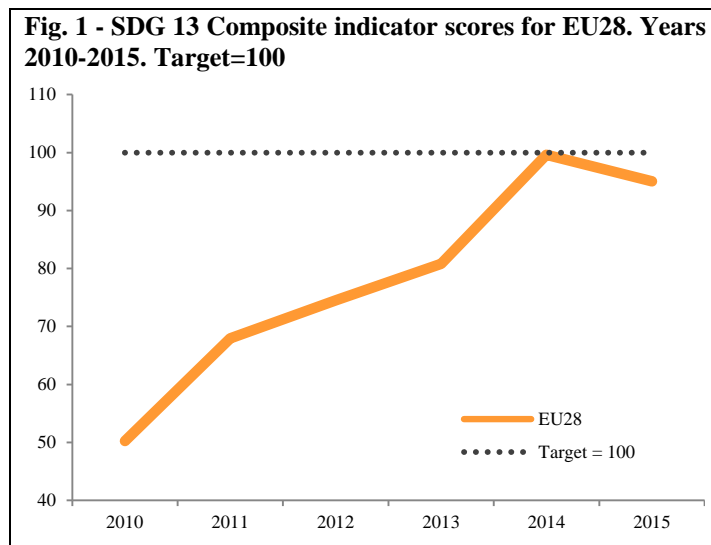
This methodology offers a clear advantage since it allows to measure the performances of a country in relation to a specific set of policy targets.

Nevertheless, there is an important trade-off to consider. In order to use this methodology in a proper way it would be necessary to set policy targets for all the elementary indicators used to monitor all SDGs.

From the methodological point of view, it is important to point out that it is impossible to compare the results of a classic AMPI with this modified version of the AMPI. Indeed, the value used for the baseline has a different meaning.

Every countries can apply this “AMPI modified” methodology assessing the composite indicator’s distance of the observed values from a vector of targets at the EU level.

Moreover, if a country has its own specific targets to achieve within, for example, the



year 2030, this methodology can be applied.

However, it would not be possible to compare the EU composite indicator with EU2020 targets and a Country’s composite indicator with its own targets. In conclusion, AMPI can be re-adapted to create a composite indicator that measures the distance from a vector of targets. Therefore, it is deeply important to set specific targets both at EU and Countries’ level.