

# EU SDG monitoring report 2021: methodology

## Assessment of indicator trends

### How are trends assessed?

The EU SDG monitoring reports provide an assessment of indicator trends against SDG-related EU objectives and targets. The assessment method considers whether an indicator has moved towards or away from the sustainable development objective, as well as the speed of this movement. The method focuses on developments over time and not on the 'sustainability' of the status <sup>(1)</sup>.

Ideally, the trends observed for each indicator would be compared against theoretical trends necessary to reach either a quantitative target set within the political process or a scientifically established threshold. However, this approach is only possible for a limited number of indicators, where an explicit quantified and measurable target exists for the EU (see Table 2). In the remaining cases, a transparent and simple approach across the indicators is applied to avoid ad hoc value judgments. The two approaches (indicators with and without quantitative targets) are explained in more detail below.

The assessment is generally based on the '[compound annual growth rate](#)' (CAGR) formula, which assesses the pace and direction of the evolution of an indicator. This formula uses the data from the first and the last years of the analysed time span and is used to calculate the average annual rate of change of the indicator (in %) between these two data points. For a detailed description of the calculation method, see Annex II.





The trend assessments presented in the EU SDG monitoring reports are based on the indicators selected for the EU SDG indicator set and the applied methodology and are not always fully aligned with the assessments in other reports from the European Commission or the EEA. This is most notably the case when other assessments take into account the level of an indicator instead of or in addition to the trend, or when the assessments also take into account planned measures or projections instead of past trends only.

### How are the assessment results presented?

The assessment of indicator trends is visualised in the form of arrows (see Table 1). The direction of the arrows shows whether the indicators are moving in a sustainable direction or not. This direction does not necessarily correspond to the direction in which an indicator is moving. For example, a reduction of the long-term unemployment rate, or of greenhouse gas emissions, would be represented with an upward arrow, as reductions in these areas mean progress towards the sustainable development objectives.

Depending on whether or not there is a quantitative EU policy target, two cases are distinguished, as shown in Table 1. For indicators with a quantitative target, the arrows show if, based on past progress, the EU is on track to reaching the target. For indicators without a quantitative target, the arrows show whether the indicator has moved towards or away from the sustainable development objective, and the speed of this movement. The assessment method therefore differs slightly for these two types of indicators, as explained further below.

**Table 1: Assessment categories and associated symbols**

Symbol	With quantitative target	Without quantitative target
	Significant progress towards the EU target	Significant progress towards SD objectives
	Moderate progress towards the EU target	Moderate progress towards SD objectives
	Insufficient progress towards the EU target	Moderate movement away from SD objectives
	Movement away from the EU target	Significant movement away from SD objectives
:	Calculation of trend not possible (e.g. time series too short)	

As far as possible, indicator trends are assessed over two periods:

- The **long-term trend**, which is based on the evolution of the indicator over the past 15-year period (usually 2004 to 2019 or 2005 to 2020). The long-term trend is also calculated for shorter time series if data are available for at least 10 consecutive years.
- The **short-term trend**, which is based on the evolution of the indicator during the past five-year period (usually 2014 to 2019 or 2015 to 2020). In a few exceptional cases, the short-term trend is calculated for shorter time periods, as long as data are available for at least three consecutive years.

Two arrows — for the assessment of the long-term and short-term trends — are therefore usually shown for each indicator, providing an indication of whether a trend has been persistent or has shown a turnaround at a certain point in time.

The growth rates (CAGR) upon which the arrow symbols are based are provided in the notes below the Figures depicting the EU-level trends for all the main indicators in a chapter. For indicators with quantitative targets, the note gives the average annual growth rates observed for the two assessment periods as well as the growth rates that would be required to meet the target in the target year. For indicators without quantitative targets, only the observed growth rates are given.

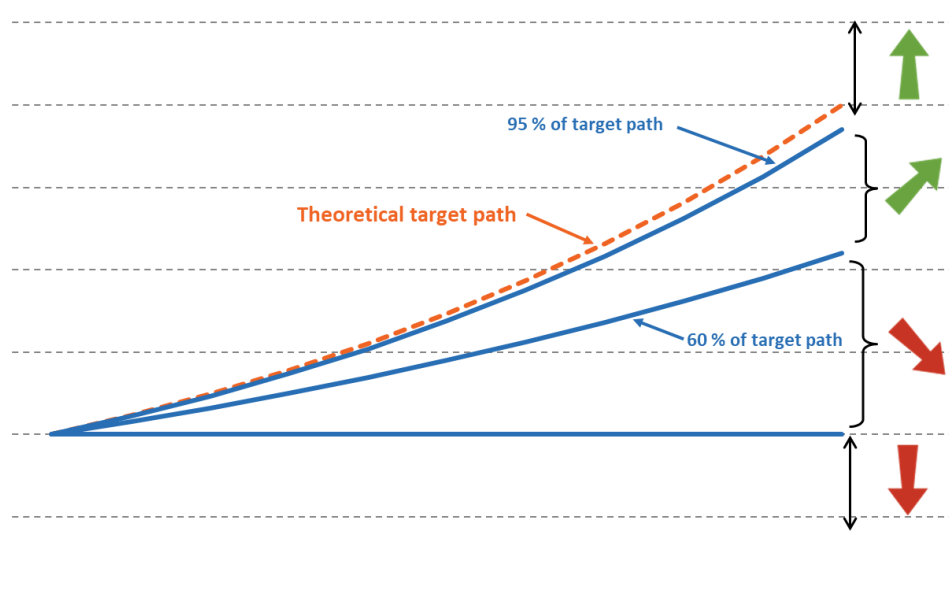
### Indicators with quantitative targets

Whenever possible, the assessment of indicator trends takes into account concrete targets set in relevant EU policies and strategies. In the presence of a quantified political target (for example, the [European Education Area](#) targets), the actual rate of change of the indicator (based on the CAGR as described in Annex III) is compared with the theoretical rate of change that would be required to meet the target in the target year. If the actual rate is 95 % or more of the required rate, the indicator shows

a significant progress towards the EU target. If that ratio is at least 60 %, but less than 95 %, the trend shows moderate progress towards the EU target, and if the ratio is at least 0 %, but less than 60 %, progress towards the EU target is insufficient. Negative ratios mean the trend is moving away from the EU target.

Figure 1 shows the thresholds for assessing an indicator trend against a quantitative target that would require the indicator values to increase (as, for example, in the case of the European Education Area target of raising the EU tertiary educational attainment rate to 45 %). For targets that require indicators to decrease (for example, the target of reducing the EU's net greenhouse gas emissions by 55 %), analogous decreasing target paths are used instead.

**Figure 1:** Thresholds for assessing indicators against a quantitative target (example of a target that requires the indicator to increase)



### Indicators without quantitative targets

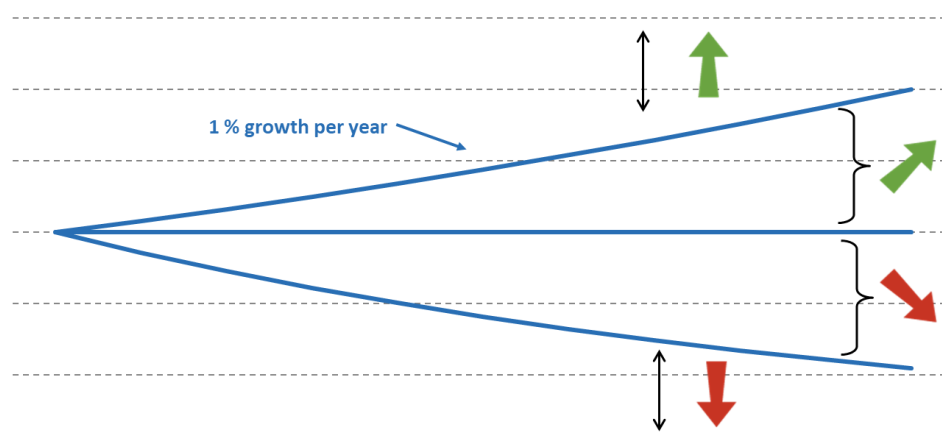
In the absence of a quantified target, it is only possible to compare the indicator trend with the desired direction. An indicator is making progress towards the SD objectives if it moves in the desired direction, and is moving away from the SD objectives if it develops in the wrong direction. The observed rate of change of the indicator, calculated based on the CAGR as described in Annex III, is then compared with the following thresholds: a change of 1 % per year or more is considered 'significant'. If this change is in the desired direction, this means 'significant progress towards SD objectives'. If the change is in the wrong direction, this means 'significant movement away from SD objectives'. A change in the desired direction which is less than 1 % (including 0 %) per year is considered 'moderate progress towards SD objectives', and a change in the wrong direction which is less than 1 % per year is considered 'moderate movement away from SD objectives'. See Table 1 for reference.

The 1 % threshold is easy to communicate, and Eurostat has used it in its monitoring reports for more than 10 years. It is discerning enough to ensure there is a significant movement in the desired direction. Furthermore, it allows a nuanced picture to be presented, with a sufficient number of indicators falling into all four categories <sup>(2)</sup>. The threshold should not be confused with the level of EU ambition on a given topic. It should also be noted that for some indicators, such as loss of biodiversity, any movement

away from the SD objectives might be irreversible and lead to environmental, economic and social changes, thus affecting many SDGs simultaneously.

Figure 2 shows the thresholds for assessing an indicator for which the desired direction would be an increase (for example, life expectancy at birth). For indicators where the desired direction is a decrease (such as the long-term unemployment rate), the categories are reversed.

**Figure 2:** Thresholds for assessing indicators without quantitative targets (example of an indicator where the desired direction is an increase)



### Summary of progress at goal level

In the synopsis chapter of this report, average scores of the indicators are used to rank the SDGs according to their level of progress towards the SDGs. To calculate these averages, a score is first calculated for each indicator, reflecting its short-term (past five years) assessment (see Annex III for details on the scoring method). For each goal, a simple average of the scores of the individual indicators (including the multi-purpose indicators) is then calculated. Indicators for which trends cannot be assessed (for example due to insufficient time series) are not taken into account for the average score on the goal level. The share of assessed indicators (those accompanied by an 'arrow' symbol) has to be at least 75 % to compute the summary result; below this threshold, the available indicators are considered insufficient to calculate a meaningful average score at goal level. This is currently the case for two goals (SDG 6 and SDG 14).

## Overview of status and progress of EU Member States towards the SDGs

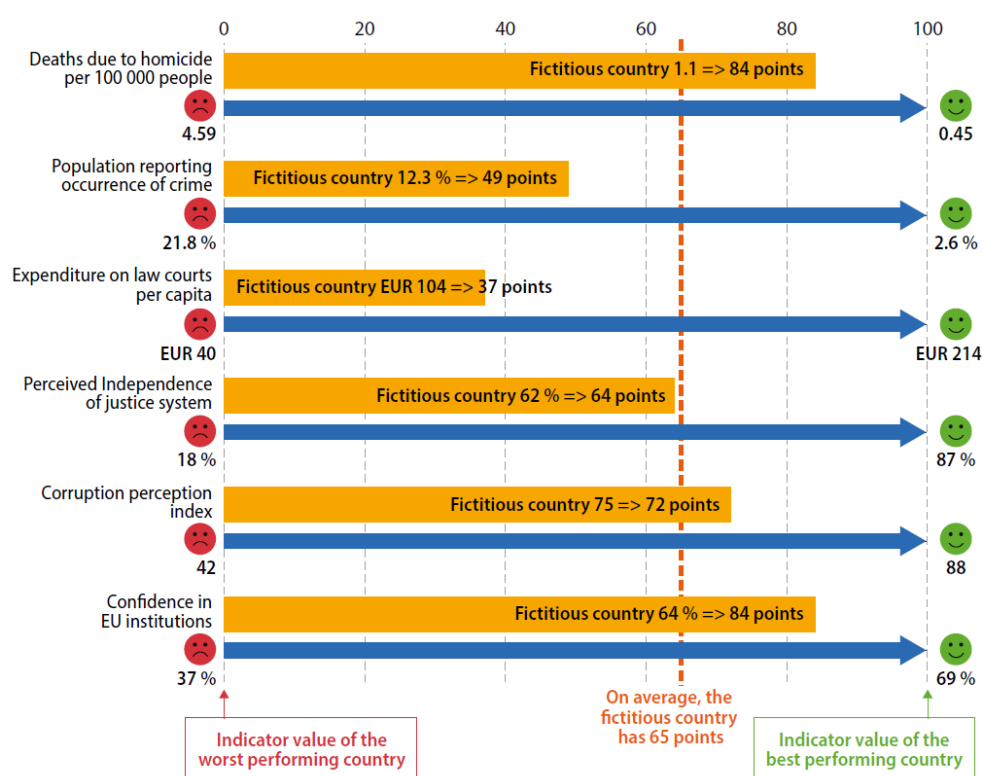
The SDG monitoring report 2021 also contains a chapter presenting a statistical overview of the status and progress of EU Member States towards the 17 SDGs, based on the EU SDG indicator set. The status of each SDG in a Member State is an aggregation of all the indicators of a specific goal relative to the other Member States and the EU average. The progress score of the Member State is based on the average annual growth rates of all assessed indicators in the SDG over the past five years.

Such a synthesised presentation allows for a quick and easy overview and facilitates communication. However, applied to individual Member States, it entails the risk of simplification and might obscure details about underlying phenomena. Moreover, it has to be kept in mind that a country's status depends to a certain extent on its natural conditions and historical developments. Therefore, users are invited to read the more detailed information at indicator level in the EU SDG monitoring report. Detailed data for the indicators on a country level are also available on the [Eurostat website](#) <sup>(3)</sup>.

### How is the status and progress assessed?

The status of a specific SDG is an aggregate score encompassing all of that goal's indicators <sup>(4)</sup>, based on the most recent data (mainly referring to 2019 and 2020). For each indicator, a country's status score is calculated relative to the range of values from the worst to the best performing country, whereby outliers are excluded <sup>(5)</sup>. Figure 3 presents an example of the calculation of the status score for SDG 16. For each country, the resulting status score at SDG level is then put in relation to the EU aggregate status score of this goal, to show how much (in %) a country's SDG status is above or below the EU average.

**Figure 3:** Example calculation of the status score for SDG 16 for a fictitious country

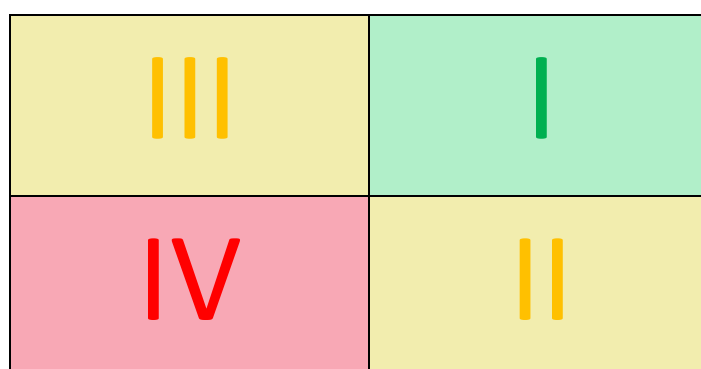


Progress is an aggregate score of the short-term (five-year) growth rates for all of the indicators assessed for each goal. The methodology uses a scoring function and is identical to the calculation of progress at EU level as presented above. Please note that the progress score calculation does not take into account any target values, since most EU policy targets are only valid for the aggregate EU level. Data mainly refer to the periods 2014-2019 or 2015-2020. Due to data availability issues, not all 17 SDGs are shown for each country.

A country's status score is a relative measure, showing its position in relation to other Member States and the EU average. A high status consequently does not mean that a country is close to reaching a specific SDG, but that it has achieved a higher status than many other Member States. On the other hand, a country's progress score is an absolute measure based on the indicator trends over the past five years, and its calculation is not influenced by the progress achieved by other Member States.

### How to interpret the graphs?

The vertical axis shows the status of SDGs in the depicted country within the distribution of Member States and relative to the EU average. SDGs in the upper part of the graph have a status above the EU average, and for SDGs in the lower part the status is below the EU average. The right side of the graph displays SDGs where the country has made progress whereas the left side indicates movements away from the SDGs. This results in four "quadrants" which can be characterised as follows:



- i. The country is progressing towards these SDGs, and on average the indicator values are above the EU average.
- ii. The country is progressing towards these SDGs, but on average the indicator values are below the EU average.
- iii. The country is moving away from these SDGs, but on average the indicator values are above the EU average.
- iv. The country is moving away from these SDGs, and on average the indicator values are below the EU average.

## Annex I: List of targets considered for assessing indicator trends at EU level

The table below shows which EU policy targets have been considered for assessing indicator trends over the long- and short-term periods, to give an indication of whether the developments observed mean indicators are on track to meet their respective target in the target year. For details on the assessment method for indicators with quantitative targets, see the introduction and Annex III.

**Table 2: EU policy targets considered for assessing indicator trends**

Indicator	Target	Policy reference
Area under organic farming (SDG 2)	At least 25 % of the EU's agricultural land should be under organic farming by 2030	Farm to Fork strategy (1)
People killed in road accidents (SDG 3, SDG 11)	Halving the overall number of road deaths in the EU by 2020 starting from 2010	Towards a European road safety area (2)
Underachievement in reading, maths and science (SDG 4)	The share of low-achieving 15-year-olds in reading, mathematics and science should be less than 15 % by 2030	European Education Area (3)
Participation in early childhood education (SDG 4)	At least 96% of children between 3 years old and the starting age for compulsory primary education should participate in early childhood education and care by 2030	European Education Area
Early leavers from education and training (SDG 4)	The share of early leavers from education and training should be less than 9 % by 2030	European Education Area
Tertiary educational attainment (SDG 4, SDG 9)	The share of 25-34 year-olds with tertiary educational attainment should be at least 45 % by 2030	European Education Area
Share of adults with at least basic digital skills (SDG 4)	By 2025, 230 million adults should have at least basic digital skills, which covers 70 % of the adult population in the EU	European Skills Agenda (4)
Primary and final energy consumption (SDG 7)	32.5 % increase in energy efficiency by 2030; for monitoring purposes this has been translated into absolute levels of primary and final energy consumption	Directive (EU) 2018/2002 (5)
Share of renewable energy in gross final energy consumption (SDG 7, SDG 13)	Increase the share of renewable energy sources in gross final energy consumption to at least 32 % by 2030	Directive (EU) 2018/2001 (6)
Gross domestic expenditure on R&D (SDG 9)	Increasing combined public and private investment in R&D to 3 % of GDP	European Research Area (7)
Share of households with high-speed internet connection (SDG 9, SDG 17)	By 2030, all European households should be covered by a Gigabit network.	2030 Digital Compass (8)

Indicator	Target	Policy reference
Average CO <sub>2</sub> emissions from new passenger cars (SDG 9, SDG 12, SDG 13)	Reduce CO <sub>2</sub> emissions from new passenger cars to 95 grams of CO <sub>2</sub> per km in 2020	Regulation (EU) 2019/631 <sup>(9)</sup>
Recycling rate of municipal waste (SDG 11)	Increase the preparing for re-use and the recycling of municipal waste to a minimum of 60 % by weight by 2030	Directive (EU) 2018/851 <sup>(10)</sup>
Greenhouse gas emissions (SDG 13)	Reduce net greenhouse gas emissions by 55 % until 2030 compared to 1990	European Climate Law <sup>(11)</sup>
Official development assistance (SDG 17)	Provide 0.7 % of gross national income (GNI) as ODA within the timeframe of the 2030 Agenda	The new European Consensus on Development <sup>(12)</sup>

<sup>(1)</sup> European Commission (2020), *A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system*, COM/2020/381 final.

<sup>(2)</sup> European Commission (2010), *Towards a European road safety area: policy orientations on road safety 2011–2020*, COM(2010) 389 final, Brussels.

<sup>(3)</sup> Council of the European Union (2021), *Council Resolution on a strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030) (2021/C 66/01)*.

<sup>(4)</sup> European Commission (2020), *European Skills Agenda for sustainable competitiveness, social fairness and resilience*.

<sup>(5)</sup> European Parliament and Council of the European Union (2018), *Directive (EU) 2018/2002 amending Directive 2012/27/EU on energy efficiency*.

<sup>(6)</sup> European Parliament and the Council of the European Union (2018), *Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources*.

<sup>(7)</sup> Council of the European Union (2020), *Council conclusions on the New European Research Area*.

<sup>(8)</sup> European Commission (2021), *2030 Digital Compass: the European way for the Digital Decade*, COM(2021) 118 final.

<sup>(9)</sup> European Parliament and Council of the European Union (2019), *Regulation (EU) 2019/631 of the European Parliament and of the Council of 17 April 2019 setting CO<sub>2</sub> emission performance standards for new passenger cars and for new light commercial vehicles, and repealing Regulations (EC) No 443/2009 and (EU) No 510/2011, OJ L 111*.

<sup>(10)</sup> European Parliament and Council of the European Union (2018), *Directive (EU) 2018/851 on waste*.

<sup>(11)</sup> Council of the European Union (2021), *Proposal for a Regulation of the European Parliament and of the Council establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law)*. Outcome of proceedings. Document number 8440/21.

<sup>(12)</sup> European Union (2017), *The new European Consensus on Development 'Our World, Our Dignity, Our Future'*, Joint statement by the Council and the representatives of the governments of the Member States meeting within the Council, the European Parliament and the Commission. 2017/C 210/01.



## Annex II: Method for assessing indicator trends

This section describes the formulas applied for assessing indicator trends in this report. For an overview of the assessment approach and a description of the data basis and the time periods for which the assessment is done, please see the Introduction chapter.

### Method 1: Indicators without quantitative targets





The assessment of trends for indicators without quantitative targets, both for the long-term (past 15 years) and short-term (past 5 years) periods, is based on the compound annual growth rate (CAGR), using the following formula:

$$(1) \text{ CAGR} = \left( \frac{y_t}{y_{t_0}} \right)^{\frac{1}{t-t_0}} - 1$$

where:  $t_0$  = base year,  $t$  = most recent year,  $y_{t_0}$  = indicator value in base year,  $y_t$  = indicator value in most recent year

The table below shows the applied thresholds and the resulting symbols.

**Table 3: Thresholds for assessing trends of indicators without quantitative targets**

Growth rate (CAGR) in relation to desired direction	Symbol
$\geq 1 \%$	
$< 1 \%$ and $\geq 0 \%$	
$< 0 \%$ and $\geq -1 \%$	
$< -1 \%$	

### Method 2: Indicators with quantitative targets

The assessment of trends for indicators with targets is based on the CAGR described above and also takes into account concrete targets set in relevant EU policies and strategies. For this type of indicator, the actual (observed) growth rate is compared with the (theoretical) growth rate that would have been required up to the most recent year for which data are available in order to meet the target in the target year. This comparison is done for both the long-term (past 15 years) and short-term (past 5 years) periods and does not take into account projections of possible future developments of an indicator. The calculation of actual and required indicator trends is based on the CAGR formula and includes the following three steps:

Actual (observed) growth rate:

$$(2a) \text{CAGR}_a = \left( \frac{y_t}{y_{t_0}} \right)^{\frac{1}{t-t_0}} - 1$$

where:  $t_0$  = base year,  $t$  = most recent year,  $y_{t_0}$  = indicator value in base year,  $y_t$  = indicator value in most recent year

Required (theoretical) growth rate to meet the target:

$$(2b) \text{CAGR}_r = \left( \frac{x_{t_1}}{y_{t_0}} \right)^{\frac{1}{t_1-t_0}} - 1$$





where:  $t_0$  = base year,  $t_1$  = target year,  $y_{t_0}$  = indicator value in base year,  $x_{t_1}$  = target value in target year

Ratio of actual and required growth rate:

$$(2c) R_{a/r} = \frac{\text{CAGR}_a}{\text{CAGR}_r}$$

The table below shows the thresholds applied for the  $R_{a/r}$  ratio and the resulting symbols.

**Table 4: Thresholds for assessing trends of indicators with quantitative targets**

Ratio of actual and required growth rate	Symbol
$\geq 95\%$	
$< 95\%$ and $\geq 60\%$	
$< 60\%$ and $\geq 0\%$	
$< 0\%$	

### Method for calculating average scores at the goal level

The calculation of average scores on the level of the individual SDGs is based on the calculations described above for the indicators that have been chosen to monitor the respective SDG. For indicators without quantitative targets, the CAGR (see formula (1) above) is used. For indicators with quantitative targets, the ratio of actual to required growth (see formula (2c) above) is used. These values are inserted into a scoring function (which is different for indicators with and without quantitative target) in order to calculate a score ranging from + 5 (best score) to – 5 (worst score) for each indicator. These indicator scores are currently only calculated for the short-term (past 5 years) period. The average

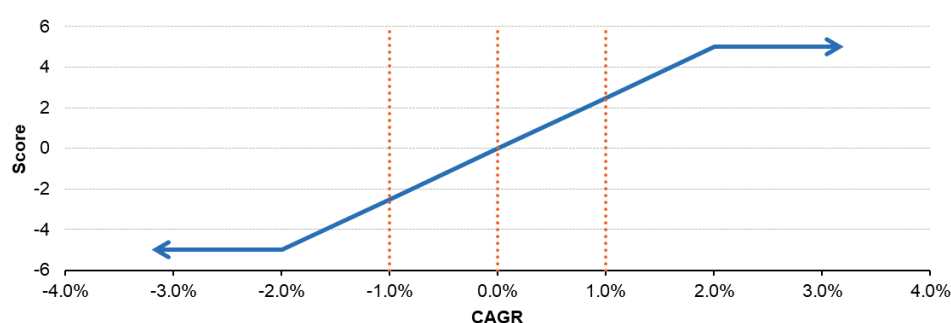
scores on the goal level are then calculated as the arithmetic mean of the individual scores of the indicators chosen for monitoring the respective goal (including both main and multipurpose indicators) <sup>(6)</sup>. Consequently, these goal-level scores can also range from + 5 (best score) to – 5 (worst score).

Note that the scoring functions use broader cut-off points than the thresholds shown in Tables 3 and 4 in order to allow for larger variability in the scores (an indicator with a CAGR of, for example, 1.1 % per year receives a different score than an indicator with a CAGR of, for example, 5.0 % per year, although they both fall into the same assessment category of Table 3). However, the scores at the threshold points in Tables 3 and 4 are harmonised (the threshold values shown in both Tables result in scores of + 2.5, 0 and – 2.5, respectively) to ensure that indicators with and without quantitative targets have the same ‘weight’ when calculating the average score at the goal level.

### Scoring function for indicators without quantitative targets

Figure 4 below shows the scoring function for indicators without quantitative targets. In this case, the scoring function is a linear transformation, with cut-off points set at growth rates (CAGR) of 2.0 % and – 2.0 %. Indicators with a growth rate of exactly 0.0 % receive a score of 0. Indicators with growth rates of 2.0 % or above in the desired direction receive a score of + 5, indicators with growth rates of 2.0 % or above in the wrong direction receive a score of – 5.

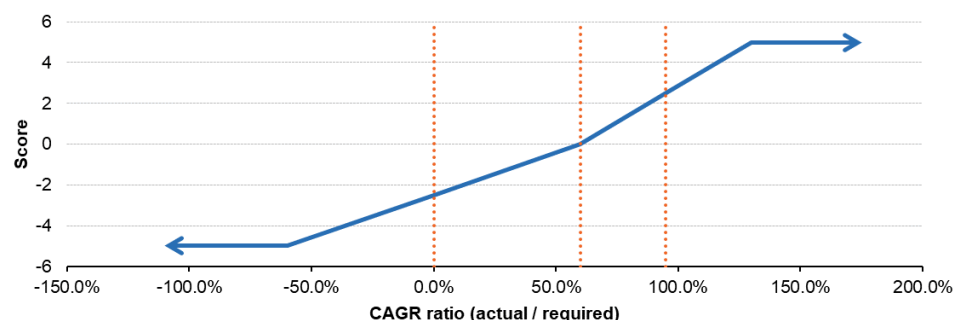
**Figure 4:** Scoring function for indicators without quantitative target



Note: The orange dotted lines represent the thresholds used for defining the assessment category of the indicator, as shown in Table 3 above.

### Scoring function for indicators with quantitative targets

Figure 5 below shows the scoring function for indicators with quantitative targets. The scoring function is not linear in this case, with cut-off points set at CAGR ratios (actual to required growth) of 130 % and – 60 % (ratios below zero indicate a movement away from the target). Indicators with a CAGR ratio of 60 % receive a score of 0. Indicators with CAGR ratios of 130 % or above receive a score of + 5, indicators with CAGR ratios of – 60 % or below receive a score of – 5.

**Figure 5: Scoring function for indicators with quantitative target**

Note: The orange dotted lines represent the thresholds used for defining the assessment category of the indicator, as shown in Table 4 above.

## Notes

- (<sup>1</sup>) The following study discusses and analyses the differences in assessment methods of status (in a given year) and progress (change over time) for the EU Member States: Hametner, M., Kostetckaia, M. (2020), *Frontrunners and laggards: How fast are the EU member states progressing towards the sustainable development goals?*, Ecological Economics 177.
- (<sup>2</sup>) Higher thresholds (for example, 2 %) have been tested and finally rejected, since they make the overall picture less interesting, as a vast majority of indicators would fall in the two 'moderate' categories.
- (<sup>3</sup>) See <https://ec.europa.eu/eurostat/web/sdi/indicators>.
- (<sup>4</sup>) The (comparative) status is a composite index based on the relative indicator values so for each indicator in the goal, the worst country value corresponds to 0 points and the best to 100 points. During the indexing at indicator level, outliers are excluded (see next footnote) and are manually assigned an index value of 0 or 100 (depending on which end of the distribution an outlier is situated). The country status is then the average points across all indicators.
- (<sup>5</sup>) Outliers are identified by means of the interquartile range (IQR) method (see Hoaglin, D. C., Iglewicz, B., & Tukey, J. W. (1986). *Performance of Some Resistant Rules for Outlier Labeling*. *Journal of the American Statistical Association*, 81(396), 991-999 and Hoaglin, D. C., & Iglewicz, B. (1987). *Fine-Tuning Some Resistant Rules for Outlier Labeling*. *Journal of the American Statistical Association*, 82(400), 1147-1149). This method involves calculating the first and third quartiles of the country distribution, with the IQR representing the difference between these two values. The boundaries for identifying outliers are then determined by multiplying the IQR by the factor two and by subtracting/adding these values from/to the first/third quartile, respectively. Values below/above these thresholds are considered outliers and are excluded during indexing, meaning that countries identified as outliers with this method are assigned the value of the next best/worst country for the indexing.
- (<sup>6</sup>) In this 2021 edition of the monitoring report, the following exceptions apply: for SDG 15, the aggregation at the goal-level takes into account the trends in the soil sealing index (sdg\_15\_41) for the period 2009 to 2015.