

Methodology

3.3 Assessment of indicator trends

3.3.1 How are trends assessed?

This publication provides 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.

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. In the remaining cases, a transparent and simple approach across these indicators is applied to avoid ad hoc value judgments. The two approaches are explained in more detail in section 3.3.3 (indicators with quantitative targets) and 3.3.4 (indicators without quantitative targets).

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 the Annex.

Table 0.1: 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 (for example, time series too short)	

3.3.2 How are the assessment results presented?

The assessment of indicator trends is visualised in the form of arrows (see Table 0.1). 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 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 0.1. 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 on page 3.

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

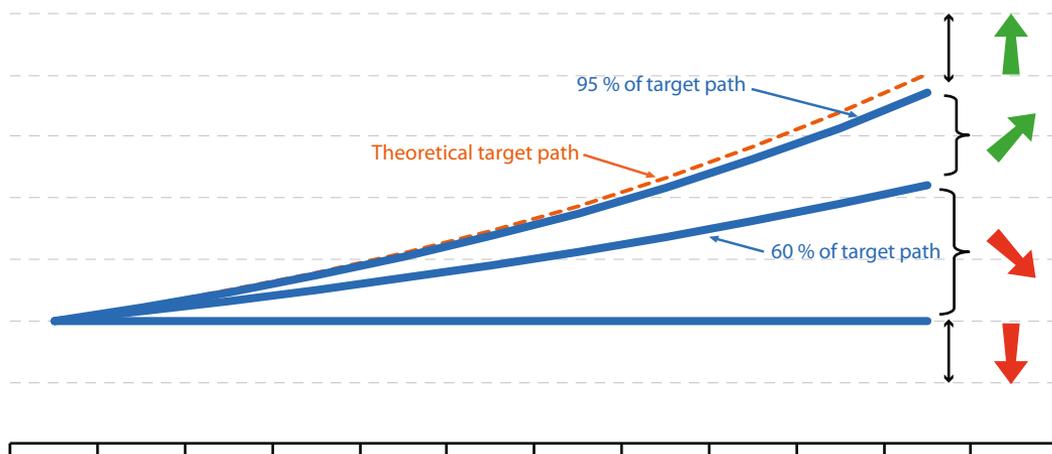
- The **long-term trend**, which is based on the evolution of the indicator over the past 15-year period (usually 2001 to 2016 or 2002 to 2017). The long-term trend is also calculated for shorter time series if data are available for at least 10 consecutive years.
- The **short-term trend**, which is based on the evolution of the indicator during the past five-year period (usually 2011 to 2016 or 2012 to 2017). 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.

3.3.3 Indicators with quantitative targets

Whenever possible, the assessment of indicator trends takes into account concrete targets set in relevant EU policies and strategies. The main point of reference for identifying relevant policy targets is the Commission Staff Working Document (SWD) 'Key European action supporting the 2030 Agenda and the

Figure 0.1: Thresholds for assessing indicators against a quantitative target (example of a target that requires the indicator to increase)



Sustainable Development Goals' accompanying the Commission Communication COM (2016) 739 'Next steps for a sustainable European future: European Union action for sustainability' from 22 November 2016.

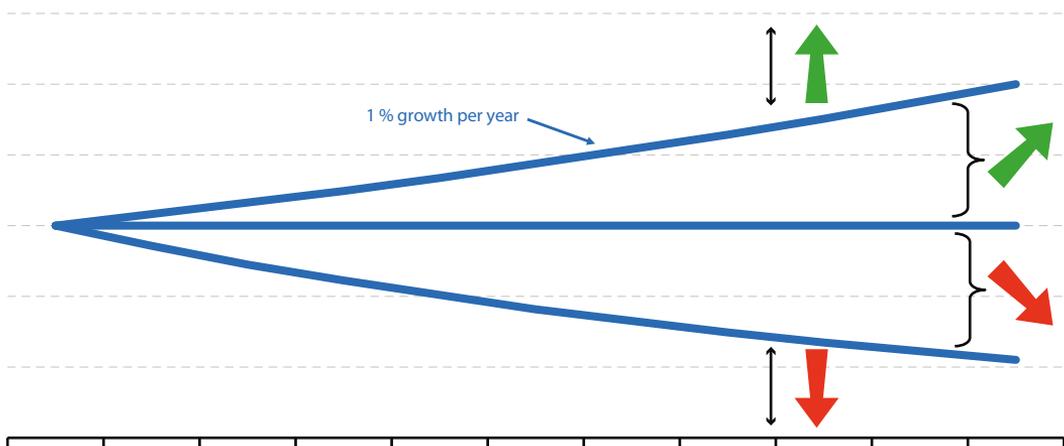
In the presence of a quantified political target (for example, the Europe 2020 targets), the actual rate of change of the indicator (based on the CAGR as described in the Annex) is compared with the theoretical rate of change that would be required to meet the target in the target year. If the actual rate is 95% or more of the required rate, the indicator shows a significant progress towards the EU target. Between 60% and 95%, the trend shows moderate progress towards the EU target, and between 0% and 60%, progress towards the EU target is insufficient. Ratios below 0% mean that the trend is moving away from the EU target. Figure 0.1 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 Europe 2020 target of raising the EU employment rate to 75%). For targets that require indicators to decline (for example, the target of reducing the EU's greenhouse gas emissions by 20%), analogous decreasing target paths are used instead.

3.3.4 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 the Annex, is then compared to the following thresholds: a change of more than 1% per year 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 between 0% and 1% per year is considered 'moderate progress towards SD objectives', and a change in the wrong direction between 0% and 1% per year is considered 'moderate movement away from SD objectives'. See Table 0.1 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 that there is a significant movement in the desired direction. Furthermore, it allows presenting a nuanced picture, with a sufficient number of indicators falling in all four categories (?). The

Figure 0.2: Thresholds for assessing indicators without quantitative targets (example of an indicator where the desired direction is an increase)



threshold should not be confused with the level of EU ambition on a given topic.

Figure 0.2 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 unemployment rate), the categories are reversed.

3.3.5 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.

Notes

- (¹) The concept of sustainable development should be distinguished from that of sustainability. 'Sustainability' is a property of a system, whereby it is maintained in a particular state through time. The concept of sustainable development refers to a process involving change or development. The strategy aims to 'achieve continuous improvement of quality of life', and the focus is therefore on sustaining the process of improving human well-being. Rather than seeking a stable equilibrium, sustainable development is a dynamic concept, recognising that changes are inherent to human societies.
- (²) 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.

Annex

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 III.1: 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 III.2: Thresholds for assessing trends of indicators with quantitative targets

Ratio of actual and required growth rate	Symbol
≥ 95 %	
< 95 % and ≥ 60 %	
< 60 % and ≥ 0 %	
< 0 %	

Method for calculating average scores at the goal level

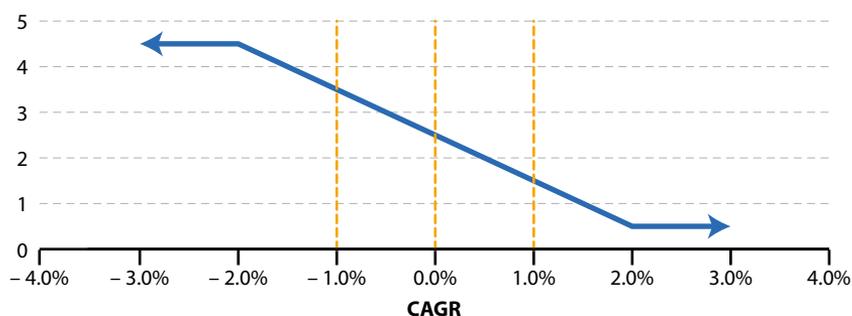
The calculation of average scores on the level of the individual SDGs is based on the calculations described above for the indicators that have been chosen to monitor the respective SDG. For indicators without quantitative targets, the CAGR (see formula (1) above) is used. For indicators with quantitative 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 0.5 (best score) to 4.5 (worst score) for each indicator. In this 2018 edition of the EU SDG monitoring report, these indicator scores are 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). Consequently, these goal-level scores can also range from 0.5 (best score) to 4.5 (worst score).

Note that the scoring functions use broader cut-off points than the thresholds shown in Tables III.1 and III.2 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 III.1). However, the scores at the threshold points in Tables III.1 and III.2 are harmonised (the threshold values shown in both Tables result in scores of 1.5, 2.5 and 3.5, 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 III.1 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 2.5. Indicators with growth rates of 2.0% or above in the desired direction receive a score of 0.5, indicators with growth rates of 2.0% or above in the wrong direction receive a score of 4.5.

Figure III.1: Scoring function for indicators without quantitative target

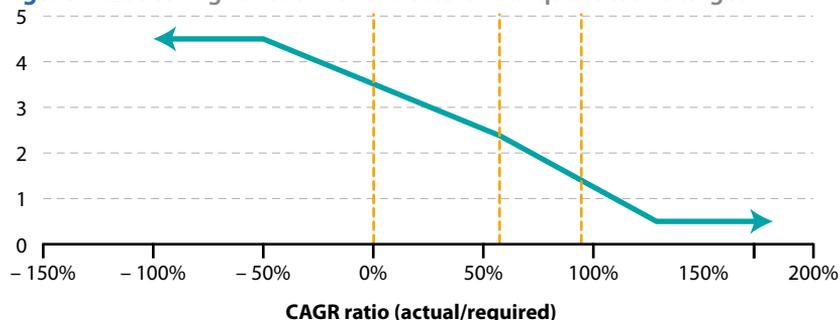


Note: The orange dotted lines represent the thresholds used for defining the assessment category of the indicator, as shown in Table III.1 above.

Scoring function for indicators with quantitative targets

Figure III.2 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 2.5. Indicators with CAGR ratios of 130% or above receive a score of 0.5, indicators with CAGR ratios of – 60% or below receive a score of 4.5.

Figure III.2: 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 III.2 above.