



TECHNICAL SPECIFICATION

**Access, Terminals, Transmission and Multiplexing (ATTM);
Sustainable Digital Multiservice Communities;
Key Performance Indicators for
Sustainable Digital Multiservice Areas;
Part 2: Global KPIs for
Sustainable Digital MultiService Areas**

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Access, Terminals, Transmission and Multiplexing (ATTM).

The present document is part 2 of a multi-part deliverable covering the Sustainable Digital Multiservice Communities as identified below:

Part 1: "Key Performance Indicators for Sustainable Digital Multiservice Areas";

Part 2: "Global KPIs for Sustainable Digital Multiservice Areas".

NOTE: Part 1 of this multi-part deliverable is a work in progress and the title may be subject to change in the future.

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Introduction

Many urban and rural areas wish to monitor and advertise improvements in parameters which indicate their level of sustainability, or progress towards their sustainability objectives.

The present document defines Global Key Performance Indicators (Global KPIs) to describe the social, environmental sustainability and economic attractiveness of Sustainable Digital Multiservice Areas - addressing urban (cities) and rural communities.

The Global KPIs are combinations of the Key Performance Indicators selected from those of ETSI TS 103 463-1 [i.1] which are either measurable or based on publicly available data and relevant to the Sustainable Digital Multiservice Area (SDMA) under consideration.

However, these individual Key Performance Indicators selected cannot be combined to produce a single Global KPI for "sustainability".

As a result, the presentation of three Global KPIs is defined:

- *Global KPI_{People}* representing a group of thirteen parameters related to the social sustainability of the SDMA;
- *Global KPI_{Planet}* representing a group of thirteen parameters related to the environmental sustainability of the SDMA;
- *Global KPI_{Prosperity}* representing a group of thirteen parameters related to the economic sustainability and the economic attractiveness of the SDMA.

The present document also defines graphical representations of each Global KPI and defines reporting requirements.

1 Scope

The present document defines Global Key Performance Indicators (Global KPIs) to describe the social, environmental sustainability and economic attractiveness of Sustainable Digital Multiservice Areas - addressing urban (cities) and rural communities.

The Global KPIs are combinations of the Key Performance Indicators selected from those of ETSI TS 103 463-1 [i.1] which are either measurable or based on publicly available data and relevant to the Sustainable Digital Multiservice Area (SDMA) under consideration.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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Not applicable.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TS 103 463-1: "Access, Terminals, Transmission and Multiplexing (ATTM); Sustainable Digital Multiservice Communities; Part 1: Key Performance Indicators for Sustainable Digital Multiservice Areas".

3 Definition of terms, symbols and abbreviations

3.1 Terms

Void.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

$GlobalKPI_{People}$	Global KPI covering social parameters of an SDMA
$GlobalKPI_{Planet}$	Global KPI covering environmental parameters of an SDMA
$GlobalKPI_{Prosperity}$	Global KPI covering economic attractiveness parameters of an SDMA
$parameter_{base_date}$	value of a given KPI parameter at the base date
$parameter_{current}$	value of a given KPI parameter at the date of assessment of the relevant Global KPI
$parameter_{previous_year}$	value of a given KPI parameter at the date of previous annual assessment of the relevant Global KPI
$value_{annual}$	the percentage change in a KPI parameter compared to its value at the base date ($parameter_{base_date}$)
$value_{overall}$	the percentage change in a KPI parameter compared to its value at the previous annual assessment date ($parameter_{previous_year}$)

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

KPI	Key Performance Indicator
SDMA	Sustainable Digital Multi-service Area

4 Application of Global KPIs for SDMAs

The present document considers the certain parameters of ETSI TS 103 463-1 [i.1] as being relevant to the presentation of Global KPIs covering People, Planet and Prosperity. These are shown in Table 1.

The selection made is based on the ready availability of the necessary data to produce an individual KPI.

Table 1: Selected parameters contributing to Global KPIs

	PEOPLE	PLANET	PROSPERITY
1	Access to basic health care services	Annual final energy consumption	Unemployment rate
2	Traffic accidents	Renewable energy generated within the city	Youth unemployment rate
3	Crime rate	CO ₂ emissions	Affordability of housing
4	Access to public transport	Water consumption	Share of certified companies
5	Access to vehicle sharing solutions for city travel	Water losses	Share of Green Public Procurement
6	Length of bike route network	Population density	Gross Domestic Product
7	Access to public amenities	Brownfield use	Creative industry
8	Access to commercial amenities	Nitrogen dioxide emissions (NO ₂)	Innovation hubs in the city
9	Access to high speed internet	Fine particulate matter emissions (PM 2,5)	Research intensity
10	Access to public free WiFi	Air quality index	Congestion
11	Ground floor usage	Noise pollution	Public transport use
12	Public outdoor recreation space	Waste Recycling rate	Net migration
13	Green space	Municipal solid waste	Tourism intensity

It is not the purpose of the Global KPIs of the present document to compare areas - but to track trends within an area, showing improvement or worsening of sustainability performance in relation to "people", "planet" and "prosperity".

With reference to Table 1, the present document considers:

- the three columns to contain KPIs that are separate (i.e. People, Planet and Prosperity cannot be combined to produce a single Global KPI);

- the individual parameters in each column cannot be combined to produce a single Global KPI for either People, Planet or Prosperity.

Moreover, as defined in ETSI TS 103 463-1 [i.1], the parameters of Table 1 in black text are able to be expressed as percentages while those in red are expressed as magnitude (numbers). As a result, it is necessary to re-define the meaning of certain parameters and how they are expressed in order to present the trends of each Global KPI.

The approach taken in the present document is to:

- amend the definition of the KPIs so that percentages indicating improvement are expressed as positives (e.g. instead of recording "crime rate", the percentage would show "reduction of crime rate") (see clause 6.1);
- establish a base date for each parameter at which, and from which, that parameters are measured and recorded (see clauses 6.2 and 6.5);
- record percentage changes of data following that base date by applying a consistent approach to periods of measurement (see clause 6.3) and calculation (see clause 6.4);
- present the changes for each Global KPI in graphical format outlined in clause 7;
- report supporting data as described in clause 8;
- adopt a strategy for the treatment of data which record exceptional circumstances (see clause 6.6).

5 Selection of parameters and provision of data

The characteristics of the parameters of Table 1 are defined in ETSI TS 103 463-1 [i.1].

6 Creation of Global KPIs

6.1 Trend indicators

Table 2 shows the conversion of the parameters of Table 1 into trending information. It is the parameters of Table 2 that are the basis of the presentation of clause 7.

The objective is to show "improvement" as a positive value when assessed as a trend.

Table 2: Parameters to indicate "improvement"

PEOPLE	PLANET	PROSPERITY
Improvement by Increases		
Increase in access to basic health care services	Increase in renewable energy generated within the city	Increase in affordability of housing
Increase in access to public transport	Increase in population density	Increase in share of certified companies
Increase in access to vehicle sharing solutions for city travel	Increase in brownfield use	Increase in share of Green Public Procurement
Increase in length of bike route network	Increase in waste Recycling rate	Increase in Gross Domestic Product
Increase in access to public amenities		Increase in creative industry
Increase in access to commercial amenities		Increase in innovation hubs in the city
Increase in access to high speed internet		Increase in research intensity
Increase in access to public free WiFi		Increase in public transport use
Increase in ground floor usage		Increase in net migration
Increase in public outdoor recreation space		Increase in tourism intensity
Increase in green space		
Improvement by reductions		
Reduction of traffic accidents	Reduction of annual final energy consumption	Reduction of unemployment rate
Reduction of crime rate	Reduction of CO ₂ emissions	Reduction of youth unemployment rate
	Reduction of water consumption	Reduction of congestion
	Reduction of water losses	
	Reduction of nitrogen dioxide emissions (NO ₂)	
	Reduction of fine particulate matter emissions (PM 2,5)	
	Reduction of air quality index	
	Reduction of noise pollution	
	Reduction of municipal solid waste	

6.2 Baseline data

All the Global KPI parameters of Table 2 should be calculated against a base date.

This can be considered to be the date on which the first accurate assessment of the relevant parameter (*parameter_{base_date}*) has been made by the body responsible for producing the KPI reports of clause 7.

If there is no baseline data, the KPI reports should indicate this (see clause 7).

6.3 Measurement periods

Global KPI trend information should be reported as being relevant to a designated assessment date.

Each parameter is subject to a measurement period (i.e. the period between two consecutive measurements) is 12 months which provides values of that parameter (*parameter_{previous}* and *parameter_{base_date}*).

All the parameters used to produce a value for a Global KPI should be measured during a defined and common time period. It is recognized that not all data is measured on the same date but to be included in the Global KPI report described in clause 7, the date for each *parameter_{current}* should be ± 6 months of the quoted assessment date.

The relevant dates should be included in the public reporting of the Global KPI information.

As an example, if the assessment date is 30th June 2018, all parameters reported should have a date of *parameter_{current}* of between 1st January 2018 and 31st December 2018. The date of measurement of each value of *parameter_{previous_year}* should be 12 months prior to that which is used for the value of *parameter_{current}*.

6.4 Trend calculations

6.4.1 General

The presentation approaches of clause 7 and the reporting of clause 8 require the calculation of both "overall trend" and "annual trend" information.

6.4.2 Increasing parameters

6.4.2.1 Overall trend

$$value_{overall} = 100 * (parameter_{current}/parameter_{base_date} - 1) \text{ (providing a \% value)}$$

6.4.2.2 Annual trend

$$value_{annual} = 100 * (parameter_{current}/parameter_{previous_year} - 1) \text{ (providing a \% value)}$$

6.4.2.3 Examples

For a given parameter:

- $parameter_{current} = 2\ 300$
- $parameter_{previous_year} = 2\ 250$
- $parameter_{base_date} = 2\ 000$

$$value_{overall} = 15 \%, \text{ } value_{annual} = 2,2 \%$$

6.4.3 Decreasing parameters

6.4.3.1 Overall trend

$$value_{overall} = 100 * (parameter_{base_date}/parameter_{current} - 1) \text{ (providing a \% value)}$$

6.4.3.2 Annual trend

$$value_{annual} = 100 * (parameter_{previous_year}/parameter_{current} - 1) \text{ (providing a \% value)}$$

6.4.3.3 Examples

For a given parameter:

- $parameter_{current} = 1\ 600$
- $parameter_{previous_year} = 1\ 800$
- $parameter_{base_date} = 2\ 000$

$$value_{overall} = 20 \%, \text{ } value_{annual} = 11,1 \%$$

6.5 Establishing a base date

The majority of parameters listed in Table 2 are based upon data which has been recorded for many years and allows a base date to be chosen 12 months before the first calculation of either $value_{overall}$ and $value_{annual}$.

However, it is recognized that some parameters follow the initiation of specific projects where the community action is starting from a very low level or even "zero". Examples of these are shown in Table 3. For such parameters, a base date cannot be selected within 12 months of the first implementation.

This is shown graphically in Figure 1 using the example of a bike route network. Before T_0 there is no bike route and the initial installation of bike routes begins at T_0 . After 12 months, the use of T_0 as a base date would result in $value_{overall}$ or $value_{annual} = \infty$. To avoid misleading representations, the present document requires a period to allow the stabilization of implementation so the base date is selected at least 12 months after T_0 allowing the first calculation of $value_{overall}$ or $value_{annual}$ to be made twelve months after that time.

The presentation (see clause 7) and reporting (see clause 8) of data relating to such parameters is not appropriate until 12 months after the establishment of a base date.

Table 3: Selected parameters contributing to Global KPIs

	PEOPLE	PLANET	PROSPERITY
1	Access to vehicle sharing solutions for city travel	Brownfield use	Creative industry
2	Length of bike route network		Innovation hubs in the city
3	Access to public free WiFi		Research intensity
4	Ground floor usage		

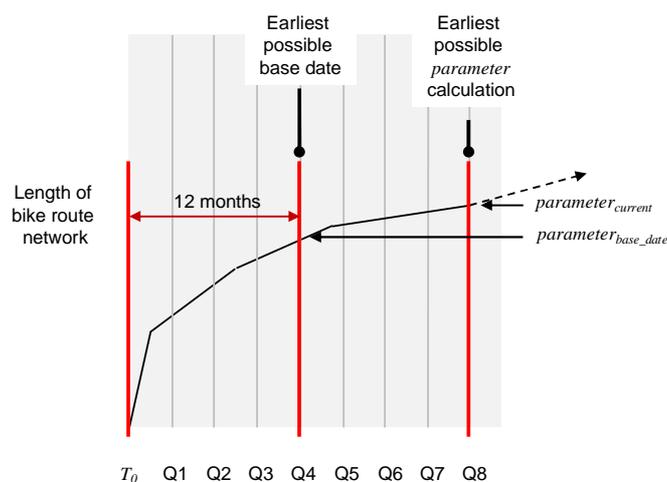


Figure 1: Selection of base dates for new projects

6.6 Exceptional circumstances

As discussed in clause 6.4, the establishment of appropriate base dates is necessary for some parameters to prevent misleading information being presented and reported. Despite such controls it is possible for parameters to change significantly within a reporting period due to exceptional events or circumstances.

For example, an extended period of drought could result in dramatic reductions in water consumption which would be reversed in the following reporting period (leading to an improvement in $value_{annual}$ in one year followed by an apparent deterioration in the following year). Similarly, a single act of terrorism could dramatically affect any attempt to reduce crime rates leading to a deterioration in $value_{annual}$ in one year followed by an apparent improvement in the following year.

The presentation and reporting of data relating to such exceptional circumstances is discussed in clause 7 and clause 8 respectively.

7 Presentation of Global KPIs

7.1 Overview

Three Global KPIs can be reported - Global KPI_{People}, Global KPI_{Planet}, and Global KPI_{Prosperity}.

Each Global KPI is both reported (see clause 8) and presented as described in this clause.

7.2 Graphical representation

7.2.1 Basic presentation

Each Global KPI should be presented as a bar chart on which positive values represent improvement and negative values represent deterioration of performance.

This form of graphical representation can be applied to both "overall" and "annual" combinations of the parameters which form part of *Global KPI_{People}*, *Global KPI_{Planet}*, and *Global KPI_{Prosperity}*.

An example of this for "Overall *Global KPI_{People, Planet or Prosperity}*" is shown in Figure 2.

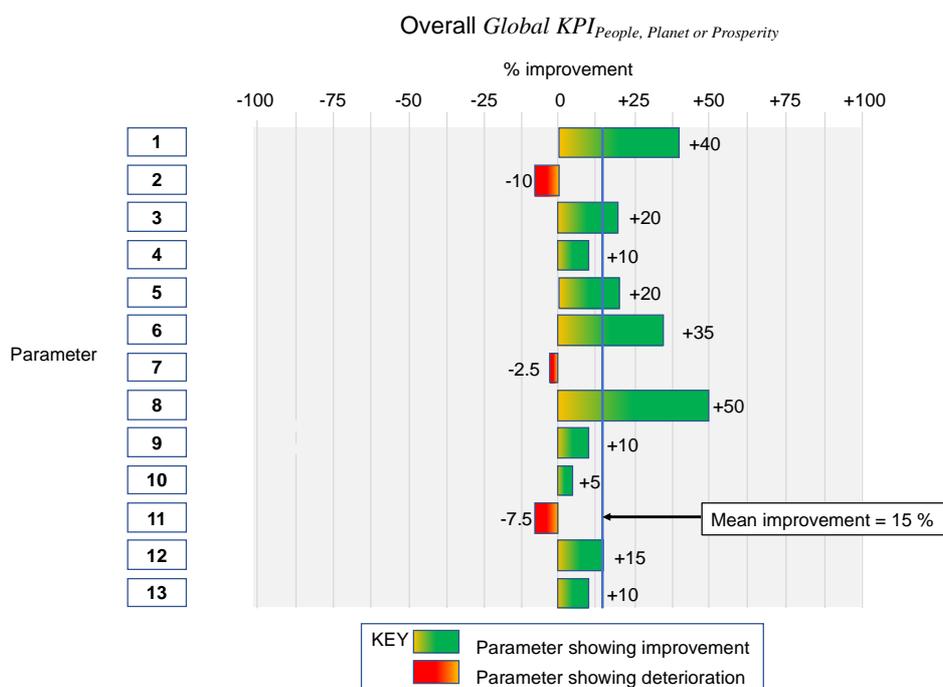


Figure 2: Graphical representation of Overall Global KPI

Another example of this for "Annual *Global KPI_{People, Planet or Prosperity}*" is shown in Figure 3.

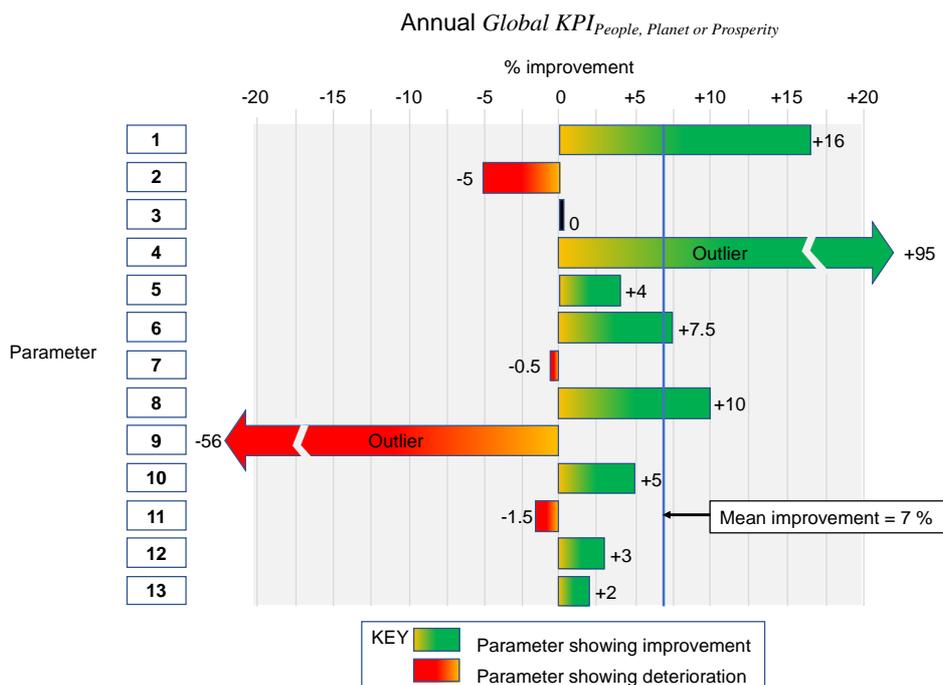


Figure 3: Graphical representation of Annual Global KPI

Both Figure 2 and Figure 3 show a representation of all thirteen parameters. If information for one or more parameters is not yet available (due to no recorded values for $parameter_{base_date}$ and $parameter_{current}$), this should be indicated with the graphic and also in the report (see clause 8).

It should be noted that the scales on the horizontal axes of Figure 2 and Figure 3 are different.

The scales should be selected to give the optimum definition for the information being portrayed. In Figure 3, 11 of the 13 parameters have values of less than 16 but 2 have very much greater values. These could represent fast-changing data or exceptional circumstances. In order not to overwhelm the important detail of the 11 parameters, the two larger values are shown as outliers.

In all cases the values are shown next to the bars on the charts.

7.2.2 Inclusion of "mean" values for a Global KPI

In addition to presenting the individual $value_{overall}$ for each parameter, Figure 2 indicates a mean value of the 13 parameters at 15 %.

In addition to presenting the individual $value_{annual}$ for each parameter, Figure 3 indicates the mean value of the thirteen parameters at approximately 7 %.

While this represents the average change across all thirteen parameters for a given Global KPI, it cannot be considered to take the place of a representation of all the parameters that comprise the Global KPI. As a result, the inclusion of the mean value is optional and cannot be reported without showing the individual parameters.

7.2.3 Presentation of "exceptional circumstances" data

As discussed in clause 8, a decision has to be made regarding the presentation of data considered to be exceptional.

The graphics of Figure 2 and Figure 3 can either include or exclude the exceptional data in the $value_{overall}$ and $value_{annual}$. Whichever decision is taken the reporting of clause 8 should include the information.

8 Reporting of Global KPIs

For each Global KPI the following should be reported:

- the date applicable to the Global KPI;
- base date of each parameter;
- the *parameter_{base_data}*;
- the *parameter_{current}*;
- the *parameter_{previous}*.

The arithmetic mean of any group of parameters within a given Global KPI may be reported provided that all the other data listed above is included in the same report.

Any missing parameters should be highlighted in the report and in the graphic (see clause 7).

For each *value_{overall}* and *value_{annual}*, the report should contain any information pertinent to the outcome such as:

- the presence of fast-changing data and the reasons for it;
- the inclusion or exclusion of data resulting from exceptional circumstances.

History

Document history		
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