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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 3, sub-part 1 of a multi-part deliverable covering the Energy management; Operational infrastructures; Implementation of Global KPIs as identified below:

ETSI EN 305 200-1: "General requirements";

ETSI TS 105 200-2: "Specific requirements";

ETSI TS 105 200-3: "ICT Sites:

Sub-part 1: DCEM";

ETSI EN 305 200-4: "Design assessments".

NOTE: Part 2 of this series has also been produced as EN and ES.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

Energy costs continue to rise, a trend that will continue in the future, while broadband penetration is introducing new active equipment to the network architecture.

In this context, and to reflect other environmental aspects of sustainability, it is vital that the main telecommunication operators implement effective general engineering of fixed and mobile broadband networks and sites provisioning, managing or using those networks (i.e. ICT sites) in order to respond to critical issues of energy consumption while proposing essential solutions to broadband deployment.

To guide this process, it is essential that metrics are defined, termed Global Key Performance Indicators (KPIs), that enable energy usage to be managed more effectively.

The Global Key Performance Indicators (KPIs) of the ETSI EN 305 200 series [1] address operational infrastructures and do not consider design or operation of individual components comprising those infrastructures.

The present document specifies the deployment of the Global KPI for energy management (KPI_{DCEM}) for the ICT sites of broadband deployment as specified in ETSI EN 305 200-3-1 [2].

1 Scope

The reporting of Global KPIs in accordance with ETSI EN 305 200-3-1 [2] requires the collection of data to enable the calculation of the following aspects:

- objective KPI relating to the total energy consumption (KPI_{EC});
- objective KPI relating to the use of energy performance (KPI_{EP}) which combines KPI_{EC} with other measurements of energy consumption to provide Objective KPIs related to task efficiency (KPI_{TE}), the reuse of energy (KPI_{REUSE}) and the use of renewable energy (KPI_{REN}).

The present document supports the requirements of ETSI EN 305 200-3-1 [2] providing a framework for, and detailing, the implementation procedures including any necessary techniques for estimation of energy consumption together with constants to be employed for weighting and banding purposes.

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.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI EN 305 200 series: "Access, Terminals, Transmission and Multiplexing (ATTM); Energy management; Operational infrastructures; Global KPIs".

[2] ETSI EN 305 200-3-1: "Access, Terminals, Transmission and Multiplexing (ATTM); Energy management; Operational infrastructures; Global KPIs; Part 3: ICT sites; Sub-part 1: DCEM".

2.2 Informative 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.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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] CENELEC EN 50600-4-2: "Information technology - Data centre facilities and infrastructures; Part 4-2: Power Usage Effectiveness".

[i.2] CENELEC EN 50600-4-3: "Information technology - Data centre facilities and infrastructures; Part 4-3: Renewable Energy Factor".

[i.3] CENELEC EN 50600-4-6: "Information technology - Data centre facilities and infrastructures; Part 4-6: Energy Reuse Factor".

[i.4] ETSI EN 305 174-2: "Access, Terminals, Transmission and Multiplexing (ATTM); Broadband Deployment and Lifecycle Resource Management; Part 2: ICT sites".

[i.5] ETSI TS 105 174-2: "Access, Terminals, Transmission and Multiplexing (ATTM); Broadband Deployment and Energy Management; Part 2: ICT sites".

[i.6] ETSI EN 305 200-2-1: "Access, Terminals, Transmission and Multiplexing (ATTM); Energy management; Operational infrastructures; Global KPIs; Part 2: Specific requirements; Sub-part 1: ICT Sites".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI EN 305 200-3-1 [2] apply.

3.2 Symbols

For the purposes of the present document, the symbols given in ETSI EN 305 200-3-1 [2] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI EN 305 200-3-1 [2] and the following apply:

NGO Non-Governmental Organization

4 Global KPIs of ETSI EN 305 200-3-1

4.1 ICT sites

The ICT sites addressed by ETSI EN 305 200-3-1 [2] and the present document are Operator Sites (OSs) and Network Data Centres (NDCs). It should be noted that an OS that is only connected to the core network is considered to be an NDC.

The schematic of an ICT site used in the present document is shown in Figure 1 (taken from of ETSI EN 305 200-3-1 [2]).

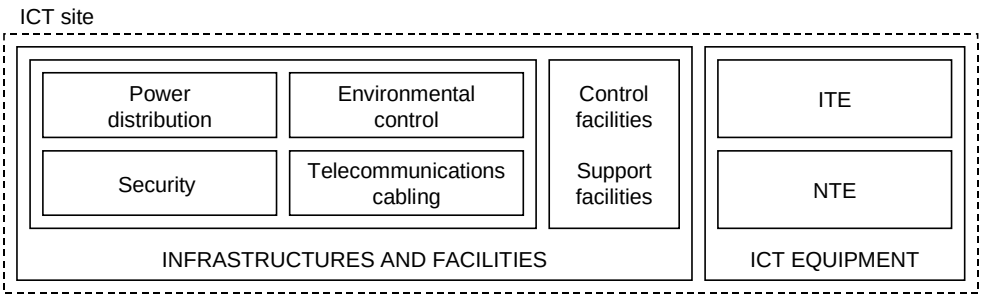

Figure 1: Schematic of the functional elements of an ICT site

With reference to the schematic in Figure 1:

- an NDC accommodates a mixture of information technology equipment (ITE) and network telecommunication equipment (NTE);
- an OS will also accommodate a mixture of ITE and NTE - where the NTE may provide connections to core, fixed access, terrestrial mobile access and satellite mobile access network infrastructures;

- the present document does not differentiate between ITE and NTE and the generic term ICT equipment is used.

4.2 KPIs for energy management

4.2.1 Global KPI (KPI_{DCEM}) for ICT sites

From ETSI EN 305 200-3-1 [2], KPI_{DCEM} is a combination of two separate KPIs, for a common assessment period *k*, as follows:

1) the Objective KPI for energy consumption expressed as KPI_{EC} (see clause 4.2.2.1);

2) a combination of three Objective KPIs for energy performance expressed as KPI_{EP}:

$KPI_{EP} = KPI_{TE}$ x ((1 - W_{REUSE} x KPI_{REUSE}) x (1 - W_{REN} x KPI_{REN})) subject to a minimum value of 0.

where:

KPI_{TE} = Objective KPI for task effectiveness (see clause 4.2.2.2);

KPI_{REUSE} = Objective KPI for energy re-use (see clause 4.2.2.3);

KPI_{REN} = Objective KPI for renewable energy (see clause 4.2.2.4);

and:

W_{REUSE} = weighting factor for energy re-use (see clause 6);

W_{REN} = weighting factor for renewable energy (see clause 6).

KPI_{EC} is presented as a banded value DC_G (see clause 6).

KPI_{EP} is presented as a banded value DC_{CLASS} (see clause 6).

4.2.2 Objective KPIs

4.2.2.1 Energy consumption (KPI_{EC})

From ETSI EN 305 200-3-1 [2], KPI_{EC} for the assessment period k, $KPI_{EC}^{(k)}$ is defined mathematically as:

$$KPI_{EC}^{(k)} = C^{(k)} = \sum_{s=1}^{S} C_s^{(k)} \text{ or } KPI_{EC}^{(k)} = \sum_{n=1}^{N} C_n^{(k)} \text{ (when applied to groups of ICT sites)}$$

where, for the assessment period *k*:

$C^{(k)}$ = total energy consumption by the ICT site

$C_n^{(k)}$ = total energy consumption by ICT site *n*

$C_s^{(k)}$ = total energy consumption by ICT site from energy source *s*

n = ICT site number

N = total number of ICT sites

s = energy source number

S = total number of separate energy sources of the ICT site including those provided only during fault conditions

4.2.2.2 Task effectiveness (KPI_{TE})

From ETSI EN 305 200-3-1 [2], KPI_{TE} for the assessment period k, $KPI_{TE}^{(k)}$ is defined mathematically as:

$$KPI_{TE}^{(k)} = \frac{C^{(k)}}{L^{(k)}} \text{ or } KPI_{TE}^{(k)} = \frac{\sum_{n=1}^{N} C_n^{(k)}}{\sum_{n=1}^{N} L_n^{(k)}} \text{ (when applied to groups of ICT sites)}$$

where, for the assessment period *k*:

$C^{(k)}$ = total energy consumption of the ICT site

$C_n^{(k)}$ = total energy consumption of ICT site *n*

$L^{(k)}$ = total energy consumed by ICT load in the ICT site

$L_n^{(k)}$ = total energy consumed by ICT load in ICT site *n*

n = ICT site number

N = total number of ICT sites

4.2.2.3 Energy reuse (KPI_{REUSE})

From ETSI EN 305 200-3-1 [2], KPI_{REUSE} for the assessment period k, $KPI_{REUSE}^{(k)}$ is defined mathematically as:

$$KPI_{REUSE}^{(k)} = \frac{EC_{REUSE}^{(k)}}{C^{(k)}} \text{ or } KPI_{REUSE}^{(k)} = \frac{\sum_{n=1}^{N} EC_{REUSE_n}^{(k)}}{\sum_{n=1}^{N} C_n^{(k)}} \text{ (when applied to groups of ICT sites)}$$

where, for the assessment period *k*:

$C^{(k)}$ = total energy consumption of the ICT site

$C_n^{(k)}$ = total energy consumption of ICT site *n*

$EC_{REUSE}^{(k)}$ = total energy re-used from the ICT site

$EC_{REUSEn}^{(k)}$ = total energy re-used from ICT site *n*

4.2.2.4 Renewable energy (KPI_{REN})

From ETSI EN 305 200-3-1 [2], KPI_{REN} for the assessment period k, $KPI_{REN}^{(k)}$ is defined mathematically as:

$$KPI_{REN}^{(k)} = \frac{EC_{REN}^{(k)}}{C^{(k)}} \text{ or } KPI_{REN}^{(k)} = \frac{\sum_{n=1}^{N} EC_{REN_n}^{(k)}}{\sum_{n=1}^{N} C_n^{(k)}} \text{ (when applied to groups of ICT sites)}$$

where, for the assessment period *k*:

$C^{(k)}$ = total energy consumption of the ICT site

$C_n^{(k)}$ = total energy consumption of the ICT site *n*

$EC_{REN}^{(k)}$ = total energy consumption from renewable sources of the ICT site

$EC_{RENn}^{(k)}$ = total energy consumption from renewable sources of ICT site *n*

4.2.3 Underlying principles

4.2.3.1 Energy consumption

ETSI EN 305 200-3-1 [2] and the present document support the reduction in the energy consumption required to provide a given level of service as a primary objective.

The KPI_{EC} may be improved by local actions within individual ICT sites and/or global actions applied to the group under common governance.

4.2.3.2 Task effectiveness

ETSI EN 305 200-3-1 [2] and the present document support the improvement in task effectiveness as a primary objective.

KPI_{TE} is the ratio of the total energy consumption of the ICT site to the energy consumption of the ICT equipment in the ICT site. KPI_{TE} is dimensionless and has the following properties:

- $KPI_{TE} \geq 1$;
- $KPI_{TE} = 1$ is an ideal value.

It should be noted that the work done by the load is not a basis for the KPI_{TE} due to the wide variety of operations performed by the ICT equipment in ICT sites.

A simple comparison between KPI_{TE} and Power Usage Effectiveness of CENELEC EN 50600-4-2 [i.1] is provided in Annex A.

4.2.3.3 Energy re-use

4.2.3.3.1 Objective

ETSI EN 305 200-3-1 [2] and the present document support re-use of energy as a secondary objective.

KPI_{REUSE} is the ratio of re-used energy by facilities, external to the ICT site, to the total energy consumption of the ICT site. Thermal energy can be reused in different forms, liquid or gas (air). KPI_{REUSE} shall be measurable and quantifiable. It is a dimensionless number.

The KPI_{REUSE} of ETSI EN 305 200-3-1 [2] reflects a preference for energy consumption reduction rather than re-use.

NOTE 1: The KPI_{REUSE} of ETSI EN 305 200-2-1 [i.6] reflects a preference for re-use of energy in the form of heat generated by the ICT equipment rather than from poorly designed facilities and infrastructures. This is not contained in ETSI EN 305 200-3-1 [2].

In all cases "non-use" is better than "re-use".

The vast majority of energy input to an ICT site is converted into heat. Possible initiatives to re-use this heat include:

- heating of water for facilities external to the ICT site;
- heating of spaces within premises containing the ICT site but not associated with the ICT site (e.g. general offices);
- heating of other premises (commercial or residential) either directly or indirectly (via combined heat and power systems);
- heating of spaces supporting the operation of the ICT site (e.g. pre-heating of diesel generators or heating offices accommodating ICT site personnel) or converting heat to provide.

NOTE 2: Energy reused for these purposes (internal to the ICT site) contributes to a reduction in KPI_{EC} and KPI_{TE} but is not counted in KPI_{REUSE}.

A simple comparison between KPI_{REUSE} and Energy Reuse Factor of CENELEC EN 50600-4-6 [i.3] is provided in Annex A.

4.2.3.3.2 Measurement

KPI_{REUSE} can only be assessed and included in subsequent calculation and presentation of KPI_{DCEM} if the energy re-used is measurable at the intended point of delivery i.e. any losses in the delivery system shall not be included.

In addition to the text of ETSI EN 305 200-3-1 [2] it should be noted that losses in the system delivering the energy to be re-used are not to be included in EC_{REUSE}.

4.2.3.4 Renewable energy

4.2.3.4.1 Objective

ETSI EN 305 200-3-1 [2] and the present document support the use of renewable energy as a secondary objective.

KPI_{REN} is the ratio of energy consumption from renewable sources to the total energy consumption of the ICT site. It is a dimensionless number.

A simple comparison between KPI_{REN} and Renewable Energy Factor of CENELEC EN 50600-4-3 [i.2] is provided in Annex A.

4.2.3.4.2 Measurement

Only the sources contributing to KPI_{EC} will be taken into account, whether dedicated or shared.

KPI_{REN} takes account of renewable energy that is produced by:

a) sources dedicated to and directly serving an ICT site;

b) sources (an ICT site or generator) under common governance with the ICT site(s) they serve and from which it is conveyed by the utility (grid) serving an ICT site or ICT sites in the group defined for the application of the KPI_{EM}.

In the case of b):

- the renewable energy shall not be included within KPI_{REN} of the recipient site if it is already included in the proportion of "green" energy within the energy mix of the utility (grid) supplied to the ICT site as defined in European standards or other international schemes;

NOTE: Any proportion in the mix of utility electricity supplies certified as "renewable" (e.g. based on the carbon footprint of the energy source) by electricity suppliers or in accordance with nationally recognized schemes is not recognized by the present document.

- the portion of such energy allocated to the recipient ICT site added to other ICT site consumptions shall not exceed the overall energy consumption by the ICT site.

4.3 Energy management trends

The Global KPI, KPI_{DCEM}, is primarily intended to indicate the success of a defined energy management policy, independent of the site or location under consideration.

The use of bands as described in clause 6 does not generally allow the trend analysis but the reporting (see clause 7) of the Objective KPIs and the relevant weightings does allow the trend analysis to be applied to those parameters.

4.4 Energy management practices

An increase in either KPI_{TE} or KPI_{REN} represents an improvement in energy management of the ICT sites - although individual improvements of KPI_{TE} and KPI_{REN} are not comparable.

Requirements and recommendations in relation to the improvement of the energy management of ICT sites are contained within ETSI EN 305 174-2 [i.4] and ETSI TS 105 174-2 [i.5].

5 Data collection

5.1 General

Measurement points and procedures have been described in detail in ETSI EN 305 200-3-1 [2]. However, there are some cases where these are difficult to apply either because of scale or lack of instrumentation. This clause describes the methods and restrictions that apply in such cases.

5.2 Estimated measurements

5.2.1 Large groups of ICT sites

While in large ICT sites, measurement of energy consumption is easy using a small number of meters as described in ETSI EN 305 200-3-1 [2], the measurement of consumption in large groups of smaller ICT sites would be costly with regard to the number of counters to be implemented.

Objective KPIs for such a group of ICT sites shall be derived from measurements of a number of fully instrumented representative sites. For each existing ICT site configuration, a number of sites shall be selected so as to be statistically representative and then to derive the total estimate of consumptions. The estimated statistical accuracy shall be specified.

5.2.2 Power measurements

Power consumption measurements can only be accepted as a palliative solution as compared to energy consumption measurements. This is because such measurements are periodic samples, typically obtained technician visits, and are less dependable than continuous energy consumption measurements which integrate over time the actual behaviour of the ICT site.

The resulting KPI_{TE} shall not be used as a valid measurement for public disclosure. However, they can be used for evaluation and trend analysis on a private basis.

To be as accurate as possible, power consumption measurements should be made daily (as a minimum) and:

- at the lowest and highest ambient temperatures;
- at the lowest and highest load (at extremes of data traffic where the predominant ICT equipment load comprises NTE).

6 Weighting and banding constants

6.1 The use of weighting factors to reflect policy objectives

In general, the Global KPIs of the ETSI EN 305 200 series [1] are designed to measure or map the performance of a infrastructure of broadband deployment to a specific policy, normally created by its owner or a third party, with regard to energy management.

The present document supports ETSI EN 305 200-3-1 [2] which specifies KPI_{DCEM} as the presentation of two separate Objective KPIs (KPI_{EC} and KPI_{EP}) as described in clause 4.2.1.

The establishment of policy objectives for energy management within KPI_{EM} is enabled by means of defining the relative importance of its underlying Objective KPIs KPI_{REUSE} and KPI_{REN} by means of the weighting parameters (W_{REUSE} , W_{REN}) as shown in clause 4.2.1.

A policy, i.e. the selection of W_{REUSE} and W_{REN}, may be applied to an ICT site or to a group of ICT sites and may be applied differently depending upon the type of ICT sites under consideration.

For example, Table 1 indicates the application of different weighting values:

- for smaller ICT sites where energy reuse is not a high priority while focussing on the provision of renewable energy;
- for large ICT sites where the provision of renewable energy is a medium priority while focussing on energy reuse.

Table 1: Example set of banded weighting parameters for telecommunications network operators

KPI_{EC} range	W_{REUSE}	W_{REN}
≤ 0,04 GWh	0,1	1,0
> 0,04 GWh	1	0,5

Some policies may not differentiate on the basis of KPI_{EC} and apply a universal weighting to all ICT sites as shown in the example of Table 2.

Table 2: Weighting example for policy not using KPI_{EC} banding

KPI_{EC} range	W_{REUSE}	W_{REN}
any	1,0	0,8

6.2 The use of bands for DC_G and DC_{CLASS}

ETSI EN 305 200-3-1 [2] specifies that KPI_{DCEM} is presented as two Objective KPIs (KPI_{EC} and KPI_{EM}) which are classified within bands (DC_G and DC_{CLASS} respectively).

This simplified description of energy management performance allows an ICT site or group of ICT sites to be easily positioned in comparison to its neighbours. There is no defined set or naming convention for the bands but example are provided in clause 6.3.

6.3 Values

Table 3 shows banding values that have been obtained from a survey of ICT sites in France and are applied for all members of Non-Governmental Organization (NGO) eG4U. It is clear from Table 3 that a consistent policy objective is applied to all values of KPI_{EC} (and therefore DC_G).

Table 3: DC_G policy used by eG4U

KPI_{EC} range	DC_G	W_{REUSE}	W_{REN}
≤ 0,04 GWh	XXS	1,0	0,8
0,04 GWh < KPI_{EC} ≤ 0,2 GWh	XS	1,0	0,8
0,2 GWh < KPI_{EC} ≤ 1 GWh	S	1,0	0,8
1 GWh < KPI_{EC} ≤ 5 GWh	M	1,0	0,8
5 GWh < KPI_{EC} ≤ 25 GWh	L	1,0	0,8
25 GWh < KPI_{EC} ≤ 120 GWh	XL	1,0	0,8
> 120 GWh	XXL	1,0	0,8

Table 4 shows the performance bands for KPI_{EP} and the resulting designations of DG_{CLASS} adopted by eG4U at the time of publication of the present document.

Table 4: DC_{CLASS} bands used by eG4U

KPI_{EP} range	DC_{Class}
≤ 1,00	A
1,00 < KPI_{EP} ≤ 1,40	B
1,40 < KPI_{EP} ≤ 1,70	C
1,70 < KPI_{EP} ≤ 1,90	D
1,90 < KPI_{EP} ≤ 2,10	E
2,10 < KPI_{EP} ≤ 2,30	F
> 2,30	G

7 Trend analysis

Trending can only be significant when comparing data using the same policy. Note that a change of KPI_{EC} band may change the two weighting parameters (W_{REN}, W_{REUSE}).

Banded values of KPI_{EC} (i.e. DC_G) are not particularly useful for assessing trends, but banded values for KPI_{EP} (i.e. DC_{CLASS}) as defined in ETSI EN 305 200-3-1 [2] may provide more accurate trending inside a given policy although not part of the public report.

KPI_{EP} applies to a single ICT site or to a group of ICT sites. Figure 2 represents the KPI_{EP} evolution of an ICT site or group of sites during its/their "ramp-up" phase using a single policy, with an addition of renewable energy at T4. Figure 2 also shows the KPI_{EP} banding of Table 4.

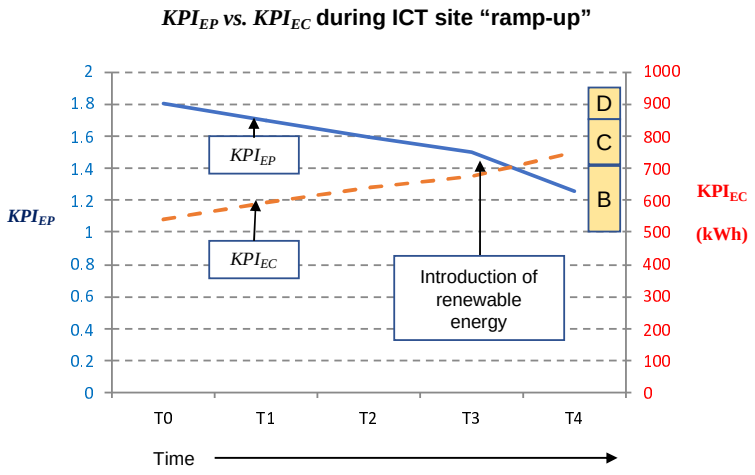

Figure 2: Evolution of KPI_{EP} during ramp-up

A single graph for a common assessment period can combine the KPI_{DCEM} for multiple ICT sites in a group as shown in Figure 3.

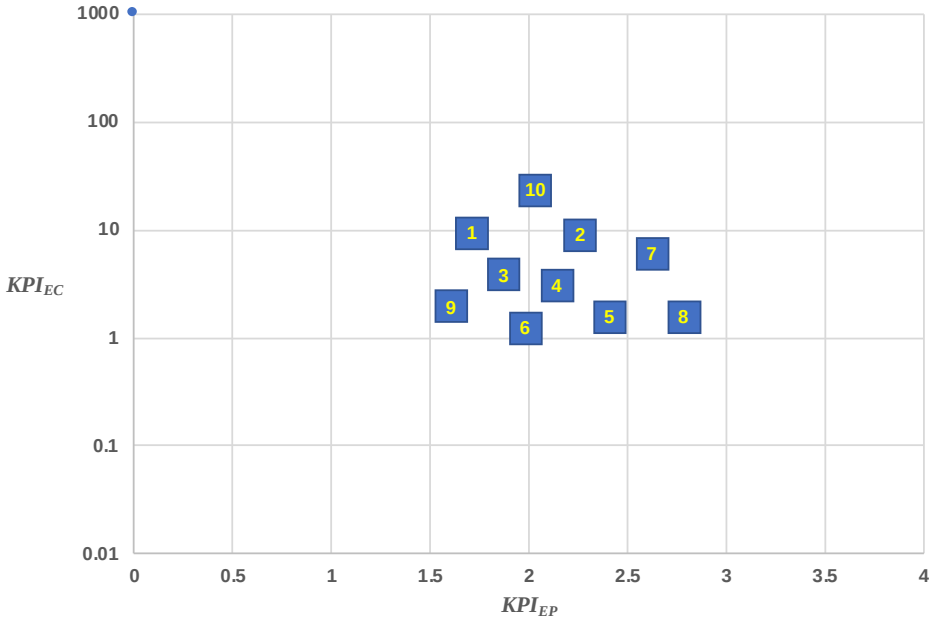

Figure 3: KPI_{DCEM} for multiple ICT sites

The same graph can be used to show trends of each ICT site in the group as shown in Figure 4. The initial values of Figure 3 are shown as dotted boxes and the current values are shown by the coloured boxes.

In the example in Figure 4, the policy objectives are a reduction of KPI_{EC} and a reduction KPI_{EP} and the trends are shown by means of different coloured boxes where:

- "green" indicates an improvement in line with the relevant policy objectives;
- "amber/orange" indicates no progress against the relevant policy objectives;
- "red" indicates a deterioration against the relevant policy objectives.

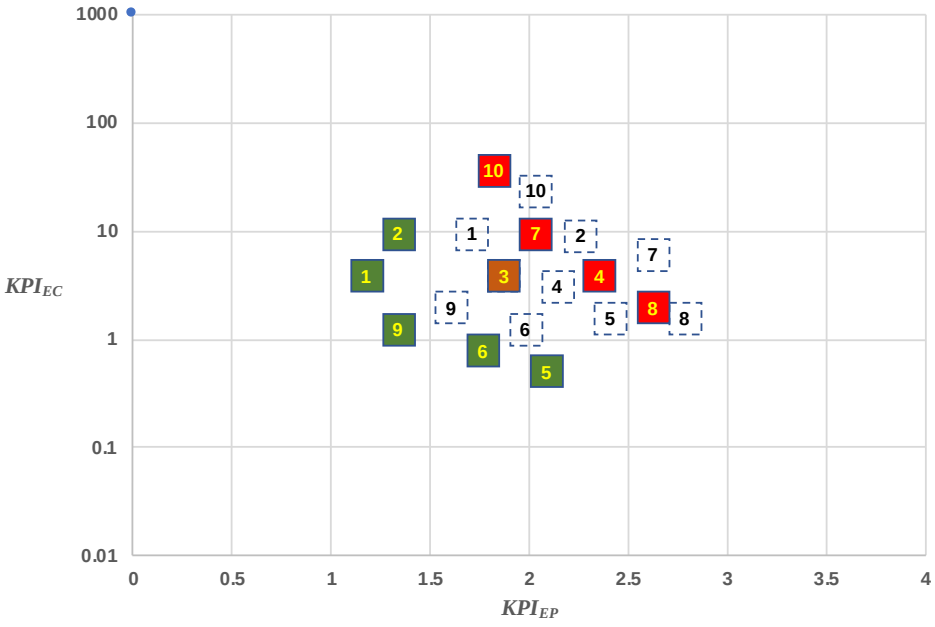

Figure 4: Trends in KPI_{DCEM} for a multiple ICT sites

8 Reporting templates

For public reporting purposes Table 5 shall be used. All assessment periods shall be one year including allowable inaccuracies as defined in ETSI EN 305 200-3-1 [2].

Table 5: Template to be used for public reporting

Name of ICT site (or group of ICT sites) See note 1	End of assessment period See note 2	Statistical accuracy See note 3	DC_{CLASS}	DC_G	KPI_{EC}	KPI_{TE}	KPI_{REUSE}	KPI_{REN}	W_{REN}	W_{REUSE}

NOTE 1: List or description shall be provided (e.g. DC1 DC2, all my ICT sites, all access sites).
NOTE 2: Date when the assessment period ended.
NOTE 3: When estimated one year measurements are used (see clause 5.2.1).

Annex A (informative): Correlation to CENELEC EN 50600-4-x standards

The CENELEC EN 50600-4 series specifies a series of KPIs similar to the objective KPIs defined in ETSI EN 305 200 series [1]:

- CENELEC EN 50600-4-2 [i.1], Power Usage Effectiveness, is similar to KPI_{TE}.
- CENELEC EN 50600-4-6 [i.3], Energy Reuse Factor, is similar to KPI_{REUSE}.
- CENELEC EN 50600-4-3 [i.2], Renewable Energy Factor is similar to KPI_{REN}.

Although the KPIs of the CENELEC EN 50600-4 standards take into account most of the content of the ETSI standards they differ slightly for the reasons explained below.

Considering task efficiency:

- KPI_{TE} defines penalties for measuring consumptions away from the actual ICT equipment or downstream of the delivery points whereas Power Usage Effectiveness of CENELEC EN 50600-4-2 [i.1] proposes decreasing accuracy Categories when measuring upstream of the ICT equipment and does not consider measuring downstream delivery points.
- Power Usage Effectiveness of CENELEC EN 50600-4-2 [i.1] includes energy supplied from waste heat such as combined heat and power systems and natural resources whereas KPI_{TE} does not.

Considering energy reuse, in order to promote the efficiency of the whole reuse chain KPI_{REUSE} only takes into account the energy reused by the final user and energy consumed to process the waste heat up to the handoff point is excluded from (although included in KPI_{EC}). In comparison the Energy Reuse Factor of CENELEC EN 50600-4-6 [i.3] takes it into account at the "handoff" point.

Considering renewable energy, the Objective KPIs of the ETSI EN 305 200 series [1] promote the implementation of ICT sites with effective energy management. For this reason, any statements of "green energy content" of utility supplies are not taken into account in KPI_{REN} which only considers renewable energy produced on-site or from a plant under common governance with the ICT site. In comparison the Renewable Energy Factor of CENELEC EN 50600-4-3 [i.2] allows the inclusion of documented written evidence from the source utility provider(s) regarding the energy supplied.

Annex B (informative): Change History

Date	Version	Information about changes
05-2019	0.0.1	First formal WD for circulation and comment
05-2019	0.0.2	Second WD for circulation and comment
05-2019	0.0.3	Third WD for circulation and comment
06-2019	0.0.4	Fourth WD for circulation and comment prior to stable draft
29-07-2019	0.0.5	Stable draft

History

Document history		
V1.1.1	February 2018	Publication as ETSI EN 305 200-3-1
V1.2.1	December 2019	Publication