	Informačná technika. Zariadenia a infraštruktúry výpočtových stredísk. Odporúčané postupy pre energetické manažérstvo.	**TNI CLC/TR 50600-99-1**
		36 7254

Information technology - Data centre facilities and infrastructures - Part 99-1: Recommended practices for energy management

Táto technická normalizačná informácia obsahuje anglickú verziu CLC/TR 50600-99-1:2016.
This Technical standard information includes the English version of CLC/TR 50600-99-1:2016.

Táto technická normalizačná informácia bola oznámená vo Vestníku ÚNMS SR č. 09/16

123446

TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

CLC/TR 50600-99-1

April 2016

ICS 35.020; 35.110; 35.160

English Version

Information technology - Data centre facilities and infrastructures - Part 99-1: Recommended practices for energy management

Technologies de l'information - Installations et infrastructures de centres de traitement de données - Partie 99-1 : Pratiques recommandées relatives à la gestion énergétique

Informationstechnik - Einrichtungen und Infrastrukturen von Rechenzentren - Teil 99-1: Empfohlene Praktiken für das Energiemanagement

This Technical Report was approved by CENELEC on 2016-04-21.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Ref. No. CLC/TR 50600-99-1:2016 E

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European foreword

This document (CLC/TR 50600-99-1:2016) has been prepared by CLC/TC 215 "*Electrotechnical aspects of telecommunication equipment*" in conjunction with the Directorate-General Joint Research Council (DG JRC) of the European Commission (EC).

This document aligns with the Best Practices document of the Code of Conduct for Data Centre Energy Efficiency (CoC) scheme operated by the DG JRC and continues to be prepared by data centre experts from operators, vendors, consultants, academics, professional and national bodies.

The publication of this Technical Report is intended to integrate recommended Practices of energy management into the EN 50600 series of standards developed by CLC TC 215 and also to widen accessibility and increase participation in the CoC scheme by ensuring translation of the Best Practices into multiple languages.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Introduction

The unrestricted access to internet-based information demanded by the information society has led to an exponential growth of both internet traffic and the volume of stored/retrieved data. Data centres are housing and supporting the information technology and network telecommunications equipment for data processing, data storage and data transport. They are required both by network operators (delivering those services to customer premises) and by enterprises within those customer premises.

Data centres need to provide modular, scalable and flexible facilities and infrastructures to easily accommodate the rapidly changing requirements of the market. In addition, energy consumption of data centres has become critical both from an environmental point of view (reduction of carbon footprint) and with respect to economic considerations (cost of energy) for the data centre operator.

The implementation of data centres varies in terms of:

a) purpose (enterprise, co-location, co-hosting, or network operator facilities);

b) security level;

c) physical size;

d) accommodation (mobile, temporary and permanent constructions).

The needs of data centres also vary in terms of availability of service, the provision of security and the objectives for energy efficiency. These needs and objectives influence the design of data centres in terms of building construction, power distribution, environmental control and physical security. Effective management and operational information is required to monitor achievement of the defined needs and objectives.

This series of European Standards specifies requirements and recommendations to support the various parties involved in the design, planning, procurement, integration, installation, operation and maintenance of facilities and infrastructures within data centres. These parties include:

1) owners, facility managers, ICT managers, project managers, main contractors;

2) architects, consultants, building designers and builders, system and installation designers;

3) facility and infrastructure integrators, suppliers of equipment;

4) installers, maintainers.

At the time of publication of this Technical Report, EN 50600 series will comprise the following standards and documents:

EN 50600-1, *Information technology — Data centre facilities and infrastructures — Part 1: General concepts*;

EN 50600-2-1, *Information technology — Data centre facilities and infrastructures — Part 2-1: Building construction*;

EN 50600-2-2, *Information technology — Data centre facilities and infrastructures — Part 2-2: Power distribution*;

EN 50600-2-3, *Information technology — Data centre facilities and infrastructures — Part 2-3: Environmental control*;

EN 50600-2-4, *Information technology — Data centre facilities and infrastructures — Part 2-4: Telecommunications cabling infrastructure*;

EN 50600-2-5, *Information technology — Data centre facilities and infrastructures — Part 2-5: Security systems*;

EN 50600-3-1, *Information technology — Data centre facilities and infrastructures — Part 3-1: Management and operational information*.

EN 50600-4-1, *Information technology — Data centre facilities and infrastructures — Part 4-1: Overview of and general requirements for key performance indicators*

EN 50600-4-2, *Information technology — Data centre facilities and infrastructures — Part 4-2: Power Usage Effectiveness*

EN 50600-4-3, *Information technology — Data centre facilities and infrastructures — Part 4-3: Renewable Energy Factor*

CLC/TR 50600-99-1, *Information technology — Data centre facilities and infrastructures — Part 99-1: Recommended practices for energy management*

The inter-relationship of the standards within the EN 50600 series is shown in Figure 1.
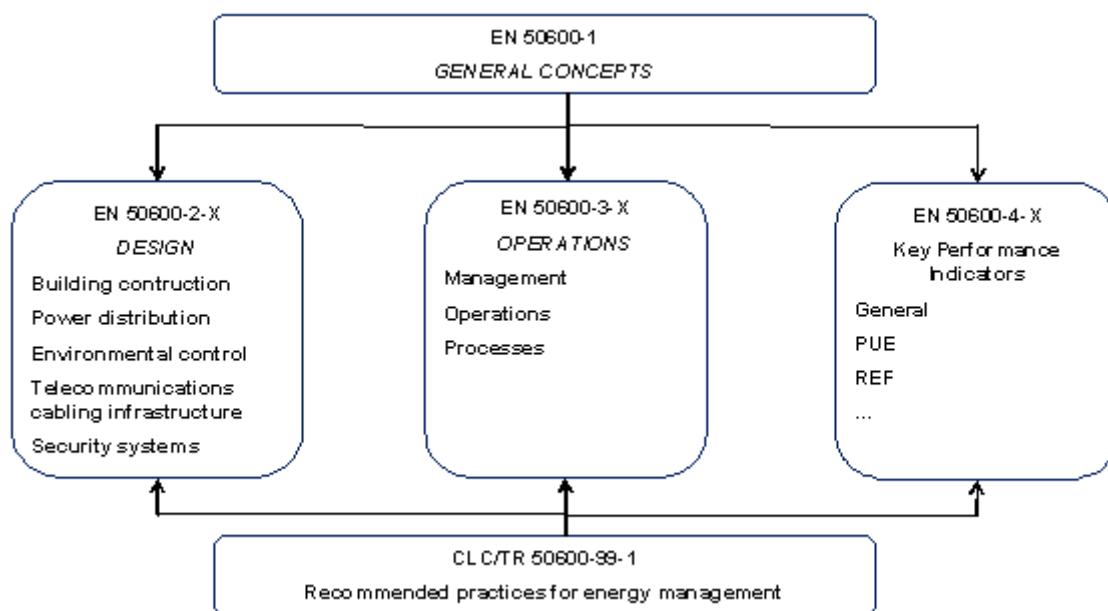
Figure 1 — Schematic relationship between the EN 50600 series of documents

EN 50600-2-X standards specify requirements and recommendations for particular facilities and infrastructures to support the relevant classification for "availability", "physical security" and "energy efficiency enablement" selected from EN 50600-1.

EN 50600-3-X documents specify requirements and recommendations for data centre operations, processes and management.

EN 50600-4-X documents specify requirements and recommendations for key performance indicators (KPIs) used to assess and improve the resource usage efficiency and effectiveness, respectively, of a data centre.

The Directorate-General Joint Research Council (DG JRC) of the European Commission operates a Code of Conduct for Data Centre Energy Efficiency (CoC) scheme. In support of the scheme, a "best practices" document has been established by DG JRC. To enhance the visibility, these Best Practices have been converted in this Technical Report to create recommended Practices for improving the energy management (i.e. reduction of energy consumption and/or increases in energy efficiency) of data centres.

The areas addressed are:

— physical building;

— mechanical and electrical equipment;

— computer room;

— cabinets/racks;

— ICT equipment;

— operating systems;

— virtualisation;

— software;

— business practices.

The Practices are separated into Expected Practices as referenced in the CoC (see Clause 5) and other Practices which may be employed as optional or alternative solutions in particular cases (see Clause 6). Practices under consideration for the next or future revision/amendment of this Technical Report are included in Clause 7. During the maintenance of this Technical Report, the Practices of Clauses 6 and 7 may be augmented and others may migrate into Clause 5.

The Practices listed in Clauses 5, 6 and 7 are referenced as ×.16.yyy where x is the clause number, 16 refers to the 2016 publication of this document and yyy is a sequential number. Also included is the CoC BP reference (as used in 2016) in order to provide an audit trail. Future versions of this document will use these references to track changes in the Practices, provide a historic record and to simplify translation of the document.

Customers or suppliers of information and communication technology (ICT) services may also find it useful to request or provide a list of the Practices of this Technical Report that are implemented in a data centre to assist in procurement of services that meet their environmental or sustainability standards.

This Technical Report also:

— acts as an education and reference document to assist data centre operators in identifying and implementing measures to improve the energy management of their data centres;

— provides a common terminology and frame of reference for describing an energy management practice, avoiding doubt or confusion over terminology.

1 Scope

This Technical Report is a compilation of recommended Practices for improving the energy management (i.e. reduction of energy consumption and/or increases in energy efficiency) of data centres. It is aligned with the EU Code of Conduct for Data Centre Energy Efficiency (CoC) scheme operated by the Directorate-General Joint Research Council (DG JRC) of the European Commission (EC).

It is recognized that the Practices included may not be universally applicable to all scales and business models of data centres or be undertaken by all parties involved in data centre operation, ownership or use.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50600 series, *Information technology - Data centres facilities and infrastructures*

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