SS 564 : Part 1 : 2020
(ICS 13.020.10; 33.020; 35.020)

SINGAPORE STANDARD

Sustainable data centres

– Part 1 : Energy and environmental management systems

Singapore Standards Council

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Foreword

This Singapore Standard was prepared by the Technical Committee on Green Information Technology under the purview of ITSC.

SS 564 was developed to help data centres improve their sustainability, thereby enhancing their competitiveness.

SS 564 comprises the following two parts under the general title, 'Sustainable data centres':

Part 1: Energy and environmental management systems

Part 2: Guidance for energy and environmental management systems

Part 1 is a revision of SS 564 : Part 1 : 2013 to align the standard to the requirements of the latest ISO 50001 on energy management and other related ISO standards on other sustainability indicators, and to incorporate additional feedback from users. The list of recommended indicators has also been updated.

While ISO 50001 is a generic standard for organisations to manage their energy use, SS 564 has been developed specifically for data centres. The alignment of the standards will reduce duplicated efforts for organisations seeking compliance to both standards.

Part 1 specifies requirements for organisations to establish the policies, systems and processes necessary to improve the sustainability of their data centres and lessen their impact on the environment.

It comprises three key parts:

i) A certifiable, management system which provides data centres with a recognised framework as well as a logical and consistent methodology to achieve sustainability and continuous improvement in this area. The standard is modelled after established international management system standards and is based on the Plan-Do-Check-Act continual improvement framework.

ii) Recommended indictors for data centres to measure and track their sustainability and identify potential areas for improvement.

iii) A set of best practices covering cooling, data centre power equipment and other equipment, ICT equipment and services, and data centre building and monitoring / measurement practices, which data centres can adopt depending on their needs and requirements. The best practices are technology dependent and will be reviewed and updated as part of the maintenance cycle of the standard.

Part 2 is a revision of SS 564 : Part 2 : 2013. It provides explanations and advice on how to implement the requirements of the revised Part 1. Where relevant, examples are given for illustration. It will serve as a guide, but will not be part of the certifiable requirements for a sustainable data centre under SS 564.

This standard is expected to be used by data centre operators, consultants, vendors and certification bodies.

The following sections of this standard have been adapted and reproduced with permission from the organisations below:

- Clauses 4 to 10
  – *ISO 50001 : 2018 – Energy management systems – Requirements with guidance for use* – International Organization for Standardization

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- Annexes A to E
  - *Self-benchmarking guide for data centres: Metrics, benchmarks, actions,* July 2009 – Lawrence Berkeley National Laboratory

  - *2018 Best Practice Guidelines for the EU Code of Conduct on Data Centre Energy Efficiency Version 9.1.0, 2018, by Mark Acton, Paolo Bertoldi, John Booth, Liam Newcombe, Andre Rouyer and Robert Tozer – the Joint Research Centre (JRC), European Commission*

In preparing this standard, reference was also made to the following documents:

- *ISO/IEC 30134-2 Information technology – Data centres – Key performance indicators – Part 2: Power usage effectiveness (PUE)*

- *ISO/IEC 30134-3 Information technology – Data centres – Key performance indicators – Part 3: Renewable energy factor (REF)*

- *ISO 14001 : 2015 Environmental management systems – Requirements with guidance for use*

- *SS 577 : 2012 Water efficiency management systems – Requirements with guidance for use*

- *The Green Grid 2011 white paper #35 Water Usage Effectiveness (WUE™): a green grid data centre sustainability metric*

- *Carbon Usage Effectiveness (CUE): A Green Grid Data Centre Sustainability Metric,* December 2010

- *High-Performance Buildings for High-Tech Industries – Data Centres website (http://hightech.lbl.gov/datacentres.html),* Lawrence Berkeley National Laboratory

Acknowledgement is made for the use of information from the above documents.

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

NOTE

1. *Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as "Mature Standards". Mature Standards will not be subject to further review, unless there are requests to review such standards.*

2. *An SS or TR is voluntary in nature except when it is made mandatory by a regulatory authority. It can also be cited in contracts making its application a business necessity. Users are advised to assess and determine whether the SS or TR is suitable for their intended use or purpose. If required, they should refer to the relevant professionals or experts for advice on the use of the document. Enterprise Singapore and the Singapore Standards Council shall not be liable for any damages whether directly or indirectly suffered by anyone or any organisation as a result of the use of any SS or TR. Although care has been taken to draft this standard, users are also advised to ensure that they apply the information after due diligence.*

3. *Compliance with a SS or TR does not exempt users from any legal obligations.*

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Sustainable data centres – Part 1 : Energy and environmental management systems

0 Introduction

0.1 General

The purpose of this standard is to enable an organisation to plan, build, operate and maintain a sustainable data centre, by establishing the systems and processes to manage and improve its data centre sustainability (inclusive of energy performance - energy usage, consumption and efficiency and water performance – water usage, consumption and efficiency, as well as other significant environmental impact if applicable). It provides a model for establishing, implementing, operating, monitoring, reviewing, maintaining and improving an energy and environmental management system for the data centre.

The adoption of an energy and environmental management system should be a strategic decision for an organisation. Implementation of this standard should lead to reductions in energy cost, greenhouse gas emissions and other significant environmental impacts in the operation of an organisation's data centre. It is applicable to all types and sizes of organisations and their data centres irrespective of geographical, cultural or social conditions. Successful implementation depends on commitment from top management, as well as environmental awareness, availability of expertise, and coordination of individual effort of data centre staff and other relevant support staff of the organisation.

This standard can be used in order to assess conformance by interested internal and external parties.

0.2 Sustainability approach

This standard specifies requirements of an energy and environmental management system for an organisation to develop and implement a sustainability policy for its data centre, establish objectives, targets, and action plans, with the consideration of its obligation to any applicable legal and other requirements, as well as the identified significant energy and water usage of its data centre. It is based on the Plan-Do-Check-Act (PDCA) continual improvement framework. The approach can be briefly summarised in Figure 1.

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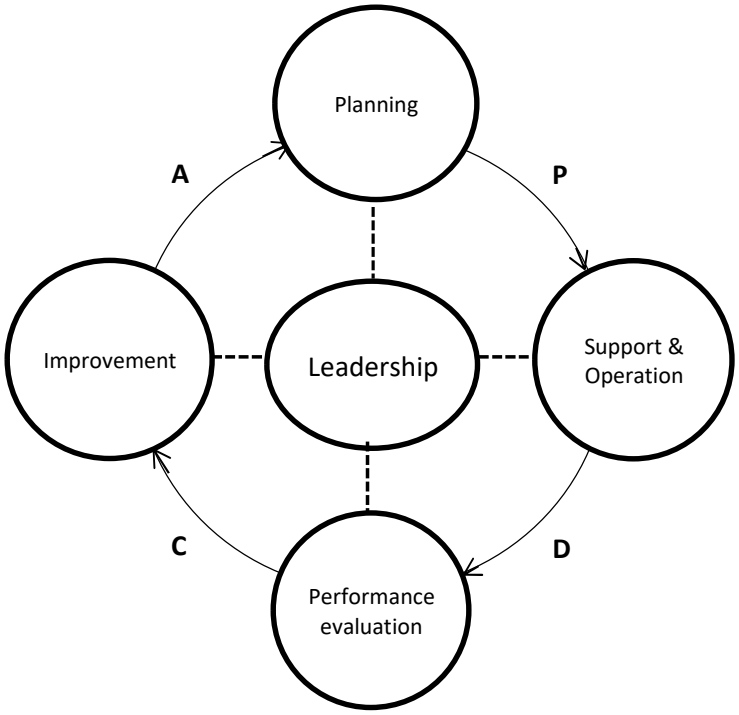

Figure 1 — PDCA cycle in EnEMS for a sustainable data centre

By applying this standard to establish the EnEMS, the organisation will be able to incorporate best practices in data centre sustainability into its everyday data centre operation. The areas of best practices applicable to a sustainable data centre are illustrated in Figure 2.

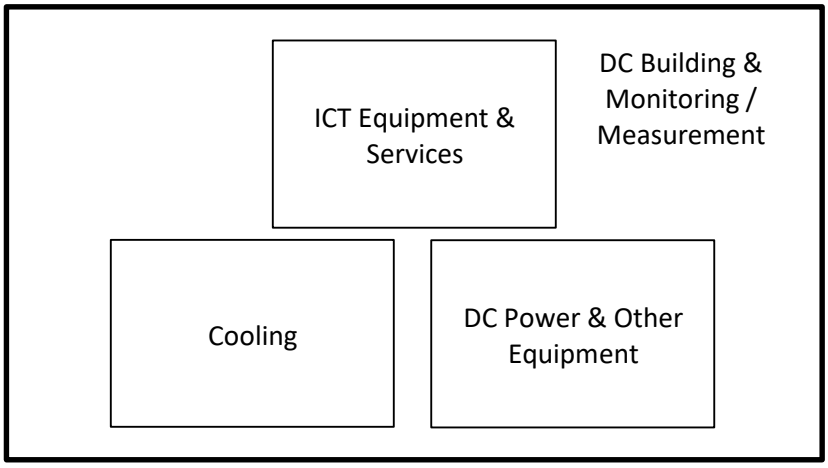

Figure 2 — Best practices applied to a sustainable data centre

This standard can be used to audit and certify an organisation's EnEMS for its data centre(s). It can also be used for self-declaration or for assessment of compliance status in general. It does not mandate any minimum requirements for the achievement of sustainability of its data centre, except those objectives and targets set by the organisation in support of its data centre sustainability policy, as well as its obligation to comply with applicable legal and other requirements. Hence organisations certified to this standard may still possibly be different in their respective achieved data centre sustainability, even though the organisations are in the same industry with data centres of similar size and facilities.

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0.3 Compatibility with other management systems

This standard conforms to requirements for management system standards, including a high-level structure, identical core text, and common terms and definitions, thereby ensuring a high level of compatibility with other management system standards. This standard can be used independently, or be used to combine with other management systems, or integrate in the achievement of other business, environmental or social objectives.

This standard contains the requirements used to assess conformity. An organisation that wishes to demonstrate conformity with this standard can do so by:

– making an evaluation and self-declaration; or

– seeking confirmation of its conformance or self-declaration by interested parties, such as customers; or

– seeking certification/registration of its EnEMS by an external organisation.

In this standard, the following verbal forms are used:

– “shall” indicates a requirement;

– “should” indicates a recommendation;

– “can” indicates a possibility or a capability;

– “may” indicates a permission.

Information marked as “NOTE” is intended to assist the understanding or use of the standard.

1 Scope

This standard specifies the requirements for the management of a sustainable data centre. It specifies requirements for an organisation to establish and maintain an energy and environmental management system, which enables the organisation to take a systematic approach, in order to achieve continual improvement of energy and water performance of its data centre.

This standard focuses on sustainability applicable to the sustainability aspects of data centre, including energy and water usage, as well as their consumption and efficiency. It elaborates on the best practices in the design of a sustainable data centre, as well as those in managing its electrical systems, mechanical systems and ICT equipment. It also specifies relevant indicators necessary for measuring the achievement of a sustainable data centre.

This standard applies to both data centre services provided as in-house support to organisations and those provided as outsourced services to clients.

2 Normative references

There are no normative references in this standard.

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