SINGAPORE STANDARD

SS 564 : Part 1 : 2013

(ICS 13.020.10; 33.020; 35.020)

SINGAPORE STANDARD FOR

Green data centres

Part 1 : Energy and environmental management systems

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Head
Standards
SPRING Singapore
1 Fusionopolis Walk
#01-02 South Tower, Solaris
Singapore 138628
Tel: (65) 6278 6666 Fax: (65) 6278 6667
Email: standards@spring.gov.sg

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This Singapore Standard was approved by Information Technology Standards Committee (ITSC) on behalf of the Singapore Standards Council of Singapore on 4 February 2013.

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The Technical Committee on Green IT, appointed by the ITSC and responsible for the preparation of this standard, consists of representatives from the following organisations:

		Name	Capacity
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		Mr Joey Wong Kum Hong	*Aurecon Singapore (Pte.) Ltd*

The Green Data Centre Standards Working Group, appointed by the Technical Committee to assist in the preparation of this standard, comprises the following experts who contribute in their *individual capacity*:

		Name
Co-Convenor	:	Dr Ronnie Lee
Co-Convenor	:	Mr Lau Soon Liang
Secretary	:	Mr Ong Chih Hsing
Members	:	Ms Jacqueline Chan
		Mr Chong Khai Sin
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		Mr James Soh
		Mr Philip Sy
		Mr Tan Guan Qun
		Mr Richard Tan
		Mr Alex Tay Soon Lai
		Ms Chris Tay Yi Hui
		Mr Joey Wong Kum Hong

The organisations in which the experts of the Working Group are involved in are:

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*Agency for Science, Technology and Research (A*STAR)*
Aurecon Singapore (Pte.) Ltd
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National Environment Agency
Network for Electronic Transfers (Singapore) Pte Ltd
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Foreword

This Singapore Standard was prepared by the Green Data Centre Standards Working Group of the Green IT Technical Committee under the purview of the IT Standards Committee.

This standard is a revision of the 2010 edition of SS 564 which was modelled after a draft of the international standard ISO 50001 on energy management. This revision has sought to align the requirements of SS 564 with the published ISO 50001. 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.

This revision also incorporated relevant feedback and findings from the users of SS 564 : 2010. The recommended metrics have been updated, e.g. environmental metrics have been introduced in the revised edition to reflect the impact of data centre operations. In addition, a set of energy distribution factor metrics has been suggested for the data centres to track other significant energy usages apart from ICT equipment.

A guidance document will also be developed to help users implement energy and environmental management systems. With the development of this guidance document, SS 564 will now comprise the following two parts under the general title, 'Singapore Standard for green data centres':

Part 1: Energy and environmental management systems

Part 2: Guidance for energy and environmental management systems

SS 564 was developed to help data centres reduce energy consumption and operating costs, thereby enhancing their competitiveness. The standard provides guidelines for organisations to establish the policies, systems and processes necessary to improve the energy efficiency of their data centres and to lessen the impact on the environment.

SS 564 : Part 1 comprises three key components:

(i) A certifiable, management system which provides data centres with a recognised framework as well as a logical and consistent methodology to achieve energy efficiency and continuous improvement in this area. The standard also addresses significant environmental impact if applicable. It is modelled after established international management system standards, and is based on the Plan-Do-Check-Act continual improvement framework.

(ii) Recommended metrics for data centres to measure and track their performance in energy efficiency and environmental impact (if applicable), and identify potential areas for improvement.

(iii) A set of best practices covering the management of mechanical and electrical systems, IT equipment and data centre design, which data centres can chose to 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.

SS 564 : Part 2 offers guidelines to help users adopt and meet the requirements in Part 1. It is not intended to be part of the certifiable requirements for a green data centre.

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

- Clause 5
  - *ISO 50001:2011 – Energy management systems – Requirements with guidance for use* – International Organization for Standardization

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

  – *2010 Best practices for the European Union code of conduct on data centres (Version 2.0.0),* November 2009, by Liam Newcome and Anson Wu – European Commission DG JRC

  – *Green Data Centre Design Best Practices, Version 0.1,* September 2009 - IBM Global Services

In preparing this standard, reference was also made to:

- *ISO 14001:2004 Environmental management systems – Requirements with guidance for use*

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

- *The Green Grid Data Centre Power Efficiency Metrics: PUE and DCiE,* October 2007 – The Green Grid

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

- *Electronics Disposal Efficiency: An IT Recycling Metric for Enterprises and Data Centers*, March 2012 - The Green Grid

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. SPRING Singapore shall not be held responsible for identifying any or all of such patent rights.

NOTE

1. *Singapore Standards are subject to periodic review to keep abreast of technological changes and new technical developments. The changes in Singapore Standards are documented through the issue of either amendments or revisions.*

2. *Compliance with a Singapore Standard does not exempt users from legal obligations.*

Singapore Standard for green 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 green data centre, by establishing the systems and processes to manage and improve its data centre's energy performance (inclusive of energy 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.

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 the individual effort of data centre staff and other relevant support staff of the organisation.

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

0.2 Process approach

This standard specifies requirements of an energy and environmental management system for an organisation to develop and implement a green data centre policy, 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 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.

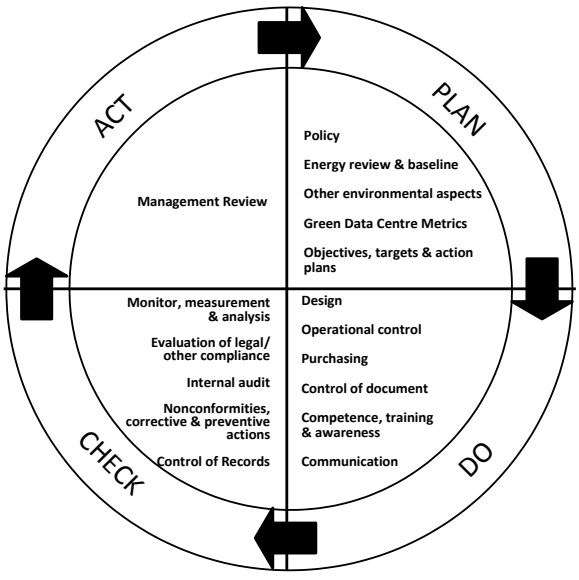

Figure 1 — Energy and environmental management system for a green data centre

By applying this standard to establish the energy and environmental management system, the organisation will be able to incorporate best practices in data centre energy management (and management of other significant environmental aspects if applicable) into its everyday data centre operation. The areas of energy management best practices applicable to a green data centre are illustrated in Figure 2.

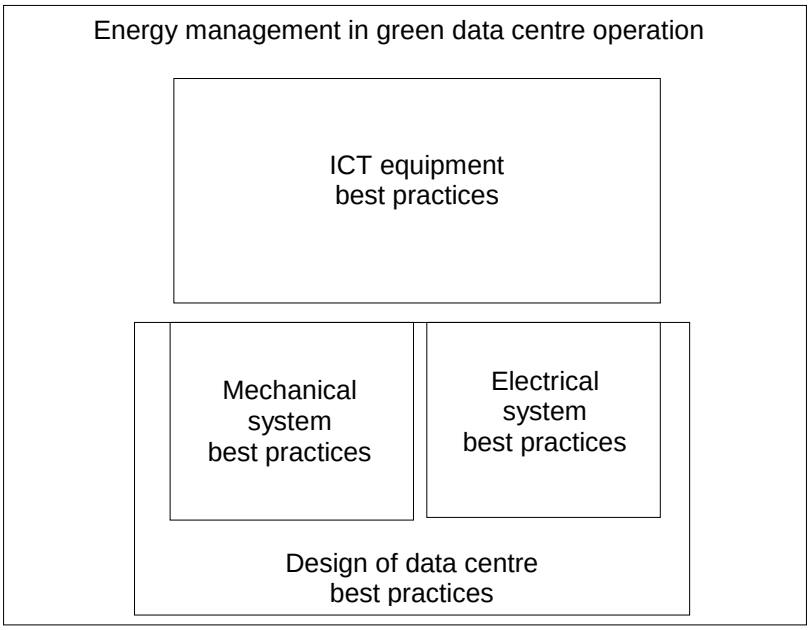

Figure 2 — Energy management best practices applied to a green data centre

This standard can be used to audit and certify an organisation's energy and environmental management system. 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 energy and other environmental performance of its data centre, except those objectives and targets set by the organisation in support of its green data centre 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 energy performance, even though the organisations are in the same industry with data centres of similar size and facilities.

0.3 Compatibility with other management systems

This standard is aligned with other major management system standards by using the PDCA approach as well as adopting all of the common elements in a management system standard (as recommended in ISO Guide 72:2001 - Guidelines for the justification and development of management system standards), in order to support consistent and integrated implementation and operation with related management standards.

1 Scope

This standard specifies the requirements for the management of energy use (and other significant environmental aspects) of a 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 performance and other significant environmental impact of its data centre.

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