SS 564 : Part 2 : 2020
(ICS 13.020.10; 33.020; 35.020)

SINGAPORE STANDARD

Sustainable data centres

– Part 2 : Guidance for energy and environmental management systems

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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 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.

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 serves as a guide and 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, certification bodies and other users with an interest to implement the requirements of SS 564 : Part 1 : 2020.

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.*

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Sustainable data centres – Part 2 : Guidance for energy and environmental management systems

0 Introduction

This clause provides an overview of the energy and environmental management system (EnEMS) specified in SS 564-1.

The EnEMS is a certifiable management system which provides data centres with a recognised framework as well as a logical and consistent methodology to achieve sustainability management and continual improvement in this area. Similar to other management systems, the EnEMS is based on the Plan-Do-Check-Act (PDCA) continual improvement framework.

The EnEMS, as specified in SS 564-1, focuses on energy and water performance applicable to the data centre industry, including the usage, consumption and efficiency of both. Its implementation should lead to reductions in energy and water cost, resources depletion, greenhouse gas emissions and other significant environmental impacts in the operation of an organisation's data centre.

For an organisation to implement the EnEMS, it needs to establish, document, implement, maintain and continually improve an energy and environmental management system. This will enable it to achieve its sustainable data centre policy, leading to systematic management and improvement of its data centre's significant energy usage (and other significant environmental aspects if applicable), in accordance with the requirements of this standard. It should also define and document the scope of its management system, as well as determine and document how it will meet the requirements of SS 564-1.

Within the Plan-Do-Check-Act framework of the EnEMS, the organisation is required to adopt the repeated cycles of "energy baseline – energy review – improvement action planning and implementation – performance monitoring and measurement" to continually improve its data centre's energy performance.

The organisation needs to adopt the SIs defined in Annex A of SS 564-1, for continuous monitoring and measurement of its data centre's sustainability. These indicators include:

(a) Overall data centre performance indicators
- Power usage effectiveness / Interim power usage effectiveness;
- Energy distribution factors.

(b) Airflow management indicators
- Temperature: Supply and return;
- Ambient relative humidity;
- Return temperature index; and
- Fan system efficiency.

(c) Cooling indicators
- Data centre cooling system efficiency; and
- Cooling system sizing factor.

(d) Electrical power chain indicators
- UPS load factor;
- Data centre UPS system efficiency;
- ICT / server equipment load density.

(e) Environmental indicators
- Carbon usage effectiveness;
- Water usage effectiveness;
- Renewable energy factor;
- ICT recycling indicator.

The organisation also needs to consider the best practices for the design, operation and maintenance of a sustainable data centre listed in Annexes B to E of SS 564-1. The best practices include:

(a) Cooling
- Air flow management and design;
- Cooling management;
- Choice of cooling system;
- Humidification / dehumidification;
- High efficiency cooling plant;
- Computer room air conditioners / air handlers;
- Reuse of data centre waste heat.

(b) Data centre power equipment and other equipment
- Selection and deployment of new power equipment;
- Management of existing power equipment;
- Selection and management of other data centre equipment.

(c) ICT equipment and services
- Selection and deployment of new ICT equipment;
- Deployment of new ICT services;
- Management of existing ICT equipment and services;
- Data management.

(d) Design, planning and management
- Data Centre Planning - Resilience Level and Provisioning
- Building physical layout;
- Building geographic location;
- Water sources;
- Energy consumption and environmental measurement;
- Energy consumption and environmental collection and logging;
- Energy consumption and environmental reporting.
- ICT reporting.

By implementing an EnEMS, the organisation will be able to incorporate best practices in data centre sustainability management into its everyday data centre operation.

Annex A provides an overview of how an organisation can prepare for a SS 564 certification audit.

1 Scope

This standard provides guidance for organisations adopting SS 564-1 to establish an Energy and Environmental Management System (EnEMS) for a sustainable data centre. It offers practical advice for an organisation to consider in its implementation of an EnEMS, and wherever possible, provides relevant examples on how to implement the various elements of the management system.

This standard adopts the viewpoint of a sustainable data centre implementer and hence follows a sequence in implementing the sustainable data centre project. Its target audience includes any personnel who are tasked to plan, implement and maintain the EnEMS according to SS 564-1, as well as any personnel interested in the adoption of processes and/or practices highlighted in SS 564-1. Similar to SS 564-1, this standard focuses on energy and water performance applicable to the data centre industry, including the usage, consumption and efficiency of energy and water. It applies to both data centre services provided as in-house support to organisations, and those provided as outsourced services to clients.

2 Normative references

The following reference document is indispensable for the application of this standard:

SS 564-1 : 2020	Sustainable data centres – Part 1 : Energy and environmental management systems