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SERIES L: ENVIRONMENT AND ICTS, CLIMATE
CHANGE, E-WASTE, ENERGY EFFICIENCY;
CONSTRUCTION, INSTALLATION AND PROTECTION
OF CABLES AND OTHER ELEMENTS OF OUTSIDE
PLANT

Smart energy solutions for data centres

Recommendation ITU-T L.1381

ITU-T L-SERIES RECOMMENDATIONS

ENVIRONMENT AND ICTS, CLIMATE CHANGE, E-WASTE, ENERGY EFFICIENCY; CONSTRUCTION, INSTALLATION AND PROTECTION OF CABLES AND OTHER ELEMENTS OF OUTSIDE PLANT

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MARINIZED TERRESTRIAL CABLES

L.430–L.449

For further details, please refer to the list of ITU-T Recommendations.

Recommendation ITU-T L.1381

Smart energy solutions for data centres

Summary

Recommendation ITU-T L.1381 considers a smart control strategy for the entire energy system, including power-feeding and cooling solutions, of data centres to achieve higher energy efficiency and to decrease overall energy consumption.

Firstly, for a multiple energy input system, including photovoltaic (PV) solar panels, wind, fuel cells, the electrical grid, power generators and batteries, can be connected to a system. Recommendation ITU-T L.1381 considers how to control these different energy inputs in a smart way to increase energy efficiency and to decrease carbon emissions. In addition, for smart cooling systems, Recommendation ITU-T L.1381 considers how to use outside cool air and maximize utilization of information and communication technology (ICT) side cooling, e.g., ICT rack cooling, row cooling methods and liquid cooling.

Recommendation ITU-T L.1381 focuses on smart energy solutions for data centres to achieve green and sustainable goals, including those which are environmentally friendly, decrease carbon emissions, increase energy efficiency and extend product life.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T L.1381	2020-06-29	5	11.1002/1000/14305

Keywords

CCHP, data centre, direct AC mains supply, evaporative cooling, green energy, liquid cooling, Smart energy, smart environmental parameters controlling solution.

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at <http://www.itu.int/ITU-T/ipr/>.

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Recommendation ITU-T L.1381

Smart energy solutions for data centres

1 Scope

This Recommendation establishes requirements for data centre smart energy solutions, including those for smart power feeding, cooling and safety. This Recommendation considers energy efficiency and environmental impacts for all solutions, including combined cooling heat and power (CCHP) systems, direct grid supply, green energy system, liquid cooling, evaporative cooling and smart control of environmental parameters.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

None.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 photovoltaic (PV) system [b-ITU-T L.1380]: A system composed of solar cell array, solar array energy converter, AC/DC power supply and related power distribution elements (e.g., circuit breakers), that can be coupled to batteries.

3.1.2 smart energy [b-ITU-T L.1380]: A power system that uses a smart control technique system to autonomously combine various energy supplies according to the working conditions of power supply and load.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 liquid cooling technique: Direct removal of the heat from electronic elements in devices using liquid for heat exchange.

3.2.2 evaporative cooling technique: Direct removal of the heat from electronic elements in devices situated in dry and hot areas using liquid evaporation.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AC Alternating Current

CCHP Combined Cooling Heat and Power

CFC Chlorofluorocarbon

COP Coefficient Of Performance