EN 50600-4: Factsheet

How do I use this methodology? Ask for support!

	EN 50600-4: Information technology: Data centre facilities and infrastructures	
Name of Initiative/Methodology	Information technology: Data centre facilities and infrastructure Part 4-1: Overview of and general requirements for key performance indicators Part 4-2: Power Usage Effectiveness Part 4-3: Renewable Energy Factor	
Link to the latest published version	EN 50600-4-1 (12/2016) EN 50600-4-2 (12/2016) EN 50600-4-3 (12/2016)	
Developed by	The CLC/TC 215 "Electrotechnical aspects of telecommunication equipment"	
History and Status	• Work started in 2015 • Published in December 2016	
Involved companies / parties	• None identified – to be filled later	
Scope	✔ **Organisation env. accounting** ✖ Scope 1 ✖ Scope 2 ✖ Scope 3	✖ **Product env. assessment** ✖ Life cycle approach ✖ Use phase only
	✖ GWP ✔ Energy (focus on secondary energy)	✔ KPIs • Power Usage Effectiveness (PUE) • Renewable Energy Factor (REF)
System(s) covered by the methodology	• Data centres, covering: ◦ IT and network telecommunications / infrastructure: ■ Servers and computing systems ■ Networking and communication equipment ■ Data storage equipment ■ Supporting electronic equipment ◦ Power distribution infrastructure ◦ Environmental control / infrastructure • Security and safety infrastructure	
Goals	• Providing indicators to measure the effective or efficient use of resources through: • The minimization of energy and other resource consumption Task effectiveness of the IT load within the data centre, maximizing the IT output with the minimum energy consumption Energy reuse in the form of waste heat, if possible The use of renewable energy, both generated on site and off site • Promoting the reduction of the environmental impacts of a data centre, through an efficient or effective use of resources (e.g. minimised energy consumption, reuse of unconsumed resources, etc.) • Improving the data centre's resource usage effectiveness or efficiency by comparing and assessing improvement options • PUE provides effective guidance and useful insight into the design of efficient power and cooling architectures, the deployment of equipment within those architectures, and the operation of that equipment	
Generic features	• In order to allow an individual facility to measure and monitor progress in each individual area, the KPIs are designed to be: ◦ applicable to all types of data centres ◦ technology neutral ◦ geographically neutral In the same way, in order to be based upon parameters that are measurable in an unambiguous manner, the following procedure shall be respected for the implementation of the KPIs: • The KPIs shall be assessed over a defined period of time • All parameters relevant to the assessment of the KPI shall be measured over a period not exceeding a specified time • The maximum time between measurements defines the time interval between which KPIs shall re-assessed Typical boundaries shall include the perimeter of the data centre property, using spatial and logical considerations. It may be in terms of aggregate space and electrical load. Changes to the boundaries require updates to the KPI. Conditions to applying the energy re-use indicator: • What about derivatives? • PUE objectives depend on the service levels	

ICT-specific features	In order to measure the energy consumed with the same metric, conversion factors for energy generated by gaseous and liquid fuels are indicated as follows: • Diesel: 9,9 kWh/l • Gas: 10,5 kWh/m^3 • Hydrogen: 38,9 kWh/kg • Bioethanol: 6 kWh/l The energy contribution of fluids for cooling shall be measured using heat meters and multiplied by the relevant conversion factor of the system used to provide the fluid used. ***Part 4-2: Power Usage Effectiveness (PUE)*** As defined, PUE is associated with the data centre infrastructure within its boundaries only, it describes the energy efficiency relative to facilities with given environmental conditions and illustrates the energy allocation of a data centre PUE provides means to determine : • Opportunities for the improvement of the operational efficiency of the data centre • The improvement of the designs and processes of a data centre over time • A design target or goal for new data centres across the anticipated IT load range PUE does not take into account: energy efficiency of the IT load, its utilisation or productivity; efficiency of onsite electricity generation; efficiency of other resources such as human resources, space or water; use of renewable energy resources or accounts for reuse of waste by products. Total data centre energy consumption shall include electricity, gaseous fuel, fluid fuel, and fluids for cooling. Measurements of air for cooling and water from natural sources are not required. PUE = E_{DC}/E_{IT} ; where: • E_{IT} is the IT equipment energy consumption (annual) in kWh and includes : IT equipment and supplemental equipment • E_{DC} is the total data centre energy consumption (annual) in kWh and includes : E_{IT}, power delivery, cooling system and others Measurements of E_{DC} and E_{IT} shall be undertaken using either: • Watt meters with the capability to report energy usage, or • Kilowatt-hour (kWh) meters that report the actual energy usage through simultaneous measurement of the voltage, current and power factor over time Derivatives of PUE may be useful in certain circumstances PUE should not be used to compare different data centres Three categories of PUE are defined, depending on the accuracy of energy usage measurements: • PUE_1 : based on uninterruptible power supply output, it provides a basic level of resolution of energy performance data • PUE_2 : based on power distribution unit output, it provides an intermediate level of resolution of energy performance data • PUE_3 : based on IT equipment input, it provides an advanced level of resolution of energy performance data The use of PUE category is based on the following distribution: • PUE > 1.5: Category 1 to 3 • 1.5 >= PUE > 1.2: Category 2 to 3 • PUE =< 1.2: Category 3 The correct reporting of power usage effectiveness relies on multiple elements such as : • Use standard construct for communicating PUE data • Provide required information and supporting evidence for public reporting of PUE ***Part 4-3: Renewable energy factor (REF)*** REF metric describes the percentage of a renewable energy (RE) over total data centre energy. It provides an assessment of the mitigation of carbon emission that originated from energy consumption in a data centre. REF is an effective KPI to monitor the use of RE and to increase the diversity of energy dependence and improve the sustainability of a data centre by enhancing the use of RE. The use of this KPI allows data centre managers to improve a data centre's energy procurement process and increase the diversity of energy dependence of a data centre. In addition, customers can also use this KPI as a guide to select a data centre. REF = Eren/ E_{DC} ; where: • E_{DC} is the total data centre energy consumption (annual) in kWh • Eren is the RE in kWh owned and controlled by a data centre REF shall have a maximum value of 1.00 indicating 100% of the total data centre energy is RE. Thus, in the case of on-site generation of RE beyond the need of the data centre, the excess power generated shall not be accounted for REF. Measurements of E_{DC} and E_{IT} shall be undertaken using either: • Watt meters with the capability to report energy usage, or Kilowatt-hour (kWh) meters that report the actual energy usage through simultaneous measurement of the voltage, current and power factor over time
Examples of implementation / experience feedback	• E-shelter in Vienna: first data center in Europe to receive the EN 50600 certification within the DIN standards United Biscuits data centre
Interaction with other methodologies	• [EN 50600] Information technology – Data centre facilities and infrastructures • [EN 62040-3] Uninterruptible power systems (UPS) – Part 3: Method of specifying the performance and test requirements • [EN 62052] Electricity metering equipment (AC) – General requirements, tests and test conditions • [EN 62053] Electricity metering equipment (AC) – Particular requirements • [ISO 8601] Data elements and interchange formats — Information interchange — Representation of dates and times

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