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**AMENDMENT 1**  
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**Information technology — Data  
centres — Key performance  
indicators —**

**Part 3:  
Renewable energy factor (REF)**

**AMENDMENT 1**

*Technologies de l'information — Centres de données — Indicateurs de  
performance clés —*

*Partie 3: Facteur d'énergie renouvelable (REF)*

*AMENDEMENT 1*



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This document was prepared by ISO/IEC JTC 1, *Information technology, SC 39, Sustainability for and by Information Technology*.

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# Information technology — Data centres — Key performance indicators —

## Part 3: Renewable energy factor (REF)

### AMENDMENT 1

*Page 1, Clause 2 Normative references*

Add to Clause 2:

ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

*Page 3, Clause 5*

In Clause 5, insert a new subclause “**5.1 General**”, which contains the whole of existing Clause 5.

Insert two new subclauses 5.2 and 5.3 as follows:

#### **5.2 Total data centre energy consumption**

The data centre under consideration shall be viewed at as a system defined by interfaces through which energy flows.

The following forms of energy shall be metered at the interfaces:

- a) electricity;
- b) gaseous fuel;
- c) fluid fuel;
- d) fluids for cooling (comprising water usage when returned fluid and not evaporated).

The following forms of energy are not required be metered at these interfaces:

- 1) air for cooling;
- 2) water from natural sources (i.e. requiring no energy consumption in its provision).

All forms of electrical energy at interfaces shall be metered to kWh. If any of the required forms of energy are not accounted for at the interfaces then  $E_{DC}$  is not determined and REF cannot be calculated.

Gaseous or liquid fuels shall be metered in kWh or converted into kWh using the heat of combustion values for the fuel used. Where information on combustion values is not available and no local regulation applies, the following values shall be applied:

- diesel: 9,9 kWh/l;
- gas: 10,5 kWh/m<sup>3</sup>;
- hydrogen: 38,9 kWh/kg;
- bioethanol: 6 kWh/l.

The energy contribution of fluids for cooling shall be measured using heat meters (providing information on flow rate and differential temperature) and multiplied by the relevant conversion factor of the system used to provide the fluid used.

For the conversion of thermal energy to its electrical equivalent, the conversion factor  $X$  shall be obtained from the supplier; in case there is no equivalent available, a conversion factor  $X = 0,4$  shall be used.

Technical subsystems, e.g. on-site co-generation of heat and electricity, shall have meters at their output and are considered external to the system.

### 5.3 Total data centre energy consumption in mixed-use buildings

The total data centre energy consumption for data centres in mixed-used buildings shall be calculated on the energy use of the data centre as system only if metering of all shared technical subsystems allows separation of energy usage.

If energy use of shared technical subsystems cannot be separated, total data centre energy usage shall comprise the building in total. The impact on REF should be counteracted by implementing the necessary meters for separation.

Page 4, Clause 6

Replace the last paragraph of Clause 6 as follows:

REF shall be determined as an annualized value. The calculation of REF requires the recording and documenting of  $E_{DC}$  and  $E_{ren}$  over a coincident period of twelve months. This standard does not specify the frequency of measurements of  $E_{DC}$  and  $E_{ren}$ , since REF is calculated on an annual timeframe. However, the frequency of measurement employed will define the timing of subsequent REF calculations on a rolling annual basis.

Page 8

Replace Figures B.3 and B.4 with the following ones:

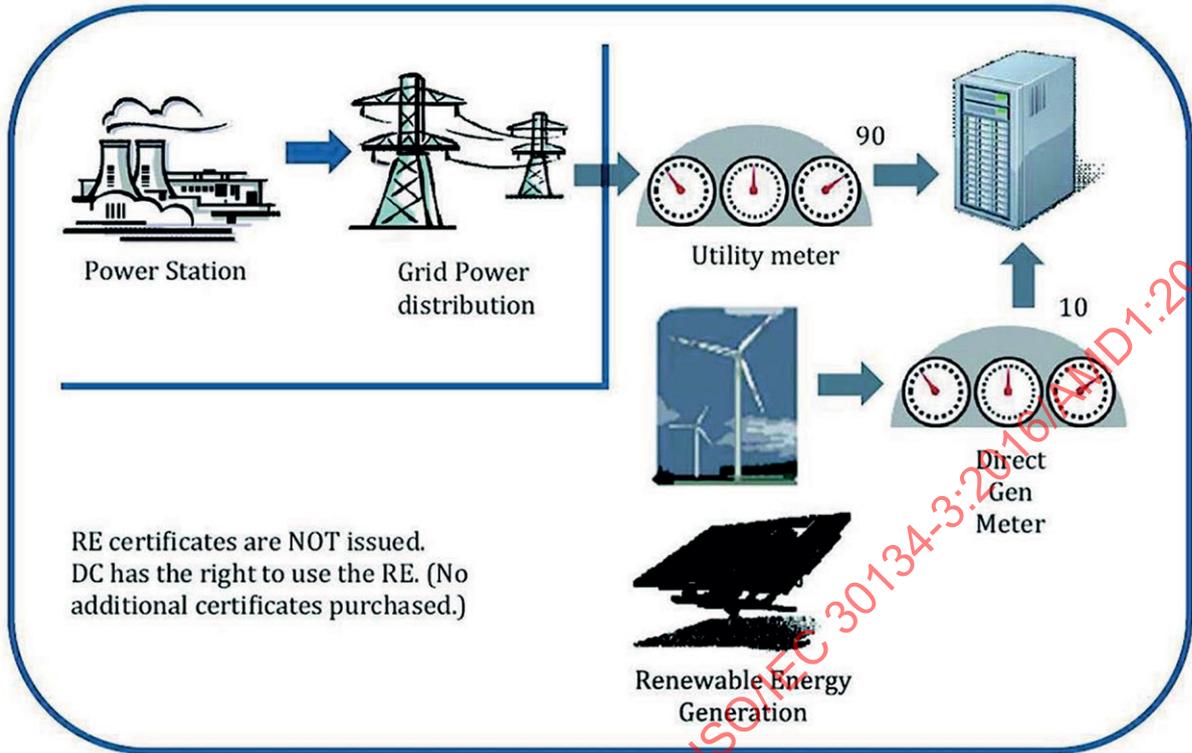


Figure B.3 — RE certificates for locally generated RE are retired by the data centre

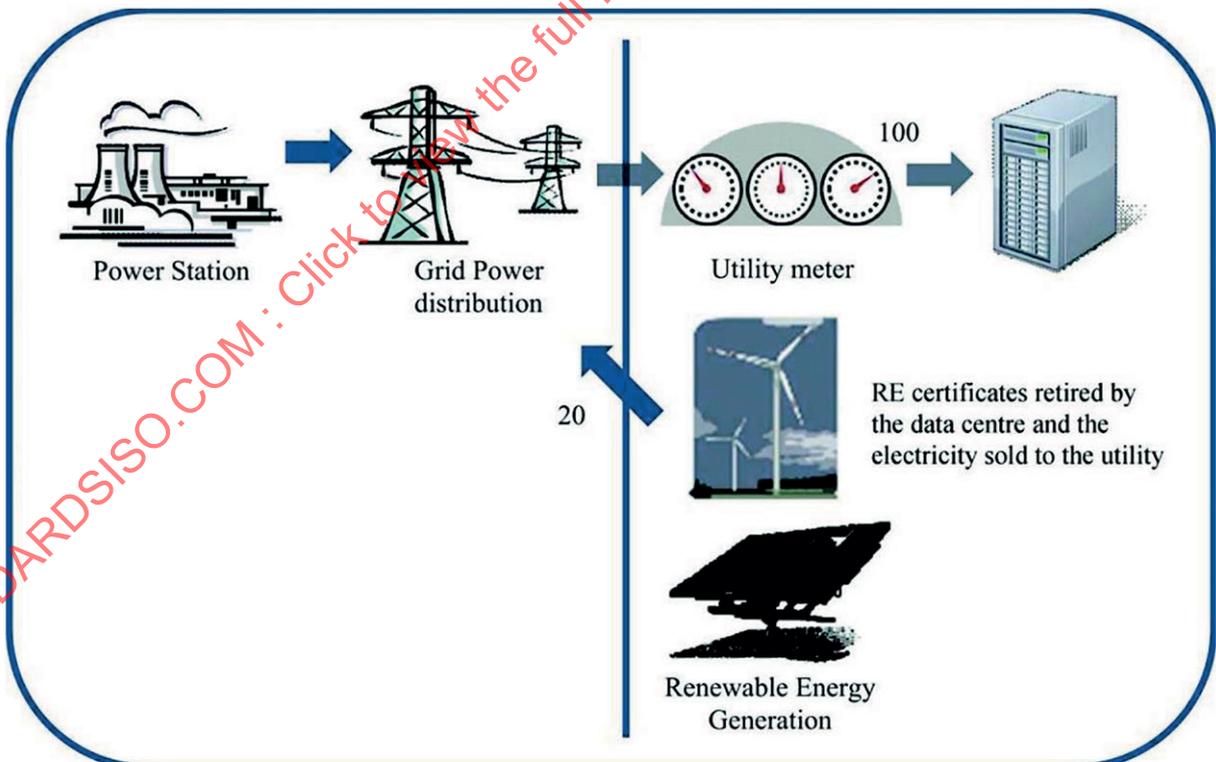


Figure B.4 — Locally generated energy sold to the utility with RE certificates retired by the data centre

*Page 11, Bibliography*

Delete Bibliography reference [1] ISO 8601.

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