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Title:
Draft IEC 62018 Ed. 1: Energy Management Requirements

(Titre) :
Projet de la CEI 62018 Ed. 1: Prescriptions applicables à la gestion de l'énergie

Introductory note

INTERNATIONAL ELECTROTECHNICAL COMMISSION

TECHNICAL COMMITTEE NO. 74: SAFETY AND
ENERGY EFFICIENCY OF IT EQUIPMENT

Draft proposal for Energy Management Requirements

This document was developed by IEC TC74/Working Group 9 at a meeting in Oahu, U.S.A., May 1999.

Background

There are three major factors driving the need for Energy Management:

1. the power demand saturation of existing generating stations linked with the high development costs of creating or extending generation capacity;
2. the possible problem of global warming due to in part the stack emissions of fossil fuel generating stations; and
3. the public perception of technological advances exerting a demand for a share of the commercial power.

It is recognised that the effective use of energy management techniques is distributed over all industries and commercial enterprises, and each must do its share in resolving the energy efficiency issues in the best possible manner.

Information technology equipment represents the leading edge of growth in technology and innovation. One issue is that in the thrust for technology growth and as the result of competitive pressures, innovators sometimes tend to overlook the social concerns resulting from technology growth. Proper energy management is emerging as one of the more important social concerns. This proposal for information technology equipment is one attempt to address this vast and growing concern.

This proposal is not:

1. attempting to inhibit the growth of technology, nor curb existing practices of commerce;
2. critical of a particular technology currently being used or which may be used for some period of time to recover the consumer's costs as a result of purchasing existing equipment, or the manufacturing costs in tooling;
3. attempting to control the functionality of the equipment or control its performance.

It is recognised that both functionality and performance are in continuous change as developers and manufacturers find better methods of accomplishing the same function using less energy.

An energy management program should be sufficiently broad to encompass many types of equipment situations, be sufficiently attainable, be readily executable by appropriate industry segments and by all manufacturers, and be sufficiently achievable so as to permit implementation of the energy management program with very little cost impact on developers, manufacturers, and consumers.

Rationale

On a global basis, there have been several attempts to study the problem of energy efficiency and to provide incentives for an increased pace of study and implementation of the findings. Some of the proposals have been set to energy targets for which to strive. Some have expressed the need for a regulator, since it is believed that developers and manufacturers are not sufficiently concerned with the societal impacts of new technology. Some have believed that the consumer or end user must become involved in the energy efficiency process in order to make the right kind of buying decision of new products that provide for effective use of energy.

Various energy management programs have been implemented, e.g., in the US, Europe, Japan and Singapore. The ultimate goal of any energy management program is to reduce the power demand on generating stations.

Proposal

1 Scope

This standard prescribes the evaluation procedures used to measure the power management and power consumption of information technology (IT) equipment. Information technology equipment includes the products identified in the scope of IEC 60950.

2 References

IEC 60950, Ed. 3.0, 1999.

3 Definitions

The definitions of IEC 60950 also apply.

3.1
full-on mode
denotes an operating condition where all components are fully powered: no power management occurring

3.2
energy saving mode
denotes an operating condition where some function is switched off. The equipment must be able to resume a functional mode from the **energy saving mode** without undue intervention of the user or extended restart of the equipment

3.2.1
doze mode
the CPU is slowed or stopped; all other devices are fully operational

3.2.2
standby mode
CPU may be stopped but one or more of the units in the equipment are not in operation and are consuming reduced power. Operator or software activity can trigger return to doze or full on mode

3.2.3
suspend mode
CPU is stopped and most other units are not consuming power

3.2.4
hard disk power down mode
only the hard disk(s) is (are) stopped

Note 1 Other energy functions of the equipment can be utilised.

Note 2 Disk control electronics may still be powered to facilitate quick reactivation.

3.3
off mode
denotes an operating condition where no power is being used or only a very small amount is used

4 General requirements

4.1. Energy management is the result or condition of a design, construction, or process for reducing power from extraneous energy sources within IT equipment, or reducing the total energy consumption of the IT equipment during periods of non-use within any program.

The result is that the minimum amount of energy is consumed in accomplishing the essential functionality of the equipment at any particular moment.

The design, process, or construction being used shall not detract from the equipment, its functionality, or deter use of the equipment, such that the equipment does not or cannot fulfil its intended functionality.

The foregoing expresses the result as the minimum amount of power to accomplish a specific task, whereas the term "energy management" is sometimes expressed in terms of a comparative ratio between states of operation.

4.2 For equipment having a period of time when it is in an idle state and has completed its intended function, the equipment must assume one of the **energy saving modes** (see 3.2.1, 3.2.2, 3.2.3, 3.2.4 and 3.3). Under some conditions, the **energy saving mode** will be an **off mode**.

Where the sole intended functionality of the equipment is to be continuously operated, the provision of an **energy saving mode** is not required, since it may rarely reach an idle state.

4.3 Following a return to a point of functionality, a security code shall be permitted prior to resumption of the specific equipment functionality to preclude unauthorised usage.

4.4 Where equipment can easily return to a functional mode from an **off mode**, then the **energy saving mode** may be the same as the **off mode** in order to provide the minimum of extraneous power usage.

5 Evaluation criteria

5.1 Input voltage

The input voltage to be used for measurement of energy efficiency shall be appropriate for the country in which the equipment is intended to be used.

5.2 Measuring equipment

Energy measurements shall be made with a suitably calibrated true r.m.s. voltmeter and wattmeter (power analyser). The voltmeter is to have an accuracy of 1 % at rated voltage and the wattmeter is to have an accuracy of 1 % at 100 watts and greater. A crest factor of 5 is required for power measurements.

The test instruments shall have a minimum bandwidth of 1 kHz, shall have a minimum sampling rate of one per second, and shall have a sufficient sampling duration to eliminate the measurement of transients of 1,0 ms or less.

5.3 Testing conditions

5.3.1 The equipment to be tested shall be a representative configuration for typical use and capable of performing the functions for which it was configured.

5.3.2 Where the operational environment is not specified by the manufacturer, the ambient test condition is to be 25 °C ± 2 °C. Where a range is specified that includes 25 °C, the test is to be conducted at 25 °C ± 2 °C. Where a range is specified that does not include 25 °C, the test temperature is to be at the end of the rated range closest to 25 °C. The test is to be conducted in the humidity range of 30 % to 70 %.

5.3.3 The test supply source shall be of known characteristics, such that the applied voltage shall contain less than 5 % Total Harmonic Distortion (THD) when the product is operating at its maximum declared configuration. The THD is to be measured and recorded in the test report.

5.3.4 The measurements of input power shall be performed at normal load under the following conditions:

- where the equipment has one or more rated voltage(s), the input power is measured at each rated voltage;
- where the equipment has one or more rated voltage range(s) the input power is measured at each end of each rated voltage range.

The test supply source shall be at rated frequency.

In each case, the readings are to be taken when the input power has stabilised. If the power varies during the normal operating cycle, the steady-state power is taken as the mean of the measured power over a complete cycle.

5.3.5 The measurement of power in the **energy saving mode** shall be made when the **energy saving mode** is fully stabilised and not sooner than one minute into the **energy saving mode**. The **energy saving mode** is permitted to be activated manually in the shortest time permitted in the energy management program, to conserve test duration time.

6 Record of results of energy consumption measurements

The following information shall be provided for the configuration tested, and for each independent IT equipment:

- Configuration and work load used for the test (see 5.3.1);
- For an independent IT equipment, the source of the data offered, or, if tested by the manufacturer marketing the configuration, the workload applied in this test;
- Input power supply - actual voltage and frequency;
- Energy consumption in the **energy saving mode**;
- Testing authority providing the information.

Annex A
(informative)

Technical Notes

A.1 Selection of the wattmeter (power analyser) should include the consideration of the frequency response and crest factor. This may be a limiting factor on many instruments with respect to its capability to perform an accurate measurement. A minimum crest factor of 5 is required.

A.2 Waveforms of the power input may be very complex and the instruments to determine the true power of the input may be difficult to identify and to select. All electronic products have the capability of distorting the input waveforms.

A.3 The capacity of the power source should be sufficiently greater than the power usage of the product so as to avoid significant deterioration of the waveforms. It is usually recommended that the power source have a factor greater than 3 to supply the power to the product.