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Energy Management Terminology
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Abstract

This document contains definitions and terms used in the Energy Management Working Group. Each term contains a definition(s), example, and reference to a normative, informative or well know source. Terms originating in this draft should be either composed of or adapted from other terms in the draft with a source. The defined terms will then be used in other drafts as defined here

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1. Introduction

Within Energy Management there are terms that may seem obvious to a casual reader but in fact require a rigorous and sourced definition. To avoid any confusion in terms among the working group drafts, one glossary / lexicon of terms should exist that all drafts can refer to. This will avoid a review of terms multiplied across drafts.

This draft will contain a glossary of definitions of terms that can be agreed upon by the working group outside of the context of drafts and then included in or sourced to this draft.

Each term will contain a definition(s), a normative or informative reference, an optional example, an optional comment(s) listed a note(s).

All terms should be rooted with a well-known reference. If a definition is taken verbatim from a reference then the source is listed in square brackets. If a definition is derived from a well-known reference then the source is listed as "Adapted from" with the reference listed in square brackets. If a defined term is newly defined here the reference will indicate as such by stating "herein" and if applicable list any composing terms from this document.

The terms are listing in an order that aids in reading where terms may build off a previous term as opposed to an alphabetical ordering. Some terms that are common in electrical engineering or that describe common physical items use a lower case notation.

2. Terminology

§ Energy Management
Energy Management is a set of functions for measuring, modeling, planning, and optimizing networks to ensure

that the network and network attached devices use energy efficiently and appropriately for the nature of the application and the cost constraints of the organization.

Reference: Adapted from [ITU-T-M-3400]

NOTES:

1. Energy management refers to the activities, methods, procedures and tools that pertain to measuring, modeling, planning, controlling and optimizing the use of energy in networked systems [NMF].

2. Energy Management is a management domain which is congruent to any of the FCAPS areas of management in the ISO/OSI Network Management Model [TMN]. Energy Management for communication networks and attached devices is a subset or part of an organization's greater Energy Management Policies.

§ Energy Management System (EnMS)

An Energy Management System is a combination of hardware and software used to administer a network with the primary purpose of energy management.

Reference: Adapted from [1037C]

NOTES:

1. An Energy Management System according to [ISO50001] (ISO-EnMS) is a set of systems or procedures upon which organizations can develop and implement an energy policy, set targets, action plans and take into account legal requirements related to energy use. An ISO-EnMS allows organizations to improve energy performance and demonstrate conformity to requirements, standards, and/or legal requirements.

2. Example ISO-EnMS: Company A defines a set of policies and procedures indicating there should exist multiple computerized systems that will poll energy from their meters and pricing / source data from their local utility. Company A specifies that their CFO should collect information and summarize it quarterly to be sent to an accounting firm to produce carbon accounting reporting as required by their local government.

3. For the purposes of EMAN, the definition from [1037C] is the preferred meaning of an Energy Management System (EnMS). The definition from [ISO50001] can be referred to as ISO Energy Management System (ISO-EnMS).

\$ Energy Monitoring

Energy Monitoring is a part of Energy Management that deals with collecting or reading information from Energy Objects to aid in Energy Management.

\$ Energy Control

Energy Control is a part of Energy Management that deals with directing influence over Energy Objects.

\$ electrical equipment

A general term including materials, fittings, devices, appliances, fixtures, apparatus, machines, etc., used as a part of, or in connection with, an electric installation.

Reference: [IEEE100]

\$ non-electrical equipment (mechanical equipment)

A general term including materials, fittings, devices, appliances, fixtures, apparatus, machines, etc., used as a part of, or in connection with, non-electrical power installations.

Reference: Adapted from [IEEE100]

\$ device

A piece of electrical or non-electrical equipment.

Reference: Adapted from [IEEE100]

\$ component

A part of an electrical or non-electrical equipment (device).

Reference: Adapted from [ITU-T-M-3400]

\$ power inlet

A Power Inlet (or simply inlet) is an interface at which a device or component receives energy from another device or component.

\$ power outlet

A power outlet (or simply outlet) is an interface at which a device or component provides energy to another device or component.

\$ energy

That which does work or is capable of doing work. As used by electric utilities, it is generally a reference to electrical energy and is measured in kilowatt hours (kWh).

Reference: [IEEE100]

\$ power

The time rate at which energy is emitted, transferred, or received; usually expressed in watts (joules per second).

Reference: [IEEE100]

\$ demand

The average value of power or a related quantity over a specified interval of time. Note: Demand is expressed in kilowatts, kilovolt-amperes, kilovars, or other suitable units.

Reference: [IEEE100]

NOTES:

1. While IEEE100 defines demand in kilo measurements, for EMAN we use watts with any suitable metric prefix.

NOTES

1. Energy is the capacity of a system to produce external activity or perform work [ISO50001]

\$ provide energy

A device (or component) "provides" energy to another device if there is an energy flow from this device to the other one.

\$ receive energy

A device (or component) "receives" energy from another device if there is an energy flow from the other device to this one.

\$ meter (energy meter)

a device intended to measure electrical energy by integrating power with respect to time.

Reference: Adapted from [IEC60050]

\$ battery

one or more cells (consisting of an assembly of electrodes, electrolyte, container, terminals and usually separators) that are a source and/or store of electric energy.

Reference: Adapted from [IEC60050]

\$ Power Interface

A power inlet, outlet, or both.

\$ Nameplate Power

The Nameplate Power is the nominal Power of a device as specified by the device manufacturer.

\$ Power Attributes

Measurements of the electrical current, voltage, phase and frequencies at a given point in an electrical power system.

Reference: Adapted from [IEC60050]

NOTES:

1. Power Attributes are not intended to be judgmental with respect to a reference or technical value and are independent of any usage context.

\$ Power Quality

Characteristics of the electrical current, voltage, phase and frequencies at a given point in an electric power system, evaluated against a set of reference technical parameters. These parameters might, in some cases, relate to the compatibility between electricity supplied in an electric power system and the loads connected to that electric power system.

Reference: [IEC60050]

NOTES:

1. Electrical characteristics representing power quality information are typically required by customer facility energy management systems. It is not intended to satisfy the detailed requirements of power quality monitoring. Standards typically also give ranges of allowed values; the information attributes are the raw measurements, not the "yes/no" determination by the various standards.

Reference: [ASHRAE-201]

\$ Power State

A Power State is a condition or mode of a device that broadly characterizes its capabilities, power consumption, and responsiveness to input.

Reference: Adapted from [IEEE1621]

\$ Power State Set

A Power State Set is a collection of Power States that comprises a named or logical control grouping.

\$ Energy Object

An Energy Object is an information model (class) that represents a piece of equipment that is part of, or attached to, a communications network which is monitored, controlled, or aids in the management of another device for Energy Management.

\$ Energy Management Domain

An Energy Management Domain is a set of Energy Objects that is considered one unit of management.

\$ Energy Object Identification

Energy Object Identification is a set of attributes that enable an Energy Object to be universally unique or linked to other systems.

\$ Energy Object Context

Energy Object Context is a set of attributes that allow an Energy Management System to classify an Energy Object within an organization.

\$ Energy Object Relationship

An Energy Object Relationship is an association among Energy Objects.

NOTES

1. Relationships can be named and could include Aggregation, Metering, and Power Source.

Reference: Adapted from [CHEN]

\$ Power Source Relationship

A Power Source Relationship is an Energy Object Relationship where one Energy Object provides power to one or more Energy Objects. These Energy Objects are referred to as having a Power Source Relationship.

\$ Metering Relationship

A Metering Relationship is an Energy Object Relationship where one Energy Object measures power, energy, demand or power attributes of one or more other Energy Objects. The measuring Energy Object has a Metering Relationship with each of the measured objects.

\$ Aggregation Relationship

An Aggregation Relationship is an Energy Object Relationship where one Energy Object aggregates Energy

Management information of one or more other Energy Objects. The aggregating Energy Object has an Aggregation Relationship with each of the other Energy Objects.

\$ Proxy Relationship

A Proxy Relationship is an Energy Object Relationship where one Energy Object provides the Energy Management capabilities on behalf of one or more other Energy Objects. These Energy Objects are referred to as having a Proxy Relationship.

3. Relationship to Other Standards

When applicable the [IEEE100] was used as the preferred source. If a term was not available from [IEEE100], then [IEC60050] was used. When these were multiple items from [IEEE100], [IEC60050] or [ISO50001], there were all included.

4. Security Considerations

None

5. IANA Considerations

None

6. References

Normative References

Informative References

[IEEE1621] "Standard for User Interface Elements in Power Control of Electronic Devices Employed in Office/Consumer Environments", IEEE 1621, December 2004

[ITU-T-M-3400] TMN recommendation on Management Functions (M.3400), 1997

[NMF] "Network Management Fundamentals", Alexander Clemm, ISBN: 1-58720-137-2, 2007

[TMN] "TMN Management Functions : Performance Management", ITU-T M.3400

- [1037C] US Department of Commerce, Federal Standard 1037C,
<http://www.its.bldrdoc.gov/fs-1037/fs-1037c.htm>
- [IEEE100] "The Authoritative Dictionary of IEEE Standards
Terms"
<http://ieeexplore.ieee.org/xpl/mostRecentIssue.js>
p?punumber=4116785
- [ISO50001] "ISO 50001:2011 Energy management systems -
Requirements with guidance for use",
<http://www.iso.org/>
- [IEC60050] International Electrotechnical Vocabulary
<http://www.electropedia.org/iev/iev.nsf/welcome?openform>
- [ASHRAE-201] "ASHRAE Standard Project Committee 201
(SPC 201) Facility Smart Grid Information
Model", <http://spc201.ashraeeps.org>
- [CHEN] "The Entity-Relationship Model: Toward a Unified
View of Data", Peter Pin-shan Chen, ACM
Transactions on Database Systems, 1976

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