                    Energy Management Terminology
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Status of this Memo

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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

Table of Contents

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 recommandation 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?o
           penform

[ASHRAE-201] "ASHRAE Standard Project Committee 201
              (SPC 201)Facility Smart Grid Information
              Model", http://spc201.ashraepcs.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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