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Energy services — Guidelines for the assessment and improvement of the energy service to users

Services énergétiques — Lignes directrices pour l'évaluation et l'amélioration du service énergétique aux utilisateurs

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 301, *Energy management and energy savings*.

Introduction

0.1 Energy issues: global context and policy framework

Energy services are critically important to sustainable development in light of the following:

— the importance of access to sustainable energy as a basic human need for the world's population as recognized by the United Nations General Assembly in 2011, by the UN Director General and the 2011 UNDP Human Development Report;

— the scale of the population (1,5 billion people without access to electricity) resulting in widespread resort to unsustainable, expensive, polluting and unsafe practices;

— the extent of poor service characterized by interruptions, fluctuations in supply and widespread network deterioration;

— the need for development of a service that is physically, environmentally and financially sustainable;

— global commitments to reduce emissions, noting that providing universal service for the poor population will have only a marginal impact on total emissions beyond existing commitments.

0.2 Energy services: general objectives

This document aims to address the following objectives:

— reducing arbitrary and irregular interruptions of supply;

— increasing information about, and promotion of, sustainable sources of supply;

— reducing aggregate demand, while providing the same or a higher level of energy services;

— improving on previously inadequate information about energy service development and conditions, especially energy efficiency and energy performance;

— improving the balance of contractual rights between provider and user;

— improving payment methods to make it easier for consumers to pay their bills;

— improving consumer responsibility and public participation in energy policy.

There is a broad array of bodies that can play a role in the improvement of energy services. These bodies can be publicly or privately owned. Examples of bodies responsible (in whole or in part) for oversight related to energy services include governments or public agencies (international, national, regional or local) acting with legal authority as legislators and regulators (relevant authorities) or as bodies charged with ensuring service delivery (responsible bodies).

The responsible bodies and relevant authorities are expected to consult with, and take into account, the interests of relevant stakeholders, which can include:

— associations of energy service providers (e.g. international, regional/multinational and national professional associations);

— non-governmental organizations (NGOs) and other autonomous bodies;

— users and associations of energy users;

— manufacturers of energy-using equipment, renewable energy sources and advanced technologies or methods.

Standardization and technical self-regulation are possible ways to ensure stakeholder involvement. It is beneficial if stakeholders are involved in both setting service objectives and assessing the adequacy and efficiency of service.

Energy service providers are expected to meet the requirements of relevant authorities and the expectations specified by responsible bodies, while ensuring the long-term sustainability of the service. In a context of scarcity of resources, including financial resources, it is important that the investments made in installations are appropriate and that necessary attention is paid to proper maintenance and effective use of the installations. It is also important that tariffs generally aim at meeting cost-recovery principles and at promoting efficiency in the use of the resources and sustainability in terms of energy sources, while striving to maintain affordable basic access to energy services.

0.3 Objectives, content and implementation of this document

This document is intended to encourage good practice in the provision of energy service, especially where there is no adequate legislation, or where regulation or common practice falls short. Good practice as set out in this document covers areas such as service contracts, payment methods, price determinations, tariffs and subsidies, equitable supply management and the needs of poor and/or vulnerable consumers. This document outlines the evolution of energy services from simple provision of energy to more sophisticated concepts. These concepts include the provision of energy informational advice and services to guide users to manage costs and to promote efficiency and conservation.

This document is applicable to developed, developing and transitional economies, to complete and incomplete/intermittent networks and to integrated and non-integrated energy supply systems.

This document covers the following areas:

— definitions of scope and terms;

— description of guidelines on how to meet users' service needs and expectations;

— service assessment criteria in accordance with the guidelines;

— examples of performance indicators linked to the assessment criteria, which can be used for assessing service performance.

Because the delivery, ownership and regulation of energy service is organized based on the legal and institutional frameworks specific to each country, this document does not prescribe the respective roles of the different bodies, nor does it define required internal organization for local, regional or national bodies that can be involved in energy services provision. This document is applicable to publicly and privately owned and operated energy service providers alike, and does not favour any particular ownership or operational model.

This document is appropriate for fixed energy distribution networks of greater or lesser extent, as well as for networks or sites where on-site alternatives are appropriate. This document recognizes the need for flexibility in terms of engineering and hardware. This document's recommendations, such as consultation mechanisms, are intended to apply universally.

This document is consistent with management system standards such as ISO 50001, ISO 9001 and ISO 14001, but it is not dependent on the adoption of a management system standard. It is also consistent with the requirements on network services billing in ISO 14452.

The organizations within the scope of this document are energy service providers. However, in order to address users' needs and expectations pertaining to relevant authorities, responsible bodies and operators, this document is written from the perspective of the energy user rather than that of the energy service provider.

In this document, the following verbal forms are used:

— "shall" indicates a requirement;

— "should" indicates a recommendation;

— "may" indicates a permission;

— "can" indicates a possibility or a capacity.

Energy services — Guidelines for the assessment and improvement of the energy service to users

1 Scope

This document addresses the relevant elements of energy service provided by energy suppliers to users. It envisages energy service as including two broad categories:

— energy supply/generation and distribution;

— advice on and improvement to energy efficiency.

This document provides best practice guidelines for energy service providers in order to continually improve their practices and quality of interaction with users.

The following are within the scope of this document:

— definition of a language common to the different stakeholders;

— definition of key components and characteristics of the energy service to users, with respect to their needs and expectations;

— guidelines for satisfying users' needs and expectations;

— assessment criteria for energy service to users;

— introduction to performance indicators;

— examples of performance indicators;

— performance improvement;

— education or training for users to understand the energy service provided by the energy service providers.

The following are outside the scope of this document:

— topics relating to individual energy service, such as energy efficiency service provided to individual users of energy or services provided by energy service companies (ESCOs);

— methods of design and construction of energy production, transmission and distribution systems;

— management structure and methodology of operation and management of activities relating to energy services, including contracting with other energy service providers;

— topics relating to energy services in systems inside buildings.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
affordability
degree to which the provision of an *energy service* (3.13) is economically bearable for *users* (3.50)

Note 1 to entry: Affordability can be estimated through the degree to which charges for an energy service can be paid by low income groups of users without significant adverse economic or social impact, taking into account allowances for subsidies and payment assistance programmes

Note 2 to entry: Certain countries apply a percentage threshold figure, most commonly 10 % of disposable income, above which households could be considered to be in "fuel poverty". This can however distort results in some cases, e.g. among high spending, high income households. To guide *tariff* (3.49) level decisions, the lowest decile of household incomes can be considered in order to check what percentage of disposable income would be taken up by a given level of charge. This information could enable an *energy service provider* (3.14) to understand how a rapid rise in percentage could result in people refusing to pay or dropping out of the system.

3.2
asset
item, thing or entity that has potential or actual value

Note 1 to entry: Assets can be tangible or intangible. Examples of tangible assets include land, buildings, heating, ventilation and air-conditioning systems, lighting systems, transmission lines, generating plants, transformer stations, storage depots, equipment and hardware. Examples of intangible assets include software and databases.

Note 2 to entry: Contrary to consumables, assets can be depreciated in accounting systems.

[SOURCE: ISO 55000:2014, 3.2.1, modified — The words "to an organization" have been deleted at the end of the definition, and the Notes to entry have been modified.]

3.3
asset management
coordinated activity of an *energy service provider* (3.14) to realize value from *assets* (3.2)

[SOURCE: ISO 55000:2014, 3.3.1, modified — The word "organization" has been replaced by the words "energy service provider" in the definition, and the original Notes to entry have been deleted.]

3.4
availability
extent to which the *infrastructure* (3.19), *assets* (3.2), resources and employees of an *energy service* (3.13) enable effective provision of *services* (3.44) to *users* (3.50) according to specified *performance* (3.26)

3.5
billing
conditions relating to charging for an *energy service* (3.13), terms of payment and information on applicable rates

3.6
community
general public in the geographical area served by a utility or other *energy service provider* (3.14), which can choose to engage with its customers through outreach programmes, consumer education and other forms of positive public relations

Note 1 to entry: The term can also refer to a "community of interest" such as one or more natural or legal persons, their associations, organizations or groups, having interests under the terms of which the *energy service* (3.13) is provided.

3.7
confidence level
assessment of the *quality* (3.32) in terms of accuracy and *reliability* (3.37)

Note 1 to entry: The confidence level can be quantitative or qualitative.

3.8
connection
set of physical components ensuring the link between a *point-of-delivery* (3.27) and the local supply

3.9
continuity
number of hours of daily *service* (3.44), or number of hours per week in the event of service being available less than daily

3.10
coverage
extent to which the *assets* (3.2) of an *energy service provider* (3.14) permit *services* (3.44) to *users* (3.50), within its defined area of responsibility

Note 1 to entry: This is often defined as a percentage of households served within the distribution area.

3.11
effectiveness
extent to which planned activities are realized and planned results achieved

[SOURCE: ISO 9000:2015, 3.7.11, modified — Note to entry has been deleted.]

3.12
energy efficiency
ratio or other quantitative relationship between an output of *performance* (3.26), *service* (3.44), goods or energy, and an input of energy

EXAMPLE Conversion efficiency; energy required/energy used; output/input; theoretical energy used to operate/energy used to operate.

Note 1 to entry: Both input and output need to be clearly specified in quantity and *quality* (3.32), and be measurable.

[SOURCE: ISO 50001:2011, 3.8]

3.13
energy service
set of organization, *processes* (3.31), activities, means and resources necessary for production, transmission, distribution and supply of energy and for providing a physical benefit, utility or goods, which are derived from a combination of energy with energy-efficient technology or with action, which can include the operations, *maintenance* (3.21) and control necessary to deliver the *service* (3.44)

Note 1 to entry: Key features for an energy service include:

— its mission to provide an energy service;

— its physical area of responsibility and the population within this area;

— its *responsible body* (3.42);

— the general organization, with the function of *operator* (3.25) being carried out by the responsible body;

— the scope of the energy service offered by the *energy service provider* (3.14), or by other organizations operating in the same geographic area;

— the type of physical or information technology systems used to provide the services, with various degrees of centralization.

Note 2 to entry: When it is not necessary or it is difficult to make a distinction between responsible body and operator, the term "energy service provider" covers both.

Note 3 to entry: In this document, the term "*energy services* (3.15)" (plural) refers to generic activities or energy uses such as heating or lighting or supply of natural gas, whereas the term "energy service" (singular) is used to refer to the activity by an organization (an energy service provider) to a *user* (3.50) or consumer to provide energy services in the best way, such as offering incentives for energy efficient air conditioning systems or financing for consumer-provided solar energy generating systems.

3.14
energy service provider
energy entity or person that provides *service* (3.44) to a retail or end-use customer

3.15
energy services
activities and their results related to the provision and/or use of energy

Note 1 to entry: In this document, the term "energy services" (plural) refers to generic activities or energy uses such as heating or lighting or supply of natural gas, whereas the term "*energy service* (3.13)" (singular) is used to refer to the activity by an organization (an energy service provider) to a *user* (3.50) or consumer to provide energy services in the best way, such as offering incentives for energy efficient air conditioning systems or financing for consumer-provided solar energy generating systems.

[SOURCE: ISO 50001:2011, 3.16, modified — Note 1 to entry has been added.]

3.16
energy supply
delivery of energy to consumers

3.17
environment
surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelationships

Note 1 to entry: Surroundings can extend from within an organization to the local, regional and global system.

Note 2 to entry: Surroundings can be described in terms of biodiversity, ecosystems, climate or other characteristics.

Note 3 to entry: For the application of this document, environment is considered as a specific *stakeholder* (3.47). The interests of this specific stakeholder can be represented by relevant authorities, by the communities or by other groups, such as NGOs.

[SOURCE: ISO 14001:2015, 3.2.1, modified – Note 3 to entry has been added]

3.18
indicator
parameter, or value derived from parameters, which provides information about a subject matter with a significance extending beyond that directly associated with a parameter value

Note 1 to entry: Indicators can refer to context, conditions, means, activities or *performance* (3.26).

3.19
infrastructure
system of fixed *assets* (3.2) needed for the operation of an *energy service* (3.13)

Note 1 to entry: Infrastructure can be tangible (e.g. transformers) or intangible (software systems).

Note 2 to entry: Infrastructure can also be necessary for the energy service to use technical equipment for transport which is not fixed (e.g. trucks, vans, bottles of LPG, kerosene drums) on a permanent or occasional basis, or in emergency situations. The term "infrastructure" is used primarily for fixed equipment and installations.

[SOURCE: ISO 9000:2015, 3.5.2, modified – The words "facilities, equipment and services needed for the operation of an organization" have been replaced by the words "fixed assets needed for the operation of an energy service" in the definition, and the Notes to entry have been added.]

3.20
interruption
situation where *energy supply* (3.16) is not available

Note 1 to entry: Interruptions can be planned or unplanned.

3.21
maintenance
combination of all technical, administrative and managerial actions during the life cycle of an *asset* (3.2), intended to retain it in, or restore it to, a state in which it can perform the required function

3.22
management
coordinated activities to direct and control an organization

Note 1 to entry: Management can include establishing policies and objectives, and *processes* (3.31) to achieve these objectives.

Note 2 to entry: The word "management" sometimes refers to people, i.e. a person or group of people with authority and responsibility for the conduct and control of an organization. When "management" is used in this sense, it should always be used with some form of qualifier to avoid confusion with the concept of "management" as a set of activities defined above. For example, "management shall…" is deprecated whereas "top management shall…" is acceptable. Otherwise different words should be adopted to convey the concept when related to people, e.g. managerial or managers.

Note 3 to entry: The term "management" can be qualified by a specific domain it addresses.

EXAMPLE Public health management; environmental management; risk management.

[SOURCE: ISO 9000:2015, 3.3.3, modified — Note 3 to entry and the Example have been added.]

3.23
management system
set of interrelated or interacting elements of an organization to establish policies and objectives, and *processes* (3.31) to achieve those objectives

Note 1 to entry: A management system of an *energy service* (3.13) can include different management systems, such as a quality management system, an energy performance management system, a financial management system or an environmental management system.

[SOURCE: ISO 9000:2015, 3.5.3, modified — Original Notes to entry have been deleted and Note 1 to entry has been added.]

3.24
on-site system
set of physical *assets* (3.2) necessary for supplying energy or fuel, with or without physical *connection* (3.8) to centralized installations from an *energy service* (3.13)

3.25
operator
person or organization performing day-to-day *processes* (3.31) and activities necessary for the provision of the *energy service* (3.13)

Note 1 to entry: There can be one or several operators for a given energy service, e.g. distinct operators for installations operation, safety checking, *billing* (3.5) and recovering payments. Accordingly, "operator" as used in this document can be singular or plural as the context in this document or the actual application indicate. The mission of an operator is determined by the *responsible body* (3.42). An operator can subcontract some of its operations to other contractors, if allowed by the responsible body.

Note 2 to entry: An operator can be public or private, and can be distinct from the responsible body or not. Examples where the responsible body and the operator are not distinct include a technical department in a municipality, a company, a small contractor, an NGO and a cooperative.

Note 3 to entry: In the context of this document, an "operator" is not a person employed within an organization to operate a piece of equipment or process.

3.26
performance
achievements of an activity, a *process* (3.31) or an organization

3.27
point-of-delivery
location of meters for the provision of the *energy service* (3.13)

EXAMPLE A connection box, a meter, the limit boundary between public and private property.

Note 1 to entry: The point-of-delivery is generally defined in the energy *service agreement* (3.45).

Note 2 to entry: In general, *energy service provider* (3.14) employees cannot obtain direct physical access to the installations beyond the point-of-delivery without the permission of the customer.

Note 3 to entry: In the case of non-metered systems (e.g. in some district heating schemes), the point of delivery can be the same as the *point-of-use* (3.28).

3.28
point-of-use
physically fixed interface where the *user* (3.50) normally takes the energy supplied for the intended use

EXAMPLE A gas tap; a mains switch.

Note 1 to entry: The point-of-use can be in private or public property.

Note 2 to entry: The point-of-use can be the same as the *point-of-delivery* (3.27), e.g. in the case of a combined meter and mains switch.

3.29
price
counterpart in money or alike paid for the supply or provision of a product or *service* (3.44)

Note 1 to entry: When relevant, price is expressed relating to a unit of product or service.

EXAMPLE Price of a cubic metre of gas; price of a kilowatt hour of electricity; price of a *connection* (3.8).

3.30
procedure
specified way of carrying out an activity or a *process* (3.31)

Note 1 to entry: Procedures can be documented or undocumented.

3.31
process
set of interrelated or interacting activities that use inputs to deliver an intended result

[SOURCE: ISO 9000:2015, 3.4.1, modified — Notes to entry have been deleted.]

3.32
quality
degree to which a set of inherent characteristics of an object fulfils *requirements* (3.41)

[SOURCE: ISO 9000:2015, 3.6.2, modified — Notes to entry have been deleted.]

3.33
rate of return
financial benefits from an investment, considering interest, as quantified using metrics such as internal rate of return, return on investment, net present value, or discounted cash flow analysis

Note 1 to entry: The time period of measurement can be annual or over the lifetime of the investment.

3.34
registered user
customer or *user* (3.50) for whom relevant information is recorded by the *responsible body* (3.42) or *operator* (3.25)

Note 1 to entry: In this definition, the term "customer" is considered to be synonymous with the term "user" in view of the fact that a customer has a commercial relationship, e.g. an *energy service* (3.13) agreement, with the *energy service provider* (3.14). The term "customer" is currently used in such expressions as "customer relations".

3.35
rehabilitation
operation on an *infrastructure* (3.19) that restores it to a defined level, or improves it to a higher level of *performance* (3.26)

3.36
relevant authority
public body entitled to set general policies, plans or *requirements* (3.41), or to check compliance with these rules, concerning all the *energy service providers* (3.14) included in its area of jurisdiction

EXAMPLE National, regional or local governments, public agencies, regulators.

Note 1 to entry: For a given energy service provider, there can be several relevant authorities, which have jurisdiction in different domains.

3.37
reliability
degree of confidence in the information for representing or for qualifying the relevant subject matter

Note 1 to entry: Information can be data, *indicators* (3.18) or estimations.

Note 2 to entry: When referring to a device, "reliability" means the probability that a device, system, or *process* (3.31) will perform its prescribed function without failure for a given time when operated correctly in a specified *environment* (3.17).

3.38
renewable energy
energy not depleted by extraction as it is naturally replenished at a rate faster than it is extracted

Note 1 to entry: Renewable energy excludes recovered or wasted energy.

Note 2 to entry: Organic fraction of municipal waste can be considered as a renewable energy.

Note 3 to entry: Whether the energy stored in a technical system is renewable or not depends upon the nature of the original energy.

Note 4 to entry: Criteria to categorize an energy as renewable can differ amongst jurisdictions, based on local environmental or other reasons.

[SOURCE: ISO/IEC 13273-2:2015, 3.1.5, modified — The term "renewable energy source" has been replaced by "renewable energy"; the word "source" has been deleted after "energy" in the definition and in each of the Notes to entry; the verb "may" has been replaced by "can" in Note 2 to entry. The term "renewable energy" is defined differently in ISO/IEC 13273-2:2015, 3.1.6.]

3.39
clean renewable energy
renewable energy (3.38) whose direct or indirect emissions of greenhouse gases, other gases with adverse impacts on human health, water pollutants, or other toxic releases, and whose impacts on ecosystems are substantially lower than those of conventional alternatives such as gas-fired generation

Note 1 to entry: Geothermal energy that releases high-SO_2 gases to the atmosphere does not qualify under this definition

Note 2 to entry: Wood pellet or solid wood combustion does not qualify if the greenhouse gas emissions associated with producing the wood are similar to those of coal on the basis of a megajoule of fuel.

3.40
repair
action on a nonconforming product, equipment or facility to make it acceptable for the intended use, but not changing the original parameters of the product, equipment or facility

Note 1 to entry: A successful repair of a nonconforming product or *service* (3.44) does not necessarily make the product or service conform to the *requirements* (3.41). It can be that in conjunction with a repair a concession is required.

Note 2 to entry: Repair includes remedial action taken on a previously conforming product to restore it for use, for example as part of *maintenance* (3.21).

Note 3 to entry: Repair can affect or change parts of the nonconforming product.

Note 4 to entry: Repair can be planned (e.g. preventive maintenance) or unplanned (e.g. in the case of damage).

[SOURCE: ISO 9000:2015, 3.12.9, modified – The words "or service to make it acceptable for the intended use" have been replaced by the words "or facility to make it acceptable for the intended use, but not changing the original parameters of the product, equipment or facility" in the definition, and Note 4 to entry has been added.]

3.41
requirement
need or expectation that is stated, generally implied or obligatory

Note 1 to entry: "Generally implied" means that it is custom or common practice for the organization and *stakeholders* (3.47) that the need or expectation under consideration is implied.

Note 2 to entry: A specified requirement is one that is stated, for example in documented information.

Note 3 to entry: A qualifier can be used to denote a specific type of requirement, e.g. product requirement, quality management requirement, customer requirement, quality requirement.

Note 4 to entry: Requirements can be generated by different stakeholders or by the organization itself.

Note 5 to entry: It can be necessary for achieving high customer satisfaction to fulfil an expectation of a customer even if it is neither stated nor generally implied or obligatory.

[SOURCE: ISO 9000:2015, 3.6.4, modified – In Notes 1 and 4 to entry, the words "interested parties" have been replaced by the word "stakeholders", and Note 6 to entry has been deleted]

3.42
responsible body
body that has the overall responsibility for provision of energy or other *energy service* (3.13) for a given geographic area to the *users* (3.50) of the energy service

EXAMPLE A local or municipal government (i.e. for a village, town or city), a regional government, or a national or federal government through a specified agency, or a private company.

Note 1 to entry: The responsible body can be public or private.

Note 2 to entry: The responsible body acts within a framework established by the *relevant authorities* (3.36). It generally establishes the strategy, the specific policies adapted to the characteristics of its area of responsibility and the general organization of the relevant *service* (3.44) or energy service.

Note 3 to entry: The responsible body can operate the energy service directly with its own means through an internal *operator* (3.25) [direct or internal *management* (3.22) or "in-house"] or entrust one or several operators for the operations ("outsourced" or contracted management).

Note 4 to entry: The *energy service provider* (3.14) can be part of the responsible body.

3.43
restriction
situation where the *service* (3.44) does not meet the *availability* (3.4) conditions specified in the *service agreement* (3.45)

Note 1 to entry: Restrictions can be planned or unplanned.

3.44
service
output of an organization with at least one activity necessarily performed between the organization and the customer

Note 1 to entry: The dominant elements of a service are generally intangible.

Note 2 to entry: Service often involves activities at the interface with the customer to establish customer *requirements* (3.41) as well as upon delivery of the service and can involve a continuing relationship such as banks, accountancies or public organizations, e.g. schools or hospitals.

Note 3 to entry: Provision of a service can involve, for example, the following:

— an activity performed on a customer-supplied tangible product (e.g. a car to be repaired);

— an activity performed on a customer-supplied intangible product (e.g. the income statement needed to prepare a tax return);

— the delivery of an intangible product (e.g. the delivery of information in the context of knowledge transmission);

— the creation of ambience for the customer (e.g. in hotels and restaurants).

Note 4 to entry: A service is generally experienced by the customer.

Note 5 to entry: The word "service" in common English can also refer to the entity providing the actions related to the subject in question, as is implicit in such phrases as "bus service", "police service", "fire service" and "water or electricity service". In this context and usage, "service" implies the entity that is delivering the service, e.g. "the public transport of passengers", "the provision of public security", "fire protection and response", and "supplying electricity".

[SOURCE: ISO 9000:2015, 3.7.7, modified — Note 5 to entry has been added.]

3.45
service agreement
establishment of an accord between the *registered user* (3.34) and the *energy service provider* (3.14) on the conditions of *service* (3.44) provisions

EXAMPLE A contract.

Note 1 to entry: A service agreement can be implicit or explicit.

3.46
service area
local geographic area where an organization has the responsibility or authority to provide a *service* (3.44)

Note 1 to entry: The service area can be established by political boundaries (e.g. citywide utility), by legislative action (e.g. formation of a utility district), or by inter-jurisdictional agreements [e.g. intercity agreements to provide *energy services* (3.15)].

3.47
stakeholder
person or group or organization having an interest in the *performance* (3.26) or success of an organization

EXAMPLE *Users* (3.50) and building owners, responsible bodies, *operators* (3.25), employees of the operator, external product suppliers and providers of other *services* (3.44), contractors, communities, customers and environmental associations, financial institutions, scientific and technical organizations, laboratories.

Note 1 to entry: For the application of this document, *environment* (3.17) is considered as a specific stakeholder

Note 2 to entry: It is the function of relevant authorities (for example government) to consider the interest of the different stakeholders when reaching a decision. For purposes of this document, government is not in itself a stakeholder. Government's responsibility is to balance stakeholder interests.

Note 3 to entry: Users are a category of stakeholder.

3.48
sustainable development
development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs

Note 1 to entry: A key component of sustainability is continually increasing reductions in greenhouse gas emissions.

3.49
tariff
structured, publicly available elements permitting calculation of the *price* (3.29) paid for a product or *service* (3.44)

EXAMPLE Flat (uniform) tariff for a cubic metre of gas, blocks with progressive or decreasing prices, prices of *connections* (3.8).

3.50
user
person, group or organization that benefits from *energy supply* (3.16) and related *services* (3.44)

Note 1 to entry: Users are a category of *stakeholder* (3.47).

Note 2 to entry: Users can belong to various economic sectors: domestic users, commerce, industry, tertiary activities, agriculture.

4 Components of the energy service relating to users' needs and expectations

4.1 General

To promote continual improvement of service to users, relevant components should first be identified. The essential components in terms of service to users are defined as:

— access to energy services;

— provision of energy service;

— energy efficiency services;

— clean renewable energy services;

— contract management and billing;

— promoting a good relationship with the users;

— protection of the environment;

— safety and emergency management.

The energy service provider should periodically assess user needs and expectations. Once these are understood, the energy service provider can develop potential actions to improve the energy service provider's ability to meet those needs and expectations. For each potential action, the energy service provider can determine resource and time requirements, along with projected effects. When not stated in the guidelines, the body responsible for the implementation of each action (relevant authority, responsible body or operator) should be defined beforehand.

Given the varying degrees of economic development, the full implementation of the guidelines presented in this clause may not yet be attainable in some countries, in which case they should be considered as objectives for continual improvement. Relevant authorities should assess and report on what energy service improvements have been considered and which undertaken or planned, providing public notice in a periodic report.

If necessary, the relevant authorities, responsible bodies and stakeholders should agree on the conditions needed to guarantee a good service.

4.2 Access to energy service

Energy service includes networked supply as well as other forms of provision.

Other options include:

— energy delivery with containers or storage devices by regulated fuel vendors;

— battery charging points;

— user-sited renewable energy sources;

— energy efficiency services

Deliverable energy may include:

— liquified petroleum gas (LPG) or other compressed gaseous fuels;

— kerosene or other liquid fuels;

— electric batteries or other forms of stored energy.

— local networks, such as:

  — solar, wind or geothermal based systems;

  — mini-hydro systems;

— other renewable systems designed at community or individual user scale including heat distribution systems, steam-based and other systems;

— co-generation systems;

— energy supplied from outside the national or regional networks that operate on a self-governing basis.

Generally wider access to energy services (in the broad meaning described above) expands economic and social well-being. It is important to define the extent and kind of access required. This definition

is important to determine management actions affecting current access and to determine whether and how to plan for future access. This could include resource management, physical infrastructure extension and alternative means of supply or for those who are not connected to a networked system. Relevant authorities and responsible bodies should take measures to promote equitable and affordable access to energy services in a transparent process with opportunities for public input (including stakeholders) on policies and implementation actions. These measures may include:

— efficiency advice or assistance in obtaining efficient energy-using equipment and systems that minimizes cost of integrated energy supply and energy consumption;

— grants and loans (including support for financing connections for the poor);

— social tariffs (including possible zero rate tariff blocks targeted on the poorest);

— subsidies, (including cross subsidies between customers at different income levels);

— incentives to users to reduce peak load by reducing consumption or by changing their usage patterns (for example using remote internet based controls).

Responsible bodies and their relevant authorities should develop and undertake a public process to examine the degree to which all users have access to enough energy services to meet basic human needs, in accordance with local conditions. This examination can guide measures to ensure user access. The choice of such measures, which may be temporary, should take into account the cost and effectiveness of physical measures, such as efficiency and on-site energy systems, as well as economic measures, such as cross subsidies between users, and the financial viability and sustainability of the service.

4.3 Provision of energy service

4.3.1 Time to establish new service provisions

The energy service provider, relevant authority and responsible body should all take steps to ensure service provision within a reasonable and specified time within the service area. An explanation may be required on the specific conditions under which the energy service can be provided. The application procedures should be clearly specified by the energy service provider. In all systems, the energy service provider should be able to estimate and clearly communicate to the user the time that it takes to establish a new service or connection. The estimate should include a reasonable allowance for unexpected local conditions or delays.

The above bodies should, through a transparent public process, examine options and provide guidance on a standard time or times for new energy service provision and commit to achieve this target for all regular connections. For example, the start time could be set as the completion of the application process by the prospective user and acceptance of the application by the energy service provider.

In the absence of an integrated network, the user should be informed as to when the energy service will be provided, and whether it is planned to be developed through an infrastructure extension or through alternative means of service.

4.3.2 Maintenance and repairs

For planned maintenance and repairs, the responsible body and energy service provider should, through a public process develop the specifications about communications by which the energy service provider would inform the affected users in advance with an estimate of the time and duration of the interruption to energy supply. For unplanned maintenance and repairs, the energy service provider should take measures to inform the affected users about the estimated time until normal service is restored. In all cases, the energy service provider should minimize the inconvenience to the affected users. The energy service provider should inform the users of any changes to the expected time for restoration of energy supply.

4.3.3 Price of energy service

The operator, the relevant authority and the responsible body should follow a transparent process giving all stakeholders an opportunity for input that results in the price at which the energy service is offered. It should aim to provide the energy service at a "fair price". In order to identify what is meant by a "fair price", the following elements should be taken into consideration:

— affordability;

— total cost;

— payment terms;

— historic price levels and inflation;

— rate of return;

— impact on energy consumption;

— relevant levies and taxes.

The acceptability to users of the outcome of this process may require providing the public with information regarding the components of the price and the extent to which the costs of providing the energy service are covered by revenues from the users. In circumstances of constrained energy supply resources, an energy service provider may offer times of reduced service provision or of interruption in return for a lower price, but should publish the details of proposals for such service in order for decisions to be taken with due and transparent discussion.

The extent, nature and purpose of relevant subsidies should be identified, as should any calculations of affordability for users. Information on those factors influencing variations in price (e.g. cost inflation, cost of capital, environmental regulations, emergencies, network extension, availability of fuel, taxes) should also be in the public domain.

Pricing information should be provided in a format that enables the consumer to be informed about how their consumption, tariff and supplier affect their cost, and to understand any available choices that they can make that may affect cost. Different payment methods should not be subject to unjustifiable differentials in unit price.

NOTE Pricing can be based on overall units of energy consumption, capacity and time of usage and level of energy services.

4.3.4 Quality and quantity of overall energy supply

A desired result in the market-wide provision of the energy service is that the operator, responsible body and relevant authorities should do their best to ensure that the current and forecast demand for energy is met. Measures should also be established to reduce demand where supply is limited. For their part, users should be expected to strive towards a rational and efficient use of energy and should be assisted and actively encouraged in that direction by the operator, responsible body and relevant authorities. To achieve this aspirational outcome, the operator, responsible body or relevant authorities should develop a process that can produce estimates of future demand and future availability of service. The estimates should contribute to the process of arriving at a reliable and sustainable energy supply in the future, in order to meet that forecast demand.

The energy service provider, responsible body and/or relevant authorities should carry out regular analysis of service provision at representative locations, including points-of-use, to determine safety levels and reliability/continuity, such as the quality and quantity of supply.

The operator, responsible body and/or relevant authorities should make the results of the analyses available to users and include in a periodic report (e.g. the annual report) a summary of quality of service and any related problems.

4.3.5 Continuity of energy supply

The relevant authority, responsible body and operator, as a result of a public process and based on data and facts brought into that process, should determine what the necessary steps are to supply energy on a continuous basis. Where this is not possible, supply should be made available on a basis that is equitable to the users. Where planned interruptions take place on the basis of rota cuts, the rota should be open to public discussion, report and negotiation.

A consideration in setting the standards for supply continuity should include the impact of events such as system failures or on-going repair or rehabilitation works that cause the energy supply to users to be interrupted. There should be requirements for informing energy users regarding supply interruptions.

Where the user is not physically connected to the energy supply system, the user should expect the alternative service to be available on a regular basis and service providers should inform users of the locations, intervals and timing of the provision of such services.

4.3.6 Coverage and availability of energy services

Responsibility for geographical coverage by the service rests with the relevant authority and responsible body. They should undertake a public process to consider options as to availability for geographic coverage and who should pay which portion of the costs. The result should be clear rules as to the extent of coverage and how costs are borne. They should take all reasonable steps to provide service on an equitable basis within and between all geographical areas. This objective of maximum coverage may require differences in methods of service delivery, in accordance with local conditions.

Where populations are not served by integrated networks, the responsible body should plan on the basis of alternative forms of provision, such as battery charge points, kerosene or LPG delivery. The possibility that a geographical area may not be profitable in commercial terms should not constitute an obstacle to service. The range of possible models of service provision should include low cost alternatives and prices adapted to the needs of economically disadvantaged zones, with a view to expanding service.

The amount of fuel or heat made available to the user should at least be comparable with the user's basic requirements defined by the World Health Organization. Coverage and availability of the service should be environmentally and financially sustainable.

4.3.7 Withdrawal or interruption of energy services

The energy service provider should have a clear policy for dealing with non-payment of bills, including investigating circumstances of non-payment before interruption, as well as alternatives to immediate shut-off of power due to non-payment. This policy should provide (or address) assistance to users in temporary or permanent financial hardship. Supplies to users in vulnerable circumstances should not be withdrawn unless all other options have been exhausted and a rigorous process has been followed which confirms that the user is deliberately withholding due payment.

4.4 Energy efficiency services

4.4.1 General

The energy service provider, relevant authority and responsible body should all seek to ensure that a satisfactory level of energy efficiency service is available to all users, providing general information on the efficiency opportunities available, their costs and benefits, where they can be acquired, and incidental benefits or conditions, and furthermore, financial incentives or financing services that may be available to the user. These services may or may not be offered by the energy service provider organization exclusively or at all; they may also be offered by a government agency or a different energy service provider. The energy service provider such as the local electric utility should collect and convey this information, or provide a link to another organization that will do so, regardless of whether the utility is the efficiency services provider.

4.4.2 Energy efficiency services to the user

The components of delivering an energy service include whether an organization (energy service provider or responsible body) will offer advice, either in written form, online or on paper, on efficiency opportunities that the user can implement with or without the assistance of an energy service provider. This could include, at least for some energy uses, financial incentives such as direct payment of a share of the cost of efficiency to the user, or rebates for the purchase of energy efficient equipment, or financing for efficiency assets. The energy service provider should ensure that the user can receive up-to-date information on what incentives are available and to whom. This could include whether there is an organization that makes this information readily available.

The energy service provider should be the first port of call for such advice. This requirement covers both those energy efficiency opportunities that the user can take up alone (such as choosing a more efficient piece of equipment) without the direct assistance of an energy service provider, and actions where the user relies directly on the energy service provider (such as buying efficient equipment that is not sold in local markets but is available elsewhere, or could become available if the energy service provider offered financial incentives).

4.4.3 Energy efficiency services in the market

The responsible body and relevant authority should ensure that sufficient information is available to the user on the range of efficiency services offered to the entire market in his/her city or region, and on the average reduction in bills that these services yield. A comparison between typical bills for a customer similar to the user and a control-group customer could be used in such a communication. The communication could include a discussion on the effect of policies or actions not directly under the control of the energy service provider, such as building energy codes and equipment efficiency standards.

4.5 Clean renewable energy services

The energy service provider, responsible body and relevant authority should ensure, both jointly and individually, that an organization or a vendor can provide energy services produced through clean renewable energy production and/or delivery to the user's site. This organization or vendor need not be the primary energy service provider(s). The energy service provider should offer information or referrals to such organizations. The energy service provider should not unreasonably or unjustifiably restrict energy service for users who make use of on-site systems or other energy service providers. The energy service provider should offer users the choice of purchasing energy from sources that rely to a greater extent on clean renewable energy. Representations concerning use of clean renewable energy need to be based on a recognized emission trading scheme or another requirement concerning documentation of renewable energy.

Energy service providers should provide information to consumers about the emissions related to energy generation. The energy service providers should provide CO_2 emission factors to enable consumers to compare generation alternatives. The emission factors can be in several forms, including grams per kWh, grams per residential customer, or grams per square meter of building served.

4.6 Contract management and billing

4.6.1 Availability of a clear service agreement

The energy service provider should offer clear, well documented and fair service agreements to users. The service agreement should comply with applicable guidelines, such as those for consumer protection and, in particular, should be as indicated to customers at the time of sale. Where the energy service uses a standard service agreement, this should be made publicly available and easily accessible. Energy service providers should take full responsibility for information provided to their customers, including incomplete or invalid information. Relevant authorities should apply appropriate sanctions in the event of incomplete or invalid information.

Where the operator proposes to change an existing service agreement, customers should be given reasonable notice of the details of the changes which should have passed through due process of scrutiny by the relevant authorities including possibilities for comment on the final decision. The operator should prepare and make available to users procedures for the establishment and termination of agreements. The termination procedures should be simple.

In some sub-sectors, e.g. district heating, it may not be necessary or feasible for an individualised service agreement to be a condition of supply.

4.6.2 Accuracy of billing

The components of delivering an energy service include billing consistent with the list prices regardless of whether prices are determined in a process overseen by a relevant authority or not. The responsible body should take all reasonable steps to ensure that billing to customers is accurate. In the event of a complaint about the accuracy of a meter used to measure the use of service, the operator should perform a meter test, and replace it when the result is not appropriate. There should be a clear procedure for adjustment in the event of an error.

In the event of billing on the basis of methods other than metering, (for example, some district and/or space heating systems) the operator should clearly articulate the basis for the calculation of the bill and allow for mechanisms that safeguard against billing inconsistencies or errors. Depending on the terms of the service agreement, in the event of failure to supply, the bill should be reduced accordingly with detailed and sufficient information on that.

4.6.3 Clarity of billing

The components of delivering an energy service include clear, accurate and detailed information on the structure and content of bills. The service billing system should provide users with paper or electronically based bills, or use other means which are clear, comprehensible, accurate, timely and complete.

The operator should provide the users with detailed information regarding the structure and content of bills. This information should be clear and easy to understand, using plain language and unambiguous presentation. Examples of documents that could be used to provide this information to users include tariff schedules. In the case of different services sharing a common bill with other services, the contents should be clearly distinct, with each service being clearly identified.

NOTE Electronic security and privacy are considerations when deciding to move to electronic or mobile payments.

4.6.4 Response to billing complaints

Where a billing complaint has been made, the energy service provider should provide a timely response to the registered user, which clarifies the problem or resolves the complaint.

The energy service provider should maintain a local service commitment to users, which specifies a maximum response time for billing complaints.

The users should be informed of the procedure for escalating their complaints, including any external sources of help or redress, if their complaints have not been satisfactorily resolved.

Depending on the terms of the service agreement, the energy service provider should give consideration to monetary issues caused by billing errors and should provide acceptable solutions. Action to recover outstanding debts should be suspended until the complaint has been resolved.

NOTE See 4.7.4

4.6.5 Methods of payment

The components of delivery of an energy service should include regular billing and a variety of convenient payment methods to be made available, either as part of a private contract (for services not under a relevant authority) or under clear arrangements developed under the oversight of a relevant authority. The energy service provider should establish systems to facilitate payment by the user in terms of:

a) regularity of billing;

b) choice and flexibility of payment methods;

c) frequency of payment;

d) minimum inconvenience (e.g. in terms of physical placement of payment locations or long queues).

In accordance with local custom and practice, payment methods could include:

— cash;

— cheques;

— bank transfer;

— pre-purchased “energy stamps”;

— credit cards;

— other methods, e.g. short message service (SMS)/text.

The responsible body should bear in mind that poorer customers often prefer to make frequent payments of small amounts and adjust the billing systems to accommodate this preference, if possible. Systems of payment records need to be maintained accordingly, with the possibility for users to verify payments made against amounts due. Any price adjustment for short-term payments should be made at charges that reflect cost recovery. Such charges should be stated in billing documents.

4.7 Promoting a good relationship with the users

4.7.1 General

The energy service provider should address user expectations and should have procedures that promote understanding, good relationships, and information. The energy service provider should provide accessible contact information for user communication and should also have procedures which deal with enquiries from users and which clarify and/or resolve them in a reasonable amount of time. The procedures should also guarantee confidentiality to the user and be carried out in a competent and respectful manner by people who have access to the most current information.

The energy service provider should maintain a local service commitment which specifies a maximum response time to enquiries.

4.7.2 Availability of service information

The operator, responsible body and relevant authorities should openly and transparently provide the users with service information, including the designation of responsibilities and the performance of the services in accordance with local conditions. This information should be provided in languages to be the greatest use to the greatest number of users. This information should also be provided in formats that address disadvantaged consumers, such as those who are illiterate or who have sensory impairments.

EXAMPLE

Customer service:

— contact details (name, address, office hours, telephone contacts, etc.);

— connection and termination procedures;

— complaints procedures and dispute resolution;

— billing procedures and payment procedure;

— how to seek available help to pay the bill (e.g. social security).

Operational matters:

— time lines for service extension;

— emergency procedures.

Financial matters:

— cost structure;

— pricing formula.

Performance of the energy service provider (performance data as published, e.g. by relevant authorities):

— operational accidents and their impact on the public;

— customer satisfaction data and actions as appropriate;

— information on the ratio of renewable energy sources to total production supplied by an energy service provider enabling comparison and thus assisting choice;

— information on greenhouse gas and polluting emissions related to energy services.

4.7.3 Contacts with users

4.7.3.1 General

The energy service provider should ensure that user contacts are responded to and dealt within a reasonable amount of time and in a respectful manner. Such contacts should be possible through written electronic or telephonic channels (including SMS/text and web-based communications) or through visits in person to the offices or service points. The user should be able to notify the energy service provider at any time during an emergency related to the service (see 4.9).

4.7.3.2 User visits to the offices of the energy service provider

The user should be offered appropriate greeting and referral in the office of the energy service provider, characterized by:

— convenient opening hours that are respected;

— reasonable, well-managed waiting times;

— a suitable public reception area offering confidentiality;

— a convenient office location (consideration should also be given to mobile, electronic, or other delivery of office functions, for example to enable bill payments and other transactions).

4.7.3.3 Visits to the user

The energy service provider should ensure that employees of the operator are required to respect appointment times, to show proper identification and to minimize any inconvenience to the user. The procedures should require that employees who visit the users carry appropriate identification and that they show it to the users. Users should be made aware of this requirement. Employees making

visits to users should be competent regarding the reason for the visit and should always behave in a courteous manner.

4.7.4 Complaints and requests

The energy service provider should have procedures for answering and/or resolving complaints and requests made by users or their nominated representatives. The energy service provider should maintain a local customer service commitment which should specify maximum response times for the users' complaints and requests and identifying any recourse for the user or the service provider. For all complaints and requests, the energy service provider should put in place a monitoring system to assess the response time.

Complaint and request methods could include:

— written;

— by telephone, including SMS;

— by e-mail;

— by facsimile;

— verbal by visit or otherwise of the user to the service;

— verbal by visit of employees of the service to the user.

Responsible bodies and relevant authorities should consider the establishment of specialized, autonomous agencies to deal with unresolved disputes between energy service providers and consumers. Their remit should include advising consumers on how to take forward unresolved issues, mediating between parties if agreement cannot be reached and publishing reports summarizing aggregate findings (with anonymity for specific cases) drawing attention to implications for national or local policy.

ISO 10002 provides further guidance on handling complaints and requests.

NOTE See 4.6.4

4.7.5 Consumers in vulnerable circumstances

The energy service provider should ensure that employees have been trained to identify and respond to the needs of consumers who may be vulnerable. The energy service provider should undertake appropriate measures to help these consumers to contact relevant support services and access the services. The relevant authorities need to ensure that social services are available for households undergoing disconnection or whose financial situation may lead to disconnection.

4.7.6 Notification of restrictions and interruptions

The energy service provider should notify users of any restrictions or interruptions of energy supply. The energy service provider should use the most appropriate method to notify affected users about any planned restrictions or interruptions of the supply. In the case of unplanned or exceptional service restrictions or interruptions, the operator should, as soon as is reasonably possible, inform affected users of the reason for, and the expected duration of, the restriction or interruption.

The energy service provider should maintain a local customer service commitment which specifies the minimum period for notification to affected users of planned restrictions or interruptions of supply.

4.7.7 Community activities

The energy service provider should participate in local community activities, whenever these are relevant to the service, or could organize its own activities, such as facility open houses and tours. The

energy service provider should promote a good relationship with the local community by providing information proactively and being aware of local expectations (as this could result in, for example, cooperation from the community and volunteer participation in the case of emergency).

4.7.8 Participation of users

The responsible body and/or relevant authorities should allow for and promote participation by users in decisions regarding the energy service, which can take several forms. Examples are:

— ongoing consultation through standing user committees which may monitor complaints and standards of service by means of in-person questionnaires or interviews;

— participation in dispute resolution for individual cases;

— consultation at key decision points, such as new programmes to extend the network, set prices for a new period, considering the content of new operating contracts and/or changes of the responsible body;

— consultation can take place between users and operators, responsible bodies and/or relevant authorities, either jointly or separately.

Users, or their representatives, may request the operator, responsible body and/or relevant authorities to disclose information. When possible, the operator, responsible body and relevant authorities should provide all available information actively when requested to do so.

4.8 Protection of the environment

4.8.1 General

This protection encompasses all the permanent or temporary impacts of the energy service on the environment, including its failures to provide service. The protection of the environment may include maintenance of the infrastructure.

4.8.2 Sustainable use of natural resources

The operator, responsible body and relevant authorities should promote and practice a sustainable use of energy resources, as well as other natural resources (e.g. water). The service should undertake actions such as:

— minimizing system losses;

— minimizing environmental contamination;

— providing or assuring that other organizations provide education and general information to users about efficient use of energy and other resources;

— providing or assuring that other organizations provide market-based incentives or financing for efficiency and for clean renewable on-site generation assets;

— setting tariffs and/or providing services which promote improved energy efficiency and/or reduced energy consumption (e.g. establishing an energy management system such as that described in ISO 50001, conducting energy audits to identify energy savings measures, expanding renewable energy).

4.8.3 Environmental impact

The operator, responsible body, and relevant authorities should take positive actions to minimize the impact of their activities on the environment, including any residual impacts. The results of implementation should be communicated to the stakeholders. These activities should be in accordance with applicable regulations and guidelines and could be enhanced by an environmental management

system (e.g. ISO 14001). The operator, responsible body and/or relevant authorities should provide regular information about the environmental impact of the activities relating to energy services.

4.9 Safety and emergency management

Safety and emergency management procedures include the information, plans and solutions to maintain or restore service in the event of major incidents or natural disasters, including pollution of the environment linked to the service.

The operator, responsible body and relevant authorities should develop and regularly test appropriate emergency and prevention plans based on risk management principles that include:

a) prevention measures;

b) the internal organization to deal with emergencies;

c) training procedures for employees;

d) appropriate information for users;

e) procedures for the restoration of normal service operation.

Emergency plans should be designed to restore the service to users in a reasonable time and reduce risks and inconvenience as far as practically possible in accordance with local conditions. Emergency plans should be in accordance with general emergency plans for the area, and integrated with them. The operator, responsible body and/or relevant authorities should provide easily accessible means of contact during an emergency. Such means may be common to all kinds of emergencies in a given area.

During any emergency, the operator, the responsible body or the relevant authority should provide timely information to the users on the following:

— the nature of the incident and the risks (if any) involved;

— contact details for appropriate representatives of the service provider;

— what (if anything) the user should do;

— the estimated time before normal service is resumed and what temporary solutions are available.

The information should be distributed to users by appropriate and available methods depending on the circumstances of the emergency.

The telephone and electronic service provided should be available at all times to respond to calls regarding emergencies. The operator should maintain a local service commitment which specifies a maximum waiting time and a maximum response time for emergency calls. In areas where neither a telephone nor an electronic service is available, the operator should provide an alternative system for responding to enquiries or emergency contacts from users.

5 Assessment criteria for energy service to users

5.1 General

The service to the users should be assessed taking into account the users' needs and expectations and the results of the actions defined from the guidelines presented in Clause 4. Performance indicators can be used to measure the fulfilment of these needs and expectations and the degree of success of the actions.

This clause presents key assessment criteria needed to evaluate the fulfilment of the related objectives. For every user need, expectation and guideline in Clause 4, corresponding assessment criteria are given in this clause. To assess the service for each objective, the energy service provider should request an

appropriate stakeholder to develop one or more performance indicators. The specific performance indicators to be used depend on local conditions (e.g. in population with high illiteracy rates, performance indicators based on written complaints are of limited value; in non-network systems, performance indicators related to continuity measures are not relevant). In every case, the performance indicators should be developed using one or more of the assessment criteria outlined in this clause and the methodology presented in Clause 6.

When the assessment criteria listed below (see 5.2) cannot be used, the energy service provider in consultation with the relevant authority should work with all stakeholders in a transparent process to develop useable alternatives. The alternative assessment criteria and the rationale for them should be published and be publically available.

5.2 Access to energy service

The assessment criteria include:

— quantity of energy/fuel available to users;

— equity in access to energy service;

— access to energy service in rural areas and poor areas;

— access of low income customers to energy service;

— affordability of energy service;

— implementation of public policy to support access to energy service for poor and vulnerable consumers;

— availability of feasible and affordable alternatives to the service;

— sustainability of the energy service.

5.3 Provision of energy service

5.3.1 Time to establish new service provisions

The assessment criteria include:

— compliance with the standard service connection time;

— simplicity of establishing a new service connection;

— average time to establish alternative forms of service provision;

— user satisfaction with the time taken to establish a service connection.

5.3.2 Repairs

The assessment criteria include:

— effects on users of service interruptions (planned/unplanned);

— extent of information to users on interruptions (planned/unplanned);

— degree of success in finishing planned repairs in the specified time.

5.3.3 Price of service

The assessment criteria include:

— variation in price regarding historic price levels (taking into account currency fluctuations);

— variation in bills for customers with comparable energy service needs;

— degree of cost-recovery and degree of coverage by subsidies;

— affordability of the service;

— comparison to other forms of provision of the energy service (e.g. ratio of vendor prices to networked energy prices);

— comparison to other networked service.

5.3.4 Quality and quantity of energy service

The assessment criteria include:

— existence of a service development plan;

— balance between demand and capacity of the energy supply system;

— efficiency in the use of energy by the supplier;

— efficiency at the user level, including the effects of efficiency services provided by the energy service provider and other energy service providers that operate in the area, and the effects of government regulations and incentives and information/education programmes on efficiency;

— quantity or rate of transmission or transport and distribution losses;

— results of analyses of service standards and compliance with applicable regulations and guidelines;

— extension of user-owned or hosted supplies of clean renewable energy;

— energy related complaints;

— customer satisfaction levels.

5.3.5 Continuity of energy supply

The assessment criteria include:

— degree of continuity of energy supply;

— regularity of non-network means of supply;

— continuity of related complaints.

NOTE Continuity refers to the consistent availability of energy supply over time, reported in scales of seconds, hours, days, and seasons. Regularity refers to the consistent delivery of energy supplies, according to a known and disclosed schedule (e.g. based on days or hours of delivery) or service agreement (e.g. based on weather or energy supply stock levels).

5.3.6 Coverage and availability of energy service

The assessment criteria include:

— degree of coverage or availability;

— equity of coverage or availability.

5.4 Energy Efficiency services

5.4.1 External conditions pertaining to energy efficiency services

The assessment criteria include:

— existence of energy efficiency mechanisms such as supportive framework or incentives by governments or government bodies;

— existence of energy efficiency improvement programmes and/or energy efficiency measures that can be verified or measured or estimated;

— provision of general education in the public and/or private sectors with regards to energy efficiency service and/or energy efficiency improvement;

— provision of aggregated statistical information on billing/metering data analysis and related services.

5.4.2 Information on efficiency provided to the energy services user by the energy service provider

The assessment criteria include:

— quantity and accuracy of efficiency information available to the customer, regardless of the source of the information;

— annual budgets for information services;

— tailoring of the information to local conditions and needs;

— level of consumer awareness, as determined by surveys;

— level of efficiency services and efficient equipment readily available in local markets.

5.4.3 Incentives for efficiency provided to the energy services user by the energy services provider

The assessment criteria include:

— level of consumer awareness of the availability of incentives;

— diversity of customers and energy uses eligible for such incentives;

— level of budget per customer for such services, regardless of the source of the funds;

— projected or measured level of user savings, annually or cumulatively over time;

— level of user consumption, adjusted for income or for variations in energy services demands;

— levels of these metrics for comparable regions or energy service providers.

5.5 Clean renewable energy services

5.5.1 External conditions pertaining to on-site generation and grid

The assessment criteria include:

— diversity of collection of energy from many sources (e.g. wind, solar, micro turbine, gas turbine);

— degree of environmental impacts;

— security of stable supply;

— efficiency of use of clean renewable energy.

5.5.2 Energy service provider actions pertaining to on-site generation and grid

The assessment criteria include:

— diversity of energy sources (e.g. wind, solar, micro turbine, gas turbine) available through contracts or programmes;

— degree of environmental impacts;

— security of stable supply of available energy sources;

— the extent to which the renewable energy can be consumed efficiently by users, and the extent to which renewable energy production will be curtailed or used inefficiently due to system operating characteristics;

— direct or third party commercial availability of clean renewable energy to users;

— ability of a user of clean renewable energy to connect to an existing electric or natural gas grid or distribution system where there is one;

— tariff structure for connections to existing grids.

5.6 Contract management and billing

5.6.1 Availability of a clear service agreement

The assessment criteria include:

— existence of a clear publicly available service agreement;

— service agreement related complaints;

— existence of a publicly available template for service agreement;

— compliance with applicable regulations and guidelines (e.g. consumer protection legislation).

5.6.2 Accuracy of billing

The assessment criteria include:

— corrected bills;

— metering errors;

— results of meter tests;

— the proportion of bills issued to meter readings.

5.6.3 Clarity of billing

The assessment criteria include:

— contacts regarding the bill;

— existence of additional information regarding the bill;

— customer surveys regarding the bill, including;

— complaints, understandings and requirements.

5.6.4 Methods of payment

The assessment criteria include:

— choice of payment methods;

— variety of payment methods;

— convenience of local payment points;

— efficiency of payment record systems.

5.7 Promoting a good relationship with users

5.7.1 General

The assessment criteria include:

— existence of an energy management system (e.g. ISO 50001);

— existence of a management unit in charge of relations with users;

— existence of a participation scheme for users;

— user surveys regarding the relationship with the energy service provider;

— degree of privacy or confidentiality enjoyed by users.

5.7.2 Contact with users

5.7.2.1 Written contacts

The assessment criteria include:

— effectiveness in handling written contacts;

— conformity with the maximum specified response time specified in contracts.

5.7.2.2 Telephone and electronic contacts

The assessment criteria include:

— effectiveness in handling telephone, electronic and internet contacts;

— conformity with the maximum specified response time to complaints or requests;

— conformity with the maximum specified waiting time for telephone or electronic acknowledgement.

5.7.2.3 User visits to the offices of the service provider

The assessment criteria include:

— availability, accessibility and convenience of offices;

— efficiency and effectiveness in handling user visits to the offices.

5.7.3 Visits to the user

The assessment criteria include:

— existence of procedures for visits to the user including identification procedures;

— complaints regarding visits to the user;

— percentage of appointments kept/missed.

5.7.4 Response to complaints and requests

The assessment criteria include:

— efficiency in complaint handling;

— effectiveness in complaint handling;

— conformity with the standard response time;

— user satisfaction with complaint resolution;

— number of repeat contacts, unresolved or escalated complaints;

— action taken at corporate level to respond to consumer feedback.

5.7.5 Notification of restrictions and interruptions

The assessment criteria include:

— efficiency and effectiveness in notifying users of interruptions to the service;

— conformity with the specified notification time.

5.7.6 Availability of service information

The assessment criteria include:

— availability of information regarding the service to the general public (e.g. website, periodic reports);

— complaints regarding availability of information;

— accessibility of available information (potential number of users with access to information channels).

5.7.7 Community activities

The assessment criteria include:

— existence of a policy for community participation by the service;

— stakeholders involved directly in activities with the service (e.g. visits to operating facilities, school programmes, information packs distributed).

5.7.8 Participation of the users

The assessment criteria include:

— existence of a framework or collective agreements to establish user's participation;

— degree of user participation in consultation processes regarding governance of the service;

— interventions delivered by users' committees on key issues such as contract renewals, complaints monitoring.

5.8 Protection of the environment

5.8.1 Sustainable use of natural resources

The assessment criteria include:

— existence of an environmental management system (e.g. ISO 14001), environmental impact assessment report and other related documents;

— transmission or transportation and distribution losses;

— efficiency in energy and water consumption;

— efficiency of use of energy by domestic and non-domestic users;

— level of energy consumption compared to control regions with comparable incomes or gross domestic product or energy services demands;

— level of emissions of greenhouse gases per capita or per other normalization variables.

5.8.2 Environmental impact

The assessment criteria include:

— existence of an environmental management system (e.g. ISO 14001), environmental impact assessment report and other related documents;

— compliance with applicable regulations and guidelines;

— total pollutant emission from the energy production and distribution system;

— environmental impact of energy use and consumption;

— level of concentrations of air and water pollution to which all citizens are exposed;

— level of hazardous waste caused by the service.

5.8.3 Safety and emergency management

The assessment criteria include:

— existence and regular testing of an emergency response plan (including prevention measures);

— availability of means of enquiry during an emergency;

— efficiency and effectiveness in communicating emergency information;

— organization, role, training and regular activities for preventing and dealing with an emergency;

— level of spills, leaked fluid, emissions, physical waste generated;

— level of injuries or incidents;

— response time to accidents.

6 Assessment of energy service

6.1 General

Assessment as a process should be managed to achieve a clear and precise objective, and refer to the components outlined in Clause 4. The following should be established as part of a comprehensive policy (see 6.2):

— objective and scope of assessment (see 6.3);

— parties and their role involved in an assessment (see 6.4);

— methodology of assessment (see 6.5);

— necessary service assessment criteria (see 6.6);

— resources necessary to conduct an assessment (see 6.7);

— documents, reports, findings and proposed improvements (see 6.8).

How, and by whom, the assessment information will be used should also be identified. If not precisely specified, an assessment can cause confusion or conflicts among the parties involved. There is a great variety of assessments, depending on the characteristics listed above.

EXAMPLE Environmental performance assessment, conformity assessment relating to best practice, risk assessment, audits.

Assessment, whether internal by energy service providers or external, is an on-going process to achieve continual improvement in the provision of energy services.

An assessment should be conducted with attention to the following characteristics:

— independence;

— impartiality;

— integrity;

— suitability;

— effectiveness;

— traceability.

The output of the assessment process should be expressed in terms of the assessment criteria and resulting performance indicators. The output should be publically available and facilitate further decision-making by the relevant authority, energy service provider or other stakeholders.

6.2 Assessment policy

A sound assessment policy is a key component for continual improvement of the service. It should provide a general framework for the assessment. It facilitates the determination of the actual situation and how strategic planning and decision making influences performance. The policy may be established by the relevant authority, responsible body, by the energy service providers, or by a group of energy service providers acting together. It should be publically available and regularly updated.

An assessment policy should address the performance of the parts of the energy service provider which interact with final energy service consumers. These parts may include overall efficiency and effectiveness of the strategic planning and decision-making activities. It could be designed to encompass some or all of the various management systems and procedures, and include self-assessment in the management component.

The assessment policy could assist in the measurement of achievements of the various functions and activities performed for providing the services, closing the cycle and linking

— the set of components stipulated in Clause 4;

— the selected assessment criteria in Clause 5.

The assessment policy could incorporate collective learning, on-going improvement and feedback for decision making.

6.3 Objective and scope of an assessment

The general objective of assessment is to use the assessment criteria in Clause 5 to compare the measured state of energy service delivery to the objectives for energy service delivery in Clause 4. As assessments are repeated over time, decreases in the gap between the energy service objectives and measured energy service provision can be determined. The objective and scope for a specific assessment should be clearly defined. This document does not deal with the assessment of the management of the service.

Service assessments should be focused on service performance as indicated by the assessment criteria. These criteria should provide a guide for the satisfaction of users given the service providers' resource or cost constraints and on meeting the objectives for the service, but not on the means used or the detailed organization implemented for meeting the objectives. The service performance can include the total amount of energy reduction by the user.

For service to users, assessment should focus on the interaction between the energy service provider and the user (e.g. measuring user satisfaction, total effectiveness of energy reduction or energy consumption rate). Assessment of the provision of energy service to users should effectively involve the users in the process. With regard to assessment of energy service (in addition to the assessment of service to users), the general recommendation is to focus on service performance. Nevertheless, some activities do not fit well with direct measurement of their performance. In such cases, indirect assessment of performance can be accomplished through the evaluation of some management systems (e.g. risk management, security management, asset management).

6.4 Parties involved in an assessment

Responsible parties and all other parties (e.g. the assessment team) involved in an assessment should be named. Responsibilities, roles and framework of operation for each party should be specified.

When the responsible body and the operator(s) are different entities, assessment procedures should be agreed to in advance if they are not fixed by the relevant authority. This is to ensure provision of coherent results from all involved parties in accordance with respective rights and responsibilities. Concerning service to users, the responsible body and its operator(s) should take a consistent position relevant to the assessment procedures.

6.5 Methodology of assessment

Due to the diversity of legal, institutional and managerial systems governing the provision of energy service, this document does not present detailed service assessment procedures. However, this document should be used to configure assessment procedures appropriate to local conditions.

The selection of the assessment tools should fit with assessment objectives and scope. Performance indicator systems are one of these tools (see Clause 7).

NOTE In some cases, specifications for assessments can be required by relevant authorities or by financial investors.

Assessment methodology and procedures should be:

— developed with a capacity for repeated measurement to determine trends;

— periodically reviewed to check their efficiency and effectiveness, paying attention notably to avoidance of duplication;

— flexible to adjust to changes in objectives, framework, assessment criteria and indicators as new insights are gained;

— matched to the importance of the action or activity being assessed and the potential benefit for improvement.

Some types of assessment procedures may be already standardized. In such cases, it is recommended that relevant standards be used (e.g. see ISO 50006 for performance measurement indicators and see ISO 50015 for energy measurement and verification.)

If specifications are established for energy service at a geographically relevant level (country, region, city, and organization), then these specifications should also include provisions concerning assessment processes.

6.6 Service assessment criteria

Service assessment criteria should be selected in accordance with the objectives and requirements of interest as determined by stakeholders taking into account local conditions. Service assessment criteria are the link between components of energy service and performance indicators. The example below shows, for one of the components proposed in Clause 4, possible service assessment criteria.

For each component listed in Clause 4, Clause 5 presents assessment criteria for service to users. It should be noticed that a service assessment criterion can be related to more than one component.

EXAMPLE Component: written contacts.

Possible service assessment criteria:

— effectiveness in handling written contacts;

— conformity with the maximum specified response time.

6.7 Resources to conduct the assessment

The party that undertakes an assessment should ensure that the necessary resources, including human, financial, organizational and information technology are available. This team should be empowered to manage and steer the assessment process within the given framework (e.g. objectives, scope, resources, parties involved, methodology, and outputs).

6.8 Production of output and recommendations for its use

The assessment output should be a report about the assessment process and its conclusions, findings and suggestions for improvement. The report should include additional guidelines for the use of these outputs. The report should make transparent the distinction between the defined targets and the actual service.

7 Performance indicators

7.1 General

Performance indicators are used to measure the efficiency and effectiveness of a service in achieving its objectives (particularly those identified in Clause 4). Performance indicator systems should be considered as a key assessment tool among the various existing assessment tools.

Performance indicators should be used within the context of a comprehensive service assessment system. This system should include, amongst other tools, a coherent set of indicators and their related

components that allow for a clear definition of these performance indicators and assist in their interpretation.

This assessment is similar in its methods for promoting continual improvement to those in an energy management system (such as that described in ISO 50001), but it differs from such a system in important ways as shown in Figure 1.

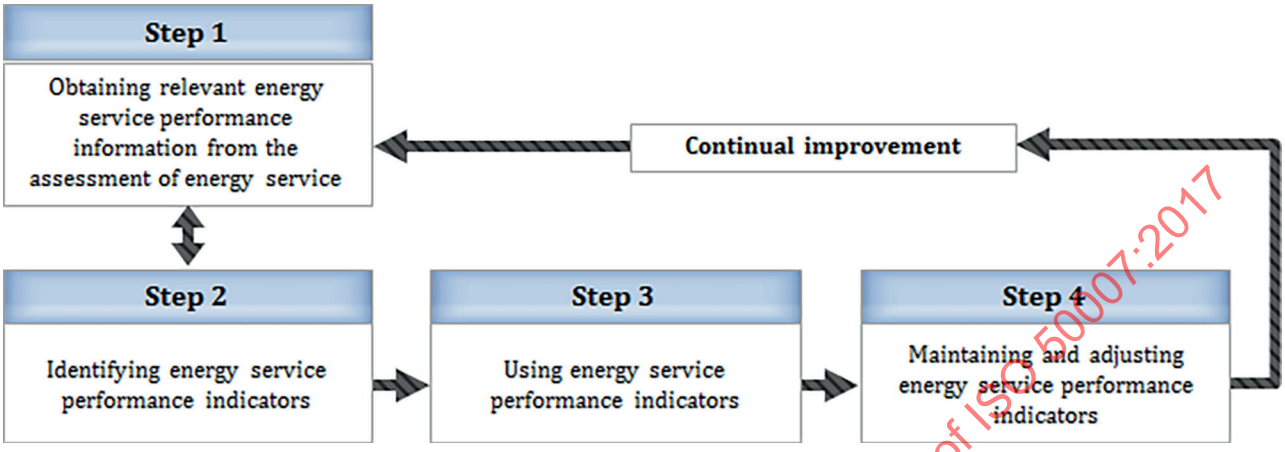

Figure 1 — Using performance indicators to promote continual improvement

7.2 Performance indicator systems

7.2.1 General

A performance indicator system comprises a set of the following key components:

— performance indicators;

— variables;

— context information.

In addition, specific targets for each indicator should be established and routinely monitored, tracked and adjusted as needed.

7.2.2 Performance indicators

Individual performance indicators should be specific and collectively appropriate for representing the relevant aspects of the service in an accurate and unbiased way.

Each performance indicator should:

— be clearly defined, with a concise and unequivocal interpretation;

— be assessable from variables that are easily and reliably measured at a reasonable cost;

— contribute to the expression of the level of actual performance achieved in a certain area;

— be related to a specified geographical area (and, in the case of comparison analysis, it should be for the same geographical area);

— be related to a specific time period (e.g. annual, quarterly);

— allow for a clear comparison with targeted objectives and simplify an otherwise complex analysis,

— be verifiable;