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Smart community infrastructures — Review of existing activities relevant to metrics

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National foreword

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Contents

Page

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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 268/SC 1, *Sustainable development in communities*.

Introduction

Community infrastructures – energy, water, transportation, waste, information and communications technology (ICT), etc. – support the operations and activities of communities and have a significant impact on economic and social development. They are a means towards ensuring the delivery of goods and services that promote economic prosperity and growth, and contribute to the quality of life. Insufficient, inadequate community infrastructures can create obstacles to achieving a change in the distribution of relative incomes through the growth process to favour the poor (pro-poor growth). Furthermore, the demand for community infrastructures, as scalable and integrable products, will continue to expand significantly in the decades ahead, driven by major factors of change, such as population growth and urbanization.

It has long been argued that human activity is surpassing the capacity of the Earth. Community infrastructures developing in line with global population growth sometimes have less desirable consequences to sustainability. This is because the imperative for further infrastructure (i.e. accelerated population growth) conflicts with a path to sustainability. As a result, there is a need for community infrastructures to play a role in sustainable development to balance economic, social and environmental aspects and to meet the needs of communities more effectively and efficiently.

This indicates an urgent need to develop and implement more effective and efficient technological solutions in terms of environmental impact, economic efficiency and quality of life. Such solutions are often referred to as "smart." A number of plans and projects to build "smart cities" are currently underway. In addition, there are increases in international trade for community infrastructure products and services.

In planning and procuring community infrastructures to contribute to sustainable development, a wide range of evaluation concepts and metrics are available or under consideration. Some of these evaluation methods are not publicly available. Though they are helpful, their complexity, redundancy and lack of transparency make it difficult for public and private buyers (e.g. governments, city planners, investors, operators of community infrastructures) to evaluate multiple proposals or plans consistently and fairly, thereby increasing the burden of decision making. Different concepts and metrics are creating uncertainty in which infrastructure vendors have difficulty in developing new technology without an appropriate International Standard.

The purpose of standardization in the field of smart community infrastructures is to promote the international trade of community infrastructure products and services and disseminate information about leading-edge technologies to improve sustainability in communities by establishing harmonized product standards to evaluate their technical performances contributing to sustainability of communities. The users and associated benefits of these metrics are illustrated in Figure 1.

In this Technical Report, the concept of smartness is addressed in terms of performance relevant to technologically implementable solutions, in accordance with sustainable development and resilience of communities as defined in ISO/TC 268.

This Technical Report reviews existing activities relevant to metrics for "smart" community infrastructures and provides directions for further standardization. This Technical Report discusses metrics which is designed to help buyers to evaluate technical performances of community infrastructure products and services for procurement and, through the development of future technical standards in this area, may additionally be used in real-time monitoring for the operation of an existing community infrastructure. The users and associated benefits of these metrics are illustrated in Figure 1.

It is expected that this Technical Report will be useful to the following individuals/groups:

— national and local governments;

— regional organizations;

— community planners;

— developers;

— community infrastructure operators (e.g in the field of energy, water, waste, transportation, ICT);

— community infrastructure vendors (e.g. constructors, engineering firms, system integrators or component manufacturers);

— non-governmental organizations (e.g.. consumer groups).

This Technical Report uses a model of the community functions in Table 1 and reviews activities relevant to metrics for community infrastructures.

Table 1 — Layers of a community

Layers	Examples of functions
Community services	Education, healthcare, safety and security, tourism, etc.
Community facilities	Residences, commercial buildings, office buildings, factories, hospitals, schools, recreation facilities, etc.
Community infrastructures	Energy, water, transportation, waste, ICT, etc.
NOTE "Water" includes sewage and wastewater as well as drinking water.	

Contribution

As illustrated in Table 1:

— Functions of community infrastructures are fundamental to support the other two layers;

— Products and services of community infrastructures are more technology-oriented, more internationally-tradable than those in other layers and therefore appropriate for international standardization.

NOTE 1 This compilation of existing activities is indicative only.

This Technical Report is intended to be used in the following ways:

— as a reference document

— to analyze the commonalities and gaps in existing activities relevant to metrics on smart community infrastructures

— to review the value of deploying smart community infrastructures

— as a basis for future standardization

— to assist stakeholders to have a better understanding of state-of-the-art smart community infrastructures around the world

NOTE 2 The environmental, social and economic subsystems of the global system interact and are interdependent. They are often referred to with phrases such as the three dimensions or pillars of sustainability. [SOURCE: ISO/Guide 82:2013 3.1].

NOTE 3 OECD states that a pace and pattern of economic growth that helps poor women and men to participate in, contribute to and benefit from it is in short pro poor growth.

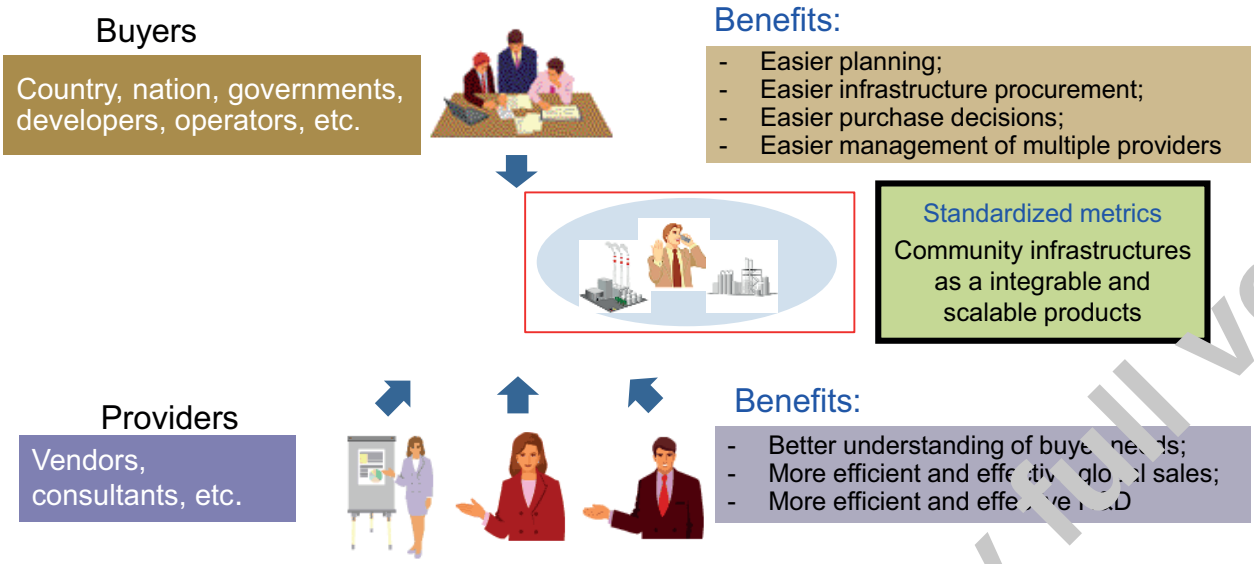

Figure 1 — Users of the metrics and associated benefits

TECHNICAL REPORT **ISO/TR 37150:2014(E)**

Smart community infrastructures — Review of existing activities relevant to metrics

1 Scope

This Technical Report provides a review of existing activities relevant to metrics for smart community infrastructures.

In this Technical Report, the concept of smartness is addressed in terms of performance relevant to technologically implementable solutions, in accordance with sustainable development and resilience of communities, as defined in ISO/TC 268.

This Technical Report addresses community infrastructures such as energy, water, transportation, waste and information and communications technology (ICT). It focuses on the technical aspects of existing activities which have been published, implemented or discussed. Economic, political or societal aspects are not analyzed in this Technical Report.

NOTE This Technical Report is not a recommendation document for best practices. Although sustainability objectives have been considered, the main subject of this Technical Report is the analysis of existing methodologies for smart community infrastructures.

2 Normative references

There are no normative references.

3 Terms and definitions

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

3.1
buyer
person who aims to get possession of a good, service and/or right through providing an acceptable equivalent value, usually in money, to the person providing such a good, service and/or right

[SOURCE: ISO/IEC 15944-1:2002, 3.8]

3.2
environmental impact
any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects

[SOURCE: ISO 14001:2004, 3.7]

3.3
interoperability
ability of systems to provide services to and accept services from other systems and to use the services so exchanged to enable them to operate effectively together

[SOURCE: ISO 21007-1:2005, 2.30]