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Smart community infrastructures — Principles and requirements for performance metrics

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National foreword

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**Smart community infrastructures —
Principles and requirements for
performance metrics**

*Infrastructures communautaires intelligentes — Principes et
exigences pour la métrique des performances*





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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. 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, *Sustainable development in communities*, Subcommittee SC 1, *Smart community infrastructures*.

Introduction

Communities have various goals to achieve, including, e.g. quality of life, economic growth, poverty reduction, antipollution, congestion mitigation.

Community infrastructures such as energy, water, transportation, waste, information and communications technology (ICT), etc. are fundamental to support the operations and activities of communities. Investment in community infrastructures is an important enabler for communities in achieving the internationally recognized community goals, e.g. the United Nations Millennium Development Goals (MDGs)¹⁾ and promoting pro-poor growth.²⁾ The demand for community infrastructures will continue to expand significantly in the decades ahead, driven by major factors of change, such as population growth, and urbanization. According to the Organization for Economic Co-operation and Development (OECD) report “Infrastructure 2030,” total cumulative infrastructure requirements amount to about USD 53 trillion over 2010/2030.

It has long been argued that human activity is surpassing the capacity of the Earth. The imperative for further infrastructure (e.g. improving living standards and addressing resource efficiency) sometimes conflicts with a path to sustainability. As a result, there is a need for community infrastructures to contribute to sustainability and resilience of communities more effectively and efficiently by balancing multiple perspectives and integrating decision making. 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 including solution-providing services.

ISO deliverables are an important source of technological information. ISO deliverables help governments and businesses of all shapes and sizes to work more efficiently, increase productivity, increase credibility and confidence, and access new markets. For example, as they define the performances that products and services have to meet in the global markets, ISO deliverables help developing countries or small and medium-sized enterprises (SMEs) take part fairly in international trade.

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. The users and associated benefits of these metrics are illustrated in [Figure 1](#).

This Technical Specification gives principles and specifies requirements for community infrastructure performance metrics and gives recommendations for analysis of community infrastructures.

It is expected that this Technical Specification 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, transportation, waste, ICT);
- community infrastructure vendors (e.g. constructors, engineering firms, system integrators or component manufacturers);
- non-governmental organizations (e.g. consumer groups).

1) All 193 United Nations member states and at least 23 international organizations have agreed to achieve these goals by 2015. One of the main outcomes of the Rio+20 Conference was the agreement by member States to launch a process to develop a set of Sustainable Development Goals (SDGs), which will build upon the Millennium Development Goals and converge with the post 2015 development.

2) Stimulate economic growth for the benefit of poor people (primarily in the economic sense of poverty).


Using a model of the community functions in [Table 1](#), this Technical Specification focuses on assessing the performance of infrastructure layer and respects the societal or cultural diversity of communities as traits of each community.

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 and more internationally-tradable than those in other layers and therefore appropriate for international standardization.

Table 1 — Layers of a community

Layers	Examples of functions
Community services	education, healthcare, public 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.
[SOURCE: ISO/TR 37150:2014, Introduction]	



NOTE 1 Because of the diversity of communities, it is not realistic to apply ‘one-size-fits-all’ solutions.

NOTE 2 This Technical Specification considers not only built or constructed community infrastructures but also utilization of natural systems (e.g. green infrastructure which uses natural hydrologic features to manage water and provide environmental and community benefits).

NOTE 3 This Technical Specification recognizes two types of ICT: The first type is the ICT as community infrastructures, e.g. telecommunication, common database, etc. The second type is the ICT which are integrated within a facility or equipment as a means for control. This Technical Specification is focused on the former type of ICT although the latter type of ICT is often a useful means to achieve smart communities or smart community infrastructures.

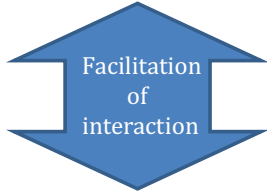
Owners and operators

Countries, nations, governments,
 investors, developers, etc.



Benefits:

- Easier planning;
- Easier infrastructure procurement;
- Easier purchase decision;
- Easier management of multiple providers



Standardized metrics
 Community infrastructures
 as integrable and scalable
 products

Providers

Vendors,
 consultants, etc



Benefits:

- Better understanding of owner needs;
- More efficient and effective global sales;
- More efficient and effective R&D

NOTE SOURCE: ISO/TR 37150:2014, "Introduction", modified.

Figure 1 — Users of the metrics and associated benefits

Smart community infrastructures — Principles and requirements for performance metrics

1 Scope

This Technical Specification gives principles and specifies requirements for the

- definition,
- identification,
- optimization, and
- harmonization

of community infrastructure performance metrics, and gives recommendations for analysis, including

- smartness,
- interoperability,
- synergy,
- resilience,
- safety, and
- security

of community infrastructures.

Community infrastructures include, but are not limited to, energy, water, transportation, waste, and ICT.

The principles and requirements of this Technical Specification are applicable to communities of any size sharing geographic areas that are planning, commissioning, managing, and assessing all or any element of its community infrastructures. However, the selection and the importance of metrics or (key) performance indicators of community infrastructures is a result of the application of this Technical Specification and depends on the characteristics of each community.

In this Technical Specification, 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.

NOTE 1 This Technical Specification recognizes that solutions for similar problems in communities in different economic situations (e.g. developed and developing countries) can call for different importance of metrics or performance indicators of community infrastructures. This Technical Specification is not a recommendation document for best practices. This Technical Specification does not recommend, e.g. replicating existing specific smart infrastructures or leveling them up to the standards of such model projects at a large scale. It is left to the users whether setting targets or not when applying this Technical Specification.

NOTE 2 Though this Technical Specification does not address principles or requirements specific to a particular type of community infrastructures, compatibility of this Technical Specification with existing International Standards for a particular type of community infrastructure (e.g. ISO 24510:2007, ISO 24511:2007, and ISO 24512:2007) was considered.

NOTE 3 This Technical Specification does not address measurement, reporting or verification. For possible deliverables related to this Technical Specification, see ISO/TR 37150:2014, Clause 6. This Technical Specification is not into comparing different communities, but to allow communities to assess community infrastructures more effectively.