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Framework for integration and operation of smart community infrastructures —

Part 2: Holistic approach and the strategy for development, operation and maintenance of smart community infrastructures

Cadre pour l'intégration et l'exploitation des infrastructures communautaires intelligentes —

Partie 2: Approche holistique et stratégie pour le développement, le fonctionnement et la maintenance des infrastructures communautaires intelligentes

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Foreword

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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 of 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 268, *Sustainable cities and communities*, Subcommittee SC 1, *Smart community infrastructures*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

In the foreseeable future, urban density is likely to increase, resulting in further urbanization complexity. From this perspective, a “smart community” approach is an important concept to address the urban challenges by integrating different forms of infrastructures in a rational and efficient manner.

An important aspect of a smart community is integrating infrastructures as “a system of systems”. In addition to that, smart community has various stakeholders including users, and each smart community infrastructure has an extended scope lifecycle (See Figure 1). A major benefit of a system of systems is that the sector specific performance of all infrastructures can be validated with regard to their contribution to the overall goals of a community. As a result of this validation, these goals can be adapted and improvement targets for each infrastructure can be derived. Thus, an intended concept of a smart community being validated and updated through its lifecycle concerning the integration and operation of smart community infrastructures is realized efficiently at all times (See Figure 2).

Until now, it has not been possible to ensure consistency across infrastructure types to meet the requirements for smart community infrastructures as owners have focused on just assembling solutions to each subsystem of infrastructures. In order to ensure consistency of the specification of smart community infrastructures as a whole, firstly, functions of each subsystem need to be clarified and arranged based on the needs for a smart community, and secondly, the perspectives of various stakeholders and lifecycle of infrastructures need to be considered.

To solve the above issues and realize well-functioning smart community infrastructures as a whole, infrastructure development and operation processes are expected to include a common framework, as described in ISO/TR 37152, composed of three elements (See Figure 3):

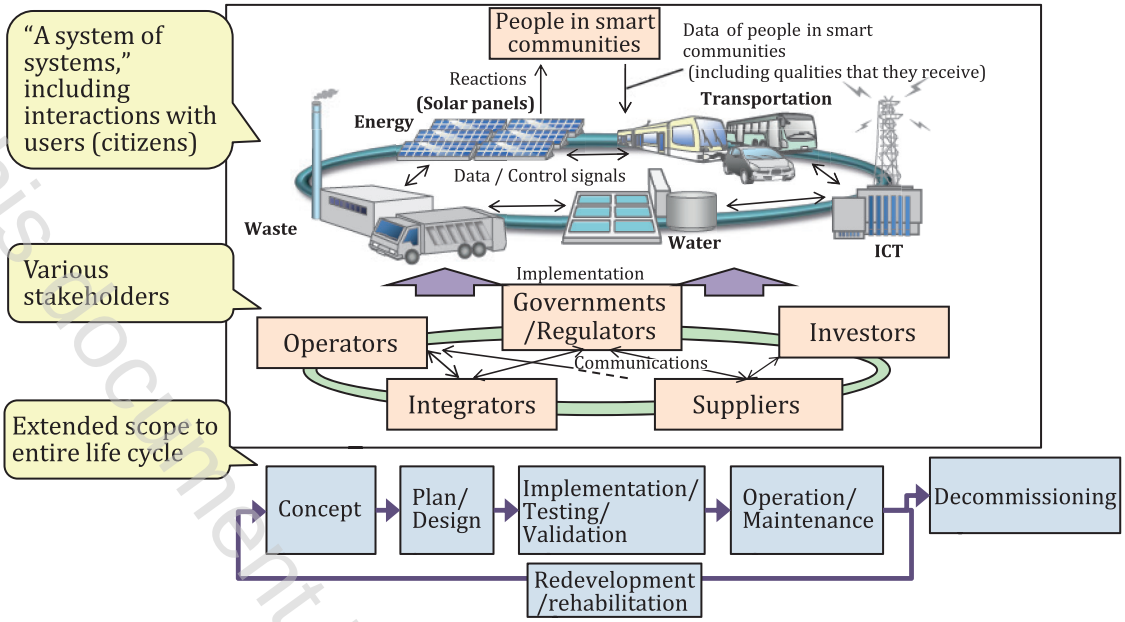
— element (A), allocation of consistent specification requirements to each component of a system and validation of the allocating procedures;

— element (B), specification requirements associated with interaction and adoption of adequate measures into planning and operation;

— element (C), process to facilitate information sharing and communication among stakeholders.

On conducting the study, it was found that each stakeholder will have various benefits through applying this framework. (See Clause 5)

This document provides the guideline to realize element (A), providing guidelines for specification to ensure consistency of smart community infrastructure and to adopt adequate measures into planning and operation. Part 1 is about element (B).



NOTE The infrastructures, stakeholders and lifecycle phases pictured in this figure are only some of the examples. Other infrastructure, such as urban agricultural system, might also be included.

Figure 1 — Characteristics of smart community infrastructure

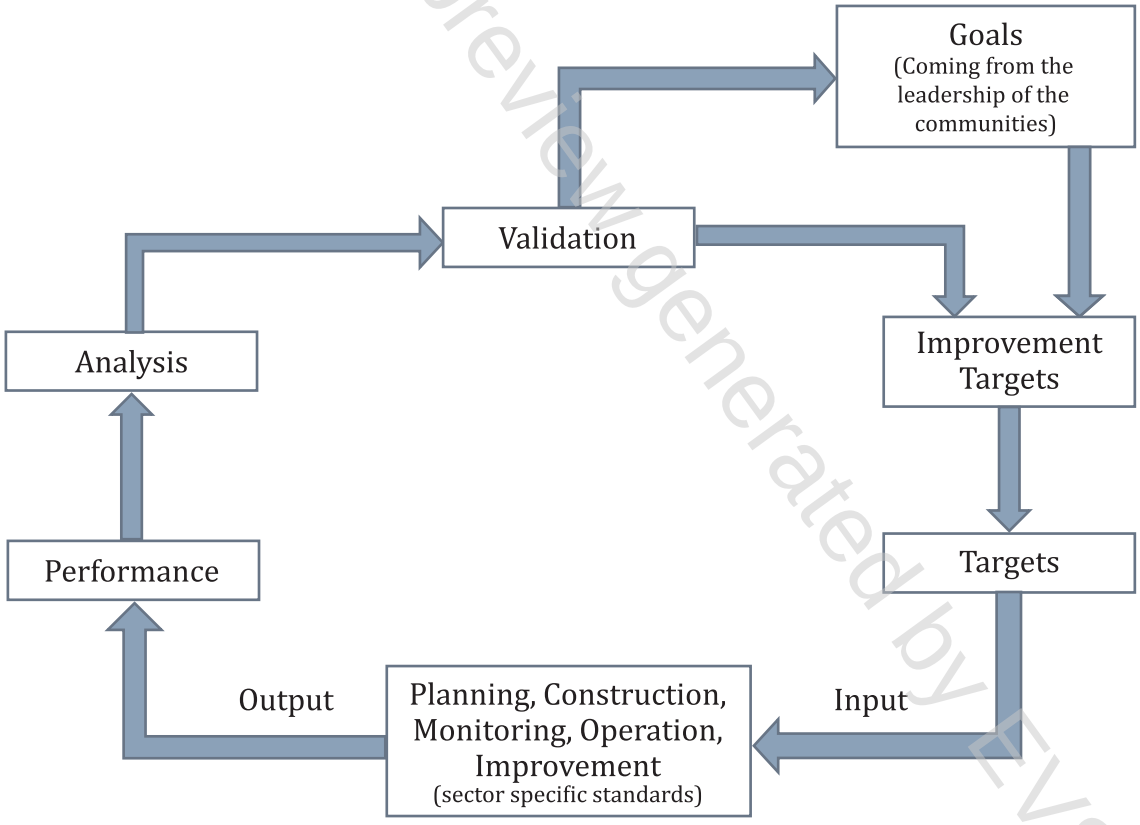


Figure 2 — Workflow of a system of systems concerning integration and operation of smart community infrastructures

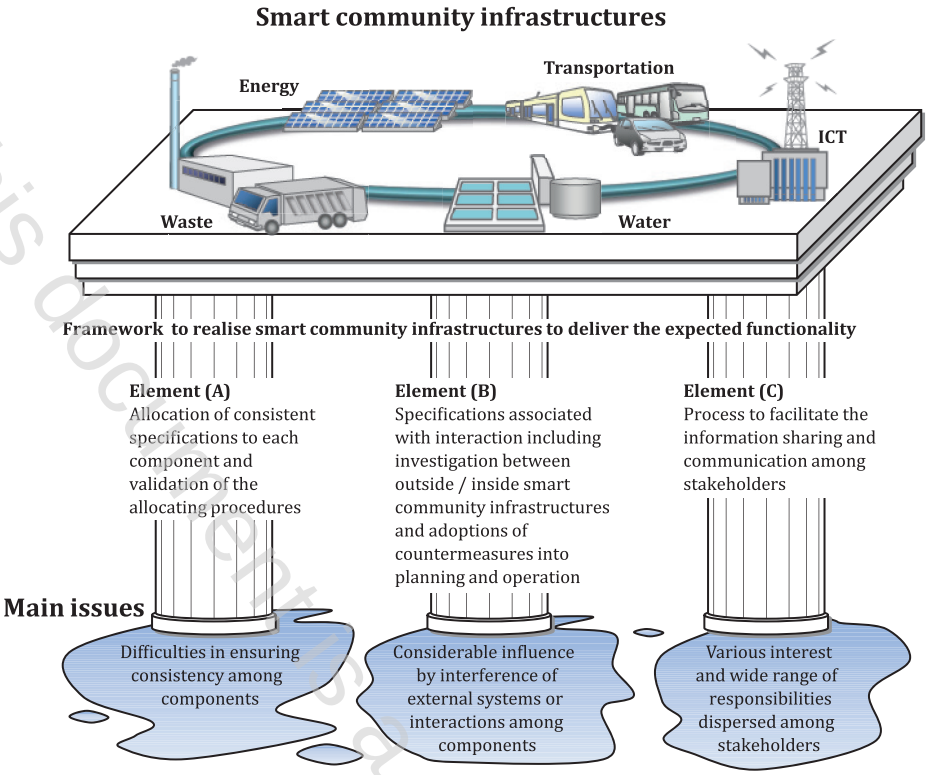


Figure 3 — Three elements of the framework

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Part 2:
Holistic approach and the strategy for development, operation and maintenance of smart community infrastructures

1 Scope

This document describes the interactions of smart community infrastructures (interactions between multiple infrastructures, between infrastructures and stakeholders, and between infrastructures and the external environment).

It describes the framework (a set of processes and methodologies) for these interactions to ensure the consistency of smart community infrastructures is well identified and managed.

There are two potential use cases for this document. The first is for the green field site, where all the smart community infrastructures can be designed and developed at the same time. This is of value to planners and investors of major new infrastructure developments.

The second is for the brown field site and builds on the first and will support efficient management of an existing urban area by taking into account the increasing interdependencies of the infrastructures on each other and the way they should be managed as a system of systems. This document will also take into account accelerating technological and environmental changes.

Since this framework aims to ensure the consistency among different systems consisting of smart community infrastructures, the scope of this document does not overlap with any existing works that are developed or being developed at the existing TCs addressing issues at individual infrastructure level.

NOTE This document describes a management case (not a management system), i.e. specific processes that an organization needs to follow in order to meet specific objectives of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 37155-1:2020, *Framework for integration and operation of smart community infrastructures — Part 1: Recommendations for considering opportunities and challenges from interactions in smart community infrastructures from relevant aspects through the life cycle*

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 https://www.iso.org/obp