

International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Series Y
Supplement 32
(07/2020)

SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS,
NEXT-GENERATION NETWORKS, INTERNET OF
THINGS AND SMART CITIES

**ITU-T Y.4000 series – Smart sustainable cities –
A guide for city leaders**

ITU-T Y-series Recommendations – Supplement 32

ITU-T



ITU-T Y-SERIES RECOMMENDATIONS

GLOBAL INFORMATION INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS, NEXT-GENERATION NETWORKS, INTERNET OF THINGS AND SMART CITIES

GLOBAL INFORMATION INFRASTRUCTURE

General	Y.100–Y.199
Services, applications and middleware	Y.200–Y.299
Network aspects	Y.300–Y.399
Interfaces and protocols	Y.400–Y.499
Numbering, addressing and naming	Y.500–Y.599
Operation, administration and maintenance	Y.600–Y.699
Security	Y.700–Y.799
Performances	Y.800–Y.899

INTERNET PROTOCOL ASPECTS

General	Y.1000–Y.1099
Services and applications	Y.1100–Y.1199
Architecture, access, network capabilities and resource management	Y.1200–Y.1299
Transport	Y.1300–Y.1399
Interworking	Y.1400–Y.1499
Quality of service and network performance	Y.1500–Y.1599
Signalling	Y.1600–Y.1699
Operation, administration and maintenance	Y.1700–Y.1799
Charging	Y.1800–Y.1899
IPTV over NGN	Y.1900–Y.1999

NEXT GENERATION NETWORKS

Frameworks and functional architecture models	Y.2000–Y.2099
Quality of Service and performance	Y.2100–Y.2199
Service aspects: Service capabilities and service architecture	Y.2200–Y.2249
Service aspects: Interoperability of services and networks in NGN	Y.2250–Y.2299
Enhancements to NGN	Y.2300–Y.2399
Network management	Y.2400–Y.2499
Network control architectures and protocols	Y.2500–Y.2599
Packet-based Networks	Y.2600–Y.2699
Security	Y.2700–Y.2799
Generalized mobility	Y.2800–Y.2899
Carrier grade open environment	Y.2900–Y.2999

FUTURE NETWORKS

CLOUD COMPUTING

BIG DATA

QUANTUM KEY DISTRIBUTION NETWORKS

INTERNET OF THINGS AND SMART CITIES AND COMMUNITIES

General	Y.4000–Y.4049
Definitions and terminologies	Y.4050–Y.4099
Requirements and use cases	Y.4100–Y.4249
Infrastructure, connectivity and networks	Y.4250–Y.4399
Frameworks, architectures and protocols	Y.4400–Y.4549
Services, applications, computation and data processing	Y.4550–Y.4699
Management, control and performance	Y.4700–Y.4799
Identification and security	Y.4800–Y.4899
Evaluation and assessment	Y.4900–Y.4999

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Supplement 32 to ITU-T Y-series Recommendations

ITU-T Y.4000 series – Smart sustainable cities – A guide for city leaders

Summary

Supplement 32 to the ITU-T Y-series Recommendations is intended for city decision makers and strategists, whose decisions have a significant impact on the way their city functions and its future development trajectory. Accordingly, this high-level policy document helps identify practical steps based on which urban decision makers can envisage and build a smart sustainable city (SSC).

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T Y Suppl. 32	2016-01-26	20	11.1002/1000/12758
2.0	ITU-T Y Suppl. 32	2020-07-16	20	11.1002/1000/14359

Keywords

City leaders, decision making, smart sustainable cities, SSC, SSC transformation.

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

FOREWORD

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Table of Contents

	Page
1 Scope	1
2 References.....	1
3 Definitions	1
3.1 Terms defined elsewhere.....	1
3.2 Terms defined in this Recommendation.....	1
4 Abbreviations and acronyms	1
5 Conventions	1
6 Smart sustainable cities: the urban future we want	1
7 Starting your SSC journey	2
8 Cities are our best future.....	5
Bibliography.....	6

Introduction

Modern cities have experienced unprecedented socio-economic growth and environmental crises since the latter half of the 20th century and the beginning of the 21st century. The world's cities are growing in both size and number. Cities with more than 10 million inhabitants are often termed "megacities". Globally, the number of megacities was projected to rise from 33 in 2018 to 43 in 2030.¹ With over 55% of the world's population now living in urban areas², cities are confronted with contemporary problems, including rapid urbanization, rising pollution levels and an ever increasing rural to urban migration, all of which have exerted pressure on ageing city infrastructure. Projections indicate that the percentage of the global population living in cities is expected to rise to 68% by 2050.³ Cities also account for more than 80% of global GDP⁴ and are considered the main engines of global economic growth.⁵ Cities consume two thirds of global energy consumption and account for more than 70% of greenhouse gas emissions.⁶

As a result, there is increasing pressure on existing natural resources such as water, land and fossil fuels [b-Naphde]. Additionally, there are growing concerns regarding existing transportation infrastructure, provision of adequate healthcare, access to education and overall safety for the growing population of urban residents [b-ERSC].

1 United Nations (UN). The World's Cities in 2018: Data Booklet. 2018, www.un-ilibrary.org/human-settlements-and-urban-issues/the-world-s-cities-in-2018_c93f4dc6-en.

2 UN Department of Economic and Social Affairs. "68% Of the World Population Projected to Live in Urban Areas by 2050, Says UN." United Nations, 16 May 2018, www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html.

3 UN Department of Economic and Social Affairs. "68% Of the World Population Projected to Live in Urban Areas by 2050, Says UN." United Nations, 16 May 2018, www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html.

4 The World Bank. Urban Development - Overview. 20 Apr. 2020, www.worldbank.org/en/topic/urbandevelopment/overview.

5 How can Cities decouple economic growth from resource use and its environmental impacts and find a balance between social, environmental and economic goals?. United Nations Environment Programme

6 The World Bank. Urban Development - Overview. 20 Apr. 2020, www.worldbank.org/en/topic/urbandevelopment/overview.

Supplement 32 to ITU-T Y-series Recommendations

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1 Scope

This Supplement is intended for city decision makers and strategists, whose decisions have a significant impact on the way their city functions and its future development trajectory. Accordingly, this high-level policy document helps identify practical steps based on which urban decision makers can envisage and build a smart sustainable city (SSC).

2 References

None.

3 Definitions

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Supplement uses the following abbreviations and acronyms:

EMF	Electromagnetic Field
ICT	Information and Communication Technology
IoT	Internet of things
KPI	Key Performance Indicator
SDG	Sustainable Development Goal
SSC	Smart Sustainable City
SWOT	Strengths, Weaknesses, Opportunities and Threats

5 Conventions

None.

6 Smart sustainable cities: the urban future we want

In light of the facts outlined in the introduction, urban planners are faced with daunting questions as to whether to promote cities as drivers of economic growth or pay heed to issues such as increasing population, resource overuse and dependence in cities. Understanding this dilemma, ITU's Focus Group on Smart Sustainable Cities (FG-SSC) set the path for cities to become smart and sustainable. Smart sustainable cities (SSC) is a concept developed by the FG-SSC which intends to leverage the potential of information and communication technology (ICT) in urban governance systems to create cities which are not only economically and socially advanced but are also designed to achieve environmental sustainability.

This Supplement is intended for city decision makers and strategists, whose decisions have a significant impact on the way their city functions and its future development trajectory. Accordingly, this high-level policy document helps identify practical steps based on which urban decision makers can envisage and build a smart sustainable city.

7 Starting your SSC journey

For cities wishing to go the SSC way, each city has to start from a different baseline for their transition to becoming a smart sustainable city. However, it is important to understand that SSC means embracing a journey and cannot be considered the final destination.

Through its research work on SSC, ITU intends to assist city decision makers (including municipal and government representatives) by re-defining the way in which the city's infrastructure is built, services are offered, citizens are engaged and systems linked, with the aim of transforming cities into more sustainable, smart, resilient and robust living environments.

Realizing that the establishment of SSC is a long term process and cannot be achieved overnight, it is essential that a series of generic steps are defined that would not only allow for comparability but would also promote sustainable development along with each city being able to quantify improvements over time.

In keeping with this way of thinking, the ITU has developed some basic steps for SSC transformation. Each of the steps described in this document are required when making the transition to a smart sustainable city. These steps can help formulate an action strategy oriented to:

- i) consensus building among varied stakeholders,
- ii) governance mechanisms,
- iii) citizen engagement,
- iv) ICT infrastructure,
- v) monitoring mechanisms, and
- vi) learning among SSC stakeholders.

Figure 1 gives an overview of the steps to becoming a smart sustainable city (SSC).



Y Suppl.32(20)_F01

Figure 1 – SSC 6-step transition cycle

(Adapted from [b-ICLEI])

Step 1 – Set the vision for your SSC venture

Local government should increasingly take on a more central role in such development initiatives. They should assist in identifying a specific SSC vision and in assessing the city's existing situation in order to establish the relevance and feasibility of becoming a smart sustainable city. This step includes the following aspects:

- a) Identifying an SSC vision that is in line with the city's identity, political priorities, and long-term development strategy;
- b) Gathering relevant data on the status of ICT infrastructure and its usage at the city-level, including the status of the city in regard to the widely used ITU-T Recommendations and Technical Reports;
- c) Identifying the SSC stakeholders;
- d) Identifying the existing governance and organisational mechanisms that would allow an efficient and effective management of SSC solutions;
- e) Identifying mechanisms for multi-stakeholder involvement, citizen engagement, communication and information sharing throughout the SSC process.

This step can be facilitated through a basic SSC strengths, weaknesses, opportunities and threats (SWOT) analysis for each city. This will assist in framing a city specific strategy and goals.

Step 2 – Identify your SSC targets

Local government should work in close collaboration with the various SSC stakeholders to design the overall master plan for the SSC's implementation. This should include broad agreement on objectives, priorities, initiatives, and actions needed in the short, medium and long term. Consideration should be accorded to setting measurable SSC targets and timeframes for their achievement. This step involves, among others, the identification of SSC targets in regard to:

- a) Developing SSC infrastructure and an integrated platform for example using Internet of things (IoT);
- b) Identifying and developing SSC services;
- c) Defining SSC key performance indicators (KPIs);
- d) Educating the stakeholders on the advantages of SSCs.

Step 3 – Build stakeholder consensus

Engagement with key stakeholders and stakeholder groups is imperative. Local governments should obtain the necessary key stakeholder buy-in and backing to ensure that the SSC strategic programme is pursued. This includes the adoption of the SSC programme/targets through consensus. This will provide the basis for an agreed document that has widespread support and will serve as a reference for the strategic planning by the local authority.

Step 4 – Build your SSC

Using the key stakeholder buy-in gained in Step 3 and support from other SSC stakeholders, local governments should lead the way to actually initiating the establishment of their smart sustainable city. For this step, the existing traditional infrastructure may be significantly improved on by integrating the required ICT applications for the upgrade to SSC. The stakeholders may also choose to build a new infrastructure from scratch.

For either of the aforementioned scenarios, the following features are pertinent:

- a) Making of a feasible master plan for your SSC journey;
- b) Conforming to appropriate construction models (e.g., public-private partnerships in various SSC programmes);
- c) Ensuring long term services via good operation and maintenance after the infrastructure is in place.

Step 5 – Measure your city progress

The fifth step consists of monitoring and evaluating a work programme required to achieve the targets. This stage involves close coordination and collaboration among SSC stakeholders, as well as an assessment on the basis of relevant key performance indicators (KPIs). The ITU has developed a useful set of KPIs for SSC, which has been adapted into Recommendation [b-ITU-T Y.4903] "Key performance indicators for smart sustainable cities to assess the achievement of sustainable development goals" and can be utilized for this specific step. These KPIs form an excellent baseline for city decision makers, as they map their city's progress of their overall SSC journey.

Step 6 – Ensure accountability and responsibility

The last step is focused on evaluating, reporting and learning from the SSC process and related experiences. This involves an assessment of the implementation of the work programme and an analysis of reflections about strengths and shortcomings. Such an evaluation contributes to informing the decision-making process of the local council, as well as to informing the preparation of future baseline reviews to deepen SSC master plans, among others.

Better decisions are reached if they emerge out of a process of knowledge sharing and dialogue between stakeholders. The reflective process of evaluation will feed into a process of continuous

learning, which in turn will influence and inform the development of the future vision and strategy for SSC.

Cities must be capable of applying lessons learned and instituting best practices concerning SSC. Consequently, cities must be accountable for continuous improvement to strengthen the effectiveness of future SSC strategies. To do this, city leaders must be flexible and able to adapt to the dynamic, evolving and complex nature of SSC and be able to continuously update the vision as required.

8 Cities are our best future

While sustainability challenges of cities are significant, urban areas also hold the key to achieving many global sustainability goals. Cities are home to the majority of humanity and sustainable development cannot be achieved without significantly transforming the way we build and manage our urban spaces.

The infusion of ICT into key processes is pertinent to achieving sustainability. ICTs can assist with the establishment of SSCs through innovation and redesign of existing processes. This can include new applications, technologies and systems for smart energy, smart transportation, smart buildings, smart water management and smart government.

As ICTs provide an integrated strategic approach to sustainability in SSC, they are key enablers of urban development, making ICT integration also vital to the achievement of the post-2015 sustainable development goals (SDGs).

Cities do not have the option to continue functioning as they have done in the past. Hence, city decision makers have to decide on a maintainable urban process, which promotes economic progress as well as environmental protection. Here, the SSC vision not only provides the benefit for sustained economic growth but also ensures a high quality of life for the citizens along with environmental sustainability.

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