STRATEGIC BUSINESS PLAN (SBP)

IEC/TC OR SC:	SECRETARIAT:	DATE:
SyCSmart Cities	**IEC CO**	**2019-07-26**

A. STATE TITLE AND SCOPE OF TC

SyC Smart Cities -Electrotechnical aspects of Smart Cities

A.1 Introduction

The word “Smart City” is often associated with the concept of more efficient and effective way of achieving city functions by orchestrating the operations of multiple domains. It is obvious that electrotechnologies, e.g. electricity, energy, control systems, automations, are essential to realize such an orchestrated operation and IEC should be responsible for and contribute to the standardization in these fields.

IEC/Systems Evaluation Group (SEG) 1 Smart Cities was set up in 2013 in recognition of this role for the IEC. SEG 1 took a goal-oriented and hypothesis verification approach to research whether there is a need for electrotechnical system standardization in the domain of smart cities. Based on the conclusions from WGs as well as recognized market demands, SEG1 confirmed the need to establish an IEC Systems Committee (SyC) in the field of electrotechnical aspects of smart cities.

A.2 Scope

To foster the development of standards in the field of electrotechnologies to help with the integration, interoperability and effectiveness of city systems.

Note 1 :

- by promoting the collaboration and systems thinking between IEC/TCs, the SyC and other SDOs in relation to city system standards;
- by undertaking systems analysis to understand the needs for standards and assess new work item proposals (NWIPs) related to city systems;
- by developing systems standards where needed and by providing recommendations to existing SyCs, TCs/SCs and other SDOs.

Note 2 :

Overall common city goals include, for example, sustainable development, efficiency, resilience, safety and support for citizen’s engagement and participation. However, an individual city will follow its own approach.

Note 3 :

“Cities” refers to any geographically located population.

A.3 Related TCs and other SDOs

In order to undertake its work, SyC Smart Cities will need to work closely with a number of IEC SyC/TCs/SC/SEG and ACs. An indicative list follows:

SyC Smart Energy, SyC AAL, SyC LVDC, TC8, TC56, TC 57, TC 59, TC61, TC 65, TC82, TC 100, TC 111, TC 120, JTC1/SC25, JTC1/ SC 41, JTC1/WG 11, SEG 8, SEG 9, SEG 10, ACEA, ACEE, ACOS, ACSEC

Other SDOs related to the SyC Smart Cities are listed below:

ISO TC 184, ISO TC 268/SC1, ISO TC 268, ITU-T/SG20, ITU-D/SG 2, ITU-T/SG 17, IEEE Smart Cites Initiative WG

B. MANAGEMENT STRUCTURE OF THE TC

B.1 Structure of SyC Smart Cities

The structure of SyC Smart Cities is shown in Figure B.1. The operation of SyC Smart Cities is shown in Figure B.2

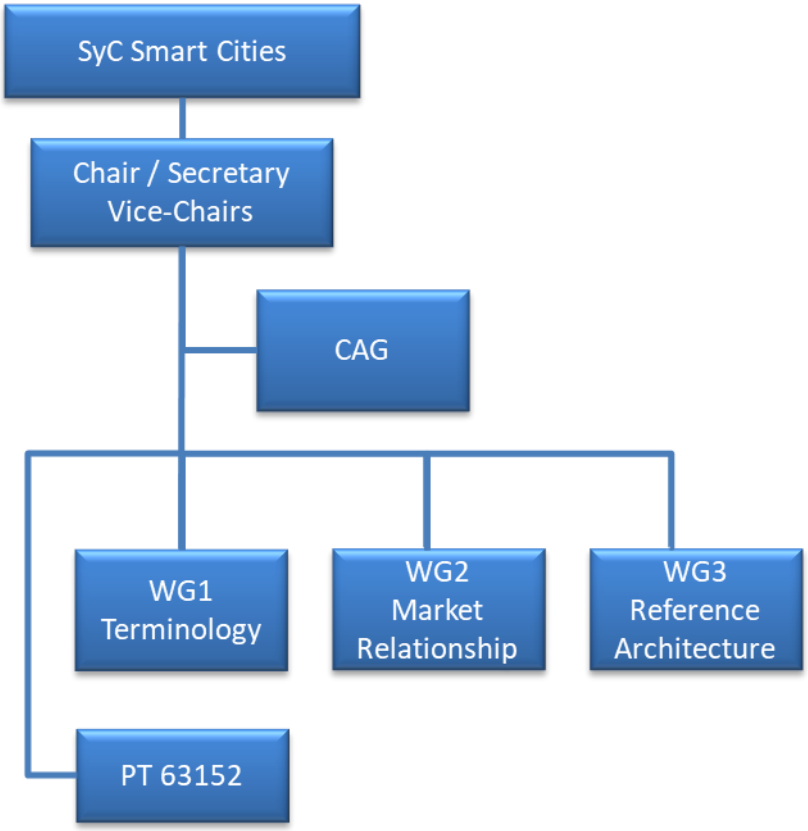

Figure B.1 - Structure of IEC/SyC Smart Cities

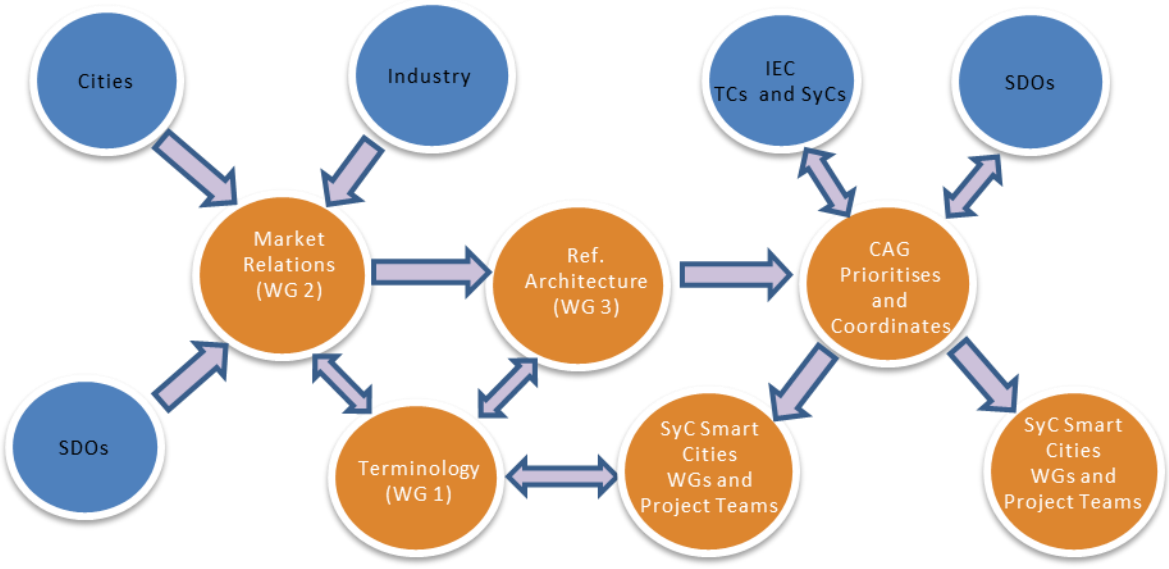

Figure B.2 – Operation of the IEC/SyC Smart Cities

B.2 Terms of reference (ToR) for the vice-chairs and subgroups

B.2.1 The Chair is supported by three vice-chairs :

Vice-Chair Coordination

Tasks:

– Gather roadmaps from relevant IEC TCs and SyCs and other SDOs

– Harmonize work in the “grey zones” between the scopes of SyC Smart Cities, other SyCs, TCs and other SDOs

– Analyse gaps, and overlap of work and standards related to smart cities between IEC TCs and SyCs and between IEC and other SDOs

– Suggest how new work might best be assigned to the most appropriate SyC, TC or SDO

– Propose policies, methods and procedures to support coordination within IEC TCs and SyCs and also with other SDOs

– Support Liaison activities

Note 1: Carry out common activities with other Systems Committees – Sharing work and experiences

Note 2: Carry out common activities with other TCs & SDOs – Sharing Work and Experiences

Vice-Chair Quality management

Tasks:

– Assist the Secretary and Chair in the following duties:
  – Ensure that the work of the IEC SyC Smart Cities is of the highest quality
  – Propose how the IEC Directives and practices might best be carried out within the SyC Smart Cities in order to best facilitate our work
  – Propose the most appropriate processes to enable the work of the individual SyC Smart Cities WGs and PTs to feed into and support each other’s work programme
  – Monitor and review existing processes and practices to determine how well these are working and how they might be improved
  – Review draft NWIPs, WDs, CDs etc with respect to clarity, completeness and compliance with the IEC directives

– Develop processes and metrics to monitor the impact of the SyC Smart Cities

Vice-Chair Strategy

Tasks:

– Undertake regular environmental scans to identify the need for new standards work

– Lead the development and maintenance of the Strategic Business Plan (SBP) and the Roadmap.

– Manage the setting up and development of the Open Forum as a way to maintain relationship and information exchange with city stakeholders (city administrations, city service providers, providers of smart city products and services, citizens) and support the planning of the workshops

– Lead the development of R-membership to ensure effective participation of key stakeholders in the development of the SyC Smart Cities strategy and standards development

B.2.2 CAG

The members of CAG1 are the Chair and Vice-Chairs, Secretary, WG Convenors, PT leaders and Heads of Delegation from P-members, plus subject matter experts as needed.

Tasks:

– Support the Chair and Secretary in the day-to-day business of the SyC Smart Cities

– Monitor the structure and working practices of SyC Smart Cities and propose any necessary changes

– Develop and maintain the Strategic Business Plan (SBP) and Roadmap

– Promote coordination with IEC TCs, SyCs and other SDOs

B.2.3 WG1 terminology

Tasks:

– Develop and maintain a common set of terminology for the SyC

(Liaison to be established for common work with ISO)

B.2.4 WG2 Market relationship

Tasks:

– Identify the key aspects of a Smart City

– Collect and analyze use cases

– Electrotechnical aspect of smart cities simulation

– Road test standards in real cities

B.2.5 WG3 Reference Architecture

Tasks:

– Develop and maintain reference architecture model and standards mapping tool for smart cities in collaboration with the IEC SRG

B.2.6 PT 63152 Smart Cities - City Service Continuity against disasters - the role of the electrical supply

– Develop IEC 63152 - City Service Continuity against disasters - the role of the electrical supply

.

C. BUSINESS ENVIRONMENT

C.1 Global standardization landscape of smart cities

Several SDOs are active in the fields and one of them can embrace the whole matter. Therefore, there is a need for orchestrating the various on-going efforts.

Table C.1 – IEC's role in smart city standards

Cross cutting subject area	Explanation	Example of IEC's role	Counterpart in other relevant SDOs
City	A smart city is one where	In order for the city to be managed effectively	ISO/TC 176

Cross cutting subject area	Explanation	Example of IEC's role	Counterpart in other relevant SDOs
management	the individual city systems are managed in a more integrated and coherent way, through the use of new technologies and specifically through the increasing availability of data and the way that this can provide solid evidence for good decision making.	as a whole, there is a need for increasing amounts of electronics (sensors, various types of wireless antennas, CCTV cameras etc.) to be deployed around the city. An obvious way of doing this is to use lampposts. One example therefore of an area where IEC could lead in the development of smart city standards is in the development of a smart lamppost standard. This would define where on a lamppost space should be provided for electronics to be mounted, what the shape and size of such space should be and where interfaces with the appropriate electric supply should be positioned. This would allow manufacturers of electronic equipment that could be deployed on lampposts in a smart city to know the shape and size of the space that would be available to them and to have a standardised interface to the specific electricity supply that they need. In this way, such a standard would support an open and future proofed market in smart city technology.	ISO/TC 268
Indicators and assessment	The effectiveness of a smart city is directly influenced by the quality, efficiency, flexibility and adaptability of systems maintained within it. There is a need for advanced monitoring methodologies to assess costs and benefits effectively and comparatively from all types of smart systems in cities.	In each city service silo, the electronic or electrical systems are key implementation components. The overall city assessment depends on the assessment of each system. An example of an area where IEC could lead is in the development of a uniform methodology to assess the subsystems of a city from the electronic and electrical aspects, particularly focusing on efficiency, resilience and safety.	ISO/TC 268
ICT & big data management	A key characteristic of a smart city is that large amounts of data are not only collected, but also aggregated analyzed and used to help manage the city as a whole.	Some of the data in a city is generated and utilised by automatic systems within the city, such as in intelligent transport systems, electronic ticketing and payment systems, building security systems, and so on. An example of standards that IEC could develop in this area would relate to the sharing of data between such electronically managed automatic systems in a way that would be safe, reliable and preserve personal privacy.	ISO/TC 268 ITU-T JTC 1
City planning and smart modelling and simulation programmes	With the process of urbanization and the rapid growth of cities, it is very important to set up a long-term development goals and consider urban resource utilization and optimization. Smart cities utilise Urban Planning and Simulation Systems (UPSS) that can show and monitor almost all factors of a city, including social development, economic situation, urban renewal, transportation, energy, water supply, waste and garbage.	A key aspect that city planners need to take into consideration is the need to ensure adequate electricity supplies within the city, specifically taking into account the increasing trend for local generation of electricity through renewables, the growth in use of electric vehicles and therefore of electric charging stations around the city and the requirements that all city systems have for secure electric supplies in order to function. An example, therefore, of an area where IEC might have a leading role, is in the development of standards that would enable city planners to have reliable and consistent estimates of electricity supply and demand, down to a very local level, in order to support their scenario modelling.	ISO/TC 268/SC 1

Cross cutting subject area	Explanation	Example of IEC's role	Counterpart in other relevant SDOs
	Such systems could take account of various potential future scenarios and enable city planners to set in place planning frameworks that would best support the optimum results.		
Security & resilience	One of the key concerns of city managers is how well their city is able to respond to potential disasters or security threats and how quickly adequate levels of functionality could be restored.	Given that electricity is a key enable of all city systems, one potential area where IEC could contribute here is the development of standards for city service continuity from a grid & backup power supply point of view.	ISO/TC 292
Infrastructure deployment and maintenance	There are many physical infrastructures in a city that support the provision of energy, water and telecoms, the disposal of waste and the transport of people and goods. Such infrastructures are expensive to install and maintain. A smart city will utilize sensors to monitor the condition of such infrastructures and will maintain precise information as to their location.	In order to accomplish this, a smart city will make use of electronic equipment related to IoT, GIS and LBS. IEC could lead on the development of standards in this area.	ISO/TC 268/SC 1

C.2 Aspects to be addressed by the standardization

SEG1 recommended the following aspects to be considered for standardisation by SyC Smart Cities:

C.2.1 City service continuity

There exist great needs for establishing safe and secured societies in which it is possible to avoid blackout and be able to continuously supply power in order to minimize negative impacts in the event of a crisis.

In order to realize the above mentioned societies, studies and discussions for standardizing ECS technologies and products which contribute to the electricity continuity are conducted. As concrete examples, the formulation of guidelines to classify and prioritize products and equipment necessary to continue power supply in disasters is studied and discussed, as well as the establishment of facility labelling scheme.

Note: this topic is already being addressed by PT63152.

C.2.2 Urban planning and simulation system

It is envisioned that urban simulation system could become a standardized tool for cities, which could also be improved by the new generation information technologies, such as internet, cloud computing and big data. In the meantime, it will promote the optimization of urban planning and management.

C.2.3 City facilities management (CFM)

Although "Smart City" contains much wider technical areas than those of IEC, the electrotechnical domains are indispensable to achieve the holistic management of underground pipelines as a part of "Smart City". For example, automation and system integration technologies will be introduced for the operation and maintenance systems of underground pipelines. Also, many electrotechnical components including sensors, communication and network devices will be introduced in the operation and maintenance systems.

C.2.4 Use case – Smart home

Smart home service system (SHSS) is an integrated system which shall be constructed by multiple electronic and electrical techniques. The home sensor, home appliance, in-home and out-home communication links, data collection and analysis are the essential component for SHSS. Because of their wide-spread application

and for the purpose of globally sharing the best practice or advanced technologies in this field, international standardization activities are expected.

C.2.5 Use case – Smart education

Personal learning space is an integrated system which shall be constructed by multiple electronic and electrical techniques. The modern education environment is constructed with electric and electrical components. The in-school and social educational system includes sensor networks, communication links, data collection and analysis. Deriving from their applications and for the purpose of globally sharing the best practice or advanced technologies in this field, international standardization activities are expected

C.2.6 Smart cities assessment

The Smart City is a complex and giant system which is the integrated application of the power grid, water system, home, healthcare, education, etc. All these fields are closely related to IEC. Inevitably, the assessment on smart cities is within the scope of IEC, since it naturally demands the focus on the entire field mentioned above.

C.2.7 Mobility and logistics

Both topics (mobility and logistics) are very broadly defined and both have vast scopes if taken everything into consideration. Here, we want to focus on the most imminent challenges cities and communities are facing in the years to come.

Ironically, the challenges that cities are facing are almost perpendicular to the challenges of rural communities. The urbanization process leaves many rural areas with drastically reduced populations. Hence, while cities are suffering from too much traffic amplified by the parcel deliveries and other additional traffic caused by logistics companies, delivering packages to remote country side towns isn't always worth their while.

In a more general mobility sense, the many various concepts that are being tested by car companies and public transportation providers are still in the laboratory stages, yet already concerning themselves the use of public space, accessibility, the use of apps, and also privacy issues due to electronically stored consumer behaviour data.

.

D. MARKET DEMAND

Stakeholders can be categorized into one or more of the following typologies based on their personal or organizational interest in the development of a smart city. As smart city stakeholders, one can have direct or indirect influence(s) in the decision-making process, which plays a significant role in the formation of a smart city as seen in the Table below.

Table D.1 – Categories of stakeholders in smart cities

Typology	Description	Interest in Smart City Initiatives	Influence on Smart-City Initiatives
Citizens	Inhabitants of the city who are active participants that consume services and goods produced by the various service/goods providers. Citizens are key drivers in defining the desired goals of a smart city.	Improvement in standard of living. Low-cost and efficient products and services. Economic, social and environmental long-term development	Primary stakeholders who drive much of the Smart City requirements. Initiatives include sustainability, affordability and availability of services, etc.
Temporary inhabitants of the city	People who are not residents but spend some time in the city	Low-cost and efficient products and services. Rich entertainment and information services	Tourists drive a lot of economical value to the city. By attracting more tourists, the city benefits economically.
Local businesses owners	Entities that produce goods or services for the citizens to consume	Reducing OPEX, better visibility, business opportunities; expanding their expertise and products among all smart-cities	Business owners create economic growth, competitive growth, local knowledge, create jobs, and create innovations.
Public interest groups	Entities or parties responsible for the protection or defence of the citizens	Social and environmental long-term development	Joint power of citizens, social networking effect
Municipal authorities	Authorities that oversee the overall management of the city	Economic, social and environmental development. Better handling of challenges and threats of the city	Main promoters of smart-city initiatives on each specific city
Urban/City planners	Entity responsible for the conservation, use, and planning of the city	Achieving the best interest of the citizens	Their expertise is important to better understand how to include ICTs into mid-long term city planning, considering cities complexities.

Typology	Description	Interest in Smart City Initiatives	Influence on Smart-City Initiatives
Utility and public services providers	Entities who are responsible for providing fundamental services to the citizens and occupants of the city.	Implementing smart-city solutions to increase city and public services efficiency	Target partners in implementation of smart-city initiatives. They provide essential services that citizens cannot do without.
Telecommunication providers	Private or public entities that provide infrastructure and/or means of communication and data transfer portal.	Expansion of Internet-based services	Provide the means for data flow between machine, people, and entities to enable smart city interoperability and efficiency. Financial support
Industries	Large entities that produce goods and services to a larger mass, local and globally	They are interested in developing and deployment of commonly-agreed and standardized products and services	Create jobs and goods/services that improve human life. Provide support for standardisation of products and services.
Academic and research institutes	Public and private entities who are responsible for providing education to the citizens and conduct research to help improve the life and sustainability of the citizens and environment around them	They study smart-city as a new trend which has impact in the sustainable development of society and has a very technological component	Provide innovations, new technologies, new methodologies that improve human life.
Cantonal and national agencies	Agencies that governs a wider area with multiple cities at state or national level.	Economic, social and environmental long-term development	They have remit on policies that can affect smart-city implementation.
Financial organisations	Entities that hold, loan and invest finances for citizens and businesses of the city.	Economic long-term development	They have remit on financial and economic soundness of smart-city implementations.
Standards Development Organizations	National or International organizations whose primary activities are developing, coordinating, promulgating, revising, amending, reissuing, interpreting, or otherwise producing technical standards that are intended to address the needs of some relatively wide base of affected adopters	Better context for standardisation work	They are critical to ensure a common ground for developing a very complex implementation of ICT, including terminology, reference models, reference architectures, interfaces, measurement methods, performance and sustainability assessment techniques, common services specifications, management practices, business process patterns
Specialized consulting firms			Their expertise is needed to be able to fuse several methodologies and technologies and propose a conceptually integrated approach for functioning of cities.
Local Professional Associations, or branches of national or international Associations	local professional associations in the sectors of the smart city domains that can provide technical contributions to the design and implementation of the smart city Master Plan and provide information about the smart city plans to their members so that they can properly take the implications of the smart city plans into their daily work.	Ensuring that their members can play a positive role in the Economic, social and environmental development of city	Their technical expertise can provide valuable contributions to the design and implementation of projects in the city domains and ensure that their members can take the overarching smart city plans into consideration in their daily work.

TRENDS IN TECHNOLOGY AND IN THE MARKET

Cities are facing unprecedented challenges. The pace of urbanization is increasing exponentially. Every day, urban areas grow by almost 150 000 people, either due to migration or births. Between 2011 and 2050, the world's urban population is projected to rise by 72 % (i.e. from 3.6 billion to 6.3 billion) and the population share in urban areas from 52 % in 2011 to 67 % in 2050.

In addition, due to climate change and other environmental pressures, cities are increasingly required to become "smart" and take substantial measures to meet stringent targets imposed by commitments and legal obligations. Furthermore, the increased mobility of our societies has created intense competition between cities to attract skilled residents, companies and organizations. To promote a thriving culture, cities must achieve economic, social, and environmental sustainability. This will only be made possible by improving a city's efficiency, and this requires the integration of infrastructure and services. While the availability of smart solutions for cities has risen rapidly, the transformations will require radical changes in the way cities are run today.

F. SYSTEMS APPROACH ASPECTS (REFERENCE - AC/33/2013)

SyC Smart Cities will adopt Systems Approach in its work. The following areas have been identified as examples to demonstrate the need for this approach.

F.1 City service continuity

In order to prevent critical city infrastructure failures and enhance crisis management (e.g. in case of a natural catastrophe), systematic interconnection between essential technologies, devices and facilities is required. This aspect is a core element of the ECS and ECP. As a larger concept, interconnection among communities is also placed in scope of this working group. Concretely, interconnection among individual consumers in grids, autonomous power supply systems of communities, buildings, production facilities and residential houses, and islanded power supply systems are studied and discussed.

F.2 Urban planning and simulation system

Although the urban space planning has already made some effects on smart city construction, a lack of a common and standardized implementation procedures have created a huge challenge for subsequent urban system expansion. As a result, there exists an urgent demand for guidelines and standardized procedures. The urban planning and simulation system would help solve this problem.

F.3 City facilities management (CFM)

Underground pipelines include multiple systems such as electricity, gas, water, sewerage, district heating or communication, which may be separately planned, constructed, operated or maintained by different entities. However, it is essential to interconnect and interchange data between these systems to achieve a holistic operation or maintenance of underground pipelines. Therefore, a systems approach is necessary for standardization.

F.4 Use case – Smart home

SHSS is a system which integrates sensors, home appliances, in-home communications, internet, and positioning, mobile communication, cloud computing, big data, platforms, city operation infrastructures and services. It needs unified and systematized standards to guide and regulate all the related technologies.

SHSS converges the subsystems in home, and collaborates with other city service systems. Each in-home and out-home service systems has its characteristics. Collaborative interconnection to different system needs a synthetic systematic methodology to realize device and data sharing among all the systems.

It can be concluded that in Smart City SHSS standardization focuses rather on the system of systems aspect than on specific products

F.5 Use case – Smart education

Smart education system integrates environmental build and service support technologies which include Internet of everything（IoT, Big Data, Learning Analytics, cloud computing, smart city infrastructure and services）. It needs unified and systematized standards to guide and regulate all the related technology.

a) Personal learning space which is the core of smart education includes personal information and e-portfolio. Besides, it can be integrated with other subsystems of smart education and realize the data sharing and connectivity, such as resource system, service system and so on.

b) The Smart City’s education system contains the information and data exchange between the personal learning space and other information systems, thus promotes a personalized and seamless learning experience. In the process of data connection, we also need the technology’s support, such as IoT, mobile internet, context awareness and so on.

F.6 Smart cities assessment

The sustainability of smart city is directly influenced by the quality, efficiency, flexibility and adaptability of systems such as smart mobility, smart energy, smart health, etc., maintained in smart city. Moreover, a smart city is one where all of these separate areas work together seamlessly as a single system. Thus, smart city are about integration and interoperability.

G. Conformity Assessment

The publications may be used for IEC Conformity Assessment Systems. The SyC will address how conformance to the standards it will develop, can be appropriately assessed.

H. Horizontal issues

These issues will be addressed in the standards. Specifically, the horizontal issues will be addressed within the work of developing the Smart Cities Reference Architecture.

I. 3-5 Year Projected Strategic Objectives, Actions, Target Dates

Strategic Objectives 3-5 years	Actions to support the strategic objectives	Target Date(s) to complete the actions
To work jointly with ISO, IEC, ITU and other SDOs on terminology work of smart city for complementary unit of thought and unit of knowledge to better understanding smart city and smart city system.	IEC/ISO/ITU Smart Cities Coordination Task Group White Paper: Suggested Priority Terms in Need of Common Definitions to Support Standards Activities for Smart Cities	Since November 2017, update annually
To build a list of terms, along with clear and concise definitions, that are applicable throughout the whole WG1, WG2 and WG3 family and their future series of products and services, and, in general, that are important and vital to the work of IEC SyC Smart City, available from different existed terminology sources	Technical report Smart City System- Glossary of definitions and terminology for smart city and smart city system	Since December 2018, update annually
To provide a multi-dimensional and multi-domain integrated methodology system for smart city concept systems building and taxonomies, not limited to concept building and vocabulary developing, which are not covered in current methodology for terminology of ISO or IEC standards and current concept systems of existed smart city standards.	International standard Smart City System - Methodology for concepts and taxonomies building	2020
To achieve consistency of concept systems and definitions for smart city system specific between all the Systems Committees and Standardisation Evaluation Groups, with the help of the SRG; To support the development of international smart city system initiatives through a consistent approach to development and use of terms and definitions.	International standard Smart City System- Vocabulary (Chapter for electropedia)	2020
To propose using the modern ontological tools, techniques to express the Smart Cities concepts and relationships between them in an explicit, formal, machine-readable and machine-executable form.	International standard Smart City System-Ontology	2023

Identify the key aspects of a Smart City Needs	to develop an overall way to categorize the city needs and draft a City Needs report for publication	2021
Collect and analyse use cases	TT1(Smart Water), TT2(Smart City Planning) and TT3(City Information Modeling) ,TT4 (intelligent operation center)	TBD
Smart cities Standard needs	Methodology of Analyzing the City Needs NWIP	2022
Road test standards in real cities	To be done after the publication of IS and SRD	TBD
Address city service continuity against disasters	Develop IEC63152 standard which establishes concepts and gives guidelines to help sustain a variety of city services on the occasion of a disaster from the perspective of providing electricity	2020
Develop the Smart Cities Reference Architecture (SCRA) and the Guide on how to use and deploy it	Provide first a methodology (SCRAM: IEC TS 63188 ED1) on how to develop the SCRA (IEC 63205 ED1) and then a guide on how to use the SCRA.	2021
To develop inventory and mapping of Smart City Standards	Provide a systematic approach (IEC TS 63233) to carry out smart city standards analysis and gap analysis based on IEC System Approach, which gives methods for smart city standards inventory, mapping and gap analysis.	2021
To develop standards mapping tool	Work jointly with the IEC SRG to define the requirements and to develop a standards mapping tool	TBD
To develop Smart City Standards Roadmap in the field of electrotechnical aspects	Undertake gap analysis based on standards maps and provide Smart City Standards Roadmap - electrotechnical aspects	TBD