

# Terms of reference for the ITU-T Focus Group on AI for Smart Sustainable Cities and Communities (FG-AI4SSC)

## 1 Rationale

Artificial Intelligence (AI) is entering a new operational phase. In many sectors, AI is now being embedded directly into systems and services, enabling autonomous planning, decision-making coordination across systems, and interaction with physical environments through existing and future AI technologies such as generative AI, agentic AI, physical AI, or spatial AI. These AI technologies are becoming increasingly central to urban digital ecosystems, enabling the operation of AI-enabled urban systems and services, that can reason, coordinate autonomous actions, and interact directly with the physical fabric of cities.

In this context, AI is no longer an isolated tool, but an embedded capability across urban services, infrastructure operations, governance processes, and digital and physical environments, serving as a key enabler of the citiverse, signalling a new type of AI-enabled digital transformation.

This transformation spans multiple city and community domains, including mobility, agriculture, industry, tourism, utilities, public services, public safety, environmental monitoring, and urban planning. It also spans multiple system layers, from devices and edge environments to platforms, digital twins, and city-level operational systems. However, the current standardization landscape does not yet fully reflect the pace, scale and systemic impact of these technological developments within the fabric of urban systems. Existing standardization activities often focus on individual technologies or specific application domains, but do not yet address AI enablement at the level of smart sustainable cities and communities as interconnected socio-technical systems.

In particular, existing work on smart sustainable cities and communities, digital twins and IoT systems does not sufficiently address the integration aspects required for AI-enabled urban systems and services. This includes the interfaces, interoperability, coordination mechanisms and frameworks necessary to enable AI technologies to integrate coherently, safely and effectively with IoT, digital twin, and smart sustainable cities and communities' systems and services within city-scale deployments.

This Focus Group will provide a global pre-standardization platform to develop a common understanding, identify gaps, and prepare the groundwork for future ITU-T Recommendations under ITU-T SG20.

## 2 Scope

This Focus Group conducts pre-standardization activities to address the integration aspects required for AI-enabled urban systems and services, including requirements, interfaces, coordination mechanisms and frameworks necessary to enable existing and future AI technologies to interoperate coherently, safely and effectively with IoT, digital twin, and smart sustainable cities and communities' systems and services within city-scale deployments in accordance with Plenipotentiary Resolution 214 (Bucharest, 2022).

The Focus Group will address the following aspects:

- Definitions, terminology, taxonomy, concepts, and vision related to AI for smart sustainable cities and communities, AI-enabled urban systems and services, including representative vertical cross-domain use cases;
- Characteristics, requirements and frameworks for AI technologies for smart sustainable cities and communities;
- Architectural frameworks and reference models for AI-enabled urban systems and services to enable interoperable and scalable deployments across vertical domains;

- Interoperability and coordination mechanisms enabled by AI technologies for smart sustainable cities and communities across city operational systems, including Minimum Interoperability Mechanisms (MIMs);
- Requirements considerations related to supervisory and control mechanisms in AI-enabled urban systems and services, taking into account service criticality and operational requirements;
- Data aspects of AI technologies for smart sustainable cities and communities, including interoperability, data sharing, quality, and lifecycle considerations;
- Lifecycle management, evaluation, and assessment frameworks of AI technologies for smart sustainable cities and communities including benchmarking, monitoring and international comparability mechanisms;
- Human-centric and inclusive aspects of AI technologies for smart sustainable cities and communities, including accessibility and digital health related to IoT and smart sustainable cities and communities, and human-AI collaboration in urban services;
- AI readiness and impact assessment in smart sustainable cities and communities, while leveraging relevant existing ITU-T Recommendations and methodologies where appropriate;
- Assessment of preparedness for AI adoption and integration and roadmap research for smart sustainable cities and communities;
- Spatial AI for digital–physical convergence in cities, integrating geospatial systems, digital twins and real-time sensing to produce reusable outputs;
- Guidance for the adoption and integration of relevant enabling AI technologies for smart sustainable cities and communities;
- Sustainability aspects of AI-enabled systems, including application and reporting of energy consumption and carbon footprint of AI deployments at city scale, while leveraging existing ITU-T Recommendations and methodologies, where appropriate.

The Focus Group will not address general urban policy, governance, social policy, ethical or regulatory frameworks for AI, or sector-specific regulation, except where directly related to interoperability, ICT-enabled systems, system integration, or pre-standardization activities within the ITU-T mandate, taking into consideration PP Resolution 214 (Bucharest, 2022).

The Focus Group will not address detailed AI model design, environmental aspects of AI, training and testing methods, general-purpose robotics, multimedia aspects, or foundational cybersecurity issues that fall under the mandate of other ITU-T Study Groups and Focus Groups.

The Focus Group will identify stakeholders and partners with whom ITU-T could collaborate, and for enabling the inclusion of non-members to contribute to the technical pre-standardization work. Potential collaboration can be built across academia, industry, regulatory bodies, UN entities and standards development organizations (SDOs), to ensure inclusive and interoperable technical foundations.

### **3 Objectives**

The objective of the Focus Group is to support pre-standardisation activities for a coherent and system-level study of AI-enabled urban technologies in smart sustainable cities and communities, including cross domain and system-level AI enablement for smart sustainable cities and communities.

The Focus Group aims to provide an open platform for collaboration, coordination, and exchange of expertise related to AI for smart sustainable cities and communities. Its work is intended to facilitate future international standardization of architectural frameworks, interoperability approaches, and assessment methodologies, which are essential for scalable, and interoperable AI-enabled smart sustainable city and community systems.

More specifically, the Focus Group will:

- Build and consolidate a cross-domain community of experts and practitioners working on AI for smart sustainable cities and communities, fostering a shared vision, common terminology and common understanding;
- Identify and document the value that AI technologies (such as generative AI, agentic AI, physical AI, spatial AI) can bring to smart sustainable cities and communities, sector by sector (mobility, energy, water, waste, safety, health, environment, public services, urban planning), so that this Focus Group becomes the focal point for AI value in the city domain;
- Identify and study key concepts, capabilities, and enabling AI technologies for smart sustainable cities and communities, such as generative AI, agentic AI, physical AI, spatial AI, and AI-enabled urban services;
- Identify use cases, characteristics, develop requirements and architectural frameworks and operational considerations and best practices for AI for smart sustainable cities and communities;
- Analyse the evolutionary trends of smart sustainable cities and communities, research on AI-empowered maturity assessment frameworks, and AI-enabled urban services;
- Perform gap analysis and identify overlaps, and coordination needs among existing standardisation activities related to AI for smart sustainable cities and communities;
- Develop system-level technical frameworks, reference models, and common approaches supporting interoperability and integration across domains and layers;
- Promote international collaboration and exchange of best practices related to interoperable, scalable, and sustainable AI adoption;
- Study lifecycle management aspects including evaluation and assessment frameworks usable by cities, governments, regulators, operators and industry;
- Provide a platform to share findings and for dialogue on technical, policy and regulatory implications of AI enablement for smart sustainable cities and communities.
- Identify stakeholders and partners with whom ITU-T could collaborate further, and to define potential next steps and a transition path for Focus Group outputs into ITU-T Recommendations under ITU-T SG20.

#### **4 Specific tasks and deliverables**

The Focus Group will develop technical reports, technical specifications and other deliverables such as:

- Deliverables covering research, investigation, and standardization analysis related to AI for smart sustainable cities and communities, including generative AI, agentic AI, physical AI, spatial AI, and AI-enabled urban services, potentially leading to new ITU-T work items;
- Deliverables related to definitions, terminology, taxonomy, concepts, and vision related to AI for smart sustainable cities and communities, including representative cross-domain use cases;
- Deliverables covering system design of AI-enabled urban systems and services;
- Deliverables related to use cases, characteristics, requirements and architectural frameworks and operational considerations and best practices for AI for smart sustainable cities and communities;
- Deliverables addressing interoperability, coordination mechanisms, data management, and interaction between digital and physical systems enabled by AI technologies;

- Deliverables related to lifecycle management, evaluation, and assessment frameworks of AI technologies for smart sustainable cities and communities including benchmarking, monitoring and international comparability mechanisms;
- Deliverables on inclusive and accessible AI usages for smart sustainable cities and communities;
- Guidelines on the applicability of AI sustainability principles in smart sustainable cities and communities;
- Assessment of preparedness for AI adoption and integration and roadmap research for smart sustainable cities and communities;
- Spatial AI for digital–physical convergence in cities, integrating geospatial systems, digital twins and real-time sensing to produce reusable outputs;
- Guidance for the adoption and integration of relevant enabling AI technologies for smart sustainable cities and communities;
- Sustainability aspects of AI-enabled systems, including application and reporting of energy consumption and carbon footprint of AI deployments at city scale;

To support liaison with relevant ITU-T SGs, industrial entities and external Organizations, especially:

- collaborate with relevant ITU-T study groups, focus groups and other standards bodies.

To support collaboration and knowledge exchange, the Focus Group will also undertake the following activities:

- Organization of forums, workshops, panels, challenges and hackathons, and collaboration activities to collect expertise and encourage broad participation, including coordination with relevant ITU and UN initiatives (e.g., AI for Good Global Summit, United for Smart Sustainable Cities initiative, UN Virtual Worlds Day and Global Initiative on AI and Virtual Worlds - Discovering the Citiverse);
- Identification of stakeholders with whom ITU-T could collaborate, and establishment of liaison relationships with other organizations that could contribute to the pre-standardization activities, as well as identification of potential areas for collective action and specific next steps;
- Providing a platform to stimulate international collaboration, share knowledge and best practices, and explore the opportunities and challenges related to AI for smart sustainable cities and communities.

Upon completion of its mandate, the Focus Group will submit its final report and complete set of deliverables to ITU-T SG20.

## **5 Relationships**

The Focus Group will work through regular meetings with ITU-T SG20 when possible. Its pre-standardization work serves to support, complement, and inform the standardization activities of SG20, without duplicating ongoing efforts. Furthermore, it will closely coordinate and liaise with other relevant ITU-T SGs as necessary to ensure coherence, promote synergy and avoid duplication, while encouraging complementarity and effective use of relevant existing ITU-T Recommendations and methodologies in related domains. In accordance with Recommendation ITU-T A.7, the Focus Group will collaborate with cities, governments, regulators, operators, industry, academia, research institutions, standards development organizations (SDOs), relevant fora and consortia, companies, and other relevant stakeholders.

The Focus Group will encourage participation from both ITU members and non- members to foster broad, inclusive, and international engagement in AI for smart sustainable cities and communities.

The Focus Group will organize webinars, workshops and forums to promote the FG activities, encouraging both ITU members and non-ITU members to jointly contribute to this Focus Group and its objectives.

## **6 Structure**

The Focus Group may establish a sub-group structure if needed.

## **7 Parent group**

The parent group of the Focus Group is ITU-T SG20.

## **8 Leadership**

See clause 2.3 of Recommendation ITU-T A.7.

## **9 Participation**

See clause 3.1 of Recommendation ITU-T A.7. A list of participants will be maintained for reference purposes and reported to the parent group.

## **10 Administrative support**

See clause 5 of Recommendation ITU-T A.7.

## **11 FG Financing**

See clause 4 of Recommendation ITU-T A.7.

## **12 Meetings**

The Focus Group will conduct regular meetings. The frequency and locations of meetings will be determined by the Focus Group management. The Focus Group will use remote collaboration tools to the maximum extent.

The meeting dates will be announced by electronic means (e.g., e-mail and website) at least four weeks in advance.

## **13 Deliverables**

See clause 8 of Recommendation ITU-T A.7.

## **14 Working language**

The working language is English.

## **15 Approval of deliverables**

Approval shall be obtained by consensus according to clause 8.2 of Recommendation ITU-T A.7.

## **16 Working guidelines**

Working procedures shall follow the procedures of Rapporteur meetings (ITU-T A.1). No additional working guidelines are defined.

## **17 Progress reports**

See clause 3.6 of Recommendation ITU-T A.7.

## **18 Announcement of Focus Group formation**

The formation of the Focus Group will be announced via TSB Circular to all ITU membership, via the ITU-T news log, press releases and other means, including communication with the other involved organizations.

## **19 Milestones and duration of the Focus Group**

The Focus Group lifetime is set for one year from the first meeting with possibility of extension.

Any extension beyond the above-mentioned date is subject to the decision by ITU-T SG20, in line with ITU-T A.7.

## **20 Intellectual Property Rights**

See clause 7 of Recommendation ITU-T A.7.

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