

Verification Report

Canton of Geneva, Switzerland

October 2022



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11 SUSTAINABLE CITIES AND COMMUNITIES



Foreword

This publication has been developed by ITU within the framework of the United for Smart Sustainable Cities (U4SSC) initiative. It provides an overview of the reporting and implementation of key performance indicators (KPIs) for smart sustainable cities (SSC) in the Canton of Geneva, Switzerland. The U4SSC KPIs are based on [Recommendation ITU-T Y.4903](#). This set of KPIs for SSC was developed to establish the criteria to evaluate ICTs' contributions in making cities and communities smarter and more sustainable, and to provide cities, cantons and regions with the means for self-assessments.


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Innover ensemble pour un territoire durable

Soutenir des idées d'avenir
pour le Grand Genève

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1 Introduction and Verification Background

This report contains the verification results for the KPI submission by the Canton of Geneva to the requirements of the United for Smart Sustainable Cities (U4SSC) Key Performance Indicators (KPIs) as described within the “[Collection Methodology for Key Performance Indicators for Smart Sustainable Cities](#)”.

John Smiciklas, who is certified as a U4SSC Key Performance Indicators for Smart Sustainable Cities Verifier, completed the verification in August 2022.

The verification assessment activities included:

- collecting and reviewing KPI data;
- interviewing canton stakeholders;
- verifying that the data submitted are in conformance with the requirements of the Collection Methodology for Key Performance Indicators for Smart Sustainable Cities; and
- preparing the Verification Report.

The verification was conducted using the information made available by the canton and the information presented during follow-up activities. It was planned and performed in order to obtain limited assurance with respect to the information examined.

There were no limitations that impacted the completion of this verification.

2 KPI Reporting and Verification Summary

	Total	Reported	Verified	% KPIs Verified
Economy				
Core KPIs	23	23	23	100 %
Advanced KPIs	22	22	22	100 %
Environment				
Core KPIs	12	12	12	100 %
Advanced KPIs	5	5	5	100 %
Society & Culture				
Core KPIs	19	19	19	100 %
Advanced KPIs	10	10	10	100 %
Overall				
Core KPIs	54	54	54	100 %
Advanced KPIs	37	37	37	100 %
Total	91	91	91	100 %

3 KPI Data Points Reporting and Verification Summary

Certain KPIs are composed of more than one data point.

Below is a summary of the verification results of those data points.

	Total	Reported	Verified	% Data Points Verified
Economy				
Core Data Points	24	24	24	100 %
Advanced Data Points	31	31	31	100 %
Environment				
Core Data Points	23	23	23	100 %
Advanced Data Points	5	5	5	100 %
Society & Culture				
Core Data Points	19	19	19	100 %
Advanced Data Points	10	10	10	100 %
Overall				
Core Data Points	66	66	66	100 %
Advanced Data Points	46	46	46	100 %
Total	112	112	112	100 %

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Note: Performance Benchmark Targets apply to all sections of the graphic. Starting from the centre: Dimensions, Categories and KPIs.

5 Benchmarks and Scoring Methodology

As part of the U4SSC KPIs project, benchmarks were developed for most KPIs in order to develop a reporting framework with which to demonstrate to cities, cantons and regions how their performance could be reported.

The benchmarks were set based on several factors:

- fully meeting the aligned SDG(s);
- performance compared with other international and transnational targets (e.g., OECD, European Commission);
- performance against a UN agency's goals (e.g., International Telecommunication Union);
- evaluation of performance using UN and other international statistical data; and
- performance measured versus leading city, canton and region performance globally.

Performance to benchmarks were then scored in four ranges for every KPI and data point reported:

- 0 – 33 % of target – 1 pt;
- 33 – 66 % of target – 2 pts;
- 66 – 95 % of target – 3 pts; and
- 95+ % of target – 4 pts.

The scores for each reported KPI and data point were added to give a percentage score for categories, sub-dimensions and dimensions, and were reported based on the above target scores. KPIs or data points that are not reported or have no benchmarks yet defined were excluded.

Example: Education 4 KPIs

- If all 4 are reported and the scores are 1 pt, 3 pts, 4 pts and 1 pt;

Total score 9 pts out of 16 = 56.25 % reported as 33 – 66 % of target.

- If only 3 are reported and the scores are 3 pts, 4 pts and 2 pts;

Total score 9 pts out of 12 = 75 % reported as 66 – 95 % of target.

Targets and scoring are meant to provide additional context to KPI data and should be used in context with Geneva Canton goals and comparisons with other similar cities, cantons and regions to determine future actions.

6 Verification Results

This section contains the data and results of the verification for the Canton of Geneva reporting for each of the U4SSC KPIs within the three dimensions:

- Economy
- Environment
- Society and Culture

and the 22 categories of the dimensions:

- | | |
|------------------------|---------------------------|
| • ICT Infrastructure | • Air Quality |
| • Water and Sanitation | • Environmental Quality |
| • Drainage | • Public Space and Nature |
| • Electricity Supply | • Energy |
| • Transport | • Education |
| • Public Sector | • Health |
| • Innovation | • Culture |
| • Employment | • Housing |
| • Waste | • Social Inclusion |
| • Buildings | • Safety |
| • Urban Planning | • Food Security |















Note: The following categories are reported under the Economy and the Environment dimensions.

- Water and Sanitation
- Waste










Note: For the results on following pages.

- **Core KPIs are highlighted in bold.**
- *Advanced KPIs are in italics.*

















Dimension: Economy

CATEGORY	KPI / Data Point	Results	Benchmark
 ICT INFRASTRUCTURE	Household Internet Access	99.00 %	
	Fixed Broadband Subscriptions	47.40 %	
	Wireless Broadband Subscriptions	102 399 / 100 000 inhabitants	
	Wireless Broadband Coverage: 3G	100.00 %	
	Wireless Broadband Coverage: 4G	100.00 %	
	<i>Availability of Wi-Fi in Public Areas</i>	965	N/A
 WATER AND SANITATION	Smart Water Meters	4.90 %	
	<i>Water Supply ICT Monitoring</i>	100.00 %	
	Basic Water Supply	100.00 %	
	Potable Water Supply	100.00 %	
	Water Supply Loss	10.02 %	
	Wastewater Collection	99.60 %	
	Household Sanitation	99.60 %	















Dimension: Economy (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
 DRAINAGE	Drainage/Storm Water System ICT Monitoring	90.00 %	
 ELECTRICITY SUPPLY	Smart Electricity Meters	2.13 %	
	Electricity Supply ICT Monitoring	7.28 %	
	Demand Response Penetration	12.43 %	
	Electricity System Outage Frequency	0.25	
	Electricity System Outage Time	10.10 Minutes	
	Access to Electricity	100.00 %	


















Dimension: Economy (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
 TRANSPORT	Dynamic Public Transport Information	100.00 %	
	Traffic Monitoring	2.55 %	
	<i>Intersection Control</i>	100.00 %	
	Public Transport Network	144.16 km / 100 000 inhabitants	
	<i>Public Transport Network Convenience</i>	99.30 %	
	Bicycle Network	96.26 km / 100 000 inhabitants	
	<i>Transportation Mode Share: Private Vehicles</i>	38.00 %	
	<i>Transportation Mode Share: Public Transport</i>	17.00 %	
	<i>Transportation Mode Share: Walking</i>	39.00 %	
	<i>Transportation Mode Share: Cycling</i>	6.00 %	
	<i>Transportation Mode Share: Para Transport</i>	0.00 %	
	<i>Travel Time Index</i>	1.30	
	<i>Shared Bicycles</i>	145.90 / 100 000 inhabitants	
	<i>Shared Vehicles</i>	40.67 / 100 000 inhabitants	
	<i>Low-Carbon Emission Passenger Vehicles</i>	6.88 %	















Dimension: Economy (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
 PUBLIC SECTOR	Open Data Sets Published	758	N/A
	Open Data Sets % Availability	73.31 %	
	e-Government	128 Services	N/A
	Public Sector e-Procurement	28.57 %	
 INNOVATION	R&D Expenditure	3.15 %	
	Patents	57.09 / 100 000 inhabitants	
	Small and Medium-Sized Enterprises	99.57 %	
 EMPLOYMENT	Unemployment Rate	4.10 %	
	Youth Unemployment Rate	3.00 %	
	Tourism Sector Employment	13.50 %	
	ICT Sector Employment	4.13 %	
 WASTE	Solid Waste Collection	100.00 %	
















Dimension: Economy (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
 BUILDINGS	<i>Public Building Sustainability</i>	50.35 %	   
	<i>Integrated Building Management Systems in Public Buildings</i>	53.20 %	   
 URBAN PLANNING	<i>Pedestrian Infrastructure</i>	6.43 %	   
	<i>Urban Development and Spatial Planning: Compact</i>	YES	   
	<i>Urban Development and Spatial Planning: Connected</i>	YES	
	<i>Urban Development and Spatial Planning: Integrated</i>	YES	
	<i>Urban Development and Spatial Planning: Inclusive</i>	YES	
	<i>Urban Development and Spatial Planning: Resilient</i>	YES	






Dimension: Environment

CATEGORY	KPI / Data Point	Results	Benchmark
 AIR QUALITY	Particulate Matter (PM 2.5)	9.50 $\mu\text{g} / \text{m}^3$	
	Particulate Matter (PM 10)	14.50 $\mu\text{g} / \text{m}^3$	
	Nitrogen Dioxide (NO₂)	16.90 $\mu\text{g} / \text{m}^3$	
	Sulphur Dioxide (SO₂)	1.80 $\mu\text{g} / \text{m}^3$	
	Ozone (O₃)	50.40 $\mu\text{g} / \text{m}^3$	
	GHG Emissions	5.20 $\mu\text{g} / \text{m}^3$	
 WATER AND SANITATION	Drinking Water Quality	100.00 %	
	Water Consumption	280.65 $\ell / \text{day} / \text{capita}$	
	Freshwater Consumption	30.43 %	
	Wastewater Treatment: Primary	100.00 %	
	Wastewater Treatment: Secondary	96.00 %	
	Wastewater Treatment: Tertiary	0.00 %	


















Dimension: Environment (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
 WASTE	Solid Waste: Landfill	0.00 %	
	Solid Waste: Burnt	0.00 %	
	Solid Waste: Incinerated	51.72 %	
	Solid Waste: Open Dump	0.00 %	
	Solid Waste: Recycled	48.28 %	
	Solid Waste: Other	0.00 %	
 ENVIRONMENTAL QUALITY	EMF Exposure	98.75%	
	<i>Noise Exposure</i>	<i>46.00 %</i>	
 PUBLIC SPACE AND NATURE	Green Areas	193.40 ha / 100 000 inhabitants	
	<i>Green Area Accessibility</i>	<i>89.00 %</i>	
	<i>Protected Natural Areas</i>	<i>12.34 %</i>	
	<i>Recreational Facilities</i>	<i>1 645 016 m² / 100 000 inhabitants</i>	

















Dimension: Environment (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
 ENERGY	Renewable Energy Consumption	90.88 %	
	Electricity Consumption	5 305 kWh / yr / capita	
	Residential Thermal Energy Consumption	17.37 GJ / yr / capita	
	Public Building Energy Consumption	7.52 ekWh / m² / yr	



Dimension: Society and Culture

CATEGORY	KPI / Data Point	Results	Benchmark
 EDUCATION	Student ICT Access	100.00 %	
	School Enrolment	144.75 %	
	Higher Education Degrees	30 243 / 100 000 inhabitants	
	Adult Literacy	90.57 %	
 HEALTH	<i>Electronic Health Records</i>	0.66 %	
	Life Expectancy	82.90 Years	
	Maternal Mortality Rate	0.00 / 100 000 live births	
	Physicians	649.80 / 100 000 inhabitants	
	<i>In-Patient Hospital Beds</i>	487.05 / 100 000 inhabitants	
	<i>Health insurance/ Public Health Coverage</i>	91.38 %	
 CULTURE	Cultural Expenditure	2.60 %	
	<i>Cultural Infrastructure</i>	60.17 / 100 000 inhabitants	N/A
 HOUSING	Informal Settlements	0.00 %	
	<i>Housing Expenditure</i>	22.04 %	

Dimension: Society and Culture (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
 SOCIAL INCLUSION	Gender Income Equity	0.84	
	Gini Coefficient	0.38	
	Poverty Rate	18.50 %	
	Voter Participation	40.70 %	
	<i>Childcare Availability</i>	45.17 %	
 SAFETY	Natural Disaster - Related Deaths	0.20 / 100 000 inhabitants	
	Disaster-Related Economic Losses	0.01 % / City GDP	
	<i>Resilience Plans</i>	NO ¹	
	<i>Population Living in Disaster-Prone Areas</i>	0.06 %	
	<i>Emergency Service Response Time</i>	12.36 Minutes	
	Police Service	292.04 FTE / 100 000 inhabitants	
	Fire Service	61.73 FTE / 100 000 inhabitants	
	Violent Crime Rate	73.06 / 100 000 inhabitants	
	Traffic Fatalities	2.73 / 100 000 inhabitants	

¹ Resilience plans are in place but do not yet meet the full requirements of the Sendai Framework

CATEGORY	KPI / Data Point	Results	Benchmark
 FOOD SECURITY	Local Food Production	56.00 %	

7 KPIs Not Reported

All KPIs were reported.

8 KPIs Not Verified

All reported KPIs were verified.

9 Next Steps

The Canton of Geneva is encouraged to focus on KPIs that have been reported as falling within the benchmarks of 0 – 33 % and 33 – 66 % of targets, and determine which of these KPIs indicates critical issues for the canton and develop plans for improvement.

The Canton of Geneva is encouraged to review the KPIs for which no data were reported, and determine plans for future data collection and reporting.

The Canton of Geneva is encouraged to continue ongoing data collection to determine trends in performance against benchmarks over time.

The Canton of Geneva is encouraged to stay engaged within the U4SSC process and continue to provide feedback on KPIs and benchmarks.

10 Using KPIs for SSC to Reach the SDGs

The **United for Smart Sustainable Cities (U4SSC)** initiative has developed the Key Performance Indicators (KPIs) for Smart Sustainable Cities (SSC) to support cities and communities worldwide in evaluating the role and contribution of ICTs in smart sustainable cities and communities, and to provide cities and communities with the tools for self-assessments in order to achieve the United Nations Sustainable Development Goals (SDGs).

United for Smart Sustainable Cities (U4SSC)



U4SSC is a UN initiative coordinated by the International Telecommunication Union (ITU), UN-Habitat and UNECE, and supported by 15 other UN Agencies and Programmes, including CBD, ECLAC, FAO, UNESCO, UNDP, UNECA, UN-Women, UNEP, UNEP-FI, UNFCCC, UNIDO, UNU-EGOV, UNOP, UNWTO and WMO.

U4SSC is the global platform to advocate for public policies to encourage the use of ICTs to facilitate and ease the transition to smart sustainable cities. [Find out more...](#)

These indicators are developed based on an international standard – Recommendation ITU-TY.4903 “Key performance indicators for smart sustainable cities to assess the achievement of sustainable development goals”.

These indicators have been developed to provide cities with a consistent and standardized method to collect the necessary data to measure performance and progress with regard to:

- achieving the Sustainable Development Goals (SDGs);
- becoming a smarter city; and
- becoming a more sustainable city.

The U4SSC KPIs consist of 91 indicators. Each indicator forms part of a holistic view of a city’s, or community’s performance in three dimensions: **Economy**, **Environment** and **Society and Culture**. Each of these dimensions provides a separate view of progress, and when reported together they provide a holistic view of a smart sustainable city or community.

The U4SSC KPIs provide a common set of metrics to benchmark a city’s or community’s performance and progression in meeting the Sustainable Development Goals (SDGs).

The list of all the U4SSC KPIs for SSC, along with its collection methodology, are contained in:

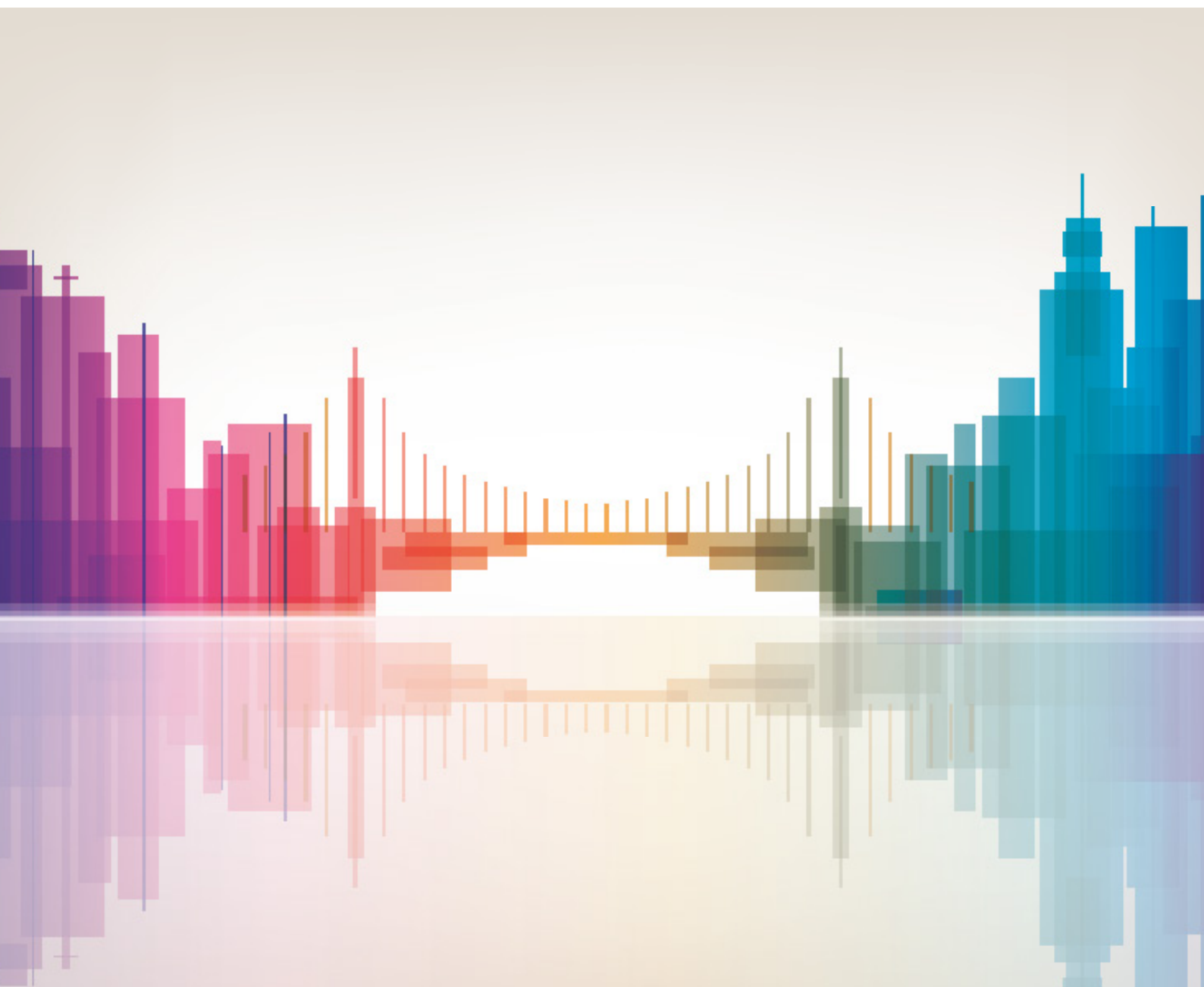
- the Flipbook on the “[Collection Methodology for Key Performance Indicators for Smart Sustainable Cities](#)”.

More than 150 cities and communities worldwide are already implementing these KPIs. All cities and communities are invited to participate in this project and employ these KPIs.

To find out more, contact the U4SSC Secretariat at: u4ssc@itu.int.







For more information,
please contact: u4ssc@itu.int
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