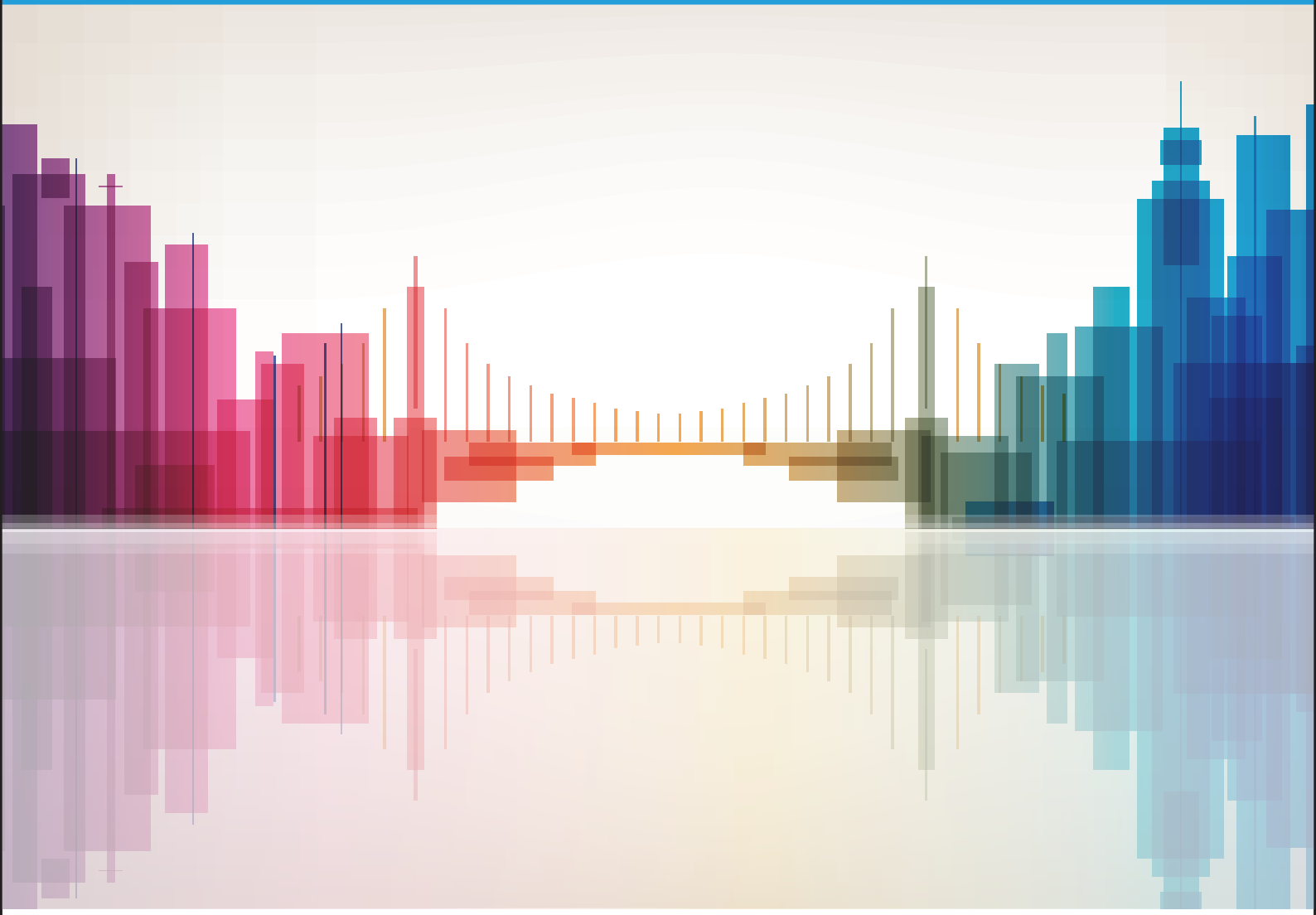
United 4 Smart Sustainable Cities

Verification Report
Ålesund, Norway

June 2020



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United 4 Smart Sustainable Cities

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SUSTAINABLE CITIES
AND COMMUNITIES

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Foreword

This publication has been developed 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 Region of Ålesund, Norway. This set of KPIs for SSC was developed to establish the criteria to evaluate ICTs' contributions in making cities smarter and more sustainable, and to provide cities with the means for self-assessments.

Disclaimer

The views expressed in this publication are those of the author and do not necessarily reflect the views of the contributing organizations.

Any references made to specific countries, companies, products, initiatives, policies, framework or guidelines do not in any way imply that they are endorsed or recommended by ITU, the authors, or any other organization that the authors are affiliated with, in preference to others of similar nature that are not mentioned.

This publication is intended for informational purposes only. The results and interim findings presented are a work in progress, as the KPIs (Recommendation ITU-T Y.4903/L.1603) implemented in Ålesund during the first phase of the project are being refined to improve the applicability of these KPIs to all cities. The revision of the KPIs may alter their scope and definition, as well as the required data-collection process.

1. Introduction and Verification Background

This report contains the verification results for the KPI submission by the city of Ålesund, Norway, 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 February 2019.

The verification assessment activities included:

- collecting and reviewing KPI data;
- interviewing city stakeholders;
- verifying that the data were submitted in conformity 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 during the onsite visit and the information presented during follow-up activities. It was planned and carried out 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	21	21	95 %
Environment				
Core KPIs	12	11	11	92 %
Advanced KPIs	5	5	5	100 %
Society & Culture				
Core KPIs	19	19	19	100 %
Advanced KPIs	10	9	9	90 %
Overall				
Core KPIs	54	53	53	98 %
Advanced KPIs	37	35	35	95 %
Total	**91**	**88**	**88**	**97 %**

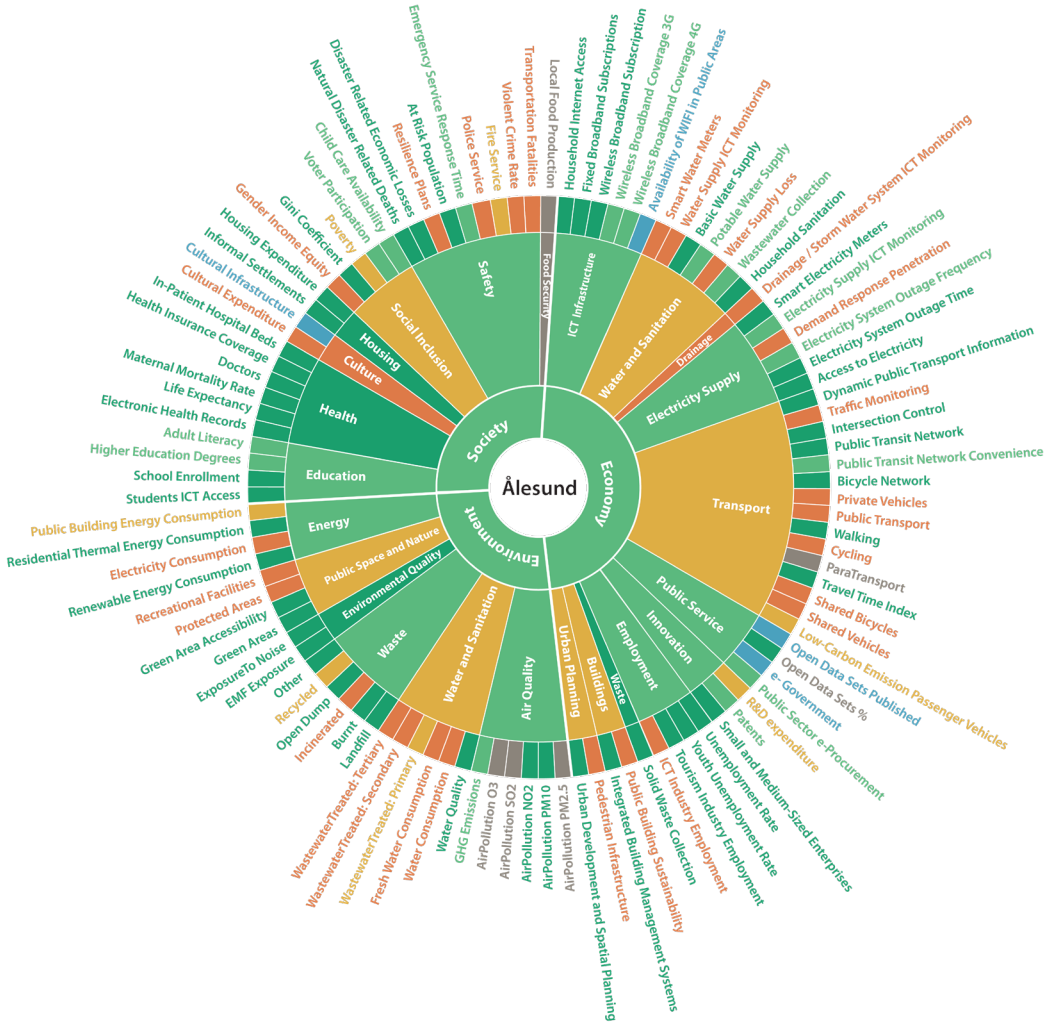
3. KPI Data Points Reporting and Verification Summary

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	30	30	97 %
Environment				
Core Data Points	23	20	20	87 %
Advanced Data Points	5	5	5	100 %
Society & Culture				
Core Data Points	19	19	19	100 %
Advanced Data Points	10	9	9	90 %
Overall				
Core Data Points	66	63	63	95 %
Advanced Data Points	46	44	44	96 %
Total	**112**	**107**	**107**	**96 %**

4. City Performance Benchmark



- 95+ % of Target
- 66 - 95 % of Target
- 33 - 66 % of Target
- Less than 33 % of Target
- No Data or No Target
- Data Reported - No Targets Yet Available

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 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 city performance using UN and other international statistical data; and
- performance measured versus leading city 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 city goals and comparisons with other similar cities to determine future actions.

6. Verification Results

This section contains the data and results of the verification for Ålesund's reporting for each of the U4SSC KPIs within the three (3) dimensions:

- Economy
- Environment
- Society and Culture

and the twenty-two (22) categories of the dimensions:

- ICT Infrastructure
- Water and Sanitation
- Drainage
- Electricity Supply
- Transport
- Public Sector
- Innovation
- Employment
- Waste
- Buildings
- Urban Planning
- Air Quality
- Environmental Quality
- Public Space and Nature
- Energy
- Education
- Health
- Culture
- Housing
- Social Inclusion
- Safety
- 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**	**96.00 %**	
	Fixed Broadband Subscriptions	**82.85 %**	
	Wireless Broadband Subscriptions	**116 673 / 100 000 inhabitants**	
	Wireless Broadband Coverage: 3G	**92.20%**	
	Wireless Broadband Coverage: 4G	**92.20 %**	
	Availability of Wi-Fi in Public Areas	*232 Spots*	N/A
 WATER AND SANITATION	**Smart Water Meters**	**0.76 %**	
	Water Supply ICT Monitoring	*20.94 %*	
	Basic Water Supply	**100.00 %**	
	Potable Water Supply	**92.00 %**	
	Water Supply Loss	**32.12 %**	
	Wastewater Collection	**93.53 %**	
	Household Sanitation	**100.00 %**	
 DRAINAGE	*Drainage/Storm Water System ICT Monitoring*	*0.00 %*	

Dimension: Economy (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
ELECTRICITY SUPPLY	**Smart Electricity Meters**	**95.01 %**	
	Electricity Supply ICT Monitoring	*91.41 %*	
	Demand Response Penetration	*0.04 %*	
	Electricity System Outage Frequency	**1.05**	
	Electricity System Outage Time	**66.86 Minutes**	
	Access to Electricity	**97.39 %**	

Dimension: Economy (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
TRANSPORT	**Dynamic Public Transport Information**	**100.00 %**	
	Traffic Monitoring	**10.20 %**	
	Intersection Control	*100.00 %*	
	Public Transport Network	**755.26 Km / 100 000 inhabitants**	
	Public Transport Network Convenience	*93.53 %*	
	Bicycle Network	**150.32 km / 100 000 inhabitants**	
	Transportation Mode Share Private Vehicles	*71.00 %*	
	Transportation Mode Share Public Transport	*6.00 %*	
	Transportation Mode Share Walking	*19.00 %*	
	Transportation Mode Share Cycling	*3.00 %*	
	Transportation Mode Share Para Transport	*Not reported*	
	Travel Time Index	*1.18*	
	Shared Bicycles	*0.00 / 100 000 inhabitants*	
	Shared Vehicles	*0.00 / 100 000 inhabitants*	
	Low-Carbon Emission Passenger Vehicles	*3.91 %*	

Dimension: Economy (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
PUBLIC SECTOR	*Open Data Sets Published*	*119 Data Sets Published*	N/A
	Open Data Sets % Availability	*100.00 %*	
	e-Government	*80 Services*	N/A
	Public Sector e-Procurement	*84.92 %*	
INNOVATION	**R&D Expenditure**	**1.13 % GDP**	
	Patents	**35.16 / 100 000 inhabitants**	
	Small and Medium-Sized Enterprises	*99.71 %*	
EMPLOYMENT	**Unemployment Rate**	**2.16 %**	
	Youth Unemployment Rate	**2.25 %**	
	Tourism Sector Employment	*3.90 %*	
	ICT Sector Employment	*1.25 %*	
WASTE	**Solid Waste Collection**	**100.00 %**	
BUILDINGS	*Public Building Sustainability*	*13.70 %*	
	Integrated Building Management Systems in Public Buildings	*100.00 %*	

Dimension: Economy (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
URBAN PLANNING	*Pedestrian Infrastructure*	*0.01 %*	
	Urban Development and Spatial Planning: Compact	*YES*	
	Urban Development and Spatial Planning: Connected	*YES*	
	Urban Development and Spatial Planning: Integrated	*YES*	
	Urban Development and Spatial Planning: Inclusive	*YES*	
	Urban Development and Spatial Planning: Resilient	*YES*	

Dimension: Environment

CATEGORY	KPI / Data Point	Results	Benchmark
 AIR QUALITY	Particulate Matter (PM 2.5)	Not reported	
	Particulate Matter (PM 10)	15.00 µg / m^3	
	Nitrogen Dioxide (NO_2)	21.00 µg / m^3	
	Sulphur Dioxide (SO_2)	Not reported	
	Ozone (O_3)	Not reported	
	GHG Emissions	5.70 tonnes eCO_2 / capita	
 WATER AND SANITATION	Drinking Water Quality	99.45 %	
	Water Consumption	560.72 ℓ / day / capita	
	Freshwater Consumption	100.00 %	
	Wastewater Treatment: Primary	62.85 %	
	Wastewater Treatment: Secondary	31.74 %	
	Wastewater Treatment: Tertiary	0.00 %	

Dimension: Environment (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
 WASTE	**Solid Waste: Landfill**	**4.10 %**	
	Solid Waste: Burnt	**0.00 %**	
	Solid Waste: Incinerated	**59.53 %**	
	Solid Waste: Open Dump	**0.00 %**	
	Solid Waste: Recycled	**36.37 %**	
	Solid Waste: Other	**0.00 %**	
 ENVIRONMENTAL QUALITY	**EMF Exposure**	**100.00 %**	
	Noise Exposure	*6.09 %*	
 PUBLIC SPACE AND NATURE	**Green Areas**	**67 240.10 ha / 100 000 inhabitants**	
	Green Area Accessibility	*98.86 %*	
	Protected Natural Areas	*2.88 %*	
	Recreational Facilities	*77 745.85 m^2 / 100 000 inhabitants*	
 ENERGY	**Renewable Energy Consumption**	**100.00 %**	
	Electricity Consumption	**14 369.36 kWh / yr. / capita**	
	Residential Thermal Energy Consumption	**0.70 GJ / yr / capita**	
	Public Building Energy Consumption	*157.27 ekWh / m^2 / yr*	

Dimension: Society and Culture

CATEGORY	KPI / Data Point	Results	Benchmark
 EDUCATION	**Student ICT Access**	**100.00 %**	
	School Enrolment	**100.25 %**	
	Higher Education Degrees	**25 027.88 / 100 000 inhabitants**	
	Adult Literacy	**94.80 %**	
 HEALTH	*Electronic Health Records*	*99.90 %*	
	Life Expectancy	**82.20 Years**	
	Maternal Mortality Rate	**0.00 / 100 000 live births**	
	Physicians	**510.38 / 100 000 inhabitants**	
	In-Patient Hospital Beds	*343.08 / 100 000 inhabitants*	
	Health insurance / Public Health Coverage	*100.00 %*	
 CULTURE	**Cultural Expenditure**	**0.00 %**	
	Cultural Infrastructure	*116.38 / 100 000 inhabitant**	N/A
 HOUSING	**Informal Settlements**	**0.04 %**	
	Housing Expenditure	*13.93 %*	

* In Norway, cultural expenditure is mainly a function of higher levels of government so that the municipal contribution does not capture the full expenditure

Dimension: Society and Culture (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
 SOCIAL INCLUSION	**Gender Income Equity**	**0.62 Ratio Female: Male**	
	Gini Coefficient	**0.23**	
	Poverty Rate	**4.34 %**	
	Voter Participation	**54.66 %**	
	Childcare Availability	*68.13 %*	
 SAFETY	**Natural Disaster-Related Deaths**	**0.0 / 100 000 inhabitants**	
	Disaster-Related Economic Losses	**0.01 % / City GDP**	
	Resilience Plans	*No***	
	Population Living in Disaster-Prone Areas	*0.93 %*	
	Emergency Service Response Time	*6.07 Minutes*	
	Police Service	**78.80 FTE / 100 000 inhabitants**	
	Fire Service	**59.68 FTE / 100 000 inhabitants**	
	Violent Crime Rate	**828.00 / 100 000 inhabitants**	
	Traffic Fatalities	**2.42 / 100 000 inhabitants**	

** Municipalities in Norway will have resilience planning in place; however, they do not yet use the Sendai framework

Dimension: Society and Culture (continued)

CATEGORY	KPI / Data Point	Results	Benchmark
 FOOD SECURITY	*Local Food Production*	*Not reported*	

7. KPIs Not Reported

KPI Number	Description
EN: EN: AQ: 1C	Partial- Following not reported: • Particulate Matter (PM 2.5) • Sulphur Dioxide (SO_2) • Ozone (O_3)
EC: I: T: 4A	Partial- Following not reported: • Para Transport Ålesund is able to collect the number of people with access to a para transport card: the TT Card. The TT Card is usually used for discounted taxi fares as there is no dedicated para transport system. The modes add up to 99 % and the remaining 1 % would include mopeds and motorcycles that are not defined within the KPIs at this time.
SC: SH: FS: 1A	Local Food Production

8. KPIs Not Verified

All reported KPIs were verified.

9. Next Steps

Ålesund is encouraged to focus on KPIs that have been reported as falling within the benchmarks of 0- 33% and 33- 66% of targets, determine which of these KPIs indicate critical issues for the city and develop plans for improvement.

Ålesund is encouraged to review the KPIs for which no data was reported and determine plans for future data collection and reporting.

Ålesund is encouraged to continue ongoing data collection to determine trends in performance against benchmarks over time.

Ålesund 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 worldwide in evaluating the role and contribution of ICTs in smart sustainable cities, and to provide cities 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 14 other UN Agencies and Programmes, including CBD, ECLAC, FAO, UNESCO, UNDP, UNECA, UN-Women, UN Environment, UNEP-FI, UNFCCC, UNIDO, UNU EGOV, UNOPS 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-T Y.4903/L.1603 '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 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.

By providing a common set of metrics to benchmark a city's performance, the indicators will also enable cities to compare their performance to other cities, allowing for the dissemination of best practices and setting the standards for progression in meeting the Sustainable Development Goals (SDGs) at the city level.

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'.

Over 100 cities worldwide are already implementing these KPIs. All cities are invited to participate in this project and employ these KPIs.

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

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