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of the instruments of the Economic Commission for Europe

Toolbox of the Economic Commission for Europe: Instruments to support the transition to smart sustainable cities
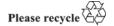
Note by the secretariat

I. Introduction

1. By 2050 almost three quarters of the world's population will live in urban areas. In the region of the Economic Commission for Europe (ECE), a large proportion of the population currently lives in cities - from less than 50 per cent in Central Asia to more than 75 per cent in Europe and 80 per cent in North America. This trend provides a tremendous opportunity to strengthen cities as drivers of sustainable development far beyond their city limits. Seizing this opportunity will require new mechanisms that promote, and enable cities to experiment with, a wide range of policies, rules, institutions, and technologies with a strong role for the private sector in the context of the 2030 Agenda for Sustainable Development, in other words: Smart and Sustainable Cities[1].

2. Cities continue to be leading engines of growth, lifting billions out of poverty over the past decades. People flock to cities to improve their lives, attracted by vast employment, trade and commercial opportunities; education; health and other public services; and social connectedness. With their ability to bring people together, allowing them to interact and explore new ideas, cities have enormous potential to drive innovation and, ultimately, the

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[1] A smart sustainable city is an innovative city that uses information and communication technology and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects. (Source: U4SSC)

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structural changes to the economy that serves as the basis for sustainable development not only in the cities themselves, but far beyond.

3.   This importance of cities as pools of talent and exchange will continue to grow. The 2030 Agenda for Sustainable Development recognizes that technological progress is needed to achieve global prosperity, poverty alleviation and environmental sustainability. However, new technologies must be green, smart, sustainable, and accessible to all to achieve these goals. Innovative solutions such as clean energy, high performance buildings, innovative housing supply and finance, intelligent and sustainable transportation, green technologies and infrastructure, innovative solutions to ensure the sustainable supply of food and manage waste, e-business, e-government and state-of-the-art standards and norms are all essential elements to enable cities to continue to drive sustainable development and become Smart and Sustainable Cities. Cities are also poised to become key hubs for the transition to a circular economy, with considerable potential to achieve sustainable production and consumption by influencing the value chain via public procurement and support to local stakeholders.

4.   Challenges also persist. The rapid growth of cities and the urban population can lead to growing inequalities and environmental degradation. Ageing and increasing international migration flows in the ECE region put pressure on public services. Climate change, air pollution and natural hazards cause economic and social losses and increase the need for resilience. Cities consume most of the world's available energy and contribute much of the world's pollution and greenhouse gas emissions. With the expansion of the knowledge economy and automation, and the need for risk management and investment into skills and institutions, cities must reform and invest in education, training and employment to respond to these new needs. Making cities smart, inclusive, safe, resilient, and sustainable requires cross-sectoral policy coordination; room for experimentation and peer learning opportunities; addressing the rural-urban migration; and intelligent investment choices that make the most of resources, land, and human and physical capital.

Working together and developing innovative approaches

5.   Global and international agreements such as the 2030 Agenda for Sustainable Development, the Sendai Framework for Action, the New Urban Agenda, the Geneva United Nations Charter on Sustainable Housing, etc. establish new policy frameworks which enable cooperation amongst and between different thematic areas and levels of government, requiring also a new understanding of action taken at the urban level.

6.   To respond to the multidimensional challenges and opportunities posed by the 2030 Agenda for Sustainable Development, ECE has introduced the nexus approach. It allows the organization to bring together the expertise, mechanisms, standards and instruments of its sub-programmes to develop integrated programmatic activities and create greater synergies among its different areas of sectoral expertise.[2] The nexus area "Smart and Sustainable Cities" builds on the strengths of ECE to address urban development challenges and opportunities, including on transport, energy, economic development, innovation, environment, trade, private sector, standards, sustainable food supplies and food waste prevention, data availability, the digital divide, urban planning, and population dynamics.

7.   Intersectoral cooperation and an integrated approach to urban development is also happening at the country level. Governments are addressing urban challenges and opportunities by going beyond city boundaries, involving different line ministries and

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[2]   ECE has identified four high-impact nexus areas: (A) Sustainable use and management of natural resources; (B) Sustainable and smart cities (C) Sustainable mobility and smart connectivity; (D) Measuring and monitoring SDGs.

fostering dialogues between municipal, provincial/regional and national governments; and involving stakeholders, including from private sector, academia and non-governmental organizations (NGOs).

8.   For over 70 years, ECE has built a deep knowledge of the region, its institutions and economic structures. This can help address challenges, seize opportunities, and translate global dialogue into concrete actions and priorities at the regional level. Its strong tradition of intergovernmental cooperation and its existing mechanisms and networks serve as a platform for concerted dialogue. Its expertise in a broad range of policy areas, from urban planning and regulatory cooperation to innovation and public-private partnerships, provides much of the necessary analytical support for such dialogue. Engaging with the Commission and utilizing its expertise can support cities to act as engines of structural change and long-term growth in a sustainable and equitable manner through exchange of best practices, peer learning, experimentation and scalability.

9.   This document is intended to present a thematic overview of the ECE instruments[3] that support the nexus "Smart Sustainable Cities". It offers a toolbox from which local and national governments may select knowledge products that can support their transition towards smart sustainable cities.

10.   The material is organized around 8 thematic areas under the Smart Sustainable City nexus:

- Smart sustainable cities as hubs and drivers of innovation, trade competitiveness and the transition towards a circular economy;

- Interoperability of city systems: harvesting the potential of block chain, internet of things and artificial intelligence;

- Affordable, decent and healthy housing and energy efficient buildings;

- Sustainable transport in cities and road safety;

- Increasing urban resilience to natural and man-made hazards and mitigating/adapting to climate change;

- Reducing the environmental footprint of cities;

- New approaches to public-private partnerships, innovative financing, policies, regulation, institutions, and technologies;

- Accountability, transparency, inclusiveness, and responsiveness of urban decision-making.

11.   Instruments that address more than one of these thematic areas are listed only in one category. An index at the end of the document cross-references other areas of relevance. For easy access, the title of each tool is hyperlinked.

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[3] On occasion, instruments are listed that ECE has developed in collaboration with its partners. Please refer to the source documents for additional information on other contributors.

II. Toolbox "Smart Sustainable Cities of the Economic Commission for Europe

A. Smart sustainable cities as hubs and drivers of innovation, trade competitiveness and the transition towards a circular economy

1. Connecting cities and communities with the Sustainable Development Goals

This study, developed within the framework of the United for Smart Sustainable Cities (U4SSC) initiative, provides an overview of how cities can use information and communication technologies (ICTs) to achieve the Sustainable Development Goals (SDGs). It maps case studies to various international agreements as well as the SDGs. The publication provides urban stakeholders with an overview of innovative concepts, policies and frameworks that have been adopted in various countries to facilitate smart-city transformations.

(Available in EN)

2. Collection Methodology for Key Performance Indicators for Smart Sustainable Cities

This publication of the U4SSC initiative provides a methodology on how to collect data or information from key performance indicators (KPIs) for smart sustainable cities (SSC). This set of KPIs for SSC were 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-assessment.

(Available in EN)

3. National policy reviews on innovation for sustainable development

These reviews have been conducted for a growing number of ECE countries, most recently in Belarus (2017) and the Kyrgyz Republic (2018). They look in-depth at the stakeholders, policies, institutions, companies, and linkages that make up the innovation system, recommending a range of institutional and policy reforms to create a conducive business climate, remove constraints, and compensate for market failures. Cities play a leading role in bringing together the key components needed for innovation to thrive and drive sustainable economic development. City innovation and competitiveness aspects will be given particular attention in forthcoming reviews, such as that for Georgia (planned for 2019–2020).

(Language availability varies based on the country reviewed.)

4. Innovation in the public sector

The public sector, including cities and municipalities, plays an essential role in enabling and promoting innovation in the private sector. Major initiatives, such as public investment and partnerships for smart and sustainable cities, can drive innovation in the public sector. This can radically increase productivity in the economy, where public spending can account for up to 50 per cent of aggregate demand, create new business opportunities and markets, and improve public services, especially for the most vulnerable segments of the population. This publication explores the nature of public sector innovation, ways to measure and benchmark it, the potential of emerging technologies, and a range of good practices from across the ECE region.

(Available in EN, RU)

5. **Innovation policy for green technologies**

This publication, drawing on assessments from several ECE countries with economies in transition, explores the opportunities, challenges, and policy options for enabling and promoting green technologies.

(Available in EN, RU)

6. **Enhancing innovation and participation in smart sustainable cities**

This U4SSC publication provides a series of case studies on smart governance, illustrating the importance of innovation and participation for smart and sustainable urban development. It showcases benefits of delivering public services via digitized and streamlined public sector processes. By providing open access to data, innovation and value creation can be further advanced by various city constituents, from public to private sector, to academia and NGOs.

(Available in EN)

7. **Smart food loss and waste prevention management in cities and opportunities to address the rural-urban migration challenge**

ECE has developed smart food-waste prevention and food loss management solutions in the urban environment. The blockchain-enhanced food loss management system traces losses and helps to plan impactful interventions at food loss hotspots, particularly in cities, and repurpose/redistribute available food that would otherwise be lost in new and unconventional supply channels to keep as much food as possible in the human consumption chain. In addition, smart technology helps to build up trade at production levels in rural areas, thus creating employment for the more vulnerable rural communities, women and particularly the youth, and contributing to alleviate rural-urban migration challenges. The smart food loss management system will be made available as a simple online and mobile app for repurposing food removed from the supply chains.

(Available in EN)

8. **Agricultural quality standards**

ECE has developed over 100 quality standards for the safe and transparent trade of food and agricultural produce to ensure that consumers in urban areas receive a constant supply of high quality, healthy and nutritious food. Matching the quality of food traded from the farm to the shop through international best practice enhances the economic value of food trade, opens opportunities and alleviates health risks for the more vulnerable city dwellers. The trade in and availability of good quality food is a prerequisite for sustaining the growing populations in cities.

(Available in EN, FR, RU)

9. **Assessment studies of regulatory and procedural barriers to trade**

These studies provide an evidence-based tool for gearing trade reforms towards SDG implementation. A comprehensive evaluation methodology combines legislative analysis with actor-oriented questionnaires to capture regulatory and procedural barriers to trade, including those stemming from capacity shortfalls in the institutional set up, legislative framework, the transport sector and enterprise support institutions. The analysis brings forward the interplay between regulatory and procedural trade barriers and regional and global dynamics, tracing their impact on structural transformation (SDG 9) and job creation (SDG 8). Based on public-private consultations, the action-oriented recommendations support a "whole of government" approach. While currently applied at the country level, the methodology can be adapted to capture trade and growth dynamics at the city level and the

manner in which they are influenced by national, regional and global factors underpinning cities' ability to achieve the SDGs.

(Language availability varies based on the country reviewed.)

10. **Guide to Drafting a National Trade Facilitation Roadmap**

This guide provides a methodology for defining and implementing trade facilitation measures. Such measures can be applied to specific projects or to specific delimited areas such as cities for such goals as streamlining the last mile of logistics, implementing trade support tools. They can also be applied to more global projects that would have a direct impact on local communities such as the implementation of a Trade Single Window (see ECE Recommendation 33)

(Available in EN, FR. Unofficial translation in AR)

11. **Riding towards green economy: Cycling and green jobs**

This joint report was prepared by UN Environment, the World Health Organization and ECE under the Transport, Health and Environment Pan-European Programme (THE PEP). It is a unique study based on data from the ECE region that shows how cycling promotion can help to address the transport-related emission of air pollutants and create green jobs. An increasing number of cities across the pan-European region are considering the promotion of cycling to address traffic emissions. This study seeks to provide policymakers with new arguments to advocate for an increased number of more effective cycling policies and interventions.

(Available in EN, RU)

12. **Unlocking new opportunities: jobs in green and healthy transport**

This publication focuses on potential job creation from public transport, cycling and walking. An analysis of the available evidence suggests that these modes could be significant employers and contributors to the green economy, including in cities.

(Available in EN, FR, RU)

13. **Traceability of sustainable value chains in a circular economy**

Promoting compliance with international regulations and standards for sustainable production and consumption, achieving resource and energy efficiency, and sustainable waste management, are key factors for moving from a linear to a circular economy, including in cities. The UN Centre for Trade Facilitation and Electronic Business (UN/CEFACT) has produced standards and tools associated with the transparency and traceability of sustainable value chains, particularly in the agri-food, fishery, and garment and footwear sectors, to support information sharing among different stakeholders. Traceability encourages producers to embrace more responsible production patterns and provides consumers with relevant information to encourage sustainable consumption.

(Available in EN)

B. Interoperability of city systems: Harvesting the potential of block chain, internet of things and Artificial Intelligence

14. **Blockchain**

Blockchain can be used in multiple contexts to improve the security of data exchanges and create a collaborative environment. This white paper, developed by UN/CEFACT in collaboration with other international organizations, contains guidance material for the use

of blockchain and various use cases. At the city level, this includes application in municipal government, tourism or healthcare services.

(Available in EN, FR, RU)

15. Internet of Things

Electronic devices can communicate with the supply chain and other devices to improve visibility and information sharing. For example, smart containers can notify relevant authorities when they enter a specific zone for highway fare payment or control of types of vehicles for carbon tax payment. This White Paper on Smart Containers outlines the benefits and potential use cases of Smart Container technology and establishes the basis for a future electronic standard on the subject.

(Available in EN, FR, RU)

16. Electronic Invoice

Within the European Union, electronic invoices are obligatory for all public entities from 2019. One of two standards identified as compulsory for all public procurements of all sizes is the UN/CEFACT Cross Industry Invoice, an electronic-business standard accompanied by business process models and implementation guidance material. All municipal authorities within Europe must accept this format, which streamlines administrative procedures and reduces the use of paper.

(Available in EN)

17. Sustainable Procurement

Traditionally, procurement focuses on economic factors. To introduce sustainability concerns into this process, UN/CEFACT has developed a recommendation that outlines the minimum requirements which should be considered for procurement to be more sustainable.

(Available in EN, FR, RU)

C. Affordable, decent and healthy housing and energy efficient buildings

18. Framework guidelines for energy efficiency standards in buildings

These recommendations represent a principles-based performance guidance for building energy standards that is outcome-based, anchored in energy actually consumed, and projects a vision of holistically designed and operated, ultra-high performance buildings as part of an integrated sustainable energy system in a city.

(Available in EN, FR, RU)

19. Promoting sustainable building materials and the implications on the use of wood in buildings: A review of leading public policies in Europe and North America

This study provides an overview of the current policy and regulatory environment regarding sustainable construction materials in the building sector in Europe and North America. A broad survey documents the status quo to inform technical meetings and policy debates and offer guidance on how to enhance the use of wood in urban buildings.

(Available in EN)

20. **Forest Products Annual Market Review, 2017–2018**

This publication ties government policies and the demand for sustainable materials to forest resources and the manufacturers of wood products. The Market Review discusses housing trends in the region, addresses policy issues and identifies demand-side drivers with a view to enhancing sustainable construction using wood. It also provides data and developments on wood energy, the single largest component of the renewable energy portfolio in Europe.

(Available in EN, FR, RU)

21. **The Geneva UN Charter on Sustainable Housing**

This document outlines key topics where political will is needed to achieve sustainable housing. Action is required to ensure decent and affordable housing to all, support cities and human settlements in adopting and implementing smart city concepts, integrating policies and plans to support socially mixed communities, resource efficiency, and resilience to climate change and hazards.

(Available in AL, AM, BG, CZ, EE, EN, ES, FR, DE, IT, RU, SI, SK[4])

22. **Geneva Ministerial Declaration on Sustainable Housing and Urban Development**

Adopted in November 2017, this document is a commitment to promote coherence, partnerships and cross-sectoral links among all relevant stakeholders in the implementation of key global and regional agreements.

(Available in EN, FR, RU)

23. **Informal settlements in countries with economies in transition in the UNECE region**

Published in 2016, this study provides guidance on how to upgrade informal settlements, following the privatization of property markets in Eastern Europe, Central Asia, the Caucasus and the Western Balkans. This work aims to enhance land tenure security through responsible governance, and support implementation of the Committee on World Food Security's Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security.

(Available in EN)

24. **Country Profiles on Housing and Land Management**

Country Profiles on Housing and Land Management assess the different aspects of the sustainability of cities in a specific country. They cover urban development, housing and land management policies, strategies and financial frameworks. They are powerful tools for informing national and local policy-making and the formulation of enabling legislation for the countries reviewed.

(Language availability varies based on the country reviewed.)

25. **Social Housing in the UNECE region: models, trends and challenges**

This study examines the trends, challenges and social housing models in the region and provides recommendations for advancing affordable housing developments to governments, local authorities, investors, private developers and NGOs. Through an extensive literature review of housing issues in over 50 countries and interviews with over 30 representatives of governments, private and non- governmental organizations, it was found that housing costs

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4 ISO Country alpha-2-codes.

are rising disproportionately to incomes. As a result, over 100 million people in the ECE region are cost overburdened and spend over 40 per cent of their disposable incomes on housing.

(Available in EN, RU)

26. **Policy Framework for Sustainable Real Estate Markets**

This study offers advice on issues such as the establishment of financial markets backed by real estate as collateral, harmonized valuation standards for real property, and transparency in investment risk assessment. It advocates for a more integrated and holistic approach towards the establishment and management or real estate organizations, especially for economies in transition.

(Available in EN, RU)

27. **Strategy for Sustainable Housing and Land Management in the UNECE region for the period 2014–2020**

This study promotes sustainable housing and land management practices in the region. It seeks to strengthen the implementation of existing tools and policy guidance of the ECE Committee on Housing and Land Management, and contribute to the overall improvement of the housing and land management situation both at the national and regional level.

(Available in EN, FR, RU)

28. **Implementing Sustainable Development Goal 11 by connecting sustainability policies and urban planning practices through ICTs**

This publication provides guidance on the advantages of using ICTs to support the implementation of the SDGs, in particular SDG 11, by closing the gap between sustainability policies and urban-planning practices through digital urban action.

(Available in EN)

29. **Action Plan for Energy-Efficient Housing in the UNECE Region**

This document provides a framework to enhance energy efficiency in the housing sector and address environmental, economic and social challenges more effectively. The Action Plan lists a range of measures aimed at removing barriers to energy efficiency and progressively moving towards a low-energy and ultimately zero-energy and carbon neutral housing sector.

(Available in EN, RU)

30. **Good practices for Energy-Efficient Housing in the UNECE region**

Building on the Action Plan, this report provides practical recommendations to help overcome barriers to energy efficiency in housing.

(Available in EN, RU)

31. **Green Homes**

This study illustrates the environmental, economic and social benefits of transitioning to energy-efficient housing. It outlines the required institutional changes and discusses key policy recommendations for governments, such as a cross-sectoral approach to energy efficiency to reduce social inequality and improve social well-being. It also emphasizes the importance of basing policies on reliable data and disseminating information to all relevant stakeholders to better coordinate efforts and clarify responsibilities.

(Available in EN, RU)

32. **Mapping of Existing Energy Efficiency Standards and Technologies in Buildings in the UNECE Region**

This study identifies energy efficiency standards in buildings in the ECE region, assesses the most effective policies, and highlights best practices to help countries learn from each other and achieve greater savings.

(Available in EN, RU)

33. **Equitable Access Score-card: Supporting policy processes to achieve the human right to water and sanitation**

The Equitable Access Score-card is an analytical tool designed to help administrations establish a baseline measure of the equity of access to water and sanitation, identify related priorities, discuss further actions to be taken and evaluate progress through a process of self-assessment. A related Guidance Note describes how to develop related action plans.

(Available in EN, FR, RU. Unofficial translations in AL, AM, AZ, HU, MK[4])

34. **Residential heating with wood and coal: health impacts and policy options in Europe and North America**

This document provides a better understanding of the role of wood biomass in residential heating as a major source of harmful air pollutants (especially fine particles (PM 2.5)) for national, regional and local administrations, politicians and the public.

(Available in EN)

D. Sustainable transport in cities and road safety

35. **Transport for Sustainable Development - The case of Inland Transport**

This publication examines issues, progress and challenges in global efforts to transition to sustainable mobility of freight and to people using inland modes of transport, i.e. road, railways, inland waterways and intermodal transport. It is the result of cooperation among the five Regional Commissions of the United Nations and other key global stakeholders.

(Available in EN)

36. **Together with UNECE on the road to safety**

ECE has identified 11 goals derived from the five pillars of the Global Plan for the Decade of Action for Road Safety of the United Nations to form its strategic approach to road safety. This report covers each goal in detail, including protecting vulnerable road users, raising awareness for road safety, making vehicles safer and mitigating the impact of road crashes. It provides a comprehensive overview, including the status quo of each goal key results expected, descriptions of specific ECE initiatives and information on the challenges facing the road safety community. One of its main conclusions is that political will and the use of national strategies are likely the most significant factors to making a difference.

(Available in EN)

37. **Road Safety Performance Reviews**

These reviews assess the current road safety situation, help beneficiary countries to identify the most critical road safety issues and recommend actions to be taken. Based on the critical

issues identified, capacity-building workshops for national road safety stakeholders are organized. These initiatives raise public awareness on road safety issues and sensitize national experts and the non-government sector to the need for ambitious road safety targets and specific measures to improve road safety.

(Language availability depends on the country reviewed.)

38. **IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units (CTU Code)**

Cargo loading and transport operations frequently take place within city limits. Poor practices in the packing of cargo transport units, including inadequate securing of the cargo, overloading and incorrect declaration of contents, create hazardous working conditions for the relevant workers and often lead to road accidents. The CTU Code, a joint publication of the International Maritime Organization, the International Labour Organization and ECE, addresses these concerns through a non-mandatory global code of practice for the handling and packing of shipping containers for transportation by sea and land. It applies throughout the intermodal transport chain and provides guidance for packing, securing, receiving and unpacking cargo. It also addresses training and the packing of dangerous goods. The CTU Code is useful for industry, employers' and workers' organizations as well as governments for staff training.

(Available in AR, CN, DE[4], EN, FR, RU, ES)

39. **Standard on Public-Private Partnerships in Roads**

This international standard provides guidance to governments, including local authorities, using People-first Public-Private Partnerships (PPPs) to deliver investment in road infrastructure in rural and urban areas and meet the SDGs. Roads can be assets to cities both in terms of physical investment and social and economic benefits. PPPs can facilitate high quality, long lasting, safer infrastructure that is more affordable and improves interconnectedness and cross-border traffic while expanding access to economic opportunities for citizens.

(Available in EN, FR, RU)

40. **Standard on Public-Private Partnerships in Railways**

This international standard contains policy recommendations targeting national and local authorities which are considering the development and implementation of People-first PPPs in the railways sector. Railways improved through PPPs can facilitate modal shift of passengers and goods from road to railways, enhancing the connectivity of urban, peri-urban and rural areas and mitigating adverse environmental impacts on cities.

(Available in EN, FR, RU)

41. **Standard on PPPs in Urban Rail Transit Projects**

ECE is currently developing a standard to help cities design ecological and green urban-metro transport solutions through PPPs. Rapid urbanization, especially in developing countries, is leading to an increased need for urban rail transit infrastructure and is generating a growing demand for ecological and green urban transport solutions in large and medium-sized cities.

(Available in EN)

42. Signs and signals for cyclists and pedestrians

This study takes stock of existing rules and regulations for signs and signals (including for tourists) for cyclists and pedestrians in urban areas in 15 countries.

(Available in EN, FR, RU)

43. Developing national action plans on transport, health and environment. A step-by-step manual for policy-makers and planners

This publication by THE PEP presents national transport, health and environment action plans (NTHEAPs), a key mechanism for developing sustainable and healthy transport in a country. It provides a comprehensive and intersectoral way of planning and implementing transport, environment and health action at the national level. A NTHEAP can also be developed at regional or city level.

(Available in EN, FR, RU)

44. Working Together for Sustainable and Healthy Transport: Guidance on Supportive Institutional Conditions for Policy Integration of Transport, Health and Environment

This brochure provides guidance to policy makers on how to strengthen policy integration among relevant sectors of government and include stakeholders into the decision-making process.

(Available in EN, FR, RU)

45. ForFITS Model - Assessing Future CO2 Emissions

The For Future Inland Transport Systems (ForFITS) model fosters sustainable transport policies and informed decision making about measures to reduce emissions from transport. Users can compare projections between a baseline scenario and scenarios where proposed transport policies are implemented; and estimate the impact of such policies on future emissions. This supports the implementation of future transport policies that are likely to reduce emissions effectively. ForFITS can be applied at an urban level where harmonized data are available.

(Available in EN)

46. Guidance Document on Emission Control Techniques for Mobile Sources under the Convention on Long-range Transboundary Air Pollution

This publication helps identify the best abatement options for mobile emission sources (e.g. sources of nitrogen oxides, sulphur oxides, ammonia, volatile organic compounds, particulate matter (PM 2.5), including black carbon), with particular reference to best available techniques. This will help authorities to reduce air pollution, including in cities.

(Available in EN, FR, RU)

47. SafeFITS - A road safety decision-making tool

The SafeFITS model facilitates knowledge-based transport policy decision-making related to reducing road traffic injuries through three complementary modules: (a) an intervention analysis module, to allow the user to forecast the safety effects of a specific road safety measure or intervention for a given country and time period, (b) a forecasting module, to allow the testing of combined scenarios of interventions (measures and programmes) at national level, and (c) a benchmarking module, to allow the user to compare the road safety outcomes in different countries and identify priority areas for improving road safety.

(Available in EN)

48. Glossary for Transport Statistics

This glossary, a joint publication of the ECE, the International Transport Forum and Eurostat, defines statistical terms for all modes of transport, from infrastructure, vehicles and traffic measurement, to transport safety, energy consumption and intermodal movements. In 2019, new chapters on energy consumption, the environmental impact of transport and passenger mobility will be added, with particular relevance for urban transport.

(Available in EN, FR, RU)

49. Transport Statistics

This database facilitates evidence-based policy making by member States. Data on bus usage are relevant at an urban level.

(Available in EN)

50. National Policy Measures to Promote Intermodal Transport

This tool monitors national policy measures to promote intermodal transport. Information is currently available for 17 ECE member States. Urban intermodal transport with trunk public transport systems is promoted as per SDG11.

(Available in EN, FR, RU)

51. Making THE (Transport, Health and Environment) Link: The Transport, Health and Environment Pan-European Programme (THE PEP)

Transport provides access to jobs, education, services, amenities and leisure, while also contributing to economic growth, jobs and trade. However, it also affects the environment and human health. Healthy and sustainable transport policies can make a major contribution to the attainment of many of the SDGs. This publication presents an analysis of how THE PEP can contribute to this process.

(Available in EN)

52. From Paris 2014 to Vienna 2019

This publication gives information on issues linked to transport faced at the national and city level and how THE PEP can help address them. It also presents the new THE PEP Priority Goal to integrate transport, health and environmental objectives into urban and spatial planning policies.

(Available in EN, FR, RU)

E. Increasing urban resilience to natural and man-made hazards and mitigating/adapting to climate change

53. Guidance on Land-Use Planning, the Siting of Hazardous Activities and related Safety Aspects

This publication was developed under three ECE legal instruments – the Convention on the Transboundary Effects of Industrial Accidents, the Convention on Environmental Impact Assessment in a Transboundary Context and its Protocol on Strategic Environmental Assessment, with contributions from the ECE Committee on Housing and Land Management. The guidance responds to the need for greater integration of industrial safety,

land-use planning and environmental assessment procedures, to be able to make coordinated decisions on accident prevention and risk reduction. It provides examples of different land-use planning approaches and risk assessment methods, and describes the key steps that authorities can take to evaluate land use proposals involving hazardous industrial facilities. It helps to prevent and minimize the effects of possible industrial accidents on humans and the environment more effectively, within and across country borders. As such, the guidance assists countries in their efforts to implement the Sendai Framework for Disaster Risk Reduction 2015–2030 and the SDGs.

(Available in EN, FR, RU)

54. Guidance on Water Supply and Sanitation in Extreme Weather Events

Increasingly, extreme weather events, including floods and droughts, are affecting the operation of water supply, drainage and sewerage infrastructure, as well as the functioning of wastewater treatment plants in cities, thereby affecting the protection of public health. This publication describes how adaptation policies should consider these growing risks, how vulnerabilities can be identified and how integrated management procedures can ensure sustained protection of health.

(Available in EN)

55. Guidance on Water and Adaptation to Climate Change

Many disasters are water-related. A city's resilience to climate change often depends on the management of the waterbasin in which they are located. This publication shows how to develop an adaptation strategy. Based on the concept of integrated water resources management, it provides advice on how to assess the impacts of climate change on water quantity and quality, how to perform risk assessment, including health risk assessment, how to gauge vulnerability, and how to design and implement appropriate adaptation strategies.

(Available in EN, FR, RU, ES)

56. Words into Action Guidelines Implementation Guide for Addressing Water-Related Disasters and Transboundary Cooperation

This publication raises awareness of the importance of river basin management and transboundary cooperation in disaster risk reduction, while taking into account climate change adaptation. It provides steps that authorities can take to harness the values of river basin management and transboundary cooperation, together with good practices from across the world and lessons learned. A specific section is devoted to the role of cities.

(Available in EN)

57. Resilience to disasters for sustainable development

This brochure presents activities undertaken under the umbrella of ECE to strengthen resilience to disasters resulting from natural and man-made hazards. It gives an overview on tools that help to strengthen institutional capacity for mitigating disaster risks related to transboundary water basins, housing, energy networks, transport hubs and information technology. These tools are of particular relevance to cities as population density in urban areas rises and increase the risk of localized disaster events causing high morbidity.

(Available in EN)

58. **Standards for Disaster Risk Reduction**

This publication helps authorities at national, regional and urban level to better utilize the potential of voluntary standards as a tool to mitigate the risk of disasters. It shows how standards can help prevent disruptions of different kinds, and better manage them when they occur. It is specifically intended for authorities working to implement the Sendai Framework for Disaster Risk Reduction 2015–2030.

(Available in EN, RU)

59. **Application of the United Nations Framework Classification for Resources to Anthropogenic Resources**

The United Nations Framework Classification for Resources (UNFC) is an international system for classifying minerals and energy resources. This document specifies the UNFC terminology and principles to enable its application to anthropogenic resources. Anthropogenic resources can be found in a variety of sources, including: mine tailings, buildings, infrastructure, consumer goods, and from all the material life cycle stages, including production, use and end-of-life. The specifications will help to manage recovery projects in the circular economy, reduce waste and improve the environmental footprint of anthropogenic resources.

(Available in EN)

F. Reducing the environmental footprint of cities

60. **Environmental Performance Review Programme**

The Environmental Performance Reviews (EPRs) address cities and human settlements in various chapters of country reviews. Since 2017, EPRs include the review of relevant goals and targets of the 2030 Agenda and provide recommendations to achieve the SDGs. Upon request by the country reviewed, they may include specific chapters on "Human Settlements and Environment" (with an overview of spatial planning, housing stock, infrastructure, the extent and types of informal settlements and illegal construction, poverty and the socio-spatial divide and environmental pressures from housing on environmental media) or on "Land Management" (addressing pressures from land degradation on environmental media, including biodiversity and ecosystems). Further, impact of and adaptation to climate change, the legal, policy and institutional framework and the participation of the country under review in relevant international agreements and processes are covered. Chapters on waste management, water management, biodiversity and forestry review the impact of housing on environmental media.

(Language availability varies based on the country reviewed.)

61. **EMEP/EEA air pollutant emission inventory guidebook 2016: Technical guidance to prepare national emission inventories**

Identifying emissions sources is critical when designing measures to improve air quality. This document describes how to compile an atmospheric emissions inventory under the ECE Air Convention and the European Union National Emission Ceilings Directive. It is also used to produce emission inventories for cities.

(Available in EN, RU)

62. **Resource Manual to Support Application of the Protocol on Strategic Environmental Assessment**

The Protocol on Strategic Environmental Assessment (SEA) applies to plans and programmes of central and local governments for town and regional planning, energy, industry, transport, waste management, water management and tourism. By ensuring that environmental and health aspects are considered in all development planning, it constitutes a key tool towards sustainable cities and communities. The Resource Manual highlights the main requirements of the Protocol, outlines the key issues for applying SEA in practice, including in the urban development context, and provides materials for training and capacity-development programmes supporting application of SEA in line with the Protocol.

(Available in EN, RU. Unofficial translations in AM, AZ, GE[4])

63. **Protocol on Strategic Environmental Assessment: facts and benefits**

This brochure introduces the SEA procedure as set out in the Protocol on SEA and presents its benefits as a systematic and anticipatory planning tool. It provides practical examples of SEA implementation, many of which are related to urban planning and planning for transport infrastructure nearby human settlements.

(Available in EN, RU. Unofficial translations in AM, AZ, GE, KZ, RO, UA[4])

64. **Food waste prevention and food loss management in cities**

Food waste makes up over half of the solid waste produced in urban areas and creates a huge environmental, financial and social problem for cities. With increasing migration expected in the coming years and even larger urban centres, these problems will be amplified further. The preventive food loss measures of ECE aim at the repurposing of food otherwise lost to keep as much food as possible in the human consumption chain (processing, drying, juicing, redistributing). They include adapting standards to prevent food loss along the entire supply chain including the end points in cities, advocating for keeping quality from the farm to the shop through international best practice, a simple mobile App for repurposing food removed from the supply chains and a Code of Good Practice to prevent food loss.

(Available in EN)

65. **Waste Management electronic messages**

Ensuring that waste is correctly managed and in compliance with international conventions, such as the Basel Convention, is essential to the sustainable management of cities. UN/CEFACT has worked on clearly identifying the business processes behind such exchanges as well as the corresponding electronic messages.

(Available in EN)

66. **Sustainable Tourism**

Stimulating local economies and ensuring compliance with the highest values of sustainability are key elements of the UN/CEFACT Green Paper on Sustainable Tourism – Experience Programs. This paper looks at rural experience programmes that can help improve local economies. It can also be applied in an urban context.

(Available in EN, FR, RU)

67. **Climate Neutral Cities: How to make cities less energy and carbon intensive and more resilient to climatic challenges**

This report provides an overview of the importance of cities for energy reduction, climate protection and climate adaptation. It discusses the actions that cities in the ECE region can undertake to mitigate their energy intensity and carbon footprint, and to reduce their vulnerability to climate change and post-carbon energy transitions.

(Available in EN, RU)

68. **Standard on Public-Private Partnerships in Renewable Energy**

This forthcoming international standard contains policy recommendations related to PPPs in the renewable energy sector. PPPs can foster investment in renewable energy and contribute to the achievement of many SDGs by expanding the means to provide reliable, affordable, sustainable and modern energy services to cities.

(Available in EN, FR, RU)

69. **Guidelines on People-first Public-Private Partnerships for waste to energy**

ECE is currently developing guidelines on People-first waste to energy PPPs in the urban sector. The work has three components:

- Guidelines on best practices related to governance and stakeholder engagement and the importance of People-first approaches;

- A methodology on how to do projects in this sector;

- A set of cases demonstrating both good and bad experiences that can guide policy makers.

(Available in EN)

70. **Framework Code for Good Agricultural Practice for Reducing Ammonia Emissions**

The document outlines good practices to reduce ammonia emissions from agricultural sources, an oft-overlooked contributor to severe episodes of particulate matter pollution in cities.

(Available in EN)

71. **Deployment of Renewable Energy: The Water-Energy-Food-Ecosystem Nexus Approach to Support the Sustainable Development Goals**

The water-energy-food-ecosystems nexus approach promotes coordination and integrated planning and sustainable management of interlinked water, energy, land and environmental resources. This brochure presents good practices and policies for intersectoral synergies and for limiting negative impacts in deploying renewable energy and improving it sustainably. It points at a number of resources that may be helpful for a practical application of a nexus approach, including guidelines, analytical tools and policy instruments.

(Available in EN)

G. New approaches to public-private partnerships, innovative financing, policies, regulation, institutions, and technologies

72. Guiding Principles on People-first Public-Private Partnerships for the United Nations Sustainable Development Goals

This document contains a list of principles outlining institutional requirements for city governments and municipalities to implement People-first PPPs. The People-first PPP model is defined as a new approach for PPPs that are made fit for purpose for the SDGs by focusing infrastructure and public services on meeting people's needs. It marks a new generation of PPPs that seeks to overcome some of the weaknesses of traditional PPP models.

(Available in EN, FR, RU)

73. UNECE Standard on a Zero Tolerance Approach to Corruption in Public-Private Partnership Procurement

The international standard provides public entities involved in PPPs with a number of recommendations for putting procedures and processes in place to lowering the risk of corruption in PPP procurement. A number of mechanisms are suggested for the design of anti-corruption practices and building a culture of integrity to support the achievement of the People-first outcomes as set out in the Guiding Principles on People-first PPPs.

(Available in EN, FR, RU)

74. ECE Declaration on a Zero Tolerance Approach to Corruption in Public-Private Partnership Procurement

This document facilitates the voluntary implementation, dissemination and promotion of the ECE Standard on a Zero Tolerance Approach to Corruption in Public-Private Partnerships Procurement.

(Available in EN, FR, RU)

75. Overcoming Barriers to Investing in Energy Efficiency

This publication presents the outcome of a survey among the energy efficiency practitioners on the challenges and solutions for overcoming barriers to energy efficiency investments. The primary geographic focus is the ECE region. The analysis of the survey and its conclusions and recommendations will serve as a useful tool for the energy efficiency community. Policy makers can apply the results to the situation in their countries and find approaches to improve the investment climate for energy efficiency.

(Available in EN, RU)

76. Best Policy Practices for Promoting Energy Efficiency

This publication provides examples of best policy practices for promoting energy efficiency in the ECE region and beyond. It presents a structured framework of policies and measures to promote energy efficiency investments for climate change mitigation and sustainable development, and ways to develop a menu of energy efficiency policies and measures.

(Available in EN, FR)

H. Accountability, transparency, inclusiveness, and responsiveness of urban decision-making.

77. Aarhus Convention: An Implementation Guide

The detailed Guide to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) is an essential reference for policy-makers, legislators and officials at national, subnational and local levels of government. It contains important guidance for members of the public, including non-governmental organizations, seeking to exercise their rights, as well as for those in the private sector engaged in activities that are subject to the Convention. The Guide provides practical examples and offers valuable insights from the findings of the Aarhus Convention Compliance Committee, a unique body inspired by human rights treaty mechanisms. The Guide can be used for a wide range of issues related to urban development, such as spatial planning and projects, normative acts or policies.

(Available in CN, EN, FR, RU)

78. Protecting Your Environment: The power is in your hands

The quick Guide to the Aarhus Convention aims to empower the public to exercise their rights to participate in decision-making and access to information and justice as to promote environmental protection, including in cities. It is aimed at the general public and a wide range of stakeholders, such as business, staff in municipalities or communal and urban services.

(Available in AR, CN, EN, FR, RU, ES)

79. Maastricht Recommendations on Promoting Effective Public Participation in Decision-making in Environmental Matters

The Maastricht Recommendations are based on existing good practice and are intended as a practical tool to assist public officials on a day-to-day basis when designing and carrying out public participation procedures on decision-making related to environmental matters, including for cities and other urban areas.

(Available in EN, FR, RU)

80. Guidance to the Protocol on Pollutant Release and Transfer Registers

The detailed guidance to the Protocol on Pollutant Release and Transfer Registers (PRTRs) aims to assist governments in establishing PRTRs, an effective online source of information for fact-based decision-making, including for cities and other urban areas. It can be used widely by public officials at national, subnational and local levels, members of the public, industry, private sector and other stakeholders to realize the full potential of the innovative approach to the use of PRTRs.

(Available in EN, FR, RU, ES. Unofficial translations in CZ and MK[4])

81. Your Right to a Healthy Community

The simplified guide to the Protocol on PRTRs aims to improve understanding of this novel regulatory instrument and promote better environmental performance through the use of PRTRs. It is aimed at the general public and a wide range of stakeholders, such as industry, staff in municipalities or communal/urban services.

(Available in EN, FR, RU)

82. **Your Right to Build a Sustainable Future: Aarhus Convention, its Protocol on PRTRs and the Sustainable Development Goals**

The document explains the key importance of transparency, effective public participation in decision-making and the rule of law for achieving SDGs. It illustrates the application of SDG 16 across the 2030 Agenda, and the role of the Aarhus Convention and its Protocol on PRTRs in implementing the SDGs, including SDG 11.

(Available in EN, FR, RU)

83. **Aarhus Clearinghouse Cities Portal**

The Aarhus Clearinghouse provides information relevant to the implementation of Principle 10 of the 1992 Rio Declaration on Environment and Development and the environmental dimension of the SDGs at global, regional, national and local levels. It facilitates the collection, dissemination and exchange of information and good practices related to the Aarhus Convention. The webportal contains a specific resource for cities and is aimed at public officials, the general public, the private sector and other stakeholders.

(Available in EN)

85. **PRTR.net**

PRTR.net is a global portal on Pollutant Release and Transfer Register information and activities from countries and organizations around the world. The website also shares good practices to help countries develop and improve PRTRs.

(Available in AR, CN, EN, FR, RU, ES)

86. **Good Practice Recommendations on Public Participation in Strategic Environmental Assessment**

These good practice recommendations aim to improve public participation in SEA as provided for by the ECE Protocol on SEA. They support the application of the Protocol's provisions on public participation and illustrate good practice in this field so as to promote early, timely and effective opportunities for such participation, including in city planning and programming.

(Available in EN, FR, RU)

Annex

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