

**Advance copy**

Economic Commission for Europe

Committee on Environmental Policy

**Working Group on Environmental
Monitoring and Assessment**

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Item 5 of the provisional agenda

**Regular pan-European environmental assessment supported
by the Shared Environmental Information System****Draft key findings, policy messages and way forward from
the pan-European environmental assessment*****Note by the Working Group***Summary*

At its twenty-fifth session (Geneva, 13–15 November 2019), the Committee on Environmental Policy requested the secretariat and the United Nations Environment Programme, working in close cooperation with the European Environment Agency, to prepare a limited indicator-based and thematic pan-European environmental assessment.^a

This document sets out the draft key findings, policy messages and way forward from the pan-European environmental assessment.

The Working Group is invited to review and comment on the document.

^a ECE/CEP/2019/15, para. 37 (k) (ii).

* This document was scheduled for publication after the standard publication date owing to circumstances beyond the submitter's control.

I. Summary for policymakers

A. Introduction

1. The secretariat of the United Nations Economic Commission for Europe (ECE) and the United Nations Environment Programme have prepared a limited indicator-based and thematic pan-European environmental assessment upon the request of the ECE Committee on Environmental Policy, as input to the Ninth Environment for Europe Ministerial Conference (Nicosia, 5–7 October 2022).¹

2. The seventh pan-European environmental assessment reports that progress has been achieved in environmental protection in certain areas, but significant shortcomings remain and pose a threat to the health of both people and the environment in the pan-European region. The summary for policymakers picks out a series of key issues and recommendations from the body of the assessment report. The reader is encouraged to turn to the thematic assessments to learn more.

B. Key messages and recommendations

1. Air quality

3. Countries in the pan-European region are expanding policies to tackle air pollution. Some progress has been achieved, but increased effort is needed (see table 1 below). The health impact of long-time exposure to fine particulate matter with a diameter less than 2.5 µm (PM_{2.5}) in 41 European countries was reduced by 13 per cent in the period 2009–2018 and that of nitrogen oxides (NO_x) by 54 per cent. However, the number of premature deaths due to ground-level ozone exposure increased in that period by an estimated 24 per cent, possibly caused by higher mean temperatures. The phasing out of hydrochlorofluorocarbons present as coolant in refrigerators and air-conditioning systems remains incomplete, especially in countries with economies in transition.

Recommendation:

4. Governments in the pan-European region should develop additional technical and organizational measures to achieve target 3.9 of the Sustainable Development Goals, especially for PM_{2.5} and ground-level ozone. Key responses are the sharpening and application of best available techniques to prevent emissions of particulate matter, NO_x and hydrocarbons by industry and emission reduction from traffic (by implementing Euro-6 and Euro-7 measures). All countries should update ambient air quality standards to align them with World Health Organization guidelines. Governments should contribute to the adequate replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol in order to accelerate the phasing out of hydrochlorofluorocarbons globally.

¹ Throughout the assessment, where feasible and relevant, the following subregions are referred to: (i) European Union, comprising 27 member States; (ii) Western Europe, comprising Andorra, Iceland, Israel, Liechtenstein, Monaco, Norway, San Marino, Switzerland and the United Kingdom of Great Britain and Northern Ireland; (iii) Central Asia, comprising Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan; (iv) Eastern Europe, comprising Armenia, Azerbaijan, Belarus, Georgia, the Republic of Moldova, the Russian Federation and Ukraine; and (v) South-Eastern Europe, comprising Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Serbia and Turkey.

Table 1
Overview on status and trends for selected indicators for air quality

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
Ambient PM _{2.5} (mg/m ³ in 2016)	☹️ (13)	☹️ (11)	☹️ (25)	☹️ (12)	☹️ (35)	☹️ (16)
Emissions of SO _x , NO _x and PM _{2.5} (2015–2019)	↗↗↗	↗↗↗	→↘→	↗↗↘	↘↗↘	↗↗→

Sources: For Ambient PM_{2.5} (mg/m³ in 2016) – World Health Organization, Global Health Observatory, “SDG Indicator 11.6.2 Concentration of fine particulate matter (PM_{2.5})”, available at [www.who.int/data/gho/data/indicators/indicator-details/GHO/concentrations-of-fine-particulate-matter-\(pm2-5\)](http://www.who.int/data/gho/data/indicators/indicator-details/GHO/concentrations-of-fine-particulate-matter-(pm2-5)), last update 7 May 2021; For emissions of SO_x, NO_x and PM_{2.5} (2015–2019) – Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe - Centre on Emission Inventories and Projections, 2021, officially reported emission data.

Note: Trend is ↗ improving (emissions falling), → stable or ↘ worsening; status of PM_{2.5} concentration is ☹️ (exceeds World Health Organization air quality guideline of 5 mg/m³); status of consumption of hydrochlorofluorocarbons is ☺️ (phased out) or ☹️ (below but close to target). European Union net consumption of hydrochlorofluorocarbons has been below zero since 2010; Western Europe except Israel has had zero consumption since 2015; Azerbaijan and Belarus achieved zero consumption in 2019, Kyrgyzstan did so in 2020. Regarding ambient PM_{2.5} (mg/m³ in 2016): Regional values are population weighted. No data for Liechtenstein. Corresponds to Sustainable Development Goal indicator 11.6.2.

Abbreviations: ODP, oxygen depletion potential; SO_x, sulfur oxides.

2. Greenhouse gas emissions

5. All pan-European region countries have committed to reducing greenhouse gas emissions, but net emissions in the region are still rising. Efforts and achievements are unevenly distributed throughout the region. Reductions, which are mostly achieved in the western part of Europe (2014–2019), are offset by the increase in emissions in the rest of the region (see table 2 below). National commitments under the Paris Agreement were renewed by 35 countries in the region with more ambitious targets. However, some countries still do not have firm, quantifiable commitments or mechanisms to follow the progress towards them, resulting in significant data gaps.




Recommendation:

6. Governments in the pan-European region should establish the conditions for medium- and long-term sustainable mobilization of funds for climate action, both by accelerating the use of available regional and global funds and mechanisms and by creating national financial instruments.

Table 2
Overview on status and trends for the selected indicator on greenhouse gas emissions

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
GHG emissions (2014–2019) (percentage change)	↗ (-4.3)	↗ (-10.8)	–	↘ (+2)	↘ (+10.2)	↗ (-1.2)

Source: Global Sustainable Development Goal Indicators Database, available at <https://unstats.un.org/sdgs/unsdg>.

Note: Trend is  improving (emissions falling),  stable or  worsening. Insufficient data for Central Asia, where emissions are rising.

Abbreviations: GHG, greenhouse gas.

3. Decarbonization







7. Decarbonization is becoming a strong narrative across the pan-European region, but action lags behind. The use of renewables was increased in 29 countries in the pan-European region in the period 2013–2017, but the region still largely relies on fossil fuels – some 78 per cent of the total final energy consumption on average comes from fossil fuels (see table 3 below). The penetration of renewables in the energy mix is rising more slowly than the increase in the total final energy consumption in the region.

Recommendation:




8. Governments in the pan-European region should eliminate or reform harmful subsidies and incentives, and develop effective positive incentives to deepen decarbonization, by shifting promotion of investments towards renewable energy.

Table 3

Overview on status and trends for the selected indicator on renewable energy share

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Renewable energy share in total energy consumption (2014–2018) (latest rate, percentage)	 (18)	 (18)	 (4)	 (4)	 (14)	 (13)

Source: 2019 Energy Balances (United Nations publication, Sales No. E.22.XVII.5).

Note: Trend is  improving,  stable or  worsening.

4. Fresh-water quantity and quality

9. Water quantity has an asymmetric space and time distribution in the pan-European region and climate change is delivering additional challenges with impacts on human health through various water-related phenomena such as floods, droughts, water-borne diseases and biodiversity changes in aquatic ecosystems. Anthropogenic pressures amplify water asymmetry by constraining fresh-water quality (see tables 4 and 5 below) and aquatic biodiversity. River basins, lakes and aquifers are subject to multiple stressors. Diffuse pollution and urban and industrial wastewater discharges remain significant in many locations and persistent organic contaminants are of greater public health concern. Science is advancing to provide solutions and foster new processes and technologies to face these negative impacts.

Recommendation:

10. Whenever fresh waters and aquatic ecosystems are at risk, the best available technology should be applied. Some examples of high readiness solutions include water conservation measures and conventional mitigation approaches, plus measures for resource protection and more efficient water use, such as digitalization and precision agriculture, nature-based solutions for water retention basins or in riparian zone restoration, and the use of new methods for environmental flow regimes. Non-conventional water sources deserve proof of concept opportunities.

Table 4
Overview on status and trends for the selected indicator on ambient water quality

Year	Percentage of bodies of water with good ambient water quality, for countries having data available (national value ranges by subregions)					
	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
2017	34–100	80–100	-	96	6–94	6–100
2020	41–99	61–100	64	89–96	31–88	31–100

Source: Global Sustainable Development Goal Indicators Database.

Note: Based on the available information, with no data produced for several countries in 2017 and 2020 and different countries having data in each year. Insufficient data for Central Asia in 2017.

Table 5
Overview on status and trends for selected indicators for safely managed drinking water or sanitation services

Indicator	Proportion of population using safely managed drinking water or sanitation services percentage					
	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
Drinking water, 2016–2020 (latest rate, percentage)	↗ (97.8)	→ (99.3)	↗ (69.6)	↗ (79.9)	↘ (78)	↗ (90.4)
Sanitation, 2016–2020 (latest rate, percentage)	↗ (90.5)	↗ (95.9)		↗ (61.5)	↗ (70)	↗ (81.4)

Source: Global Sustainable Development Goal Indicators Database, accessed 10 February 2022.

Note: Trend is ↗ improving, → stable or ↘ worsening. No data for some countries. Insufficient sanitation data for Central Asia.

5. Fresh water – financing

11. Financing of water-related projects under the international climate agenda has been limited and setting up bankable projects is difficult. Financing models are highly susceptible to technical and governance insufficiencies and have been restrained by local and regional crises during the past decade.

Recommendation:

12. Economic sustainability in water resources management should be pursued and innovative financing mechanisms are still required. Natural and human-made infrastructure development may use several financing tools (for example, fair water pricing, ecological payments, cost recovery and incentives) but a clear legal framework is vital for success.

6. Integrated water resources management and transboundary water cooperation

13. Increasing water resources management challenges indicate that fragmented governance practices are unlikely to succeed in the long term. Granularity of information is important for better knowledge and involving public and private actors is becoming fundamental to successful water policy and good decision-making. Transboundary management of shared rivers, lakes and aquifers remains a challenge (see table 6 below). The problem is acute when upstream water abstraction or retention is significant and downstream

countries lack alternative water sources. Despite some good examples, cooperation and participatory processes for water protection, allocation and other practical achievements are not implemented as in depth as they could be in the pan-European region.

Recommendation:

14. Integrated water resources management should be pursued, involving a balance between human water needs and water's availability for nature. Water policy should enhance its interdisciplinarity and transdisciplinary character to maximize societal impact. Therefore, the water-food-energy-ecosystems nexus should strengthen an anticipatory policy approach to combining short-term projects with a long-term vision for the pan-European region. Water resources management is more efficient at the basin level and good governance is required to bring success to technology and financing. This integrated approach is even more critical in international rivers, lakes or aquifers where floods or droughts are likely to occur. Co-management should be pursued towards environmental protection and benefit-sharing within an efficient and resilient transboundary cooperation framework in the subregions, as envisaged by the ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention).

Table 6

Overview on status and trends for the selected indicator on transboundary basin area with an operational arrangement

	<i>Percentage of transboundary basin area with an operational arrangement (2020)</i>					
	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
For rivers and lakes	89	84	91	55	80	83
For aquifers	90	59	..	73	51	43

Source: Global Sustainable Development Goal Indicators Database.

Note: Based on the available information, with no data produced for several countries. No reported arrangements for aquifers in Central Asia.

7. Ecosystems

15. The status of ecosystems remains a cause for concern, with no evidence of a clear positive trend. Only a minority of the habitats assessed at the European Union level have a good conservation status, and the overall picture is likely to be similar in the remaining region. The relative share of the particularly biodiversity-rich primary and intact forests has been stable at a very low level over the same period. Forest fragmentation remains an important pressure. There are significant variations in the proportion of sustainable fish stocks. The Mediterranean Sea and the Black Sea remain highly overfished, whereas signs of recovery of fish stocks can be observed in the North-East Atlantic Ocean and the Baltic Sea as a result of improved management decisions (see also point 10 below). Land continues to be taken for infrastructure development in the pan-European region, but the rate of land take has decreased in most European Environment Agency member countries and even reversed in Eastern Europe (see table 7 below; see also point 9 below).

Recommendation:

16. Governments in the pan-European region should establish the conditions for medium- and long-term sustainable mobilization of funds for biodiversity and other environmental components, both by accelerating the use of available regional and global funds and mechanisms and by creating national financial instruments. Governments should also eliminate or reform subsidies and incentives for products and activities that lead to biodiversity loss, and develop effective positive incentives to mainstream biodiversity conservation across sectors and policies, promoting biodiversity conservation and sustainable use of resources. Furthermore, Governments should ensure that trends in forest area remain

positive and take additional measures to safeguard the remaining primary and intact forests and their ecological functionality, for example, by promoting management standards aimed at preserving high-conservation value forest and by preventing forest fragmentation and thus enhancing forest connectivity.

Table 7

Overview on status and trends for the selected indicator on land take

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
Land take (2012–2018), as proportion of total land area	↘	↘	↘	↗	↘	↘
Rate 2012–2018 compared with 2006–2012	↗	↘	↗	↗	↘	↗

Sources: European Environment Agency (EEA), Indicator Assessment, Land take in Europe, available at <https://www.eea.europa.eu/data-and-maps/indicators/land-take-3/assessment>; Data from several national statistical offices outside the EEA cooperating countries.

Note: Trend is ↗ improving, → stable or ↘ worsening.

8. Protected areas

17. The protected area estate in the pan-European region has almost tripled, and the overall forest area in the ECE region has increased by 33.5 million ha over the past 30 years. The coverages of terrestrial and marine protected areas have increased over the period since 2000 and are 13.6 per cent and 9.2 per cent, respectively, for the overall pan-European area (below the respective 17 per cent and 10 per cent goals in Aichi Target 11). Marine protected areas have grown in area by 66 per cent and terrestrial ones by 22 per cent over the past five years (see table 8 below). Despite progress in terrestrial and marine protected areas, overall biodiversity loss continues to occur.

Recommendation:






18. Governments in the pan-European region should consolidate and improve the extended protected area network in the region through investment in management effectiveness, ecological representativeness and connectivity, i.e. making sure that protected areas are connected to each other to foster movement of fauna and that they represent the variety of ecosystems in the country. Further efforts are needed, in particular in Eastern and South-Eastern Europe, to achieve the target of conservation of 10 per cent of coastal and marine areas in the pan-European area.

Table 8

Overview on status and trends for selected indicators on protected areas

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
Percentage of terrestrial area protected (2021)	↗ 😊 (26.1)	↗ 😊 (27)	↗ 😞 (9)	↗ 😊 (11.5)	↗ 😞 (7.4)	↗ 😞 (13.6)
Percentage of marine area protected (2021)	↗ 😊 (15.2)	↗ 😊 (17.1)	↗ 😊 (31.9)	↘ 😞 (2.3)	↗ 😞 (1.8)	↗ 😊 (9.2)

Sources: December 2021 release of the World Database on Protected Areas; United Nations Environment Programme (UNEP) World Conservation Monitoring Centre.

Notes: trend is  improving, or  worsening; status is  (area nominally meets Aichi Target 11 of 17 per cent of terrestrial and inland water, 10 per cent of marine areas) or  (does not meet) or  (below but close to target).

9. Land use and soil

























19. Land use and land-use change dynamics in the pan-European region continue to be mainly driven by agriculture. Erosion can be further reduced in most affected areas by implementing conservation agriculture.² Conservation agriculture practices in the pan-European region may also play an important role in carbon sequestration and raising soil productivity by increasing soil organic carbon content. In Eastern Europe, the average rate of soil erosion decreased over the last 30 years following massive cropland abandonment and climate change. In the Russian Federation, the total amount of washed soil and the rate of erosion have been reduced by 56.1 per cent and 15 per cent respectively in the last 30 years due to the widespread abandonment of cropland and lower spring run-off. Land continues to be taken for infrastructure development in the pan-European region, but land take has decreased in most European Environment Agency member countries (see table 9 below).

Recommendation:

20. Governments in the pan-European region should provide better guidance to farmers on using soil conservation methods in areas of degraded (eroded) soils. Policies should also maintain a judicious balance between soil organic carbon accumulation for higher crop productivity and soil organic carbon storage for climate change mitigation, in line with initiatives that aim, for example, to boost carbon storage in agricultural soils by 0.4 per cent each year. Measures should also address the conversion of natural to agricultural ecosystems and the degradation of habitat quality due to biodiversity-unfriendly agricultural practices, for example, through more targeted use of subsidies and other incentives for sustainable agriculture. Furthermore, Governments should take measures to reduce land take further and consistently.






Table 9

Overview on status and trends for selected indicators on land and soil

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
Land take rate (in 2012–2018, percentage)	  (0.05)	  (0.06)	  (0.15)	  (-0.23)	  (0.15)	  (0.08)
Proportion of land that is degraded (2005–2019) (net land with improvement, percentage)	 (39)	 (31)	 (18)	 (26)	 (51)	 (28)
Soil organic carbon content (2005–2019) (net land with improvement, percentage)	 (-0.2)	 (0)	 (+0.7)	 (+0.7)	 (+0.4)	 (+0.5)

Sources: For land take – European Environment Agency and national data published by countries' statistical entities; For land that is degraded and soil organic content – Conservation International.

² According to the Food and Agriculture Organization of the United Nations (FAO), conservation agriculture is a farming system that promotes minimum soil disturbance (i.e. no tillage), maintenance of a permanent soil cover, and diversification of plant species. It enhances biodiversity and natural biological processes above and below the ground surface, which contribute to increased water and nutrient use efficiency and to improved and sustained crop production (see FAO, "Conservation Agriculture", available at www.fao.org/conservation-agriculture/en/ (accessed on 14 February 2022)).

Notes: trend is  improving (for land take, rate is improving if 2012–2018 rate was lower than 2006–2012 rate),  stable or  worsening; status of land take rate in 2012–2018 is  (negative) or  (positive). Land may be improving but still degraded. No data for several countries.

10. Marine protection

21. Marine pollution, from both land-based (for example, nutrients, plastic and chemicals) and sea-based (for example, plastic and oil) sources, continues to be an urgent problem in most sea regions. Beach and marine litter, dominated by plastic, is recognized as a major global threat to coastal and marine ecosystems in most areas, including remote and less populated areas such as the Barents Sea (see table 10 below). At the same time, climate-induced changes in coastal and marine ecosystems are occurring with as-yet unknown impact, such as increasing sea surface temperatures by about 0.2°C per decade in the North Atlantic and 0.5°C per decade in the Black Sea (since 1981) and observed acidification of surface water, at a rate of approximately 0.02 pH units per decade, in the sea regions surrounding the European Union (and across the global ocean). A holistic and ecosystem-based approach to the management of coastal waters and marine ecosystems that addresses the combined effects of multiple pressures is progressively integrating social, economic and governance aspects. Such an approach applies equally to the use of nature-based solutions in sustainable infrastructure for enhancing coastal resilience and able to withstand the effects of climate change, and to the transition to sustainable coastal and maritime tourism as part of the recovery after the coronavirus pandemic (COVID-19) situation. The Mediterranean Sea and the Black Sea remain highly overfished, whereas signs of recovery of fish stocks can be observed in the North-East Atlantic Ocean and the Baltic Sea as a result of improved management decisions.

Recommendation:

22. Governments in the pan-European region should take urgent action to reduce key pressures to halt and reverse the degradation of coastal waters, marine ecosystems and seas (see also points 7 and 8 above). They should also increase efforts to complement inventories of the number of items of beach and marine litter with information on composition and sources of litter to be able to design more effective measures, in particular where subregional measures are deemed necessary.

Table 10

Overview on status and trends for selected indicators for marine protection

Indicator	Baltic Sea	Black Sea	Mediterranean Sea	North-East Atlantic
Number of items on beach per 100 m of shoreline, median (2014–2019)	78	652	428	105
Percentage of assessed marine fish stocks of good environmental status (2018)	13	0	0	44

Sources: For number of items on beach – Ahmet E. Kideys and Mustafa Aydın, *Marine Litter Watch (MLW) European Beach Litter Assessment 2013–2019*, ETC/ICM Technical Report 2/2020 (n.p., European Topic Centre on Inland, Coastal and Marine waters, 2020); For marine fish stocks of good environmental status – European Environment Agency (EEA), *Marine Messages II: Navigating the course towards clean, healthy and productive seas through implementation of an ecosystem-based approach*, EEA Report No. 17/2019 (Luxembourg, Publications Office of the European Union, 2019).

11. Waste management

23. While the waste management hierarchy assigns highest priority to waste prevention, waste generation continues to rise across the region. Even where a strong political commitment for a circular economy exists, such as in the European Union and other Western European countries, the generated waste quantities are growing. Recycling rates differ significantly among the countries and are particularly low in Eastern Europe and Central

Asia. Municipal waste recycling rates above 45 per cent exist only in a few European Union countries and Switzerland. Progress is being achieved in all subregions, but slowly. Average electrical and electronic equipment waste (e-waste), which contains both hazardous and precious components, is stabilizing in the region as a whole, but continues to increase rapidly in the economically less mature subregions (see table 11 below). E-waste collection and recycling are highly deficient across all subregions; the recovery rates are low.

Recommendation:

24. Governments in the pan-European region should support waste prevention in production and consumption and repair, refurbishment and remanufacturing, including through financial incentives such as tax relief, in order to reduce waste. These waste prevention efforts would improve resource efficiency. Governments should also equip public administrations with a skilled work force, ready to engage with all sectors of society, and to increase broad access to reliable and detailed information, in order to achieve sound management of chemicals and waste. The countries of the region should establish a resource-oriented, pan-European e-waste management partnership aimed at the effective collection and sound handling of recyclables to enable the recovery of valuable resources. One urgent priority is the recovery of secondary resources from e-waste, especially in view of the rapidly growing quantities across Eastern Europe, South-Eastern Europe and Central Asia.

Table 11

Overview on status and trends for selected indicators for waste management

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
E-waste generation per capita (kg in 2019)	↗ 😞 (18)	↗ 😞 (23)	↘ 😊 (7)	↘ 😞 (10)	↘ 😞 (9.9)	→ 😞 (15)
Total waste per capita (2018)	↘	↘	↘	↘	↘	↘

Source: For e-waste generation – Vanessa Forti and others, *The Global E-waste Monitor 2020: Quantities, flows and the circular economy potential* (n.p., United Nations University/United Nations Institute for Training and Research, co-hosted Sustainable Cycles Programme, International Telecommunication Union and International Solid Waste Association, 2021); For total waste per capita – national statistics for the European Union, Iceland, Liechtenstein, Norway, the United Kingdom of Great Britain and Northern Ireland, and South-Eastern Europe except Albania: Eurostat data, retrieved 20 May 2021; other countries: national data published by countries' statistical entities, retrieved May–July 2021.

Note: Trend is ↗ improving, → stable or ↘ worsening; status of e-waste generation is 😊 (at the global average of 6.95 kg per capita in 2019) or 😞 (above the global average rate). No data for Andorra, Liechtenstein, Monaco, San Marino, Tajikistan and Uzbekistan. Limited or no data for some of the countries.

12. Chemicals

25. Chemicals play a vital role in the economy and are essential in paving the way towards a green economy, but it remains difficult to capture what is full human exposure to hazardous chemicals (see table 12 below). Chemicals and waste management are at the heart of many solutions to the current challenges that countries face in their transition to a net zero greenhouse gas emission and sustainable economy.

Recommendation:

26. Governments in the pan-European region should strengthen their waste and chemicals management systems. Governments should strive to further advance full and coherent implementation of multilateral environmental agreements, including the Protocol on Pollutant Release and Transfer Registers to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (see also point 18 below).

Table 12

Overview on status and trends for selected indicators for safely managed drinking water or sanitation services

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Reporting under Basel, Rotterdam and Stockholm Conventions (average for 2015–2019, percentage)	↘ (82)	↘ (51)	↘ (33)	↘ (57)	↗ (75)	↘ (68)

Source: Global Sustainable Development Goal Indicator Database, retrieved 18 May 2021.

Abbreviations: Basel Convention, Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal; Rotterdam Convention, Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; Stockholm Convention, Stockholm Convention on Persistent Organic Pollutants.

Note: Trend is ↗ improving or ↘ worsening.

13. Minerals

27. Minerals too are critical for the transition to a net zero greenhouse gas emission and sustainable economy, in particular those used in electric and electronic gear and batteries. An important, as-yet unexploited, opportunity exists to harness economic value for the region and to reduce the region's dependency regarding the sourcing of critical raw materials, which are bottlenecks in the shift towards resilient future economies (see table 13 below).

Recommendation:



28. Governments in the pan-European region should adopt a circular – or resource efficient – economy approach and strengthen management of raw materials.

Table 13

Overview on status and trends for the selected indicator on material footprint

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Material footprint, tons per capita, trend since 2000 (2017)	↘ (23.3)	↗ (24.6)	↘ (10.4)	↘ (9.8)	↘ (16.2)	↘ (18.5)

Sources: UNEP World Environment Situation Room, available at <https://wesr.unep.org/downloader> and ECE Statistical Database for populations.

Note: Trend is  improving or  worsening. No data for Andorra, Liechtenstein, Monaco, or San Marino. Population of Turkmenistan 2010–2017 uses figure for 2009; for the Russian Federation 2014–2017, uses 2013.

14. Disaster risk reduction



















29. About 65 per cent of the population in the pan-European region is covered by local disaster risk reduction strategies.³ Only 15 countries in the region reported that all their local authorities are implementing such strategies under Sustainable Development Goal target 13.1; while 23 countries – which jointly represent a quarter of the region’s population – do not report on that target (see table 14 below).

Recommendation:

30. Governments in the pan-European region should strengthen awareness of climate hazards, especially among poorer communities, and establish conditions to report regularly on Sustainable Development Goal target 13.1 and under the Sendai Framework for Disaster Risk Reduction 2015–2030.









Table 14

Overview on status and trends for selected indicators on disaster risk reduction

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
Countries having local disaster risk reduction strategies	 	 	 	 	 	 
Countries reporting under SDG target 13.1						

Source: Global Sustainable Development Goal Indicators Database.

Abbreviations: SDG, Sustainable Development Goal.

Note: Trend is  improving, or  stable (or no trend information); status of countries having local disaster risk reduction strategies is  (majority of countries reporting report 100 per cent of local governments implementing disaster risk reduction strategies),  or  (majority of countries reporting report less than 5 per cent of local governments); status of reporting is  (all countries reporting),  or  (less than half of countries reporting).

15. Finance

31. In all countries across the pan-European region for which data are available, environmental tax revenues and government expenditures on environmental protection, closely following gross domestic product (GDP) growth, have increased since 2000. However, in terms of percentage of GDP, public expenditure for environmental protection (with a maximum of around 0.8 per cent) is much lower than environmental tax revenues, implying that revenues from environmental taxes are not necessarily earmarked for reducing environmental damage. Nonetheless, environmental expenditures for environmental protection made by Governments are only a subset of total environmental protection expenditures in each country. Green bonds have emerged as a tool for financing environmentally friendly projects, by both the private sector and Governments. Despite their

³ Local governments are determined by the reporting country for the corresponding Sustainable Development Goal indicator (11.b.2), considering subnational public administrations with responsibility to develop local disaster risk reduction strategies.

negative impacts on the environment, all countries continue to implement fossil fuel subsidies to varying degrees. International Monetary Fund projections suggest that these subsidies will remain in place at least until 2025, with implicit subsidies increasing until that time (see table 15 below).

Recommendation:

32. Governments should favour the development of green finance and consider spending on environmental protection in the wider context of environmental and public finance. Environmental taxes should be used to decrease different kinds of pollution, and the income generated should be primarily used to finance environmental protection public expenditures. Governments should use subsidies only when they are really necessary, as they always distort markets and increase public sector deficit. Governments should also periodically reconsider environmental subsidized finance in the light of the “polluter pays” principle and regularly perform impact assessment analysis of such funding, so that the funds can bring a genuine value added. Furthermore, Governments should envisage green bonds, in particular, through a series of policies including demonstration issuance, dissemination of clear guidelines for green bonds issuance and implementation of favourable regulatory policies, as complementary tools for environmental financing alongside more traditional ones such as taxes and fees. National environmental policies across the pan-European region should aim at phasing out harmful subsidies and transitioning towards greener energy sources quickly.

Table 15
Overview on status and trends for selected indicators on environmental finance

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
Government environmental protection expenditures, as percentage of GDP, 2015–2019 (latest rate, percentage)	↘ (0.73)	↘ (0.67)	↗ (0.17)	↗ (0.22)	↗ (0.45)	↘ (0.58)
Total fossil fuel subsidies, 2015–2020 (percentage change)	↗ (-19)	↗ (-32)	↘ (+37)	↗ (-1.2)	↘ (+32)	↗ (-3.2)

Source: International Monetary Fund Climate Change Dashboard, Indicators, available at <https://climatedata.imf.org/pages/go-indicators>.

Note: Trend is ↗ improving (increasing percentage of GDP spent on governmental environmental protection, or declining fossil fuel subsidies) or ↘ worsening. The subregional Government environmental protection expenditures are simple unweighted averages across the countries. Values for environmental protection expenditures are simple unweighted averages across the countries. No data for several countries.

16. Sustainable infrastructure

33. Sustainable infrastructure investment has been recognized as one of the strategies with the greatest impact in terms of building back better in the post-COVID pandemic recovery. There is a recent common understanding that sustainability solutions should be incorporated as early as possible into the strategic planning phase. However, most pan-European region countries have yet to develop mechanisms to incorporate sustainability considerations (such as climate risk) and externality accounting (e.g., the cost of pollution, ecosystem services, or biodiversity protection) into the cost-benefit analysis of large infrastructure projects, while this analysis is not a legal requirement in many countries. Access to basic drinking water

services is consistently above 90 per cent across the pan-European subregions, except in rural Tajikistan where access is below 75 per cent. Sanitation access ranges, for example, from 82.3 per cent in rural Eastern Europe to 99.5 percent in urban South-Eastern Europe and Western Europe, the average being 96.3 per cent. The pan-European region shows full access to electricity, and countries have at least over 83.8 percent coverage of third generation telecommunications. The challenges are currently to guarantee that there is an increase in sustainable infrastructure, using nature-based solutions, resource efficiency, recycling and reuse, in an environmentally responsible, socially inclusive and economically viable way. It is important to guarantee that the needs of all stakeholders are identified and addressed, and that infrastructure is conceived to be flexible in its use, interconnected and able to employ real-time information to adapt to the changing conditions (including climate risk, changes in service demand and migration patterns) (see table 16 below).

Recommendation:

34. Governments should participate in a pan-European effort to create a common understanding of what sustainable infrastructure means and define a common strategy to quantify progress across nations. Governments should make use of existing tools to promote sustainable infrastructure development, including the ECE Protocol on Strategic Environmental Assessment, and devote additional resources to achieving the institutional and technical capacity necessary for the planning, design, execution, operation and decommissioning of sustainable infrastructure projects. Governments should also deploy economic and financial incentives – in the short and medium terms – to support the implementation by the private sector of nature-based solutions in infrastructure projects. Moreover, Governments should establish favourable conditions to implement a life cycle approach and circular economy strategies aligned with or similar to the Pan-European Strategic Framework for Greening the Economy in sustainable consumption and production patterns, or other initiatives such as the European Union taxonomy.

Table 16

Overview on status and trends for the selected indicator on the Corruption Perceptions Index

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
Corruption Perceptions Index (2020)	↗ (64)	↘ (76)	↗ (28)	↗ (40)	↘ (38)	↗ (55)

Source: Transparency International, Corruption Perceptions Index, available at www.transparency.org/en/cpi/2020/index.

Note: Trend is ↗ improving or ↘ worsening over period 2012–2020, with 0 being the highest and 100 being the lowest level of corruption. Simple average of national values per subregion. No data for Andorra, Liechtenstein, Monaco or San Marino.

17. Sustainable tourism and circular economy

35. A pan-European circular tourism economy will be more resilient to and better equipped to cope with future crises, be they economic, health-related, or derived from the environmental challenges that the region faces. This essential for the sustainable development of tourism and can contribute to the achievement of the Sustainable Development Goals. With the rapid growth of tourism, its impacts are growing despite efficiency improvements, increasingly contributing to environmental crises and social issues. The application of circular principles in tourism is still in its infancy, apart from individual cases. Many sharing economy initiatives currently have too many non-circular counter effects. Key areas in tourism with a strong relation to both Sustainable Development Goals and the circular economy are energy use and emissions in transport, accommodation and restaurants, waste management of accommodation and restaurants (including food waste), water consumption and generation of wastewater in general, and resource usage in building,

for interiors, and in amenities. Opportunities may be most straightforward in construction and operations, including (food) waste management, of accommodations and restaurants. Tourism, under the condition of its sustainable development, has the potential for long-lasting positive impacts beyond the sector itself, due to its interlinkages with other economic activities and the direct producer-consumer interaction. Indicator development for the monitoring of circularity in tourism is hampered by data availability and definitional issues (see table 17 below).

Recommendation:

36. Governments should increase efforts together with entrepreneurs to apply circular economy principles across the tourism value chain, and promote knowledge creation and the sharing of good practices. Direct investment in the wake of the pandemic and in preparation of recovery plans might include the promotion of domestic and nearby country tourism, with the scaling-up of international, long-distance rail infrastructure, and electric charging infrastructure in tourism destinations, facilitating the transition towards renewable energy use by accommodation. Governments should work together to promote tighter product loops, which are easier to make circular, and establish incentives to promote resource efficiency and sustainable consumption. ECE member States need to select a number of specific key-impact tourism indicators to be included in ECE statistical databases. Indicators for circular economy in tourism should be aligned with those being developed for the monitoring of sustainable development in tourism and be compatible with Sustainable Development Goals.

Table 17

Overview on status and trends for selected indicators on circular economy and sustainable tourism

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
Renewable energy share in total energy consumption (2014–2018) (latest rate, percentage)	→ (18)	↗ (18)	↗ (4)	→ (4)	→ (14)	→ (13)
Percentage domestic tourism of total trips by nationals (2019)	73	54	90	79	89	73
Percentage air transport of all inbound trips (2019)	47	79	13	21	56	49

Source: For air transport of all inbound trips and domestic tourism of total trips – World Tourism Organization, Eurostat; For renewable energy share – *2019 Energy Balances*.

Note: Trend is ↗ on average improving, or → on average stable; limited data for domestic trips (all of the European Union, but only Norway and Switzerland in Western Europe, Tajikistan in Central Asia, Armenia, Azerbaijan and Georgia in Eastern Europe, and North Macedonia and Turkey in South-Eastern Europe) and inbound trips by air (only 14 European Union member States, Iceland and the United Kingdom of Great Britain and Northern Ireland in Western Europe, Kyrgyzstan and Uzbekistan in Central Asia, not the Republic of Moldova or the Russian Federation in Eastern Europe, and only Albania, Bosnia and Herzegovina and Turkey in South-Eastern Europe).

18. Environmental governance

37. The environmental governance system in the pan-European region remains partly fragmented in terms of applied policies, institutions, the harmonization of legislation and the

participation of the 54 countries in multilateral environmental agreements, which is incomplete. The assessment of state and trends and policy recommendations in the thematic chapters of this report indicates the need to strengthen the environmental governance system and existing policies in the region and to make adjustments to address substantive gaps. Gaps also remain in the implementation of good environmental governance, including in relation to public participation, transparency, responsiveness, effectiveness and efficiency, with implications for the environment and health of the region (see table 18 below).

Recommendations:

38. Governments, the private sector, academia and citizens must work together to achieve the Sustainable Development Goals, including in a transboundary context. They should explore new partnerships on topics such as circular economy, sustainable infrastructure, resource efficiency and waste management. Governments should consider joining multilateral environmental agreements to which they are not yet party so as to enhance the coherency and harmonization of policies and legislation. They can also use the Pan-European Strategic Framework for Greening the Economy as a framework for commitments on circular economy, resource efficiency and sustainable infrastructure development, including through promoting nature-based solutions. Finance should be redirected to these areas in support of a just transition. The effectiveness of such investments needs to be monitored and evaluated. Successful outcomes are more likely when public participation in planning and implementation of actions is assured, gender is mainstreamed and public access to reliable and timely information is guaranteed. Governments should seek to enhance science-policy linkages and the rapid deployment of innovative solutions, while investing in digitalization. Other recommendations in the summary and the assessment provide further details on steps to be taken to improve governance in the future.

Table 18

Overview on status and trends for selected indicators on environmental governance

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Percentage of 12 MEAs to which countries are party	93	47	40	68	81	76
Percentage of countries with legislation or regulations on mandatory corporate sustainability reporting	100	56	20	29	50	70

Sources: For parties to MEAs – United Nations Treaty Collection and websites of treaties; For mandatory corporate sustainability reporting – Database of mandatory and voluntary instruments that either require or encourage organizations to report sustainability-related information, 2020, Carrots and Sticks, available at www.carrotsandsticks.net/.

Note: The multilateral environmental agreements are eight ECE environmental treaties, plus three global chemicals conventions and the Convention on the Conservation of Migratory Species of Wild Animals. There are no data for several countries in Central Asia, Eastern Europe and South-Eastern Europe.

Abbreviations: MEA, multilateral environmental agreement.

19. Monitoring and information management

39. Availability and access to information and knowledge to support government decision-makers, industry and the public taking impact-oriented choices is improving but continues to be challenging in some sectors more than in others. It constitutes a challenge for measuring progress towards policy targets in the pan-European region, including for

emerging policy developments such as circular economy or sustainable infrastructure, as revealed during this assessment. This assessment reveals various data gaps across the region in almost all areas, with data available for some countries but not others, or no recent data available. Data for some indicators needed for this assessment are not routinely collected, in particular for emerging policies including the two conference themes.

40. While, according to the Final review report on the establishment of the Shared Environmental Information System (ECE/CEP/AC.10/2021/6), such national systems have been successfully established in all countries in Europe and Central Asia, the systems vary in form and regularity regarding their updates and content. Gaps remain that need to be addressed, including regarding compliance with all principles and pillars of the Shared Environmental Information System and the full production and sharing of all data flows associated with the ECE environmental indicators. Monitoring gaps, both in terms of data availability and quality, were identified during the assessment for the region. Examples include:

(a) Air and climate change: Gaps remain for the measurement and analysis of fine particulate matter and the quality of data varies widely for emissions. Data sets on greenhouse gas emissions remain incomplete for some countries;

(b) Fresh water: The use of geographic information systems needs to be strengthened, in particular at the transboundary level, and there is a need to enhance water statistics. Ecological water quality assessment and the identification of hydromorphological pressures require knowledge not yet available everywhere in the region. The monitoring of emerging contaminants requires more attention throughout the pan-European region. Monitoring and data are incomplete for production of certain indicators;

(c) Coastal waters, marine ecosystems and seas: Challenges remain regarding the spatial and temporal data coverage and data gaps remain, for example, for the amounts, composition and sources of beach and marine litter in parts of the region;

(d) Biodiversity and ecosystems: Data gaps remain for the production of certain indicators, including the ECE indicators “Terrestrial protected areas” and “Land uptake”, in particular for countries outside the European Union. Comparability of data is another issue that was noted;

(e) Land and soil: Data gaps were identified for the indicator “Prevalence of stunting among children aged under 5 years, per cent”;

(f) Chemicals and waste: No set of impact-oriented chemical indicators is regularly monitored across the region. There is also a lack of information regarding the impact of chemicals on the efficiency and economic viability of circular economy schemes. Gaps remain regarding capacities and data availability for certain indicators including “Total waste generation per capita”, “E-waste generation per capita” and “Recycling rate of municipal solid waste”;

(g) Environmental financing: There is a severe lack of quantitative data on environmental financing for countries of Central Asia and South-Eastern Europe and there is an urgent need to improve data-collection systems;

(h) Sustainable infrastructure: Significant data gaps have been identified both in the social, environmental, institutional, economic and financial indicators proposed and when quantifying the contribution (positive or negative) of infrastructure development based on the indicators. A common definition of the term “sustainable infrastructure” is missing, with implications for quantifying progress in the region;

(i) Circular economy and sustainable tourism: Indicator development for sustainable tourism, let alone for monitoring circularity, is still evolving. There are currently no indicators across the region that give explicit information on tourism’s circular state and for several general circularity aspects, classification definitions differ between States. Even mainstream tourism statistics tend to be incomplete and suffer from varying definitions, while detailed statistics needed for accurate circularity monitoring are absent;

(j) While a Shared Environmental Information System has been established, national Systems vary in form and regularity regarding their updates and content. Gaps

remain that need to be addressed, including regarding the full establishment of the system in line with all principles and pillars of the System. The gaps identified indicate that countries still need assistance to fully implement the System's pillars and principles and for the full production and sharing of all data flows associated with the ECE environmental indicators (see table 19 below).

Recommendations:

41. Governments in the pan-European region should:

(a) Bring policy and science together to develop and implement appropriate and standardized pan-European methods and systems for monitoring and information management, including through the application of new technologies, to fill data gaps for improved decision-making and ensure timely availability of information for the public;

(b) Employ the ECE Revised Guidelines for the Application of Environmental Indicators (for completed parts see ECE/CEP-CES/GE.1/2021/4), provide the ECE set of environmental indicators in accordance with the principles and pillars of the Shared Environmental Information System and adopt indicators to cover emerging policymaking themes of importance;

(c) Promote the use of appropriate and standardized methods for monitoring air pollution emissions and the public availability of monitoring data in the pan-European region, while also strengthening cooperation and national investment to fill monitoring gaps in countries with economies in transition;

(d) Invest in data collection and information processing, as knowledge is instrumental for decision-making and water policy design (for example, water accounts, ecosystem assessment and indicators). The continuous improvement of monitoring and communication technologies is a top priority in terms of a water information system for the pan-European region;

(e) Increase efforts to complement inventories of the number of items of beach and marine litter with information on composition and sources of litter to be able to design more effective measures. Joint efforts should be taken where subregional monitoring measures are deemed necessary;

(f) Establish a region-wide chemicals and waste impact-oriented monitoring scheme, as a part of cooperation between science and policy, in order to build up a better picture of and address the adverse impacts of chemicals on human health and the environment;

(g) Improve data-collection systems on environmental financing, for example, on environmental expenditures, throughout the region to clarify and report which entities spend money on the environment, how much, with what objectives and who finances these expenditures;

(h) Develop a common definition of the term "sustainable infrastructure" in the pan-European region. This would enable reporting on and quantifying of progress across countries and subregions (see also point 16 above);

(i) Select some specific key-impact tourism indicators to be included in ECE statistical databases. Indicators for circular economy in tourism should be aligned with those being developed for the monitoring of sustainable development in tourism (particularly with those that are most promising) and be compatible with Sustainable Development Goals. Circular economy indicator development could follow the approach adopted by the initiative of the World Tourism Organization towards a Statistical Framework for Measuring the Sustainability of Tourism;

(j) Assist countries to fully implement the Shared Environmental Information System's pillars and principles and the full production and sharing of all data flows associated with the ECE environmental indicators;

(k) Continue digitalization of environmental monitoring systems and use of new technologies for enhanced high-quality data production in support of regular assessments and policymaking.

Table 19

Overview on status and trends for the selected indicator on the Shared Environmental Information System

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
Shared Environmental Information System established (2011–2021)	😊 ↗	😊 ↗	😊 ↗	😊 ↗	😊 ↗	😊 ↗

Source: United Nations Economic Commission for Europe, ECE/CEP/AC.10/2021/6, Final review report on the establishment of the Shared Environmental Information System.

Note: Trend is ↗ on average improving; Shared Environmental Information System established but with gaps in the alignment with the pillars and principles 😊.

II. Way forward

42. The environmental governance system and environmental legislation and policy landscape in the pan-European region have evolved and become more integrated and coherent since the Eighth Environment for Europe Ministerial Conference (Batumi, Georgia, 8–10 June 2016), in particular through developments under key mechanisms such as the 2030 Agenda for Sustainable Development, the Paris Agreement and other multilateral environmental agreements and efforts to establish a Shared Environmental Information System, as well as many other policy instruments not directly focusing on environment. This landscape is based on an indispensable system of science-policy interaction with key elements of monitoring, assessment and knowledge creation, and enabled by partnerships and cooperation among stakeholders and countries in the pan-European region.

43. While progress has been achieved in environmental protection in certain areas, there are significant shortcomings that pose a threat to the health of both people and the environment in the pan-European region, as highlighted in this assessment. The seventh pan-European environmental assessment has identified knowledge gaps in various areas, including air quality, fresh water, marine ecosystems and land and soil. In addition, knowledge and data gaps exist in chemicals and waste, including e-waste, and common policy targets are missing in most countries for biodiversity, resource efficiency and waste prevention, the development of sustainable infrastructure and circular economy. Environmental monitoring and measurement continue to be weaker than in most other sectors, and there is little disaggregated information. There is also room for improvement in integrative environmental planning and in enhancing integrative policies, including with respect to environment and health, particularly in countries in the eastern part of the region, as identified in the assessment.

44. Furthermore, the environmental governance system in the pan-European region remains partly fragmented in terms of the application of policies, the strengthening of institutions and the harmonization of legislation, as illustrated by the incomplete participation of the countries in existing multilateral environmental agreements and their implementation and reporting exercises.

45. Tracking progress and evaluating the effectiveness of policies in the region also remains a challenge, because of a lack of: (a) data and information; and (b) established standard procedures to evaluate whether policies are fulfilling their goals. The selected

indicators in the assessment provide only a narrow snapshot of where progress has been achieved and what developments are expected in the coming years. Nonetheless, they provide guidance on where urgent action is required.

46. Availability and accessibility of timely, relevant and robust data is essential for ensuring informed decisions, transparency and public participation. The sparsity of underlying data, particularly for the assessment of sustainable infrastructure and applying the principles of circular economy in sustainable tourism, highlights the need for better integration between the environmental dimension of the Sustainable Development Goals and the social and economic dimensions of sustainable development.

47. Besides strengthening participation in existing multilateral environmental agreements and international policy instruments including the Batumi Initiative on Green Economy, there is a need to: (a) develop policy and set coherent and quantitative targets to better address emerging topics, including circular economy and sustainable infrastructure, to support the transition to sustainable development in the region; and (b) strengthen the implementation of policies on the ground, for example, through upscaling successful pilot schemes, mobilizing resources from State and non-State actors and improving regulatory frameworks.

48. Strengthening of the knowledge base in support of environmental policies is another crucial enabling condition for improved environmental governance. The enhanced use of geospatial data and new technologies, including Big Data, artificial intelligence and, specifically, machine learning, and increased digitalization will increase efficiency and effectiveness in integrating policies if used in a sound manner. Strong partnerships within countries but also across borders will be crucial and need to be further strengthened.

49. There is little time left to ensure the successful implementation of the 2030 Agenda. The recent assessment *Sustainable Development Goals: Is the UNECE region on track for 2030? Assessment, stories and insights* indicates that the ECE region will achieve only 23 of the 169 Sustainable Development Goal targets by 2030 and only 7 of the targets related to environment and climate change. For 57 targets, progress needs to accelerate and, for 9 targets, the current trend needs to be reversed. Data are insufficient for the assessment of 80 targets.⁴ Therefore, it is essential to make the best possible use of existing tools and initiatives in the coming years in support of the Sustainable Development Goals. Where needed, additional measures and more ambitious goals, such as for e-waste or resource efficiency, can accelerate the implementation of the policy agenda.

50. The following areas have been identified as enabling conditions for a successful transition to a green and circular economy and sustainable development in the region.

A. Strengthening of policies and their implementation and up-scaling of actions

1. Promotion of participation in multilateral environmental agreements and harmonization of policies and legislation

51. Policy fragmentation should be reduced across the region to promote the existing multilateral environmental agreements and participation therein and support countries in ensuring coherency and harmonization of legislation.

2. Acceleration of the implementation of the Pan-European Strategic Framework for Greening the Economy

52. Participation in the Pan-European Strategic Framework for Greening the Economy and the Batumi Initiative for Green Economy needs to be enhanced. Governments and public and private organizations should scale up contributions through voluntary commitments in the form of green economy actions and envisage, in particular, commitments on circular economy and sustainable infrastructure development, including through promoting nature-

⁴ United Nations Economic Commission for Europe (2021).

based solutions. Successful pilot actions, including those illustrated in the case studies presented in this assessment, could be scaled up or replicated.

3. Development and adoption of common and coherent policies in the pan-European region for emerging topics, including circular economy and sustainable infrastructure

53. To address emerging challenges stemming from increased pressures on ecosystems and health, the development and adoption of systemic policy frameworks across the region in support of green economy and the transition to sustainable development will be crucial to keep pace with and address challenges in an increasingly complex world. Possible areas of engagement include adoption of common and systemic policies with common targets for circular economy, sustainable infrastructure and resource efficiency. Gender should be mainstreamed in policy development.

4. Strengthening of mechanisms for monitoring the effectiveness of policies and legislation, including at the international level

54. The tracking of progress and evaluation of the effectiveness of policies in the region remains a challenge and standard procedures to evaluate whether the policies are fulfilling their goals often need to be established or improved and data and information gaps need to be closed.

B. Investing in a just transition and redirecting finance, notably to sustainable infrastructure, a circular economy and nature-based solutions

55. The pandemic has created an unprecedented global economic downturn, with significant losses in human lives and employment in certain sectors. It has exposed gaps in knowledge, capacity, accessibility to basic services and gender equality. However, the pandemic has also created an opportunity to correct the path of resource exploitation, the rise of greenhouse gas emissions and other injustices, which came at the expense of healthy ecosystems and human well-being. Countries should take this opportunity to invest in a just and green transition.

1. Investing in and reorienting finance to support a just transition

56. Governments and private actors need to invest in and redirect finance towards sustainable infrastructure, circular economy and especially nature-based solutions. While the transition will require major investments, the pan-European region will gain immensely, both in terms of reduced pressure and impacts on ecosystems and nature and through gained health benefits and new economic opportunities. Investments in nature-based solutions should be given priority where possible to enhance resilience, while at the same time constructing and operating in a climate-friendly manner.

2. Strengthening of participation and access to information

57. Good environmental governance is built on broad participation and pluralistic governance, which are key for a just transition. Furthermore, participative processes in planning, implementation and evaluating the effectiveness of actions for a just transition are needed to ensure optimal solutions and buy-in, paying particular attention to the participation of vulnerable groups. Access to and availability of timely and reliable information are fundamental.

3. Investing in capacity development and education for sustainable development

58. In order to ensure the transition to sustainable development, there is a need to develop and invest in capacity and education in responsible authorities, the private sector and civil society.

C. Strengthening the science-policy interaction and the use of technology and innovation

59. The pan-European region is home to many outstanding scientific organizations, universities, research centres and individuals capable of innovation and of filling knowledge and data gaps. To support existing and upcoming environmental policy objectives, there is a need to strengthen the science-policy dialogue and the monitoring of environmental conditions and progress in policy implementation. Innovation and technology, including Earth observation, Big Data supported by analysis through artificial intelligence, developments in digitalization and citizen science, provide major opportunities for the pan-European region to enhance the creation of knowledge to complement existing monitoring.

1. Enhancing the use of technology and innovation in support of system thinking

60. Decision-making can benefit from strengthened science-policy interaction supported by data-driven innovation and technology. Digitalization in all areas, while respecting personal rights, will be crucial to enhance the understanding of complex processes and interlinkages of human needs, environmental and social impacts, and planetary boundaries.

2. Benefiting from existing knowledge and potential new sources

61. Making use of existing knowledge, tools and systems is beneficial not only from an economic perspective but also for sustainability reasons. The ECE and Organisation for Economic Co-operation and Development environmental performance review programmes, the Shared Environmental Information System, the various United Nations Environment Programme assessments and the European Environment Agency state and outlook environmental reports are examples of existing knowledge products and tools in the pan-European region. Their continued development and alignment with emerging policy needs should be supported. The use of the ECE Revised Guidelines for the Application of Environmental Indicators and the ECE set of environmental indicators, in accordance with the principles of the Shared Environmental Information System, will support sound policymaking. At the same time, better environmental monitoring and reporting will help facilitate reporting on Sustainable Development Goal indicators.

D. Development and strengthening of partnership initiatives and cooperation at regional and subregional levels

62. To achieve the Sustainable Development Goals and other global and regional policy targets, Governments, the private sector, academia and citizens must work together. In the pan-European region, various forms of cooperation, partnerships, institutional information exchanges and citizen engagement have advanced the protection of the environment in certain areas. Challenges remain, however, in many areas, including the creation of partnerships for emerging policy topics.

1. Strengthening of existing partnerships to address regional challenges

63. Governments should promote cooperation at all levels in order to address transboundary environmental challenges, including in integrated water resources management, the prevention of industrial and chemical accidents, environmental impact assessment and the establishment of environmental information systems in line with the principles and pillars of a Shared Environmental Information System.

2. Development of new partnerships for emerging policy themes

64. Governments and others need to consider creating new partnerships on emerging and urgent policy themes, including on circular economy, sustainable infrastructure, resource efficiency and waste management.