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The Eighth Environment for Europe Ministerial Conference: developing the Shared Environmental Information System

Targets and performance indicators for measuring progress in developing the Shared Environmental Information System across the pan-European region

Note by the Group of Friends of the Shared Environmental Information System

Summary

To support the development of the Shared Environmental Information System (SEIS) across the pan-European region the United Nations Economic Commission for Europe Committee on Environmental Policy (CEP) established a Group of Friends of SEIS. CEP requested the Friends of SEIS to look into several related issues, including with regard to how progress should be monitored and evaluated — i.e., what should be the clear targets and performance indicators for the development of SEIS (ECE/CEP/2013/2, paras. 38–39).

Pursuant to its mandate, Friends of SEIS met in Geneva on 12 May 2014 and worked on developing targets and performance indicators for developing SEIS. Friends of SEIS considered the concepts included in a first version of the present document, prepared by the secretariat, proposing a possible approach to SEIS targets and performance indicators. The Group made suggestions for further developing the targets and performance indicators and invited the secretariat in cooperation with the European Environment Agency to finalize the document. Accordingly, the current document presents a framework for measuring progress in developing SEIS.

CEP will be invited to consider for approval the targets and performance indicators for measuring progress in developing SEIS in support of the regular environmental assessment process, as well as to decide on modalities for reviewing that progress.

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Contents

	<i>Paragraphs</i>	<i>Page</i>
Introduction.....	1–4	3
I. Background and mandate.....	5–10	3
II. Benefits of a Shared Environment Information System.....	11	4
III. Development of a Shared Environment Information System.....	12–26	5
A. Understanding a Shared Environment Information System	12–15	5
B. Building blocks for a Shared Environment Information System.....	16	6
C. No one-size-fits-all approach.....	17–20	6
D. Development of a vision for a Shared Environment Information System	21–26	8
IV. Targets and performance indicators	27–71	8
A. Assessing progress and measuring the state of the art.....	27–32	8
B. Moving towards Shared Environment Information System targets.....	33–38	9
C. Timelines for development of a Shared Environment Information System ...	39–41	11
D. Performance indicators	42–59	12
E. Performance management	60–70	19
F. Issues for consideration	71	20
Annexes		
I. International priority data flows proposed for implementation in 2015 in order to be ready for use for a possible pan-European assessment cycle in 2016		21
II. International priority data flows proposed for gradual implementation until 2021.....		24
Tables		
1. Performance indicator and related actions for stock taking exercise		12
2. Example 1: stock taking (e.g., data flows of annual average concentration of coarse particulate matter (PM ₁₀) in urban areas/capital city)		13
3. Performance indicator and related actions for definition of outputs exercise		14
4. Example 2: definition of outputs for selected data flows		15
5. Performance indicator and its related actions for implementation of outputs.....		16
6. Example 3: road map for implementation of outputs based on definition of outputs as provided in example 2.....		17
Boxes		
1. Three building blocks of a Shared Environment Information System		6
2. Common targets for monitoring progress for each building block of a Shared Environment Information System.....		10
Figure		
Illustration of a Shared Environment Information System.....		10

Introduction

1. The availability of integrated, relevant, high quality, timely and easily accessible environmental information provides the means for assessing environmental status and the foundation for meaningful and informed environmental governance. Conversely, a lack of such information presents a major obstacle to defining effective policies and targets for environmental conservation and sustainable use and to monitoring their effectiveness.
2. Timely, relevant, reliable and easily accessible environmental information is also essential to inform citizens about the quality of their environment so that, with full awareness, they can defend their basic right to live in a healthy and safe environment.
3. At the same time, organizing a vast array of environmental data and information and integrating them, where appropriate, with economic and social data is a challenging task. Even more challenging is to make this information and data available for analysis so that they can offer the basis for easily comprehensible, accessible and targeted recommendations to decision makers and the public or for reporting at the country level or internationally in accordance with legal obligations, policy commitments and mandates.
4. Recognizing the challenge, the international community in the pan-European region, facilitated the discussion and sharing of experience between the various countries on the management and use of environmental information. This process led to a proposal by the European Environment Agency (EEA) to develop, initially within the European Union (EU), a Shared Environmental Information System (SEIS) — a system that, with the support of modern technologies such as the Internet, would link all the existing data and information flows relevant at the country and international levels in support of the regular environmental assessment process.

I. Background and mandate

5. The EEA proposal on the development of SEIS was agreed and launched in the EU primarily to support the reporting related to EU environmental policies and legislation. Regularly assessing the environment and developing SEIS was also considered by the ministers of environment from the pan-European region at the Seventh Environment for Europe (EfE) Ministerial Conference (Astana, 21–23 September 2011). Following a discussion and acknowledging the benefits of SEIS, the ministers decided to establish a regular process of environmental assessment and to develop SEIS across the region to keep the pan-European environment under review (ECE/ASTANA.CONF/2011/2/Add.1, para. 14).
6. The ministers emphasized that SEIS should serve multiple policy purposes, taking into account the needs of the multilateral environmental agreements (MEAs), and that the work on SEIS and its development should include support and capacity-building for countries in Eastern and South-Eastern Europe, the Caucasus and Central Asia. Therefore, they invited EEA, in cooperation with its partners, to develop an outline for SEIS activities and implement them under the auspices of the United Nations Economic Commission for Europe (ECE) Committee on Environmental Policy (CEP).

7. The progress in establishing SEIS was reviewed by CEP at its nineteenth session in October 2013 based on reports and notes prepared by EEA.¹ While CEP acknowledged the efforts made, in particular by EEA and its partners in helping develop SEIS in the entire ECE region, the progress made in this area was found to be rather limited. To this end, CEP decided to establish a coordination mechanism for SEIS development in the entire ECE region in the form of a Group of Friends of SEIS and entrusted the Group to work on two issues: (a) preparing clear targets and performance indicators to monitor and evaluate the development of SEIS in the pan-European region; and (b) organizing and shaping the regular assessment process taking into consideration the benefits of SEIS (ECE/CEP/2013/2, paras. 38–39).

8. Pursuant to its mandate from CEP, the Group of Friends of SEIS prepared the present document proposing a framework for measuring progress on SEIS. The framework is designed to help countries in measuring SEIS at the national level, as well as to oversee SEIS development and functioning at the pan-European level to support regular reporting and assessment processes. The elaboration of the paper was supported by the ECE secretariat and EEA.

9. The document is structured into two main parts:

(a) Part 1 (sections II and III) on the development of SEIS introduces the key issues that should be considered in the process of an effective and efficient SEIS development;

(b) Part 2 (section IV) on targets and performance indicators explores a possible approach to measuring progress on SEIS development across the region.

10. CEP is invited to consider the present document and to take a decision on the proposed framework set out in Part 2 to measure progress on SEIS. CEP is further invited to consider SEIS performance management and, to that end, assign an intergovernmental body with the task of regularly reviewing progress on developing SEIS.

II. Benefits of a Shared Environment Information System

11. The benefits of SEIS development in every country of the pan-European region could be significant for the countries as well as for the international organizations and the intergovernmental bodies serviced by these organizations, e.g., the meetings of the Parties to MEAs:

(a) *Efficiency gain and cost savings:* With SEIS environmental data and information will not only be available, but readily accessible by their potential users. This will bring a new perspective to national reporting, including under the MEAs, and should result in cost savings for the reporting processes. There will also be considerable cost savings if data and information will not need to be gathered each and every time prior to carrying out an assessment;

(b) *Effective and meaningful governance:* The availability of high quality data and information will improve policy development and decision-making processes;

¹ A review of Shared Environment Information System-related developments with an impact on environmental assessment and reporting since the Seventh Environment for Europe Ministerial Conference (ECE/CEP/2013/18) and outline on the establishment of a regular assessment and reporting process underpinned by the gradual development of a Shared Environment Information System (ECE/CEP/2013/15), available from <http://www.unece.org/env/cep/2013sessionoctober.html>.

(c) *Simplification*: Readily accessible data and information will change the way assessments are carried out, as they will be included in the national SEIS for analyses and assessments carried out at the country level, as well as for general or topic-related assessments carried out internationally whether under the MEAs or various initiatives in which the countries participate;

(d) *Innovation*: SEIS will contribute to the improvement and increased use of new technology, software or information technology (IT) platforms;

(e) *Informed public*: The general public will have the opportunity to access environmental data and information more easily, which should result in increased awareness about the environment among the public.

III. Development of a Shared Environment Information System

A. Understanding the Shared Environment Information System

12. SEIS should be seen as an approach to be followed for facilitating regular environmental assessments and reporting. At the heart of SEIS are existing data and information flows relevant at the country as well as the international level, which should be linked with the support of modern technologies such as the Internet and shared between existing networks.

13. The data and information flows at the country level should allow a particular country to track changes in specific environmental thematic areas (e.g., air, water, waste), as well as concerning the various interlinks between them, and to assess these changes against the policy framework.

14. The international data and information flows should make it possible to track changes in the environment, again as per specific thematic areas and the interlinks between them, subregionally or regionally, and to provide information on the progress made on the agreed regional or global commitments. They should help in:

(a) Preparing assessments on the state of the environment at the subregional, regional or global levels (e.g., a pan-European assessment, or the United Nations Environment Programme Global Environmental Outlook (GEO));

(b) Understanding changes or progress in addressing the issues covered by the regional MEAs and further developing them or strengthening their implementation;

(c) Contributing to global initiatives related to sustainable development or the post-2015 development agenda, for which environmental data and information are key.

15. The establishment of SEIS as an approach for facilitating regular environmental assessment and reporting is guided by the following principles:

(a) Information should be managed as close as possible to its source;

(b) Information should be collected once, and shared with others for many purposes;

(c) Information should be readily available to public authorities and enable them to easily fulfil their legal reporting commitments;

(d) Information should be readily accessible to end-users, primarily public authorities at all levels from local to pan-European, to enable them to assess in a timely fashion the state of the environment and the effectiveness of their policies, and to design new policy;

(e) Information should also be accessible to enable end-users, both public authorities and the public, to make comparisons at the appropriate geographical scale (e.g., countries, cities, catchments areas) and to participate meaningfully in the development and implementation of environmental policy;

(f) Information should be fully available to the public, after due consideration of the appropriate level of aggregation and subject to appropriate confidentiality constraints, including at the national level and in the relevant national language(s);

(g) Information sharing and processing should be supported through common, free and open standards.

B. Building blocks for a Shared Environment Information System

16. Taking into account that SEIS is an approach rather than a technical system, it has three equally important building blocks: (1) Content; (2) Institutional cooperation; and (3) Infrastructure (see box 1). Hence, SEIS must not be seen as a technological or infrastructural development only.

Box 1

Three building blocks of a Shared Environment Information System

Content: comprises all the data and information necessary to understand the changes in the state of the environment as per specific thematic areas (e.g. air, water, waste) and the interlinks between them (as tackled also under the MEAs). Such data are available from various institutions at various levels and are crucial in terms of policymaking, but also awareness-raising. They need to follow agreed, common format requirements, at least for these data and information constituting international flows.

Institutional cooperation (networks): relates to all the holders of the relevant data and information at the various levels in the country that need to be enabled to become data and information and even assessments providers as well as users at the same time under SEIS. Therefore, this block includes issues such as: development/amendments to the legal framework and data policy agreements and protocols to enable data exchange, cooperation and coordination while ensuring trust building and confidence between various data providers and between them and users.

Infrastructure: includes all the e-tools and e-instruments to facilitate the sharing by providers of data and information so that it can be accessed by users, including experts, that would analyse the information and share it for further use. Such infrastructure comprises: IT platforms, software, standards, methodologies, policy agreements and protocols for data sharing and exchange).

C. No one-size-fits-all approach

17. While actors involved in the development of a pan-European SEIS need to consider the national and international dimensions of SEIS against the SEIS principles, the individual systems to be developed in various countries will not be identical but interoperable. The national SEIS may depend on various criteria and conditions:

- (a) The size and governance structure of the country, which would determine the number of stakeholders needed to be involved in data and information management (collection, processing, validation, and sharing);
- (b) The legal base or lack thereof regulating data and information management, the availability or not of a dedicated data policy;
- (c) The institutional structure or lack thereof for data and information management;
- (d) The country's participation in international activities and related commitments (MEAs and other international processes) or willingness and plans to join and/or participate in those that the country is not a party/member of yet;
- (e) The level of the development of IT in the country, and related to that:
 - (i) The number and state of the art of IT systems in use;
 - (ii) The IT literacy of the staff of SEIS-involved institutions (information providers/managers);
- (f) The availability of a national/local budget for monitoring and assessment:
 - (i) To develop and maintain the system, including the necessary IT infrastructure and the capacity of staff involved in the maintenance work;
 - (ii) To train staff of the SEIS-involved institutions (information providers/managers) on using the system;
- (g) Developments in the e-governance field (an open data policy for data sharing, the availability of a spatial data infrastructure in the country).

18. These above-mentioned criteria and conditions impact, as a minimum, the data and information in use under SEIS (Content); the number of information providers that should constitute the SEIS network and the way they manage the data and information (Institutional cooperation); as well as the complexity or level of development of the electronic infrastructure in use for SEIS (Infrastructure).

19. It is very important that the SEIS development vision and related road map be built upon the criteria and conditions listed above, or — where it has been developed already — that it be reassessed against these criteria and conditions. Also, while the SEIS process can be initiated with the support of donor funding, its effective maintenance and sustainable operation can be only achieved with sufficient national/local resources.

20. At the same time, following the national and international dimensions and the principles of SEIS, each country should ensure that:

- (a) SEIS priority content relevant nationally as well as internationally is ensured and stored in electronic databases;
- (b) The content for international exchange is compatible (follows adopted internationally agreed methodologies) and interconnected virtually within and between national systems, which ensures SEIS integrity;
- (c) Responsibility for content (control of quality and timeliness) should always stay with its providers, at the source, which makes SEIS dispersed while the virtual interconnectivity makes it integrated;
- (d) SEIS is based on the existing infrastructure, system and services available in the country or the infrastructure to be developed that can be maintained with the available resources;
- (e) Access to data and information is provided to all stakeholders.

D. Development of a vision for a Shared Environment Information System

21. Countries in the initial stages of SEIS development can take advantage of and benefit from the knowledge, experience (including lessons learned) and good practice available in countries that are more advanced in SEIS development. In this way, countries initiating the process can better understand the SEIS concept and develop their own vision for establishing an effective national SEIS. Examples of good practice on SEIS development, including different solutions for SEIS implementation, are publicly available from the websites of a number of countries.²

22. Another helpful tool for SEIS development is the SEIS Cookbook prepared by EEA.³

23. At the same time, a related action in helping countries to develop their SEIS vision and related road map, as well as to implement and operate the various thematic components of the system, will be the development of a tool for self-monitoring and self-evaluation of the progress by establishing clear targets and performance indicators, as requested by CEP.

24. Some countries, nevertheless, may require support, including to build their capacity in developing SEIS. Various options for how to efficiently provide such support may therefore need to be considered. Currently, a number of EU and bilateral (donor-based) projects supporting SEIS development are under way across the pan-European region (European Neighbourhood and Partnership Instrument (ENPI)/SEIS, the Forest and Biodiversity Governance including Environmental Monitoring (FLERMONECA) Environmental monitoring in Central Asia (MONECA) component, etc.)

25. Establishing a SEIS coordination mechanism at national level to coordinate and oversee national SEIS development would be useful, in particular for countries that will need further assistance in developing SEIS. Such a national mechanism can vary from country to country. While some countries may establish a SEIS inter-institutional council or working group, others may assign this SEIS coordination to an already existing council or working group or even to a particular institution. Whichever format is adopted for the coordination, it is sensible that national focal points for MEAs and other international process are included in the mechanism.

26. Establishing or identifying SEIS coordination mechanism at the pan-European level that would support SEIS development and oversee progress achieved towards SEIS targets, in particular for the international, regular data and information flows, can also be very useful.

IV. Targets and performance indicators

A. Assessing progress and measuring the state of the art

27. A progress measurement framework for SEIS is a complex matter. Since SEIS can differ from country to country and from topic to topic, the measurement framework has to offer elements and methods that can be used by every country.

² E.g., <http://www.irceline.be>; <http://issar.cenia.cz/issar/index.php>; <http://www.portalu.de/>; <http://www.geonorge.no/geonetwork/srv/eng/main.home>; <http://www.ekoregistar.sepa.gov.rs/en>; <http://www.arso.gov.si/>.

³ Available from <http://enpi-seis.ew.eea.europa.eu/seis-infrastructure/seis-cookbook>.

28. Countries are also at different stages of SEIS development, with some countries in the initial stage of the process and others being quite advanced, having worked on SEIS issues also under other initiatives, such as streamlining reporting processes or e-governance.

29. Nevertheless, countries that are in the initial stage of the SEIS development process may also be relatively advanced in producing a number of crucial data and information flows. This is, among others, the result of the ongoing work of the Joint Task Force on Environmental Indicators⁴ and projects such as the EU/SEIS-ENPI East project, led by EEA, and the EU FLERMONECA MONECA component, led by the Austrian Environment Agency, through which countries of Eastern Europe, the Caucasus and Central Asia are helped to ensure sustainable data flows for the production of eight environmental indicators. The eight indicators refer to topics such as air pollution, ozone depletion, climate change, water, biodiversity and waste. Most of these countries already produce and share the majority of these indicators.⁵

30. The EU member States and EEA members and cooperating countries do ensure, to varying degrees, the production and sharing of indicators and data in the following thematic areas: agriculture, air pollution, biodiversity, climate change, energy, transport, waste, water, fisheries, land and soil.⁶

31. Therefore, while efforts for the full development of SEIS may continue, some parts of it might already be operational. The measurement framework should therefore also help to ensure that what has been developed works effectively, i.e., the data are regularly updated and made available for regular reporting and assessments.

32. The SEIS measurement framework therefore needs to be suitable to address everybody's needs, regardless of the national SEIS vision or the work already implemented. It should also help measure the establishment of the pan-European network of SEIS to underpin the regular reporting and assessments.

B. Moving towards Shared Environment Information System targets

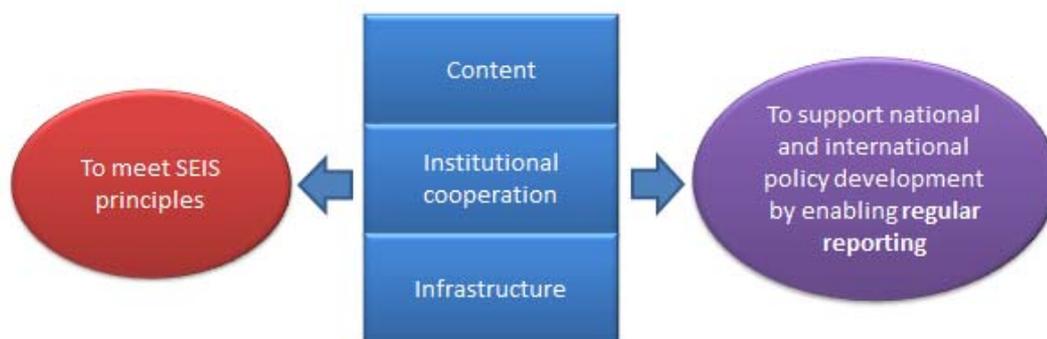
33. Due to possible differences in SEIS development from country to country, it is crucial to set up common SEIS targets that all countries can agree upon. These targets need to be defined per each building block — Content, Institutional cooperation and Infrastructure — and to ensure that the established SEIS is compliant with SEIS principles and aimed at supporting policy development by enabling regular assessment and reporting (see figure).

⁴ The activities of the Joint Task Force on Environmental Indicators have been receiving considerable EU funding through EEA in the period 2010–2014 for helping countries of Eastern Europe, the Caucasus and Central Asia to ensure the production and sharing of crucial environmental indicators and their data sets.

⁵ For more information, see the report, “Analysis on the production and sharing of United Nations Economic Commission for Europe core environmental indicators by countries of South-Eastern and Eastern Europe, Caucasus and Central Asia” (ECE CEP-CES/GE.1/2014/3), available from <http://www.unece.org/stats/documents/2014.05.viron.html>.

⁶ Further information can be found at <http://www.eionet.europa.eu/dataflows/pdf2012>; and <http://www.eionet.europa.eu/dataflows/pdf2013>.

Figure
Illustration of a Shared Environment Information System



34. Taking the above considerations into account, common targets are proposed for monitoring SEIS progress for each SEIS building block (see box).

Box 2

Common targets for monitoring progress for each building block of a Shared Environment Information System

Content

- A1. Agreed environmental indicators and related data sets are produced (per thematic area and their interlinks) to meet country and international level policy needs and enable regular reporting and assessments.
- A2. Agreed methodologies and calculation methods (including necessary data aggregation), etc., for the production of the environmental data sets and indicators are described through metadata.
- A3. Agreed indicators and related data sets are assessed regularly against the policy targets.

Institutional cooperation

- B1. Clear protocols for institutional cooperation in terms of data management (collection, processing and validation), sharing and assessment are established.
- B2. Interoperability protocols for intersectoral institutional cooperation enabling regular and timely data flow (national and international) and public access are established.
- B3. A coherent environment data sharing policy is defined and implemented.

Infrastructure

- C1. Availability of electronic databases to data managers is ensured.
- C2. Environmental indicators underpinned by data sets are available online described/structured by metadata.
- C3. Any data exchange is based on agreed open standards.

35. The above common targets, if fully met, would indicate that a national SEIS has been developed and is being effectively operated nationally, and that it is integrated into a pan-European SEIS network of international priority data flows supporting regular reporting and assessments.

36. Meeting the targets requires, first of all, that gaps in the SEIS Content, Institutional Cooperation and Infrastructure are identified. This should be followed by defining the necessary outputs to eliminate the gaps and an elaboration of a realistic but ambitious road map for implementing the outputs. Subsequently the road map should be implemented. Furthermore, the targets should be observed when operating SEIS.

37. There are therefore three phases that can be distinguished for SEIS:

(a) *Phase 1, SEIS mapping or initial development* — this phase includes preparatory work to ensure that the implementation can be done efficiently. It covers the identification of gaps and output definitions and should result in the preparation of a national road map for SEIS. The phase should be limited in duration;

(b) *Phase 2, SEIS implementation* — this phase is focused on the implementation of the national road map. It covers implementation of each and every output defined under the three building blocks (Content, Institutional cooperation and Infrastructure) within the specified deadlines. It can last several years;

(c) *Phase 3, SEIS sustainable operation* — this phase starts with the conclusion of the implementation phase and is aimed at maintaining SEIS fully operational.

38. The SEIS performance indicators should measure the advancement towards the SEIS common targets (initial development and implementation phases) and meeting them (sustainable operation phase). This requires that they are translated into related actions for each of the phases. Five performance indicators are proposed: two for the initial development phase, one for the implementation phase and two for the sustainable operation phase.

C. Timelines for development of a Shared Environment Information System

39. The timeline for SEIS development can depend on many factors, such as those discussed under country-specific criteria and conditions, as well as progress achieved already. As a result, while it may be a relatively rapid process for some countries, for others it may take several years.

40. At the same time, to take advantage of SEIS, its gradual development should be linked with the relevant regular environmental assessment processes to allow regular and increasing (while SEIS is in development) data and information reporting for the assessments.

41. Therefore, to facilitate preparation of a possible assessment for the Eighth EfE Ministerial Conference to be held in 2016, the availability of minimum international priority data flows, as proposed in annex I, should be ensured in course of 2015 under each national SEIS. Additional international priority data flows should be further ensured in time for the GEO assessment in 2018, while full international priority data flows, as proposed in annex II, should be available through national SEIS in time for the pan-European assessment expected for 2021.

D. Performance indicators

1. Performance indicators for phase 1 — initial SEIS development

42. Phase 1 is linked to the development of SEIS vision and design, based on the assessment of the existing situation (a stock-taking exercise). In other words, in this phase a country needs to assess SEIS status and identify possible gaps in the Content, Institutional cooperation and Infrastructure vis-à-vis its own vision and, in conjunction, define the necessary outputs in the form of a national road map for filling the existing gaps.

43. If a country faces difficulties in defining its clear national vision for SEIS, it should start by building upon the implementation of international priority data and information flows derived from existing policy commitments. Annexes I and II list the international data flows proposed as priority ones, arranged by thematic areas.

44. To guide the work of the countries towards achieving the common SEIS targets in the initial development phase, related actions have been defined for the stock-taking and the definition of outputs exercises. These related actions are provided in tables 1 and 2.

Table 1

Performance indicator and related actions for stock-taking exercise

<i>Building block indicator</i>	<i>Content</i>	<i>Institutional cooperation</i>	<i>Infrastructure</i>
<i>Performance indicator 1.1: Stock-taking exercise is completed</i>	<p>A1. Full knowledge of:</p> <ul style="list-style-type: none"> – Environmental data sets and indicators already in use – Legal obligations for environmental data sets (and indicators) <p>A2. Full knowledge of metadata availability behind each environmental data set and indicators (units, calculation and validation methods) and whether the metadata meets the internationally accepted standard</p> <p>A3. Full knowledge of which data sets and indicators are regularly produced and analysed against policy targets</p>	<p>B1. Full knowledge of public authorities' responsibilities for collection, processing and analysis of environmental data sets and related indicators</p> <p>B2. Full knowledge of:</p> <ul style="list-style-type: none"> – The kind of data flows taking place – The legal basis for the flows (legal requirement, memorandum, ad hoc exchange) <p>B3. Full knowledge of online sharing policies</p>	<p>C1. Full knowledge of use of electronic databases by data managers from public authorities</p> <p>C2. Full knowledge of online availability of data sets and indicators, with description through metadata and brief interpretation, and of participation in various online data publishing projects (e-governance, PRTRs, etc.)</p> <p>C3. Full knowledge of IT solutions in use for online data sharing</p>

45. The performance indicators should measure at regular intervals whether and how far the related actions for the stock-taking and definition of outputs exercises have been implemented.

Table 2

Example 1: stock taking (e.g., data flows of annual average concentration of coarse particulate matter (PM₁₀) in urban areas/capital city)

<i>Support questions^a</i>	<i>YES/NO^b</i>
Support questions to be addressed under A1	
A1a: Do we use these data already?	YES/NO
A1b: Is the use in accordance with national legal practice?	YES/NO
Support questions to be addressed under A2	
A2a: If A1a YES: Is there clear metadata for these data, including on units of calculation and validation methods?	YES/NO
A2b: If A2a YES: Does the metadata meet the internationally accepted standard?	YES/NO
Support questions to be addressed under A3	
A3a: Is a brief assessment of these data provided?	YES/NO
A3b: If A3a NO, why?	
Support questions to be addressed under B1	
B1a: If A1a YES: Is there a public authority(ies) in charge of these data?	YES/NO
B1b: If B1a YES: which one(s)? If NO, how are the data produced?	
Support questions to be addressed under B2	
B2a: If B1a YES: Are these data exchanged with others (data flow enabled)?	YES/NO
B2b: If B2a YES: with whom/is there anybody else that should receive these data? If NO, why?	
B2c: Is there a legal basis for the flow?	YES/NO
Support questions to be addressed under B3	
B3a: Do you have online data sharing policies in place?	YES/NO
B3b: If B3a NO: Why?	
Support questions to be addressed under C1	
C1a: If A1a YES: Are the data maintained in the electronic database?	YES/NO
C1b: If C1a NO: how are they maintained?	
Support questions to be addressed under C2	
C2a: Are these data made available online?	YES/NO
C2b: If C2a YES: How and what is made available? If NO: why?	
Support questions to be addressed under C3	
C3a: If B3a and C2a YES: What are the information technology solutions used for enabling the flows?	YES/NO
C3b: If C3a YES: Are these open source solutions?	YES/NO

^a Since this data flow is included as a flow for international exchange it should be part of each and every SEIS. Therefore, a country should make sure that this flow is enabled through relevant actions

under Content, Institutional cooperation and Infrastructure. Such an exercise should be carried out for each of the international priority data flows, but also for the national data flows that a country would want to be fully enabled.

^b If the answer to the questions can be answered YES, it would mean that the data flow on the annual average concentration of PM₁₀ in the capital city is fully enabled through necessary actions under Content, Institutional Cooperation and Infrastructure, unless the answers to open questions (like B1b, C2b, etc.) show that improvements may be required. In this latter case, or when any of the answers is NO, the necessary outputs should be defined for inclusion into the SEIS road map under phase 2 for implementation.

46. The performance is validated through a brief assessment of results achieved under each related action. A common reporting format should be made available to the countries.

Table 3

Performance indicator and related actions for definition of outputs exercise

<i>Building block indicator</i>	<i>Content</i>	<i>Institutional cooperation</i>	<i>Infrastructure</i>
<i>Performance indicator 1.2: Outputs are clearly defined</i>	<p>A1. Identification of the missing key environmental data sets and indicators (those data sets and indicators produced on an ad hoc basis to be also included in the list). The existing and newly defined data sets and indicators have to meet the demand for the minimum content both with regard to country and international (e.g., MEA obligations) policy requirements. The content of various thematic components to be included in every national SEIS is defined in annex I)</p> <p>A2. Elaboration of a list of data sets and indicators (can be also relevant for those already in use) for which metadata needs to be developed and/or modified to meet the internationally accepted standard</p> <p>A3. Elaboration of methodologies for analysis using indicators</p>	<p>B1. Adoption of a list/ consolidated list of responsibilities for collection, processing, validation and analysis of data underpinning the indicators (can include changes to existing responsibilities)</p> <p>B2. Definition of a list of responsibilities for providing data (enabling new data flows, can include possible changes to existing data flows). This can also include data flows on indicators from. e.g. MEAs</p> <p>B3. Elaboration of coherent policies for data sharing in place</p>	<p>C1. Elaboration of a list of data sets and indicators for which electronic databases need to be set up or upgraded</p> <p>C2. Elaboration of a list of data sets and related indicators(including metadata) to be available online</p> <p>C3. Definition of needs for elaboration/adoption of IT solutions for online sharing using open standard</p>

47. While the initial development phase is a preparatory phase and hence limited in duration, it should be the aim of each country concerned to carry out the stock-taking and definition of output exercises in the short time that is left before the first pan-European review of progress in SEIS development takes place.

Table 4

Example 2: definition of outputs for selected data flows⁷

<i>Thematic area</i>	<i>Dataflow</i>	<i>Environmental indicator produced? (Yes/No/Needs improvement)</i>	<i>Content</i>	<i>Institutional cooperation</i>	<i>Infrastructure</i>
Air pollution and ozone depletion	Emissions of sulphur	Yes	—	—	—
	Emissions of fine particulate matter (PM _{2.5})	No	A1: Introduction of the data set in accordance with legal practice A2: Preparation of metadata A3: Elaboration of practice for interpretation	B1: Designation of dedicated authorities for collection, validation, processing and interpretation of data B2: Establishment of data flow between necessary authorities B3: Establishment of a coherent data sharing policy	C1: Set up of an electronic database C2: Ensuring online availability — creation of indicator webpage with data, metadata and brief interpretation C3: Application of open standard for data flow
Climate change	Aggregated greenhouse gas (GHG) emissions including land use, land use change and forestry (LULUCF)	Needs improvement	A2: Incorporation of emissions/removals from LULUCF into metadata	B3: Establishment of a coherent data sharing policy	—
Water	Mean concentration of biological oxygen demand (BOD) in a major river	Needs improvement	—	B2: Establishment of data flows between relevant authorities	C2: Ensuring online availability — creation of indicator webpage with data, metadata and brief interpretation

⁷ This example contains hypothetical situations and answers. This schema would need to be modified according to each country situation.

<i>Thematic area</i>	<i>Dataflow</i>	<i>Environmental indicator produced? (Yes/No/Needs improvement)</i>	<i>Content</i>	<i>Institutional cooperation</i>	<i>Infrastructure</i>
Waste	Waste generation by source	Needs improvement	A1: Introductions of calculation of waste generation by households A2: Elaboration of metadata A3: Elaboration of practice for interpretation	B1: Ensuring responsibility for this data flow	—

Note: For the determination of whether or not the environmental indicator is produced, “No” indicates that the indicator was not produced at all; “Yes” indicates that the indicator is produced and no deficiencies were identified during the stock-taking exercise, i.e., no outputs are defined; “Needs improvement” means that the indicator is produced, though certain needs for improvement were identified during the stock-taking exercise.

48. Depending on the results achieved validated through the implementation report, countries could rate their progress in a quantitative way by indicating “good progress” for performance when all or a majority of the related actions have been achieved before the first review for all the data and information to constitute SEIS, “fair progress” if about half of the related actions have been achieved and “no progress” if the related actions have not been started/or have only just been initiated.

2. Performance indicators for phase 2 — SEIS implementation

49. Phase 2 is linked with the implementation of the individual outputs as self-defined by each country during phase 1 (e.g., new indicator to be elaborated, metadata to be developed, responsibilities to be assigned, electronic database to be set up, etc.).

50. The outputs should be grouped per thematic area under the relevant related actions guiding the work of the countries towards achieving the common SEIS targets in the implementation phase. These related actions are provided in table 3.

Table 5

Performance indicator and its related actions for implementation of outputs

<i>Building block indicator</i>	<i>Content</i>	<i>Institutional cooperation</i>	<i>Infrastructure</i>
<i>Performance indicator 2: Outputs are implemented in a timely fashion</i>	A1. New data sets or indicators (as defined under phase 1) available so that a complete set of data sets or indicators are available. The indicators and data sets need to be anchored in the national legislation as per available national practice A2. Metadata available for	B1. Responsibilities in place for each of the newly established data sets/indicators and for existing ones for which clear responsibilities were not in place (as defined under phase 1), so that there are clear data collection, processing and assessment	C1. Electronic databases available as per the list under phase 1 so that each dataset and indicator is managed through an electronic database C2. Online publication of data sets or indicators (including metadata) in place in accordance with the rules and IT solutions

<i>Building block indicator</i>	<i>Content</i>	<i>Institutional cooperation</i>	<i>Infrastructure</i>
	new indicators and data sets as well as for those existing ones where such metadata were missing A3. Methodologies in place for data analysis	responsibilities, which are anchored in the legislation B2. Responsibilities and rules in place to enable data flows as per the list elaborated under phase 1 B3. Policies for data sharing in place	as per the list defined under phase 1 so that all indicators and the underpinning data sets are available online C3. IT solutions for online sharing using open standards in place (Extensible Markup Language (XML) schemas, Resource Description Framework (RDF) feeds for data deliveries linking code lists, etc.)

51. The performance indicator should measure at regular intervals (e.g., annually), whether and how far the outputs under the related actions planned for implementation were implemented. If a particular output is delayed in implementation, it should be reviewed again in the next review cycle. Annex I provides specific data flows to be implemented in the course of 2015 in time for the possible 2016 pan-European assessment.

52. The performance is validated through a brief assessment report describing the work carried out and the results achieved under each related action, as per the planned implementation periods and deadlines. A common reporting format should be made available for the countries.

Table 6

Example 3: road map for implementation of outputs based on definition of outputs for selected indicators as provided in example 2⁸

<i>Thematic area</i>	<i>Data flow</i>	<i>Outputs for implementation</i>	<i>Authority in charge</i>	<i>Implementation deadline</i>	<i>Time limit for implementation</i>
Air pollution and ozone depletion	Emissions of PM _{2.5}	A1	[name of authority]	May 2017	2021
		A2	[name of authority]	December 2017	
		A3	[name of authority]	December 2017	
		B1	[name of authority]	2016	
		B2	[name of authority]	June 2018	
		B3	—	—	
		C1	[name of authority]	June 2018	
		C2	[name of authority]	June 2019	
		C3	[name of authority]	June 2018	

⁸ This example contains hypothetical situations and answers. This schema would need to be modified according to each country situation.

<i>Thematic area</i>	<i>Data flow</i>	<i>Outputs for implementation</i>	<i>Authority in charge</i>	<i>Implementation deadline</i>	<i>Time limit for implementation</i>
Climate change	Aggregated GHG emissions including LULUCF	A2	[name of authority]	June 2015	2016
		B3	[name of authority]	December 2015	
Water	Mean concentration of BOD in a major river	B2	[name of authority]	June 2015	2016
		C2	[name of authority]	September 2015	
Waste	Waste generation by source	A1	[name of authority]	May 2015	2016
		A2	[name of authority]	October 2015	
		A3	[name of authority]	October 2015	
		B1	[name of authority]	February 2015	

53. Depending on the results achieved validated through the implementation report, countries could rate their progress in a quantitative way by indicating “good progress” for performance when all or majority of outputs under each related action have been implemented as planned during the designated time period, “fair progress” if about half of the related actions’ outputs have been implemented as planned and “no progress” if the implementation of the related actions is not started/or just initiated.

54. The SEIS is fully developed if all the outputs are implemented, as planned, although the planning can be adjusted (outputs added, removed or changed) through corrective actions during the implementation process. The international priority data flows of SEIS should be implemented, i.e., fully enabled for regular reporting and assessments, not later than per the deadlines agreed.

3. Performance indicators for phase 3 — SEIS sustainable operation

55. Phase 3 is linked with ensuring that the SEIS-developed content, networking rules and procedures as well as infrastructure are maintained up to date or adjusted as necessary in accordance with the changing priorities to keep the system fully operational.

56. The performance should be measured at regular intervals through the availability and accessibility of the priority data and information (indicator 3.1) as well as their use in the assessment and reporting process. In case of changes in the priority data flows, the implementation of the necessary actions in terms of defined outputs under the three SEIS building blocks should be measured at those moments (indicator 3.2).

57. The performance with regard to indicator 3.2 can be measured per related actions of phase 2 and be supported through a report describing the work carried out and the results achieved.

58. Indicator 3.1 should be measured in a quantitative way by indicating the percentage of the timely availability of the updated, complete priority data and information against all the priority data and information. A clear cut-off date should be established as of which performance should be evaluated annually. For the international priority data flows, in case of delayed data flows or lack of updating for any data flow, the performance failure should be reported with reference, in particular, to the Institutional cooperation and Infrastructure building blocks. A common reporting form should be made available for the countries.

59. Furthermore, the international priority data flows can be further rated with “smiley faces” or other similar scale to show timeliness and completeness of the updates for each

data flow. Changes in performance from year to year can be further visualized with arrows showing increasing, stable or decreasing performance.

E. Performance management

60. The targets and performance indicators are primarily intended for self-assessment by countries, which are invited to manage the application of these indicators with the use of reporting forms. Such forms for reporting under each SEIS phase — initial development, implementation and sustainable operation — should be made available to the countries before the first reporting period. They should include a set of questions, tailored to the phase and its related actions, allowing the countries to prepare a concise but informative and precise report within a relatively short period of time and not requiring extensive national consultations.

61. The national review of performance for priority data and information flows both in national and international exchange could be done through the national coordination mechanism.

62. With regard to the performance of international priority data and information flows, these could be reviewed by an intergovernmental body, whose tasks could also include assistance in addressing challenges faced in SEIS implementation. The body could also have an advisory role regarding the international priority data and information to adjust them to the changing policy needs, as necessary.

63. The body, which should consist of the representatives of ECE member States, the governing bodies of the MEAs, intergovernmental bodies and other interested international organizations, should agree on the review of practice and be able to discuss emerging issues and exchange experience with regard to SEIS Content, Institutional cooperation and Infrastructure.

64. To this end, CEP may consider establishing an intergovernmental body or assigning this task to an existing body that would serve as a platform to review the progress achieved, consider the challenges faced, offer solutions to the challenges and report back to CEP and the governing bodies of the MEAs on the overall progress achieved.

65. Such an intergovernmental body could meet annually, e.g., each spring, to take stock and discuss the work carried out by countries during the preceding calendar year, i.e., a possible time period during which progress be measured. The outcome of the work could feed into the activities of other intergovernmental working groups (the Joint Task Force on Environmental Indicators, working groups of the MEAs) aiming to better assist the countries in improving their performance across the Monitoring-Data-Information-Assessment-Reporting (MDIAR) chain.

66. In accordance with the proposed deadlines for SEIS development for the international priority data and information flows, the review body should assess progress achieved under the implementation phase until 2021, by which date every pan-European country should establish SEIS for the international priority data and information flows. At the same time, since a number of international priority data flows should be fully enabled for use in possible regular reporting and assessments as of early 2016, the body should start evaluating SEIS effective operation for those flows starting from its meeting in 2016.

67. With the adoption of the SEIS targets and performance indicators and the establishment of the review body, the latter could meet for the first time in 2015 to review the progress in developing the initial priority flows as bound for the possible 2016 assessment (annex I). At its first meeting, the body could also agree on the priority data flows to be ensured for the 2018 and 2021 assessments (annex II) as well as discuss and

decide about the cut-off date for measuring the performance under phase 3 — SEIS sustainable operation.

68. Furthermore, the intergovernmental body could be given a mandate to design and provide, upon availability of funding from donors, hands-on assistance activities to meet the specific challenges countries may be facing, in particular during the SEIS implementation phase.

69. The meetings of the body, if established, should be serviced by the ECE secretariat. The work focused on initial screening of country reports and the rating of performance in the sustainable operation phase should be shared between the ECE secretariat and EEA accordingly. Adequate capacity within the ECE secretariat should be ensured for the SEIS functions.

70. The review of national performance on SEIS should be considered as a future part of the Environmental Performance Review (EPR) process for countries of Eastern and South-Eastern Europe, the Caucasus and Central Asia. In agreement with the Organization for Economic Cooperation and Development (OECD), this proposal can be also reflected in the future in the OECD EPRs process.

F. Issues for consideration

71. The following issues are proposed for consideration by CEP:

(a) Is the proposed framework for measuring the progress on SEIS sufficient to ensure that SEIS is gradually developed until 2021 across the pan-European region?;

(b) What are the most efficient and feasible modalities to manage and review the progress in developing SEIS across the pan-European region?;

(c) What role should the ECE secretariat play in managing and reviewing progress in developing SEIS?

Annex I

International priority data flows proposed for implementation in 2015 in order to be ready for use for possible pan-European assessment cycle in 2016

<i>Thematic area</i>	<i>No.</i>	<i>Priority data flows proposed for implementation in 2015</i>
Air pollution and ozone depletion	1	Emissions of sulphur expressed in sulphur dioxide (total, stationary and mobile sources)
	2	Emissions of nitrogen oxides expressed in nitrogen dioxide (total, stationary and mobile sources)
	3	Emissions of non-methane volatile organic compounds (NMVOCs) (total, stationary and mobile sources)
	4	Emissions of ammonia (total, stationary and mobile sources)
	5	Emissions of carbon monoxide (total, stationary and mobile sources)
	6	Emissions of lead (total, stationary and mobile sources)
	7	Emissions of cadmium (total, stationary and mobile sources)
	8	Emissions of mercury (total, stationary and mobile sources)
	9	Emissions of polycyclic aromatic hydrocarbon (PAH) (total, stationary and mobile sources)
	10	Emissions of polychlorinated biphenyl (PCB) (total, stationary and mobile sources)
	11	Emissions of polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran (PCDD/F) (total, stationary and mobile sources)
	12	Annual average concentration of sulphur dioxide in capital city/another major city
	13	Annual average concentration of nitrogen dioxide in capital city
	14	Annual average concentration of ground-level ozone in capital city
	15	Total ozone depleting potential (ODP) of chlorofluorocarbons (CFCs)
	16	Total ODP of Halons
	17	Total ODP of other fully halogenated CFCs
	18	Total ODP of carbon tetrachloride
	19	Total ODP of 1,1,1-trichloroethane
	20	Total ODP of hydrochlorofluorocarbons (HCFCs)
	21	Total ODP of methyl bromide

<i>Thematic area</i>	<i>No.</i>	<i>Priority data flows proposed for implementation in 2015</i>
Climate change	1	Average annual deviation from the long-term average temperature
	2	Annual deviation from the long-term average precipitation
	3	Aggregated GHG emissions including emissions/removals from LULUCF
	4	Aggregated GHG emissions by energy, industrial processes, solvent and other product use, agriculture, land use and forestry, waste
Water	1	Renewable freshwater resources
	2	Total freshwater abstraction
	3	Freshwater abstraction by water supply industry, households, agriculture forestry and fishing, manufacturing, electric industry, other economic activities
	4	Water exploitation index
	5	Total water available
	6	Total water use
	7	Losses of water during transport
	8	Water use by households, agriculture forestry and fishing of which irrigation, manufacturing, electric industry, other economic activities
	9	Mean concentration of BOD in a major river
	10	Mean concentration of BOD in a second major river
	11	Mean concentration of ammonium in a major river
	12	Mean concentration of ammonium in a second major river
	13	Mean concentration of phosphates in a major river
	14	Mean concentration of phosphates in a second major river
	15	Mean concentration of nitrates in a major river
	16	Mean concentration of nitrates in a second major river
	17	Mean concentration of total phosphorus in a major lake
	18	Mean concentration of nitrates in a major lake
	19	Mean concentration of nitrates in groundwater
Biodiversity	1	Total areas under protection (International Union for Conservation of Nature (IUCN) categories)
	2	Total forest area
Land and soil	1	Total land uptake

<i>Thematic area</i>	<i>No.</i>	<i>Priority data flows proposed for implementation in 2015</i>
Agriculture	1	Agricultural area
	2	Total consumption of mineral fertilizers
	3	Area treated with mineral fertilizers
	4	Consumption of organic fertilizers
	5	Area treated with organic fertilizers
	6	Total consumption of pesticides
	7	Area treated with pesticides
Energy	1	Total final energy consumption
	2	Final energy consumption by category (industry, transport, households, commercial and public services, agriculture forestry and fishery, non-specified, non-energy use)
	3	Total energy consumption (production, export, import, bins, stock changes)
	4	Energy intensity (final energy consumption/ total energy consumption)
Transport	1	Total passenger transport demand
	2	Total freight transport demand
Waste	1	Total waste generation
	2	Waste generation by source (agriculture forestry and fishery; mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; construction; other economic activities; households)

Annex II

International priority data flows proposed for gradual implementation until 2021⁹

<i>Thematic area</i>	<i>No.</i>	<i>Priority data flows for implementation until 2021</i>
Air pollution and ozone depletion	22	Emissions of total suspended particles (TSP) (total, stationary and mobile sources)
	23	Emissions of PM ₁₀ (total, stationary and mobile sources)
	24	Emissions of PM _{2.5} (total, stationary and mobile sources)
	25	Annual average concentration of sulphur dioxide in five other major cities
	26	Annual average concentration of nitrogen dioxide in five other major cities
	27	Annual average concentration of PM ₁₀ in capital city and in five other major cities
	28	Annual average concentration of ground-level ozone in five other major cities
	Water	20
21		Population using self-water supply (surface water or groundwater)
22		Population connected to a wastewater collecting system (with and without treatment facilities)
23		Total reuse of freshwater
24		Reuse of freshwater by sector (agriculture forestry and fishing, manufacturing, other economic activities)
25		Drinking water quality from water supply industry
26		Drinking water quality from decentralized water supply (open reservoirs)
27		Drinking water quality from groundwater — springs, wells
28		Mean concentration of BOD in third major river
29		Mean concentration of ammonium in third major river
30		Mean concentration of phosphates in third major river
31		Mean concentration of nitrates in third major river
32		Mean concentration of total phosphorus in a second major lake

⁹ As the priority data flows per area in annex II build upon those identified in annex I, the numbering of the data flows per area is linked.

<i>Thematic area</i>	<i>No.</i>	<i>Priority data flows for implementation until 2021</i>
	33	Mean concentration of nitrates in a second major lake
	34	Mean concentration of phosphates in costal sea water
	35	Mean concentration of nitrates in costal sea water
	36	Mean concentration of ammonium nitrogen in seawater
	37	Mean concentration of dissolved oxygen in seawater
	38	Mean concentration of oil hydrocarbons in seawater
	39	Mean concentration of chlorinated pesticides in sediments
	40	Mean concentration of oil hydrocarbons in sediments
	41	Wastewater treated in urban wastewater treatment plants (primary, secondary, tertiary)
	42	Wastewater treated in independent treatment facilities
	43	Wastewater treated in other treatment plants (primary, secondary, tertiary)
	44	Wastewater discharged
	45	Non-treated/not adequately treated wastewater
	46	Number of incidents of infectious diseases potentially related to water
	47	Number of outbreaks for a number of infectious diseases potentially related to water
Biodiversity	3	Natural forest
	4	Planted forest
	5	Forest area designated for production
	6	Forest area designated for protection of soil, water and ecosystem services
	7	Forest area protected and designated for the conservation of biodiversity
	8	Number of species protected — vascular plants
	9	Number of species threatened — vascular plants
	10	Number of species protected — mosses
	11	Number of species threatened — mosses
	12	Number of species protected — lichens
	13	Number of species threatened — lichens
	14	Number of species protected — fungi
	15	Number of species threatened — fungi
	16	Number of species protected — algae

<i>Thematic area</i>	<i>No.</i>	<i>Priority data flows for implementation until 2021</i>
	17	Number of species threatened — algae
	18	Number of species protected — invertebrates
	19	Number of species threatened — invertebrates
	20	Number and distribution of selected species — Keystone species — characteristic species for country
	21	Number and distribution of selected species — Flagship species — characteristic species for country
	22	Number and distribution of selected species — Endemic species — characteristic species for country
	23	Number and distribution of selected species — Other species — characteristic species for country
Land and soil	2	Land uptake by mining and quarrying, construction, manufacturing, technical infrastructure, transport and storage infrastructure, residential including recreational, landfills waste dumps tailing pits
	3	Total area affected by water erosion
	4	Area by degree of water erosion (extreme, strong, moderate, light, no effect)
	5	Total area affected by wind erosion
	6	Area by degree of wind erosion (extreme, strong, moderate, light, no effect)
	7	Number of soil contaminated sites by size and degree of contamination
Energy	5	Total renewable energy consumption
	6	Renewable energy consumption by hydropower, biomass, biofuels, wind, solar, geothermal, other
Transport	3	Passenger transport demand by mode (road, railway, inland waterways, maritime, domestic aviation, underground)
	4	Freight transport demand per mode (road, railway, inland waterways, maritime, domestic aviation)
	5	Composition of road passenger cars fleet (gasoline, diesel, gas, electricity, biofuels, other)
	6	Composition of road motor coaches and buses fleet (gasoline, diesel, gas, electricity, biofuels, other)
	7	Composition of road motor trolleybuses fleet (gasoline, diesel, gas, electricity, biofuels, other)
	8	Composition of road motor trucks fleet (gasoline, diesel, gas, electricity, biofuels, other)
	9	Composition of road tractors fleet (gasoline, diesel, gas, electricity, biofuels, other)

<i>Thematic area</i>	<i>No. Priority data flows for implementation until 2021</i>
	10 Age of road passenger cars fleet (<2 years, <5 years, <10 years>)
	11 Age of road motor coaches and buses fleet (<2 years, <5 years, <10 years>)
	12 Age of road trolleybuses cars fleet (<2 years, <5 years, <10 years>)
	13 Age of road trucks fleet (<2 years, <5 years, <10 years>)
	14 Age of road tractors fleet (<2 years, <5 years, <10 years>)
Waste	3 Hazardous waste generated
	4 Hazardous waste imported
	5 Hazardous waste exported
	6 Total hazardous waste treated or disposed
	7 Hazardous waste treated or disposed of which recycling, incineration, landfilling, other disposal
	8 Stock of hazardous waste
	9 Total municipal waste managed
	10 Municipal waste managed through reuse and recycling, composting, incineration (with and without energy recovery) landfilling on controlled/non-controlled site, other disposal
	11 Total industrial waste managed
	12 Industrial waste managed through recycling, composting, incineration (with and without energy recovery) landfilling on controlled/non-controlled site, other disposal