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Measuring circular economy

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Addendum

Results of the consultation on the Joint UNECE/OECD Guidelines for Measuring Circular Economy (Part A): Conceptual Framework, Statistical Framework and Indicators

Prepared by the Secretariat

Summary

This document summarizes the comments by members of the Conference of European Statisticians on the *Joint UNECE/OECD Guidelines for Measuring Circular Economy (Part A): Conceptual Framework, Statistical Framework and Indicators* (ECE/CES/2023/3). The Secretariat carried out an electronic consultation in April – May 2023.

A total of 41 replies to the consultation were received. There was strong support to the endorsement of the Guidelines, subject to the amendments resulting from the consultation which are explained in this note.

In view of the support received, the Conference is invited to endorse the *Joint UNECE/OECD Guidelines for Measuring Circular Economy (Part A): Conceptual Framework, Statistical Framework and Indicators* (ECE/CES/2023/3), subject to amendments presented in this note. The Conference is also invited to express views on possible further work for developing practical guidance.



I. Introduction

1. The present document summarizes the comments by members of the Conference of European Statisticians (CES) on the *Joint UNECE/OECD Guidelines for Measuring Circular Economy (Part A): Conceptual Framework, Statistical Framework and Indicators*.
2. The document was prepared by a Task Force (chaired by Finland) in close collaboration with the OECD Expert Group on a new generation of information for a Resource Efficient and Circular Economy (RECE-XG).
3. The main objective of the Task Force is to draft practical guidelines for measuring circular economy, including:
 - (a) Definition of the measurement scope;
 - (b) Clarification of key terms and definitions;
 - (c) Identifying key statistics and indicators needed from the policy point of view;
 - (d) Identifying data sources for measuring circular economy, with particular attention on SEEA and FDES;
 - (e) Describing the required institutional collaboration.
4. The Task Force was also asked to contribute to and coordinate with related work of other international organisations, and to provide a platform for exchange of experience and knowledge.
5. Since the beginning the Task Force has been collaborating closely with the OECD Expert Group on a new generation of information for a Resource Efficient and Circular Economy (RECE-XG). One of the objectives of the RECE-XG is to develop a harmonised framework and indicators for monitoring progress, and provide guidance on how to produce, use and communicate circular economy information. Therefore, both groups decided to join forces and to draft “Joint UNECE/OECD Guidelines for Measuring Circular Economy”.
6. The groups decided to split the work into the following two parts:
 - (a) Part A: Discussing the conceptual framework, indicators and measurement issues;
 - (b) Part B: Practical guidance on data sources and on using indicators, the required institutional collaboration, and more case examples.
7. The present document refers to Part A, and the feedback of CES on that part is crucial for the development of Part B.
8. In February 2023, the CES Bureau reviewed Part A and decided that the document can be sent for an electronic consultation to all CES members before the 2023 CES plenary session. The CES Bureau also extended the Terms of Reference of the Task Force until 2025, which will allow for drafting Part B.
9. Section II summarises the outcome of the consultation which was carried out in April and May 2023. Section III provides a brief overview of the general comments received. Section IV summarises the comments and amendments on specific sections of the Framework, and section V presents a proposal to the Conference.

II. Summary of feedback

10. The following 41 countries responded to the consultation: Albania, Australia, Austria, Belarus, Belgium, Bosnia and Herzegovina, Canada, Chile, Costa Rica, Denmark, Ecuador, Estonia, Finland, France, Georgia, Germany, Hungary, Ireland, Italy, Japan, Kazakhstan, Latvia, Lithuania, Mexico, Montenegro, Netherlands, New Zealand, Norway, Poland, Republic of Moldova, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye, Ukraine, United Kingdom and the United States.

11. Thirty-eight of the responding countries explicitly considered the document ready for endorsement, subject to incorporation of the comments made in the consultation. Australia, Ecuador and United States had some concerns. These were discussed with the country experts and the Task Force, and a solution was found to address the concerns so that these countries also support the endorsement.

12. The Task Force thanks all countries that provided feedback.

III. General comments

13. Many countries expressed their appreciation for the efforts on this well-structured, complete, and useful framework. For example:

(a) **Canada:** “The document is comprehensive and includes important information that will help guide organizations in the measurement of the circular economy.”

(b) **Chile:** “The document is very complete. It provides a fairly clear conceptual framework on the circular economy, in addition to considering and including international statistical frameworks and classifiers, which support a consistent methodology. The provision of the set of indicators is appreciated, they provide a basis that will allow the circular economy to be measured...”

(c) **Estonia:** “Good, in depth and well elaborated material.”

(d) **France:** “These guidelines are especially interesting and very well documented”.

(e) **Germany:** “We appreciate that the guidelines provide a broad conceptual framework on measuring the circular economy that substantially builds on relevant existing standards such as the SEEA and at the same time allows for flexibility to take into account different national circumstances and priorities.

(f) **Ireland:** “This is a very comprehensive paper on the circular economy. The working definition of a circular economy provided in the paper is very useful as a definition has been missing...”

(g) **Italy:** “Overall well-balanced and complete, the document tackles almost all relevant aspects and clarifies/unifies/organises the huge amount of already available materials”

(h) **Lithuania:** “We appreciate the work done by the Task Force on Measuring Circular Economy. The document is well prepared, comprehensive and clear.”

(i) **Mexico:** “These materials show significant progress in the conceptualization of the circular economy, and the routes to implement substantive aspects of economic circularity. They are also a good exercise for integrating and taking advantage of previous experiences and conceptual frameworks, such as the SNA and the SEEA-CF.”

(j) **Norway:** “The guidelines are quite detailed and well-written. It addresses a range of topics within the framework, which are useful for many individuals working in this field. It will be a valuable tool for both beginners and experienced professionals involved in physical environmental accounts and circular economy indicators. Thanks to the experts who have contributed to this work.”

(k) **Switzerland:** “The Guidelines are well structured and balanced, concise, clear and understandable. We consider the Guidelines an excellent foundation for the implementation of the statistical measurement of the circular economy.”

(l) **Slovenia:** “A very well structured document that provides a lot of additional information regarding the circular economy and its monitoring. It will certainly help in the further development of this area in our office.”

14. Important feedback concerning the further improvement of the document include the following:

(a) **Australia** and the **United States** mentioned that the Guidelines as currently formulated do not display the technical precision needed for a statistical framework. Some terms are defined in a manner that could be misleading and require more clarity.

(b) **Germany** stated that the implementation of the framework would require a meaningful effort of the statistical community and is expected to be limited by data availability. As for now, many of the proposed indicators are not yet readily available for most countries as manifold challenges remain to be addressed before the statistical community may generate the proposed information. Above all, many crucial data and classification gaps related to various aspects of circular economy need to be closed so that meaningful indicators can be compiled.”

(c) **Ireland** proposed that clearer links between this document and existing relevant statistical frameworks should be made further, such as SEEA Ecosystem Accounting. National statistical offices should take the leading role of measuring the circular economy. **Switzerland** has this proposal as well, stating that much work is still needed to fill the important gaps identified. The links with statistical definitions and classifications, the SNA and the SEEA-CF are considered particularly important. It could be interesting to also specify the links with other existing frameworks, like Green Growth or Resource Efficiency, and the added value of this one compared to the others (on the basis that because of the many existing gaps, the indicators that can currently be used are largely the same in these different systems)”

(d) **Italy** found the focus of this document to be too much on products. Some "processes that might lead to lower rates of natural resource extraction and use, and to lower negative environmental impacts" are connected to recognition of the role and importance of non-products. It is suggested to also highlight the flows of so called "unused" materials extracted from the environment, not embodied in products (reference made to Eurostat's MFA methodological guide of 2001 and volume II of OECD's MF&RP 2008 guide). It is also suggested to include a discussion on how certain material cycles (such as that of carbon) can be partly closed by/through nature itself (e.g. by considering a "nature-based solution" as an additional "R"). That would link to the Ecosystem Services concept and the recognition of non-products as valuable per se.

(e) **Mexico** recommended a continuous review and updating mechanisms in the further round of reviewing, because international experiences can provide wide range and inclusive feedbacks on the conceptual, methodological and progress indicators, as well as ways to harmonize with and incorporate elements from other relevant frameworks and processes.

(f) **Romania** stated that there should be more connection with quantitative estimates within national accounts. There are few or no connections with statistical indicators or with the input-output tables / supply-uses tables. Most of these concepts will be implemented in the new SNA 2025 - Sustainability and Wellbeing pillars, but adapted to the national accounts methodology.

(g) **Sweden** was asking for more information on the implementation of the indicators. It was also recommended to discuss the highly relevant question “Are we on the whole as a nation becoming more circular or not?”.

15. Other general comments or additions are listed as below:

(a) **Australia** asked for clarification whether the proposed list of indicators for European countries only or of global relevance (e.g. foreseen for endorsement by the UN Statistical Commission).

(b) **France** suggested to take into account other existing dashboards (UN, OECD, Eurostat), on the basis "one indicator, multiple uses", to maximise comparability.

(c) **Mexico** suggested creating in the medium or long term a virtual site (wiki), where the progress of the countries in the construction and updating of the indicators can be reviewed in an integrated and structured manner, in such a way that the rest of the countries can take advantage of the experiences and good practices.

(d) **Poland** was of the opinion that some parts of document still need some reflections, updating and amendments, including the discussion of critical raw materials in circular economy in the light of current Communication from the Commission “A secure and sustainable supply of critical raw materials in support of the twin transition COM (2023) 165 final”, the list of indicators and the glossary of terms.

Action by the Task Force:

16. Looking at the comments in total and taking into account bilateral discussions with representatives of Australia and the United States who initially did not support endorsement by CES, the following actions will be taken to increase the overall clarity of the document:

(a) The introduction will recall the main objective of the task force and which parts will be covered in Part A and/or Part B of the document. The main objective of the Task Force, according to its Terms of Reference is to *draft practical guidelines for measuring circular economy, including:*

- i. *Definition of the measurement scope (Part A)*
- ii. *Clarification of key terms and definitions (Part A)*
- iii. *Identifying key statistics and indicators needed from the policy point of view (Part A: Indicators, Part B: Statistics)*
- iv. *Identifying data sources for measuring circular economy, with particular attention on SEEA and FDES (Part A on general level, Part B more in detail)*
- v. *Describing the required institutional collaboration (Part B).*

(b) It will be explained in the appropriate chapters that this document provides perspectives on the conceptual understanding of a circular economy from both the policy and monitoring point of view and the measurement point of view. It will be mentioned that further refinement of this document is needed once there is more experience available in countries and by international organizations in applying these guidelines and its proposed indicators, for example after a period of 3 years.

(c) It will furthermore be clarified that Part B is planned to help NSOs to better understand which elements of the conceptual framework and which of the proposed indicators fall in their responsibility. Part B will also provide a detailed discussion of indicator methodologies, the needed data sources, partnerships, etc.

17. Chapter 5 (Indicators) will be moved right after chapter 3 (Circular economy concept) to make it better understandable that those chapters are closely linked. Furthermore, a paragraph will be added stating that this initial list of indicators requires a regular review to better reflect the evolving information needs, data availability and countries practices.

18. Current chapter 4 (Statistical Framework) will be renamed to “Measurement issues and links to other frameworks” to consider the concerns of some countries that elements of a statistical framework are missing here.

IV. Comments and amendments on specific sections of the document

A. Executive Summary

19. Many respondents, e.g. Canada, Denmark, Serbia, Slovenia and Spain were of the opinion that the Executive Summary is good and synthesizes well the main aspects of the Guidelines.

20. Some respondents had suggestions for further improvement of the text:

(a) Clarify the target audience, whether the document also could be useful for companies (because it also refers to micro-level measurements). (Ecuador)

(b) Stronger reference (also in other parts of the document) should be made to national accounts and statistical quantitative indicators and their impact on GDP. It is expected that the future work will make a clear distinction between SNA and SEEA and explain the role of circular economy on national accounts. (Romania)

(c) Some editorial comments. E.g. Poland commented that the number of indicators mentioned in the Executive Summary does not match with the list of indicators in Table 6.

Action by the Task Force:

21. The Executive summary will be reviewed considering the comments made by Ecuador, Poland and Romania. Furthermore, a paragraph on the target audience will be added.

B. Chapter 1. Introduction

22. Canada, Chile, Denmark, Mexico and Serbia expressed their satisfaction with the chapter.

23. Ecuador and Mexico suggested to review the target audiences in the following ways:

(a) Clarify whether the document is relevant for companies (Ecuador);

(b) One could consider clarifying the target audiences of the individual chapters or sections. (Mexico).

24. Spain mentioned the importance of Part B, which has to be carefully reviewed once it is available. The importance to define and calculate coincident indicators in other strategies (sustainable development, climate change, green deal,...) in the same way was stressed.

Action by the Task Force:

25. A clarification on the target audiences of the document will be added.

26. The description of how Part A and Part B relate with each other will be improved.

27. A paragraph will be added discussing the need for a regular review and update of the document, including its list of proposed indicators.

C. Chapter 2. Policy background

28. Several respondents stated that the chapter looks good and is written clearly (Canada, Chile, Denmark, Hungary, Mexico, Serbia and United Kingdom).

29. Some suggestions were made to improve the text:

(a) More clarity is needed about the goals, how to seek these goals, and the key players in policy. (Australia);

(b) The 9-Rs could be aligned with where National Statistical Organisation are likely playing a significant role versus any qualitative information. (Australia);

(c) A section providing a more in-depth vision of the different situations that arise in some countries that are applying Circular Economy policies could be added. (Chile);

(d) The importance of Circular Economy policies at regional and local levels (Denmark) as well as the responsibility of the state (Ecuador) could be mentioned;

(e) The internal contradiction that environmental improvement does not only mean economically viable solutions but may also include negative economic impacts by reduction of consumption and production, should be discussed. (Hungary);

(f) A few examples could be useful to showcase the importance of information to support CE policies nationally and internationally, e.g. at the EU level in the areas of green economy, zero waste economy and SDG policy. (Ireland and Poland);

(g) It was proposed to rephrase paragraph 10 to make it more explicit what the requirements and ways of setting the mentioned limits are. (Mexico).

Action by the Task Force:

30. The Task Force will review the chapter to take into account the comments and suggestions by respondents.

31. Practical examples will be added.

D. Chapter 3. The circular economy concept and the headline definition of a circular economy

32. Several countries mentioned that the concept and the headline definition are clear, including Australia, Canada, Denmark, Hungary, Mexico, Serbia and the United Kingdom.

33. Ecuador believed the chapter is very general and does not consider the different types of waste management required, for example on management of WEEE or plastics.

34. United States was concerned on how “technical” and “biological” materials are being defined. In particular, the assertion that biological materials can “safely flow back to the environment where they can biodegrade” was considered as untrue of many biological materials. For example, runoff from fields fertilized with manure can contribute to algal blooms (which are harmful to aquatic environments) and biodegradation/decomposition of organic waste produces methane, a potent greenhouse gas. It was also mentioned, that with respect to the proposed dichotomy between biological and technical, the line between biological and technical blurs when considering biofuels, bioplastics, etc.

35. The following suggestions were made for improving the chapter and its clarity:

(a) Substitution of sustainable renewable materials (biomass) for non-renewables may also be considered a CE strategy. This is related to the transition towards a bio-based economy. It was recommended to specify the role this kind of substitution takes within these guidelines. (Netherlands);

(b) It should be made clear whether supply security of critical resources is a circular economy policy target. (Netherlands);

(c) Paragraph 33: Use the same themes as used in chapter 3.2 (closing, slowing and narrowing the loop) (Netherlands);

(d) Paragraph 34, bullet 1: A short text could be added to the footnote that explains there is difference between bio-based plastics and bio-degradable plastics (Canada);

(e) There could be more about the scope of circular economy as regards activities and employment. For instance, whether it includes all kinds of repair activities (even with harmful products), or about the use of public transportation depending on the type of use (permanent or one-off). (France);

(f) “Prevention” could be added to the section discussing the measures (Hungary);

(g) One could mention that the definition may be subject to modifications as a response to the adoption of technological, social, and cultural changes, affecting the use of materials or the economic dynamics. (Mexico);

(h) In future revisions one could add some criteria for the implementation of the R’s to guarantee an effective match with the Circular Economy approach. (Mexico);

(i) Regarding the component of the definition “value of materials”, it is not entirely clear what exactly this characteristic implies. It is suggested continuing work on economic valuation schemes for materials, considering that, although the SEEA itself makes recommendations on valuation, they are not yet considered as part of the statistical standard endorsed by the UN Statistical Commission in 2021. (Mexico);

(j) Regarding the component of the definition “Minimize the input of materials and their consumption” (in the qualitative dimension), it was considered it as important to

develop a classifier on the so-called “materials that are potentially harmful to the environment or whose production and consumption processes have negative environmental impacts”, or make some reference that allows the homogeneous development of the indicators by countries. (Mexico).

Action by the Task Force:

36. The chapter will be reviewed, considering all comments and suggestions made by respondents.

37. To address the specific comments by the United States there will be a more detailed discussion on biomaterials, biological materials etc., including a statement that these materials indeed can be harmful to the environment. It also will be mentioned with respect to the proposed dichotomy between biological and technical, the line between biological and technical blurs when considering biofuels, bioplastics, etc. This will also take into account the specific comments made by the Netherlands concerning the transition towards a bio-based economy.

E. Chapter 4. The statistical framework

38. Several countries expressed their support to the content and structure of the session, including Canada, Denmark, Lithuania, Poland, Serbia, Spain and the United Kingdom.

39. On the other hand, Australia believed this chapter has the hallmarks of a reporting framework, but important elements of a statistical framework are missing.

40. The following proposals were made for further expanding the chapter and improving its clarity:

(a) Section 4.3.2.1: Canada uses the North American classifications for both industries and products: NAICS and NAPCS (Canada);

(b) Section 4.3.2.2: It could make sense to include also material-specific MFAs here in addition to EW-MFAs as a recommendation. (Canada);

(c) Incorporate a summary table containing a comparison between the different sources of information at the end of the subchapter on key terms and definitions. (Chile);

(d) Further descriptions of the alignment of the mentioned accounting frameworks with such frameworks as SEEA-EA could be given, and descriptions as to the potential links and dependencies between it and CE. For example, a reduction in inputs as a result of CE policies could result in a reduced requirement for services from ecosystems, further resulting in improvement in the condition of such ecosystems. (Ireland);

(e) Even if the links with SNA and SEEA-CF/SEEA-EA are adequately described, the bridges with the United Nations Framework for Development of Environment Statistics (FDES) remain unclear. (Mexico);

(f) Paragraph 163 on water: It was suggested to mentioning the reasons for excluding water from the classification (Mexico). United States was of the opinion, that given the importance of water in drier areas, water should not be treated differently than other materials in this regard.

(g) It was suggested to develop a full example with the linkages amongst SNA, SEEA-CF, and SEEA-EA. Also, an example of a SUT in physical terms could be useful. (Mexico and Romania)

(h) More discussion of the role of SNA in various parts of the chapter could be useful. The SNA and the SEEA-CF are international statistical standards and are closely interlinked, but different. Also, the role of National Accounting teams and experts could be discussed. The SNA 2025 should be mentioned in the context of measuring a circular economy. (Romania)

(i) Definition of “by-products”: Slovenia mentioned that it is hard to imagine “by-products” in correlation with Services. The definition presented by Waste Framework

Directive 2008/98/EC is considered more suitable with the concept of circular economy. The United States wrote that a not mentioned important distinction is that the EU definition requires that the use of “by-products” cause no “overall adverse environmental or health impacts.” Verifying that would be burdensome for statisticians.

(j) Term “unused extraction” in section 4.4.2 should be discussed in more detail, because it is relevant and missing in the current Eurostat EW-MFA. (Switzerland)

(k) Terms “renewable” and “non-renewable”: They are not defined as complements of each other. The definition of renewable makes sense, but “renewable” is defined as a resource that is being replenished at least as fast as it is being depleted. By this definition, if timber is being over-harvested, it ceases to be a renewable resource (but also would not be a “non-renewable” resource, as defined here). This definition is considered unhelpful in two ways: first, adhering to it would require that statisticians track not only the flow of materials through the economy but also evaluate whether those materials were harvested sustainably; second, in transitioning to a circular economy it is critical to understand the set of materials which are renewable (capable of being renewed) and sustainable harvesting strategies for those resources, even if sustainable strategies are not currently being used. (United States)

(l) Similarly, to the definition of “by-product,” recycled or reused waste is only defined as becoming a product again if its use will not lead to “overall adverse environmental or human health impacts.” It is considered unfeasible to verify this in the case of all recycled or reused goods/materials.

41. Other comments and suggestions included the following:

(a) France suggested to add the opinion of the UNECE Task force on the works of Eurostat's task force on circular economy. Eurostat's works are described page 43, but no opinion is given. For instance, it would be interesting to have an opinion on excluded activities (organic agriculture, renewable energies, public transportation, energy management). If it is debatable whether the first three are in the scope of circular economy or not, but France believes that energy management must be included in circular economy.

(b) Poland suggested to move more definitions to chapter 3 where in the title the concept of definitions is mentioned, as the section on explanatory notes and definitions seems too extensive. Concerning paragraph 184 (secondary raw material) it was mentioned that data on some by-products which are materials from production process are covered by PRODCOM statistics, e.g. molasses, bran.

(c) Spain agreed on an approach by means of CPA but considered it convenient to also address this aspect in the revision of the classification of environmental activities, as such relationships are needed. It was mentioned that it will be difficult to obtain all the information from these accounts mentioned in section 4.5, especially regarding consumer behaviour, R&D activities, product designs, or product lifespan. It is expected that this will be discussed in more detail in Part B.

42. Canada and Mexico provided some editorial comments.

Action by the Task Force:

43. The chapter will be reviewed, taking into account all comments and suggestions made by respondents, including the suggestions made for Part B (see e.g. comment by Spain).

44. Taking into account the comment made by Australia, the chapter will be renamed to “Measurement issues and links to other frameworks” and in its introduction it will be mentioned that the measurement issues discussed here will help in the further development of a statistical framework. Reference to Part B will be made as well.

45. Concerning the role of (bulk) water in a circular economy, a specific section will be added on “the role of water in a circular economy”. This will address the related comments made by Mexico and the United States.

46. As suggested by the United States, the chapter will clarify that “renewable” does not automatically mean “sustainable”. It will be made clear that this quality dimension

(sustainable or not sustainable) is to be considered when measuring renewable materials. Part B of the guidelines will include a recommendation to distinguish between sustainable use of renewable materials and non-sustainable use of these materials (which could be different in different regions or countries).

47. It will be considered simplifying the definition of by-products (i.e. using the SNA definition, but stating that for CE purposes we look at goods) and explain that in the EU WFD this is defined slightly differently.

48. The explanation on how SNA, SEEA-CF, SEEA-EA and FDES are linked will be improved.

F. Chapter 5. Indicators for measuring circular economy

49. Some countries mentioned explicitly that the selection of the proposed indicators is suitable, including Canada, Serbia, Slovakia and the United Kingdom.

50. Several suggestions were made how the chapter and the list of indicators could be further improved:

(a) A sequential numbering scheme was proposed, and the need for a following document that covers metadata for these indicators was mentioned. (Australia);

(b) Some inconsistencies between tables 6 and 7 were noted. (Poland);

(c) Poland proposed that only those indicators that can be well measurable should be considered as “core indicators”. Spain suggested that core indicators should only be high relevance indicators;

(d) The indicators should be in line with the United Nations Framework for Environment Statistics. (Kazakhstan);

(e) A clarification on how the proposed indicator set relates to the Eurostat indicators on CE would be helpful. (Sweden);

(f) Some of the proposed indicators are not in the typical scope of a National Statistical Organisation. (Australia);

(g) A proposal to include a new indicator category as a part of the category Environmental quality implications: “The environmental impact from the green transition”. (Sweden);

(h) The question of planned obsolescence could be more thoroughly covered (Sweden);

(i) Only the core set of indicators should be included in this chapter, and the proposed list of indicators in table 7 would be better placed in chapter 6 (list of issues for further work). It might be better to select around 10 indicators and to try them out and to get countries to report on them. (Ireland);

(j) There is a need for a link to a management response for problems with achieving CE. With SEEA there are strong links to where policy can intervene and measured into the future to determine success. For instance, material productivity has two elements which can be used to control efficiency in the economy. Material productivity is derived from DMC (SEEA Physical supply use tables) and GVA (SNA)). Better representation of GVA could be from monetised flows based on PSUT to exclude financial flows where there is no material equivalent. With this example there would have sufficient information to intervene in physical flows (restriction, substitution) and monetary flows (taxation on products or physical inputs). (Australia);

(k) The main core indicators should relate material use or material input to suitable economic indicators (e.g. adequate components of GDP) in order to inform about the economy-wide productivity of material input and use. Aspects of this productivity are covered by the proposed indicator 1.2. on material consumption. It is suggested that another

productivity measure relating to the material inputs should be added to the indicator set. These productivity related indicators should constitute the main core indicators. (Germany);

(l) Use material intensity instead of material productivity because it may confuse the indicator with the Total Factor Productivity approach used in national accounting. (Australia);

(m) Indicators using “Share of...” are considered not a fit for purpose descriptor, it works for report writing. These indicators are suggested to refer to “Proportion of...” or “Percentage contribution to”. (Australia);

(n) Hazardous waste should refer to the Basel convention. (Australia).

(o) On the indicators on value added and employment it is suggested to expand the definition to also include repair services and second-hand markets as data availability progresses. (France)

(p) EGSS data could be utilised more to have broader perspective. (France)

(q) Indicators related to “improving the productivity of the use of materials at all stages of their life cycle”, should be complemented with decoupling indicators (Mexico).

(r) 1.1 Changes in natural resource stocks - Domestic extraction from natural stocks (renewable & non-renewable) (trends; mix): What will be the formula for calculating this indicator? (Poland)

(s) Intensity of use of forest resources (removals overgrowth): It is worth considering whether this indicator should be relative (%) so that the indicator is not affected by different local conditions (e.g. by the type-of-forest variable). (Poland)

(t) 2.1 Impacts on climate: It is worth considering if within this field we shouldn't include emission from deforestation / absorption connected with afforestation. (Poland)

(u) 2.4 Impacts on biodiversity: Is any special indicator regarding forest habitats included? There is information about 'land cover change', so is the loss of forest land included in this general indicator? Are any special indicators for the 'loss of forest' or the 'loss of non-cultivated forest'? (Poland)

(v) Indicator “Natural resource index/depletion ratios”: A discussion of the relation between the fact that mineral resources is needed for the green transition (the benefits of the minerals), but at the same time the extraction of these minerals entail environmental and social problems (e.g. conflict minerals). (Sweden)

(w) “Net addition to stocks” is considered with L for the measurability. This indicator is already collected (on a voluntary basis) by Eurostat within the EW-MFA questionnaire. It is suggested attributing to it at least M. (Switzerland)

(x) “Trade in secondary raw materials” is considered with H for the measurability. Material flows from recycling are currently not easily separable in foreign trade statistics, therefore there are doubts whether this should be categorized with H. (Switzerland)

51. Canada and Netherlands made some editorial comments.

Action by the Task Force:

52. All comments made by respondents will be taken into account, including suggestions on the presentation of the list of indicators (e.g. with consecutive numbers as proposed by Australia).

53. In the introduction to this chapter it will be mentioned that the list of recommended indicators requires continuous refinement to take into account countries' practices and changes in related policy questions. Furthermore, reference will be made to Part B which will discuss in more detail the uses of the indicators, the role of Official Statistics in producing them, data sources, etc.

G. Chapter 6. List of issues for further work

54. Several countries expressed their support for this list of issues, including Canada, Denmark, Lithuania and United Kingdom.

55. Additional issues that could be considered are the following:

(a) How does the territory vs. residence principle affects the statistical framework and the indicators for CE. For instance, processing abroad generates solid waste in other countries, which are not captured by the national waste statistics, and may be very difficult to estimate in practice. Should that be left for footprint estimations and in that case in which way? (Denmark);

(b) Add something aimed at how public administration could be included to raise awareness. (Ecuador);

(c) Regarding the slowing of the loop (reuse, refurbish etc.) it is becoming inevitable to make distinction in product and economic activity (eg. trade) statistics among secondary and primary products. This is important for being able to build up the “CE accounts”. (Hungary);

(d) The conversion of monetary terms to physical is also an issue in product for the future. (Hungary);

(e) The hidden flows of imports should be addressed as most problematic part of EW-MFA. (Hungary);

(f) Ireland pointed out that an important omission in the list of issues for further work is the absence of a material purchases survey. PRODCOM provides statistics on manufactured products but there is no equivalent survey on the input materials being used to manufacture these products. Such a survey is necessary to develop reliable physical Supply Use Tables and it could be used to quantify use of renewable and recycled materials.

56. Spain suggested to add a clear timeline for the next steps in the process, as well as any upcoming milestones or deliverables.

Action by the Task Force:

57. New suggestions made by respondents will be added to the list of proposed issues for further work.

58. This includes also the following proposals of the United States:

(a) Further work on developing internationally agreed terminology for biomaterials and related terms is needed.

(b) How to classify and measure extraction of renewable materials when this is done in an unsustainable manner?

(c) The discussion “secondary raw materials” versus “secondary materials” remains open, as this terminology is used differently in different frameworks.

H. Chapter 7. Glossary of terms

59. Canada, Denmark, Estonia, Hungary, Serbia, Spain and United Kingdom mentioned that the glossary of terms looks fine to them.

60. Comments on the following terms and their definitions were made:

(a) By-product: See comments by Slovenia and United States on chapter 4.

(b) Finite materials: Include in the "comments" column their relationship with the term “non-renewable resources”. (Mexico)

(c) Recycled: See comments by United States on chapter 4.

(d) Reused: See comments by United States on chapter 4.

(e) Renewable versus non-renewable: See comments by United States on chapter 4.

(f) Biological material versus technological material: See comments by United States on chapter 3.

(g) Secondary raw material: Is defined in a way that would include a second-hand TV in a thrift shop, which is likely not the intention. Also, as defined here, “secondary raw materials” is a superset of “secondary materials,” when it should instead be a subset, given that raw materials are a subset of materials. (United States)

61. Poland recommend providing the source of definitions of terms together with relevant internet links. Empty cells should be avoided. In the case when there are no external sources of definition, it could be indicated that this definition was elaborated by task force team.

62. United Kingdom said they were interested to see a glossary for “consumption” since this tends to be used in various ways.

63. Canada made some editorial comments.

Action by the Task Force:

64. Editorial suggestions made by respondents will be considered in the review of the chapter.

65. Updates of definitions or explanatory remarks as discussed earlier will be done. This includes the terms biomaterials, secondary raw materials, secondary materials and by-products.

I. Annex.

66. Canada and Poland proposed a few minor updates to references in Annex 1: Examples of selected definitions of a circular economy.

Action by the Task Force:

67. The Annexes will be updated as suggested by the respondents.

V. Proposal to the Conference

68. The Conference is invited to endorse the *Measuring Circular Economy (Part A): Conceptual Framework, Statistical Framework and Indicators*, subject to incorporation of the amendments by the Task Force listed above.

69. The Conference is also invited to express views on possible further work related to the measurement of circular economy.