

**For Official Use****English - Or. English****19 April 2021****COUNCIL****Council****REPORT ON THE IMPLEMENTATION OF THE OECD  
RECOMMENDATION ON RESOURCE PRODUCTIVITY****(Note by the Secretary-General)****JT03474969**

1. This document presents, in its Annex, the second report (hereafter the “Report”) by the Environment Policy Committee (EPOC), developed through its Working Parties on Environmental Information (WPEI) and Resource Productivity and Waste (WPRPW), on the implementation and dissemination of the Recommendation of the Council on Resource Productivity [[OECD/LEGAL/0358](#)] (hereafter, the “Recommendation”). The Report provides the results of the review of Adherents’ progress in the implementation and dissemination of the Recommendation since the first report in 2014 [[C\(2014\)148 and its CORR1](#)] (hereafter the “2014 Report”), as well as an assessment of its continued relevance and proposals to strengthen its impact in the future. The Report was approved by EPOC by written procedure on 31 March 2021 [[ENV/EPOC/WPRPW/WPEI\(2020\)1/REV2](#)].

## Background

2. The Council adopted the Recommendation on 28 March 2008 [[C\(2008\)40; C/M\(2008\)6/PROV](#)]. The Recommendation responds to the particular interest in resource productivity and sustainable materials management. The objective of the Recommendation is to support Adherents’<sup>1</sup> efforts to improve resource productivity considering the entire resource cycle, with a view to reducing negative effects on the environment, avoiding situations where valuable materials contained in waste are disposed of and ultimately lost for the economy, and preventing natural resource degradation. The focus is on the environmental management of natural resources and materials.

3. The Recommendation applies to both:

- The *knowledge and analytical capacity* concerning material flows and their environmental impacts that is needed to support resource productivity policies (first part of the Recommendation - I).
- The *policies and measures* that are needed to encourage environmentally effective and economically efficient uses of natural resources and materials to improve resource productivity (second part of the Recommendation - II).

4. In adopting the Recommendation, the Council instructed EPOC to report “on progress achieved in implementing this Recommendation, within five years of its adoption”. When it reviewed the 2014 Report, the Council invited EPOC to carry out further work to support the implementation of the Recommendation, continue monitoring its developments, and to report again to the Council by 2020.

## Methodology

5. The Report has been prepared jointly by the WPRPW and the WPEI. It builds on information from:

- A survey on the implementation of the Recommendation asking Adherents to assess the level of awareness, the degree of implementation, the usefulness and the continued relevance of the Recommendation.
- Contributions to two questionnaires distributed in December 2017: (i) on “Policy Instruments for Sustainable Materials Management (SMM), Resource Efficiency, and the Circular Economy”, and (ii) on “Objectives of SMM, Resource Efficiency and Circular Economy Policies”.

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<sup>1</sup> To date, all OECD Members are Adherents. There are no non-OECD Member Adherents. Brazil has requested to adhere to the Recommendation but the process has not yet been completed.

- Contributions to the 2018 OECD Burdens on the Economy of Environmental Policies (BEEP) questionnaire.
- Contributions to the WPEI's annual Round Table on Environmental Information.
- OECD country reviews, international sources (e.g. the EEA, UN Environment and the International Resource Panel), national sources and business associations.
- Work by EPOC to support the implementation of the Recommendation, most notably the OECD Resource Efficiency and Circular Economy work stream and its outputs (OECD RE-CIRCLE project), and work on indicators and measurement methodologies concerning material flows and resource productivity and its outputs.

## Process

6. The preparation of the Report was initiated in 2019. It included the following steps:
  - Distribution of the survey on the implementation of the Recommendation to the Delegates of the WPRPW and the WPEI in May 2019 [[ENV/EPOC/WPRPW/WPEI\(2019\)1](#)].
  - Discussion of preliminary findings by the WPEI on 21 November 2019 [[ENV/EPOC/WPRPW/WPEI\(2019\)2](#)].
  - Discussion of a first draft Report by the WPRPW on 4 February 2020 and subsequent written comments by the WPRPW and the WPEI [[ENV/EPOC/WPRPW/WPEI\(2020\)1](#)].
  - Discussion of expanded findings on the analysis of material flows by the WPRPW on 20 November 2020.
  - Submission of an expanded second draft Report to the Delegates of the WPRPW and the WPEI on 21 December 2020 for written comments and agreement to transmit a revised version to EPOC [[ENV/EPOC/WPRPW/WPEI\(2020\)1/REV1](#)].
  - Approval of the third draft Report to EPOC on 31 March 2021 [[ENV/EPOC/WPRPW/WPEI\(2020\)1/REV2](#)].
7. The Council is now invited to note and declassify the Report, as set out in the Annex. Thereafter, the Report will be made publicly available on the [online Compendium of OECD Legal Instruments](#), as well as on the relevant webpages of the OECD Environment Directorate.

## Dissemination

8. The Recommendation has been disseminated and promoted by EPOC and the Secretariat in several ways. A primary means of dissemination has been the preparation of country environmental performance reviews that regularly assess progress towards resource productivity and often have a special chapter on waste and materials management and the circular economy (OECD, 2020<sup>[1]</sup>). Country reviews are useful to bring the Recommendation to life and show how its principles can help advance integrated policies. The Secretariat is also supporting individual Adherents in preparing their Circular Economy Roadmap in line with the Recommendation. The Recommendation has been disseminated more widely through:

- A number of events and publications, most notably the OECD Resource Efficiency and Circular Economy work stream (RE-CIRCLE project). Notable events and

publications include country environmental performance reviews, sessions at past Green Growth and Sustainable Development (GGSD) Forums and other events and workshops, publications, such as the OECD Policy Guidance on Resource Efficiency (OECD, 2016<sup>[2]</sup>), the Global Materials Outlook to 2060 (OECD, 2019<sup>[3]</sup>), Updated Guidance on Extended Producer Responsibility (OECD, 2016<sup>[4]</sup>) and work on plastics (OECD, 2019<sup>[5]</sup>; OECD, 2019<sup>[6]</sup>; Watkins et al., 2019<sup>[7]</sup>; OECD, 2018<sup>[8]</sup>).

- OECD collaboration with other International Organisations and stakeholders, including, but not limited to, the International Resource Panel (IRP), the United Nations Economic Commission for Europe (UNECE), the United Nations (UN) Environment, the World Circular Economy Forum and the World Economic Forum.
- Smaller-scale events such as Roundtable discussions at meetings of relevant OECD bodies; events and missions related to environmental performance reviews; expert meetings; and through the OECD's new interactive website Environment at a Glance (OECD, 2020<sup>[9]</sup>).

9. At country level, Adherents show some engagement in disseminating the Recommendation (e.g. through media channels and publications) and promoting it (e.g. through legislative and fiscal measures; through inclusion of its principles in national plans and strategies; through events with industry and other stakeholders). However, the Recommendation itself is rarely mentioned or acknowledged. Adherents that are member states of the European Union (EU) for example tend to rather make reference to EU directives and policy packages that provide further detail and guide national policies. Hence, the awareness of the Recommendation as an OECD brand is low in many Adherents, but awareness of the content of the Recommendation and its provisions is high.

10. Overall, there remains scope to strengthen dissemination efforts, as a means to:

- Involve all relevant stakeholders in policies and actions to improve resource productivity and reduce negative environmental impacts of material and product use throughout their entire life-cycles.
- Share OECD guidance<sup>2</sup> and experience on the measurement and analysis of material flows and resource productivity with all relevant stakeholders.
- Encourage co-operation with non-Adherents to strengthen their capacity for analysing material flows and the associated environmental impact, and for developing and implementing policies concerning the improvement of resource productivity. Such efforts to align with the Recommendation could lead to their adherence in line with the relevant OECD process.
- Share the content of the Recommendation and related guidance with OECD bodies outside the EPOC community (e.g. industry and innovation, technological policy, digital economy, agriculture, economic policy, investment).

11. In-country dissemination could be facilitated by providing national translations of the Recommendation, and by making greater use of social media to inform about trends and progress made.

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<sup>2</sup> This includes for example the OECD Guide on Measuring Material Flows and Resource Productivity, <https://www.oecd.org/environment/indicators-modelling-outlooks/MFA-Guide.pdf> .

## Summary and conclusions

12. Thirteen years after the adoption of the Recommendation and six years after the first assessment of progress, resource productivity issues continue to receive significant policy attention. All Adherents have taken actions to improve resource productivity and reduce negative environmental impacts of material and product use, and important advances have been made as regards knowledge and analysis of material flows and resource productivity. However, the policy measures implemented so far have not yet produced the expected results in terms of improvements in resource productivity and reductions in the environmental impacts of material and product use, and important knowledge gaps remain.

### ***Information, scientific knowledge and analysis of material flows and resource productivity (first part of the Recommendation - I)***

13. The analysis of material flows and their associated environmental impacts is seen as a solid foundation for designing policies and interventions that generate environmental improvements. Most Adherents are taking measures to improve the information base and measurement systems, albeit at varying degrees and with different objectives. Macro-level material flow accounts (EW-MFA) and overview indicators are increasingly produced and updated on a regular basis. More data have become available on material use by industry, flows of individual materials and products, and natural resource stocks. Scientific knowledge of the environmental impacts of material flows is progressing thanks to greater use of life-cycle based approaches, environmentally extended Input Output models and footprint methodologies in research and analysis. Recent years have also seen promising initiatives to develop indicator frameworks for a circular economy.

14. Still, Adherents need to make additional efforts to fully implement the Recommendation and to consolidate the progress made. The provisions I.1 to I.4 on the analysis of material flows and their environmental impacts are perceived as being ambitious and more time is required to fully implement them.

15. Though nuanced, the messages arising from this second assessment are thus similar to those arising from the first assessment (2014 Report). The information available is not yet sufficient to effectively support natural resource and materials management, and resource productivity and circular economy policies. Many advances made in recent years do not benefit the establishment of international databases and there are still data and knowledge gaps across countries, sectors and material types that make it difficult to get the full picture of materials use and related environmental impacts. Methodological differences also remain, for example concerning the calculation of demand-based raw material consumption indicators. The Recommendation's call to improve measurement systems beyond economy-wide systems, and to improve capacity for analysis in this area is still valid and could help fill those gaps in future.

- The development of compatible material flow accounts and work to improve the quality of data on material flows and to establish international databases need to be pursued and consolidated beyond economy-wide material flows, as does work on industry-level and material-specific information that helps identify opportunities for improved performance along the supply chains.
- More effort is needed to advance the development of compatible international data on (i) material flows within the economy and across economic activity sectors, (ii) flows that are important to a circular economy and the 3Rs (Reduce, Reuse, Recycle), including secondary raw materials and waste and their physical trade flows, (iii) flows of key materials and substances that are of economic and environmental

importance (e.g. plastics; food; critical metals, electric and electronic goods), (iv) the different processing levels of the materials (raw materials, semi-finished products, finished products), and (v) the size, value and availability of materials from urban mines.

- More work is needed to further improve knowledge on the environmental impacts and costs of material resource use throughout the life-cycle of materials, and to produce related data and indicators on a regular basis to enable wider use in decision-making.
- More work is also needed to build robust and internationally comparable indicators on circular flows of materials and products, indicators that link resource stocks to material flows, and indicators that link material flows to waste flows.

16. Among other issues that need to be better studied, and already mentioned in the 2014 Report, are (i) the economic and fiscal instruments in use to improve resource productivity; (ii) the way particular material flows interact with commodity prices and recycling markets, and how they relate to natural resource stocks, resource rents and supply security, and to innovation and competitiveness; and (iii) the socio-economic and environmental opportunities provided by improved resource productivity, sustainable materials management and circular business models. There is also still room for better using the information and indicators available for the purpose of policy planning and for target setting.

***Policies and actions to improve resource productivity (second part of the Recommendation - II)***

17. Since the 2014 Report, significant efforts have been made in the development of resource productivity policies. Whilst it remains to be seen what effect these initiatives and policies will have on resource productivity in the upcoming years, current trends suggest that past policy efforts have been insufficient to curb environmental impacts linked to materials use. More stringent policies are needed to fully implement the Recommendation, and the current political momentum in this area suggests that this may, at least in part, already be happening:

- The majority of implemented policies target the downstream, end-of-life phase of the supply chain and the existing policy mix could benefit from strengthening policy interventions further upstream the supply chain (e.g. instruments to influence product design or demand for circular products and materials).
- Target setting related to resource productivity can be improved in most countries. Resource productivity strategies remain often descriptive and include predominantly qualitative targets. Where quantitative resource productivity targets exist, these could often be strengthened by broadening them to account for transboundary effects and burden shifting.
- Resource productivity policies could benefit from a better integration with other cross-cutting and sectoral policies. Proper institutional frameworks are required to ensure horizontal policy co-ordination and to design a coherent policy mix that maximises the benefits and minimises potentially adverse effects in other policy areas.

18. Though the bulk of the content of the Recommendation has been implemented and good progress has been made on many provisions, it will still take time to implement the Recommendation fully.

### ***Continued relevance***

19. Responses to the Survey on the implementation of the Recommendation revealed that the Recommendation is still considered relevant and useful. Even though the level of awareness of the Recommendation has decreased since it was adopted 13 years ago, respondents find it relevant in the current policy context as it provides a good high-level framework for guiding action by Adherents. The Recommendation's call to improve measurement systems and capacity for analysis is considered still valid and useful for filling knowledge gaps in future. Related provisions (I.1 to I.4) are however perceived as ambitious. The provisions on policies and actions are sometimes perceived as being too general by those who are familiar with them. Only a minority of respondents considers there is a need to update the Recommendation, mainly to better reflect linkages with other environmental issues such as climate change and biodiversity, and to connect to planetary boundaries and societal needs. The need for more practical and concrete guidance on implementation was also mentioned.

20. The responses also revealed that significant efforts are still required to implement individual provisions. EPOC, the WPRPW and the WPEI therefore agree to continue and reinforce efforts aimed at supporting the implementation and dissemination of the Recommendation, including for specific materials or sectors. One example is the field of plastics, where there appears to be a particular need for policy guidance among Adherents, given the increased production, consumption and waste of this materials stream.

### ***Next steps and future work***

21. Given the continued relevance of the Recommendation, EPOC will continue and enhance its efforts to support the dissemination and the implementation of the Recommendation and to support Adherents' efforts as suggested in the Report. Relevant ongoing and planned work by EPOC includes:

- The further development of information and knowledge.
- The continuation of work on policy design and implementation.
- The continued provision of a forum for exchanging experience and good practices.

22. In the field of ***information, scientific knowledge and analysis of material flows and resource productivity***, this encompasses work on data, indicators and accounts giving particular attention to the production of reliable and internationally comparable data and indicators and to the exchange of related experience and good practices. Efforts will concentrate on (i) circular economy metrics (conceptual framework, indicator set, practical guidance), (ii) material flow accounts with the implementation of the System of Environmental-Economic Accounting (SEEA), (iii) waste statistics, (iv) modelling, (v) the further harmonisation of international calculation methods for demand-based material flows, and (vi) the refinement and regular use of material flow and resource productivity indicators in OECD work. This would provide Adherents with improved tools to assess progress in implementing the Recommendation, and would help disseminate the Recommendation and promote its uptake.

23. In the field of ***policy design and implementation***, efforts will concentrate on (i) specific waste and material streams, most notably plastics and the development of a Global Plastics Outlook, on (ii) specific sectors (e.g. textiles and construction), and (iii) on policy tools, such as economic instruments, most notably extended producer responsibility. In addition, (iv) ***country specific projects***, such as Environmental Performance Reviews and country support projects for circular economy and resource efficiency policies and roadmaps will be conducted and support these goals.

24. In the light of past trends, it will be important that future work explores the development paths for a “sustainable” resource use, considering decoupling needs and planetary boundaries, as well as resource demands, alternative economic models and associated policies. This should include further discussions on how relevant targets could be formulated and on how they could best be achieved.

25. Adherents should also be encouraged to join in and support these efforts, and develop further domestic initiatives. This could include the provision of national translations of the Recommendation to facilitate its dissemination and use, the involvement of all relevant stakeholders, and the regular communication of information on progress with resource productivity and sustainable materials management, including through social media.

26. To further *promote the uptake of the Recommendation by Adherents and enhance co-operation with non-Adherents*, EPOC has agreed to strengthen the dissemination of OECD experience and guidance and the sharing of good practices. This would be done through:

- The organisation of workshops or webinars on specific provisions and implementation issues (to be defined with Adherents and to be organised, as appropriate, in co-operation with relevant OECD bodies and other international organisations).
- The inclusion of resource productivity issues in high-level events (OECD Forum, GGSD Forum, etc.).
- The involvement of interested non-Adherents in OECD work in view of their alignment towards the Recommendation and possible adherence.
- Continued OECD participation in relevant international initiatives and processes and multilateral resource efficiency dialogues (e.g., the G7 and the G20).
- Enhanced co-operation with other International Organisations, in particular UN Environment and the International Resource Panel.

27. Some of this work may result, at a later stage, in further implementation guidance or best practices, especially in the area of sustainable materials management and the circular economy.

28. The Report approved by EPOC proposes to continue monitoring developments regarding the implementation, dissemination and continued relevance of the Recommendation. EPOC also intends to report to the Council on the continued monitoring of the implementation of the Recommendation in ten years (see paragraph 28 of [\[ENV/EPOC/WPRPW/WPEI\(2020\)1/REV2\]](#))

## Proposed action

29. In the light of the preceding, the Secretary-General invites the Council to adopt the following draft conclusions:

### THE COUNCIL

- a) noted document [C\(2021\)62/REV1](#), in particular the Report set out in its Annex, and agreed to its declassification;
- b) encouraged Adherents to the Recommendation to continue their efforts to implement and disseminate the Recommendation and to address the main findings and challenges identified in the summary and conclusions section of the report;

- c) invited the Environment Policy Committee, through its Working Parties on Environmental Information (WPEI) and on Resource Productivity and Waste (WPRPW), and in co-operation with other relevant committees and international organisations, to:
- i. continue monitoring developments regarding the implementation, dissemination and continued relevance of the Recommendation of the Council on Resource Productivity;
  - ii. support further dissemination of the Recommendation and the sharing of OECD experience and guidance, and of good practices;
  - iii. support Adherents in addressing the findings and challenges identified in the summary and conclusions section of the report, and promote the uptake of the Recommendation by non-Adherents;
  - iv. report to the Council in no later than ten years on the implementation, dissemination and continued relevance of the Recommendation.

## Annex. Report on the implementation of the OECD Recommendation on Resource Productivity

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## *Abbreviations and Acronyms*

ASDF	-	Americas Sustainable Development Foundation
CE	-	Circular economy
DMC	-	Domestic Material Consumption
BEEP	-	Burdens on the Economy of Environmental Policies
EEB	-	European Environment Bureau
EEE	-	electric and electronic equipment
EPOC	-	Environment Policy Committee
EPR	-	Extended producer responsibility
EW-MFA	-	economy-wide material flow accounts
FAO	-	Food and Agriculture Organization
GPP	-	Green public procurement
IGO	-	inter-governmental organisations
IO models	-	Input-Output models
MF	-	material flows
MSW	-	Municipal solid waste
NoAw	-	The No Agricultural Waste project
PAYT	-	Pay as you throw
PINE	-	Policy Instruments for the Environment
PRO	-	Producer responsibility organisation
RE	-	Resource efficiency
SEEA	-	System of Environmental Economic Accounting
SMM	-	sustainable materials management
TMC	-	Total Material Consumption
UNCTAD	-	UN Conference on Trade and Development
UNECE	-	United Nations Economic Commission for Europe
UNFCCC	-	UN Framework Convention on Climate Change
UNIDO	-	UN Industrial Development Organization
WCEF	-	World Circular Economy Forum
WPEI	-	Working Party on Environmental Information
WPRPW	-	Working Party on Resource Productivity and Waste
WTO	-	World Trade Organization

## 1. Background

1. The Recommendation of the Council on Resource Productivity [[OECD/LEGAL/0358](#)] (hereafter “the Recommendation”) was adopted by the OECD Council on 28 March 2008 [[C\(2008\)40](#); [C/M\(2008\)6/PROV](#)] and welcomed by Environment Ministers at their meeting on 28 April 2008 [[Chair’s summary](#)]<sup>3</sup>. The Recommendation responds to the particular interest in resource productivity<sup>4</sup> and sustainable materials management expressed by countries and at international level in the 2000s and that has been growing since.<sup>5</sup> It provides a contribution by the OECD to international debates and initiatives concerning green growth, sustainable materials management, resource efficiency and the circular economy.

2. The objective of the Recommendation is to support Adherents’<sup>6</sup> efforts to improve resource productivity considering the entire resource cycle, with a view to reducing negative effects on the environment, avoiding situations where valuable materials contained in waste are disposed of and ultimately lost for the economy, and preventing natural resource degradation. The focus is on the environmental management of natural resources and materials.

3. The Recommendation applies to both:

- The *knowledge and analytical capacity* concerning materials flows and their environmental impacts that is needed to support resource productivity policies (first part of the Recommendation - I).
- The *policies and measures* that are needed to encourage environmentally effective and economically efficient uses of natural resources and materials to improve resource productivity (second part of the Recommendation - II).

4. In adopting the Recommendation, Council instructed EPOC to report “on progress achieved in implementing this Recommendation, within five years of its adoption”.

5. A first progress assessment by EPOC was prepared in 2013-14 (hereafter the “2014 Report”). It was discussed by the Executive Committee and noted by Council in December 2014 [[C\(2014\)148 and CORR1](#); [C/M\(2014\)13](#)]. It recognised that:

- Progress had been achieved in a number of areas, but the provisions of the Recommendation had not yet been fully implemented.

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<sup>3</sup> This follows on an earlier OECD Recommendation on Material Flows and Resource Productivity [[OECD/LEGAL/0324](#)] (hereafter the “2004 Recommendation”), which was adopted by the Council in April 2004 and whose objective is to improve information on material flows and to establish common measurement systems and indicators.

<sup>4</sup> The term “resource productivity” is understood to contain both a quantitative dimension (e.g. the quantity of output produced with a given input of natural resources) and a qualitative dimension (e.g. the environmental impacts per unit of output produced with a given natural resource input). The term “resource” is understood to include natural resources (and the materials and products derived therefrom) whose extraction, processing, use and disposal are internationally significant, in both economic and environmental terms.

<sup>5</sup> See the Annex describing the context and content of the Recommendation in <https://www.oecd.org/env/40564462.pdf>.

<sup>6</sup> To date, all OECD Members are Adherents. There are no non-Member Adherents. Brazil has requested to adhere to the Recommendation but the adherence process has not yet been completed.

- The Recommendation had been in place for a relatively short time, and not long enough to (i) develop the scientific knowledge and information needed to implement its main provisions, and (ii) implement effective policies.
  - Effective policies require consideration of the entire life-cycle of resources, involve a large number of stakeholders along the value chain in different sectors of the economy, and cut across multiple policy domains.
6. It also showed that the provisions of the Recommendation remained valid and did not need revision at that point in time.
7. The Council subsequently invited EPOC to carry out further work to support the implementation of the Recommendation, continue monitoring developments regarding the implementation of the Recommendation, and report again to Council by 2020.
8. This draft report presents the findings from the second progress assessment. It is divided into six chapters. Following this background chapter, chapter 2 provides an overview of the methodology applied. Chapter 3 outlines the timeline and procedural steps for the development of this second progress assessment. Chapter 4 provides a summary of the actions that the OECD, the Secretariat and Adherents have taken to disseminate the Recommendation. Chapter 5 assesses key trends in resource productivity in Adherents; Chapter 6 assesses the progress made by Adherents with the analysis of material flows and their environmental impacts (6.1); the progress made with the development of resource productivity policies (6.2); and Adherent’s perception of the Recommendation (6.3). Chapter 7 summarises and proposes actions to support the implementation, dissemination and continued relevance of the Recommendation in the future.

## 2. Methodology

9. This second progress assessment was conducted jointly by the Working Party on Resource Productivity and Waste (WPRPW) and the Working Party on Environmental Information (WPEI) in 2019-2020. It builds on information from:
- A survey on the implementation of the Recommendation asking Adherents to assess the level of awareness, the degree of implementation, the usefulness and the continued relevance of the Recommendation of the Council on Resource Productivity (hereafter “the Survey”). The Survey was distributed to the delegates of the WPRPW and the WPEI in May 2019 [[ENV/EPOC/WPRPW/WPEI\(2019\)1](#)]. Eighteen Adherents provided responses to the Secretariat (hereafter “the respondents”).<sup>7</sup>
  - Contributions to two policy questionnaires: (i) on “Policy Instruments for Sustainable Materials Management (SMM), Resource Efficiency, and the Circular Economy”, and (ii) on “Objectives of SMM, Resource Efficiency, and Circular Economy Policies”. These questionnaires were distributed to the delegates of the WPRPW in December 2017.
  - Contributions to the 2018 OECD Burdens on the Economy of Environmental Policies (BEEP) questionnaire. The BEEP questionnaire was created in 2013 as an

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<sup>7</sup> Responses to the Survey were received from 18 Adherents (out of 36 Adherents at the time of the Survey): Austria, Belgium, Canada, Chile, Denmark, Estonia, France, Israel, Italy, Japan, Lithuania, Poland, Portugal, Spain, Switzerland, Turkey, United Kingdom, and United States.

annex to the OECD's flagship Product Market Regulation (PMR) questionnaire. The second wave of the BEEP questionnaire (which took place in 2018) also included questions on waste policies.<sup>8</sup>

- Contributions to the WPEI's annual Round Table on Environmental Information.
  - OECD country reviews (e.g. chapters on waste and materials management and the circular economy in environmental performance reviews), from other international sources (e.g. the EEA, UN Environment and the International Resource Panel), from other national sources and from business associations.
  - Work by EPOC to support the implementation of the Recommendation, most notably the OECD Resource Efficiency and Circular Economy work stream and its outputs (OECD RE-CIRCLE project), and work on indicators and measurement methodologies concerning material flows and resource productivity.
10. The Secretariat further conducted desk research, reviewed available data sources and assessed the progress made towards key resource productivity indicators based on data retrieved from the OECD.Stat website.

### 3. Process

11. The preparation of the second draft Report was initiated in 2019. It included the following steps:

- Distribution of the survey on the implementation of the Recommendation to the Delegates of the WPRPW and the WPEI in May 2019 [[ENV/EPOC/WPRPW/WPEI\(2019\)1](#)].
- Discussion of preliminary findings by the WPEI on 21 November 2019 [[ENV/EPOC/WPRPW/WPEI\(2019\)2](#)].
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- Discussion of expanded findings on the analysis of material flows by the WPRPW on 20 November 2020.
- Submission of an expanded second draft Report to the Delegates of the WPRPW and the WPEI on 21 December 2020 for written comments and agreement to transmit a revised version to EPOC [[ENV/EPOC/WPRPW/WPEI\(2020\)1/REV1](#)].
- Approval of the Report by EPOC on 31 March 2021 [[ENV/EPOC/WPRPW/WPEI\(2020\)1/REV2](#)].

12. The Report was noted and declassified by the Council [[C\(2021\)62/REV1](#)]. It will be made publicly available on the webpage of the Recommendation on the [online Compendium of OECD Legal Instruments](#), as well as on the relevant webpages of the OECD Environment Directorate.

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<sup>8</sup> Waste policy aspects were however not included in the BEEP indicator.

## 4. Dissemination

13. The Recommendation does not specifically invite the Secretary-General and Adherents to disseminate the Recommendation. But it includes provisions that are closely related to dissemination. It recommends that Adherents share OECD guidance and experience on measurement and analysis of material flows and resource productivity with all relevant stakeholders (relevant ministries and departments of government, research and other non-governmental organisations, and members of the private sector), and that Adherents involve all relevant stakeholders in actions to improve resource productivity and reduce negative environmental impacts of materials and product use. It further recommends that Adherents co-operate with non-Members to strengthen their capacity for analysis of material flows and the associated environmental impacts, and for developing and implementing policies concerning the improvement of resource productivity.

### 4.1. Dissemination efforts could be strengthened

#### 4.1.1. Dissemination efforts by OECD

14. The OECD has been promoting and disseminating the Recommendation in several ways. A primary means of dissemination by the Secretariat has been the preparation of country environmental performance reviews that regularly assess progress towards resource productivity and often have a special chapter on waste and materials management and the circular economy (examples include the Czech Republic, Latvia, Greece, Denmark) (OECD, 2020<sub>[1]</sub>). Country reviews are useful to bring the Recommendation to life and show how the principles outlined can help advancing integrated policies. The OECD is also supporting individual countries in preparing their Circular Economy Roadmap in line with the Recommendation's principles (the Slovak Republic, Hungary the Czech Republic, Chile).

15. The Recommendation has also been disseminated through:

- Flagship events organised by the OECD, such as the Green Growth and Sustainable Development Forum (2019 GGSD on Greening heavy and extractive industries; Investing in Resource Efficiency, side event at 2018 GGSD; Marine litter, microplastics; and a circular economy, session at 2017 GGSD) (OECD, 2020<sub>[10]</sub>).
- OECD participation in high-level international initiatives. The OECD supported discussions at G7 and G20 level on this topic. A Policy Guidance on Resource Efficiency was prepared, following a request by G7 Leaders at the Schloss Elmau Summit 2015, and published in 2016 (OECD, 2016<sub>[2]</sub>). The OECD also supported discussions on the circular economy, plastics and marine litter at the G7 (OECD, 2018<sub>[11]</sub>) and G20 (OECD, 2019<sub>[12]</sub>), as well as at the 2018 and 2019 OECD Ministerial Council Meetings (OECD, 2019<sub>[13]</sub>).
- OECD collaboration with other International Organisations and stakeholders, including, but not limited to the International Resource Panel (IRP), United Nations Economic Commission for Europe (UNECE), UN Environment, the World Circular Economy Forum and the World Economic Forum.

16. Additionally, the Recommendation has been promoted through a number of completed and ongoing work streams, in particular:

- The OECD Resource Efficiency and Circular Economy project (RE-CIRCLE). This work included modelling analyses on materials use and the publication of a Global Materials Outlook to 2060 (OECD, 2019<sub>[3]</sub>) as well as work on circular

economy business models (OECD, 2019<sup>[14]</sup>). It also included work on specific waste streams, such as plastics, including a 2018 Global Forum on "Plastics in a Circular Economy: Design of Sustainable Plastics from a Chemicals Perspective" and related background documents (OECD, 2019<sup>[5]</sup>; OECD, 2019<sup>[6]</sup>; Watkins et al., 2019<sup>[7]</sup>), as well as a publication on secondary plastics markets (OECD, 2018<sup>[8]</sup>). Finally, it includes work on specific policy tools that can help to increase resource productivity, such as work on Extended Producer Responsibility (OECD, 2016<sup>[4]</sup>).

- OECD work to develop an internationally agreed upon methodology for measuring demand-based material flows that involves other International Organisations, country experts and research institutes.

17. The Secretariat has also promoted the Recommendation through smaller-scale events such as Roundtable discussions at Working Party meetings that are regularly used to share information and good practices on aspects related to the implementation of the Recommendation; events and missions related to environmental performance reviews (e.g. Czech Republic, Latvia); expert meetings (workshops on measuring demand-based material flows); and through the OECD's new interactive web-site Environment at a Glance (OECD, 2020<sup>[9]</sup>).

#### ***4.1.2. Dissemination efforts by Adherents***

18. Adherents' dissemination efforts reported in the Survey appear to be more limited. No respondent indicated having translated the Recommendation into national language. This is likely because Adherents promote and disseminate the content and principles of the Recommendation, rather than the Recommendation itself.

19. Adherents promote and disseminate the content of the Recommendation through:

- Consideration of its principles in legislative and fiscal measures.
- Inclusion of its principles in national plans and strategies (e.g. the 4th Fundamental Plan for Establishing a Sound Material-Cycle Society of Japan, the Resource Efficiency Programme of Germany, the Sustainable Materials Management Program Strategic Plan of the US EPA).
- Media channels and the publication of working papers.
- Events with industry and other stakeholders on waste and materials management and resource efficiency
- Capacity building and the provision of advice to firms on resource efficiency and the circular economy.

20. The Recommendation itself is rarely mentioned or acknowledged. Adherents that are member states of the European Union (EU) tend to rather make reference to EU directives and policy packages (e.g. the Circular Economy Package) that provide further detail and guide national policies. Hence, the awareness of the Recommendation itself is low in many countries, but awareness of the content of the Recommendation and its provisions remain high.

21. Adherents could consider providing national translations of the Recommendation, to further facilitate its dissemination and use.

## 4.2. The Recommendation could be more used to level the playing field and involve all relevant stakeholders

22. The above and the general assessment of the implementation of the Recommendation indicate that there is scope to strengthen dissemination efforts, as a means to:

- Involve all relevant stakeholders in policies and actions to improve resource productivity and reduce negative environmental impacts throughout a materials and products lifecycle.
- Share OECD guidance<sup>9</sup> and experience on the measurement and analysis of material flows and resource productivity with all relevant stakeholders.
- Encourage cooperation with non-Adherents to strengthen their capacity for analysing material flows and the associated environmental impacts, and for developing and implementing policies concerning the improvement of resource productivity. Such efforts to align with the Recommendation could lead to their adherence in line with the relevant OECD process.

23. Dissemination efforts could further be enhanced by translating the Recommendation into national languages and by making greater use of social media to inform about trends and progress made.

24. The *content of the Recommendation cuts across policy domains*, and implementation depends on the effective involvement of many stakeholders. Efforts in countries to raise awareness about the Recommendation are thus more effective if paralleled by efforts in the OECD Secretariat to share the Recommendation and related guidance<sup>10</sup> with OECD bodies outside the EPOC community (e.g. industry and innovation, technological policy, digital economy, agriculture, economic policy, investment). The profile of the Recommendation could also be raised by highlighting the synergies between the implementation of the Recommendation and the achievement of other national and international objectives. Promoting resource productivity and the 3Rs contributes to tackling various environmental issues such as reducing greenhouse gas (GHG) emissions, limiting water footprints and pressures on natural habitats, while at the same time addressing competitiveness, economic growth, security of supply and job creation.

25. The *content of the Recommendation is relevant to both Adherents and non-Adherents*, as material life cycles (extraction, design, manufacturing, use, recycling, and disposal) and value chains are often global. It is therefore important to ensure cooperation with all relevant countries, Adherents and non-Adherents alike. A broader dissemination of the Recommendation could help promote its uptake in both Adherents and non-Adherents, level the broader international playing field and bridge the gap between more advanced and less advanced countries. It would also help achieving global climate and biodiversity objectives, preventing marine litter from land-based sources and more generally implementing the 2030 Agenda and its Sustainable Development Goals (SDG).

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<sup>9</sup> This includes for example the OECD Guide on Measuring Material Flows and Resource Productivity, <https://www.oecd.org/environment/indicators-modelling-outlooks/MFA-Guide.pdf>.

<sup>10</sup> Related guidance includes the 2016 *Policy Guidance on Resource Efficiency* (OECD, 2016<sub>(2)</sub>).

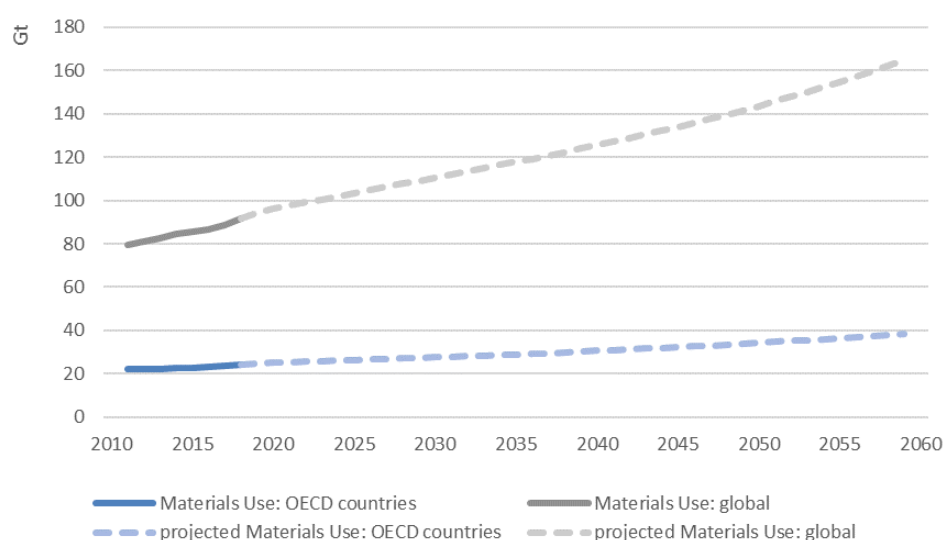
## 5. Key trends in resource productivity

### 5.1. Trends in global material demands and resource extraction

26. The 2014 Report stated that “the last decades have witnessed unprecedented growth in demands for raw materials worldwide”. This hunger for virgin materials has continued in the past five years and global material consumption has further increased. Recent OECD modelling suggests that material use will further increase and double by 2060 from 76 Gt to 167 Gt, in the absence of further policies (OECD, 2019<sup>[31]</sup>).

27. In the OECD area, Domestic Material Consumption has further increased, yet at a slower rate, from 22.7 Gt in 2014 to 24.3 Gt in 2018. In the absence of new policies, it is projected to increase further, reaching about 39 Gt in 2060 (Figure 1).

**Figure 1. Recent development and projections of material consumption globally and in OECD countries**



Source: OECD Global Materials Outlook to 2060 (2019<sup>[31]</sup>)

### 5.2. Trends in resource productivity and material footprints

28. Resource productivity in statistical terms refers to the effectiveness with which an economy uses materials extracted from natural resources to generate economic value. Material resources include energy carriers (gas, oil, coal), metal ores and metals, construction minerals and other minerals and biomass. Resource productivity or material productivity is an indicator that measures the economic value generated per unit of resources or materials used; it is commonly calculated as Domestic Material Consumption (DMC) over Gross Domestic Product (GDP).

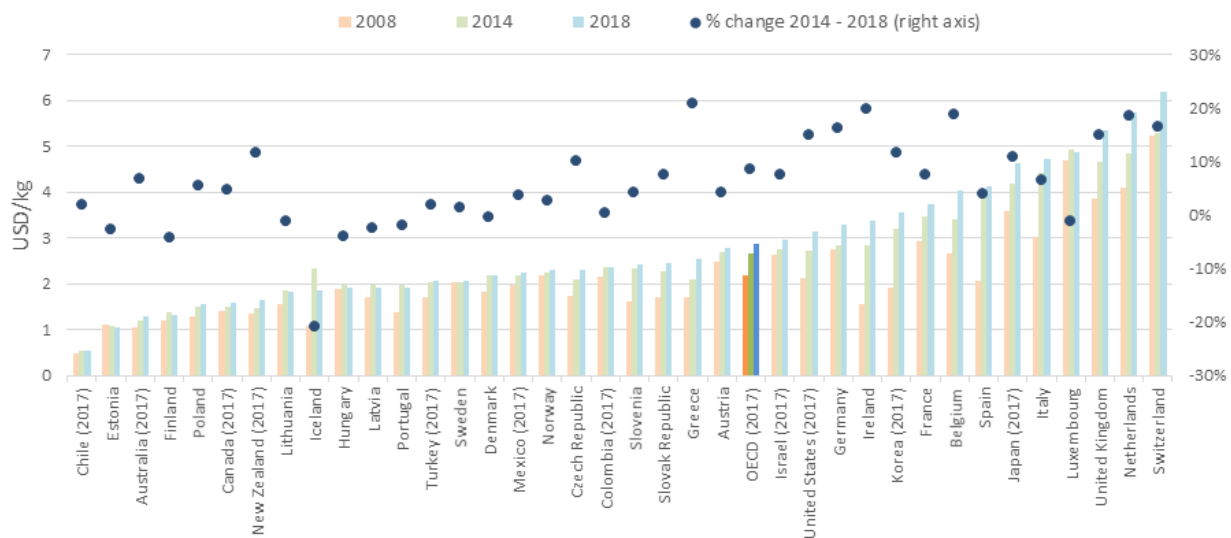
29. Many OECD Member countries have experienced improvements in material productivity since 2008 and since the last progress report in 2014. Across the OECD membership, material productivity increased by 8.7% between 2014 and 2018<sup>11</sup> (Figure 2).

<sup>11</sup> 2014 marks the date of the last progress assessment on the implementation of the Recommendation on Resource Productivity.

30. However, levels of resource productivity vary greatly across the OECD, and whilst some countries have experienced improvements, in some others resource productivity levels declined between 2014 and 2018. OECD countries with the highest resource productivity improvements since the last update are Greece (21%) and Ireland (19%). OECD countries, where resource productivity has decreased, include Estonia (-2.8%), Hungary (-4%) or Finland (-4.3%).

31. Overall resource productivity remains heterogeneous across OECD Member countries, depending on the underlying economic structure. Countries with highest material productivity tend to be those whose economies are focused on services and high-value products, as seen for Switzerland and the Netherlands. Countries with economies more reliant on extracting material resources tend to have lower material productivity levels, such as Chile, Estonia or Australia.

**Figure 2. Some progress has been made on increasing resource productivity since 2008**



Note: Resource productivity is measured in USD per kg of Domestic Material Consumption (DMC).

Source: OECD Environment at a Glance Platform; OECD Environment Statistics (database),

[http://dotstat.oecd.org/Index.aspx?DataSetCode=MATERIAL\\_RESOURCES](http://dotstat.oecd.org/Index.aspx?DataSetCode=MATERIAL_RESOURCES).

32. Indicators on resource productivity and on DMC do not take into account the flows of raw materials indirectly embodied in international trade. Productivity gains are more modest once these indirect trade flows of materials needed to satisfy final demand are considered. Demand-based material flows as reflected in the material footprint indicator, have increased in many OECD Member countries (Figure 3).

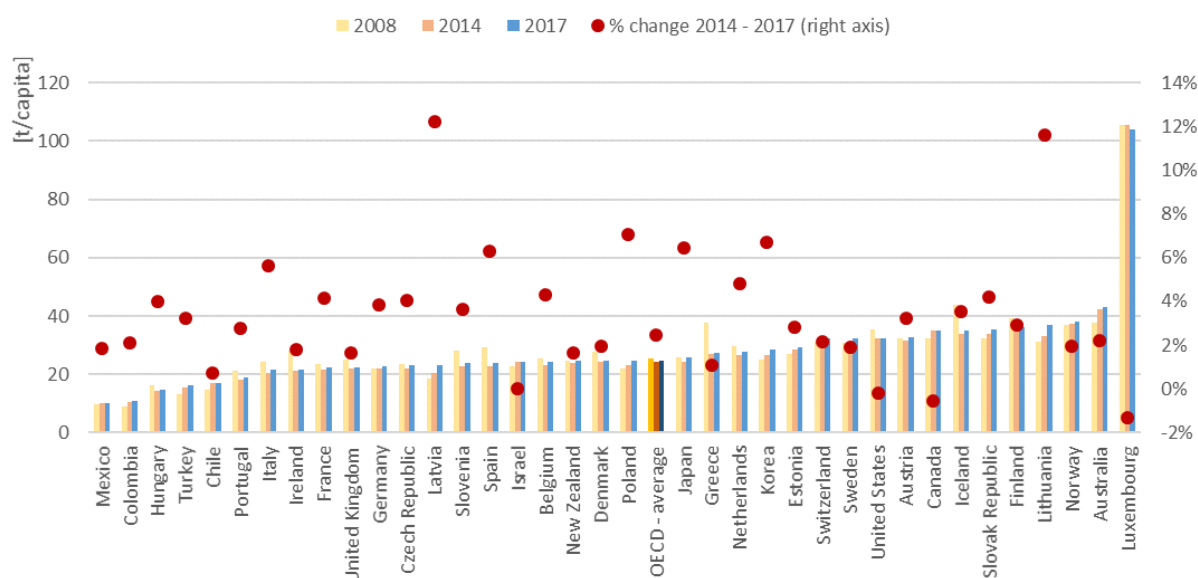
33. Trade is responsible for much larger amounts of material extraction than direct trade flows indicate, when accounting for the additional raw materials, energy, water and land used in the extraction and production of traded goods but left behind as waste and emissions in the exporting country. In 2017, the material demand for traded goods was three times the direct trade; more than 35 billion tonnes of material resources were extracted globally to produce 11 billion tonnes of directly traded goods. This means that one-third of the total 92 billion tonnes of material resources extracted in the global economy that year were destined to produce goods for trade (UNEP, 2020<sub>[15]</sub>).

### Different concepts of material consumption

**Domestic material consumption (DMC)**, represents the materials extracted in a country (domestic extraction), plus imports of materials (whether in the form of raw materials, semi-processed materials or processed goods), minus exports of materials (whether in the form of raw materials, semi-processed materials or processed goods). DMC can be complemented with estimates of the amount of raw materials needed to produce traded products to calculate raw material consumption.

**Raw material consumption (RMC)**, also called demand-based material consumption or material footprint, represents the portion of raw materials extracted anywhere in the world (global extraction) that are needed to satisfy final demand of an economy. It includes materials that are directly used by an economy in the form of raw materials, semi-processed materials or processed goods (i.e. DMC), and the raw materials that are associated with the production of traded goods but not physically traded. It is calculated as DMC + the raw material equivalents of imports – the raw material equivalents of exports. The weight of raw material extractions needed to produce manufactured products is usually several times greater than the weight of the products themselves.

**Figure 3. Material footprint per capita has slightly increased or remained the same since the 2014 Report**



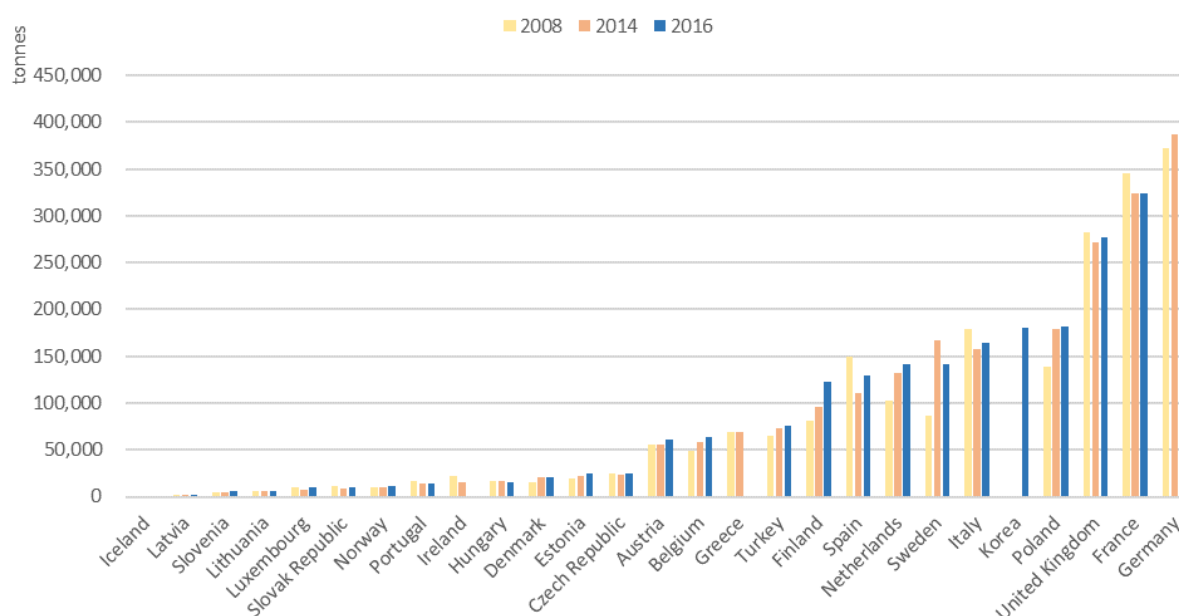
*Note:* Material footprint accounts for all raw materials needed to satisfy final demand of economies. It takes into account raw materials extracted abroad and embodied in imported goods (i.e. a demand-based measure). The data used for this figure from the UNEP "Environment Live" database (<http://uneplive.unep.org/material>). They should be interpreted with caution as they may differ from national estimates, and as they may change as international work on methodologies for material footprints progresses.

*Source:* OECD Environment at a Glance Platform; OECD Environment Statistics (database), [http://dotstat.oecd.org/Index.aspx?DataSetCode=MATERIAL\\_RESOURCES](http://dotstat.oecd.org/Index.aspx?DataSetCode=MATERIAL_RESOURCES).

### 5.3. Trends in waste generation and management

34. Growing consumption of material resources also leads to rising amounts of solid waste generated. The generation of total primary waste varies widely across OECD countries (Figure 4). This can be linked to several factors, including DMC and GDP levels. The trends draw a mixed picture with some countries showing increases and others significant decreases of total waste generation between 2014 and 2016 (latest data available). Different waste accounting methodologies between countries and across time may also contribute to the large variation found.

**Figure 4. Total waste generation in OECD Member countries**



*Note:* Data is incomplete for some countries. Differences in accounting methodologies between countries and across time may contribute to some of the variation found. For instance, in the United States data for non-hazardous industrial solid waste generation is not collected.

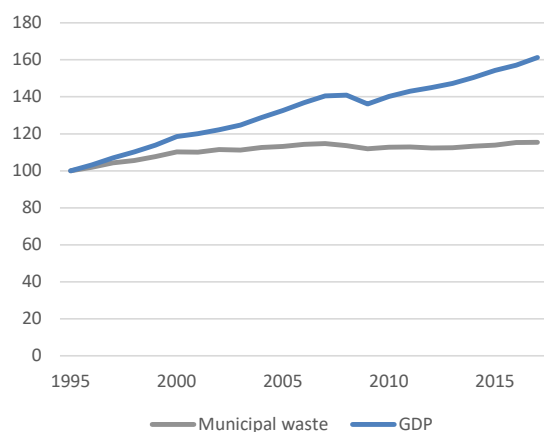
*Source:* OECD Environment at a Glance Platform; OECD (2020), "Waste: Waste generation by sector", OECD Environment Statistics (database), <https://doi.org/10.1787/data-00674-en>.

35. Municipal solid waste (MSW) represents roughly 10% of the total waste generated in most OECD Member countries. MSW includes waste from households and from other municipal sources. The trend towards increased material recovery in municipal waste has continued since the last review. Yet, overall waste generation still increased:

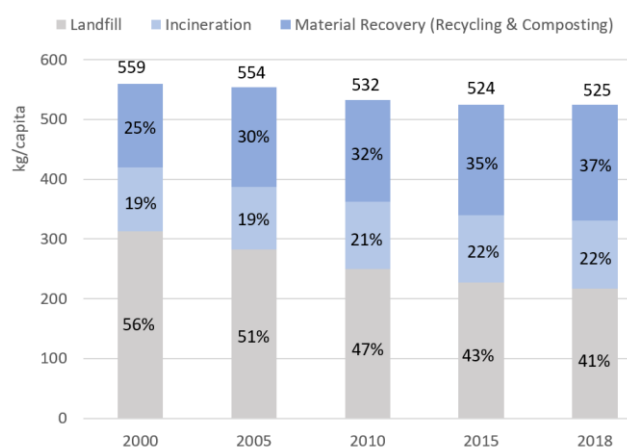
- The total amount of MSW generated in 2018 was around 682.7 million tonnes. Total municipal waste generation has slightly increased since the last review (663.6 million tonnes in 2014).
- The decoupling trend between MSW generation and GDP growth has further continued in recent years (Figure 5).
- Per capita MSW generation in OECD Member countries decreased until 2014, but slightly increased again in recent years. It also remains high compared to other countries in the world and is still higher than in the early 1990s.

- The treatment of MSW has improved and more resources are being diverted from landfills and kept in the economy through material recovery and recycling. However, much material is still lost to the economy or “downcycled” (Figure 6).

**Figure 5. Decoupling trends in municipal waste generation in OECD Member countries**



**Figure 6. Municipal waste generation intensities and treatment per capita (OECD average)**



Source: OECD Environment at a Glance Platform; OECD (2020), "Waste: Municipal waste", OECD Environment Statistics (database), <https://doi.org/10.1787/data-00601-en>.

## 6. Implementation

36. This chapter reviews progress made by Adherents in implementing the Recommendation that aims at improving resource productivity considering the entire resource cycle, with a view to reducing negative effects on the environment, avoiding situations where valuable materials contained in waste are disposed of and ultimately lost for the economy, and preventing natural resource degradation.

37. It highlights the progress made and the challenges met by Adherents on:

- The *knowledge and analytical capacity* concerning materials flows and their environmental impacts that is needed to support resource productivity policies (first part of the Recommendation - I).
- The *policies and measures* that are needed to encourage environmentally effective and economically efficient uses of natural resources and materials to improve resource productivity (second part of the Recommendation - II).

### 6.1. Progress made with the analysis of material flows and their environmental impacts (first part of the Recommendation - I)

38. This section reviews progress made by Adherents since the 2014 Report in implementing the first part of the Recommendation, which provides that, with regard to the analysis of the material flows and their environmental impacts, Adherents:

“Promote resource productivity by strengthening their capacity for analysing material flows and the associated environmental impacts, and work to improve measurement

systems for material flows and resource productivity, drawing on the expertise of all relevant ministries and departments of government, research and other non-governmental organisations, on OECD guidance and experience on measurement and analysis of material flows and resource productivity and on other international work;”

39. It builds on Adherent replies to the Survey<sup>12</sup>, on information compiled from country contributions to the annual Round Table on Environmental Information held by the WPEI, and from national websites. The description of the implementation follows the structure of the Recommendation. It starts with an overview of key developments at international level and in countries. It then highlights the progress made and the challenges met by Adherents on the following aspects:

- The extent of scientific knowledge about the environmental impacts and costs of resource use (I.1).
- The availability and quality of (i) data on material flows (including recyclables and waste) and on associated environmental impacts (I.2); (ii) material flow accounts that track natural resource stocks and flows (I.3).
- The availability, quality and use of indicators that monitor the efficiency of material resource use, considering (I.4): (i) indicators on natural resource use, resource productivity and the associated environmental impacts; (ii) indicators on the availability, quality and deterioration of natural resource stocks; (iii) indicators that track the flows and environmental impacts of materials, throughout the entire life cycle.

#### ***6.1.1. Key developments to strengthen the information base for monitoring progress in resource productivity***

40. There are many synergies between national and international developments to improve resource productivity and its monitoring. Adherents are actively engaged in international work and some have stimulated international initiatives on resource productivity and related issues. International initiatives in turn encourage countries to measure and analyse material flows and their environmental impacts. They help promoting the uptake of selected provisions of the Recommendation in both Adherents and non-Adherents, in particular I.1 to I.4 on scientific knowledge, data, accounts and indicators, and contribute more generally to the implementation of I.5 on co-operation with non-Adherents.

#### *International developments*

41. Sustainable resource use, sustainable materials management and resource productivity have long been addressed by the Heads of State and Government of G8 or G7 countries, and are actively promoted by the OECD, United Nations (UN) Environment and the European Union (section 6.2). Improving resource productivity is also a central element in international efforts to establish a green economy and move towards green growth<sup>13</sup> and

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<sup>12</sup> Eighteen out of the thirty-six Adherents in 2019 provided a response to the Survey. Replies were received between May 2019 and February 2020.

<sup>13</sup> The Declaration on Green Growth [[C/MIN\(2009\)5/ADD1/FINAL](#)] was adopted at the 2009 OECD Ministerial Council Meeting. The OECD released a Green Growth Strategy at the 2011 OECD Ministerial Council Meeting, including a conceptual framework and a set of indicators to monitor progress. The United Nations Environment Program launched its Green Economy Initiative in late 2008, including a framework for assessing progress. To achieve synergies at international

a sustainable development. Most of these initiatives have a monitoring and knowledge component and encourage countries to strengthen their activities related to the measurement and the analysis of material flows and resource productivity. In recent years, attention has increasingly turned to the circularity of material flows and the circular economy.

- Twelve out of the 17 sustainable development goals (SDGs) of the 2030 Agenda refer to resource efficiency in one way or the other. Goals 8 and 12 are particularly important as they include two targets that specifically aim at improving resource efficiency and whose monitoring is supported with two material flow indicators: the material footprint and domestic material consumption.
  - SDG Target 8.4: Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead.
  - SDG target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources.
- The G7 has taken a series of initiatives on resource efficiency and the 3Rs, including the G7 Alliance on Resource Efficiency (Schloss Elmau, 2015).
  - The Toyama Framework on Material Cycles (2016) refers to the need for “appropriate science-based and widely acknowledged indicators at the domestic level to provide an orientation on the progress...” and for supporting “international efforts to identify indicators that can measure the reduction of various environmental impacts and effectiveness of resource stock”.
  - The G7 Bologna Roadmap (2017) explicitly refers to resource efficiency indicators. It commits to “Continue work to develop our joint capability to measure and monitor resource efficiency outcomes and impacts. Building on the expertise of the OECD, the IRP, the G7 statistical institutes and other relevant bodies, we will work collaboratively to review and share existing practices, identify gaps in measurements as well as develop possible new global, regional and national indicators, and advance existing ones, where needed”.
  - This follows on the 3R initiative (Reduce, Reuse, and Recycle) endorsed in 2004 by Heads of State and Government of G8 countries (Sea Island, United States) and the 3R Action Plan adopted in 2008 by G8 Environment Ministers (Kobe, Japan).
- The G20 Resource Efficiency Dialogue established by G20 governments in 2017 to provide a platform for exchanging views, policy experiences and good practices on resource efficiency, calls for “broadening the knowledge base on global resource use and future resource needs”.
- In the EU, following earlier initiatives the European Commission released a communication “Towards a circular economy: a zero waste programme for

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level, the OECD works together with the Global Green Growth Institute, UNEP and the World Bank within the framework of the Green Growth Knowledge Platform (GGKP).

Europe” in 2014 and a circular economy package and Action Plan in 2015.<sup>14</sup> A new Circular Economy Action Plan is part of the 2020 European Green Deal. Work on a circular economy includes the development of indicators to monitor progress (Eurostat).

- At global level, the International Panel on Sustainable Resource Management (International Resource Panel – IRP) established in 2007 by UN Environment, continues to provide scientific assessments on the sustainable use of natural resources and their environmental impacts over the full life cycle. It also provides a Global Material Flows Database and in 2019 produced a Global Resources Outlook, coordinated with related OECD work. Recent work has dwelled upon trade flows of material resources and their environmental impacts, on resource efficiency and climate, and on the weight of cities in material flows.

42. This is supported by international efforts that promote good governance in the raw materials sector and aim at making the management of natural resource rents more transparent (e.g. the [Extractive Industries Transparency Initiative](#)<sup>15</sup> that provides extractive related data on countries implementing the EITI Standard, and the [OECD Due Diligence Guidance for Responsible Supply Chains](#) of Minerals from Conflict-Affected and High-Risk Areas<sup>16</sup>).

43. The OECD monitors resource productivity through its work on environmental information and indicators and green growth indicators, and through its work on environmental modelling and outlooks.

- Material flow and waste data are available on the OECD statistical platform; they are compiled from national and international sources (Eurostat, UN Environment).
- The implementation of material flow accounts is encouraged, including through OECD contributions to the UN Committee of Experts on Environmental Economic Accounting (UNCEEAA) and the implementation of the SEEA<sup>17</sup>, and through

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<sup>14</sup> Earlier initiatives by the European Commission include (i) the 2005 EU Thematic strategy on the sustainable use of natural resources, complemented with the strategy on the prevention and recycling of waste, integrated product policies (IPP), the Environmental Technology Action plan, and a Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan (2008); (ii) the EU Raw Materials Initiative (2008) and Strategy (2011); (iii) the development of criteria to distinguish secondary raw materials from waste so as to create greater legal certainty and a level playing field for the recycling sector, and establish a common market for “green products”; and (iv) the EU Flagship Initiative on Resource Efficiency under the Europe 2020 strategy (announced in January 2011) that provided a long-term framework for policy actions and encompasses a RE Roadmap and a set RE indicators whose implementation was supported by the European Resource Efficiency Platform.

<sup>15</sup> The EITI standard for the good governance of oil, gas and mineral resources requires the disclosure of information along the extractive industry value chain, from licensing to extraction, to how revenue makes its way through to government, to how it contributes to the economy and wider society. The EITI also provides related data.

<sup>16</sup> Embodied in the OECD Recommendation on Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas [[OECD/LEGAL/0386](#)].

<sup>17</sup> Work has been carried out to develop a methodology for physical and monetary asset accounts with focus on mineral and energy resources, and a database with harmonised data for selected countries has been made available on dotstat.

contributions to a global manual on material flow accounting prepared by UN Environment.

- Indicators on material flows, resource productivity and waste are included in the OECD Core Set of Environmental Indicators and in the OECD set of Green Growth indicators<sup>18</sup> (OECD, 2011<sub>[16]</sub>; OECD, 2014<sub>[17]</sub>; OECD, 2017<sub>[18]</sub>). They are available on the OECD statistical platform (oecd.stat) and on the interactive [Environment at a Glance web platform](#) (OECD, 2020<sub>[19]</sub>), and are regularly used in OECD country reviews.
- A *Global Material Resources Outlook to 2060* with focus on economic drivers and environmental consequences was produced under the OECD RE-CIRCLE project (OECD, 2019<sub>[3]</sub>). With plastics receiving increasing policy attention, a Global Plastics Outlook is planned for 2021-22.
- Work with UN Environment and Eurostat continues to develop an internationally agreed method for estimating demand-based material flows and calculate reliable and comparable international material footprint indicators to support the SDG targets 8.4. and 12.2.

44. More recently, work has been initiated by the WPEI in cooperation with the WPRPW to move towards a new generation of information on waste and material flows so as to better support resource efficiency and circular economy policies (2018). A related project is included in the 2021-22 Programme of Work and Budget (PWB) of EPOC. It encompasses the development of a conceptual framework and indicators for monitoring progress towards a circular economy, and the provision of guidance on to how compile and combine related data.

45. The OECD also monitors resource productivity through its country environmental performance reviews and economic surveys that use material flow and resource productivity indicators in their analysis, and through statistical work on measuring the distance to SDG targets.

### *Developments in countries*

46. Improving resource productivity and monitoring related progress remains of great importance to all Adherents. Many of them have included resource productivity and efficiency in their sustainable development strategies, green growth strategies or environmental plans, and have programmes on sustainable production and consumption, sustainable manufacturing, or stewardship programmes for raw materials and natural resources, integrated waste and materials management policies such as the 3Rs or circular economy approaches, and green public procurement policies. These policies are generally interwoven with energy efficiency and climate policies, and often include a monitoring component supported with indicators and targets.

47. Since the last progress report, there has been considerable advancement in strengthening the information base, including for certain sectors, products and stages along the value chain. Many countries have indicators and national targets for waste management, material productivity and sustainable use of natural resources. Many Adherents also monitor progress towards resource productivity through national reporting on the Implementation of the 2030 Agenda for sustainable development, i.e. through voluntary

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<sup>18</sup> OECD green growth indicators monitor progress with establishing a low carbon, resource efficient economy; maintaining the natural asset base; improving people's quality of life; implementing appropriate policy measures and realising the economic opportunities that green growth provides.

national reviews and the production of indicators related to the SDGs. Many have established accounts that monitor material flows and natural resources and carry out research on material flows and resource productivity. The types of studies and analyses carried-out vary among countries depending on their national policy focus and the resources and expertise available: material flow analyses and accounts (economy-wide, for particular materials or activity sectors), analyses of the environmental impacts of material consumption (for particular materials or activity sectors), different types of material flow and resource productivity indicators.

48. The most promising developments are seen in the application of life-cycle approaches in the monitoring and analysis of material flows, in the further development and use of footprint methodologies, and in the establishment of indicator frameworks for supporting circular economy policies.

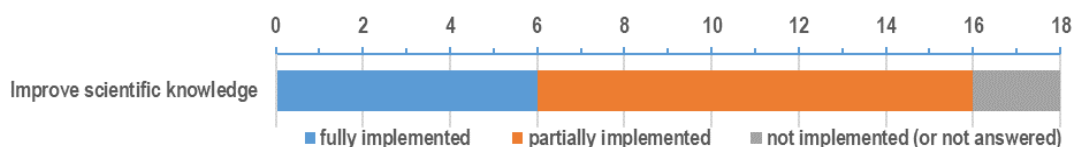
49. Initiatives to strengthen the information base for monitoring progress in resource productivity have considerably expanded in Europe, stimulated by EU policies, regulations and action plans on resource efficiency, raw materials, waste management and the circular economy. Related initiatives have also been taken or are planned in non-EU Adherents (e.g. work on the circular economy in Canada and in Chile, on sustainable materials management in the United States, on a sound material-cycle society in Japan), as well as in non-Adherents such as OECD Key Partners (e.g. People's Republic of China (China) and South Africa). Some Adherents have established multi-stakeholder groups, bringing together representatives from ministries, government agencies, local authorities, and NGOs, to support and coordinate their Circular economy and resource productivity policies and the related monitoring of progress.

50. All respondents to the Survey indicated that their country is taking measures to improve the information base, albeit at different degrees and with different objectives. The analysis of material flows and their associated environmental impacts is seen as a solid foundation for designing policies and interventions that generate environmental improvements. There are however still data and knowledge gaps across countries, sectors and material types that make it difficult to get the full picture of materials use and related environmental impacts. The Recommendation's call to improve capacity for research in this area is still valid and could help fill those gaps in future.

### 6.1.2. Scientific knowledge (I.1)

"1. Improve scientific knowledge concerning the environmental impacts and costs of resource use throughout the entire life cycle of materials and the products that embody them, from natural resource extraction and manufacturing to end of life management, including from resources that have been imported".

51. Most respondents declared having implemented this provision only partially.



52. Scientific research and analysis on material flows and resource productivity is a dynamic field, and scientific knowledge about the use of natural resources and materials and its environmental impacts has generally improved thanks to work in Adherents and to research work carried out by the International Resource Panel (IRP) and the OECD.

53. The implications of material resource use and resource productivity for environmental quality are increasingly studied and analysed, and related to environmental

policy concerns and sustainability issues. This is done by conducting scientific research and case studies, including life-cycle assessments of materials or products and assessments of the urban metabolism<sup>19</sup>, and by linking information on material flows to information on pollution or on natural resource stocks.

- Adherents increasingly use *life-cycle based approaches* to study the environmental impacts of material flows. Such approaches are also promoted through international initiatives and programmes. The Life Cycle Initiative hosted by UN Environment facilitates the application of life cycle knowledge by public and private decision-makers.<sup>20</sup> The European Commission's LCA4Regions project promotes the use of life cycle methods when elaborating and implementing public policies related to resource efficiency at regional level in the EU.<sup>21</sup>
- Adherents also increasingly use *footprint methodologies* in their national research and case studies. These methodologies consider demand-based material flows, i.e. the equivalent raw materials embodied in goods, also called material footprints. Examples include material footprint studies for particular sectors (e.g. textile, glass, construction, food in Belgium; vehicles in Switzerland; cleaning services, electrical appliances and furniture in France) or for the entire economy (several EU member states) and with a link to planetary boundaries (e.g. Switzerland).
- Progress is also being made with environmentally extended *Input Output* models and analyses to track resource flows beyond national boundaries and among industries, and to monitor the associated environmental pressures. Examples include analyses of current and potential environmental impacts of glass recycling and of the global environmental impact of reuse and recycling of textiles (e.g. Belgium (Flanders)).
- A few Adherents have programmes in place to evaluate the *environmental impact of consumer products* using life cycle analyses<sup>22</sup>, and make these evaluations available to consumers through product labelling (e.g. France). Others have developed tools to evaluate the potential impact of the production and consumption of goods and services across a range of environmental, social and economic indicators, using environmentally extended input-output models (e.g. United States).

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<sup>19</sup> The Urban Metabolism Of Brussels, Belgium: Transitioning Towards A More Circular Economy, 2018, <https://ecocitybuilders.org/the-urban-metabolism-of-brussels-belgium-transitioning-towards-a-more-circular-economy/>

AMNEKLEV, J., AUGUSTSSON, A., SÖRME, L. & BERGBÄCK, B. 2016. Monitoring Urban Copper Flows in Stockholm, Sweden: Implications of Changes Over Time. *Journal of Industrial Ecology*, n/a-n/a.

At international level, studies on the urban metabolism are promoted by the IRP and the Global Initiative for Resource Efficient Cities (GI-REC), launched in June 2012 by UN Environment to capitalise on the potential of cities to lead a global shift toward resource efficiency.

<sup>20</sup> The Life Cycle Initiative is a public-private, multi-stakeholder partnership, <https://www.lifecycleinitiative.org/>

<sup>21</sup> "Improved Environment and Resource Efficiency through use of Life Cycle Assessment instruments for Implementation of regional Policies of the European Union", <https://www.interregeurope.eu/lca4regions/>

<sup>22</sup> The principles, requirements and modalities of LCA are defined by the international standards ISO 14040 and ISO 14044.

- In some Adherents research has concentrated on *nationally-relevant materials* (e.g. copper in Chile) or on the material implications of the transition towards a more energy efficient and circular economy (e.g. work to better understand the environmental and social impacts of critical raw materials and work to assess the flows of mineral resources associated with the low-carbon transition in France).

54. But tracking the environmental impacts of resource use throughout the entire life-cycle and value chain of materials and products remains difficult, even for countries that have an advanced knowledge.<sup>23</sup> In most Adherents, work concentrates on monitoring and analysing physical flows of materials. Little progress has been made in analysing the environmental and economic costs<sup>13</sup> of material resource use. None of the Survey respondents indicated monitoring these costs associated with resource use.

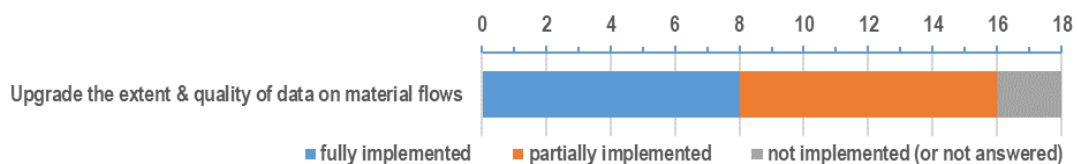
55. There is also still scope for deeper analysis of specific material and waste flows and the way they interact with commodity prices and recycling markets, and how they relate to natural resource stocks, resource rents and supply security, and to innovation and competitiveness. This is particularly important for flows of secondary raw materials, and flows of materials and products that raise concerns as to their environmental impacts or supply security (e.g. plastics, food, critical metals, electric and electronic goods).

56. Hence the implementation of the provision on the scientific knowledge and analysis of material flows remains partial.

### 6.1.3. Data on material flows and the associated environmental impacts (I.2)

”2. Upgrade the extent and quality of data on material flows within and among countries and the associated environmental impacts, giving particular attention to the availability and international comparability of data on physical trade flows, including flows of recyclable materials and waste, and selected material flows that are of economic and environmental importance”.

57. The majority of respondents to the Survey declared having implemented this provision, fully or partially.



58. A number of respondents, even those at an early stage of development of material flow data and accounts (e.g. Chile, Israel), declared having made progress, albeit in some cases only for some sectors, material types or flow variables. A closer look reveals that this applies mainly to general improvements in data quality and availability, and to a lesser extent to data on material flows within countries, on environmental impacts, on trade flows of recyclable materials and waste, and selected material flows that are of economic and environmental importance.

59. The most important progress has been made concerning *data that are needed to populate economy-wide material flow accounts*. Such data are generally comparable internationally. They are requested by EU legislation and many EU member states work

<sup>23</sup> It is for example not easy to identify the geographical location of the various processing stages along the material value chains.

<sup>13</sup> For example, costs associated with the loss of productivity due to inefficient use of material resources, negative effects of materials and product use on human health, labour productivity, and ecosystem services, etc.

towards improving their quality. Economy-wide MF data are regularly published in national reports on environmental indicators and assessments, and increasingly used to monitor developments towards a circular economy. Some Adherents work towards better aligning data on material inputs and data on processed output such as air emissions and waste generation, and at identifying secondary raw materials in their material flow statistics (e.g. Austria). (see the next section on accounts below).

60. Progress has also been reported as regards (i) the production of *sector-specific* data on material use and resource productivity in the business sector; and (ii) the production of *material- or product-specific* data, for example on flows of packaging materials (e.g. in the United Kingdom), plastics, or materials contained in waste (e.g. in Canada). Such data are usually country specific and less comparable internationally. They are rarely included in official statistical programmes and often depend on one-off studies.

61. Little progress has been made to estimate the size and value of the material stocks locked in the economy, i.e. *future urban mines*. The information available remains insufficient to form a reliable picture of the potential of urban mines to contribute to future supply, and how they relate to virgin stocks.

62. Since 2015, work to estimate *demand-based material flows*, i.e. the equivalent raw materials embodied in goods, including traded goods, has been expanding, and material footprints and indicators on raw material consumption (RMC) are being produced in an increasing number of countries. While not informing about environmental impacts per se, this is one step towards better understanding the environmental consequences of traded materials and products and where these consequences take place. It also helps to identify the raw material requirements of an economy and to what extent improvements in resource productivity are the result of domestic policies or of a relocation of production abroad. Eurostat supports EU member states in these developments. Some Adherents have developed their own raw material equivalents to calculate their material footprint using the expertise of research institutes (e.g. Austria). There are however still methodological differences in the way material footprints are calculated, and work by the OECD and other international organisations to converge towards a common calculation method will need to continue. The footprint methodology is also applied to economic activity sectors and to material categories (e.g. France). Adherents also increasingly relate data on material flows to data on environmental pressures such as greenhouse gas or air pollutant emissions, or produce carbon-based metrics of resource efficiency (e.g. United Kingdom). Data on the actual *environmental impacts* of materials use are rarely produced regularly; they often stem from research projects and case studies.

63. The level of implementation of this provision has improved since the 2014 report. But implementation remains partial. Gaps remain as regards the availability and international comparability of data on:

- Resource use and material flows within the economy and *across sectors and industries*.
- *Key materials and substances*, including critical raw materials, environmentally harmful substances, substances that play a role in global biogeochemical cycles and materials that raise global concerns as to their production, use and end-of-life management (e.g. plastics; food; materials in electric and electronic goods; packaging materials).
- Flows of materials that are important to a *circular economy and the 3Rs*, including secondary raw materials (recycled materials) and waste. Distinguishing between primary and secondary raw materials is important for assessing resource

productivity and decoupling trends, and for understanding the economic benefits of a circular economy.

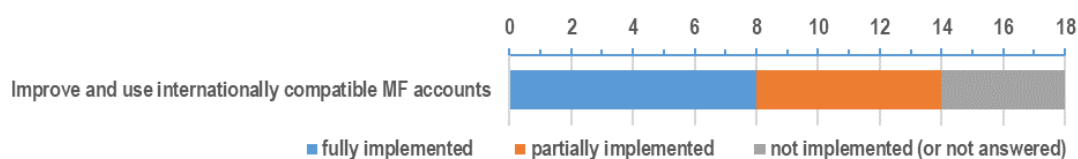
- The different **processing levels** of materials (raw materials, semi-finished products, finished products). Information on processing levels is important to identify opportunities for improved performance and efficiency gains in production and consumption processes, and along the supply chain.
- The size, value and availability of materials from **urban mines**.

64. Other important gaps include (i) data on the actual environmental impacts associated with material flows across all stages of the life cycle, (ii) data on the level of circularity of materials use in the economy and in economic activities, and (iii) data on the economic and fiscal instruments in use to promote greater resource productivity, including subsidies for resource extraction and use, beyond those for fossil fuels, and other market-based instruments.

#### 6.1.4. Material flow accounts (I.3.)

“3. work to improve and use soundly based, relevant and internationally compatible material flow accounts that track natural resource stocks and flows and link them to critical environmental cycles”.

65. Half of the respondents declared having fully implemented this provision and one third that they have implemented it partially.



66. The responses reveal important variations among Adherents. Some are more advanced than others. **Economy-wide MF Accounts** (EW-MFA) are well established in Europe. Statistical reporting building on such accounts is mandatory for EU member states since 2011 ([Regulation No 691/2011 of the European Parliament and of the Council on European Environmental Economic Accounts](#)) and is supported by Eurostat.<sup>24</sup>

67. EW-MFA are also regularly produced in other Adherents (e.g. Switzerland). Work has been initiated in Canada and Chile, and is planned in Israel and Colombia motivated by the accession process. The development of material flow accounts in countries, including non-Adherents, is further encouraged by international work on the implementation of the System of Environmental-Economic Accounting (SEEA), and by the SDG monitoring process that includes two material flow indicators under targets 8.4.1 and 12.2.1. UN Environment recently published a Global Manual on economy-wide material flow accounting supported by UNSD, the International Resource Panel, Eurostat and the OECD, and assists countries with a capacity building programme.

<sup>24</sup> Eurostat, Economy-wide material flow accounts handbook, 2018. Economy-wide material flow accounts (EW-MFA) report the amounts of physical inputs into the economy, material accumulation in the economy and outputs to other economies or back to nature. Physical inputs are classified in 50 material categories of biomass, metal ores, non-metallic minerals and fossil energy materials. EW-MFA are used to estimate, among other things, resource extraction by economies, material consumption, resource productivity, material footprints and the decoupling between economic growth and extraction of natural resources.

68. Adherents report improvements as regards (i) accounting methodologies (e.g. adjustment to the residence principle, new estimation methods for the extraction of sand and gravel); (ii) the length of the time series; (iii) the timeliness of material flow data, and (iv) the scope of the data covered, for example on Domestic Processed Output (emissions and wastes, dissipative use of products, dissipative losses); or on physical imports and exports disaggregated by stage of manufacturing (finished, semi-finished and raw products).

69. Some Adherents do not yet have economy-wide MF accounts. They focus their efforts on other types of physical flow accounts (e.g. energy, minerals), and on monitoring specific aspects of material resources (e.g. flows of waste and scrap) or specific sectors (private sector). A few Adherents have also developed detailed material flow accounts, which include information on material use and output *by economic activity*, i.e. physical supply and use tables by industry (e.g. Denmark, France, Germany). Others have set-up accounts for particular materials (e.g. copper in Chile). Material flow accounts are also being produced at *territorial level*. France has, for example, developed a methodology for regional material flow accounts that is now used in several regions (Aquitaine, Bretagne, Grand Est, Bourgogne).

70. *Physical flow accounts* for natural resources and materials are implemented in many Adherents. Their establishment is mandatory in the European Union for energy supply and use.<sup>25</sup> Other examples include waste accounts (e.g. Denmark, Germany, Norway), water accounts (e.g. Australia, France, Spain) and forest accounts (e.g. Australia, Canada, Estonia, Finland, France, Norway). Efforts continue to improve these accounts in line with the UN-SEEA-CF and to align their structure with that of monetary accounts to facilitate the integration of physical and economic data for further analysis (e.g. the Canadian System of Environmental-Economic Accounts). Progress has also been made with the development and use of *environmentally extended input-output models* to connect data on raw materials extraction and use to data on e.g. greenhouse gas emissions and employment, or to connect detailed consumption statistics and to data on environmental pressures of the use phase of consumption products (e.g. Belgium (Flanders)).

71. A number of Adherents have established or pilot-tested *physical asset accounts* on natural resources and materials, such as forest resources, soil resources, water resources, aquatic resources, energy (oil and natural gas) and minerals and produce related indicators. Some have established monetary asset accounts. International comparability of such accounts is promoted through the implementation of the SEEA. Stocks of non-renewable resources (minerals, oil, natural gas) and forest resources are generally better covered than stocks of water, soil or land resources. The information made available is however not yet comparable across countries. The production of asset accounts is not yet well developed and does not yet enable an effective tracking of natural resource stocks and flows.

72. Little has been done to link natural resource accounts to critical environmental cycles, though a few countries are moving in this direction. The United Kingdom for

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<sup>25</sup> Physical Energy Flow Accounts (PEFA) are produced in all EU member states; their implementation is mandatory under the Regulation on environmental accounts (European Regulation 691/2011) and is supported by Eurostat. PEFA report flows of energy (including natural inputs used to manufacture energy products and energy residuals) from the environment into the economy, within the economy and from the economy to the environment. Energy flows are reported with a breakdown by type of natural inputs, products and residuals as well as by supplier and user (64 industries plus households).

example looks at natural resource stocks and flows and at their links to environmental cycles as part of the work of its Natural Capital Committee.

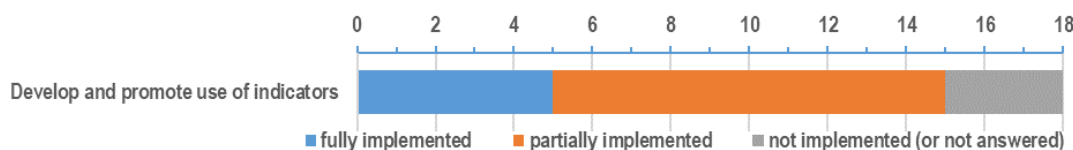
73. According to the Survey responses, other types of accounting, such as material flow cost accounting receive little attention<sup>26</sup>.

74. The level of implementation of the provision on accounts remains partial. Most progress made focuses on economy-wide material flow accounts. Work in this area will need to be consolidated and the country coverage expanded. The production of specific and more detailed accounts needs to be further encouraged in line with international standards<sup>27</sup> (e.g. material flow accounts by economic activity; accounts for specific materials). Progress to establish internationally compatible material flow accounts that track natural resource stocks and flows in physical and monetary terms is slow. Asset accounts, in particular, remain insufficiently developed and are often not comparable internationally. Little efforts have been made to link natural resource and material flow accounts to critical environmental cycles.

#### 6.1.5. Indicators (I.4.)

"4. Further develop and promote the use of indicators for the assessment of the efficiency of material resource use: [...]"

75. Most respondents declared having only partially implemented this provision that covers many different types of indicators at various levels of granularity. The responses reveal important variations among Adherents.



76. Most Adherents have national sets of environmental, sustainable development or green growth indicators, which include indicators derived from natural resource or material flow accounting, often complemented with indicators on waste flows and their management. These indicators usually describe *economy-wide material use and decoupling trends*, as well as related intensity and productivity ratios. An increasing number of countries are producing indicators on *demand-based material flows*: material footprints or raw material consumption, and related intensity and productivity ratios (e.g. Austria<sup>28</sup>, France, Germany<sup>29</sup>, Italy, Switzerland). The methodology used in Europe is

<sup>26</sup> In 2011, MF cost accounting has been integrated into the family of ISO standards on environmental management (ISO 14051:2011). It establishes an information system, which traces and quantifies material input and output flows and stocks within an organisation, and which can be used to better understand the environmental and financial consequences of material and energy use practices, and to identify opportunities for efficiency improvements.

<sup>27</sup> See the Central Framework of the System of Environmental Economic Accounting (SEEA).

<sup>28</sup> Austria developed an excel tool for the calculation of raw material equivalents (RME) for use at Statistics Austria.

<sup>29</sup> Germany uses Total Raw Materials Productivity (productivity ratio) as a policy indicator, e.g., in the German Resource Efficiency Program and Sustainable Development Strategy. See: <https://www.umweltbundesamt.de/en/indicator-raw-material-consumption> <https://www.umweltbundesamt.de/en/indicator-total-raw-material-productivity> .

usually based on guidance by Eurostat. Some Adherents use their own calculation method. Beyond the European Union, efforts to develop national aggregate material flow indicators are in a preliminary stage (e.g. Canada, Chile, Israel).

77. Economy-wide indicators are used to monitor the efficiency of material resource use and its sustainability at various levels, often with a link to waste management policies, sometimes with a link to globalisation and trade, and to the security of materials supply. Material footprint indicators are used to get a sense of the potential pressures exerted by domestic final demand on natural resources abroad. They are also applied to identify environmental hotspots along the value chain of economic sectors (e.g. in Switzerland). Economy-wide indicators are further used to monitor progress towards the *SDG targets* 8.4. and 12.2.<sup>30</sup> In the European Union, progress towards a resource efficient, low-carbon economy is monitored with a dashboard of indicators.<sup>31</sup> The main indicator is resource productivity.

78. A few Adherents have developed, or started to develop, sets of indicators that go beyond standard economy-wide MF indicators, and that provide *more targeted information* for policy making. A few countries have developed an indicator framework for monitoring the use of resources and waste management across the *lifecycle* (e.g. the United Kingdom). Several Adherents use indicators focusing on *particular resources, materials*, substances, products or industries. The indicators' focus varies across countries and often depends on national policy priorities. A few indicators reflect global concerns on e.g. plastics or marine litter.

79. One of the most complete indicator sets can be found in Japan. Japan was among the first OECD Member countries introducing a framework for monitoring progress towards a Sound Material-Cycle Society, supported with quantitative targets and performance indicators (Box 1).

80. Relevant indicators are also being developed by the *business sector*. In a few Adherents businesses have developed risk indicators that focus on critical material resources and that monitor how different types of resource risks could affect the material supply chain and product portfolio (e.g. in the United Kingdom). The risks covered include physical risks (related to resource scarcity), economic risks (related to volatile pricing) and geopolitical risks (related to political barriers).

81. Indicators on the availability, quality and deterioration of *natural resource stocks* are less developed. The same applies to indicators on the *environmental impacts* of material flows. Material footprint indicators are often seen as proxies for reflecting the environmental impacts of material flows. Some countries produce indicators on the carbon intensity of materials use; others link material flow data to data on environmental pressures through input-output modelling and produce related indicators; some use indicator dashboards that juxtapose material flow and resource productivity indicators and environmental quality indicators. But, reliable and broadly accepted indicators on the qualitative dimension of "resource productivity" and the real environmental costs of resource use (e.g. in terms of climate change and biodiversity) are still missing.

82. In recent years, efforts have been increasingly directed at developing measurement frameworks and *indicators for a circular economy*, building on data from national waste statistics and material flow accounts (e.g. Canada, Colombia, Finland, France, the

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<sup>30</sup> The global list of SDG indicators includes two economy-wide material flow indicators : material footprint (8.4.1 and 12.2.1) and domestic material consumption (8.4.2 and 12.2.2).

<sup>31</sup> See the EU flagship initiative A resource-efficient Europe under the Europe 2020 Strategy.

Netherlands, Poland).). The main material flow and resource productivity indicators are thus found in circular economy indicator sets, together with indicators on waste recovery and management (e.g. France) In the EU, Eurostat developed an indicator dashboard for the circular economy, including a circular use rate indicator similar to the one used in Japan.

83. Overall, the level of implementation of the provision on indicators remains partial, but with promising recent developments notably in the area of circular economy indicators. Advances were made with the development and availability of overview indicators, but progress is insufficient as regards indicators on natural resource stocks and indicators on the environmental impacts of materials, taking account of their entire life cycle. More is needed to develop reliable indicators that link resource stocks and flows, and indicators that link material flows and waste flows. More is also needed to build robust and internationally comparable indicators on circular flows of materials and products that embody them and to develop indicators that help improve the coherence of policies and measures to improve resource productivity and establish a circular economy. There is also still room for better using the information and indicators available for the purpose of policy planning and for target setting (see section on Targets II.1).

### *Availability of indicator types*

Indicator types (as provided for in the Recommendation)	Survey responses
<p>Indicators to measure <b>resource productivity and decoupling</b> of resource use from economic growth, at relevant macro, sectoral and/or micro levels, considering both:</p> <ul style="list-style-type: none"> <li>• <b>overview indicators</b> for monitoring natural resource use, resource productivity and the associated environmental impacts; and</li> <li>• <b>specific and disaggregated indicators</b> for monitoring resource use, resource productivity, 3R (Reduce, Reuse, and Recycle) related flows and the associated environmental impacts concerning particular resources, materials or activities</li> </ul>	<ul style="list-style-type: none"> <li>• Most Adherents, especially in EU member states, regularly produce and publish overview indicators on material flows and resource productivity derived from EW-MFA. Examples include DMC, material productivity or intensity, material footprints.</li> <li>• Specific indicators on particular materials or activities are produced less regularly and are often country-specific, but are increasingly considered in work on indicators for a circular economy.</li> </ul>
<p>Indicators to inform about the availability, quality and deterioration of <b>natural resource stocks</b>, in particular renewable resource stocks</p>	<p>A number of Adherents produce indicators on natural resource stocks derived from physical asset accounts. Stocks of non-renewable resources (minerals, oil, natural gas) and forest resources are generally better covered than stocks of water, soil or land resources.</p>
<p>Indicators to track the <b>flows and environmental impacts of materials</b>, taking account of their entire life cycle from natural resource extraction and manufacturing to end of life management.</p>	<p>Efforts are concentrated in a small number of countries and focus on demand-based material flow indicators (material footprints, raw material consumption). These indicators do however not reflect all stages of the life cycle, nor do they allow to track actual environmental impacts. They rather help understanding the potential environmental pressures that drive impacts, and point to developments that require further analyses.</p> <p>Some Adherents use indicator sets or dashboards that present MF indicators together with other relevant indicators to establish a link with environmental impacts. Other countries invest in the development of supply-use tables and life cycle approaches to strengthen their analytical work.</p>

## Box 1. Material flow and resource productivity indicators in Japan

The Japanese government adopted its Fundamental Plan for Establishing a Sound Material-Cycle Society in 2003. The Plan included a first set of three quantitative time-bound targets. Stakeholders are asked to contribute to their achievement. The targets and the associated indicators are used to monitor progress, assess each stakeholder's efforts and encourage further action. The indicators are published in the Annual report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan ([White Paper](#)). The Fundamental Plan and its targets were last revised in 2018 ([Fourth Fundamental Plan](#)).

### *I. Overview indicators and associated targets for FY 2025*

<i>Indicators</i>	<i>Targets for FY 2025</i>
1. Resource Productivity	490 000JPY/tonne, i.e. approx. a doubling of FY 2000
2. Cyclical Use Rate (resource based)	18%, i.e. ~ 80% increase from FY 2000
3. Cyclical Use Rate (waste based)	47%, i.e. ~ 30% increase from FY 2000
4. Final Disposal Amount of waste	13 million tonnes, i.e. a 77% cut from FY 2000

### *II. Thematic material flow indicators (some associated with targets)*

1. Resource productivity by industry	6. Ratio of domestically-produced biomass resources to total natural resource inputs
2. Generation of household food waste	7. Per-capita waste generation per day
3. Generation of commercial food waste	8. Per-capita household waste generation per day
4. Emission of greenhouse gas from the waste sector	9. Business waste generation
5. Reduction of GHG emissions from other sectors through using waste as raw materials and fuel for power generation	10. Amount of illegal dumping
	11. Amount of waste treated improperly

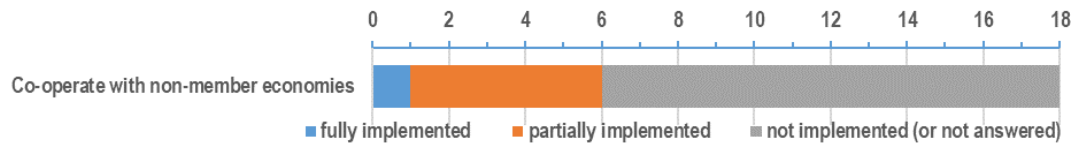
### *II. Thematic management indicators (some associated with targets)*

1. Market size of sound material-cycle society business	12. Diffusion rate of electronic manifests
2. Average power generation efficiency of waste incineration facilities constructed/improved during the period	13. Remaining sustainable years of final disposal sites for municipal waste
3. Area of forests with specific forest management plans	14. Remaining sustainable years of final disposal sites for industrial waste
4. Number of local governments working on Regional circular and ecological sphere	15. Share of local governments having a disaster waste management plan
5. Size of reuse market	16. Number of nations with which a memorandum of understanding/agreement on environmental cooperation (including for resource recycling) is signed
6. Size of sharing economy market	17. Number of recycling businesses promoting overseas expansion
7. Guidelines for product assessment by industries (design for environment)	18. Share of research projects on sound material cycles
8. Implementation rate of recycling of cyclical food resources	19. Waste reduction and awareness for cyclical use and green purchase
9. Establishment rate of life extension plans for individual facilities (individual facility plan)	20. Implementation rate of specific 3R actions
10. Number of illegal dumping cases	
11. Number of improper waste treatment cases	

*Source:* Country contribution to the annual Round Table on Environmental Information (WPEI) and <http://www.env.go.jp/en/wpaper/>

### 6.1.6. Co-operation with non-Members (I.5.)

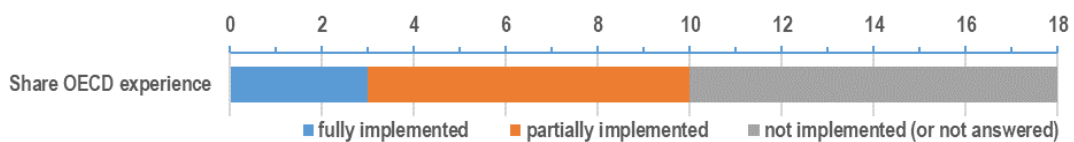
”5. Co-operate with non-member economies to strengthen their capacity for analysis of material flows and the associated environmental impacts”.



84. The level of implementation of this provision is considered low. According to the Survey results, bilateral co-operation with non-Members is rare. But many Adherents are actively engaged in international work (e.g. by UNDP, UNEP, OECD) and see this as a way to cooperate with non-Members. According to the first progress report, co-operation with non-Members and capacity building are often done through research institutes and academia and supported with public funding. Examples of bilateral cooperation reported under the Annual Round Table on Environmental Information of the WPEI include for example technical cooperation between Statistics Netherlands and the Central Bank of Costa Rica to establish material flow accounts. Such programmes were however not reported by respondents to the Survey. This could point at a lack of coordination in countries when responding to the Survey. It could also point at a lack of attention given by Adherents to cooperation with non-Members on this topic in recent years. Some non-Members participate in the meetings of the WPEI where material flow analysis and resource productivity indicators are discussed (e.g. Indonesia, South Africa, Russian Federation).

### 6.1.7. Sharing OECD guidance (I.6.)

”6. Share OECD guidance and experience on the measurement and analysis of material flows and resource productivity with all relevant ministries and departments of government, research and other non-governmental organisations, and members of the private sector.”



85. The level of implementation of this provision is considered low. Only a few respondents reported that they share OECD guidance<sup>32</sup> and experience. Examples include the development of a methodological guide to help companies prepare material balance sheets (e.g. France).

86. This points at insufficient dissemination efforts (see Chapter 4) both in Adherents and by the Secretariat, and at a general lack of awareness about existing OECD guidance and about the Recommendation (including the 2004 Recommendation on Material Flows and Resource Productivity that focuses in information and indicators). In countries that are EU member states, guidance under the EU Directives and action plans and statistical guidance by Eurostat is usually the main reference. Respondents see the Recommendation as a more general reference for the development of indicators.

<sup>32</sup> This includes for example the OECD Guide on Measuring Material Flows and Resource Productivity, <https://www.oecd.org/environment/indicators-modelling-outlooks/MFA-Guide.pdf>.

### 6.1.8. Conclusions

87. Thirteen years after the adoption of the Recommendation and six years after the first assessment of progress, *important advances* have been made as regards the analysis of material flows and resource productivity and related measurement systems. Macro-level material flow accounts (EW-MFA) and overview indicators are increasingly produced and updated on a regular basis. More data have become available on material use by industry, flows of individual materials and products, and natural resource stocks. Scientific knowledge of the environmental impacts of material flows is progressing thanks to greater use of life-cycle based approaches, environmentally extended Input Output models and footprint methodologies. Though not reflecting environmental impacts per se, such approaches provide an indication of potential environmental pressures stemming from materials use. Recent years have also seen promising initiatives to develop indicator frameworks for a circular economy.

88. However, specific progress in implementing the Recommendation *remains insufficient*. Many advances made in recent years do not benefit the establishment of international databases and important knowledge gaps remain. Responses to the Survey suggest that the provisions on the analysis of material flows and their environmental impacts are ambitious and that more time is required to fully implement them. They also indicate that the way Adherents interpret the provisions and their level of implementation varies among Adherents. Though nuanced, the main messages arising from this second assessment are thus similar to those arising from the first assessment.

89. The information available remains insufficient to effectively support natural resource and materials management, and resource productivity and circular economy policies. Little progress has been made in analysing the environmental costs of material resource use.<sup>13</sup> The size, value and availability of future urban mines, i.e. the material stocks locked in the economy that could contribute to future supply is not yet well known, and little information is available on the level of circularity of materials use in the economy and in economic activities. Other important gaps include information on economic and fiscal instruments in use to improve resource productivity, including subsidies for resource extraction and use, beyond those for fossil fuels, and other market-based instruments.

90. Adherents will need to make additional efforts to fully implement the Recommendation and to consolidate the progress made.

- In areas such as macro-level *material flow accounts*, economy-wide MF data and overview indicators, work will need to be strengthened and the country coverage expanded. The production of specific and more detailed accounts needs to be further encouraged in line with other international standards<sup>33</sup> (e.g. material flow accounts by economic activity; physical and monetary asset accounts; accounts for specific materials).
- More effort is needed to advance the development *compatible international data* on (i) material flows within the economy and across economic activity sectors, (ii) flows that are important to a circular economy and the 3Rs, including secondary raw materials and waste and their physical trade flows, (iii) flows of key materials and substances that are of economic and environmental importance (e.g. plastics;

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<sup>13</sup> For example, costs associated with the loss of productivity due to inefficient use of material resources, negative effects of materials and product use on human health, labour productivity, and ecosystem services, etc.

<sup>33</sup> See the Central Framework of the System of Environmental Economic Accounting (SEEA).

food; critical metals, electric and electronic goods), (iv) the different processing levels of the materials (raw materials, semi-finished products, finished products), and (v) the size, value and availability of materials from urban mines.

- More work is needed to build *robust and internationally comparable indicators*, including indicators on circular flows of materials and products that embody them, indicators that link natural and man-made resource stocks to material flows, and indicators that link material flows to waste flows. More work is also needed to develop indicators that help improve the coherence of policies and measures to improve resource productivity and establish a circular economy and that build on a combination of well-structured environmental and socio-economic data.
- Research and analysis to monitor the *actual environmental impacts* throughout the entire life cycle and value chain of materials and the products that embody them needs to be pursued and strengthened, and related data and indicators produced on a more regular basis so as to enable wider use in decision-making.

91. There is also still scope for deeper analysis of other issues already mentioned in the 2014 Report. This includes: (i) analysis of specific material and waste flows and the way they interact with commodity prices and recycling markets, and how they relate to natural resource stocks, resource rents and supply security, and to innovation and competitiveness; (ii) analysis of the socio-economic and environmental opportunities provided by improved resource productivity, sustainable materials management and circular business models. There is also still room for better using the information and indicators available for the purpose of policy planning and for target setting.

92. The OECD will continue to support Adherents in their efforts to improve information and knowledge on material flows and resource productivity, and to provide a forum for the exchange of experience and good practices, including with non-Members. It will continue to develop high quality data and indicators on resource productivity, promote their use in OECD work and in Adherents, and monitor and report on the state of resources and resource productivity in OECD Member countries and beyond. Particular attention will be given to the following work elements:

- The development of internationally harmonised information and indicators on material flows and resource productivity, both at macro level and for selected materials, including critical raw materials and materials raising particular environmental concerns, such as plastics. And the further harmonisation of international methodologies to calculate material footprints and the provision of guidance to interpret the associated indicators. This is done as part of OECD work on environmental information and indicators, and work on modelling. An analysis of information needs and available data for supporting the transition to a resource efficient circular economy will be carried out as part of the PWB 2021-22 (joint work by the WPEI and the WPRP). This work will result in the production of a conceptual framework and a set of indicators to monitor progress and the circularity of material flows in the economy, and a report with practical guidance. This is done in coordination with other International Organisations, including UNECE, Eurostat, the European Environment Agency (EEA) and the UN Environment International Resource Panel.
- Work in the Environment Policy Committee and the Committee on Statistics and Statistical Policy to implement the System of environmental economic accounting (SEEA) continues. The OECD leads international work on the establishment of global SEEA core databases, including on material flows. This is done in

cooperation with other International Organisations, including the UNSD, UN Environment and Eurostat.

- Further analysis of material flows and their economic, trade and environmental implications will be carried out as part of the organisation’s work on modelling and on trade and the environment. This includes work on trade and the circular economy (by JWPTE), as well as trade flow analyses, modelling and scenarios of plastic production, consumption and waste (joint work by WPRPW and WPIEEP).

## **6.2. Progress made with policies concerning the improvement of resource productivity (second part of the Recommendation - II)**

93. This section reviews progress made by Adherents since the 2014 Report in implementing the second part of the Recommendation, which provides that, with regard to **the policies concerning the improvement of resource productivity**, Adherents:

“Take appropriate actions to improve resource productivity and reduce negative environmental impacts of materials and product use, by encouraging environmentally effective and economically efficient uses of natural resources and materials at the macro, sectoral and micro levels and by involving all relevant ministries and departments of government as well as research and other non-governmental organisations.”

94. The transition to improved resource productivity has gained significant political traction in recent years and a variety of policy frameworks, targets and specific policy instruments have been developed and implemented at sub-national, national and multilateral levels by Adherents.

### ***6.2.1. Key developments at international and national levels***

#### *International developments*

95. Several high-profile multilateral initiatives have emerged in recent years that affirm the importance of resource productivity, sustainable resource use and management and the circular economy. These initiatives contribute to the implementation of resource productivity policies at the national level. They help to promote the uptake of resource productivity policies and thus contribute to the implementation of selected provisions of the Recommendation in both Adherents and non-Adherents, in particular provisions II.1, II.4, and II.5 to II.7.

96. In the G7 context, the G7 Alliance on Resource Efficiency was established at Schloss Elmau in 2015, and has been built upon by the adoption of the Toyama Framework on Material Cycles in 2016, and the Bologna Roadmap in 2017. In 2017, G20 governments established the ongoing G20 Resource Efficiency Dialogue. In the European Union, the Resource Efficiency Platform was established as well as the 2015 Circular Economy Action plan. A new Circular Economy Action Plan released in 2020 forms one of the main building blocks of the 2020 European Green Deal.

97. OECD Member countries also identified resource productivity, the circular economy and sustainable materials management (SMM) as one of the top priorities for the OECD Environmental Policy Committee (EPOC). During the past three biennia (2015/16; 2017/18; 2019/20), resource productivity, circular economy and SMM have been ranked among the top three – if not at top – of the priority ranking exercise and will likely remain a key priority for the upcoming biennium (2021/22). At the OECD Secretariat, this work is essentially carried-out in the framework of the OECD RE-CIRCLE project, which has produced a broad range of outputs on this topic (e.g. (OECD, 2019<sub>[3]</sub>; OECD, 2019<sub>[14]</sub>)).

Plastics have been given particular attention, with an analysis of secondary plastics markets (OECD, 2018<sup>[8]</sup>) and a Global Forum on sustainable design of plastics held in Copenhagen in 2018.

### *National and subnational developments*

98. At the national level, at least 12 Adherents have developed national strategies, roadmaps and policy packages that address elements of resource productivity since the last progress assessment (see Table 1). These strategies and roadmaps lay out and support the implementation of resource productivity policies. Their development and adoption among Adherents is thus an indication of progress towards implementing the policy related provisions of the Recommendation.

99. The priority areas of these resource productivity strategies vary across countries. Waste management, material recovery and raw material consumption are common focus areas, but some also include aspects of eco-design, green public procurement (GPP), innovation, repair and reuse. National strategies can also have a specific policy focus on certain waste streams; some frequently addressed issues are plastics or food waste, others focus on waste of electric and electronic equipment (WEEE) or construction and demolition waste.

100. The policy field is dynamic and several adherent countries are currently in the process of developing national resource productivity roadmaps and strategies using a circular economy approach. Thus, the list provided in Table 1 is non-exhaustive and should be considered a snapshot in time.

**Table 1. National and subnational resource productivity and circular economy strategies in OECD and Partner Countries**

	Year of introduction	Strategy name	Level	Content
Australia	2018	2018 National Waste Policy: Less waste, more resources	National	Framework for collective action by businesses, governments, communities and individuals until 2030.
Belgium (Brussels)	2016	Regional plan for the circular economy, Brussels Capital Region	Regional	10-year framework to move Brussels' economy to a circular model including 4 axes: Transversal ( regulatory framework); sectorial (specific industries); territorial and governance (to bring together 3 ministerial department)
Belgium (Flanders)	2017	Circular Flanders	Regional	Partnership of governments, companies, civil society, and the knowledge community that will take action together
Canada (Ontario)	2017	Strategy for a Waste-free Ontario	Regional	Comprising 15 actions towards resource productivity and building a circular economy.
Denmark	2017	Strategy for the circular economy	National	High level national strategy including 15 initiatives
European Union	2015	EU Circular Economy Action Plan	Multi-national	The EU Circular Economy Action Plan establishes a programme of action, with measures covering the whole cycle: from production and consumption to waste management and the market for secondary raw materials. The accompanying revised legislative framework on waste entered into force in July 2018.
European Union	2018	EU Plastics Strategy	Multi-national	Comprehensive policy strategy to transform the way plastics and plastics products are designed, produced, used and recycled, with the aim that all plastics packaging should be recyclable by 2030.
European Union	2020	EU New Circular Economy Action Plan	Multi-national	The new Circular Economy Action Plan forms one of the main building blocks of the 2020 European Green Deal. Building on the work done since 2015, the new Plan focuses on the design and production for a circular economy, with the aim to ensure that the resources used are kept in the EU economy for as long as possible.

	Year of introduction	Strategy name	Level	Content
Finland (Paijat-Hame)	2017	Paijat-Hame roadmap towards a circular economy	Regional	Overarching themes: Closed loops of technical streams to create added value, Sustainable business from bio-circular economy, Towards energy self-sufficiency by sustainable transport and energy solutions, Shared economy generates new consumption models and business opportunities, Piloting and demonstrating innovative circular economy solutions
Finland	2016	Leading the cycle – Finnish road map to a circular economy 2016-2025	National	Focus areas: sustainable food system, forest-based loops, technical loops, transport and logistics, and joint actions.
France	2018	Circular Economy roadmap of France	National	Priority areas: better production, better consumption, better waste management, and engaging all stakeholders
Germany	2020	German Resource Efficiency Programme (ProgRes) III	National	Objectives: (1) Decouple economic growth from resource consumption and reduce the associated environmental burdens; (2) Make the German economy more future-proof and competitive, thus promoting stable employment and social cohesion. ProgRes III specifically stresses the importance of resource efficiency for achieving Germany's climate targets, analyses the potential and risks of digital transformation in the field of resource efficiency, and takes a look at mobility from the point of view of resource efficiency and identifies priority actions. Note that several sub-national programs exist (at the level of the Länder) in addition to ProgRes at the national level.
Greece	2018	National Action Plan on Circular Economy	National	Priority actions: lifting barriers to a circular economy, earmarking existing funds to implement interventions and fund demonstration projects; further enhancing knowledge, understanding, education, awareness and communication, improving governance structures by setting up an inter-ministerial Executive Secretariat for the Circular Economy to oversee implementation and related Observatory to monitor progress
Italy	2017	Towards a Model of Circular Economy for Italy	National	Call for a "change of paradigm" for Italy's economy, for a new way to consume, produce and do business. Focus on the need for a new industrial policy aimed at sustainability and innovation capable of increasing the competitiveness of products and manufacturing.
Japan	2018	4th Fundamental Plan for Establishing a Sound Material-Cycle Society	National	The Plan is formulated based on the Basic Act on Establishing a Sound Material-Cycle Society (enacted in 2000), and sets a mid- to long-term direction for the establishment of a sound material-cycle society in Japan.
Korea	2016	Framework Act on Resource Circulation	National	The provisions of the FARC can be divided into three categories, each of which is establishing a basis for resource circulation, promoting resource circulation, and supporting recycling industries. The FARC introduces new waste management related programs such as 'Recyclable Resource Recognition Program (RRRP)', 'Resource Circulation Performance Management Program (RCPMP)', 'Waste Disposal Fees'.
Lithuania	2020	Nacionalinis pažangos planas	National	The "National Progress Plan" covers the main areas where Lithuania seeks to achieve progress in the period 2021-2030 as well as new indicators for monitoring the progress achieved. The Plan includes resource productivity goals and indicators (e.g. recycling of municipal waste, material recovery). Additionally, Lithuania has a National Waste Prevention Programme and a National Waste Management Plan.
Luxembourg	2018	National Waste and Resource Management Plan	National	Includes measures that will be taken to ensure the re-use, recycling, recovery and disposal of waste in the most environmentally friendly conditions, as well as targets related to waste.
Poland	2019	Roadmap towards the Transition to Circular Economy	National	The aim of the roadmap is twofold: first, to identify cross-cutting measures capable of having the broadest possible impact in Poland, both socially and economically; and second, to prioritise areas that will enable Poland to take advantage of its current opportunities, and to deal with existing or future challenges.
Portugal	2017	Leading the transition: a circular economy action plan for Portugal	National	Focus areas: EPR, Incentivising a circular market, Education, Food waste, Secondary raw materials, Innovation, Green public procurement, Responsible business
Slovenia	2018	Roadmap Towards	National	Priority areas: Food system, Forest-based value chains, Manufacturing,

	Year of introduction	Strategy name	Level	Content
		the Circular Economy in Slovenia		Mobility
Slovenia (Maribor)	2018	Strategy for the Transition to Circular Economy in the Municipality of Maribor	Municipal	Focus: cross-sectoral cooperation in handling, processing, re-use and development of resources, which deals with the circular economy in Maribor in seven selected sectors (i.e pillars or circles).
Spain (Castilla La Mancha)	2019	Castilla La Mancha – Circular Economy Law	Regional	
Spain (Basque Country)	2019	Circular Economy Strategy of Basque Country	Regional	
Spain (Galicia)	2019	Galician Strategy on Circular Economy	Regional	
Spain (Navarre)	2019	Navarre Agenda for the circular economy development	Regional	Focus on waste free design, economic resilience, renewable energies, system thinking, cascading of materials
Spain (Andalusia)	2018	Andalusian Strategy on Sustainable Development (2018-2030)	Regional	Sustainable development strategy includes circular economy principles.
Spain (Extremadura)	2017	Extremadura 2030	Regional	Implementation through 4 horizontal programmes - Massive citizen participation program; - Citizen training program in green leadership; - Green and bio-economy R&D support program; - Program for the identification and enhancement of the full potential of the green economy of Extremadura.
Spain (Catalonia)	2015	Promoting Green and Circular Economy in Catalonia	Regional	Key policy areas: the generation of demand and creation of markets, the improvement of the access to funding, the stimulation of research, development and innovation, the boosting of internationalisation and the promotion of employment and entrepreneurship
The Netherlands	2016	Netherlands Circular in 2050	National	Priorities: Biomass and food, plastics, the manufacturing industry, construction sector and consumer goods.
United Kingdom (England)	2018	Resources and waste strategy for England	Regional	Comprehensive strategy to preserve material stocks, promote resource efficiency, minimise environmental damage through improved waste management and waste reduction and address waste crime.
United Kingdom (Scotland)	2016	Making Things Last: a circular economy strategy for Scotland	Regional	Priorities: food and drink, remanufacture, construction and build environment, energy infrastructure
UK (London)	2017	London's Circular Economy Route Map	Municipal	Vision of London thriving through the adoption of the principles of circular economy where products, components and materials keep their highest use and value at all times.
United States	2015	Sustainable Materials Management Action Plan	National	Four primary SMM program objectives: Decrease the disposal rate, which includes source reduction, reuse, recycling and prevention; Reduce the environmental impacts of materials across their life cycle; Increase socio-economic benefits; and Increase the capacity of state and local governments, communities and key stakeholders to adopt and implement SMM policies, practices and incentives. Priority areas for 2017-2022: 1) The Built Environment; 2) Sustainable Food Management; and 3) Sustainable Packaging.

*Note:* This table only lists policy strategies that are already in place. Several countries and regions are currently in the process of developing similar policy strategies. Relevant strategies of non-adherent countries are indicated in italic.

*Source:* (EESC, 2019<sup>[20]</sup>) (European Union, 2018<sup>[21]</sup>), (Circulate, 2018<sup>[22]</sup>), (Green Growth Knowledge Platform, 2016<sup>[23]</sup>), (EPA, 2015<sup>[24]</sup>) (EEA, 2020<sup>[25]</sup>)

101. Whilst several Adherents have developed strategies for resource efficiency or circular economy, others developed strategies focusing on specific issues, such as waste management, recycling, energy or energy efficiency or developed broader policy strategies

on sustainable development or the environment that touch upon resource productivity. For instance, the 2018 Luxembourg's National Waste and Resource Management Plan includes measures on re-use, recycling, recovery and disposal of waste (Government of the Grand Duchy of Luxembourg, 2018<sup>[26]</sup>). Similarly, the 2018 National Reform Programme of the Czech Republic includes objectives on the effective use of secondary raw materials, conversion of waste to resources and recycling (Government Czech Republic, 2018<sup>[27]</sup>). Canada's "Federal Sustainable Development Strategy 2019–2022" also includes aspects on promoting recycling, waste reduction and efficient use of natural resources (Government of Canada, 2019<sup>[28]</sup>). Spain's State Plan for Waste Management Framework (PEMAR) and State Waste Prevention Program aims to reduce waste generation and increase material recovery.

### Box 2. The rise of plastics on the political agenda

The growing concern about the adverse environmental impacts of (marine) plastics litter has led to a number of high-profile multilateral and national initiatives specifically on increasing resource productivity, resource recovery and reducing environmental impacts related to plastics.

At the level of the G7, the issue of plastic waste and marine litter was first included in the agenda in 2015 in the form of the G7 Action Plan to Reduce Marine Litter, and has remained in the spotlight during subsequent G7 presidencies (Government of Canada, 2020<sup>[29]</sup>). Marine plastics litter was introduced to the G20 in 2017 at the G20 Hamburg summit, with the adoption of the "G20 Action Plan on Marine Litter". In 2019, the "G20 Implementation Framework for Actions on Marine Plastic Litter" was established, as well as the "Osaka Blue Ocean Vision", which aims to reduce additional pollution by MPL to zero by 2050 through a comprehensive life-cycle approach, which has since been widely shared at various international fora as a common global vision (G20, 2020<sup>[30]</sup>).

In the EU, a plastics strategy was launched in 2018, which sets bold targets for plastics recycling quotas and recycled content requirements. Furthermore, a number of countries and the EU have introduced plastic specific policies, such as levies and bans on single use plastic items or other initiatives to improve plastic waste sorting and recycling.

Sources: (G20, 2017<sup>[31]</sup>; G7, 2019<sup>[32]</sup>; European Commission, 2018<sup>[33]</sup>)

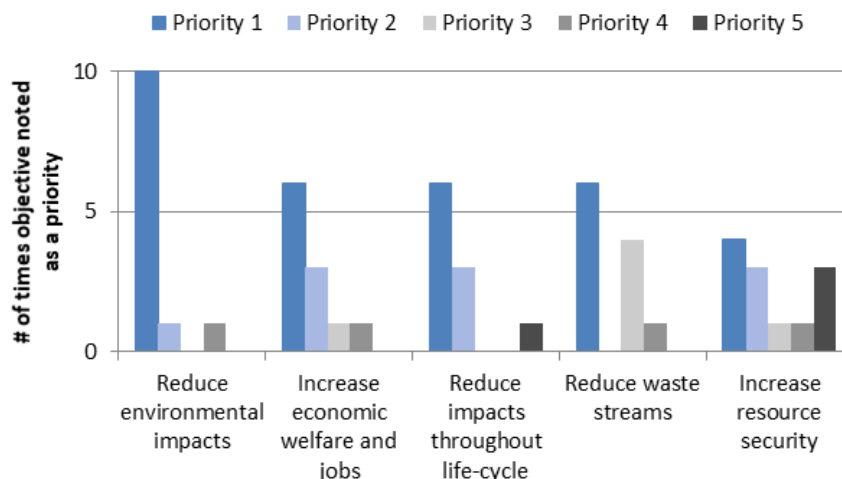
### *Drivers of resource productivity policies*

102. Adherents can have different rationales to increasing resource productivity. According to an OECD questionnaire, environmental objectives seem to be key driver to increase resource productivity (Figure 7). Decoupling economic activities from environmental impacts related to upstream raw materials consumption or downstream waste generation and landfilling was indicated as motivating driver by all respondents.

103. Economic, resource security and resilience seem to be additional, but secondary motivating factors. Resource productivity can achieve increasing economic output with the same resource input, which can lead to an increase in economic welfare and jobs. Increasing

the resilience to imports of critical raw materials and increasing resource security through resource productivity can be especially of concern for resource importing countries.<sup>34</sup>

**Figure 7. Results of the 2017 OECD questionnaire on circular economy policy objectives**



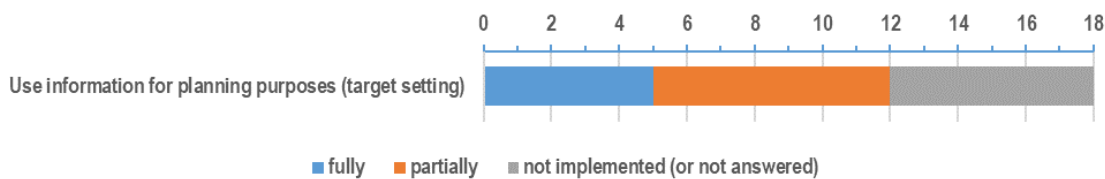
*Note:* Respondents were asked to assign a “priority 1” to the objective that they consider to be the most important, a “priority 2” to the objective that they consider as the next most important, and so on. Response rate: 10 out of 36.

*Source:* 2017 OECD Questionnaire on Objectives of Sustainable Materials Management (SMM)

**6.2.2. Targets (II.1)**

”1. Consider the use of information about material flows and their environmental impacts for planning purposes, as appropriate in a national context, including, for instance, using such information for target setting, and share these experiences and best practices with other Member countries”

104. According to the Survey, five Adherents reported that they implemented this provision fully and seven partially.



105. Most national-level strategies are supported by specific quantitative targets and objectives, but the targets and indicators differ widely. Some focus on improvements in resource efficiency or material intensity, others aim to reduce materials use (either domestic or total materials consumption) and again others focus on waste outputs and set targets for recycling rates, final disposal and landfill volumes.

*Resource productivity and efficiency targets*

106. Within the resource productivity indicators an important distinction needs to be made between Total Material Consumption (TMC) and Domestic Material Consumption

<sup>34</sup> The OECD Global Materials Resources Outlook to 2060 provides information on materials criticality (OECD, 2019<sub>[3]</sub>)

(DMC). Most targets for material consumption and resource productivity targets are expressed in DMC/GDP. Germany stands out and states a target including total raw material productivity (TMC/GDP), which takes into account raw materials needed for the production of imported goods and subtracts materials consumption of exported goods.

**Table 2. Overview of selected national resource productivity targets in selected Adherents**

Adherent	National target	Period or year
Austria	50 % increase in GDP/DMC	2008–2020
	4 to 10-fold improvement in GDP/DMC	By 2050
Estonia	10 % increase to 0.46 EUR/kg GDP/DMC)	2023
France	30 % increase in GDP/DMC	2010–2030
Germany	Doubling abiotic material productivity	1994–2020
	Trend of total raw material productivity to continue increasing at 1.5 % per year	2010–2030
Hungary	Reducing material intensity (DMC/GDP) to 80 %	2007–2020
Japan	roughly double resource productivity to 490,000 JPY/ton (base year 2000)	2000-2025
Latvia	Resource productivity of EUR 600/tonne	2020
	Resource productivity of EUR 710/tonne	2030
Portugal	Resource productivity of EUR 1.17/kg	2020
	Resource productivity of EUR 1.72/kg	2030
Slovenia	Resource productivity of EUR 1.5/kg from 1.07/kg	2011-2023
	EUR 3.5 purchasing power parity (PPP)/kg	2030

*Note:* This list of resource productivity targets in adherent countries is non-exhaustive.

*Source:* adapted from (EEA, 2019<sup>[34]</sup>) for European Countries and complemented by (Japan Ministry of Environment, 2018<sup>[35]</sup>)

107. There seems to be no direct correlation between Adherents that have circular economy and resource productivity strategies in place and countries that implemented targets for resource productivity. Of the countries listed in Table 2 only Austria and Germany seem to have dedicated resource efficiency strategies (EEA, 2019<sup>[34]</sup>). Reversely, many countries with RE-CE strategies do not necessarily state specific targets on resource productivity.

#### *Waste related targets*

108. Waste related targets have been implemented more abundantly among Adherents. These include waste generation caps and limits, waste reduction, recycling and recovery targets as well as waste stream specific targets, such as for food waste.

109. In the European Union, the EU action plan for the Circular Economy sets a common recycling target for 65% of municipal waste and 75% of packaging waste by 2030. In addition, EU member states face a binding landfill target to reduce landfill shares to maximum of 10% of municipal waste generated by 2035. Differentiated recycling targets are also set for different packaging materials including plastic (55%), wood (30%), ferrous metals (80%), aluminium (60%), glass (75%) and paper and cardboard (85%) (all by 2030) (European Parliament, 2017<sup>[36]</sup>).

110. While the EU targets are binding for EU member states, some of them have set target values that go beyond or complement the required EU target values (see Table 3 for selected examples of waste related targets in selected Adherents).

**Table 3. Selected examples of waste related targets in selected Adherents**

Adherent	National target	Year
<b>Examples of waste generation caps</b>		
Belgium (Flanders)	Residual waste: the targets range from 116 kg/person/year for suburbs to 258 kg/person/year for coastal municipalities. Overall for Flanders an average of 140 kg/person/year should be reached, taking into account that this no longer covers just household waste fractions but all mixed municipal waste as defined in the new EU Waste Framework Directive.	2020
Hungary	Generation of solid municipal waste to be less than 70 kg/person.	2020
Netherlands	The annual volume of household residual waste to be a maximum of 100 [30] kg/person.	2020 & [2025]
<b>Examples of waste reduction targets</b>		
United Kingdom (Scotland)	No more than 5% of all waste to go to landfill.	2025
Netherlands	Halve (compared to 2012) the volume of residual waste from companies, organisations and government	2022
Japan	Reduce disposable plastic waste by 25%	2030
Australia	National Food Waste Strategy: Halving Australia's food waste by 2030	2030
Canada	Reduction of waste disposal per capita by 30% [50%]	2030 & [2050]
<b>Examples of collection targets</b>		
Croatia	Separately collect 75% of the mass of construction waste.	2022
Germany	A 50% increase in the quantity of separately collected organic waste and high-quality recycling/recovery of such waste by 2020 relative to 2010.	2020
<b>Examples of recycling targets</b>		
Denmark	Recycling of organic waste, paper, cardboard, glass, wood, plastic and metal waste from households, including packaging: the target is to reach 50% by 2022.	2022
France	60% of materials purchased by national and local authorities for road construction to be reused or recycled building waste.	2020
Japan	Increase recycled and reused plastic of household and industrial waste to 60%	2030
Slovak Republic	The objective for recycling metal packaging waste is 55% and for wood-based packaging waste 25%.	2020
Canada	100% reusable, recyclable or recoverable plastics. At least 50% recycled content in plastic products. Recycle at least 55% of plastic packaging by 2030 and recover 100% of all plastics by 2040	2030

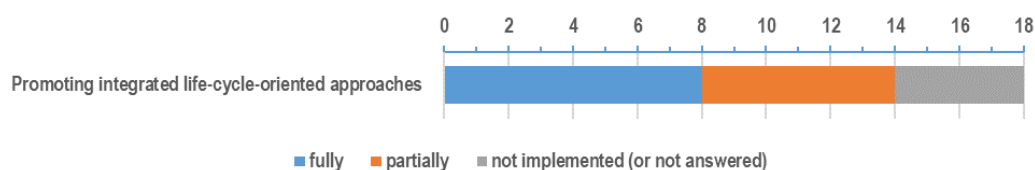
Source: adapted from (EEA, 2019<sup>[34]</sup>) for European Countries and complemented by other sources: (The Japan Times, 2018<sup>[37]</sup>) (State Council, 2017<sup>[38]</sup>)

111. To sum up, as resource productivity encompasses upstream as well as downstream economic activities, related targets cover a broad range of different activities. Not all countries with resource productivity strategies have linked these to specific resource productivity targets. Targets on material recovery and waste management appear to be more abundant.

### 6.2.3. Promote integrated life-cycle-oriented approaches (II.2)

"2. Promote integrated life-cycle-oriented approaches, such as 3R policies (Reduce, Reuse, and Recycle), sustainable materials management and sustainable manufacturing as an input to decision-making and to increasing coherence among policies"

112. Another aspect that is put forward by the Recommendation is to increase coherence among policies by promoting integrated life-cycle-oriented approaches, such as 3R policies, SMM and sustainable manufacturing. Most Adherents reported that they implemented this provision fully (8) or partially (6).



113. Cross-cutting issues are increasingly being recognised by Adherents and resource productivity policies start to be implemented across different policy domains. Whilst it remains a challenge to ensure policy coherence for resource productivity, some approaches consider the issue across multiple policy domains and include innovation policies, fiscal incentives for new circular business models, education and information campaigns or green public procurement (see Box 3). Some of the resource productivity strategies that have been adopted by Adherents illustrate this development (Table 1).

### Box 3. Green public procurement for a Circular Economy: best practices

Green public procurement (GPP) is seen as a key driver for sustainability strategies, including those related to resource productivity. With respect to resource productivity, it can be an important driver of environmentally friendly material selection and better end-of-life or second life management. The EU Circular Economy Action Plan, for instance, sets out several actions for the European Commission and EU member states to facilitate the integration of CE principles in GPP. Several best-practice examples illustrate how national and regional governments have incorporated circular economy criteria in the procurement plans.

GPP can set specific criteria for products, suppliers or address the overall system:

*Product level* GPP sets specific criteria for products, for instance by setting requirements on recycled content, reparability or recyclability. The City of Ghent (Belgium) established a four-year framework agreement for the supply of cleaning and polishing products and required certain product categories to meet criteria of the Cradle 2 Cradle (C2C) ‘Bronze’ label or equivalent. As a result, the recycled content of procured products greatly improved: packaging now contains 85% recycled cardboard, PEHD bottles 10% recycled PEHD and PET 81% recycled material. Similarly, the Dutch Ministry of Defence procured in 2017 towels and overalls, requiring the goods to contain at least 10% recycled post-consumer textile fibres. Contracts were awarded for 100,000 towels and 10,000 cloths with 36% recycled content; and 53,000 overalls with 14% recycled content. Overall, the contracts resulted in savings of 15,252 kg of cotton, 68,880 kg of CO<sub>2</sub>, 23,520 MJ of energy, and more than 233 million litres of water (Langeland, 2017<sup>[39]</sup>).

GPP can also set criteria for the *supplier*, requiring supplier take-back systems or demanding external or internal reuse of the products. For instance, the Dutch city Venlo, published a tender in 2012 for office furniture, which requirement that furniture should be easily disassembled and refurbished. The contract also included a clause for a 10-year annual preventative maintenance, repair services on demand and the provision of temporary replacements for defective furniture (European Commission, 2016<sup>[40]</sup>).

Lastly, the *system* of procurement contracts can be changed through GPP, for instance through a shift from a product-purchasing model to a product-service-system (PSS) model. Examples of PSS procurement models are ESCOs (Energy Service Contracts), chemical leasing, print-per-copy or light-per-lux contracts, where the contractor retains ownership of the product stock, which incentivises efficient product use and lifetime extension. For example, the Department for Environment, Construction and Transport in the German city Bremen replaced its vehicle fleet with a membership in the local car-sharing service. Instead of owning a fleet of 11 cars, with low utilisation rate, the switch to the on-demand car-sharing fleet with electric vehicles has significantly reduced costs of servicing and parking fees, increased convenience and saved staff management time.

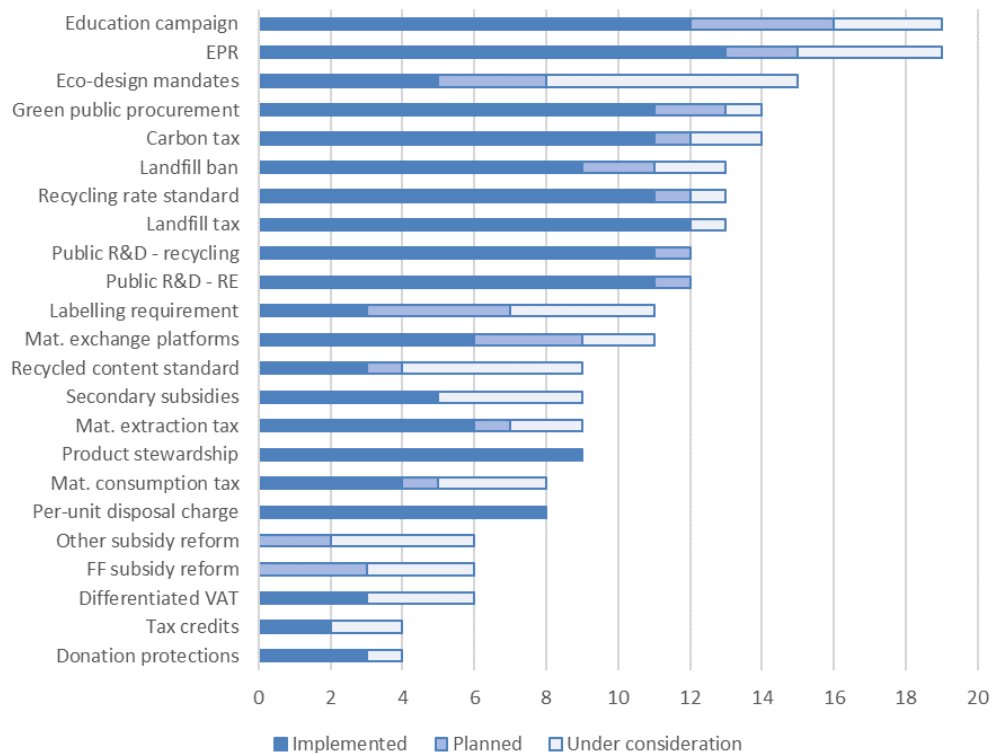
Sources: (European Commission, 2017<sup>[41]</sup>; European Commission, 2015<sup>[42]</sup>)

*The resource productivity policy landscape: Implemented and planned policy measures*

114. To avoid displacing environmental burdens across the lifecycle of products or from one environmental medium to another a coherent and concerted mix of policies is needed that internalises environmental costs and provides incentives for efficient resource use. The main types of instruments available to policy makers are economic instruments, regulations, information-based approaches, voluntary approaches, and public financial support.

115. There seems to be a divergence between the policies that have already been implemented, and those that are either planned or under consideration (Figure 8). Extended producer responsibility schemes, landfill taxation, consumer education and awareness raising campaigns, public R&D funding, carbon taxes, and recycling rate standards have been widely implemented by member countries in some form or the other. Eco-design mandates, labelling requirements, environmentally harmful subsidy reform, green public procurement and recycled content standards have not been widely implemented, but are beginning to attract significant interest. Some policies are both widely implemented and in further planning, such as EPR schemes and education campaigns. For EPR schemes, there may be plans to extend existing schemes to a wider range of sectors and products or to modulate EPR fees according to circular economy criteria.

**Figure 8. Questionnaire results: SMM, RE, and CE policies implemented, planned and under consideration**

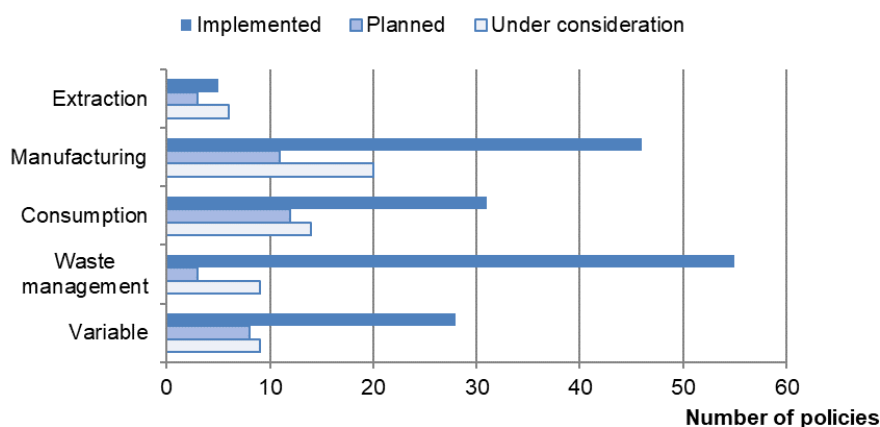


*Note:* Implemented policies are defined as those that are already enacted, planned policies as those that are likely to be implemented in the near future, and policies under consideration as those that are relevant but not associated with any specific plan for implementation in the near future.

*Source:* 2017 OECD questionnaire on “Policy Instruments for Sustainable Materials Management, Resource Efficiency, and the Circular Economy”

116. Resource productivity policies can target different phases of the value chain. Figure 9 shows the value chain distribution of implemented, planned and considered policies that were stated in the questionnaire. Most implemented policies focus on the end-of-life and manufacturing parts of the value chain (e.g. eco-design mandates and recycled content standards). Most planned and considered policies target manufacturing and consumption phases (e.g. education and labelling requirements).<sup>35</sup>

**Figure 9. Questionnaire results: SMM, RE, and CE policies by supply chain incidence**

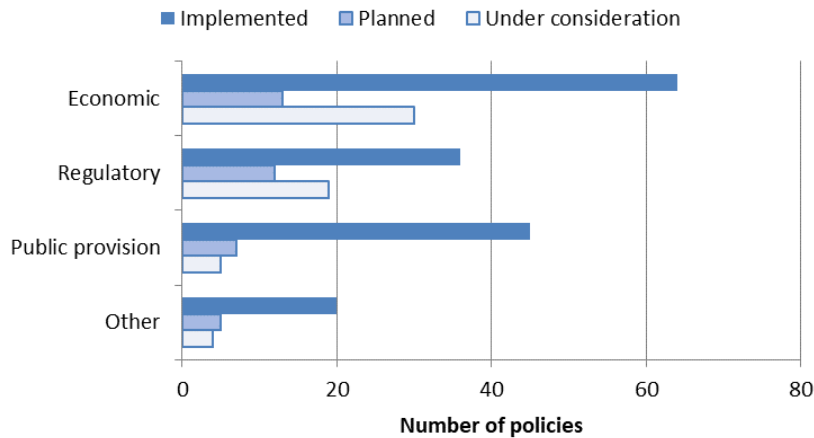


Source: 2017 OECD questionnaire on “Policy Instruments for Sustainable Materials Management, Resource Efficiency, and the Circular Economy”

117. Figure 10 illustrates the distribution by type of implemented and planned policies, and policies under consideration. Implemented policies do not have a strong bias towards one type of instrument or another. Instead, respondent countries appear to be employing a broad mix of economic, regulatory, and public provision type instruments. Most policies that will add to the existing policy landscape in the near future (planned or considered) seem to be economic and regulatory policy instruments. Public provision policies (e.g. green public procurement and the provision of public R&D funding) are less considered.

<sup>35</sup> Generally, few of the Adherents that responded to the questionnaire enacted policies that target the upstream extraction phase of value chains. This is probably partially due to the characteristics of the responding countries as most do not have significant extractive sectors, but it may also reflect concerns about domestic competitiveness.

**Figure 10. Questionnaire results: SMM, RE, and CE policies by type**

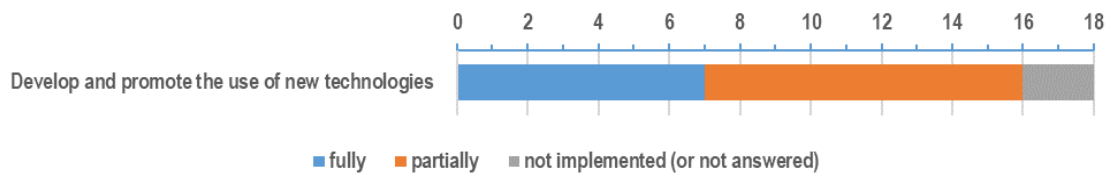


Source: 2017 OECD questionnaire on “Policy Instruments for Sustainable Materials Management, Resource Efficiency, and the Circular Economy”

**6.2.4. New technologies (II.3)**

“3. Further develop and promote the use of new technologies and innovations aimed at improving resource productivity”

118. Innovative new technologies and circular business models are essential elements to increase resource productivity and decouple materials use from economic growth. Supporting their development and promoting their use is thus an important part of a coherent resource productivity policy mix. Most Survey respondents declared that they implemented relevant policies that fully (7) or partially (9) fulfil this provision.



119. Examples of implemented policies that support the further development and promote the use of new technologies and innovations aimed at improving resource productivity include innovation funding for early technologies (e.g. Clean Growth Hub in Canada), consultancy support for developing technologies and bringing them to market (e.g. the “Eco-Consultant” project in Lithuania), as well as awards and prizes that reward innovative solutions (e.g. French Green Tech Label). Some Adherents mentioned that aspects of resource productivity and circular economy are central themes in innovation policies (e.g. Denmark) (Table 4).

**Table 4. Selected examples of initiatives to promote the use of new technologies in selected Adherents**

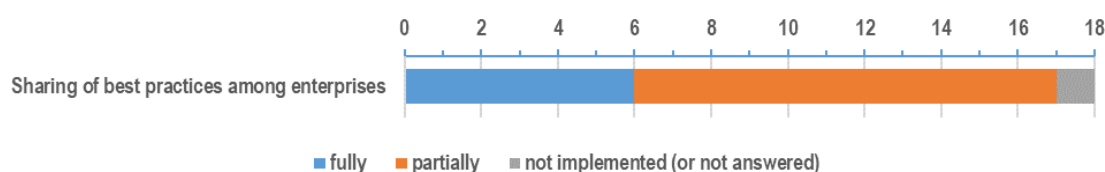
Adherent	Description
Canada	Technology R&D to promote resource efficiency and circular practices is supported through its Clean Growth Hub (previous RE funding focused on plastics, the steel supply chain and precision agriculture) as well as its Mining Value from Waste programme, which aims to accelerate reprocessing and repurposing projects for mine waste (Canada, 2020 <sup>(43)</sup> ).
Denmark	Resource productivity and circular economy are central themes in the Danish Research and Innovations policies. Additionally, the Danish Government established in 2016 The Advisory Board for Circular Economy counting 12 CEO's and firm leaders from big as well as small Danish companies.
France	Resource productivity and circular economy have been implemented in various funds to support R&D. Since 2011, 67 projects have received financial a total of 135 million EUR of support (ADEME, 2019 <sup>(44)</sup> ). The Green Tech Label, which was set up by the French Ministry of Environment awards innovative sustainable and circular technologies and business models.
Lithuania	As part of the "Operational Programme for EU Structural Funds Investments for 2014-2020", a total of 5.7 million EUR is allocated for consultancy and assistance support in the development of eco-technologies ('Eco-Consultant' and 'Eco-innovation LT'). An additional 87 million EUR is allocated for the uptake of eco-technologies in SMEs.
Poland	The National Plan for Sustainable Development envisages an increase of overall spending on R&D to reach to 2% of GDP by 2020. Between 2010-2015 74 Polish companies involved in developing green technologies were supported under the GreenEvo Initiative, coordinated by the Ministry of the Environment. A new edition of GreenEvo started in June 2018.
Switzerland	Federal offices of the environment and energy both have subsidy programs to promote the development and use of resource efficiency technologies.
United Kingdom	The publicly available National Materials 'Datahub' by the UK Office of National Statistics helps address the issue of data availability of secondary materials, which is often cited as a barrier by industry to their use. It provides comprehensive data on the availability of raw and secondary materials, including chemicals, across the economy (ONS, 2020 <sup>(45)</sup> ). Additionally, in November 2017, the UK Cabinet Office announced a £400,000 Innovate UK fund to encourage tech firms to deliver innovative solutions to the improvement of waste tracking.
United States	The US EPA promotes the development of product-service systems, for instance through its 2009 report on "Green Servicing For a More Sustainable US Economy: Key concepts, tools and analyses to inform policy engagement" (EPA, 2009 <sup>(46)</sup> ) and an accompanying workshop.

Source: Examples reported by Adherents in the Survey on the implementation of the Recommendation

### 6.2.5. Experience and information exchange (II.4)

#### "4. Encourage co-operation and sharing of best practices among enterprises"

120. Platforms for information exchange that facilitate discussion on good practice among different stakeholders (e.g. businesses, cities, and circular economy experts) can enable a better diffusion of best-practices and their subsequent adoption. Almost all respondents to the Survey reported that they implemented this provision to some extent (17 out of 18), though the majority only partially (11).



121. With the increasing political attention on resource efficiency and the circular economy, a variety of multi-stakeholder platforms for information exchange have been established in recent years (Box 4).

#### Box 4. Selected examples of multi-stakeholder platforms for information campaigns that emerged in recent years

*The World Circular Economy Forum (WCEF)*, established 2017, is a global initiative of Finland and the Finnish Innovation Fund Sitra. The WCEF brings together business leaders, policymakers and experts to discuss how businesses can seize new opportunities and gain a competitive advantage through circular economy solutions, as well as how the circular economy contributes to achieving the UN Sustainable Development Goals (SDGs). The third WCEF was held in Helsinki, Finland in June 2019 and the fourth edition will be hosted by Canada in 2021, after an online Forum in 2020.

*European Circular Economy Stakeholder Platform (ECESP)*, established in 2017, founded by the European Economic and Social Committee, ECESP provides a meeting place for stakeholders to share and scale up effective solutions and address specific challenges and bridges existing initiatives at local, regional and national level, supporting the implementation of the circular economy (European Commission, 2019<sup>[47]</sup>).

*CircE Project*, established in 2015, brings together 8 partners at regional and local level and representatives of different European social and economic scenarios. The project aims at strengthening the diffusion of Circular Economy in Europe, primarily through an exchange of knowledge and experiences among Partners (Interreg, 2020<sup>[48]</sup>).

*The No Agricultural Waste (NoAW) project*, established in 2016, is an EU Horizon 2020 project focussing on innovative approaches to turn agricultural waste into ecological and economic assets. The NoAW Knowledge Exchange Stakeholder Platform, enables information exchange and discussion among agro-food businesses, farmers, biogas processors, food companies, scientific community and the authorities (NoAW, 2020<sup>[49]</sup>).

*The Circular Economy Platform of the Americas*, established in 2016, is an initiative powered by the Americas Sustainable Development Foundation (ASDF). The platform gives access to information about Circular Economy from and for the Americas, and brings together individuals, businesses, governments, academia and organisations willing to engage in promoting, facilitating and help realising Circular Economy adoption and implementation in the Americas (CEP Americas, 2020<sup>[50]</sup>).

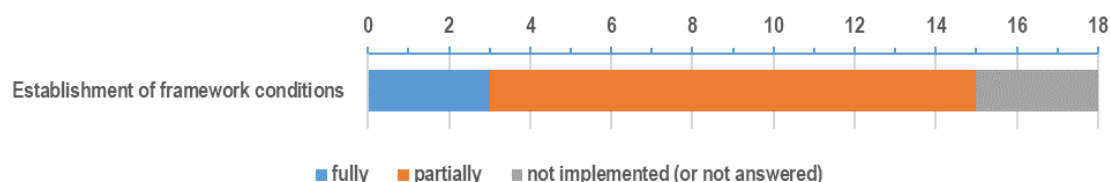
*Circular Economy Alliance Australia (CEAA)* brings together experts and leaders from government, industry, university, consulting and training organizations from around the world on a common platform to enable collaboration, knowledge sharing, networking and wider adoption of Circular Economy (CEAA, 2020<sup>[51]</sup>).

Finally, the *EU Platform on Food Losses and Food Waste (FLW)*, established in 2016, brings together EU institutions, experts from the EU countries and relevant stakeholders. The Platform aims to support all actors in defining measures needed to prevent food waste, sharing best practice, and evaluating progress made over time (European Commission, 2016<sup>[52]</sup>).

#### 6.2.6. Economic instruments for resource productivity (II.5)

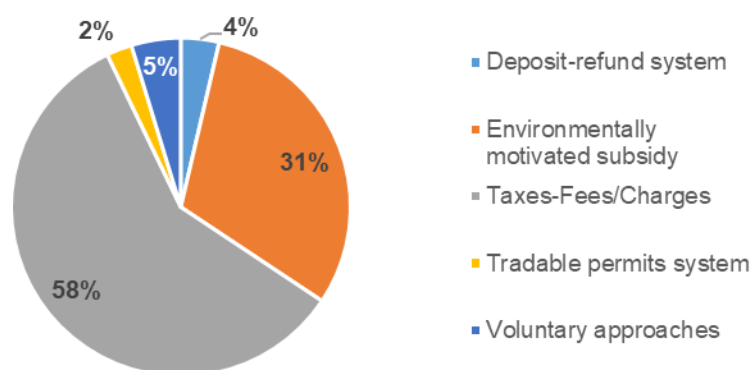
”5. Contribute to the establishment of framework conditions that improve resource productivity through economic instruments”

122. Economic instruments internalise the environmental externalities from materials management (i.e. extraction, use (such as pollution) and disposal or recovery) and provide an incentive structure to increase resource productivity. Most commonly used are taxes on wastes, waste management practices or raw materials, pay-as-you-throw (PAYT) schemes or extended producer responsibility schemes (EPR) for specific waste streams. According to the Survey, the vast majority (15 out of 18) implemented this provision at least to some extent, but most Adherents (12 out of 18) implemented it only partially.



123. The OECD database on “Policy Instruments for the Environment” (PINE) provides a comprehensive source of information on policy instruments relevant to the environment and natural resource management. Taxes, fees and charges represent the vast majority of resource productivity economic instruments registered in PINE, followed by environmentally motivated subsidies (Figure 11). Deposit-refund schemes, voluntary approaches and tradable permits systems make up smaller shares.

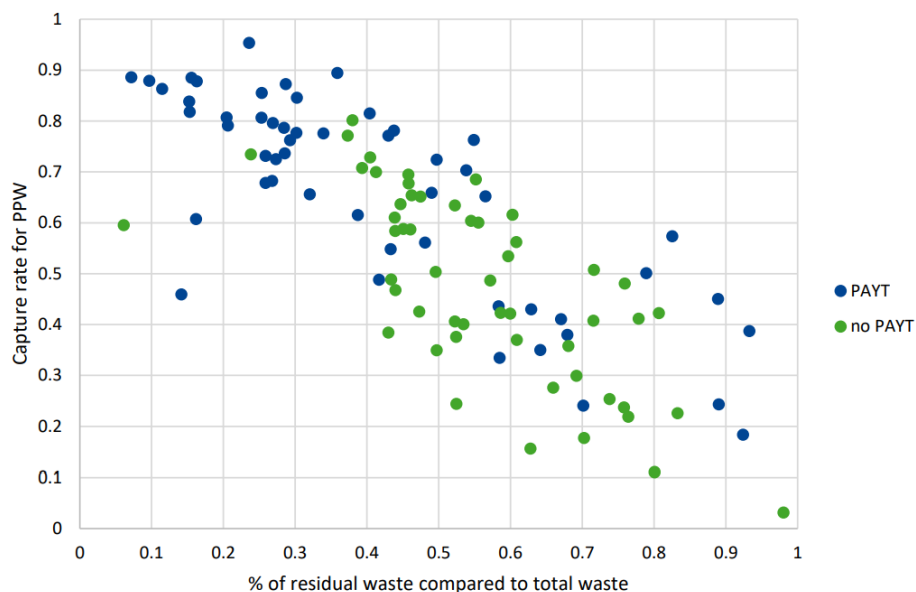
**Figure 11. Implemented economic instruments for RE, CE, and SMM by type**



Source: Data from OECD database on Policy Instruments for the Environment; <http://oe.cd/pine>.

#### *Disposal fees, landfill and incineration tax developments*

124. Pay-as-you-throw systems (PAYT) can have a significant impact on the amount of MSW generated as well as recovery rates. A recent review study of waste collection systems performance in Europe showed that, multiple countries have PAYT systems in place (ACR plus, 2019<sup>[53]</sup>). Waste collection systems with PAYT generally present higher performances and lower production of residual waste (Figure 12). PAYT systems have also been implemented outside the Europe. A prominent example is Korea, which introduced weight-based fees for food waste and volume-based fees for residual waste (Seoul Solution, 2018<sup>[54]</sup>).

**Figure 12. Performance of waste collection systems in Europe**

*Note:* This graph includes a review of 135 waste collection systems in Europe.

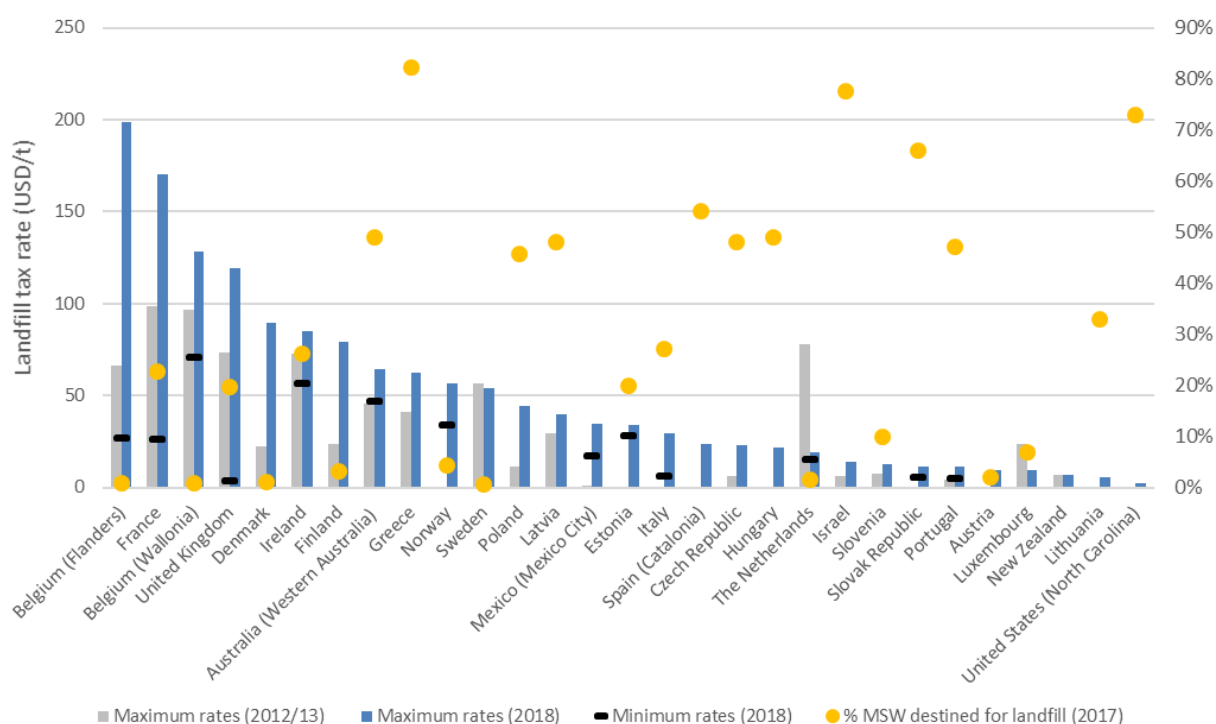
*Source:* (ACR plus, 2019<sup>[53]</sup>)

125. Landfill taxes provide an incentive to reduce the tonnage of waste landfilled. Figure 13 illustrates the developments of landfill tax rates between 2013 and 2018. Landfill taxes in most Adherents have increased, sometimes significantly, over the past five years.<sup>36</sup>

126. Adherents with high landfill taxes tend to have lower landfill rates. Some have managed to decrease landfill rates for MSW to below 1%, such as Belgium, Denmark, Finland, Sweden, Switzerland and the Netherlands (OECD, 2019<sup>[55]</sup>). It should be noted that complementary to economic instruments, several Adherents and the EU have implemented landfill bans, which also contributed to a reduction in landfill activities.

<sup>36</sup> Note that not all countries had a landfill tax implemented in 2012 or data was not available in the PINE database nor in the 2014 OECD Progress Report.

**Figure 13. Landfill tax rates of MSW in OECD Member countries in 2018 and 2013**



*Note:* The Netherlands abolished their landfill tax in 2012 and reintroduced a different model in 2015, hence the two values may not be comparable. Landfill tax rates can vary depending on type of waste, hence the range between minimum and maximum values in some countries.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

*Source:* Landfill tax rates: PINE database, complemented by: (CEWEP, 2017<sup>[56]</sup>; New Zealand Ministry for the Environment, 2019<sup>[57]</sup>; EEA, 2013<sup>[58]</sup>; EEA, 2013<sup>[59]</sup>); Landfill share: OECD.Stat, complemented by landfill data for US states from (Themelis and Shin, 2015<sup>[60]</sup>)

127. Besides landfill taxes on MSW, some Adherents have also introduced taxes on incineration activities. Waste incineration with energy recovery is usually environmentally preferable to landfilling, and incineration taxes – if existent – thus tend to be lower than landfill taxes to provide a coherent incentive structure. For instance, the Italian waste law (549/95) defines that incineration tax without energy recovery should amount to 20% of the landfill tax in each region (Italian Ministry of Economy and Finance, 1996<sup>[61]</sup>).

128. The Netherlands have the highest current MSW incineration tax with 13 EUR/t. Spain (Catalonia)'s tax design stands out, as generated tax revenues are earmarked for a Waste Management Fund. About 50% of the fund is destined for biological treatment of biowaste, aiming to reduce organic content of residual waste. The remaining revenue is refunded to the local authorities according to their performance regarding separate collection and recycling of biowaste, providing an incentive to local authorities to increase material recovery.

129. The Danish incineration tax was converted in 2010 from a weight-based tax to one based on energy and CO<sub>2</sub> content. The new system aims to provide a stronger incentive to recycle the most energy intensive waste, such as plastics. The tax is a combined input-output tax, charged at DKK 26.5 (EUR 3.56) per GJ according to the energy content in the input waste and DKK 19.8 (EUR 2.66) per GJ for heat output. Additional emission taxes for CO<sub>2</sub>, NO<sub>x</sub> and sulphur emissions also apply (Table 5).

**Table 5. Selected examples of incineration taxes of MSW in Adherents**

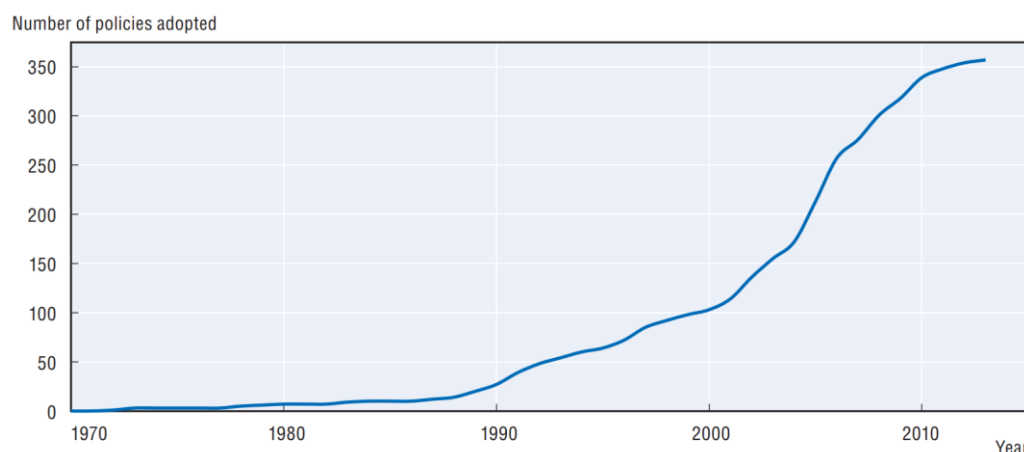
Adherent	Incineration tax rate	Year of introduction	Comment
Austria	8 EUR/t	2006	
Belgium (Flanders)	8.18 EUR/t general waste, 2.34 EUR/t for recycling residues	2006	
Belgium (Wallonia)	11.3 EUR/t	2016	
Denmark	Combined input-output tax: 26.5 DKK (EUR 3.56)/GJ according to energy content of input waste, 19.8 DKK (2.66 EUR)/GJ for heat output Additional emission taxes apply: 173.2 DKK (23.2 EUR)/t of CO <sub>2</sub> and 5.10 DKK (0.68 EUR)/t NO <sub>x</sub> emissions	2010	The incineration tax was converted in 2009 from a weight-based tax to one based on energy and CO <sub>2</sub> content. The new system aims at providing a stronger incentive to recycle the most energy-intensive waste, such as plastics.
Italy	1.03 - 5.16 EUR/t for inert waste incineration without energy recovery. The interval is set in the National Law 549/95, while the rates are decided every year by each region e.g. 5 EUR/t in Campania, 2-3 EUR/t in Lombardy, 3 EUR/t in Lazio	1995, revised in 2015	
The Netherlands	13 EUR/t	2016	
Portugal	Waste incineration with energy recovery (R1): €2,75/t (25% of Waste Management Tax) Waste incineration without energy recovery (D10): €7,70/t (70% of Waste Management Tax)		
Spain (Catalonia)	7.4 EUR/t for MSW post-sorting, 18.6 EUR/t for non-separated and sorted MSW	2009	
United States (Indiana)	0.5 USD/t (0.45 EUR/t) solid waste destined for landfill or incineration		
Sweden	487 SEK/t (ca. 45 EUR/t) with reductions for electricity producing incineration plants	2006	Incineration tax suspended in 2010 as it has not stimulated recycling.
Norway	90 NOK/t (ca. 8 EUR/t)		Incineration tax suspended in 2010.

Source: OECD PINE database, complemented by (Italian Ministry of Economy and Finance, 1996<sup>[61]</sup>; Norwegian Ministry of Environment, 2012<sup>[62]</sup>)

### *Extended producer responsibility scheme developments*

130. Extended producer responsibility (EPR) consists of a range of policy instruments that are applied to encourage or oblige manufacturers to take on financial and/or physical responsibility for their products after the point of sale. EPR systems include incentive-based instruments such as deposit/refund (where a deposit is charged at the point of sale and then redeemed when the product is brought back to a collection point), advance disposal fees (where a fee is charged at the point of sale or directly from the producer or importer), mandatory take-back systems (where producers are under the obligation to take back and recycle end-of-life products), or upstream material taxes combined with downstream subsidies (which works like a deposit/refund system, but the charge is levied upstream at the level of the producer and a subsidy is paid to collectors and recyclers). EPR schemes can be mandated by governments, but they can also be voluntary or industry lead initiatives.

131. The governance of EPR schemes can differ. Most EPR systems are self-regulating, where collective producer responsibility organisations (PROs) manage and collect post-consumer products and define the producer fees accordingly (OECD, 2016<sup>[63]</sup>). In other cases the government plays a more direct role in fee collection and disbursement. According to the 2018 OECD BEEP questionnaire, around three quarters of the EPR fees are based on self-regulation by the sector, whereas around one quarter is controlled by governments.

**Figure 14. Cumulative EPR policy adoption globally, 1970-2015**

*Note:* Graph presented in the 2014 Report, showing a marked increase in EPR schemes since the implementation of the Recommendation.

*Source:* (OECD, 2016<sup>[63]</sup>)

132. The 2014 Report concluded that EPR has seen a marked increase over the last decades, with close to 400 schemes implemented, targeting packaging, electronics, vehicles or tyres (Figure 14). Since then, more has happened in the field of EPR and essentially three developments are apparent.

133. First, the total number of EPR schemes globally has further increased. Multiple countries have implemented new EPR schemes since the 2014 Report. EPR continues to be a widely-used policy tool to implement the ‘producer pays principle’, such that waste management costs are internalised and charged to the specific producers and consumers of the waste generating products, rather than to all tax payers.<sup>37</sup>

134. Second, EPR schemes have extended to new jurisdictions as well as to new sectors and product groups. A range of new Adherents have explored and developed EPR schemes in the past years. The use of EPR is no longer limited to the most highly developed countries, but there is also an increasing number of emerging economies using EPR, such as Colombia (packaging, EEE) or Chile (packaging currently being implemented). In addition, the scope of EPR systems is gradually being extended. For instance, new EPR systems for textiles, furniture and construction materials have been introduced in France and systems to address littered chewing gum and cigarette butts are under discussion in the EU and several of its member states. There is also some initial discussion about the possible use of EPR to address releases of microplastics from certain products (e.g. textiles and tyres).

135. Third, there is an ongoing evolution in the design and fee modulation of EPR schemes. Most EPRs charge a flat fee or follow a “basic fee modulation” (e.g. fixed fee per kg material/unit or bonus/penalty scheme), but modulated fees with a more diverse set of criteria and “advanced fee modulation” are receiving increasing attention. Developments around advanced EPR fee modulation is still relatively new, but several countries have implemented modulated fees for some product groups applying different criteria (Table 6).

<sup>37</sup> Note that it was beyond the scope of this report to conduct a stocktake of existing schemes as extensive as the previous. However, anecdotal evidence supports this claim.

**Table 6. Selected examples of modulated EPR fees in Adherents**

Adherent	EPR policy description
<b><i>Design for recycling; sortability and recyclability</i></b>	
Belgium	Mono-material packaging almost twice as high as mixed-material packaging (EUR 408/t, vs. EUR 259/t).
France	50% fee increase mixed-material 100% for non-recyclable material. 8% bonus by replacing both with mono-material substitutes.
Italy	Plastic packaging is split into three bands based on recyclability criteria (179-228EUR/t).
<b><i>Reparability</i></b>	
France	20% fee increase for unavailability of spare parts (refrigerator, vacuum cleaners, drills). Reversely, 20% fee decrease for ensuring availability of spare parts for 5-11 years (depending on product group).
<b><i>Recycled content</i></b>	
France	10% fee reduction for cardboard/paper with >50% recycled content; 50% fee reduction for textiles and shoes with 15% recycled fibres.
Canada	Quebec: 20% bonus for producers using recycled content in containers and packaging and for printer materials.
<b><i>Consumer awareness and prevention</i></b>	
France	8% discount for producers that organize prevention and consumer awareness campaigns and/or develop reusable packaging.

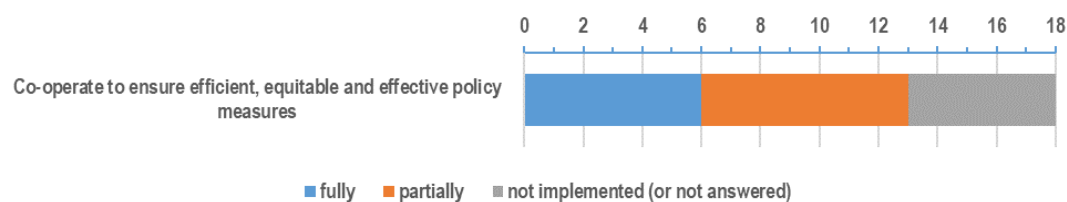
Source: (EEQ, 2018<sup>[64]</sup>), (Pro Europe, 2017<sup>[65]</sup>), (Legifrance, 2017<sup>[66]</sup>), (EY, 2016<sup>[67]</sup>)

136. To sum up, these developments show that there have been considerable efforts to implement new or extended policy instruments for resource productivity over the past five years as a result of significantly increased policy interest in the area of resource efficiency and the transition to a circular economy.

### 6.2.7. Co-operate to ensure efficient and effective policy measures (II.6)

“6.Co-operate to ensure that policy measures taken to improve resource productivity are efficient in economic terms, effective in environmental terms and equitable in social terms”

137. To ensure that resource productivity policies are just and economically efficient, policy efforts need to be assessed against environmental, as well as social and economic criteria. Thirteen survey respondents declared that they implemented this provision fully (6) or partially (7) and that appropriate framework conditions are in place.



138. International initiatives (e.g. at the G7, G20, or the OECD) as well as national roadmaps help to ensure appropriate framework conditions. A number of Adherents developed and implemented roadmaps in recent years that aim to integrate and streamline resource and waste policy in all sectors or national policy (See section on key developments at international and national level). Furthermore, progress towards implementing the Recommendation’s provisions II.2 (policy coherence and promoting life-cycle-oriented approaches) and II.5 (economic instruments for resource productivity), also contribute to ensuring that policy measures are efficient, effective and equitable.

139. Adherents’ efforts to establish the right framework conditions and ensure policy coherence for resource productivity will also benefit from the implementation of the OECD

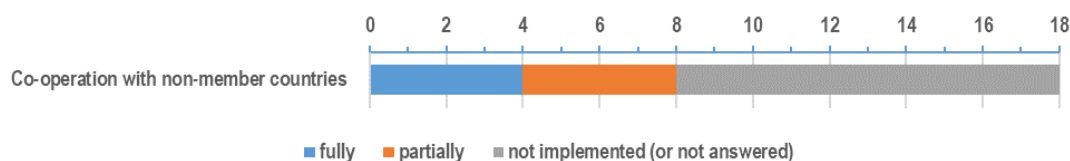
Recommendation on Policy Coherence for Sustainable Development [OECD/LEGAL/0381]. This Recommendation offers a comprehensive standard to help Adherents equip policy-makers with the necessary institutional mechanisms and tools to enhance policy coherence and address the integrated nature of the Sustainable Development Goals.

### 6.2.8. Co-operation with non-member economies (II.7)

”7. Co-operate with non-member economies to strengthen their capacity for developing and implementing policies concerning the improvement of resource productivity”

140. Production chains are increasingly becoming fragmented and structured along global value chains and there is a trend towards increased outsourcing in Adherents. As part of this development, the global flow of materials and resources embedded in the traded goods has grown substantially in volume and complexity. Not only has this led to an increase in direct material flows across borders, but it has also resulted in indirect material use and associated environmental impacts (Monfreda, Wackernagel and Deumling, 2004<sup>[68]</sup>; Dittich, Bringezu and Schütz, 2012<sup>[69]</sup>). In this context, the Recommendation’s provision on co-operation with non-Members to strengthen their capacities is important.

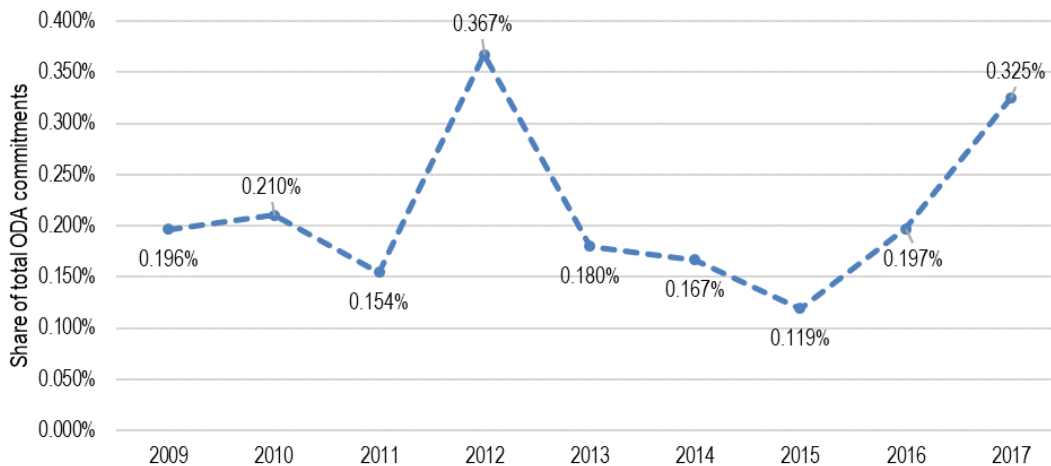
141. The majority of respondents to the Survey declared have implemented this provision partially or insufficiently implemented and only four respondents declared to have implemented fully.



142. Development co-operation can contribute to the reduction of the “ecological backpack” caused by the increased imports of processed goods from emerging countries, and reduce “burden shifting” linked to the negative effects of production relocation. For instance, the Danish government has established a strategic sector corporation with ministries in Kenya, Turkey and Indonesia with a focus on waste handling and circular economy (Danish Ministry of Environment, 2020<sup>[70]</sup>). In France, since 2014, the water sanitation and energy law, enables local waste authorities to allocate up to 1% of their waste budget to finance international cooperation projects. The system already mobilised four million EUR and realised 50 projects (AMORCE, 2017<sup>[71]</sup>). Furthermore, Circular Economy Missions, organised by the European Commission, aim to increase cooperation between EU and third countries to communicate and promote resource-efficient policies and green solutions. Missions have visited a number of non-Adherents, including Senegal (2019), Singapore and Malaysia (2019), Indonesia (2018), South Africa (2017) and China (2016) (Commission, 2020<sup>[72]</sup>).

143. Official development assistance (ODA) provided by the members of the OECD Development Assistance Committee (DAC) for purposes of resource efficiency and waste management accounted for around USD 412 million in 2017. This made up less than 0.35% of the overall ODA commitment budget. Generally, ODA for resource efficiency and waste purposes have made up only a small share of 0.15-0.35% of total ODA commitments over the past decade (Figure 15).

**Figure 15. Share of ODA commitments purposed for resource efficiency and waste projects**



*Note:* ODA purposed for RE and waste projects included ODA commitments from DAC Donor countries for the following purpose codes: 14050 (Waste management/disposal); 23360 (Non-renewable waste-fired electric power plants); 23270 (Biofuel-fired power plants).

*Source:* OECD.Stat - Creditor Reporting System (CRS)

144. Whilst a number of capacity-building initiatives are ongoing, there seems to be no trend that ODA commitments have notably increased in recent years. Significant effects could be achieved if resource efficiency was mainstreamed into development assistance more systematically. Increasing ODA directed at resource efficiency and waste and materials management would lead to more capacity development and technology transfer. Increasing resource productivity in non-OECD Member countries through ODA, would indirectly also benefit resource productivity in Adherents, if material flows embedded in the trade of processed goods are taken into account. This appears to be an area where Member countries could make significant progress in the coming years.

### 6.2.9. Conclusions

145. Since the 2014 Report, significant efforts have been made in the development and implementation of policies to improve resource productivity. Resource productivity – and related concepts such as the 3Rs, resource efficiency and the circular economy – have gained political traction and a variety of policy frameworks, targets and instruments have been developed in countries and at international level. The growing concern about the adverse environmental impacts of (marine) plastic litter has further led to a number of high-profile multilateral and national initiatives.

146. Whilst it remains to be seen what effect these initiatives and policies will have on resource productivity in the upcoming years, current trends suggest that past policy efforts have been insufficient to curb environmental impacts linked to materials use. More stringent policies are needed to fully implement the provisions of the Recommendation, and the current political momentum in this area suggests that this may, at least in part, already be happening.

147. Adherents employ broad mixes of economic, regulatory and information instruments. However, the majority of these policies target the downstream, end-of-life phase of the supply chain. The existing policy mix could therefore benefit from strengthening policy interventions further upstream the supply chain, e.g. instruments that influence product design and that increase demand for resource-efficient and circular

products, including secondary raw materials. Target setting related to resource productivity could also be improved. Resource productivity strategies remain often descriptive and more qualitative than quantitative in the way targets are set. Where quantitative resource productivity targets exist, these could often be strengthened by broadening them to account for transboundary effects and burden shifting (e.g. assess demand-based material flows or investigate more thoroughly the fate of recyclates and used goods destined for recycling or reuse aboard).

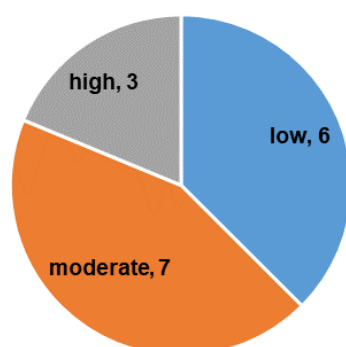
148. More generally, resource productivity policies could further benefit from a better integration with other cross-cutting and sectoral policies. The circular economy and resource productivity agenda is broad and cuts across a variety of policy domains. Proper institutional frameworks are required to ensure the horizontal co-ordination of policies and to design a coherent policy mix that maximises the benefits and minimises potentially adverse effects in other policy areas.

149. Increasingly globalised production chains also increase the transboundary flow of resources. Development co-operation can contribute to the reduction of environmental impacts in emerging markets and developing countries, generated by material consumption of importing countries, as well as those related to domestic materials use and waste generation (e.g. most leakage of plastics into the oceans is occurring outside OECD Member countries). Currently, official development assistance (ODA) provided by the members of the Development Assistance Committee (DAC) for purposes of resource efficiency and waste management remain very low (USD 412 million in 2017, i.e. around 0.15-0.35% of ODA over the past decade). Increasing ODA directed at materials management could lead to a substantial increase in resource productivity, indirectly also in Adherents if material flows embedded in the trade of processed goods are taken into account. This appears to be an area where significant progress could be made.

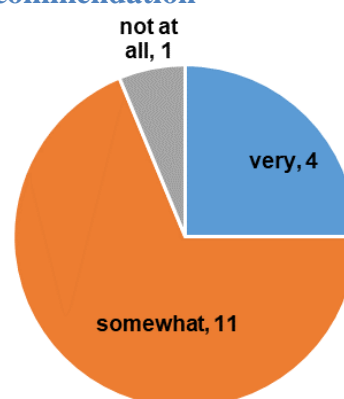
### 6.3. Continued relevance

150. The level of awareness of the Recommendation appears to be moderate to low among Adherents, which is probably unsurprising given it was adopted more than 10 years ago and a number of other standards at the level of the G7 and G20 have been adopted more recently (Figure 16). One country mentioned that internal experts were unaware of the Recommendation. However, the Recommendation is still considered useful but several Adherents recommended increasing dissemination efforts at the OECD as well as at the national level (Figure 17).

**Figure 16. Level of awareness of Recommendation**



**Figure 17. Usefulness of Recommendation**

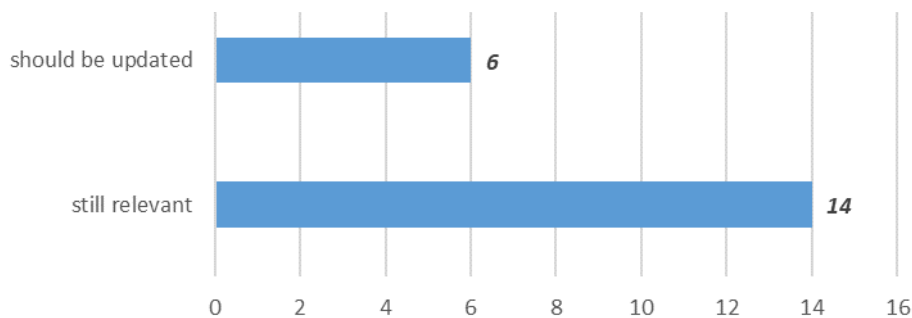


Source: 2019 OECD Survey on the implementation of the Recommendation on Resource Productivity

151. Despite the declining awareness and use of the Recommendation, three-quarters of respondents find it to be still relevant in the present policy context, as it provides a good high-level framework for guiding action by Adherents. This signals that the lack of awareness and use may be more linked to the time that has passed since its adoption than to the relevance of its contents. Less than a quarter of respondents find that the Recommendation would merit an update, mainly to better reflect linkages with other environmental issues such as climate change and biodiversity, and to connect to planetary boundaries and societal needs (Figure 18). Survey responses however indicate that the provisions on resource productivity policies are perceived as too general by those who are familiar with it. The need for more practical and concrete guidance on implementation was also mentioned.

152. Concerning the provisions on the analysis and knowledge of material flows, most respondents consider them as being still relevant. The Recommendation's call to improve measurement systems and capacity for analysis is considered still valid as it could help fill remaining knowledge gaps in future. Responses to the Survey however suggest that these provisions are ambitious and that more time is required to fully implement them. Survey responses also indicate that the way Adherents implement the provisions varies. The responses did generally not distinguish between economy-wide measures or overview indicators and specific studies and analyses, nor between statistical measurement efforts and efforts to improve scientific knowledge through other means.

**Figure 18. Relevance of the Recommendation**



*Note:* Response rate: 18 out of 36. Two respondents indicated that the Recommendation is both still relevant and would deserve an update.

*Source:* 2019 OECD Survey on the implementation of the Recommendation on Resource Productivity

153. The Recommendation thus seems still relevant and useful. Even though the level of awareness of the Recommendation among Adherents has gradually decreased since it was adopted more than 10 years ago, Adherents find it to be relevant in the current policy context. Only a minority of Adherents considers that there is a need to update the Recommendation.

## 7. Summary and conclusions

### 7.1. Implementation

154. Twelve years after the adoption of the Recommendation and six years after the first assessment of progress, resource productivity issues continue to receive significant policy attention. All Adherents take actions to improve resource productivity and reduce negative

environmental impacts of materials and product use, and important advances have been made as regards knowledge and analysis of material flows and resource productivity.

155. However, the policy measures implemented so far have not yet produced the expected results in terms of improvements in resource productivity and reductions in the environmental impacts of materials and product use, and important knowledge gaps remain.

156. Available data show that most OECD Member countries have achieved a relative decoupling of materials use from economic growth and generate more economic value per unit of materials consumed than in the preceding decade. Relative decoupling has also been achieved between municipal waste generation and GDP growth and the share of municipal solid waste (MSW) being used for material recovery continues to grow. Yet, overall material consumption has continued to increase and the increased consumption and production that came along with economic growth has led to a further increase of total waste generation.

### ***7.1.1. Information, scientific knowledge and analysis of material flows and resource productivity***

157. The analysis of material flows and their associated environmental impacts is seen as a solid foundation for designing policies and interventions that generate environmental improvements. Most Adherents are taking measures to improve the information base and measurement systems, albeit at different degrees and with different objectives. Macro-level material flow accounts (EW-MFA) and overview indicators are increasingly produced and updated on a regular basis. More data have become available on material use by industry, flows of individual materials and products, and natural resource stocks. Scientific knowledge of the environmental impacts of material flows is progressing thanks to greater use of life-cycle based approaches, environmentally extended Input Output models and footprint methodologies in research and analysis. Recent years have also seen promising initiatives to develop indicator frameworks for a circular economy.

158. Still, Adherents need to make additional efforts to fully implement the provisions of the Recommendation and to consolidate the progress made. Responses to the Survey suggest that the provisions on the analysis of material flows and their environmental impacts are ambitious and that more time is required to fully implement them. Though nuanced, the messages arising from this second assessment are thus similar to those arising from the first assessment.

159. The information available is not yet sufficient to effectively support natural resource and materials management, and resource productivity and circular economy policies. Many advances made in recent years do not benefit the establishment of international databases and there are still data and knowledge gaps across countries, sectors and material types that make it difficult to get the full picture of materials use and related environmental impacts. The Recommendation's call to improve measurement systems beyond economy-wide systems, and to improve capacity for analysis in this area is still valid and could help fill those gaps in future.

160. The development of compatible material flow accounts and work to improve the quality of data on material flows and to establish international databases need to be pursued and consolidated beyond economy-wide material flows, as does work on industry-level and material-specific information that helps identify opportunities for improved performance along the supply chains. More effort is needed to advance the development compatible international data on (i) material flows within the economy and across economic activity sectors, (ii) flows that are important to a circular economy and the 3Rs, including secondary

raw materials and waste and their physical trade flows, (iii) flows of key materials and substances that are of economic and environmental importance (e.g. plastics; food; critical metals, electric and electronic goods), and (iv) the different processing levels of the materials (raw materials, semi-finished products, finished products). Methodological differences concerning, for example, the calculation of demand-based raw material consumption indicators (material footprints), need to be further analysed.

161. More work is needed to further improve knowledge on the environmental impacts and costs of material resource use throughout the life-cycle of materials, and to produce related data and indicators on a regular basis to enable wider use in decision-making. More work is also needed to build robust and internationally comparable indicators on circular flows of materials and products, indicators that link resource stocks to material flows, and indicators that link material flows to waste flows.

162. Among other issues that need to be better studied, and already mentioned in the first progress assessment, are (i) the economic and fiscal instruments in use to improve resource productivity; (ii) the size, value and availability of materials from urban mines, (iii) the way particular material flows interact with commodity prices and recycling markets, and how they relate to natural resource stocks, resource rents and supply security, and to innovation and competitiveness; and (iv) the socio-economic and environmental opportunities provided by improved resource productivity, sustainable materials management and circular business models. There is also still room for better using the information and indicators available for the purpose of policy planning and for target setting.

### ***7.1.2. Policies and actions to improve resource productivity***

163. Since the 2014 Report, significant efforts have been made in the development and implementation of policies to improve resource productivity. Resource productivity – and related concepts such as the 3Rs, resource efficiency and the circular economy – have gained political traction and a variety of policy frameworks, targets and instruments have been developed in countries and at international level. The growing concern about the adverse environmental impacts of (marine) plastic litter has further led to a number of high-profile multilateral and national initiatives.

164. Whilst it remains to be seen what effect these initiatives and policies will have on resource productivity in the upcoming years, current trends suggest that past policy efforts have been insufficient to curb environmental impacts linked to materials use. More stringent policies are needed to fully implement the provisions of the Recommendation, and the current political momentum in this area suggests that this may, at least in part, already be happening.

165. Adherents employ ***broad mixes of economic, regulatory and information*** instruments. However, the majority of these policies target the downstream, end-of-life phase of the supply chain. The existing policy mix could therefore benefit from strengthening policy interventions further upstream the supply chain, e.g. instruments that influence product design and that increase demand for resource-efficient and circular products, including secondary raw materials. Target setting related to resource productivity could also be improved. Resource productivity strategies remain often descriptive and more qualitative than quantitative in the way targets are set. Where quantitative resource productivity targets exist, these could often be strengthened by broadening them to account for transboundary effects and burden shifting (e.g. assess demand-based material flows or investigate more thoroughly the fate of recyclates and used goods destined for recycling or reuse aboard).

166. More generally, resource productivity policies could further benefit from a better integration with other cross-cutting and sectoral policies. The circular economy and resource productivity agenda is broad and cuts across a variety of policy domains. Proper institutional frameworks are required to ensure the horizontal co-ordination of policies and to design a coherent policy mix that maximises the benefits and minimises potentially adverse effects in other policy areas.

167. Increasingly globalised production chains also increase the transboundary flow of resources. Development co-operation can contribute to the reduction of environmental impacts in emerging markets and developing countries, generated by material consumption of importing countries, as well as those related to domestic materials use and waste generation (e.g. most leakage of plastics into the oceans is occurring outside OECD Member countries). Currently, official development assistance (ODA) provided by the members of the Development Assistance Committee (DAC) for purposes of resource efficiency and waste management remain very low (USD 412 million in 2017, i.e. around 0.15-0.35% of ODA over the past decade). Increasing ODA directed at materials management could lead to a substantial increase in resource productivity, indirectly also in Adherents if material flows embedded in the trade of processed goods are taken into account. This appears to be an area where significant progress could be made.

## 7.2. Dissemination

168. While Adherents' dissemination efforts of the Recommendation itself has been limited, key principles and elements contained in the Recommendation have been promoted and integrated in recent international and domestic policy efforts. The OECD Secretariat has been actively promoting the Recommendation, including through country Environmental Performance Reviews (OECD, 2020<sub>[11]</sub>), OECD indicators (OECD, 2020<sub>[73]</sub>), and the recent OECD RE-CIRCLE project with related publications, and events (OECD, 2020<sub>[74]</sub>).

169. There remains scope to strengthen dissemination efforts, as a means to:

- Involve all relevant stakeholders in policies and actions to improve resource productivity and reduce negative environmental impacts of throughout a materials and products lifecycle use.
- Share OECD guidance<sup>38</sup> and experience on the measurement and analysis of material flows and resource productivity with all relevant stakeholders.
- Encourage cooperation with non-Adherents to strengthen their capacity for analysing material flows and the associated environmental impacts, and for developing and implementing policies concerning the improvement of resource productivity. Such efforts to align with the Recommendation could lead to their adherence in line with the relevant OECD process.
- Share the content of the Recommendation and related guidance with OECD bodies outside the EPOC community (e.g. industry and innovation, technological policy, digital economy, agriculture, economic policy, investment).

170. Dissemination in countries could further be facilitated by providing national translations of the Recommendation.

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<sup>38</sup> This includes for example the OECD Guide on Measuring Material Flows and Resource Productivity, <https://www.oecd.org/environment/indicators-modelling-outlooks/MFA-Guide.pdf>.

### 7.3. Continued relevance

171. Adherents' responses to the Survey indicate that the Recommendation is still relevant and useful. Even though the level of awareness of the Recommendation has decreased since it was adopted 12 years ago, respondents find it relevant in the current policy context as it provides a good high-level framework for guiding action by countries. The Recommendation's call to improve measurement systems and capacity for analysis is considered still valid and could help fill remaining knowledge gaps in future. The provisions on policies and actions are however perceived as being too general by those who are familiar with them. Only a minority of respondents considers there is a need to update the Recommendation, mainly to better reflect linkages with other environmental issues such as climate change and biodiversity, and to connect to planetary boundaries and societal needs. The need for more practical and concrete guidance on implementation was also mentioned.

172. EPOC, the WPRPW and the WPEI may therefore consider continuing and reinforcing efforts aimed at supporting the implementation of the Recommendation (see below). This could be supplemented with targeted updates or additions where this appears appropriate. One example is the field of plastics, where there appears to be a particular need for policy guidance among adherents, given the increased production, consumption and waste of this materials stream.

### 7.4. Next steps

173. The OECD Secretariat will continue to promote the key provisions of the Recommendation in its ongoing and planned work and reinforce efforts to support implementation in countries.

#### *7.4.1. Information, scientific knowledge and analysis of material flows and resource productivity*

174. The OECD will continue to support Adherents in their efforts to improve information and knowledge on material flows and resource productivity and to provide a forum for the exchange of experience and good practices, including with non-member economies. It will continue to develop reliable and internationally comparable data and indicators on resource productivity, promote their use in OECD work and in adherent countries, and monitor and report on the state of resources and resource productivity in OECD Member countries and beyond. Particular attention will be given to the following work elements:

- The development of internationally harmonised information and indicators on material flows and resource productivity, both at macro level and for selected materials, including critical raw materials and materials raising particular environmental concerns, such as plastics. And the further harmonisation of international methodologies to calculate material footprints and the provision of guidance to interpret the associated indicators. This is done as part of OECD work on environmental information and indicators, and work on modelling.
- An analysis of information needs and available data for supporting the transition to a resource efficient circular economy to be carried out as part of the PWB 2021-22 (joint work by the WPEI and the WPRPW). This work will result in the production of a conceptual framework and a set of indicators to monitor progress and the circularity of material flows in the economy, and a report with practical guidance.

It is done in coordination with other International Organisations, including UNECE, Eurostat, the EEA and the UN Environment IRP.

- The implementation of the System of Environmental Economic Accounting (SEEA) through joint work by EPOC and the Committee on Statistics and Statistical Policy. The OECD leads international work on the establishment of global SEEA core databases, including on material flows. This is done in cooperation with other International Organisations, including the UNSD, UN Environment, and Eurostat.
- Further analysis of material flows and their economic, trade and environmental implications will be carried out as part of the organisation's work on modelling and on trade and the environment. This includes work on trade and the circular economy (by JWPTE), as well as trade flow analyses, modelling and scenarios of plastic production, consumption and waste (joint work by WPRPW and WPIEEP).

175. This will provide Adherents with improved tools to assess progress in implementing the Recommendation, and will help disseminate the Recommendation and promote its uptake.

#### ***7.4.2. Policies and actions to improve resource productivity***

176. The OECD will continue to support Adherents in their efforts to develop and implement policies and actions to improve resource productivity. This work will focus on developing guidance for specific waste and material streams, most notably plastics, and on specific policy tools, such as economic instruments, most notably extended producer responsibility. In addition, country specific projects, will be conducted to provide targeted support to some members and non-members. This work stream will include the following actions:

- The development of an integrated Global Plastics Outlook to 2060, which will mobilise EPOC's environment-economy modelling capabilities to project the economic drivers of global plastic production and use, and connect these to indicators about plastic waste management and plastic pollution. The modelling work will be complemented by in-depth analysis of secondary plastics markets, green innovation in the plastics sector, as well as a mapping of relevant policies along the value chain.
- Work on economic policy instruments will focus on issues around the design and implementation of extended producer responsibility schemes, including deposit-refund-systems, amongst other things.
- An analysis of circular economy transition in specific sectors, possibly the construction and building sector and/or the textiles sector. This will assess the opportunities and challenges for the uptake of circular business models in the given sector and provide a modelling assessment of the macro-economic consequences of the circular economy transition.
- Country specific projects will include further Environmental Performance Reviews, as well as support projects for circular economy and resource efficiency policies and roadmaps.

177. In the light of past trends, it will be important that future work explores the development paths for a "sustainable" resource use, considering decoupling needs and planetary boundaries, as well as resource demands, alternative economic models and

associated policies. This should include further discussions on how relevant targets could be formulated and on how they could best be achieved.

178. Adherents should be encouraged to join in and support these efforts, and develop further domestic initiatives. This could include the provision of national translations of the Recommendation to facilitate its dissemination and use, the involvement of all relevant stakeholders, and the regular communication of information on progress with resource productivity and sustainable materials management, including through social media.

*Supporting the implementation of the Recommendation and report on progress*

179. To further support the implementation of the Recommendation by Adherents and enhance cooperation with non-Adherents, EPOC will strengthen the dissemination of OECD experience and guidance and the sharing of good practices. This will be done through:

- The organisation of workshops or webinars on specific provisions and implementation issues (to be defined with Adherents and to be organised, as appropriate, in co-operation with relevant OECD bodies and other international organisations).
- The inclusion of resource productivity issues in high-level events (OECD Forum, GGSD Forum, etc.).
- The involvement of interested non-Adherents in OECD work related to resource productivity.
- Continued OECD participation in international initiatives and processes, and the harnessing of multilateral resource efficiency dialogues (G7, G20).
- Enhanced cooperation with other International Organisations, in particular UN Environment and the IRP.

180. Some of this work may result, at a later stage, in further implementation guidance or best practices, especially in the area of sustainable materials management and the circular economy. To that effect, the WPRPW, the WPEI and EPOC will continue monitoring developments on the implementation, dissemination and continued relevance of the Recommendation and report back to Council in ten years.

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