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The G20: Accelerating the Transition to a Global Circular Economy

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A transition towards a more resource-efficient and circular economy (CE) has earned growing political attention across the globe. The CE concept is increasingly viewed as a central component in the world's pursuit of new models for sustainable, "green" and resilient growth. Building greater social, environmental and economic resilience in a post-pandemic world is now a central topic of discussion among policy-makers and commentators globally. Several countries in Europe and Asia have adopted CE strategies, and momentum is also growing elsewhere – for instance, in Canada.¹ CE measures are now a core component of both the

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Europe Union's (EU's) 2050 long-term strategy to achieve a climate-neutral Europe and China's current Five Year Plan. Japan, as a global front-runner in the development of CE, included it as a priority at the Group of Twenty summit during its G20 presidency in 2019.² The Italian Government has decided to explore CE as one of the main priorities for international cooperation during Italy's upcoming G20 presidency, in 2021.

CE is an ambitious paradigm that stems from concerns about such issues as the efficient use of resources, waste management, material recycling and an environment-friendly transformation of business models. As such, it aims to complement and integrate with the social, economic, educational and health objectives identified by international organizations, including the United Nations (UN) Sustainable Development Goals (SDGs). CE is not a wholly new concept; it blends the principles underlying many schools of thought, including resource efficiency. The transition to a CE at global, regional, national and local levels would benefit from the development of common standards – e.g. CE terms and definitions. A global, multi-stakeholder consensus would help to progress the development of circular business models, products, technologies and services; allow the creation of “bridges” to broader social and economic goals; and potentially unleash more funding opportunities.

Four key benefits of a transition to a CE are commonly referred to in the literature: (1) reduced extraction of virgin natural resources; (2) reduced exposure to (geopolitical) supply risk(s); (3) reduced environmental pressures; and (4) new economic opportunities.³

US management consulting firm McKinsey has predicted that by 2030, adopting CE principles will generate a net economic benefit of 1.8 trillion euro in Europe as well as substantial environmental and social

¹ Canada Government website: *Circular Economy*, 2 December 2019, <https://www.canada.ca/en/environment-climate-change/news/2019/12/circular-economy.html>.

² Felix Preston, Johanna Lehne and Laura Wellesley, “An Inclusive Circular Economy: Priorities for Developing Countries”, in *Chatham House Research Papers*, May 2019, <https://www.chathamhouse.org/node/39058>.

³ Andrew McCarthy, Rob Dellink and Ruben Bibas, “The Macroeconomics of the Circular Economy Transition. A Critical Review of Modelling Approaches”, in *OECD Environment Working Papers*, No. 130 (16 April 2018), <https://doi.org/10.1787/19970900>.

benefits.⁴ Dublin-based professional-services company Accenture has forecast that CE could generate 4.5 trillion US dollars of additional economic output globally by 2030.⁵

In order to facilitate the transition towards CE at a global level, supranational institutions and national governments will need to explore more deeply the policy implications of the CE paradigm and its potential synergies with other policy objectives. This includes its relationship with any post-pandemic recovery, and the continuing need to ensure economic competitiveness in a world in which labour-market changes are increasingly driven by digital technology, automation and artificial intelligence.

The G20 is a forum focused on advancing international cooperation and coordination among 20 major developed and emerging-market countries. It accounts for more than two thirds of global material resource use,⁶ and has, on average, higher growth rates for material use than the rest of the world. Based on current trends, the amount of material used in G20 countries is expected to increase from 65.4 billion tonnes in 2015 to 142.2 billion tonnes by 2050.⁷ Global material use has tripled in the past few decades, and in the absence of specific measures to counter such a trend it is expected to further double by 2060.⁸

⁴ Ellen MacArthur Foundation, Deutsche Post Foundation and McKinsey Center for Business and Environment, *Growth Within: A Circular Economy Vision for a Competitive Europe*, June 2015, <https://www.ellenmacarthurfoundation.org/publications/growth-within-a-circular-economy-vision-for-a-competitive-europe>.

⁵ Peter Lacy and Jakob Rutqvist, *Waste to Wealth. The Circular Economy Advantage*, Basingstoke/New York, Palgrave Macmillan, 2015.

⁶ Material resources include biomass (like crops for food, energy and bio-based materials, as well as wood for energy and industrial uses), metals (such as iron, aluminium and copper used in construction and electronics manufacturing), non-metallic minerals (used for construction, notably sand, gravel and limestone), and fossil fuels (in particular coal, gas and oil for energy).

⁷ International Resource Panel (IRP), *Resource Efficiency for Sustainable Development: Key Messages for the Group of 20*, Paris, UN Environment Programme (UNEP), 2018, <http://hdl.handle.net/20.500.11822/31622>.

⁸ European Commission, *A New Circular Economy Action Plan* (Ares/2019/7907872), 23 December 2019, [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=pi_com:Ares\(2019\)7907872](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=pi_com:Ares(2019)7907872).

Increased material use will also have an impact on climate change. According to the International Resource Panel (IRP), resource-efficiency approaches could reduce greenhouse gases (GHGs) emissions by 60 per cent by 2050.⁹ Transitioning towards CE has enormous potential to reduce CO₂ emissions and to mitigate the impact of climate change. It would entail the eventual elimination of the linear conversion of hydrocarbons to CO₂ and its replacement with enhanced energy-efficiency, bio-energy and carbon capture, utilization and storage technologies,¹⁰ and more circular strategies.

Unlike the traditional linear “take-make-consume-throw away” model of consumption and production, the CE model aims to achieve sustainable growth by retaining value in products, materials and components for *as long as possible* in economic and social systems.¹¹

“Designing for the CE” thus requires shifting focus from waste management and resource recovery to the objective of “closing the loop” in both biological and technical cycles (Appendix B). A circular economy is one in which products, materials and components are better designed and better maintained – and are repaired, reused, refurbished, remanufactured and finally recycled rather than being thrown away.

CE policy initiatives to close, extend and narrow material loops are largely initiated at national level (see Table 1, below).¹² For instance, Extended producer responsibility (EPR) schemes, landfill taxes and industrial partnerships to encourage ecodesign are generally imple-

⁹ Paul Ekins et al., *Resource Efficiency: Potential and Economic Implications*, Paris, UN Environment Programme (UNEP), March 2017, <http://hdl.handle.net/20.500.11822/21230>.

¹⁰The position of the authors is that CE must be seen as vital component and enabler of the United Nations 2030 Agenda for Sustainable Development and notes that CE links directly to several of the individual Sustainable Development Goals. For the purposes of this paper, direct discussion over energy is taken to be outside of the scope of CE.

¹¹ Martin Charter (ed.), *Designing for the Circular Economy*, London/New York, Routledge, 2018.

¹² Green Growth Knowledge Platform (GGKP), “Can International Trade Increase Resource Efficiency?”, in *GGKP Webinars*, 8 December 2015, <https://www.greengrowth-knowledge.org/node/141517>.

mented within national jurisdictions.¹³ Greater focus is therefore needed in specific areas in order to enable a global transition to CE: international cooperation, global governance, trade, supply/value chains, standardization, of products/processes and economic incentives – e.g. taxes on virgin raw materials and investment frameworks.

This chapter focuses on the “state of the art” in CE, international cooperation and policy-making – and highlights major global actors, stakeholders and initiatives related to CE. Some issues are explored from a macroeconomic perspective, some from a regional one and some at the level of organizations and products. It also offers recommendations to enhance the role of the G20 in promoting the transition to CE through short-term and medium-term actions as well as initiatives aimed at longer-term systemic change.

Table 1 | Selected policy instruments used by developed countries to drive CE

Type	Policy	Example
Economic instruments	Landfill taxation	Landfill tax in Denmark, the Netherlands and the UK
	Carbon tax	Carbon tax in the Netherlands, Norway and Sweden
	Container deposit legislation	AB Svenska Returpak in Sweden
	Infrastructure investment	UK Recycling and Waste LP fund for smaller-scale recycling
	Differentiated VAT rate	Reduced VAT rates in China for secondary raw materials
Information-based	Labelling	EU Ecolabel; Der Grüne Punkt in Germany
	Public education programmes	EU public information campaign on environmental damage caused by plastic waste
	Skills and training	Scotland Skills Investment Plan
Ecodesign	Extended producer responsibility (EPR)	India 2016 E-Waste Management Rules; Canada-wide Action Plan for Extended Producer Responsibility
	Ecodesign requirements: durability, reparability, recyclability	EU's Eco-Design Directive

¹³ OECD, *Extended Producer Responsibility. Updated Guidance for Efficient Waste Management*, Paris, OECD, 2016, <https://doi.org/10.1787/9789264256385-en>.

Other regulations	Waste prevention standard	BS 8001: 2017 – a framework standard for implementing the CE in organizations
	Voluntary agreements	European PVC industry voluntary agreement; WRAP’s Courtauld Commitment to reducing private-sector food waste
	Waste shipments: proper enforcement	UK Transfrontier Shipment of Waste Regulations
Public procurement and innovation	Green public procurement	Dutch government’s Green Deal
	Targeted public R&D	EU Circular Economy Finance Support Platform; EU InnovFin, backed by Horizon 2020; Innovate UK
	Pilot zones	CE industrial parks in China; eco-industrial parks in Scandinavia

Source: Felix Preston, Johanna Lehne and Laura Wellesley, “An Inclusive Circular Economy: Priorities for Developing Countries”, cit., p. 41.

1. THE IMPACT OF COVID-19

The Covid-19 pandemic is causing profound transformations worldwide. The coronavirus has disrupted global supply chains, creating major challenges in sourcing products, components and raw materials from countries around the world. Arguably, it is also fuelling a backlash against globalization.¹⁴

While the pandemic is still unfolding daily as this chapter is written, its global economic, social and environmental impact has not fully emerged – and it is important to learn lessons in real time rather than to wait until the end of the crisis. As Covid-19 has shown, our challenges are increasingly global in nature and require systemic solutions at a global level. The decisions that we make now to tackle this threat will affect us for generations to come. The present crisis has also illustrated the worldwide challenges that we face in developing solutions to halt global warming¹⁵ and transitioning to a CE. As emphasized by European

¹⁴ Peter S. Goodman, “A Global Outbreak Is Fueling the Backlash to Globalization”, in *The New York Times*, 5 March 2020, <https://www.nytimes.com/2020/03/05/business/coronavirus-globalism.html>.

¹⁵ Christiana Figueres and Tom Rivett-Carnac, “Our Approach to Covid-19 Can Also Help Tackle Climate Change”, in *New Scientist*, No. 3276 (4 April 2020), <https://www.newscientist.com/article/mg24532763-500>.

Commission President Ursula von der Leyen, the “circular economy will make us less dependent and boost our resilience”. She signalled that sustainability had been elevated to a top security priority, after the viral outbreak exposed the EU’s vulnerability vis-à-vis global supply chains.¹⁶

The epidemic may, in particular, have the following eventual impacts:

1) The world might move from a globalized economy to one based on regional “bloc economies” centred around the EU; North America; Asia; and, in the longer term, Africa. This major potential shift will have profound implications for the global economy and for the transition towards CE. In particular, with more production migrating back to individual countries (so-called “re-shoring” in opposition to the hitherto more common offshoring), there may be more opportunities to design “closed loop” models based on increased national and localized consumption and production.

2) The world is moving away from reliance on China as a major manufacturing hub. Some companies are accelerating the re-shoring of manufacturing activities from China in order to shorten global supply chains.¹⁷ Such actions, which also reflect growing protectionist drives, reduce the business risks associated with global supply chains that have been exposed by Covid-19. They have therefore come to be seen as a way to increase resilience in case of further economic shocks.

3) Recent commitments to ban single-use plastics might remain unmet in the short term for hygiene reasons.¹⁸ Citizens around the globe

¹⁶EwaKrukowskaandNikosChrysoloras, “EuropeSignalsPandemicMadeGreenAgenda Top Security Priority”, in *Bloomberg*, 16 April 2020, <https://www.bloomberg.com/news/articles/2020-04-16/stimulus-measures-should-help-green-shift-eu-climate-chief-says>.

¹⁷ For example, on the same day that Japan announced that it would spend upwards of 2.2 billion US dollars to get its corporations out of China and either back to Japan or spread throughout southeast Asia, White House National Economic Council Director Larry Kudlow said the US should “pay the moving costs” of every American company that wants to move out of China in the early of April of 2020. Kenneth Rapoza, “Kudlow: ‘Pay the Moving Costs’ of American Companies Leaving China”, in *Forbes*, 10 April 2020, <https://www.forbes.com/sites/kenrapoza/2020/04/10/kudlow-pay-the-moving-costs-of-american-companies-leaving-china>.

¹⁸ Starbucks announced in March 2020 that it would be temporarily pausing the use of ceramic mugs amid the Covid-19 outbreak, with all drinks being

are now increasingly taking precautions to increase domestic hygiene amid the pandemic, like wearing single-use disposable gloves or masks in public. This may lead to increased marine litter in a number of countries.¹⁹ The likely resulting increase in hazardous waste calls for measures that can ensure damage limitation and mitigation.²⁰

2. CONCEPTUAL AND DEFINITIONAL ISSUES

Unlike the “traditional”, linear economic model used since the Industrial Revolution and based on a “take-make-consume-throw away” pattern of consumption and production, the CE model aims to achieve environmentally and economically sustainable growth by retaining *value* in products, materials and components *for as long as possible* in economic and social systems.²¹ CE means moving away from the generation of waste and the recovery of materials towards “closing the loop” in both biological and technical cycles. Those materials can then be fed back into new rounds of manufacturing or different cycles of reuse, and reutilized components can be incorporated in new products (e.g. reused plastic bumpers in some heavy-goods vehicles).

Many definitions of CE are used worldwide, and there is a lack of consensus over the term.²² In addition, there are numerous terms associated with CE whose usage differs widely. The author’s involvement in the core team of BS8001:2017,²³ for example, identified confusion over spe-

served in disposable cups for the time being in the US and Canada, Victoria Forster, “Starbucks Won’t Fill Your Reusable Cup Anymore Over Coronavirus Fears”, in *Forbes*, 4 March 2020, <https://www.forbes.com/sites/victoriaforster/2020/03/04/starbucks-wont-fill-your-reusable-cup-anymore-over-coronavirus-fears>.

¹⁹ Kelly McCarthy, “Single-Use Plastic Gloves Seem Like a Good Idea During Coronavirus, But Here’s the Problem”, in *ABC News*, 7 April 2020, <https://abcn.ws/2JJWBMg>.

²⁰ *Ibid.*

²¹ Martin Charter (ed.), *Designing for the Circular Economy*, cit.

²² *Ibid.*; Julian Kirchherr, Denise Reike and Marko Hekkert, “Conceptualizing the Circular Economy: An Analysis of 114 Definitions”, in *Resources, Conservation and Recycling*, Vol. 127 (December 2017), p. 221-232, <https://doi.org/10.1016/j.resconrec.2017.09.005>.

²³ British Standards Institution (BSI), *Framework for Implementing the Principles of*

cific CE-related terms such as “upcycling” and “remanufacturing”. This lack of standardization has now been recognized by the International Organization for Standardization (ISO), which has set up a new technical committee, TC323, that is progressing the development of four standards – including one covering terms and definitions.

As indicated above, the discussion, which has thus far concentrated on the problem of waste, is now starting to address the problem of *value* – e.g. how to retain *value* in products, materials and components for *as long as possible* in economic and social systems.²⁴ However, at present, most of the world’s focus is still primarily on narrower, “downstream” issues such as waste management and materials recycling. Policy, standards and government initiatives will increasingly set their sights higher up the value chain, concentrating on the ecodesign of new products and the repair, reuse, refurbishment and remanufacture of existing products that are already in use.

Today, the implementation of comprehensive approaches to CE is still very limited. To accelerate the transition to global CE and a circular society, the long-standing environmental imperative of the 3 R’s – Reduce, Reuse, Recycle – will need to be extended towards a large spectrum of objectives (see the 12 “R’s in Appendix A).²⁵

3. CE PLANS LAUNCHED BY THE EU AND NATIONAL GOVERNMENTS AROUND THE WORLD

As stated above, policy action that aims to close, extend or narrow material loops is commonly considered at the national level.²⁶ For instance, EPR schemes, landfill taxes and ecodesign policies are generally implemented within national jurisdictions. More broadly, waste management and materials recovery are also taken forward at a national level, and

the Circular Economy in Organizations. Guide, London, BSI, May 2017.

²⁴ Martin Charter (ed.), *Designing for the Circular Economy*, cit.

²⁵ Ichin Cheng, “Why Asia Matters: Circular Economy in Japan, China and Taiwan”, in Martin Charter (ed.), *Designing for the Circular Economy*, London/New York, Routledge, 2018.

²⁶ GGKP, “Can International Trade Increase Resource Efficiency?”, cit.

CE initiatives are largely enacted through national policies.²⁷ The concept of CE is taking root around the world – especially in Europe and Asia²⁸– and there are numerous examples of CE action undertaken by G20 countries (see Appendix B). Europe, in particular, is at the forefront in promoting the CE agenda globally. The European Commission’s Circular Economy Action Plan (CEAP) policy package was passed in 2015, and a great deal of progress has since been published. In March 2020, the Commission published a new action plan, CEAP 2.0,²⁹ that highlighted various initiatives to support a global transition to CE. For example, the European Plastics Strategy aims at an international agreement on plastics and promotes the uptake of the EU’s CE approach on plastics. The Commission has proposed a Global Circular Economy Alliance in order to identify knowledge and governance gaps that hinder the advancement of a global CE and to build partnerships with other major economies, including those of China and African countries. Under CEAP 2.0, the Commission has also started discussions on an international agreement on the management of natural resources, and is working to ensure that free-trade agreements and the International Platform on Sustainable Finance reflect the enhanced objectives of the CE. One of the actions of CEAP in 2015 was to develop a mandate for CEN/CENELC (the European Committee for Standardization and the European Committee for Electrotechnical Standardization) to incorporate CE aspects into energy-related products. Standards related to critical raw materials (CRMs), repair, reuse, durability and remanufacturing have now been published.³⁰

In parallel with Commission developments, several EU member states such as Italy, the Netherlands, Finland, Denmark, Spain, France and Ger-

²⁷ OECD, *Extended Producer Responsibility. Updated Guidance for Efficient Waste Management*, cit.

²⁸ Ibid.

²⁹ European Commission, *A New Circular Economy Action Plan. For a Cleaner and More Competitive Europe* (COM/2020/98), 11 March 2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0098>.

³⁰ European Environmental Citizens Organisation for Standardisation (ECOS), *M/543 Series of Horizontal Standards on Material Efficiency Soon to Be Finalised*, 20 January 2020, <https://ecostandard.org/?p=2744>.

many have developed proactive CE policies at the national or regional level. In 2016, the Dutch Government set a dual objective at national level: reduce the use of virgin raw materials by 50 per cent by 2030 and become a “100% circular economy” by 2050. Sweden and Austria have blazed a trail by putting in place new policy instruments – e.g. tax reductions – to incentivize product repair. In France, a “Roadmap for the CE” – 50 measures for a “100% Circular Economy” has been launched; and Germany has undertaken a Resource Efficient Programme for the sustainable use and conservation of natural resources.

In 2017, Italy established a national strategic framework to increase circularity in the Italian economy. It calls for a “change of paradigm” and a new way in which to consume, produce and do business.³¹ The country’s national strategy is based on an action plan that includes various CE demonstration projects aimed at promoting the regenerative bioeconomy, improving the use of economic tools, implementing public procurement and e-commerce.³² The Italian Government has also identified international cooperation in the CE field as one of the main priorities of its G20 presidency in 2021.

The United Kingdom (UK) has not explicitly used the term “circular economy” in its policy. In Britain, the Waste and Resource Action Programme (WRAP) was established in 2010 to promote sustainable waste management and fund a significant number of CE-related projects.³³ The United States (US) has also not used the term CE. It has adopted the Sustainable Materials Management (SMM) approach, which aims at a more productive use of materials throughout their life span.

A group of Asian countries is setting up CE strategies focused on

³¹ Italian Ministry for the Environment and Ministry of Economic Development, *Towards a Model of Circular Economy for Italy. Overview and Strategic Framework*, November 2017, <http://consultazione-economiciacircolare.minambiente.it/node/21>.

³² Circular Economy Network (CEN) and ENEA, *Report on Circular Economy in Italy 2019. 10 Proposals and Research Summary*, April 2019, <https://circulareconomy.europa.eu/platform/en/node/2298>.

³³ Italian Ministry for the Environment and Ministry of Economic Development, *Towards a Model of Circular Economy for Italy*, cit.

managing waste, and is implementing the 3 “R” principles.³⁴ Japan has proved to be the global front-runner in the development of CE. Its strategy is based on a comprehensive long-term legislative framework aiming towards a circular society. At the turn of the Millennium, the country announced that the year 2000 was to be “the first year of Japanese Circular Society”, and a Fundamental Law for Sound Material-Cycle Society (MCS) was passed in 2001. This approach was underpinned by legislation related to resource efficiency, waste and several sector-specific initiatives. As a result, Japan had, by 2014, implemented advanced materials-recycling systems³⁵ with 98 per cent of metals recycled and 74–89 per cent of the materials from home appliances recovered.³⁶ In comparison, the EU had a 32.2 per cent e-waste recycling rate in 2015.³⁷ Japan also holds the highest number of patents related to CE technologies globally (28 per cent). Strategically, 2018 was an important year for Japan as it moved into the third phase of its strategy towards a circular society and, in the same year, it also hosted the World Circular Economy Forum.

China provides another long-term example. The Chinese Government aims to address environmental problems in parallel with maintaining economic growth. The People’s Republic’s Circular Economy Promotion Law came into force in 2008, and it is now promoting CE as a national strategy focused on the greening of its industry and the reduction of waste. CE has become one of the key national policies with which to build China’s “Ecological Civilization”, guided by the country’s 12th (2011–15) and 13th (2016–20) Five Year Plans, and the Made in China 2025 Strategy.³⁸

India has not adopted CE terminology, but the Indian Resource Efficiency (InRE) strategy released by the Indian Resource Panel (InRP) in

³⁴ Ichin Cheng, “Why Asia Matters: Circular Economy in Japan, China and Taiwan”, cit.

³⁵ Ibid.

³⁶ H. Itoh, “The Recent Trend of E-waste Recycling and Rare Metal Recovery in Japan”, in *WIT Transactions on Ecology and the Environment*, Vol 180 (2014), <https://doi.org/10.2495/WM140011>.

³⁷ De Groene Zaak, *Governments Going Circular. A Global Scan*, Dutch Sustainability Business Association, February 2015, <http://www.govsgocircular.com/media/1354/governments-going-circular-dgz-feb2015.pdf>.

³⁸ Ichin Cheng, “Why Asia Matters: Circular Economy in Japan, China and Taiwan”, cit.

2017 detailed the way in which CE approaches such as recycling, reuse, repair and remanufacture could support improvements in resource efficiency. The InRE strategy identifies numerous opportunities associated with a more resource-efficient economy, including the development of industries focused on reprocessing waste (e.g. the reuse of construction and demolition waste in new building products) and job creation in green product certification, eco-labelling and green marketing.³⁹

4. CE POLICY INSTRUMENTS

Experience from advanced CE countries suggests that many different policies can be used to support the implementation of CE (see Table 1).⁴⁰ A variety of actions can thus facilitate the transition. Key CE policy-instrument areas include economic instruments, information-based policy, regulations and public procurement. Developed countries have introduced financial incentives such as reduced value-added tax (VAT) on repaired products, as well as EPR policies and labelling schemes to help consumers choose more “circular” products. Other examples include economic instruments like landfill taxes in Denmark, the Netherlands and the UK. An independent, evidence-based study completed for the European Commission covering product policy and CE highlights a number of demand- and supply-side policy recommendations.

Some of the measures enacted in developed countries have been adopted and/or are now being considered in emerging and developing nations. For example, China, Colombia, India, Nigeria, Thailand, Indonesia and the Philippines are considering adopting EPR schemes for the management of plastic waste.⁴¹

³⁹ Felix Preston, Johanna Lehne and Laura Wellesley, “An Inclusive Circular Economy: Priorities for Developing Countries”, cit.

⁴⁰ Ibid.

⁴¹ Ludwig O. Federigan, “An Extended Producer Responsibility Policy for PH”, in *The Manila Times*, 19 July 2018, <https://www.manilatimes.net/?p=420998>; and Basten Gokkon, “Indonesia leans on businesses to do more about plastic waste”, in *Mongabay*, 12 November 2018, <https://news.mongabay.com/2018/11/indonesia-leans-on-businesses-to-do-more-about-plastic-waste>.

CE measures, including new waste and recycling laws, are expected to account for “half of the EU’s effort to achieve net-zero carbon emissions by 2050. European Commission President Ursula von der Leyen has recently stated that CE is “the number one priority” of the European Green Deal.⁴²

Under the aegis of the European Green Deal, the Commission has, as stated above, recently published the CEAP 2.0 to accelerate the transition towards a CE in Europe. The CEAP 2.0 was published in March 2020 together with the EU’s New Industrial Strategy in order to mobilize industrial sectors and value chains towards a model of sustainable and inclusive growth, ensuring resource-efficient and clean resource cycles.

Over the past three years, the issue of plastics has become a high political priority in many G20 member countries. A ministerial declaration issued at the UN Environment Assembly in 2019 aimed at “significantly reducing single use plastics by 2030”. In addition, the International Maritime Organization (IMO) adopted an action plan to target plastic litter from ships.⁴³

G20 global CE initiatives should focus on actions with the greatest possible impact in increasing sustainable resource use. In the context of globalized value and supply chains, the use of a sector-based approach is likely to be a useful strategy—for developed and developing countries alike. Such an approach might focus on the following:

4.1 Climate change and decarbonization

By early 2020, over 1,400 local governments in 28 countries had made climate-emergency declarations and set up policy priorities to tackle climate change. However, to what extent these plans will be implemented in the post Covid-19 situation is an open question.

There should be greater clarity over the links between CE activities

⁴² Frédéric Simon, “Circular Economy Erected As ‘Number One Priority’ of European Green Deal”, in *Euractiv*, 13 November 2019, <https://www.euractiv.com/?p=1399987>.

⁴³ European Commission, *Leading the Way to a Global Circular Economy: State of Play and Outlook* (SWD/2020/100), 11 March 2020, https://ec.europa.eu/environment/circular-economy/pdf/leading_way_global_circular_economy.pdf.

and climate change. A study related to seven European countries has shown that national CO₂ emissions can be reduced by 66 per cent and new jobs created by shifting to a CE.⁴⁴

A paper, “Completing the Picture – How the Circular Economy Tackles Climate Change”, published by the UK-based Ellen MacArthur Foundation in 2019 emphasizes the link between CE and the achievement of climate goals by governments and businesses. The paper highlights the fact that while 55 per cent of the climate-change challenge can be addressed through renewable-energy systems the other 45 per cent needs to be addressed by a CE transformation in how we make and use products.⁴⁵

4.2 Agriculture, water and food

The literature has hitherto paid limited attention to the problem of how to integrate CE with food-security and agricultural-development plans. Incorporating CE could offer interesting policy opportunities for developing countries – particularly those with ambitious targets for the advancement of their agricultural sectors. Tanzania’s National Development Vision 2025, for example, aims to transform the East African country “from a low productivity agricultural economy to a semi-industrialized one led by modernized and highly productive agricultural activities” supported by industrial and service activities. Opportunities for

⁴⁴ Anders Wijkman and Kristian Skånberg, *The Circular Economy and Benefits for Society. Jobs and Climate Clear Winners in an Economy Based on Renewable Energy and Resource Efficiency. A Study Pertaining to Finland, France, the Netherlands, Spain and Sweden*, Club of Rome, 2015, <https://clubofrome.org/?p=11053>; Anders Wijkman and Kristian Skånberg, *The Circular Economy and Benefits for Society. Jobs and Climate Clear Winners in an Economy Based on Renewable Energy and Resource Efficiency. A Study Pertaining to the Czech Republic and Poland*, Club of Rome, 2015, <https://circulareconomy.europa.eu/platform/en/node/277>; Anders Wijkman and Kristian Skånberg, *The Circular Economy and Benefits for Society. Jobs and Climate Clear Winners in an Economy Based on Renewable Energy and Resource Efficiency. A Study Pertaining to the Norwegian economy*, Club of Rome, 2016, <https://www.avfallnorge.no/fagomraader-og-faggrupper/rappporter/the-circular-economy-and-benefits-for-society>.

⁴⁵ Ellen MacArthur Foundation, *Completing the Picture. How the Circular Economy Tackles Climate Change*, 26 September 2019, <https://www.ellenmacarthurfoundation.org/publications/completing-the-picture-climate-change>.

CE approaches to minimize input requirements while adding value to agricultural outputs and creating new asset loops can be found along the entire food value chain, from production to processing to consumption.⁴⁶

4.3 Construction and Building

The construction sector uses billions of tons of materials – from sand to gravel and iron ore, to biotic resources such as wood and food. According to one estimate, more than one third of global material consumption is accounted for by construction materials and the building sector.⁴⁷ The production of these materials requires an amount of energy representing more than 40 per cent of GHG emissions associated with global materials production. Such raw-material consumption is predicted to grow faster than urban populations, and to reach an estimated 90 billion tons by 2050 (from 40 billion tons in 2010).⁴⁸ The high demand for such raw materials far exceeds what the planet can sustainably provide, and contributes significantly to climate change (today, concrete alone is responsible for 9 per cent of total GHG emissions).⁴⁹

4.4 Textiles, clothing and fashion

These are a fundamental part of everyday life, and an important sector in the global economy. The 1.3 trillion US dollars clothing industry employs more than 300 million people worldwide along its value chain. After the oil industry, textiles and clothing form the second-largest polluting sector in the world. The sector accounts for 10 per cent of global CO₂ emissions, 25 per cent of chemical emissions and is second only to agriculture as a consumer of water. One kilogram of textile material

⁴⁶ European Commission, *Leading the Way to a Global Circular Economy: State of Play and Outlook*, cit.

⁴⁷ Ellen MacArthur Foundation & ARUP, *Urban Buildings System Summary*, March 2019, https://www.ellenmacarthurfoundation.org/assets/downloads/Buildings_All_Mar19.pdf.

⁴⁸ Ibid.

⁴⁹ European Commission, *Leading the Way to a Global Circular Economy: State of Play and Outlook*, cit.

requires approximately 100–150 litres of water.⁵⁰

The CE is one of the strategic areas of innovation for the future development of the textiles, clothing and fashion sector. The industry has begun engaging with the CE in multiple ways. Many global brands are supporting the transition to circularity by nurturing and scaling innovation,⁵¹ and leading companies have made commitments, at CEO (Chief executive officer) level, to creating a circular fashion system.⁵²

4.5 ICT, e-waste and CRMs

E-waste is one of fastest-growing global challenges in economies increasingly based on information and communications technology (ICT). However, in a “closed loop” world, components could be reused or consumer electronics could be repaired – and e-waste could be a valuable resource for many new products. In addition, there have been growing concerns over the reliance on the use of CRMs⁵³ in advanced technologies – e.g. rare-earth elements for smartphones or cobalt for electric vehicles.⁵⁴ Increased demand in certain sectors will impact on prices, creating intense competition as some materials become increasingly scarce and more expensive.

⁵⁰ Carmen Busquets, *4 Reasons Fashion Is the Second Largest Polluter*, 29 March 2017, <https://www.carmenbusquets.com/journal/post/sustainable-fashion>.

⁵¹ C&A Foundation website: *Circular Fashion*, <https://www.candafoundation.org/impact/circular-fashion>.

⁵² Global Fashion Agenda, *CEO Agenda 2019*, <https://globalfashionagenda.com/?p=5244>.

⁵³ The European Commission produced a list of 27 CRMs that includes raw materials that have reached or exceeded thresholds of economic importance and supply risk to Europe. From its original list of 14 CRMs in 2011, the EU expanded its total of designated CRMs to 27 in 2017. Those 27 CRMs include 17 rare earth metals (REMs), also known as rare earth elements (REE). European Commission, *2017 List of Critical Raw Materials for the EU* (COM/2017/490), 13 September 2017, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017DC0490>.

⁵⁴ Felix Preston, Johanna Lehne and Laura Wellesley, “An Inclusive Circular Economy: Priorities for Developing Countries”, cit.

4.6 Crosscutting issues

CE processes aim to retain *value* in products, components and materials within the economic and social systems for as long as possible through better design (ecodesign) and through repair, reuse, refurbishment and remanufacturing – all considered value-retention processes (VRPs).⁵⁵

Ecodesign: Design specifications are typically responsible for about 75 per cent of a product’s manufacturing costs, and an estimated 80 per cent of product-related environmental impacts are determined at the design and development phase.⁵⁶ So, without an emphasis on designing-out waste and retaining *value* in products, components and materials, the pursuit of CE can only be an incremental affair. Ecodesign (including circularity considerations) requires a team approach and the engagement and involvement of a range of internal business functions and external stakeholders. Several options are available to designers to improve product circularity at different lifecycle stages. Incorporating circularity means adopting an extended lifecycle perspective – designing for durability, longevity or multiple uses or lives, while delivering the same or greater value to customers.

Repair: A campaign led by the non-governmental organization (NGO) the European Environmental Bureau (EEB) has influenced policy in the EU related to the repair of consumer electronics, home appliances and other products.⁵⁷ Citizen-led repair activities are also on the move. Repair cafés – community-led workshops focused on the repair of products by volunteers – now number nearly 3,000 worldwide and were continuing to grow consistently pre Covid-19.⁵⁸

The “Right to Repair” movement has spread from the US across the Atlantic to Europe.⁵⁹ EU environment ministers have proposed various

⁵⁵ Nabil Nasr et al., *Redefining Value. The Manufacturing Revolution. Remanufacturing, Refurbishment, Repair and Direct Reuse in the Circular Economy*, Paris, UNEP International Resource Panel, 2018, <https://www.resourcepanel.org/node/712>.

⁵⁶ Smallpiece Trust, *Design for Production. Seminar Notes*, Leamington Spa, 1989.

⁵⁷ EEB website: *Right to Repair*, <https://eeb.org/tag/right-to-repair>.

⁵⁸ Repair Café website: *About Repair Café*, <https://repaircafe.org/en/about>.

⁵⁹ Roger Harrabin, “EU Brings in ‘Right to Repair’ Rules for Appliances”, in *BBC News*, 1 October 2019, <https://www.bbc.co.uk/news/business-49884827>.

measures to induce manufacturers to make products that last longer and are easier to repair than in the days of “built-in obsolescence”. The right to repair a core component of the European Commission’s CEAP 2.0.

Remanufacturing: This practice is a key element in global CE transition, offering huge potential economic opportunities and environmental benefits. In 2011, the US led the world’s remanufacturing efforts – followed by the EU, in which Germany took 70 per cent of the market. Today, China is the fastest-growing market in the sector, with a value projected to be 290 billion US dollars by 2020. However, remanufacturing accounts for only 2 per cent of production in the US and just 1.9 per cent in Europe, leaving ample opportunity for further development.⁶⁰

Systemic change: At local level, a CE can be operationalized where waste (or value) from one industrial process becomes an input into another process (industrial symbiosis – IS). IS means a designed process whereby one firm’s waste becomes a raw material for another. It has already been implemented in Kalundborg, Denmark; in Yokohama, Japan; and in Ulsan, South Korea – and is being piloted in eco-industrial parks in China.⁶¹ Future “closed loop” systems will need to factor in the location of waste exchanges and materials banks in order to facilitate the process. Creating and optimizing resource “loops” along value and supply chains could help to meet the material needs of growing populations through drastically lower rates of per capita primary-resource use.

European front-runner countries have incorporated IS in their Smart Specialisation Strategies. For example, in Finland’s southern Päijät-Häme region, CE and IS have been embedded in the Regional Development Strategy and the RIS3 Strategy in the Regional Land Use Strategy.⁶² In Italy, the National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) has developed IS in three regions – Sicily, Lazio and Emilia-Romagna – and established the country’s first national IS network, “SUN – Symbiosis User Network”. This network

⁶⁰ Nabil Nasr et al., *Redefining Value. The Manufacturing Revolution*, cit.

⁶¹ Ichin Cheng, “Why Asia Matters: Circular Economy in Japan, China and Taiwan”, cit.

⁶² Venelina Varbova and Ruslan Zhechkov, *Uptake of Industrial Symbiosis in European Regions. A Policy Learning Platform Event*, Helsinki, 22-23 May 2019 [follow up brief], <https://www.interregeurope.eu/industrialsymbiosis/conclusions>.

aims to promote and share knowledge among stakeholders, and identify new opportunities to implement the CE through IS.⁶³

In addition, the traditional lifecycles of products need to be reassessed in order to take account of the CE as product circularity focuses on extending the *value* of products, components and materials across multiple lifecycles. There is therefore a need for a new understanding of *product lifetime*. For example, products, materials and components may go through various loops as they are returned for repair, reuse, refurbishment, remanufacturing or recycling in economic and social systems.⁶⁴

5. THE STATE OF PLAY OF CE INTERNATIONAL INITIATIVES

5.1 *International trade and finance*

While current CE policies have been mostly developed at the national and regional levels, there is increasing awareness that a transition towards a CE has broad linkages with international trade. This, for instance, takes place through global value chains as well as trade in second-hand goods, end-of-life products, secondary materials or non-hazardous waste –and in trade in related services.⁶⁵

There is increasing awareness of the opportunities and challenges related to international trade resulting from a global transition towards CE. The Organisation for Economic Co-operation and Development (OECD) policy guidance on resource efficiency emphasizes the need to better address trade-related obstacles to resource efficiency in supply chains, such as export restrictions on secondary materials, secondary goods and used products.⁶⁶ Moreover, shared approaches and measure-

⁶³ Italian Ministry for the Environment and Ministry of Economic Development, *Towards a Model of Circular Economy for Italy*, cit.

⁶⁴ Hans-Christian Eberl and Martin Charter (eds), *Products and Circular Economy. Policy Recommendations Derived from Research & Innovation Projects*, Luxembourg, Publications Office of the European Union, 2020, <https://doi.org/10.2777/15587>.

⁶⁵ Shunta Yamaguchi, “International Trade and the Transition to a More Resource Efficient and Circular Economy. A Concept Paper”, in *OECD Trade and Environment Working Papers*, No. 2018/03 (October 2018), <https://doi.org/10.1787/18166881>.

⁶⁶ Ibid.

ment standards can also have a strong positive effect. Dialogue on regulation and practical cooperation between countries can help too –for example, if it covers the waste hierarchy, waste management and the use and standardization of secondary raw materials.⁶⁷

The World Trade Organization (WTO) and free-trade agreements provide useful platforms from which to further explore CE issues within the context of trade and the environment. This process might be undertaken, in particular, through a number of WTO committees – including those covering Trade and Environment (CTE): Rules; Technical Barriers to Trade (TBT) and Sanitary and Phytosanitary (SPS) measures; and Agriculture and Committee on Development. In addition, the next WTO Ministerial Conference may provide an opportunity to deepen dialogue around CE-related issues.⁶⁸

As mentioned earlier, the transition to a CE at a global level needs a common definition and globally agreed standards that help to promote more circular business models, goods, technologies and services. This is also essential to enable the flow of funding into the sector.

The financial sector has a key role to play in facilitating a shift to a CE. It can, for example, provide financial resources for circular investments; offer insurance products suitable for circular practices, such as leasing and sharing; and develop rating systems and information-disclosure requirements that can help to improve transparency around CE-related business risks. In early 2017, the European Commission and the European Investment Bank (EIB) undertook a joint initiative called the Circular Economy Finance Support Platform (CEFSP) in order to promote coordination and knowledge exchange among key stakeholders and to implement actions needed to enhance investments in the CE. The CEFSP has produced recommendations to improve the “bankability” of CE projects, coordinate funding activities and share good practice. It has worked with the EIB to provide financial assistance and explore syner-

⁶⁷ European Commission, *Leading the Way to a Global Circular Economy: State of Play and Outlook*, cit.

⁶⁸ Shunta Yamaguchi, “International Trade and the Transition to a More Resource Efficient and Circular Economy”, cit.

gies with the EU's action plan on financing sustainable growth.

The EIB also set up the Joint Initiative on Circular Economy (JICE).⁶⁹ JICE is a partnership between the EU's largest national CE promotional banks and institutions. The Bank aims to invest at least 10 billion euro in the CE by 2023 in order to support projects that prevent and eliminate waste, increase resource efficiency and promote circular business models. JICE is working on harmonizing CE definition; on sharing knowledge about CE activities; on CE advisory facilities; and on creating a new, dedicated CE financing platform.⁷⁰ The Asian Development Bank (ADB) and Africa Bank have also developed CE initiatives of their own. However, these initiatives have seemingly had a limited role in advancing global cooperation among financial institutions.

Managing the global CE transition demands a deep understanding of trends and issues related to global trade and sustainable consumption and production (SCP) patterns. Unfortunately, financial institutions suffer from several knowledge gaps –including on:

- developing definitions, taxonomy and tools to measure the circularity of projects;
- identifying the risks related to linear business models and reviewing credit-risk assessment methods to account for those risks;
- strengthening risk-sharing financial instruments, advisory support and creating a pool of experts available for financial institutions in order to assess the technological risk of innovative circular technologies; and
- clearly identifying financial instruments that are appropriate for financing CE projects, and increasing awareness and knowledge of the CE within the financial sector.⁷¹

⁶⁹ Arnold Verbeek views on “Financing the Circular Economy and Closing the Investment Gap”, in *Chatham House Circular Economy Conference*, 1 April 2020, <https://www.chathamhouse.org/file/59604>.

⁷⁰ Ibid.

⁷¹ Ibid.

5.2 Other multilateral initiatives

Several multilateral initiatives aim to promote global CE cooperation: *The Partnership for Action on Green Economy (PAGE)*⁷² – PAGE was launched in 2013 in order to support those countries that wish to adopt sustainable economic policies and embrace greener and more inclusive growth objectives. The partnership brings together five UN agencies.⁷³ Their combined mandates, expertise and networks can offer support to countries embarking on models of inclusive green economy, ensuring coherence and avoiding duplication.

The 10-Year Framework of Programmes on Sustainable Consumption and Production (10YFP) – Also known as the “One Planet Network”, the UN’s 10YFP was adopted in 2012 at the World Summit on Sustainable Development (WSSD). It marks a global commitment to accelerate the shift towards SCP, in both developed and developing countries. It is a multi-stakeholder partnership that is organized into six programmes: Public Procurement, Buildings and Construction, Tourism, Food Systems, Consumer Information, and Lifestyles and Education. The 10YFP implicitly includes activities related to CE.

The Platform for Accelerating the Circular Economy (PACE) – PACE was launched in 2017 as a public–private collaboration mechanism and project accelerator for the CE. The World Economic Forum (WEF) hosts and facilitates the platform. It aims to develop blended financing models in order to help create and adjust enabling policy frameworks to address specific barriers to advancing CE, and to bring in public–private collaborations in order to scale its impact.⁷⁴ The Global Leadership Group

⁷² Partners of PAGE include 10YFP, Green Economy Coalition, Global Green Growth Institute, Green Growth Knowledge Platform, SWITCH Africa Green, SWITCH Asia, UN Environment Finance Initiative, UN Environment Inquiry, UN-REDD Programme, UNDP-UNEP Poverty-Environment Initiative. PAGE implicitly includes activities on CE but not explicitly. See PAGE website: *About PAGE*, <https://www.un-page.org/node/3>.

⁷³ UN Environment Programme (UNEP); International Labour Organization (ILO); UN Development Programme (UNDP); UN Industrial Development Organization (UNISO); and UN Institute for Training and Research (UNITR).

⁷⁴ Sitra website: *The Platform for Accelerating the Circular Economy (PACE)*, <https://www.sitra.fi/?p=103503>.

of PACE currently includes over 40 CEOs, government ministers and heads of international organizations committed to leading a portfolio of CE projects and activities. Projects are focused on a number of areas: plastics, electronics, food, bioeconomy, business models and market transformation.⁷⁵

The World Circular Economy Forum (WCEF) – The WCEF is an annual global conference on CE that helps to facilitate network building and knowledge exchange. It was established in 2017 by the Finnish Government and its innovation agency, Sitra. First held in Finland in that founding year, the WCEF then met in Japan in 2018 and in Finland, again, in 2019. Plans were drawn up for it to be hosted in Toronto, Canada in 2020, but this has now been put back to 2021; it will mark the first time that the international forum has taken place in North America.⁷⁶

*European Circular Economy Missions (CEMs)*⁷⁷ – The European Commission has organized a series of high-level political and business meetings in third countries in order to communicate and promote the CE. From 2016 to 2019, these CEMs took place in Chile, China (2016); South Africa, Colombia (2017); Japan and Indonesia, India (2018); and Mexico, Singapore, Malaysia, Senegal (2019). Other CEMs planned for 2020–21 focus on sub-Saharan Africa (Nigeria, Ethiopia, Ghana, Kenya and Rwanda); Asia (South Korea, Vietnam, China, India and Japan); North America (Canada); and South America (Brazil and Costa Rica).⁷⁸

The African Alliance on Circular Economy (AACE) – In 2017. The Alliance was founded by three countries Rwanda, Nigeria and South Africa along with UNEP and the World Economic Forum. AACE creates an alliance of African countries represented at the Ministerial level who share best practices, undertake collaborative projects and advocate circular economy programmes and practice.

⁷⁵ World Economic Forum website: *Circular Economy and Material Value Chains*, <https://www.weforum.org/projects/circular-economy>.

⁷⁶ Canada Government website: *Circular Economy*, cit.

⁷⁷ European Commission website: *Circular Economy Missions to Third Countries*, https://ec.europa.eu/environment/international_issues/missions_en.htm.

⁷⁸ European Commission, *Leading the Way to a Global Circular Economy: State of Play and Outlook*, cit.

The Africa–Europe Alliance for Sustainable Investment and Jobs (AEASIJ) – The European Commission launched AEASIJ in September 2018 in order to highlight the EU’s interest in building a strong partnership and cooperation with Africa. This is aimed at enhancing opportunities for sustainable growth and creating local employment through new business models and mutually beneficial trade relations.⁷⁹

The European Circular Economy Stakeholder Platform (ECESP) – ECESP is a joint initiative by the European Commission and the European Economic and Social Committee (EESC) that was established in 2017. It brings together European stakeholders from member states in order to promote the exchange of ideas, policies and best practice related to CE.⁸⁰ An annual conference is organized in Brussels.

Business-driven CE networks – Several business-driven CE networks have been established, including WBCSD “Factor 10” and the Ellen MacArthur Foundation (EMF) CE100.

The WBCSD “Factor 10” – This initiative started at the WEF in 2018, with over 30 leading companies across 16 sectors joining forces to implement CE through the World Business Council for Sustainable Development (WBCSD). The aim of the WEF is to scale up CE from sustainability departments to all business functions and value chains, with a focus on practical actions at a company level. The “Factor 10” initiative aims to capture economic and sustainability benefits by implementing scalable solutions to resource-use challenges. Three priority areas are highlighted: (1) developing transformative cross-value chain solutions that unlock circular opportunities for business; (2) generating CE knowledge in order to help businesses to understand the “landscape”, (3) best practice and leading examples; and (3) amplifying the business voice globally.⁸¹

The Ellen MacArthur Foundation Circular Economy 100 (CE100) – The CE100 Network was established in 2013 and provides a platform for busi-

⁷⁹ European Commission website: *Circular Economy Missions to Third Countries*, cit.

⁸⁰ Website of the European Circular Economy Stakeholder Platform: *About the Platform*, <https://circulareconomy.europa.eu/platform/en/about-platform>.

⁸¹ WBCSD, *30 Leading Companies with a Combined Revenue of USD \$1.3 Trillion Join Forces to Implement the Circular Economy*, 23 January 2018, <https://www.wbcd.org/Programs/Circular-Economy/Factor-10/News/launching-Factor10>.

ness communities to learn, share knowledge and put ideas into practice. Its membership includes a diverse range of global companies including Apple, BASF, Cisco, Coca-Cola, Dell, HP, IBM, Ikea, ING Bank, Kingfisher, Marks & Spencer, Michelin, Microsoft, Orange, Steelcase, Tetrapak, Veolia and Walmart.⁸²

Individual business initiatives – There has also been a marked increase in business engagement with CE, as companies increasingly see their profitability and long-term success as being dependent on CE-related issues. A growing range of companies have been adopting innovative CE approaches – these include H&M Foundation’s Global Change Award to call for ideas to make the fashion industry circular.

6. CE INITIATIVES WITHIN THE G20 FRAMEWORK

The G20 also regularly engages with key stakeholders who are important for CE policies in its engagement groups – each suffixed “20”, as they fall under the G20 umbrella. These stakeholders include NGOs from the following areas: business (B20), civil society (C20), labour (L20), think tanks (T20), youth (Y20), science (S20), women (W20) and urban (U20). All these groups hold major events during a G20 presidency, and the outcomes contribute to the deliberations of G20 leaders. The current G7 (the smaller group comprising Canada, France, Germany, Italy, Japan, the United Kingdom and the United States) and G20 processes that are of particular interest for advancing the global transition to a CE include the G7 Alliance on Resource Efficiency (2015), the G7 Action Plan to Combat Marine Litter (2015) and the G20 Resource Efficiency (RE) Dialogue (2017).

The last-named process (the G20 RE Dialogue) first took place under the German G20 presidency in 2017. It focuses on closer cooperation on the efficient and sustainable use of natural resources. A key outcome of the G20 RE Dialogue was the G20 RE Roadmap on Energy Transitions and Global Environment for Sustainable Growth in June 2019.⁸³

⁸² Ellen MacArthur Foundation website: *Members*, <https://www.ellenmacarthur-foundation.org/our-work/activities/ce100>.

⁸³ G20 Resource Efficiency Dialogue, *Roadmap for the G20 Resource Efficiency*

The G20 RE Roadmap aims to share actions and good practice, strengthen and mainstream resource-efficiency policies, improve the measurement of resource efficiency, encourage innovation and create opportunities, encourage multi-stakeholder engagement and cooperate with other international initiatives. Tackling marine litter has become a major global concern, and a series of initiatives was launched by the G7/G20 between 2017 and 2019. These include the Marine Litter Action Plan (2017), the Future of the Seas and Oceans working group (2017), the Innovation Challenge to Address Marine Plastic Litter (2018) and the Implementation Framework for Action on Marine Plastics Litter (2019).⁸⁴ In 2019, the G20 leaders also endorsed the “Osaka Blue Ocean Vision” – a commitment to reduce additional pollution from marine plastic litter to zero by 2050.⁸⁵

CONCLUSIONS AND RECOMMENDATIONS

The G20 should seek the maximum possible integration of CE initiatives with other major policy areas.

In a post-pandemic economic environment, it is vital that CE be “mainstreamed” into broader policy priorities – e.g. economic recovery and social resilience in a climate-constrained and increasingly digital and automated world. The G20 can play a crucial role in highlighting the impact of Covid-19 on CE, and in identifying the global-governance instruments best suited to address health problems in close connection with economic and financial measures.

Clearer links between CE and the UN’s 10YFP on SCP should be established. There should be a more explicit discussion over how to create a synergy between CE policies and SCP. Also, there needs to be greater clarity over the goals and mission of the proposed European Commis-

Dialogue, Tokyo, 9-10 October 2019, https://g20re.org/pdf/Roadmap_for_the_G20_Resource_Efficiency_Dialogue.pdf.

⁸⁴ European Commission, *Leading the Way to a Global Circular Economy: State of Play and Outlook*, cit.

⁸⁵ European Commission website: *Multilateral Relations – G7/G8 And G20 - Public Events*, https://ec.europa.eu/environment/international_issues/relations_g20_events_en.htm.

sion Global CE Forum in order to avoid a duplication of efforts with the World CE Forum led by the Finnish Government and Sitra.

The G20 should establish a framework to manage CE within a product policy that helps to illustrate the potential use of demand-side and supply-side policy tools. To avoid long-term problems, there needs to be a recognition of trade-offs –for example, between implementing CE policy approaches and the impact on energy and water consumption. The Group of Twenty should collect examples of best practice in CE design – e.g. design for preventative maintenance, repair, refurbishment, remanufacturing and (materials) recycling. The G20 should consider valuing research and innovation assets so as to reflect and define the advanced technologies (advanced materials, photonics, nanotechnologies, artificial intelligence, etc.) needed to encompass and respond to the emerging needs, and to maximize the impacts on society and businesses.

The Group of Twenty should consider the development of a “top-runner” programme to drive CE within firms in individual countries, building on the Japanese approach on energy. It should develop CE leadership awards for governments, businesses and civil society organizations (CSOs) – possibly working with the WEF and other policy stakeholders identified earlier in the paper (e.g. the B20, the C20 and so on).

G20 governments should demonstrate leadership in cooperative action in support of the CE under the Italian G20 presidency to speed up a global CE transition. The G20 should mainstream CE into the Resource Efficiency Working Group (CEREWG) and expand the G20 Climate Sustainability Working Group (CSWG) to explicitly cover CE issues.⁸⁶ An expert working group should be established to develop new perspectives based on sound international collaboration on CE.

Define, standardize and measure circularity – A recent European Commission paper on product policy and CE has highlighted a lack of shared

⁸⁶ Within G20, the Energy Sustainability Working Group (ESWG) was established in 2013 to cover the energy-related issues. In 2017, there was recognition that energy policy and climate change issues were closely linked and the CSWG was established under the Sustainability Working Group (SWG). In 2018, under the Argentine presidency, CSWG was separated from ESWG and became one of the Working Groups in the Sherpa process.

definitions and indicator sets that could allow comparison between the circularity performance of products and services within and across sectors. A more harmonized approach would help to improve and standardize key CE performance data across economic sectors. This would facilitate comparability and the exchangeability of data within and between those economic sectors.⁸⁷

The proposed G20 CEREWG should work with the ISO and International Electrotechnical Commission (IEC) in order to develop a universally agreed definition of CE and establish key circularity indicators for products and processes based on that definition. CE standards also need to be developed and harmonized through the ISO and other international and national standards bodies in order to cover areas such as performance measurement, reporting and accounting.⁸⁸ The ISO established TC323 in 2019 as a technical committee to take forward the standardization proposals related to CE.

Monitoring frameworks to measure progress in the circular transition should also be established. In addition to “hard” indicators about resource productivity, material footprints, waste generation or recycling rates, progress could also be measured using indicators at an international level.⁸⁹

Establish synergy with decarbonization – As mentioned above, increased clarity is needed over the links between CE activities and climate change. One of the key areas for cooperation within the G20 lies in exploring strategies for the decarbonization of global industry through CE, taking account of both supply-side and demand-side perspectives. Key supply-side technologies include energy efficiency (especially at the system level), electrification, carbon capture and chemical feedstock. Crucial demand-side approaches include material-efficient

⁸⁷ Hans-Christian Eberl and Martin Charter (eds), *Products and Circular Economy*, cit.

⁸⁸ Yong Geng, Joseph Sarkis and Raimund Bleischwitz, “How to Globalize the Circular Economy”, in *Nature*, No. 565 (2019), p. 153-155, <https://doi.org/10.1038/d41586-019-00017-z>.

⁸⁹ Luc Alaerts et al., “Towards a More Direct Policy Feedback in Circular Economy Monitoring via a Societal Needs Perspective”, in *Resources, Conservation and Recycling*, Vol. 149 (October 2019), p. 363-371, <https://doi.org/10.1016/j.resconrec.2019.06.004>.

design (ecodesign); reductions in material waste; the substitution of low-carbon for high-carbon materials; and other CE interventions such as improving product longevity, reusability, refurbishment, remanufacturing and recyclability.⁹⁰ This approach applies well, for example, to the mining, energy and transportation sectors, in which electrification, the growth of EVs (electric vehicles) and the development of various battery and other storage technologies provide numerous opportunities for undertaking CE initiatives.

Prioritize key impact sectors – Each country and economy have different opportunities and challenges related to CE and “closing loops”. The G20 should particularly focus on resource-intensive and high-impact sectors such as agriculture, water and food production; construction; textiles, clothing and fashion; ICT; e-waste; and critical raw materials.

Accelerate innovation and technology deployment through CE pilots – Technological acceleration is already creating a fundamental shift in the manufacturing landscape as a result of significant advances in sensing, digitization, computation, storage, networking and software.⁹¹ The digital transformation of the production system and the enabling technologies of so-called “industry 4.0” (the fourth industrial revolution) already offer solutions to make more sustainable and circular productions possible and efficient in areas such as wireless predictive maintenance, operational efficiency and advanced manufacturing.

Strategic, well-designed CE policies can accelerate innovation and provide incentives for technology deployment. The G20 should promote CE pilot projects and accelerator networks. Such coordinated commitments would signal to both business and investment communities that future CE pathways will depend on international coordination and openness to trade in CE goods and services. They would also strengthen the position of international financial institutions seeking to enhance the synergies in their investment plans between the CE and wider sustaina-

⁹⁰ Jeffrey Rissman et al., “Technologies and Policies to Decarbonize Global Industry: Review and Assessment of Mitigation Drivers Through 2070”, in *Applied Energy*, Vol. 266 (15 May 2020), p. 114848, <https://doi.org/10.1016/j.apenergy.2020.114848>.

⁹¹ Thomas L. Friedman, *Thank You for Being Late. An Optimist’s Guide to Thriving in the Age of Accelerations*, New York, Farrar, Straus and Giroux, 2016.

ble-development programmes.⁹²

Provide economic instruments and incentives to mainstream CE – The G20 should evaluate how existing economic instruments could incentivize the mainstreaming of CE at a global level.

The OECD’s “Policy Guidance on Resource Efficiency” identifies a set of instruments to guide national systems towards the circularity of economic processes. These economic instruments include:

- taxes on virgin materials or products, or waste disposal and incineration;
- “deposit refund” schemes;
- taxation based on recycled-product content;
- public support for the creation of industrial symbiosis (IS) processes; and
- certification and labelling rules to strengthen the image of the product and the company, making traceability of the production process more verifiable.⁹³

In particular, it is important to deploy a variety of economic instruments and policy tools in the international trade and agreement arena, such as taxation on carbon emissions (carbon tax), on landfill disposal (landfill tax) and on pollution in general (pollution tax) in order to encourage the transition to less-impactful technologies, promoting reuse, recovery and recycling.⁹⁴

Promote CE governance in developing countries – Developing countries are becoming increasingly important centres for the production of goods and will be the future centres of consumption in the global economy. An increasing share of the global “consuming class” now lives in emerging and developing countries, with a vast concentration in India and China.

⁹² Felix Preston, Johanna Lehne and Laura Wellesley, “An Inclusive Circular Economy: Priorities for Developing Countries”, cit.

⁹³ OECD, *Policy Guidance on Resource Efficiency*, Paris, OECD, 2016, <https://dx.doi.org/10.1787/9789264257344-en>.

⁹⁴ UN Environment Inquiry and Italian Ministry of Environment, *Financing the Future. Report of the Italian National Dialogue on Sustainable Finance*, December 2016, <https://unepinquiry.org/?p=2531>.

Cooperative approaches will be needed to develop common rules and standards for the governance of global CE value chains.

Discussions are happening on the ways in which international governance frameworks, such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (the “Basel Convention”), could be strengthened in order to manage the significant environmental and health impacts associated with global flows in e-waste.⁹⁵ Particular attention should be paid to the ways in which CE governance rules can be applied in developing countries.

Achieve the SDGs through CE actions – Progressing CE is essential for achieving individual and interdependent SDGs (see Appendix C). CE practices are of particular relevance to solving the global waste crisis, which disproportionately affects the populations of low- and middle-income countries – where at least 2 billion people still do not have access to solid-waste collection. Looking forward, the G20 should integrate CE into the achievement of the SDGs and the pursuit of new models for sustainable, green and resilient growth.

⁹⁵ Felix Preston, Johanna Lehne and Laura Wellesley, “An Inclusive Circular Economy: Priorities for Developing Countries”, cit.

Appendix A | Three “Rs” to 12 “Rs”

	12 “R’s	Definition of each R
Initial stage (in use by many companies today)	Reduce	Action to reduce the use of resources in the beginning
	Reuse	A product, component or material can be used again without requiring any reprocessing or treatment
	Recycle/ Reclaiming	The action of processing a used product, component or material for use in a future product, component or material
Accelerating stage (in use by advanced companies today)	Repair	Returning a faulty or broken product, component or material back to a usable state
	Refurbish/ Recondition	Aesthetic improvement of a product, component or material, which might involve making it look like new, with limited functionality improvements
	Repurpose (including upcycle and downcycle)	<ul style="list-style-type: none"> - Using a product, its components or materials in a role that they were not originally designed to perform - Downcycling: process of converting waste into new materials, components or products of lesser quality and reduced functionality compared with its original intended purpose - Upcycling: process of converting otherwise waste into new materials, components or products of better quality, improved functionality and/or a higher environmental value
	Re-design/ Eco-design	Significant changes in existing products, processes or organizational structures, redesigning them towardsecodesign or green design
	Re-manufacturing	Returning a used product to at least its original performance with a warranty that is equivalent to or better than that of the original manufactured product
Advanced stage (rare best practice today)	R&D	Investment in new materials, processes, technologies and general innovation
	Reverse-supply chain/Reverse logistics	<ul style="list-style-type: none"> - Reverse logistics: the process of reclaiming products and materials from the end user - Reverse supply-chain management: the process to managing reverse logistics and the remanufacturing of products and materials for new products. In some cases, reverse supply chain involves different suppliers and crosses different industries
	Re-skilled people	Retraining employees, designers, engineers, managers, policymakers, stakeholders and shareholders in order for them to understand the CE approach
	Reinvention of the industrial system into a green industrial system	Using CE principles to reinvent the industrial process and ways of treating materials and resources towards a green industrial revolution in order to achieve an ecological civilization

Source: Ichin Cheng, “Why Asia Matters: Circular Economy in Japan, China and Taiwan”, cit.

Appendix B | Some other CE initiatives and activities by G20 members

G20 member	Topics	Activities
EU	Global CE outreach	See above
EU	Plastics, textiles, construction and materials	<ul style="list-style-type: none"> - Identify possible actions by the G20 to reduce the environmental and social impact of the production, use and disposal of plastics, textiles and construction materials through a circular approach addressing, inter alia, product design and consumption - Lead efforts at the international level to reach a global agreement on plastics in line with the objectives of the European Plastics Strategy
Canada	CE tech and Zero Plastic Waste international cooperation	Host World Circular Economy Forum 2021 CE policy initiatives are underway at all levels of government, including the Canada-Wide Action Plan on Zero Plastic Waste
Germany	Resource Efficient	German Resource Efficient Programme II: Programme for the sustainable use and conservation of natural resources
France	Roadmap	Roadmap for the CE – 50 measures for a 100% CE
Italy	Green public procurement (GPP) Plastics/Bioplastics	Towards a CE model for Italy The public sector, with its large demand for goods and services, can, through processes of green public procurement, play a pivotal role in promoting resource efficiency, innovation and the green economy – and can do so in collaboration with the private sector
Japan	International cooperation on resource-efficiency improvement in the Asia-Pacific and Africa regions	Promote activities under the 'Regional 3R Forum in Asia and the Pacific' and the 'African Clean Cities Platform (ACCP)', in collaboration with related international organizations and countries, providing good practice on sound waste management, the 3 'R's and CE policy and technologies
UK	Sustainable Production	Share information and best practice on resource efficiency and waste prevention at an international level with G20 partners. This includes ecodesign of products; improved consumer information; and increasing usage of secondary materials, including industrial by-products
USA	Developing and incentivizing markets for secondary materials Food loss and waste	At a minimum, this work would cover approaches to ensure that the supply of material is abundant, clean and reliable, as well as strengthening the demand for processed secondary materials – domestically and internationally Advance cooperation on measuring and reducing food loss and waste.
China		<ul style="list-style-type: none"> - China revised its Circular Economy Promotion Law in 2018 - 10 zero-waste city demonstration projects established in 2019

Source: European Commission, *A New Circular Economy Action Plan*, cit.; G20 Resource Efficiency Dialogue, *Roadmap for the G20 Resource Efficiency Dialogue*, cit.; author's own research; and Canada Government website: *Circular Economy*, cit.

**Appendix C | Circular economy in the 2030 Agenda Framework:
contributions and gaps**

	Direct positive contributions through circular economy	Gaps in addressing social dimensions in the circular economy	Requirements to enable circular economy transition
SDG 1 (No poverty)		X	
SDG 2 (Zero hunger)		X	
SDG 3 (Good health & wellbeing)	X		
SDG 4 (Quality education)			X
SDG 5 (Gender equality)		X	
SDG 6 (Clean water and sanitation)	X		
SDG 7 (Affordable and clean energy)	X		
SDG 8 (Decent work and economic growth)	X		
SDG 9 (Industry, innovation and infrastructure)	X		
SDG 10 (Reduced inequalities)		X	
SDG 11 (Sustainable cities and communities)	X		
SDG 12 (Sustainable consumption and production)	X		
SDG 13 (Climate change)	X		
SDG 14 (Life below water)	X		
SDG 15 (Life on land)	X		
SDG 16 (Peace, justice and strong institutions)			X
SDG 17 (Partnerships for the goals)			X

Source: Patrick Schröder, “Promoting a Just Transition to an Inclusive Circular Economy”, in *Chatham House Research Papers*, April 2020, p. 9, <https://www.chathamhouse.org/node/41013>.

REFERENCES

Luc Alaerts et al., “Towards a More Direct Policy Feedback in Circular Economy Monitoring via a Societal Needs Perspective”, in *Resources, Conservation and Recycling*, Vol. 149 (October 2019), p. 363-371, <https://doi.org/10.1016/j.resconrec.2019.06.004>

British Standards Institution (BSI), *Framework for Implementing the Principles of the Circular Economy in Organizations. Guide*, London, BSI, May 2017

- Martin Charter (ed.), *Designing for the Circular Economy*, London/New York, Routledge, 2018
- Ichin Cheng, “Why Asia Matters: Circular Economy in Japan, China and Taiwan”, in Martin Charter (ed.), *Designing for the Circular Economy*, London/New York, Routledge, 2018
- Circular Economy Network (CEN) and ENEA, *Report on Circular Economy in Italy 2019. 10 Proposals and Research Summary*, April 2019, <https://circulareconomy.europa.eu/platform/en/node/2298>
- De Groene Zaak, *Governments Going Circular. A Global Scan*, Dutch Sustainability Business Association, February 2015, <http://www.govsgocircular.com/media/1354/governments-going-circular-dgz-feb2015.pdf>
- Hans-Christian Eberl and Martin Charter (eds), *Products and Circular Economy. Policy Recommendations Derived from Research & Innovation Projects*, Luxembourg, Publications Office of the European Union, 2020, <https://doi.org/10.2777/15587>
- Paul Ekins et al., *Resource Efficiency: Potential and Economic Implications*, Paris, UN Environment Programme (UNEP), March 2017, <http://hdl.handle.net/20.500.11822/21230>
- Ellen MacArthur Foundation, *Completing the Picture. How the Circular Economy Tackles Climate Change*, 26 September 2019, <https://www.ellenmacarthurfoundation.org/publications/completing-the-picture-climate-change>
- Ellen MacArthur Foundation & ARUP, *Urban Buildings System Summary*, March 2019, https://www.ellenmacarthurfoundation.org/assets/downloads/Buildings_All_Mar19.pdf
- Ellen MacArthur Foundation, Deutsche Post Foundation and McKinsey Center for Business and Environment, *Growth Within: A Circular Economy Vision for a Competitive Europe*, June 2015, <https://www.ellenmacarthurfoundation.org/publications/growth-within-a-circular-economy-vision-for-a-competitive-europe>
- European Commission, *2017 List of Critical Raw Materials for the EU* (COM/2017/490), 13 September 2017, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017DC0490>
- European Commission, *Leading the Way to a Global Circular Economy:*

- State of Play and Outlook* (SWD/2020/100), 11 March 2020, https://ec.europa.eu/environment/circular-economy/pdf/leading_way_global_circular_economy.pdf
- European Commission, *A New Circular Economy Action Plan* (Ares/2019/7907872), 23 December 2019, [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=pi_com:Ares\(2019\)7907872](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=pi_com:Ares(2019)7907872)
- European Commission, *A New Circular Economy Action Plan. For a Cleaner and More Competitive Europe* (COM/2020/98), 11 March 2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0098>
- European Environmental Citizens Organisation for Standardisation (ECOS), *M/543 Series of Horizontal Standards on Material Efficiency Soon to Be Finalised*, 20 January 2020, <https://ecostandard.org/?p=2744>
- Ludwig O. Federigan, “An Extended Producer Responsibility Policy for PH”, in *The Manila Times*, 19 July 2018, <https://www.manilatimes.net/?p=420998>
- Christiana Figueres and Tom Rivett-Carnac, “Our Approach to Covid-19 Can Also Help Tackle Climate Change”, in *New Scientist*, No. 3276 (4 April 2020), <https://www.newscientist.com/article/mg24532763-500>
- Victoria Forster, “Starbucks Won’t Fill Your Reusable Cup Anymore Over Coronavirus Fears”, in *Forbes*, 4 March 2020, <https://www.forbes.com/sites/victoriaforster/2020/03/04/starbucks-wont-fill-your-reusable-cup-anymore-over-coronavirus-fears>
- Thomas L. Friedman, *Thank You for Being Late. An Optimist’s Guide to Thriving in the Age of Accelerations*, New York, Farrar, Straus and Giroux, 2016
- G20 Resource Efficiency Dialogue, *Roadmap for the G20 Resource Efficiency Dialogue*, Tokyo, 9-10 October 2019, https://g20re.org/pdf/Roadmap_for_the_G20_Resource_Efficiency_Dialogue.pdf
- Yong Geng, Joseph Sarkis and Raimund Bleischwitz, “How to Globalize the Circular Economy”, in *Nature*, No. 565 (2019), p. 153-155, <https://doi.org/10.1038/d41586-019-00017-z>

- Peter S. Goodman, "A Global Outbreak Is Fueling the Backlash to Globalization", in *The New York Times*, 5 March 2020, <https://www.nytimes.com/2020/03/05/business/coronavirus-globalism.html>
- BastenGokkon, "Indonesialeansonbusinesses to do more about plastic waste", in Mongabay, 12 November 2018, <https://news.mongabay.com/2018/11/indonesia-leans-on-businesses-to-do-more-about-plastic-waste>
- Green Growth Knowledge Platform (GGKP), "Can International Trade Increase Resource Efficiency?", in *GGKP Webinars*, 8 December 2015, <https://www.greengrowthknowledge.org/node/141517>
- Roger Harrabin, "EU Brings in 'Right to Repair' Rules for Appliances", in *BBC News*, 1 October 2019, <https://www.bbc.co.uk/news/business-49884827>
- International Resource Panel (IRP), *Resource Efficiency for Sustainable Development: Key Messages for the Group of 20*, Paris, UN Environment Programme (UNEP), 2018, <http://hdl.handle.net/20.500.11822/31622>
- Italian Ministry for the Environment and Ministry of Economic Development, *Towards a Model of Circular Economy for Italy. Overview and Strategic Framework*, November 2017, <http://consultazione-economicacircolare.minambiente.it/node/21>
- H. Itoh, "The Recent Trend of E-waste Recycling and Rare Metal Recovery in Japan", in *WIT Transactions on Ecology and the Environment*, Vol 180 (2014), <https://doi.org/10.2495/WM140011>
- Julian Kirchherr, Denise Reike and Marko Hekkert, "Conceptualizing the Circular Economy: An Analysis of 114 Definitions", in *Resources, Conservation and Recycling*, Vol. 127 (December 2017), p. 221-232, <https://doi.org/10.1016/j.resconrec.2017.09.005>
- Ewa Krukowska and Nikos Chrysoloras, "Europe Signals Pandemic Made Green Agenda Top Security Priority", in *Bloomberg*, 16 April 2020, <https://www.bloomberg.com/news/articles/2020-04-16/stimulus-measures-should-help-green-shift-eu-climate-chief-says>
- Peter Lacy and Jakob Rutqvist, *Waste to Wealth. The Circular Economy Advantage*, Basingstoke/New York, Palgrave Macmillan, 2015
- Andrew McCarthy, Rob Dellink and Ruben Bibas, "The Macroeconomics of the Circular Economy Transition. A Critical Review of Modelling

- Approaches”, in *OECD Environment Working Papers*, No. 130 (16 April 2018), <https://doi.org/10.1787/19970900>
- Kelly McCarthy, “Single-Use Plastic Gloves Seem Like a Good Idea During Coronavirus, But Here’s the Problem”, in *ABC News*, 7 April 2020, <https://abcn.ws/2JJWBmg>
- Nabil Nasr et al., *Redefining Value. The Manufacturing Revolution. Remanufacturing, Refurbishment, Repair and Direct Reuse in the Circular Economy*, Paris, UNEP International Resource Panel, 2018, <https://www.resourcepanel.org/node/712>
- OECD, *Extended Producer Responsibility. Updated Guidance for Efficient Waste Management*, Paris, OECD, 2016, <https://doi.org/10.1787/9789264256385-en>
- OECD, *Policy Guidance on Resource Efficiency*, Paris, OECD, 2016, <https://dx.doi.org/10.1787/9789264257344-en>
- Felix Preston, Johanna Lehne and Laura Wellesley, “An Inclusive Circular Economy: Priorities for Developing Countries”, in *Chatham House Research Papers*, May 2019, <https://www.chathamhouse.org/node/39058>
- Kenneth Rapoza, “Kudlow: ‘Pay the Moving Costs’ of American Companies Leaving China”, in *Forbes*, 10 April 2020, <https://www.forbes.com/sites/kenrapoza/2020/04/10/kudlow-pay-the-moving-costs-of-american-companies-leaving-china>
- Jeffrey Rissman et al., “Technologies and Policies to Decarbonize Global Industry: Review and Assessment of Mitigation Drivers Through 2070”, in *Applied Energy*, Vol. 266 (15 May 2020), p. 114848, <https://doi.org/10.1016/j.apenergy.2020.114848>
- Patrick Schröder, “Promoting a Just Transition to an Inclusive Circular Economy”, in *Chatham House Research Papers*, April 2020, <https://www.chathamhouse.org/node/41013>
- Frédéric Simon, “Circular Economy Erected As ‘Number One Priority’ of European Green Deal”, in *Euractiv*, 13 November 2019, <https://www.euractiv.com/?p=1399987>
- Smallpiece Trust, *Design for Production. Seminar Notes*, Leamington Spa, 1989

- UN Environment Inquiry and Italian Ministry of Environment, *Financing the Future. Report of the Italian National Dialogue on Sustainable Finance*, December 2016, <https://unepinquiry.org/?p=2531>
- Venelina Varbova and Ruslan Zhechkov, *Uptake of Industrial Symbiosis in European Regions. A Policy Learning Platform Event*, Helsinki, 22-23 May 2019 [follow up brief], <https://www.interregeurope.eu/industrialsymbiosis/conclusions>
- WBCSD, *30 Leading Companies with a Combined Revenue of USD \$1.3 Trillion Join Forces to Implement the Circular Economy*, 23 January 2018, <https://www.wbcd.org/Programs/Circular-Economy/Factor-10/News/launching-Factor10>
- Anders Wijkman and Kristian Skånberg, *The Circular Economy and Benefits for Society. Jobs and Climate Clear Winners in an Economy Based on Renewable Energy and Resource Efficiency. A Study Pertaining to Finland, France, the Netherlands, Spain and Sweden*, Club of Rome, 2015, <https://clubofrome.org/?p=11053>
- Anders Wijkman and Kristian Skånberg, *The Circular Economy and Benefits for Society. Jobs and Climate Clear Winners in an Economy Based on Renewable Energy and Resource Efficiency. A Study Pertaining to the Czech Republic and Poland*, Club of Rome, 2015, <https://circulareconomy.europa.eu/platform/en/node/277>
- Anders Wijkman and Kristian Skånberg, *The Circular Economy and Benefits for Society. Jobs and Climate Clear Winners in an Economy Based on Renewable Energy and Resource Efficiency. A Study Pertaining to the Norwegian economy*, Club of Rome, 2016, <https://www.avfallnorge.no/fagomraader-og-faggrupper/rapporter/the-circular-economy-and-benefits-for-society>
- Shunta Yamaguchi, “International Trade and the Transition to a More Resource Efficient and Circular Economy. A Concept Paper”, in *OECD Trade and Environment Working Papers*, No. 2018/03 (October 2018), <https://doi.org/10.1787/18166881>