



NEW ECONOMICS FOR SUSTAINABLE DEVELOPMENT

CIRCULAR ECONOMY

INTRODUCTION

At the macroeconomic level, a circular economy implies the decoupling of economic growth from the use of natural resources and inputs. Ideally, the rate of resource extraction ought to remain below the rate of resource consumption, and the rate of waste production ought to remain below the environment's ability to absorb and transform the waste. A circular economy can also be seen as a regenerative system in which resource input and waste, emissions, and energy leakages are minimized through long-lasting design, maintenance, repair, reuse, sharing, remanufacturing, refurbishing, and recycling activities.

Global economic consumption and production does not exist within a vacuum but relies on resource stocks and flows in our Earth System, acting as a limit to growth¹. By managing stocks and flows appropriately, and helping to preserve, restore and develop environmental and natural capital, a circular economy contributes to a steady system state, minimizing the risks from resource depletion².

While there is not yet an internationally agreed definition of a circular economy, the description of the United Nations Environmental Assembly (UNEP/EA.4/Res.1) provides a shared understanding of some of its basic principles. A circular economy is presented as "one of the current sustainable economic models, in which products and materials are designed in such a way that they can be reused, remanufactured, recycled or recovered (4-R) and thus maintained in the economy for as long as possible, along with the resources of which they are made, and the generation of waste, especially hazardous waste, is avoided or minimized, and greenhouse gas emissions are prevented or reduced". The definition highlights the 4-R framework for making the circular economy possible through more resource efficient processes, with life cycle considerations, and the prevention of programmed obsolescence. A circular economy thus provides an alternative to the "take-make-waste" linear model. Such

an alternative is based on the sustainable management of natural resources, the closing of material loops, the preservation of natural capital, and circular consumption and production behaviours in the economy.

Another definition from The Ellen MacArthur Foundation proposes three key aspects: the elimination of waste and pollution, keeping products and material in use, and regenerating natural systems. Emphasis is made on the systemic character of this approach to economic development which can benefit businesses, society and the environment while decoupling growth from the consumption of finite resources.

While the concept of the circular economy is inspired by the physical features of a closed material circulation system, the economic aspects remain critical for policy operationalization. Kircherr et al. (2017) note that current definitions of the circular economy have gaps in relation to the system's perspective, business models and consumer behaviour. Closing material loops is not sufficient, as it depends on its effect on effective consumer demand. Real progress takes place when circular initiatives (such as the use of secondary materials) displace linear ones, not when they coexist. Practical applications and regulatory frameworks for the circular economy need to ensure that producer and consumer behaviours support circularity at the macro and micro levels³.

MACROECONOMIC RELEVANCE OF A CIRCULAR ECONOMY

The circular economy is based in the reduction of waste (e.g., goods with negative value), which can take the form of physical waste such as technical materials (construction, metals, plastics), organic (agriculture residues), or informational waste (e.g., absence of or imperfect information leading to a mismatch between supply and demand). The latter refers to the opportunities missed due to lack of communication, awareness, or tools for society to tap into idle capacities, such as unused vehicle seats, empty rooms, underused equipment (which another company may need) - triggering unnecessary production, higher costs, and environmental impacts due to the limited information on capacities already available.

The implementation of the circular economy concept is likely to have important macro effects in the medium term. Its gradual adoption will produce structural change – in investment, employment, capital depreciation and

sectoral growth – as attention shifts towards end-of-life resource management, design-for-durability and services playing a larger role in the economy. The circular economy is also likely to bring production and consumption sites closer to each other, as material loops are more easily managed on a national and regional basis. As in many industrial areas and manufactures, inputs are predominantly imported. A circular economy can contribute to lower input-based imports towards greater regionalization of supply chains.

Policies supporting a circular economy can change relative prices between imported and recycled inputs to promote these new circular economy industrial segments until scale economies are achieved. Considering a circular economy is strategic in terms of sustainability, these efforts should be economically profitable in the long term.

Many countries promote segments of production such as agriculture or energy on a temporary basis until these are competitive. The same principle should apply to a circular economy and within a context of provision of incentives (taxes, investment promotion policies, financing, technical assistance), these new areas should attract fresh capital and expand growth. When these circular economy investments incorporate resource-saving technology, there is another impact in terms of productivity, favouring macroeconomic growth potential.

Taxes can play an important signal to ensure market transformation. Taxes on carbon, landfill and other similar actions, can contribute to a more circular economy and collect additional fiscal revenue in line with the polluter pays principle. At municipal levels this can contribute to fund further investments. Increased import tariffs for inputs with potential substitution can also contribute, at least temporarily, to higher fiscal revenue.

In terms of sectoral analysis, circular economy developments should also contribute to new activities in the provision of services, for collecting and processing of materials, and in services linked to repair and reconditioning. These usually are sectors intensive in labour, thus contributing to employment growth. That can also bring additional benefits in the form of efficiency-enhancing formalization of material recovery activities, which often happen informally and under inadequate working conditions. More employment and income should contribute to consumption, which in turn can boost aggregate demand and output, especially for services.

THE SOCIAL VALUE OF THE CIRCULAR ECONOMY

The concept of a circular economy enables the rethinking of the production and consumption nexus along non-linear and integrated lines of thought – and along normative sustainable production and consumption trajectories that encompass i) social responsibility and action; ii) the

sustainability of production and investment structures; and iii) the scale and growth in economic activities involved (especially of “essential consumption”). The SDG framework, in particular SDG 12, supports the incorporation of the social value of economic activities into policy and planning.

Developing recyclable and renewable resource approaches requires socializing the circular economy concept through initial education processes and subsequent civil actions. This may lead to results across the entire value chain and sectors – a social responsibility by policymakers, producers and consumers.

Such public, private, and community-type partnerships can help drive the demand for circular solutions. They require systemic change, new practices and collaboration across both value chains and with policymakers. It also requires increasing the role of local entrepreneurs with the aim to reduce reliance on open ended material usage cycles.

While the concept of the circular economy is inspired by the physical features of a closed material circulation system, the economic aspects remain critical for policy operationalization. Closing the material loops is not sufficient as there are potential rebound effects and this should developed with impacts on demand and supply chains in mind. For instance, reducing environmental pressures through the substitution of primary finite raw materials with more sustainable alternatives in supply chains while maintaining the economic demand for the product or service Real progress takes place when circular initiatives (such as the use of secondary materials) displace linear ones, not when they just coexist.

SYNERGIES BETWEEN A CIRCULAR ECONOMY AND OTHER NESD CONCEPTS

The Circular Economy concept has two kinds of synergies with the other NESD concepts: complementing and intersecting (see Table 1). Complementing synergies between NESD concepts may develop positive feedback loops, while intersecting synergies may improve efficiency by merging with each other.

The synergies with the blue economy, green economy, yellow/attention economy and frugal/innovation economy have complementing and intersecting characteristics. For example, the circular economy and the yellow/attention economy rely on the use of digital technologies for economic transformation (convergent), yet the circular economy focuses on the use of resource-efficient technologies, while the yellow/attention economy appeals to the capacities of social media technologies (complementing). More specifically, the circular economy concept can contribute to the progress of the other NESD concepts as shown in the next table with synergies that complement or intersect with other concepts.

Table 1. How a Circular Economy can complement and intersect with other NESD concepts.

NESD Concepts	Key contributions	Complementary	Intersecting
Blue Economy	Reduction of dispersion of pollutants to waterways and oceans.	X	X
Green Economy	Less carbon intensity through higher reuse and recovery of secondary materials.	X	X
Orange/Creative Economy	Design-thinking for resource-efficient production and processes, and use of resource-efficient digital technologies.	X	
Purple/Care Economy	Valuing the innovation and productive capacities of labour and improved living conditions (environmental, health);	X	
Social & Solidarity Economy	Opportunity for using human innovation capacities in recycling, recovery and repair activities, including solidarity economy models conducive to upgrade working conditions from informal to formal sectors.	X	X
Yellow/Attention Economy	Norms setting to shift from goods-ownership to delivery-as-a-service models, highly driven by digital infrastructure and sustainable consumption behaviour.	X	X
Frugal/Innovation Economy	Reduction of inputs and natural resources; higher traditional/natural material usage; and emphasis on product and systems design to minimize waste. A CE also improves efficiency by aggregating resources through asset sharing business models.	X	X

Source: UNEN

SYNERGIES AND TRADE-OFFS OF A CIRCULAR ECONOMY WITH THE SDGS

The circular economy relies on resource efficiency and sustainable consumption and production, which are central concepts to achieve sustainable development. Resource efficiency refers to the improved use of resources in production and consumption processes, while reducing externalities in the input to output process. Sustainable consumption and production refer to “the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of future generations”⁴.

Key goals such as SDG 12 on “Ensuring Sustainable Consumption and Production patterns” are particularly relevant to a circular economy, as the targets rely on recirculating what was previously seen as waste back into the economic space, via closed loop processes which reduce negative externalities.

A circular economy also relies on achieving goals such as SDG 8, especially target 8.4 which aims to “Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple

economic growth from environmental degradation...” (see Table 2 on the next page).

Broadly, taking SDG 8, target 4, and SDG 12 as proxies for a circular economy, a network of relevant synergies and trade-offs with most SDGs and respective targets can be identified (see Table 2).

BARRIERS AND POLICY OPPORTUNITIES TO THE DEVELOPMENT OF A CIRCULAR ECONOMY

There are multiple factors that prevent faster progress towards more economic circularity. Prices are often not reflective of all environmental costs and may thus not be sufficient to drive fundamental change. Subsidies may create incentives for the overuse of natural resources, undermining recycling options, and making linear production more attractive e.g., fossil fuel subsidies. Coordination failures may prevent the adoption of solutions across supply lines, including in the international context.

A fundamental policy challenge is how to correct these barriers and, more broadly, put in place policies and regulations that support the development of a circular economy and create opportunities for the business sector to engage in this transition. As the world moves towards circular economy patterns, countries should map

Table 2. Synergies between Circular Economy and the Sustainable Development Goals.

LINKS WITH SDGs	CIRCULAR ECONOMY
SDG 1	Target 1.5 (build resilience to shocks and disasters)
SDG 2	Target 2.3 (double the agricultural productivity and incomes of small-scale food producers) Targets 2.1 (end hunger and ensure access by all people to safe, nutritious and sufficient food), 2.2 (end all forms of malnutrition and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons), 2.4 (ensure sustainable food production systems, resilient agricultural practices, strengthen climate adaptation and improve land quality), 2.a (international cooperation for rural infrastructure, research & technology) and 2.b (correct and prevent trade restrictions and distortions in world agricultural markets).
SDG 3	Target 3.9 (reduce air, soil and water pollution).
SDG 4	Target 4.7 (foster education and skills for sustainable lifestyles, gender equality and culture).
SDG 5	Targets 5 (ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life) and 5.b (enhance the use of ICTs to promote women's empowerment).
SDG 6	Targets 6.3 (improve water quality) and 6.4 (water-use efficiency).
SDG 7	Target 7.1 (ensure universal access to affordable, reliable and modern energy services) Targets 7.2 (increase the use of renewable energy) and 7.3 (double global rate of improving energy efficiency).
SDG 8	Targets 8.1 (sustain per-capita economic growth at 7% for LDCs), 8.2 (achieve higher levels of economic productivity), and 8.3 (support productive activities). Targets 8.4 (global resource efficiency in consumption/production and decoupling economic growth from environmental degradation), 8.5 (productive employment and decent work for all, including for young people and persons with disabilities, and equal pay for work of equal value).
SDG 9	Target 9.4 (increase resource-use efficiency and resilient industrial processes).
SDG 11	Targets 11.6 (improve cities' air quality and waste management), 11.b (increase the number of cities implementing integrated plans for inclusion, resource efficiency, mitigation and adaptation to climate change) and 11.c (support LDCs, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials).
SDG 12	Targets 12.2 (achieve sustainable management and efficient use of natural resources), 12.3 (halve per cap global food waste and reduce food losses), 12.4 (achieve sound management of chemicals and waste through the life cycle), 12.5 (substantially reduce waste generation through prevention, reduction, recycling and reuse), 12.7 (promote public procurement practices that are sustainable), 12.8 (ensure people have relevant information and awareness for sustainable development and lifestyles in harmony with nature) and 12.c (rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption).
SDG 13	Targets 13.1 (strengthen resilience to climate hazards and natural disasters) and 13.2 (integrate climate change measures into national policies).
SDG 14	Targets 14.1 (prevent and reduce marine pollution of all kinds), 14.2 (sustainably manage and protect marine and coastal ecosystems) and 14.c (enhance conservation and sustainable use of oceans and their resources).
SDG 15	Targets 15.1 (ensure conservation, restoration and sustainable use of freshwater), 15.4 (ensure the conservation of mountain ecosystems, including their biodiversity) and 15.9 (integrate ecosystem and biodiversity values into national and local planning).
SDG 16	Targets 16.3 (promote the rule of law at the national and international levels and ensure equal access to justice for all), 16.5 (reduce corruption and bribery in all their forms), 16.6 (develop effective, accountable and transparent institutions), 16.7 (ensure responsive, inclusive, participatory and representative decision-making), 16.8 (strengthening the participation of developing countries in the institutions of global governance), 16.10 (ensure public access to information and protect.
SDG 17	Targets 17.1 (strengthen domestic resource mobilization through international support to developing countries), 17.7 (promote development, transfer, and diffusion of environmentally sound technologies to developing countries), 17.13 (enhance global macroeconomic stability, mainly through policy coordination and policy coherence), and 17.19 (develop measurements of progress on sustainable development to complement GDP, and support statistical capacity-building in developing countries).

Source: UNEN

the potential barriers and opportunities to limit adverse effects on demand, trade, prices, while moving ahead from dependencies on raw materials. Two outstanding barriers and potential opportunities can be identified:

- A** In the short run, importers of linear inputs, companies with established linear production processes and those affected by adverse changes in relative prices could reject new circular economy policies. Thus, these should be responded with immediate incentives and reallocation of opportunities.
- B** Several developing countries that rely on commodity intensive growth models dependent on exports of linear raw materials such as agricultural commodities, minerals, and other primary goods. These economies should capture more value by localizing secondary and tertiary stages of the value chain with a circular approach in mind. Further, the impact on employment growth, considering new or stronger segments for repair and reuse of products, can support an integrated strategy across sectors.

REVIEW OF POLICY TOOLS AND INSTRUMENTS FOR A CIRCULAR ECONOMY

Several public policy instruments can be used to implement a circular economy model. The section highlights examples of such instruments, including cases of policy progress at the national level and through international cooperation.

DOMESTIC POLICIES

Countries worldwide are pursuing national policies that explicitly seek greater circularity and the sustainable use of natural resources. The domestic policy toolkit includes regulatory and market-based instruments, public spending on infrastructure, support to innovation and strengthening of legal frameworks. In some cases, there are national policies spanning multiple sectors and stakeholders, while others may focus on particular sectors such as waste management, energy production or agriculture. Policies in developed and developing countries can also differ, especially when developing countries rely on linear resource extraction and exports of primary products, and others may focus on domestic resource capture

reducing imports. Commonly, economies stand to gain efficiency, accelerate innovation, and reduce environmental externalities by adopting circularity.

PUBLIC INVESTMENT AS A TOOL FOR SOCIETAL TRANSFORMATION DRIVEN BY A CIRCULAR ECONOMY.

Public investment strategies can provide the overall public governance framework to steer the economy towards circularity. They can aim for short and long-term targets that set the agenda for a whole of government and whole of society transformation, with the financial commitment to enable an inclusive transition. These overarching strategies can provide a unifying framework including tax incentives, regulation for accelerated depreciation for new investments (machinery and technology for CE processes), and infrastructure investments for circular economy clusters.

In 2020, the Republic of Korea announced its New Deal to enable a sustainable, resilient and inclusive recovery from the COVID-19 pandemic. It included a commitment of US\$144 billion and the creation of 1,901,000 jobs by 2025⁵. The New Deal also includes a “Green New Deal” that embeds circularity aspects on renewable energy, green infrastructure and industrial sector initiatives. The Ministry of Environment of the Republic of Korea announced a plan to foster hydrothermal energy as the flagship project of the Green New Deal in June 2020. The plan introduces a pilot project to build Gangwon Hydrothermal Energy Convergence Cluster in Chungcheong, Gangwon Province by 2027 by utilizing the Soyang Dam with a more circular approach to resource efficiency. This pilot project aims to increase energy efficiency by aggregating energy-intensive facilities such as data centers, smart farms, enterprises, and residential complexes around the Soyang Dam, while using hydrothermal energy from the dam water for cooling and heating⁶.

In Israel, public procurement accounts for 10.24 per cent of gross domestic product, and the public sector is recognized as a key player in driving demand for more circularity. Recognizing the potential of this purchasing power, the Ministry of Environmental Protection has

DOMESTIC

- National public investment & public procurement strategies
- Market-based instruments (e.g. fiscal policy)
- Public-private partnership instruments (e.g. PPPs for R&D or investment)
- Regulatory or legal instruments (e.g. EPR laws)
- Voluntary commitment measures (e.g. compacts or action plans)

POLICY TOOLS

INTERNATIONAL

- Trade agreements
- International standards
- International agreements on monitoring and evaluation indicators

worked closely with the Government Procurement and Logistics Division of the Ministry of Finance to promote procurement targets that support a switch to a low-carbon resource-efficient society. In 2012, the Government set targets for green procurement for governmental ministries, measured by the percentage of government tenders that had environmental criteria. Those targets of 5 per cent by 2013, 12 per cent by the end of 2016, and 20 per cent by the end of 2020, were all achieved.

MARKET-BASED INSTRUMENTS USING FISCAL POLICY CAN BE POWERFUL INCENTIVES FOR CIRCULARITY

In the transition to a circular economy, public investment should be complemented by market-based instruments such as taxes or subsidies to help guide the behaviour of firms, consumers and the public sector, while generating revenue for direct action by governments⁷. These policies can include tax deferrals, regulation for accelerated depreciation for new investments (machinery and technology for circular economy processes, temporary lower corporate income tax for those making these investments, and higher temporary import tariffs on inputs that can be efficiently recycled and substituted by circular inputs. The idea is to apply these policy instruments temporarily, shifting market behaviour, while avoiding permanent market distortions.

For years, environmental taxes have been used as instruments to correct market failures derived from externalities that cause an inefficient allocation of resources. Yet, during recent years countries have also started thinking about circular economy fiscal policy instruments. For example, Finland implemented a national road map towards a circular economy by identifying tax options and other economic instruments, together with best practices to promote circular economy goals⁸. In Thailand, government policies provide an attractive business climate for those looking to add value to raw materials or turn waste and plastic into green industries⁹.

PRIVATE SECTOR ENGAGEMENT

Public-Private Partnerships can help build engagement to jump start a circular economy. Together, both public and private institutions can identify sectoral or cluster-based opportunities, develop short- to long-term growth agendas, and propose policy options to facilitate coordinated investments. The private sector, through its institutions (e.g., associations, chambers, etc.) should advocate and propose public/private partnerships to governments, including at the municipal and local levels. Research and Development clusters can include both entrepreneurs and academic sectors to ensure applied innovation. Finally, the private sector can contribute with financing within an integrated strategy of financial instruments, not just traditional credit, but also through investment funds using the instruments

generated by the public sector, such as limited coverage guarantee funds. The private sector can also explore joint investments with domestic and foreign capital, taking advantage of incentives and favourable regulations frameworks designed by governments.

In specific clusters, public investment can target Small and Medium Enterprises (SMEs). These can include technical assistance, public guarantee funds to enhance credit for SMEs, and venture capital investments using public agencies. In the case of Chile, the Production Development Corporation (CORFO) is a Chilean governmental organization founded in 1939 to promote economic growth through entrepreneurship and innovation and competitiveness. In 2021, CORFO launched an initiative on the circular economy and sustainable consumption and production, through the program *"Transforma Economía Circular"*. CORFO provides financing and technical assistance, among other services, and accelerate startups development towards a circular economy. The program focuses on the massification in the use of Circular Economy Diagnosis tools at production chains, and the initial target is to accelerate 200 innovations centred in Circular Economy developments with Chilean SMEs. Also, the program will promote Circular Economy clusters, with solutions in at least nine sectors and specific zones of the country, identifying suppliers capable to scale up to their response to the demand for goods produced locally and with low negative environmental impact¹⁰.

APPLYING THE POLLUTER PAYS PRINCIPLE TO ENSURE MARKET TRANSFORMATIONS FOR A CIRCULAR ECONOMY

Legal frameworks provide strong command and control signals to transform markets when well designed and implemented. The Extended Producer Responsibility (EPR) is a regulatory tool targeting the private sector and requiring manufacturers to finance recycling costs or the safe disposal of products in the end-of-life stage. The tool has been applied through legal frameworks to reduce negative externalities from e-waste, plastic products and others. EPR may be viewed as an application of the polluter pays principle extending the manufacturers' responsibility, which can incentivise more circular practices under the 4R framework to capture resources for reuse¹⁰. EPR laws should be designed in consultation with manufacturers to ensure incentives for producers to design products that are easy to recycle.

An increasing number of countries are adopting EPR laws at national and local level levels. Between 1991 and 2011, US states enacted more than 70 EPR laws¹¹. In Sweden, EPR is both a policy and law supported by a 1994 European Union Directive for a more circular waste system. However, the driving force for the policy in Sweden has been mostly economic because recycling resources are more profitable than making new products from virgin

materials¹². Such laws shift the waste management cost from local governments to producers for packaging, newsprint, electronic products, batteries, tires, end-of-life vehicles, pharmaceutical waste, stray radioactive products and radioactive sources. Success factors for the policy include strong cooperation and trust between producers and municipalities, matching the supply and demand for circular or 'cradle to cradle' waste stream, and compliance from industry for full operational and financial responsibility for collection, sorting and recycling. Developing countries such as Mexico, Bolivia, Namibia and Indonesia also have EPR legislation in place, while others are developing them¹³.

VOLUNTARY COMMITMENTS

Many regions and countries are shaping their commitment to a circular economy through high-level action plans, strategies, compacts, and targets. These are adopting both a 'whole of government' and 'whole of society' approach. In Latin America, there are more than 60 strategies supporting a circular economy that focus on multi-stakeholder engagement¹⁴.

Peru, for example, has a Circular Economy Roadmap for Industry with the "Peruvian Agreement for a Circular Economy" signed in July 2021. This agreement is a multisectoral initiative that is part of the State's proposal for a comprehensive intervention to promote the country's transition towards the new model of sustainable production and consumption. It promotes the articulation between public sector, business associations, academia, and international cooperation. An interesting aspect of the Peruvian Pact is that it was signed by 28 institutions, both public and private, to act with a long-term perspective. These organizations include the Ministries of Environment, Production, Agrarian Development and Irrigation, and Foreign Trade and Tourism, as well as different business associations, academia, and international organizations such as the United Nations System (including all its agencies, funds and programs working in the country) and the European Union.

INTERNATIONAL POLICIES TO FACILITATE THE DEVELOPMENT OF A CIRCULAR ECONOMY

GLOBAL TRADE AGREEMENTS CAN ENSURE A REGIONAL AND GLOBAL SHIFT TO A CIRCULAR ECONOMY

Closing material loops in a global circular economy requires a level of policy harmonization in every jurisdiction where value is added – only then can material loops be made more circular at the international level.

The interface between trade and the circular economy is a complex, but essential one¹⁵. It involves, for example, an updating of the Harmonized System (HS) codes to give better granularity for trade data on secondary materials; facilitation of trade-related services that are key circular economy

activities (e.g., reuse, repair, refurbishment, remanufacturing and recycling), while eliminating restrictions and subsidies that negatively affect the competitiveness of these activities across borders¹⁶. Other areas include a revitalization of environmental goods and services (EGS) negotiations, improved traceability and design standards of goods in e-commerce, trade facilitation and various other areas¹⁷. Progress in transitioning towards the circular economy can create further opportunities for trade, also in services sectors, such as traditional areas of waste management and recycling, as well as novel approaches that deliver high resource efficiency, such as product-as-a-service models¹⁸. By tapping the comparative advantages and market scales which are only possible through international trade, circular offerings can become competitive, making possible the emergence of new business models harnessing the potential of circularity across borders.

At the same time, there are potential conflicts that need to be addressed, between furthering the advance of the circular economy and other important policy objectives. For example, an emphasis on extending the life of products, including by facilitating the international trade of second-hand products, may slow down the introduction of more efficient low-carbon technologies¹⁹. Divergence in the levels of responsibility imposed on producers of circularity measures across countries may create a disadvantage to those facing more stringent regulations, which may limit progress in the absence of international agreements²⁰.

GLOBAL COOPERATION ON CIRCULAR ECONOMY STANDARDS

Overall, there is a need for cooperation to agree on common rules and standards for international circular value chains. This is particularly important because there are potential negative social issues that need to be monitored, such as environmental or health risks²¹. Domestic initiatives in support of the circular economy risk being constrained by the absence of international agreements that extend the acceptability of standards beyond national borders in critical areas, such as recyclable content.

International agreements on standards set quality benchmarks for production, exports and circular value chains globally. Traceability and transparency of value chains can foster circularity in diverse ways, including by verifying compliance with circularity requirements, identifying hotspots for waste and loss along the value chain, and helping to trace the use of harmful substances and other resources²². For example, standards on consumer information such as with product composition are central to facilitate consumption, disposal and recyclability of products. The lack of agreed definitions of what non-hazardous waste or secondary raw materials are, may impair trade and environmentally sound waste management.

The International Organization for Standardization, ISO, created a technical committee, with experts from over 80 countries, to develop industry-based standards for circularity. Standards under development include ISO 59004, which will offer a framework for implementing a circular economy; ISO 59010, which will provide guidelines on business models and value chains, and ISO/TR 59031, a future technical report that will include case studies and best practices. This suite of international standards, once finalized, will be adopted at the country level by the national member bodies of ISO, which is also expected to receive wide take up by industry, which is engaging in the development of the standards²³.

GLOBAL COOPERATION ON METRICS FOR EVIDENCE-BASED POLICYMAKING

What cannot be measured, cannot be regulated. A global circular economy requires data - and evidence based public governance informed by globally comparable metrics. A key challenge is ensuring countries adopt comparable metrics and data collection to inform policymaking as an iterative process. Some metrics today focus on end-of-use cycling of materials that re-enter the economic system (e.g., Circularity Gap Report), while others are measuring national recycling rates. Yet, more work needs to be done.

A circular economy has multiple dimensions that are difficult to capture with a single indicator. From a policy angle, the relevant question is not only how to measure circularity but what are the indicators that can be used to track progress. The choice of indicators would reflect specific policy priorities associated to the shift to a more circular economy. From a practical point of view, some indicators are more easily calculated for a group of countries (or the world)

than for individual ones. For example, the EU monitoring framework for the circular economy has 10 indicators across four dimensions: production and consumption, waste management, secondary raw materials, and competitiveness and innovation.

KEY POLICY TAKEAWAYS

- ⇒ Policy innovation is needed to realize the CE's potential to enhance resource efficiency and protect natural resources.
- ⇒ Circularity can yield value in both material and immaterial areas of the economy. The services sector is perhaps the most important enabler for closing material loops and producing less material and pollution intensive markets.
- ⇒ Macroeconomic policies are important enablers, such as development planning, taxation reforms and Extended Producer Responsibility rules.
- ⇒ A global metric is required to comparatively assess country by country progress towards a circular economy and this can be achieved through greater multilateral cooperation and agreement, likely through a UN resolution on measuring and advancing the circular economy.
- ⇒ The social side of a circular economy can enhance the positive impact of supporting and formalizing material recovery operations, which are often informal and intertwined with poverty and unhealthy work. At the same time, effective policy tools must be in place to ease the employment/social friction during the linear-to-circular transition.
- ⇒ Financing circularity requires an open dialogue among public, private and development finance representatives, for sustainably de-risk circular economy investments.
- ⇒ International trade plays a key role in advancing the circular economy at the international level. Work on multilateral rules, standards and principles are essential to allow circular markets and solutions to achieve scales and efficiencies fit for international competitiveness.

Table 3. National to global indicators for a circular economy.



Indicator type	Metric description
Number	Number of national policies and laws on the circular economy.
Value	National budget dedicated to enabling a circular economy.
Number	Number of national circular economy clusters implemented.
Percentage	Sustainable Development Goal 12 targets – e.g. SDG 12.5 national recycling rate.
Number	Number of business reporting engagement in circular economy clusters, resource capture or value chains.
LCA/Mass	Material metabolism and material efficiency indicators.
Index	Productive capacity (such as UNCTAD's productive capacity index).
Number	Number of decent jobs created through circular economy measures.
Number	Number of standards adopted for the circular economy (such as circulareconomy earth policy mapping).
Value/Volume	Trade and logistics flows related to key goods to enable circular economy transition (e.g. energy, minerals, etc.)
Percentage	Share of cycled materials as a proportion of the total material inputs into the global economy every year (e.g. Circularity Gap Report).

Source: UNEN

Table 3 above summarises key indicators in use, while also consolidates suggestions on additional metrics based on national and global initiatives to advance on a circular economy. It should be noted that relevant indicators can move in opposite directions, e.g., an improvement in the circularity rate can be accompanied by an increase in the overall demand for resources if such improvement is insufficient to meet a growing demand. To this end, a suggested global metric on cross-country comparisons for a circular economy could build on existing metrics.

Endnotes:

- ¹ Meadows, D. H., Meadows, D. L., Randers, J., Behrens, W., & Club of Rome. (1972). The Limits to growth: A report for the Club of Rome's project on the predicament of mankind. New York: Universe Books. For further reading: <https://donellameadows.org/archives/a-synopsis-limits-to-growth-the-30-year-update/>
- ² Daly, H. (1974). The Economics of the Steady State. *The American Economic Review*, 64(2), 15-21. Retrieved September 6, 2021. For further reading: <http://www.jstor.org/stable/1816010>
- ³ Kircherr and other, 2017, Conceptualizing the circular economy: An analysis of 114 definitions <https://www.sciencedirect.com/science/article/pii/S0921344917302835>
- ⁴ <https://www.undp.org/blogs/south-koreas-green-new-deal-year-transition>
- ⁵ <http://www01.koreaherald.com/view.php?ud=20210618000591>
- ⁶ Vence, X.; López Pérez, S.d.J. Taxation for a Circular Economy: New Instruments, Reforms, and Architectural Changes in the Fiscal System. *Sustainability* 2021, 13, 4581. <https://doi.org/10.3390/su13084581>
- ⁷ Sitra 2018. ALIGNING FISCAL POLICY WITH THE CIRCULAR ECONOMY ROADMAP IN FINLAND. https://green-budget.eu/wp-content/uploads/Final_report_final-version-with-revised-charts_08-01-19.pdf
- ⁸ Thailand Investment Review 2019. Circular Economy, shaping a sustainable future. Vol. 29. November 2019. https://www.boi.go.th/upload/content/TIR5_2019_5e2e95134a76b.pdf
- ⁹ <https://www.paiscircular.cl/consumo-y-produccion/corfo-y-ministerio-del-medio-ambiente-lanzan-nuevo-programa-publico-privado-para-acelerar-la-economia-circular-en-chile>/Dalhammar, 2018. DOI: <https://doi.org/10.4337/9781785365669.VI.16>
- ¹⁰ <https://smartcitysweden.com/best-practice/337/extended-producer-responsibility-in-sweden-towards-better-waste-management/>
- ¹¹ GGKP, 2018. UNEP. https://d2ouvy59p0dg6k.cloudfront.net/downloads/2019_wwf_epr_legal_framework_analysis_vf.pdf
- ¹² <https://news.un.org/es/story/2021/03/1490082>
- ¹³ See UNCTAD (2018) Circular Economy: The New Normal? Policy Brief 61. Available at: https://unctad.org/system/files/official-document/presspb2017d10_en.pdf
- ¹⁴ Steinfatt, K. (2020), "Trade policies for a circular economy: what can we learn from WTO experience?", WTO Staff Working Paper ERSD-2020-10.
- ¹⁵ Yamaguchi, S. (2021), "International trade and circular

economy - Policy alignment", OECD Trade and Environment Working Papers, No. 2021/02, OECD Publishing, Paris, <https://doi.org/10.1787/ae4a2176-en>.

- ¹⁶ See Hernandez (2019) Sustainable Product-Service Systems and Circular Economies. Available at: <https://www.mdpi.com/2071-1050/11/19/5383/pdf>
- ¹⁷ An example of this conflicts is the trade of second-hand vehicles, with imports being restricted in some countries to advance environmental targets. Background paper to the UNECE/ITC-UNEP conference on "Ensuring Better Air Quality and Reduced Climate Emissions through Cleaner Used Vehicles" (20-24 February 2017), Used vehicle global overview. Regular updates of country situations on this issue are provided in UNECE Environmental Performance Reviews.
- ¹⁸ Kettunen, M., Gionfra S. and Monteville, M. (2019), EU circular economy and trade: Improving policy coherence for sustainable development, IEEP Brussels / London.
- ¹⁹ Preston, F., Lehne, J. and Wellesley, L. (2019), An Inclusive Circular Economy, Priorities for Developing Countries, Chatham House.
- ²⁰ See initiatives such as the UNECE-UN/CEFACT International Framework Initiative on Enhancing Transparency and Traceability of Sustainable Value Chains in the Garment and Footwear Industry.
- ²¹ <https://www.iso.org/news/ref2402.html>

Authors:

Prepared by: Sara Castro de Hallgren, Alex Julca, Jose Palacin Lucio, Ruben Ferrufino, and Henrique Silva Pacini Costa.

With contributions from: Mohammad Ali Farzin, Luz Fernandez Garcia, Sebastien Vauzelle, Lorenza Jachia, Richard Roehrl, Benjamin Rae, Md. Mazedul Islam, Sunday Khan, and Mphucuko Mamba.

Disclaimer:

The views and opinions expressed in this policy brief are those of the authors and do not necessarily reflect the opinions and policies of the United Nations.

The designations and terminology employed may not conform to United Nations practice and do not imply the expression of any opinion whatsoever on the part of the Organization.

All queries should be addressed to DESA-UNEN@un.org.