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# POLICY BRIEF

## Key points

- Keeping materials longer in the economy through reuse, repurposing or recycling could reduce 33 per cent of the carbon dioxide emissions embedded in products.
- Circularity requires a significant bridge between trade in goods and trade in services.
- Increased recycling could reduce demand for primary resources, leading to both risks and opportunities in developing countries dependent on the extraction of natural resources.



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## CIRCULAR ECONOMY: THE NEW NORMAL?

Linear production is a familiar cycle. Resources are extracted and transformed into goods and services, sold and used, after which they are scrapped. This model has underpinned the expansion of the global economy since the industrial revolution. It has linked material prosperity to the extraction of resources, yet has often overlooked the undue pressures placed on the environment and has rarely considered the cost of handling, scrapping and disposing of used materials, some of which are hazardous to human health. As the global population increases, incomes rise and nations strive to eradicate poverty, demand for goods and services will necessarily grow. The aim of achieving Sustainable Development Goal 12 on responsible consumption and production requires changing the linear production model. The concept of a circular economy and practice therefore merits close attention, as it can open new opportunities for trade and job creation, contribute to climate change mitigation and help reduce the costs of cleaning and scrapping in both developed and developing countries.

A circular economy entails markets that give incentives to reusing products, rather than scrapping them and then extracting new resources. In such an economy, all forms of waste, such as clothes, scrap metal and obsolete electronics, are returned to the economy or used more efficiently. This can provide a way to not only protect the environment, but use natural resources more wisely, develop new sectors, create jobs and develop new capabilities.

Each year, 1.3 billion tons of garbage are produced by 3 billion urban residents.<sup>1</sup> This is the end point of a linear economic flow that starts with manufacturing, which uses 54 per cent of the world's delivered energy, especially in energy-intensive industries such as petrochemicals, cement, metals

and paper.<sup>2</sup> Each year, 322 million tons of plastic, 240 million tons of paper and 59 million tons of aluminium are produced in the world, much of which goes to export markets and is not recycled.<sup>3</sup>

A rusty container or an obsolete mobile telephone are only two examples of the many products that end up being discarded, along with their transistors, metal structures and complex plastics. Each component requires a great deal of energy, time, land and capital to be produced and, even as the products become obsolete, their components often do not. The potential value of metals and plastics currently lost in electronic waste may be €55 billion annually.<sup>4</sup>

As the supply of recycled, reused and

<sup>1</sup> World Bank, 2012, *What A Waste: A Global Review of Solid Waste Management* (Washington, D.C.).

<sup>2</sup> United States of America Energy Information Administration, 2016, *International Energy Outlook 2016* (Washington, D.C.).

<sup>3</sup> Plastics Europe, 2016, *World Plastics Production 1950–2015*, available at <https://committee.iso.org/files/live/sites/tc61/files/The%20Plastic%20Industry%20Berlin%20Aug%202016%20-%20Copy.pdf> (accessed 3 May 2018); World Aluminium, 2016, *Primary aluminium production database*; Food and Agriculture Organization of the United Nations, 2017, *Pulp and Paper Capacities: Survey – 2016–2021* (United Nations publication, Rome).

<sup>4</sup> CP Baldé, V Forti, V Gray, R Kuehr and P Stegmann, 2017, *The Global [Electronic] Waste Monitor 2017* (United Nations University, International Telecommunication Union and International Solid Waste Association, Geneva).

remanufactured products increases, such products are maintained for longer in the economy, avoiding their loss to landfills. Food losses could be halved through food-sharing and discounting models that reduce fresh food waste. Access to efficient home appliances could be increased through leasing instead of sales. Organic waste could be recovered or transformed into high-value protein through the production of insect larvae.

Benefits such as these could be gained by both developed and developing countries; the potential economic gains are estimated at over \$1 trillion per year in material cost savings.<sup>5</sup> Several economies are already exploring circular strategies, including Brazil, China, India, Kenya, the Lao People's Democratic Republic, Morocco, South Africa, Turkey, Uruguay, Viet Nam and the European Union.<sup>6</sup> India and the European Union stand to gain savings of \$624 billion and €320 billion, respectively.<sup>7</sup>

The effects of increased recycling on global value chains are an important area for research. For example, a circular model for metals implies an increase in the repurposing, reuse and recycling of such materials. This can transform end points of the value chain, such as junkyards and dumping sites for metals, into new reprocessing hubs that supply metals to markets. This growth trend in recycling markets may be desirable from an environmental perspective, yet could reduce demand for primary resources, requiring an adjustment in employment, logistics and fiscal structures in countries dependent on the extraction of natural resources.<sup>8</sup> At the same time, growth in the recycling, repurposing and reuse of materials could support the emergence of regional reprocessing and recycling hubs and open new opportunities for the commodities and manufacturing sectors. Greater circularity could reduce the depreciation of physical

capital in the economy, increasing overall wealth in societies. The specific benefits that developing countries could obtain by adopting formal circular economy strategies is a new subject for research, and further studies and data are needed.

### **Circularity can change trade patterns and improve the utilization of idle capacity**

Circular models could help countries grow with resources already available in their territories. This may imply a reduction in international trade, yet the 140 million people joining the middle class each year guarantee growth in overall trade.<sup>9</sup> Such growth may occur not in goods but in services such as access-over-ownership models.<sup>10</sup> In addition, increased circularity can change production patterns, improving asset utilization rates and producing value chains based on recycling and remanufacturing centres close to where products are used. This could lead to fewer transport-related losses, quicker turnarounds between orders and deliveries, lower levels of carbon dioxide emissions and the creation of jobs that cannot be offshored.

Some countries have trade surpluses in physical goods and others in immaterial services. Trade therefore results in a net transfer of materials from one region to another as seen, for example, in trade patterns between China and the United States. The United States imports many goods from China but does not export nearly as many finished goods in return. However, nearly 3,700 containers of recyclables per day are exported to China; in 2016, such exports amounted to 16.2 million tons of scrap metal, paper and plastics worth \$5.2 billion.<sup>11</sup>

Many countries are concerned about importing scrap materials and used goods, as such flows can involve negative health

<sup>5</sup> Ellen MacArthur Foundation, 2014, *Towards the Circular Economy: Accelerating the Scale-up Across Global Supply Chains* (Cowes, United Kingdom of Great Britain and Northern Ireland).

<sup>6</sup> Chatham House, 2017, *A wider circle? The circular economy in developing countries*, Briefing, The Royal Institute of International Affairs.

<sup>7</sup> Ellen MacArthur Foundation, 2017, *Achieving Growth Within* (Cowes, United Kingdom); UNCTAD, 2016, *Circular economy principles could help India realize \$624 billion*.

<sup>8</sup> Centre of Expertise on Resources, 2016, *The Circular Economy and Developing Countries* (The Hague, Netherlands).

<sup>9</sup> Brookings, 2017, *The unprecedented expansion of the global middle class: An update*, Global Economy and Development Working paper No. 100.

<sup>10</sup> *Forbes*, 2012, *Welcome to the new millennial economy: Goodbye ownership, hello access*, 11 October.

<sup>11</sup> Bloomberg BNA, 2017, *Looming Chinese import ban creates [United States] recycling bottleneck*, 15 September; American Metal Market, 2017, *Non-ferrous scrap market awaits China's next move*, September.

**Table 1. The circular economy and climate change mitigation**

From	To
Renewable sources of energy, energy efficiency and reduced deforestation	Low-carbon materials and dematerialization
Optimizing existing assets and installations	Building efficient metabolisms and systems
Plant, city or country levels	Supply-chain or cross-border interactions
Products	Services
Carbon taxes	Extraction taxes
Territorial emissions	Consumption-based emissions
Paris Agreement, article 6 (inspired by the Clean Development Mechanism and offsetting)	Targeting the cross-border trade of carbon-intensive products and materials (Paris Agreement, article 6)

Source: UNCTAD, based on The Stanley Foundation, 2017, The circular economy pathway to pursuing 1.5°C, available at <https://www.stanleyfoundation.org/resources.cfm?id=1630> (accessed 3 May 2018).

and sanitation issues. For example, some countries in East Africa recently curbed imports of used textiles, stating that they impeded the development of local industry. In addition, China has implemented a policy that seeks to increase inspections of scrap materials imported for recycling, which signals to waste processors in exporting countries that sorting practices need to improve, and China notified the World Trade Organization in 2017 of its intention to further restrict such imports.<sup>12</sup>

### Trade can link circularity and climate change mitigation

Data is limited, yet it appears that the economies of poor countries may be in many ways more circular than those of richer countries, with many traditional activities that involve repair, reuse and recovery.<sup>13</sup> This could provide entry points

for implementing wider circular economy measures, facilitating commitments under the Paris Agreement under the United Nations Framework Convention on Climate Change. If products and materials are kept longer in the economy through reuse, repurposing or recycling, this could reduce 33 per cent of the carbon dioxide emissions embedded in products, serving as a cost-efficient way of mitigating greenhouse gas emissions (table 1). Given the number of markets, jurisdictions and complex value chains present in a global economy of 7.5 billion, resource circularity cannot be engineered in a top-down fashion or through multilateral negotiations alone. Rebalancing national incentives and orchestrating incentives across jurisdictions are important in order to move value chains towards circular patterns.

**Table 2. Instruments for promoting circularity**

Command and control	Economic	Public-private
Waste disposal and trade standards	Landfill and/or incineration taxes	Improved logistics and infrastructure
Minimum recycling requirements	Different taxation levels for reused or recycled products	Circularity certification and labelling schemes
Deposit refund systems, for example for plastic bottles	Reduced value added taxes for repair and reuse services	Extended producer responsibility schemes
Circular public procurement	Increased taxes on non-reparable products	Discounts for efficiency
Waste disposal and trade standards	Landfill and/or incineration taxes	Improved logistics and infrastructure
Extended legal warranties	Tax shifts from labour to consumption	Products designed for recycling
Streamlined regulations for leasing and sharing businesses	Incentives for access over ownership	Virtual platforms for asset sharing

Source: Chatham House, 2017.

<sup>12</sup> World Trade Organization, 2017, Notification, G/TBT/N/CHN/1211, 18 July.

<sup>13</sup> Chatham House, 2017.

## **Ways to seize opportunities for greater circularity**

### **Create incentives for the reduction, reuse and recycling of waste streams**

Any wasted resource represents a cost to the economy, whether it is physical, such as scrap metal and electronics in a landfill, or abstract, such as empty rooms or unused seats in vehicles. Moving value chains away from such losses requires incentives to transform linear supply chains into circular ones (table 2).

### **Enable collaborative sectors to emerge**

Supply and demand need to meet in smarter ways. Services are essential to achieve this, as technology can remove information barriers, for example in services that empower individuals and businesses to diversify and increase incomes by tapping into underutilized assets, such as car sharing, food sharing and space and machinery renting for residential, industrial or business-related purposes. In the European Union, for example, the total revenue from the collaborative economy increased from around €1 billion in 2013 to €3.6 billion in 2015.<sup>14</sup>

### **Move from the ownership of goods towards access to services**

Circularity requires a significant bridge between trade in goods and trade in services. In contrast with ownership of a good, for example a printer, car or washing machine, the quality, energy efficiency and durability of such products is higher if the function is delivered as a service; a leased printer, shared car or communal washing machine tends to be more efficient and longer lasting

and university curriculums. In markets such as garments and apparel, it is important to encourage responsible consumption shifts, making better use of the textile fibres that are currently discarded, in particular in developed countries.<sup>16</sup> Similarly, efforts may be made to delink social status from ownership and urge customers instead towards quality public or shared mobility or to choose to repair instead of buying new. A shift is required, from consumers who want to have to consumers who want to be, in line with Goal 12 on responsible consumption and production.<sup>17</sup>

### **Suggested actions**

The alignment of enablers in various markets and shifting consumer preferences can make the circular economy an important contributor to achieving the Sustainable Development Goals and the goals in the Paris Agreement.

Regions exporting scrap material need to ensure compliance with health protection standards and that such material is optimally prepared for recycling. Countries importing recyclable materials may consider stimulating high-quality recycling and remanufacturing that are safe for workers and the environment. It is also important to differentiate between waste and used and remanufactured goods, creating clear protocols for their acceptability at national borders. In order to achieve this, some instruments, such as those noted in table 2, adapted to national circumstances, may be adopted and orchestrated across jurisdictions. Furthermore, well-functioning and innovative educational systems that increase information technology literacy are essential to allow entrepreneurs to implement ideas that can utilize idle and discarded resources.

As illustrated by current discussions on

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