
CLIMATE AND ENVIRONMENT

Policies and Practices to Enable Business Models for Resource Efficiency and a Circular Economy

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Abstract

If current patterns of production and consumption continue, the global demand for materials is expected to more than double by 2050. The efficient use of resources can enable economic growth while also ensuring resource security and environmental sustainability. The promotion of business models which reduce the extraction of primary raw materials, increase the use of secondary materials, and generate less waste is central to achieving resource efficiency and a circular economy. However, the market share of these 'circular' business models has been limited.

G20 member countries can take the following measures to enable circular business models: (i) incentivize circular business models through policy instruments that improve access to finance, the provision of tax incentives and subsidies, integrating resource efficiency criteria in procurement policies and practices, and enabling industrial symbiosis; (ii) develop mechanisms, which may be either voluntary or binding, to mainstream circularity in business models through the promotion of design and material re-use standards, certification schemes, labeling requirements, and extended producer responsibility; (iii) provide institutional support to circular business models through developing indicators and targets for resource efficiency, harmonizing waste and material use regulations, and facilitating partnerships between key resource users; and (iv) enable a behavioral shift among consumers through consumer awareness and education programmes, feedback mechanisms, and peer-based nudges.



Challenge

According to the International Resource Panel (IRP), the global demand for materials is expected to increase from 85 billion tons in 2015 to 186 billion tons in 2050. Per capita resource use is expected to increase by 71 per cent in the same time period (UNEP, 2017). This will impact the availability of resources that are needed to sustain production and consumption systems, economic growth, environmental sustainability, and ultimately human well-being.

A common challenge for governments is enabling economic growth while also ensuring the continued availability of resources. Transitioning towards a circular economy can allow governments address this challenge. A circular economy is one in which resources are used efficiently and waste generation is minimized, through improvements in the design of products and processes to allow for durability and re-use in a way that also addresses the needs of consumers.

Circular business models are based on these principles and seek to decouple economic activity and growth from resource consumption and foster social, economic and environmental sustainability. These models focus on creating value while using fewer inputs (such as energy, water, land, and materials) and/or generating less waste. The focus of this brief is on business models that can improve material-use efficiency. For example, business models that are built around remanufacturing seek to repair and reassemble products and sell them at 'new product' performance levels.¹ This can help consumers lower

Box 1: Types of circular business models

- *Circular supply models*: replace inputs from primary materials with renewable or secondary/recovered materials.
- *Resource recovery models*: recycle waste to convert it to secondary materials.
- *Product life extension models*: extend the period for which products can be used
- *Sharing models*: enable the sharing of products
- *Product service system models*: market services rather than products

Source: OECD, 2018

¹ Remanufacturing is the process of recovering, disassembling, repairing and sanitizing components for resale at 'new product' performance, quality and specifications. By remanufacturing products, components or parts, a company contributes to the circular economy by extending the lifetime of these products, components, or parts while also creating value.



owning and operating costs, and insulate firms from material input price shocks and their scarcity. Estimates suggest that the re-manufacturing of products reduces the extraction of primary raw materials and waste generation by 80% when compared to the manufacturing of new products (OECD, 2018). Major types of circular business models are outlined in Box 1.

Key challenges faced while developing business models to promote resource efficiency, specifically material-use efficiency, and a circular economy are outlined below.

Economic/financial

- Linear business models encourage the use of greater quantities of primary raw materials to produce more single-use products to generate larger profits and consequently economic growth. However, sustainable economic growth will require **decoupling growth from resource consumption**, the central focus of circular business models. This implies using fewer resources to produce a given economic output, recovering secondary materials at the end-of-life stages of products and channeling them back into the production process, to reduce the environmental impact of the extraction of primary raw materials. However, in practice, global material efficiency has been decreasing in the 21st century as compared to a gradual increase that was evident over the 20th century (UNEP, 2016).
- Creating **economically viable circular business models** can be a challenge given that high investments may be required at the design stage to develop new products and identify suitable technologies. Further, there may be a long gap between making initial investments and receiving economic returns.
- Circular business models currently account for a small percentage of existing business models and require **replication and scaling up**, within and across organizations.² However financial resources need to be

² Scaling-up a business refers to increasing its size for example, in terms of revenue or sales volume. Replication refers to the action of reproducing or copying a business model or parts of it at another location.



mobilized to support the scaling up of an intervention, and/or the costs of the intervention may need to be adapted to fit available financial resources.

- **Creating monetary value for secondary material or waste that is recovered** requires transforming the waste management sector into one that is built around the recovery of secondary materials and integrating it with the manufacturing sector, which remains largely dependent on primary raw materials. The return flow of secondary materials to the manufacturing sector may be expensive due to inadequate infrastructure and limited capacity of current reverse logistics set-ups.

Institutional

- While some resource efficiency measures can be implemented at the level of one firm, others require interventions across key resource users. For example, secondary materials may be exchanged between firms, between consumers and manufactures, as well as between consumers and waste-intermediaries. In the absence of **partnerships and networks across key resource users** and stakeholders including businesses, governments, consumers, waste-intermediaries, and local communities, interventions may not address concerns of key stakeholders and have limited acceptability. Further, the lack of mentoring and networking platforms can also prevent entrepreneurs and firms from developing circular business models.
- Achieving resource efficiency and transitioning towards a circular economy requires **inter-agency co-ordination** to align policies in diverse sectors such as trade, education, and finance with the resource efficiency agenda.
- The low **availability of information** on best practices and available technologies can hinder the development of circular business models. Further, if technologies are imported, there may not be adequate domestic capacity to operate them. This lack of **technical support** can act as a deterrent for firms that use these technologies. This could include manufacturing firms that build products or waste management



companies that seek to improve end-of-life management.

- Environmental impacts may not be integrated at the level of value creation and distribution and be treated as an externality. This leads to **pricing policies for natural resources** in a manner that fails to incorporate the cost of resource depletion and environmental degradation, including the provision of subsidies to non-renewable resources.
- The effectiveness of recycling systems hinges on the **awareness among waste generators** on the relevance of recycling, on methods of recycling, and on how to re-use recyclables (Lakhan, 2016).

Social/behavioral

- **Creating consumer demand for resource efficient products** can be a challenge as environmentally sustainable products may not be easily available, affordable, user-friendly or functional and attractive to consumers, especially at the early stages of their development.³
- The **lack of credible information and standards** about the quality of the recycled material can also hinder their use in the production process. Consumers too may not be confident of purchasing refurbished and remanufactured products in the absence of credible information on their quality and performance. For example, the use of local, eco-friendly construction technologies remains low, even if they are cost effective (Gieseckam et al., 2015).

Status-quo biases, wherein disadvantages of alternatives appear larger than the advantages of status-quo, can lead to inertia in consumer behavior and slow down the uptake of new products (OECD, 2017).

Proposal

³ Resource efficient products are defined here as goods and/or services produced using resource efficient processes that enable a circular economy.



Proposal 1: G20 member countries should develop policies to incentivize the adoption of circular business models among firms through economic/market based instruments and strategies such as providing easier access to finance and tax incentives to these firms, developing procurement policies that include resource efficiency criteria, and enabling industrial symbiosis.

Rationale

- While there is increasing consensus on the need for resource efficiency and a circular economy, in practice firms face several barriers which disincentivize actions towards meeting these objectives. Some of these barriers are outlined in the previous section, and include limited access to finance, high initial investments, and long payback periods, amongst others, making economic viability a challenge.
- In addition, there are multiple policy instruments and strategies that are available to incentivize circular business models, and it is important to be able to identify and prioritize actions and minimize any trade-offs that may occur. Incentive structures should be framed such that producers and consumers see economic interest in maximizing a product's life.

Suggestions on means to implement

- **Facilitate access to finance for technology and process improvement:** A range of financing mechanisms are available to enable firms to address issues such as high initial investments and long payback periods which are typically identified as key barriers to the adoption of circular business models. Key mechanisms include the provision of grants or low interest loans, modifying collateral requirements to enable small and medium enterprises (SMEs) to access bank finance, viability gap funding, and the use of revolving funds. For example, the European Regional Development Fund Innovations Actions Grant Scheme (Environment) provides grants to SMEs for eco-innovations relating to resource efficiency and waste reduction on a co-financing basis (European Commission, 2015). Viability gap funding (VGF), which entails supporting projects till they can be financially self-sustaining, can



enable firms to meet high initial costs and address long payback periods and also support scaling up or technology up-gradation. Instruments such as revolving funds can be used specifically to incentivize circularity in business models by allowing business models or specific resource efficiency measures that are seen as potentially risky to obtain funding.⁴ Local governments can provide seed-funding for circular business models that are suitable to the local context.

- **Introduce economic/financial instruments such as tax exemptions or reduced tax rates and subsidies:** In addition to financing, instruments such as subsidies schemes and tax incentives including tax reduction or exemptions can incentivize the adoption of circular business models. Reduced tax rates for resource efficient products can make them cheaper and stimulate demand for them. Tax incentives can also be provided to companies that invest in research and development of these resource efficient products. In addition, fiscal incentives are observed to have a 'signaling effect' and impact consumer demand beyond financial considerations. Selected economic/financial instruments should keep pace with evolving market and technical conditions, and should incentivize the 'greenest' products at the time, by taxing them the least (IVM, 2008).
- **Promote sustainable procurement** practices to enable circular business models to achieve economies of scale and reduce product costs: Preferential procurement by large organizations, public or private, can be used to aggregate demand and create scale by including resource efficiency criteria in their purchasing and thereby bolster the market demand of resource efficient products. Government agencies should design and implement procurement guidelines that encourage the use of resource efficient products.
- **Facilitate industrial symbiosis:** Inter-firm reuse of waste is the

⁴ A revolving fund is a financial instrument where the means for risk financing are obtained from a fund that is replenished as projects pay back loans and then used to finance other projects. They differ from subsidies, which can be provided once and without issuing refunds. Revolving funds become useful when investments have a longer payback period or when the capital market cannot bear the associated risks.



cornerstone of industrial symbiosis, where a group of firms in relative geographic proximity cooperate on resource management issues. For this, industrial parks and clusters that enable the utilization of the waste of one sector or industry as secondary raw material in another can be created. Materials recovery facilities, or facilities where recyclables are sorted and prepared for reuse, should form part of these industrial parks/clusters. However, industrial symbiosis does not always require the creation of physical clusters. In 2010, Portugal created an online platform for the trade of non-hazardous waste to allow for waste trading and the recovery of secondary materials. This was a voluntary instrument, introduced along with a set of administrative and financial incentives to management entities, producers and waste recovery entities to increase the number of online trading platforms and ensure adhere to their rules (European Commission, 2015).

Proposal 2: G20 member countries should develop mechanisms, which may be either voluntary or binding, to mainstream circularity in business models through the promotion of design and material re-use standards, certification schemes, labeling requirements, and extended producer responsibility.

Rationale

- While the resource efficiency agenda and the need to transition towards a circular economy has begun to be incorporated into national policies and plans, organizational and institutional inertia remains.
- A study by the European Investment Bank found that the private sector tends to focus on short-term gains and is risk averse, and while some enterprises have developed innovative circular business models, this remains the exception rather than the rule. (EIB, 2018)
- Accelerating the transition towards resource efficiency and a circular economy requires developing a framework of regulations and obligations, which may be either voluntary or binding, to drive more firms, both large enterprises as well as small and medium enterprises towards adopting resource efficiency and circularity measures in their business models.



Suggestions on means to implement

- **Develop standards for the use of secondary materials:** Standards should be developed for the reuse of secondary raw materials to address concerns regarding quality, ensure safety and enable greater uptake by industries. In the absence of formal standards, **industry-wide benchmarks** can play a similar role. Industry associations can play a key role in developing and propagating the adoption of these standards and benchmarks. Governments can collaborate to harmonize quality standards to enable cross-border secondary material flows.
- **Develop standards for the design of products:** Standards for recycled materials now exist in several countries. However, there are opportunities to expand the use of standards at the design phase of products. This implies developing standards that require designing products that are durable, make use of secondary materials, and are easy to repair and/or recycle. For example, the European Union's (EU) Ecodesign Directive sets minimum mandatory energy efficiency requirements for products such as household appliances. It outlines outcomes to be achieved while allowing EU member states to choose implementing measures (European Parliament, 2009). Products that are designed to facilitate reuse and recycling become the starting point of effective secondary material recovery.
- **Resource efficient packaging:** Resource efficiency requirements can be instituted at the post manufacturing stage, through requirements for resource efficient packaging which is recyclable or compostable, uses fewer materials, or uses recycled material.
- **Institute credible certification schemes:** Along with standards, credible certification schemes should be designed for secondary raw material and resource efficient products to improve confidence among potential users of these materials and/or products. In Italy, ReMade, is an officially accredited certification scheme for the verification of recycled content, originally developed by a CSO. ReMade in Italy® labels contain information on the consumption of raw materials and energy as well as CO₂ emissions (European Commission, 2016). Certification schemes can



also ensure that the recycling facilities apply relevant health, safety and environmental standards.

- **Design extended producer responsibility (EPR) systems:** EPR refers to the responsibility (mandatory or voluntary) given to producers to manage the environmental impact through the life-cycle of a product, even after it is used by consumers. This can help reduce the cost of end of life management of the products being borne by tax payers and municipalities, and also integrate sustainability measures into the design of products, including design for value recovery. While designing EPR systems, it is important to: (i) define the objective and scope of EPR clearly and update these as market conditions and technology evolve; (ii) establish reporting and monitoring mechanisms, for example through regular independent audits; (iii) develop sanctions and enforcement mechanisms through creating registers of producers, mandating official accreditation of producer responsibility organizations; (iv) prevent anti-competitive behavior by (a) consulting competition authorities while establishing EPR systems, and (b) procuring services such as waste collection, sorting, and material recovery through competitive tenders; and (v) align producers' fees more closely with end-of life treatment costs (OECD, 2016).
- **Institute product labeling requirements:** These may include relevant and informative product labeling, appropriate marketing communication, and information on the safe usage and disposal of their products and services.

Proposal 3: G20 member countries should provide institutional support to circular business models through developing indicators and targets for resource efficiency, harmonizing waste and material use regulation, skill development, enabling partnerships between key resource users, and research and development.

Rationale

- Certain resource efficiency measures can be taken by firms alone, including the reuse of materials in the manufacturing stage. However,



the exchange of materials between firms, between consumers and firms, as well as among other intermediaries, requires institutional support.

- More broadly, pushing forward the agenda on resource efficiency and transitioning towards a circular economy will require institutional frameworks that establish a coherent set of incentives and obligations across government agencies responsible for a range of sectors and operating in a range of contexts.
- For example, key challenges and consequently strategies for circular business models will vary across rural and urban contexts. While urban areas are typically production centers, rural areas are the resource base for several of these production centers. Further, governments are also recognizing the role that resource efficiency can play in agricultural growth, for example through efficiency improvements in food processing.
- In addition, several challenges related to resource efficiency cross jurisdictional boundaries and require systemic changes beyond the capabilities of individual firms or even of an industry. It is important for governments, businesses, researchers, as well as consumers to be brought together on common platforms to be able to address these challenges holistically.

Suggestions on means to implement

- **Formulate indicators and targets for RE:** Official data on material flows remains limited and indicators, particularly quantitative indicators that include environmental costs of industrial activity are not widely used. A target can concretize policy objectives and prioritize actions to achieve it. Targets should be specific, quantifiable and measurable, time-bound, and accompanied by a framework for monitoring. When supported by an appropriate mix of policy measures, this can drive policy effectively. Nine European countries have currently quantified targets for economy-wide material efficiency (EEA, 2016). Targets can be at national or local levels as well as for sectors. An indicator framework may follow a tiered system of core and non-core indicators, and could be aligned to national



priorities or global goals such as the Sustainable Development Goals.

- **Incorporate negative environmental impacts into natural resources prices and subsidies:** Natural resources should be priced by including the negative environmental impacts of resource use in their prices. This refers to ‘internalizing’ negative externalities such as environmental damage into the cost of resources, and removing subsidies to non-renewable resources (UNEP, 2017).
- **Harmonize waste and material use regulations:** Waste management regulations may prohibit the reuse of waste products, given health and environmental implications of reuse. These regulations should be harmonized with other material use regulations to ensure that potentially reusable secondary material is not classified as waste.
- **Promote partnerships, platforms and networks among stakeholders:** Partnerships, platforms and networks among key stakeholders such as governments, firms, investors, and consumers can accelerate the transition towards a circular economy through enabling experience and knowledge sharing. For example, public-private partnerships can allow small enterprises in the private sector access to finance and also allow industry to support the transition towards a circular economy. For example, to support the transition towards a circular economy, private enterprises can adopt zero-waste-to-landfill practices, conduct waste audits, and identify opportunities for closed-loop recycling. Waste exchange platforms are increasingly being used to connect waste generators and potential users of waste products. For example, the Integrated Waste Exchange in Cape Town, South Africa is an online platform that allows businesses, organizations, and schools to sell their waste directly to those who may wish to reuse it, facilitating a circular flow of materials and reducing landfilling (Coetzee, 2014, City of Cape Town, n.d.).
- **Invest in skilling and capacity building for RE:** Developing new technologies or up-grading existing technologies and manufacturing processes will require a new set of skills. Equipping the labor force with the requisite skill-sets to address skill shortages, skill gaps and skill



mismatches are important to be able to enable RE and the transition to a circular economy. It is also important to integrate the informal sector involved in waste collection and sorting into newer processes of waste management.. Technical support to entrepreneurs will encourage them to set up new businesses and create new employment opportunities. Joint ventures can also address issues associated with technology access and transfer, and enable cross-country learning.

- **Enable co-ordination across government agencies and departments:** This can allow for policy coherence and strengthen policy implementation. Data availability, management and assessment can also be improved through inter-agency coordination for the management of materials. Co-ordination between relevant departments can also facilitate efficient flows of materials and waste, for example from areas which provide natural resources to areas which are production centers.
- **Support eco-start-ups:** Incubators and accelerators can provide funding, mentoring, training and other support to start-ups that make resource efficiency and a circular economy central to their business models. Introducing resource efficiency benchmarks can enable these start-ups to measure their performance on achieving resource efficiency relative to industry best practices. These incubators can also provide a mentoring and networking platform for entrepreneurs to validate their business models with guidance from peers, mentors, experts, and investors.
- **Integrate circular economy approaches into rural development strategies:** Realigning production systems in rural areas by balancing renewable resource flows, optimizing natural resource yields by circulating products, components and materials, and designing out bio-wastes can allow for increased value creation with the use of fewer inputs while also improving natural capital.
- **Ensure occupation health and safety in the processing of waste:** One major challenge that the informal sector faces is the continued reliance on potentially hazardous waste processing techniques and lack of standards for occupational health and safety. Circular business models



should also make provisions for safe recycling infrastructure.

- **Promote research on material flow patterns and best practices:** Improving the availability of official data on resource flows can aid policy makers and businesses in decision-making. For example, the Finnish National Material Efficiency Centre collects and disseminates data related to material efficiency and develops tools to enable material efficiency among firms (USEPA, 2018). Data can also provide information to potential investors on the nature of the industry and potential risks (IGES, 2014). Databases of waste management stakeholders can enable transparency and a more efficient supply chain.

Proposal 4: G20 member countries should make use of behavioral insights to facilitate greater demand from consumers for resource efficient products and services. Tools can include green labels, consumer awareness and education campaigns, feedback mechanisms and peer-based nudges.

Rationale

- Behavioral biases such as a gap between attitude and behavior and external considerations such as social norms and notions of acceptable behavior can impact the consumption patterns of individuals and organizations.
- The use of insights from the behavioral sciences can facilitate creation of greater demand for resource efficient products and help increase their market share.
- Research shows that interventions such as the increased availability of information on the content of products, feedback on impacts of actions, and peer-based nudges can influence the choices that consumers make, including increasing the demand for resource efficient products.

Suggestions on means to implement

- **Increase information about products through green labels:** Green labels have been shown to influence consumer choices. A credible regime of certification can engender greater trust in the claims of the resource



(and energy) efficient products. Green labels are of several types. They may be awarded by a third party to products that meet certain environmental performance benchmarks across sectors or be instituted in specific sectors such as energy efficiency.

- **Conduct consumer awareness and education campaigns** on resource efficient products to address informational and perceptual barriers towards them. National and local consumer education plans can be developed to raise awareness on the need for and benefits of a circular approach as opposed to a linear approach to production and consumption. School and university curricula could provide early exposure to students about concepts underlying resource efficiency and circular economy.
- **Use feedback mechanisms to inform consumers about their consumption patterns and associated impact on environment.** Feedback mechanisms provide information to consumers to enable them to become more aware of the impacts of their choices. Giving feedback has been shown to be useful in domains such as energy. Resource efficient behavior can be rewarded through monetary and non-monetary incentives based on sustainable choices that are informed by feedback.
- **Enable peer-based nudges:** Social norms, or customary forms of behavior that regulate our interaction with others, have been shown to influence consumer behavior, including making environmentally sustainable choices.⁵

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⁵ Social norms are informal rules or expectations that govern behavior in groups or societies. Prescriptive norms are those that encourage behavior that is perceived as positive, while proscriptive norms are those that discourage behavior that is seen as negative. Norms are also categorized as being descriptive (what is common behavior) and injunctive (what ought to be common behavior).



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