

TRANSFORMING TO NET-ZERO EMISSION ECONOMIES:

Circular Business Models for Systems Innovation

Key messages

- We have less than twelve years' time to significantly reduce our global greenhouse gas emissions to prevent catastrophic climate change. This requires the decarbonisation of our economies at least six times faster than we have ever achieved so far.
- The circular economy provides great potential for emissions reduction and job creation.
- The transition to a circular economy requires a rapid and fundamental transformation of economic, social and financial systems. Relying on gradual, incremental changes will not be enough.
- Focusing on innovative circular business models, this series of case studies showcases experiences and learnings from the EIT Climate-KIC community, aiming to inspire further action.

Introduction

With the landmark Paris Agreement in 2015, global leaders agreed on keeping the global temperature rise to well below 2°C above pre-industrial levels – a threshold that seemed appropriate for avoiding 'dangerous climate change'; however, recent data shows that severe effects will already start at a global temperature increase of 1.5°C (1). Climate scientists warn that we have a 12-year window until 2030 to radically reduce our global greenhouse gas emissions.

In order to stay well below the required temperature increase thresholds, the speed of decarbonisation necessary is at least six times faster than anything the global community has achieved so far. Relying on gradual, incremental changes will not be enough. What is needed is a rapid and fundamental transformation of economic, social and financial systems that will trigger exponential change in decarbonisation rates and strengthen climate resilience. In order to make this happen, we need 'systems innovation': integrated and coordinated interventions in economic, political and social systems and along whole value chains, through deliberate and connected innovation experiments.

Circular Economy: a promising pathway towards carbon neutrality

If we are to transform our current systems, in which direction should we be heading? One of the strategies with great potential for delivering on low carbon agendas, while also building economic opportunities, is the circular economy (2). It has been estimated that the circular economy has the potential to deliver deep emissions cuts, from EU heavy industry alone, of up to ~ 60% – an estimated 296 Mt CO₂ per year by 2050 – in an economically attractive way (3). Transitioning to a circular economy in Europe has the potential to deliver an estimated net economic benefit of €1.8 trillion per year by 2030 (4).

The circular economy refers to a restorative economic model, which seeks to extend the life of products, components and materials by keeping these in use within the economy for as long as possible. Circular strategies include, but are not limited to: eco-design, re-use, repair, refurbishment, remanufacturing, product-service systems and recycling.

Over the last five years the circular economy has become a central pillar of policymaking in Europe. In December 2015, coinciding with the negotiation of the Paris Agreement, the European Commission adopted its ambitious Circular Economy Package as a mechanism to boost competitiveness, creating jobs and generating sustainable growth, while mitigating climate change. Three years after adoption, the resulting Circular Economy Action Plan has been completed, with its 54 actions having generated almost €147 billion in added value and four million people employed in circular economy related jobs in 2016 (5). That said, there is substantial work still to be done as it is estimated that only 9% of the world economy is currently circular (6).

Circular Business Models: on-the-ground manifestation of the Circular Economy

More and more innovative circular business models are now emerging across Europe in response to the substantial opportunity they represent. In order to accelerate these efforts it is

imperative to learn what works and what doesn't, while also understanding the role of each stakeholder in the transition.

In this context, EIT Climate-KIC – Europe's largest public-private partnership dedicated to climate innovation – would like to share the strategies, experiences and lessons learnt from nine pioneering circular projects and start-ups in our community. Our aim is to inspire further action, while highlighting the importance of concerted effort: innovative business models and circular solutions alone cannot transform whole production and consumption systems; there are various other forces at play that influence the market take-up of circular innovations.

The business models presented in this series come from a multitude of sectors, geographic and political contexts and employ a variety of circular strategies (see Table 1 for an overview).

Start-up / Project	Topic	Strategy	Geographic location
3.2 Circular IQ	Enabling circular procurement for the public and private sectors	circular procurement	The Netherlands
3.3 Repamera	Online clothing repair platform	repair	Sweden
3.4 Refurbed	Growing the online market for refurbished electronics	refurbishment	Switzerland
3.5 Recycl3R	Increasing packaging recycling with the use of digital passports	recycling/ secondary materials	Spain
3.6 rePATRN	Creating social impact while solving Ghana's plastic waste problem	recycling/ secondary materials	Ghana
3.7 loncell-F	Making closed-loop textiles from wood pulp and waste materials	recycling/ secondary materials	Finland
3.8 MAB 2.0	Scaling the production of algae biomass from wastewater	recycling/ secondary materials	Hungary
3.9 B-PLAS DEMO	Creating bioplastics from industrial organic waste	recycling/ secondary materials	Italy
3.10 BBC 2.0	Upcycling carbon black from end-of-life tyres	recycling/ secondary materials	The Netherlands

Figure 1: Overview of Climate Innovation Insights Series 3

System conditions for enabling market take-up of Circular Business Models

Revolutionary business models and digital technologies can provide solutions but are not guaranteed access to market. The innovation is a part of a wider system and it is often the surrounding environment that proves decisive on whether an innovation will flourish or perish.

The case studies presented in the Climate Innovation Insights Series 3 provide on-the-ground examples of how system elements such as policy, skills, behaviour, market structures, information flows, organisational governance and finance influence market take-up of innovative business models.

The emerging cross-cutting themes from these case studies are:

- **Policy is key in creating the necessary conditions for circular business models to thrive.**

Insights 3.7 Ioncell, 3.2 CircularIQ and 3.3. Repamera illustrate how a strong political will displayed through long-term strategies can create favourable environments for the diffusion of circular innovations. In 2016, Ioncell's home country of Finland published the world's first roadmap to a circular economy. As a result, funding flows into innovative circular endeavours, such as Ioncell, increased considerably. Similarly in the Netherlands, where Circular IQ is based, the Dutch government pledged to move the country to a circular economy by 2050. In Sweden, Repamera took advantage of the Swedish government's decision to cut almost half of the VAT on repaired items in early 2017.

Policymakers also have a key role to play in driving the growth of markets for circular alternatives, by, for example, setting mandatory waste disposal costs – which in turn incentivise business engagement in cost-effective circular solutions (see 3.9 B-PLAS DEMO) – or by setting best practices and creating demand through circular procurement (3.2 Circular IQ). The development of international quality standards also has an important role to play both in the case of secondary and refurbished materials (see 3.4 refurbished and 3.10 BBC 2.0).

However, policy can also act as a prohibiting factor: Insights 3.8 MAB 2.0 and 3.4 refurbished display how the regulatory status of 'waste' can create or prohibit new markets, adding complexity to all related processes.

- **Digitalisation has a key role to play in enabling the circular economy, with great potential for supporting new, sustainable behaviours.**

Changing our behaviour to fit a more circular, sustainable paradigm is critical for accelerating the transition to a circular economy (7); Insight 3.5 recycl3R demonstrates how the simplification of packaging recycling information can support consumers in developing better recycling habits, while providing companies with business intelligence and a channel for communication with their customers. Insight 3.4 refurbished displays how user-friendly online platforms, together with raising consumer awareness and competitive pricing can gradually shift customer perception regarding refurbished goods.

- **Going circular requires intensive collaboration and the development of new skillsets.**

Scaling circular business models often requires intensive collaboration along the value chain as well as across different sectors and between multiple actors (e.g. entrepreneurs, academics, investors, and end users – see EIT Climate-KIC Climate Innovation Insights Series 2 (8)). These collaborations can prove crucial for building credibility and entering conservative markets.

However, the development and nurturing of new partnerships requires investing in skillsets and competencies that research spin-out and new venture teams do not always possess. These skills can range from business modelling to stakeholder engagement and conflict management.

Insight 3.10 BBC 2.0, shows how collaboration within the value chain from the very start of a circular innovation's development can provide much-needed access to finance and open new markets. The Insights 3.9 B-PLAS and 3.7 Ioncell illustrate the diverse skill-range required when taking an innovation from the lab to market. Success requires more than technical competence – it often demands complementary skills related to business and stakeholder management.

- **Circular business models do not always require technological disruption or large upfront investment – and they can deliver substantial societal benefits.**

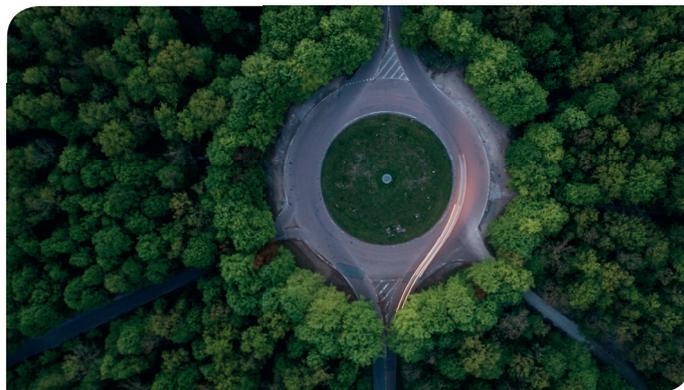
Insights 3.3 Repamera and 3.6 rePATRN illustrate how circular business models can be built on existing technologies and societal structures at relatively low cost, without necessarily requiring substantial R&D or financial investment at the onset. They also demonstrate how, at the same time, they can provide substantial co-benefits related to increased social impact. The careful design of circular business models can provide access to employment for potentially disadvantaged population groups and provide a springboard for communities to thrive.

Conclusion

If we are to prevent catastrophic climate change, we have less than 12 years' time to significantly reduce our global greenhouse gas emissions. This requires the decarbonisation of our economies at least six times faster than we have ever achieved so far. The circular economy is considered a promising pathway for achieving this transformation to a prosperous, sustainable, low-carbon economy.

Climate Innovation Insights Series 3 showcases on-the-ground innovative circular business models from the EIT Climate-KIC project and start-up community, in an attempt to inspire and share learnings.

A common thread observed through the series is that 'there is no silver bullet': revolutionary business models and digital technologies alone will never be able to transform our societies, as they are not guaranteed access to market; it is often the surrounding environment that proves decisive on whether an innovation will flourish or perish. This is because the innovation is embedded in a wider system and influenced by key



system elements: policy, skills, behaviour, market structures, information flows, organisational governance and finance.

It is imperative that we take collaborative, concerted action on all these fronts of our current social and economic systems. In this way we will achieve the much-needed rapid and fundamental transformation required for decarbonising our economy and strengthening climate resilience.

About

EIT Climate-KIC is Europe's largest public-private partnership addressing climate change through innovation to build a net zero carbon economy. The Climate Innovation Insights are one of the most knowledge sharing prominent formats of EIT Climate-KIC since 2016. Building on innovation endeavours of EIT Climate-KIC start-ups and partner institutions, the Insights are intended to share learnings and provide a platform for reflection and discussion.

We would like to thank:

- Series Authors: Simon Brandon and Dr Geraldine Brennan
- Series Editors: Dr Geraldine Brennan (CUSP Research Fellow, Middlesex University), Maria Loloni (EIT Climate-KIC)
- Series Reviewers: Vasileios Rizos, Dr. Arno Behrens (Centre for European Policy Studies) and Catherine Weetman (Re-think Solutions)

Disclaimer

The information contained in this paper is provided for general information purposes only. Views are those of the author and do not reflect the views of EIT Climate-KIC, unless stated. While care has been taken to ensure that the information is accurate, the publisher cannot accept responsibility for any errors or omissions, or for subsequent changes to details given. EIT Climate-KIC provides no warranties or representations as to the completeness, accuracy or suitability for any purpose of this paper's content, nor any other warranty of any kind, express or implied, including but not limited to, warranties of satisfactory quality, non-infringement or compatibility. All rights reserved. This paper is supplied for the information of users and may not be distributed, published, transmitted, reproduced or otherwise made available to any other person, in whole or in part, for any purpose whatsoever without the prior written consent of EIT Climate-KIC. © EIT Climate-KIC 2019

Endnotes:

(1) IPCC (2018) Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. [Authored by Masson-Delmotte et al.] <https://www.ipcc.ch/sr15/>

(2) Blok, K. et al (2016) Implementing Circular Economy Globally Makes Paris Targets Achievable. Circle Economy and Ecofys, The Netherlands. <https://www.navigant.com/-/media/www/site/downloads/energy/2018/circleeconomyecofys2016circleeconomy-whitepaper.pdf>

(3) Material Economics (2018) The Circular Economy – A Powerful Force for Climate Mitigation, Sweden <https://materialeconomics.com/publications/the-circular-economy-a-powerful-force-for-climate-mitigation-1> and Material Economics (2019) Industrial Transformation 2050 Pathways to Net-Zero Emissions from EU Heavy Industry, Sweden. <https://www.climate-kic.org/wp-content/uploads/2019/04/Material-Economics-Industrial-Transformation-2050.pdf>

(4) Ellen MacArthur Foundation (2015), UK. Growth Within: A Circular Economy Vision for a Competitive Europe: https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_Growth-Within_July15.pdf

(5) EC (2018) Implementation of the Circular Economy Action Plan. European Commission, Brussels. http://ec.europa.eu/environment/circular-economy/index_en.htm

(6) Circle Economy (2019) Closing the Circularity Gap in a 9% World, the Netherlands. https://docs.wixstatic.com/ugd/ad6e59_ba1e4d16c64f-44fa94fd8708eae8e34.pdf

(7) EIT Climate-KIC (2018) Digitalisation-Unlocking the potential of the Circular Economy. https://www.climate-kic.org/wp-content/uploads/2018/08/ClimateKICWhitepaperFinalDigital_compressed.pdf

(8) EIT Climate-KIC (2017) Climate Innovation Insights, Series 2 - Accelerating the Transition to Sustainable Production Systems, Edited by G. Brennan. <https://www.climate-kic.org/spinsights>