Global Circularity Protocol
for business

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Global Circularity Protocol *for business:*

Impact Analysis on Climate, Nature, Equity and Business Performance

Contents

Foreword

The likelihood of overshooting the 1.5°C target helps sharpen our focus on the innovations, actions, and opportunity areas that can accelerate the recovery needed to keep our planet within safe and just operating boundaries.

One such opportunity area is the circular economy and the staggering 55%[i] of global greenhouse gas emissions that result from the extraction and processing of materials.

Circularity is a critical mitigator of planetary crises; it drives decarbonization, helps halt biodiversity loss, and offers economic and well-being gains. It is an important lever of acceleration that can decouple resource demand from material supply.

Businesses are actively seeking ways to drive change, but face challenges in measuring and disclosing circular performance due to the lack of standardized metrics and frameworks, while policy gaps impede scaling. As a result they have reduced ability for fully informed decision making on innovation, cost reduction, cutting greenhouse gas emissions, and reducing their dependency on finite resources.

The Global Circularity Protocol for Business (GCP) offers a comprehensive framework to accelerate how companies can close these gaps.

Building on the success of the GHG Protocol and grounded in WBCSD's Circular Transition Indicator (CTI) metrics, the GCP is a science-based standardized framework to provide a harmonized methodology for the management, measurement, target setting, and disclosure of circular performance, aligned with developing reporting requirements.

This Impact Analysis reveals that the GCP can accelerate the shift towards a circular economy by more than doubling the current rate of adoption of circular business practices. The analysis foresees a saving of up to 120 billion tons of materials and up to 76 gigatons of CO2 emissions over the next 25 years; equivalent to 1.5 times current annual global emissions.

We are driving the solutions businesses need which enable faster action to limit the climate crisis, restore nature and tackle inequality. Join us in helping close the emission gap, decoupling resource demand from material supply, and making the GCP the go-to circularity action-framework for business by 2026.

Diane Holdorf
Executive Vice President,
Pathways, WBCSD

i United Nations Environment Programme (2024): Global Resources Outlook 2024: Bend the Trend – Pathways to a liveable planet as resource use spikes. International Resource Panel. Nairobi

At the heart of more sustainable resource use is an accelerated shift in resource productivity, together with responsible consumption. A global transition towards circular approaches and business models, can reduce material resource use and also reduce environmental impacts in high and upper middle-income countries, while improving well-being and boosting economic growth. This can also create the space for resource use to grow where it is most needed to provide a life of dignity and sufficiency for all.[2]

The One Planet Network (OPN) supports the development of the Global Circularity Protocol for Business in collaboration with WBCSD.

According to the latest report of the International Resources Panel, it is possible to reduce resource use while promoting sustainable development, reducing inequality and improving well-being. This requires however the adoption by private sector actors of system-based approaches across sectors.

The Global Circularity Protocol for Business stands as a critical framework designed to guide businesses in transitioning to more sustainable, circular models, enabling companies to decouple economic growth from resource consumption while promoting reporting, transparency and disclosure.

The potential benefits of circularity presented in this GCP Impact Analysis report, 2024 are compelling: it could unlock $4.5 trillion in economic growth and create 6 million jobs through activities such as recycling, repair, renting, and remanufacturing. Additionally, it could reduce greenhouse gas emissions by 6% to 7%, translating to cumulative savings of 67 to 76 gigatons of CO2 equivalent between 2026 and 2050 (GCP Impact Analysis report, 2024).

The Global Circularity Protocol for Business is being developed through a collaborative and inclusive process, engaging stakeholders from diverse geographical, sectoral, policy, and value chain backgrounds including through the participation of stakeholders from the Global South, ensuring a comprehensive and representative framework.

To this end, the One Planet Network welcomes this impact analysis which is expected to pave the way to a Corporate Performance and Accountability System tailored for circularity, fostering harmonized methodologies and accounting metrics for reporting and disclosure by businesses. This is how change the way we think, act and inspire about circularity.

Jorge Laguna-Celis
Head of the One Planet Network Secretariat

[ii] United Nations Environment Programme (2024): Global Resources Outlook 2024 Summary for Policymakers: Bend the Trend – Pathways to a liveable planet as resource use spikes. International Resource Panel. Nairobi. https://wedocs.unep.org/20.500.11822/44902

The global increase in human development while expanding our ecological footprint is not sustainable. The healthcare sector has a critical role to play. With its energy-intensive and material-intensive practices, healthcare accounts for 4.4% of global CO_2 emissions[iii] and 10% of raw materials extracted[iv] globally each year.

At Philips, we see a growing need – and traction – for a circular economy, which aims to decouple economic development from the use of natural resources. When done well, the shift to a circular economy can help mitigate climate change, nature degradation, and resource scarcity, while also reducing social inequality. As a leader in sustainable Health Technology, Philips has engaged in circularity for over a decade, and continues to set itself ambitious targets. By the end of 2025, we aim to get 25% of our revenue from products and services that contribute to circularity.

The circular transition is a systemic transition, no single company or organization can do this alone. We need to collaborate across value chains, with a common language, an agreed set of metrics, and a shared understanding of the environmental and social impact that is to be generated.

The Global Circularity Protocol for Business aims to do exactly that. As Philips, we fully endorse the initiative, and are actively supporting to develop the framework, provide critical feedback, and contribute with the lessons we learned from our own circular journey over the years.

This Impact Analysis report shows the substantial influence GCP can have on the four impact areas mentioned above. It also demonstrates the potential for GCP to accelerate the circular transition, similar to how the GHG protocol has helped climate mitigation.

I would strongly invite other companies to join the initiative, and to start steering circularity across their value chains with bigger and faster impact. Only together can we address the major challenges of our time.

Harald Tepper
Global Lead Circular Economy, Philips

In the past six years, the world has consumed as many resources as in the entire 20th century. As global wealth increases, so does the demand for materials, bringing challenges like resource depletion, waste, and emissions. To combat this, we must decouple economic growth from virgin material consumption. When reduction isn't possible, we should adopt circular models to minimize resource extraction, increase efficiency, and prolong material use through, for example, reuse and recycling. The solutions needed to make circular economies a reality have been around for decades, and yet, only seven percent of resources today are consumed in a circular way.

Despite consumers, policy makers, and businesses wanting increased circularity, the transition is hindered by complex and opaque value chains, from raw material extraction to manufacturing, sales, consumption, collection, sorting, and recycling. Without clear metrics, businesses struggle to understand and improve their resource impact. A unified framework for analyzing the impact and nature of the circularity challenge for individual organizations, like the Global Circularity Protocol for Business (GCP), can drive change by leveraging existing solutions. The GCP Impact Analysis shows that its adoption in high-impact sectors such as construction, manufacturing, transportation, and agriculture, could, reduce material consumption by a further 100 to 120 billion tons between 2026 and 2050. Additionally, it could cut CO2 emissions by, on average, 6% per year, and decrease particulate matter pollution by, on average, 11% per year between 2026 and 2050 compared to a no GCP scenario.

A unified framework for analyzing the nature of circularity challenges for individual organizations will also prompt much needed policy changes, regulatory predictability and investments into systems and technology that can solve problems that are not yet detangled. Businesses have a proven ability to solve complex problems when given the right conditions. While we've contributed to the problem in the past, we are now ready to be part of the solution.

Tove Andersen
CEO, Tomra

[iii] Health Care Without Harm (2019). Health care climate footprint report. Retrieved from https://global.noharm.org/resources/health-care-climate-footprint-report

[iv] Circle Economy (2020). The Circularity Gap Report 2020. Retrieved from: https://www.circularity-gap.world/2020

In support of this report

Davinah Milenge Uwella

Principal Program Coordinator, Climate Change and Green Growth, the African Development Bank

"While the terminology of circular economy has modern origins, circular practices such as permaculture, the use of biomaterials, and community sharing have existed for hundreds of years in African countries. When applied as an industrialization strategy, circular economy has the potential to address key African challenges such as climate change, food security, water scarcity, and natural resources management. Adoption of circular principles can create employment-generating businesses and contribute to a significant number of the 17 Sustainable Development Goals (SDGs). When designed right, GCP has a great potential to accelerate this adoption."

Dr. Heinz Schandl

Environment Circular Economy Lead, CSIRO

"Transitioning to a circular economy is essential for enhancing human well-being while staying within planetary boundaries. This shift demands significant changes in provision systems - such as housing, mobility, food, energy, and water - along with transformations in social practices and a reorientation of priorities for businesses, governments, and communities. This transition will be achieved through well-designed policies, informed by the best scientific evidence, and through collaborative efforts."

Dr. Hong Quan NGUYEN

Director, Institute for Circular Economy Development (ICED) Vietnam National University, Ho Chi Minh city

"Global Circularity Protocol for Business—Impact Analysis" supports industry in joining the green, decarbonization transition process. Especially in the Global South, apart from gaining business opportunities, achievable human-nature values (e.g., via restoration and regeneration) inspire multiple-level actors."

Dr. Janez Potočnik

Co-chair UNEP, International Resource Panel (IRP)

"Circular (bio)economy is the oldest concept on Earth. All Nature is based on the principles of a circular economy: nothing is lost, everything has its purpose. We humans, as part of Nature, should abide by the same principles. Unfortunately, what seems logical in theory isn't so clear in practice. GCP is a promising concept which could bring us closer to our goals."

Dr. Naoko Ishii

Executive Vice President, Center for Global Commons, Tokyo University

"Planetary boundary science and everyday news of extreme weather tell us that we need to reset our relationship with nature for our own survival. But we are stuck with the current economic system characterized as "take-make-waste". We need to make breakthrough by designing and adopting Global Circular Protocol, arguably the most ambitious instrument with full of ingenuity."

Dr. Patrick Schröder

Senior Research Fellow, Environment and Society Centre, Chatham House

"The Global Circularity Protocol for Business has the potential to become a vital framework for driving business transformation and embedding circularity at the core of business models. It will be key in achieving circularity across global value chains, with support for suppliers and small enterprises essential to realizing an inclusive circular economy and enabling high-value economic opportunities in the Global South."

Paula Pelaez Zambrano

Director of Advisory MSME Inter-America Development Bank Group (IDB Invest)London

"Ensuring that business – of all sizes- transition to a circular economy is critical for achieving a low-carbon, resilient and inclusive economy. Emerging markets often face rapid growth, infrastructure development, industrialization, and agricultural expansion leading to increased demand for materials. Adopting a circular economy helps reduce dependency on finite resources. To succeed in this transition, a systemic approach is needed, spanning from within the business, its value chain, partners, and investors. Access to finance and innovative financing mechanisms are critical to support this transition and foster a thriving circular economy, as is the development of a common language, and standardized guidelines like those spearheaded by the Global Circularity Protocol for Business."

Satoshi Yoshida

Director for International Resource Circulation and Circular Economy, Ministry Of Environment of Japan

"G7 Leaders endorsed Circular Economy and Resource Efficiency Principles in 2023 to accelerate circular and resource efficient businesses across sectors. The Global Circularity Protocol for Business, driven by leading companies, will provide essential infrastructure for the private sector to implement the principles, including a corporate circularity disclosure scheme, and become a global voluntary framework for increasing circularity."

Smail Alhilali

Chief of our Circular Economy and Green Industry Division, UNIDO

"Embracing a circular economy is vital for inclusive and sustainable industrial development. It reduces waste and other negative environmental impacts, conserves valuable resources and fosters innovation, creating resilient businesses along supply chains. By designing out waste, retaining value and regenerating natural systems, companies can drive long-term growth while ensuring that economic benefits are shared across society, contributing to a more equitable future."

Dr. Teresa Domenech

Associate Professor of Industrial Ecology and the Circular Economy and co-director of the UCL Circular Economy Lab and UCL Plastics Innovation Hub at University College London

"A circular economy uses resources in a restorative and efficient way, ensuring that maximum value is extracted through multiple use cycles, preserving resources and minimising the production of waste. While circularity presents opportunities for organisations to enhance value chain resilience and preserve value in the long term, it requires of profound changes in the way businesses operate today. The GCP provides a tool kit of CE strategies, implementation frameworks and metrics to drive transformational change in organisations towards circularity."

Dr. Victoria Santos

Coordinator of the Just Transition, Institute for Climate and Society (iCS)

"The Global Circularity Protocol for Business promises to be a lever for accelerating climate mitigation and resilience since it embraces the challenge of providing actionable and comprehensive frameworks for businesses and policy makers to advance in their climate plans. On a Global South perspective, circular economy is key for both addressing economic dynamicity and job creation demands with qualification, societal diversity and inclusion."

Quentin Drewell
Director, Circular Products and materials, WBCSD

"To prevent climate breakdown, we must urgently transition to a circular economy. The Global Circularity Protocol for Business will enable businesses to accelerate adoption of circular business models, reduce emissions, save resources, and drive sustainable growth. Now is the time to act, ensuring a fair and inclusive future where people and the planet thrive together."

Adriana Zacarias Farah
Deputy Head, One Planet Network

"The Global Circularity Protocol for Business offers harmonized circularity methodologies, accounting metrics and interoperability, creating a level playing field that enhances cooperation. The Protocol will accelerate the transition to an inclusive circular economy together with SMEs, ensuring a just transition"

Jeff Turner
Senior Advisor-Pathways, WBCSD

"This important milestone impact study really sets the stage for the work ahead and shows we can double the rate of adoption of circular business practices with the implementation of the Global Circularity Protocol. Warm thanks to the study team and to all the members of the business, policy and independent scientific committees for their hard work."

Jennifer Steinmann
Global Sustainability Business leader, Deloitte

"Deloitte is proud to have collaborated with WBCSD, OPN, and Circle Economy on the Global Circularity Protocol for Business, a critical effort to help drive global adoption of circular business models to enable sustainable growth and resilient supply chains, and generate positive environmental and social impact. The GCP underscores the urgent need for systemic change across industries and will support businesses in their circularity journey."

Ivonne Bojoh
CEO, Circle Economy

"The global transition to a circular economy can only succeed if we collectively adopt a robust protocol to monitor and report on our circular performance. This report outlines the tangible results expected from a swift adoption of the GCP and how it can help address today's urgent sustainability challenges. Now, it's up to businesses to act and drive this change, with policymakers supporting the framework to make it widespread and impactful."

Executive Summary

This study analyzes the potential of the Global Circularity Protocol for Business (GCP) to drive business performance and global sustainability outcomes such as decarbonization, through accelerating circularity maturity. The GCP initiative is spearheaded by the World Business Council for Sustainable Development (WBCSD), in collaboration with The One Planet Network (OPN), hosted by the United Nations Environment Programme (UNEP). It is a multi-year and multi-stakeholder process engaging cross-sectoral businesses, academia, NGOs, and policymakers both from the Global North and the Global South to develop an international voluntary framework that is open to all and aims to ultimately address gaps in **accountability** and **policy** currently impeding the scaling of circularity.

Scaling circular business models is critical to achieving social, economic and environmental sustainability goals, and the GCP emerges as a potent catalyst to accelerate this. The GCP aims to be the go-to framework to guide companies through their transition to circularity by establishing a common language to enable interoperability, creating guidelines, and fostering a unified approach to support the systemic ecosystem transformation that is needed. It will also offer insights and guidance to support policymakers in creating a supportive regulatory environment that is critical to enabling businesses circular transition.

To determine the GCP's potential impact, the study applies quantitative and qualitative methods to model a world with a GCP against a scenario in which the GCP does not exist. This has been done through the lens of four high impact sectors based on their combined material footprint; manufacturing, transportation, construction and agriculture. For the quantitative impact analysis, this study used a subset of interventions from the CGR® macro-economy model, where the business transformation resulting from the GCP is expected to have most influence.

In addition, a business 'Circularity Maturity Framework' was developed to further assess business' circular maturity and the impact of increasing maturity levels on business benefits. This maturity framework provides a simplified approach to conceptualizing circular maturity levels across three pillars (breadth of circular strategies applied, scale of the circular practices, and the organizational boundaries of the circular practices). The maturity model was also used to determine the potential accelerated impact of the GCP on the circularity transition.

As the GCP is still under development, the analysis relies on several assumptions, which were first identified from a literature review building on evidence from other voluntary protocols, like the GHG protocol. These were then developed in consultation with over 75 members of the GCP Technical Working Group, members of the Business Committee, the Policy Committee and the Independent Scientific Advisory Committee, all of whom are active in circularity.

The evidence finds that the GCP could play a foundational role in doubling the rate at which circular maturity develops within business. For example, the adoption of circular business models could reach a level in 2035 that would otherwise not be expected until 2046. This relies on behavioral and operational change within business, and the ecosystem change to support this including the right policy and regulatory frameworks, financial instruments, such as financial incentives, access to public and private capital and ultimately a consumer behavior shift. To maximize its impact, GCP adoption should be prioritized in sectors with high material footprint and high potential for global value chain influence.

Assuming the required transformation of business practices and policy measures occur, this study projects some of the following long-term benefits of this accelerated circularity transition attributable to the GCP.

These benefits are additional to a "no GCP scenario" circular transition, in the selected subset of interventions:

- **Additional reduction of material consumption by 4% to 5% per year** between 2026 to 2050 by accelerating the decoupling of economic activity from resource use. Additional cumulative material savings in this period are 100 to 120 billion tons and are equivalent to the amount of material consumed currently per year.
- **Additional reduction of GHG emissions between 6% to 7% over the period 2026-2050** equivalent to 67 to 76 gigatons of cumulative CO_2eq savings, between 2026 and 2050. In comparison, this is between 1.3 and 1.5 times annual global emissions. This is equal to 12 times the annual emissions of the US or 5 times the annual emissions China.[v]
- **Additional decrease of air pollution (PM2.5), on average by 11% to 12% per year,** between 2026 and 2050, and an additional **reduction in arable land occupation** on average by 1 to 2% per year over the same period.

These figures highlight the additional benefits that high-impact sectors could achieve sooner by adopting the GCP and enhancing their circular maturity, rather than the full benefits that a circular economy could bring.

While large scale quantitative modelling exists to understand the impact of circularity on environmental indicators, research at the business level is more fragmented and varied. This study used literature reviews, primary source surveys and interviews to analyze the GCP's impact of business' circular maturity. This qualitative analysis finds the GCP has the potential to provide crosscutting benefits, across several areas, including but not limited to:

- **Finance:** Unlock capital by giving investors transparency to compare businesses and industries, in doing so de-risk those investments.
- **Corporate:** Reduce regulatory reporting risks by facilitating better measurement of material use, more informed allocation of resources to gain competitive advantage, and improving the focus of skill development within organizations and across the value chain.
- **Value Chain:** Improve analytics from enhanced data to optimize supply chains and reduce cost. Harmonize and advance supply chain transparency to reduce risk and increase supply chain resilience, benchmark suppliers, and simplify the response to increasing consumer and regulatory requirements for product environmental information.
- **Environmental:** Achieve business goals on climate, biodiversity, and reduction of waste, water usage and pollution by increasing circular maturity.
- **Social:** Provide a unique opportunity to embed social considerations into business decisions around circularity, enabling a range of broader social benefits to be maximized, from health and well-being to job creation.

As the GCP continues to develop, this report will be part of a broader set of research and activities. However, even in its infancy, the GCP shows immense potential to transform current business linear practices, increase consumer and investors' confidence in circular products and business models, and accelerate the path towards nature positive, social equity and climate change mitigation goals, such as "net-zero". Finally, it sheds light on a just and regenerative pathway in which successful business models are circular by design.

[v] Climate Watch (2022). Historical emissions. Washington, DC: World Resources Institute (WRI). Note that the total GHG emissions excluding land use change and forestry (LUCF) for China and the United States in 2021 were used. Respectively these are 13,348 MtCO2e and 5,782 MtCO2e in 2021. Retrieved from: https://www.climatewatchdata.org/data-explorer/historical-emissions?historical-emissions-data-sources=climate-watch&historical-emissions-gases=all-ghg&historical-emissions-regions=All%20Selected&historical-emissions-sectors=total-excluding-lucf&page=1#data

Introduction

The Global Circularity Protocol for Business (GCP) is a new global initiative spearheaded by the World Business Council for Sustainable Development (WBCSD), in collaboration with The One Planet Network (OPN), hosted by the United Nations Environment Programme (UNEP). By 2026, the Global Circularity Protocol for Business will be the go-to action framework to guide companies in target-setting, measuring, reporting and showing progress on resource efficiency and circularity, combined with comprehensive and targeted policy guidance to accelerate the shift toward circular business models and a regenerative economy. The GCP's will cover resource[vi] flows in both the techno-sphere and the biosphere.

The development of the GCP takes place across four workstreams[vii]:

1. Circular Transition Impact Analysis
    a. Landscape analysis of circularity-related Corporate Performance & Accountability (CP&A), policies and regulations
    b. ***Impact analysis of the GCP on Climate, Nature and Social Equity goals, as well as business and value chain performance***
    c. *Global Circularity Protocol design principles*
    d. *Risk and Opportunity Assessment*
2. Corporate Performance and Accountability System (CP&A) for Circularity
3. Policy Framework for Circularity
4. Science-informed Target Setting for Circularity

Building on the Global Circularity Protocol for Business landscape analysis,[1] this study focuses on exploring the potential impact of the GCP *on accelerating the circular transition, and therefore realizing benefits from a circular economy sooner*. The report sets out how the GCP could drive impact on climate, nature, social equity, and circular business value, and highlights the ways in which the GCP's potential can be maximized alongside potential risks. Underpinning this research is the assumption that the success of the GCP will be contingent on widespread adoption,[viii] subsequent policy change to enable a supportive operating environment for circular business models, and a resultant increase in businesses' circular maturity over time.

This study has two key objectives:

1. Explore and validate the underlying **impact** the GCP could have on the **financial and environmental performance of business in four high impact value chains.**
2. Estimate the potential impact of the GCP to accelerate circularity on **a global level, as well as on achieving climate, nature and social goals.**

Methodology

The impact analysis was conducted using a combination of modelling, literature review and analysis, and stakeholder consultations, as follows:

- **Modelling**: The macro impact analysis compares scenarios in four high impact sectors, in which the GCP exists with faster and slower adoption rates and maturity progression against one in which it does not. This analysis is based on the existing macro-economy model developed by Circle Economy Foundation. This model is based on the Multi-region Input-Output (MRIO) model EXIOBASE,[2] developed by harmonizing and detailing supply-use tables for many countries, estimating emissions and resource extraction by industry. The figures in this report are indicative and limited by the research's scope. They reflect a scenario where all

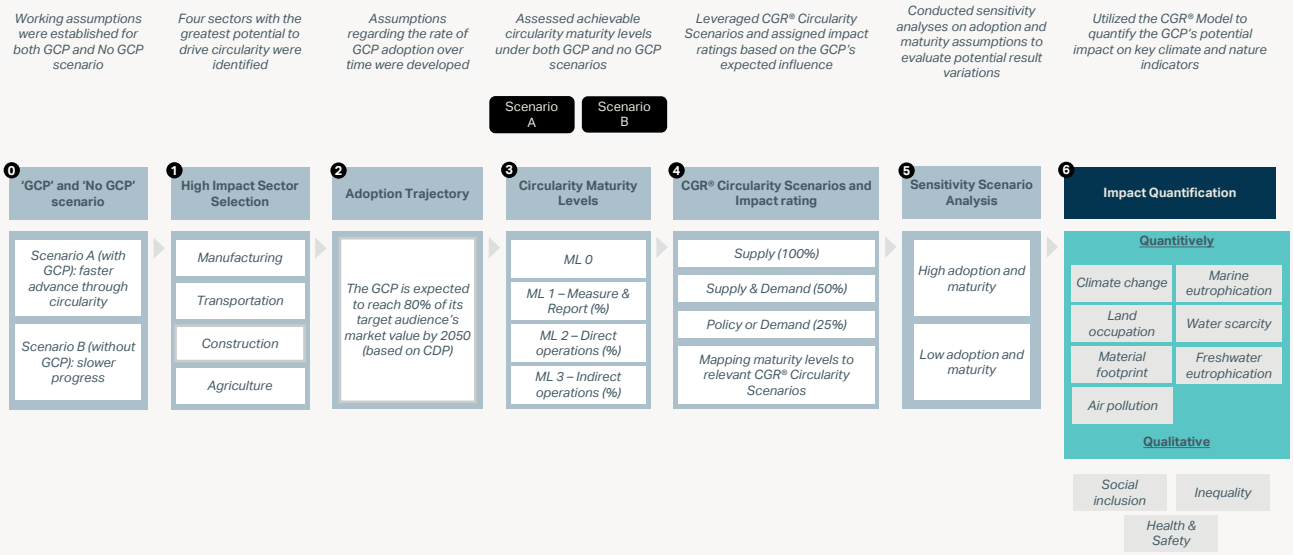
[vi] Resources include land, energy, water and materials.

[vii] For more detailed information on each of the workstreams visit the GCP website.

[viii] For this report, widespread adoption is considered to be adoption by companies representing, in 2050, at least 50% of the global market share of the four selected high impact sectors.

Figure 1. **Approach used to estimate the acceleration impact GCP can have on the transformation toward circularity on a global scale.**

Source: Authors of this report



underpinning assumptions and dependencies are true, including a GCP-enabled operating environment[ix] that supports businesses in developing their circular maturity. Figure 1 shows an overview of the step-by-step approach followed in the modelling. Please refer to *Annex A | Modelling Methodology* for further details on the methodology, assumptions and limitations of the study. This modeling was used for a variety of resource, climate and nature indicators. Social indicators were not part of this quantitative model.

- **Literature review**: Comprised over 110 sources including scientific papers and circularity reports, from 5 continents and published until July 2024. This literature review focused primarily on contextualizing the GCP, surfacing potential social indicators related to the just and equitable transition, and assessing the business performance benefits.
- **Stakeholder consultations and survey**: A survey was circulated amongst the members of the GCP Technical Working Group (TWG) to further inform the analysis. The survey was completed by 23 TWG member organizations, primarily representing large companies (>250 employees and >US$1 billion revenue) with headquarters in the Global North and existing circular economy strategies.
  The respondent group included 13 business representatives, alongside 8 multilateral organizations and scientific voices. The findings were discussed and collaboratively reviewed with the TWG, who provided input and guidance. The TWG consists of 60+ members representing 36 organizations from Global North and South, across academia, policy, businesses and civil society organizations.
- **Interviews:** Three case study interviews took place with businesses active in the selected high impact sectors to understand their circularity initiatives, strategies and challenges. Additionally, six interviews were carried out with global subject matter experts. These were used to surface challenges to developing, implementing and scaling circular business models, understanding and validating the maturity framework, and challenging and testing the approach and results.
- **Review and validation**: Finally, the results of this impact analysis were reviewed and validated by the GCP Business, Policy, and Independent Scientific Advisory Committees.

[ix] For example, this includes a policy, regulation and incentive landscape that promotes circularity.

The research for this impact analysis was carried out between May and August 2024. Given the evolving nature of scientific research and data sources, the work may be updated in the future, as the transition to a circular economy is progressing and more data sources become available.

Report structure

This report is structured as follows:

- **Chapter 1** provides the definition of the GCP and the overarching assumptions that were used to support this impact analysis.
- **Chapter 2** seeks to understand how the GCP could impact business performance, through an analysis of four specific value chains.
- **Chapter 3** explores the potential impact of a GCP at a global scale, with quantitative analysis of the impact of the GCP on accelerating the transition to a circular economy, climate and nature, supported by qualitative analysis of the impact of the GCP on accelerating a just and equitable transition.

1 Defining, contextualizing and assessing the GCP

1 Defining, contextualizing and assessing the GCP

The adoption of circular business models is critical to achieving social, economic and environmental sustainability goals. Reports such as the Global Resource Outlook[3] (GRO) and the Circularity Gap Report[4] (CGR) underscore the importance of circularity for society to thrive in the long term, as well as regenerate our ecosystems and preserve biodiversity. With ambitious corporate commitments to decarbonize our economy, circularity practices are an essential solution for businesses to achieve their sustainability and performance goals synergistically. Next to environmental benefits resulting from reduction of waste and extraction, circular business models provide a way to mitigate increasing risks and price volatility across supply chains, maintain operations amidst unforeseen disruptions, foster resilience in an interconnected world,[5] and unlock a tremendous business value, potentially worth trillions of dollars[6] for the global economy.

However, total material consumption surged by over 65% during the past two decades, now exceeding 100 billion tons per year. In effect, material consumption is outpacing circular activities.[7,8] As the demand for raw materials grows, it is essential that circularity matures at an equal or greater pace, so businesses can decouple growth from finite supply of primary resources. This is not straight forward. To advance business circularity, circularity at a value chain or ecosystem level must also mature simultaneously.

Section 1.1: Positioning the GCP

With emerging evidence to support the circularity business case, the GCP can be a critical instrument to steer businesses to adopt, scale and most importantly measure the impact of circular practices in a uniform and comparable way. The GCP focuses on businesses, as most of the environmental and social impacts are generated within the scope of business operations, they have a critical role in achieving commercial targets, as well as social and environmental goals.[9,10]

*The GCP's overall objective is to **enable an accelerated transition to a circular economy**, with inherent positive impact on climate, nature, the social equity agenda, and resource scarcity through supporting businesses in increasing their circular maturity, and provide insights and recommendations for policymakers.*

Against this background, this research assesses the impact the GCP could have in driving improvements in circular business performance and global sustainability outcomes. To begin quantifying the impact of the GCP, it was necessary to establish assumptions regarding its objectives, definitions, and other key elements. These were developed and agreed with the Technical Working Group (TWG) to use as a basis for this study. With these assumptions, this study sets out to explore the potential impact of the GCP on both a global scale (quantitative and qualitative macro analysis) and on a value chain level (qualitative assessment in the four high impact sectors).

It is important to note that the GCP is a protocol in development, with the aim of a first iteration becoming available in late 2025. As some characteristics are likely to evolve, the descriptions in this chapter should be considered preliminary and understood as working assumptions for the study. Additionally, this study assumes that the GCP, on its own, will not be successful in enabling an accelerated transition to circularity. The systemic transition to a circular economy (CE) is complex and requires a variety of levers, predominately policy, but also business, consumer behavior, innovation, and development.

This chapter further details the learnings surfaced from exploring the content and success of other protocols and standards, then providing a working definition and context for the GCP.

Section 1.2: Learning from other protocols' effectiveness and impact

To understand the acceleration and impact potential of the GCP, this research considered the impact of other voluntary protocols, treaties and reporting standards, and the direct and indirect results stemming from their adoption. While the scope of the GCP is broader than other protocols, including the Greenhouse Gas (GHG) protocol, there is limited large scale evidence to be drawn upon on the impact of voluntary environmental protocols, especially quantitative evidence. We established important insights that frame the findings in this study.

Firstly, research on reporting – a crucial aspect of voluntary protocols – revealed that it is influenced by various factors, including internal organizational characteristics, societal and stakeholder pressures, government and regulatory demands, ecosystem development and expected returns.[11] According to the research, adopting a voluntary protocol can influence direct change in behavior and operations. This could then enable business to contribute to the overall goal of the protocol.

This suggests that the impact of GCP adoption could be positive in directly changing business behaviors and operations. For example, the adoption of voluntary carbon reporting and accounting standards, including performance measurement and targets, is associated with improved carbon mitigation by organizations.[12,13,14] This impact is also related to, for example, the implementation of proactive carbon strategies, fostering behavioral change through value chain engagement and the implementation of reduction initiatives.[15] While preliminary research points to these high-level results, there are limited studies conducted that quantify this exact impact, especially on a regional or global scale. We also note that to achieve the behavioral and operational changes needed within business, a supportive operating environment is required, where, for example, (financial and business) incentives are aligned to the desired change. We define a supportive operating environment as being the range of policy, financial, regulatory and other measures that will enable the growth of circularity and are dependent upon a GCP. Parallels can be drawn with how the operating environment has developed since the launch of the GHG protocol.

> *For the GCP to achieve its potential impact, it is **critical that a supportive operating environment for circular business models is created**, which necessitates policy change among other factors. The insights from the protocol's voluntary disclosures, alongside clear and actionable guidance for policymakers, could provide the foundation for this wider change.*

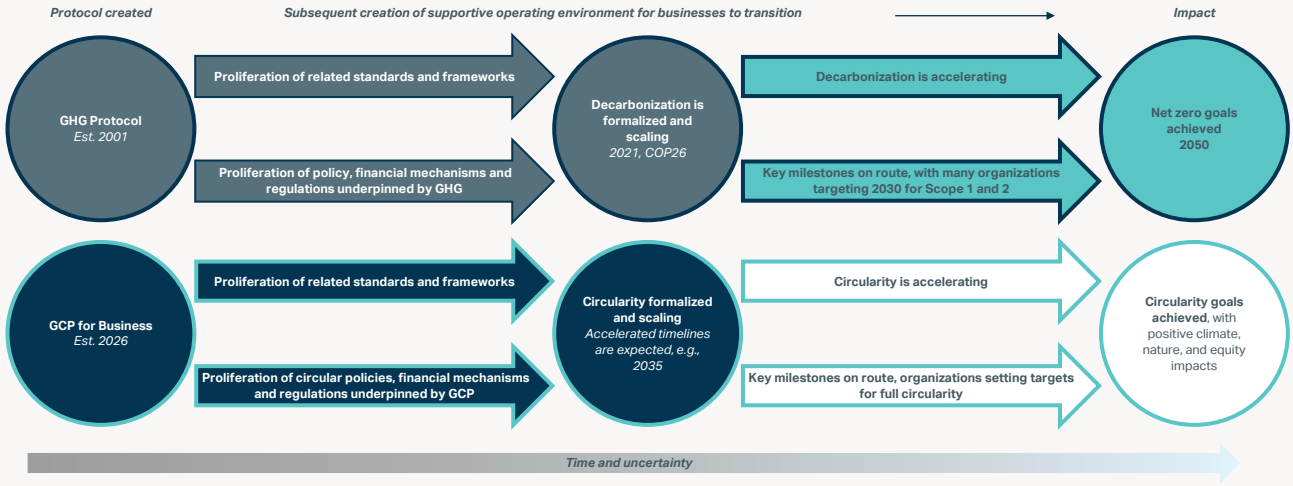
Indirect results stem from policymakers formalizing a protocol's targets in regulations, *enforcing companies to change their behavior and operations*. One of the most successful environmental treaties is the Montreal Protocol, aimed at phasing out the production and consumption of ozone-depleting substances (ODS). The protocol was ratified by 197 countries and as a result, the production and consumption of ODS have been reduced by over 98% compared to 1990 levels.[16] As the Montreal Protocol is a legally binding treaty it cannot be directly compared to the voluntary GHG Protocol, but some parallels can be drawn.

The assertion that a protocol may result in subsequent regulatory change by policymakers can also be drawn from the GHG Protocol, a closer relation to the GCP. Since its inception in 1998, the GHG Protocol has significantly influenced policy on emissions by providing standardized frameworks and methodologies that have been adopted and integrated into various regulations and legislations, e.g., the European Union's Emissions Trading System, the Green Deal legislation, and the Corporate Sustainability Reporting Directive (CSRD). This requires companies to report on their emissions and set targets for reductions. The GHG protocol was developed at a time when limited legislation on emissions existed. In the case of circularity, the landscape is different and potentially more advanced, with over 70 national circular roadmaps and strategies existing to date.[17] Figure 2 illustrates the steps between a protocol being created, the subsequent proliferation of changes from policymakers, and the resultant impact.

There are significant risks that the GCP will not achieve its desired impact without this wider change. Research on other voluntary disclosure mechanisms in other subject areas revealed some had mixed results, which could apply to GCP and its impact. One example, albeit in the context of consumer behavior, is for financial product disclosures where the financial services regulator

Figure 2. **Logic chain hypothesizing how the GCP could result in impact, based on GHG insights.**

Source: Authors of this report



in the UK (the Financial Conduct Authority) found cases where disclosures had occurred or changed but there was no evidence as to their effectiveness.[18] Another example is mandatory gender pay gap reporting in the UK which was found to have an, at best, modest impact on the pay gap.[19]

The maturity and implementation of policy frameworks supporting the circular economy transition remains a known unknown in shaping this research. Nevertheless, it is clear that emerging and developing policy can be strengthened by a GCP, and the GCP's impact is dependent on national and regional policy development and implementation. Underpinning the findings in this study is the critical assumption that this policy making will occur and result in a supportive operating environment for circular business models.

Combined with the insights from the landscape analysis,[20] and based on this overarching research, for this study, the following definition of a protocol is applied:

> *A protocol is a standardized **set of guidelines, rules**, or **methodologies** that define how specific market-related activities should be conducted. Protocols are **essential** in ensuring **consistency, transparency**, and **accountability**. They also serve as frameworks that enable participants to **measure, report,** and **verify** (MRV), thereby facilitating compliance, communication, and benchmarking.*

Section 1.3: Contextualizing the GCP

Further research into the business ecosystem was necessary to build on the definition of a protocol and to contextualize the GCP with its objective to accelerate the CE transition. Therefore, this research looked at overarching challenges to achieving circularity (Table 1) while the insights were based on the GCP Landscape Analysis,[21] the circularity challenges highlighted by a variety of companies, and the value chain analyses in four selected high impact sectors elaborated on in Chapter 2 of this report. The four high impact sectors were manufacturing, transportation, construction, and agriculture, and follow the International Standard Industrial Classification (ISIC) classification.[22] The sectors were selected based on their high environmental footprint and resource-intensive production practices, combined representing around 85% of global material consumption.[23] Within each sector one value chain was selected (electronics, automotive, concrete and agrifood) for further detail, see Chapter 2 and *Annex B | Detail of value chain analysis*.

The research focused on identifying challenges that the GCP is expected to help alleviate, which was used to inform the protocol's potential main elements. While overarching challenges are shown in Table 1, this is a non-exhaustive and non-weighted list.

To define the GCP in further detail, this research explored comparable protocols to identify common elements. In addition to the landscape analysis insights and the challenges noted in Table 1, five potential elements for the GCP were identified. Each element has associated benefits for business that could enable an accelerated transition to circularity.

These are further discussed as part of the business level analysis in Chapter 2.4. The GCP should consider the following elements:

i. Contain metrics, guidance, and target-setting;
ii. Provide clarity, allow for interoperability and standardization;
iii. Prioritize data requirements and provide digitalization guidance;
iv. Encompass the entire lifecycle of products; and
v. Incorporate policy guidance.

These will be further explored and refined in the next phase of work: Global Circularity Protocol Design principles (Workstream 1C in the GCP development).

Table 1. **An indicative and non-exhaustive list of the main sectoral and value chain circular economy challenges in manufacturing (electronics), transportation (automotive), construction (concrete) and agriculture (agrifood).**

Overview of main circular economy challenges in manufacturing, transport, construction and agriculture[151]				
Materials used, product and service design	Collaboration	Market and demand	Metrics, valuation, and financing	Policy and regulatory limitations
Use of **low-quality**, **non-durable materials** and **complex** designs limit repair, reuse, disassembly and recycling across sectors.[152,153]	Necessary for sector innovation and closing loops (e.g., reverse logistics), yet challenges persist such as **aligning on a common vision** and agreeing on **value distribution.[154]**	A linear economy mind-set, **low demand** for **reuse** and **under-developed markets** for recycled materials hinder availability of circular materials and reaching **economies of scale.**	The lack of globally **consistent** and **comparable metrics** and **valuation** models for circular businesses, inhibit adoption of circular practices.[155,156]	Weak or complex policies, lacking incentives, and under-investment in reuse and recycling infrastructure limit CE efforts and create (economic) barriers in all sectors.[157,158]
Sector or value chain insights				
• **Limited adoption of bio-based** and **regenerative materials[159]** contributes to resource depletion and environmental degradation. • Circularity potential is hindered by design requirements or choices that can lead to, for example, early obsolescence.[160] • Non-modular designs **inhibit material recovery.** • Long lifecycles make it difficult to plan for future reuse, repurpose and remanufacture.	• Value chains often transcend borders hindering collaboration, particularly for **second- life products or waste streams.** • **Complex** and geographically dispersed value chains, e.g., in manufacturing and automotive, pose challenges for **innovation** and **standardization.[161]** • Despite the interconnectedness of value chains, **identifying the right partners** on the ground in various geographies and **sharing relevant knowledge** remains a challenge.[162]	• **Customer perceptions** often **devalue** recycled materials or reused products, expecting lower prices, impacting market viability across sectors. • A **shift from buy-use-discard to resource maximization** is needed both in business-to-business and business-to-consumer. • Perceived **high initial investments** with uncertain demand can discourage uptake of circular business models.[163] • Developing markets for e.g., alternative food,[164] materials or business models is difficult due to **entrenched consumer preferences**, government policies, and **instilled interests** of established linear businesses.	• **Standardizing** metrics is difficult across sectors, **creating disparities and hindering broad adoption.[165]** This creates an **unlevel playing field.** • The lack of quality data limits insights on where to focus to maximize positive impact.[166] • Construction and agri-food face challenges in creating **financial structures** that recognize the **long-term benefits of circular practices**, which are often undervalued in traditional financial assessments.	• **Inconsistent policies** and a lack of cross-regional standardization create barriers to implementing global CE practices.[167] • **Regulations,** like right-to-repair and Extended Producer Responsibility (EPR), that drive circularity,[168,169] **are often misaligned globally**, complicating efforts on international value-chains. • **Incentives and infrastructure** for material recovery and reuse **are insufficient** in many regions (particularly in those with significant agriculture and manufacturing activities).

2

The potential impact of the GCP at a business level

2 The pontential impact of the GCP at a business level

Section 2.1: Introduction

After defining and contextualizing the GCP, this study explored the impact of the GCP on business. While large scale quantitative modelling exists to understand the impact of circularity on environmental indicators, research at the business level is more fragmented and varied. Using literature and primary source surveys and interviews, this chapter explores the impact of circularity at the business level alongside the impact of the GCP on accelerating circular maturity. As previously indicated, the high-impact sectors (and value chains) explored were manufacturing (electronics), transportation (automotive), construction (concrete), and agriculture (agrifood). See Annex B for the deep dives in these high impact sectors and their corresponding value chains.

Although not new, circularity is still an emerging area and there are limited globally scaled circular businesses to study and learn from. Despite this and other data related limitations, this study found that when implemented correctly, circular solutions can aid in surfacing long-term performance and resilience benefits, including financial, environmental, material, and reputational gains. However, to unlock some of the most significant benefits, businesses need to increase their own circular maturity, alongside that of the ecosystem in which they operate.

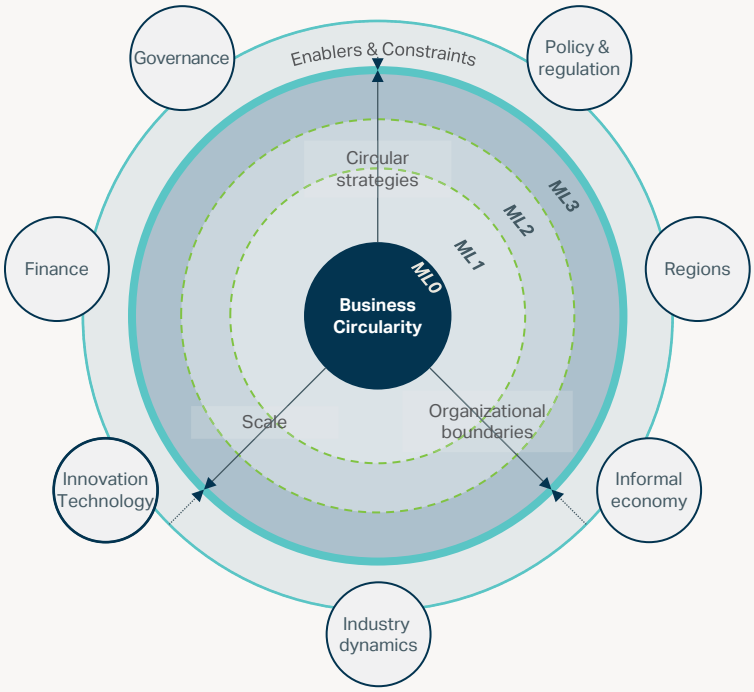
> *"No company would likely be able to become fully circular and regenerative without a circular and regenerative system around it that includes its supply chain, infrastructure, consumer behavior changes and policy interventions." (TWG Survey, 2024)*[24]

The faster circular maturity advances, the more business value is created. Against this background, this chapter investigates:

- **Section 2.2**: The different levels of circular maturity for business;
- **Section 2.3**: The business benefits of circularity;
- **Section 2.4:** The catalyzing impact of GCP adoption on business maturity.

Figure 3. **Conceptual Circular Maturity Framework.**

Source: authors of this report.



Section 2.2: The different levels of circular maturity for business

Maximizing material value and decoupling business growth from material consumption requires businesses to fundamentally transform business models, optimizing operations and resource use, as well as innovating products or service(s) design. When measuring the effectiveness of circular interventions, it is important to consider that the circular transition is rarely sequential and will vary across organizations.

To further assess business' circular maturity, this study utilizes a 'Circularity Maturity Framework' aimed at providing a simplified approach to conceptualizing the stages of circular maturity. It also overlays a non-exhaustive indication of potential business benefits across the stages of increasing maturity. (See Annex A | Modelling Methodology for more details on the framework.) As outlined in Table 2, the framework is grounded in three pillars (breadth of circular strategies applied, scale of the circular practices, and the organizational boundaries of the circular practices) to measure the circular maturity level (ML) that contribute to the business benefits realized when increasing maturity.

Table 2. **The three pillars are used for conceptually assessing circular maturity.**

Circular strategies	Scale	Organizational boundaries
The extent to which a business is adopting circular initiatives across **CE principles** (narrow, slow, close and regenerate) and further along **the 9R framework (**R-ladder with the hierarchy of circular practices**)**.[170,171]	**The volume** at which a business is applying circular principles and circular design to their products, services and business units.	The extent to which a business is applying circular practices externally, in the **wider value chain**.
More mature businesses will have a greater ability to capitalize on increased circularity through new business models by decoupling economic activity from resource consumption, benefiting from new income streams by offering new innovative products and services. **Less mature** businesses will see some benefits, including initial supply resilience and reduced GHG emissions, but will be unable to reduce costs or exploit new business opportunities to the same extent.	**More mature** businesses will achieve greater economies of scale and allow circular products to become more financially viable. Over time, large scale roll out of circular products or adoption of circular business models could is likely to provide a competitive advantage and allow businesses to promote their product's sustainability credentials, which may in turn; potentially translating into to a growth in total market share. **Less mature** businesses will not benefit from economies of scale, although in certain pockets of their portfolio financial benefits may already be evident.	**More mature** businesses will gain enhanced value from applying circularity across their entire value chain. For example; • greater technology access; • procurement of more sustainable materials; • more intimate customer relationships; and • optimized end-of-life pathways. **Less mature** businesses may not be able to capitalize on these benefits, limiting the circularity credentials of their products or services.

To some extent, businesses can increase the maturity of the three pillars independently, however the pillars can also be interdependent. For example, a business that is part of a complex global value chain would struggle to advance on the R-ladder[25] (a hierarchy of waste and circular practices) or scale circular strategies without involving external stakeholders and partners. Business, sectoral and value chain differences also entail that some businesses may only address a part of the value chain (e.g., design or reverse logistics) while others address more comprehensively from upstream to downstream.

The emerging effect of these pillars, in combination with wider contextual considerations, results in four different and increasing maturity levels, which are summarized as follows:

- **Maturity Level 0:** Businesses not active in the circular economy (CE).
- **Maturity Level 1 (Measure and Report) - Transparent businesses:** Businesses reporting on CE performance but not (yet) having undertaken any significant changes in products, services, business or value chain.

- **Maturity Level 2 (Direct Operations) - Businesses with improved operations:** Businesses reporting on CE and implementing some circular solutions and practices in their own business operations (e.g., design, procurement, waste management, etc.).
- **Maturity Level 3 (Indirect Operations) - Businesses participating in systemic change**[x]**:** Businesses operating at ML2 *and* implementing and influencing significant changes in their own operations and the wider value chain or sector (e.g., similar to influencing Scope 3), requiring the involvement of multiple actors across the value chain or market.

As illustrated in the Circular Maturity Framework, it is also important to consider the enablers (or constraints) of circular maturity. Put simply, for businesses to consistently progress through the different maturity levels, a supportive operating environment for circular business models is required. This is covered in Section 2.4 in further detail.

Section 2.3: Unlocking business benefits of circularity

As the circular transition accelerates and different ecosystem stakeholders become more familiar with new circular processes, products, services and offerings, businesses are expected to evolve and benefit:

- In the short term, the business transformation necessary to increase circularity may require upfront investment and is unlikely to lead to revenue generation. It will require policy change, new incentives, additional time and resources, and value-chain collaboration at its core, all of which require some level of upfront investment.[26,27,28]
- As companies move from **Maturity Level 0** (not active in the circular economy) to **Maturity Level 1**, starting to measure and report is expected to have some initial behavioral impact, however it does not per se translate into circular business action.
- In the medium term, as companies move from **Maturity Level 1** (Measure and Report) to **Maturity Level 2** (Direct Operations), the implementation of circular systems will increase, and this will impact actors upstream and downstream in the value chain. Upstream supply of circular materials and products (including refurbishment, repair and reuse) will need to grow with demand and downstream customers start to become familiar with new circular products, services and offerings. Revenue and costs will start to balance as material efficiencies emerge and circular revenues grow.
- In the long term, once circular business models are fully established and scaled across the value chain, **Maturity Level 3** (Indirect Operations) can be achieved. Here, full circular business performance could start to materialize through achieving economies of scale and stabilized revenue streams, for example from as-a-service models. This will maximize material efficiency and decoupling, leading to the environmental and social benefits described in Chapter 3.

A summary of insights from value chain analysis are shown in Table 3, outlining the business performance per maturity level. This is a non-exhaustive and non-weighted list.

[x] Some businesses such as platforms, consultants, assurers and certifiers provide services to enabling other businesses to promote and implement circular economy activities. These businesses place more importance on and may start with the highest maturity level given their engagement with a wide(r) ecosystem.

Table 3. **Business circularity progression across maturity levels; complemented with insights from TWG and business cases. Non-exhaustive.**

	ML 1 Measure & report	ML 2 Direct operations	ML3 Indirect operations	Case Studies TWG
Circular Revenue	○ Acknowledging the existence of possible circular offerings and foster strategic thinking to identify potential opportunities to generate revenue through circular business models.	◔ Initial investments in circular models, like take-back schemes in electronics and automotive, may outpace revenue gains. As circular models stabilize, revenue streams are expected to increase.	◕ Established circular models expected to lead to stable revenue from services and product reuse, evident in mature product-as-a-service (PaaS) models.	Companies are increasingly using circular revenues as one of their key metrics, tracking the growth in circular business models. For instance, in 2023, **Koninklijke Philips N.V.** reported 20% circular revenues.[29]
Operational cost reduction	○ Create awareness of areas where circular practices could reduce costs, enabling businesses to target improvement efforts.	○ Upfront investments are usually needed to build circular systems, especially for as-a-service models, or if established products require extensive R&D and piloting. ◑ Business models utilizing byproducts or increasing utilization of existing assets bases, are expected to have lower or competitive operational costs sooner. Longer term, total cost of ownership is expected to decrease. Material efficiency and waste minimization start to lower operational costs.	◕ As circular revenues scale, and the supply chain secondary resources or take-bake is established, economies of scale and efficiencies significantly reduce costs and mitigate supply risks of secondary material and recycled content.[30,31] Dematerialization and business models based on sharing economy can be fully achieved.	Tools like dashboards help quantify reclaimed materials and material use, helping target cost efficiencies. Cost reductions are achieved through material efficiency and waste minimization, as seen with **Holcim Ltd.'s** use of recycled materials.[32]
Customer sentiment	◔ Start engaging with customers to understand perceptions and preferences related to circular products /services provides insights into market demand, including perception of costs. Transparency can already increase customer intimacy.	◑ As-a-service models or refurbished products can unlock new target markets and compete with linear business ones, resulting in increased brand value.[33]	◕ Businesses start to witness benefit of innovative business models, increased customer loyalty is driven by sustainable offerings, sharing economy and PaaS models.[35]	By promoting circularity, companies appeal to more customers. Top sustainability strategies that healthcare leaders plan to implement in the next 3 years are sustainable procurement including circular equipment (41%) and prioritize reusable medical equipment and supplies (40%).[35]
GHG emissions reduction	○ Establishing a baseline of emissions across direct operations and the value chain, combined with material flows, helps to pinpoint hotspots where reduction is possible and necessary.	◔ Initial GHG emissions reductions are modest as circular solutions have not yet scaled. As it matures noticeable carbon footprint reductions from resource efficiency can be observed	◕ Significant GHG emissions reduction as circular strategies reach scale and resource use is maximized, reducing the dependency on (virgin) raw materials.[36,37]	Annual reporting on total environmental footprint, including CO2 emissions across scopes 1, 2, and 3, helps address GHG emissions reduction.
Decoupling	○ Gain insights into key materials flows and potential risks & opportunities. Acknowledging the possibility for secondary material and product supply, as well as the future need for the implementation of circular designs.	◑ Moderate decoupling as availability of non-virgin and circular materials increases and partial adoption of circular designs, and actions such as reusing, reducing, and repairing. ◕ Business models focused on resell and refurbishment can see decoupling occurring sooner.	● Substantial and absolute decoupling with reduced reliance on virgin resources, reinforced by sectors like agriculture and construction. Consistent implementation of circular designs and solutions including redesigning for reduced material use and reverse logistics.	Efforts to decouple from virgin materials include increasing the use of reclaimed materials and by products. For example, Holcim Ltd.'s ECOCycle products contain at least 10% recycled content, contributing to resource efficiency and reduced reliance on virgin resources.[39]

○ No or negative impact ◔ Low impact ◑ Medium impact ◕ High impact ● Absolute impact

Section 2.4: The GCP as a catalyst for circular maturity

Progressing through the levels of circular maturity requires a transformation from businesses and the ecosystem in which they operate. The GCP's core goal is to deliver business benefit by supporting faster progression through the circular maturity levels, helping to make a stronger business case for change, for C-suite, boards, investors, regulators and policymakers.

By addressing the value chain challenges discussed in Chapter 1 and accelerating circular maturity as described in 2.3, the GCP could unlock potential based on the elements described in Chapter 1. These elements are mapped to potential business benefits in Table 4. As the design of the GCP matures, these business benefits can be refined and further developed.

Table 4. **Key elements of the GCP with potential benefits to businesses**

GCP elements	Potential benefits for business
i. Contain metrics, guidance, and target-setting	It can help business to simplify reporting and create a common language, enabling: 1. Increased capital to be unlocked by providing investors with standardized metrics and targets to compare like-for-like performance, and properly value circular business models, to understand and make relevant decisions. This will "...give investors…transparency to compare with competitors and other industries, and it will help to identify gaps to tackle."[40] Additionally, these benefits can be realized for consumers too, with increased information and informed decision making by consumers, benefitting business; 2. A level playing field to be created, both locally and globally, by informing policymakers; 3. A path for governments to set reasonable targets that businesses can relate to (as with GHG emissions); 4. Reduced regulatory reporting risks by harmonizing concepts and facilitating more complete and consistent measurement of material use and corresponding environmental (including GHG) and social impacts; and 5. Accountability, efficiency and value creation across the value chain. Additionally, targeted sector guidance will allow businesses from specific industries to collaborate and act, similar to sectoral guidance published in other protocols.[41,42]
ii. Provide clarity, allow for interoperability, and standardization	It can help business to make strategic decisions allowing: 1. Reduced risks related to procuring circular materials and services by applying standardizing definitions of terminology (e.g., bio-based, renewable, recyclable, reusable, etc.). The GCP will build on existing standards including ISO 59004;[43] 2. A badge of credibility and practical accounting methodology; 3. Facilitate better value sharing mechanisms across the value chain, which will in turn accelerate circular economy uptake; and 4. Help businesses clarify the impact of their circular strategies on climate, nature, resource scarcity and social equity, thus connecting circularity to their overall ESG commitments.
iii. Prioritize data and digitalization guidance	It can help business to increase data availability and quality to: 1. Reduce the complexity of responding to increasing consumer demand for environmental information and make it easier to communicate the environment aspect of products; 2. Enhance supply chain transparency including among tier 2 and 3 suppliers (and potentially beyond), to reduce the risk of sharing incorrect/incomplete data; and 3. Accelerate the adoption of a data driven approaches to design, as well as improving repair and refurbishment timelines;[44] 4. Better analytics to optimize supply chains to reduce cost, through enhanced data quality; and 5. Reduce the costs and complexity of sharing data through better data sharing platforms.

iv. Encompass the entire lifecycle of products	It can help business, both large and small to: 1. More effectively allocate resources and gain competitive advantage, while meeting the demands of retailers and customers; 2. Understand and optimize the benefit of circularity on decarbonization goals; 3. Apply a resource-centric view fundamental to decoupling, value retention and resource maximization, enabling better product design and 'moves up the R-ladder';[45] 4. Unlock the full value of the product, by understanding and accounting for end-of-life processes and material recovery; 5. Understand their reliance and use of critical materials in the supply chain, reducing risk and increasing supply chain resilience; and 6. Allow for more targeted skill development within organizations and across the value chain, and improved recruitment and retention.
v. Incorporate policy guidance	It can help business by: 1. Allowing governments to better understand business' performance to inform regulatory requirements; 2. Creating a unique opportunity for business to effectively influence future policy direction (e.g., pricing externalities, critical material risk, etc.); 3. Supporting the development of a level playing field for circular businesses and mitigate the constraints in which circular businesses operate; 4. Providing a foundation to harmonize policy guidance to aid in eliminating early obsolescence; 5. Maximize the positive social impact of the systemic transition to a circular economy, particularly focused on job creation, decent work, and addressing global inequality; and 6. Facilitate common approaches and standards for trade of circular products, including for reuse and recoverable and recyclable materials, to lower the cost and to scale circularity across value chains at the global level, addressing the circularity gaps among countries with different capacities and infrastructure.

While aimed at businesses of all sizes, from large corporates to small and medium sized enterprises (SMEs), who can all benefit from increased clarity and guidance, it is expected that metrics, circular interventions etc., from the GCP will vary in applicability for businesses.

Reaching critical mass in terms of adoption of circular business models across a value chain is key for circular business models to deliver their full potential, and for business performance benefits to be acquired, as is characterized by Maturity Level 3. This allows businesses to operate in an ecosystem where circular business models are attainable and commercially viable. Recognizing that attaining this will differ between geographies, as highlighted in the maturity framework constraints and enablers. The GCP will be a global framework, and as such, aims to support businesses worldwide in transforming ecosystems faster, moving beyond isolated circularity efforts toward a systemic circular transition.

Estimating the GCP adoption trajectory and effect on business maturity levels based on CDP

Drawing on the trajectory of previous voluntary protocols and systemic transition models,[46] the adoption of GCP is assumed to follow an S-curve (as conceptually illustrated in Figure 4). This means that as more businesses adopt the GCP and embrace circularity, critical mass would be reached, leading to increased acceleration in adoption. This results in greater potential for behavioral and operational change across value chains.[47]

To estimate the potential adoption rate of the GCP, the historical adoption rates of the GHG protocol via the Carbon Disclosure Project (CDP)[48] and the SBTi[49] were used to inform a GCP adoption trajectory, which follows an established transition adoption theory. See *Annex A | Modelling Methodology* for further detail.

Business should not only adopt the protocol but leverage it to help change their behavior and influence their ecosystem and operating environment to evolve accordingly. This

supportive operating environment is critical to accelerating circularity and its positive climate, nature and social equity impacts and is something the GCP has a unique opportunity to be a cornerstone for.

Reaching the highest level of circular maturity requires a systemic approach encompassing internal alignment across business units, regional subsidiaries, strategic partnerships with key suppliers, and an ecosystem approach. It is also contingent on a series of enablers that were highlighted in the Landscape Analysis *(Annex C | Executive summary of the landscape analysis* for further detail).[50]

***Greater and faster adoption of the Global Circularity Protocol for Business is expected to be a catalyst for advancing circular maturity**, enabling businesses to achieve higher maturity levels, engaging more of their value chain and climbing up the R-ladder, faster than without the GCP.*

To understand the potential enabling impact that the GCP could have on accelerating circular maturity, the study used the share of CDP disclosures and target setting for GHG Scope 2 and 3 as a starting proxy for Circularity Maturity Levels 2 and 3. This was surveyed with a small panel of circularity experts that sit in the TWG were consulted in a survey to generate qualitative and quantitative insights.

Figure 4. **Conceptual adoption profile of circular solutions and business models with GCP.**

Source: Authors of this report

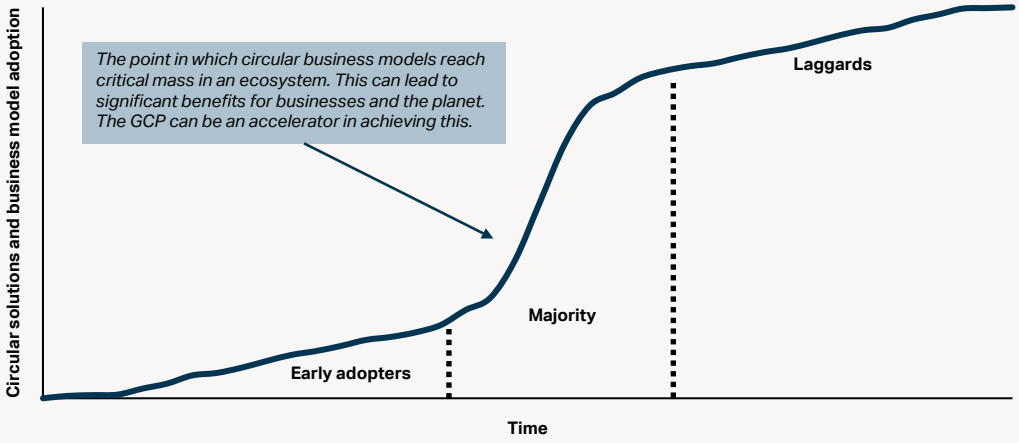
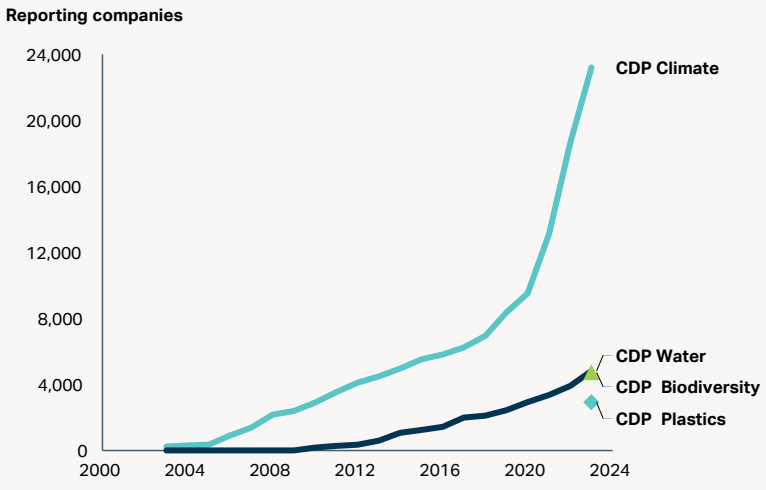


Figure 5. **Overview of companies reporting in the CDP.**

Source: CDP



These steps revealed the GCP's potential to double the pace of business circular maturity growth across each level, from internal business model changes (Maturity Level 2 – Direct Operations) to complex value chain transformations (Maturity Level 3 – Indirect Operations). The model points to the following acceleration:

- Maturity Level 1 to Maturity Level 2: around 5 instead of 12 years
- Maturity Level 2 to Maturity Level 3: around 9 instead of 19 years

Put into the context of the overall impact and its timelines, the findings show that by 2035, GCP has the potential to accelerate the business transition by 11 years, meaning circular business model adoption would be at same level as otherwise achieved by 2044 in a scenario where there was no GCP. Furthermore, the positive impact of GCP has the potential to extend to 2050 and beyond.

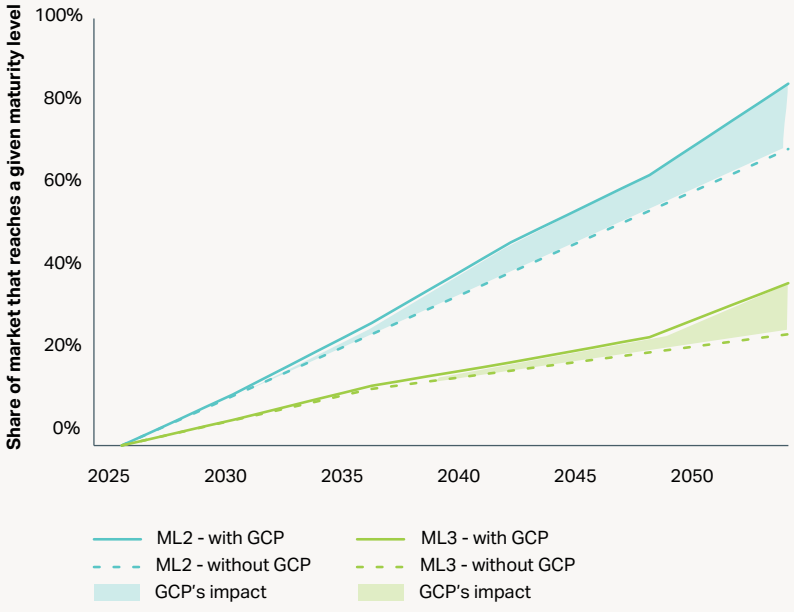
The survey also reveals consensus among experts that business circular maturity rates would be lower without the GCP. Crucially, 40% of the survey participants believed that achieving the highest level of maturity (level 3), which involves effective value chain collaboration, would not be possible without the GCP and/or further policy intervention. Figure 6: *Modelled market penetration of circularity over time across maturity levels, and the resulting impact* shows that the GCP could be a critical enabler in accelerating the transition to a circular economy.

Dependencies for behavioral and operational change

Alongside adoption, the key factor that will enable the GCP to realize its potential impact is understanding how it will influence behavioral and operational change among businesses. This is highly dependent on the environment in which businesses operate. This environment is composed of factors such as policy and regulatory frameworks, financial incentives, investor sentiment, consumer behaviors and access to finance.

Figure 6. **Modelled market penetration of circularity over time across maturity levels, and the resulting impact.**

Source: Authors of this report



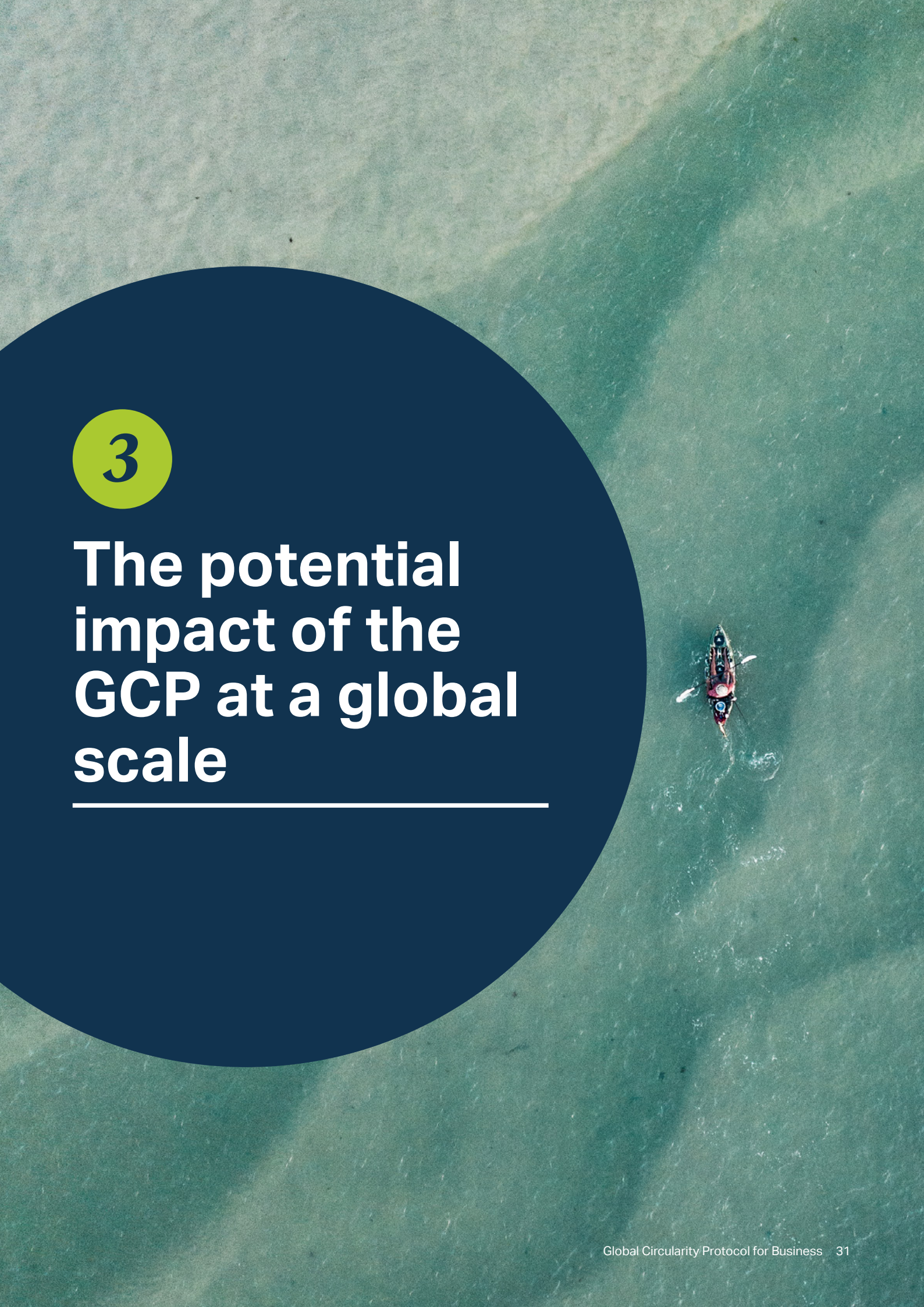
As set out in Section 1.3, the research identified that these factors would need to be supportive of the circular transition for the potential impact of GCP to be realized. For example, without a level playing field, businesses bypassing upfront costs associated with the circular transition can offer lower prices, gaining a competitive advantage. This discourages and disincentivizes the adoption of circular business models. However, if policy mechanisms create a level playing field for circular business models, products and services, the benefits of circularity could better prevail. Over time, circular maturity would increase, eventually reaching critical mass.

Indeed, the most successful protocols have involved subsequent policy and regulatory change, such as the Montreal Protocol which was ratified at a national level. Anecdotal evidence from the TWG survey supports this view: *"We need to at least reach a level playing field between linear and circular business. Consider that today linear business models have the advantage of not carrying the cost of externalities".*[51]

Without a supportive operating environment aligned with achieving circular maturity, the GCP could have limited influence on behavioral and operational change, and thus a limited overall impact. While there are some levers through which the GCP can influence these dependencies, for example through policy guidance, it is important to recognize that these external dependencies will drive the impact the protocol has.

For the purposes of analysis set out in this impact analysis, and its modelling results, it is assumed that the dependencies set out in Table 9 of *Annex A | Modelling Methodology* are supportive of circular business models.

Further considerations toward dependencies can be found in Chapter 4.



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The potential impact of the GCP at a global scale

3 The pontential impact of the GCP at a global scale

Section 3.1: Introduction

Building on the potential for the GCP to accelerate business maturity of circularity, outlined in the previous chapter, this chapter focuses on the potential transformative impact that the GCP, alongside a wider supportive operating environment, can have to accelerate circularity, reduce material consumption, and achieve climate, nature, and social goals. The study focuses on quantifying the impact within four high impact sectors; however, it is assumed that the global impact of the GCP would extend further.

To demonstrate the global impact of the GCP, this analysis is divided into four categories:

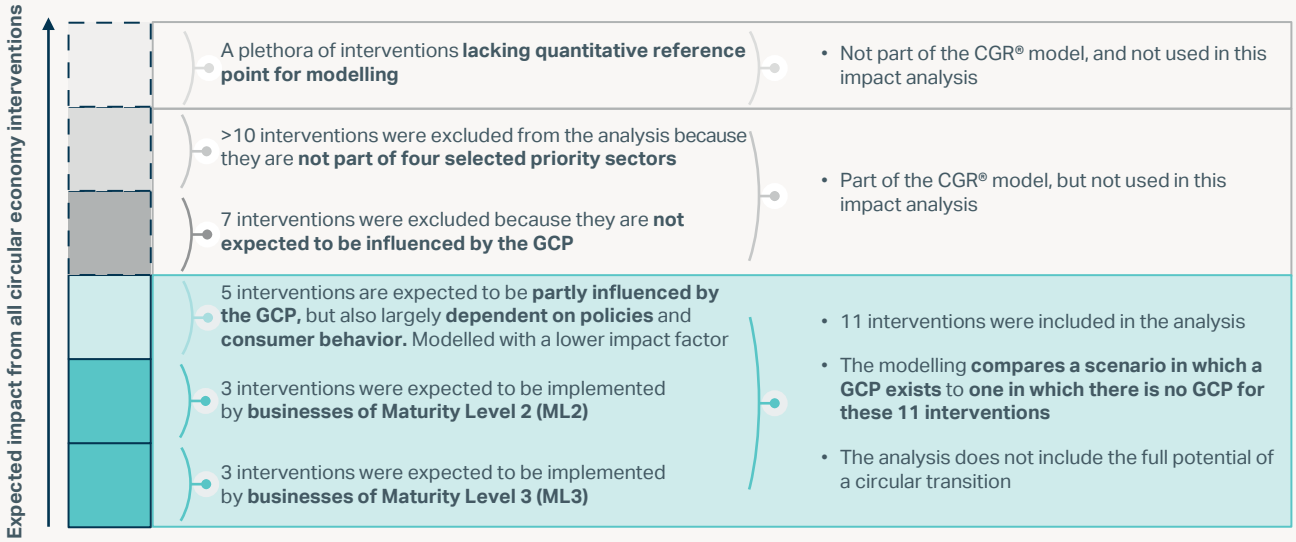
- **Section 3.2 – Raw material consumption**: used as an indicator for material use and productivity and defined by a quantitative reduction in raw material consumption (RMC) or its equivalent term, material footprint (MF);
- **Section 3.3 – Climate**: defined by quantitative and qualitative impact on carbon emission reduction;
- **Section 3.4 – Nature**: defined by quantitative and qualitative impacts on a series of nature indicators which include air pollution, land occupation for arable land, water scarcity and water eutrophication, which if reduced can, among others, mitigate biodiversity loss and water stress; and
- **Section 3.5 – Just and equitable transition**: defined by a series of qualitative indicators on business, socio-economic, and health and safety.

It is crucial to acknowledge the likelihood of further rebound effects. While not included in the quantitative modeling a high-level summary of the likely rebound effects is provided (**Section 3.6 - Rebound effects**).

As set out in Section 1.2 and 2.4, the benefits also assume that the GCP would be complemented with wider developments in policy and regulation, in part facilitated by GCP, to create a supportive operating environment for firms to engage in circular business models. For example, creating a world in which there was a level playing field between linear and circular businesses.

Figure 7. **Conceptual depiction of modelled circular interventions, where not all circular economy interventions can be modelled.**

Source: GCP impact analysis based on a sub-set of interventions from the CGR(c)



*The results in this report are **indicative** and **assume the existence of subsequent policy making** to create a supportive operating environment for circular business models. A **static model without rebound effects** was used.*

The approach used to calculate the potential impact of a world with a GCP (Scenario A), compared to a world without a GCP (Scenario B), is as follows:

1. Select four high-impact sectors (Section 1.3);
2. Derive a GCP adoption trajectory (Section 2.4); and
3. Explore implications for varying business circularity maturity levels (Section 2.4).

These insights were applied to a select group of 11 circular economy interventions (out of the 30+ interventions) found in the Circular Gap Report initiative (CGR®) model.[52] While many circular economy interventions exist, some cannot be quantified. Others were not considered relevant or applicable to the sectors studied or were not expected to be significantly influenced by the GCP, as shown in Figure 6.

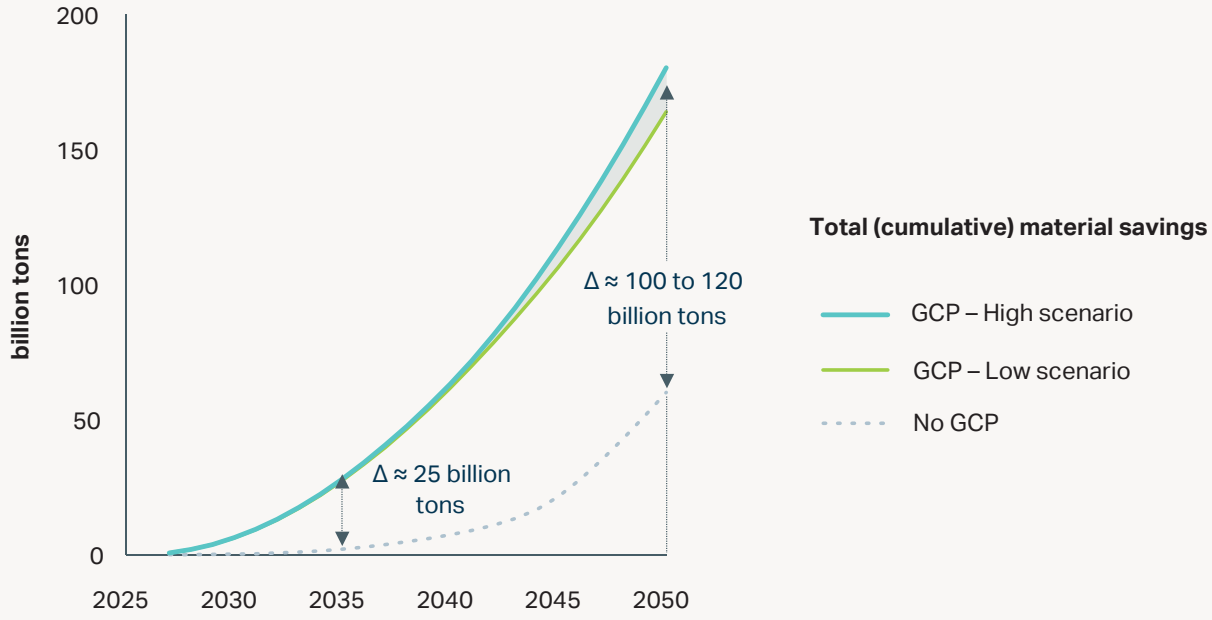
The selection of interventions was based on several factors including relevance to the selected key sectors, relevance to businesses, and influence of policy and demand-side factors.

The selected interventions were classified according to impact factor (i.e., attribution of impacts to GCP) and circular maturity levels (i.e., required circular maturity of involved businesses). The adoption and maturity insights were then applied to quantify the potential macro impact. More detail on the methodology can be found in *Annex A | Modelling Methodology.*

The quantitative modelling results in the study are estimated using the Circular Gap Report initiative ('CGR®') model developed by Circle Economy Foundation.[53] This is a macro-economic model based on the Multi-region Input-Output (MRIO) model EXIOBASE, developed by harmonizing and detailing supply-use tables for many countries, estimating emissions and resource extractions by industry.[54]

Figure 8. **Total (cumulative) material savings of a GCP scenario against a no GCP scenario. Units in billion tons.**

Source: GCP impact analysis based on a sub-set of interventions from the CGR(c)



The call out box below contains a summary of the respective modelling limitations.

Key modelling assumptions and limitations

Modelling the impacts of circularity on nature and society is a new and emerging topic. And modelling the impact of a protocol is even more emerging. Research has much further to progress. So, while this approach yields quantitative results where feasible, the figures should be interpreted as indicative only. A comprehensive explanation of the methodology and its limitations is provided in *Annex A | Modelling* Methodology.

The global analysis has been limited by time and subject to the following key limitations, which are important to consider when interpreting the results:

- **Surveys** – The survey conducted with the TWG in July 2024 was limited in terms of audience (the TWG) and sample size (23 respondents), and therefore not representative for the broad economy. Due to limited availability of quantitative studies that assess the effectiveness of protocols and the time constraints of this study, the results from the survey have been used as key input for the GCP impact modelling. While this could overstate the impact of the GCP, it also gives clear insights for the design principles on what the GCP should focus on to help drive both adoption and behavior change.
- **Sectoral and circular intervention scope** – This work and the model focuses on the selected CGR® interventions related to the four high-impact sectors only, and their known and modellable impacts. If the protocol applies to each sector of the economy, it could have a wider impact than reflected in the modelling.
- **Requirement of wider policy change** – there is limited evidence or information available on the impact of voluntary protocols on behavioral and operational change. This change relies on key dependencies set out in *Annex A | Modelling* Methodology, i.e., there is a key dependency on the existence of a supportive operating environment for businesses to adopt circular business models, as a result of policy making. Therefore, an overarching assumption is that these dependencies are true, which in part could be facilitated by GCP. If this assumption is not true, the GCP could have limited impact, which is not reflected in the results set out in this study.
- **Static model assumptions** – The focus of the work is to identify the incremental impacts of scenario with a GCP vs a counterfactual scenario without the GCP ('No GCP'). However, a No GCP is difficult to define in the long-term and given the transformation that will take place. Therefore, in the interest of transparency and also to be conservative, the GCP and No GCP scenarios assume no changes to the economy and its interaction with materials (among other things) over time. The model also assumes that the economy's structure does not change.
    - By assuming a static model, the impact of the GCP is likely to be conservative. For instance, the GRO assumes that consumption will increase in a business-as-usual scenario, and with growing consumption the delta between the GCP scenario vs the No GCP scenario is expected to be larger for many of the indicators (in absolute terms).
- **Rebound effects** have not been included in the quantitative model; this could be a consideration for a study in the future. However, we cover them qualitatively. Rebound effects could act to reduce the impacts reported in this study.
- **Model Scope** – The numbers do not show the full impact of Circularity, as it is limited to the intervention areas where a GCP is expected to have the most direct impact. They do, however, show the benefits that will be brought forward and realized sooner if the high impact sectors modelled were to adopt a Global Circularity Protocol.

Section 3.2: Raw material consumption

Collectively, we are already exceeding six of the nine planetary boundaries.[xi] Global material consumption surged by over 65% over the past two decades and is now exceeding 100 billion tons annually.[xii, xiii]

Estimates show if this trend persists, we will need three times the resources available on Earth by 2050.[xiv]

The GCP alongside a supportive operating environment could serve as a catalyst to help reverse this trajectory by enhancing transparency, providing clear guidance on measuring and reporting circularity, and encouraging businesses to implement actions to increase circularity within their own operations and in their value chains. Using a static baseline, e.g., assuming annual global material consumption remains at current levels, the macroanalysis of key interventions in the four high impact sectors finds that the GCP has the potential to drive significant raw material consumption (RMC),[xv] savings among businesses, compared to a no GCP scenario.

> *The GCP has the **potential to support decoupling economic activity from resource consumption**, and thereby yield an additional 100 to 120 billion tons of cumulative material savings over approximately 25 years.*

The GCP can help decouple[xvi] economic activities from resource consumption by promoting business circularity, leading to an additional reduction in material footprint.[xvii] The estimated additional reduction in material consumption is, on average, 4% to 5% per year from 2026 to 2050, or on average an additional 4 to 5 billion tons per year, compared to a no GCP scenario.

Based on stable consumption levels assumed in the model, the additional, total cumulative material savings, as shown in Figure 8*: material savings per year*, are estimated at:

- ~25 billion tons cumulative by 2035
- ~100 to 120 billion tons cumulative by 2050, with the 2050 cumulative savings estimates being comparable to all materials consumed in Africa in 2021.[xviii]

Material savings by material category

Based on the modelled interventions, which include interventions related to resource efficient construction and circular construction materials, the GCP has the potential to have the most positive impact on reducing the global use of non-metallic minerals (e.g., sand and gravel, limestone, salt, gypsum), critical raw materials in the construction industry, with sand and gravel being the most mined in the world. By 2050, the GCP has the potential to yield around an additional 50 billion tons of cumulative non-metallic mineral savings as shown in the first panel of Figure 9*: cumulative material savings by material type, compared to a scenario without a GCP*.

Section 3.3: Climate

As stated in the Global Resource Outlook (GRO), over 55% of current global emissions stem from *material extraction and processing*.[xix] While the shift to renewable energy is critical for meeting the Paris Agreement targets, it alone cannot address global GHG emissions[xx], and the adoption of circular economy practices is crucial to further reduce GHG emissions and reach net zero.

[xi] Richardson, K., et al. (2023). Earth beyond Six of Nine Planetary Boundaries. Science Advances, 9(37). doi: doi.org/10.1126/sciadv.adh2458

[xii] United Nations. (2019). SDG indicators. Retrieved from unstats.un.org/sdgs/report/2019/goal-12/

[xiii] United Nations Environment Programme (2024). Global Resources Outlook 2024: Bend the Trend – Pathways to a liveable planet as resource use spikes. International Resource Panel. Nairobi. Retrieved from https://www.unep.org/resources/Global-Resource-Outlook-2024

[xiv] United Nations Development Programme (2023). What is circular economy and why does it matter? Retrieved from climatepromise.undp.org/news-and-stories/what-is-circular-economy-and-how-it-helps-fight-climate-change

[xv] Raw Material Consumption (RMC), also termed "material footprint" (MF) is global raw material extraction associated with final demand. It encompasses four main categories: biomass, fossil fuels, metal ores, and non-metallic minerals. UNEP (2021). The use of natural resources in the economy: A Global Manual on Economy Wide Material Flow Accounting. Nairobi, Kenya. Retrieved from https://www.resourcepanel.org/reports/global-manual-economy-wide-material-flow-accounting

[xvi] The ratio between absolute and relative decoupling cannot be drawn from the static model.

[xvii] United Nations Statistics Division (2019). SDG indicators. Retrieved from unstats.un.org/sdgs/report/2019/goal-12/

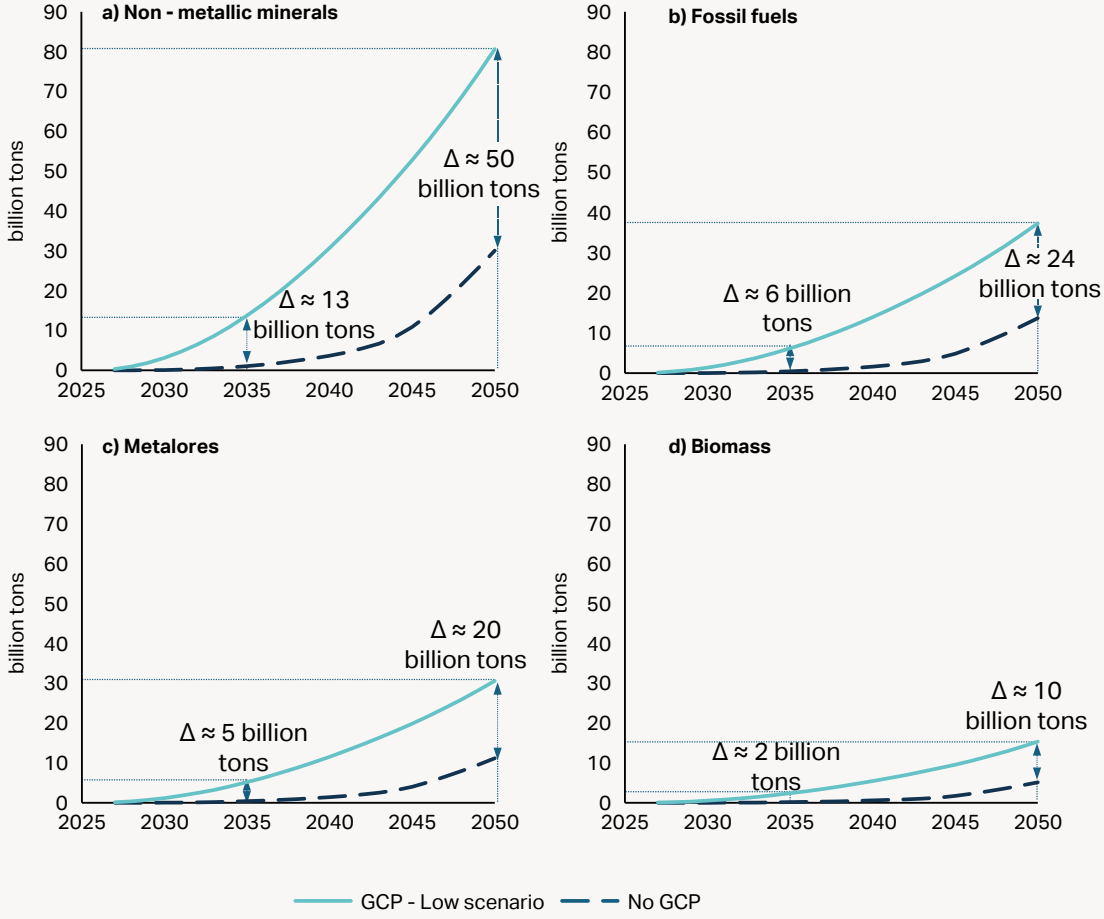
[xviii] Own calculation based on CGR® model that draws on EXIOBASE database

[xix] International Resource Panel (2024). Global Resource Outlook. Retrieved from www.unep.org/resources/Global-Resource-Outlook-2024

[xx] United Nations Development Programme (2023). What is circular economy and why does it matter? Retrieved from climatepromise.undp.org/news-and-stories/what-is-circular-economy-and-how-it-helps-fight-climate-change

Figure 9. **Total (cumulative) material savings by material type in a GCP scenario, compared to a No GCP scenario.** *Units in billion tons.*

Source: GCP impact analysis based on a sub-set of interventions from the CGR(c)



The GCP alongside a supportive operating environment (e.g., finance, policy instruments, etc., as described in section 1.2) can enable an accelerated circular transition, and thereby further reduce CO_2eq[xxi], amongst others resulting from a decrease in material consumption and consequently avoided emissions.

Total emissions savings

The estimated additional CO_2eq reduction could be by on average 6% to 7% per year between 2026 and 2050 compared to Scenario B with no GCP. This equates to a potential emission reduction of, on average, 3 Gt CO_2eq per year.

The estimated additional CO_2eq cumulative emissions are:

- ~17 Gt CO_2eq by 2035
- ~70 Gt (between 67 and 76 Gt) CO_2eq by 2050

The cumulative additional reduction (around 67 to 76 Gt CO2eq by 2050) represents a substantial contribution to global climate action, equivalent to roughly 1.3 to 1.5 times current annual global CO_2eq emissions.[xxii]

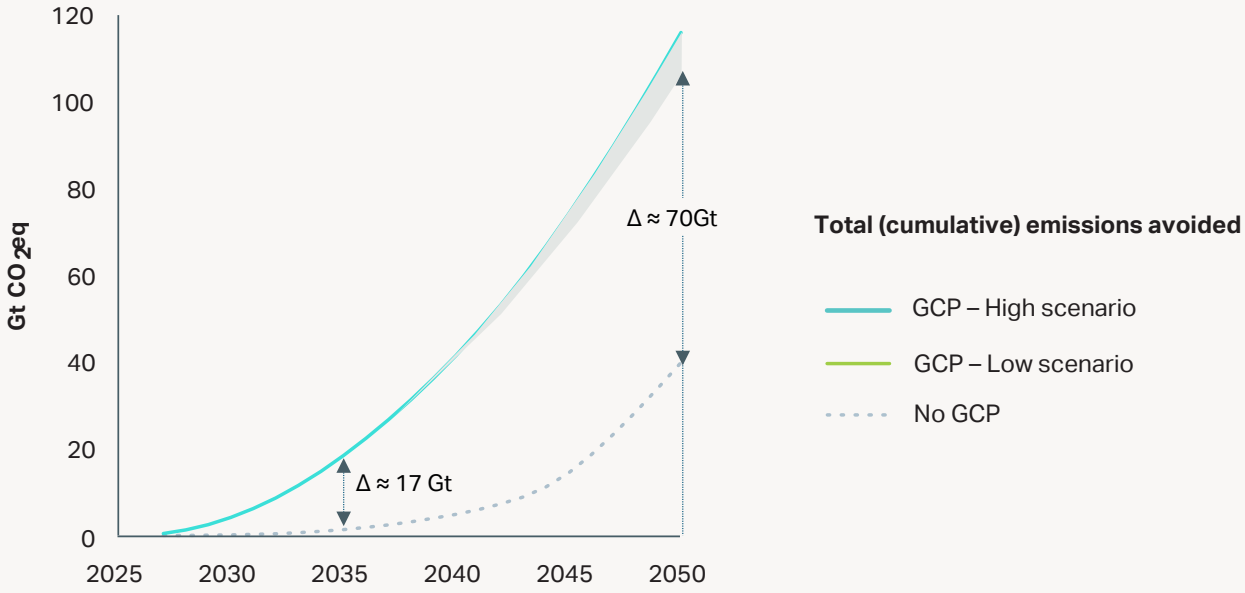
The peak impact is estimated to occur between 2040-2045, where in the following years, circular business model adoption in Scenario B would reach critical mass and would effectively begin to catch up with Scenario A (with GCP).

[xxi] CO2 equivalent (CO2eq) is a metric that standardizes the impact of various greenhouse gases by converting their emissions into the amount of CO2 with the same global warming potential.

[xxii] Ritchie, H., Rosado, P., Roser, M., (2023). CO2 and Greenhouse Gas Emissions. OurWorldInData.org Retrieved from https://ourworldindata.org/co2-and-greenhouse-gas-emissions

Figure 10. **Total avoided emissions (cumulative, upper and lower range).**
Units in Gt CO2eq.

Source: GCP impact analysis based on a sub-set of interventions from the CGR(c)



Section 3.4: Nature

The extraction and processing of natural resources leads to more than 90% of global biodiversity loss and water stress, among others due to land use and water eutrophication.[55] Circular practices and business models such as regenerative agriculture and efficient resource utilization mitigate the strain on ecosystems. These actions are crucial for protecting natural habitats and improving overall ecosystem health. This section highlights how the GCP alongside a supportive operating environment can support substantial environmental benefits, ensuring a healthier planet for future generations.

Among other sectors, agricultural activities play a pivotal role in compromising water quality and contribute significantly to impairments in wetlands, lakes, coastal water, and the contamination and pollution of groundwater.[56] Across various sectors, circular practices are expected to reduce waste and pollution, benefit biodiversity, and lessen waste discharges into the environment. An accelerated transition toward a circular economy, facilitated by the GCP, could decrease the demand for primary resources, thus easing pressure on biodiversity through reducing land use.[57] Additionally, this transition could help reduce air pollution and lower marine and freshwater eutrophication (often caused by pollution and nutrient runoff. For example, providing a common understanding of measurement methods and standardized metrics (e.g., metrics for water consumption, efficiency and recovery, or fertilizer use) to measure performance, track negative and positive impact and set targets, could help to accelerate a reduction in negative environmental impact of the agriculture sector by encouraging regenerative agricultural practices, reducing the inflow of resources and waste generation.

These practices, alongside others, enhance soil health, and increase biodiversity in surrounding ecosystems. This can help to maintain the productivity of agricultural land, and therefore, reduce the need for its expansion.[58] Additionally and more broadly, by increasing water circularity in businesses, less water is withdrawn, thereby alleviating water stress and scarcity.

Table 5 provides an overview of these impacts on a series of indicators encompassing air pollution, land occupation, water scarcity, and freshwater and marine eutrophication. While reduction of waste and pollution are also important benefits of circular business models, these indicators have not been modelled.

Table 5. **Overview of the impacts GCP alongside a supportive operating environment can have on nature, based on the analysis of key interventions in the high impact sectors manufacturing, transportation, construction, and agriculture.**

Source: 2035 and 2050 GCP impact analysis based on a sub-set of interventions from the CGR(c)

The GCP has the potential to:	Potential impact of a GCP scenario A compared to Scenario B, without a GCP		Context
	In 2035	In 2050	
Decrease air pollution (PM2.5), by…	an additional ~12%	an additional 10% to 14%	PM2.5 emissions are responsible for 700,000 deaths per year and a significant number of respiratory illnesses.[172] To what degree circular economy interventions will help remedy those deaths, is highly depended on the exact location of the avoided emissions and pollution.
Reduce arable land occupation by…	an additional ~1.5% or ~0.6 million km^2 of land	an additional 1.8% to 2.9% or 0.7 to 1.1 million km2 of land	In 2050, the potential reduced land occupation is comparable to the size of Ethiopia.
Reduce water scarcity, by…	an additional ~1.6%	an additional 1.6% to 2.3%	Over 2 billion people still lack access to safe drinking water.[173] The degree to which circular economy interventions will help reduce this number, is highly dependent on the specific location of remedied water scarcities.
Reduce freshwater eutrophication by…	an additional ~1.5%	an additional 1.7% to 2.6%	Water eutrophication is generally caused by pollution (e.g., from hazardous substances used in products) and nutrient runoff into the soil, and later water systems. Reducing eutrophication is paramount as it causes ecosystem damage, loss of biodiversity, water toxicity, and increases the cost of water treatment.[174,175]
Reduce marine eutrophication by…	an additional ~1.4%	an additional 1.4% to 2.1%	

Section 3.5: Just and equitable transition

This section complements the quantitative impact assessment on environmental and climate indicators. It provides an initial qualitative assessment of the effects of the GCP and a suite of wider policy measures on the development of circular business models, and through those, on a just and equitable transition. To illustrate the impact on a just and equitable transition, research was conducted across a series of indicators. This preliminary research is elaborated on in this section, however, in contrast to climate and nature impact, which can be realized regardless of how circularity is implemented, just and equitable impacts are much more dependent on how circular practices are carried out, including the informal sector (which accounts for 61% of workers globally)[59] and on policy decisions. Therefore, as the GCP develops it is recommended that further quantitative analysis is conducted to understand the extent of the impact.

Central to the just transition, is the transition to circularity – where economic growth and advancing human well-being is decoupled from resource use. According to the Global Resource Outlook 2024, "*Delivering on the Sustainable Development Goals for all requires decoupling, so that environmental pressures and impacts of resource use fall, while the well-being contributions increase. In practice, this has different implications for groups with different levels of resource use and resource footprints.*"[60]

In line with existing definitions, the aim of the just transition is to consider and address existing inequalities, enable social inclusion and mobility, and promote health equity.[61] As such, this section is divided into three sub-sections:[xxiii]

- **Addressing existing inequalities**: the UN defines inequality as the state of not being equal, especially in terms of rights, status, and opportunities.[176]
- **Enabling social inclusion**: the UN defines social inclusion as, "the process of improving the terms of participation in society, particularly for people who are disadvantaged, through enhancing opportunities, access to resources, voice and respect for rights."[177]
- **Promoting health equity**: According to the World Health Organization, "health equity is the absence of unfair, unavoidable, or remediable differences among groups of people, whether those groups are defined socially, economically, demographically or by another dimension. Health equity is achieved when everyone can attain their full potential for health and well-being."[178]

[xxiii] This study acknowledges that these areas are non-exhaustive, other elements include procedural justice, distributive justice and recognition of rights. In addition, within these areas there are other elements that can be investigated.

Addressing existing inequalities

	Unequal material consumption	Decent jobs and skills development
Current state	The Global Resources Outlook 2024 (GRO) shows that in 2020, consumption per capita in the high-income group was 24 tons of material compared to 4 tons for the low-income group globally. As income rises from low to middle income, so does material consumption per capita, particularly for mobility and construction.[179] However, the study finds that growth in material use outpaces increase in well-being. "*Without urgent and concerted action to change the way resources are used, material resource extraction could increase […] far exceeding what is required to meet essential human needs for all in line with the SDGs*"	Research shows that a circular transition can have an effect on global jobs: Potentially *create* over 100 million new jobs, depending on training and skills, although not likely to be evenly distributed across the world.[180] *Eliminate* jobs in traditional (polluting) industries and mining sectors like fossil fuel extraction and manufacturing, with a significant footprint in the Global South.[181] *Substitute* low quality circular economy jobs (e.g., focused on recycling and sorting, which can be associated with harmful working conditions) with high quality jobs, as businesses move upward on the R-ladder.[182,183,184,185]
Impact potential of the GCP	In section 3.2, this study shows that the GCP can enable the acceleration of circular maturity and influence material consumption reduction, especially in mobility and construction. Research is still in an early stage when it comes to understanding the full extent of the impact of less material use (in these sectors) on reducing inequality, especially when comparing the Global North and South.	By enabling circular maturity acceleration, the GCP could also influence the creation, elimination and/or substitution of jobs. The GCP could guide business in investing in skills development and shifting to less harmful business practices (e.g., refurbishment or remanufacture facilities vs recycling and recovery practices). Job creation and skill development across the total value chain, covering all regions, are important elements that the GCP could further enable.[186]
Areas for further research	The quantitative model applied is static and does not account for economic growth or increased consumption (e.g., split for income groups). Therefore, the potential impact on different income groups is unclear.	This research concluded that definitions around circularity, especially linked to jobs and skills development, is key to accelerating the circular transition.[187] The current model does not account for a shift in the job landscape based on the circular transition nor the geographical distribution of jobs.

Enabling social inclusion

	Poverty	Informal economy
Current state	*Global poverty:* In 2022, 712 million people were living below the extreme poverty line.[188] 47% of the world lives on less than $6.85 per day – a poverty line broadly reflective of the lines adopted in upper-middle income countries. 84% live on less than $30 per day – a poverty line broadly reflective of the lines adopted in high income countries.[189] *Poverty distribution:* the Multidimensional poverty index measures poverty cross health, education and living standards indicators, and concludes that 5 out of 6 of people living in poverty are in Sub-Saharan Africa (48%) and South Asia (35%).[190]	*Informal economy:* The informal economy consists of over 61% (2 billion) of workers globally, and even 90% in low-income countries.[191] The informal plays a key role in the circular economy, however this is often not recognized or fully valued.[192] Women are overrepresented in the informal economy, "In Africa and India, as many as nine in 10 working women are in informal jobs."[193] *Informal economy distribution:* According to the International Monetary Fund, Latin America and sub-Saharan Africa have the highest levels of informality, and in Europe and East Asia the levels of informality are lower compared to other regions.[194]
Impact potential of the GCP	*Global poverty:* The GCP alongside a suite of wider policy changes can allow for the adoption of circular business models that are more labor intensive (e.g., repair and resell) than linear manufacturing practices, creating opportunities for decent work.[195] This new stream of income could contribute to lifting people out of poverty. *Poverty distribution*: The GCP, as an enabler for increased value chain collaboration, could consider creating (job) opportunities to allow for addressing poverty across all geographies. *Overall*: The GCP could facilitate the creation of metrics and business key performance indicators to stimulate skill development; this could be particularly beneficial for workers transitioning from declining industries.	*Informal economy and Informal economy distribution:* The GCP can support the formalization of jobs and work in specific sectors, by including metrics and guidance on incorporating the informal economy and gender in company reporting. This can help business focus on informal workers across their value chain and incorporate this in how business is looking at their circularity targets. In addition, it can support businesses in determining and evaluating potential risks that could adversely affect informal workers, or minorities across their value chain.
Areas for further research	*Poverty:* Currently, no circularity-specific standards and frameworks connect circular practices to poverty levels globally. As an area of further development, and particularly given the distribution of extreme poverty globally, it may be interesting to understand how the GCP, through increasing circular maturity across value chains, could have an impact on reducing (or displacing) poverty.	*Informal economy:* The informal economy is difficult to measure, because it cannot be directly observed, and participants often do not want to be accounted for. Nevertheless, measuring the impact of the GCP on the informal economy will be critical because of its significance to the circular transition and because it also employs some of the world's most vulnerable people.[196]

Promoting health equity

	Health and safety
Current state	Air pollution poses a significant economic burden, particularly on the Global South, through lost productivity and increased healthcare costs, while also hindering development by impairing human capital, reducing worker productivity, and limiting the potential of future generations.[197] It is estimated that waste mismanagement results in the deaths of between 400 thousand and 1 million people every year because of diseases related to it (i.e., includes diarrhea, malaria, heart disease and cancer).[198] Health concerns due to waste (mis)management are exacerbated by (uncontrolled) waste exports to countries lacking formal recycling infrastructure. For instance, around 10% of global e-waste is shipped across borders, of which 65% is estimated to be uncontrolled and undocumented. Material values recovered by the (informal) sector are largely offset by extremely high health and environmental costs.[199,200,201]
Impact potential of the GCP	As per section 3.4, by reducing air pollution, the world's top environmental health risk,[202] the GCP could enable the acceleration to circularity and minimize the risk of disease. As an example, in Europe, as PM2.5 fell by 32% over the 2005-2020 period, premature deaths attributed to PM2.5 exposure in the EU-27 also fell by 33%.[203] As the GCP alongside a suite of wider policy changes may help to reduce pollution by accelerating the transition to circularity, the positive impacts associated with this will also follow. Alongside addressing inequalities and enabling social inclusion, a GCP-supported circular transition may also have an impact on health and safety indicators, linked primarily to the reduction of pollution and waste creation, waste handling and (uncontrolled) waste export. The GCP could potentially include metrics and targets on hazardous materials to reduce harmful chemical exposure of workers during the product's lifecycle. Tracking these beyond the organization's boundaries will be important to understand the impact of their products. The GCP could strengthen emerging regulations like the Eco-design for Sustainable Products Regulation in the EU, including specific elements like the Digital Product Passport.[204] By potentially including a series of social indicators and waste indicators across the whole lifecycle of products, the GCP could create transparency for businesses and policymakers.
Opportunities for further research	While some key health and safety benefits circular strategies higher up the R-ladder are clear, there are also potential negative health impacts, e.g., activities linked to the recovery and repurposing of materials that may contain hazardous substances. This is an emerging area and could benefit from more comprehensive and interdisciplinary study. Understanding these impacts is vital for developing strategies and policies that ensure the transition to a circular economy enhances overall sustainability and well-being. In addition, the model does not quantify waste reduction nor the possible effects of less waste exports. As the GCP develops, it may be interesting to consider how metrics in these areas could help track and quantify the impacts.

Section 3.6: Rebound effects

This analysis highlights the potential of the GCP to enable an accelerated transition to a circular economy and its associated positive benefits. However, it is crucial to acknowledge the potential for rebound effects, which has not been considered in this analysis.

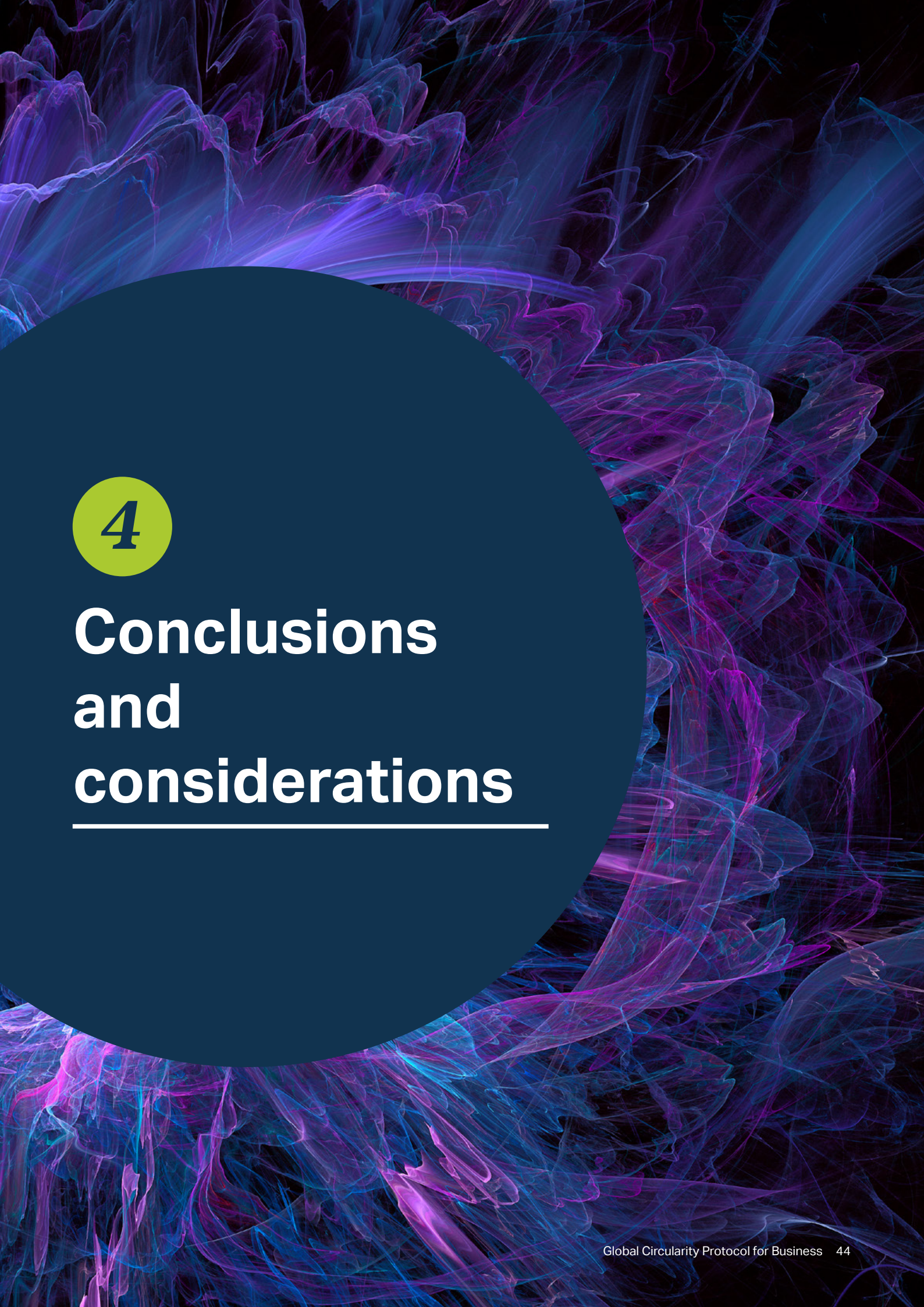
The concept of rebound effects is well established in the energy sector. Energy efficiency improvements often lead to lower prices, which can stimulate demand and offset some of the intended environmental benefits.[62] Empirical studies have estimated long term rebound effects of 50% from improved energy efficiency. That is, for a given energy efficiency improvement, 50% of the benefits are realized, with the other 50% efficiency improvements being unrealized and offset by various economic and consumer behavioral responses.[63]

Similar rebound effects can occur within the circular economy, with literature showing some of the following mechanisms, influenced by consumer behavior:[64,65,66]

- **Imperfect substitution:** instead of *replacing* the demand for new products, refurbished, recycled or shared goods could create a parallel market where both types of products are consumed, partially offsetting any reduction in material consumption.
- **Price effects:** potential lower prices for refurbished or recycled products could encourage consumers to buy more, partially offsetting any reduction in material consumption levels.

Additionally, literature suggests a 'symbiotic' rebound effect stemming from the opportunity cost of having to choose among different R-strategies, with the consequences arising later, or elsewhere in a complex chain.[67] Furthermore, the expected nature benefits, such as reduced land occupation by arable land, might be undermined if the freed-up land is repurposed for other production activities instead of being restored to benefit biodiversity.[68] Another example is water usage. Increased water efficiency and efforts to recycle and reuse water resources may result in a decrease in the price of water or an improvement in its accessibility that could raise the demand for water.[69] This increase in water consumption could offset the gains from circular practices.

To ensure that the efficiency gains from circular practices are not offset by increased consumption or other unintended consequences, such as increased manufacturing, a collective effort will be required from policymakers, producers and consumers.[70,71]



4

Conclusions and considerations

4 Conclusion and considerations

This research estimated the potential impact of the GCP to drive business performance and global sustainability outcomes, such as decarbonization, through accelerating business circularity maturity.

GCP as a catalyst for accelerating circularity maturity

The evidence finds that the GCP could play a foundational role in doubling the rate at which circular maturity develops within business. The level and pace of the circular transition will vary across organizations though, with further benefits expected to emerge as companies increase circular maturity. Achieving full circularity requires internal transformation and systemic change in the ecosystem. The GCP can also serve as a catalyst for this, fostering faster progression through maturity levels by offering comprehensive tools and guidance.

GCP as an enabler of business goals

The GCP is expected to contain five key elements. The research found a broad range of benefits that could be attributed to these. These span financial, corporate risk management, value chain, environmental and social benefits. For the full benefits to be realized adoption of circular business models across a value chain is key, as characterized by Maturity Level 3. This allows businesses to operate in an ecosystem where circular business models are attainable and commercially viable.

GCP as an enabler of Climate, Nature and Social goals

Assuming the required transformation of business practices and policy measures occur, the long-term benefits of this accelerated circular transition attributable to the GCP are:

Table 6. **Overview of key modelling results.**

Source: 2035 and 2050 GCP impact analysis based on a sub-set of interventions from the CGR(c)

	Potential impact of a GCP scenario (A) compared to Scenario B, without a GCP		Context
The GCP has the potential to:	**2035**	**2050**	
Decrease raw material consumption or 'material footprint' by…	An additional ~**25 billion tons** of **cumulative** savings **between 2026 and 2035**	An additional **100** to **120 billion tons** of **cumulative** savings **between 2026 and 2050**	The potential cumulative impact is equivalent to 1 to 1.2 times the current annual material consumption globally.[205] *Material reduction will also lead to reduced waste generation, however this was not modelled.*
Reduce CO_2eq emissions by…	an additional **~17 Gt CO_2eq cumulative** savings **between 2026 and 2035**	an additional **67** to **76 Gt CO_2eq cumulative** savings **between 2026 and 2050**	The potential cumulative impact is equivalent to 1.3 to 1.5 times the current annual emissions globally.[206]
Decrease air pollution (PM2.5), by…	an additional **~12% in 2035**	an additional **10%** to **14% in 2050**	PM2.5 emissions are responsible for 700,000 deaths per year and a significant number of respiratory illnesses.[207] To what degree circular economy interventions will help remedy those deaths, is highly depended on the exact location of the avoided emissions and pollution.
Reduce arable land occupation by…	an additional reduction of **~1.5%** or **0.6 million km²** of land **in 2035**	an additional **~1.8%** to **2.9%** or **0.7** to **1.1 million km²** of land **in 2050**	In 2050, the potential reduced land occupation is about the size of Ethiopia.

GCP can also be an enabler to the just transition; addressing existing inequalities, enabling social inclusion and promoting health equity. By including a stronger focus on social data, as well as environmental, it will allow businesses and policy makers to better understand the holistic impacts of circularity interventions.

Dependencies for the GCP

The research points to the potential the GCP has in enabling the transition to a circular economy, but this is also dependent on a series of other factors:

1. **Supportive policy and regulatory frameworks**
   - Policy frameworks are crucial to create a level **playing field for businesses and the countries in which they operate.** For example, this could include mechanisms that **price in externalities** to ensure fair competition, or redirecting, repurposing and reforming public subsidies. *"We need to at least reach a level playing field between linear and circular business. Today linear business model have the advantage of not carrying the cost of externalities*." (TWG Survey, 2024).
   - The GCP's **policy guidance** could play a vital role in supporting policymakers in developing such frameworks.
2. **Global alignment for a Just transition**
   - **A coherent global strategy is crucial** to ensure a **just and equitable transition** to a circular economy**.** This should consider job creation, access to opportunities, and skill development. Aligning circularity with climate and nature goals will be vital for this transition, as is securing business commitments to support these changes.
3. **Shifting consumer behavior and consumption patterns**
   - A fundamental shift in consumer behavior is necessary, driven by increased demand for circular products and services. Raising awareness about the benefits of circularity will be key. The GCP can play a pivotal role by **enabling transparency**, facilitating **data and information exchange** along the value chain and fostering a supportive policy environment. *"We need to include focus on customer demand, as this will also be critical to drive justice and equality."* (Stakeholder feedback, 2024).
4. **Access to finance**
   - Empowering businesses to **adopt circular models requires access to finance**. This involves shifting investment priorities and developing innovative financing mechanisms tailored to the circular economy. The GCP can support these efforts by providing standardization and metric guidance to reduce information asymmetry in financial markets, thereby enabling more effective capital allocation.
5. **Data and information exchange**
   - **Effective data exchange within value chains and networks** is vital. The GCP can aid this by providing standardization and data and digitalization guidance to enhance data availability and interoperability.
6. **Continued research and technological innovation**
   - Ongoing research is crucial to understand the impacts and opportunities of the circular economy. Innovations, particularly technological, are needed to implement **circular interventions that maximize net positive impact**.

Areas for further considerations

As the direction and the contents of the GCP develop, this report may benefit from further research and exploration, particularly to address some of the main limitations of quantitative and qualitative modeling. This could include:

1. Building a more advanced model departing from the static nature of the current model, and further considering the quantitative impact of rebound effects.
2. Modelling a larger variety of circular interventions.
3. Exploring interventions that are more dependent on consumer behavior and enforcing policies.
4. Modelling of rebound effects to ensure the efficiency gains from circular practices are not negated by increased consumption or other unintended consequences
5. Adoption of any protocol will have cost and resource implications for both business and policy makers. Considering these and how to develop the GCP in a way to minimize them should be included in future development work.
6. Conducting more quantitative research on the impact of circular economy practices on social aspects, and how the GCP could support.

A true win-win-win situation

The GCP, with its broader positive environmental and social impacts, has the potential to be a pivotal driver in advancing businesses' decarbonization pathways and sustainability goals. By promoting circularity to achieve net zero, the GCP supports not only environmental sustainability and societal well-being but can also enhance business performance. This creates a mutually beneficial scenario for nature, society, and enterprises—a true win-win-win situation.

5 Annexes

5 Annexes

Annex A | Modelling Methodology

This study examines the potential of the GCP in accelerating the transition toward a circular economy, exploring its impact on climate, nature, and society.

A literature review of over 131 sources was conducted combined with 5 interviews with actors active in the value chains and a survey with the Technical Working Group (TWG) to inform the analysis. The survey was completed by 23 TWG members, primarily representing large companies (>250 employees and >US$1 billion in annual revenue) with headquarters in the Global North and existing circular economy strategies. The respondent group included 18 business representatives, alongside government and academic voices.

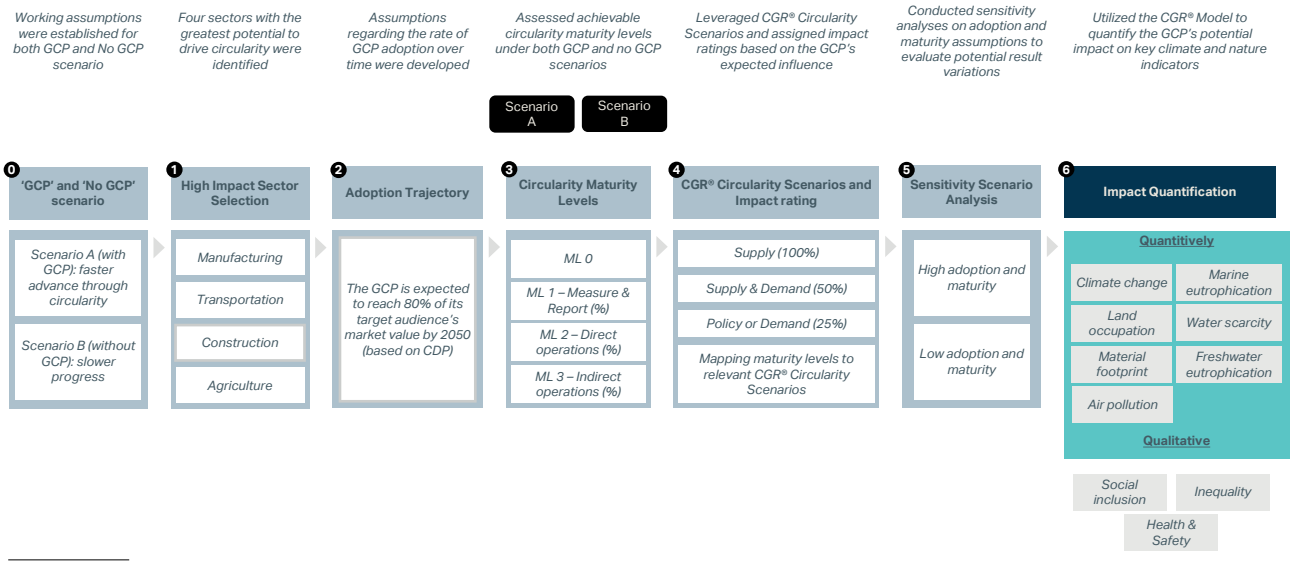
To evaluate the potential net impact of the GCP in 2050, the Macro Impact Assessment compared two hypothetical scenarios including a world in which the GCP exists and a world in which it does not exist. Both scenarios were informed by the survey conducted with the TWG and findings from the landscape analysis. The Environmentally Extended Input-Output Model developed by Circle Economy Foundation for the Circularity Gap Report Initiatives (CGR® model) was then used to estimate the potential macro-level impacts of the GCP.[xxiv] The analysis can be set out in the following key steps:

0. **GCP and No GCP scenario:** develop the working assumptions for Scenario A, with the GCP and Scenario B, without the GCP.
1. **High Impact Sector Selection:** identify four high impact sectors that could have the greatest potential in driving circularity.
2. **Adoption Trajectory:** develop assumptions about the rate and speed of GCP adoption over time.
3. **Circularity Maturity Levels:** develop assumptions on the achievable levels of circularity maturity under both the GCP and No GCP scenarios.
4. **CGR® Circularity Scenarios and Impact Rating:** select specific circular economy interventions from the CGR® model where the GCP is expected to have a significant acceleration effect and assign impact ratings to reflect the varying degrees of influence the GCP might have on each of them.
5. **Sensitivity Scenario Analysis:** conduct sensitivity analyses on adoption and maturity assumptions to assess their potential influence on the results.
6. **Impact Quantification:** Use the CGR® Model to quantify the potential impact of the GCP on selected climate and nature indicators.

The following sections will delve deeper into each of these steps.

Figure 11. **Approach used to estimate the acceleration impact GCP can have on the transformation toward circularity on a global scale.**

Source: Authors of this report



[xxiv] Circle Economy Foundation (2023). Circular Gap Report initiative methodology. Retrieved from www.circularity-gap.world/methodology

TWG survey on adoption rates and circularity maturity

The general GCP approach and projections were reviewed and refined through engagement with the TWG, incorporating their expertise and insights. For the GCP adoption rate (Step 2. Adoption Trajectory) and the GCP's influence on driving circular maturity (Step 3. GCP Circularity Maturity Levels) a survey with the TWG was conducted in July 2024. The survey had 18 respondents from the TWG.

The survey set out adoption rates from the CDP and the behaviour change from the Montreal Protocol, and the TWG members were asked to indicate whether the GCP could have similar, higher or lower adoption and circularity maturity impact rates.

This resulted in an estimation of the GCP's potential to accelerate the pace of circular maturity across the levels:

- Maturity Level 1 to Maturity Level 2: around 5 instead of 12 years
- Maturity Level 2 to Maturity Level 3: around 9 instead of 19 years

It is key to note that the audience and the sample size of the survey are not representative for the broad economy. However, due to limited quantitative studies of the effectiveness of protocols and the time constraints of this study, the results have been used as input for the GCP impact modelling.

While this could overstate the impact of the GCP, it also gives clear guidance for the design principles that the GCP should focus on both driving adoption and behavior change.

Underlying assumptions of the impact analysis

0. GCP and No GCP scenario

The analysis assessed the potential acceleration impact of the GCP by comparing a future state with the GCP against a counterfactual scenario – the expected trajectory without the GCP (i.e., No GCP scenario). This is crucial for an impact analysis as it allows the isolation of the net impact of the GCP on circularity.

Two scenarios were examined:

- **GCP scenario:** this scenario outlines the anticipated characteristics of the GCP and explores how these features could drive change. The working assumptions were drawn from the landscape analysis and consultations with the TWG (see Figure 12). An example of an assumption is that the protocol would be voluntary and sector agnostic.
- **No GCP scenario:** this scenario projects the trends in circularity without the GCP. This assumes that circularity will increase even without the GCP but at a slower pace. This assumption is underpinned by the world beginning to see decoupling between economic activity and carbon emissions. As this shift moves away from, for example, being based on the energy transition, one could assume that material usage will become the next priority.

Details on how circularity is assumed to develop with and without the GCP are provided in section 3 'Circular Maturity Levels'.

1. High Impact Sector Selection

The analysis focuses on four High Impact Sectors chosen based on three selection criteria:

1. **Circularity potential:** sectors that are characterized by resource-intensive productions and substantial environmental footprints which present a significant opportunity for circularity improvements.
2. **Data availability:** sectors with comprehensive data and established connection to circular economy activities within the CGR® Model.

3. **Global value chain coverage:** sectors with extensive global value chains spanning both Global North and South to maximize potential impact.

Based on these criteria, Manufacturing, Construction, Transportation and Agriculture were selected, all of which are included in the CGR® model and thus satisfy the data availability criteria. This selection was further validated through a workshop with the TWG. The sectors were used both for the modelling scenario selection (see 4. CGR® Circularity Scenarios and Impact Rating of this annex), as well as for the value chain analysis (see Annex B | Detail of value chain analysis).

2. Adoption Trajectory

The GCP's projected adoption trajectory is informed by observed adoption rates of existing protocols and reporting standards, such as the GHG Protocol and the Carbon Disclosure Protocol (CDP) and follows established transition adoption theory. Based on this, the GCP is expected to follow an S-Curve adoption pattern over time, characterized by initial slow adoption by early adopters, followed by rapid growth as critical mass is reached with the majority adopting the protocol. Finally, adoption will slow down as the market saturates, with laggards being the last to adopt. Adoption rates are based on the CDP market proportions, utilizing its 20-year historical trajectory and growth rates as a benchmark.

Figure 12. **The working assumption for the GCP characteristics.**

Source: Authors of this report

Working assumption on the characteristics of GCP

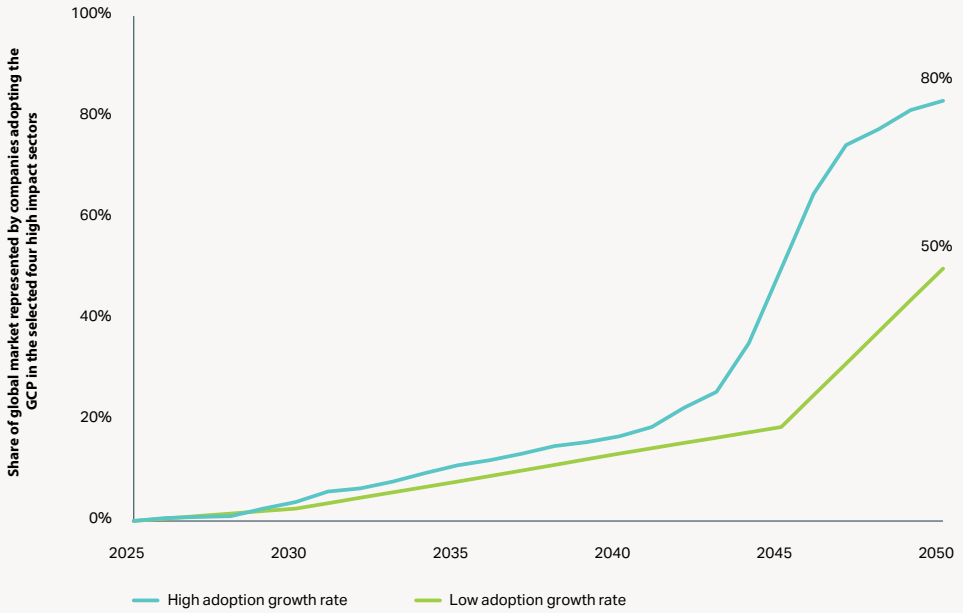
Characteristic	Spectrum of options			
Region – the GCP will be region agnostic	Region-specific			Region-agnostic
Region consistency – the GCP will be consistent across and within regions	No			Yes
Sector – the GCP will be sector-agnostic	Sector-specific			Sector-agnostic
Sector guidance – the GCP will have specific sectoral guidance	No			Yes
Sector consistency – the guidance will be tailored but consistent sectors	No			Yes
Size of business – that the GCP will be aimed at businesses of all sizes	Large only			All
Glossary – Included definitions can be sector-agnostic and/or tailored to sectors	No			Yes – sector based
CE Targets – Guidance, requirement or suggestions on target-setting	No			Yes
Impact Targets – Guidance, requirement or suggestions on target-setting	No			Yes
Reporting boundaries – Where the reporting boundaries extend to	Flows w/in the orgs. boundaries			Flows inside and outside bound.
CE scope – Indicator scope ranging from focused to a holistic set of indicators	Focused (e.g., Waste)			Holistic
Reporting characteristics – Reporting qualitatively and/or quantitatively	Quantitative			Qualitative
Completion requirement – Ability to report against a core and optional set of indicators	Core			Options
Interoperability – Level of interoperability with other frameworks	Custom made			Interoperable

Table 7. **ISIC classification of the four selected sectors.**[208]

ISIC Rev.4 label	Main underlying industries	ISIC Code	Estimated share of global material consumption[209]
Agriculture, forestry, and fishing	Crop farming, livestock breeding, forestry	A	~20%
Manufacturing	Manufacturing of electronics, textile, plastic products	C	~15%
Construction	Construction of buildings, civil engineering	F	~40%
Transportation and storage	Land transport, water transport, air transport	H	~10%

Figure 13. **High and low adoption scenarios. The % adoption is measured as a share of the global manufacturing, transportation, construction, and agriculture market covered by adopting companies.**

Source: Authors of this report



Analysis further suggests a potential disparity in uptake between the Global North and Global South, mirroring trends seen in initiatives like the Science Based Targets initiative (SBTi), where a respective circa 85% to 15% split was seen in early adoption.

Whether through intrinsic motivation or due to investor requirements, over 23 thousand companies disclosed through CDP in 2023, representing US$67 trillion in market capitalization, covering over 65% of global market capitalization.[72] Using market capitalization as a proxy for market share, the assumed GCP adoption curve entails that by 2050, adopters will cover between 50% and 80% of the global manufacturing, construction, transportation and agriculture markets. As detailed in the circular maturity section, this does not imply that all adopting and reporting companies exhibit the same circular behavior.

Additional survey insights

The survey with the TWG provided additional key insights into anticipated GCP adoption trends as set out in Table 8.

Table 8. **Survey Insights: Adoption Rate.**

Theme	Key Insight
Anticipated adoption patterns	
Sectors	Most participants agree that the initial adoption will differ between the four high impact sectors (manufacturing, transportation, construction, agriculture) and expect the manufacturing sector to have the highest adoption, followed by agriculture.
Regions	Survey participants anticipate that GCP adoption will vary by region, mirroring the regional distribution observed with CDP adoption, where Global North has taken the lead.
Potential challenges arising in the adoption of the GCP	
Business units	The prioritization of the GCP and the transition toward circularity will vary across business units, influenced by factors such as the level of resources required and the associated cost implications.
Data availability	Data necessary for assessing and implementing circularity interventions is often fragmented within companies. Large corporations may encounter difficulties accessing this data from national subsidiaries, particularly those lacking dedicated sustainability departments.
IT systems	Adopting a new protocol such as the GCP often requires IT system changes, which can take time to implement. Additionally, successful integration requires staff training and incorporation into existing disclosure processes.

3. GCP Circularity Maturity Levels

The Circular Maturity Framework

The overall impact of the GCP will depend on its adoption rate and on how much businesses change their behavior by implementing circularity strategies and transforming their business models. To account for this in the Impact Assessment, a Circular Maturity Framework was developed (Figure 3), encompassing three pillars for measuring circularity across four distinct Maturity Levels. It should be noted that this is a theoretical framework, and businesses do not follow a constant or linear path on their circularity journey.

Importantly, the results throughout this report assume that the following dependencies are true – i.e., they are supportive of businesses in developing their circular maturity.

Table 9. **Circular maturity areas.**

Circular strategies	Scale	Boundaries
The extent to which circular interventions are adopting and implementing: • The more mature a company, interventions higher up the R-ladder are applied, seeking to decouple resource using a plethora of solutions, and the more they adopt narrow, slow, close, and regenerate practices	The scale of adoption of circularity principles across the business: • The circular percentage of a company's portfolio • Applying circular principles and designs in a cross-cutting manner across multiple products or business units	The reach of a business's circular practices across the value chain: • Ranging from circularity only in own direct operations... • ...to undertaking initiatives across supply chain, leading on innovation and collaboration with suppliers, customers

- **Maturity level 0 – Business not active in circular economy (CE)**
- **Maturity level 1 (Measure and Report) - Transparent businesses**: businesses reporting on CE performance using the GCP but have not (yet) led to any significant changes in their products, business, or value chain.
- **Maturity level 2 (Direct Operations) - Businesses with improved operations**: businesses reporting on CE and implementing some circular solutions and changes in their own business operations (e.g., procurement, design, waste management, etc.). These changes can have some value chain or sector broad impact.
- **Maturity level 3 (Indirect Operations) - Businesses participating in systemic change:** ML2 + implementing/ influencing significant changes in their own operations and the wider value chain or sector. This requires multiple market participants to be involved.

Table 10. **Dependencies influencing circular maturity.**

Governance, which promotes inclusive and collaborative decision-making among all stakeholders, integrating social considerations and enhancing the effective implementation of circular economy practices	**Policy and regulation**, which can accelerate or hinder progress through the use (or lack of) financial instruments and incentives, research, and innovation funding, EPR, harmonized rules, etc.	**Regions**, in which businesses operate, as infrastructure availability and policy and regulation, among other factors, differ across the world
Finance, the ease and availability of financing for circular business models and products can support businesses and organizations in accelerating their adoption and scaling of circular practices and thus in accelerating their overall circular maturity	**Innovation and technology**, including through new market entrants or solutions, creating competition, which can incentivize others to venture into new territory, and the development of new technologies and solutions	**Industry dynamics**, including (linear) competition which is likely to affect the adoption of circular practices as businesses seek to build a competitive edge, while others follow later. And value chain complexity, with sectors having different resource use types and intensities, customer awareness, challenges and opportunities
As highlighted in the landscape analysis, the **informal economy** plays a key role in the CE, therefore the GCP impact and circularity maturity will also be influenced by the share of informal economy in a region		

Maturity Levels in the Macro Impact Assessment

In this analysis, Maturity Level 0 (Businesses not active in the circular economy) and Maturity Level 1 (Measure and Report) are not assumed to impact circularity.

Maturity Level 2 (Direct Operations) and Level 3 (Indirect Operations) are based on the percentage of CDP disclosures reporting and setting targets on Scope 2 and 3 GHG emissions, respectively. Recognizing that achieving Maturity Level 3 generally takes longer than Maturity Level 2, the analysis assumes a slower progression.[xxv]

The survey also tested the potential for businesses to achieve Maturity Levels 2 and 3 by 2050 without the GCP. Based on the survey findings and expected positive influence of Net Zero strategies on business circularity (i.e., decoupling between economic activity and carbon emissions), the counterfactual scenario assumes a gradual, albeit slower, improvement in circular maturity for companies at the forefront of circularity, even without the GCP.[xxvi]

In the scenario where the GCP is widely adopted, companies are projected to accelerate their progress through maturity levels. Furthermore, it is assumed that businesses not adopting the GCP will also experience a slow increase in maturity levels over time once the GCP has become more established (i.e.., circular ecosystem transformation).

These projections were reviewed and refined through engagement with the TWG, incorporating their expertise and insights. The resulting circular maturity projections, assume that by 2050, all companies choosing to adopt GCP could have *at least* 'Maturity Level 2', i.e., businesses reporting on CE and implementing some circular solutions and changes in their own business operations. Additionally, by 2050, 50% of companies choosing to adopt GCP could have reached 'Maturity Level 3', influencing and implementing changes within their business and their value chain.

Multiplying the circular maturity projections explained in the previous paragraph, by the GCP adoption rate, shown earlier in Figure 13, yields the share of the total market covered by the four high impact sectors (both adopting and non-adopting companies) that reaches a given maturity level, with and without the GCP, and is shown in Figure 6.

[xxv] Some businesses such as platforms, consultants, assurers and certifiers provide services to enabling other businesses to promote and implement circular economy activities. These businesses place more importance on and may start with the highest maturity level given their engagement with a wide ecosystem.

[xxvi] The TWG comprises businesses at the forefront of circularity, along with academics and scientists. Consequently, the survey results may reflect bias toward businesses optimistic about advancing their circularity efforts. This potential bias could lead to an overestimation of maturity levels in the counterfactual scenario, making the presented results a conservative estimate of the GCP's potential impact.

Additional survey insights

The survey offered more key insights into anticipated GCP adoption as set out in Table 11.

Table 11. **Survey insights: Maturity Levels**

Theme	Key Insight
A. ***Anticipated circular maturity over time (compared to counterfactual)***	
Current state	Around half of the survey participants rate their company at ML 1 (Measure and Report) and 35% at ML 2 (Direct Operations). Only 3% would consider that their company has reached ML 3 (Indirect Operations).
Timeline	The GCP is expected to accelerate the pace at which companies can advance through the circularity maturity levels. On average, companies adopting the GCP are anticipated to transition from Maturity Level 1 to Maturity Level 2 within approximately 5 years and reach Maturity Level 3 within 9 years. This contrasts with the anticipated 12 years and 19 years, respectively, for the counterfactual scenario.
Acceleration	Businesses that adopt the GCP can move to Maturity Level 2 and Maturity Level 3 twice as quickly.
Maturity Level 3	Almost 40% of survey participants believe that businesses will not be able to reach Maturity Level 3 at all without the GCP or further policy intervention.
Circular Economy	Over half (61%) of survey participants believe that adopting the GCP and reaching Maturity Level 3 will achieve a level of circularity consistent with a sustainable, circular economy by 2025, aligning with best-case projections from GRO/CGR.
Other factors to increase circular maturity	Most participants agree that reaching a level consistent with a sustainable, circular economy by 2050 also depends on other factors. The three key factors mentioned by respondents were (1) demand, (2) policy and (3) regulation and legislation.

4. CGR® Circularity Scenarios and Impact Rating

The Macro Impact Assessment uses 11 of the 21 CGR® Circularity Scenarios, developed by Circle Economy Foundation, to model the potential impact of circularity at a macro-level. In the main body of this report, the selected and modelled Circularity Scenarios are referred as interventions. See Table 13 for the full list of CGR® Circularity Scenarios.

Given not all circular economy interventions can be nor have been modelled (shown conceptually in Figure 7), an update to the analysis could be carried out in the future if deemed useful, for example to include more sectors, or more scenarios as data becomes available or research provides new evidence.

For the calculation of the impact of the GCP, a number of circular economy scenarios were selected out of the 30+ scenarios available for the model. The selection of scenarios was based on a number of factors including relevance to the selected key sectors, relevance to businesses and influence of policy and demand-side factors.

For each of the scenarios, an Impact Rating ranging from 0-100% was applied to reflect the varying degrees of influence the GCP might have on each of the scenarios (Table 12).

As the GCP primarily targets businesses, the rating reflects the extent to which business behavior can drive the acceleration of these scenarios. CGR® Circularity Scenarios which are heavily reliant on individual consumer demand, behavior, or policy intervention received lower impact ratings, acknowledging the limitations of business-driven influence in those areas. Based on this impact rating, 11 out of 21 CGR® Circularity Scenarios were included in the analysis.

The potential impact of the GCP is further constrained by the theoretical maximum embedded within represent the upper limits of what is considered achievable within each scenario[xxvii], even with the GCP's influence.

[xxvii] See Circularity Report Initiative (2023): Methodology

Table 12. **Impact rating applied to CGR® circularity scenarios in the four high-impact sectors.**

Focus of CGR® Circularity Scenario	Description	Impact Rating
Supply-side	Driven by changes in business behavior, among others they include lifetime expansion of products, recycling, and material efficiencies. The GCP is aimed at businesses and offers guidance on circular strategies, to accelerate the impact on business behavior. Demand or policy changes may also occur but are not the predominate causal driver of behavioral change toward circularity.	100%
Supply and Demand-side	Driven by both changes in business behavior and the demand from individual consumers for circular products. Business can influence individual consumer demand by offering more circular products, however this alone will not fully drive demand. Hence a lower impact rating.	50%[xxviii]
Policy or Demand-side	Mainly driven by policy intervention such as taxes on linear business models and / or demand from individual consumers for circular products. The GCP and business behavior are expected to have limited impact on these scenarios. A low impact rating is applied to reflect that businesses can influence the market by providing a greater choice of circular products. In addition, the GCP is expected to provide insights for policymakers to develop regulations that will enable the circular transition, however this will be an indirect result of the protocol (e.g., by tackling externalities to produce a more level playing field against linear businesses).	25%
Individual Consumer Behavior	Driven by consumer awareness and willingness to change behavior, such as reducing the number of air trips. The GCP is not expected to impact individual consumer behavior at this stage.	0%
Energy Transition	Energy transition CGR® scenarios can be seen as overarching to the 4 impact sectors as they refer to the electrification of production and the shift away from fossil fuels. The GCP is not expected to accelerate this transition, as the energy transition is already well underway without it.	0%

The Impact Rating is indicative and aims to be conservative, focusing on where there is an expected strong causal and direct relationship between business behavior and scenario, which the GCP can further influence. In addition to the Impact Rating, Maturity Level 2 (Direct Operations) and Maturity Level 3 (Indirect Operations) were mapped to each of the 13 selected CGR® Circularity Scenarios based on their definition set out earlier in the methodology section (Table 13). The Impact Rating and Maturity Mapping were tested and agreed with the TWG in a workshop.

[xxviii] For the scenario 'Nutrition – avoidable food waste' an impact rating of 75% applies as research suggests that 35% of food waste happens at the consumption stage, which could in part be avoided via consumer behavioural change, the rest is directly influenced by businesses. https://www.circularity-gap.world/

Table 13. **CGR® Circularity Scenarios – modified impact ratings and maturity levels.**

Sector focus (as per CGR® model designation)	CGR® Circularity Scenario	Description (as per the GCR® model designation)	Impact Rating	Maturity Level
Manufacturing	Sustainable textile	Natural and local textile manufacturing is incentivized, alongside lifetime extension strategies and recycling of end-of-life garments.	Supply-side 100%	ML 3
Manufacturing	Material sufficiency	A raw input material tax is introduced to minimize the purchase of household goods, electronics, and other consumables. The shift results from incentives (or tax exemption) to activities of membership organizations, sport, and recreational activities.	Policy or Demand-side **0%**	**N/A**
Manufacturing	Lifetime extension of machinery and equipment	Lifetime extension strategies for machinery and equipment are supported by reduced costs for repair, re-manufacturing, upgrading, and re-use along with regulations on minimum product guarantees.	Supply-side **100%**	**ML 3**
Manufacturing	Industrial symbiosis and efficiency	Process improvement, scrap diversion, and yield loss reduction are achieved through industrial symbiosis and efficiency, fostering a tighter collaboration within industrial poles.	Supply-side **100%**	**ML 3**
Construction	Resource efficient lifestyle	Energy efficient washing machines, tumble dryers and irons are used. The number of washes is reduced through better appliances loading, minimizing tumble drying frequency and washing at lower temperatures, resulting in a 24% reduction in energy use. Additional savings come from hot water savings, maintaining a 2°C lower room temperature, and using smart metering.	Individual Consumer Behavior **0%**	**N/A**
Construction	Efficient housing solutions	Passive house and renewable energy generation through solar thermal systems, photovoltaics and heat pumps are adopted. Low carbon construction practices reduce the emissions intensity of steel and concrete with partial substitution using wood.	Supply and Demand-side **50%**	**ML 3**
Construction	Resource efficient construction	Frugal design and lightweighting of structural elements, coupled with the use of local construction materials and supply chains, leading to a 50% reduction of transport fuels in the construction sector.	Supply-side **100%**	**ML 2**
Construction	Circular construction materials	Landfill and incineration of Construction and Demolition Waste are eliminated or significantly reduced.	Supply-side **100%**	**ML 2**
Mobility	Car-free lifestyle	Car purchases are reduced, with a shift toward bikes, scooters, and car sharing varying between urban and rural areas. A reduction in travelled kilometers occurs. Parking spaces are repurposed with bicycle infrastructure and open spaces for walking car sharing services are incentivized.	Individual Consumer Behavior **0%**	**N/A**
Mobility	Model shift	Increased use of public transport is promoted, leading to a shift from private vehicles to public transports both for urban and extra-urban trips. Passenger kilometers by car decreases, and Public Transport use is maximized to full capacity without additional infrastructure investment.	Individual Consumer Behavior **0%**	**N/A**

Sector focus (as per CGR® model designation)	CGR® Circularity Scenario	Description (as per the GCR® model designation)	Impact Rating	Maturity Level
Mobility	Flex work	Remote work is promoted to reduce commuting, targeting workers whose jobs can be performed remotely. This reduces the demand for office spaces in proportion to the reduced frequency of office attendance.	Individual Consumer Behavior **0%**	**N/A**
Mobility	Fleet electrification	The transition to electric vehicles is targeted at 50% for private fleets and 100% for the buses.	Supply and Demand-side **50%**	**ML 2**
Mobility	Lightweight vehicles	The design and production of lightweight vehicles are incentivized over conventional heavy vehicles, by the introduction of a material input tax on the production and sales of private and public vehicles.	Policy or Demand-side **25%**	**ML 2**
Mobility	Reduced air traffic	Air travel is reduced, particularly for congested routes and airports, based on the number of trips per capita per year and distance travelled.	Individual Consumer Behavior **0%**	**N/A**
Nutrition	Diet shift (vegetarian diet)[xxix]	A shift toward vegetarian diets leads to the replacement of the caloric intake from meat and fish with an equivalent caloric intake from cereals, fruits, vegetables, and nuts.	Policy or Demand-side **25%**	**ML 3**
Nutrition	Avoidable food waste	50% of post-consumer food waste is avoided.	Supply and Demand-side **75%**	**ML 3**
Nutrition	Local, seasonal, and organic food production	Organic, seasonal, and local farming practices are adopted reducing the need for fertilizer, heating fuels (by reduced greenhouse framing) and transportation service inputs to the agricultural and food processing sectors.	Supply-side **100%**	**ML 3**
Nutrition	Balanced diet	A balanced diet is achieved by reducing the total actual caloric intake per capita to the sufficiency level for the average person, estimated at 2,920 kcal/cap/day based on the current global average and applied to all diets.	Individual Consumer Behavior **0%**	**N/A**

[xxix] Note that this does not mean a vegetarian diet, the scenario already includes a theoretical maximum of this shift. On top of this the maturity level of 25% is applied

5. Sensitivity Scenario Analysis

Sensitivity analysis was conducted on both adoption and maturity levels to account for the complexities and uncertainties in projecting the adoption and impact of a new and voluntary protocol like the GCP. The assumption about adoption rates comes with a high degree of uncertainty. While the CDP provides a proxy for adoption, there are several factors that could influence the pace of the GCP adoption.

Results in this report are presented as a range and are based on the sensitivity scenario analysis considering a low and high adoption and maturity scenario in Table 14.

6. Impact Quantification

To quantify the potential impact of the GCP on climate and nature indictors, this study uses the CGR® Model, an Environmentally extended Input-Output model developed by Circle Economy Foundation. Model inputs were adjusted to account for assumptions regarding GCP adoption, circularity maturity levels, and CGR® Circularity Scenarios were selected where the GCP is expected to drive impact. Circle Economy Foundation developed its methodology and datasets for the CGR® in close collaboration with partners from academic and research institutes that make up the scientific committee. A detailed methodology of the CGR® Model can be found here.

7. Model Limitations

The Macro Impact Assessment, using the CGR® model, has been limited by time and is subjected to the following limitations, which are important to consider when interpreting the results:

- **Limited evidence on impacts of circularity** – there is limited evidence or information available on the potential impact of circularity. This is particularly apparent at a business level, where available case studies are typically narrow in scope, and are not consistent in their measurement of outcomes (which would inform the study), nor are they comprehensive enough to develop an overall understanding of an entire sector or value chain.
- **Limited evidence on impacts of protocols** – there is limited evidence or information available on the impact of protocols on behavioral and operational change. This change relies on key dependencies set out in the annex, i.e., there is a key dependency on there being a supportive operating environment for businesses to adopt circular business models. Therefore, an overarching assumption is that these dependencies are true, which in part could be enabled by GCP. If this assumption is not true, the GCP could have limited impact, which is not reflected in the results set out in this study.

Table 14. **Low and high adoption and maturity scenarios.**

Low adoption and maturity scenario	High adoption and maturity scenario
This more conservative scenario assumes a slower uptake, drawing a parallel with a slower CDP uptake by extending the CDP's current adoption timeframe from 20 years to 25 years. Based on this, the GCP is anticipated to achieve an adoption rate of 50% by 2050, assuming a slower growth rate compared to the CDP over a similar period (25 years) Maturity rates for the counterfactual and GCP scenario use the 25% quantile of TWG survey responses.	This scenario draws a parallel with the adoption rate of the Carbon Disclosure Project (CDP), utilizing its 20-year historical trajectory as a benchmark. Based on this, the GCP is expected to achieve an adoption rate of around 80% by 2050. Maturity rates for the counterfactual and GCP scenario use the average of TWG survey responses.

- **Simplified logic chain:** while the underlying theory of how GCP can influence change encompasses complex interactions between sectors, policymakers and economic factors, this study uses a simplified representation, recognizing the need for further refinement.
- **Static Model Assumptions:** the CGR® Model used in this analysis is a static model based on 2021 data, assuming no incremental changes to the economy over time. It does not capture dynamic feedback such as sector transformation, price and demand fluctuations, technological advancements, consumption pattern shifts, or the impact of environmental regulations. Consequently, the 2050 results in this analysis are solely driven by adoption and maturity assumptions, relying on 2021 data without incorporating emission or population forecasts.
- **Limited Sectoral Scope:** the analysis focuses specifically on four High Impact Sectors that are expected to drive the greatest impact on circularity, however, acknowledging that a broader sectoral scope could be included to cover the full potential impact of the GCP.
- **Circularity Scenario Constraints:** the analysis is limited to the Circularity Scenarios within the CGR® Model. It is recognized that there might be added circularity activities that could significantly contribute to the broader circular economy transition but are excluded from this analysis.
- **Regional Distribution:** while the model cannot pinpoint the location of circularity actions, it can offer valuable insights into the regions where impacts are likely to be observed.

Further research could be explored to mitigate each of these limitations, strengthening the evidence base as new data becomes available and enables other approaches (e.g., the development of a dynamic macroeconomic model).

Annex B | Detail of value chain analysis

To deepen the understanding of how circularity can drive business performance, four value chains were analyzed in four key impact sectors:

i. Manufacturing - electronics

ii. Transportation - automotive

iii. Construction - concrete

iv. Agriculture - agrifood

The sectors were selected based on their high environmental footprint and resource-intensive production practices. This means that while they present some of the most significant circularity challenges today, they can be a part of the most impactful circularity solutions in the future. To facilitate this transition, businesses in each sector require clear guidance to implement and measure targeted circularity interventions.

Within the sectors a value chain deep dive was conducted, ensuring global coverage. To bring a real-world view to this guidance, members of the WBCSD Circularity Working Group were engaged to provide input, through interviews, questionnaires, and workshops. This input focused on how businesses set commitments against circularity principles and the actions they had taken to drive progress. Beyond this, contributors also highlighted how the circular economy could drive business performance in the short-medium-long term, and finally how the GCP could help overcome barriers inhibiting circularity.

Four selected value chains were analyzed, using the following approach:

i. **Mapping of the value chain** – using interviews with stakeholders and publicly available information, performed a high-level mapping of the value chain surfacing opportunities and barriers;

ii. **Challenges faced** – comprehend how are sector activities or characteristics preventing the adoption of circular principles and where do these sit in the value chain;

iii. **Potential circular strategies** – understand the potential strategies that could be implemented across the value chain to allow the business to progress upwards on the R-ladder;

iv. **Performance indicators** – demonstrate how companies could measure and use new/innovative revenue streams and reduce their environmental footprint, through circular approaches;

v. Using these collective insights, it was mapped how GCP can accelerate the circular transition and help companies adopt more mature circular solutions.

Selecting business performance indicators

The micro analysis assesses how a GCP-accelerated circular transformation can drive socio-economic value for businesses. To do so, business performance indicators have been selected and assessed qualitatively in their relationship with the circularity performance and maturity level for each studied sector.

From the landscape analysis, a list of commonly used financial and non-financial indicators was identified. The indicators linked to the four Flows circularity strategies (Narrow, Slow, Close, Regenerate) were selected, as those would relate circularity with maturity levels used in the study.

From that subset of indicators, five were chosen based on evidence availability and their relevance to the GCP and the four selected high impact sectors. Resulting in five selected business performance indicators intended to capture the impact of circularity in three main areas: financial, reputational and environmental. The indicators used in this study were the following Table 15.

Table 15. **Business performance metrics**

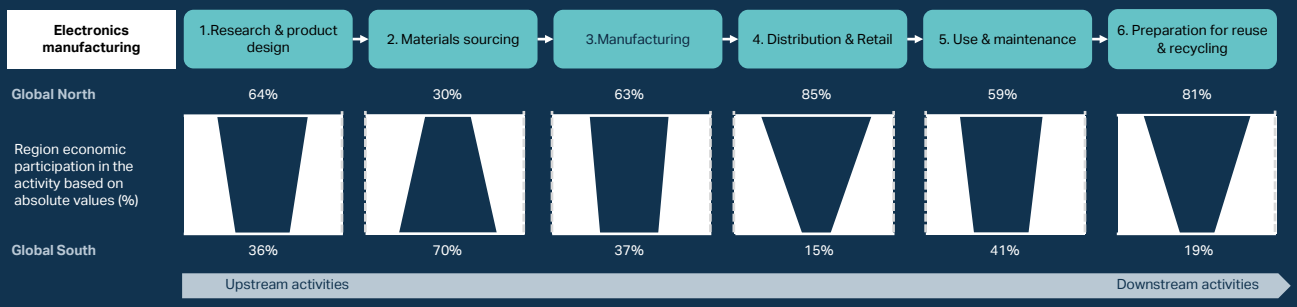
#	Business performance	Performance driver	Example Metrics
1	Financial	Revenue generation	Circular revenue (e.g., RSCR: the share of a business' total sales revenue generated by use of circular resources or circular products[73] or 'CTI revenue': circular portion of the revenue[74])
2	Financial	Cost reduction	Reduced total cost of ownership (TCO) over the product lifetime, Operational Expenditure/Capital Expenditure from access to funding e.g., governments funds, and incentive schemes[75]
3	Reputational	Customer sentiment	Customer (business and individual consumers) sentiment from circular brand identity or customer satisfaction from extended lifecycle, affordable and sustainable options
4	Environmental	GHG emissions	Reduction in GHG emissions (inflow or outflow)[76]
5	Environmental	Decoupling resource use from growth	Material productivity (MP) demonstrating the ratio of revenue to resource intensity[77,78] or Resource intensity index (RII) providing provides a quantitative measure of economic growth versus total resource use,[79] thus capturing the effects of either relative or absolute decoupling

Manufacturing | Electronics

The electronics value chain is complex and globally fragmented; however, it has high potential for circularity, which can be achieved by adopting circular strategies across the value chain (Figure 14).

Figure 14. **General value chain of the electronics sector.**

Sources: MRIO Input-Output tables, 2021; S&P Global, 2021; United Nations Institute for Training and Research, 2024.



Challenges

Some of the challenges that can be seen in the electronics value chain include:

- **Upstream** – Research and development activities (R&D) are concentrated in the Global North, with material preparation located in the Global South.[80] Poor end-of-life (EoL) infrastructure and material movement barriers thus create difficulties in closing supply loops for use in new products.
- **Midstream** – Multinationals have challenges finding Global South partners to recover, remanufacture and refurbish devices. This also highlights the geographical knowledge gap.[81,82]
- **Downstream** – Most e-waste is in the Global South, which lacks formal recycling infrastructure, therefore formal reuse and recycling activities are limited. Around 10% of global e-waste is shipped across borders, mainly from the Global North to the Global South, while 65% of this through is estimated to be uncontrolled and undocumented transboundary movements. Material values recovered by the informal sector are largely offset by extremely high health and environmental costs.[83]

Circularity strategies

When developing circularity strategies to address the challenges in the electronics sector, businesses should focus on how to progress upwards on the R-ladder by prioritizing the following:

- **Product design** in electronics, can incentivize longer product life cycles and decouple material use while maintaining revenue, being designed, for example, for modularity, upgradability, and disassembly combined with **as-a-service business models**.[84,85,86]
- **Standardizing parts and material specifications** can reduce downstream complexity. Circular models emphasizing reuse and refurbishment enable manufacturers to retain higher value, while remanufacturing can reduce production costs by 6%-12% compared to new materials.[87]
- **Substitution for cleaner materials** in design and manufacturing can improve recycling, with many devices containing up to 60 chemicals. Effective regulation and industry standards in e-waste recycling and EoL management can also prevent health issues and reduce pollution.[88]

Circular opportunities and performance indicators

However, implementing circularity improvements in the electronics sector is not just about mitigating challenges, but rather capitalizing on opportunities to uplift business performance. Some of the most significant opportunities in the sector include:

- **Revenue generation** – A mature installed-base of Product as a Service (PaaS) equipment and established take-back programs can lead to long-term stable services and reuse / refurbishment revenues.[89]
- **Customer sentiment** – Improved customer satisfaction via affordable refurbished products[90]
- **Decoupling resource use from growth** - Impact will accumulate as circular solutions reach scale[91]

How the GCP can help accelerate circularity

The GCP can support the electronics sector in realizing these new opportunities using the following five measures:

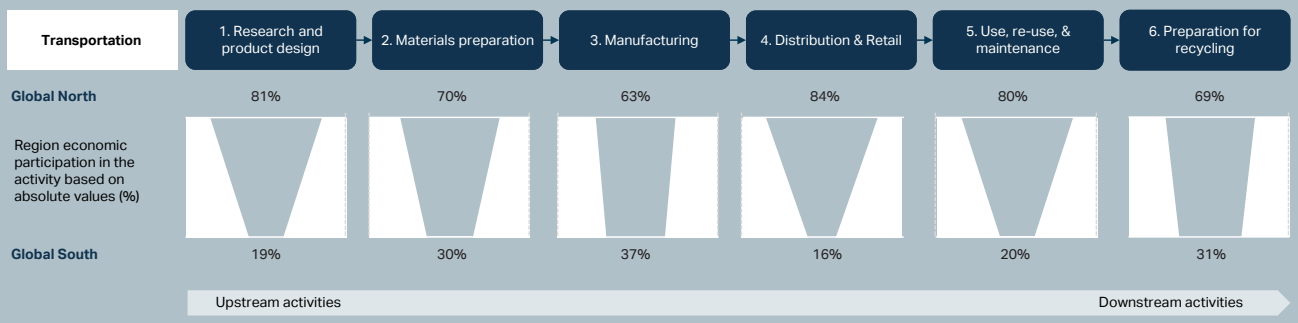
- **Metrics, guidance and target-setting** – Incentivize practices and strategies that are higher up the R-ladder, by encouraging businesses to adopt metrics that move beyond e-waste to measure circularity, such as repair, refurbishment and remanufacturing, will incentivize companies to focus on circular product design (e.g. modular) and on circular business models (as-a-service).[92] This will enable companies to benchmark performance and normalize business models as repair service or remanufacturing units, encourage them also to review material sourcing and reutilization and revaluation of end-of-life products.
- **Interoperability and standardization** – Standardization on product design, processes and materials used (e.g., modularity of design) helps the sector move higher on the R-ladder and increases interoperability within the value chain[93] ensuring that parts, components, and processes are consistent and interchangeable. Hence circular practices can easily be replicated across geographies, electronic product categories and even throughout the value chain when standards are harmonized.
- **Data and digitalization guidance** – Facilitate lifetime extension, predictable maintenance, and material sorting for reuse through data availability[94] (e.g., cases like the battery passport can be extended to products' components). Digitalization allows businesses to manage and decide upon complex value chains and lifecycle processes at scale, encouraging stakeholders to increase their data performance.
- **Entire life cycle approach** – Accelerate focus on dematerialization, cleaner non-hazardous substances for easier recovery and adopting as-a-service models,[95] ensuring electronic industry companies can capitalize on future revenues through product differentiation, a more integrated and longer relationship with the customer and rethink the use of raw materials. Ensuring that all stages of a product's life are optimized for circularity, from design to disposal, will lead to focus shifts from individual products to others where either components or processes are similar, rapidly expanding circularity practices.
- **Policy guidance** – Support policymakers in policy development to eliminate early obsolescence and (e-)waste, requiring/ incentivizing companies to offer fit-for-purpose products e.g., right-to-repair policies with benefits like reducing e-waste, resource extraction, reducing climate and environmental impacts, or even decreasing total cost of ownership.[96]

Transportation | Automotive

The global automotive value chain is scattered, forming a barrier to realizing a circular value chain at scale; additionally, the lack of (formal) end-of-life and end-of-use infrastructure limits reuse and recycling activities (Figure 15).

Figure 15. **General value chain of the automotive sector.**

Source: MRIO Input-Output tables, 2021



Challenges

Some of the core challenges that can be seen in the automotive value chain include:

- **Upstream** – Until 2021 The Global North was leading in R&D and advanced manufacturing, while the Global South focused on traditional vehicle production.[97] To bridge this gap, specific support is needed for the Global South to advance in new technologies and high-value activities, although innovation has been witnessed in some Global South countries in recent years.
- **Midstream** – The Global South's growing manufacturing presence and the Global North's dominance in distribution and retail create obstacles, such as economic disparities or policy differences, when implementing circular models and ensuring value chain traceability.[98]
- **Downstream** – The Global South has longer vehicle lifespans and lower dismantling costs, leading to more recycling but limited advanced processes due to infrastructure and technology constraints. The Global North shows more advanced recycling processes but often exports used vehicles to the Global South, delaying local recycling advancements.[99]

Circularity strategies

When developing circularity strategies to address the challenges in the automotive sector, businesses should focus on how to progress upwards on the R-ladder by prioritizing:

- **Waste generation and low utilization rates** can be addressed through new automotive business models, (e.g., vehicle sharing services), capturing more financial value.[100] Further, product design and manufacturing (e.g., lightweight vehicles) can encourage the use of secondary materials, reducing components and selecting more efficient materials.[101]
- **Vehicle design** is crucial to standardize parts and material specifications, reducing downstream complexity. Circular models focused on repair and the use of spare parts allow manufacturers to retain higher value than linear models, as less new production is required. Through remanufacturing procedures, costs can be reduced, and the production of recycled materials is significantly less CO_2 intensive.[102]
- **Define standards and requirements** in the research, development, and production phases so that the recycling process ensures the provision of high-quality materials at EoL. This strategy can enable easier recycling and minimizes harmful chemicals, enhancing safety and reducing pollution.

Circular opportunities and performance indicators

However, implementing circularity improvements in the automotive sector is not just about mitigating challenges, but rather capitalizing on new opportunities to uplift business performance.

Some of the most significant opportunities in the sector include:

- **Operational cost reduction** – The implementation of circular strategies enhances the stability of the value chain and mitigates supply risks, significantly lowering production costs.[103]
- **GHG emissions reduction** – Significant reduction of GHG emissions from circular business models (e.g., by 70% reduction by 2050, or 285 million tons of CO_2 equivalent).[104]
- **Customer sentiment** - Improved customer satisfaction with affordable prices and the shifting demand from ownership to usage-based models (e.g., Vehicle-as-a-Service based on subscription models).[105]

How the GCP can help accelerate circularity

The GCP can support the automotive sector in realizing these new opportunities using the following five measures:

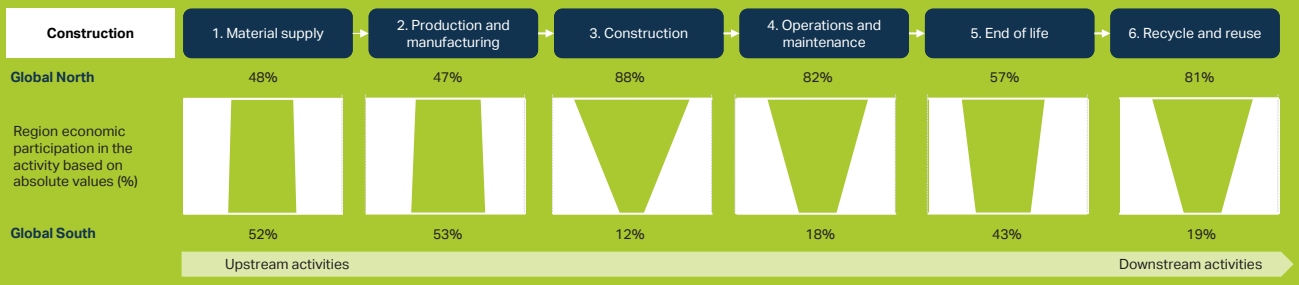
- **Metrics, guidance and target-setting** – Incentivize circular production by increasing recycled aluminum and plastic use (e.g., refurbished vehicle parts, batteries), aligning with the new ELV directive, and prioritizing circularity metrics over waste reduction.[106,107] Establishing clear targets helps automotive businesses scale their circular activities by aligning their practices across different geographies and with industry standards.
- **Interoperability and standardization** – Cross value chain collaboration is key to accelerate circular production, setting industry standards for components and recycled content, like green steel, will enable easier repair, refurbishment, and remanufacturing of vehicles and parts, improve overall environmental performance.[108] Standard definitions and methodology, building on ISO 59000 series of Circular Economy standards, for calculating metrics allow comparability between competitors, which is a catalyst for action.
- **Data and digitalization guidance** – Enhance design using product and lifetime data, using EU battery regulations and the upcoming ELV Directive, while setting ambitious industry standards for recycled content through data-driven methods.[109]
- Improved data sharing and digital tools can significantly optimize circular strategies, for example predictive maintenance powered by data analytics can prolong the life of vehicle components, data on usage can also guide more effective recycling, repurposing and design processes. Sharing data on material composition and performance can help companies move through its operations and enables collaboration between the value chain.
- **Entire life cycle approach** – Accelerate focus on dematerialization, cleaner non-hazardous substances for easier recovery and adopting as-a-service models. Life cycle thinking also encourages the product design to use of materials that are easier to recycle or reuse and to focus on easy disassembly reducing remanufacturing and refurbishment efforts, further promoting circularity. This will broaden the scope of circular practices by incorporating all stages of a vehicle's life cycle, from design to reuse, which encourages the integration of circular strategies across the entire value chain, potentially leading to new partnerships and expanded markets (e.g., repair and remanufacture units, recycled and refurbished components sellers / buyers).[110,111]
- **Policy guidance** – Support policymakers in developing policies to extend vehicle lifespan and foster a global recycling infrastructure (Global North and Global South). If policies focus on limiting resource usage it will incentivize companies to focus on remanufacturing and reuse over less sustainable practices like simple recycling, or even on vehicle leasing or product-as-a-service, which inherently promote reuse and longevity. These will incite value chain collaboration to drive circularity and companies to scale-up circular solutions other parts of their operations / geographies, especially if there is a standardization across regions.[112]

Construction | Concrete

The construction sector is the largest consumer of materials and is facing reduced circularity due to the lack of trust, infrastructures, and data for cycling practices, and the fragmented market that hinders scaling and collaboration (Figure 16).

Figure 16. **General value chain of the construction sector.**

Source: MRIO Input-Output tables, 2021



Challenges

Some of the core challenges that can be seen in the construction sector and concrete value chain include:

- **Upstream** – The built environment is the biggest consumer of raw materials worldwide. The focus is mostly on materials produced locally, except for high value materials such as steel.[113] Due to the large quantity of materials with high environmental needs (concrete, steel, etc.), the sector has important impacts on land use, biodiversity and GHG emissions.[114]
- **Midstream** – New buildings growth in the Global South does not align with demolitions in the Global North, leading to a disconnect between supply and rapidly growing demand.[115] Additionally, buildings are not designed for circularity, hindering future reuse and recycling.[116]
- **Downstream** – Long building life cycles make it difficult to predict EoL and plan for secondary materials. The lack of data, reduced trust in secondary materials, and local standards hinder scaling up circular practices. In the Global South, informal and unregulated demolition waste often ends up in landfills or illegal dumping sites.[117,118]

Circularity strategies

When developing circularity strategies to address the challenges in the construction sector, businesses should focus on how to progress upwards on the R-ladder by prioritizing:

- **Reforms to building usage** (e.g., rethink office usage to minimize space[119]) and new design approaches (e.g., building with less concrete[120]) could pave the way to a more sustainable urban development. Those approaches could reduce the need for materials as less space is needed per individual.
- **Designing buildings to drive longevity** could include developing buildings that are modular, detachable, standardized, adaptable and connected for easy monitoring. Standardization can help minimize waste creation in the process, while adaptability can make sure that the building can always fit the needs of the tenants.
- **Recycling** can be used to recover building materials, albeit usually at a lower value,[121] by applying practices such as backfilling and low-grade recovery applications.[122] Additionally, the long lifetime of products can make it challenging to recover material at the end of life as there are limits to the materials which can be looped-back into construction value chains.[123]

Circular opportunities and performance indicators

However, implementing circularity improvements in the construction sector is not just about mitigating challenges, but rather capitalizing on new opportunities to uplift business performance. Some of the most significant opportunities in the sector include:

- **Operational cost reduction** – Using recycled concrete aggregate instead of virgin can reduce cost by up to 40%.[124]
- **Customer sentiment** - Switching to high-value circular offerings aligns with customers' increasing sustainability expectations.
- **GHG emissions reduction** – Circular strategies, such as mineralization technologies, smart crushed aggregates, and sourcing recycled aggregates, can reduce 96% of embodied GHG emissions by 2050.[125]

How the GCP can help accelerate circularity

The GCP can support the construction sector in realizing these new opportunities using the following five measures:

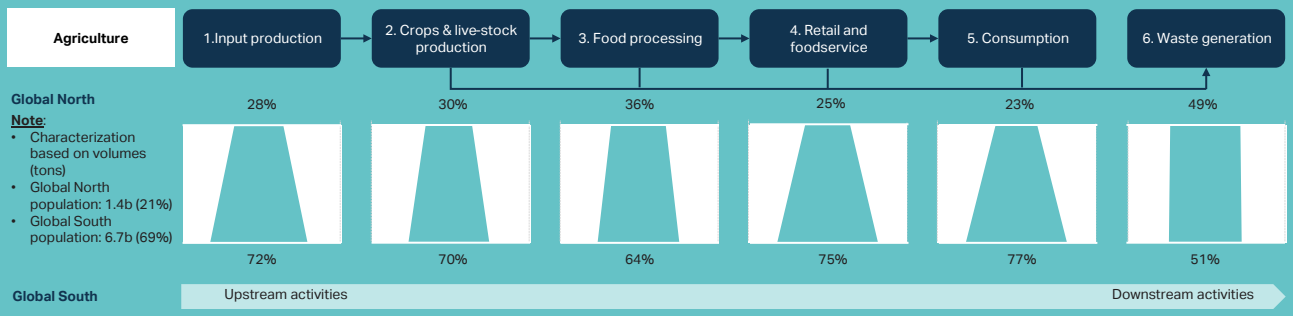
- **Metrics, guidance and target-setting** – Incentivize practices and strategies that are higher up the R-ladder, by encouraging business to adopt metrics that move beyond waste to measuring for circularity, such as reuse (e.g., reusing materials like steel or concrete), remanufacturing (e.g., refurbishing structural components), and repurposing (e.g., converting building materials for new uses). By focusing on targets for waste reduction or material recovery, businesses are incentivized to prioritize strategies that retain the value of materials for longer periods enabling to scale up processes across multiple projects and regions.[126]
- **Interoperability and standardization** – Standardization in materials, components, and construction processes would drive reuse, repurpose and recovery practices and improve trust in secondary materials. In the long run, it would help scaling circular strategies across geographies and value chains, driving circular practices throughout the industry.[127]
- **Data and digitalization guidance** – Improve design of more circular and efficient building through product and lifetime data. Digital platforms (e.g., Building Information Modeling and Geographic Information Systems) can provide real-time data on material usage and enabling more efficient repurposing and reuse of materials and guiding predictive maintenance. With data sharing collaboration is swifter and sharing data on material composition, life expectancy and structural integrity can help the industry to optimize the use of stronger and less impactful materials across projects and regions.[128,129]
- **Entire life cycle approach** – Ensuring the industry considers the full life cycle during the design stage, leading to buildings easy to disassemble, with materials that can be reuse, repurposed, recycled or even that are biobased that the impact throughout its lifetime is minimized. This will encourage collaboration both in downstream and upstream processes and accelerate focus on new urban approaches that maximize space usage while enhancing social values.
- **Policy guidance** – Support policymakers in harmonized policy development to improve recovery potential by incentivizing highest R-ladder approaches and focus on the circularity of the materials used and their circularity potential. Guidance could help global policies to get more standardized, as project value chains are usually strict to close regions and policies deeply vary.[130]

Agriculture | Agrifood

Agriculture is central to the world population's livelihood and faces many challenges, especially as the world looks to increase output and productivity while reducing environmental impacts. The GCP can help in advocating for circular strategies across the value chain to improve the sustainability of our food systems. Intensive agriculture is linear, requiring a high level of input, such as capital and chemicals, per unit of land. Additionally, as discussed in the nature impact analysis, intensive agriculture runoff causes water pollution and soil degradation.[131] The inputs, crops and livestock production, food processing, retail and foodservice and consumption are divided proportional to the global population spread, except waste generation, which is higher in the Global North, see Figure 17. The hypothesis is that in the Global South more waste is managed via the informal economy.[132]

Figure 17. **General value chain of the agriculture sector and share of activities that take place in Global North versus Global South.**

Source: Food and Agriculture Organization Corporate Statistical Database (FAOSTAT Database), 2022



Challenges

Some of the core challenges that can be seen in the agricultural value chain include:

- **Upstream** - Nitrogenous fertilizers require natural gas feedstock. The linear production process transforms non-renewable inputs into a non-recoverable output. As such, nitrogen-based fertilizers are a core challenge in scaling circular agricultural value chains.[133]
- **Midstream** – While crops and livestock are produced according to consumption, agriculture moves nutrients from soil into crops. To increase soil health, solutions like rotating crops and applying manure are sometimes applied. This 'nutrient gap' is, however, reduced by non-circular synthetic fertilizers.[134,135]
- **Downstream** - Malnourishment and malnutrition continue to be prevalent worldwide challenges, particularly in the Global South. However, a significant 2.5 billion tons of food is currently wasted or lost annually on the farm, in the supply chain or at consumption.[136,137] As the population grows, it becomes even more crucial for the food system to reduce waste.[138]

Circularity strategies

When developing circularity strategies to address the challenges in the agriculture sector, businesses should focus on how to progress upwards on the R-ladder by prioritizing:

- **Regenerative agriculture** includes five pillars[139] which focus on the application of more circular farming practices to increase sustainable food production and reduce resource use. Companies, including McCain and Nestle, have set 2030 targets to source 100%[140] and 50%[141] of their respective food products from farmers using regenerative practices.
- **Process surplus and edible food** via atmospheric control and food preservation techniques (e.g., canning, freezing, and fermenting), and focus on more effective stock management systems to reduce waste, including differentiation of food prices based on factors like best before date and quality.
- **Utilize locally produced manure, human waste, and compost** in agricultural activities to recover nutrients and recirculate organic waste back into the biological process as natural fertilizer.

Circular opportunities and performance indicators

Food and food waste are both an environmental and societal challenge. Implementing circularity improvements throughout the value chain and investing in regenerative agriculture is not just about mitigating challenges, but rather capitalizing on new opportunities to uplift business performance. Some of the most significant opportunities in the sector include:

- **Revenue generation** – Maximize resource value and value creation through industrial symbiosis and reusing of by-products.[142]
- **Customer sentiment** - Build long-term brand loyalty as sustainability leader with focus on supporting circular food systems and developing quality organic product lines.
- **Decoupling resource use from growth** – Introduce regenerative agriculture practices to reduce the emissions, soil degradation and erosion, increase resilience to climate change and to long-term linear risks, thereby reducing business risks too. Create partnerships with utilities and waste management organizations to use outputs of other sectors through industrial symbiosis.[143]

How the GCP can help accelerate circularity

The GCP can support the sector in realizing these new opportunities using the following five measures:

- **Metrics, guidance and target-setting** – By encouraging the adoption of metrics that go beyond food waste reduction, such as nutrient recycling, water reuse, and the use of organic-based fertilizers, agricultural businesses can be incentivized to embrace higher-order circular practices like precision agriculture. This focus on circular metrics will drive the integration of sustainable practices across the agricultural value chain, helping to scale these practices globally and expand their application across different farming and food systems and regions.
- **Interoperability and standardization** – While agriculture and agricultural practices benefit from diversity for increased biodiversity and resilience, interoperability and standardization in reporting can enable businesses in the agrifood value chain through the circular transition. For example, interoperability and standardization can support the sharing of information as well as resources and by-products, enabling industrial symbiosis. Standardization and interoperability of measurement and reporting could support industry and policymakers to prioritize actions.
- **Data and digitalization guidance** – The use of digital tools and data-driven approaches, as precision agriculture and satellite monitoring, can optimize resource use and support higher R-Ladder circular strategies (e.g., precision nutrient application and water management). Improvements on data sharing will enable better decision-making, more transparency and more efficient resource management along the agricultural value chain, allowing businesses to scale these practices across diverse regions and farming systems.
- **Entire life cycle approach** – Adopting a life cycle approach in agriculture encourages businesses to consider the full impact of their practices, from resource extraction to end-of-life management. This approach promotes strategies like the use of bio-based inputs, efficient resource use, and waste minimization. It would also support the scaling of circular practices by ensuring that circularity is embedded at every stage of the agricultural process, across a wide range of products and regions.
- **Policy guidance** – Policy guidance that supports circularity in agriculture can drive businesses to adopt higher-order strategies in the R-Ladder which could stimulate innovation and support differently small- and large-scale producers. Policies that incentivize sustainable agriculture will encourage companies to scale these practices across different regions and farming systems, helping to standardize circular practices globally. Having knowledge of the impact of population's nutrition on climate and environmental factors, policies affecting the downstream stakeholders can also push the substitution of livestock-based proteins production to less resource intensive productions, such as plant-based proteins.

Annex C | Summary of the landscape analysis

The landscape analysis identified gaps and opportunities in circularity-related Corporate Performance and Accountability (CP&A), policies and regulations. This section contains a summary of the findings, for a full view click **here**.

For both CP&A and policy and regulation analysis the main insights are listed below, followed by recommendations for the GCP resulting from the analysis.

Corporate Performance and Accountability

- **A sustainable and just transition**: Companies can use circularity as an instrument to address resource scarcity, achieve net-zero, zero pollution goals, combat biodiversity loss, drive an impactful and just transition, and create economic impact.[144,145,146] However, circularity can lead to unintended consequences and rebound effects (e.g., job changes may affect communities differently, increased consumption, etc.) if not implemented deliberately and cautiously to "optimize its impact and help society reap the benefits".[147]
- **Resource value retention and maximization**: Most reporting metrics focus on end-of-life or lifespan extension, and do not account for a resource-centric view, which is fundamental to decoupling, value retention and resource maximization.
- **Accelerating the transition through organizational enablers**: While measuring material flows and environmental and societal impact is fundamental, and understanding business performance is critical, organizational enablers are needed to help accelerate the circular transition.
- **Finance for circular businesses and models**: Financing is a key enabler of the CE transition and scaling of circular business models. Financial actors, including governments, investors, insurers, investment, commercial and multilateral development banks and private equity have different needs and roles to play. Both finance providers and businesses seeking finance run into similar challenges due to the gaps in current standards and frameworks.
- **Value chain transparency and harmonized reporting**: Challenges related to value chain transparency are significantly impeding the circular transition. Amongst others stemming from discrepancies in definitions and indicators, barriers to data access and exchange, and a limited scope of reporting and responsibility.

Recommendations for the Protocol:

- The GCP should set **globally consistent metrics**, but also incorporate relevant environmental and social indicators to enable a clear link and measurement between CE practices and business impacts. For example, recognition of the *informal economy* as a key contributor to the circular economy will help ensure the GCP is conductive to a just transition.
- The GCP should include a broad range of indicators aligned with CE principles not represented, enabling the measurement of avoided impacts and resource use of circular and sharing models. For example, these should cover both the techno- and biosphere, life cycle approaches, value maximization aligning to the top of the R-ladder, and indicators to measure businesses' demand-side strategies (e.g., circular procurement, data and information available to consumers).
- The GCP should provide **quantitative indicators and comprehensive guidance**, highlighting how enablers can be leveraged within different parts of a business regardless of its size and region to drive systemic value creation. For example, establish a common circularity language to provide a base for regulation, standards and frameworks, and organizational global alignment, supporting collaboration and data sharing.
- The GCP should set **guidance to navigate external enablers** that can accelerate the transition toward a circular economy, such as financing. For example, standardized methods, (unit value) metrics and definitions will enable the comparison of investments as well as the surfacing of value creation by circular businesses (necessary tools include holistic risk models that are better suited for circularity, and valuation methods for residual resources, as well as for companies with circular business models).

- The GCP should incorporate the below considerations:
  - Set clear definitions of material flows and define the boundaries of flows for which businesses are accountable to increase transparency and consistency.
  - Adopt a value chain and value network approach that enables the systemic shift from waste to resource centricity.
  - Build on existing frameworks to address inconsistencies, providing harmonization and interoperability and enabling comparability.
  - Provide guidance to reflect that circular solutions (and their measurement) will vary per industry, sector or region.

Policy and Regulations

Strategic policy levers and ecosystem enablers to support the transition: The research has found that governments are key the transition to circularity. Policymakers are using a range of strategy levers to achieve certain circularity goals, but the success is linked to broader ecosystem enablers. The analysis summarizes eight strategic levers[xxx] and eight ecosystem enablers[xxxi], all are critical to a successful move toward a circular economy. These levers and enablers are being applied in different combinations across geographies to varying degrees and levels of success. The steps needed to enhance levers and enablers are not always clearly defined as they relate to overarching system change.

Recommendations for the Protocol:

- The policy landscape for circular economy is divergent across countries and is constantly changing. There is therefore a need **to standardize, harmonize and align definitions and approaches** to help embed consistency across geographies.
- Policy actions in national and regional circular economy roadmaps often focus on waste management.[148,149] There is a need to **shift the focus to the entire lifecycle** including policy on eco-design and designing for circularity.
- The **impact** of individual **policy levers** is optimized when **implemented together** (applying to domestic and international levers). Strong cross-governmental engagement is the most effective to ensure a joined-up approach which works toward all circularity objectives.
- Ecosystem enablers are cross-cutting and play a key role in supporting a just transition. However, their development relies on strong **public-private and cross-sector collaboration** to bring about systemic change.

Governments must consider the **circular economy as part of their broader sustainability strategies**. Circularity is inherently linked to economic development, industrial strategy and other policy objectives, such as net-zero, and it should be viewed as a mechanism for achieving climate, biodiversity, land, water, pollution and resource scarcity goals as well as business and value chain performance, but will require infrastructure development, incentives to drive circular business models and investments.[150]

[xxx] Research & innovation, Knowledge & information sharing, convening & partnerships, public procurement, Targets, In monitoring & data, Producer & product responsibility, Fiscal instruments and Standards & disclosures.

[xxxi] Behavior, culture and value awareness, Skills & education, Technology, digitalization & data, Circular infrastructure & resource management, bridging the supply-demand gap, Structure & governance, Trade agreements & international collaboration and Equity & Just transition.

References

1 World Business Council for Sustainable Development & One Planet Network (2024). *Landscape Analysis of Circularity-related Corporate Performance & Accountability and Policy & Regulation.* Retrieved from https://www.wbcsd.org/resources/gcp-landscape-analysis/

2 EXIOBASE (2024). Retrieved from https://www.exiobase.eu/

3 United Nations Environment Programme (2024). *Global Resources Outlook 2024: Bend the Trend – Pathways to a liveable planet as resource use spikes.* International Resource Panel. Nairobi. Retrieved from http://www.unep.org/resources/Global-Resource-Outlook-2024

4 Circle Economy Foundation (2024). *Circularity Gap Report 2024.* Retrieved from http://www.circularity-gap.world/2021

5 World Economic Forum (2024). *For manufacturers, the circular economy strengthens supply chains.* Retrieved from http://www.weforum.org/agenda/2024/02/how-manufacturers-could-lead-the-way-in-building-the-circular-economy/

6 Lu, S., & Serafeim, G. (2023). *Circular Products and Business Models: Opportunities for Entrepreneurs, Managers, and Investors. Managers, and Investors.* Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4431027

7 United Nations (2019). *SDG indicators.* Retrieved from https://unstats.un.org/sdgs/report/2019/goal-12/

8 United Nations Environment Programme (2024). *Global Resources Outlook 2024: Bend the Trend – Pathways to a liveable planet as resource use spikes.* International Resource Panel. Nairobi. Retrieved from http://www.unep.org/resources/Global-Resource-Outlook-2024

9 Meinrenken, C.J., et al., *Carbon emissions embodied in product value chains and the role of Life Cycle Assessment in curbing them.* Sci Rep 10, 6184 (2020). https://doi.org/10.1038/s41598-020-62030-x

10 World Benchmarking Alliance (2023). *Corporate Human Rights Benchmark 2023.* Retrieved from https://www.worldbenchmarkingalliance.org/corporate-human-rights-benchmark/

11 Gradillas, M; Castro, A; Salandra, R; (2021) *Understanding the adoption of voluntary environmental, social and governance (ESG) standards in the real estate sector.* The Bartlett School of Sustainable Construction, UCL: London, UK. Retrieved from https://discovery.ucl.ac.uk/id/eprint/10139259/

12 Luo, L., & Tang, Q. (2023). *The real effects of ESG reporting and GRI standards on carbon mitigation: International evidence.* Business Strategy and the Environment, 32(6), 2985–3000. https://doi.org/10.1002/bse.3281

13 Tomar, S., (2023). *Greenhouse Gas Disclosure and Emissions Benchmarking.* SMU Cox School of Business Research Paper No. 19-17, European Corporate Governance Institute – Finance Working Paper No. 818/2022. Retrieved from http://dx.doi.org/10.2139/ssrn.3448904

14 Bui, B., Houqe, M.N. & Zahir-ul-Hassan, M.K. (2022). *Moderating effect of carbon accounting systems on strategy and carbon performance: a CDP analysis.* J Manag Control 33, 483–524. Retrieved from https://doi.org/10.1007/s00187-022-00346-7

15 Ibid.

16 United Nations Environment Programme (2020). *About the Montreal protocol.* Retrieved from www.unep.org/ozonaction/who-we-are/about-montreal-protocol

17 Chatham House and UNIDO (2024). *National Circular Economy Roadmaps: A global stocktake for 2024.* Retrieved from https://www.unido.org/sites/default/files/unido-publications/2024-05/UNIDO_National%20circular%20economy%20roadmaps_v07.pdf

18 Financial Conduct Authority (2014). *Review of literature on product disclosure.* Retrieved from Report Cover. Retrieved from https://www.fca.org.uk

19 Raghunandan, A and Rajgopal, S. (2021) *Mandatory Gender Pay Gap Disclosure in the UK: Did Inequity Fall and Do these Disclosures Affect Firm Value?* Columbia Business School Research Paper. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3865689

20 World Business Council for Sustainable Development & One Planet Network (2024). *Landscape Analysis of Circularity-related Corporate Performance & Accountability and Policy & Regulation.* Retrieved from www.wbcsd.org/resources/gcp-landscape-analysis/

21 Ibid.

22 International Labour Organization (2022). *International Standard Industrial Classification of All Economic Activities (ISIC).* Retrieved from https://ilostat.ilo.org/methods/concepts-and-definitions/classification-economic-activities/

23 Circle Economy Foundation (2021). *Circularity Gap Report* 2021. Retrieved from www.circularity-gap.world/2021

24 Technical Working Group (July 2024). *Survey on GCP adoption*

25 Kirchherr, J., Reike, D. and Hekkert, M. (2017). *Conceptualizing the circular economy: an analysis of 114 definitions.* Resources, Conservation and Recycling, 127, pp.221–232. Retrieved from https://www.doi.org/10.1016/j.resconrec.2017.09.005

26 Murdie, M., Birliga Sutherland, A., and Nusseck, M., (2024). *The Global South and the circular economy. World Commerce Review.* Retrieved from: https://worldcommercereview.com/the-global-south-and-the-circular-economy/

27 Geissdoerfer, M., et al., (2023). *Drivers and barriers for circular business model innovation. Business Strategy and the Environment,* 32(6), 3814–3832. https://doi.org/10.1002/bse.3339

28 Deloitte (2017). *Breaking the Barriers to the Circular Economy.* Retrieved from https://www.deloitte.com/content/dam/Deloitte/nl/Documents/risk/deloitte-nl-strategic-risk-breaking-the-barriers-to-the-circular-economy-white-paper.pdf

29 Philips (2023). *Annual Report 2023.* Retrieved from www.results.philips.com/publications/ar23

30 World Economic Forum (2022). *Driving Ambitions: The Business Case for Circular Economy in the Car Industry.* Retrieved from www.weforum.org/publications/driving-ambitions-the-business-case-for-circular-economy-in-the-car-industry/

31 World Economic Forum (2023). *Circularity in the Built Environment: Maximizing CO2 Abatement and Business Opportunities.* Retrieved from www.weforum.org/publications/circularity-in-the-built-environment-maximizing-co2-abatement-and-business-opportunities/

32 Holcim (2023). *Holcim Full Year 2023 Results.* Retrieved from www.holcim.com/sites/holcim/files/2024-02/28022024-finance-holcim-fy-2023-analyst-presentation-en.pdf

33 Deloitte (2021). *Vehicle as-a-service: From vehicle ownership to usage-based subscription models.* Retrieved from https://www.deloitte.com/global/en/Industries/automotive/perspectives/vehicle-as-a-service.html

34 Internet Retailing (2023). *The rise of refurbished tech: 71% of consumers conscious of electronics' eco credentials.* Retrieved from https://www.internetretailing.net/the-rise-of-refurbished-tech-71-of-consumers-conscious-of-electronics-eco-credentials/

35 Stakeholder communication (September 2024).

36 World Economic Forum (2023). *Circularity in the Built Environment: Maximizing CO2 Abatement and Business Opportunities.* Retrieved from www.weforum.org/publications/circularity-in-the-built-environment-maximizing-co2-abatement-and-business-opportunities/

37 Ellen Macarthur Foundation (2021). *Climate change and a circular economy for transport.* Retrieved from www.ellenmacarthurfoundation.org/climate-change-and-a-circular-economy-for-transport

39 Holcim (2023). *Holcim Full Year 2023 Results.* Retrieved from www.holcim.com/sites/holcim/files/2024-02/28022024-finance-holcim-fy-2023-analyst-presentation-en.pdf

39 Stakeholder Interview, July 2024

40 Opferkuch, K., et al., (2022). *Circular economy disclosure in corporate sustainability reports: The case of European companies in sustainability rankings.* Sustainable Production and Consumption. doi: https://doi.org/10.1016/j.spc.2022.05.003

41 Saari, U.A., et al., (2024). *Capabilities for circular economy innovation: Factors leading to product/service innovations in the construction and manufacturing industries.* Journal of Cleaner Production, 434, pp.140295–140295. doi: https://doi.org/10.1016/j.jclepro.2023.140295

42 ISO (2024). ISO 59004 *Circular Economy.* Retrieved from https://www.iso.org/standard/80648.html

43 Stakeholder Interview, July 2024

44 World Business Council for Sustainable Development & One Planet Network (2024). *Landscape Analysis of Circularity-related Corporate Performance & Accountability and Policy & Regulation.* Retrieved from www.wbcsd.org/resources/gcp-landscape-analysis/

45 Simons, L., Nijhof, A., and Janssen, M., (2023). *TransMission: The mission-driven transition approach to managing complex change processes.* TransMission Institute. Retrieved from https://www.newforesight.com/wp-content/uploads/2023/07/TransMission-E-book_ENG.pdf?x20847

46 Everett Rogers (1962). *Diffusion of Innovations.* Retrieved from https://link.springer.com/chapter/10.1007/978-3-658-09923-7_9

47 Carbon Disclosure Project (2024). *Website.* Retrieved from www.cdp.net/en

48 Science Based Targets initiative (2024). *Website.* Retrieved from https://www.sciencebasedtargets.org/

49 World Business Council for Sustainable Development & One Planet Network (2024). *Landscape Analysis of Circularity-related Corporate Performance & Accountability and Policy & Regulation.* Retrieved from www.wbcsd.org/resources/gcp-landscape-analysis/

50 Technical Working Group (July 2024). *Survey on GCP adoption*

51 Circle Economy Foundation (2023). *Circular Gap Report initiative methodology.* Retrieved from www.circularity-gap.world/methodology

52 Ibid.

53 Exiobase (2024). *Exiobase website – Home.* Retrieved from https://www.exiobase.eu/

54 Ellen Macarthur Foundation (2024) – *Biodiversity and the Circular Economy.* Retrieved from https://www.ellenmacarthurfoundation.org/topics/biodiversity/overview

55 Velasco-Muñoz, J. F., et al., (2022). *Circular economy in agriculture. An analysis of the state of research based on the life cycle.* Sustainable Production and Consumption, 34, 257-270. Retrieved from https://doi.org/10.1016/j.spc.2022.09.017

56 Capitals Coalition (2021). *Natural Capital Protocol.* Retrieved from https://www.capitalscoalition.org/capitals-approach/natural-capital-protocol/?fwp_filter_tabs=guide_supplement

57 Ellen Macarthur Foundation (2023). *The Nature Imperative: How the circular economy tackles biodiversity loss.* Retrieved from www.ellenmacarthurfoundation.org/topics/biodiversity/overview

58 International Labour Organization (2018). *Women and men in the informal economy: a statistical picture.* Third edition. Geneva. Retrieved from https://www.wiego.org/publications/women-and-men-informal-economy-statistical-picture-3rd-edition

59 International Resource Panel. (2024). *Global Resources Outlook 2024.* Retrieved from https://www.unep.org/resources/Global-Resource-Outlook-2024

60 London School of Economics (2024). *What is the just transition and what does it mean for climate action?* Retrieved from https://www.lse.ac.uk/granthaminstitute/explainers/what-is-the-just-transition-and-what-does-it-mean-for-climate-action/

61 Brockway, P.E., et al., (2021). *Energy efficiency and economy-wide rebound effects: A review of the evidence and its implications.* Renewable and Sustainable Energy Reviews, 141, p.110781. Retrieved from https://doi.org/10.1016/j.rser.2021.110781

62 Ibid.

63 Zink, T. and Geyer, R. (2017). *Circular Economy Rebound.* Journal of Industrial Ecology, 21(3), pp.593–602. doi: https://doi.org/10.1111/jiec.12545

64 Zerbino, P., (2022). *Circular Economy Rebound: The Third Wheel on the Date Between Circularity and Sustainability.* Journal of Circular Economy. Retrieved from https://doi.org/10.55845/UREH6873

65 Gonçalves Castro, C., et al., (2022) *The rebound effect of circular economy: Definitions, mechanisms and a research agenda,* Journal of Cleaner Production, Volume 345, 2022, 131136. Retrieved from https://doi.org/10.1016/j.

jclepro.2022.131136.

66 Figge, F., Stevenson Thorpe, A., (2019). *The symbiotic rebound effect in the circular economy,* Ecological Economics, Volume 163, Pages 61-69, Retrieved from https://doi.org/10.1016/j.ecolecon.2019.04.028.

67 Paul, C., et al., (2019). *Rebound effects in agricultural land and soil management: Review and analytical framework.* Journal of Cleaner Production, 227, pp.1054–1067. Retrieved from https://doi.org/10.1016/j.jclepro.2019.04.115.

68 Zhou, Y., et al., (2021). *Analysis of the Economy-Wide Rebound Effect of Water Efficiency Improvement in China Based on a Multi-Sectoral Computable General Equilibrium Analysis.* Water, 13(21), p.2963. Retrieved from https://doi.org/10.3390/w13212963

69 Umwelt Bundesamt (2019). *Economic and legal dimensions of resource conservation: Rebound effects.* Retrieved from www.umweltbundesamt.de/en/topics/waste-resources/economic-legal-dimensions-of-resource-conservation/rebound-effects

70 Zerbino, P., (2022). *Circular Economy Rebound: The Third Wheel on the Date Between Circularity and Sustainability.* Journal of Circular Economy. 1(1). Retrieved from https://doi.org/10.55845/UREH6873

71 CDP (2023). *CDP Capital Markets: Understanding climate risks and maximizing financial rewards: The benefits for investor signatories.* Retrieved from: https://cdn.cdp.net/cdp-production/cms/guidance_docs/pdfs/000/004/844/original/CDP_Investor_Brochure_2023_(US).pdf

72 ISO (2024). ISO 59020:2024: *Circular economy — Measuring and assessing circularity performance.* Retrieved from www.iso.org/standard/80650.html

73 World Business Council for Sustainable Development (2023). *Circular Transition Indicators V4.0 (CTI).* Retrieved from www.wbcsd.org/resources/circular-transition-indicators-v4/

74 Ibid.

75 Ibid.

76 bid.

77 ISO (2024). ISO 59020:2024: *Circular economy — Measuring and assessing circularity performance.* Retrieved from www.iso.org/standard/80650.html

78 Ibid.

79 OECD (2024). *Data Explorer – Business enterprise R&D expenditure by main activity (focused) and source of funds.* Retrieved from https://data-explorer.oecd.org/

80 Stakeholder feedback (April – July 2024)

81 OECD (2023). *Trade in value-added – database on domestic and foreign value add components of exports.* Retrieved from www.oecd.org/en/topics/sub-issues/trade-in-value-added.html

82 United Nations Institute for Training and Research (2024). *Global E-Waste Monitor 2024.* Retrieved from https://www.ewastemonitor.info/the-global-e-waste-monitor-2024/

83 Mugge, R. (2017). *A consumer's perspective on the circular economy. In Routledge handbook of sustainable product design* (pp. 374-390). Routledge. Retrieved from www.taylorfrancis.com/chapters/edit/10.4324/9781315693309-31/consumer-perspective-circular-economy-ruth-mugge

84 Thorsteinsson, G. & Page, T. (2014). *User attachment to smartphones and design guidelines.* Retrieved from: https://doi.org/10.1504/IJMLO.2014.067020

85 European Environment Agency (2023). *Europe's consumption in a circular economy: the benefits of longer-lasting electronics*. Retrieved from www.eea.europa.eu/publications/europe2019s-consumption-in-a-circular/benefits-of-longer-lasting-electronics

86 PWC (2023). *Future Proofing the Electronics Industry: The case for circular business models.* Retrieved from Future Proofing the Electronics Industry: The case for circular business models. Retrieved from pwc.com/gx/en/services/tax/assets/the-case-for-circular-business-models-new.pdf

87 PACE (2021). *Circular Economy Action Agenda: Electronics.* Retrieved from https://www.pacecircular.org/sites/default/files/2021-02/action-agenda-electronics-feb2021_FINAL.pdf

88 University of Cambridge Institute for Sustainability Leadership and the Wuppertal Institute (2023). *Embracing circularity: A pathway for strengthening the Critical Raw Materials Act.* Retrieved from www.corporateleadersgroup.com/files/cisl_embracing_circularity_report_v5.pdf

89 Internet Retailing (2023). *The rise of refurbished tech: 71% of consumers conscious of electronics' eco credentials.* Retrieved from https://www.internetretailing.net/the-rise-of-refurbished-tech-71-of-consumers-conscious-of-electronics-eco-credentials/

90 CE-HUB (2024). *Circular Economy in the Medical Technology Sector.* Retrieved from https://www.ce-hub.org/knowledge-hub/circular-economy-medtech/

91 World Business Council for Sustainable Development (2023). *Circular Transition Indicators V4.0 (CTI).* Retrieved from www.wbcsd.org/resources/circular-transition-indicators-v4/

92 World Business Council for Sustainable Development & One Planet Network (2024). *Landscape Analysis of Circularity-related Corporate Performance & Accountability and Policy & Regulation.* Retrieved from www.wbcsd.org/resources/gcp-landscape-analysis/

93 Järvenpää, A. M., Salminen, V., & Kantola, J. (2021). *Industrial symbiosis, circular economy and Industry 4.0–a case study in Finland.* Management and Production Engineering Review, 14(4), 111-121. Retrieved from https://doi.org/10.24425/mper.2021.139999

94 World Business Council for Sustainable Development (2024). *CTI for Electronics.* Retrieved from www.wbcsd.org/resources/circular-transition-indicators-cti-sector-guidance-electronic-devices/

95 Ibid.

96 OECD (2024). *Data Explorer – Business enterprise R&D expenditure by main activity (focused) and source of funds.* Retrieved from https://data-explorer.oecd.org/

97 IEA (2024). *Global EV Outlook 2024: Moving towards increased affordability.* Retrieved from https://www.iea.org/reports/global-ev-outlook-2024/executive-summary

98 Prates, L., et al., (2023). *Sustainability for all? The challenges of predicting and managing the potential risks of end-of-life electric vehicles and their batteries in the Global South.* Environmental Earth Sciences, 82(6). doi: https://

blogs.worldbank.org/en/transport/defining-role-transport-circular-economy

99 Lacy, P., Long, J. and Spindler, W. (2020). *The Circular Economy Handbook.* London: Palgrave Macmillan UK. doi: https://doi.org/10.1057/978-1-349-95968-6

100 World Bank Blogs (2022). *Defining the role of transport in the circular economy*. Retrieved from https://www.blogs.worldbank.org/en/transport/defining-role-transport-circular-economy

101 World Economic Forum (2022). *The Business Case for Circular Economy in the Car Industry.* Retrieved from https://www3.weforum.org/docs/WEF_Driving_Ambitions-2022.pdf

102 Ibid.

103 Ellen Macarthur Foundation (2021). *Climate change and a circular economy for transport.* Retrieved from www.ellenmacarthurfoundation.org/climate-change-and-a-circular-economy-for-transport

104 Deloitte (2021). *Vehicle as-a-service: From vehicle ownership to usage-based subscription models.* Retrieved from https://www2.deloitte.com/content/dam/Deloitte/de/Documents/consumer-industrial-products/vehicle-as-a-service_deloitte.pdf

105 Lacy, P., Long, J. and Spindler, W. (2020). *The Circular Economy Handbook.* London: Palgrave Macmillan UK. doi: https://doi.org/10.1057/978-1-349-95968-6

106 European Commission (2023). *End-of-Life Vehicles.* Retrieved from https://www.environment.ec.europa.eu/topics/waste-and-recycling/end-life-vehicles_en

107 World Economic Forum (2022). *What is green steel and why does the world need more of it?* Retrieved from https://www.weforum.org/agenda/2022/07/green-steel-emissions-net-zero/

108 World Bank Blogs (2022). *Defining the role of transport in the circular economy.* Retrieved from https://blogs.worldbank.org/en/transport/defining-role-transport-circular-economy

109 World Economic Forum (2022). *The Business Case for Circular Economy in the Car Industry.* Retrieved from https://www3.weforum.org/docs/WEF_Driving_Ambitions-2022.pdf

110 Circle Economy (2022). *Beyond recycling: the opportunity for passenger cars in Europe.* Retrieved from www.circle-economy.com/resources/beyond-recycling-the-opportunity-for-passenger-cars-in-europe

111 World Business Council for Sustainable Development & One Planet Network (2024). *Landscape Analysis of Circularity-related Corporate Performance & Accountability and Policy & Regulation.* Retrieved from www.wbcsd.org/resources/gcp-landscape-analysis/

112 United Nations Environment Programme (2024). *Beyond foundations. Mainstreaming sustainable solutions to cut emissions from the building sector.* Retrieved from https://www.unep.org/resources/report/global-status-report-buildings-and-construction

113 United Nations Environment Programme (2024). *Global Status Report for Buildings and Construction.* Retrieved from https://www.unep.org/resources/report/global-status-report-buildings-and-construction

114 Saint-Gobain (2022). *Challenges and Opportunities of Sustainable Construction in the Global South.* Retrieved from www.saint-gobain.com/en/magazine/challenges-and-opportunities-sustainable-construction-global-south

115 European Environment Agency (2020). *Construction and demolition waste: challenges and opportunities in a circular economy.* Retrieved from www.eea.europa.eu/publications/construction-and-demolition-waste-challenges/construction-and-demolition-waste-challenges

116 Stakeholder Interview, July 2024

117 Olofinnade, O. M., Manda, I., & Ede, A. N. (2021, March). *Management of construction & demolition waste: barriers and strategies to achieving good waste practice for developing countries.* In IOP Conference Series: Materials Science and Engineering (Vol. 1036, No. 1, p. 012045). Retrieved from https://doi.org/10.1088/1757-899X/1036/1/012045

118 The New Statesman (2023). *Refurbishing existing office space could support businesses and help the planet.* Retrieved from www.newstatesman.com/spotlight/sustainability/sustainable-business/2023/11/redesigning-offices-buildings-corporate-business-carbon-emissions

119 Holcim (2024). *Building better with less.* Retrieved from www.holcim.com/what-we-do/decarbonizing-building/building-better-with-less

120 Küpfer, C., Bertola, N., & Fivet, C. (2024). *Reuse of cut concrete slabs in new buildings for circular ultra-low-carbon floor designs.* Journal of Cleaner Production, 448, 141566. https://doi.org/10.1016/j.jclepro.2024.141566

121 European Environment Agency (2020). *Construction and demolition waste: challenges and opportunities in a circular economy.* Retrieved from www.eea.europa.eu/publications/construction-and-demolition-waste-challenges/construction-and-demolition-waste-challenges

122 World Economic Forum (2024). *As construction accelerates globally, implementing sustainable building practices is critical.* Retrieved from www.weforum.org/agenda/2024/02/construction-sustainable-building/

123 Ohemeng, E. A., & Ekolu, S. O. (2020). *Comparative analysis on costs and benefits of producing natural and recycled concrete aggregates: A South African case study.* Case Studies in Construction Materials, 13, e00450. Retrieved from: https://doi.org/10.1016/j.cscm.2020.e00450

124 World Economic Forum (2023). *Circularity in the Built Environment: Maximizing CO2 Abatement and Business Opportunities.* Retrieved from www.weforum.org/publications/circularity-in-the-built-environment-maximizing-co2-abatement-and-business-opportunities/

125 Ibid.

126 Circle Economy and ABN Amro (2017). *A future proof built environment.* Retrieved from https://www.circle-economy.com/resources/a-future-proof-built-environment

127 World Economic Forum (2016). *Shaping the Future of Construction: A Breakthrough in Mindset and Technology.* Retrieved from www.weforum.org/publications/shaping-the-future-of-construction-a-breakthrough-in-mindset-and-technology/

128 World Business Council for Sustainable Development (2023). *Finance and built environment primer: Accelerating the decarbonization of the built environment through*

finance sector engagement. Retrieved from www.wbcsd.org/resources/finance-and-built-environment-primer-accelerating-the-decarbonization-of-the-built-environment-through-finance-sector-engagement/

129 Deloitte (2024). *The built environment: Pathways to decarbonization.* Retrieved from www.deloitte.com/global/en/issues/climate/pathways-to-decarbonization-built-environment.html

130 Xia, Y., Zhang, M., Tsang, D.C.W. et al. (2020). *Recent advances in control technologies for non-point source pollution with nitrogen and phosphorous from agricultural runoff: current practices and future prospects.* Appl Biol Chem 63, 8. Retrieved from https://doi.org/10.1186/s13765-020-0493-6

131 United Nations Environment Programme (2024). *Global Waste Management Outlook 2024: Beyond an age of waste – Turning rubbish into a resource.* Nairobi. Retrieved from https://wedocs.unep.org/20.500.11822/44939

132 Fertilizers Europe (2019). *How fertilizers are made.* Retrieved from www.fertilizerseurope.com/fertilizers-in-europe/how-fertilizers-are-made/

133 Food and Agriculture *Organization of the United Nations (2022). Food and agriculture data.* Retrieved from www.fao.org/faostat/

134 OECD (2024). *2017-2024 Data.* Retrieved from www.oecd.org/en/data.html

135 Food and Agriculture Organization of the United Nations (2022). *Food and agriculture data.* Retrieved from www.fao.org/faostat/

136 OECD (2024). *2017-2024 Data.* Retrieved from www.oecd.org/en/data.html

137 UNEP (2024). *World squanders over 1 billion meals a day – UN report.* Retrieved from https://www.unep.org/news-and-stories/press-release/world-squanders-over-1-billion-meals-day-un-report

138 The Royale Agricultural Society of England (2023). *The principles of regenerative agriculture.* Retrieved from www.rase.org.uk/news/the-principles-of-regenerative-agriculture/

139 McCain (2024). *Smart and Sustainable Farming.* Retrieved from www.mccain.co.uk/sustainability/smart-sustainable-farming/

140 Nestle (2024). *Regenerative agriculture.* Retrieved from www.nestle.com/sustainability/nature-environment/regenerative-agriculture

141 YARA (2017). *Position paper on Circular Economy.* Retrieved from https://www.yara.com/siteassets/sustainability/position-papers/247755_pp_circulareconomy.pdf

142 YARA (2018). *Nutrient circular economy: fertilizer company integration in circular value chains.* Retrieved from https://www.sustainable-phosphorus-platform.eu/images/Conference/ESPC3/Outcomes/ESPC3-Boels-Yara.pdf

143 World Resources Institute (2021). *5 Opportunities of a Circular Economy.* Retrieved form www.wri.org/insights/5-opportunities-circular-economy

144 Ellen MacArthur Foundation (2013). *Towards the Circular Economy, Vol. 1 Economic and business rationale for an accelerated transition.* Retrieved from www.ellenmacarthurfoundation.org/towards-the-circular-economy-vol-1-an-economic-and-business-rationale-for-an

145 Accenture (2015). *The Circular Economy Could Unlock $4.5 trillion of Economic Growth, Finds New Book by Accenture.* Retrieved from https://newsroom.accenture.com/news/2015/the-circular-economy-could-unlock-4-5-trillion-of-economic-growth-finds-new-book-by-accenture

146 World Resources Institute (2019). *Here's what could go wrong with the Circular Economy – and how to keep it on track.* Retrieved from www.wri.org/insights/heres-what-could-go-wrong-circular-economy-and-how-keep-it-track

147 Chatham House and UNIDO (2024). *National Circular Economy Roadmaps: A global stocktake for 2024.* Retrieved from https://www.unido.org/sites/default/files/unido-publications/2024-05/UNIDO_National%20circular%20economy%20roadmaps_v07.pdf

148 Friant, M. C., Vermeulen, W. J., & Salomone, R. (2021). *Analysing European Union circular economy policies: words versus actions.* Sustainable Production and Consumption, 27, 337-353. Retrieved from https://doi.org/10.1016/j.spc.2020.11.001

149 Stakeholder feedback (April – July 2024)

150 World Business Council for Sustainable Development & One Planet Network (2024). *Landscape Analysis of Circularity-related Corporate Performance & Accountability and Policy & Regulation.* Retrieved from www.wbcsd.org/resources/gcp-landscape-analysis/

151 PACE (2021). *Circular Economy Action Agenda: Electronics.* Retrieved from www.pacecircular.org/sites/default/files/2021-02/action-agenda-electronics-feb2021_FINAL.pdf

152 European Commission (2023). *End-of-Life Vehicles Regulation.* Retrieved from https://environment.ec.europa.eu/topics/waste-and-recycling/end-life-vehicles/end-life-vehicles-regulation_en

153 Opferkuch, K., et al., (2022). *Circular economy disclosure in corporate sustainability reports: The case of European companies in sustainability rankings.* Sustainable Production and Consumption. Retrieved from: https://doi.org/10.1016/j.spc.2022.05.003

154 Circle Economy Foundation (2022). *Financial Accounting in the Circular Economy: Redefining Value, Impact and Risk to Accelerate the Circular Transition.* Retrieved from www.circle-economy.com/resources/financial-accounting-in-the-circular-economy-redefining-value-impact-and-risk-to-accelerate-the-circular-transition

155 Opferkuch, K., et al., (2022). *Circular economy disclosure in corporate sustainability reports: The case of European companies in sustainability rankings.* Sustainable Production and Consumption. Retrieved from: https://doi.org/10.1016/j.spc.2022.05.003

156 Ibid.

157 United Nations Economic Commission for Europe (2021). *Thirteenth session of the Team of Specialists on Innovation and Competitiveness Policies.* Retrieved from https://unece.org/economic-cooperation-and-integration/events/thirteenth-session-team-specialists-innovation-and-0

158 World Business Council for Sustainable Development (2024). *CTI – Guidance for the chemical industry to accelerate deployment of circular metrics.* Retrieved from

https://www.wbcsd.org/resources/cti-guidance-for-the-chemical-industry-to-accelerate-deployment-of-circular-metrics/

159 PACE (2021). *Circular Economy Action Agenda: Electronics.* Retrieved from https://www.pacecircular.org/sites/default/files/2021-02/action-agenda-electronics-feb2021_FINAL.pdf

160 Ibid.

161 Circle Economy Foundation (2022). *Financial Accounting in the Circular Economy: Redefining Value, Impact and Risk to Accelerate the Circular Transition.* Retrieved from www.circle-economy.com/resources/financial-accounting-in-the-circular-economy-redefining-value-impact-and-risk-to-accelerate-the-circular-transition

162 World Business Council for Sustainable Development & One Planet Network (2024). *Landscape Analysis of Circularity-related Corporate Performance & Accountability and Policy & Regulation.* Retrieved from www.wbcsd.org/resources/gcp-landscape-analysis/

163 Kirby, P. (2023). *Italy bans lab-grown meat in nod to farmers.* BBC News. Retrieved from www.mybib.com/tools/harvard-referencing-generator

164 Saari, U.A., et al., (2024). *Capabilities for circular economy innovation: Factors leading to product/service innovations in the construction and manufacturing industries.* Journal of Cleaner Production, 434, pp.140295–140295. Retrieved from: https://doi.org/10.1016/j.jclepro.2023.140295

165 Ibid.

166 European Commission (2023). *End-of-Life Vehicles Regulation.* Retrieved from https://environment.ec.europa.eu/topics/waste-and-recycling/end-life-vehicles/end-life-vehicles-regulation_en

167 Ibid.

168 PACE (2021). *Circular Economy Action Agenda: Electronics.* Retrieved from https://www.pacecircular.org/sites/default/files/2021-02/action-agenda-electronics-feb2021_FINAL.pdf

169 Potting, J., et al., (2017). *Circular Economy: Measuring Innovation in the Product Chain.* Available at https://www.pbl.nl/en/publications/circular-economy-measuring-innovation-in-product-chains

170 Kirchherr, J., Reike, D. and Hekkert, M. (2017). *Conceptualizing the circular economy: an analysis of 114 definitions.* Resources, Conservation and Recycling, 127, pp.221–232. Retrieved from: https://doi.org/10.1016/j.resconrec.2017.09.005

171 Junjie Hu, et al., (2023) *Effect of PM2.5 air pollution on the global burden of lower respiratory infections, 1990–2019: A systematic analysis from the Global Burden of Disease Study 2019,* Journal of Hazardous Materials, Volume 459, 2023, 132215, Retrieved from https://doi.org/10.1016/j.jhazmat.2023.132215

172 World Bank (2024). *Water security is critical for poverty reduction, but billions will remain without water access unless urgent action is taken.* Retrieved from https://www.worldbank.org/en/news/press-release/2024/05/19/water-security-is-critical-for-poverty-reduction

173 U.S. Geological Survey (2019). *Nutrients and eutrophication.* Retrieved from https://www.usgs.gov/mission-areas/water-resources/science/nutrients-and-eutrophication#overview

174 U.S. Environmental Protection Agency (2013). *Nutrient Pollution.* Retrieved from https://www.epa.gov/nutrientpollution/effects-economy

175 United Nations (2015). *Concepts of Inequality. Development Issues No. 1.* Retrieved from https://www.un.org/en/development/desa/policy/wess/wess_dev_issues/dsp_policy_01.pdf

176 United Nations (2016). Identifying social inclusion and exclusion. Retrieved from https://www.un.org/esa/socdev/rwss/2016/chapter1.pdf

177 World Health Organization (2024). *Health equity.* Retrieved from https://www.who.int/health-topics/health-equity#tab=tab_1

178 International Resource Panel. (2024). *Global Resources Outlook 2024.* Retrieved from: https://www.unep.org/resources/Global-Resource-Outlook-2024

179 International Labour Organization (2023). *Decent Work in the Circular Economy: An Overview of the Existing Evidence Base.* Retrieved from www.ilo.org/publications/decent-work-circular-economy-overview-existing-evidence-base

180 Circle Economy, ILO, S4YE (2023). *Decent Work in the Circular Economy.* Retrieved from www.circle-economy.com/resources/decent-work-in-the-circular-economy

181 Ibid.

182 European Environment Agency (2016). *Circular economy in Europe.* Retrieved from https://www.eea.europa.eu/publications/circular-economy-in-europe

183 Health Care Without Harm Europe, (2020), *Sustainable healthcare waste management in the EU Circular Economy model.* Retrieved from https://circular-cities-and-regions.ec.europa.eu/support-materials/papers-and-reports/sustainable-healthcare-waste-management-eu-circular-economy

184 Ortiz-de-Montellano, C., & al. (2023). *How can the circular economy support the advancement of the Sustainable Development Goals (SDGs)? A comprehensive analysis.* Retrieved from https://www.sciencedirect.com/science/article/pii/S2352550923001598

185 Korsunova, A., et al., (2022). *Necessity-driven circular economy in low-income contexts: How informal sector practices retain value for circularity.* Global Environmental Change, 76, 102573. Retrieved from: https://research.aalto.fi/en/publications/necessity-driven-circular-economy-in-low-income-contexts-how-info

186 Circle Economy, ILO, S4YE (2023). *Decent Work in the Circular Economy: An overview of the existing evidence base.* Retrieved from: https://www.ilo.org/publications/decent-work-circular-economy-overview-existing-evidence-base

187 World Bank (2024). *Poverty and Inequality Platform.* Retrieved from: https://pip.worldbank.org/home

188 Joe Hasell, Max Roser, Esteban Ortiz-Ospina and Pablo Arriagada (2022) - *"Poverty" Published online at* OurWorldInData.org. Retrieved from: https://ourworldindata.org/poverty

189 United Nations Development Programme & Oxford Poverty and Human Development Initiative. (2023). *Unstacking global poverty.* Retrieved from: https://hdr.undp.org/system/files/documents/hdp-document/2023mpireporten.pdf

190 Bonnet, F., Vanek, J., & Chen, M. (2019). *Women and Men in the Informal Economy – A Statistical Brief.* Manchester, UK:

WIEGO. Retrieved from: https://www.ilo.org/publications/women-and-men-informal-economy-statistical-brief

191 Circle Economy. (2023). *Circularity gap report Latin America and the Caribbean.* Retrieved from: https://www.circularity-gap.world/lac

192 Bill & Melinda Gates Foundation (2022). *How to economically empower informal women workers.* Retrieved from: https://www.gatesfoundation.org/ideas/articles/how-to-economically-empower-informal-women-workers

193 International Monetary Fund (2021). *Five things to know about the informal economy.* Retrieved from: https://www.imf.org/en/News/Articles/2021/07/28/na-072821-five-things-to-know-about-the-informal-economy#:~:text=Latin%20America%20and%20sub%2DSaharan%20Africa%20have%20the,the%20regions%20with%20the%20lowest%20levels%20of

194 Ortiz-de-Montellano, C., & al. (2023). *How can the circular economy support the advancement of the Sustainable Development Goals (SDGs)?* A comprehensive analysis. Retrieved from https://www.sciencedirect.com/science/article/pii/S2352550923001598

195 International Monetary Fund (2021). *Five things to know about the informal economy.* Retrieved from: https://www.imf.org/en/News/Articles/2021/07/28/na-072821-five-things-to-know-about-the-informal-economy#:~:text=Latin%20America%20and%20sub%2DSaharan%20Africa%20have%20the,the%20regions%20with%20the%20lowest%20levels%20of

196 World Bank Blogs (2023). *Fighting air pollution: A deadly killer and a core development challenge.* Retrieved from blogs.worldbank.org/en/health/fighting-air-pollution-deadly-killer-and-core-development-challenge

197 United Nations Environment Programme (2024). *Beyond age and waste.* Retrieved from https://wedocs.unep.org/bitstream/handle/20.500.11822/44939/global_waste_management_outlook_2024.pdf?sequence=3

198 United Nations Institute for Training and Research (2024). *Global E-Waste Monitor 2024.* Retrieved from ewastemonitor.info/the-global-e-waste-monitor-2024/

199 World Health Organization (2018). *Circular Economy and Health.* Retrieved from www.who.int/europe/publications/i/item/9789289053341

200 Circle Economy, ILO, S4YE (2023). *Decent Work in the Circular Economy.* Retrieved from www.circle-economy.com/resources/decent-work-in-the-circular-economy

201 World Health Organization (2021). *Global air quality guidelines: particulate matter (ᵎPM2.5 and PM10)ᵎ, ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide.* Retrieved from www.who.int/publications/i/item/9789240034228

202 European Environment Agency (2023). *How air pollution affects our health.* Retrieved from https://www.eea.europa.eu/en/topics/in-depth/air-pollution/eow-it-affects-our-health

203 European Commission, *Ecodesign for sustainable product regulation* (2024). Retrieved from: https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/sustainable-products/ecodesign-sustainable-products-regulation_en

204 United Nations Environment Programme (2024). *Global Resources Outlook 2024: Bend the Trend – Pathways to a liveable planet as resource use spikes.* International Resource Panel. Nairobi. Retrieved from www.unep.org/resources/Global-Resource-Outlook-2024

205 International Energy Agency (2022). *Global Energy Review: CO2 emissions in 2021*. Retrieved from www.iea.org/reports/global-energy-review-co2-emissions-in-2021-2

206 Junjie Hu, et al., (2023), *Effect of PM2.5 air pollution on the global burden of lower respiratory infections, 1990–2019: A systematic analysis from the Global Burden of Disease Study 2019,* Journal of Hazardous Materials, Volume 459, 2023, 132215, Retrieved from https://doi.org/10.1016/j.jhazmat.2023.132215

207 International Labour Organization (2022). *International Standard Industrial Classification of All Economic Activities (ISIC).* Retrieved from ilostat.ilo.org/methods/concepts-and-definitions/classification-economic-activities/

208 Circle Economy Foundation (2021). *Circularity Gap Report 2021.* Retrieved from www.circularity-gap.world/2021

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The World Business Council for Sustainable Development (WBCSD) is a global community of over 225 of the world's leading businesses driving systems transformation for a better world in which 9+ billion people can live well, within planetary boundaries, by mid-century. Together, we transform the systems we work in to limit the impact of the climate crisis, restore nature and tackle inequality.

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It is comprised of thousands of individual members; six thematic programmes and their partner organisations; numerous working groups; and over 140 national focal points for sustainable consumption and production within country governments. Serving as the secretariat of the 10YFP, the United Nations Environment Programme facilitates the One Planet network.

Collectively, the One Planet network holds enormous experience and expertise on sustainable consumption and production, and houses a global repository of projects, policies, tools and resources.

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