# American Journal of IR 4.0 and Beyond (AJIRB)

ISSN: 2837-4738 (ONLINE)

VOLUME 4 ISSUE 1 (2025)

PUBLISHED BY
E-PALLI PUBLISHERS, DELAWARE, USA

American Journal of IR 4.0 and Beyond(AJIRB)

Volume 4 Issue 1, Year 2025
ISSN: 2837-4738 (Online)
DOI: https://doi.org/10.54536/ajirb.v4i1.5466
https://journals.e-palli.com/home/index.php/ajirb

# Reframing Circular Economy Targets: A Strategic Approach to Advancing beyond Recovery and Recycling

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**Article Information**

**Received:** May 29, 2025

**Accepted:** July 01, 2025

**Published:** July 24, 2025

**Keywords**

*Beyond Recycling, Circular Economy Governance, Circular Economy Targets, Resource Efficiency, Strategic Circular Economy Framework*

## ABSTRACT

The traditional focus on circular economy (CE) goals has primarily emphasized recovery and recycling. However, such techniques, while prevalent, only partially address the systemic adjustments needed for a truly circular shift. This study critically reframes the function of CE targets by taking a broader and more strategic approach that goes beyond the traditional focus on end-of-life waste management. This study, which is based on ten circular methods (recover, recycle, repurpose, remanufacture, refurbish, repair, reuse, reduce, rethink, and discard), evaluates both existing and newly proposed CE targets in a methodical manner. The findings show that an overreliance on recovery and recycling may harm rather than support circular objectives because of their limited ability to maintain resource value and close production cycles. The study calls for the incorporation of upstream and design-oriented solutions such as reuse, repair, and rethink, which are more effective in promoting resource efficiency and economic value preservation. By proposing an expanded and strategic set of CE targets, this paper offers fresh insights to scholars and decision-makers aiming to steer governance and policy frameworks toward a more impactful and holistic circular economy transition.

## INTRODUCTION

The circular economy (CE) is gaining popularity as a transformative model for sustainable development (Chizaryfard *et al.*, 2021). It emphasizes resource efficiency by reducing waste, increasing product lifecycles, and decreasing reliance on primary materials. A well-functioning CE attempts to close material loops and keep economic value while adhering to environmental sustainability and social well-being (Sarkar, 2022). As global worries over climate change, resource shortages, and pollution deepen, the transition to a CE has become a priority for governments, businesses, and institutions. However, despite the increased interest in CE, the notion remains broad and open to interpretation (Kirchherr *et al.,* 2023). Various schools of thought have investigated CE from various perspectives, ranging from its fundamental concepts and business models to implementation strategies and policy frameworks. While diversity enhances the area, it also highlights a lack of unified governance systems capable of effectively steering the shift (Roblek & Dimovski, 2024). In particular, the strategic function of targets which are crucial instruments for determining direction, monitoring success, and ensuring accountability has not been systematically addressed in CE research. Targets are important in governance because they provide measurable goals for shifting systems from one state to another (Sharma *et al.*, 2024). In the context of CE, goals have typically focused on waste management, with a significant emphasis on recycling and recovery. While these tactics are valuable, they often reflect downstream interventions and frequently fail to realize the full potential of a circular system. Recycling, for example, can result in value loss while not necessarily reducing material throughput or consumption. As a result, such targets may unintentionally reinforce a linear logic, delaying rather than reversing resource loss.

To unlock the circular economy's revolutionary potential, present CE targets must be reframed and expanded (Abu-Bakar & Charnley, 2024). This entails moving the focus from end-of-pipe solutions to higher-value circular methods including reuse, repair, remanufacturing, and design innovation (Ho *et al.*, 2024). These upstream solutions are more effective in preserving product integrity, extending life cycles, and minimizing environmental impact. Therefore, CE governance should not only monitor recycling rates but also prioritize targets that push businesses and consumers to reconsider production, consumption, and disposal behaviors (Chenavaz & Dimitrov, 2024).

This study investigates which targets can strategically accelerate the transition to a more comprehensive circular economy (Abu-Bakar *et al.*, 2024). It addresses two types of targets: existing targets, which have already been incorporated in policies and organizational practices, and new targets, which are offered as future-oriented tools to fill current gaps. New targets may result from scholarly proposals or wholly new contributions introduced in this study (Dolunay & Temel, 2024). They aim to promote systems thinking and long-term value retention, rather than a narrow focus on waste recovery.

This study makes significant contributions by utilizing a strategy framework based on ten circular economy



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strategies: refuse, rethink, reduce, reuse, repair, refurbish, remanufacture, repurpose, recycle, and recover. This approach allows for a comprehensive investigation of how different aims fit with various circular tactics (Mesa *et al.*, 2024). By doing so, it shows the disparity in present CE governance, which overemphasizes certain tactics while disregarding others with higher cyclical potential. This study provides a strategic view on CE targets for scholars, policymakers, and practitioners looking to expedite the circular transition (Graessler *et al.*, 2024). It emphasizes the significance of creating goals that not only track success but also actively affect behavior, innovation, and system change. By extending beyond recovery and recycling, this method establishes the framework for a more resilient, regenerative, and circular economy (Çetin & Kirchherr, 2025).

## LITERATURE REVIEW

For decision-makers to convert broad visions into tangible results, targets are essential tools in governance (Petrovics *et al.*, 2024). Goals are often open-ended and aspirational, whereas targets are time-bound, quantifiable, and defined. They assist in progress monitoring, guarantee accountability, and give clear guidance (Mendelson *et al.*, 2024). The circular economy (CE) uses targets as operational instruments to direct the shift from linear production and consumption systems to more resource-efficient and regenerative ones. Although they are frequently used in policymaking, it is unclear exactly what a circular economy aim is (Domenech & Bahn-Walkowiak, 2019). The clearly measurable goals of current CE standards, such raising recycling rates, enhancing material recovery, or cutting energy consumption, are frequently the focus. Although significant, these initiatives mostly focus on downstream effects and fall short of a CE transformation's strategic potential (Zils *et al.*, 2025). Recycling and recovery are reactive strategies that are used after garbage has already been produced, despite being obvious and extensively used. Because of this, a lot of current targets show a narrow knowledge of circularity. They typically focus on a limited range of topics, including waste management or efficiency enhancements, instead of adopting the entire range of CE solutions (Lüdeke-Freund *et al.*, 2019). Furthermore, targets' governance value comes from their capacity to influence behaviors, systems, and innovation. Therefore, continuing to rely on old or narrowly conceived targets may undermine the greater ambition of constructing resilient and sustainable economies (Kedward & Ryan-Collins, 2021). The goals of a strategic circular economy must be more ambitious and forward-looking. This ought to promote upstream interventions like systems thinking, eco-design, service-based models, and product life extension. New goals are particularly crucial for developing fields with more potential for value retention and environmental benefit, such as reuse, repair, remanufacturing, and redesign. These higher-order techniques can protect materials' inherent worth, stop waste, and lessen the need to harvest virgin resources. Existing and new targets are distinguished in this study. The goals that governments, corporations, and institutions are now pursuing are known as existing targets. A review of the literature, policy documents, and practice can be used to assess them. There are two types of new targets: brand-new aims presented in this study and those that have already been suggested by experts or researchers but have not yet been implemented in practice. These are intended to close gaps, encourage creativity, and facilitate more comprehensive circular transitions (Tan *et al.*, 2022). For such goals to be successful, they need to be realistic, quantifiable, and consistent with CE principles. They must also be able to adjust to various products, industries, and governance settings. New goals are not just substitutes for previous ones in this framework. Instead, by addressing systemic hurdles, integrating underrepresented strategies, and aligning with more general sustainability goals, they broaden and improve the current environment. This necessitates a sophisticated comprehension of the ways in which targets engage with strategies and governance procedures (Meuleman & Niestroy, 2015). In the end, reconsidering CE goals is about influence, direction, and transformation rather than just measurement. It's critical to ground CE targets in a thorough strategic framework in order to evaluate and create them methodically. Structured methods or action plans that facilitate circularity throughout the lifecycle of materials and products are referred to as CE strategies. These cross-sectoral strategies function at various levels, including national and international governance, industrial zones, individual businesses, and even households and consumers (Boas *et al.*, 2016). From proactive approaches that completely avoid resource use (Refuse, Rethink) to reactive ones that control waste and resource loss (Recycle, Recover), each of these signifies a different level of intervention in the circular system. By arranging methods in this manner, we may more easily determine which goals correspond with results that have a significant influence and which tactics are currently overlooked when creating goals. According to Pan and Hashemizadeh (2023), a significant finding is that the majority of current CE aims center on the less impactful tactics of efficiency, recovery, and recycling. These are crucial, but they frequently occur too late in the material lifespan to fully reap the rewards of circularity. Strategies like reuse, repair, remanufacturing, and refurbishment, on the other hand, lessen their impact on the environment, promote product innovation, and retain more economic and material value. However, these domains frequently lack precise, quantifiable objectives.

By applying this strategic lens, organizations, researchers, and policymakers can create new, more effective targets in addition to evaluating the suitability of current ones. For instance, instead of aiming for a certain percentage of garbage to be recycled, a more strategic goal may be to track how many products are reused, how long products last thanks to repair services, or what percentage of products are made to be disassembled and

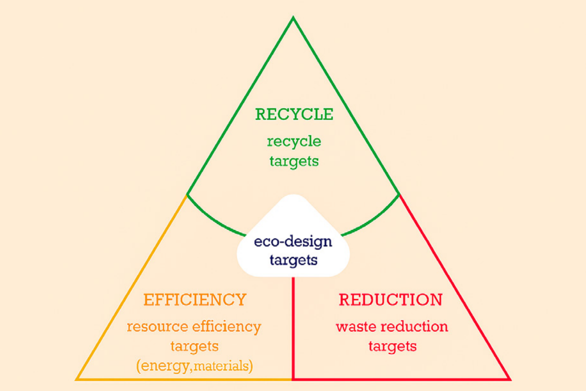


**Figure 1:** Main existing CE targets by areas of application

remanufactured. The fundamental ideas of the circular economy would be more directly supported by such goals. Additionally, this framework acknowledges that not every strategy applies to every product or industry in the same way (Tegethoff *et al.*, 2025). The hierarchy of strategies provides a general direction, but must be applied flexibly. While some industries might concentrate on business model innovation or changing consumer behavior, others might gain more from modular design and renovation. As a result, the framework functions as a planning and diagnostic tool that enables governance actors to customize goals in accordance with their unique priorities and circumstances. In essence, anchoring CE targets inside a strategic framework of different, value-retaining initiatives provides for a more balanced and transformative approach. It creates room for upstream innovation and systemic change, moving beyond the conventional focus on end-of-life procedures. A road map for creating a genuinely regenerative and sustainable circular economy is provided by this reframed approach to CE targets.

## MATERIALS AND METHODS

Although circular economy (CE) governance is gaining popularity, no previous research has thoroughly investigated CE targets from a governance standpoint, with a particular emphasis on how targets strategically relate to CE's overarching objectives. Through a methodical examination and analysis of CE goals and tactics, this study fills this vacuum by attempting to reinterpret how goals can promote the shift away from the traditional emphasis on recovery and recycling.

### Data Collection

The initial step involves a thorough literature search done in late 2022 and throughout 2023. To fully capture the range of CE aims and techniques, a combination of key terms was used, utilizing both general search engines like Google and scholarly databases like Google Scholar and Scopus. The circular economy plus target or targets and solutions were among the primary search phrases. Since CE and the "zero waste" concept clearly overlap, the latter term was also looked up alongside targets. To guarantee comprehensive coverage, these questions were repeated for each of the ten circular techniques. A thorough manual screening was necessary to find pertinent documents that specifically addressed targets within a CE governance or policy context because the terms target and strategy are frequently used with different meanings. The dataset produced by this procedure included 13 non-academic sources, including policy reports and publications from research institutes, and 59 peer-reviewed academic articles that all specifically addressed CE objectives.

### Framework-Based Organization of Data

To analyze the obtained data systematically, the study used a well-established CE framework based on ten techniques usually referred to as the 10 Rs: Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, and Recover. This framework, initially presented unites these techniques into three overarching categories: a) Useful application of materials, b) Extending the lifespan of products and components, c) Smarter product manufacturing and use. A systematic and comprehensive evaluation of how current and prospective targets fit with various CE methods was made possible by the way targets were arranged within these groupings.

### Target Identification and Development

The study's dual focus allowed it to critique the dominance of recovery and recycling targets and propose targets aligned with upstream and value-preserving strategies. The evaluation also looked at the qualitative and quantitative nature of targets, taking into consideration how they address key CE objectives like waste minimization, resource efficiency, closed-loop production, and economic value retention. The study organized the framework and conducted a literature review before making a distinction between existing targets, those currently applied in policies or organizational practices, and new targets that are either proposed by researchers but have not yet been implemented, or entirely new targets formulated in this study.

### Methodological Considerations

The scope of the study is naturally shaped by a keyword-based search. Although terms such as closed-loop economy, green supply chain management, cradle-to-cradle, and industrial symbiosis" have conceptual similarities with the circular economy, they were not explicitly included in the initial search phase. This limitation was partially addressed by snowball sampling, in which references and citations within pertinent documents were methodically followed to find additional sources. The study also used a reversed numbering approach to the 10 Rs framework, starting with the most common, lower-impact strategies (Recover and Recycle) and working toward higher-impact, preventative strategies (Refuse and Rethink). This approach emphasizes the importance of upstream strategies while highlighting the predominance of recovery and recycling targets.

### Analytical Approach

The collected data were qualitatively analyzed to map targets onto the CE strategies and governance objectives. This included evaluating the distribution and emphasis of current targets,

• Identifying gaps and underrepresented strategies in target-setting,

• Putting up fresh, strategic goals that more accurately capture the systemic and value-preserving goals of a circular economy.

The three main groups of strategies present the findings in the following sections, showing how a strategic rephrasing of targets can more successfully guide the shift to a circular economy that goes beyond the limited emphasis on recovery and recycling.

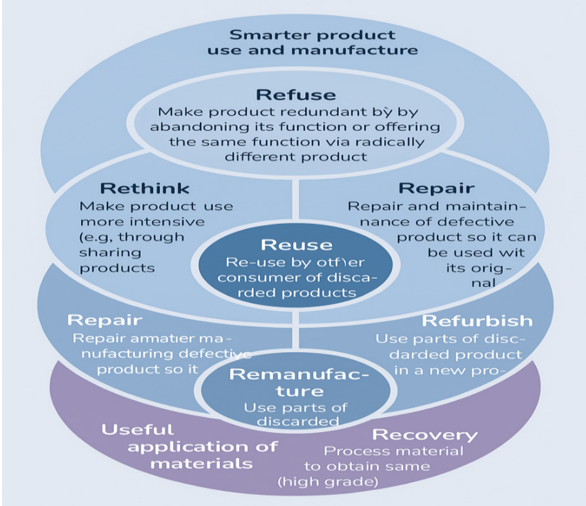


**Figure 2:** CE strategies, form

## RESULTS AND DISCUSSION

### Results

This section looks at three sets of circular economy goals organized according to the 10R framework: making better use of materials, prolonging the life of products and their components, and using and manufacturing products more intelligently. Each group is introduced in a separate subsection, all of which follow the same format: a synopsis of the strategy is given first, and then associated aims and how well they advance the objectives of the circular economy are examined. The focus is on how present targets tend to prioritize recovery and recycling, and why a strategic shift beyond these is required for significant development.

### Useful Application of Materials (R9–R8)

The recovery (R9) and recycling (R8) strategies, which are part of the first group, primarily address solid waste that would otherwise be landfilled or burned without energy recovery. Waste is a mixture of inorganic and organic components that are frequently classified as technical or biological nutrients. Recycling aims to recover materials for future use, whereas recovery concentrates on obtaining energy from waste. However, both recovery and recycling often suffer from low energy conversion efficiencies and material loss. These tactics are usually expensive to execute and compromise the integrity of the product. Additionally, they mainly manage waste at the end of the product lifecycle and have limited influence on upstream production and consumption systems. Despite these drawbacks, recovery and recycling initiatives continue to be a major focus of the majority of current circular economy plans and goals (Mallik & Rahman, 2024).

### Recovery (R9)

In order to recover energy, recovery usually entails burning garbage. It mostly targets organic waste streams and is used for waste that cannot be recycled. Because it can manage enormous volumes of different garbage and gives non-recyclable fractions a place to go, incineration is widely used in conjunction with recycling. Although incineration recovers energy and helps reduce landfill volumes, it irreversibly destroys materials and can encourage wastefulness by providing incentives for ongoing waste generation in order to keep facilities operating (Mallik, 2024). Additionally, it complicates resource allocation by competing with other circular strategies for waste inputs. Since incineration should ideally be completely eliminated in a truly circular economy, some nations have policies aimed at either limiting or reducing it. Strict zero-waste approaches reject waste-to-energy solutions, viewing all waste as a design failure. However, reaching absolute zero waste is unrealistic, as a small fraction of trash is often unavoidable due to its mixed or polluted nature. Life-cycle assessments often show that energy recovery through incineration is preferable to landfill disposal, suggesting that a pragmatic target might allow a limited, low percentage of incineration focused strictly on unavoidable waste. Complementary policies could incentivize reduced incineration capacity or punish excessive use, so prioritizing higher-value circular alternatives. By setting incineration goals at this low, inevitable level, recovery can aid in the transition without compromising the tenets of the circular economy (Mallik & Rahman, 2024).

### Recycling (R8)

Recycling processes waste materials to recover secondary raw resources, which can be of equivalent or lower quality than the original inputs. Sometimes, materials can be upcycled into higher-value forms, but this is less common than downcycling, where material quality degrades. Recycling can take place in open-loop systems, where materials flow into different product categories, or closed-loop systems, where materials return to the same product system to replace virgin inputs. Closed-loop recycling is generally desirable due to lower travel and processing impacts, but it is not always environmentally superior, as the overall impact depends on several aspects such as material kinds, contaminants, and processing efficiencies. Recycling is the circular strategy that is most developed and pushed globally, with several goals set for recycling rates across industries and materials. However, because of the need for processing and transportation, recycling is an energy-intensive process that has environmental costs. Additionally, it undermines the integrity of the product, gradually degrades the quality of the materials, and fails to provide incentives for better product design or consumption habits. Furthermore, not all materials can be recycled equally; composites, some metals, and polymers pose particular technical difficulties. Even glass, which is theoretically infinitely recyclable, often faces practical restrictions due to contamination and sorting issues. Despite its limitations, recycling remains a prominent focus in policy frameworks. Setting targets based only on recycling volumes may incite poor recycling techniques that can withstand higher levels of contamination, undermining environmental objectives. Instead of promoting the structural social changes required for a circular economy, these volume-centric goals frequently reinforce a waste management mentality. To support the transition to a circular economy, recycling targets should be reframed to prioritize environmental performance and high-quality recycling. This entails including recyclability considerations early in product design and prioritizing closed-loop solutions within industries or product categories. Instead, then only setting recycling rate targets, regulations should promote recycled content standards in products. Furthermore, from the standpoint of governance, recycling targets would be more in line with the goals of the circular economy if they were combined with aggressive waste reduction targets. This would encourage the creation of products that promote circularity and reduce waste production. Combining high-quality recycling targets with aggressive waste reduction targets produces a balanced strategy that promotes a move away from trash-centric initiatives. The zero-waste principles, which prioritize designing waste out of production systems and getting rid of waste at its source or through on-site recycling, are in line with this combined approach. Adopting such antithetic and "antagonist" aims could yield larger environmental, social, and economic advantages than present recycling-focused strategies (Mallik, 2025).

### Extending the Lifespan of Products and Their Parts (R3–R7)

The second set are those that would 58 extend the life span of products and their constituents, which is to say, maintain or enhance their value in use. These are reuse, repair, refurbishment, remanufacturing and repurposing. These methods depend on receptive markets, effective reverse logistics, revenues and new business models. Goods that are subject to these types of policies are often qualitatively and quantitatively unstable, which complicates planning and the design of policy. Thus, the effort to successfully reaping the benefits from lifespan extension requires rethinking business practices and reorienting economic and social structures (Mallik *et al.*, 2025).

There are a few caveats to take into consideration when defining goals that are focused on extending lifespan. Extending product shelf life might be a means to retard the adoption of new, and more sustainable, technologies or products. Lifespan extension by either phase-outs or tighter safety and efficiency standards could contribute to diminishing these regulated burdens. Accordingly, governance mechanisms must weigh the advantages of increasing product longevity against the disadvantages of impeding innovation or compliance. This, it seems, requires regulation to reduce the rate of sustainable consumption by breaking the association between growth and quality of life but without constraining technological progress or regulation compliance. Product life extension has direct effects on the goals of the circular economy, as it helps to decrease material extraction and waste generation. In contrast to recovery and recycling, these measures retain the value of the product and materials in multiple life cycles and a higher resource efficiency is achieved within the whole system. Although both could be more developed, endpoint targets for extending life are generally less developed than recovery or recycling targets. More attention and a clearer focus on this side could reveal much circularity potential encouraging business innovation and consumer behavior which emphasizes durability, reparability and reuse (Mallik, 2024).

### Repurpose (R7)

**Description**

Repurpose (or recontextualizing) is to use an object for anything other than what it was originally created for. This process, which we refer to as open-loop reuse, re-imposes the identity of the original product or component with new function, differentiating Repurpose from some existing strategies such as remanufacture or repair (R3–R6).

**Analysis**

1. It's hard to measure Repurpose for a couple of reasons:
2. A multitude of components can be recycled to create various products.
3. It's all about the creativity of the repurpose.
4. Repurposes are generally separate from the initial product developers.
5. Production is usually of a small-scale or artisanal nature.

As such, targets would sit alongside other measures (R3–R6) and affect only the singularity of products that are not manufacturable, refurbished able, repairable or re-usable. Buildings form a unique case. The Repurpose strategy makes room for adaptive reuse, like turning a house into an office. Criteria for building repurposing are hard, though, because of cost, permits and urban planning.

### Remanufacture (R6), Refurbish (R5), Repair (R4)

These three approaches take place primarily inside the producer's network or between private consumers.

A product can be remanufactured, reconditioned (refurbished), or repaired, but not both. All are based on the wish to reverse or at least postpone obsolescence.

**Description**

Remanufacture (second-life production) consists of using parts recovered from discarded products to produce new products with the same functionality or the same level of quality as new products. It is usually for hard-wearing applications and sector specific. When referring to old, worn or obsolete machine tools, the term refurbishing is often applied, where most or all of the components that can be subject to wear are replaced during the refurbishing process so that the item can no longer be said to be worn out or obsolete, so as to simultaneously upgrade or update the item; and/or, the term reconditioning is often used to refer to the process of replacing all components that are subject to wear to enable the item to again perform its original duty. Repair is actual physical repair or maintenance of a broken or damaged product, performed by the user or authorized by the user, regardless of warranty status. Maintenance is related, but not the same, and falls into the category of a "soft" repair here. It also contains preventive, predictive, and corrective actions, which are linked to these strategies.

**Analysis**

Such targets of these strategies are scarce at the national and corporate levels and are often associated with cost, emissions, and energy savings. One possibility is banning planned obsolescence but the high burden of proof and enforcement make it hard. The best target would seek to achieve the maximum use of the technical life of the product, but it will vary by use, customer expectations, technology advancement and legislation. Warranties require a minimum level of service, while lifetime guarantees could signal durability thresholds. When spare parts and repair services are cheap, and repair information is easy to come by, those are barriers that lower. Durable, modular, easy to repair and disassemble products encourage a longer life and ease of maintain ace. Design targets can be provided by certification standards and metrics but may take time to become available. There is a consumer belief in rapid turnover and waste. Regularity shifts along with appropriate regulations, incentives, and extended warranties are what really matter. Targets have to go along the social-economic surrounding to prevent inefficient measures and rebound effects, prices on repaired goods markets.

**Reuse (R3)**

**Description**

'Reuse' means that the product again is used (without use being changed, and without it being transformed or reprocessed) by a subsequent user. Even though they are so common in the world, few targets exist around reuse. Examples include the EU directives for vehicle end-of-life re-use and waste management, and Spanish re-use targets for furniture, textiles, and electronics. The scarcity could be due to renewed focus on new production or challenges framing reuse policies.

**Analysis**

Reuse can take various forms including relocation, resale and sharing that are useful to classify as follows: (a) changing ownership (b) retained ownership but used by multiple users. These are functions of willingness to use second-hand markets, and the efficiency of resale marketplaces (charity shops, pawnbrokers and online sales). Targets to be addressed here could include lowering transactions costs, particularly in the case of low-value items, and increasing the volumes of reuse mediated in terms of marketplace sales data.

**Products Retaining Ownership**

PSS models prolong product life by allowing access to them on a shared or rented basis – decoupling ownership of them from their use. Strategic objectives may accelerate the adoption of PSS through incentives and tax benefits, even though rebound effects such as higher consumption facilitated by easier access are to be kept in check. This new business and supply chain model is key to the circular economy.

**Packaging and Design**

Targets for re-using packaging, especially primary packaging, could be as ambitious as radical zero-disposal solutions, but would imply a total redesign of products and logistics. Improving modularity and standardization can facilitate the reusability for example, the quasi-standardized reusable beer bottle of Sweden and Denmark shows the benefit of the collective industry effort. Some industrial specific predictions of efficiency improvements may also increase the reuse potential.

**Part Harvesting and Product Design for Take-Down**

Reuse refers to the recovery of components from end-of-life products in R4-R6. Goals, supporting product designs for easy, allowed for dismantling at low costs are essential for upscaling reuse in the CE.

**Inner Cycles and Social Considerations**

The encouragement of re-use alongside maintenance extends the life of the product in inner loops. From an anti-Western perspective, premature waste and addiction must be stopped but not rushed, particularly for well-developed markets - that way the poverty-stricken regions will not suffer undue dependency on second-hand [goods], and the use of old goods would be more supported in the Eastern circles of the globe.

**Smarter Product Use and Manufacture (R0–R2)**

The earliest CE strategies Refuse (R0), Rethink (R1), and Reduce (R2)—operate at the design and development stage and are:

- Precursory: Initiating CE transition before production.

• Enabling: Facilitating downstream CE activities.
• Transformative: Offering systemic change toward circularity.

Their close integration with design extends beyond products to processes, logistics, and consumption patterns. These strategies form the foundation for all other circular approaches and require distinct target setting.

**Rethink (R1)**
**Description**
Rethink encourages intensifying product use (sharing, multifunctionality) and reimagining entire systems and uses, including dematerialization replacing physical goods with non-material alternatives delivering equivalent utility.

**Analysis**
Though formal targets are lacking; Rethink offers vital avenues for CE progression:

**Circularity Metrics**
Targets could track increases in closed-loop material flows, currently about 7% globally. Corporate and national goals for circularity levels can drive ambition.

**Constitutive CE Elements**
Targets might define minimum shares of recycled materials, zero waste, and full by-product reuse, with environmental criteria including emissions and toxicity reductions.

**Enabling Other R Strategies**
Design and engineering targets such as percentages of easily repairable or upgradeable products can enable repair, reuse, and refurbishment. Packaging reuse and refill goals also fit here, requiring systemic logistics innovation.

**Refuse (R0)**
**Description**
Reject cancels out products or materials with redundant or disparate counterparts, exhausting resource flow.

**Analysis**
Some countries set refuse targets by phasing out harmful or one-and-done products (plastic bags, incandescent bulbs). Bolstering those goals by extending it to other throwaway products, non-essential packaging or virgin materials could significantly cut waste. Rejection of open-loop, harmful processes is also consistent with the aims of CE. In reality, such bans might be implemented as aggressive cuts (R2) targets.

**Reduce (R2)**
**Description**
Reduce focuses on lowering inputs of energy, raw materials, and waste, including fewer products consumed overall.

**Analysis**
Efficiency targets currently exist but may lack CE framing. True CE Reduce targets should holistically cover production and consumption. Examples include:

**Material Footprint Reduction**
Up to 80% reduction globally is projected necessary by mid-century. Lightweight design principles minimizing material use without sacrificing function are critical .

**Scrap Reduction**
High scrap rates in steel and aluminum production (25%-50%) highlight a significant Reduce opportunity.

**Dissipative Use Minimization**
Targeting material flows lost to emissions and diffusion (carbon, nitrogen) supports closed material cycles.

**Discussion**
A valuable CE target framework is created beyond recovery and recycling to encompass all 10R strategies, focusing on early interventions (Rethink, Refuse, Reduce). This perspective requires coherent policy, business model innovations, consumer behavior modifications, and shared standards for design (Botti & Baldi, 2025). Target-setting is practiced in such a way that targets are quantifiable, context sensitive, and structured to avoid rebound to speed up transitions to CE. This paper has critically evaluated the current and emerging CE targets, and it provides an inclusive and systematic structure for the scholars and policy makers to strategically move beyond conventional recovery and recycling methods(Rajayya *et al.*, 2025). Adopting the 10R lens as an analytical framework, this study cross-examined targets for the ten CE strategies and there was a call to depart from a myopic view on waste management and toward more transformative and impactful circular strategies. Existing targets are predominantly waste, resource, and emissions centric, which primarily concentrate on Recovery (R9) and Recycle (R8). These initiatives on their own are not adequate to deliver a truly circular economy. While being absolutely essential, the recovery and reprocessing procedures are, often, in themselves, destructive of product integrity, and may even be considered a latter rather than a primary, or life extending alternative. Thus, targets for R8 and R9 are desired to be reduced to the physiological/baseline level to be able to keep upstream (more powerful) strategies in R0 to R7 that preserve product and material value for longer periods of time.
The study results show that there are opportunities for the strategies, Reuse (R3), Repair (R4), Refurbish (R5), and Remanufacture (R6), to prolong product lifespans and value. While the targeting of Repurpose (R7) is difficult, strategic targeting in this space could sit alongside life extension for those items that are not candidates for refurbishment or remanufacture. This study also advances a new list of targets that directly

refer to both mid-loop strategies and to early-stage, preparatory strategies: Refuse (R0), Rethink (R1), Reduce (R2). These new targets are potent regulatory instruments that can support systemic circularity improvements and speed up CE transitions at various levels. Crucially, these CE targets (objectives) should not be seen as isolated from one another; instead, they constitute an inter-linked suite of objectives whereby it may be possible that trade-offs, synergies, or complementarities arise. For instance, low targets for recovery and recycling can be successfully counteracted by ambitious targets for reuse and lifetime extension. Targets oriented to Reduce, Rethink and Refuse are enablers to the other CE strategies, with Rethink design and innovation-oriented targets being a crucial factor in driving the systemic change along the CE continuum. Although it is unrealistic to achieve the maximum of all targets at once because of different conflicting technical or economy barriers; the combined R-strategies proposed presents various flexible options which will, collectively, contribute toward 214 making the overall system a more resilient and circular economy system (Mohd Firdaus *et al.*, 2025).

Further studies are warranted to extend the understanding of the target contingencies within industries, product types, and organisational forms (Chabowski *et al.*, 2025). Follow-up empirical research is required to in turn validate, fine-tune, and optimize such targets in practice. In addition, it shall be of utmost relevance to further investigate the interfaction explanations toward incorporating targets in innovation policy, product life extension incentives and full policy mixes that are required to unlock effective roadmaps toward circular economies. Ultimately, as a transformative policy agenda, CE needs targets that are well-designed, but also strategically connected in ways that can drive effectual change. Setting ambitious targets requires strong programmatic and decision-making frameworks to ensure that our aspirations in the circular economy are realized in quantifiable, sustainable ways that go beyond just the recovery and recycling of materials.

## CONCLUSION

This study emphasizes the required change in the strategic targeting of the circular economy (CE), surpassing the recovery (R9) and recycling (R8) legacy. As these tactics will continue to be needed, they must become tools of last resort, with reducing targets for the most inevitable of waste streams. More focus is needed on upstream and mid-loop strategies (Refuse R0, Rethink R1, Reduce R2, Reuse R3, Repair R4, Refurbish R5, Remanufacture R6 and Repurpose R7) that maximize the value of products and extend their life. Establishing specific, quantitative, and context-based expectations across all 10R strategies will serve to catalyze systemic transformation, spur innovation and develop a robust circular economy. Next generation work and policy ought to be directed toward honing these goals and norms, and integrating them into cohesive, harmonized visioning structures that help guide CE transitions in meaningful, supportable terms.

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